



**The ImageStream
Standard Architecture
For Network Devices (SAND)**

Command Reference

Compatible with all RISCom/N2x, WANic, Aries and Maxim series cards
For SAND-compatible Linux Driver Version 3.4.0 or later
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Global Commands

interface *DeviceXX*

Global configuration command used to denote the beginning of a WAN or LAN interface where “XX” is the interface number.

<i>SerialXX</i>	Specifies the beginning of a serial device configuration
<i>EthernetXX</i>	Specifies the beginning of an ethernet device configuration
<i>SerialXX.XX</i>	Specifies the beginning of a frame relay or ATM subinterface (see <i>Frame Relay Commands</i>)
<i>SerialXX-XX</i>	Specifies the beginning of a multiplexed subinterface (see <i>Multiplexing Commands</i>)
<i>BonderXX</i>	Specifies the beginning of a bonder device configuration

Example: interface Serial0.1 indicates that the primary interface is Serial0 and that this is the first subinterface.

end

Denotes the end of the wan.conf configuration file.

ip route *prefix mask {address / interface}*

Add a static route to the routing table.

<i>prefix</i>	IP route prefix for the destination.
<i>mask</i>	Prefix mask for the destination.
<i>address</i>	IP address of the next hop that can be used to reach that network.
<i>interface</i>	Network interface to use.

Example:

Set a default gateway via interface Serial0: ip route 0.0.0.0 0.0.0.0 Serial0

Interface Commands

bandwidth *bits per second*

Sets the intended bandwidth in bits per second. This command only affects the output of the “stats” program and does not set internal clock speeds. See *baud* to set internal clocking for interfaces.

baud *rate*

Configure internal clocking for the interface in bits per second. *Use the baud command only with cards that do not have integrated CSU/DSUs. Use the “service-module” command to set clocking parameters for cards with integrated CSU/DSUs.*

Example:

```
Set internal clocking to 2.0 Mb/sec: baud 2000000  
Set internal clocking to 45.0 Mb/sec: baud 45000000
```

bond *Serial device*

Used to add serial devices or PVCs to a bonder interface.

Example:

```
interface Bonder0  
description Pair of T1s to Anytown  
bond Serial0.14  
bond Serial0.15  
ip address 192.168.10.1 255.255.255.252
```

crc *size*

Sets the length of the Cyclic Redundancy Check (CRC).

<i>0</i>	Disabled
<i>1</i>	CCITT/16-bit (default)
<i>2</i>	32-bit

debug protocol/hardware *number*

Used to set the debugging level for protocol or hardware layers (default: 2).

Valid debugging levels are:

- 1 Module information only.
- 2 Adds hardware details.
- 3 Adds port state changes.
- 4 Adds port error details.
- 5 Adds advanced hardware details.
- 6 Adds tx & rx packet counts.
- 7 Adds lock debugging.
- 8 Adds function entry/exit debugging.
- 9 Turns on everything possible.

description *string*

Used to add a comment (description) for tracking what is attached to a particular interface.

dctype *type-code*

Several WANic series cards allow for software setting of the hardware interface type. Valid only for cards with a multi-interface daughtercard (WANic 524, 604 and 608 only):

- 0 V.35 (default)
- 1 RS-422
- 2 RS-232

disable-hdlc-processing

Valid only for 600 and 800 series cards. Disables HDLC frame processing for that particular interface on the WAN card for non-IP or non-framed data applications. Typically used with the driver suite's character mode operation (encapsulation type "none").

rate-limit *bits per second* [input**|**output**] [**latency *milliseconds***|**buffer *kilobytes***]**

Restricts data rates on the interface to the bits per second value specified.

Optional Keyword	Description
input	Applies the rate-limiting policy to packets received on this interface only
output	Applies the rate-limiting policy to packets sent on this interface only
latency	Highest allowed latency value on the interface (affects buffer size and packet drop rates)
buffer	Highest allowed buffer value on the interface (affects latency and packet drop rates)

encapsulation *type*

Set the protocol for an interface.

Keyword	Encapsulation Type
frame-relay	Frame Relay protocol (Uses IETF standard)
hdlc	High-Level Data Link Control (HDLC) protocol for serial interface. This encapsulation method provides the synchronous framing and error detection functions of HDLC without windowing or retransmission.
ppp	Point-to-Point Protocol.
raw	Raw IP encapsulation.
x25	X.25 protocol.
none	Raw character device read/write for external applications

ip address *ip-address mask [secondary]*

To set IP addresses for an interface, use the **ip address** command.

<i>ip-address</i>	IP address
<i>mask</i>	Network mask (netmask)
secondary	(Optional) Specifies additional IP addresses (aliases)

mtu *value*

Configure the maximum transfer unit size for this interface. 800 series cards default to 4470 byte MTU. All other cards default to a 1500 byte MTU. The mtu command is valid in Serial, Bonded and Ethernet devices. 10 Mbps and 100 Mbps Ethernet do not support an MTU above 1500. Gigabit Ethernet supports larger MTU sizes.

pointpoint address *address*

Configure the destination address for this interface. For use with PPP connections when the destination router will not negotiate this setting.

Example: pointpoint address 192.168.10.2

shutdown

Shut down an interface.

x21-clockmode

Valid only for cards using an RS422 interface. Setting this clocking option on cards using an RS422 interface and the standard X.21 DB26-DB15 cable disable the use of the carrier signal (DCD) and enables the dual clocking required for X.21 interfaces. Note: Remember to set "dtype 1" to set RS422 mode on cards that allow for software setting of the hardware interface type.

Interface CSU commands

T1 & E1 Interface CSU commands

service-module {t1 | e1} clock source { line | internal }

Set the internal CSU's clock source to external/line (default) or internal.

service-module {t1 | e1} data-coding { normal | inverted }

Set the internal CSU's coding to normal (default) or inverted.

service-module t1 framing { esf | sf }

Set the internal CSU's framing to esf (Extended Super Frame-default) or sf (Super Frame also known as D4).

service-module e1 framing { ccs | cas }

Set the internal CSU's line coding to ccs (default) or cas.

service-module t1 lbo { -22.5 db | -15 db | -7.5 db | none }

Set the internal CSU's line buildout. Use only if the cable between your card's TX connector to the demarcation point is greater than 225 feet.

service-module t1 linecode { b8zs | ami }

Set the internal CSU's line coding to b8zs (default) or ami.

service-module e1 linecode { hdb3 | ami }

Set the internal CSU's line coding to hdb3 (default) or ami.

service-module {t1 | e1} timeslots { range | all } [speed { 56 | 64 }]

Set the internal CSU's timeslot usage and speed per timeslot. 56K channel speeds require the use of D4 framing.

Example: service-module t1 timeslots 1-12 for a 768K circuit.

Example: service-module t1 timeslots 1-4, 5, 6-10, 12-18, 19, 23 speed 56

Example: service-module e1 timeslots 1-28 for a 1.792Mbps circuit.

service-module {t1 | e1} egl

Set the internal CSU's equalizer gain limit on.

service-module e1 unstructured

Sets unstructured mode on the e1 CSU/DSU, making all 32 timeslots available for use. *Note: Command only supported by 520 series cards.*

service-module e1 crc4

Enables the generation of CRC4 (per ITU recommendation G.703 and G.704) to improve data integrity. *Note: Command only supported by 520 series cards.*

DS3 & E3 Interface CSU commands

service-module {ds3 | e3} clock source { line | internal }

Set the internal CSU's clock source to external/line (default) or internal.

service-module {ds3 | e3} egl

Set the internal CSU's Rx equalization on.

service-module {ds3 | e3} lbo

Set the internal CSU's line buildout. Use only if the cable between your card's TX connector to the demarcation point is greater than 225 feet.

Frame relay commands

Frame relay master interface commands

encapsulation frame-relay ietf

Required command to set the protocol for the frame relay subinterface.

frame-relay lmi-type *type*

Set the lmi type for an interface. Valid only in main interface configurations and not in subinterfaces.

ansi Annex D defined by ANSI standard T1.617. (default)
cisco LMI type defined jointly by Cisco and three other companies.
ccitt ITU-T Q.933 Annex A.

frame-relay map ip *ip-address dlci*

Maps an IP address to a frame relay dlci number. Provided for backwards compatibility only. Configure PVCs using subinterfaces instead of using frame-relay map ip statements.

frame-relay interval *interval*

Sets the LMI interval in Mhz.

frame-relay mode {*dte* | *dce*}

Sets the frame-relay mode to dte (default) or to dce

Frame relay subinterface commands

interface *Device.Subinterface*

Global configuration command used to denote the beginning of a frame-relay subinterface. The subinterface for the frame relay PVC is added to the primary interface.

Example: interface Serial0.1 indicates that the primary interface is Serial0 and that this is the first subinterface.

bandwidth *bits per second*

Sets the intended bandwidth in bits per second. This command only affects the output of the “stats” program and does not set internal clock speeds.

encapsulation frame-relay ietf

Required command to set the protocol for the frame relay subinterface.

frame-relay interface-dlci *dlci*

Assigns a data link connection identifier (DLCI) to a specified frame relay subinterface on the router.

ip address *ip-address mask*

To set IP addresses for a subinterface, use the **ip address** command.

<i>ip-address</i>	IP address
<i>mask</i>	Network mask (netmask)

Multiplexing commands

Multiplexing master interface commands

description *string*

Used to add a comment (description) for tracking what is attached to a particular interface.

service-module {t1 | e1} clock source { line | internal }

Set the internal CSU's clock source to external/line (default) or internal.

Multiplexing subinterface commands

interface *Device-Subinterface*

Global configuration command used to denote the beginning of a multiplexed hardware subinterface.

Example: interface Serial0-1 indicates that the primary interface is Serial0 and that this is the first subinterface.

service-module {t1 | e1} timeslots { range | all } [speed { 56 | 64 }]

Set the channel group and speed per timeslot for the hardware subinterface. 56K channel speeds require the use of D4 framing.

Example: service-module t1 timeslots 1-12

Example: service-module t1 timeslots 1-4, 5, 6-10, 12-18, 19, 23 speed 56

Example: service-module e1 timeslots 1-28

ATM commands

ATM master interface commands

encapsulation atm

Required command to set the protocol for the master interface. Only valid for 1000 and 1050 series cards.

service-module {oc3 | ds3 | e3} clock source { line | internal }

Set the internal CSU's clock source to external (default) or internal.

service-module {ds3 | e3} egl

Set the internal CSU's Rx equalization on.

service-module ds3 framing { cbit | m23 }

Set the internal CSU's framing to C-bit parity (default) or m23.

service-module ds3 lbo

Set the internal CSU's line buildout. Use only if the cable between your card's TX connector to the demarcation point is greater than 225 feet. Valid only for DS-3 transports.

service-module {ds3 | e3} scrambling { on | off }

Enable (default) or disable ATM cell scrambling.

service-module oc3 mode { sonet | sdh }

Set the OC-3 interface mode to sonet (default) or sdh.

service-module oc3 scrambling { on | off }

Enable (default) or disable ATM cell scrambling.

transport { ds3 | e3 }

Valid only for 1050 series cards. Sets the circuit type to ds3 (default) or e3.

ATM subinterface commands

interface *Device.Subinterface*

Global configuration command used to denote the beginning of an ATM subinterface. The subinterface for the ATM VPI/VCI pair is added to the primary interface.

Example: interface Serial0.1 indicates that the primary interface is Serial0 and that this is the first subinterface.

ip address *ip-address mask*

To set IP addresses for a subinterface, use the **ip address** command.

<i>ip-address</i>	IP address
<i>mask</i>	Network mask (netmask)

pvc [**name**] { *vpi* } / { *vci* }

Sets up a pvc using a specified VPI and VCI identifier- The name field is present for compatibility reasons. It is not required and is not used.

Example: pvc 2/33 sets up a pvc using VPI 2 and VCI 33.

ATM Quality of Service designators

ubr *peak cell rate*

Specifies the "unspecified bit rate" quality of service designator for a PVC with a peak cell rate specified by the peak cell rate parameter. If the pcr parameter is omitted, the proper pcr will be calculated based on the PVC's bandwidth. Omitting the pcr value *requires* that the bandwidth command is set for the PVC. Typically, users will find it much easier to specify the bandwidth than to calculate the pcr value from the bandwidth.

cbr *peak cell rate*

Specifies the "constant bit rate" quality of service designator for a PVC with a peak cell rate specified by the peak cell rate parameter. If the pcr parameter is omitted, the proper pcr will be calculated based on the PVC's bandwidth. Omitting the pcr value *requires* that the bandwidth command is set for the PVC. Typically, users will find it much easier to specify the bandwidth than to calculate the pcr value from the bandwidth.

abr { *peak cell rate* } { *minimum cell rate* }

Specifies the "available bit rate" quality of service designator for a PVC with a peak cell rate specified by the peak cell rate parameter and the minimum cell rate specified by the mcr parameter. If the pcr parameter is omitted, the proper pcr will be calculated based on the PVC's bandwidth. Omitting the pcr value *requires* that the bandwidth command is set for the PVC. Typically, users will find it much easier to specify the bandwidth than to calculate the pcr value from the bandwidth.