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Nortel Ethernet Routing Switch 8600

Configuration — Ethernet Modules

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Contents

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New in this release

The following sections detail what's new in *Nortel Ethernet Routing Switch 8600 Configuration — Ethernet Modules* (NN46205-503) for Release 7.0.

Features

Replaced Device Manager configuration information with Enterprise Device Manager (EDM). Starting with this release, EDM is replacing Device Manager as the graphical user interface.

Other changes

All classic module content has been removed in this release.

Introduction

Use this document to help you configure the Nortel Ethernet Routing Switch 8600 Ethernet modules.

For module specifications and installation procedures, see *Nortel Ethernet Routing Switch 8600 Installation — Modules* (NN46205-304).

For optical transceiver specifications and installation procedures, see *Nortel Ethernet Routing Switch 8600 Installation — SFP, XFP, GBIC, and OADM Hardware Components* (NN46205-320).

Navigation

Ethernet module fundamentals

Use the information in this section to understand Ethernet configuration concepts.

For more information about Ethernet module statistics, see *Nortel Ethernet Routing Switch 8600 Performance Management* (NN46205-704).

For more information about the interfaces you can use to configure the switch, see *Nortel Ethernet Routing Switch 8600 User Interface Fundamentals* (NN46205-308).

Navigation

Ethernet module concepts

Extending Ethernet over local, metropolitan, and wide area networks provides cost-effective solutions for data transmission and ensures end-to-end Ethernet connectivity. To optimize Ethernet communications, you can configure a number of parameters. The following sections provide information to configure Ethernet modules for optimal performance.

Ethernet module concepts navigation

- “MLT/LACP groups and port speed” (page 19)
- “Clocking and 10 Gigabit Ethernet” (page 19)

Port speed and duplex mode

The Ethernet Routing Switch 8600 Ethernet modules support various data rates; these include 10 Mbit/s, 100 Mbit/s, 1000 Mbit/s, and 10 Gbit/s. Some modules, like the 8648GTR, support several data rates and use autonegotiation (see “Autonegotiation” (page 14)) to determine the appropriate data rate.

The duplex mode determines the direction of traffic flow during data communication. Half-duplex indicates that communication occurs between two Ethernet devices in both directions, but only in one direction at a time. Full-duplex indicates that communication occurs simultaneously in both directions. If you do not use autonegotiation, ensure that two interconnected Ethernet devices are in the same mode.

Some modules must use full-duplex; on these modules, full-duplex is not a configurable parameter.

Autonegotiation

By using autonegotiation, the switch automatically negotiates the best common data rate and duplex mode to use between two autonegotiation-capable Ethernet devices.

Autonegotiation automatically configures devices that share a link segment to take maximum advantage of the abilities. Autonegotiation allows the devices at both ends of a link segment to advertise abilities, acknowledge receipt and understanding of common modes of operation, and to reject the use of operational modes that both devices do not share. Where more than one common mode exists between the two devices, a mechanism allows the devices to resolve to a single mode of operation using a predetermined priority resolution function

Autonegotiation uses automatic sensing to allow 10Base-T-, 100Base-TX-, and 100Base-T4-compatible devices to be recognized even if they do not support autonegotiation. In this case, only the speed can be sensed, not the duplex mode.

Autonegotiation uses a modified 10Base-T link integrity test pulse sequence to perform autonegotiation; no packet or upper layer protocol overhead is added to the network devices.

Inconsistent behavior can occur if you disable autonegotiation on 1000Base-T ports. Nortel recommends that you enable autonegotiation on all 1000Base-T ports when they operate at 1000 Mbit/s.

After you enable or disable autonegotiation on one MLT port, you enable or disable autonegotiation on all MLT ports, and the MLT goes down and comes up. Because interswitch trunks (IST) are a type of multilink trunk, then enabling or disabling autonegotiation also affects IST MLTs. Split Multilink Trunking (SMLT) depends on ISTs, so when the IST goes down and comes up, SMLT links also go down and come up.

10 Gbit/s XFP ports do not support autonegotiation. While 100 and 1000 Mbit/s SFP ports do support autonegotiation, they do not support data rate change unless the SFP changes: a 100 Mbit/s SFP can operate only at 100 Mbit/s, and a 1 Gbit/s SFP can operate only at 1 Gbit/s. On optical links, autonegotiation does not negotiate the data rate; you can use autonegotiation only for Remote Fault Indication (RFI).

Autonegotiation recommendations

Nortel recommends that you set the following autonegotiation parameters between two 10/100Base-TX ports on devices A and B.

Table 1
Recommended Auto-Negotiation setting on 10/100BASE-TX ports

Port on device A	Port on device B	Remarks	Recommendation
Autonegotiation enabled	Autonegotiation enabled	Ports negotiate on highest supported mode on both sides.	Recommended setting if both ports support autonegotiation mode.
Autonegotiation disabled; configure as full-duplex	Autonegotiation disabled; configure as full-duplex	Both sides require the same mode.	Recommended setting if full-duplex is required, but autonegotiation is not supported.
Autonegotiation disabled; configure as half-duplex	Autonegotiation enabled	Mode should be configured as half-duplex because autonegotiation port cannot detect duplex mode. Speed can be sensed. Autonegotiation ports default to half-duplex.	10 Mbit/s half-duplex recommended on the fixed side.

Although all Ethernet Routing Switch 8600 1000Base-T ports support autonegotiation, there can be situations where autonegotiation does not function properly, and a link remains down. If this situation occurs, Nortel recommends that you disable autonegotiation and configure matching speed and duplex setting on both sides of the link (usually 10 Mbit/s and full-duplex). This operation does not comply with the latest IEEE 802.3ab standard, which states that on 1000Base-T ports, autonegotiation should be used for 1000 Mbit/s links.

Remote Fault Indication and Far End Fault Indication

The 802.3z Gigabit Ethernet standard defines Remote Fault Indication (RFI) as part of the autonegotiation function. RFI provides a way for stations on both ends of a fiber pair to be informed if a problem occurs with a fiber. Because RFI is part of the autonegotiation function, if you disable autonegotiation, RFI is automatically disabled. Therefore, Nortel recommends that you enable autonegotiation on Gigabit Ethernet links in all cases where autonegotiation supports the devices on both ends of a fiber link.

For 10 Gigabit Ethernet, Far End Fault Indication (FEFI) is automatically used. Remote failure is detected at the MAC level. Upon receiving FEFI notification from the remote site, the 10 Gbit/s LAN module port changes the link state to nonoperational.

The WAN PHY module supports FEFI. When one end of a 10 Gbit/s WAN module link detects a link-down condition or is administratively disabled, the Synchronous Optical Network (SONET) Alarm Indication Signal (AIS) notifies the other end of the link. Upon receiving this notification, the other end changes its link state to down.

CANA

The 10/100/1000 Mbit/s ports of R and RS modules support Custom Auto-Negotiation Advertisement (CANA). Use CANA to control the speed and duplex settings that these modules advertise during autonegotiation sessions between Ethernet devices. You can establish links only using these advertised settings, rather than at the highest common supported operating mode and data rate.

Use CANA to provide smooth migration from 10/100 Mbit/s to 1000 Mbit/s on host and server connections. Using autonegotiation, the switch always uses the fastest possible data rates. In scenarios where uplink bandwidth is limited, CANA provides control over negotiated access speeds, and thus improves control over traffic load patterns.

Only 10/100/1000 Mbit/s RJ-45 ports support CANA. To use CANA, you must enable autonegotiation.

ATTENTION

If a port belongs to an MLT group and CANA is configured on the port (an advertisement other than the default is configured), then you must apply the same configuration to all other ports of the MLT group (if they support CANA).

If a 10/100/1000 Mbit/s port that supports CANA is in an MLT group with 10/100Base-TX ports, or other port type that does not support CANA, then you can use CANA only if it does not conflict with MLT abilities.

For more information about configuring CANA, see (Enterprise Device Manager) “Configuring an Ethernet port” (page 24), (CLI) “Configuring 10/100/1000 Mbit/s ports” (page 37), or (NNCLI) “Configuring 10/100/1000 Mbit/s ports” (page 52).

Single Fiber Fault Detection

Use Single Fiber Fault Detection (SFFD) to detect remote faults on 1 Gigabit Ethernet fiber ports. When a fiber break occurs, data can be lost. SFFD detects the fault and, to stop packet loss, disables the port.

For SFFD to work properly, both ends of the fiber connection must have SFFD enabled and autonegotiation disabled. Because the Ethernet Routing Switch 8600 supports autonegotiation, it is not necessary to enable SFFD on fiber-based links with an Ethernet Routing Switch 8600 at both ends. In this case, enable autonegotiation (and disable SFFD) on both switches. When you enable SFFD on the Ethernet Routing Switch 8600, SFFD detects single fiber faults and brings down faulty links immediately. If the port is part of a multilink trunk, traffic fails over to other links in the MLT group. After you correct the fault, SFFD starts the link within 12 seconds.

SFFD is supported on the following Ethernet Routing Switch 8600 modules:

- 8630GBR
- 8648GBRS and fiber-optic gigabit ports of 8634XGRS
- 8648GTR

Because Nortel recommends that you use RFI through autonegotiation whenever it is supported by both link devices, SFFD is disabled by default. You can configure SFFD through the CLI and NNCLI.

To make sure that SFFD works properly, adhere to the following rules:

- When both ends of a fiber link support autonegotiation, use the default setting (disabled) for SFFD.
- Configure both ends of a fiber connection with the same setting. If you configure a port at one end of a fiber link for SFFD, then you must configure the port at the other end for SFFD.
- Enable only one option on each port—either SFFD or autonegotiation—not both. If you enable SFFD on a port, you must disable autonegotiation. If you enable autonegotiation for a port, you must disable SFFD.
- Configure all ports in a multilink trunk with the same option. If you enable SFFD on one port in a multilink trunk, you must enable SFFD on all ports in the multilink trunk and disable autonegotiation. If you

enable autonegotiation on one port in a multilink trunk, you must enable autonegotiation on all ports in the multilink trunk and disable SFFD.

SFFD detects faults for a single link between two devices. You can also use Virtual Link Aggregation Control Protocol (VLACP) to detect link faults end-to-end. For more information about VLACP, see *Nortel Ethernet Routing Switch 8600 Configuration — Link Aggregation, MLT, and SMLT* (NN46205-518).

For configuration examples and additional information about SFFD, see the *Single-Fiber Fault Detection Technical Configuration Guide* on the Nortel Technical Support Web site.

802.3x flow control for Gigabit Ethernet

Use flow control to protect against packet loss. Flow control prevents Ethernet ports from receiving more data than they can process.

The 802.3x flow control mechanism is effective only at the Data Link Layer (Layer 2). When packets are routed, flow control packets are ignored.

The Ethernet modules support IEEE 802.3x flow control in the following ways:

- generate 802.3x flow control PAUSE frames when they become congested
- respond to 802.3x PAUSE frames that enter from the other side of the link
- temporarily halt packet transmission when an 802.3x PAUSE frame is received from the remote end

You can enable flow control only on 1 Gigabit Ethernet (GbE) and 10 Gbit/s ports. You cannot enable flow control for ports that run at less than 1 Gbit/s.

If you enable flow control, also configure the fc-pause-time parameter. This parameter sets the timer value placed in the MAC flow control PAUSE frame. This indicates to the link partner the length of time to pause transmission.

Maximum transmission unit and jumbo frames

Jumbo frames are larger than the maximum Ethernet frame size (maximum transmission unit, or MTU) specified in the IEEE 802.3 standard. For untagged frames, the maximum standard size is 1518 bytes. For tagged frames, the maximum standard size increases by 4 bytes to 1522 bytes.

Note that these values include FCS bytes.

The default maximum Ethernet frame size supported by the Ethernet Routing Switch 8600 is 1950 bytes. The 10 Gbit/s module also supports this frame size. To support a jumbo frame system, set the SF/CPU MTU to 9600 bytes on the Edit, Chassis, Chassis tab. You can also use the **config sys set mtu** CLI command or the **set mtu <1522|1950|9600>** NNCLI command. Interface ports can pass jumbo frames by default.

If a jumbo frame enters on an interface and is destined to egress a chassis interface that does not support jumbo frames, it is gracefully dropped.

MLT/LACP groups and port speed

Ensure that all ports that belong to the same MLT group or Link Aggregation Control Protocol (LACP) group use the same port speed, for example, 1 Gbit/s, even if you use autonegotiation. The software does not enforce this requirement.

Clocking and 10 Gigabit Ethernet

To determine whether each incoming data bit is a one or a zero, the module must know when to sample the incoming data stream. The module determines the appropriate sampling time through clocking. Ethernet modules have internal clocks and can regenerate a clock signal from the incoming data stream.

Nortel recommends internal timing, unless you have a specific requirement for loop timing in a system, because the transmit side operates even if a failure occurs on the incoming Receive Side Signal.

You can configure clocking only for 10 Gbit/s ports.

For a port that uses the internal clock and directly connects to another port, the other side of the link can be either internal or line (loop) clocking. For a port set for line clocking, configure the other port for internal clocking to avoid a potential timing loop.

By default, each 10 Gbit/s WAN port generates the transmit clock from its own internal clock. However, a line timing option is provided for applications that involve synchronization to SONET equipment and timing hierarchies. You must manually change clock settings from internal to line timing.

For more information about clocking and synchronization applications, see *Nortel Ethernet Routing Switch 8600 Planning and Engineering — Network Design* (NN46205-200).

Ethernet modules and VRF Lite

Virtual Routing and Forwarding (VRF) Lite feature, added in Release 5.0, enables the Ethernet Routing Switch 8600 to be multiple virtual routers.

You can configure each VRF instance as a separate router; this means that you can configure various routing protocols and associated parameters for each instance. You can associate non0 VRF instances with R series module ports (8648GTR, 8648GTRS, 8612XLRS, 8630GBR, 8634XGRS, 8648GBRS, 8683XLR, 8683XZR).

The Ethernet parameters (for example, Auto-negotiate, AdminDuplex, and AdminSpeed) that you can edit for a VRF instance depend on whether the port belongs to one, or more than one, VRF instance. For example, if a port belongs to only one VRF, you can edit the Ethernet parameters of the VRF. If a port belongs to more than one VRF instance, then you cannot edit the Ethernet parameters of the VRF instance; you can edit only the GlobalRouter port parameters. If a port belongs to a single non0 VRF, then the VRF can change the port Ethernet parameters; if a port belongs to multiple VRF instances, then only the Global Router can change this port configuration.

For more information about VRF Lite, see *Nortel Ethernet Routing Switch 8600 Configuration — IP Routing* (NN46205-523).

Ethernet modules

The following table shows supported Ethernet modules you can use to provide Ethernet services using the Ethernet Routing Switch 8600.

Table 2
Ethernet modules

Module	Module description
8612XLRS	12-port 10 Gbit/s LAN
8630GBR	30-port 1000Base-X SFP
8634XGRS	2-port XFP, 24-port 1000Base-X SFP, 8-port RJ-45
8648GTR	48-port 10Base-T/100Base-TX/1000Base-T
8648GTRS	48-port 10Base-T/100Base-TX/1000Base-T
8648GBRS	48-port 1000Base-X SFP
8683XLR	3-port LAN 10GBase-X XFP
8683XZR	3-port 10GBase-X LAN/WAN XFP

The 8683XZR module can provide both 10 Gbit/s WAN and 10 Gbit/s LAN connectivity. WAN Ethernet frames are enclosed within SONET or Synchronous Digital Hierarchy (SDH) payload to traverse the fiber-optic link. Unlike the WAN 10 Gbit/s module, the LAN version module does not

use SONET as the transport mechanism. You cannot program the WAN and LAN modes of operation. Due to different clock frequencies, LAN and WAN versions of the 10 Gbit/s module have different module IDs and part numbers.

10 Gbit/s module features

The 8683XZR and 8683XLR modules have three forwarding engine lanes. Each lane supports 10 Gbit/s bidirectional traffic. All three ports can run concurrently at 10 Gbit/s. These modules run in full-duplex mode.

The 8634XGRS module uses lane 3 for two XFP ports.

For the 8683XZR, you can choose either LAN or WAN mode. If you configure multiple ports of the 8683XZR module to WAN mode, the framing type and clock mode must be the same for all the WAN mode ports. Support is unavailable for mixed configurations for multiple WAN mode enabled ports.

By default, XFP ports are configured as access ports (rather than as trunk ports with tagging enabled).

The 10 Gbit/s modules have the following characteristics:

- compliant with IEEE 802.3ae standards
- 802.3 Ethernet frame format, MAC layer functionality
- 64B/66B line encoding
- asynchronous Ethernet interface
- 128 000 records

The 10 Gbit/s modules support the following:

- 10GBase-LX XFP (AA1413001-E5)
- 10GBase-EX XFP (AA1413003-E5)
- 10GBase-SX XFP (AA1413005-E5)
- 10GBase-ZX XFP (AA1413006-E5)
- 10GBase-LRM XFP (AA1413007-E6)

The 10 Gbit/s modules also support the following 10GBase-ZR/ZW DWDM XFPs:

- NTK587AY-E5
- NTK587BA-E5
- NTK587BC-E5

- NTK587BE-E5
- NTK587BG-E5
- NTK587BJ-E5
- NTK587BL-E5
- NTK587BN-E5
- NTK587BQ-E5
- NTK587BS-E5
- NTK587BU-E5

For Release 5.0 and later, Nortel recommends that you install only one 10GBase-ZX for each 8683XZR or 8683XLR module due to module cooling limitations. Nortel further recommends that you install the XFP only on port 1. If you install the high-speed cooling module, you can install more 10GBase-ZX XFPs.

No XFP limitations exist for the 8634XGRS or 8612XLRS modules.

RS modules require the use of the high-speed cooling module.

ATTENTION
You can configure the XFP to operate in either LAN or WAN mode, depending on the module. The 8683XLR, 8634XGRS, and 8612XLRS are LAN-only modules, and the 8683XZR is a LAN/ WAN module. Only the 8683XZR module can use the WAN (SONET/SDH) mode.

Ethernet module features

The 10/100/1000 Mbit/s and 1 Gbit/s Ethernet modules have the following characteristics:

- compliant with IEEE 802.3ae standards
- 802.3 Ethernet frame format, MAC layer functionality
- asynchronous Ethernet interface

Ethernet modules support many SFPs and GBICs, which are described in *Nortel Ethernet Routing Switch 8600 Installation — SFP, XFP, GBIC, and OADM Hardware Components* (NN46205-320).

Ethernet module configuration using Enterprise Device Manager

Configure an Ethernet module and port to ensure proper operation and optimum performance of the module and port.

You can configure some Ethernet module parameters using only the NNCLI or CLI. These include flow control, Single Fiber Fault Detection (SFFD), and others.

Navigation

Disabling an Ethernet module

Disable an Ethernet module before you remove it from the chassis to minimize traffic loss. Traffic does not flow on a disabled module.

Procedure steps

Procedure steps

Step	Action
1	In the Device Physical View tab, select the Ethernet module.
2	In the navigation pane, open the following folders: **Configuration**, **Edit**.
3	Double-click **Card**.
4	In the **FrontAdminStatus** section, enable (up) or disable (down) the module as required.

5 Click **Apply**.

6 Alternatively, select the module, and right-click. Choose **Enable** or **Disable**.

--End--

Configuring the active connector

If you use ports with redundant connectors (links), you can define which connector is the primary connector.

Procedure steps

Step	Action
1	In the Device Physical View tab, select one of the ports.
2	In the navigation tree, open the following folders: **Configuration**,**Edit**, **Port**.
3	Double-click **General**.
4	Click the **Dual** tab.
5	Configure the primary connector as required.

--End--

The following table describes the Dual tab fields.

Variable	Value
Index	Specifies the unique value the system assigns to each interface.
PrimaryConnector	For ports configured with redundant connectors, this value indicates which connector to use as the active connector on this port the next time the port is placed into the ifAdminStatus=Up state.
ActiveConnector	Indicates which connector is currently the active connector. Only one connector is active at a time.
BackupConnectorStatus	Indicates the status of the link attached to the backup (nonactive) connector.

Configuring an Ethernet port

Configure an Ethernet port to ensure proper operation and optimum port performance.

ATTENTION
Ensure that all ports that belong to the same Multilink Trunking/Link Aggregation Control Protocol (MLT/LACP) group use the same port speed.

ATTENTION
If a port belongs to a Multilink Trunking (MLT) group and you configure Custom Auto-Negotiation Advertisement (CANA) on the port (an advertisement other than the default is configured), then the same configuration must be applied to all other ports of the MLT group (if they support CANA).

If a 10/100/1000 Mbit/s port that supports CANA is in an MLT group with 10/100Base-TX ports, or other port type that does not support CANA, then use CANA only if it does not conflict with MLT abilities.

Procedure steps

Step	Action
1	In the Device Physical View, select a port. .
2	In the navigation tree, open the following folders: **Configuration**, **Edit**, **Port**.
3	Double-click **General**.
	Alternatively, select a port, right-click, and choose **Edit General** .
4	Name the port.
5	Ensure that the port is enabled (**AdminStatus** is **up**).
6	Enable Auto-Negotiation as required.
	You cannot use Auto-Negotiation on 10 Gigabit Ethernet ports.
7	To use CANA on R or RS module 10/100/1000 Mbit/s copper ports, set the appropriate option in the **AutoNegAd** field.
	You must enable Auto-Negotiation to use CANA; you cannot use CANA on 1 or 10 Gigabit (optical) Ethernet ports.
8	If Auto-Negotiation is disabled, configure the speed and duplex mode.
9	Configure other parameters as required.
10	Click **Apply**.

--End--

The following table describes the Interface tab fields.

Many of these parameters are described in other documentation. See “Job aid: Port-related configuration parameters” (page 35).

Variable	Value
Index	Specifies the unique value the system assigns to each interface. The default value is 196.
Name	Specifies the name of the port.
Descr	Shows the port type of this interface and the slot/port number.
Type	Shows the media type of this interface.
Mtu	Specifies the size of the largest packet, in octets, that can be sent or received on the interface. The default is 1950.
PhysAddress	Specifies the MAC address assigned to a particular interface.
VendorDescr	Shows the vendor description.
AdminStatus	Sets the port to one of the following states: • up • down • testing The default is up. When a managed system initializes, all interfaces start with AdminStatus in the down state. As a result of either management or configuration action, the AdminStatus changes to the up state (or remains in the down state).
OperStatus	Shows the current operational state of the interface, either up or down. The default is down. If AdminStatus is down, OperStatus is down. If AdminStatus changes to up, OperStatus changes to up if the interface is ready to transmit and receive network traffic. It remains in the down state only if a fault prevents it from coming up.
LastChange	Shows the value of UpTime at the time the interface entered its current operational state. If the current state was entered prior to the last reinitialization of the local network management subsystem, the value is zero.

Variable	Value
LinkTrap	Indicates whether or not Link Up or Link Down traps are generated for this interface. The default is enabled.
AutoNegotiate	Enables or disables autonegotiation for the port. You cannot use autonegotiation on 10 Gigabit Ethernet ports. The default is true.
AdminDuplex	Specifies the duplex mode. This parameter does not apply to 1 or 10 Gbit/s ports.
OperDuplex	Shows the current operational duplex mode of the port (always full-duplex for the 10 Gbit/s module). The default is full.
AdminSpeed	Shows the port data rate. This parameter does not apply to optical transceiver ports.
OperSpeed	Shows the current operating speed of the port. The default is 0.
AutoNegAd	Sets the parameters for the CANA feature. Applies only to RS module 10/100/1000 Mbit/s RJ-45 ports. To use CANA, you must enable Auto-Negotiation.
QosLevel	Sets the Quality of Service level. The default is level1.
DiffServ	Enables or disables Differentiated Services on this port.
Layer3Trust	Sets the type of Differentiated Service access (untrusted at Layer 3) or core (trusted at Layer 3). The default is core.
MultiMediaPlatformAndDevice	Selects a multimedia or telephony filter to use for the port.
TelephonyAndMultimediaFilter Enable	Enables IP telephony and multimedia filters.
MltId	Specifies the multilink trunk to which the port is assigned (if any). The default is 0.
Locked	Shows whether the port is locked. When locked, you cannot change the port configuration. To lock or unlock a port, choose Edit, Security, Port Lock.

Variable	Value
UnknownMacDiscard	If True, a packet with an unknown source MAC address is dropped on that port, and other ports discard packets with this MAC address in the destination field. For example, if 11:22:33:44:55:66 is an unknown source MAC, then packets with the source MAC address 11:22:33:44:55 that come from this port are discarded. Furthermore, packets with a destination MAC 11:22:33:44:55:66 that come from other ports are also discarded, unless this address is later learned on another port or the restriction ages out.
DirectBroadcastEnable	Indicates whether this interface forwards direct broadcast traffic.
IngressRateLimitState	For R and RS modules, enables or disables ingress rate limiting.
IngressRateLimit	For R and RS modules, sets the ingress rate limit. The valid values are 1000–10000000 kbit/s.
EgressRateLimitState	For R and RS modules, enables or disables egress rate limiting.
EgressRateLimit	For R and RS modules, sets the egress rate limit. The valid values are 1000–10000000 kbit/s.
AdminRouting	Enables or disables routing.
OperRouting	Shows whether routing is enabled or disabled.
HighSecureEnable	Enables or disables High Secure mode.
Layer2Override8021p	If enabled, 802.1p bits are not trusted.
Wan	Enables WAN (SONET) or LAN (Ethernet) mode for the 8683XZR module.
Action	Sets one of the following port-related actions: • none • flushMacFdb—flush MAC forwarding table for port • flushArp—flush ARP table for port • flushIp—flush IP route table for port • flushAll—flush all tables for port

Variable	Value
	• triggerRipUpdate—manually update the RIP table • clearLoopDetectAlarm—clear the loop detect alarm
Result	Shows the result from the last system action.

Associating a port to a VRF instance

Associate a port with a Virtual Router Forwarding (VRF) so that the port becomes a member of the VRF instance.

You can assign a VRF instance to a port after the VRF is configured. Ports are assigned to the Global Router, VRF 0, by default.

For more information about VRF Lite, see *Nortel Ethernet Routing Switch 8600 Configuration — IP Routing* (NN46205-523).

Procedure steps

Step	Action
1	In the Device Physical View tab, select a port. Alternatively, select a port and right-click. Choose **Edit General** .
2	In the navigation tree, open the following folders: **Configuration**, **Edit**, **Port**.
3	Double-click **General**.
4	Click the **VRF** tab.
5	In **BrouterVrfId**, select the VRF.
6	Click **Ok**.

--End--

Ethernet module configuration using the CLI

Configure an Ethernet port to ensure proper operation and optimum port performance.

Navigation

Roadmap of port CLI commands

The following table lists some of the **config ethernet <slot/port>** commands and parameters that you can use to perform the procedures in this chapter.

Table 3
Roadmap of port CLI commands

Command	Parameter
config ethernet <slot/port>	802.1p-override <enable|disable>
	access-diffserv <true|false>
	action <action choice>
	alias <name>
	auto-negotiate <enable|disable>
	auto-negotiate-advertisements <10-full|10-half|100-full|100-half|1000-full|1000-half|default|none>
	auto-recover-port <enable|disable>
	block-traffic <true|false>
	broadcast-bandwidth-limit <value> [<enable|disable>]
	broadcast-rate-limit <value> [<enable|disable>]
	clock-source <internal|line>
	cp-limit <enable|disable> [multicast-limit <value>] [broadcast-limit <value>]
	default-vlan-id <vid>
	duplex <half|full>
	enable-diffserv <true|false>
	ext-cp-limit <None|SoftDown|HardDown|> [threshold-util-rate <value>]
	fc-pause0 <enable|disable>
	fc-pause-time <0...65535>
	flush-mac <mac> [<vid>]
	framing <sonet|sdh>
	high-secure <true|false>
	info
	linktrap <enable|disable>
	lock <true|false>
	loop-detect <enable|disable> [action <value>] [arp-detect]
	multicast-bandwidth-limit <value> [<enable|disable>]

Command	Parameter
	multicast-rate-limit <value> [<enable|disable>]
	name <name>
	perform-tagging <enable|disable>
	police <kbps> [<enable|disable>]
	preferred-phy <left|right>
	qos-level <0...6>
	routing <enable|disable>
	sffd <enable|disable>
	shape <kbps> [<enable|disable>]
	speed <10|100>
	spoof-detect <enable|disable>
	state <disable|enable|test>
	svlan-porttype <uni|nni|normal>
	tagged-frames-discard <enable|disable>
	tx-flow-control <enable|disable>
	untagged-frames-discard <enable|disable>
	untag-port-default-vlan <enable|disable>
	vrf <vrfName>
	wan-mode <enable|disable>
show config [verbose] [module <value>] [mode <value>]	
show ports info	802.1p-override [port <value>]
	all [vlan <value>] [port <value>] [by <value>]
	arp [port <value>]
	bandwidth-limit [vlan <value>] [port <value>]
	brouter-port [vlan <value>]
	config [vlan <value>] [port <value>]
	dhcp-relay [vlan <value>] [port <value>] [vrf <value>] [vrfids <value>]
	dvmrp [vlan <value>] [port <value>]
	ext-cp-limit [vlan <value>] [port <value>]

Command	Parameter
	fdb-entry [vlan <value>] [port <value>]
	high-secure [vlan <value>] [port <value>]
	igmp [vlan <value>] [port <value>] [vrf <value>] [vrfids <value>]
	interface [vlan <value>] [port <value>]
	ip [vlan] <value>] [port <value>] [vrf <value>] vrfids <value>]
	ipv6 [vlan <value>] [port <value>]
	ipv6-nd [vlan <value>] [port <value>]
	ipv6-nd-prefix [vlan <value>] [port <value>]
	ipx [vlan <value] [port <value>]
	l1-config [vlan <value>] [port <value>] [vrf <value>] [vrfids <value>]
	limit-fdb-learning [vlan <value> [port <value>]
	loop-detected [vlan <value>] [port <value>]
	mld [vlan <value] [port <value>]
	mroute-limit [vlan <value>] [port <value>]
	multimedia [vlan<value> [port <value>]
	name [vlan <value>] [port <value>]
	ospf [vlan <value>] [port <value>]
	ospfv3 [vlan <value>] [port <value>]
	pim [vlan <value>] [port <value>] [vrf <value>] [vrfids <value>]
	police [port <value>]
	rate-limit [vlan <value>] [port <value>]
	remote-mirroring [vlan <value>] [port <value>] [enable <value>] [mode <value>] [srcmac <value>] [dstmac <value>] [ether-type <value>]
	rip [vlan <value>] [port <value>]
	route-discovery [vlan <value>] [port <value>]
	shape [port <value>]
	slpp [port <value>]

Command	Parameter
	smlt [vlan <value>] [port <value>]
	state [vlan <value>] [port <value>]
	unknown-mac-discard [vlan <value>] [port <value>]
	vlacp [vlan <value>] [port <value>]
	vlans [vlan <value>] [port <value>]
	vrfs [port <value>] [vrf <value>] [vrfids <value>]

Job aid: Port-related configuration parameters

A port can participate in many types of operations. For more information about some of the port parameters (functions) that use the **config ethernet <slot/port>** command, see the documents referenced in the following table.

Table 4
Port configuration parameters reference information

For more information about	See
802.1p-override <enable|disable>	*Nortel Ethernet Routing Switch 8600 Configuration — QoS and IP Filtering for R and RS Modules* (NN46205-507)
access-diffserv <true|false>	*Nortel Ethernet Routing Switch 8600 Configuration — QoS and IP Filtering for R and RS Modules* (NN46205-507)
auto-recover-port <enable|disable>	See *Nortel Ethernet Routing Switch 8600 Configuration — VLANs and Spanning Tree* (NN46205-517)
broadcast-bandwidth-limit <value> [<enable|disable>]	*Nortel Ethernet Routing Switch 8600 Configuration — QoS and IP Filtering for R and RS Modules* (NN46205-507)
cp-limit <enable|disable> [multicast-limit <value>] [broadcast-limit <value>]	*Nortel Ethernet Routing Switch 8600 Administration* (NN46205-605)
default-vlan-id <vid>	*Nortel Ethernet Routing Switch 8600 Configuration — VLANs and Spanning Tree* (NN46205-517)
enable-diffserv <true|false>	*Nortel Ethernet Routing Switch 8600 Configuration — QoS and IP Filtering for R and RS Modules* (NN46205-507)
ext-cp-limit <None|SoftDown|HardDown> [threshold-util-rate <value>]	*Nortel Ethernet Routing Switch 8600 Administration* (NN46205-605)

Table 4
Port configuration parameters reference information (cont'd.)

For more information about	See
flush-mac <mac> [<vid>]	*Nortel Ethernet Routing Switch 8600 Configuration — VLANs and Spanning Tree* (NN46205-517)
high-secure <true|false>	*Nortel Ethernet Routing Switch 8600 Security* (NN46205-601)
linktrap <true|false>	*Nortel Ethernet Routing Switch 8600 Performance Management* (NN46205-704)
loop-detect <enable|disable> [action <value>] [arp-detect]	*Nortel Ethernet Routing Switch 8600 Configuration — VLANs and Spanning Tree* (NN46205-517)
multicast-bandwidth-limit <value> [<enable|disable>]	*Nortel Ethernet Routing Switch 8600 Configuration — QoS and IP Filtering for R and RS Modules* (NN46205-507)
perform-tagging <enable|disable> This parameter is called **encapsulation** in the NNCLI	*Nortel Ethernet Routing Switch 8600 Configuration — VLANs and Spanning Tree* (NN46205-517)
police <kbps> [<enable|disable>]	*Nortel Ethernet Routing Switch 8600 Configuration — QoS and IP Filtering for R and RS Modules* (NN46205-507)
qos-level <0-6>	*Nortel Ethernet Routing Switch 8600 Configuration — QoS and IP Filtering for R and RS Modules* (NN46205-507)
routing <enable|disable>	*Nortel Ethernet Routing Switch 8600 Configuration — IP Routing* (NN46205-523)
shape <kbps> [<enable|disable>]	*Nortel Ethernet Routing Switch 8600 Configuration — QoS and IP Filtering for R and RS Modules* (NN46205-507)
svlan-porttype <nni|nni|normal>	*Nortel Ethernet Routing Switch 8600 Configuration — VLANs and Spanning Tree* (NN46205-517)
tagged-frames-discard <true|false>	*Nortel Ethernet Routing Switch 8600 Configuration — VLANs and Spanning Tree* (NN46205-517)
unknown-mac-discard <true|false>	*Nortel Ethernet Routing Switch 8600 Configuration — VLANs and Spanning Tree* (NN46205-517)
untag-port-default-vlan <enable|disable>	*Nortel Ethernet Routing Switch 8600 Configuration — VLANs and Spanning Tree* (NN46205-517)
untagged-frames-discard <true|false>	*Nortel Ethernet Routing Switch 8600 Configuration — VLANs and Spanning Tree* (NN46205-517)
vrf <vrfName>	*Nortel Ethernet Routing Switch 8600 Configuration — IP Routing* (NN46205-523)

Disabling a module

Disable an Ethernet module before you remove it from the chassis to minimize traffic loss. Traffic does not flow on a disabled module.

Procedure steps

Step	Action
1	To disable a module, enter the following command: `config slot <slot> state disable`
2	To re-enable the module, enter the following command: `config slot <slot> state enable`

--End--

Variable definitions

Use the information in the following table to help you use the **`config slot`** command.

Variable	Value
`<slot>`	Specifies the slot number.

Configuring 10/100/1000 Mbit/s ports

Configure 10/100/1000 Mbit/s Ethernet ports so that they operate optimally for your network conditions.

ATTENTION
Ensure that all ports that belong to the same MLT/LACP group use the same port speed.

ATTENTION
If a port belongs to a Multilink Trunking (MLT) group and you configure Custom Auto-Negotiation Advertisement (CANA) on the port (an advertisement other than the default is configured), then you must apply the same configuration to all other ports of the MLT group (if they support CANA).

If a 10/100/1000 Mbit/s port that supports CANA is in an MLT group with 10/100BASE-TX ports, or other port type that does not support CANA, then use CANA only if it does not conflict with MLT abilities.

Procedure steps

Step	Action
1	If required, enable the port by using the following command: `config ethernet <slot/port> state <enable|disable>`

2 Configure Auto-Negotiation:

```
config ethernet <slot/port> auto-negotiate
<enable|disable>
```

3 For RS module 10/100/1000 Mbit/s ports, configure CANA:

```
auto-negotiate-advertisements <10-full|10-half|100-fu
ll|100-half|1000-full|1000-half|default|none>
```

To use CANA, you must enable autonegotiation.

4 If you do not use autonegotiation, then set the duplex mode and port speed:

```
config ethernet <slot/port> duplex <half|full>
```

```
config ethernet <slot/port> speed <10|100|1000>
```

5 Configure the other parameters as required.

6 Ensure that your configuration is correct by using one of the following commands:

```
config ethernet <slot/port> info
```

```
show ports info l1-config
```

--End--

Variable definitions

Use the following table to help you configure 10/100/1000 Mbit/s Ethernet port operational parameters using the **`config ethernet <slot/port>`** command.

Variable	Value
`auto-negotiate <enable|disable>`	Enables or disables autonegotiation.
`auto-negotiate-advertisements <10-full|10-half|100-full|100-half|1000-full|1000-half|default|none>`	Specifies the CANA advertisement to send. Only R and RS module 10/100/1000 Mbit/s copper ports can use CANA. You must enable autonegotiation to use CANA.
`duplex <half|full>`	Specifies half- or full-duplex mode. Applies only to 10/100/1000 Mbit/s ports; 1 and 10 Gbit/s ports must use full-duplex mode.
`name <name>`	Specifies a name for the port.
`preferred-phy <left|right>`	For duplex connectors, specifies which line and connector is active: left or right.

Variable	Value
speed <10|100|1000>	Specifies the port speed. Not applicable to 1 Gigabit or 10 Gigabit Ethernet modules.
state <enable|disable|test>	Enables or disables the port. The default is enable.

Configuring 1 Gigabit Ethernet ports

Configure Ethernet parameters for the 1 Gbit/s (SFP) ports so that they operate optimally for your network conditions.

ATTENTION
Ensure that all ports that belong to the same MLT/LACP group use the same port speed.

Procedure steps

Step	Action
1	If required, enable the port by using the following command: **config ethernet <slot/port> state <enable|disable>**
2	Enable Auto-Negotiation: **config ethernet <slot/port> auto-negotiate <enable|disable>**
3	Enable flow control as required: **config ethernet <slot/port> tx-flow-control <enable|disable>**
4	Enable PAUSE frames: **config ethernet <slot/port> fc-pause0 <enable|disable>**
5	Configure the pause timer as required: **config ethernet <slot/port> fc-pause-time <1...65535>**
6	Enable Single Fiber Fault Detection: **config ethernet <slot/port> sffd <enable|disable>**
7	Use the following variable definitions table to configure other parameters as required.
8	Ensure that your configuration is correct by using one of the following commands: **config ethernet <slot/port> info** **show ports info l1-config**

--End--

Variable definitions

Use the following table to help you configure 1 Gigabit Ethernet port operational parameters using the **config ethernet <slot/port>** command.

Configuring 10 Gigabit Ethernet ports

Configure Ethernet parameters for 10 Gbit/s (XFP) ports so that they operate optimally for your network conditions.

ATTENTION
Ensure that all ports that belong to the same MLT/LACP group use the same port speed.

Procedure steps

Step	Action
1	If required, enable the port by using the following command: **config ethernet <slot/port> state <enable|disable>**
2	Configure the clock source: **config ethernet <slot/port> clock-source <internal|line>**
3	Configure tx-flow-control: **config ethernet <slot/port> tx-flow-control <enable|disable>**
4	Enable PAUSE frames: **config ethernet <slot/port> fc-pause0 <enable|disable>**
5	Configure the flow-control-pause timer: **config ethernet <slot/port> fc-pause-time <1...65535>**
6	For LAN/WAN modules, configure the mode: **config ethernet <slot/port> wan-mode <enable|disable>** When you configure multiple ports of the 8683XZR module to WAN mode, the framing type and clock mode must be the same for all the WAN mode ports. Mixed configurations for multiple WAN mode enabled ports is not supported.
7	If the mode is WAN, configure the framing type: **config ethernet <slot/port> framing <sonet|sdh>**
8	Use the following variable definitions table to configure other parameters as required.
9	Ensure that your configuration is correct by using one of the following commands:

```
config ethernet <slot/port> info
show ports info l1-config
```

--End--

Variable definitions

Use the following table to help you configure 10 Gigabit Ethernet port operational parameters using the **config ethernet <slot/port>** command.

Variable	Value
clock-source <internal|line>	**line** mode uses the recovered Receive (Rx) clock to generate the Transmit (Tx) clock. **internal** mode uses the onboard oscillator to generate the Tx clock. The default value is internal. Only applicable to 10 Gbit/s ports.
fc-pause0 <enable|disable>	When **tx-flow-control** is enabled and **fc-pause0** is enabled, the TX port transmits MAC control PAUSE frames with a timer value of 0 to indicate to its link partner to resume transmission. The default is enable. This parameter applies only to 1 and 10 Gigabit Ethernet ports.
fc-pause-time <1...65535>	Setting the flow-control-pause time sets the timer value in the MAC control PAUSE frame. This indicates to the link partner how long to pause transmission. The pause time is in units of 512 bit-times. Do not set it to a low value, such as 1 or 2. These lower values reduce effect on network congestion. The default is 65535. This parameter applies only to 1 and 10 Gigabit Ethernet ports.
framing <sonet|sdh>	Specifies Synchronous Optical Network (SONET) or Synchronous Digital Hierarchy (SDH) framing. SONET is the standard format used in North America. SDH is the standard format used in Europe. The default is SONET. This parameter applies only to 10 Gbit/s WAN ports.
name <name>	Specifies a name for the port.
preferred-phy <left|right>	For duplex connectors, specifies which line and connector you want to be active: left or right.
state <enable|disable|test>	Enables or disables the port. The default is enable.

Variable	Value
tx-flow-control <enable|disable>	Enables or disables flow control. When **tx-flow-control** is enabled, the TX port transmits MAC control PAUSE frames to indicate congestion on the receive side of the port interface. The link partner ceases transmission based on the MAC control frame pause-timer value. The default is disable. You can enable flow control only on 1 Gbit/s and 10 Gbit/s ports. You cannot enable flow control for ports that run at less than 1 Gbit/s.
wan-mode <enable|disable>	Enables or disables WAN mode. This parameter is applicable only to the 8683XZR module. If you enable WAN mode, the port uses SONET or SDH. When you configure multiple ports of the 8683XZR module to WAN mode, the framing type and clock mode must be the same for all the WAN mode ports. Mixed configurations for multiple WAN mode enabled ports is not supported.

Associating a port to a VRF instance

Associate a port to a Virtual Router Forwarding (VRF) so that the port becomes a member of the VRF instance.

You can assign a VRF instance to a port after the VRF is configured. Ports are assigned to the Global Router, VRF 0, by default.

For more information about VRF Lite, see *Nortel Ethernet Routing Switch 8600 Configuration — IP Routing* (NN46205-523).

Procedure steps

Step	Action
1	To configure a Virtual Router Forwarding (VRF) port instance, use the **vrf <vrfName>** command as you configure the port. For example: **config ethernet 2/1 vrf <vrfName>**

--End--

Variable definitions

Use the following table to help you use the **vrf** command.

Variable	Value
<vrfName>	Specifies the VRF by name.

Configuring high-priority control MAC addresses for the 8648GTR module

Use the high-priority control MAC address feature to treat selected control MAC addresses as high priority. Packets with these MAC addresses are processed by the SF/CPU at a higher priority than other packets. Choose the control MAC addresses that correspond to the most critical protocols running on the switch.

The high-priority control MAC address feature operates only under congestion. If there is no congestion, all MAC addresses are treated equally.

You can configure up to six 8648GTR control MAC addresses with high priority.

Procedure steps

Step	Action
1	Show the current control MAC mappings: **config sys set 8648gtr high-priority-control-mac info**
2	Configure the control MAC addresses to be given high priority: **config sys set 8648gtr high-priority-control-mac <register> [<mac>]**

--End--

Variable definitions

Use the following table to help you use the **config sys set 8648gtr high-priority-control-mac** command.

Variable	Value
`info`	Shows information about the high priority control MAC addresses configured on the switch.
`<register> [<mac>]`	`<register>` specifies the MAC address register and ranges from 0–5. `<mac>` specifies the MAC address to be given high priority. If no MAC address is specified, it is set to default.

Job aid: default high-priority control MAC address list

The following table shows the default high-priority MAC addresses.

Table 5
8648GTR default high-priority control MAC address list

Register number	Control MAC address	Protocol
0	01:80:C2:00:00:00	Spanning Tree Protocol (Bridge Protocol Data Unit)
1	01:00:5e:00:00:05	Open Shortest Path First
2	01:00:5e:00:00:06	Open Shortest Path First
3	01:00:5e:00:00:09	Routing Information Protocol version 2
4	01:00:5e:00:00:04	Distance Vector Multicast Routing Protocol
5	01:00:5e:00:00:12	Virtual Router Redundancy Protocol

Job aid: example high-priority control MAC addresses

The following table gives examples of control MAC addresses that you can configure as high-priority. The MAC addresses you choose depend on performance requirements. Nortel recommends that you change the high-priority control MAC addresses only if the corresponding protocols are not in use on your network. For example, if Protocol Independent Multicast is not used in a network, then substitute the MAC address of another important protocol that is used.

Table 6
Example high-priority control MAC addresses and protocols

Register number	Control MAC address	Protocol
0	01:00:81:00:01:00	Topology Discovery Protocol
1	01:00:81:00:01:01	Topology Discovery Protocol
2	01:00:5e:00:00:0d	Protocol Independent Multicast
3	01:80:C2:00:00:21	GVRP Control MAC

Register number	Control MAC address	Protocol
4	01:80:C2:00:00:02	LACP Multicast MAC address prefix
5	01:80:C2:00:11:00	VLACP Multicast MAC Address prefix

Ethernet module configuration using the NNCLI

Configure an Ethernet port to ensure proper operation and optimum performance of the port.

Navigation

Roadmap of Ethernet module NNCLI commands

The following roadmap lists some of the IP commands and their parameters that you can use to complete the procedures in this section.

Table 7
Job aid: Roadmap of Ethernet module NNCLI commands

Command	Parameter
Privileged EXEC mode	

Command	Parameter
show interfaces <fastEthernet|GigabitEthernet>	[<portList>] [config] [<1-4094>]
	interface
	l1-config [<portList>] [<1-4094>]
	name [<portList>] [<1-4094>]
	state [<portList>] [<1-4094>] [<portList>]
	vrfs [vrf <WORD 0-16>] [vrfids <WORD 0-255>] [<portList>]
show slot <1-10>	
Global Configuration mode	
shutdown <1-10>	
Interface Configuration mode	
auto-negotiate [port <portList>] [enable]	
auto-negotiation-advertisements [port <portList>] <10-full|10-half|100-full|100-half|1000-full|1000-half|none>	
clock source <internal|line>	
duplex [port <portList>] <half|full>	
flowcontrol	[port <portList>] pause0
	[port <portList>] pause-time <1...65535>
framing [port <portList>] <sonet|sdh>	
name [port <portList>] <WORD 0-42>	
port-phy [port <portList>] <left|right>	
sffd [port <portList>] enable	
shutdown [port <portList>]	
speed [port <portList>] <10|100|1000>	
tx-flow-control [port <portList>] [enable]	

Command	Parameter
`wan-mode [port <portList>] [enable]`	
`vrf <WORD 0-16>`	

Job aid: port-related configuration parameters

A port can take part in many different types of operations. For more information about other port-related parameters, see the documents referenced in the following table.

Table 8
Port configuration parameters reference information

For more information about:	See:
Interface Configuration mode	
`access-diffserv [port <portList>] [enable]`	*Nortel Ethernet Routing Switch Configuration — QoS and IP Filtering for R and RS Modules* (NN46205-507)
`action [port <portList>] <none|flushMacFdb|flushArp|flushIp|triggerRipUpdate|flushAll|clearLoopDetectAlarm>`	*Nortel Ethernet Routing Switch Configuration — IP Routing* (NN46205-523) and *Nortel Ethernet Routing Switch Configuration — VLANs and Spanning Tree* (NN46205-517)
`auto-recover-port [port <portList>] [enable]`	*Nortel Ethernet Routing Switch Configuration — VLANs and Spanning Tree* (NN46205-517)
`bandwidth-limit [port <portList>] <broadcast|multicast> <250-2147483647>`	*Nortel Ethernet Routing Switch Configuration — QoS and IP Filtering for R and RS Modules* (NN46205-507)
`block-traffic [port <portList>] [enable]`	*Nortel Ethernet Routing Switch Security* (NN46205-601)
`brouter port <portList> vlan <1-4094> subnet <a.b.c.d/0-32> mac-offset <0-65535> [vrf <WORD 0-16>]`	*Nortel Ethernet Routing Switch Configuration — IP Routing* (NN46205-523)
`clear mac-address-table dynamic <MAC address> <1-4094>`	*Nortel Ethernet Routing Switch Configuration — VLANs and Spanning Tree* (NN46205-517)
`cp-limit`	*Nortel Ethernet Routing Switch Administration* (NN46205-605)
`default-vlan-id [port <portList>] <1-4094>`	*Nortel Ethernet Routing Switch Configuration — VLANs and Spanning Tree* (NN46205-517)
`eapol`	*Nortel Ethernet Routing Switch Security* (NN46205-601)

Table 8
Port configuration parameters reference information (cont'd.)

For more information about:	See:
`enable-diffserv`	*Nortel Ethernet Routing Switch Configuration — QoS and IP Filtering for R and RS Modules* (NN46205-507)
`encapsulation dot1q [port <portList>]`	*Nortel Ethernet Routing Switch Configuration — VLANs and Spanning Tree* (NN46205-517)
`ext-cp-limit`	*Nortel Ethernet Routing Switch Administration* (NN46205-605)
`high-secure`	*Nortel Ethernet Routing Switch Security* (NN46205-601)
`ip`	*Nortel Ethernet Routing Switch Configuration — IP Routing* (NN46205-523)
`ipv6`	*Nortel Ethernet Routing Switch Configuration — IPv6 Routing* (NN46205-504)
`ipx`	*Nortel Ethernet Routing Switch Configuration — IPX Routing* (NN46205-505)
`lacp`	*Nortel Ethernet Routing Switch Configuration — Link Aggregation, MLT, and SMLT* (NN46205-518)
`lock [port <portList>] [enable]`	*Nortel Ethernet Routing Switch Security* (NN46205-601)
`loop-detect`	*Nortel Ethernet Routing Switch Configuration — VLANs and Spanning Tree* (NN46205-517)
`mac-security`	*Nortel Ethernet Routing Switch Security* (NN46205-601)
`mpls`	*Nortel Ethernet Routing Switch Configuration — MPLS Services* (NN46205-519)
`nsna`	*Nortel Ethernet Routing Switch Security* (NN46205-601)
`pcap`	*Nortel Ethernet Routing Switch Troubleshooting* (NN46205-703)
`qos`	*Nortel Ethernet Routing Switch Configuration — QoS and IP Filtering for R and RS Modules* (NN46205-507).
`remote-mirroring`	*Nortel Ethernet Routing Switch Troubleshooting* (NN46205-703)
`routing [port <portList>] [enable]`	*Nortel Ethernet Routing Switch Configuration — IP Routing* (NN46205-523)
`slpp`	*Nortel Ethernet Routing Switch Configuration — Link Aggregation, MLT, and SMLT* (NN46205-518)

Table 8
Port configuration parameters reference information (cont'd.)

For more information about:	See:
`smlt`	*Nortel Ethernet Routing Switch Configuration — Link Aggregation, MLT, and SMLT* (NN46205-518)
`snmp`	*Nortel Ethernet Routing Switch Security* (NN46205-601)
`spanning-tree`	*Nortel Ethernet Routing Switch Configuration — VLANs and Spanning Tree* (NN46205-517)
`spoof-detect`	*Nortel Ethernet Routing Switch Configuration — VLANs and Spanning Tree* (NN46205-517)
`svlan-porttype`	*Nortel Ethernet Routing Switch Configuration — VLANs and Spanning Tree* (NN46205-517)
`tagged-frames-discard`	*Nortel Ethernet Routing Switch Configuration — VLANs and Spanning Tree* (NN46205-517)
`test`	*Nortel Ethernet Routing Switch Troubleshooting* (NN46205-703)
`untagged-frames-discard`	*Nortel Ethernet Routing Switch Configuration — VLANs and Spanning Tree* (NN46205-517)
`vlacp`	*Nortel Ethernet Routing Switch Configuration — Link Aggregation, MLT, and SMLT* (NN46205-518)
`vrf <WORD 0-16>`	*Nortel Ethernet Routing Switch Configuration — IP Routing* (NN46205-523)

Disabling a module

Disable an Ethernet module before you remove it from the chassis to minimize traffic loss. Traffic does not flow on a disabled module.

Prerequisites

- You must be in Global Configuration mode.

Procedure steps

Step	Action
1	Disable a module by using the following command: `slot shutdown {slot[-slot][,...]}`
2	Re-enable a module by using the following command:

```
no slot shutdown {slot[-slot][,...]}
```

--End--

Variable definitions

Use the information in the following table to help you use the **shutdown** command.

Variable	Value
{slot[-slot][,...]}	Specifies the slot number.

Configuring 10/100/1000 Mbit/s ports

Configure 10/100/1000 Mbit/s Ethernet ports so that they operate optimally for your network conditions.

Prerequisites

- You must be in Interface Configuration mode.

ATTENTION
If a port belongs to a Multilink Trunking (MLT) group and Custom Auto-Negotiation Advertisement (CANA) is configured on the port (that is, an advertisement other than the default is configured), then the same configuration must be applied to all other ports of the MLT group (if they support CANA).

If a 10/100/1000 Mbit/s port that supports CANA is in a MLT group that has 10/100BASE-TX ports, or other port type that do not support CANA, then CANA should be used only if it does not conflict with MLT abilities.

ATTENTION
Ensure that all ports that belong to the same MLT/LACP group use the same port speed.

Procedure steps

Step	Action
1	Enable Auto-Negotiation: `auto-negotiate enable`
2	Configure CANA: `auto-negotiation-advertisements <10-full|10-half|100-full|100-half|1000-full|1000-half|none>` To use CANA, you must enable Auto-Negotiation.
3	If you do not use Auto-Negotiation, set the duplex mode and port speed:

duplex <half|full>

speed <10|100|1000>

4 Use the following variable definitions table to configure other parameters as required.

--End--

Variable definitions

Use the following table to help you configure 10/100/1000 Mbit/s Ethernet port operational parameters. These commands are available in Interface Configuration mode.

Variable	Value
auto-negotiate [port <portList>] [enable]	Enables or disables Auto-Negotiation for the port and/or other ports of the module. Use **port <portList>** to change other ports to the same settings. You cannot configure Auto-Negotiation for 10 Gbit/s ports. The default form of this command is **default auto-negotiate [port <portList>] [enable]**. The no form of this command is **no auto-negotiate [port <portList>] [enable]**.
auto-negotiation -advertisements [port <portList>] <10-full|10-half|100 -full|100-half|1000-ful l|1000-half|none>	Specifies the CANA advertisement. Only R and RS module 10/100/1000 Mbit/s copper ports can use CANA. You must enable Auto-Negotiation to use CANA. Use **port <portList>** to change other ports to the same settings. The default form of this command is **default auto-negotiation-advertisements [port <portList>]**. The no form of this command is **no auto-negotiation-advertisements [port <portList>]**.
duplex [port <portList>] <half|full>	Specifies half- or full-duplex mode. Only applicable to 10/100/1000 Mbit/s ports; 1 and 10 Gbit/s ports must use full-duplex mode. Use **port <portList>** to change other ports to the same settings.

Variable	Value
name [port <portList>] <WORD 0-42>	Specifies a name for the port. Use **port <portList>** to change other ports to the same settings. The default form of this command is **default name [port <portList>]**. The no form of this command is **no name <WORD 0-42> [port <portList>]**.
port-phy [port <portList>] <left|right>	For duplex connectors, specifies which line and connector you want to be active: left or right. Use **port <portList>** to change other ports to the same settings. The default form of this command is **default port-phy [port <portList>]**.
shutdown [port <portList>]	Disables the port. Use **port <slot/port>** to change other ports to the same settings. The no form of this command is **no shutdown [port <portList>]**.
speed [port <portList>] <10|100|1000>	Specifies the port speed. Not applicable to 1 Gigabit or 10 Gigabit Ethernet modules. Use **port <portList>** to change other ports to the same settings. The default form of this command is **default speed [port <portList>]**.

Configuring 1 Gigabit Ethernet ports

Configure Ethernet parameters for 1 Gbit/s (SFP) ports so that they operate optimally for your network conditions.

Prerequisites

- You must be in Interface Configuration mode for the port you want to configure.

ATTENTION
Ensure that all ports that belong to the same MLT/LACP group use the same port speed.

Procedure steps

Step	Action
1	Enable Auto-Negotiation: **auto-negotiate enable**

2 Enable Single Fiber Fault Detection (SFFD) as required:

```
sffd enable
```

3 Enable flow control as required:

```
tx-flow-control enable
```

4 Enable flow control pause0:

```
flowcontrol pause0
```

5 Configure the flow control pause timer:

```
flowcontrol pause-time <0...65535>
```

6 Use the following variable definitions table to configure other parameters as required.

--End--

Variable definitions

Use the following table to help you configure Ethernet port operational parameters. These commands are available in Interface Configuration mode.

Variable	Value
auto-negotiate [port <portList>] [enable]	Enables or disables Auto-Negotiation for the port and/or other ports of the module. Use **port <portList>** to change other ports to the same settings. You cannot configure Auto-Negotiation for 10 Gbit/s ports. The default form of this command is **default auto-negotiate [port <portList>] [enable]**. The no form of this command is **no auto-negotiate [port <portList>] [enable]**.
flowcontrol [port <portList>] pause0	When **tx-flow-control** is enabled and **flowcontrol pause0** is enabled, the TX port transmits MAC control PAUSE frames with a timer value of 0 to indicate to its link partner to resume transmission. The default is enable. This parameter applies only to 1 and 10 Gigabit Ethernet ports.

Variable	Value
flowcontrol [port <portList>] pause-time <0...65535>	Setting the pause time sets the timer value in the MAC control PAUSE frame. This indicates to the link partner how long to pause transmission. The pause time is in units of 512 bit-times. Do not set the pause-time to a low value, such as 1 or 2. Low values do not reduce network congestion. The default is 65535. This parameter applies only to 1 and 10 Gigabit Ethernet ports.
name [port <portList>] <WORD 0-42>	Specifies a name for the port. Use **port <portList>** to change other ports to the same settings. The default form of this command is **default name [port <portList>]**. The no form of this command is **no name <WORD 0-42> [port <portList>]**.
port-phy [port <portList>] <left|right>	For duplex connectors, specifies which line and connector you want to be active: left or right. Use **port <portList>** to change other ports to the same settings. The default form of this command is **default port-phy [port <portList>]**.
sffd [port <portList>] [enable]	Enables or disables SFFD. For SFFD to work properly, both ends of the fiber connection must have SFFD enabled and Auto-Negotiation disabled. This parameter applies only to 1 Gigabit Ethernet ports. Use **port <portList>** to change other ports to the same settings. The default form of this command is **default sffd [port <portList>] [enable]**. The no form of this command is **no sffd [port <portList>] [enable]**.

Variable	Value
shutdown [port <portList>]	Disables the port. Use **port <slot/port>** to change other ports to the same settings. The no form of this command is **no shutdown [port <portList>]**.
tx-flow-control [port <portList>] [enable]	Enables flow control. When **tx-flow-control** is enabled, the TX port transmits MAC control PAUSE frames to indicate congestion on the receive side of the port interface. The link partner ceases transmission based on the MAC control frame pause-timer value. The default is disable. You can enable flow control only on 1 Gbit/s and 10 Gbit/s ports. You cannot enable flow control for ports that run at less than 1 Gbit/s. Use **port <portList>** to change other ports to the same settings. The default form of this command is **default tx-flow-control [port <portList>] [enable]**. The no form of this command is **no tx-flow-control [port <portList>] [enable]**.

Configuring 10 Gigabit Ethernet ports

Configure Ethernet parameters for 10 Gbit/s ports so that they operate optimally for your network conditions.

Prerequisites

- You must be in Interface Configuration mode for the port you want to configure.

ATTENTION
Ensure that all ports that belong to the same MLT/LACP group use the same port speed.

Procedure steps

Step	Action
1	Enable flow control: **tx-flow-control enable**

2 Enable flow control pause0:

```
flowcontrol pause0
```

3 Configure the flow control pause timer:

```
flowcontrol pause-time <0...65535>
```

4 For LAN/WAN modules, configure the mode:

```
wan-mode enable
```

When you configure multiple ports of the 8683XZR module to WAN mode, the framing type and clock mode must be the same for all the WAN mode ports. Mixed configurations for multiple WAN mode enabled ports is not supported.

5 If the mode is WAN, configure the framing type:

```
framing <sonet|sdh>
```

6 For WAN modules, configure the clock source:

```
clock source <internal|line>
```

7 Use the following variable definitions table to configure other parameters as required.

--End--

Variable definitions

Use the following table to help you configure Ethernet port operational parameters. These commands are available in Interface Configuration mode.

Variable	Value
clock source <internal|line>	**line** mode uses the recovered Receive (Rx) clock to generate the Transmit (Tx) clock. **internal** mode uses the onboard oscillator to generate the Tx clock. The default value is internal. Only applicable to WAN 10 Gbit/s ports. The default form of this command is **default clock source**.
flowcontrol [port <portList>] pause0	When **tx-flow-control** is enabled and **flowcontrol pause0** is enabled, the TX port transmits MAC control PAUSE frames with a timer value of 0 to indicate to its link partner to resume transmission. The default is enable. This parameter applies only to 1 and 10 Gigabit Ethernet ports.

Variable	Value
flowcontrol [port <portList>] pause-time <0...65535>	Setting the pause time sets the timer value in the MAC control PAUSE frame. This indicates to the link partner how long to pause transmission. The pause time is in units of 512 bit-times. Do not set the pause-time to a low value, such as 1 or 2. Low values do not reduce network congestion. The default is 65535. This parameter applies only to 1 and 10 Gigabit Ethernet ports.
framing [port <portList>] <sdh|sonet>	Sets the port to Synchronous Optical Network (SONET) or Synchronous Digital Hierarchy (SDH) framing. The default value is SONET. This parameter applies only to 10 Gbit/s WAN ports. Use **port <portList>** to change other ports to the same settings.
name [port <portList>] <WORD 0-42>	Specifies a name for the port. Use **port <portList>** to change other ports to the same settings. The default form of this command is **default name [port <portList>]**. The no form of this command is **no name <WORD 0-42> [port <portList>]**.
port-phy [port <portList>] <left|right>	Specifies which line/connector you want to be active: left or right. Use **port <portList>** to change other ports to the same settings. The default form of this command is **default port-phy [port <portList>]**.
shutdown [port <portList>]	Disables the port. Use **port <portList>** to change other ports to the same settings. The no form of this command is **no shutdown [port <portList>]**.
tx-flow-control [port <portList>] [enable]	Enables flow control. When **tx-flow-control** is enabled, the TX port transmits MAC control PAUSE frames to indicate congestion on the receive side of the port interface. The link partner ceases transmission based on the MAC control frame pause-timer value. The default is disable. You can enable flow control only on 1 Gbit/s and 10 Gbit/s ports. You cannot enable flow control for ports that run at less than 1 Gbit/s.

Variable	Value
	Use **port <portList>** to change other ports to the same settings. The default form of this command is **default tx-flow-control [port <portList>] [enable]**. The no form of this command is **no tx-flow-control [port <portList>] [enable]**.
wan-mode [enable] [port <portList>]	Enables or disables WAN mode. This parameter is applicable only to the 8683XZR module. If you enable WAN mode, the port uses SONET or SDH. Use **port <portList>** to change other ports to the same settings. When you configure multiple ports of the 8683XZR module to WAN mode, the framing type and clock mode must be the same for all the WAN mode ports. Mixed configurations for multiple WAN mode enabled ports is not supported. The default form of this command is **default wan-mode [enable] [port <portList>]**. The no form of this command is **no wan-mode [enable] [port <portList>]**.

Associating a port to a VRF instance

Associate a port to a Virtual Router Forwarding (VRF) so that the port becomes a member of the VRF instance.

You can assign a VRF instance to a port after the VRF is configured. Ports are assigned to the Global Router, VRF 0, by default.

For more information about VRF Lite, see *Nortel Ethernet Routing Switch 8600 Configuration — IP Routing* (NN46205-523).

Prerequisites

- You must be in Interface Configuration mode.

Procedure steps

Step	Action
1	To associate a VRF instance with a port, use the following command: `vrf <WORD 1-32>`
	--End--

Variable definitions

Variable	Value
`vrf <WORD 1-32>`	`<WORD 1-32>` specifies the VRF name.

Configuring high-priority control MAC addresses for the 8648GTR module

Use the high-priority control MAC address feature to select control MAC addresses to be treated as high priority. Packets with these MAC addresses are processed by the SF/CPU at a higher priority than other packets. Choose the control MAC addresses that correspond to the most critical protocols running on the switch.

The high-priority control MAC address feature operates only under congestion. If there is no congestion, all MAC addresses are treated equally.

You can configure up to six 8648GTR control MAC addresses with high priority.

For more information about this feature, see "Job aid: default high-priority control MAC address list" (page 44) and "Job aid: example high-priority control MAC addresses" (page 44).

Prerequisites

- You must be in Global Configuration mode.

Procedure steps

Step	Action
1	Show the current control MAC mappings: `show sys 8648gtr`

2 Configure the control MAC addresses to be given high priority:

```
sys 8648gtr high-priority-control-mac <0-5>
[<0x00:0x00:0x00:0x00:0x00:0x00>]
```

--End--

Variable definitions

Use the following table to help you use the **sys 8648gtr high-priority-control-mac** command.

Variable	Value
<0-5> [<0x00:0x00:0x00:0x00:0x00:0x00>]	<0-5> specifies the MAC address register and ranges from 0–5. <0x00:0x00:0x00:0x00:0x00:0x00> specifies the MAC address to be given high priority. If no MAC address is specified, it is set to default. The default form of this command is **default sys 8648gtr high-priority-control-mac [<0-5>]**

Index

A

B

C

D

E

F

G

H

I

J

L

M

N

O

P

Nortel Ethernet Routing Switch 8600

Configuration — Ethernet Modules

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