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T1/FT1 Adapter Module ***Supplement***

NORTEL
NETWORKS™

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European Requirements Only

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This is to certify that the Nortel Networks T1/FT1 Adapter Module is shielded against the generation of radio interference in accordance with the application of Council Directive 89/336/EEC, Article 4a. Conformity is declared by the application of EN 55 022 Class A (CISPR 22).

Warning: This is a Class A product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take appropriate measures.

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Canadian Department of Communications Radio Interference Regulations

This digital apparatus (T1/FT1 Adapter Module) does not exceed the Class A limits for radio-noise emissions from digital apparatus as set out in the Radio Interference Regulations of the Canadian Department of Communications.

Règlement sur le brouillage radioélectrique du ministère des Communications

Cet appareil numérique (T1/FT1 Adapter Module) respecte les limites de bruits radioélectriques visant les appareils numériques de classe A prescrites dans le Règlement sur le brouillage radioélectrique du ministère des Communications du Canada.

Canada Requirements Only *(continued)*

Canada CS-03 Rules and Regulations

Notice: The Industry Canada label identifies certified equipment. This certification means that the equipment meets telecommunications network protective, operational and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements document(s). The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent the degradation of service in some situations.

Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

Notice: For equipment using loopstart lines, please note that the Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed 5. The REN is located on the "FCC Rules Part 68" label located on the bracket of the module, or on the back of the unit.

Canada CS-03 -- Règles et règlements

Avis: L'étiquette d'Industrie Canada identifie le matériel homologué. Cette étiquette certifie que le matériel est conforme aux normes de protection, d'exploitation et de sécurité des réseaux de télécommunications, comme le prescrivent les documents concernant les exigences techniques relatives au matériel terminal. Le Ministère n'assure toutefois pas que le matériel fonctionnera à la satisfaction de l'utilisateur.

Avant d'installer ce matériel, l'utilisateur doit s'assurer qu'il est permis de le raccorder aux installations de l'entreprise locale de télécommunication. Le matériel doit également être installé en suivant une méthode acceptée de raccordement. L'abonné ne doit pas oublier qu'il est possible que la conformité aux conditions énoncées ci-dessus n'empêche pas la dégradation du service dans certaines situations.

Les réparations de matériel homologué doivent être coordonnées par un représentant désigné par le fournisseur. L'entreprise de télécommunications peut demander à l'utilisateur de débrancher un appareil à la suite de réparations ou de modifications effectuées par l'utilisateur ou à cause de mauvais fonctionnement.

Pour sa propre protection, l'utilisateur doit s'assurer que tous les fils de mise à la terre de la source d'énergie électrique, des lignes téléphoniques et des canalisations d'eau métalliques, s'il y en a, sont raccordés ensemble. Cette précaution est particulièrement importante dans les régions rurales.

Avertissement: L'utilisateur ne doit pas tenter de faire ces raccordements lui-même; il doit avoir recours à un service d'inspection des installations électriques, ou à un électricien, selon le cas.

Avis: Veuillez prendre note que pour tout appareillage supportant des lignes de type "loopstart," l'indice d'équivalence de la sonnerie (IES) assigné à chaque dispositif terminal indique le nombre maximal de terminaux qui peuvent être raccordés à une interface. La terminaison d'une interface téléphonique peut consister en une combinaison de quelques dispositifs, à la seule condition que la somme d'indices d'équivalence de la sonnerie de tous les dispositifs n'excède pas 5. Le REN figure sur l'étiquette "FCC Rules Part 68" située sur le support du module ou à l'arrière de l'unité.

FCC Part 68 Compliance Statement

This equipment complies with Part 68 of FCC Rules. All direct connections to telephone network lines must be made using standard plugs and jacks compliant with FCC Part 68. Please note the following:

1. You are required to request service from the telephone company before you connect the unit to a network. When you request service, you must provide the telephone company with the following data:
 - When you request T1 Service, you must provide the telephone company with
 - The Facility Interface CodeProvide the telephone company with all the codes below:
 - 04DU9-BN (1.544 MB, D4 framing format)
 - 04DU9-DN (1.544 MB, D4 framing format with B8ZF coding)
 - 04DU9-1KN (1.544 MB, ESF framing format)
 - 04DU9-1SN (1.544 MB, ESF framing format with B8ZF coding)
 - 04DU9-1ZN (1.544 MB, ANSI ESF and ZBTISI without line power)The telephone company will select the code it has available.
 - The Service Order Code(s) (SOC): 6.0F
 - The required Universal Service Order Code (USOC) jack: RJ48C
2. Your telephone company may make changes to its facilities, equipment, operations, or procedures that could affect the proper functioning of your equipment. The telephone company will notify you in advance of such changes to give you an opportunity to maintain uninterrupted telephone service.
3. If the unit causes harm to the telephone network, the telephone company may temporarily discontinue your service. If possible, they will notify you in advance, but if advance notice is not practical, you will be notified as soon as possible and will be informed of your right to file a complaint with the FCC.
4. If you experience trouble with the unit, please contact the Nortel Networks Technical Solutions Center in your area for service or repairs. Repairs should be performed only by service personnel authorized by Nortel Networks.

United States	1-800-2LANWAN
Valbonne, France	33-4-92-96-69-68
Sydney, Australia	61-2-9927-8800
Tokyo, Japan	81-3-5740-1700
5. You are required to notify the telephone company when you disconnect the unit from the network.

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Preface

The T1/FT1 Adapter Module provides high-speed connectivity to the digital services networks in North America. It is capable of operating at fractional T1 rates, in increments of 64 Kb/s, up to 1.544 Mb/s.

Before You Begin

This guide is intended for qualified service personnel who are installing the T1/FT1 Adapter Module in an AN/ANH, ARN, Passport 5430, or Passport 2430 for the first time or who need to install or replace any customer-replaceable unit (CRU). A qualified service person should have appropriate technical training and experience and be aware of the hazards involved in installing and replacing CRUs.

How to Use This Supplement

This WAN adapter module can be used with several different platforms. Refer to the table below to find the chapter that contains the information appropriate for the platform you are using.

Platform	Refer to
AN or ANH	Chapter 1
ARN	Chapter 2
Passport 5430	Chapter 3
Passport 2430	Chapter 4

Text Conventions

This guide uses the following text conventions:

bold text	Indicates command names and options and text that you need to enter.
------------------	--

Example: Enter the **diags** command.

<i>italic text</i>	Indicates new terms, book titles, and variables in command syntax descriptions.
--------------------	---

Acronyms

This guide uses the following acronyms:

CRU	customer-replaceable unit
IP	Internet Protocol

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- The “CD ROMs” section lists available CDs.
- The “Guides/Books” section lists books on technical topics.
- The “Technical Manuals” section lists available printed documentation sets.

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If you purchased a Nortel Networks service program, contact one of the following Nortel Networks Technical Solutions Centers:

Technical Solutions Center	Telephone Number
Billerica, MA	800-2LANWAN (800-252-6926)
Santa Clara, CA	800-2LANWAN (800-252-6926)
Valbonne, France	33-4-92-96-69-68
Sydney, Australia	61-2-9927-8800
Tokyo, Japan	81-3-5740-1700

Chapter 1

Using the T1/FT1 Adapter Module in a BayStack AN or ANH Router

This chapter supplements *Installing an Adapter Module in a BayStack AN or ANH Router*. Follow the hardware installation steps in that manual, then refer to this document for information specific to the T1/FT1 adapter module.

Verifying AN/ANH Router Requirements

Table 1-1 shows the minimum boot and diagnostic programmable read-only memory (PROM) code required for the T1/FT1 adapter modules.

Table 1-1. PROM Diagnostic and Boot Code for AN/ANH Routers

Code Type	Minimum Version	Directory	File Name
Boot	9.00c	<i>an_proms</i>	<i>anboot.exe</i>
Diagnostic	7.30	<i>an_proms</i>	<i>anddiag.exe</i>

For information on upgrading PROM, see the BayRS™ *Upgrading Routers* guide.

Attaching Cables

Connect the T1 communication device cable to the RJ-48C connector on the installed T1/FT1 adapter module (Figure 1-1).

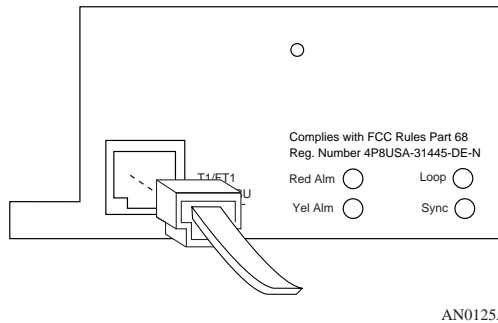


Figure 1-1. T1/FT1 Adapter Module Cable Connection and LEDs

You install the T1/FT1 adapter module in an open adapter module slot on the router, as follows:

- AN or 12-port ANH -- the back-panel adapter module slot (Figure 1-2).
See *Installing an Adapter Module in a BayStack AN or ANH Router*.
- 8-port ANH -- the back-panel COM3 slot (Figure 1-3).
See *Installing an Adapter Module in a BayStack AN or ANH Router*.

Using the T1/FT1 Adapter Module in a BayStack AN or ANH Router

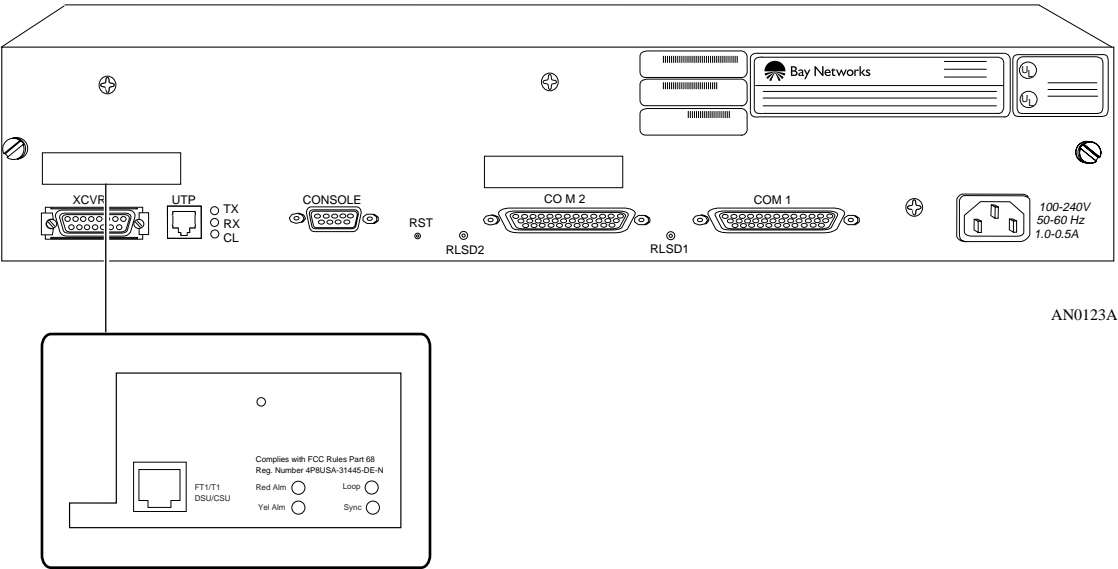


Figure 1-2. AN or 12-Port ANH T1/FT1 Adapter Module

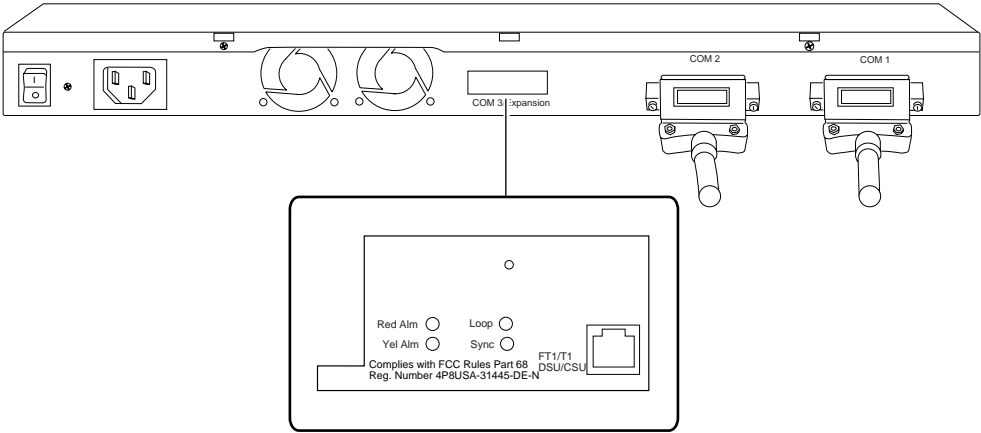


Figure 1-3. 8-Port ANH T1/FT1 Adapter Module

Completing Software Configuration

Once you have successfully installed the adapter module, complete the following software configuration tasks using instructions found in your BayRS documentation:

Configuration Task	Location of Instructions
Connect the AN/ANH to the network. Note that you cannot perform a Netboot or Directed Netboot operation using the T1/FT1 adapter module interface. The boot/startup methods you can use are Local Boot and EZ-Install.	One of the following: <ul style="list-style-type: none">• <i>Installing and Operating BayStack AN and ANH Routers</i>• <i>Configuring BayStack Remote Access</i>
Modify the configuration file to add the T1/FT1 module and enable default software services.	One of the following: <ul style="list-style-type: none">• <i>Configuring and Managing Routers with Site Manager</i>• <i>Using the Bay Command Console (BCC)</i>
Configure T1 or FT1 services.	<i>Configuring WAN Line Services</i>

For the latest information, be sure to review the release notes and documentation change notice for your version of BayRS software.

Interpreting LEDs

The T1/FT1 adapter module LEDs (Figure 1-4) will blink on and off during diagnostic testing, but they will not stay on to indicate data transfer until you have configured and enabled T1/FT1 software services.

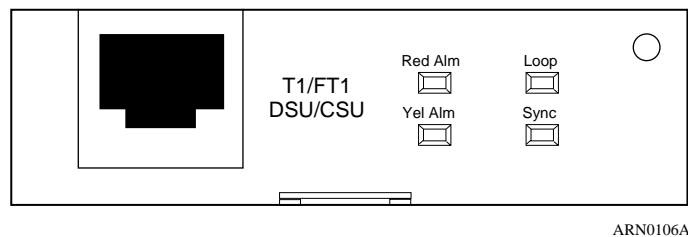


Figure 1-4. T1/FT1 Adapter Module LEDs

Table 1-2 describes the function of each T1/FT1 LED.

Table 1-2. T1/FT1 LEDs

Label	Color	Meaning
Red Alm	Red	Lights when the T1 port is in a red alarm state.
Yel Alm	Amber	Lights when the DSU/CSU has received a yellow alarm from the T1 network.
Loop	Amber	Lights when the T1 interface is placed in loopback mode.
Sync	Green	Lights when the T1 port is synchronized with the T1 network.

Chapter 2

Using the T1/FT1 Adapter Module in a BayStack ARN Router

This chapter supplements *Installing and Operating BayStack ARN Routers* (Chapter 4, “Installing a WAN Adapter Module”). Follow the hardware installation steps in that manual, then refer to this document for information specific to the T1/FT1 adapter module.

Verifying ARN Router Requirements

Table 2-1 shows the minimum boot and diagnostic programmable read-only memory (PROM) code required for the T1/FT1 adapter modules.

Table 2-1. PROM Diagnostic and Boot Code for ARN Routers

Code Type	Minimum Version	Directory	File Name
Boot	1.18	<i>arn_proms</i>	<i>arnboot.exe</i>
Diagnostic	2.00	<i>arn_proms</i>	<i>arndiag.exe</i>

For information on upgrading PROM, see the BayRS™ *Upgrading Routers* guide.

Attaching Cables

Connect the T1 communication device cable to the RJ-48C connector on the installed T1/FT1 adapter module (Figure 2-1).

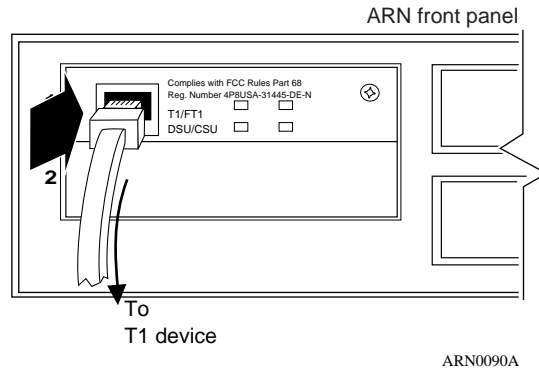


Figure 2-1. T1/FT1 Adapter Module Cable Connection

You install the T1/FT1 adapter module in one of the two front-panel WAN adapter module slots (Figure 2-1). See *Installing and Operating BayStack ARN Routers*.

Completing Software Configuration

Once you have successfully installed the adapter module, complete the following software configuration tasks using instructions found in your BayRS documentation:

Configuration Task	Location of Instructions
Connect the ARN to the network. Note that you cannot perform a Netboot or Directed Netboot operation using the T1/FT1 adapter module interface. The boot/startup methods you can use are Local Boot and EZ-Install.	One of the following: <ul style="list-style-type: none"> • <i>Installing and Operating BayStack ARN Routers</i> • <i>Configuring BayStack Remote Access</i>
Modify the ARN configuration file to add the T1/FT1 module and enable default software services.	One of the following: <ul style="list-style-type: none"> • <i>Configuring and Managing Routers with Site Manager</i> • <i>Using the Bay Command Console (BCC)</i>
Configure T1 or FT1 services.	<i>Configuring WAN Line Services</i>

For the latest information, be sure to review the release notes and documentation change notice for your version of BayRS software.

Interpreting LEDs

The T1/FT1 adapter module LEDs (Figure 2-2) will blink on and off during diagnostic testing, but they will not stay on to indicate data transfer until you have configured and enabled T1/FT1 software services.

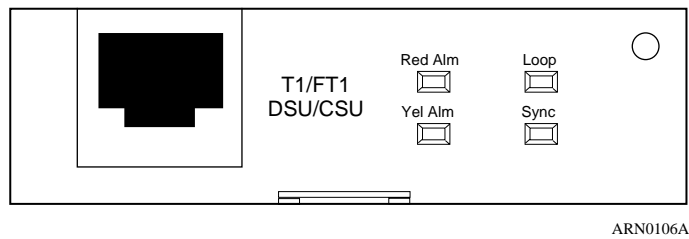


Figure 2-2. ARN T1/FT1 Adapter Module LEDs

Table 2-2 describes the function of each T1/FT1 LED.

Table 2-2. T1/FT1 LEDs

Label	Color	Meaning
Red Alm	Red	Lights when the T1 port is in a red alarm state.
Yel Alm	Amber	Lights when the DSU/CSU has received a yellow alarm from the T1 network.
Loop	Amber	Lights when the T1 interface is placed in loopback mode.
Sync	Green	Lights when the T1 port is synchronized with the T1 network.

Chapter 3

Using the T1/FT1 Adapter Module in the Passport 5430 Multiservice Access Switch

This chapter supplements *Installing and Operating the Passport 5430 Multiservice Access Switch*. Follow the hardware installation steps in that manual, then refer to this document for information specific to the T1/FT1 adapter module.

WAN Adapter Module Placement Considerations

When installing WAN adapter modules in the Passport 5430 Module slots, note the following:

- Each WAN adapter module you install is automatically assigned a circuit, even if the WAN adapter module has not been configured. This prevents disruption of active circuits if you reconfigure the module at a later time.
- ISDN BRI adapter modules can use two circuits (one for each of the 2 B channels).
- You can configure a total of 4 circuits.
- Circuit allocations are prioritized according to which Module slot is being used by the WAN adapter modules. Module slot 3 has priority over Module slot 4, and Module slot 4 has priority over Module slot 5.
- When there are more than the 4 possible circuits to be configured, for example if there are 2 ISDN BRI adapter modules and a serial adapter module (5 circuits in all), circuit allocation becomes an issue.

In the example above, the first ISDN BRI module (in Module slot 3) has the resources to bring up a second B channel (thus using 2 circuits). The serial adapter in Module slot 4 uses a third circuit. The second ISDN BRI adapter module (in Module slot 5), can have only 1 B channel configured because the serial adapter module (in Module slot 4) has priority and is allocated a circuit over anything in Module slot 5. In this case, there are not enough circuits left to utilize the second B channel on the ISDN BRI adapter in Module slot 5. In this example, if you wanted to have both B channels on both ISDN BRI adapters configured, you would have to remove the serial card from Module slot 4.

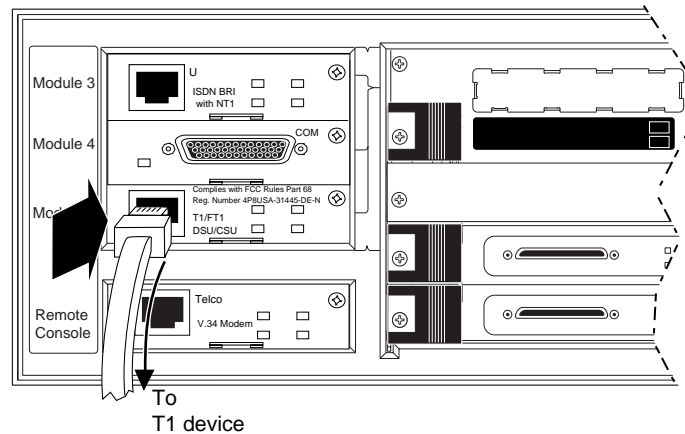
Table 3-1 lists examples of valid WAN adapter module combinations.

Table 3-1. Example WAN Adapter Module Combinations

Module 3	Module 4	Module 5
T1/FT1 or E1/FE1	T1/FT1 or E1/FE1	T1/FT1 or E1/FE1
T1/FT1 or E1/FE1	T1/FT1 or E1/FE1	Serial or V.34 modem
T1/FT1 or E1/FE1	Serial or V.34 modem	Serial or V.34 modem
T1/FT1 or E1/FE1	T1/FT1 or E1/FE1	ISDN 2 B-channels plus 1 D-channel
T1/FT1 or E1/FE1	ISDN BRI 1 B-channel plus 1 D-channel	Serial or V.34 modem
T1/FT1 or E1/FE1	Serial or V.34 modem	Serial or V.34 modem
Serial or V.34 modem	Serial or V.34 modem	Serial or V.34 modem
Serial or V.34 modem	Serial or V.34 modem	ISDN BRI 1 B-channel plus 1 D-channel
Serial or V.34 modem	Serial or V.34 modem	ISDN BRI 2 B-channels plus 1 D-channel
Serial or V.34 modem	ISDN BRI 2 B-channels plus 1 D-channel	ISDN BRI 1 B-channel plus 1 D-channel
ISDN BRI 2 B-channels plus 1 D-channel	ISDN BRI 2 B-channels plus 1 D-channel	Empty
ISDN BRI 2 B-channels plus 1 D-channel	ISDN BRI 1 B-channel plus 1 D-channel	Serial or V.34 modem
ISDN BRI 2 B-channels plus 1 D-channel	ISDN BRI 1 B-channel plus 1 D-channel	T1/FT1 or E1/FE1
ISDN BRI 2 B-channels plus 1 D-channel	Serial or V.34 modem	ISDN BRI 1 B-channel plus 1 D-channel
ISDN BRI 2 B-channels plus 1 D-channel	T1/FT1 or E1/FE1	ISDN BRI 1 B-channel plus 1 D-channel

Attaching Cables

Connect the T1 communication device cable to the RJ-48C connector on the installed T1/FT1 adapter module (Figure 3-1).



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Figure 3-1. T1/FT1 Adapter Module Cable Connection

You install the T1/FT1 adapter module in one of the three front-panel Module slots (Figure 3-1). See *Installing and Operating the Passport 5430 Multiservice Access Switch*.



Note: The slot labeled Remote Console is reserved for the V.34 modem adapter module. Do not install the T1/FT1 adapter module in the Remote Console slot.

Completing Software Configuration

Once you have successfully installed the adapter module, complete the following software configuration tasks using instructions found in your BayRS documentation:

Configuration Task	Location of Instructions
Modify the configuration file to add the T1/FT1 module and enable default software services.	One of the following: <ul style="list-style-type: none">• <i>Configuring and Managing Routers with Site Manager</i>• <i>Using the Bay Command Console (BCC)</i>
Configure T1 or FT1 services.	<i>Configuring WAN Line Services</i>

For the latest information, be sure to review the release notes and documentation change notice for your version of BayRS software.

Interpreting LEDs

The T1/FT1 adapter module LEDs (Figure 3-2) will blink on and off during diagnostic testing, but they will not stay on to indicate data transfer until you have configured and enabled T1/FT1 software services.

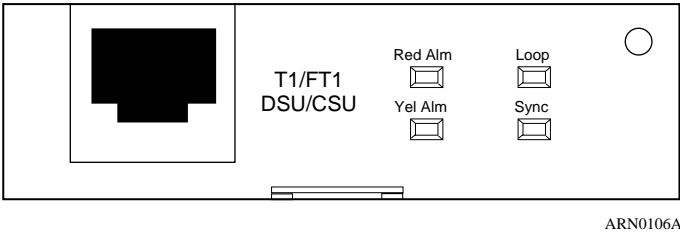


Figure 3-2. Passport 5430 T1/FT1 Adapter Module LEDs

Table 3-2 describes the function of each T1/FT1 LED.

Table 3-2. T1/FT1 LEDs

Label	Color	Meaning
Red Alm	Red	Lights when the T1 port is in a red alarm state.
Yel Alm	Amber	Lights when the DSU/CSU has received a yellow alarm from the T1 network.
Loop	Amber	Lights when the T1 interface is placed in loopback mode.
Sync	Green	Lights when the T1 port is synchronized with the T1 network.

Chapter 4

Using the T1/FT1 Adapter Module In a Passport 2430 Multiservice Access Switch

This chapter supplements *Installing and Operating the Passport 2430 Multiservice Access Switch*. Follow the hardware installation steps in that manual, then refer to this document for information specific to the T1/FT1 adapter module.

Attaching Cables

Connect the T1 communication device cable to the RJ-48C connector on the installed T1/FT1 adapter module (Figure 4-1).

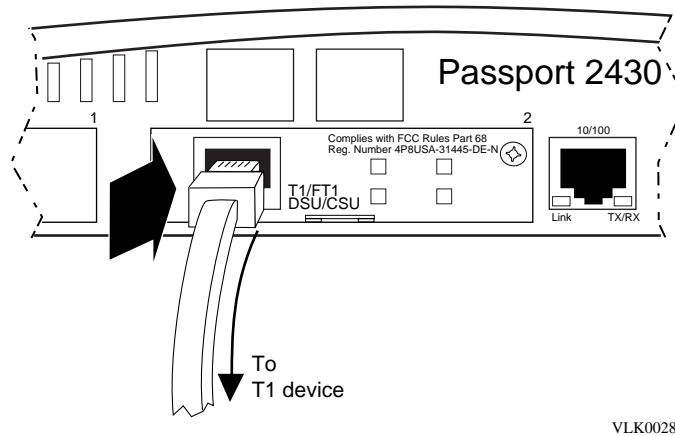


Figure 4-1. T1/FT1 Adapter Module Cable Connection

You install the T1/FT1 adapter module in one of the two rear-panel slots on the Passport 2430 (Figure 4-1). See *Installing and Operating the Passport 2430 Multiservice Access Switch*.

Completing Software Configuration

Once you have successfully installed the adapter module, complete the following software configuration tasks using instructions found in your BayRS documentation:

Configuration Task	Location of Instructions
Connect the Passport 2430 to the network. Note that you cannot perform a Netboot or Directed Netboot operation using the T1/FT1 adapter module interface. The boot/startup methods you can use are Local Boot and EZ-Install.	One of the following: <ul style="list-style-type: none">• <i>Installing and Operating the Passport 2430 Multiservice Access Switch</i>• <i>Configuring BayStack Remote Access</i>
Modify the configuration file to add the T1/FT1 module and enable default software services.	One of the following: <ul style="list-style-type: none">• <i>Configuring and Managing Routers with Site Manager</i>• <i>Using the Bay Command Console (BCC)</i>
Configure T1 or FT1 services.	<i>Configuring WAN Line Services</i>

For the latest information, be sure to review the release notes and documentation change notice for your version of BayRS software.

Interpreting LEDs

The T1/FT1 adapter module LEDs (Figure 4-2) will blink on and off during diagnostic testing, but they will not stay on to indicate data transfer until you have configured and enabled T1/FT1 software services.

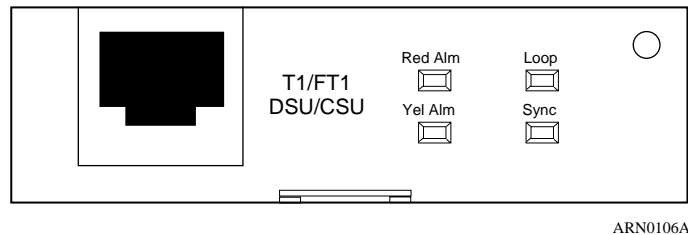


Figure 4-2. Passport 2430 T1/FT1 Adapter Module LEDs

Table 4-1 describes the function of each T1/FT1 LED.

Table 4-1. T1/FT1 LEDs

Label	Color	Meaning
Red Alm	Red	Lights when the T1 port is in a red alarm state.
Yel Alm	Amber	Lights when the DSU/CSU has received a yellow alarm from the T1 network.
Loop	Amber	Lights when the T1 interface is placed in loopback mode.
Sync	Green	Lights when the T1 port is synchronized with the T1 network.

