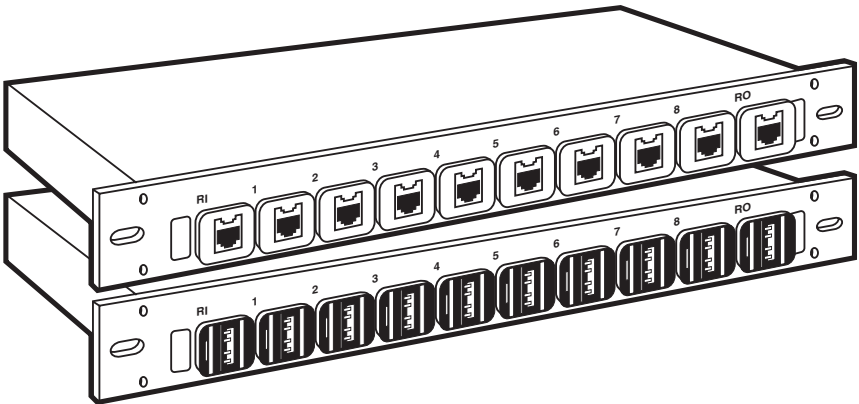




LT0006A  
LT0006A-NMC  
LT0006A-IC16  
LT0006A-ICOC  
LT0006A-IPOP

LT0006A-IPNM  
LT0006A-IPRJ  
LT0006A-TNM  
LT0006A-RJ  
LT0006A-RJNM

## Smart Token Ring Access Unit



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**CUSTOMER  
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INFORMATION**

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**FEDERAL COMMUNICATIONS COMMISSION  
AND  
CANADIAN DEPARTMENT OF COMMUNICATIONS  
RADIO FREQUENCY INTERFERENCE STATEMENTS**

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

*This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications.*

*Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par le ministère des Communications du Canada.*

**NORMAS OFICIALES MEXICANAS (NOM)  
ELECTRICAL SAFETY STATEMENT****INSTRUCCIONES DE SEGURIDAD**

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc..
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.

11. El aparato eléctrico deberá ser conectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra física y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las líneas de energía.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objetos líquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
  - A: El cable de poder o el contacto ha sido dañado; u
  - B: Objetos han caído o líquido ha sido derramado dentro del aparato; o
  - C: El aparato ha sido expuesto a la lluvia; o
  - D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
  - E: El aparato ha sido tirado o su cubierta ha sido dañada.

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# 1. Specifications

## Electrical

### Phantom Circuit —

|                                |                 |
|--------------------------------|-----------------|
| <i>Operating Voltage:</i>      | 3.5 to 7V       |
| <i>Operating Current:</i>      | 1.0 mA @ 5.0V   |
| <i>DC Resistance TX to RX:</i> | 4.7±0.2kΩ@ 4.0V |
| <i>Insertion Time:</i>         | 5 sec. max.     |
| <i>Removal Time:</i>           | 50 to 200 msec  |

**NOTE: TX/RX apply to each lobe.**

### Insertion Loss (maximum) —

|          | <b>0.5 to<br/>4 MHz</b> | <b>4 to 16<br/>MHz</b> | <b>16 to<br/>32 MHz</b> |
|----------|-------------------------|------------------------|-------------------------|
| RI or RO | 0.3 dB                  | 0.6 dB                 | 1.2 dB                  |
| TX to RX | 0.65 dB                 | 1.3 dB                 | 2.6 dB                  |
| RI to RX | 0.55 dB                 | 1.1 dB                 | 2.2 dB                  |
| TX to RO | 0.55 dB                 | 1.1 dB                 | 2.2 dB                  |

### Crosstalk (maximum) —

|                            | <b>0.5 to<br/>4 MHz</b> | <b>4 to 16<br/>MHz</b> |
|----------------------------|-------------------------|------------------------|
| TX to RX                   | 43 dB                   | 37 dB                  |
| Bypassed Lobe to Main Path | 43 dB                   | 37 dB                  |
| Main Path to Backup Path   | 47 dB                   | 41 dB                  |

### Return Loss (minimum) —

|                | <b>1 to<br/>6 MHz</b> | <b>4 to 12<br/>MHz</b> | <b>12 to<br/>24 MHz</b> |
|----------------|-----------------------|------------------------|-------------------------|
| RI to any lobe | 20 dB                 | 14 dB                  | 11 dB                   |



**Common Mode Rejection (minimum) —**

| <b>1 to<br/>6 MHz</b> | <b>6 to 12<br/>MHz</b> | <b>12 to<br/>24 MHz</b> |
|-----------------------|------------------------|-------------------------|
| 40 dB                 | 28 dB                  | 25 dB                   |

**Connectors —** *Standard Unit* (LT0006A): (10) 4-position data connectors;  
*Unit with RJ-45 option* (LT0006A-RJ): (10) self-shorting RJ-45 connectors

**Power —** Operates without power; each RI/RO option requires an external power supply of either 9V @ 300 mA or 7.5V @ 800 mA

**Network Management**

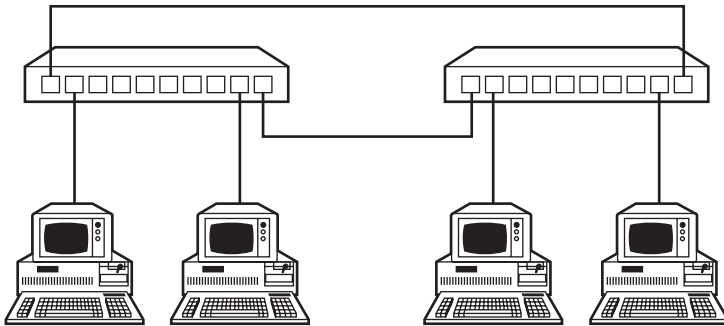
|                               |  |
|-------------------------------|--|
| <b>Transmission Line —</b>    | 4-wire telephone lines (two twisted pairs) |
| <b>Data Rate —</b>            | 2400 bps, asynchronous                     |
| <b>Interface —</b>            | RS-485 compatible                          |
| <b>Mechanical Interface —</b> | Two RJ-45 connectors                       |
| <b>Address Setting —</b>      | 6-position DIP switch                      |
| <b>Power —</b>                | No external power required                 |
| <b>Input Voltage Range —</b>  | 10 to 28 VDC                               |
| <b>Power Consumption —</b>    | 5 mA max. @ 24 VDC                         |

**General**

|                                      |   |
|--------------------------------------|---|
| <b>Operating Temperature —</b>       | 32 to 122°F (0 to 50°C)                     |
| <b>Relative Humidity Tolerance —</b> | 10 to 90%, noncondensing                    |
| <b>Size —</b>                        | 1.7"H x 19"W x 6.8"D (4.3 x 48.3 x 17.3 cm) |
| <b>Weight —</b>                      | 4.8 lb. (2.2 kg)                            |

## 2. Introduction

The Smart Token Ring Access Unit provides physical and electrical interconnection between workstations and the IEEE 802.5 Token Ring network. The unit is a passive wiring concentrator, which offers star-shaped ring topology for eight users. For larger networks, several Smart Token Ring Access Units can be linked together, by connecting Ring In/Ring Out expansion ports. The Smart Token Ring Access Unit operates at 4 and 16 Mbps.



**Figure 2-1. The Smart Token Ring Access Unit in a typical application.**

### *Insert/Bypass Functions*

Insert and bypass functions are provided within the unit. Insertion of a workstation into the ring can be carried out at any time by simple connection of the workstation interface card (NIC) to one of the lobes (insertion indicated by connector LED). Bypassing of a lobe occurs automatically when its cable connection is removed, or when the workstation becomes inactive.

### *External Power*

The Smart Token Ring Access Unit operates without external power. However, a power supply is required for each RI or RO option installed. A 7.5-volt, 800-mA power supply is available for all options; a smaller 9-volt, 300-mA power supply is available for the 4-Mbps repeater options and the TCP cable-fault protector options.

***Management***

A management option is available for direct installation into the Smart Token Ring Access Unit. This option allows a central network management station to monitor and control the operation of each lobe and repeater.

***Rackmount***

The Smart Token Ring Access Unit is housed in a 19-inch rack-mount enclosure. The unit height is only 1U (1.75"), requiring minimal rack space.

***Connectors***

The standard Smart Token Ring Access Unit is provided with IBM® Data Connectors. In addition, it can optionally be supplied with special RJ-45 connectors, for connection of Unshielded Twisted Pair (UTP), to reduce installation costs while retaining the self-shorting (bypass) feature.

***Relay Tool***

To ensure proper operation of the Smart Token Ring Access Unit, a pre-installation set-up tool should be used (LT037). This small universal tool should be ordered separately.

***The Network Management Option (NM)***

The network management option enables the Smart Token Ring Access Unit to be connected to the Network Management System via an independent, low-bit-rate communication channel, using a separate 4-wire line. This allows continued management of the network, even if the ring is down.

The management system provides a complete solution for monitoring and controlling the physical layer of the network, while simplifying its configuration and maintenance. In addition it enables the user to:

- Monitor the status of each node (Inserted/Bypassed) according to the phantom signal sent from the workstation.
- Report on Smart Token Ring Access Unit lobe and RI, RO configuration.
- Monitor the status of each repeater and the ring trunk segments connected to it.
- Force any node out of the ring by physically bypassing it, regardless of IEEE 802.5 protocols.
- Perform loop-back (self-shorting) at either the RI or the RO port, enabling segmentation of the ring for fault isolation.
- Reset all the circuits for a lobe after installation, eliminating the need for set-up tools such as the LT037.

## SMART TOKEN RING ACCESS UNIT

Control of the network is via an application program running on a centrally located PC. The management option is comprised of a printed circuit board housed in the Smart Token Ring Access Unit, which is accessible from the back panel via two RJ-45 connectors. A DIP switch enables the user to assign individual addresses to each Smart Token Ring Access Unit. The management option card requires no power supply.

## 3. Setup

The following procedure applies to a Smart Token Ring Access Unit with no options installed:

### NOTE

**An LT037 Relay Tool pre-installation set-up tool is required for this procedure.**

### 3.1 Smart Token Ring Access Unit Without Options

1. Install the Smart Token Ring Access Unit in a 19-inch rack (no cables should be connected to the unit).
2. Test and reset all lobes according to the following instructions:
  - a. Plug the hand-held pre-installation set-up tool into the lobe #1 connector. The left LED should glow brightly and then fade out within 3 to 5 seconds.
  - b. Continue to apply the set-up tool into the lobe connector for 5 more seconds. A click can be heard shortly after the LED's light fades completely.
  - c. Remove the set-up tool from the lobe. A click should be heard confirming that the lobe-insertion control circuitry is functioning properly.
  - d. Repeat this procedure for all other lobes.
3. Plug the set-up tool into the RI connector, observing that both LEDs are glowing brightly. In order to save battery life, do not leave the set-up tool plugged in for more than a few seconds.
4. Repeat step 3 for the RO connector.
5. Label your new Smart Token Ring Access Unit in the appropriate place, according to your network plan.
6. Connect the cables to the appropriate lobes and RI and RO ports according to your network plan and label them.

7. The Relay Tool can be used to check each individual component of the physical ring (Smart Token Ring Access Units, cables etc.) and correct implementation of the complete ring.

The Smart Token Ring Access Unit is now ready for operation.

### 3.2 Setting Up the Smart Token Ring Access Unit With Options

When the Smart Token Ring Access Unit is equipped with an option card, additional procedures are required. Refer to the appropriate Token Ring Option operator's instruction manual for set-up and operation of RI and RO option cards.

#### SETTING UP THE SMART TOKEN RING ACCESS UNIT WITH AN NM CARD

### NOTES

1. For installation of the Smart Token Ring Access Unit with the NM option (LT0006A-TNM, LT0006A-IC16, LT0006A-ICOC, LT0006A-IPNM, LT0006A-RJNM), the Network Management System should be used to reset all lobes. Should Network Management not be available, or be inactive, the LT037 tool should be used to reset the lobes, as described in steps 2 through 4 in *Section 4.1*.
2. Resistor networks RN1 and RN2 should be removed if the NM card option (LT0006A-TNM, LT0006A-IC16, LT0006A-ICOC, LT0006A-IPNM, LT0006A-RJNM) is installed.

## 4. Installation

### 4.1 General

The Smart Token Ring Access Unit is supplied completely assembled, and is designed for immediate installation in a 19-inch rack located within a wiring closet. Mechanical and electrical installation procedures for the Smart Token Ring Access Unit are as described in this chapter. For instructions on installing the NM card (LT0006A-NMC), refer to **Appendix B**.

### 4.2 Unpacking

Unpack the unit in the following manner:

1. Place the container on a clean, flat surface. Cut all straps and open the top cover.
2. Remove each item carefully and place it securely on the clean surface.
3. Inspect all items for damage. Report any signs of damage immediately.
4. Check all items against the list below:
  - Smart Token Ring Access Unit
  - Cable Organizer Kit
  - Manual

Report any missing items or discrepancies.

### 4.3 Site Requirements

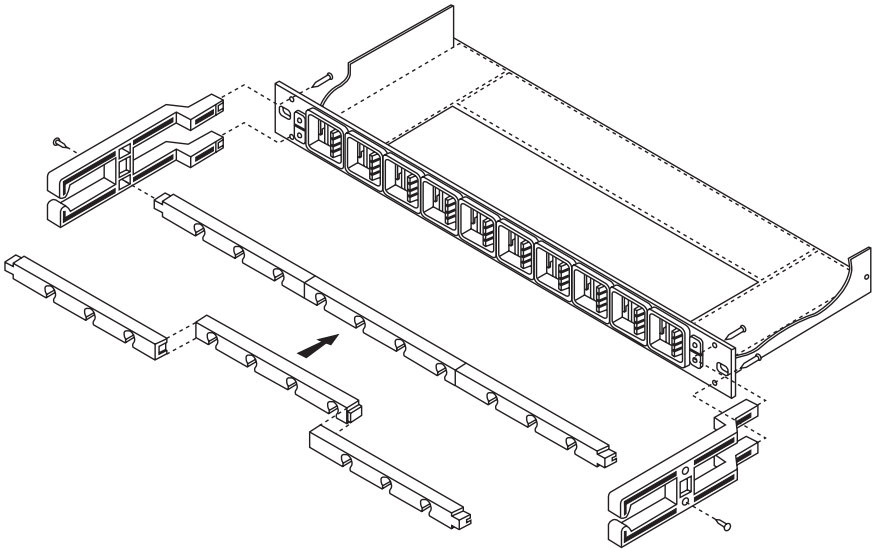
#### 4.3.1 POWER

When supplied without options, the Smart Token Ring Access Unit does not require a power supply. When an RI or RO option is installed within the Smart Token Ring Access Unit, an external AC adapter is required. In this case, the Smart Token Ring Access Unit should be installed within 5 feet (1.5 m) of an easily accessible grounded AC outlet capable of furnishing 115 or 230 V.

## SMART TOKEN RING ACCESS UNIT

### 4.3.2 DATA CABLES

The data cables are connected to the ten connectors on the front panel. The eight lobe cables are usually connected to an adjacent distribution panel. IBM type-6 cables are generally used for patching within the wiring closet. A plastic cable organizer is supplied and can be used for cable management in the rack. See the illustration below.



### 4.3.3 FRONT- AND REAR-PANEL CLEARANCE

Allow a minimum of 36 inches (90 cm) frontal clearance for operator access, and a minimum of 8 inches (20 cm) at the rear of the unit for power cables and connections, and set-up of the Network Management (NM) option.



# 5. Operation

## 5.1 Maintenance

The Smart Token Ring Access Unit operates entirely unattended.

## 5.2 Front-Panel Indicators

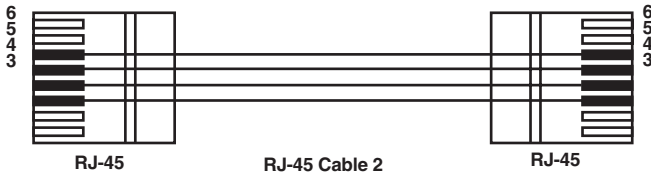
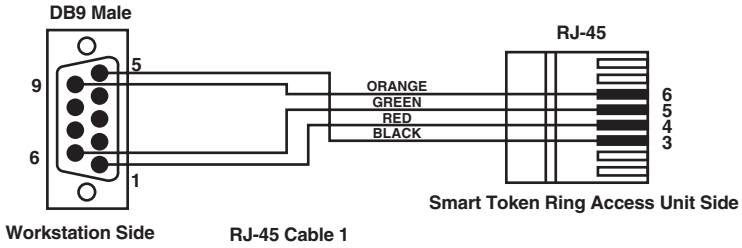
Located at the lower right-hand corner of each connector is an LED, which is lit upon insertion of a lobe on an active Smart Token Ring Access Unit.

## 5.3 Fault Isolation and Troubleshooting

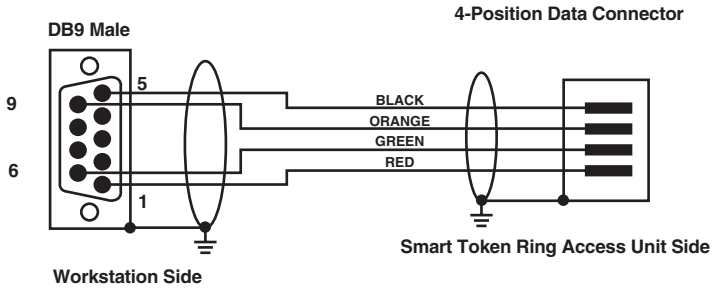
In the event of ring failure, the failure point can be quickly identified by the Network Management.

1. Unplug RI and RO connectors and try to operate any station attached to the problematic Smart Token Ring Access Unit. If it works, replug the connectors and repeat this procedure for the rest of the Smart Token Ring Access Units; otherwise, proceed to the next step.
2. Unplug all of the connectors of the problematic Smart Token Ring Access Unit.
3. Plug the LT037 set-up tool into the RI or RO port. If both LEDs are glowing (indicating normal position of the relays), replace the Smart Token Ring Access Unit. If the LEDs are off, use the LT037 to repeat the set-up procedure.
4. Following the set-up procedure, re-plug the LT037 into the RI or RO port. If both LEDs are glowing now, plug a station into any port and try to operate it. If it doesn't work, replace the Smart Token Ring Access Unit. If it does work, plug all the connectors back into the Smart Token Ring Access Unit and start normal operation. If the ring is still not operating, there is a fault somewhere else in the ring.

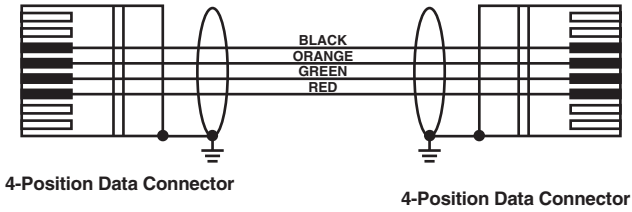
# Appendix A: Smart Token Ring Access Unit Cable Configurations



**NOTE:** Take care to connect pins 3 and 6 of the RJ-45 connector to one twisted pair, and pins 4 and 5 to the other twisted pair.



IDC Cable 1

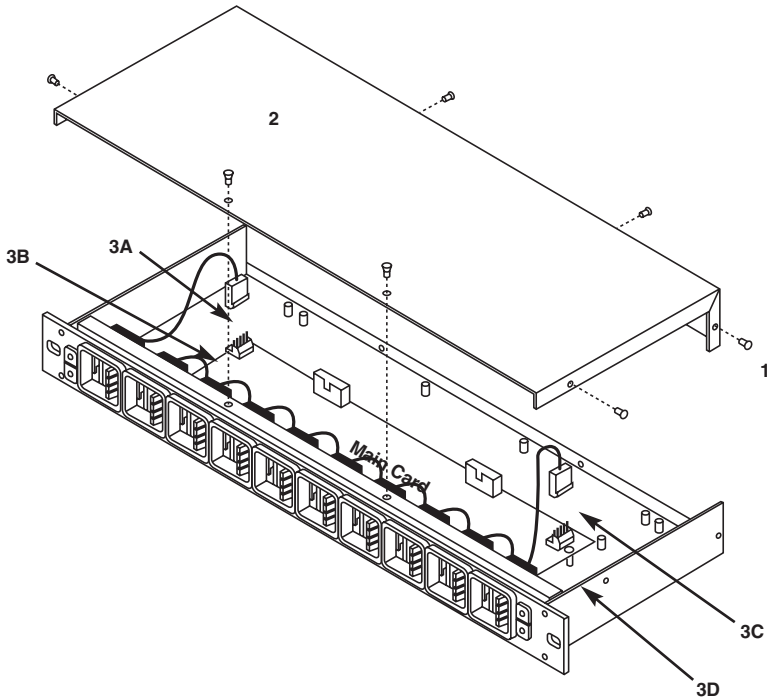


IDC Cable 2

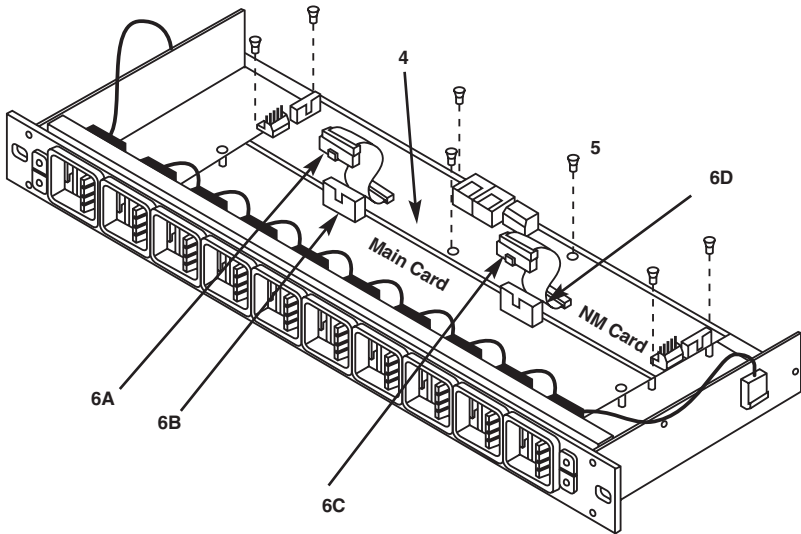
NOTE: For IDC Cable 2, green and red lines are used for the main ring path, and orange and black lines are used for the backup ring path.

# Appendix B: Installing the NM Card

1. Open the eight screws that fasten the top cover.
2. Remove the top cover.
3. Disconnect the connectors (3A and 3C) of the harnesses connected to the RING IN and RING OUT connectors (3B and 3D) of the main card.



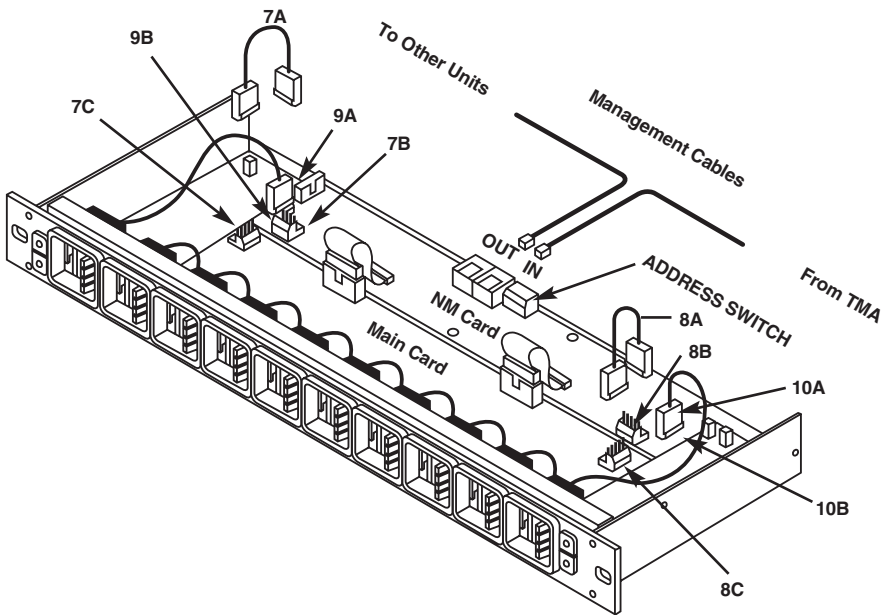
4. Position the NM card (4) as shown in the figure below.
5. Fasten the NM card to the Smart Token Ring Access Unit chassis with the seven screws (5).
6. Connect the two connectors (6A and 6C) of the NM harnesses to the MNGMNT LEFT and MNGMNT RIGHT connectors (6B and 6D) on the Smart Token Ring Access Unit main card.



## SMART TOKEN RING ACCESS UNIT

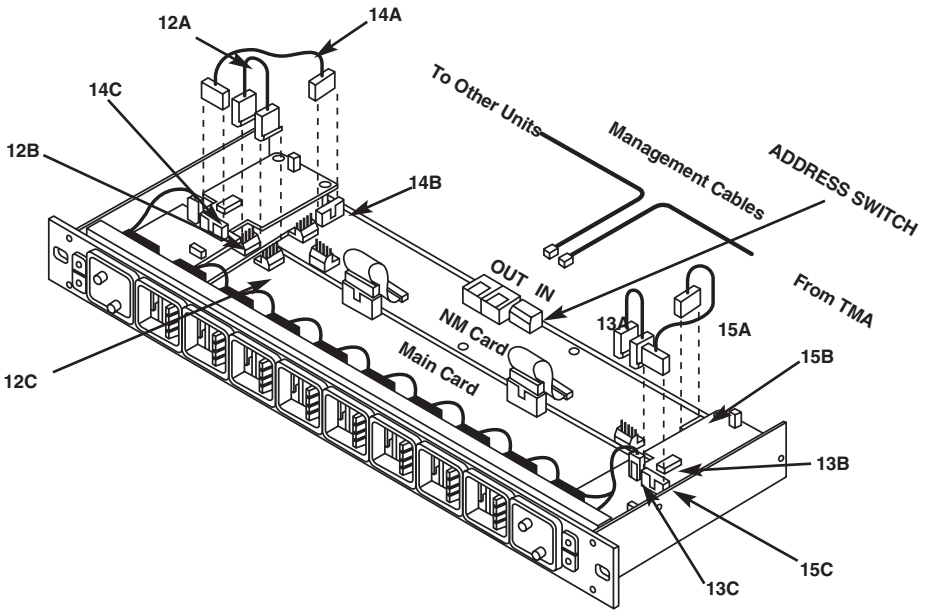
### Internal Connections for Smart Token Ring Access Units without Option Cards

7. Connect the jumper (7A) from the TAU IN connector (7B) on the NM card to the RING IN connector (7C) on the Smart Token Ring Access Unit main card.
8. Repeat step 7 for the other jumper (8A, 8B, 8C).
9. Connect the harness of the RI connector (9A) to the RING IN connector (9B) on the NM card.
10. Repeat step 9 for the harness of the RO connector (10A, 10B).
11. Reinstall the top cover.



## Internal Connections for Smart Token Ring Access Units with Option Cards

12. Connect the jumper (12A) from the RI connector (12B) on the option card to the RING IN connector (12C) on the Smart Token Ring Access Unit main card.
13. Repeat step 12 for the other jumper (13A, 13B, 13C).
14. Connect the management cable (14A) between the RI MNG (14B) connector of the NM card and the management connector (14C) of the option card.
15. Repeat step 14 for the other option card (15A, 15B, 15C).



## NOTE

When the Smart Token Ring Access Unit is installed in the network:

1. Set the ADDRESS switch in accordance with the prescribed management address.
2. Connect the management cable connected to the next Smart Token Ring Access Unit unit to the OUT connector.



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