Overview

This document covers the mounting, installation and initial start-up of the TAC I/A Series® UNC-520. It applies to the following products:

North American Model	International model
UNC-520	UNC-520-N

These models are collectively known as the UNC-520.

This document is targeted at engineers, technicians, and service personnel who are involved in control system installation and start-up using the Niagara Framework®. These are the main topics included in this document:

Also included in this document are several appendixes, as follows:

This document does not cover station configuration. For more information about this topic, please refer to the "Related Documentation" section on page 19.

Product Description

The UNC-520 is a compact embedded processor platform with Flash Memory for backup. It provides integrated control, supervision, and legacy device integration. When connected over an Ethernet network, the UNC-520 can communicate with BACnet™ devices or systems and share data between LONWORKS™ devices and BACnet exposed system data. A complete set of Java-based control, application, logging, and user interface "objects" are included in a library for the Systems Integrator to create a robust monitor and control system for any size building. With the Web User Interface option (factory ordered as UNC-520-WEB), the UNC-520 can directly serve live data and dynamic displays over the Internet to any standard web browser such as Internet Explorer.

Included in this Package

Included in this package you should find the following items:

- A UNC-520.
- *UNC-520 Installation Instructions*, F-27391-2 (this document).
- A packing slip, which lists the factory settings for IP address, machine name, and host logon.
- A hardware bag containing the following items:
    – Four 3-position RS-485 screw terminal connector plugs.
    – Two wire nuts (North American model only).
    – One 2-position LON screw terminal connector plug
- Optional items (if ordered):
    – Factory-installed modem.
    – RJ-45 to DB-9 adapter (for the RS-232 port).
    – Silver satin patch cable (used between the adapter and serial port).

Precautions

This document uses the following warning and caution conventions:

⚠️
Caution   Cautions remind the reader to be careful. They alert readers to situations where there is a chance that the reader might perform an action that cannot be undone, might receive unexpected results, or might lose data. Cautions contain an explanation of why the action is potentially problematic.

⚠️
Warning   **Warnings alert the reader to proceed with extreme care. They alert readers to situations where there is a chance that the reader might do something that can result in personal injury or equipment damage. Warnings contain an explanation of why the action is potentially dangerous.**

Safety Precautions

The following items are warnings of a general nature relating to the installation and start-up of the UNC-520 controller. Be sure to heed these warnings to prevent personal injury or equipment damage.

⚠️
Warning
- **A 120Vac (North American model) or 230Vac (international model) circuit powers the UNC-520 controller. Disconnect power before installation or servicing to prevent electrical shock or equipment damage.**
- **Make all connections in accordance with national and local electrical codes. Use copper conductors only.**
- **To reduce the risk of fire or electrical shock, install in a controlled environment relatively free of contaminants.**
- **This device is only intended for use as a monitoring and control device. To prevent data loss or equipment damage, do not use it for any other purpose.**

Static Discharge Precautions

Static charges produce voltages high enough to damage electronic components. The microprocessors and associated circuitry within a UNC-520 controller are sensitive to static discharge. Follow these precautions when installing, servicing, or operating the system:

⚠️
Caution
- **Work in a static-free area.**
- **Discharge any static electricity you may have accumulated. Discharge static electricity by touching a known, securely grounded object.**
- **Do not handle the printed circuit board (PCB) without proper protection against static discharge. Use a wrist strap when handling PCBs, with the wrist strap clamp secured to earth ground.**

Installation and Start-up

There are four major steps to installing and starting the UNC-520, as outlined below:

1. Unpack the UNC-520.
2. Install the UNC-520.
3. Upgrade, License, and Configure the Host.
4. Install the Station Database and Start the Station.

Please read through the entire document before beginning the installation procedure.

Unpack the UNC-520

Unpack the UNC-520 and inspect the contents of the package for damaged or missing components. If damaged, notify the appropriate carrier at once and return any damaged components for immediate repair or replacement.

Install the UNC-520

Installing the UNC-520 has four major phases, as outlined below:

1. Physical Installation.
2. Make Connections.
3. Power Up and Initial Checkout.
4. Connect to the UNC-520.

Physical Installation

Tools Required

The following tools and supplies may be required for installation:
- 1/4-inch nut driver: used to remove the transformer shield.
- Small flat-blade screwdriver: used for RS-485 connectors (all models) and power terminal connections (UNC-520-N only).

Note   If removing or installing the circuit board from the enclosure, a 1/4-inch thin-walled *socket* is required (*do not use a nut driver*). See "Replacing the UNC-520 Circuit Board," page 25.

Mounting

Mount the UNC-520 controller in a location that allows clearance for wiring, servicing, and module removal. For mounting details refer to Figure 3 on page 18.

Pay attention to the following recommendations and precautions when mounting and installing the unit.

- This product is intended for indoor use only. The unit should not be exposed to ambient conditions outside of the range of 32° to 122° F (0° to 50° C) and relative humidity outside the range 5% to 95%, non-condensing.
- If the controller is mounted inside an enclosure, that enclosure should be designed to keep the unit within its required operating range considering a 20-watt dissipation by the controller. This is especially important if the controller is mounted inside an enclosure with other heat producing equipment.
- See Figure 3 on page 18 for proper mounting clearances. Minimum clearance from the wall on which the unit is mounted is 0.2 inch (5 mm), provided by the dimpled mounting feet. Ensure that this space is not compromised and that airflow is not blocked behind the unit.
- Do **not** mount the unit:
  - in an area where excessive moisture, corrosive fumes, or explosive vapors are present.
  - where vibration or shock is likely to occur.
  - in a location subject to electrical noise. This includes the proximity of large electrical contactors, electrical machinery, welding equipment, spark igniters, and other equipment of this nature.
- The unit is designed to be wall mounted with the battery situated towards the bottom of the unit. For proper airflow at temperature extremes, do not mount the unit oriented in any other way.

Removing and Replacing the Cover

The UNC-520 cover is removable. The cover is secured in place with a knurled-edge, *slotted-head* screw.

Note   If you need a more secure installation for the cover, you can use a padlock through the security tab that protrudes through the cover.

Procedure 1   Removing the cover of a UNC-520.

Step 1   Loosen the cover screw and open the cover.
(You may need a flat-blade screwdriver to loosen the cover screw, if previously tightened this way.)

Step 2   On the inside of the door, loosen and remove the nut and locking washer that secures the green grounding strap to the cover.

Step 3   Pull the grounding strap off the screw post.

Step 4   Replace the locking washer, then the nut on the screw post and tighten.

Step 5   Close the door about half way.

Step 6   Slide the cover toward the top of the unit until the tops of the hinge tabs on the cover hit the top of the hinge slots on the left wall of the metal enclosure.

Step 7   Slide the hinge tabs out of the slots.

Procedure 2   Replacing the cover of a UNC-520.

Step 1   Align the hinge tabs on the cover with the hinge slots on the left wall of the metal enclosure.

Step 2   Slide the hinge tabs into the slots and slide the door toward the bottom of the unit, until the bottom of the hinge tabs hit the bottom of the slots.

Step 3   Loosen and remove the nut and locking washer on the grounding strap post on the door.

Step 4   Slide the ground strap onto the screw post and replace the locking washer, then the nut and tighten.

Step 5   Close the door and tighten the cover screw.

Make Connections

Make connections to the UNC-520 in the following order. For specific details on each step, refer to the "Wiring Details" section on page 13.

1. With the 6-position power connector disconnected from the board, wire the power to the transformer (North American model) or the power terminal block (International model). See "Power Wiring," page 13.

2. Connect the Ethernet cable.

3. Connect any other communication cables.

See Figure 2 on page 17 to locate connectors and other components on the UNC-520 controller.

Power Up and Initial Checkout

Ensure power wiring to the transformer has been completed before proceeding (see the "Power Wiring" section on page 13). The UNC-520 controller does not include an on/off switch. To apply power, insert the 6-position power connector to the board.

Refer to Figure 2 for the locations of status LEDs on the UNC-520 controller.

Checking the Heartbeat LED

When power is first supplied to the controller, the red heartbeat LED comes on solid for approximately 10 seconds, then begins to blink. The blink pattern of the heartbeat LED under normal operation differs for each installation (depending on station activity); but, in general, the LED should blink about once per second. The rate will be slower when the control engine is executing the station database and as more objects are added.

After applying power to the controller, if the heartbeat LED comes on (steady) and stays lit longer than two minutes, contact Schneider Electric Product Support for technical assistance. See also the "Using Status LEDs" section on page 19.

About the Battery

The UNC-520 is provided with a sealed lead acid battery. The sealed lead acid battery is automatically charged during normal operation. The UNC-520 monitors the battery's backup capability and generates battery trouble messages accordingly. After allowing the battery to charge for at least 12 hours following initial installation, investigate any battery trouble messages. Check the battery voltage level and connections before contacting Schneider Electric Product Support

⚠️
Caution   In the event of battery trouble messages, ensure the station database is backed up to removable storage so that it can be restored in the event of a power failure and loss of data.

For more information on the use and replacement of the battery, refer to the "Required Battery Maintenance" section on page 21.

Connect to the UNC-520

Notes
- These instructions assume that you have a PC installed with the TAC I/A Series Enterprise Server software, which includes the Java Desktop Environment (JDE) and the host administration tool (Admin Tool). This PC will be referred to as "your PC".
- You should use the same Niagara release level on your PC that you want to run in the UNC-520.

Once the UNC-520 has powered up, you should connect to it with the Admin Tool to assign it a unique IP address and other network settings to be used for communications. In addition, you must set current host date, time, and time zone since the UNC-520 is shipped with the battery disconnected.

Note   It is strongly recommended that you change the password for the default administrator-level host user account (tac)—see the related Caution on page 8 for more details.

The UNC-520 controller is pre-configured with an IP address in the range 192.168.1.14*x*, and a default subnet mask of 255.255.255.0.

Notes
- The IP address is listed on the packing slip that accompanies the unit.
- Make sure the PC that you use to access the UNC-520 during installation is assigned an address in the range: 192.168.1.1 to 192.168.1.254, with a subnet mask of 255.255.255.0.

Changing Networking Properties

You can use the Admin Tool from your PC to access all Niagara hosts including a remote UNC-520. In addition to station-related operations (that is, starting and stopping stations, archiving station data, importing and exporting configuration databases, and so on), the Admin Tool allows you to change operating system parameters on the UNC-520.

These changes include editing host name, TCP/IP networking properties, and setting time, date, and time zone. The reboot function allows you to restart a UNC-520 remotely to implement changes.

The right half of the Admin Tool window provides access to operating system parameters for the selected host. Six tabs are available: the **Summary** tab, the **Network Settings** tab, the **Users** tab, the **System Time** tab, **DbAdmin** tab, and the **Installation** tab.

The Networks Settings tab provides access to the selected host's networking properties, including host name (computer name) and the TCP/IP properties listed below (each property must be obtained from your Network Administrator). Use the **Apply** button to store any changes you make (note that changes are not effective until the host is rebooted). The **Reset** button restores changes since the last **Apply**.

- **Computer Name**—The name you want to use for this host.
- **DNS Domain**—The TCP/IP Domain Name System (DNS) domain this host belongs to, if used.
- **IP Address**—The unique Internet Protocol (IP) address for this host.
- **Subnet Mask**—The IP subnet mask used by this host.
- **Default Gateway**—The IP address for the device that forwards packets to other networks or subnets.
- **Hosts File**—A text file used by TCP/IP to associate host names with IP addresses.

- **DNS Servers**—The IP address for one or more DNS servers, each of which can automate associations between host names and IP addresses. The Add, Delete, Modify, and Up/Down buttons in the Admin Tool window can be used as needed to reference the DNS server IP addresses and set DNS search order.

Note If you specify a DNS server, you must provide a domain name for this host in the DNS Domain field. Otherwise, the DNS function will not work.

Use the following procedure to change the network settings of the new UNC-520.

Procedure 3   Setting the IP address on a new UNC-520.

Step 1 If not already installed, install the TAC **I/A Series Enterprise Server** (release 2.3.4 or later) software on your PC.

Step 2 Attach one end of a standard Category-5 Ethernet unshielded twisted pair (UTP) patch cable to the RJ-45 connector on the UNC-520.

Step 3 Attach the other end of the patch cable to a network port or directly to an Ethernet hub.

Tip If you do not have access to a hub, use an Ethernet crossover cable to connect the UNC-520 controller directly to your PC's network port. For more details about crossover cables, see the "About Ethernet Straight Through and Crossover Cables" section in the *Niagara Networking & Connectivity Guide*.

Step 4 Power up the UNC-520.

Step 5 Assign the IP address of your PC in the range of 192.168.1.1 to 192.168.1.254; however, do not duplicate the IP address already assigned the UNC-520 or another host on the LAN.

Step 6 From your PC, start the R2.3.4 (or later) **Admin Tool**.
   a. Click the **Start** button on the **Taskbar** and expand the **Programs** menu to view the **Niagara** folder.
   b. Click the **Admin Tool** icon to launch the **Admin Tool**.

Step 7 In the **Admin Tool** view, click **File** on the menu, and click **Open**.
   A connection dialog is displayed.

Step 8 Type the pre-assigned IP address of the UNC-520 and click **OK** (see the previous section "Connect to the UNC-520").

Step 9 Log on to the UNC-520 controller with default logon user name and password, as it appears on the packing list. Typical defaults are: user name = **tac** and password = **niagara**. Click **OK**.
   The UNC-520 controller (IP address) appears in the Admin Tool view as an open host.

Note By default, the **Summary** tab is shown first. Among the items listed is an **AC Power Status**, which shows "ok" if the power is good. If the UNC loses power (and is running on its battery), this status shows "failed." See also "Configure Power Shutdown Options," page 10.

Step 10 Click the **Network Settings** tab.

Step 11 Assign the UNC-520 a unique IP address and other network settings to be used for communications, as described above.

Note Once you have made changes to one or more network settings, you must reboot the host for those changes to be implemented.

Step 12 From the menu, select **Admin Tool > Host > Reboot** to implement your changes.

The UNC is now accessible using the IP address you assigned it (and not the default IP address).

Note An **ipchanges.txt** file is created or updated in the **<x>:\niagara\<release>\nre\user** directory on your PC whenever you change the IP address of a host using the Admin Tool. If needed, you can refer to this file to see the new (and previous) IP address. Ensure that you do not change the IP to an illegal IP address such as xx.xx.xx.255, xx.xx.xx.0, or 224.xx.xx.xx or higher.

Setting Host Date and Time

Use the **System Time** tab of the Admin Tool to access the host's system time, date, and time zone. To change the settings, click on the information you want to change and type the new information. When finished, click **Apply**. Changes you make in these settings become immediately effective on the host.

Configuring Host Users

Use the **Users** tab of the Admin Tool to access host user accounts on the UNC-520. The top area shows current user accounts, which you select by clicking on the user name. A selected user can be deleted, or have password and/or groups assignments modified (available user groups are accessed in the lower area).

Caution It is strongly recommended that you **change the password** for the default, administrator-level, *host* user account (tac) upon installation. This account cannot be deleted. Signing on as the "tac" administrator allows you to modify *all* host user accounts.

Note Be aware that once this user is modified, Schneider Electric cannot provide you with an alternative means of accessing the unit should the new password be lost or forgotten! The UNC must be returned to Schneider Electric for re-commissioning.

You can also add a new user. This produces a New User dialog to establish the User Name and Password. By default, a new user is not assigned to any user group(s); you need to check the Administrator group assignments in order for the user to use the JDE Admin Tool.

Use the **Apply** button to store any modifications, which become effective immediately. The **Reset** button restores changes since the last Apply.

Upgrade, License, and Configure the Host

This step consists of three main tasks:

1. Install the Software.
2. Configure Power Shutdown Options.
3. Configure the Serial Ports.

Install the Software

Each UNC-520 controller is shipped with the Wind River VxWorks™ operating system and the appropriate Java™ virtual machine (JVM) installed. However, the Niagara Runtime Environment (NRE) software, and the Niagara service (`niagarad`) are not installed and you must install them.

Use the following procedures to install the software. Consult the *Niagara Release 2.3.4 Installation and Upgrade Instructions* for more information.

These procedures assume that you have successfully tested connectivity to the UNC-520 and can access the unit over the Ethernet LAN.

Procedure 4   Installing the software.

Step 1   If not previously installed by selecting the **emb** and **nt** selections within the Niagara installer, use Window s® Explorer to manually copy the **emb** and **nt** directories. Copy the **emb** and **nt** directories from the R2.3.4 (or later) installation CD to the following directory on the hard drive of your PC:

<*x*>:\niagara\<*release*>

where <*x*>**:** is the drive where you installed TAC I/A Series Niagara, and <*release*> is the TAC I/A Series Niagara release you installed in Step 1 of Procedure 3.

Step 2   Using the R2.3.4 (or later) **Admin Tool,** connect to the UNC-520 as described in Procedure 3.

Step 3   Click the **Installation** tab.

Step 4   On the **Installation** view, click the **Installation Wizard** button.

Step 5   In the **Select Distribution Directory** dialog, select **emb** and click the **Install** button.

Step 6   In the **Niagara Remote Installation** dialog, click the radio button next to **Upgrade**, then click **Next**.

Step 7   In the **Upgrade** dialog box, click the check boxes for **Upgrade OS** and **Upgrade NRE**, then click **Next**.

Note   You must upgrade `niagarad` when you upgrade the OS.

Step 8   In the **Configure Modules** dialog box, click inside the **Upgrade/Add** column for each module licensed for installation on the UNC-520.

A red check mark appears for each selected module.

Note   The UNC-520 has finite memory resources (software modules run out of flash memory rather than a hard disk). Therefore, select only those modules that are required for station operation. If you are unsure about the software modules that have been purchased and licensed for the UNC-520, check the license by clicking **View License** on the **Installation** tab of the **Admin Tool** view.

Step 9   Click **Next** to continue.

Step 10   On the **Database Backup** dialog box, click the red check mark next to the database name and click **Next** to continue. You do not need to back up the pre-installed "test" database on the UNC-520.

The **Niagara License** dialog box opens.

Note   The UNC-520 controller is shipped with the license file already installed.

Step 11   On the **Niagara License** dialog box, click **Finish**.

A text box displays the tasks selected for the software upgrade.

Step 12   Click **OK** to continue.

A dialog displays each task as it is performed. Depending on the number of tasks to be performed, the process may take from one to three minutes.

Step 13 When complete, click **OK**.

Configure Power Shutdown Options

If desired, you can change the operation of UNC-520's "power monitoring/shutdown" mechanism by editing the **drivers.properties** file. Any changes to this file requires a station restart (host reboot) to become effective.

Table 1 lists power parameters for the UNC-520 found in **drivers.properties**. For additional information, please refer to the Engineering Notes document *Niagara System and Power Monitoring*.

Table 1   UNC-520 power parameters in the drivers.properties file.

Parameter, Default Value	Description
`power.enabled=true`	Enables the power driver, which provides graceful shutdown of the UNC on A/C power loss. When set to false: • the UNC does not monitor the A/C power. • on power loss, the UNC runs on battery backup until the battery is drained or A/C power is restored. **Note:** You should leave this value set to true, the default.
`power.pollRate=15`	The rate (in seconds) that the power monitor of the UNC waits before checking for A/C power loss. The monitor wakes up every `pollRate` seconds, checks the A/C power status, then goes back to sleep (if the power status is OK). However, if the UNC has lost A/C power, the monitor generates a station alarm and starts the shutdown timer. Default is 15 seconds. Station alarms are sent to the Station object's notificationClass.
`power.shutdownDelay=60`	Number of seconds the UNC waits between detecting the loss of A/C power and performing a graceful shutdown (where the UNC does a database backup and turns the board off). Typically, the default value is recommended. You can increase this time, however, this means more time running on battery power. In this case, if multiple lengthy power failures occur in succession, the battery may become completely discharged. Default is 60 seconds. If a station is not running, the UNC runs from the battery for 5 minutes before shutdown.
`power.batteryTestRate=15`	Number of minutes between the periodic testing of the backup battery under a simulated load. Default (and *minimum* recommended) value is **15** minutes. When the test runs, a 900mA load is placed on the battery for less than one second. If the voltage drops below a predefined value, then the "battery test failed." If the voltage is higher, then the "battery test passed." A station alarm is generated *only* when the new outcome is different than the previous test. If a battery is marginal, the test may go from "failed" to "passed," and then "failed" again.

Use the following procedure to view or edit the **drivers.properties** file.

Procedure 5   Viewing or editing the drivers.properties file.

Step 1 Using the R2.3.4 (or later) **Admin Tool,** connect to the UNC-520 as described in Procedure 3.

Step 2 Click the **Installation** tab.

Step 3 Click **Edit drivers.properties**.

The drivers.properties file opens in a text editor.

Step 4 Make any changes to the text of the file.

Step 5 From the file menu, choose **File > Close**.

If you made any changes, you are prompted to save them, otherwise the window closes.

Step 6 If prompted to save your changes, click one of the following:

- **Yes** to save your changes. The file saves and the window closes.
- **No** to discard your changes. The window closes.
- **Cancel** to return to the editing window, then refer to Step 4.

Step 7 From the menu, select **Admin Tool > Host > Reboot** to implement your changes.

Configure the Serial Ports

The UNC-520 has six serial ports (two RS-232 and four RS-485) and one optional on-board 56K modem. However, only six of these serial channels can be active at any one time.

If the optional 56K modem is installed, it is always COM2. COM1 is assigned to the first RS232 port and COM2 is assigned to the second RS232 port if no modem is installed. Changes to these assignments can be made using the R2.3.4 (or later) Admin Tool.

You can choose from one of the following options for configuring your serial ports:

Table 2   Serial port configuration options.

Option 1 (default)	COM2=232
Option 2	COM2=MODEM

Use the following steps to configure the serial ports.

Procedure 6   Configuring serial ports.
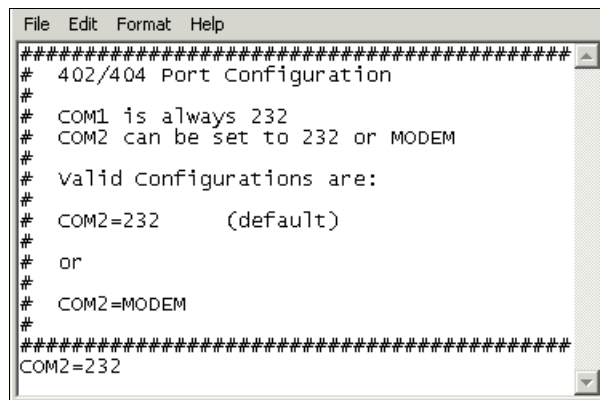
Step 1 As described in Procedure 3, open the R2.3.4 (or later) **Admin Tool** and connect to the UNC-520.

Step 2 Click the **Network Settings** tab.

Step 3 On the **Network Settings** tab, click **Edit Port Properties**.

The port.properties file opens in a text editor (see Figure 1).

Figure 1   port.properties file opened for editing.

Step 4 Make any changes to the text of the file, using any of the options from Table 2.

Step 5 From the file menu, choose **File > Close**.

If you made any changes, you are prompted to save them, otherwise the window closes.

Step 6   If prompted to save your changes, click one of the following:

- **Yes** to save your changes. The file saves and the window closes.
- **No** to discard your changes. The window closes.
- **Cancel** to return to the editing window, then refer to Step 4.

Step 7   From the menu, select **Admin Tool > Host > Reboot** to implement your changes.

Install the Station Database and Start the Station

This step assumes that you have created a station database on your PC and need to install that database onto the UNC-520. Use the following procedure to install a previously created station on the new UNC-520.

Note   Installing a station from your PC places everything in your local station database folder (**<x>:\niagara\<release>\stations\<stationname>**) onto the UNC-520. Since the UNC-520 has limited memory resources, you should limit what is in your local station database folder so you do not exhaust the resources on the UNC.

Procedure 7   Installing and starting a station.

Step 1   As described in Procedure 3, open the **Admin Tool** and connect to the UNC-520.

Step 2   Click the **Installation** tab.

Step 3   On the **Installation** tab, click the **Install Station** button.

Step 4   From the list of available stations on your PC, choose the desired station and click **OK**.

Step 5   Verify your intent to overwrite the existing database by clicking **Yes**.

Step 6   If more than one version or format of the station database exists on your PC, select the one that you intend to install and click **OK**.

A progress dialog displays tasks as it completes them. These messages indicate when the installation wizard is converting the database, starting maintenance, and reconnecting to the station.

Step 7   When the installation wizard indicates that it is complete, click **OK**.

The installation wizard automatically starts the station. Therefore, you should not have to perform this step separately. However, if the status of the station shows "idle", use the next step to start the station on the UNC controller.

Step 8   From the **Admin Tool** view, click the station name and click the **Start** button ▷ on the tool bar.

Verify that after showing a status of "starting," the selected station's status updates to **running**.

Wiring Details

The following section provides details on:

- Power Wiring
- Communications Wiring including:
  - Ethernet
  - Serial
  - LONWORKS (LON)
  - Modem (Optional)

Power Wiring

Building power is wired directly to the transformer supplied with the UNC-520. There is no disconnect switch in the unit, therefore you should wire the UNC to an external switch or breaker. Some local codes require the switch to be in sight of the unit. Also, conduit or similar is typically required for Class 1 wiring.

About the Transformer

The UNC-520 ships with a 120Vac, 50/60 Hz transformer and 12V battery. The UNC-520-N ships with a 230Vac, 50/60 Hz transformer and a 12V battery.

The transformer provides power to the controller in a 14-CT-14 configuration (28Vac center tapped). The power connector has been disconnected for shipping.

The following things should be noted about the UNC-520 transformer:

Warning
- **Wiring is to be made to the supplied transformer. All connections should be made in accordance with national and local electrical codes. Use copper conductors only.**
- **Do not power other devices from the transformer of the UNC. The transformer should be dedicated to running the UNC.**
- **Do not attempt to use any other power source or otherwise defeat the isolation provided by the integral transformer. A two-wire power source, including a 24V transformer, can cause permanent damage or greatly shorten the life of the unit.**
- **Verify that neither side of the transformer's secondary winding is connected to earth ground or building neutral.**

Making the Power Connection to the Transformer

With the 6-position power connector disconnected from the PCB, unscrew the nut and locking washer and remove the metal enclosure of the transformer.

Note   As typically required by code, high voltage "Class 1" wiring must be confined behind the transformer's enclosure divider. Be sure to replace this barrier after completing the wiring. Do not pinch wires underneath the barrier when re-installing the barrier.

For UNC-520—Using the provided wire nuts, connect **120Vac 50/60 Hz** power to the transformer and power connector using the information in Table 3.

Table 3   UNC-520—Building Power Termination.

Building Power Source		
Type of Wire	**Typical Color of Wire**	**Termination point**
Ungrounded—Hot	Black	Either wire of the 120V transformer
Grounded—Neutral	White	Other wire of the 120V transformer
Grounding—Ground (Earth)	Green or bare copper	Grounding stud

For UNC-520-2-N —Connect **230Vac, 50/60 Hz** power to the power terminal block using the information in Table 4.

Table 4   UNC-520-N—Building Power Termination.

Building Power Source (International)		
Type of Wire	**Typical Color of Wire**	**Termination point**
Ungrounded—Hot	Brown	Either empty terminus of the terminal block
Grounded—Neutral	Blue	Other empty terminus of the terminal block
Grounding— Ground (Earth)	Green/yellow or bare copper	Grounding stud

Communications Wiring

All communications wiring is made through knockouts adjacent to the communication ports. Prior to connecting cables, ensure that the grommet bushing has been installed for each knockout. Employ strain relief on the communication wiring to prevent damage to the controller.

Ethernet

A single, female 10/100-Mbit Ethernet connection is provided on the controller. This connection is capable of running at either 10 Mbps or 100 Mbps—it automatically adjusts to either speed. This means the UNC-520 can exist on the same network with a mixture of 10BaseT and 100BaseTX hardware connected to a smart 10/100 hub capable of adjusting to the devices it supports.

Connection is made via a standard male RJ-45 (8-wire) connector. Using a Category 5 unshielded twisted pair (UTP) cable, connect one end of the cable through the knockout adjacent to the RJ-45 connector on the UNC, and the other end to a hub on the Ethernet LAN.

The maximum end-to-end distance from the controller to the hub is 328 feet (100m).

Serial

There are six serial ports on the UNC-520, located at the bottom of the board (see Figure 2 on page 17). From left-to-right, ports are two RS-485 (COM3 and COM4), two RS-232 (COM1 and COM2), and two more RS-485 (COM5 and COM6). All RS-485 ports are optically-isolated; the RS-232 ports are not isolated.

RS-485

RS-485 multi-point connections are made to the 3-position, screw terminal connectors on the board. Wire to this connector with shielded 18-22 AWG wiring (refer to the TIA/EIA-485 standard). The screw terminals (from left to right) are shield, plus (+), and minus (–).
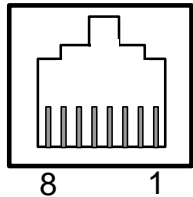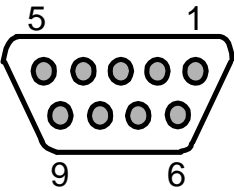
RS-232

RS-232 serial port connections can be made to the female (socket) RJ-45 connectors using an 8-conductor flat silver satin stranded cable with standard male (plug) RJ-45 connectors. Connect the flat satin cable (maximum distance 50 feet) through the enclosure knockout nearest the port. This "straight-through" cable is then connected to a socket-to-socket type RJ-45 to DB-9 adapter.

The UNC-520 is a serial DTE device, such that another DTE device (PC, for example) requires a "null modem" adapter (UNCC-405). If connecting the UNC-520 to a DCE device (modem, for example), a straight-through adapter is used. Table 5 provides pinouts for both types of RJ-45 to DB-9 adapters.

Notes
- Silver satin cable is not standard Ethernet UTP cable, in which the pairs are twisted around each other. The twisting of the pairs may cause undesirable effects on the serial communication, therefore we recommend the use of flat silver satin cable instead.
- Flat silver satin cable is unshielded. If installing this cable in a noisy electrical environment, run the cable through conduit, **with no other wires in that conduit**.

Table 5   RJ-45 to DB-9 adapter pinouts.

RJ-45 and DB-9 Pinout References	Type of Adapter	RJ-45 Socket Pin	Signal		DB-9 Socket Pin
RJ-45 Socket (female)	**Null Modem** (for connecting to another DTE device) **Part number UNCC-405**	5	DCD	Data carrier detect	1
		3	TXD	Transmit data	2
		6	RXD	Receive data	3
		8	DSR	Data set ready	4
		4	GND	Ground	5
		1	DTR	Data terminal ready	6
		7	CTS	Clear to send	7
		2	RTS	Request to send	8
		—	Not used on the UNC-520		9
DB-9 Socket (female)	**Straight-through** (for connecting to a DCE device)	5	DCD	Data carrier detect	1
		6	RXD	Receive data	2
		3	TXD	Transmit data	3
		1	DTR	Data terminal ready	4
		4	GND	Ground	5
		8	DSR	Data set ready	6
		2	RTS	Request to send	7
		7	CTS	Clear to send	8
		—	Not used on the UNC-520		9

LONWORKS (LON)

A single, two-pin, male LonWorks FTT-10A Weidmuller connection is provided on the controller. This connection supports twisted pair, unshielded, polarity-insensitive, peer-to-peer communications at 78 Kbps.

Refer to the *LONWORKS FTT-10A Free Topology Transceiver User's Guide* (078-0156-01F) for technical guidelines associated with free topology restrictions and the *Junction Box and Wiring Guidelines for Twisted Pair LONWORKS Networks* (005-0023-01) for more detailed information on wiring specifications. These documents are available on the Echelon® web site (www.echelon.com).

Modem (Optional)

The female RJ-11 connection for the modem is located near the internal modem. Connect one end of a standard flat satin telephone cable (6-position/4-connector) through the adjacent knockout to the modem's RJ-11 connector and the other end to an analog telephone port.

This modem is approved for US use only, and must be tested for use in other countries.

Note The modem option is not available for UNC-520-2-N or international applications. Use an external modem for international applications.
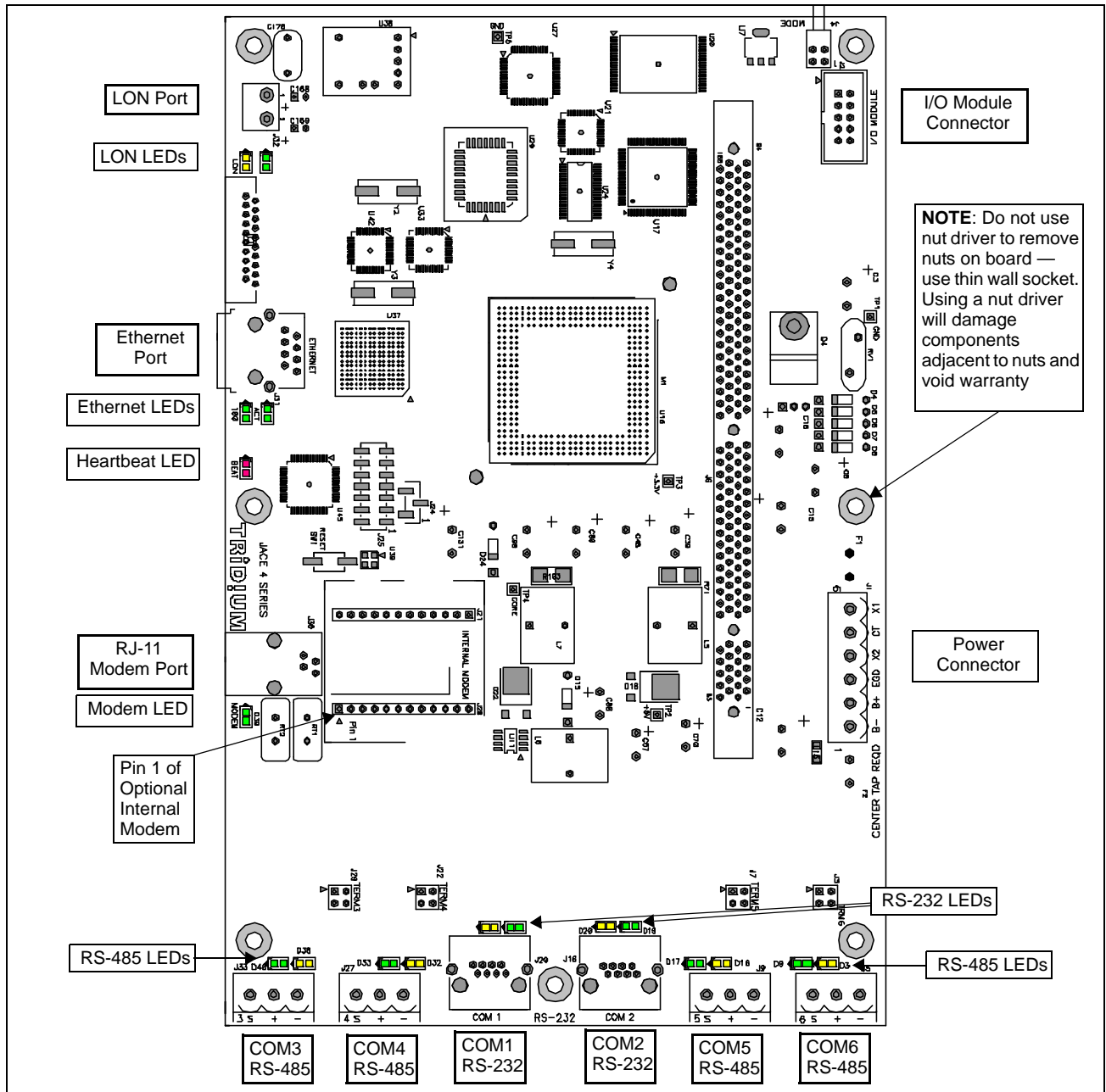
Figures

The following figures provide details for component layout and mounting dimensions for the UNC-520.

Board Layout

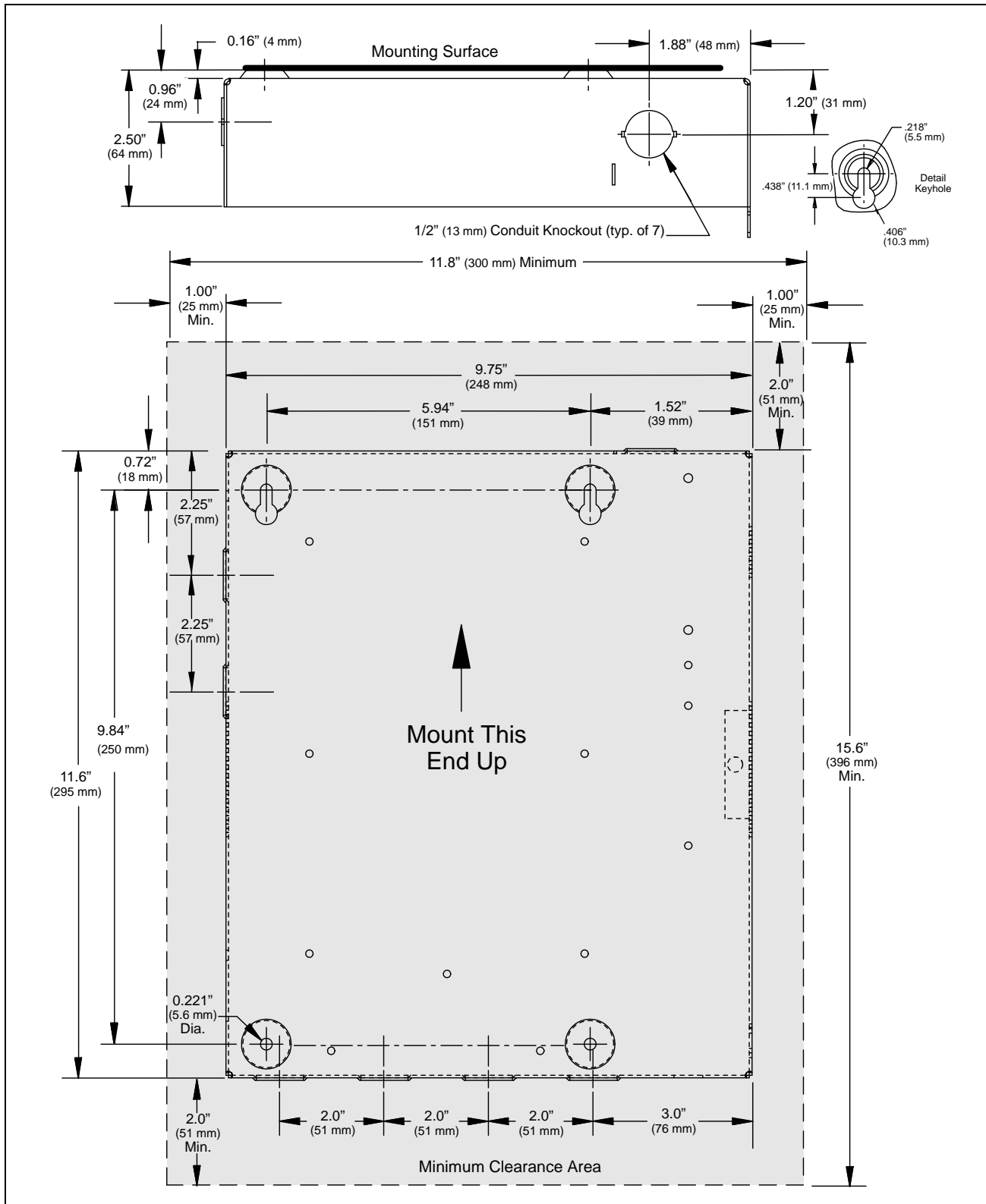**Figure 2   Board layout details.**

- LON Port
- LON LEDs
- Ethernet Port
- Ethernet LEDs
- Heartbeat LED
- RJ-11 Modem Port
- Modem LED
- Pin 1 of Optional Internal Modem
- I/O Module Connector
- **NOTE**: Do not use nut driver to remove nuts on board — use thin wall socket. Using a nut driver will damage components adjacent to nuts and void warranty
- Power Connector
- RS-232 LEDs
- RS-485 LEDs
- RS-485 LEDs
- COM3 RS-485
- COM4 RS-485
- COM1 RS-232
- COM2 RS-232
- COM5 RS-485
- COM6 RS-485

Mounting Guide

Figure 3 on page 18 provides a mounting guide for the UNC-520.

Mounting Details

Figure 3   Mounting Details.

      F-27391-4

Related Documentation

For more information on configuring and using the UNC-520 controller, consult the following documents included in the TAC I/A Series Enterprise Server CD:

- *Niagara Release 2.3.5 Installation and Upgrade Instructions*
- *Niagara System and Power Monitoring, Engineering Notes*
- *Niagara Networking & Connectivity Guide*
- *Niagara Standard Programming Reference, Release 2.3.5*

Using Status LEDs

The UNC-520 controller includes a series of LEDs that can be used to determine the status of a variety of normal operating parameters for the unit. They are located on the circuit board. From the top of the board to the bottom, these include the following:

- LON (LONWORKS) Port
- Ethernet Port
- Heartbeat
- Modem
- Serial Ports

Refer to Figure 2 on page 17 for the exact locations of status LEDs on the UNC-520 controller.

LON (LONWORKS) Port

Two LEDs are located below the LON port and show transmit and receive activity.

The **yellow** transmit LED (TxD) indicates that the UNC is *transmitting* a message on the LONWORKS trunk.

The **green** receive LED (RxD) indicates that *another* LONWORKS device is transmitting a message on the LONWORKS trunk.

Ethernet Port

The Ethernet port has two green LEDs, located below the Ethernet connector.

The LED marked "100" indicates whether the UNC-520 is operating at 10 Mbps (Ethernet) or 100 Mbps (Fast Ethernet). If the 100 LED is on, the network connection is operating at 100 Mbps. Otherwise, the port is communicating at 10 Mbps.

The "ACT" LED indicates activity on the port as follows:

- **Off**—No Ethernet link is made
- **On**—Ethernet link is present, but no activity on the LAN
- **Blinking**—Ethernet link is present with data activity on the LAN.

Heartbeat

The Heartbeat LED is located below the Ethernet status LEDs, and is red. Under normal operation, this LED should blink about once per second. Blink patterns differ as station activity varies, but any pulse rate from once per second to 10 blinks per minute usually indicates normal operation. If the heartbeat LED stays *on constantly*, *does not light*, or blinks *very fast* (more than once per second), contact Schneider Electric Product Support.

Modem

The modem LED is located below the RJ-11 connector for the optional internal modem. When the modem LED is lit, it indicates that the modem is connected to another modem (a carrier is detected). In this case, the serial port LEDs for COM2 should indicate transmit and receive activity—see "Serial Ports" below.

Serial Ports

Status LEDs for the serial ports are located directly above each respective RS-485 and RS-232 port. They show transmit and receive activity for the serial ports and optional modem (see "Configure the Serial Ports," page 11).

The **yellow** transmit LED indicates that the UNC-520 is *sending* data out the serial port over a communications line to a connected device.

The **green** receive LED indicates that the UNC-520 is *receiving* data from a connected device.

These LEDs are driven by pulse detectors that provide a fixed on-time when data is detected on the port. If these LEDs are on constantly, this indicates a problem with the communications channel, such as a shorted wire or reversed wiring.

Maintaining the UNC-520

This section provides information on the following topics:

- Cleaning
- Required Battery Maintenance
- Replacement Parts

Cleaning

If dust or metal filings are present inside the unit, clean with vacuum or compressed air. Otherwise, no cleaning inside the unit is required. Optionally, if the outside of the metal enclosure becomes dirty, you can wipe it with a damp cloth and mild detergent.

Required Battery Maintenance

Battery life expectancy is a function of its discharge cycles (the number of discharges and their depth) and the ambient temperature of the battery during normal operation. In most applications, the battery should see relatively few discharges. Therefore, ambient temperature has more to do with determining the life expectancy of the battery than does any other factor. If the UNC-520 is installed in a conditioned space, the battery should provide dependable service for approximately three years (average). In an environment where the operating temperature is higher (122⁰F or 50⁰C), you should only expect the battery to last approximately one year.

The sealed lead acid battery in the UNC-520 controller is automatically float-charged during normal operation (while power is applied to the unit). The UNC-520 monitors the battery and periodically loads the battery to test its ability to maintain battery-backed functions. After allowing the battery to charge for at least 12 hours following initial installation, investigate any battery trouble messages. Check the voltage level and its connections to the unit. Replace the battery as required.

To order a new battery, see the

Replacing the Battery

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Warning **When replacing the battery or harness, maintain proper polarity as marked on the label inside the unit. Although the UNC-520 is fully protected against shorted battery terminals, the battery itself is not internally protected. Use extreme care to not short circuit the battery. A shorted battery may overheat rapidly and damage the power wiring harness or cause other physical harm to the hardware.**

To replace the battery, proceed as follows:

Procedure 8   Replacing a UNC-520 battery.

Step 1   Unplug the 6-position power connector. Do not remove the male connector from the wiring harness.

Step 2   Using a 1/4-inch nut driver, unscrew the lock nut from the bracket that is holding the battery.

Step 3   Hold the battery in place while you remove the bracket that secures it to the bottom of the unit.

Step 4   Disconnect the two quick connect terminals on the battery.

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Note   The UNC-520 will lose its time and date settings if it is disconnected from both battery and AC power for more than one hour.

Step 5   Remove the old battery and recycle as defined by your regional codes. For recycling within the US, see the labelling on the battery.

Step 6   Connect the quick connect terminals to the new battery. Make sure the RED (+) wire is connected to the positive terminal of the battery and the BLACK (–) wire is connected to the negative terminal.

Step 7   Secure the new battery to the bottom of the unit with the bracket and tighten the lock nut.

Step 8   Plug the power connector in and verify normal operation.

Replacement Parts

Servicing the UNC-520 may call for replacement parts. There are three categories of parts:

- Non-replaceable Parts
- Standard Replacement Parts
- Field Replacement Units

Non-replaceable Parts

Other than the parts listed in the replacement parts sections, there are no serviceable components on the base assembly.

Memory

Any addition, modification, or replacement of memory components requires software configuration and is not a field upgrade.

Fuses

The UNC has two 250V, 2.5A delay (series 372) fuses on the printed circuit board. These fuses are Wickman F015-2.5A250V fuses. However, on-board power circuit protection is not user-serviceable. If this circuitry is suspect, contact Schneider Electric Product Support.

Standard Replacement Parts

Standard replacement parts are listed in Table 6 and can be ordered from stock without restriction.

Table 6   **Standard replacement parts.**

Part Number	Description
UNC-400-BAT	Battery, 12 Vdc, 1.2 AH (see "Replacing the Battery," page 21.)
E24-1555-2	LON Plug, 2-position
E24-1604-3	RS-485 connector plug, 3-position
UNC-400-HRN	Battery/ground harness (also includes 6-position power connector)
UNCC-405	Adapter, RJ-45 to DB-9 null modem, for serial port to connect to DTE device
CBL-RJ45-4	Silver satin patch cable, 4 feet (used between adapter and serial port)
CBL-RJ45-10	Silver satin patch cable, 10 feet (used between adapter and serial port)
CBL-RJ45-25	Silver satin patch cable, 25 feet (used between adapter and serial port)
UNC-410-MDM	On-board auto dial/auto answer 56k modem (see "Replacing the Modem", below)

Replacing the Modem

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Caution   Be sure to discharge any accumulated static by touching the metal surface of the UNC before handling board components. For more information, see the "Static Discharge Precautions" section on page 3.

To replace the modem, proceed as follows:

Procedure 9   Replacing the on-board modem.

Step 1   Open the cover of the unit.

Step 2   Unplug the 6-position power connector. Do not remove the male connector from the wiring harness.

Step 3   Unplug the RJ-11 telephone wire from the modem's RJ-11 connector.

Step 4   Remove the old modem as follows:

    a. Locate the on-board modem (see Figure 2) and note the following:

      • Orientation of the sockets for the pins on the modem. The sockets are two parallel lines. The socket for pin 1 (noted on Figure 2) is the left-most pin on the bottom line.

      • Orientation of the writing on the modem. Writing on the replacement modem will be the same.

    b. Place the blade of a flat-blade screwdriver under the left end of the modem, between the pin sockets.

    c. Gently pry the modem up about 1/8th inch (3 mm).

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Caution   Do **not** try to completely remove the modem with this step. Doing so may damage the pins.

    d. Place the blade of the screwdriver under the right end of the modem and gently pry the modem up about 1/8th inch (3 mm).

    e. Repeat steps b–d until the modem is out of its socket.

Step 5   Insert a new modem as follows:

    a. Locate pin 1 on the modem. If you are reading the writing on the modem, pin 1 is the first pin in the lower left corner. It is marked with a small black dot on the top of the modem.

    b. Locate the socket for pin 1 on the board (see Figure 2).

    c. Orient the modem so that pin 1 of the modem is over the socket for pin 1.

🔍

Tip   Use the white trace lines on the board to help you align the modem. When the modem is correctly aligned, the trace lines will outline the modem completely.

    d. Push the modem into the sockets using your thumbs. All pins should be properly inserted.

Step 6   Plug the RJ-11 telephone wire into the modem's RJ-11 connector.

Step 7   Plug the power connector in and verify normal operation.

Field Replacement Units

To obtain repair or replacement of unit (Advance Warranty Replacement, In-Warranty Repair and Return, or Out-of-Warranty Repair and Return), obtain the information listed in Table 7 prior to contacting Schneider Electric Product Support at 888-444-1311.

Table 7   Information for Repair and Return

Factory Order Number [1]	
Reason for Return	
UNC Part Number	
UNC Serial Number	
Project ID	
Network Settings (IP, Subnet, Name)	
UNC Username and Password	
Station DB Username and Password	

1. Factory order number prefixes include INT, SLS, DNP, TIP, QWK, 961, 963, 964, 965, 967, 968, 969 and 977

Replacing the UNC-520 Circuit Board

⚠️
Caution
- Be aware of small surface-mounted components on the circuit board near each mounting point! Use a 1/4" thin-walled **socket**, *not a nut driver*, to **carefully** loosen or tighten the nuts that secure the UNC-520 circuit board to the 7 mounting studs. A *nut driver* invariably *causes board damage* to adjacent components, while a socket (if used carefully) typically does not.

- Retain and reuse metal spacers on all mounting studs (between the board's back and enclosure).

- Before handling circuit boards, discharge any accumulated static by touching the metal surface of the UNC-520. For details, see the "Static Discharge Precautions" section on page 3.

To replace the UNC-520 circuit board in the field, proceed as follows:

Procedure 10   Replacing a UNC-520 circuit board.

Step 1 Using the **Admin Tool**, back up the station database to your PC.

Step 2 Open the cover of the unit.

Step 3 Turn off building power to the unit. The unit should power down automatically.

Step 4 Unplug the 6-position power connector from the board.

Step 5 Note positions of all communications connectors going to the circuit board.
If necessary, label connectors to avoid mis-connection later (after circuit board is replaced).

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Note   The software that runs on the unit expects the terminal positions to be the same to collect data from or to control the attached devices.

Step 6 Unplug all Ethernet, serial, LON, and modem connectors from the circuit board.

Step 7 Using a 1/4" socket (see previous Caution), carefully remove and retain the seven 1/4" nuts securing the circuit board. Be mindful of small surface-mount components located near board mounting points.

Step 8 Remove the circuit board.
Make sure that the metal spacers (behind the board) remain on the seven mounting studs.

Step 9 Replace the FRU circuit board on the mounting studs and spacers, carefully securing with the seven 1/4" nuts. Again, be mindful of small surface-mount components located near board mounting points.

Step 10 Turn on building power to the unit.

Step 11 Plug the 6-position power connector in and verify normal operation.

Step 12 Reconnect any Ethernet, serial, LON, and modem connectors.

Step 13 Using the **Admin Tool**, re-commission the UNC-520, including the following:

  a. Install the correct Niagara release and set the date and time.

  b. Install the new license file.

  c. Restore the station database and start the station.

Certifications

Federal Communications Commission (FCC)

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause interference with radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference, in which case, users at their own expense will be required to take whatever measures may be required to correct the interference. Any unauthorized modification of this equipment may result in the revocation of the owner's authority to continue its operation.

Canadian Department of Communications (DOC)

Note   This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Note   Cet appareil numerique de la classe A respecte toutes les exigences du Reglement sur le materiel brouilleur du Canada.

If you have any questions regarding this publication or the operation of the UNC-520 please contact Schneider Electric Product Support at 888.444.1311.

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