Ultra 300 User Manual

www.linortek.com

Preliminary

For Ultra 300 Ethernet I/O Controller with Various Software

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Contents

LINORTEK ONE-YEAR LIMITED WARRANTY

Consumer law: For consumers who are covered by consumer protection laws or regulations in their country of residence ("Consumer Law"), the benefits provided in this Linortek One-Year Limited Warranty ("Linortek Limited Warranty") are in addition to and not instead of the rights provided by Consumer Law and it does not exclude, limit or suspend your rights arising from Consumer Law. You should consult the proper authorities in your country of residence for further information about these rights

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The foregoing warranty is subject to Buyer's (i) prompt written claim and (ii) timely provision to Linortek of an opportunity to inspect and test the Product claimed to be defective. Such inspection may be on Buyer's premises and/or Linortek may request the return of the Product at Buyer's expense. However, Linortek shall not be responsible for packing, inspection, or labor costs in connection with the return of Product. No Product shall be accepted for warranty service that is not accompanied by a Return Merchandise Authorization number (RMA#) issued by Linortek.

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Disclaimers

1. Read Instructions – Read all the safety and operating instructions before operating the product.
2. Retain Instructions – Retain the safety and operating instructions for future reference.
3. Heed Warnings – Adhere to all warnings on the product and in the operating instructions.
4. Follow Instructions – Follow all operating and use instructions.
5. Cleaning – Unplug the product from power before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning the enclosure only.
6. Attachments – Do not use attachments unless they are specifically recommended by Linortek. Using incompatible or otherwise unsuitable attachments can be hazardous.
7. Accessories – Do not place this product on an unstable stand, tripod, bracket, or mount. The product may fall, causing serious injury to a person and serious damage to the product. Use only with a stand, tripod, bracket, or mount recommended by the manufacturer, or sold with the product. Follow the manufacturer's instructions when mounting the product, and only use mounting accessories recommended by the manufacturer. Be cautious when using an appliance and cart combination. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.
8. Ventilation – Openings in the enclosure, if any, are provided for ventilation and to ensure reliable operation of the product and to protect it from overheating. Do not block or cover these openings. Do not place this product in a built-in installation unless proper ventilation is provided or the Linortek's instructions have been adhered to.
9. Power Sources – Operate this product only from the power source type indicated in the instruction manual or on the product label. If you are not sure of the type of power supply you plan to use, consult your appliance dealer or local power company – provided that use of any power source type other than indicated in the instruction manual or marking label will void any warranty. For products intended to operate from battery power, or other sources, refer to the operating instructions [included with the product].
10. Grounding or Polarization – This product may be equipped with a polarized alternating-current line plug (a plug having one blade wider than the other). This plug will fit into the power outlet only one way. This is a safety feature. If you are unable to insert the plug fully into the outlet, try reversing the plug. If the plug still fails to fit it is because your outlet is incompatible with the plug. Contact your electrician to replace your outlet with one that is compatible. Do not force the plug to fit into an incompatible outlet or otherwise try to defeat the safety purpose of the plug. Alternately, this product may be equipped with a 3-wire grounding-type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. Do not force the plug to fit into an incompatible outlet or otherwise try to defeat the safety purpose of the plug. If your outlet is incompatible with the plug, contact your electrician to replace your outlet with one that is compatible.
11. Power-Cord Protection – Route power supply cords so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords and plugs, convenience receptacles, and the point where the cords exit from the appliance.
12. Power Lines – Do not place an outdoor system anywhere in the vicinity of overhead power lines or other electric light or power circuits, or where it can fall into such power lines or circuits. When installing an outdoor system, use extreme care to keep from touching such power lines or circuits as contact with them might be fatal.
13. Overloading – Do not overload outlets and extension cords as this can cause fire or electric shock.
14. Object and Liquid Entry – Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short-out parts which can cause fire or electric shock. Never spill liquid of any kind on the product.
15. Servicing – Do not attempt to service to this product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing of the product to Linortek.
16. Damage Requiring Service – Unplug the product from the outlet and refer servicing to Linortek Customer Support under the following conditions:

a. When the power-supply cord or plug is damaged.
b. If liquid has been spilled, or objects have fallen onto the product.
c. If the product has been exposed to rain or water.
d. If the product does not operate normally by following the operating instructions [included with the product]. Adjust only those controls that are covered by the operating instructions, as an improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to its normal operation.
e. If the product has been dropped or the cabinet has been damaged.
f. If the product exhibits a distinct change in performance.

17. Replacement Parts – If replacement parts are necessary, have a Low-Voltage Electrician replace them using only part specified by the manufacturer. Unauthorized substitutions may result in fire, electric shock or other hazards. Replacement parts can be found at https://www.linortek.com/store/
18. Safety Check – Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in proper operating condition.
19. Coax Grounding – If an outside cable system is connected to the product, be sure the cable system is grounded. U.S.A. models only–Section 810 of the National Electrical Code, ANSI/NFPA No.70-1981, provides information with respect to proper grounding of the mount and supporting structure, grounding of the coax to a discharge product, size of grounding conductors, location of discharge product, connection to grounding electrodes, and requirements for the grounding electrode.
20. Lightning – For added protection of this product during a lightning storm, or before leaving it unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the cable system. This will prevent damage to the product due to lightning and power-line surges.
21. Outdoor Use – This product is not waterproof and should not be allowed to get wet. Do not expose to rain or other types of liquid. Do not leave out-of-doors overnight as condensation may occur.
22. While changing batteries, fuses or handling a board level product be careful of electrostatic discharge which can damage electronic devices. It is best to use a grounded electronics service bench. If this is not available you can discharge yourself by touching a metal appliance or pipe. While changing the batteries or fuses do not touch i) any wires other than the battery wires and ii) the printed circuit board.

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Unless specifically stated, our Products are NOT designed to switch line voltage (110V and above) devices. To control device that operate at line voltages a qualified electrician MUST install an intermediary device such as a relay. When choosing devices to control, it is best to select low voltage controls such as a 24VAC solenoid to water flow control. Only qualified electricians may wire a line voltage device. Additionally, local codes must be followed including but not limited to wire gauge size and suitable housing. Linortek assumes no responsibility for harm to the user or third parties for improperly using our Products. This liability remains with the user. Linortek assumes no responsibility for damage to the device due to improperly using our Products.

RELAY VOLTAGE SPECIFICATIONS

Please use caution when connecting devices to electrical circuits or other equipment. This web controller is NOT designed to connect to any voltage greater than 48V. If you want the product to control Line Voltage products and devices, refer to Diagram 1 below. Utilizing this arrangement, should allow you to virtually control anything. It is important that you use licensed electricians and comply with electrical codes that are applicable to your location. These codes exist for your safety, as well as the safety of others. Linortek assumes no responsibility for any harm or damage resulting from a failure adhere to local laws, ordinances or regulations or failure to follow specified instructions for installation and product usage.

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10. Notices.

Linortek may provide any notice to you related to this EULA using the email and address that you provided when you registered with Linortek.

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To be effective, any and all waivers by Linortek hereunder must be in writing and signed by an authorized Linortek representative. Any other failure of Linortek to enforce any term hereunder will not be deemed a waiver.

12. Severability.

Any provision of this EULA that is found to be unenforceable will be edited and interpreted to accomplish the objectives of that provision to the greatest extent possible under applicable law and all remaining provisions will remain in full force and effect.

13. Governing Law; Venue.

You agree that this EULA, and any claim, dispute, action, cause of action, issue, or request for relief arising out of or relating to this EULA, will be governed by the laws of the state of North Carolina, U.S.A., without regard to conflicts of laws principles, provided that if you reside in a country that will not apply U.S. law to disputes related to these terms, then the laws of your country will apply. You also agree that the United Nations Convention on Contracts for the International Sale of Goods shall not apply. You agree that regardless of any statute or law to the contrary, any cause of action against us arising out of or related to the Linortek website, the Software or the Linortek Products must commence within one (1) year after the cause of action accrues or such cause of action shall be permanently barred. Any action or proceeding relating to this EULA must be brought in a federal or state court located in Raleigh, North Carolina and each party irrevocably submits to the jurisdiction and venue of any such court in any such claim or dispute, except that Linortek may seek injunctive relief in any court having jurisdiction to protect its intellectual property.

This Product may expose you to traces of chemicals including lead which is known to the state of California to cause cancer or birth defects or other reproductive harm. For more information, visit www.p65warnings.ca.gov

Getting Started

Thank you for purchasing the Linortek ITrixx-Ultra 300. The Ultra 300 is an IoT controller and run-time meter. The Ultra 300 is equipped with two meters on the software that you can use to track equipment usage or uptime/downtime or as a counter.

The Ultra 300 is the latest development of Linortek web-enabled I/O controller with MQTT protocol, hardware-based encryption, supports HTTPS connections, encrypted email servers, CAN interface, increase in RAM and FLASH memories.

The Ultra 300 is equipped with two digital inputs (5-24VDC), two analog inputs (AC), two relay outputs, CAN interface and built-in web-based software. All of our controllers come complete with all parts and software necessary for installation, operation and ability to control the devices attached to it. Upon arrival, please inspect the contents of the box to ensure that your kit is complete and contains all necessary components.

The iTrixx-Ultra 300 will be referred to as SERVER, and the hour meter as METER hereafter. When there are differences or additional features they will be noted in the text.

For instructional videos, FAQ's and contact information for our technical support team, please visit:
https://www.linortek.com/technical-support

PRODUCT CHECKLIST – Each product kit box contains the following:

____One Ultra 300 SERVER

____One 12VDC Power Supply

____One USB C to 12V Jack

____One CAT5 Patch Cord

____One DIN Rail Mount Clip (Not Included for Netbell Software)

____ Quick Setting Instructions (May Vary Depending on Software)

____One 2.2k Resistor Kit (For Hour Meter Software Only)

The SERVER is designed to be integrated into existing equipment. Installing your SERVER will involve tapping circuits on the equipment you intend to monitor.

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FURTHER NOTICE FOR LIMITATION OF USE

Unless specifically stated, this product is NOT designed to switch line voltage devices. This limitation includes all of Linortek products. To control device that operate at line voltages the user MUST install and intermediary device such as a relay.

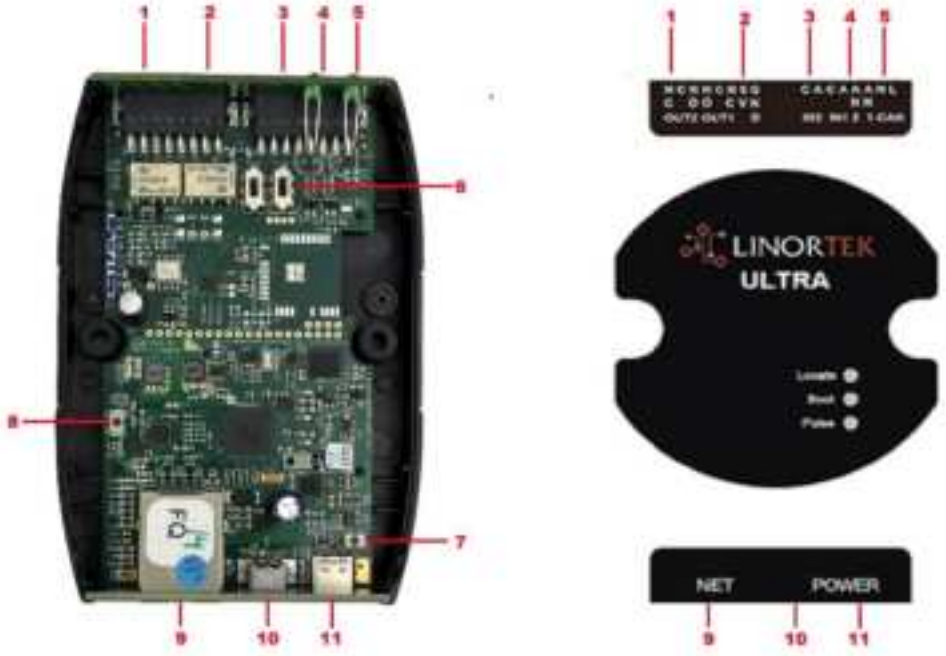
When wiring a line voltage device using intermediary device, you MUST either be a qualified electrician or use the services of a qualified electrician. Additionally, local codes must be followed including, but not limited to, wire gauge size and suitable housing.

Linortek cannot assume any responsibility for harm to the user or third parties for improperly using our Fargo product. This liability remains with the user. Linortek cannot assume any responsibility for damage to the device for improperly using our SERVER product.

Wiring the Server

Note: For a diagram showing the location of all connectors on your SERVER referenced in this section, please see the **Board Layout Reference** below.

Board Layout Reference



1. Relay outputs: 2 relay outputs, signal relay, 1 Form C, 1A @ 30VDC, #2 on the left
2. Voltage output: This is used to drive external devices such as a sensor. The voltage supplied depends on what power source is used to power the ULTRA SERVER. (Gives max 12V even if it's driven with POE)
3. Digital inputs: 2 digital inputs, 5VDC-48VDC (24VDC-48VDC must use the external resistor), #2 on the left
4. Analog inputs: 2 analog inputs, isolated, #2 on the left
5. CAN inputs (software not yet implemented)
6. Digital input switches: IN2 on the on the left; Up position – Pull-up (PU), Down position - Isolated (ISO)
7. Reset button
8. Reload button
9. RJ 45 connector
10. USB mini connector for temperature/humidity sensor (Sold separately)
11. Power input 5VDC-24VDC

Caution: These units are ground isolated. Always connect so that power loop is only connected to the SERVER unit. Do NOT use external ground connections. Doing so may damage the SERVER or POE originating device.

Power Connection

The SERVER power input is a Micro USB connector and marked as POWER on the enclosure. Connect the 12VDC power supply to a suitable AC outlet and connect the barrel connector into the Micro USB connector, plus the other side of the USB connector to the SERVER at the location labelled POWER, or you can use a USB cable to connect it to your computer to power it on and find out the IP address from your network. Alternatively, you may also use POE. At this point the GREEN/Boot LED should come on and start flashing indicating the SERVER is operating and is in the "Bootload Mode". This mode allows the user to update the server software that is used on the unit. After about 5 seconds, the GREEN LED

will go off and the RED LED will start blinking once per second indicating the SERVER is operating in "Server Mode" and is accessible on a network utilizing TCP/IP protocols.

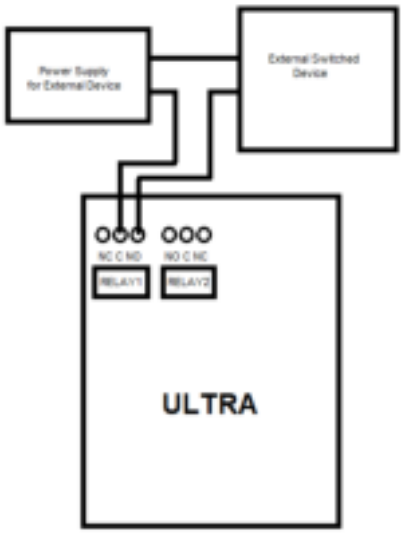
Network Connection

Plug the Ethernet cable into the NET connector, the “Connection" LED on the Ethernet connector side will come on if you connect to network switch and a 100MHz network is available, otherwise it will remain off and the "Activity" LED should start blinking indicating network activity.

CAUTION: WHEN YOU USE POE NETWORK SWITCH, DO NOT USE THE 12VDC POWER SUPPLY TO POWER THE SERVER AT THE SAME TIME, IT WILL DAMAGE THE BOARD.

Relay Connection

The SERVER has 2 signal Relays (1 Form C, 1A @ 30VDC) with push-in spring connectors and are simply numbered OUT "1" and "2". These are dry contact relays. The Ultra 300 units are designed for only low voltage control and should not have a voltage applied to the relay greater than 30 volts. This is for your safety as well as to stay within the parameters of the parts and circuit board design.



The relays have 3 terminals labelled NO, C and NC which stand for Normally Open, Common and Normally Closed. When activated, the relay moves the connection from C-NC to C¬NO. If you want to make a connection when the relay is activated, connect your wires between C and NO. When the relay is activated C and NO will be connected together. If you want to break a circuit when the relay is activated, make your connections to C and NC. When the relay is activated, the circuit will be broken (or open)

Note: To operate high-power bells or buzzers, please use a 12/24VDC step relay for each output channel. This will ensure safe and reliable switching without overloading the controller.

Voltage Output Connection

The SERVER has a voltage output that can be used to drive external devices. The voltage depends on what power source is used to power the ULTRA SERVER. When USB is used the voltage out is 5V, when POE is used it's 12V out, when an external power supply is used it is the same voltage as the power supply. There is always a small voltage drop and it is limited to 50mA. This is useful when using the output to trigger a relay, or power a sensor. Wire the positive side of your external device to the "Voltage/+" terminal, negative to "GND" terminal if needed.

Digital Input Connection

There are two digital inputs on the SERVER with push-in spring connectors, labeled as IN1 and IN2 on the enclosure. Each input has 2 terminals, marked as C A [C-cathode (-), A-anode (+)].

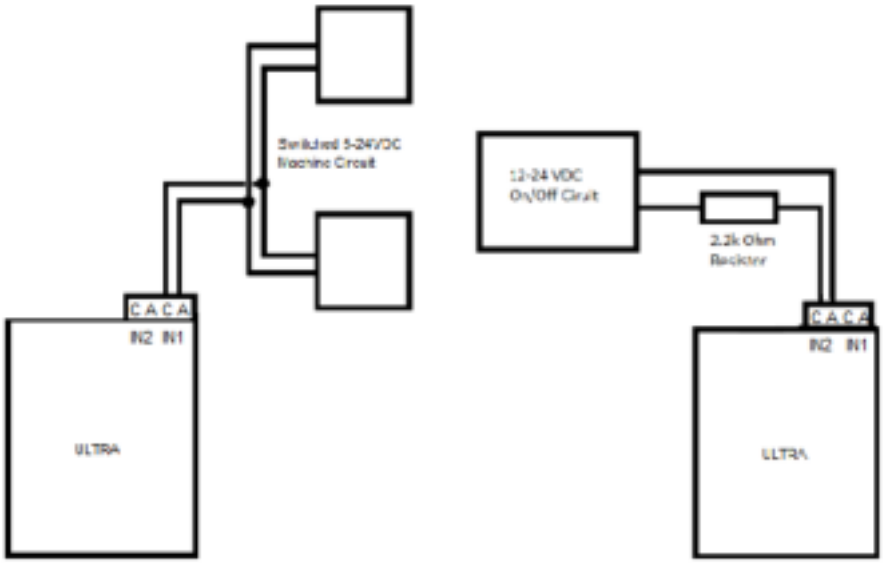
The digital inputs allow the SERVER to detect an external on/off state of a sensor. With this information the SERVER can display whether an input is on or off, count events in a resettable or non-resettable counter, and calculate the frequency (such as for use as a tachometer) or the period of the input. There are two modes of operation for the digital inputs - **PULL UP** and **ISOLATED**.

- **PULL UP** mode connects a 1K resistor to an internal voltage allowing you to use a simple switch (such as a magnetic door switch) across terminals 1 and 2. This when the switch is activated a signal is sent to the input.

- **ISOLATED** mode allows you to directly drive the Ultra's optoisolator with an external voltage though an internal 1K resistor. This voltage may be in the range of 5V to 24V supplying a minimum of 2mA or a maximum of 30mA to the optoisolator diode. There is no other internal connection to this voltage so it is an isolated input.

These modes are selected by the switch on the SERVER (see **Board Layout Reference**), put the switch to down position for ISO and up position for PU. These are set at the factory to ISO (down) by default.

Caution: If you intend to use isolated mode, verify input switch is set to ISO before applying an external voltage. Doing otherwise may damage the Ultra or POE originating device.

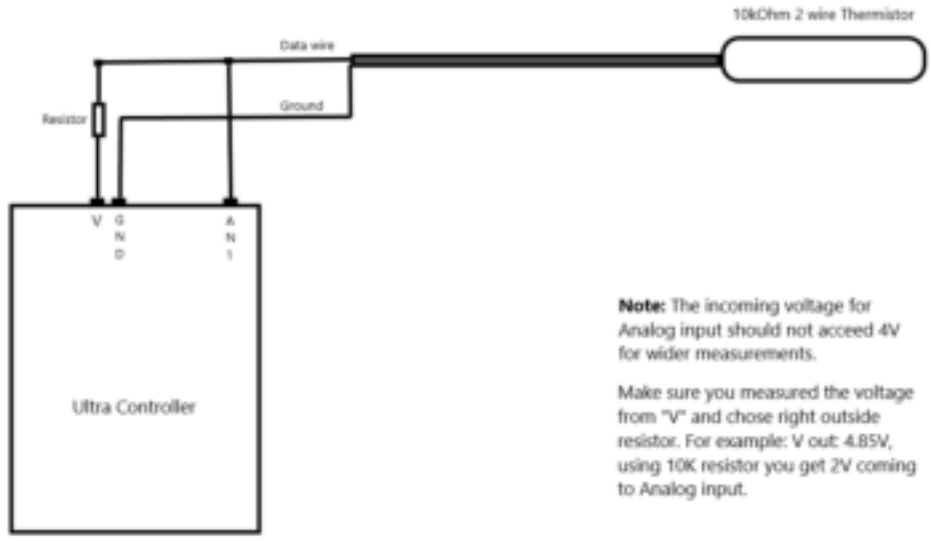


Analog Input Connection

The analog inputs allow the SERVER to read the value of external equipment. There are 2 analog inputs on the SERVER with push-in spring connectors, labeled as AN1 and AN2 on the enclosure. Each input has 1 terminal. To wire a 2-wire analog sensor to the server, wire the data wire to the analog input and power source if needed, ground wire to GND terminal. If your analog sensor comes with 3 wires, wire the data wire to the analog input, ground wire to GND terminal, power wire to the Voltage/+ terminal.

The 2 analog input terminal blocks are connected to non-isolated 0-5V current sensors which may be connected to a variety of devices such as temperature or pressure sensors. The SERVER provides a ground and power connection so that measurements can be made without external voltage references. You should use a sensor that is isolated so that it makes no connection to a remote ground.

Connecting Analog Thermistor to Ultra 300 schematic:



Activate the Meter (for Hour Meter Software Only)

The iTrixx Hour Meter software has two separate hour counters with independent triggers. The hour counters may be activated in a number of different ways.

1. In the simplest setup the METER may be activated whenever power is applied to the unit. In this case, if the SERVER is on, it is counting. A voltage threshold is provided so the SERVER may stop counting as power is lost to prevent memory corruption. In this way, you only need to connect the SERVER to the same power source of the equipment you wish to collect running data, no other wiring required.

2. Digital input or analog input: If your machine has a 5-24VDC circuit, you can tap this circuit and connect to the digital input of the hour meter to turn counting on and off. Or connecting a sensor (5-24VDC) to one of the inputs to detect an external on/off state of the equipment to activate the meter.

3. Alternatively, it can be configured to follow one of the relays such that when the relay is activated the SERVER will count. There are two relay outputs and are simply numbered "OUT1" and "OUT2" on the SERVER. These relays are dry contact relays, normally open/normal close options.

Most common use case is to wire a sensor to a digital input to the same power source of your SERVER to trigger the meter, so when your equipment is on, the meter is counting.

Accessing the SERVER

Once your SERVER is powered on and connected to the network, it will automatically obtain an IP address via DHCP as long as your router is configured to do so. To connect, enter the IP address into your web browser. This will take you to your SERVER's landing page. To log in, click the **Log In** button on the top right of the page. Your browser will prompt you to enter your username and password. By default, these credentials are both set to **admin**. To find your Ultra's IP address, see below.

Finding your IP Address with Linortek Discoverer

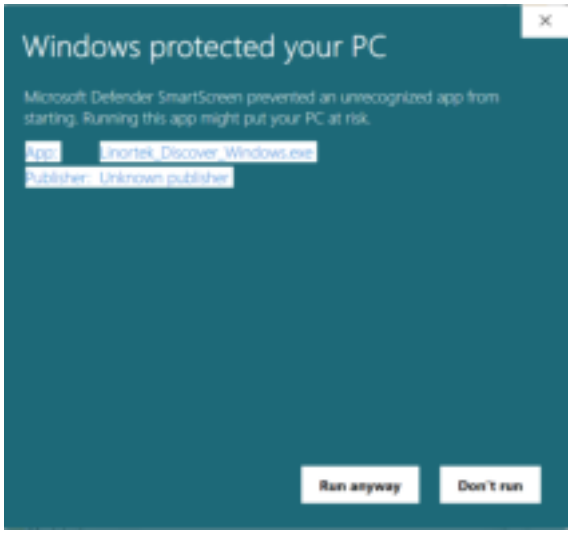
We have developed two types of Discover apps to help our customers find the IP address on the network:

- Our upgraded Discover app, developed for Windows PC and Android phones
- A Java-based app that can be used on all types of computers, as long as your computer has Java runtime installed.

If you are using a Windows computer, we strongly recommend using the upgraded Discover app.
To download the Discoverer program, please go to: https://www.linortek.com/downloads/support-programming/.

- **Linortek Discover for Windows**

The program you download from our website is a zip file, you will need to extract the file first after downloading. After extracting the zip file, you will see a file called "Linortek_Discover_Windows.exe", double click the file, you will most likely to see a popup window stating that "Windows protected your PC, Microsoft Defender SmartScreen prevented an unrecognized app from starting. Running this app might put your PC at risk." with a "Don't run" button. You need to click **More info**, the app name, publisher information will display, click **Run anyway** to open the app, it won't harm your computer.

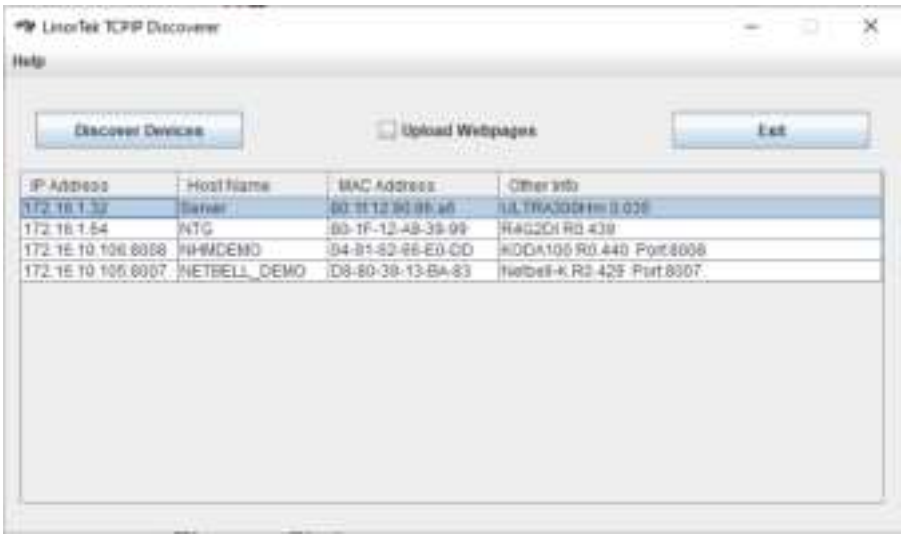


Alternatively, you can download the Java-based Discover program if you believe you have the Java runtime installed on your PC.

- **Linortek Java-Based TCP/IP Discoverer**

The Linortek TCP/IP Discoverer is a program that will automatically locate your Ultra300 server. Because discoverer is a Java program, Java runtime needs to be loaded to use this feature. Java can be found here: https://www.java.com/en/download/.

When downloading the Java Discoverer program, sometimes you will see a popup warning message depending on your browser security settings, asking if you want to keep or discard this file, please click the Keep button as this is a Java program, it won't harm your computer.Once Discoverer locates your device, it will display:

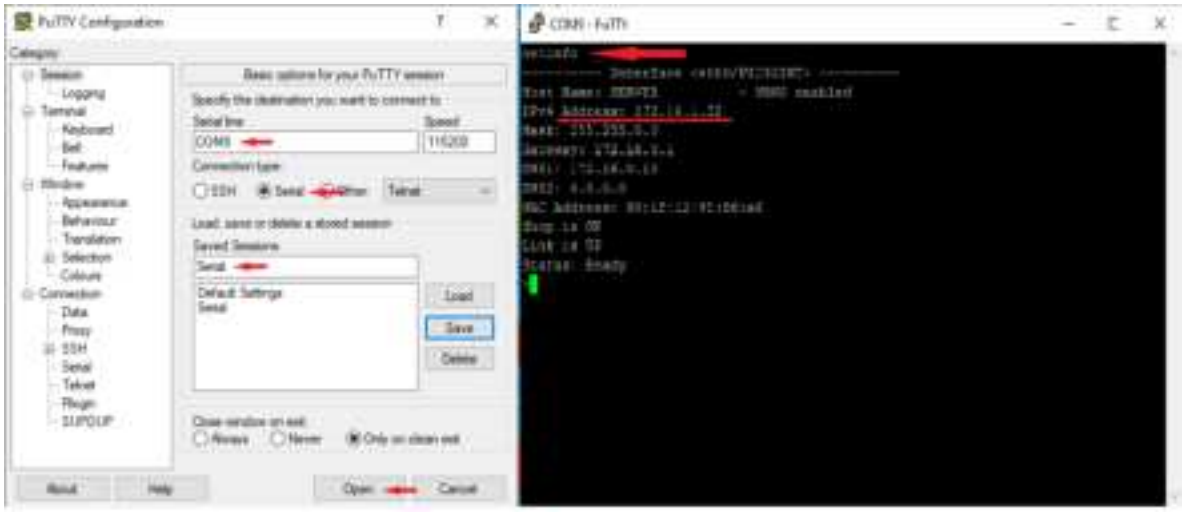


- IP Address
- Host Name
- MAC Address
- Other Info:
  - Blue LED (if it's ON)
  - Product name
  - Server Software Revision
  - Port Number (If ported)

Click the device you want to use shown on the Discoverer program to launch the SERVER's web pages in your browser. Click the Login button on the homepage. **Default username/password is: admin/admin.** You may change these as you desire or disable this feature in the settings menu.

Finding the IP address by connecting to USB port on Your PC

If there is no way to run The Discoverer app you can find the SERVER's IP address using any terminal emulator. Connect your SERVER to the USB port on your PC using Device's 'POWER' input. Open any terminal emulator you prefer and set your COM port to Serial (You can find your COM port number under Device Manager), open the window and type **netinfo** command. You will get your Ultra's IP address.



Connecting your SERVER directly to Your PC

You can also plug your SERVER directly to your PC in the case there is no network connection available. If you plug your SERVER to your PC's Ethernet port it will use the default IP address: **169.254.1.1** unless you have previously configured your SERVER to use a static IP. Enter **169.254.1.1** into your web browser to connect. No internet connection required. Once configured, you can then install your Ultra 300 where desired.

Software Configuration

Landing Page

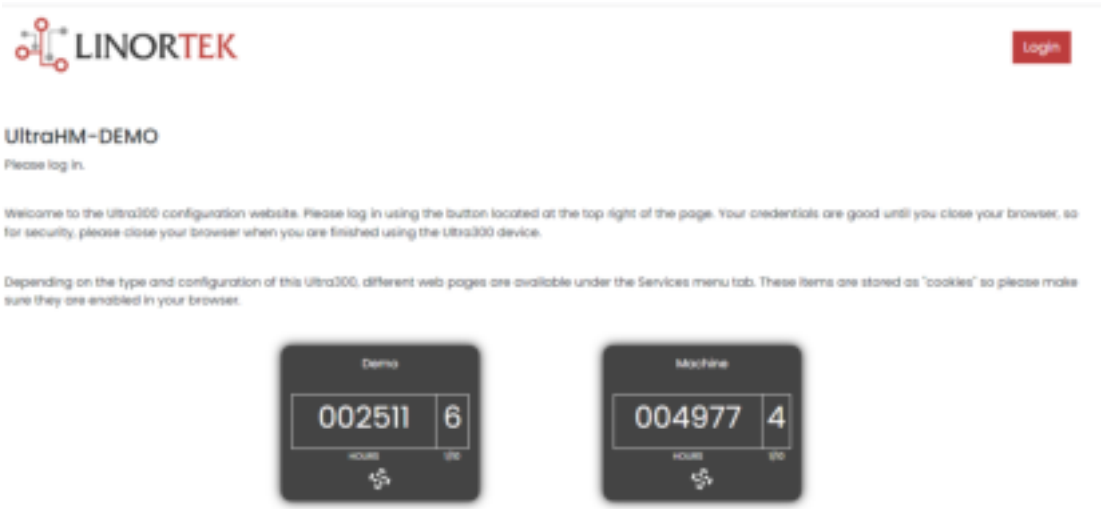
Once you have entered the IP address and port number, if set, the Landing page will open. This page shows the SERVER name of this server which you may change in **Configure/Network Config** page.

This page is static with no background activity and is a useful place to park if you are not using the SERVER and do not want to close the connection.

By pressing **LOGIN,** you will be asked for your username and password, the default username/password is **admin/admin**. These credentials will be retained by the browser until the browser is closed. You can disable the password requirement in **Settings – User and Admin Credentials** page.

Landing Page (for Hour Meter Software)

If you purchase an Ultra 300 with hour meter software, it has a different landing page from most Linortek devices. In addition to the normally displayed information, this page also displays the data from each of the two meters on your device.



The landing page displays the following settings:

- Two meters: Each Ultra 300 includes two separate hour meters with independent triggers.
- Each meter can record 999999.99 hours, decimal hours with 1/100 hour (you can change it for 1/10 from **Hours** page).
- Running indicator: Spins if all conditions are met and counting hours.

Home

Once your login credentials are entered, you will be redirected to the main page of the application. The Home or Index page displays some of the system information and offers the ability to locate the physical device if it is in an area with others. See list below for description.

- **TIME** - Displayed along with the day of the week. This time may be set to be in a 12-hour format with AM/PM indicator or 24-hour format.
- **DATE –** Current date is displayed here.
- **VOLTS** – Voltage at the board is displayed. This may be useful if the SERVER is powered along with other equipment, voltage variance can be noted. The SERVER have an input voltage range of 12-24VDC or POE
- **TEMPERATURE** – Temperature on the board is displayed. This display may be either °C or °F. This temperature will be affected by the heat generated by the SERVER itself so it will always be slightly higher than ambient temperature.
- **LEDs** - There are 3 LEDs displayed. The RED LED is the system pulse. This should blink about once per second as long as the server is running. The GREEN LED is used for bootloader options and is generally not visible on the website. The BLUE LED is clickable and you can turn it on and off from this web page. This is useful for locating the device physically should it be in use with other similar units as it will illuminate on the unit to which this web browser is connected. The Discoverer program will also note if the BLUE LED is on. This is often referred to as a "Locate" function.

Services

In/Out Page

The Services tab is dynamic and will change depending on the configuration of your server. This is where you can control the inputs, outputs, sensors and other specialty controls.

Depending on which SERVER you are using the first page on the SERVICES tab will be either **In/Out** or **Relays**., while **Relays** only has the relay controls.

Select **Services – In/Out**, the **In/Out** page is displayed below. The **In/Out** page has the relay controls and the input controls on one page. The Ultra 300 SERVER has two relay outputs, two digital inputs and two analog inputs. The relay is named as Relay 1 and Relay 2, digital input is named DIN1 and DIN2, analog input is named AN1 and AN2, you can change the names as desired.

Relay Control

On the **In/Out** page, the first section is the **Relay Control,** here you can set the relay property based on your application. Each relay has a number, in this case 1 to 2.

The **State** LED show whether the relay is on or off indicated by GREEN and RED respectively. This icon is clickable to manually control the corresponding relay. Each relay can have a Name as well as identifiers for the Normally Open, Common and Normally Closed connections.

There are four status LEDs that show:

- **Email** – If an email is to be sent when this relay is switched on and off
- **Pulse** – If this Relay is set with a pulse width and pulse width multiplier (duration) – see next section for more information
- **Sched**. – If there is schedule created in the **Tasks** page set to automatically trigger this relay.
- **Timed** – If pulse is set and this relay is activated, the **Timed** LED will turn red showing the relay is currently operating on a timer.

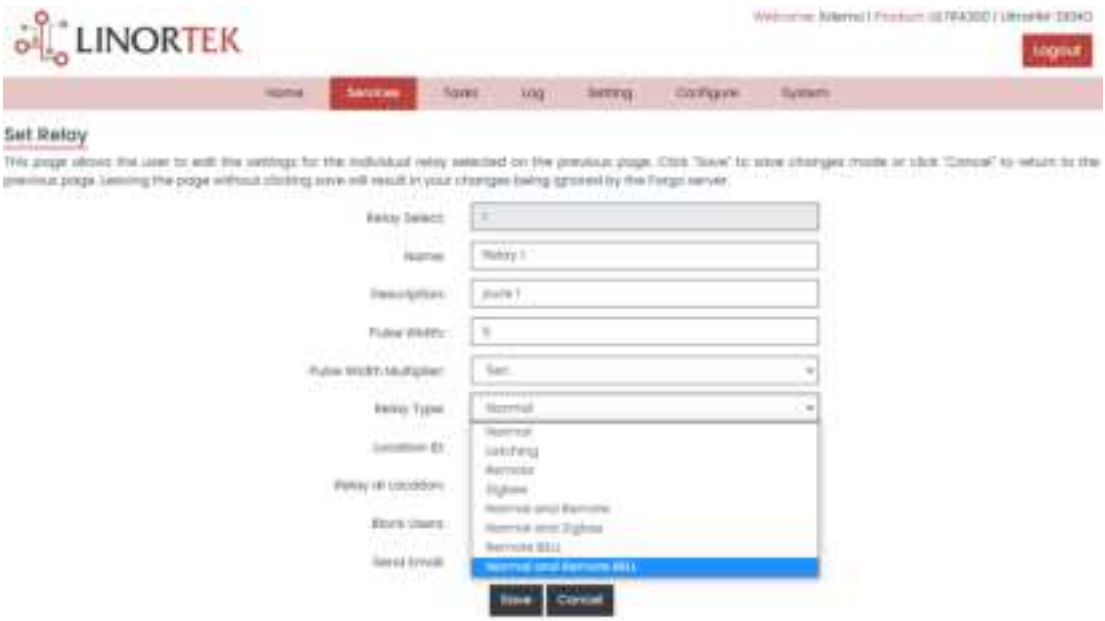
Click the **Edit** Icon to edit the controls for the corresponding relay. This will take you to the **Set Relay** page.

Set Relay

The SET RELAY page allows you to set various properties pertaining to the Relay.

- **Relay Select** - The Relay that you are editing is identified by the line on which you clicked the Edit icon on the RELAY page.

- **Name** - Enter a 15-character Relay Name (Use numbers and letters only, no special characters). This and the following 3 fields may be used for any identify information desired.
- **Pulse Width** - When you control the relay it turns on or off. You may control it for a timed turned on period by entering a Pulse Width when 0 means there is no timed event and a number represents duration of the pulse. The maximum number you can enter here is 4 digits, i.e. 1234.
- **Pulse Width Multiplier** - To further define the pulse length select a Pulse Width Multiplier to further define the pulse width. You can select:
    - **None**
    - **mS** (Millisecond, 1/1000 second)
    - **Sec** (Seconds)
    - **Min** (Minutes)
- **Relay Type** - the SERVER can access relays physically on the SERVER or using other means. You may select:
    - **Normal** - relay physically on the SERVER
    - **Latched** - not currently supported
    - **Remote** - a relay on another Linortek device access over the network
    - **Zigbee** - a relay at a remote device access over an RF system
    - **Normal and Remote** - both relays activated
    - **Normal and Zigbee** - both relays activated
    - **Remote BELL** – to turn on a bell at remote location (for Netbell software only)
    - **Normal and Remote BELL** – to turn on both local and remote bells (for Netbell software only)
- **Location ID** - this is a number identifying a remote location
- **Relay at Location** - a number representing the relay or device at the Location
- **Send Email** - the SERVER can be programmed to send an Email if the relay is turned on or off.



4 Relays (for Bell Software)

There are only 2 physical relays on the Ultra 300 controller. But we have enabled two additional virtual relays to make the Ultra 300 to be able to control extra slave controllers if needed. To access the 4 relays, go to **Services – 4 Relays**. To configure the virtual relays, please follow the Relay Control setting instructions in previous step.

Inputs

The **In/Out** page will display information from each input, at here you can set the inputs data based on your application.

At the top of each input is a label (ex: **DIN 1, AIN 2**) specifying whether it is a digital input (DIN) or analog input (AIN) as well as the input number. This label will turn green when the input is enabled. Inside the Box will be any display configured from the **Set Input** page (see the pages below for the input setting details). A red dot in the lower-left corner indicating the state of a linked relay (if any), will turn green when the linked relay is activated. Finally, an **Edit** icon in the lower-right corner of the box to edit the corresponding input. This will take you to the **Set Digital Input** or **Set Analog Input** page.

Set Digital Input

The Digital Inputs can be set to provide various readouts on using a range of display types. In addition to displaying the input data, you can name the display as well as associate a relay with it. This relay will change from Green to RED as it goes from on to off as well as is clickable to control it. By clicking on the edit pencil icon, you can edit the settings for this input:

- **Digital Input Selected** - The Digital Input that you are editing is identified by the line on which you clicked the Edit icon.
- **Name** - You can set a 15-character name (use numbers and letters only, no special character) for this input. This name goes in the bar at the top of the display.
- **Label** - Set a 7-character label which is displayed on the actual active display.
- **Corrector** - Using this field you can add, subtract, multiply, or divide a value before the value is shown on the display page. This is a 2-value corrector with each being separated by a single space character. (ie. "+2, -2, *3, /3")
- **USE** - Set this input to active. Turns the input number indicator to green. It should be noted that when in use the input consumes CPU time and other resources depending on its type. Although all inputs may be active at the same time, it is recommended to turn on only those you want to use.
- **Type** - The input data can be used to calculate a range of results. You may select:
    - **State** - This is useful for knowing if an input is on or off, like a door switch being on or off.
    - **CounterNR** - This is a non-resettable counter.
    - **CounterR** - This is a resettable counter.
    - **Frequency** - Counts the frequency of an input in KHz (kilo hertz or1/1000 seconds). This could be useful in displaying a tachometer where 60Hz = 1 R.P.M.
    - **Period** - in 1/1000 seconds an input in kHz (milliseconds or1/1000 seconds). This would be useful for measuring timed events.
- **Display** - This selection lets you change the display type used. You can select:
    - **Dot** - A single dot with the value in the middle. This can be used for State. You can make a dumb indicator by changing the color of the Dot based on the value. The label is under the Dot.
    - **Values** - Displays the Corrected Value with the Label in a box directly below it.
    - **Meter** - This Meter has configurable scale based on the Min/Max values and arcs can be colored per the Color ranges. The Label is displayed within the Meter.
    - **VBar** - Also based on the Min/Max values for the scale and the bar changes color based on the values in the Color ranges.

- **Relay L/T** - Enter a Relay number here. If it is a local relay, it will show Green or RED depending if it is on or off. By clicking on it the relay will turn on and off. The name comes from the relay settings page. This may be useful if you want to turn the subject of a display on and off. Any relay can be used on any input and each may be reused for any other input. Adding an L after the relay number (ex: 2L) will link the state of the input to the state of the relay. This is an easy and immediate way to have an input follow the relay. Adding a T after the relay number will trigger the relay to the state of the input. This is an easy and immediate way to have a relay follow the input.
- **Command Z/N/I** - This field is used for issuing various commands to the Digital Input controller: Z - Zero the resettable counter. N - Leave the input as Normal. I - Invert the input.
- **Value** - These are Min/Max values used for the display. This is useful for preventing a Meter from going past its end or setting the value of a VBar. This is the Value after the Corrector. The system cannot display a value past Max so be sure this is at least set to 1.
- **Yellow/Red/Green** - There are three colors that can be used to further define a display. Set the range of these colors to define a color to the display Value. This is the Value after the Corrector. Note that if you are using a State type you may want to assign RED = From 0 to 0, GREEN = From 1 to 1 and YELLOW = From 2 to 2. Since a State is always either 1 or 0 this will prevent ambiguous information and prevent the YELLOW color from being used. You can select any two colors you like for a State type.

Set Analog Input

The Analog Inputs can be set to provide various readouts on using a range of display types. In addition to displaying the input data, you can name the display as well as associate a relay with it. This relay will change from Green to RED as it goes from on to off as well as is clickable to control it.

- **Analog Input Selected** - The Analog Input that you are editing is identified by the line on which you clicked the Edit icon.
- **Name** - You can set a 15-character name for this input. This name goes in the bar at the top of the display.
- **Label** - Set a 7-character label which is displayed on the actual active display.

- **Corrector** - Using this field you can add, subtract, multiply, or divide a value before the value is shown on the display page. This is a 2-value corrector with each being separated by a single space character. (ie. "+2, -2, *3, /3"). **Note**: for Thermistor use T-value (thermistor's resistance), B-value (Betta value), R-value (outside resistor), V-value (voltage). Example: T10000, B3892, R10000, V4.77

- **USE** - Sets this input to active. Turns the input number indicator to green. It should be noted that when in use the input consumes CPU time and other resources depending on its type. Although all inputs may be active at the same time, it is recommended to turn on only those you want to use.

- **Type** - The input data can be used to calculate a range of results. You may select:

    - **Analog 1** - Analog 1 input from a Ultra

    - **Analog 2** - Analog 2 input from a Ultra

    - **AC Current 1** - AC current sensor 1 input from Ultra (AC current sensor connected to AIN1)

    - **AC Current 2** - AC current sensor 2 input from Ultra (AC current sensor connected to AIN2)

    - **AC Current 3** - Not used

    - **Volts** - The measurement of the voltage powering the Ultra.

    - **Current** - This is the current consumed by the Ultra.

    - **Int. Temp** - Temperature from the board mounted sensor.

    - **Ext. Temp** - Temperature from AM2302 Temperature and Humidity sensor (sold separately).

    - **R. Humidity** - % Relative Humidity from AM2302 Temperature and Humidity sensor (sold separately).

    - **MMA X** - The X axis accelerometer data from Ultra.

    - **MMA Y** - The Y axis accelerometer data from Ultra.

    - **MMA Z** - The Z axis accelerometer data from Ultra.

- **Display** - This selection lets you change the display type used. You can select:

    - **Dot** - A single dot with the value in the middle. This can be used for State. You can make a dumb indicator by changing the color of the Dot based on the value. The label is under the Dot.

    - **Values** - Displays the Corrected Value with the Label in a box directly below it.

    - **Meter** - This Meter has configurable scale based on the Min/Max values and can arcs can be colored per the Color ranges. The Label is displayed within the Meter.

    - **VBar** - Also based on the Min/Max values for the scale and the bar changes color based on the values in the Color ranges.

- **Relay** - Enter a Relay number here. If it is a local relay, it will show GREEN or RED depending if it is on or off. By clicking on it the relay will turn on and off. The name comes from the relay settings page. This may be useful if you want to turn the subject of a display on and off. Any relay can be used on any input and each may be reused for any other input.

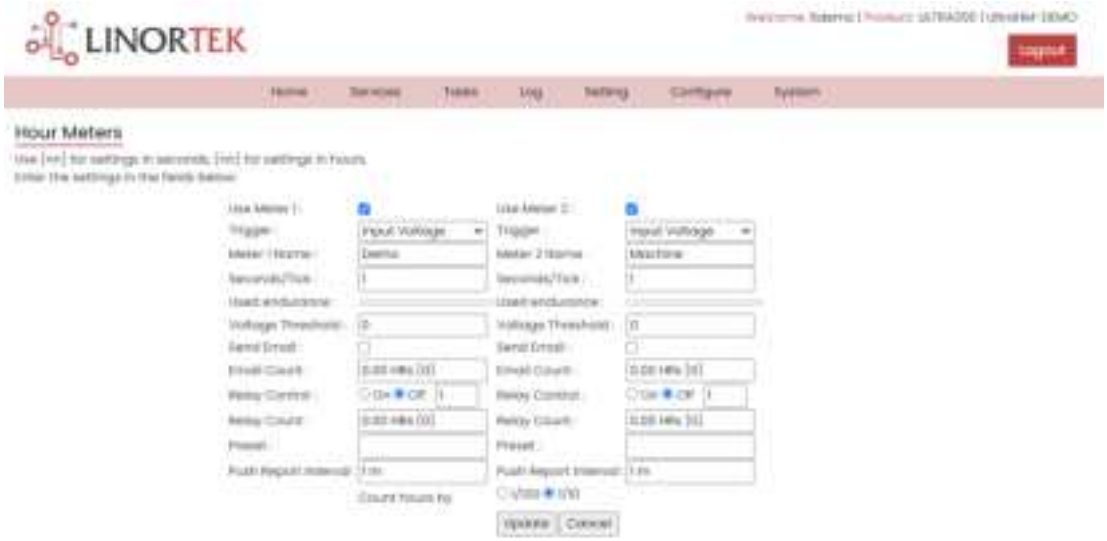
- **Value** - These are Min/Max values used for the display. This is useful for preventing a Meter from going past its end or setting the value of a VBar. This is the Value after the Corrector. The system cannot display a value past Max so be sure this is at least set to 1.

- **Yellow/Red/Green** - There are three colors that can be used to further define a display. Set the range of these colors to define a color to the display Value. This is the Value after the Corrector. Note that if you are using a State type you may want to assign RED = From 0 to 0, GREEN = From 1 to 1 and YELLOW = From 2 to 2. Since a State is always either 1 or 0 this will prevent ambiguous information and prevent the YELLOW color from being used. You can select any two colors you like for a State type.

Hours Page (for Hour Meter Software)

After wiring your SERVER into your equipment and setting your trigger, you now need to activate & configure the hour meter. To reach the Hour Meter page, navigate to the **Services** dropdown menu and select **Hours**. On this page there are two identical columns; one for each hour meter.

1. **Use Meter –** Hour counter will not run unless the "Use Meter" is checked.
2. **Trigger –** The trigger selects the condition to start and stop the counter meter. You can select an **INPUT** or a **RELAY**. If those conditions are met such that the device is ON, the meter will start running. You may additionally select to have the **INPUT VOLTAGE** start the counter. For example, if the SERVER is powered the counter runs.
3. **Meter Name –** Give the meter a name to identify what is being metered.
4. **Seconds/Tick –** The ticks set the counting resolution. The smaller the number the faster the memory is used up. Usually set to 2.
5. **Used Endurance –** Because the number of memory writes is finite, the Endurance indicator gives an idea of the memories condition. It will wear out. (Tick*512*100000 = memory endurance in seconds.)
6. **Voltage Threshold –** The Voltage Threshold condition must be satisfied along with the trigger condition to make the meter count. This is useful to stop the counter should the unit start to lose power. For example: by setting a threshold of 20 volts on a 24-volt system, the Hour Meter will assume that the power is declining and shut off to prevent a counter memory error.
7. **Send Email –** Using the Email checkbox and the Count, the unit will send an email when this value is exceeded. To use the email function, you have to setup the email first. Please refer to Email Setup page for instruction.
8. **Email Count –** Hour meter value to send email notification. This value may be entered in [seconds] or (hours).
9. **Relay Control –** By using a Relay Number and a Count, the unit will activate a relay when the value is exceeded. This is useful for turning on a maintenance light or buzzer on a machine that requires a look.
10. **Relay Count –** Hour meter value to trigger relay. This value may be entered in [seconds] or (hours).
11. **Preset –** The Preset is used to ZERO the meter or set it to any value you like. This value may be entered in [seconds] or (hours).
12. **Push Report Interval –** You can change how often to send the hour report out to the HourCollector App, it's set for 1 minute by default. If you want to change the frequency, you can enter the number here (by minutes).
13. **Count Hours By -** Each meter can record 999999.99 hours, decimal hours with 1/100 hour by default, you can change it to 1/10 if desired.



Bells (for Bell Software)

You can add up to 500 events for each schedule. Please NOTE: Before adding the bell events, make sure to select the schedule first!

To add an event, go to **Services - Bells** page, the add bells section is at the bottom of the page.

Name: 15-character max, no special character

Time: 24hr format (HH:MM:SS)

Date: if selected, the bell **ONLY** rings at this specific time and date, the day of the week is disabled when this feature is used, a date will be displayed instead

Duration: enter a number (1-99) in the duration box and select a length (mS, Sec and Min), this is where you set bell ringing duration for each event, if leave empty, the bell will ring for 1 millisecond by default

Then click **Add** button, your first schedule will show up. Bell 1 and 2, Monday to Friday (M T W T F) are selected by default when you add a schedule. To change the selection, simply click the pip under the Bell or Day, the selected bell/day will show as **GREEN** (otherwise **GREY**).

If you want save a copy of your current bell events, or edit the events to use for other devices/schedules, you can use the Download & Upload function to do so.

Download Bell Events

If you have created bell events for your first schedule, you can download it to a .txt file, then edit & upload to other schedules/devices. To download the bell events, go to Services - Bells page, click the DOWNLOAD button, a new window will open with the events you created, which starts with #Start command.

1. Create a .txt file,

2. Copy and paste the bell events to your text file, please make sure command #Start is copied at the very beginning of the events as it is shown on the download page.

3. Click **Save** after you paste the events.

Edit Bell Events

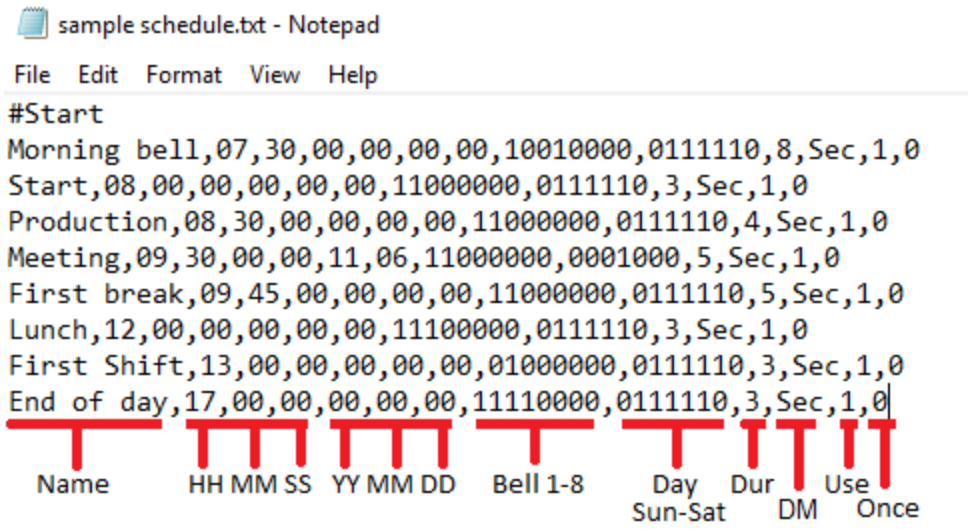
If you want to make any changes to your existing events, you can edit it on the .txt file, and then upload to other schedules or devices.

Understand the Netbell Event Template

1. Your bell template should always start with #START command.

2. The order for the schedules is: NAME (15char max),HH (2-digit,24hr), MM (2-digit),SS (2-digit), YY (2-digit), MM(2-digit), DD(2-digit), BELLS (1-8),DOW (Sunday-Saturday),bell duration(from 1-99),duration multiplier (Ms, Sec, Min),Use(1-digit), Once(1-digit). Seperate the value with comma.

- **NAME:** Use any words for the name, max. 15 characters
- **HOUR(HH):** 2-digit number, 24 hours format. For example, if you want to set a event at 3 clock in the afternoon, you need to set it as 15 in the HH area.
- **MINUTE (MM):**2-digit number.
- **SECOND (SS):**2-digit number.
- **YEAR (YY):** 2-digit number.
- **MONTH (mm):** 2-digit number.
- **DAY (dd):** 2-digit number.
- **BELLS:** the bells you want to schedule, from 1-2 bells (2 physical and 2 virtual bells). Using the value "1" for the bell you want to schedule, put value "0" for not on schedule bell. For example, if you want to schedule all of the bells ringing at certain time. then you BELLS value should be: 11110000.
- **DAY OF WEEK (DOW):** The day you want the bell ringing. Starting from Sunday, ends with Saturday. Use value "1" for the day you wish the bell ringing, "0" for no bell ringing. For example, you want to schedule your bell ringing from Monday to Friday, your DOW setting should be: 0111110.
- **DURATION:** How long you want the bell ring, from 1-99.
- **DURATION MULTIPLIER:** Ms, Sec, Min.
- **USE:** Use value "1" to put this schedule in use, "0" for not in use.
- **ONCE:** Use value "1" to put this schedule to use only for once, "0" for use in normal schedule.



Upload Bell Events

To upload the txt file to Netbell-Ultra 300, first select which schedules that you want to use the bell events to, then go to **Services - Bells page**, click the **Upload** button, you will be directed to the upload page. Browse the file you created from your computer, then press Upload button, come back to the Bells page, your events are already there! The page will also show you how many records have been uploaded.

If you want to make changes for the events you just uploaded, for example, to change which bell rings at certain days, simple click the pips to check/uncheck, then click the SAVE button, your changes will be saved.

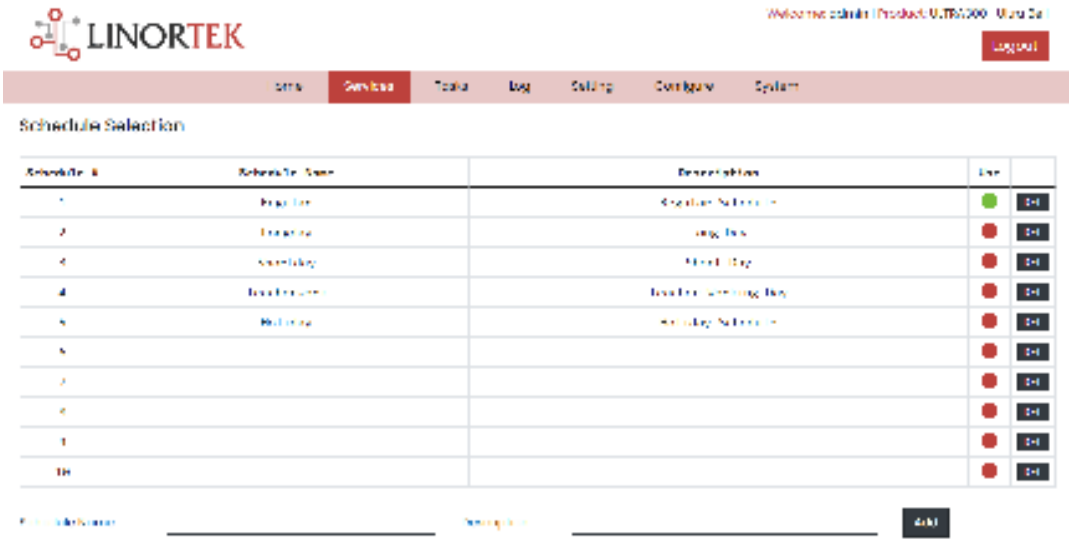
If you want to delete a schedule, you can click the **DEL** button at the end of an event. If you want to delete all events, you can do so by clicking the *Reset* button, your events will be deleted from your bell memory.

Bell Event txt Template:

```
#Start
Morning,07,00,00,00,00,00,10000000,0111110,5,Sec,1,0
8AM,08,00,00,00,00,00,10000000,0111110,5,Sec,1,0
Form,08,30,00,00,00,00,00000000,0111110,5,Sec,1,0
9AM,09,00,00,00,00,00,10000000,0111110,5,Sec,1,0
10AM,10,00,00,00,00,00,10000000,0111110,5,Sec,1,0
11AM,11,00,00,00,00,00,10000000,0111110,5,Sec,1,0
Noon,12,00,00,00,00,00,10000000,0111110,5,Sec,1,0
Lunch,12,30,00,00,00,00,10000000,0111110,5,Sec,1,0
Back from lunch,13,00,00,00,00,00,10000000,0111110,5,Sec,1,0
2PM,14,00,00,00,00,00,10000000,0111110,5,Sec,1,0
Second shift,15,00,00,00,00,00,10000000,0111110,5,Sec,1,0
End of Day,17,00,00,00,00,00,10000000,0111110,5,Sec,1,0
```

Schedules (for Bell Software)

You can add up to 10 sets of schedules to the Netbell-Ultra 300 controller, such as regular schedule, teacher work day and holiday schedules. To add a schedule, go to **Services - Schedules** page, the system comes with a default schedule, it's named as **Schedule 1** and it's in **USE**. You can't delete this default schedule until you add a new one. Go to **Add** section which is located at the bottom of **Schedules** page, enter a name for the schedule (15 characters max), a description (32 characters max) for this schedule, then click **Add**.



Tasks

The **TASKS** page displays the automatic events that can be programmed into the SERVER. You can schedule up to 32 condition-logic events in the SERVER. These are constructed as IF ... THEN statements. In addition, the IF term can have 2 elements (IF a, AND/OR/NOT b … THEN c). This provides a simple to program and powerful way to take advantage of the data acquired by the Ultra. The Tasks page shows you an overview of configured tasks. You can click the dot in the **Use** column to turn a task on or off indicated by a green dot for ON, and a red dot for OFF. To edit or create a task, click the **Edit** icon to the right of the task line. This will take you to the **Set Schedule** page detailed in the next section.

Set Task Page

The **SET Task** page allows you to create time and logic-based events that will occur automatically if the conditions are met.

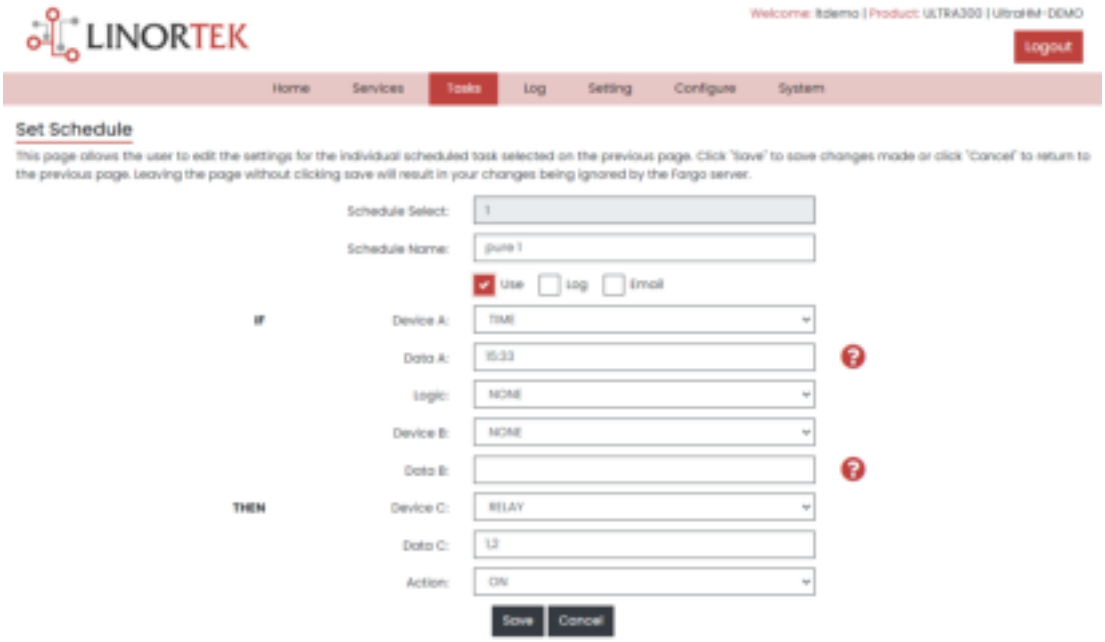
- **Task Select** - Determined by clicking on a schedule line from the previous page.

- **Task Name** - Enter a 15-character Task Name.
- **USE** - In order for a task line to be active you must select the **USE** button. If there is an error detected in entering task data, the **USE** box will automatically uncheck.
- **LOG** - Select log for this item to appear in the system log every time it is executed.
- **Email** - Click Email to automatically send an email when this task is executed.
- **Device A** - Select the Device A for the first term in the IF statement from the drop box.
- **Data A** - Select Data A for the above device. Depending on the device selected the Data used for testing may have special properties. See the list below for Data that may be entered. If an error is detected in data entry when the "Save" button is pushed, the USE box will uncheck and the Data box containing the error will be highlighted.
    - **Minute** - Enter: mm
    - **Hour** - Enter: hh (use 24-hour system)
    - **Day** - Enter: dd
    - **DayofWeek** - Enter: Sunday = 1, Monday = 2, Tuesday = 3, Wednesday = 4, Thursday = 5, Friday = 6, Saturday = 7, Weekday = 8, Weekend = 9
    - **Time** - Enter: hh:mm (use leading zeros, seconds are ignored) (use 24-hour system) ex:07:30 or 14:05
    - **Date** - Enter: yy/mm/dd (use leading zeros) ex: 20/01/10 for January 10, 2020
    - **Relay** - Enter: Relay number and (+ or -), ex: 01+ for Relay 1 ON or 01- for Relay 1 OFF
    - **Button** - Enter: + or - (for ON or OFF respectively)
    - **Flag** - Enter: Flag number(opt.+), or Flag number (for ON or OFF respectively)
    - **Temp** - Enter: >, = or < value; example: >40 (always degrees C)
    - **Volts** - Enter: >, = or < value; example: <10
    - **Analog** - Analog input. Enter an input number and >, = or < and value. Example: 3<123
    - **Digital** - Digital input. Enter **Input Number**, **Type**, >, =, or < and value; example: 1F>7500 **Type** can be (case sensitive):
        - S - State (On/Off)
        - C - Non-resettable counter
        - c - Resettable counter (lower case 'c')
        - F - Frequency in 1/1000 seconds
        - P - Period in 1/1000 seconds
- **Logic** - Set up a Logic comparison between Device A and Device B.
    - **AND** - True if: Device A is true **AND** Device B is true
    - **OR** - True if: Device A is true **OR** Device B is true
    - **NOT** - True if: Device A is true and Device B is **NOT** true
- **Device B** - Select Device B from the drop box.
- **Data B** - Select Data B for the above device. Depending on the device selected the Data used for testing may have special properties. See above list.
- **Device C** - is what to control.

- **Data C** – Set property for **Device C**. Syntax is used as follows:
    - **RELAY** - These are relays on this Ultra. You can set up to four per schedule. Enter separated by commas, for example "1,2,3,4"
    - **FLAG** - This is a storage flag that can be used to make more complex schedules. There are 8 flags that can be turned on or off.
    - **REMOTE** - Refers to a remote Linortek IoT units. When these conditions are met, this Ultra will send a command to control a remote device. The Data field for a remote unit should be in the format, "REMOTE UNIT NUMBER, REMOTE UNIT RELAY". For example, "3,5". These remote SERVERS must be identified in the page Configure/Remote Device Config.
    - **COUNTER** – Add count to digital input counter – set as 1 or 2 depending which digital input is counting
    - **BLUE LED** – Will turn on Blue LED. No data needed.
    - **SEND EMAIL** - Will send eMail when condition meets. No data needed for the full JSON report. If Device A(or B) set for Analog or Digital, the user might enter “Short” for the short Input data report. Implemented only for Digital and Analog inputs.
    - **NOTIFY** – Will register the log with current data. Implemented only for Analog inputs.
    - **DELAY** – Set the delay for Relay to turn on in the following format: Relay#,seconds. (Ex.: DATA C: 1,180)
    - **HOURMETER** – Set hourmeter number for the RESET action. (Ex. : DATA C: 1)
    - **SEND UART** – Not implemented with the current software
    - **SENT MQTT** – No dada needed for the full JSON report. For separate messages under separate topics such as “lt1000/Mac_address/**relay/1**”: Insert “relay/1(2)” to get Relay 1(2) state; Insert “digital/1(2)” to get Digital input 1(2) state; Insert “hourmeter/1(2)” to get Hour meter 1(2) value; Insert “analog/1(2/3/4)” to get Analog input 1(2/3/4) value
    - **Action** – What to do with Device C. Options are:

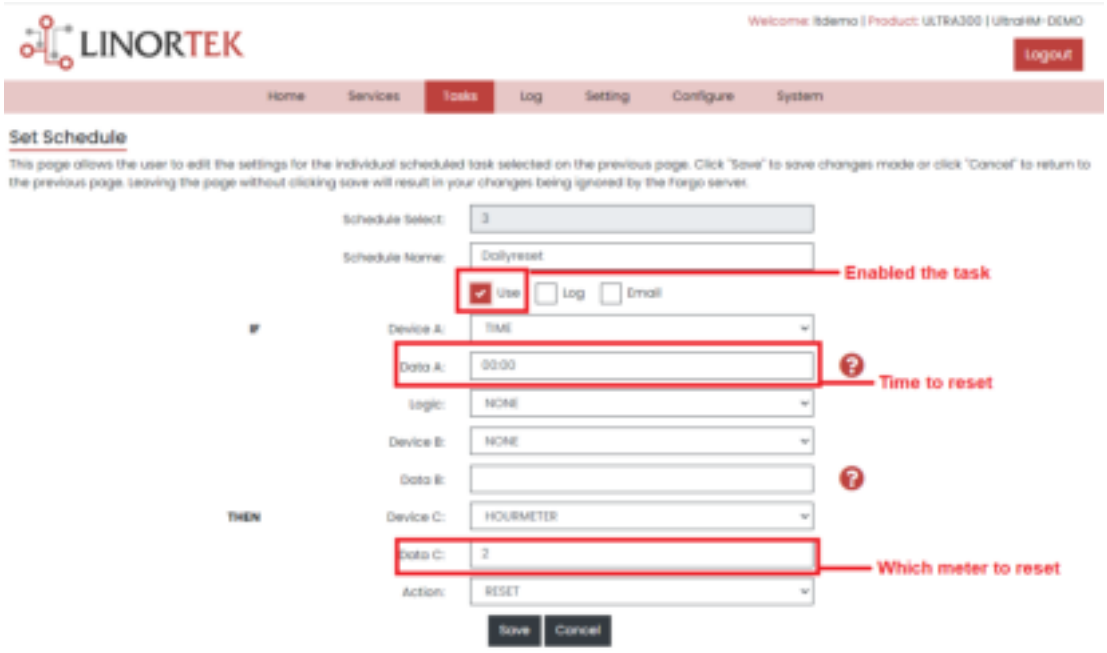
      ON – Turns device **ON**
    - **OFF** – Turns device **OFF**
    - **TGL** – **Toggles** state of **Device C;** Will register **hour meter readings** if **Device C** set for **HORMETER** and **Data C** says **1** or **2.**
    - **RESET** – **Resets Counters**

Using the condition-logic task builder, you can easily create tasks based on inputs or outputs’ status using **IF…THEN… THAT** statement introduced above. Create up to three actions for each task providing you with the ultimate control and monitoring solution for your project. Below is a typical use case to use the task builder for resetting the meter daily.



Reset the Meter Automatically Using the Task (for Hour Meter Software)

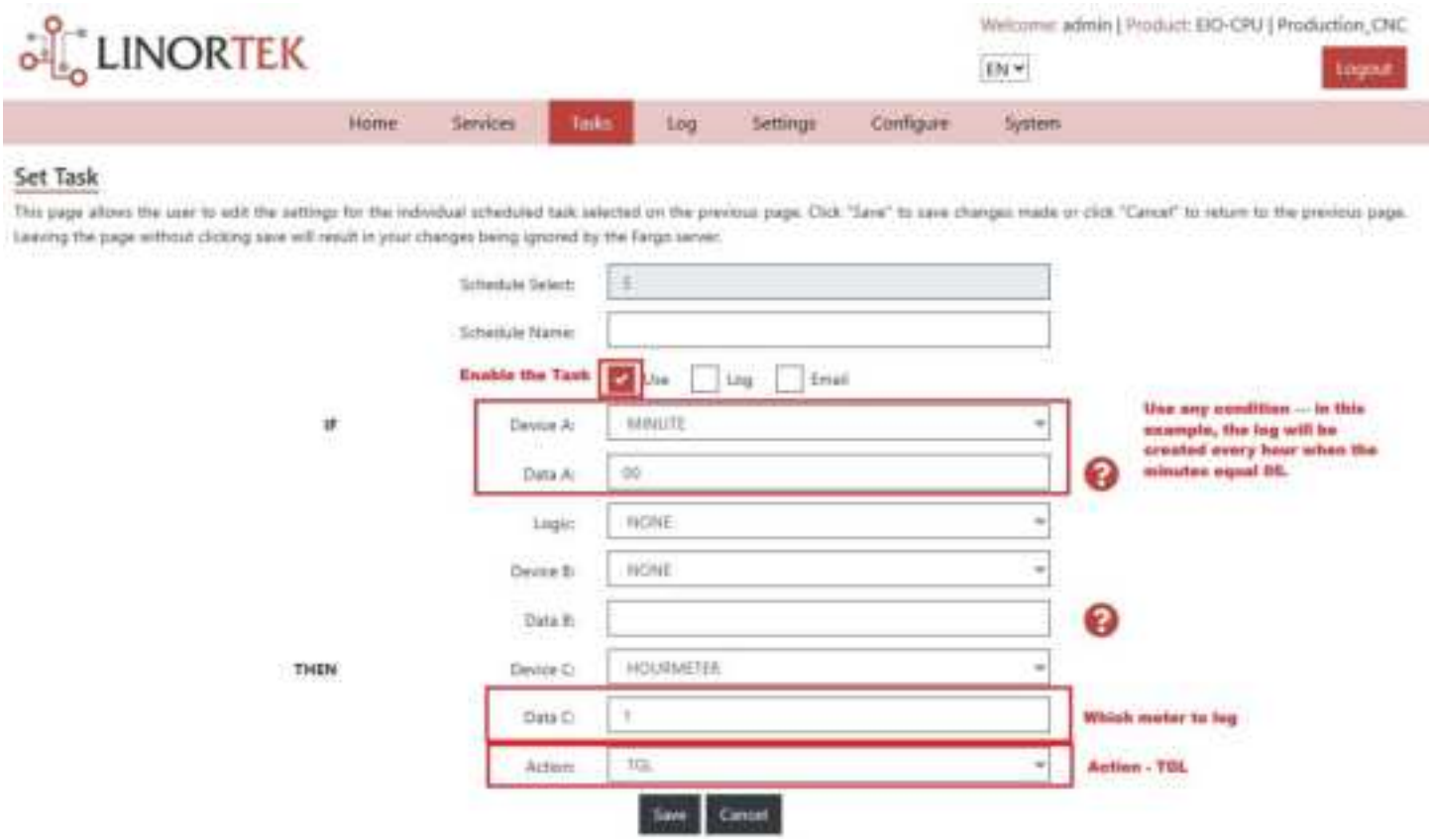
In some cases, you might need to reset the meter at regular time, for example, daily. You can do so by setting a task on the TASKS page. Below is an example to reset meter#2 every day at 12:00am.



Register the Meter Reading Log Automatically Using the Task (for Hour Meter Software)

Use **any condition** — in this example, the log will be created **every hour when the minutes equal 00**.

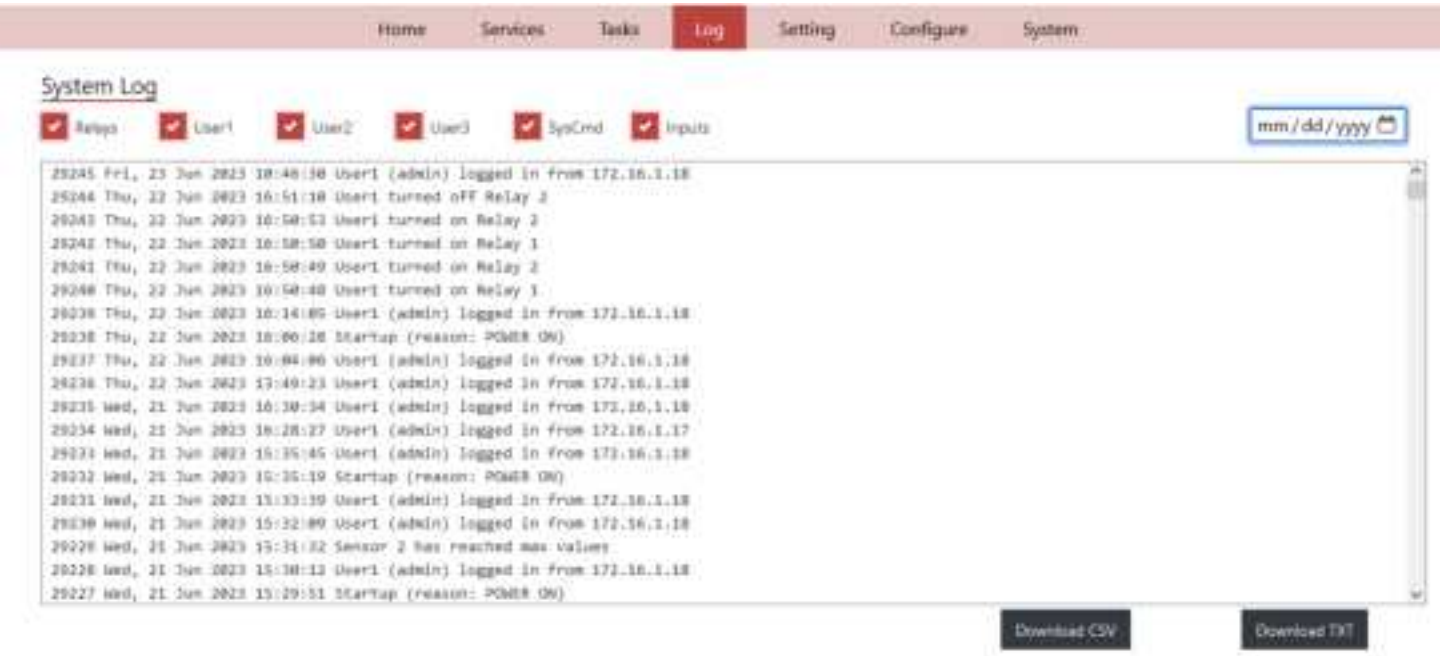
```
3581 Mon, 28 Jul 2025 10:00:00 Hourmeter1: 14259.11
```



Logs

The Logs tab displays over 10,000 entries from actions taken by the SERVER or by users themselves. This feature allows several actions for the convenience of displaying and collecting data from the Ultra.

- The checkboxes above the display allow the user to filter logs from different sources. To filter out logs you do not wish to see from a certain source simply uncheck the box.
- The date window allows the user to filter logs by dates.
- Each log has a reference number and a time and date attached Afterwards is the event displayed.
- Use your mouse to scroll through the logs.
- The logs refresh automatically.
- To download the Log Details, click the DOWNLOAD button below the Log Display, this allows the user to save the logs as a separate file in TXT or CSV format.



Settings

User and Admin Credentials Page

Use this page from the **Settings** drop down menu. Here you can set up to 3 users for your Ultra 300 system. As a default only User 1 is Active. Here you can:

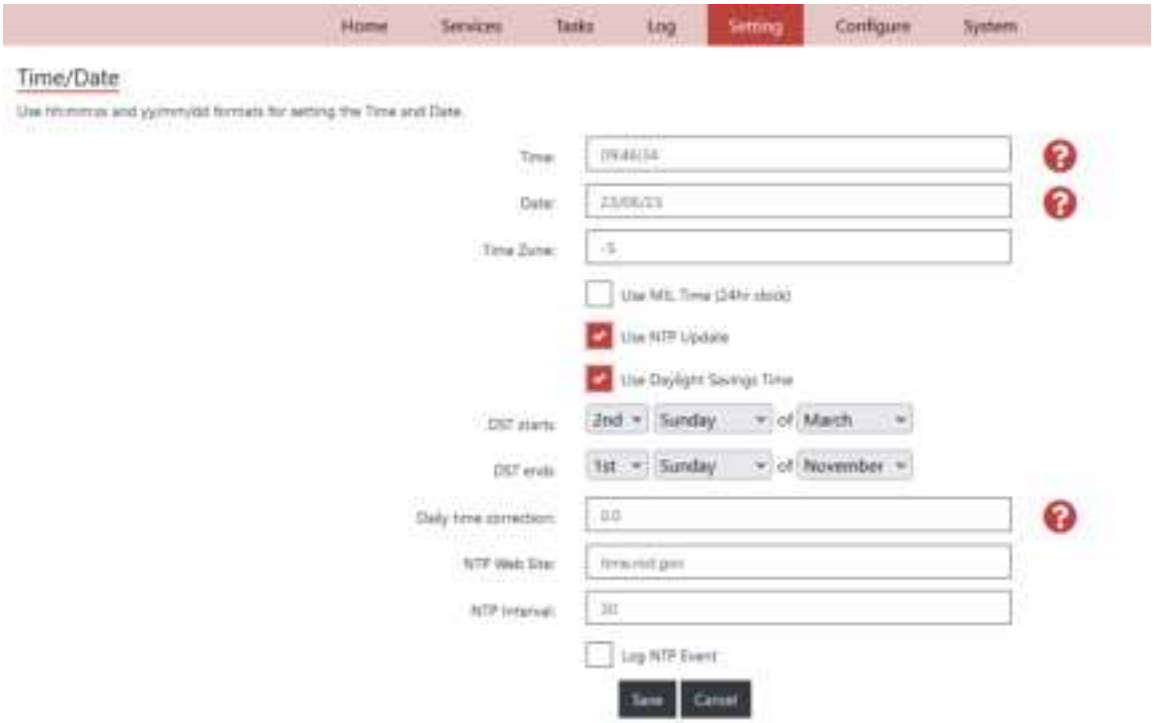
- **User Name and Password** - Each user has their own credentials. As a default these are set to admin/admin, user2/user2 and user3/user3 for Users 1, 2 and 3 respectively. The passwords are never displayed. Password length are limited to 13 characters. If you set a password longer than the limits, you won't be able to login to the account.
- **Active** - Must be checked for this user to sign on, you cannot deactivate User 1.
- **Admin** - Only admin can save data in most pages. This protects your SERVER from being changed by an unauthorized person.
- **Timeout** - Not enabled at this time.

Time/Date Page

Use this page from the **Settings** dropdown menu. This page allows you to set up the time and date system.

- **Time** - Set time using an hh:mm:ss format. Always standard time
- **Date** - Set date using a yy/mm/dd format.

- **Time Zone** - Set desired time zone. -5 for EST, -8 for PST, you can now add a :mm for setting part hour, for example, 5:30 is a time zone at 5 hours and 30 minutes.
- **Use MIL Time** - Select to use 24-hour format.
- **Use NTP Update** - Select to synchronize SERVER's time with NTP server
- **Use Daylight Savings Time** - Select to automatic adjust your system time on daylight savings day. (Not accurate in all time zones.)
- **DST starts/ends –** set the date for DST if it is different (By default: North and South America)
- **Daily time correction –** set the correction if your device doesn't communicate with any NTP servers
- **NTP Web Site** - This is the selected NTP server for updates.
- **NTP Interval** - Time interval between updates in minutes.
- **Log NTP Event** - Normally NTP events won't be logged, select this option to Log every NTP event. (May be useful in debugging.)

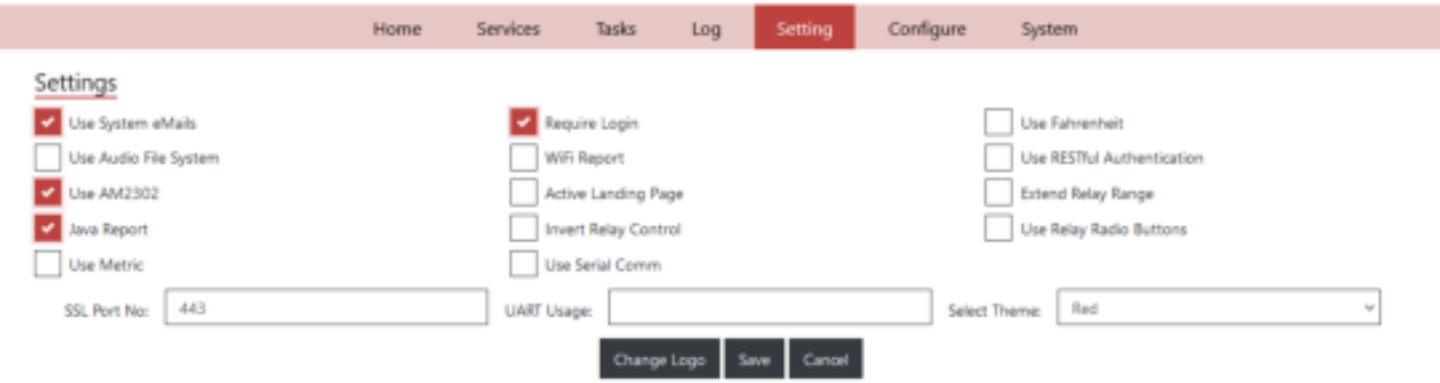


Settings Page

Access this page from the **Settings** dropdown menu. Select these settings to enable various features in the Ultra 300

- **Use System emails** – Enables additional email messages.
- **Use Audio File System** – Settings may be vary depending on application. Not required for hour meter software.
- **Use AM2302** – Use AM2302 Temperature and Humidity sensor (sold separately).
- **Java Report** – Send data to HourCollector app over ethernet (only for Meter software).
- **Use Metric** - Not supported.
- **Require Login** – If not selected the SERVER will allow all access without credentials.
- **WiFi Report** – Enable data transfer over WiFi (For iTrixx WiFi enabled devices).

- **Active Landing page** – Check to enable additional information to display on Landing page.
- **Invert Relay Control** – Changes Relay state from NO to NC and back without wiring changes.
- **Use Serial Comm** – not implemented.
- **Use Fahrenheit** – Selects Celsius or Fahrenheit.
- **Use RESTful Authentication** – Require username and password for RESTful.
- **Extend Relay Range** – Enables 8 relays.
- **Use Relay Radio Buttons** – If set, when one relay is turned on, all others are turned off.
- **SSL Port No**. – By default, it is set as 443, no needs to change.
- **UART Usage** – Settings may be vary depending on application. Not required for hour meter software.
- **Select theme** – Choose theme color: red/green/blue.
- **Change Logo** – Choose your Company's Logo to replace Linortek logo (max size: 60kB, format: .png file) .



Configure

Dynamic DNS Page

Access this page from the **Configure** dropdown menu. From this page you can assign dynamic DNS settings. This page, along with proper port forwarding through the router, can enable global access to a device behind a NAT router or firewall. You will need to assign a static IP address and port number (see **Network Config Page** on page 28) and port the IP address on your router (refer to your router's user manual). An internet IP address will have to be hosted in order to access your Ultra from the internet. Currently the only IP hosting service supported is provided by DynDNS (https://dyn.com)

- **Use DDNS** - Enables this service.
- **DDNS Service** - Select a service from the drop box. Currently the only supported service is DynDNS
- **User Name** - This refers to the account set up at the DDNS Service.
- **Password** - Password for access at the DDNS service.
- **Host** - This is the IP name registered at the DDNS service for rerouting to this Ultra

Email Setup Page

Setup an email account for the SERVER to use in sending email messages from various modules. Access this page from the **Configure** tab.

IMPORTANT**: To CC / To BCC currently not supported by Microchip driver. They will be eventually added

- **SMTP Server** – Enter the outgoing mail server that you want to use.
- **Port** – This is the port on that server. You can look up your mail service online for this information as well as the other set up fields.
- **Use SSL** – This server supports 2048-bit SSL encoding. Use this check box only for port 465
- **User Name** – Your email account name.
- **Password** – Email account password.
- **To Address** – Enter up an addressee
- **Subject** – Subject line of the email header.

MQTT Setup Page

MQTT (MQ Telemetry Transport) is an open messaging protocol that is designed to be as light a load on a network as possible. MQTT can be used by all sorts of devices to communicate with each other. This can range from machines sharing information over MWTT, or sending commands in order to remotely control devices without user input, and this is all done while using as little bandwidth as possible.

- **MQTT Server:** This section refers to the IP address that the MQTT Broker is hosted on. For example, a company may have a computer that runs the MQTT Broker, and all devices that want to connect to that broker needs its IP Address. In this example, the Broker's IP address is "192.168.1.10".
- **Port:** The port section refers to the port the MQTT Broker is hosted on. This is configurable when setting up the broker, but by default it is 1883.
- **Username and Password:** The username and password are optional sections that allows the devices to be password protected if the MQTT Broker is set to have passwords enabled. This will allow connected devices to be protected from outsiders attempting to peak in. However, this is optional, and if password protection is not set up, these fields can be left blank.
- **Topic:** The topic section allows the user to choose the Topic Name the device will connect to. Topics are channels within the MQTT server that allows messages to be sent between devices. However, only devices that are connected to those topics can see the messages within them. When using this section, you can enter an existing topic name to connect the device to that topic, or enter a new topic name to create a new topic.
- **Client ID:** The client ID section is what the device's display name will be when connected to a topic, and this is different from the device's username (if any). For instance, the device's username might be "admin123", and can be used to log into the device's MQTT settings. However, this is not the devices display name. Its display name might be "Device A", and that is what you would see when the device would send a message. Unlike the username and password section, the client ID section is mandatory.

Network Configuration Page

Access this page from the **Configure** dropdown menu. This page allows the configuration of the Ultra's network settings.

CAUTION: Incorrect settings may cause the board to lose network connectivity. In order to access a device in your network remotely you must **PORT** the device. This tells your router that information coming in should be sent to a specific device on your network.

To enable HTTPS for Ultra Webpages set port # 443. After this config saving every time to get access to the webpage by typing: https://Ultra's_IP_adress:443

- **MAC Address** – This is a unique MAC address that is assigned to this product at time of assembly. It cannot be altered.
- **Host Name** – This is the device's name at which this unit may be addressed in some networks. It may also appear in your router's lease directory. It makes a useful place to name your SERVER and appears on the Home page and on the Discoverer.
- **Port Number** – This becomes part of the IP address and is necessary for Internet access. If this is not set, the SERVER defaults to a port number of 80. (443 for https)

- **Enable DHCP** – The DHCP is enabled by default. If you need to assign a static IP address to the SERVER, uncheck this box.
- **IP Address** – Typically you only change the last group of numbers. If you change this IP address, make sure to reserve this IP on your router and no other devices are using this IP address or you may not be able to reach this SERVER. If this happens you may need to Restore Defaults using the push button method.
- **Gateway** – Typically a router on your TCP/IP network that serves as an access point to your ISP.
- **Subnet Mask** – A 32-bit number that masks an IP address, and divides the IP address into network address and host address. Just leave it at 255.255.255.0
- **Primary DNS** – A primary DNS.
- **Secondary DNS** – A secondary DNS.

IP Range Configuration Page

Access this page from the **Configure** dropdown menu. Use these security settings to select a range of IP address that will be allowed to access the SERVER. CAUTION: Incorrect settings may cause the board to lose network connectivity. (Currently not available, for future use)

Remote Devices Page

Access this page from the **Configure** dropdown menu. These settings allow the SERVER to remotely control the relays on other Linortek devices (Peer-to-Peer communication). This is done by selecting the Remote Device in the Schedule program or by setting up a relay as a REMOTE. There are 8 possible REMOTE locations.

CAUTION: Incorrect settings will cause the board to lose its remote connections.

- **Device Name** – Enter a text name for this device for future reference.
- **IP Address** – The IP address of the remote device including a port number.
- **User Name** – Used in Basic Authentication.
- **Password** – Used in Basic Authentication

System

The System page is used for software update or reset the software to factory default if needed.

Load/Reboot System Page

Click **System – Load/reboot System**, from here you can upload the software file if you need to update the software on your SERVER, or reset the device to factory default if needed.

Reset to Factory Default

There are two ways to reset the SERVER to its factory defaults.

1. Reset through the hardware: For some reasons, such as forgetting password, you can reset the SERVER to factory default in order to use the default login credentials (admin/admin). To reset to factory default from the hardware, first to push the **RESET** button, the **RED** LED should be blinking and the **GREEN** LED is on. While in this state (called Bootload state) press and hold the **RELOAD** (DFLT) button (about 10-15seconds) until the RED LED comes on steady (blinks at 1 second rate). To locate the RESET/RELOAD buttons, please check Board Layout Reference section in this manual.
2. There is an equivalent RESET DEFAULTS function in the web browser at **System/ Load/Reboot System** page. Check the **Restore Default Values** box, then click the **Boot Mode** button, your device will be reset to factory default once the RED LED come back to normal (blinks at 1 second rate).

Update Software

Your SERVER comes with the latest version of software when it leaves the factory. When a new software version is available, you can download it from our website Download page, then upload it to your SERVER from the System – Load/Reboot System page. Check the **Update Software** box, then click Boot Mode, go to Discover app and find your Ultra in Bootloader state. Click on the IP address, the webpage will pop-up. Click “Browse”button to select the **.img** file you just downloaded from our website, then click “Upload”.

Once the software is successfully uploaded, you will get a message “Done!!”, then click the “Go to U300 app” you will be directed to the Login page. On the bottom of every page, you can see your Webpage Software version.

Desktop/Mobile App

Data Collection (for Hour Meter Software)

Once your SERVER is wired and configured, it will periodically report its data over your network. Any computer on the same network can collect that data using the free Linortek Hour Collector app, Linortek DataCollector app, MQTT, RESTful API, Microsoft Excel, or other software via API.

Hour Collector App

The Hour Collector app was developed for use with the Linortek iTrixx hour meter. This is free to download at: https://www.linortek.com/downloads/support-programming/

Before downloading, ensure your computer has Java installed. Java is available for download here: https://www.java.com/en/

The Hour Collector app will automatically locate your SERVER and allows for quick access similar to the Discoverer app. The Hour Collector app updates every two minutes by default, you can change the interval on the app. For more information about the features for the app, as well as how to use the data saved by the app, please refer to the **Linortek HourMeter Collector App Setting Instruction,** which can be downloaded from our website Download page at: https://www.linortek.com/downloads/documentations/

DataCollector Pro App

The DataCollector desktop app can listen for UDP broadcasts from our hour meter devices. It can record and log this data into a .csv file.

Alternatively, you can also set it to manually collect data. This is useful for port forwarded network hour meters as it can go out to the internet and read data off the device's XML pages. It can also collect data from the Wifi mini both via REST or subscribe to an MQTT broker.

To download the DataCollector app, please go to our website Download - Support Programming page, under Special Programs section, click Download Linortek DataCollector App Pro, select Save as on the download popup window: **https://www.linortek.com/downloads/support-programming/.**

For more information about the features for the app, as well as how to use the data saved by the app, please refer to the **Linortek Data Collector App Setting Instruction**, which can be downloaded from our website Download page at: **https://www.linortek.com/downloads/documentations/**

RESTful API and XML

Here is the available API and XML that you can export the data from the device directly or control the inputs and outputs.

https://www.linortek.com/download/documentation/advanced-setting/Accessing-with-RESTful-V3.pdf

MQTT

In our latest development, MQTT protocol is added to the Ultra 300 controller. The Ultra 300 publishes under the topic: lt1000/xxxxxxxxxxxx/tele – where xxxxxxxxxxxx is the device’s MAC address (all lower case). It currently sends a single payload in JSON format to the configured broker on a interval you set on “Configure Hourmeter” page at QoS 0. For more information on how to use the MQTT to transfer data to your own system, please refer to the **iTrixx WFMN MQTT - Product Documentation,** which can be downloaded from our website Download page at: https://www.linortek.com/downloads/documentations/

JSON file

You can use JSON file to get the report from Ultra 300 controllers. It is capable only in http:// Configuration. The port number for .json file is :30000 (http://Ultra’s_IP_adress:30000)