

Model 375 Series, 375P, 3276, and 4525/4530 Ethernet Network Settings Addendum

This addendum describes how to configure the network settings for a 375 Series, 3276, 4525, or 4530 that has been configured for Ethernet using the new ESP32 Ethernet board. Ethernet boards using the Rabbit Ethernet board do not support all the features described below.

The new ESP32 Ethernet board looks like this:



Part Number	Description	Ethernet Board
4396-579	Model 375/375P Legacy Ethernet Hardware Kit	ESP32
4498-958	Model 3276 Ethernet Hardware Kit	ESP32
4558-566	Model 375 Ethernet Option	ESP32
4558-567	Model 375 Retrofit to support ESP32	ESP32
4558-616	Model 375 Legacy ESP32-POE Assembly/Mount Board	ESP32
4558-617	Model 375 ESP32-POE Assembly/Mount Board	ESP32
4558-098	Model 375 Ethernet Hardware Interface	RCM3750
4558-105	Model 375 Webpage Hardware Interface	RCM3750

Part Number	Description	Ethernet Board
4511-954-01	Model 4525-5000 Main Module Ethernet Kit	ESP32
4517-540	Model 4530 Parts Kit	ESP32
4558-618	Model 4525 ESP-POE Assembly/Mount Board	ESP32
5396-565	Model 4525 Main Board	ESP32
5558-536	Model 4530 Main Board	ESP32

Modes of Operation

The new firmware in the Ethernet kit supports all the instruments above using a single firmware version. The three different modes are:

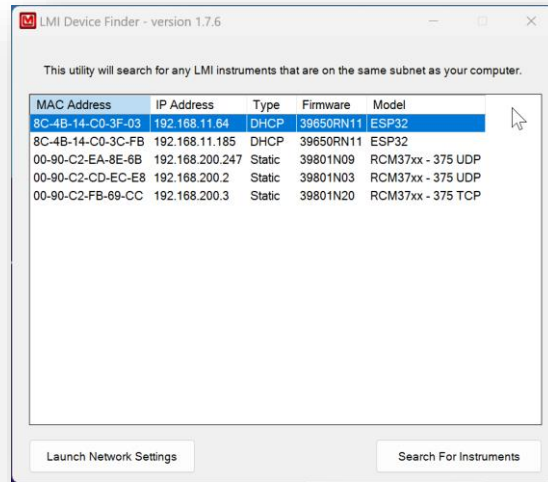
1. Model 375 TCP – Compatible with the Model 375 Web page and Universal software.
2. Model 375 UDP – Compatible with the Model 375 Ethernet software.
3. Model 4525 – Compatible with the Model 4525/4530.

The mode can be changed by selecting the radio button at the top of the network settings page and saving. The mode must be saved first before the corresponding parameters are shown.

NOTE: it is no longer necessary to have custom firmware on the 375 main board to support Ethernet software using the 375 UDP mode. The UDP port and unit id are now handled by the Ethernet board. If the firmware is already installed, those settings will be ignored in favor of the settings on the Ethernet board.

Finding the instruments on the network

The instruments can be found by launching the Device Finder utility. This can be downloaded from our website here: <https://ludlums.com/software/DeviceFinder.zip>



Device Finder will search the local subnet for any instruments on the network using a UDP broadcast message on UDP port 20034. This port must be opened on the computer running the utility for it to find any instruments.

The MAC address, IP address, Type (DHCP or Static), Firmware versions, and Model will be displayed.

MAC Addresses

MAC Address	Description
00-90-C2 or 00-C0-33	Rabbit RCM37xx (Obsolete)
8C-4B-14 or 08-3A-AF	ESP32 (New Board)

To open the instruments network setting page, select the instrument from the list and click **Launch Network Settings**. This will open the default web browser to the IP address of the instrument. You can also type in the IP address into a web browser directly to access the network settings page.

NOTE: RCM37xx – 375 UDP does not have a network settings page.

If an instrument does not show up in the list or was added to the network after the search was completed, click the **Search for Instruments** button to perform another search.

Network Settings

Using either the Device Finder app or typing the IP address directly into a web browser will open the Network Settings page of the Ethernet board. Depending on the current mode of operation the network settings page will display different parameters. The modes will all have some common parameters such as serial number and network settings.

Before the applicable settings are displayed, the mode must be changed using the password and Submit button.

The screenshot shows the 'Model 375 Network Settings' web page. At the top, there are three radio buttons for mode selection: '375 TCP Mode' (selected), '375 UDP Mode', and '4525 Mode'. Below the mode selection, a note states: 'When changing to 4525 mode, IP address will change to 192.168.200.1'. The page is divided into several sections:

- Connection Status:** Connected to Supervisor, Current Reading: 0227.0 cpm.
- Firmware Version:** 39650RH11
- MAC Address:** 8C-4B-14-C0-3C-FB
- Last Updated:** 4/19/2023, 4:44:58 PM
- Serial Number:** 325486 (Serial number of device (000000 - 999999))
- Unit Code:** eprn (Units of device)

Below these fields, there are two radio buttons: 'Use DHCP' (selected) and 'Use Static Address'. A note says: 'When changing between DHCP and static IP address, the setting must be saved first before the network settings can be changed.' The network configuration section includes:

- IP Address:** 192.168.11.165 (IP address of device)
- Subnet Mask:** 255.255.0.0 (Subnet mask IP address of device)
- Gateway:** 192.168.0.1 (Gateway IP address of device (automatically set for DHCP))
- DNS:** 192.168.0.71 (DNS IP address of device (automatically set for DHCP))
- TCP/IP Port:** 50001 (Port number of Supervisor service (0-65535))
- Supervisor IP Address:** 10.0.0.50 (IP address that device will use to attempt to connect to the Supervisor service)

At the bottom, there are password fields: 'New Password (optional)', 'Confirm New Password (optional)', and 'Password'. A 'Submit' button is located below the password fields. The footer contains contact information for Ludlum Measurements, Inc.

Figure 1 - 375 TCP Mode

Model 375 Network Settings

375 TCP Mode
 375 UDP Mode
 4525 Mode

When changing to 4525 mode, IP address will change to 192.168.200.1

Current Reading	0020.0 cpm		
Firmware Version	39650RN11		
MAC Address	8C-4B-14-C3-3C-FB		
Last Updated	4/19/2013, 4:45:51 PM		

Serial Number	<input type="text" value="52496"/>	Serial number of device (00000 - 99999)	
Unit Code	<input type="text" value="cpm"/>	Units of device	

Use DHCP
 Use Static Address

When changing between DHCP and static IP address, the setting must be saved first before the network settings can be changed.

IP Address	<input type="text" value="192.168.11.155"/>	IP address of device	
Subnet Mask	<input type="text" value="255.255.0.0"/>	Subnet mask IP address of device	
Gateway	<input type="text" value="192.168.0.1"/>	Gateway IP address of device (automatically set for DHCP)	
DNS	<input type="text" value="192.168.0.71"/>	DNS IP address of device (automatically set for DHCP)	
UDP Port	<input type="text" value="5000"/>	UDP Port number for broadcast UDP Messages (5000-5999)	
Unit ID	<input type="text" value="1"/>	Unit ID of M375 (1-255)	

If you wish to change any of the above settings, simply enter the correct password in the "Password" text box, then click on the "Submit" button.

If you wish to change the password, enter the current password in the "Password" text box and the new password in the "New Password" and the "Confirm New Password" text boxes, then click on the "Submit" button.

New Password (optional)	<input type="text"/>
Confirm New Password (optional)	<input type="text"/>
Password	<input type="text"/>
<input type="button" value="Submit"/>	

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Figure 2 - 375 UDP Mode

Model 4525 Network Settings

375 TCP Mode
 375 UDP Mode
 4525 Mode

When changing to 4525 mode, IP address will change to 192.168.200.1

Connection Status	Waiting for connection from Supervisor...		
Firmware Version	39650RN11		
MAC Address	8C-4B-14-C3-3F-03		

Serial Number	<input type="text" value="GM0V791"/>	Serial number of device (GM00000 - GM09999)	
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Use DHCP
 Use Static Address

When changing between DHCP and static IP address, the setting must be saved first before the network settings can be changed.

IP Address	<input type="text" value="192.168.11.64"/>	IP address of device	
Subnet Mask	<input type="text" value="255.255.0.0"/>	Subnet mask IP address of device	
Gateway	<input type="text" value="192.168.0.1"/>	Gateway IP address of device (automatically set for DHCP)	
DNS	<input type="text" value="192.168.0.71"/>	DNS IP address of device (automatically set for DHCP)	

If you wish to change any of the above settings, simply enter the correct password in the "Password" text box, then click on the "Submit" button.

If you wish to change the password, enter the current password in the "Password" text box and the new password in the "New Password" and the "Confirm New Password" text boxes, then click on the "Submit" button.

New Password (optional)	<input type="text"/>
Confirm New Password (optional)	<input type="text"/>
Password	<input type="text"/>
<input type="button" value="Submit"/>	

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Figure 3 - 4525 Mode

Common Settings

The following settings are common to all operating modes.

DHCP/Static IP Address – These two radio buttons determine if the IP address and other network settings are set statically (Manually Assigned) or automatically through DHCP. When set to DHCP, the network settings shown are the values set by DHCP. To set the network settings manually, click the Use Static IP address radio button and fill in the appropriate values for the network settings.

When in DHCP mode, if the radiation monitor cannot get an IP address automatically, it will fall back to an IP address in the 169.254.x.x range.

Serial Number – This is the serial number stamped on the front of the instrument or on a sticker.

IP Address – An IP address is a unique IPV4 address assigned to each device on the network. It can be assigned manually or dynamically through DHCP.

Subnet Mask - A subnet mask is a 32-bit number created by setting host bits to all 0s and setting network bits to all 1s. In this way, the subnet mask separates the IP address into the network and host addresses.

Gateway – The Default Gateway IP address is the device that allows access to servers that are outside of the network.

DNS – The DNS IP address is the server that is responsible for converting human readable names into IP addresses.

Password Settings

To save settings the correct password must be entered into the Password field. By default, the password is password. To change the password, enter the new password in the New Password field and retype it in the Confirm new Password field. Then enter the current password and click the Submit button.

Model 375 TCP Mode

The TCP mode sends data to a user-defined IP address and user-defined TCP port number. This mode is compatible with both the 375 Web page and Universal software. The following settings can be set in this mode.

Unit Code – Set the display units reported to the software. This must match the label on the front of the instrument. Choices are: $\mu\text{R/hr}$, mR/hr , R/hr , $\mu\text{Sv/hr}$, mSv/hr , Sv/hr , $\mu\text{rem/hr}$, mrem/hr , rem/hr , cpm , cps , kcpm , kcps .

TCP/IP Port – Sets the port number that the Supervisor computer is listening on. The default is 50000 but can be adjusted to 50000 – 59999.

Supervisor IP Address – Sets the IP address that the instrument will connect to. This is the computer running the Windows service of the web page or Universal software.

The data is sent every two seconds in the following format:

```
<?xml version="1.0" encoding="us-ascii" ?>
<area_monitor rev="1.0" serial="12345">
  <status>
    <rate>9999.9</rate>
    <units_code>99</units_code>
    <audio>1</audio>
    <alarm1>1</alarm1>
    <alarm2>1</alarm2>
    <over_range>1</over_range>
    <monitor>1</monitor>
    <error_code>9</error_code>
  </status>
</area_monitor>
```

The data has been formatted here to show the structure more easily, the actual data does not have line breaks after each section and is one continuous line.

Model 375 UDP Mode

The UDP mode sends data to a user defined UDP port number. This mode is compatible with the Model 375 Ethernet software. The data are sent using a broadcast IP Address of 255.255.255.255. Any device on the same subnet will be able to see the data on the correct UDP port number. The following settings can be set in this mode.

Unit Code – Set the display units reported to the software. This must match the label on the front of the instrument. Choices are: μ R/hr, mR/hr, R/hr, μ Sv/hr, mSv/hr, Sv/hr, μ rem/hr, mrem/hr, rem/hr, cpm, cps, kcpm, kcps.

UDP Port – Sets the UDP port that the data will be broadcasted. This is adjustable from 50000 to 59999.

Unit ID – This is a unique id number assigned to each instrument on the network. Typically instrument one is assigned a unit id of 1, the next one 2, etc.

NOTE: Previous versions of the Ethernet board required a special firmware to be installed in the 375 to be able to set the unit id and UDP port. On the newer versions, this is set here in the network settings page, so no special firmware is required. If the instrument has the special firmware, the unit id and UDP port are ignored, instead using the values set on the network settings page.

The data is formatted as a string, very much like the standard RS-232 data output. See below:

```
Byte 1      L
Byte 2      M
Byte 3      I
Byte 4      0          x
Byte 5      x          x
Byte 6      x      OR  x
Byte 7      x          x
Byte 8      .          .
Byte 9      x          0
Byte 10     Audio Status = 1 = on
Byte 11     Alarm Status = 1 = on
Byte 12     Alert Status = 1 = on
Byte 13     Over Range Status = 1 = on
Byte 14     Monitor Status = 1 = on
Byte 15     Error Code
Byte 16     UNIT ID CHAR 1
Byte 17     UNIT ID CHAR 2
Byte 18     UNIT ID CHAR 3
Byte 19     PORT NUM CHAR 1
Byte 20     PORT NUM CHAR 2
Byte 21     PORT NUM CHAR 3
Byte 22     PORT NUM CHAR 4
Byte 23     3          Firmware version of Model 375|
Byte 24     9
Byte 25     6
Byte 26     x
Byte 27     x
Byte 28     n
Byte 29     x
Byte 30     x
Byte 31     3          Firmware version of Ethernet board
Byte 32     9          Note: The firmware version of the
Byte 33     8          Ethernet board is not sent out the
Byte 34     x          serial port of the Model 375!
Byte 35     x
Byte 36     n
Byte 37     x
```



```
Byte 38    x
Byte 39    Carriage Return (0DH)
Byte 40    Line Feed (0AH)
```

If the firmware in the instrument is standard, then the values for the instrument firmware in the data output will be all the letter X.

Model 4525 Mode

The Model 4525 mode is compatible with both the 4525 and 4530 gate monitors. The Ethernet board waits for a connection from the Supervisor computer on TCP port 23. Once the connection is established, it begins passing data back and forth from the Supervisor computer and the gate monitors serial port.