



NCM-4

**OPERATION
MANUAL**



TRILITHIC

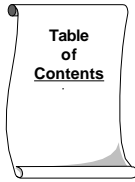
Trilithic, Inc. was founded in 1986 as an engineering and assembly company providing customized communications and routing systems for business and government applications. As business expanded, Trilithic broadened its offerings by acquiring components manufacturer Cir-Q-tel and instruments manufacturer Texscan, adding broadband solutions to the product line. Today, Trilithic is comprised of three major divisions, Broadband/CATV Instruments & Systems, Wireless & RF Microwave Components, and Emergency Alert Systems.

The Instruments Division offers Test, analysis and quality management solutions for the major cable television systems worldwide. The Division specializes in the design and manufacturing of portable RF test equipment and integrated test systems performing in a wide range of HFC and LAN applications. The Wireless division provides components and custom solutions for companies specializing in cellular, military and other wireless applications. The EAS Division is a leading supplier of government-mandated Emergency Alert Systems used by HFC service providers.

An industry leader providing telecommunications solutions for major broadband and wireless markets around the world, Trilithic is dedicated to providing quality products, services and communications solutions meeting or exceeding our customers' expectations.

Today, from our worldwide headquarters in Indianapolis Indiana, we provide over 1500 measurement products and communications components to thousands of customers around the world.

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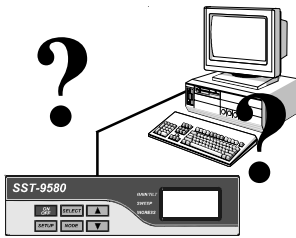
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GENERAL INFORMATION



Introduction

The **NCM-4** is a high speed, Communications Manager which provides multi-user access to your 9580 SST or 9581 SST Return Path Analyzer. The NCM-4 is an Ethernet-compatible interface. It can obtain ingress data simultaneously from up to four SST units and stores a fresh ingress spectrum for each of the 32 nodes every .7 seconds. The interface then acts as a server by making this data available via standard communications manager commands. The NCM-4 emulates the ACM-8 Communications Manager in local limits checking and support of the *PING* function (for more information, refer to the *INGRESS MANAGR OPERATION MANUAL*). Due to its server topology, the NCM-4 enables you to view LIVE data for any node without stopping or interrupting a running scan strategy.

NOTE: In order to use the full capabilities of NCM-4 version 3.X, you will need *INGRESS MANAGR* version 3.X or higher and *NCM-4 SET UP* version 3.X or higher.

Since the NCM-4 supports multi-user access, up to six users may run their own scan strategies, collect data and launch alarms. One user is designated as the “primary” or “master” user. This user can change the SST’s detector modes (NORM, FAST, AVG, etc.). The other users are designated as “secondary” users. These users receive their ingress data which is taken based on the master user’s settings. Access to the NCM-4 is password protected and utilizes a user hierarchy designating the master and secondary users.

CAUTION: You may use the NCM-4 to access FOUR SST units for up to 32 nodes or one TPX with up to 64 nodes. If you need to support more than four SSTs, you will need additional NCM-4 interfaces.

About NCM-4

The NCM-4 has the following features and capabilities:

- Replaces the ACM-8 and EI-1 interfaces. It mimics the ACM-8 capability of local check to limits and PING functions although it does NOT mimic the EI-1.

REMINDER: You will need *INGRESS MANAGR* version 3.X or higher and *NCM-4 SET UP* version 3.X or higher to access the NCM-4. Please contact Trilithic at (800) 344-2412 for more information.

- Enables several users to network access data from any SST. The interface contains a password-protected hierarchical access. Each user has a password (one primary, up to five secondaries). The passwords are downloaded to the NCM-4 via the NCM-4 Setup program (see *CONFIGURE NCM-4* page 9).

The primary user has control over the detector mode (NORM, FAST, AVG, PEAK and TRAFFICCONTROL). The five secondary users can run their own strategies or view LIVE data. Their data is based on the primary user's settings. User #5 can be regular ingress or MINIMUM HOLD while user #6 can be regular ingress or MAXIMUM HOLD. Each user has local limits (four not to exceed and one must exceed limit) assigned to it.

The MIN/MAX feature allows a user to capture the minimum or maximum value over time. The running minimum or maximum value can be read and stored by polling the respective user from an Ingress ManagR Scan Strategy. MIN HOLD will accumulate the running minimum value for each data point while MAX HOLD stores the maximum value. Both functions are reset by *pinging* the respective users within Ingress ManagR's Scan Strategy.

- It supports up to four SSTs simultaneously. The interface holds in memory the most recent spectrum and alarm spectrum for each node.

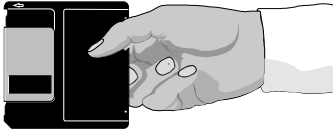
- Acts as a TCP/IP data server so that up to six users may run scan strategies and access data simultaneously.
- Supports **TPX (Test Point Expander)** functions. However, the update rate will not be as fast. It will acquire data for up to 64 nodes by selecting each installed TPM sequentially. It can capture and buffer ingress data for each node.

In normal operation, the data collection process runs in a continuous loop. For a fully loaded TPX, new data is acquired for each node every twelve seconds in **NORMAL** Mode or twelve seconds in **FAST** Mode. The time to acquire data is proportionately shorter for fewer nodes.

NOTE: The number of nodes scanned is determined by logically ORing the declared nodes (those SSTs and Nodes not named “unused” in Ingress ManagR- see the Ingress ManagR Operation Manual) for all active **USERS** (those user passwords not declared as Unused- see **PASSWORD** section in **NCM-4 SETUP OPERATION**, page 17). In other words, every named node for every named user will be scanned. The named nodes for a secondary user do not have to be the same as for the master user or any other secondary user.

REMINDER: After changes to the password list in an NCM-4, you should always perform the Configure Hub function (within Ingress ManagR) for all hubs associated with that NCM-4.

- Includes the means for future firmware upgrades/updates via the Ethernet or RS-232 cable.



SOFTWARE INSTALLATION



Introduction

Before you use the NCM-4, you will need to configure it.

NOTE: For installation of the NCM-4 if it is not already installed in your SST and connection information, see *INSTALLATION PROCEDURE* page 25.

To do this, you will need to install **NCM SETUP**. This is a software utility that enables you to set the NCM-4 using a COM Port (COM1, COM2, etc.) or a TCP/IP enabled network.

System Requirements

In order to run NCM-4 Setup, you need an IBM®-compatible computer with the following options:

- 486-33 or greater is necessary for optimal performance
- 4 Meg of RAM or greater.
- 2 Communication Ports or more (if installing via a COM Port):
 - 1 COM Port for the Mouse (if not using a PS2 Mouse)
 - 1 COM Port for the NCM-4
- 2 Meg of Hard drive space for installation
- VGA or SVGA color monitor with a resolution of 640 x 480 and 256 colors (the screen may look odd if other resolutions are used). The Windows System color map determines the color of the message boxes which appear.
- A PC compatible mouse

- Windows '95 or higher
Windows NT 4.0 or higher
- CD Drive

NCM Setup is designed to work with the same hardware setup you use for Windows 95 or Windows NT. If your Windows setup works smoothly, you should have no difficulty running NCM Setup.

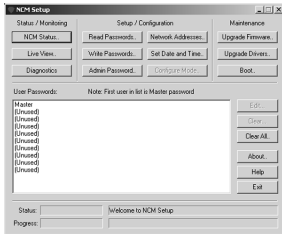
Install Software

Now that you've checked the system requirements, you can install NCM Setup.

1. Turn ON your PC.
2. Insert the NCM-4 disk into the CD Drive.
3. *Click* **MY COMPUTER**.
4. *Double-click* on the CD Drive letter (usually D:).
5. *Double-click* **SETUP**.
6. The software's setup utility will install the software into your PC.

Troubleshooting the Installation

If you have difficulties installing NCM Setup, you will need to call Trilithic at (1-800-344-2412).



CONFIGURE NCM-4



Introduction

Now that you have connected the NCM-4 and installed the NCM Setup software, you need to configure the interface.

QUICK CHECKLIST

Use the following quick checklist to install, connect and configure your NCM-4.

1. Install NCM-4 in your SST or TPX unit – page 25.
2. Install NCM-Setup Software – page 7.
3. Connect the NCM-4 to your PC via a Null Modem Cable (supplied with NCM-4 P/N 2071119001) – page 10.
4. Test the serial connection by *clicking* the **STATUS** button – page 11.
5. Assign IP Address – page 9.
6. Assign Administration Password – page 12.
7. Assign User Passwords – page 15.

Assign IP Address/Admin Password

Before you can start using your NCM-4, you will need to configure it via a direct serial connection.

CAUTION: You **MUST** use the serial connection to assign the IP Address. Once that has been done, you may assign the passwords via the serial connection or over the network connection.

NOTE: If you wish to change the setup of your NCM-4 later, you may do so via either the direct serial connection or on the network connection. Although the IP Address may be reassigned using either the serial connection or the network, it is a good idea to reassign via the serial connection since changing the IP Address while using the network may cause you to lose the connection.

After assigning the IP Address it is a good idea to go ahead and change the Admin Password from it's factory default to your own so that there is less chance of an unauthorized party gaining access to the setup function of the NCM-4.

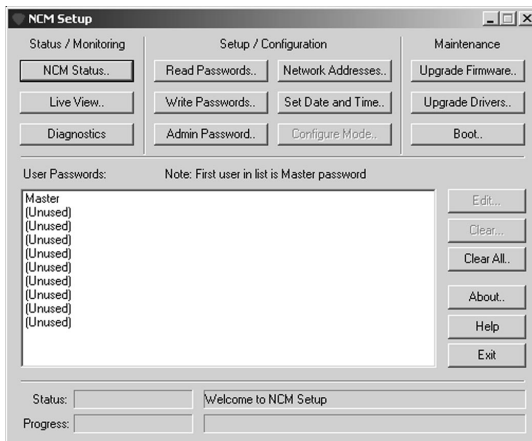
Connect NCM-4 to PC – First, connect the NCM-4 to your PC (using the null modem cable supplied with the NCM-4, P/N 2071119001).

NOTE: This serial connection is also useful if you forget the IP Address or Administration Password and need to regain contact with your interface.

If the interface is installed in an SST, connect the cable to the SST's #2 port on the NCM-4 and an available COM Port on your PC.

If the interface is installed in a TPX, connect the cable to the setup connector and an available COM Port on your PC.

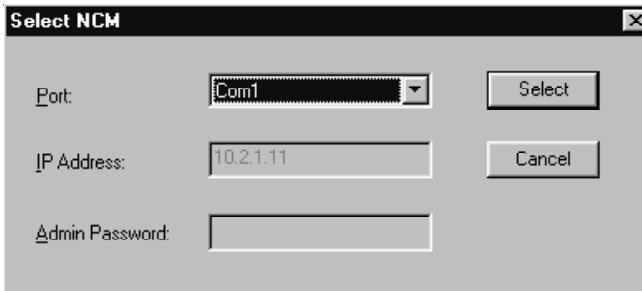
Start NCM-4 SETUP program.



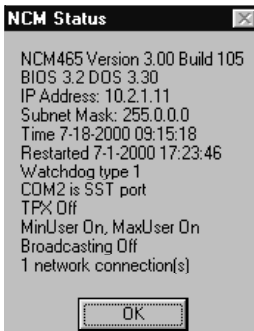
Test Connection – Now, make sure the connection between the PC and the NCM-4 is viable. *Click* the **NCM STATUS** button.



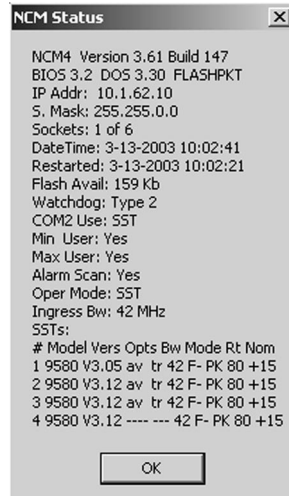
The SELECT NCM window is displayed. Select the COM Port on the PC to which the NCM-4 is connected (i.e. Com1).



Click on the **SELECT** button. If the connection works, the STATUS box will be displayed which contains the NCM-4 data such as IP Address and Subnet Mask. Make note of the information you need and then *click* the **OK** button.



Before V 3.61

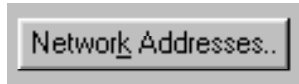


V 3.61 and above

NOTE: If the connection does not work, you will receive a “timeout” error box. If this happens, try selecting the other COM Ports. If the connection still fails, make sure that the

NCM-4 power is turned ON. Make sure that you are using the proper cable (P/N 2071119001) and that the cable is connected to the SST #2 connector on the NCM-4. If this does not solve the difficulty, try moving the cable to a different COM Port. If this does not resolve the problem, contact Trilithic.

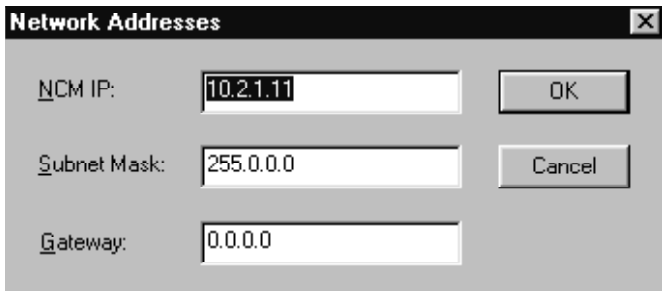
Set the NCM-4 IP Address – Once you make sure that the NCM-4 is in contact with your PC, *click* on the **NETWORK ADDRESSES** box. This selection enables you to set the IP address as well as the network subnet mask to your system’s subnet mask parameters. You may also set the gateway if used for your system. Otherwise, set the gateway to 0.0.0.0.



Click on the **SELECT** button.

NOTE: If this is the first time you have used the setup software or your systems’ manager has not changed the password, use the default password “ADMIN” for now.

When the SELECT NCM box is displayed, enter the desired IP Address, subnet mask and gateway (if applicable) and then *click* **OK**.

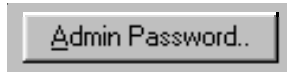


NOTE: You will need to work closely with your network/ systems people to make sure that the IP Address is the correct one to use.

Set the NCM-4 Administration Password – The NCM-4 is designed to support multiple users. The Administration Password

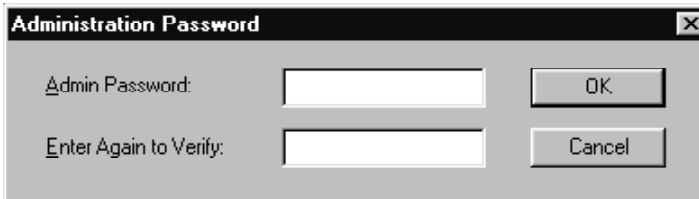
is used by the system operator to control who may access any of the NCM-4s in your system to ensure that the configuration cannot be changed by just anyone. Further, the Administration Password is required for most of the configuration functions except for downloading of user limits.

To assign the Administration Password, *click* on the **ADMIN PASSWORD** button.



NOTE: If this is the first time you have used the setup software or your systems' manager has not changed the password, use the default password "ADMIN" for now.

Click on the **SELECT** button.



When the ADMINISTRATION PASSWORD box is displayed, you may enter the desired Password. Reenter for verification and then *click* **OK**.

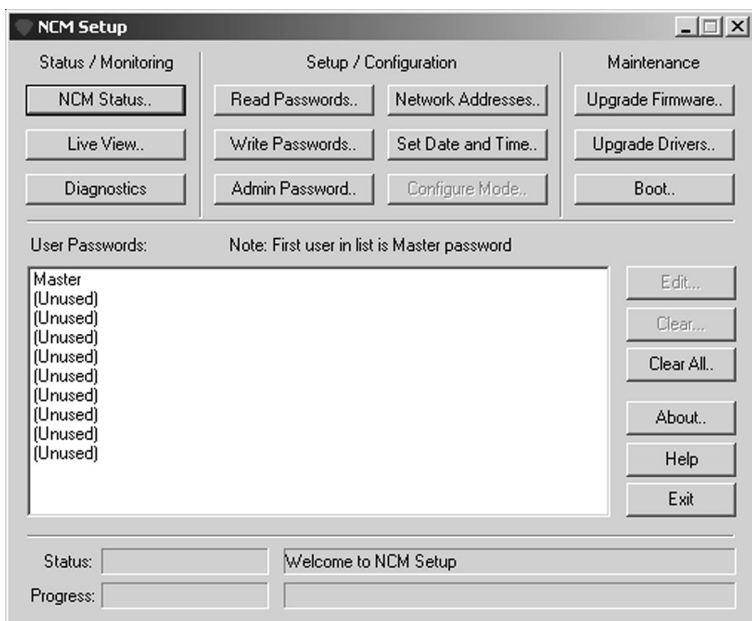
NCM-4 Overview

The MAIN window of the NCM Setup program contains several buttons which are used to perform various operations. It also displays the current user passwords that exist in the program's USER PASSWORD Buffer.

The MAIN screen's operation buttons are arranged in three groups at the top of the window.

The middle left portion of the MAIN screen contains the USER PASSWORD list.

The middle right portion of the MAIN screen consists of several utility buttons.



At the bottom of the MAIN screen is a status and progress reporting area.

The operation buttons at the top of the screen include:

Status Monitoring

- NCM Status – reads the version information from an NCM-4.
- Live View – *Click* on this button to bring up a live view of a current node; similar to LIVE Mode in Ingress ManagrR.
- Diagnostics – This button is an advanced diagnostic tool for Trilithic technical support and is used for troubleshooting.

CAUTION: Do NOT use this button unless you are directed to do so by Trilithic technical support.

Setup Configuration

- Read Passwords – reads the passwords from the NCM and displays them in the USER PASSWORD list.

- Write Passwords – writes the passwords that are currently displayed in the USER PASSWORD list to an NCM-4.
- Admin Password – allows you to change the administration password for the NCM-4 (see page 12).
- Network Addresses – used to change the IP Address on an NCM-4 (must be done using direct serial connection to the NCM-4, see page 9).

This button also enables you to set the network subnet mask to your system's subnet mask parameters as well as to set the gateway if used for your system.

- Set Date and Time – reads the date and time from an NCM-4.
- Configure Mode – Does not have a function in conjunction with **Ingress ManagR 3.X** but may have at a later time.

Maintenance

- Upgrade Firmware – writes new firmware to an NCM-4 (see page 21).

CAUTION: Do NOT use this button unless you are directed to do so by Trilithic technical support.

- Upgrade Drivers – writes new driver firmware to an NCM-4 (see page 21).
- Boot – resets the NCM-4 firmware.

You may edit the USER PASSWORD list via three buttons to the right of the display:

- Edit – edits the selected password.

NOTE: You may also *double-click* on a password to select and edit it

- Clear – sets the selected password to blank


- Clear All – sets all passwords to blank

The NCM Setup program has three utility buttons below the USER PASSWORD buttons:

- About – *click* on this button to bring up information about the program such as the version number
- Help – accesses the Windows ONLINE HELP feature for the program
- Exit – *click* on this button to exit the program

NCM-4 Setup Operation

When you wish to perform an operation on the NCM Setup program, simply *click* on the button for that operation. This brings up the PASSWORD screen (for more information, see the *PASSWORD* section page 17).



Enter the network IP Address of the NCM that you wish to access as well as its Administration Password.

NOTE: If this is the first time you have used the setup software or your systems' manager has not changed the password, use the default password "ADMIN".

Click **SELECT**.

If the desired operation does not require additional information, it will begin. If further data is required, you will be prompted for the additional parameters or data.

NOTE: Several operations do not require the Administration Password (i.e. NCM Status). In addition, if you set up your NCM-4 via a COM Port (see page 40), it is not necessary to use an Administration Password or IP Address for any operations. In such cases, the **ADMIN PASSWORD** field is disabled.

All of the setup operations are displayed in the program's MAIN Menu. Whenever you select an operation, you are prompted for the IP Address of the NCM-4 on which you desire to perform the operation.

PASSWORDS

The NCM-4 supports multi-user access so that up to six users may run their own scan strategies, collect data and launch alarms. One user is designated as the "primary" or master user. This user can change the 9580's detector modes (NORM, FAST, AVG, etc.). The other users are designated as "secondary" users. These users receive their ingress data based on the master user's current settings. In order to use this capability, the NCM-4 is password protected and utilizes a user hierarchy designating one master and up to nine secondary users.

The master user is given a MASTER PASSWORD. Up to five secondary users are assigned USER PASSWORDS. These passwords are used to govern the access level of the NCM-4. The MASTER PASSWORD provides access for functions that affect ALL users on a target NCM-4. The USER PASSWORDS provide access for only particular functions used by the individual user.

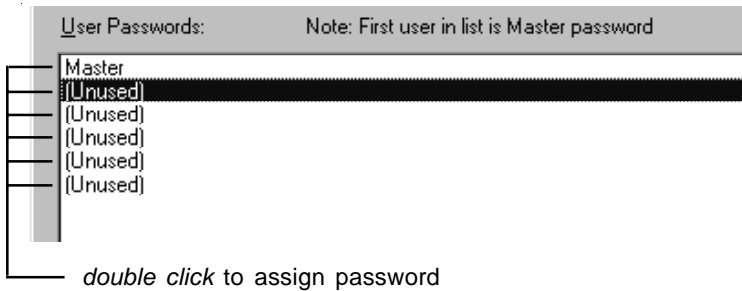
For example: The USER PASSWORD enables a secondary user to read ingress, read sweep data, write ACM thresholds and perform *pings* for that particular password.

The MASTER PASSWORD is the FIRST password in the USER PASSWORD list of the MAIN Menu. It enables the master user to set the 9580's detector modes (NORM, FAST, AVG, etc.).

Each user password has local limits (four not to exceed and one must exceed the limit) assigned to it. This enables the different

users to set different local limits based upon their scanning needs. For example, one user might be using one set of limits while the second looks at a different set through the same NCM-4 during polling and pinging operations. For more information regarding local limits, poll method and ping method (high limits only), refer to the *Ingress Mode*, *SST Mode Rate* and *Hit Sample Size* sections in the *INGRESS MANAGER OPERATION MANUAL*.

To set the user passwords, *double click* on the user password you wish to assign in the password list.

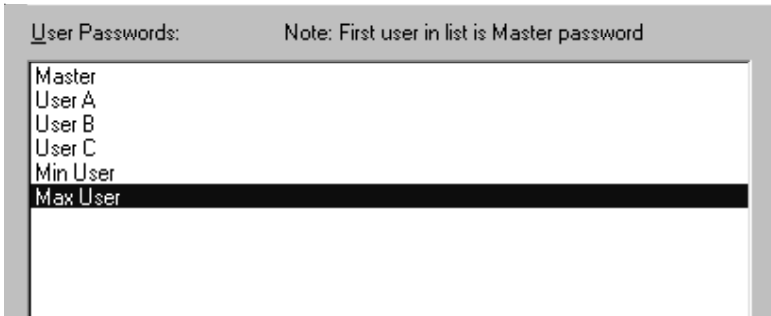


In the PASSWORD window, type in a password for the selected user.



Click OK and the password list will contain the assigned user password.

User #5 can be set to MINIMUM HOLD while User #6 can be set to MAXIMUM HOLD. To assign these functions, *double click* on the fifth (next to the last) user password in the list and assign the password "Min ___" and the sixth (last) to assign "Max ___" (you may use any word after Min and Max, for example "user"). The MINIMUM/MAXIMUM HOLD feature enables you to capture the minimum or maximum value over time. The running minimum



or maximum can be read and stored by polling the respective user from an Ingress ManagR Scan Strategy. MIN HOLD accumulates the running minimum value for each data point. MAX HOLD stores the maximum value. Both functions are reset by *pinging* the respective user within Ingress ManagR's Scan Strategy.

CAUTION: You may also designate one or more passwords as utility passwords which are given out to several users. This means that two or more users may use the same password even at the same time for such functions as viewing LIVE Mode. However, keep in mind that this simultaneous sharing of a password does not work with the *ping* function since the first user to *ping* after an alarm condition will reset the ingress alarm flag.

NCM-4 Setup has several buttons which pertain to password usage.

REMANDER: After changes to the password list in an NCM-4, you should always perform the Configure Hub function (within Ingress ManagR) for all Hubs associated with that NCM-4.

Admin Password

The ADMIN PASSWORD command enables you to change the Administration Password for a target NCM-4. The Administration Password enables the system operator to control who may access an NCM-4. It is also required for all configuration functions except downloading of user limits.

To change the Administration Password of a target NCM-4, *click* on the **ADMINISTRATION PASSWORD** operation button.

NOTE: NCM-4 interfaces are shipped with *ADMIN* as the ADMINISTRATION PASSWORD.

REMINDER: If you forget the Administration Password, you will need to reconnect the NCM-4 via the serial connection. However, the unit will not indicate the old Administration Password so you will need to repeat the assigning of the password and replace it with another (see *Assign IP Address/Admin Password* on page 9).

Read Passwords

READ PASSWORDS enables you to read the passwords from a target NCM-4 and then list them in the USER PASSWORDS list in the MAIN Menu. You may edit the passwords in this list (see *EDITING THE USER PASSWORDS* on page 15).

REMINDER: The FIRST password in the list is ALWAYS the MASTER PASSWORD.

Editing the User Passwords

You may edit the USER PASSWORDS list via the **EDIT**, **CLEAR** and **ALL CLEAR** buttons which are to the right of the list on the MAIN Menu.

NOTE: Before you can edit the user passwords, you will need the Admin Password.

Use the **READ PASSWORDS** button to upload the passwords for the target NCM-4 into your USER LIST.

To change a password in the USER LIST, select the desired password. *Click* the **EDIT** button to edit the password.

NOTE: You may also *double-click* on the desired password to edit it.

To set the selected password to blank, *click* on the **CLEAR** button.

You may also set all of the passwords to blank by *clicking* on the **CLEAR ALL** button.

Write Passwords

WRITE PASSWORDS enables you to write the passwords displayed in the USER PASSWORDS list in the MAIN Menu to the target NCM-4s.

NOTE: Before you can write the user passwords, you will need the Admin Password.

REMINDER: The FIRST password in the list is ALWAYS the MASTER PASSWORD.

NCM STATUS

The NCM STATUS operation reads the version information and status from an NCM. When you *click* on the **NCM STATUS** operation button, the version information for the NCM appears in a separate dialogue box. This operation is useful for checking to see if the selected NCM-4 is online.

REMINDER: You do not need to enter the Administration Password for this operation.

NETWORK ADDRESSES

The NETWORK ADDRESSES operation enables you to change the IP Address on an NCM-4 via the direct serial connection or the network.

You may also set the network subnet mask to your system's subnet mask parameters, and you may specify the gateway if used for your system.

CAUTION: Although you may change the IP Address while your NCM-4 is connected to the network, it is a good idea to reconnect via the serial connection to make the change. If you change the IP Address via the network, you may wind up losing the network connection.

When you select this operation, you are asked for the IP Address of the desired NCM-4. Then, you are prompted to type in a new IP Address and subnet mask. If successful, the NCM-4 will respond to the new IP Address.

UPGRADE FIRMWARE

UPGRADE FIRMWARE enables you to write new firmware to an NCM-4. *Click* on the **UPGRADE FIRMWARE** button and enter the administration password (see page 12). Then, select the firmware upgrade file (**.FW**) which is supplied by Trilithic. Once selected, *click* **OPEN** and the Firmware file will be uploaded to the NCM-4. Once the upgrade is completed, you may click on the **NCM STATUS** button to verify the version number.

CAUTION: Do NOT use this button unless you are directed to do so by Trilithic technical support.

UPGRADE DRIVERS

UPGRADE DRIVERS writes new driver firmware to an NCM-4. *click* on the **UPGRADE FIRMWARE** button and enter the administration password. NCM Setup will upgrade drivers on the NCM-4 if any need upgrading.

SET DATE AND TIME

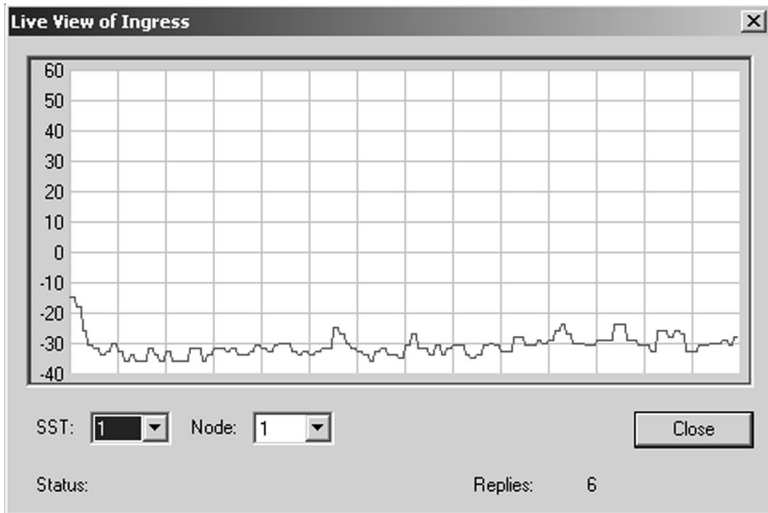
The **DATE AND TIME** operation enables you to read the date and time for a target NCM-4. It also allows you to edit the information and write back the modified date and time to the unit.

BOOT

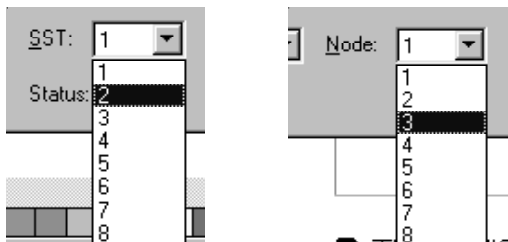
BOOT enables you to reset the NCM-4 firmware.

LIVE VIEW

This feature is similar to the LIVE Mode in **Ingress ManagR 3.X**. To access the LIVE VIEW OF INGRESS, press the **LIVE VIEW** button.



In the LIVE VIEW screen, you can select the SST and Node that you wish to view by *clicking* on the selection arrows.



Once you select the desired SST and Node, the LIVE VIEW will begin showing the trace.

Once you have viewed the SST and Node information, *click* on the **CLOSE** button to exit the LIVE VIEW window.

DIAGNOSTICS

This button is used as an advanced diagnostic tool for troubleshooting by Trilithic's technical support.

CAUTION: Do NOT use this button unless you are told to do so by Trilithic technical support.

Computer TCP/IP Setup

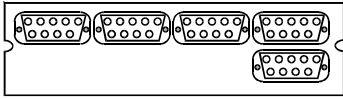
When the NCM-4 has been configured, you will need to make sure that your PC is set up for TCP/IP. In Windows 95/98, it is important to note that your computer may have two network adapters. This could occur if you use a modem to connect to the internet, as well as a network card.

In this case, each installed protocol can be associated to either network adapter, or both of them.

When following the instructions below, you should make sure you have TCP/IP associated with the network adapter you plan to use with Ingress ManagrR.

1. To begin your installation, *click* on the **Start** button. From there, go to SETTINGS and then CONTROL PANEL.
2. Next, *double-click* on the **NETWORK** icon.
3. Check to see if TCP/IP is listed as one of the protocols. If it is, you have TCP/IP installed already. *Skip* to Step 15.
4. If TCP/IP is not on the list, *click* **Add....**
5. Now, *click* **PROTOCOL**. *Click* **Add...** again.
6. Next, *click* on **MICROSOFT** in the left display, *click* on **TCP/IP** in the right display. *Click* **OK**.
7. Once that is done, *click* **OK** in the Network Window. Windows will install TCP/IP on your computer.
8. When the installation is completed, Windows may tell you to reboot. *Click* **NO**. (We'll reboot after some changes).

9. Now, *click* on **TCP/IP** in the installed components list and then on **Properties....**
10. Assign an IP Address and Subnet mask.
11. Modify any other parameters required for your network.
12. Again, *click* **OK**.
13. Finally, *click* **OK**. Close all of the windows until your Desktop is clear again.
14. Now you can reboot the PC. *Click* on **Start**. Go to **Shut-down** and then **Restart**. *Click* **OK**.
15. Once your PC has rebooted, try to *PING* a known device on your network to ensure that TCP/IP is loaded and functioning. *Click* on **Start**. Go to **Run** and type **PING xxx.xxx.xxx.xxx** (must be the IP Address of a device installed on the network i.e. 10.2.1.12) into the display bar. If you get a response then you have set up TCP/IP correctly.



INSTALLATION PROCEDURE



Introduction

Before you use the NCM-4, you will need to install it in the 9580 SST, 9581 SST or TPX unit (if it is not already installed).

NOTE: Before proceeding, check the firmware of your 9580 SST unit (located in the lower right of the title display when you first turn the unit ON). If it is version 2.00.5 or higher, you can go ahead and do the upgrade. If it is less than 2.00.5, you will need to call Trilithic for more information at: 800-344-2412.

Equipment Required

You will need the following for installation:

- NCM-4 Kit/9580 SST (P/N 2071216000) or
- NCM-4 Kit/9581 SST (P/N 2071216003) or
- NCM-4 Kit/TPX (P/N 2071216001)
- Phillips Screw Driver
- Static Wrist Strap and static free work area
- Null Modem cable
- 3/16" Hex Driver

Installation Steps for 9580 SST

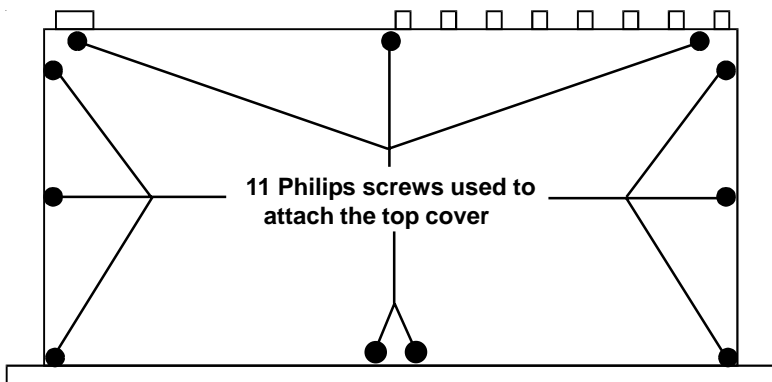
Use the following procedure to install the NCM-4 interface.

1. Place the 9580 SST Headend Unit (in which the board is to be installed) on your workbench. Disconnect all cables from the back of the SST Unit.

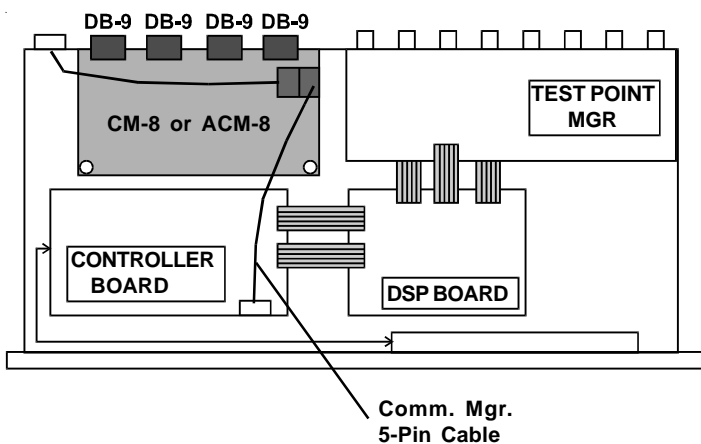
NOTE: If this Unit came with the Test Point Manager option, you may leave the RF jumper coax.

CAUTION: Make sure that the SST Unit is turned OFF and that the power plug is disconnected.

2. Place the static wrist strap on your wrist and attach it to ground.
3. Use the Phillips screw driver to remove the eleven (11) screws on TOP of the SST Unit. Remove the top panel.

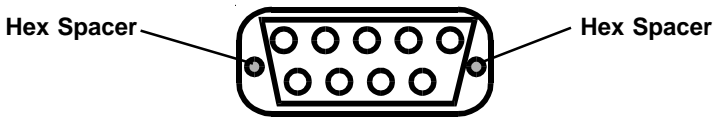


4. Disconnect the 4-pin connector (with two wires) which connects the Control Board with the Power Jack.
5. Disconnect the 5-Pin connector that goes to the Control Board.

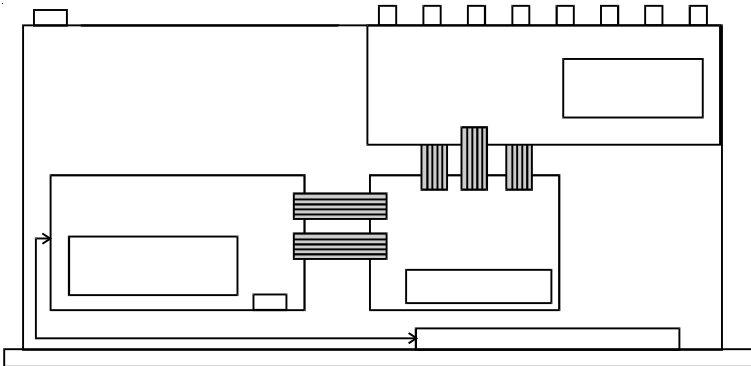


6. ***If the CM-8 or ACM-8 Option is installed, perform the following steps to remove it!***

- a. Disconnect the two 5-pin connectors which go to the ACM-8 board. Remove the cable with 5 wires from the Control Board.
- b. Remove the two screws which hold the ACM-8 to the standoffs on the bottom plate.
- c. Remove the sixteen Hex Spacers which hold the ACM-8 to the rear panel (there is one on either side of each DB9 connector).



- d. Remove the ACM-8.
- e. Remove the two 3/16" Hex Spacers (used to mount the ACM-8) from the bottom plate.

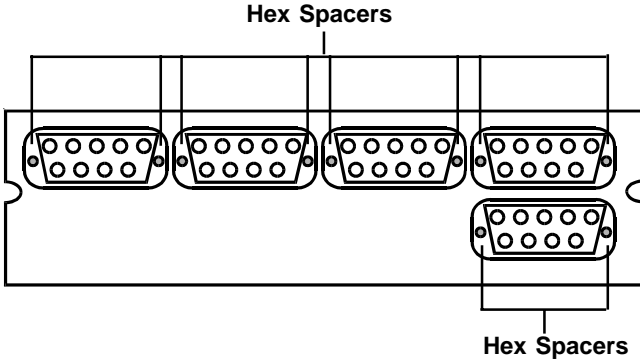


7. Install two 4-40 x 15/16" (3/16") Hex Spacers (included with the NCM-4) on the screw studs on the bottom plate.

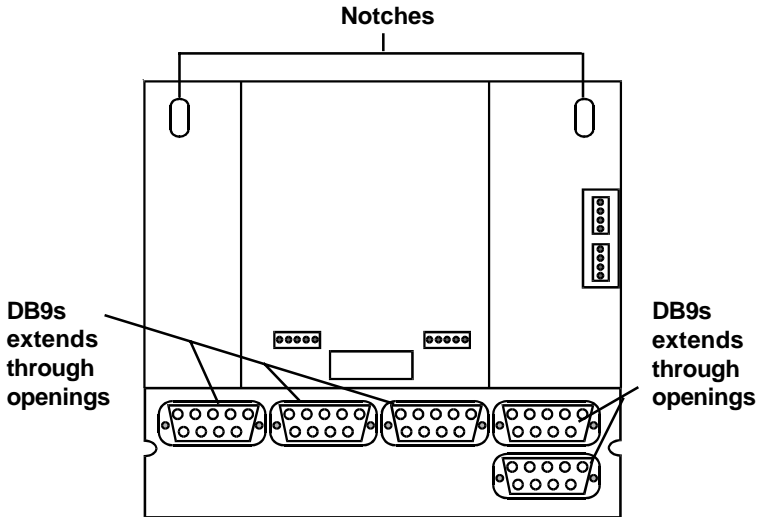
CAUTION: Do NOT overtighten.

NOTE: These are the same studs which were used for the Hex Spacers for the ACM-8 (see Step 6 above).

8. Remove the ten Hex Spacers holding the DB9 connectors to the NCM-4 bracket (one on either side of each DB9 connector).

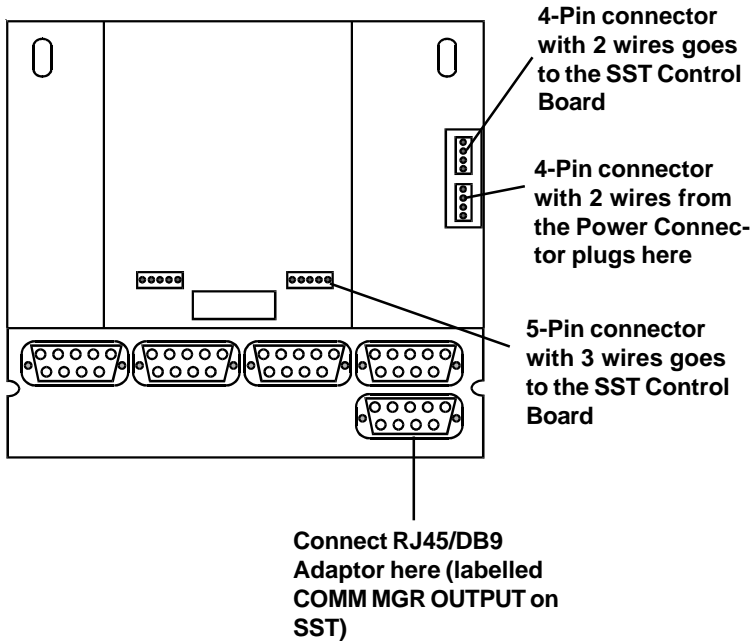


9. Place the NCM-4 into the SST so that each DB9 connector fits through a DB9 opening in the SST rear panel. Make sure that the two Hex Spacers are lined up with the two notched holes on the NCM-4 bracket.

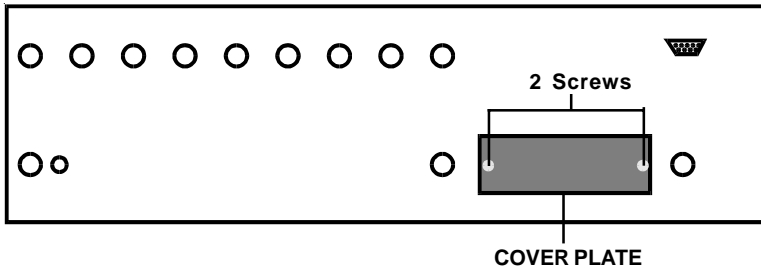


10. Install the ten Hex Spacers through the rear panel (one on either side of each DB9) into the threaded holes in the NCM-4 and tighten.

11. Install the two 4-40 x 1/4" screws (included) through the NCM-4 and into the Hex Spacers.
12. Install the 4-pin connector (with two wires) from the Power Jack to the vacant 4-pin plug on the small power connector PCB which is mounted on the NCM-4 bracket.
13. Install the 4-pin connector (with two wires) from the 4-pin connector on the small Power Connector board to the 4-pin plug on the Control Board.
14. Install the 5-pin connector (with three wires) from the NCM-4 to the 5-pin plug on the SST Control Board.



15. Position the I/O cover plate over the DB9 connectors on the rear panel. Install two 4-40 x 1/4" screws (supplied with the NCM-4) through the holes at each end of the plate into the threaded openings of the rear panel.



16. Connect the RJ45/DB9 Adaptor (included with NCM-4) to the COMM MGR OUTPUT connector on the rear panel.
17. Replace the SST's top cover and secure it with the eleven screws you removed in Step 3.

Installation Steps for 9581 SST

Use the following procedure to install the NCM-4 interface.

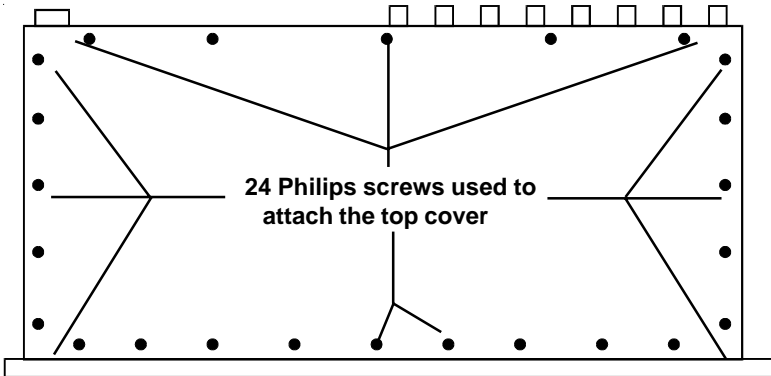
1. Place the 9581 SST Headend Unit (in which the board is to be installed) on your workbench. Disconnect all cables from the back of the SST Unit.

NOTE: If this Unit came with the Test Point Manager option, you may leave the RF jumper coax.

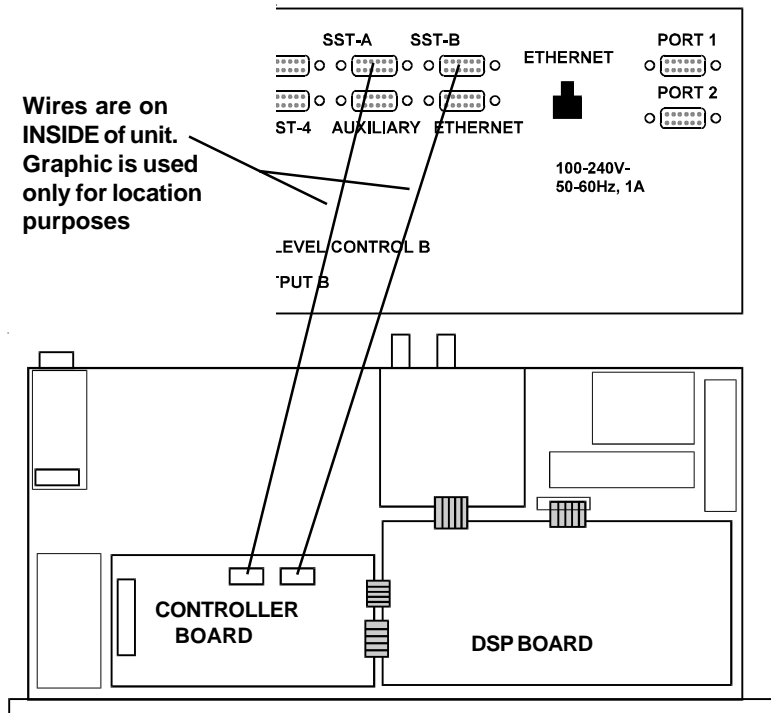
CAUTION: Make sure that the SST Unit is turned OFF and that the power plug is disconnected.

2. Place the static wrist strap on your wrist and attach it to ground.

- Use the Philips screw driver to remove the twenty four (24) screws on TOP of the SST Unit. Remove the top panel.



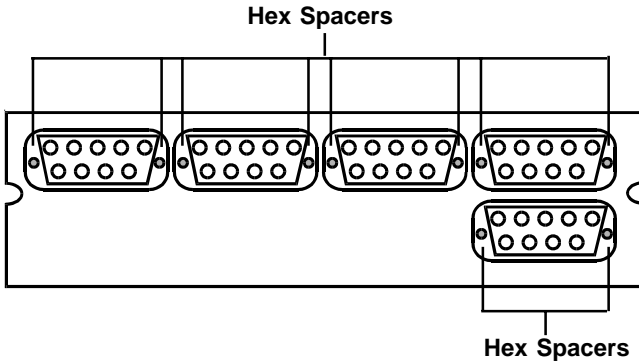
- Disconnect the two 5-pin connectors (with two wires) which connects the Control Board with the SST A and SST B.



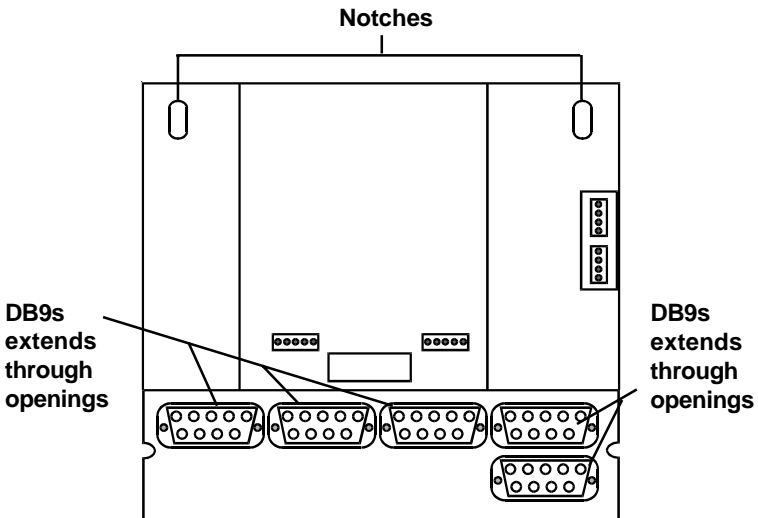
5. Install two 4-40 x 15/16" (3/16") Hex Spacers (included with the NCM-4) on the screw studs on the bottom plate.

CAUTION: Do NOT overtighten.

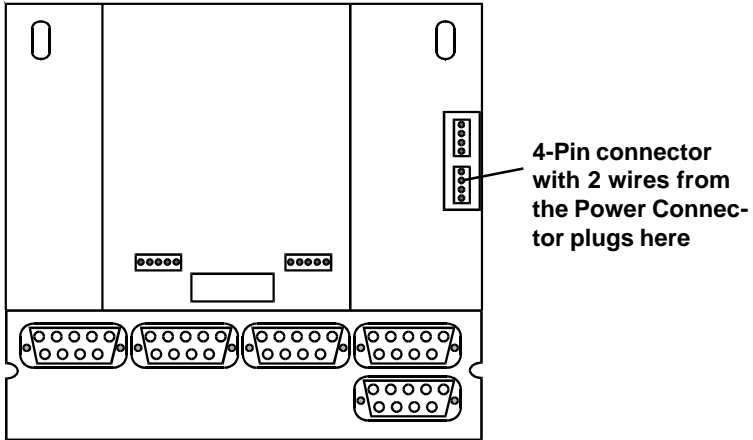
6. Remove the ten Hex Spacers holding the DB9 connectors to the NCM-4 bracket (one on either side of each DB9 connector).



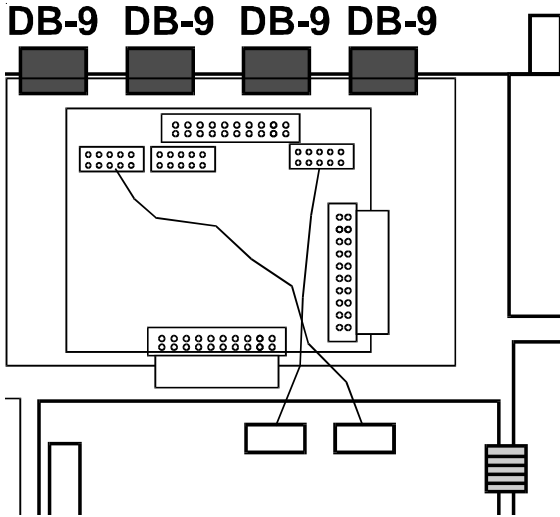
7. Place the NCM-4 into the SST so that each DB9 connector fits through a DB9 opening in the SST rear panel. Make sure that the two Hex Spacers are lined up with the two notched holes on the NCM-4 bracket.



8. Install the ten Hex Spacers through the rear panel (one on either side of each DB9) into the threaded holes in the NCM-4 and tighten.
9. Install the two 4-40 x 1/4" screws (included) through the NCM-4 and into the Hex Spacers.
10. Install the 4-pin connector (with two wires) from the Power Jack to the vacant 4-pin plug on the small power connector PCB which is mounted on the NCM-4 bracket.

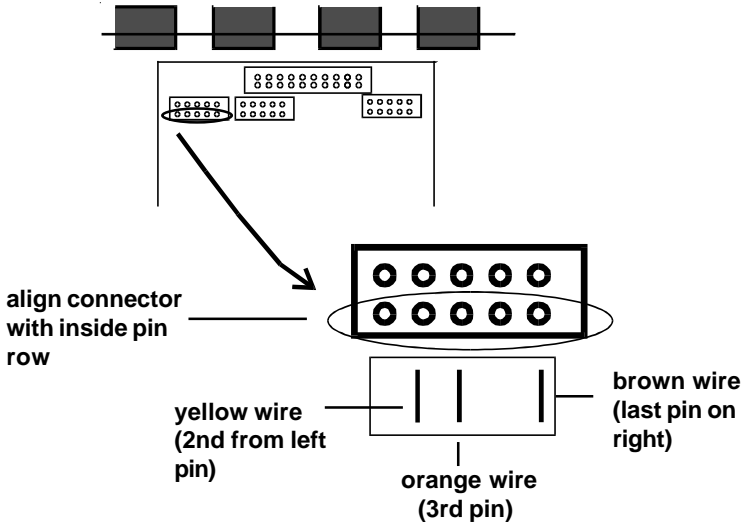


11. Install the two 5-pin connectors (with three wires) from the NCM-4 to the two 5-pin plugs on the SST Control Board.

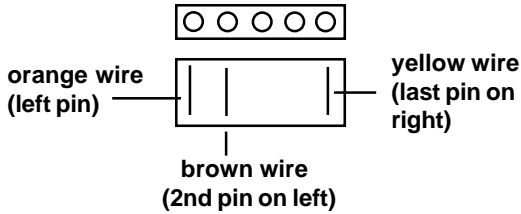


The connector plugs go on the NCM-4's pins nearer the center of the board.

LEFT NCM-4 Connector to RIGHT PLUG on Control Board—
On the NCM-4, the yellow wire must be aligned to the left and the brown wire must be aligned to the right.

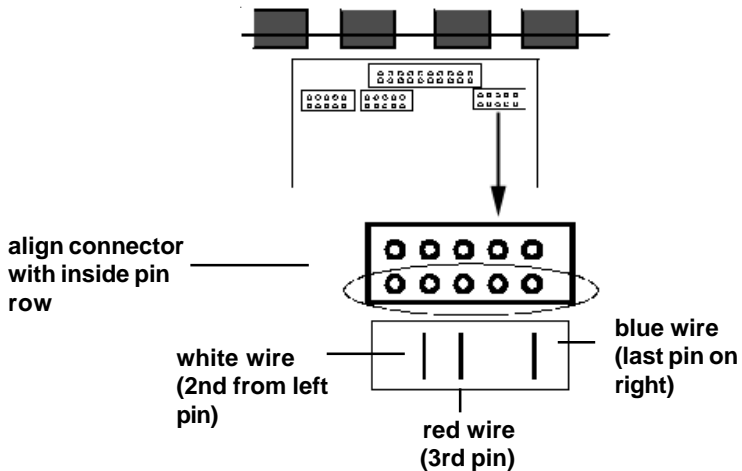


Next, connect the other end to the single row of pins on the Control Board. The yellow wire must be be on the RIGHT and the orange wire on the LEFT.

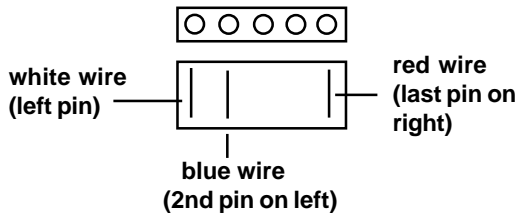


CAUTION: Make sure you align the wires correctly. If you reverse the position of the connectors, you can damage the unit.

RIGHT NCM-4 Connector to LEFT PLUG on Control Board—
On the NCM-4, the white wire must be aligned to the left and the blue wire must be aligned to the right.



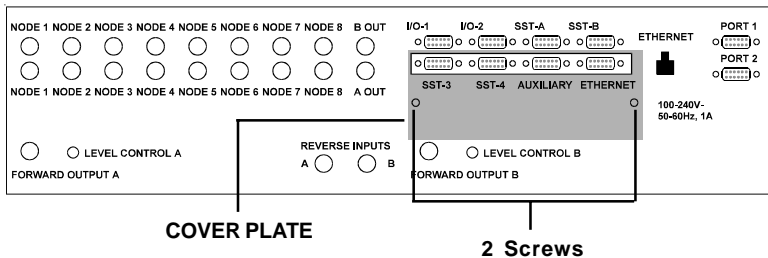
Next, connect the other end to the single row of pins on the Control Board. The yellow wire must be be on the RIGHT and the orange wire on the LEFT.



CAUTION: Make sure you align the wires correctly. If you reverse the position of the connectors, you can damage the unit.

REMINDER: The wires will crisscross. This means that the LEFT connector on the NCM-4 goes to the RIGHT connector on the Control Board. The RIGHT connector on the NCM-4 goes to the LEFT connector on the Control Board.

- Position the I/O cover plate (which labels the installed connectors) over the DB9 connectors on the rear panel. Install two 4-40 x 1/4" screws (supplied with the NCM-4) through the holes at each end of the plate into the threaded openings of the rear panel.



- Connect the RJ45/DB9 Adaptor (included with NCM-4) to the COMM MGR OUTPUT connector on the rear panel.
- Replace the SST's top cover and secure it with the twenty four screws you removed in Step 3.

Installation Steps for Satellite 9581 SST

The NCM-4 enables you to connect a satellite 9581 SST to your primary 9581 SST unit.

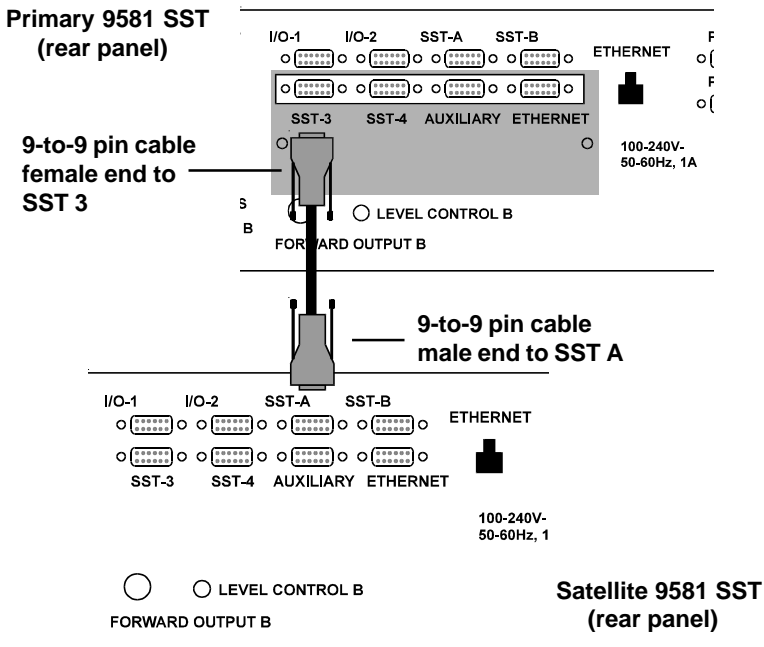
Equipment:

- 9581 SST primary unit with NCM-4 Installed
- 9581 SST satellite unit
- Straight 9-to-9 pin cable (male/female)*

* If the 9581 SST satellite unit has two TPMs, you will need two cables (see **NOTE** below).

Once the NCM-4 is installed in the 9581 SST primary unit, connect the female end of the 9-to-9 pin cable to the port on the rear panel labelled **SST 3**.

Connect the male end of the cable to the 9581 SST secondary unit's port labelled **SST A**.

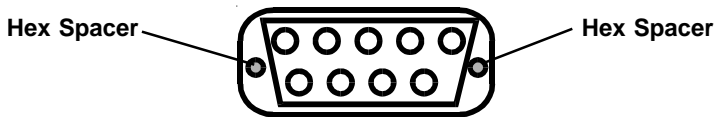


NOTE: If the 9581 SST satellite unit has a second TPM, connect its **SST B** port to the primary unit's **SST 4** port with the second 9-to-9 pin cable.

Installation Steps for TPX

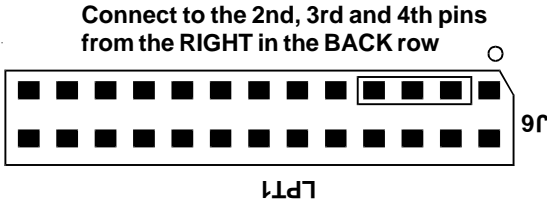
Use the following procedure to install the NCM-4 interface.

1. Unplug the CONTROL, AUX and COMM MGR OUT PUT cables from the rear panel.
2. Remove the nine screws in the top cover and remove it.
3. Remove the two hex spacers holding the CONTROL CONNECTOR to the rear panel and move the CONTROL CONNECTOR board aside (toward the front of the TPX).
4. Disconnect the 3-pin and 5-pin connectors which go to the CM-8/ACM-8 Communications Manager.
5. Remove the two screws which hold the CM-8/ACM-8 to the standoffs on the bottom of the unit.
6. Remove the sixteen hex spacers which hold the DB9 connectors to the rear panel and remove the CM-8/ACM-8.
7. Remove the eight hex spacers which hold the DB9 connectors to the NCM-4 bracket (there is one on each side of each DB9 connector).



8. Position the NCM-4 above the TPX (the DB9 connectors should face the rear). Connect the 5-pin connector coming from the TPX Main board (which was removed from the ACM-8) to the vacant 5-pin plug on the small 2-connector board which is mounted on the NCM-4 bracket.

9. Connect the 3-pin connector from the TPX Main board (which was removed from the CM-8/ACM-8) to the indicated pins on J6 (LPT1), which is located on the bottom of the NCM-4 as shown below:



10. Place the NCM-4 into the TPX so that each of the DB9 connectors fits through a DB9 opening. Make sure that the two standoffs on the bottom panel are aligned with the two notched holes in the bottom of the NCM-4 bracket.
11. Position the I/O cover plate over the DB9 connectors on the rear panel. Install the eight hex spacers (one on each side of the DB9 connectors) through the rear panel and into the threaded holes in the NCM-4 bracket. Tighten.
12. Install the two 4-40 x 3/8" screws (included with the NCM-4) through the NCM-4 bracket into the standoffs on the bottom panel.
13. Replace the TPX Control-connector (moved aside in Step 3) in the TPX Control opening in the rear panel. Secure it with the two hex spacers which were removed in Step 3.
14. Replace the TPX top cover and secure it with the nine top cover screws.
15. Connect the DB9/RJ45 adapter (supplied with NCM-4) to the ETHERNET (formerly COMM MGR OUTPUT) connector on the rear panel.
16. Connect the DB9/PWR JK adapter (supplied with NCM-4) to the POWER (formerly AUX 6) connector on the rear panel.

Connecting NCM-4

Before you use the NCM-4, you will need to set up the NCM using a direct serial connection (see page 9).

CONNECTING VIA A COM PORT

To connect via a COM port, connect a NULL modem cable (Trilithic P/N 2071119001) from a spare COM port on your PC, to any of the input ports on the NCM (see page 10).



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