Network Service Module
Installation and Safety Guide

AT-AR040
AT-AR040-B
AT-AR041
AT-AR042
AT-AR048
AT-AR048-B

Allied Telesis™

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AT-AR048
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Download the complete document set from
www.alliedtelesis.com/support/software

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Contents

About this Guide

This Installation and Safety Guide describes how to install the following Network Service Modules (NSMs):

- AT-AR040 and AT-AR040-B, four Port Interface Card (PIC) expansion bays
- AT-AR041, eight ISDN Basic Rate S/T interfaces
- AT-AR042, four ISDN Basic Rate S/T interfaces
- AT-AR048 and AT-AR040-B, one unchannelised DS3 interface

You can download the complete documentation for Network Service Modules from www.alliedtelesis.com/support/software. For more information about the documentation and other resources, see .

Compatible Switches and Routers

The following table shows which NSMs are appropriate for different models of switch and router.

Models	AR040	AR040-B	AR041	AR042	AR048	AR048-B
Rapier 8/8 (MT & SC) switch	✓		✓	✓		
Rapier 16F-FX (MT-RJ & SC) switch	✓		✓	✓		
Rapier 16F*i*-FX (MT-RJ & SC) switch	✓		✓	✓		
Rapier 24 switch	✓		✓	✓		
Rapier 24*i* switch	✓		✓	✓	✓	
Rapier 24*i*-B switch		✓				✓
Rapier 48w switch	✓				✓	
Rapier 48w-B switch		✓				✓
AR816F-FX (MT-RJ & SC) modular switching router	✓		✓	✓		
AR824 modular switching router	✓		✓	✓		
AR740 router	✓		✓	✓		
AR745 router	✓		✓	✓		

AT-AR048 Support

Maximum DS3 packet forwarding rates are achieved only when the AT-AR048 is installed in a Rapier 48w switch, or a Rapier 24*i* switch whose serial number ends with the letter N or higher. If maximum DS3 performance is not required, you can install the AT-AR048 in any Rapier 24*i* whose serial number ends with the letter J or higher. You can find the serial number on the underside of the switch, as shown in the following figure.

```
Model : AT-RP241-10
|||| |||||| |||||||| |||||||||||
Part Number: 990-11934-10
|||||||||||| |||||||||||||||||||| |||
Product Serial Number: S03K225N
|||| |||||||| |||||||||||||||||||||
Quantity With Unit of
Measure:        |||||||||||||||||||||||||| |||||||
||||||||||||        1 EA        7 67035 14875
5
Made in Singapore
```

N or higher for maximum DS3 performance

J, K, L, or M for less demanding DS3 applications
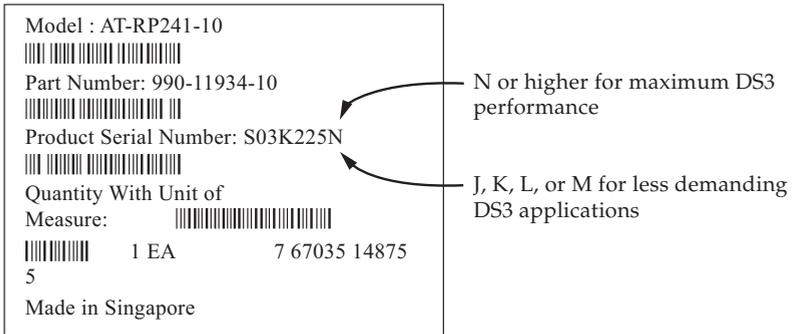
The AT-AR048-B NSM can only be installed in Rapier 48w-B and Rapier 24*i*-B switches. This NSM will achieve Maximum DS3 packet forwarding rates in both of these switches.

Package Contents

The following items are included with each Network Service Module (NSM). Contact your authorised Allied Telesis distributor or reseller if any items are damaged or missing.

- one NSM

- this Installation and Safety Guide

- one warranty card

Hot Swapping

There are two methods for installing and removing NSMs: the standard installation method and the hot swap installation method. The software release running on your switch or router determines which of these two methods should be used.

If your switch or router is running Software Version 2.2.3 or earlier, follow the standard method. If your switch or router is running Software Version 2.3.1 or later, you can use the hot swap method.

To find out which software release your switch or router is running, use the command:

```
show system
```

The following installation procedure describes how to install an NSM using either installation method.

Hot swapping an AT-AR040 or AT-AR040-B NSM

Caution You cannot install PICs into an AT-AR040 or AT-AR040-B NSM that has power applied to it. This includes NSMs that have been deactivated using the hot swap button, but not physically removed from the switch or router. To ensure that all power is removed from the NSM bay, you must either physically remove it from the switch or router using the hot swap method, or disconnect all power sources to the switch or router.

If you are installing an AT-AR040 or AT-AR040-B NSM and you have PICs to install, follow the *Port Interface Card Installation and Safety Guide*. You can download this document from www.alliedtelesis.com/support/software/. If there are more PIC bays than PICs, use the bays on the switch or router base unit first, then fill the NSM PIC bays starting with bay 0.

You can hot swap the AT-AR040 or AT-AR040-B NSM with PICs already installed in its PIC bays. There is no need to remove the PICs before hot swapping. See the *Network Service Module Hardware Reference* for information on the operational characteristics of hot swapped interfaces. You can download this document from www.alliedtelesis.com/support/software/.

Installing a Network Service Module

⚠️ **Warning** Failure to follow this procedure when hot swapping an NSM will cause the switch or router to halt, and may damage it and any files stored in flash memory.

1. Read the safety information.

   See the Installation and Safety Guide or Safety and Statutory Information Booklet for your switch or router. You can download this document www.alliedtelesis.com/support/software/.

2. If you are not hot swapping, remove power to the switch or router.

   ⚠️ **Warning** Be sure to disconnect the main power supply and the redundant power supply before installing the NSM. Installing an NSM with the switch or router powered on can damage the NSM or base unit.

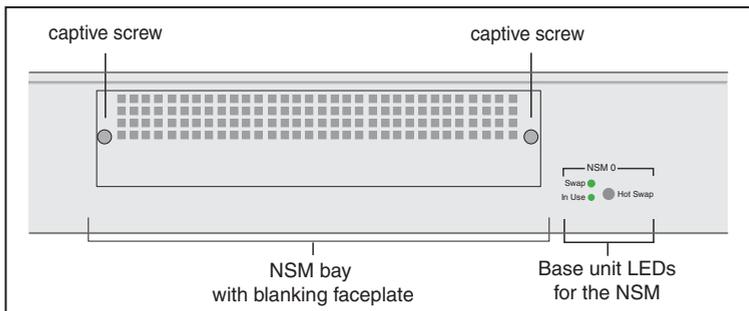3. If you are hot swapping, prepare the NSM bay.

   ⚠️ **Warning** Do not attempt to hot swap while the contents of flash are being modified; for instance, during flash compaction or when files are being loaded onto the switch or router. If the switch or router halts while flash is being modified, configuration files, software release files, feature licenses and other files may be damaged.

   If the In Use LED (next to the NSM bay) is lit, use a pencil tip or similar object to press the recessed Hot Swap button. The In Use LED should go out and the Swap LED should light.

   If the In Use LED remains lit or if neither the In Use nor Swap LED are lit, the software release does not support hot swapping, and you must install the NSM with the switch or router powered off.

4. Remove the faceplate or existing NSM.

   If the switch or router does not have an NSM installed, remove the blank faceplate by loosening the two captive screws, as shown in the following figure.

captive screw   captive screw

NSM 0
Swap ●
In Use ●   ○ Hot Swap

NSM bay
with blanking faceplate

Base unit LEDs
for the NSM

If an NSM is already installed, disconnect all network cables and TNV lines before removing the NSM from the switch or router.

Remove the NSM by unscrewing both captive screws at the same time. As the captive screws are turned, they will push the NSM out of the bay.

If the NSM has extractor levers, moving them to the open position will assist the removal process, as shown in the following figure.
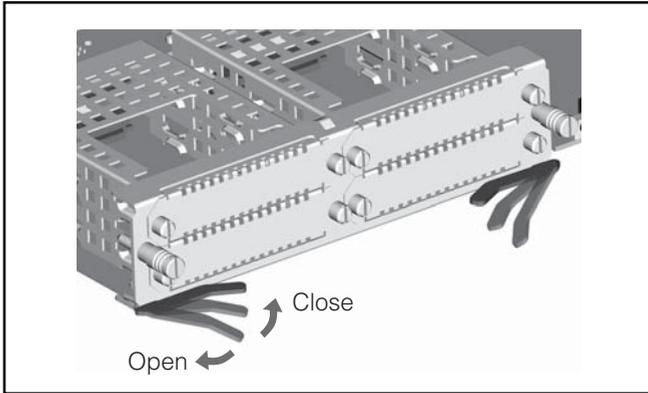
When removing an NSM, take care to turn each captive screw by an equal amount to ensure the NSM does not become misaligned. Forcing a jammed captive screw may damage the NSM.

If a captive screw becomes tight, it must not be forced. Instead, screw it in or out slightly to loosen it and then try again, taking care to unscrew both captive screws at the same rate.

Keep the faceplate for future use. If you remove an NSM, replace the faceplate to prevent dust and debris from entering the switch or router and to maintain proper airflow.

5. Prepare the NSM.

    In an antistatic environment, remove the NSM from its packing material. Be sure to observe ESD precautions.

Warning Do not attempt to install an NSM without observing correct antistatic procedures. Failure to do so may damage the switch, router, or NSM. If you are unsure what the correct procedures are, contact your authorised Allied Telesis distributor or reseller.

6. Slide the NSM into place.

Slide the NSM into the NSM bay, making sure the ends of the captive screws are aligned with the screw holes on the switch or router.

If the NSM has extractor levers, they should be in the closed position.

7. Secure the NSM.

When the NSM has been firmly pushed into place, turn the two captive screws to engage their threads. Tighten both captive screws at the same rate to pull the NSM into position.

The screws will tighten when the NSM panel is in its installed position. The captive screws should be firm but not over-tight.

If one captive screw becomes tight before the other, loosen it slightly before proceeding.

8. If you are not hot swapping, apply power to the switch or router.

Re-attach the power cord, and reconnect any redundant power supply. Check that the switch or router power LED lights green.

Check the In Use LED on the switch or router rear panel. The In Use LED lights to indicate the NSM is installed, is receiving power, and is operational.

9. If you are hot swapping, return the NSM bay to use.

Press the recessed Hot Swap button. The Swap LED will go out and the In Use LED will light.

If the In Use LED lights only briefly and the Swap LED then lights continuously, the NSM is not supported by the current software release.

10. Verify the installation.

Use the **show system** command to verify that the switch or router has recognised the NSM. If the NSM does not appear in the list of boards at the top of the display, or the In Use LED fails to light, then the switch or router has not recognised the NSM. Likely reasons are:

• Your switch or router does not support the NSM. See "Compatible Switches and Routers" on page 4.

• The NSM is not installed correctly. Repeat the installation process, paying particular attention to steps 6 and 7.

If the installation still fails, see the *Network Service Module Hardware Reference*, which has further troubleshooting information.

LEDs and What They Mean

The following LEDs report operations and faults on NSMs:

-
-
-

The AT-AR040 and AT-AR040-B NSM units do not have independent LEDs. See "Switch and Router LEDs" on page 11 for information about related LEDs found on the base switch or router.

PIC LED descriptions can be found in the *Port Interface Card Hardware Reference*, which can be downloaded from www.alliedtelesis.com/support/software.

AT-AR041 and AT-AR042 LEDs

The following table describes LEDs on the AT-AR041 and AT-AR042 NSMs.

LED	State	Function
Active	Green	Lit when the BRI has successfully completed the exchange of INFO 1 and INFO 2 signals, and INFO 3 and INFO 4 signals are present on the link. This means the ISDN interface is correctly connected to a working NT device.
	Off	There is no connection to the ISDN, or the ISDN has deactivated the connection.
Data	Amber	For on-demand ISDN, lit when there is a call up over the respective B (data) channel. For permanent circuits, lit when HDLC packets are being exchanged between the switch or router and another TE end system device (normally another switch or router) over the respective B channel.
	Flashing Amber	For on-demand ISDN, flashing when data is being exchanged.
	Off	For on-demand ISDN, Off when there is no active connection or when continuous data exchange is occurring. For permanent ISDN circuits, Off when no data exchange is occurring.

AT-AR048 and AT-AR048-B LEDs

The following table describes LEDs on the AT-AR048 and AT-AR048-B NSMs.

LED	State	Function
Active	Green	Lit when the Line Interface Unit (LIU) is receiving a signal.
Loop	Green	Lit when any loopback is active.
LOS	Amber	Lit when the received signal is lost. This usually indicates a network disruption, such as a cable being disconnected or a device failure.
LOF	Amber	Lit when the DS3 framer cannot extract valid frames from the received signal.
AIS	Amber	Lit when an Alarm Indication Signal is detected.
FERF	Amber	Lit when a Far End Receive Failure signal is detected. This indicates the far end is receiving an AIS, LOS, or LOF signal.

Switch and Router LEDs

The following table describes LEDs on switches and routers that support NSMs.

LED	State	Function
In Use	Green	An NSM is installed, is receiving power, and is operational. The NSM and its PICs are not ready for hot swap.
	Off	No NSM is installed or the NSM is not installed correctly. The switch or router has not recognised the NSM.
Swap	Green	The NSM and its PICs are ready to be hot swapped.
	Off	The Hot Swap button must be pressed before the NSM or its PICs can be hot swapped, or the software release does not support hot swapping. Hot swapping is supported by Software Version 2.3.1 or later.

Obtaining Documentation and Resources

For more information, see:

- the Installation and Safety Guide for your switch or router

- the *Network Service Module Hardware Reference*, which contains detailed information on NSMs and their hardware features

- the *Port Interface Card Installation and Safety Guide*, which describes how to install PICs in the AT-AR040 and AT-AR040-B NSMs

- the *Port Interface Card Hardware Reference*, which contains detailed information on PICs and their hardware features

- the *AlliedWare® Operating System Software Reference*, which contains detailed information on configuring protocols to use NSM interfaces

You can download these documents and updates from www.alliedtelesis.com/support/software.

You need Adobe® Acrobat® Reader® software to view, search, or print these documents. You can download it from www.adobe.com.

Other resources

How-To Notes describe a range of standard Allied Telesis solutions, and include technical tips and guides to configuring specific hardware and software features. You can download the latest How-To Notes from www.alliedtelesis.com/resources/literature/howto.aspx.

MIBs supported by Allied Telesis products can be downloaded from www.alliedtelesis.com/support/software.

Microsoft® Visio® stencils for Allied Telesis products can be downloaded from www.alliedtelesis.com/resources/images/visio.aspx.

AT-TFTP Server for Windows is a TFTP (*Trivial File Transfer Protocol*) server for transferring software versions, configuration scripts and other files between a PC and a switch or router. You download AT-TFTP Server from www.alliedtelesis.com/support/software.

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With locations covering all of the established markets in North America, Latin America, Europe, Asia, and the Pacific, Allied Telesis provides localized sales and technical support worldwide. To find the representative nearest you, visit us on the Web at www.alliedtelesis.com.