Schneider Electric

Overview

This document covers the mounting, installation and initial start-up of the TAC I/A Series® UNC-410. It applies to the following products:

US Model	International model
UNC-410-1	UNC-410-1-N

These models are collectively known as the UNC-410.

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 on this topic, refer to the "Related Documentation" section.

Product Description

The UNC-410 is a compact embedded processor platform with flash memory for backup. It provides integrated control, supervision, as well as direct, on-board I/O for monitoring and control. When connected over an Ethernet network, the UNC-410 can communicate with BACnet™ devices or systems, and share data between the LonWorks™ devices and exposed BACnet 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 service, the UNC-410 can directly serve live data and dynamic displays over the Internet to any standard web browser such as Netscape™ Navigator or Internet Explorer. The total number of connected field devices that the UNC-410 can support is 27.

Included in this Package

Included in this package you should find the following items:

- a UNC-410
- *UNC-410 Installation Instructions*, F-27321-3
- a packing slip, which lists the factory settings for IP address, machine name, and host logon
- a hardware bag containing the following items:
  - 499 ohm resistors (quantity 6)
  - 6-position I/O screw terminal connector plugs (quantity 4)
  - 3-position RS-485 screw terminal connector plug (quantity 1)
  - US models only—wire nuts (quantity 2)
  - 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-410 controller. Be sure to heed these warnings to prevent personal injury or equipment damage.

Warning
- **A 120Vac (US models) or 240Vac (International models) circuit powers the UNC-410 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

The following items are cautionary notes that will help prevent equipment damage or loss of data caused by static discharge.

Caution
- Static charges produce voltages high enough to damage electronic components. The microprocessors and associated circuitry within a UNC-410 controller are sensitive to static discharge. Follow static electricity precautions when installing, servicing, or operating the system.

- 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. The wrist strap clamp must be secured to earth ground.

Installation and Start-up

There are four major steps to installing and starting the UNC-410, as outlined below:

1. Unpack the UNC-410
2. Install the UNC-410
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-410

Unpack the UNC-410 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. See "Field Replacement Units" on page 34.

Install the UNC-410

Installing the UNC-410 has four major steps, as outlined below:

1. Physical Installation
2. Make Connections
3. Power Up and Initial Checkout
4. Connect to the UNC-410

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 I/O and RS-485 connectors (all models) and power terminal connections (UNC-410-1-N only)
- Phillips screwdriver: used to secure the door

Mounting

Mount the UNC-410 controller in a location that allows clearance for wiring, servicing, and module removal. For mounting details, refer to the "Figures" section on page 25.

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 0ºC (32º F) to 50ºC (122º F) 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 8 for proper mounting clearances. Minimum clearance from the wall on which the unit is mounted is 0.2-inches (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 contractors, electrical machinery, welding equipment, and spark igniters.
- 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-410 cover is removable, and provides a security screw that secures the cover in place.

Note   The security screw that ships with the UNC-410 is a standard #10-32 machine screw, pan head, 1/2-inch Phillips. You can replace this screw with a tamper-proof screw to provide a more secure installation. In addition, you can secure the unit with a padlock through the security tab that protrudes through the cover.

Removing the cover—To remove the cover of the UNC-410, loosen the security screw, and open the cover. On the inside of the door, loosen and remove the nut and locking washer that secures the green grounding strap to the cover. Pull the grounding strap off the screw post. Replace the locking washer, then the nut on the screw post and tighten. Close the door about half way. 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. Slide the hinge tabs out of the slots.

Replacing the cover—Align the hinge tabs on the cover with the hinge slots on the left wall of the metal casing. 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. Loosen and remove the nut and locking washer on the grounding strap post on the door. Slide the ground strap onto the screw post and replace the locking washer, then the nut and tighten. Close the door and tighten the security screw.

Make Connections

Make connections to the UNC-410 in the following order. For specific details on each step, refer to the "Wiring Details" section on page 18.

1. With the 6-position power connector disconnected from the board, wire the power to the transformer (US models) or the power terminal block (International models).

2. Connect the Ethernet cable.

3. Connect any other communication cables.

4. Connect the I/O wiring.

See Figure 7 to locate connectors and other components on the UNC-410 controller.

Power Up and Initial Checkout

Note As referenced above, the Ethernet connection must be made prior to applying power to the controller.

Ensure power wiring to the transformer has been completed before proceeding (see the "Power Wiring" section on page 18). The UNC-410 controller does not include an on/off switch. To apply power, insert the 6-position power connector to the board.

Refer to Figure 7 for the locations of status LEDs on the UNC-410 controller.

Checking the Heartbeat LED

When power is first supplied to the controller, the red heartbeat LED will come on solid for approximately 10 seconds, then begin to blink. The blink pattern of the heartbeat LED under normal operation will differ 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 28.

About the Battery

The UNC-410 is provided with a sealed lead acid battery. The sealed lead acid battery is automatically charged during normal operation. The UNC-410 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 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 such 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 31.

Connect to the UNC-410

Notes
- These instructions assume that you have a PC installed with 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-410.

Once the UNC has powered up, you should connect to the UNC 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-410 is shipped with the battery disconnected.

Also, it is strongly recommended that you change the password for the default administrator-level host user account (tac)—see the related Caution on page 11 for more details.

The UNC-410 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-410 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 remote UNC-410's. In addition to station-related operations (i.e., 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-410. 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-410 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-410.

Procedure 1   Setting the IP address on a new UNC-410.

Step 1   If not already installed, install the TAC I/A Series Enterprise Server 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.

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-410 controller directly to the network connection on your PC. For more information about crossover cables, see the "About Ethernet Straight Through and Crossover Cables" in the *Niagara Networking & Connectivity Guide*.

Step 4   Power up the UNC.

Note If the controller is powered on prior to making the Ethernet connection, the unit will not be accessible on the network. With the Ethernet connector plugged in, disconnect the 6-position power connector, allow the controller to completely power down (no blinking status LEDs), and reconnect the power connector.

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-410 or another host on the LAN.

Step 6   From your PC, start the R2.3 **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-410 and click **OK** (see the previous section "Connect to the UNC-410").

Step 9   Log onto the UNC-410 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-410 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 14.

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

Step 11   Assign the UNC-410 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 (release 2.2 or later). If needed, you can refer to this file to see the new (and previous) IP address.

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-410. 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-410 controller is shipped with the Wind River VxWorks™ operating system and the appropriate JVM (Java™ virtual machine) 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 Installation & Configuration Instructions* for more information.

⚠️

Caution | This upgrade also automatically performs a firmware upgrade to the I/O processor's flash memory, if required. Do not remove power from the unit during the I/O upgrade or damage will occur, which would require replacement of the UNC-410.

These procedures assume that you have successfully tested connectivity to the UNC-410 and can access the unit over the Ethernet LAN.

Procedure 2   Installing the software.

Step 1   If not previously installed by selecting the **emb** and **nt** selections within the Niagara installer, use Windows® Explorer to manually copy the **emb** and **nt** directories. Copy the **emb** and **nt** directories from the R2.3 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 1.

Step 2   Using the R2.3 **Admin Tool,** connect to the UNC-410 as described in Procedure 1.

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 next to **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-410.

A red check mark appears for each selected module.

Notes   • Be sure to choose the **ndio** module. The on-board I/O requires
the **ndio** module to function.

• Remember that the total number of connected field devices that
the UNC-410 can support is 27.

• The UNC-410 has limited 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-410, 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. It is not
necessary to back up the test station database pre-installed on the
UNC-410 controller.

The **Niagara License** dialog box opens.

Note   The UNC-410 controller is shipped with the licence 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**.

A UNC-410 running release 2.3 requires the following line in its **drivers.properties** file to avoid a startup error:

 driver.sysmon=tridium.nre.drivers.SysMonDriver

If you are upgrading from a previous beta release of 2.3, you must manually add this line to drivers.properties using Procedure 3.

Configure Power Shutdown Options

If desired, you can change the operation of UNC-410'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-410 found in **drivers.properties**.

Table 1 UNC-410 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.
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. 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. If a station is not running, the UNC runs from the battery for 5 minutes before shutdown.

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

Procedure 3 Viewing or editing the drivers.properties file.

Step 1 Using the R2.3 **Admin Tool,** connect to the UNC-410 as described in Procedure 1.

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-410 has two serial ports (one RS-232 and one RS-485) and one optional on-board 56k modem. However, only two of these three serial channels can be active at any one time.

By default, COM1 is assigned to the RS232 port and COM2 is assigned to the RS485 port. Changes to these assignments can be made using the R2.3 Admin Tool.

Note This function is not available in Release 2.2 or earlier versions.

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

Table 2 Serial port configuration options.

Option 1 (default)	COM1=232
	COM2=485
Option 2	COM1=232
	COM2=MODEM
Option 3	COM1=485
	COM2=MODEM

Use the following steps to configure the serial ports.

Procedure 4 Configuring serial ports.

Step 1 As described in Procedure 1, open the R2.3 **Admin Tool** and connect to the UNC-410.

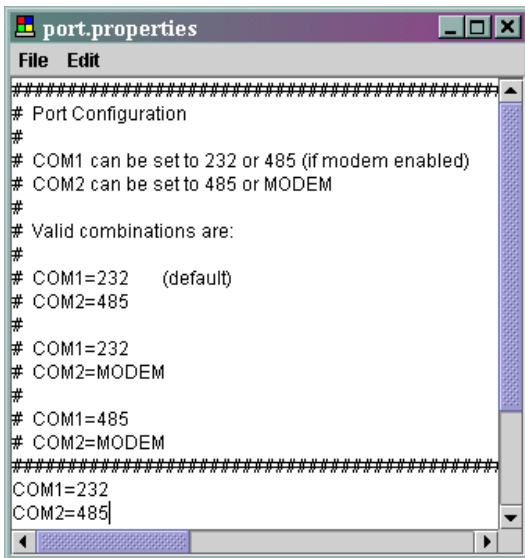**Step 2** Click the **Network Settings** tab.

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

Notes
- If you cannot see the **Port Properties** button, maximize the **Admin Tool** window. If you are using the Admin Tool within the JDE, you may also have to contract the left pane to see the button.
- The **Port Properties** button is available in Release 2.3 or later.

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

Figure 1   port.properties file opened for editing.


```
port.properties                        _ □ ✕
File   Edit
##########################################
# Port Configuration
#
# COM1 can be set to 232 or 485 (if modem enabled)
# COM2 can be set to 485 or MODEM
#
# Valid combinations are:
#
# COM1=232     (default)
# COM2=485
#
# COM1=232
# COM2=MODEM
#
# COM1=485
# COM2=MODEM
##########################################
COM1=232
COM2=485
```

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-410. Use the following procedure to install a previously created station on the new UNC-410.

Note Installing a station from your PC places everything in your local station database folder (***x*:\niagara*release*\stations*stationname*>**) onto the UNC-410. Since the UNC-410 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 5   **Installing and starting a station.**

Step 1 As described in Procedure 1, open the **Admin Tool** and connect to the UNC-410.

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 toolbar.

Verify that the status of the selected station updates to **running**.

Wiring Details

The following section provides details on:

- Power Wiring
- Communications Wiring including:
  - Ethernet
  - Serial
  - Modem (Optional)
  - LonWorks (Optional)
- I/O Wiring

Power Wiring

Building power is wired directly to the transformer supplied with the UNC-410. 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.

About the Transformer

The UNC-410-1 ships with a 120Vac, 50/60 Hz transformer and 12V battery. The UNC-410-1-N ships with a 240Vac, 50/60 Hz transformer and 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-410 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-410-1—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-410-1—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	Green or bare copper	Grounding stud

For UNC-410-1-N—Connect 240Vac 50/60 Hz power to the power terminal block using the information in Table 4.

Table 4   UNC-410-1-N—building power termination.

Building Power Source		
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	Green 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-410 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).

Note The UNC-410 controller identifies itself to the Ethernet LAN during power up. If the controller is powered on prior to making this connection, the unit will not be accessible on the network. With the Ethernet connector plugged in, disconnect the 6-position power connector, allow the controller to completely power down (no status LEDs are blinking), and reconnect the power connector.

Serial

There are two serial ports on the UNC-410. From the top of the board (see Figure 7), the top serial port is a two-wire, non-isolated RS-485 port. The port beneath the RS-485 is an RS-232 port accessible by an RJ-45 connector.

RS-485

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

RS-232

RS-232 serial port connection is made to the female RJ-45 connector using an 8-conductor flat silver satin stranded cable with standard male RJ-45 connectors. Connect the flat satin cable (maximum distance 50 feet) through the knockout to the left of the port.

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.

Connection to a serial device is made from the flat satin cable through a female RJ-45 to female DB-9 adapter. The serial connection of the UNC-410 is DTE, such that DCE devices (i.e., modem) can be connected with a straight-through DB9 adapter. A null-modem adapter is required to connect the UNC to another DTE device (i.e., a PC).

For more information on RJ-45 to DB-9 adapters and alternate wiring methods for the serial port, see the "About Serial and Null Modem Cables and Adapters" section of the *Niagara Networking and Connectivity Guide*.

Modem (Optional)

The female RJ-11 connection for the modem is located below the RS-232 port. Connect one end of a standard flat satin telephone cable (4-connector) through the adjacent knockout to the modem's RJ-11 connector and the other end to an analog telephone port.

Note The modem option is not available for UNC-410-1-N or international applications. Use an external modem for international applications.

LonWorks (Optional)

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).

I/O Wiring

The UNC-410 provides six universal inputs supporting analog inputs (temperature, resistance, voltage, and current) and digital inputs (high speed counter and contact closure). The inputs support any mix of the following devices:

- 10K Thermistor
- Resistive
- 0–10 Vdc
- 4–20 mA
- Binary Input

The UNC also provides four form-C (SPDT) relay outputs.

About Station Objects

Each type of input or output you use requires a special Ndio (Niagara Digital Input/Output) object to be added to and configured in the station database. These act as the station interface to the physical I/O points on the UNC-410. The Ndio objects you need for each input type or output are referenced below.

For instructions on how to configure these objects, see Chapter 10 of the Release 2.3 *Niagara Standard Programming Reference.*
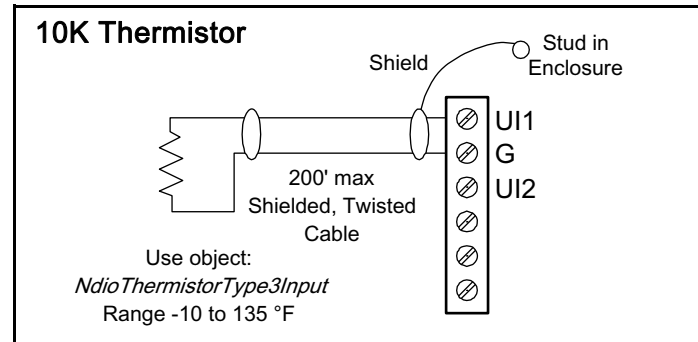
Inputs

Thermistor

The universal inputs support Schneider Electric 10KW Thermistor-type temperature sensors. The input has a range of -10 to 135 °F (-23.3 to 57.2 °C) with an accuracy of ±1% of span. Compatible sensors include the TS-5700, TS-5711, TS-57011, TS-57031, and TSMN-90110 series with a Thermistor resistance of 10KW at 77 °F (25 °C). Sensors with equivalent temperature-versus-resistance curves can also be used. See the TS series sensor documentation for further details.

> **Note** Do NOT use sensors that include an 11KW shunt resistor in parallel with the 10KW Thermistor.

Thermistors require the **NdioThermistorType3Input** object.
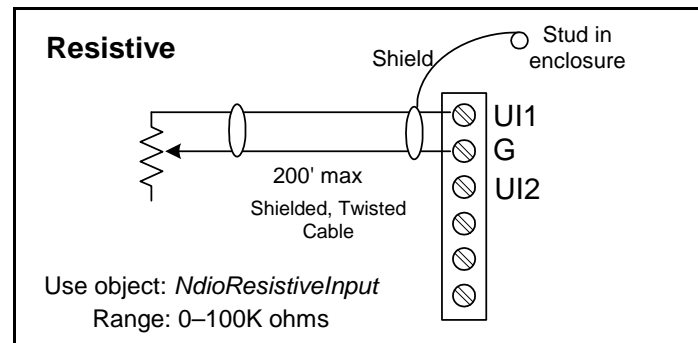
Figure 2   Thermistor wiring.

Resistive

The inputs support resistance inputs with a range of 0–100K ohms. The input accuracy is in the range of ±1% of span.

This type of load requires the **NdioResistiveInput** object.
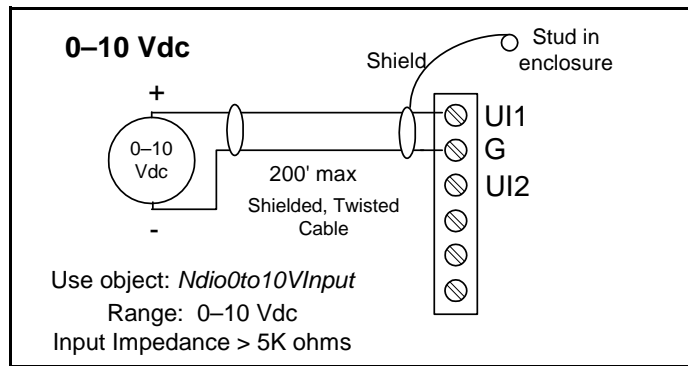
Figure 3   Resistive wiring.

0–10 Vdc

The inputs support self-powered 0–10 Vdc sensors. Input impedance is greater than 5K ohms. 0–10 volt accuracy is ±2% of span, without user calibration.

0–10 Vdc sensors require the **Ndio0to10VInput** object.

Figure 4   0–10 Vdc wiring.

4–20 mA

The inputs support self-powered or controller-powered 4–20 mA sensors. The UNC-410 controller provides 20 Vdc at 80 mA to source controller-powered sensors. Input accuracy is ±2% of span, without user calibration. The input requires an external resistor when accepting a current input (six are provided with the unit).

4–20 mA sensors require the **Ndio0to10VInput** object.

Figure 5   4 to 20 mA wiring.
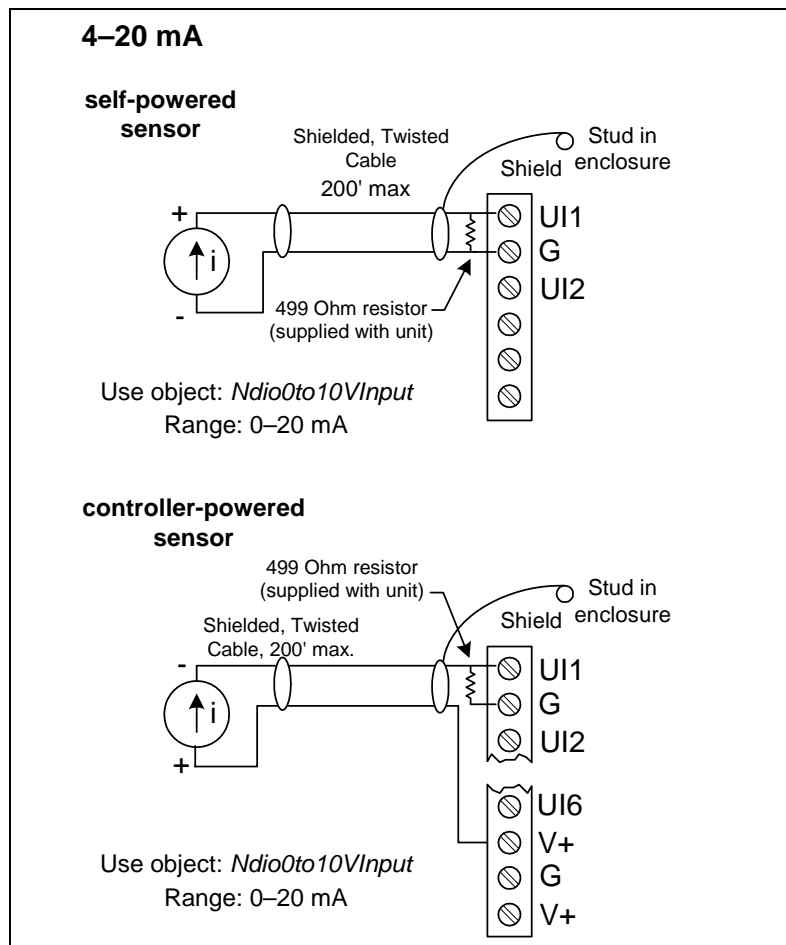
Binary Input

The inputs support both pulse contacts and dry contacts. Pulse contacts are supported that have a maximum change-of-state (COS) frequency of 20 Hz. and a 50% duty cycle. Standard dry contacts are supported that have a 1 Hz. (or less) COS frequency. Both types of dry contacts support 3.3 Vdc open circuits or 330 µA short-circuit current.

For a pulse contact, use the **NdioHighSpeedCounterInput** object in the station database. For other dry contacts, use the **NdioBinaryInput** object.

Figure 6   Binary input wiring.
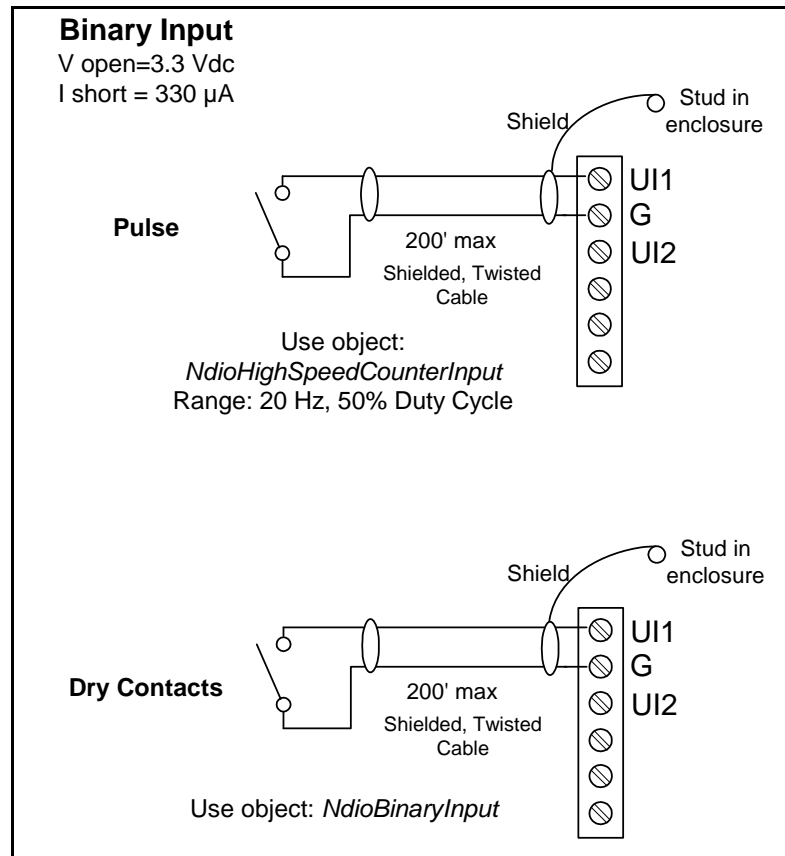
Outputs

The UNC provides isolated dry contact relay output closures for each point. Each output is rated for 24 Vac/dc at 2 A resistive. An LED indicator for each relay is located between the relay and the wiring connection point (see the "Relay Output Status" section on page 29).

For any output, use the **NdioBinaryOutput** object in the station database.

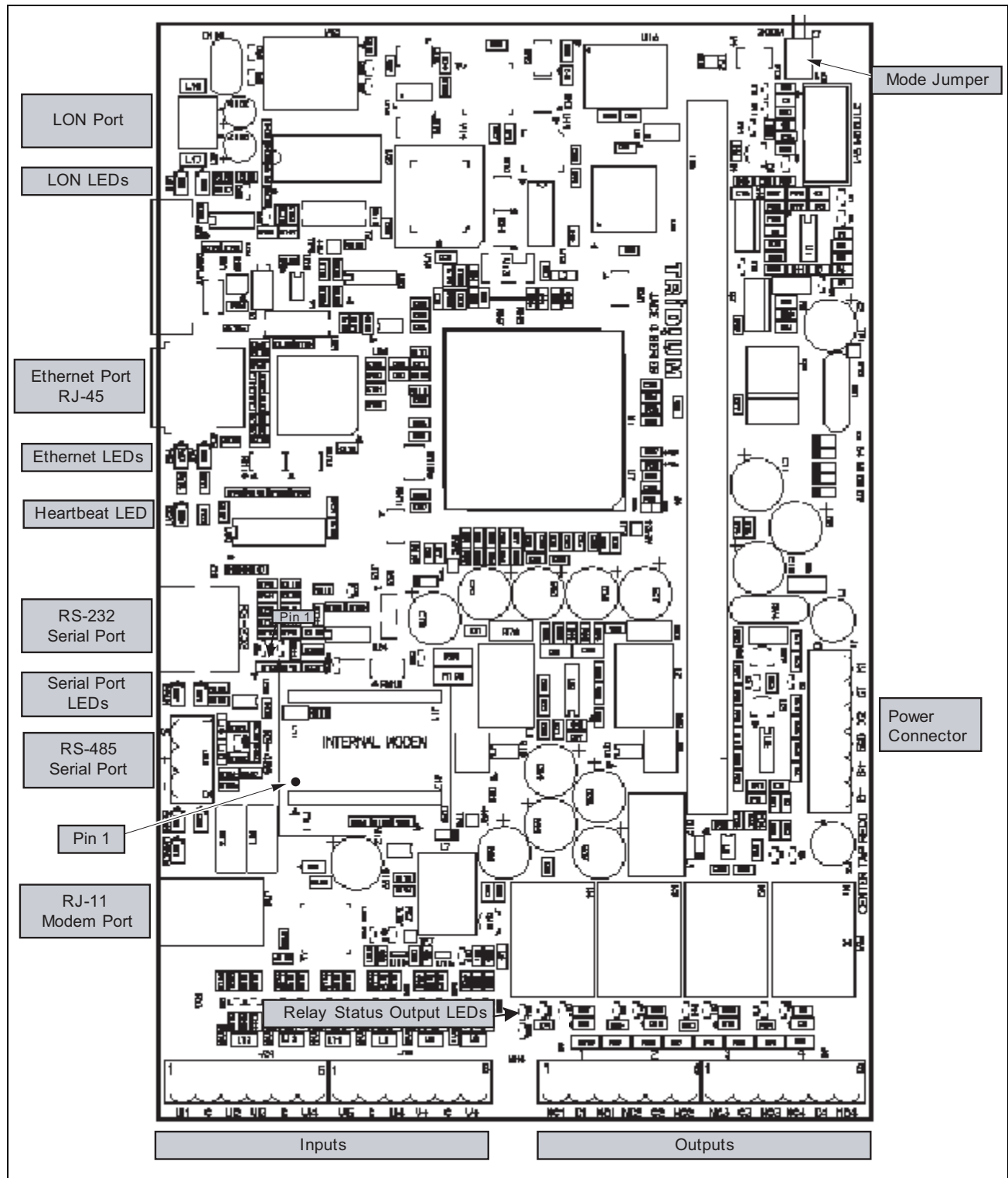# Figures

The following figures provide details for component layout, and mounting the UNC.

Board Layout

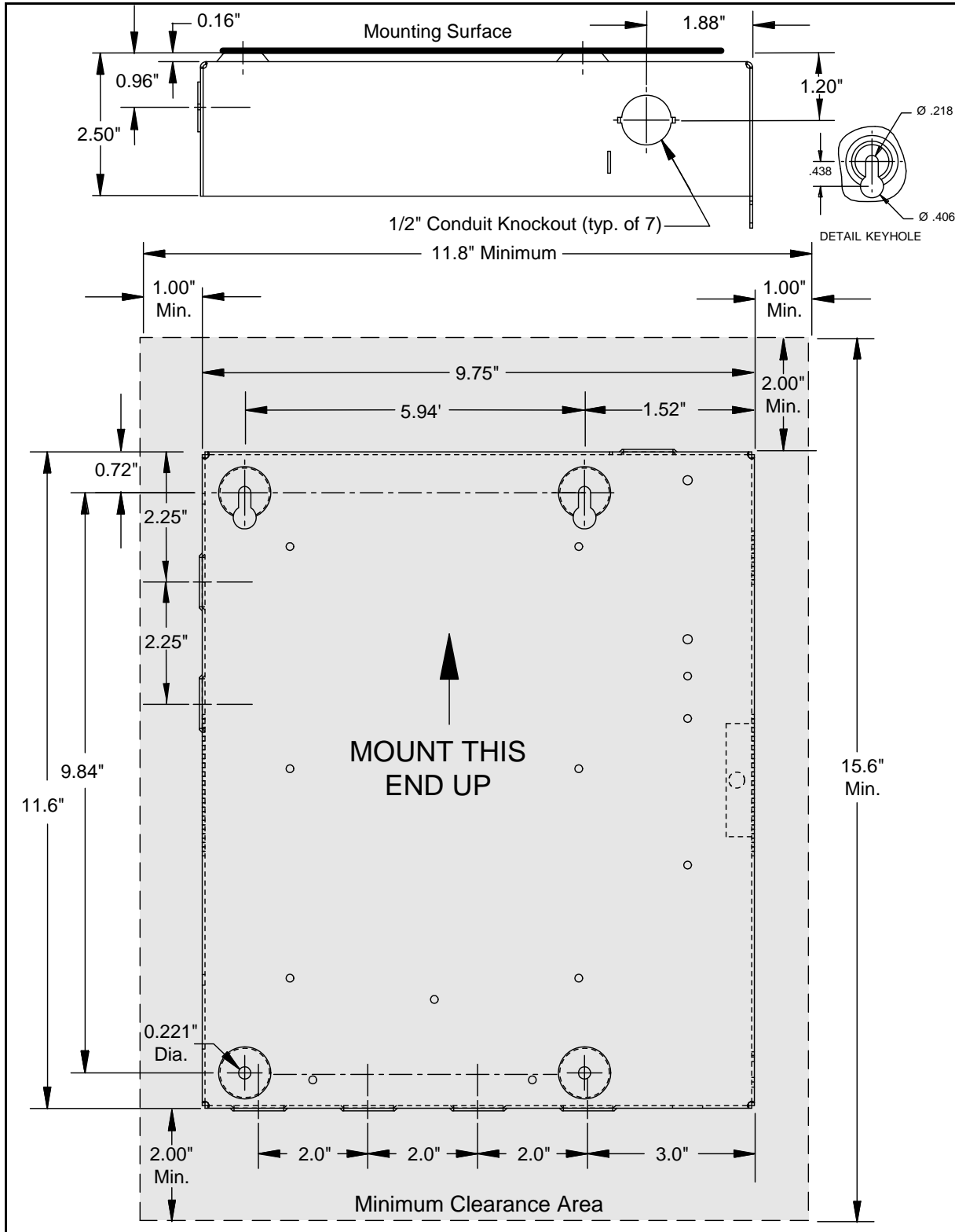Figure 7   Board layout details.

LON Port

LON LEDs

Ethernet Port RJ-45

Ethernet LEDs

Heartbeat LED

RS-232 Serial Port

Serial Port LEDs

RS-485 Serial Port

Pin 1

RJ-11 Modem Port

Mode Jumper

Power Connector

Pin 1

INTERNAL MODEM

Relay Status Output LEDs

Inputs

Outputs

Mounting Guide

The figure below provides a mounting guide for the UNC-410.

Mounting Detail

Figure 8   Mounting details.

- 0.16"
- Mounting Surface
- 1.88"
- 0.96"
- 1.20"
- 2.50"
- Ø .218
- .438
- Ø .406
- DETAIL KEYHOLE
- 1/2" Conduit Knockout (typ. of 7)
- 11.8" Minimum
- 1.00" Min.
- 1.00" Min.
- 9.75"
- 2.00" Min.
- 5.94'
- 1.52"
- 0.72"
- 2.25"
- 2.25"
- 9.84"
- MOUNT THIS END UP
- 15.6" Min.
- 11.6"
- 0.221" Dia.
- 2.00" Min.
- 2.0"
- 2.0"
- 2.0"
- 3.0"
- Minimum Clearance Area

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Related Documentation

For more information on configuring and using the UNC-410 controller, consult the following documents included in the TAC I/A Series Enterprise Server CD:

- *Niagara Release 2.3 Installation & Configuration Instructions*
- *Niagara Networking & Connectivity Guide*
- *Niagara Standard Programming Reference, Release 2.3*

Using Status LEDs

The UNC-410 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:

- Ethernet Port
- Serial Ports
- Heartbeat
- Modem
- I/O Heartbeat
- Relay Output Status

Refer to Figure 7 for the exact locations of status LEDs on the UNC-410 controller.

Ethernet Port

There are two green LEDs associated with the Ethernet port, located below the port (if viewing from the top of the board). The LED marked "100" indicates whether the UNC-410 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

Serial Ports

The status LEDs for the serial ports are located below (if viewing from the top of the board) the RS-232 and RS-485 ports. They are marked COM1 and COM2 and correspond to the software configuration of the COM ports (see the "Configure the Serial Ports" section on page 15). They show the transmit and receive information for the serial ports and optional modem.

The yellow transmit LED indicates that the UNC-410 is sending data out the serial port over a communications line to a connected device. The green receive LED indicates that the UNC-410 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.

Heartbeat

The Heartbeat LED is located below the serial LEDs, and is red. Under normal operation, this LED should blink about once per second. The blink pattern will differ as station activity increases, but any pulse rate from once per second to 10 blinks per minute usually indicates normal control engine activity. If the heartbeat LED stays on constantly or does not light, contact Schneider Electric Product Support.

Modem

The modem LED is located below the RJ-11 connector for the modem. When it is lit, it indicates that the modem is connected to another modem (a carrier is detected). For more information about transmit and receive information for the modem, see "Serial Ports."

I/O Heartbeat

The I/O Beat LED is the heartbeat LED of the attached I/O coprocessor. The I/O coprocessor is a TI mixed-signal processor with internal flash memory. It is a dedicated processor for operating the local I/O. The I/O processor also provides factory-calibrated data to the system. The I/O processor LED blinks about once per second during normal operation.

The admin tool supports firmware upgrade to the I/O processor's flash memory. During I/O processor firmware upgrade, the I/O processor heartbeat LED will stop blinking (it will be solid on or off) for about 15 seconds. It is important that power not be removed from the unit during I/O upgrade or permanent damage will occur, which will require replacement of the board.

Relay Output Status

The relay output status LEDs are located below each form-C relay, just above the screw terminals for the output wiring.

Under normal operation, the LEDs indicate activity as follows:

- **Off**—Relay coil is not energized
- **On**—Relay coil is energized

Therefore, for a circuit with a normally open contact, an On status indicates that the contact is closed. For a circuit with a normally closed contact, an On status indicates that the contact is open.

LON (LonWorks) Port

Two LEDs are located above the LON port and show transmit and receive activity. The yellow transmit LED (TxD) indicates that the UNC-410 is transmitting a message on the LonWorks trunk. the green receive LED (RxD) indicates that another LonWorks device is transmitting a message on the wire.

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Maintaining the UNC-410

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-410 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 (that is, 50^oC or 122^oF), you should only expect the battery to last approximately one year.

The sealed lead acid battery is automatically charged during normal operation. The UNC-410 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 level and connections before contacting Schneider Electric Product Support.

To order a new battery, see the "Standard Replacement Parts" section on page 33.

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-410 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 6   **Replacing a UNC-410 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.

> **Note**   The UNC-410 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-410 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 5 and can be ordered from stock

Table 5   Standard replacement parts.

Part Number	Description
UNC-400-BAT	Battery, 12 Vdc, 1.2 AH (see "Replacing the Battery," page 31.)
E24-1555-2	LON (LonWorks) Trunk Connector Plug, 2-position
E24-1576-3	RS-485 connector plug, 3-position
E24-1576-6	I/O connector plug, 6-position
AD-8969-304	6 Piece resistor kit, 499 ohm, 1%, 1.0W
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)

without restriction.

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 7   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 internal modem (see Figure 7) and note the location of pin 1.

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

     c. Gently pry the modem up about 1/8th inch.

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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 other end of the modem and gently pry the modem up about 1/8th inch.

     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 7).

    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. The modem clicks into place when it is 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 6 prior to contacting Schneider Electric Product Support at 888-444-1311.

Table 6   Information for Repair and Return.

Factory Order Number[a]	
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	

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

Replacing a UNC-410

To replace a UNC-410 in the field, proceed as follows:

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.

Procedure 8   Replacing a UNC-410.

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

Step 2   Open the cover of the unit.

Step 3   Unplug the 6-position power connector. Do not remove the male connector from the wiring harness.

Step 4   Turn off building power to the unit.

Step 5   Disconnect building power from the unit (see "Power Wiring," page 18).

Step 6   Unplug any Ethernet, serial, and modem cables and pull them out of the unit through the adjacent knockouts.

Step 7   If any of your I/O points have voltage, turn the devices off or disconnect power to them.

Step 8   Unplug all I/O connectors, remove the I/O connectors from their cables (see the Caution that follows), and pull the cables out of the unit through the adjacent knockouts.

⚠️
Caution   Be sure to label the I/O wires so that you can attach them to the corresponding terminals in the new unit. The software that runs on the unit expects the terminal position to be the same to collect data from or to control the attached devices.

Step 9   Remove the unit from its mounting by unscrewing the #10 screws which hold it to the wall.

Step 10   Replace the unit, and attach it to the wall with the #10 screws.

Step 11   Reconnect building power to the unit (see "Power Wiring," page 18).

Step 12   Turn on building power to the unit.

Step 13   Reconnect all I/O connectors and secure them in place.

Step 14   If any of your I/O points have voltage, turn the devices back on, or reconnect power to them.

Step 15   Reconnect any Ethernet, serial, and modem cables.

Step 16   Plug the power connector in and verify normal operation.

Step 17   Using the Admin Tool, restore the station database.

Step 18   Using the Admin Tool, install the new license file 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 exigencies du Reglement sur le material broilleur du Canada.

If you have any questions regarding this publication or the operation of the UNC-410 please contact Schneider Electric Product Support at 888-444-1311 or productsupportrockford@buildings.schneider-electric.com.

Schneider Electric