Intelligent Load Bank Admin Manual

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Statements, Notices and Liability information

FCC Part 15 Class B

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the affected equipment and the panel receiver to separate outlets, on different branch circuits.
- Consult the dealer or an experienced radio/TV technician for help.

Statement of Faultlessness:

The information in this manual has been reviewed for accuracy at the time of writing. No responsibility can be assumed by Rx Monitoring Services Inc. for inaccuracy or changes that have taken place since production. The "Cx Monitor User Manual" is for informational purposes only and is subject to change without notice.

Liability:

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Copyright:

Safety Information

Definitions

- **WARNING**
  This statement is to reinforce the practice of certain conditions may cause physical bodily harm or loss of life.

- **CAUTION**
  This statement is to reinforce the practice of certain conditions may cause physical damage to the Load Bank, Cx Monitor, accessories, equipment or property.

- **NOTE**
  General information for simplifying the user experience.

Abbreviations

CT's :	Current Transducers	Wireless Probes:	Wireless add-on's for power monitor
Rope Probes :	Rogowski coil current transducers	EWE:	External Wireless Extensions
Cx :	Power Monitor	Site:	Cx Monitor data set.
Monitor :	Power Monitor (Cx)		

Symols

The following are (IEC) symbols are used on this document or on the power monitor, and their definitions.


This symbol indicates AC or DC volrage or current

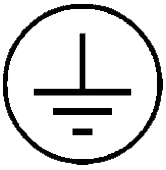

This symbol indicates DC only voltage or current


This symbol indicates AC only voltage or current


This symbol indicates earth ground conductor.


This symbol indicates that caution is necessary when operating the device or control close to where the symbol is placed, or to indicate that the current situation needs operator awareness or operator action in order to avoid undesirable consequences.


This symbol indicates high voltage. It calls your attention to items or operations that could be dangerous to you and other persons operation this equipment.
Read the message and follow the instructions carefully.


This symbol indicates safety ground conductor.

WARNING

To avoid electric shock or fire:

Review the entire manual before using the Power Monitor and its accessories and observe all warnings and cautions.

- Before using the power monitor inspect wireless probes, voltage probes, current probes, leads and accessories for mechanical damage or broken plastic and call Rx Monitoring Services Inc. for replacements.
- Wear proper Personal Protective Equipment, including safety glasses and insulated gloves when making connections to power circuits.
- Use only current probes, test leads, and adapters supplied with equipment.
- Remove unnecessary voltage leads or accessories that are not in use.
- Make sure the power monitor is properly connected through the power cord to protective earth ground.
- Do not insert foreign objects into connectors, only use approved accessories.
- Never open the equipment, there are no customer replaceable parts.
- Never use equipment outside or when condensing water is present.
- Use proper lockout procedures on circuits under test.
- Hands, boots and the working area must be dry when making connections to power system.
- Do not operate the equipment or probes around volatile gas or vapor.

********** WARNING DO NOT EXCEED CAT RATINGS **********

Voltage Ratings:

Power Monitor	**: CAT III - 600V**	**Pollution Degree 2**
Rope CT's	**: CAT III - 1000V**	**Pollution Degree 2**
Clamp CT's	**: CAT III - 600V**	**Pollution Degree 2**
Wireless DC	**: CAT II - 600V**	**Pollution Degree 2**
Wireless DC w	**: CAT III - 600V**	**Pollution Degree 2**
Wireless DCx	**: CAT II - 150V**	**Pollution Degree 2**

Table of Contents

Introduction

The Intelligent Load Bank was designed with one function in mind, bringing usability and simplicity to the power testing market.

Throughout this documentation the Cx Monitor™ will be referred more simply as “Monitor”.
Throughout this documentation the Intelligent Load Bank will be referred more simply as “LoadBank”.

Some of the key features:

- **Software runs on any windows 7/10 PC as well as tablets (Windows 10 recommended)**
- **Up to 250 units in a Ethernet string**
- **Power Meter Integration**
- **Switch timings within 500mSec**
- **Voltage compensation based on power system levels**
- **Virtual groups within strings with different max power settings**
- **Automatic scripts with Run / Rewind / Restart**
- **Keeps running log of all LoadBank commands with time stamped that can be saved for later use**
- **Remote update of firmware**
- **Software:**
  The packages used with the Cx Monitor - Live-View™ and U-View™ are free for life. On a release cycle of 2 months they are written and developed at Rx Monitoring Services, Inc. and are constantly being improved.

Minimum PC requirements:
Win 7/10
i3-8130 CPU
4Gbytes Ram
20Mbytes Hard Disk
WiFi or ethernet port
Display: 1280x1080 resolution
Min

WiFi Adapters from GL.inet

Recommended routers

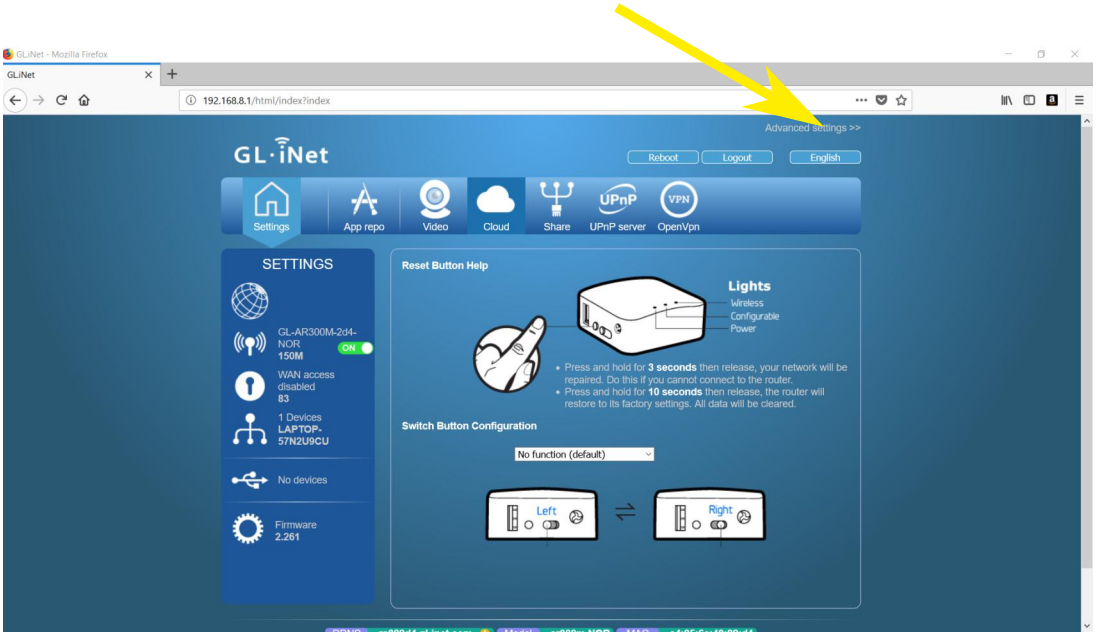
The GL.iNet routers are recommended because they run the openWRT router software. This software is open source and very stable for production use.

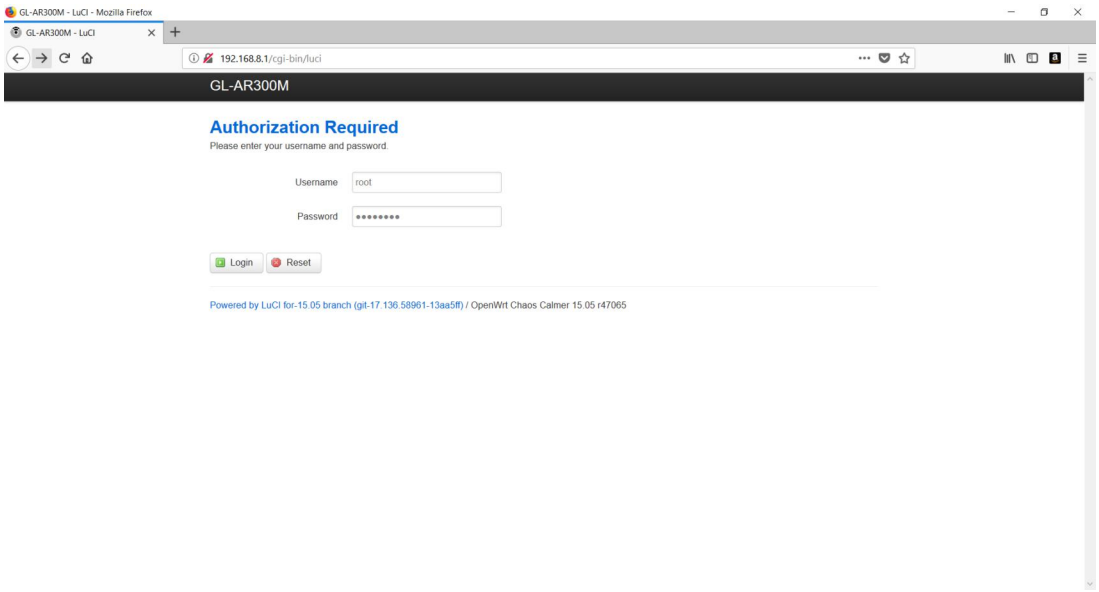
There are multiple versions: RxMS recommends two
With external Antennas greater then 50 units: GL-AR300M16-ext
With Internal Antennas less then 50 units : GL-AR150

Setup is required for these routers.

1) Set password (Keep the same across all units) we keep as "goodlife"
2) Login to advanced screen.
3) Enable DHCP for larger network (250 units)
4) Make WAN & LAN act as a bridge. (So customers can use both ports
5) Change Wifi ESSID (Wireless name) Keep the last digits the same as each WiFi ESSID needs to be unique.
6) Program LEDs if required.

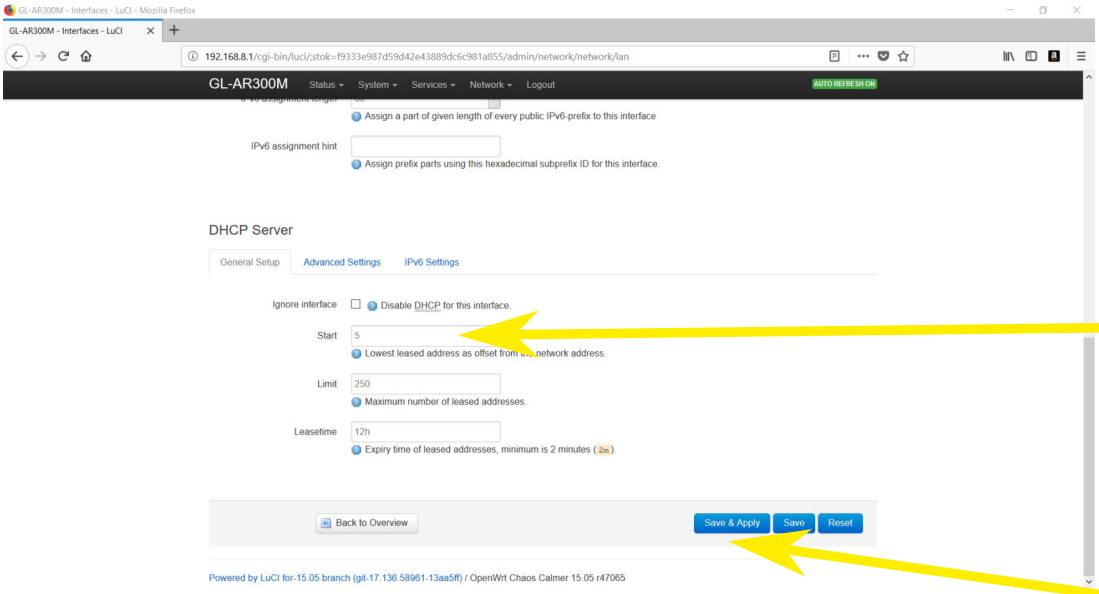
Click Advanced Settings





Login using
user: root
password: set when first connected.

Network - > DHCP

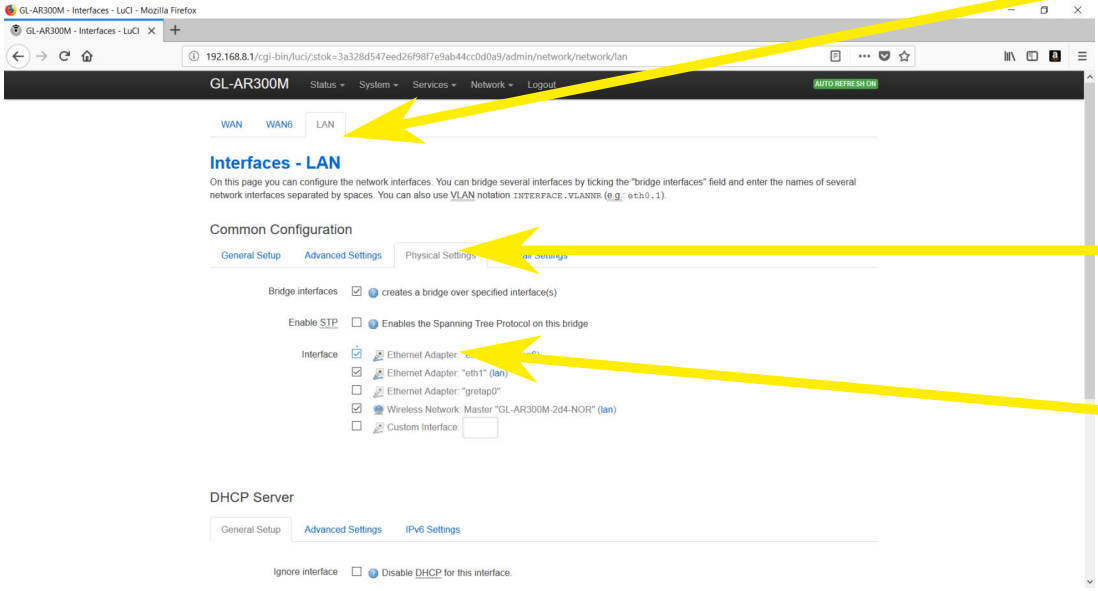


Change Start to 5 and limit to 250

Click Save & Apply

Network - > Interfaces -> LAN EDIT

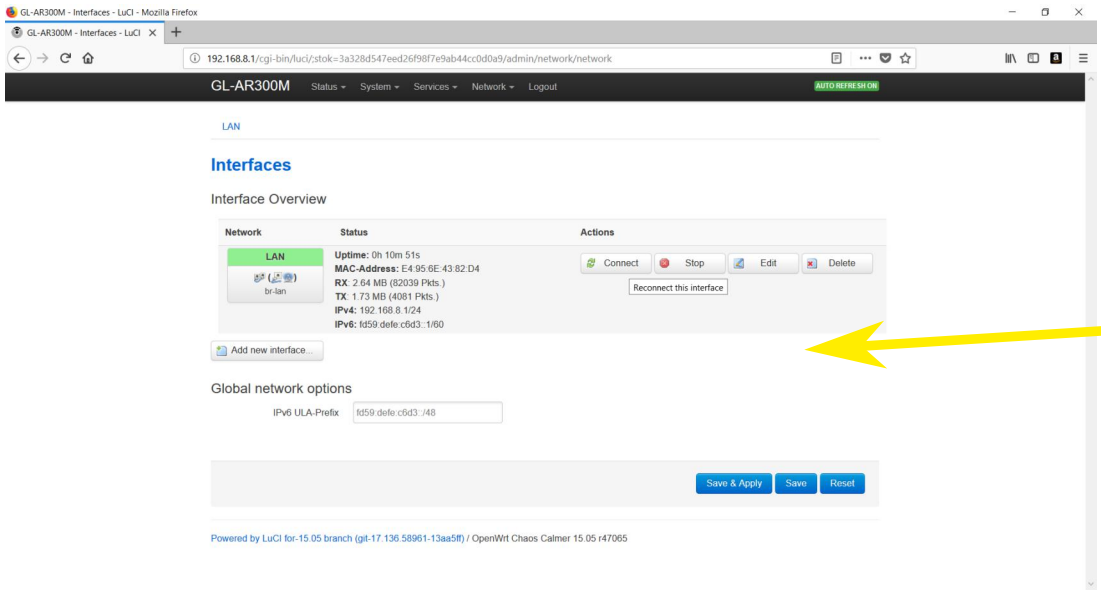
Click LAN or EDIT



Click Physical Settings

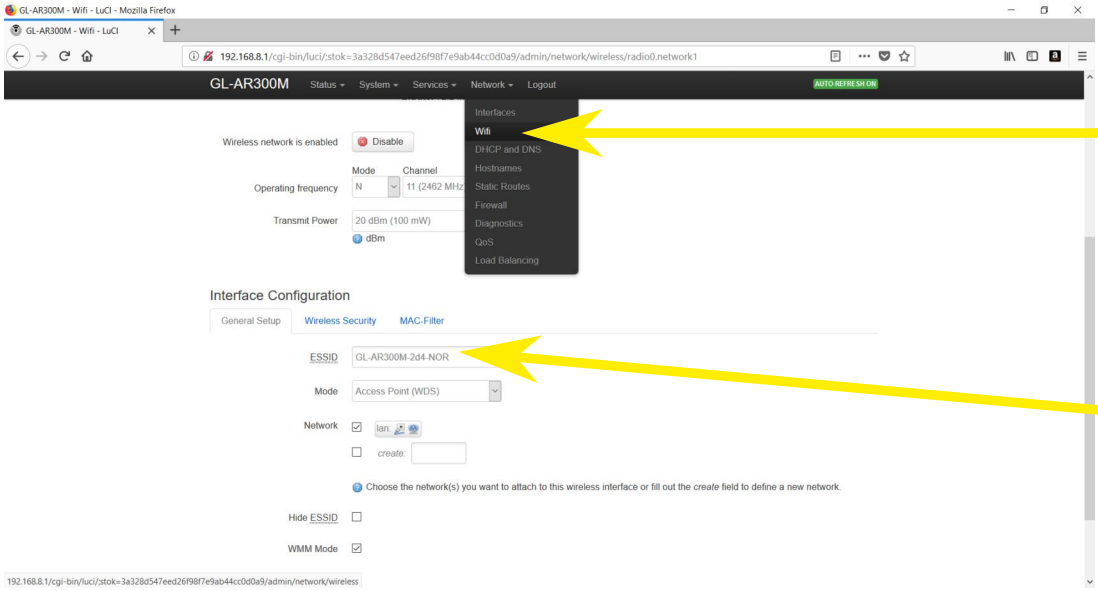
Click checkbox "Eth0"

Network - > Interfaces

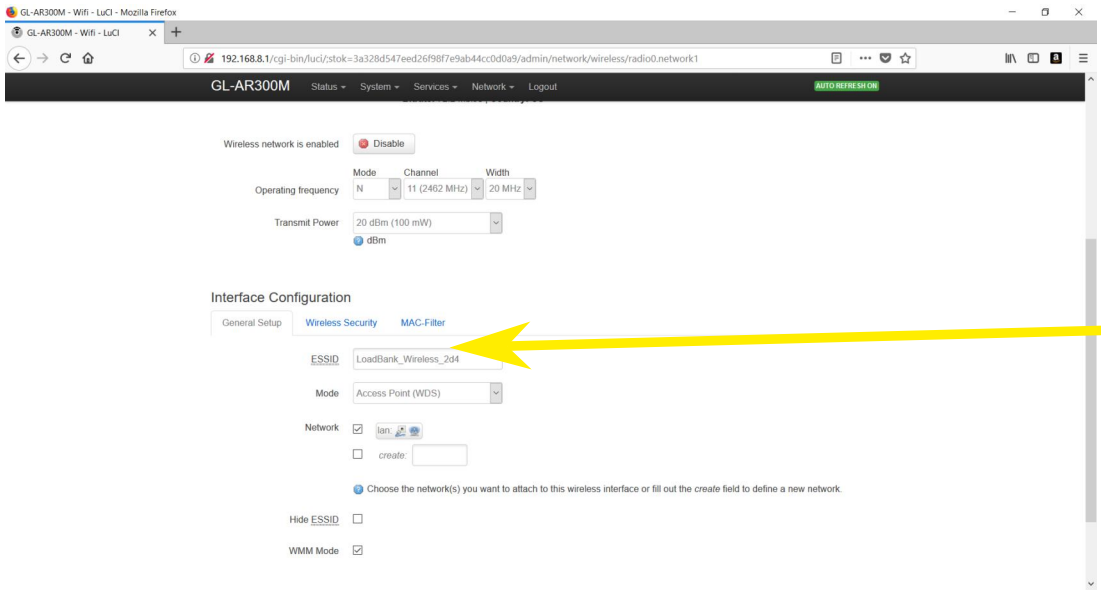


DELETE WAN
DELETE WAN6
Should Look like this.

Network - > WiFi



Edit ESSID:
Keep unique
between routers



Changed ESSID

Save & Apply

UPS Recommendations

UPS: Use for best uninterrupted connection

APC UPS 600VA Battery Backup & Surge Protector with USB Charging Port, APC UPS BackUPS (BE600M1)

This UPS will keep hardware up for 1-2 hours.

Switch Recommendations

8 Port: Use to expand start network

TRENDnet 8-Port Gigabit GREENnet Switch, 10/100/1000 Mbps, 16 Gbps Switching Capacity, Metal Housing, Plug & Play, Lifetime Protection, TEG-S82G

Ethernet Cord Recommendations

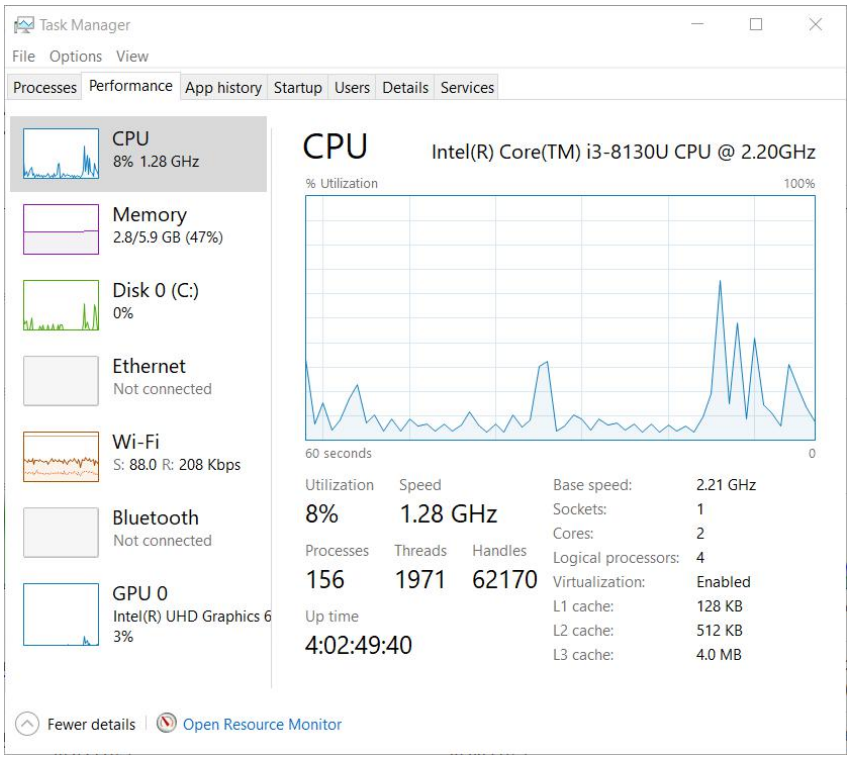
CAT6 has the best shielding:

Monoprice Cat6 Ethernet Patch Cable - Snagless RJ45, Stranded, 550Mhz, UTP, Pure Bare Copper Wire, 24AWG

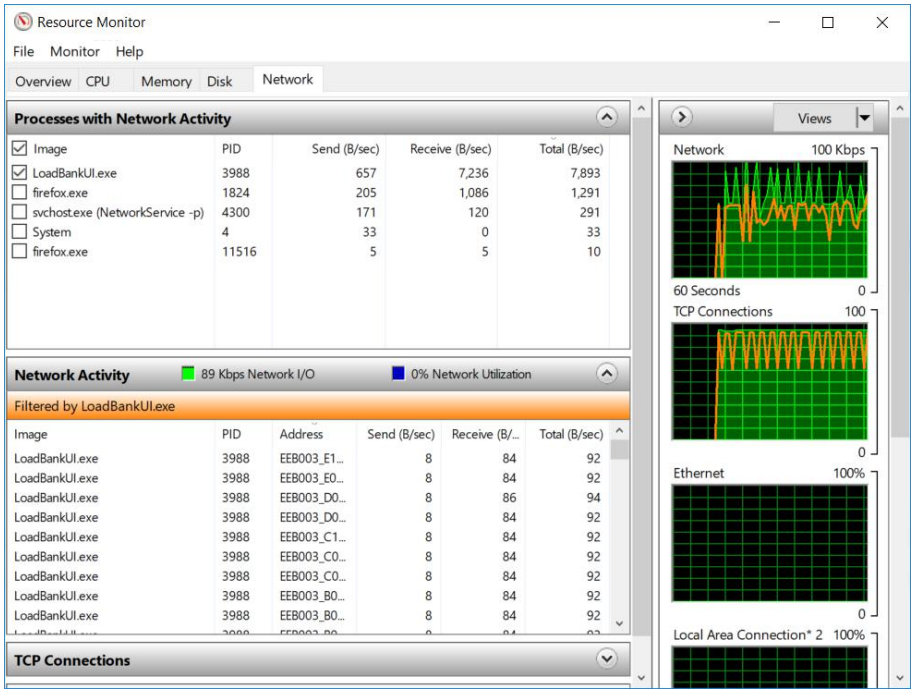
https://www.monoprice.com/product?p_id=2115.

Computer Recommendations

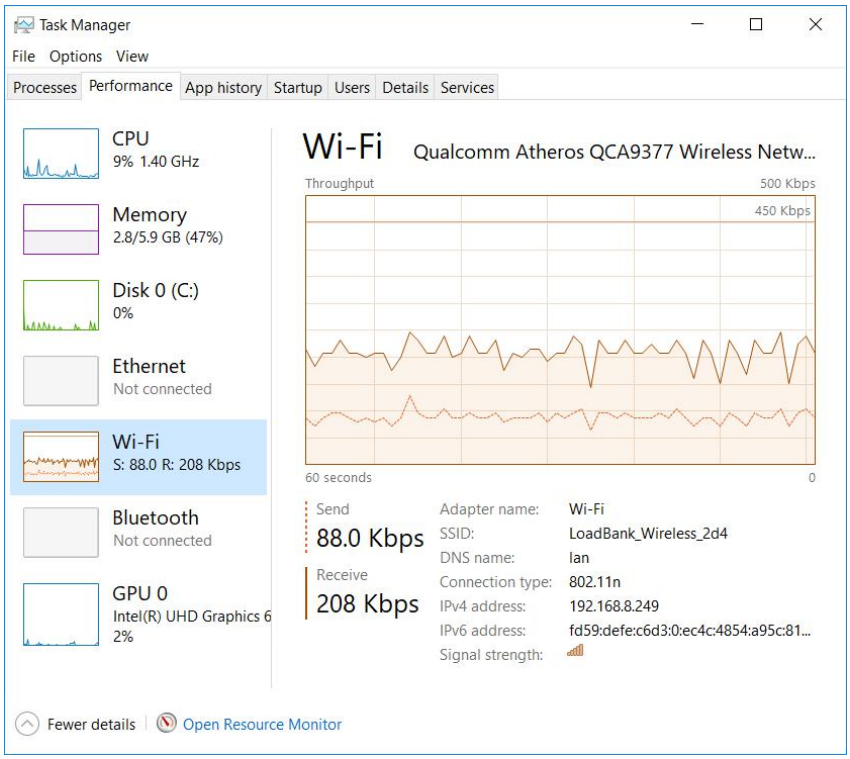
CPU loading with 100 units



Ethernet loading with 100 units



WiFi loading with 100 units



Tested Laptop

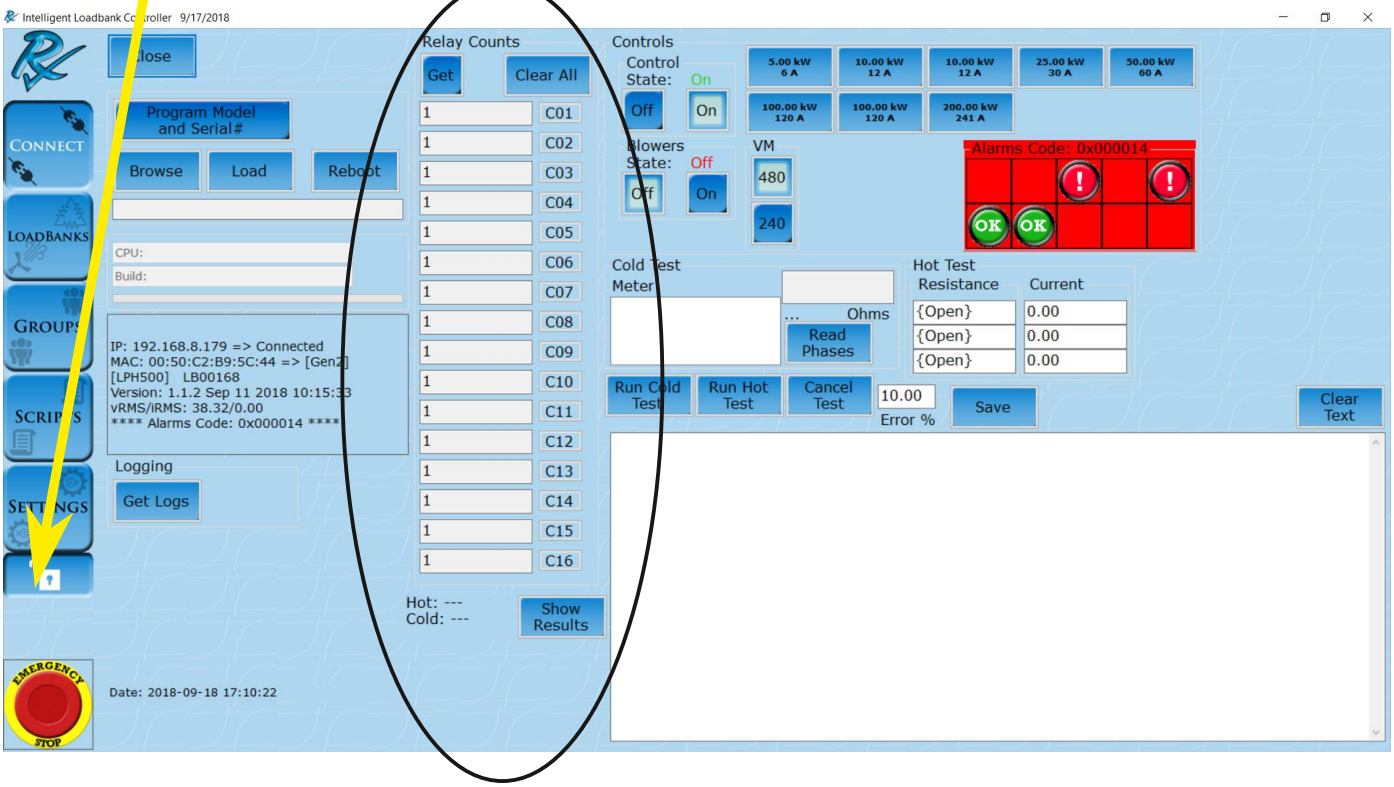
Acer Aspire E 15, E5-576-392H

8th Generation Intel Core i3-8130U Processor 2.2GHz with Turbo Boost Technology up to 3.4GHz,
Windows 10 Home, 15.6" Full HD (1920 x 1080) widescreen LED-backlit display,
Intel UHD Graphics 620, 6GB Dual Channel Memory,
1TB 5400RPM SATA Hard Drive,
8X DVD Double-Layer Drive RW (M-DISC enabled),
Secure Digital (SD) card reader, Acer True Harmony,
Two Built-in Stereo Speakers,
802.11ac Wi-Fi featuring MU-MIMO technology (Dual-Band 2.4GHz and 5GHz),
Bluetooth 4.1, HD Webcam (1280 x 720) supporting High Dynamic Range (HDR), 1 - USB 3.1 Type C Gen 1 port (up to 5 Gbps), 2 - USB 3.0 ports (one with power-off charging), 1 - USB 2.0 port, 1 - HDMI Port with HDCP support, 6-cell Li-Ion Battery (2800 mAh), Up to 13.5-hours Battery Life, 5.27 lbs. | 2.39 kg (system unit only) (NX.GRYAA.001).

Maintenance Mode

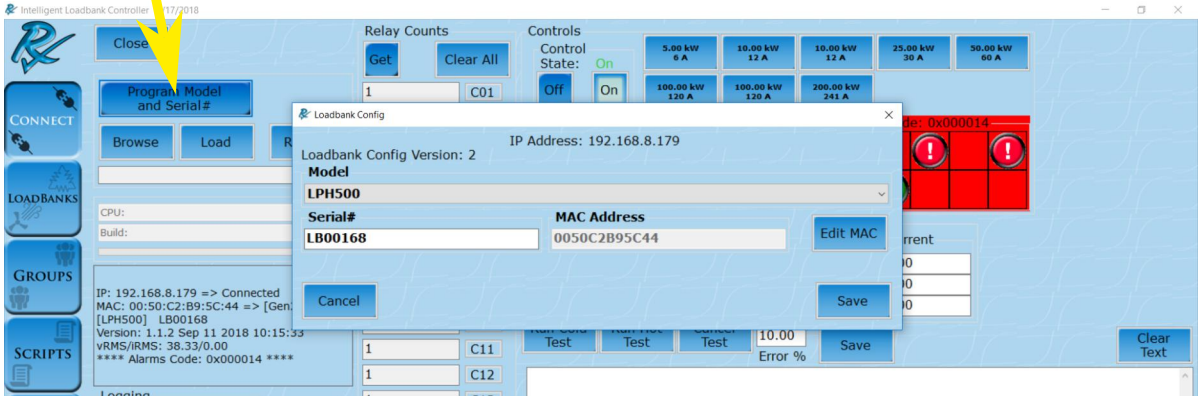
Click Lock to enter Maintenance mode

Password: 6606



Relay counts can be indivdually cleared
by clicking on the Cxx button
Or clear All

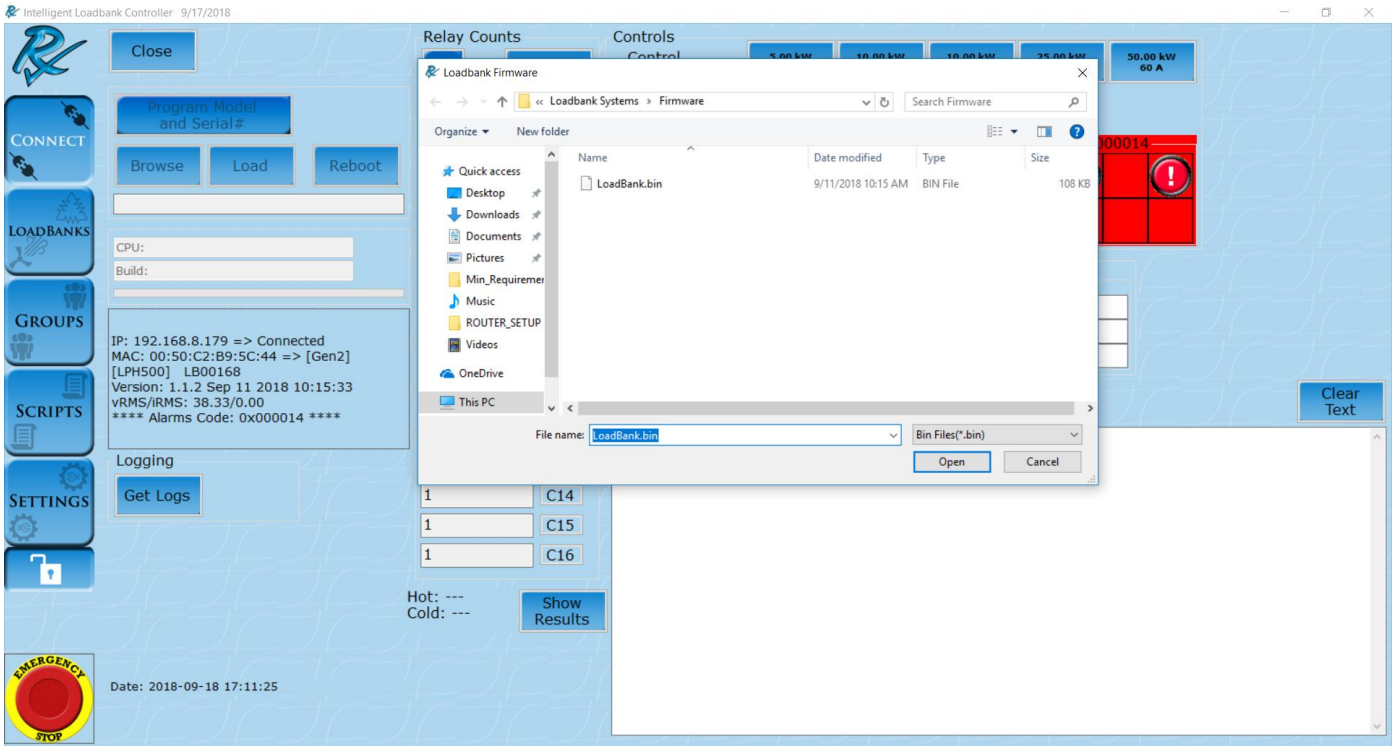
Click Program to change Serial Number, Model or switch values



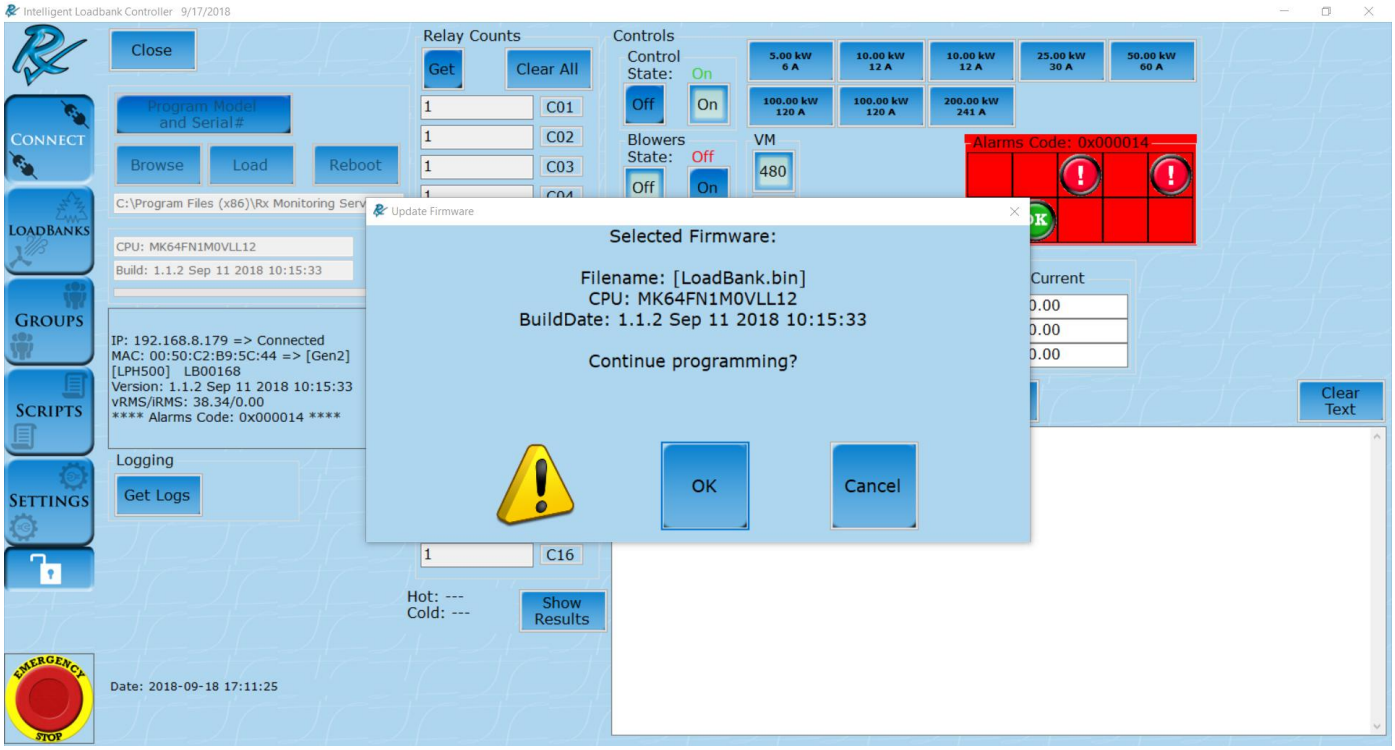
Click Save to push settings to load bank flash.

Update Firmware

Click Browse to get .bin file should default to current version; Click Open.



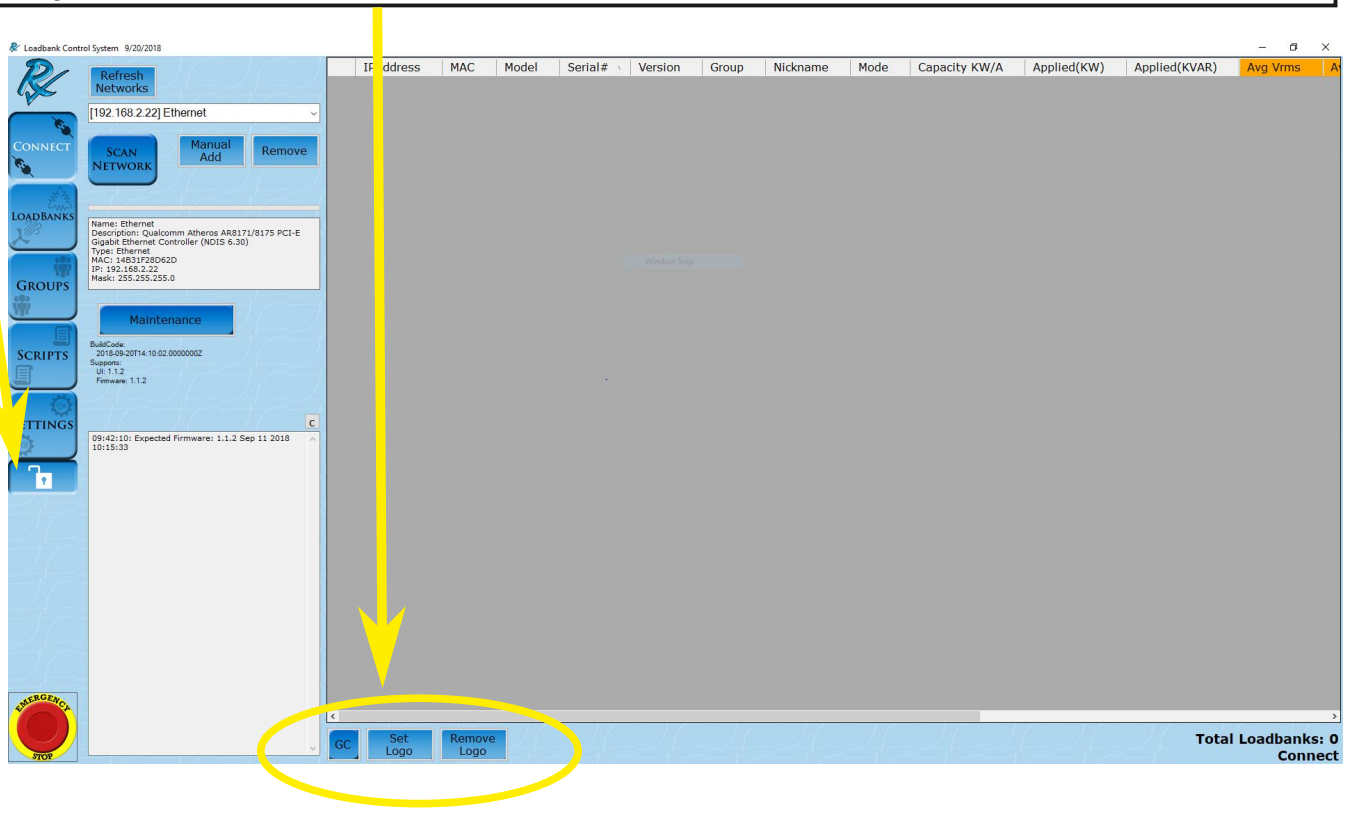
Click Load, popup will show new verison ID: Click OK.

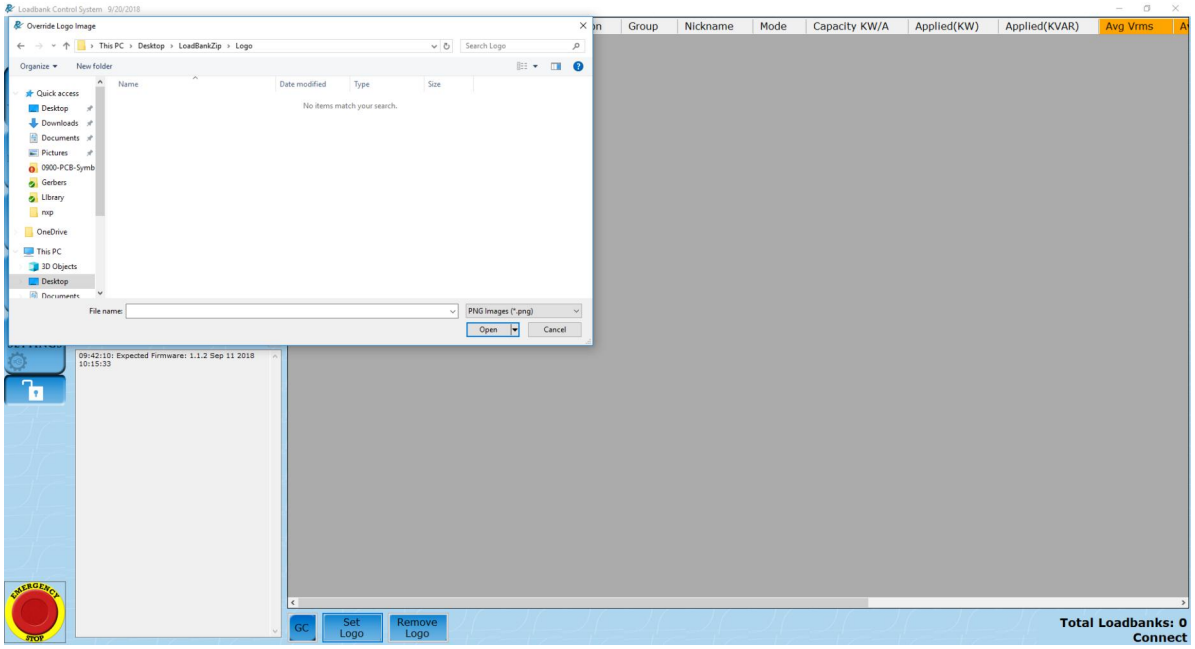


Change Logo

The loadbank software can be customized with your company logo. The ideal way to do this is login as a admin on the computer. (If you don't do as a admin account, you will have to change for each user)
Unlock the software by clicking the lock on the left bar.
On the **Connect** Screen click the "**Set Logo**" on the bottom of the page (See picture)Highlight the .png file that you would like to use and click **"Open"**
Remove Logo will default to the RxMS logo.

The Logo ideal size 100 x 70 pixels. The software will try to scale the picture approperatly.





LED Operation:

No ethernet hardware connections = **LED's ON**

Phy connection (Ethernet cord and connecting switch works) **LED off & blinking during communications**

Leds should be on when powered up. If not then the board is not getting 120V power. Or something is wrong with the 120Vac power supply or on board UPS.

If leds do not turn on, check this 3.15A fuse. 120V should be on both sides.

If voltage is present, board will need to be returned.

If on board LEDS are blinking, switch is working on board.

The microcontroller should can be confirmed working by 12V LED (External) blinking when DHCP server found.

Alarms listing

Below are the alarms that can be listed in the Syslog as well as the on board memory.
Highlighted Alarms in red are board hardware issues and should be reported to RxMS.

"ALARM - Blower Alarm Set"

"ALARM - Blower Alarm Cleared"

"ALARM - Over Temperature Set"

"ALARM - Over Temperature Cleared”

"ALARM - Louvers Fault Set"

"ALARM - Louvers Fault Cleared"

"ALARM - General Failure Fault Set"

"ALARM - General Failure Fault Cleared"

"ALARM - Container Over Temp Fault Set"

"ALARM - Container Over Temp Fault Cleared"

"ALARM - Reactor Over Temp Fault Set"

"ALARM - Reactor Over Temp Fault Cleared"

"ALARM - On Board Over Temperature Set”

"ALARM - On Board Over Temperature Cleared"

"480 Mode Change."

"240 Mode Change."

"ALARM - Fan Motor Fail Set"

"ALARM - Fan Motor Fail Cleared"

"ALARM - Voltage Fault Set”

"ALARM - Voltage Fault Cleared"

"ALARM - Air Flow Fault Set”

"ALARM - Air Flow Fault Cleared"

"ALARM - Manual Mode Fault Set"

"ALARM - Manual Mode Fault Cleared"

"ALARM - Meter Comms Fault Set"

"ALARM - Meter Comms Fault Cleared"

"RTC Time Set."

"System Logs Cleared."

"Relay Counts Cleared."

"MeterLogs Clear Start."

"MeterLogs Clear Complete."

"****** Start ******"

"Shutting down."

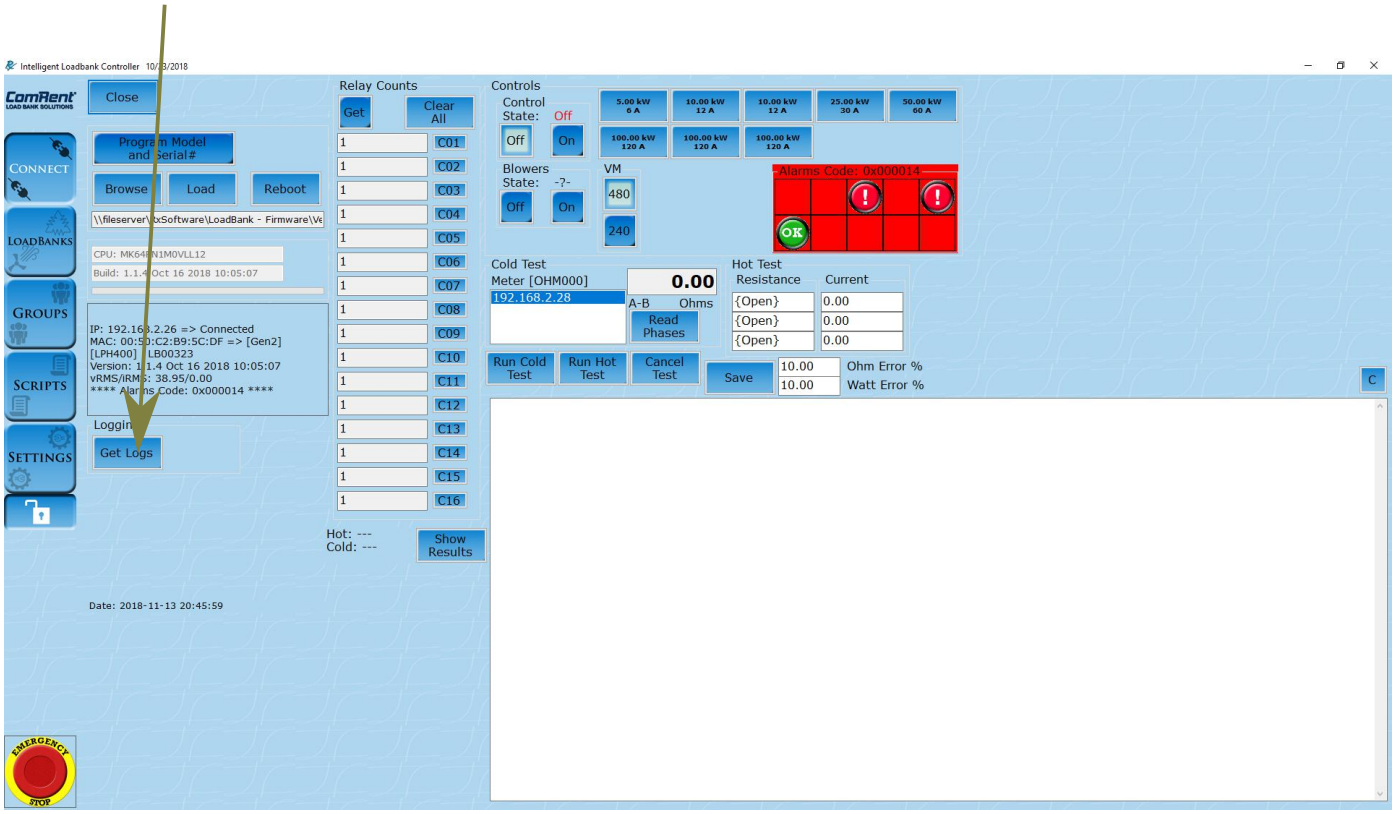
"****** WDOG Recovery ******"

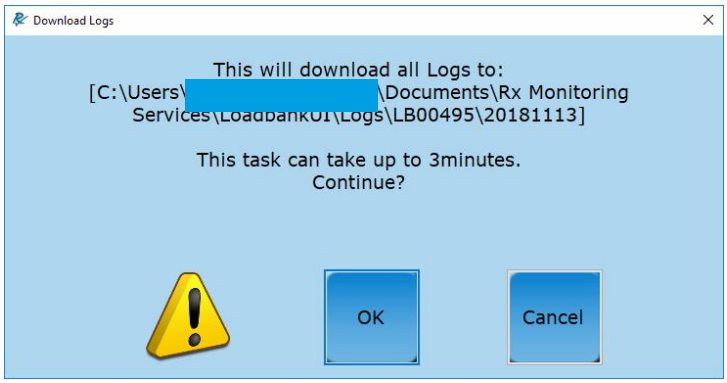
"Version: #.#.##"

"SPIIntReadRelays io value mismatch"

"SPIIntVerifyRelays relay states do not match outputs: 0xHHHH 0xHHHH"

To get the SysLog that is stored on the system, go into maintenance mode and click the **Get Logs** button.
Click **OK** on popup.





File explore to:
\Documents\Rx Monitoring Services\LoadbankUI\Logs Serial****Date Downloaded****

This is a typical output from the syslog

Note: All times are in UTC, you will need to convert to the local time.

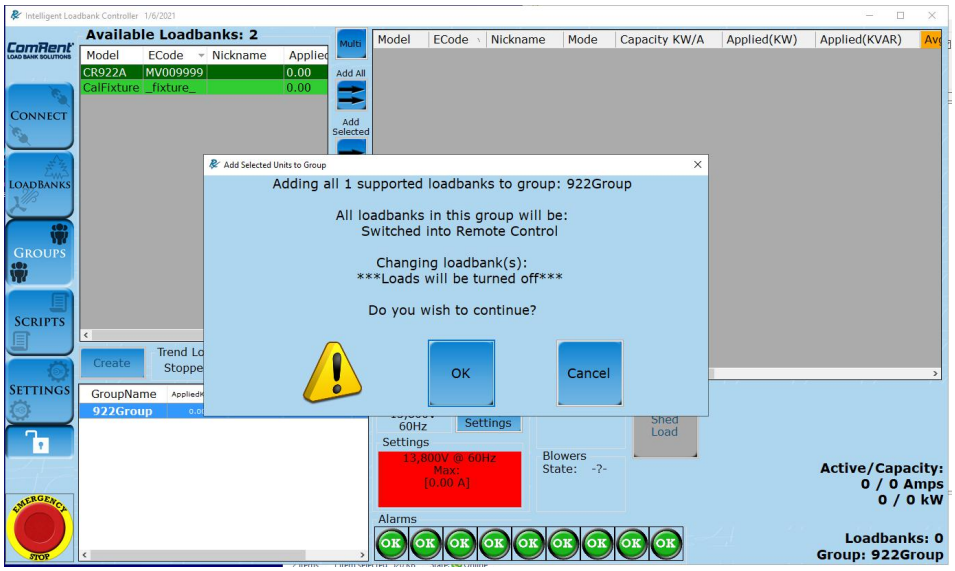
[CALL_IS_OK] 1/1/1970 12:00:27 AM ::: ALARM - Meter Comms Fault Set
[CALL_IS_OK] 1/1/1970 12:00:57 AM ::: Shutting down.
[CALL_IS_OK] 1/1/1970 12:00:00 AM ::: ****** Start ******
[CALL_IS_OK] 1/1/1970 12:00:00 AM ::: Version: 1.0.4 Aug 1 2017 15:40:00
[CALL_IS_OK] 1/1/1970 12:00:20 AM ::: Shutting down.
[CALL_IS_OK] 1/1/1970 12:00:00 AM ::: ****** Start ******
[CALL_IS_OK] 1/1/1970 12:00:00 AM ::: Version: 1.0.4 Aug 1 2017 15:40:00
[CALL_IS_OK] 1/1/1970 12:00:35 AM ::: Shutting down.
[CALL_IS_OK] 1/1/1970 12:00:00 AM ::: ****** Start ******
[CALL_IS_OK] 1/1/1970 12:00:00 AM ::: Version: 1.0.4 Aug 1 2017 15:40:00
[CALL_IS_OK] 1/1/1970 12:00:47 AM ::: Shutting down.
[CALL_IS_OK] 1/1/1970 12:00:00 AM ::: ****** Start ******
[CALL_IS_OK] 1/1/1970 12:00:00 AM ::: Version: 1.0.4 Aug 1 2017 15:40:00
[CALL_IS_OK] 1/1/1970 12:00:51 AM ::: Shutting down.
[CALL_IS_OK] 1/1/1970 12:00:00 AM ::: ****** Start ******
[CALL_IS_OK] 1/1/1970 12:00:00 AM ::: Version: 1.0.4 Aug 1 2017 15:40:00
[CALL_IS_OK] 1/1/1970 12:00:50 AM ::: Shutting down.
[CALL_IS_OK] 1/1/1970 12:00:00 AM ::: ****** Start ******
[CALL_IS_OK] 1/1/1970 12:00:00 AM ::: Version: 1.0.4 Aug 1 2017 15:40:00
[CALL_IS_OK] 1/1/1970 12:00:33 AM ::: Shutting down.
[CALL_IS_OK] 1/1/1970 12:00:00 AM ::: ****** Start ******
[CALL_IS_OK] 1/1/1970 12:00:00 AM ::: Version: 1.0.4 Aug 1 2017 15:40:00
[CALL_IS_OK] 1/1/1970 12:00:12 AM ::: Shutting down.
[CALL_IS_OK] 1/1/1970 12:00:00 AM ::: Version: 1.0.4 Aug 1 2017 15:40:00
[CALL_IS_OK] 1/1/1970 12:00:27 AM ::: ALARM - Meter Comms Fault Set
[CALL_IS_OK] 11/12/2018 5:14:23 PM ::: Relay Counts Cleared.
[CALL_IS_OK] 11/12/2018 5:20:16 PM ::: Shutting down.
[CALL_IS_OK] 1/1/1970 12:00:00 AM ::: ****** Start ******
[CALL_IS_OK] 1/1/1970 12:00:00 AM ::: Version: 1.1.4 Oct 16 2018 10:05:07
[CALL_IS_OK] 1/1/1970 12:00:28 AM ::: ALARM - Meter Comms Fault Set
[CALL_IS_OK] 11/12/2018 10:13:53 PM ::: Shutting down.
[CALL_IS_OK] 1/1/1970 12:00:00 AM ::: ****** Start ******
[CALL_IS_OK] 1/1/1970 12:00:00 AM ::: Version: 1.1.4 Oct 16 2018 10:05:07
[CALL_IS_OK] 1/1/1970 12:00:28 AM ::: ALARM - Meter Comms Fault Set

Start time will always be 1/1/1970

If attached to a PC after boot, time will be set and shutdown time will be the correct UTC time.

Export Configuration (Swap Controller)

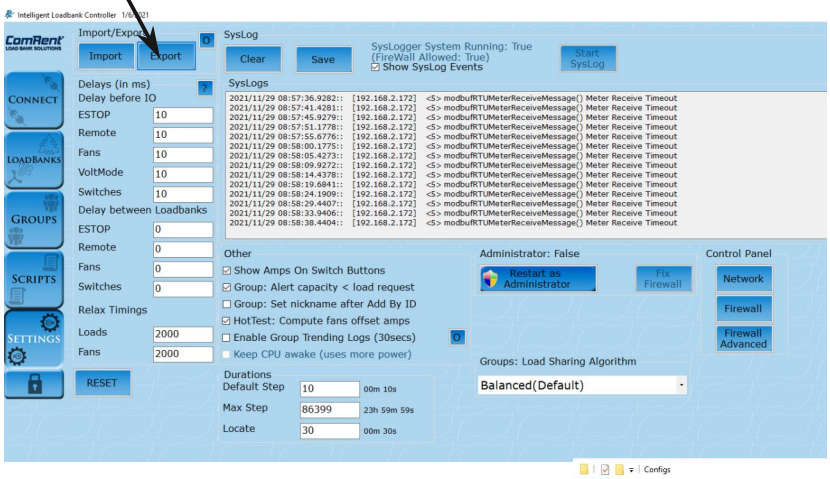
Because of the amount of settings that are stored in a group. Swapping a controller can not be done by making a new group on a second tablet and putting the load banks in that group. (This would cause a load shed while adding loadbanks to the group) See warning below.

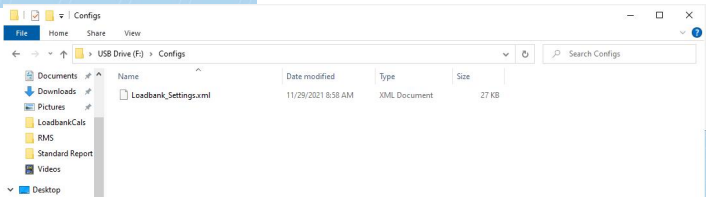


To swap a controller and all of the settings (without changing anything on the loadbanks) follow the steps below.

1.) On the first tablet: Go to **Settings -> Export**

2.) Save the **Loadbank_Settings.xml** to a USB stick to move to the second tablet.





3.) On the **(new) Second Tablet** : Attach and Scan the network to find loadbanks.

4.) Go to **Settings -> Import**

5.) Explore to the Loadbank_Settings.xml on the USB stick. Click Open.

6.) All settings are now copied to the second tablet with no changes to the loadbanks.

The settings are also automatically saved at the location whenever something is changed:

C:\Users\{current user}\Documents\Rx Monitoring Services\LoadbankUI\AutoSave.xml