IBM Release Note

IBM 8285 Nways ATM Workgroup Switch

Release Note

for

ATM upgrade kit
Support of FPGA level C31, C30, B50
Operational Microcode v.1.5.2
Boot Microcode v.1.5.2

PN N.A. 1 of 38	EC N.A. 18Jun97				

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2.0 Warning to Customers

Due to new functions integrated in this release of the 8285 operational microcode v.1.5.2 and its corequesite boot microcode v.1.5.2, imply the following:

- **Corequisites**

  ATM blades with the firmware upgrade kit FPGA level will not be able to communicate inside the same 8285 and its expansion with ATM blades at a previous FPGA level and vice versa. You must upgrade all the ATM blades inside a given 8285 and expansion with the FPGA level given in the present kit.

- **PVC compatibility with old 8260 A-CPSW modules**

  The Permanent Virtual Circuit (PVC) "smart" management is *not compatible* with versions of IBM 8260 A-CPSW Module anterior to v.2.1.0, but you can still split such PVCs so that they continue to work (see the section 9.0, “Warnings” on page 27).

  Note: ***This applies to PVCs only***. The **SVCs** (Switched Virtual circuits) are ***totally compatible*** with all versions of IBM 8260 A-CPSW Module .

- **SSI compatibility with old 8260 A-CPSW modules**

  The automatic Switch-to-Switch (SSI) topology computation is *not compatible* with the IBM 8260 A-CPSW Module anterior to v.2.0.4 .

  You may upgrade your IBM 8260 A-CPSW Module to the version v.2.0.8 (available on the internet, URL = http://www.raleigh.ibm.com/826/826fix.html), or you may prefer to configure your interfaces between the Switches as NNI (Network-to-Network), thus losing the automatic route computation.

3.0 Trademarks and Service Marks

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4.0 References

Here are the references to the documents you should always refer to:

- *IBM 8285 Installation and User's guide (SA33-0381-01).*
- *IBM 8285/8260 ATM Command Reference Guide (SA33-0385-00).*

They both have useful sections on either troubleshooting or description of error codes following specific functions.

5.0 Upgrade Information

5.1 Installing the 8285 Upgrade Field BM

CAREFULLY APPLY THE INSTALLATION INSTRUCTIONS provided in the companion document INST8285 10J2450 , EC level E95670

6.0 New and Enhanced functions

6.1 A12-TP25/A1-MB155

This new feature allows the support of the 12 port 25MB-1 port 155MB blade. Please refer to the combo daughter card installation and user's guide.

6.2 MIB 1.7

Following are the MIB changes in v1.7 (compared to v1.5) related to 8285 and in the ATM Forum LAN Emulation mibs.

1. Changes in the MIB ibm-8285-atmSw version: 1.5

   A3-MB155 module
   support for this new module and associated interfaces

   For moduleOperState : addition of incompatible-level value for modules that have FPGA levels incompatible with levels running in the 8285

   Setting of the number of bits VPI.VCI for the variable range of VPC/VCC values.

   Setting of Point to Multipoint PVC and PVP.

   A12-TP25/A1-MB155
   Support for this new module and associated interfaces.

   A new attribute of sysTrace which is clear has been added.

6.3 A3-MB155 module

Corrected : When a 3 ports 155Mbps mother card was not fully populated with daughter cards, the Network Management displayed an empty faceplate.

6.4 FIBERCOM I/O card

FIBERCOM circuit emulation I/O card is now recognized.

This card passed the IBM ATM kit certification program, which verify that customer can plug this I/O card in the 8260, without disturbing the operation of the rest of the Hub, and that communication through the UTOPIA interface is running. No test of the functionality of the card itself has been done.

7.0 Known Problems

The following problems exist in this 8285 microcode version.

1. Changing the ATM address of a 8285 module inside an ATM cluster

   If you need to change the ATM address in an ATM Hub interconnected to other Hubs by SSIs (ATM Cluster Intraconnection), the routing table may be become inaccurate. To avoid this do the following:

   Save the configuration

   Disable all the SSI ports

   Wait for 25 seconds

   Change the ATM address

   The 8285 is reset with the previous configuration and the new address . SSI ports will be up again automatically.

2. Telnet session cannot be re-established after the previous session has been accidently lost.

   Bypass:

   set a timeout value , using the SET TERMINAL TIMEOUT command

3. Ping -f of the LAN Emulation Client (LEC) in the 8285 creates a reset of the Control Point Switch.

   Bypass:

   Do not use Ping -f command

8.0 User's Guide and Command Guide update

8.1 UPLOAD and DOWNLOAD of CONFIGURATION

WARNING :

The file resulting from an UPLOAD of CONFIGURATION on a TFTP server, should only be DOWNLOADED on a 8285 with the same level of operational code. Otherwise, you might encounter strange behaviours on the 8285.

The IBM 8285 Installation and User's guide (SA33-0381-01) and the IBM 8285/8260 ATM Command Reference Guide (SA33-0385-00) do not have the latest information in terms of Token-Ring LAN-Emulation Client, and do not reflect the change of the "SET PORT" command.

There is also a mistake in the description of the Twisted-Pair cable.

8.2 LAN Emulation, supported protocols : 802.3 / DIX / 802.5

- The LAN-Emulation client now supports Ethernet (802.3), Ethernet v2 (DIX), and **Token-Ring (802.5)**.
- The LAN-Emulation Client, Server, and BUS are in conformity with the ATM-Forum LAN Emulation Specifications 1.0 .

8.3 LAN-Emulation Configuration Server (LECS) compatibility

Your IBM 8285 supports the three ways of reaching the LECS defined by the ATM Forum, provided that the LECS **has neither its 12th byte (ACN) equal to 0 nor its 13th byte (HN) equal to 0** :

1. ILMI support :

   the LAN-Emulation Client can get the ATM address of the LECS by doing a GETNEXT on the variable atmfSrvcRegATMAddress of the ILMI (ATM-Forum) MIB, provided that the LECS real ATM address has been entered in the 8285, using the command "SET LAN_EMUL CONFIGURATION_SERVER".

   Note: These LECS ATM addresses **must** be defined *in all IBM 8285s* that are dealing with LAN-Emulation Clients requesting the LECS ATM address from the ILMI MIB.

   Note: You can define in the IBM 8285 several ATM addresses for the LECS, but **only one** can be enabled at a time (using the command "SET LAN_EMUL CONFIGURATION_SERVER ACTIVE_WKA atm_address").

2. Well-Known Address :

   The LAN-Emulation Client may directly call the LAN-Emulation Well-Known Address (WKA), which is :

   47. .79. . . . . .A .3E. . . 1.

   To make the IBM 8285s know where to route such calls, you must define the LECS real ATM address **in all the IBM 8285s** that are on the Call-Setup path.

The command to use is "SET LAN_EMUL CONFIGURATION_SERVER" .

Note: The IBM ATM switches (8285 and 8260) will keep the destination address in the Call Setup frame as it is : the Well-Known Address. The LECS must accept a call destined to that particular address. Note that the LECS may or may not accept such a call, especially when it is denied the registration of the Well-Known Address at the ILMI, which is the case with IBM ATM switches.

3. VPI:VCI = 0:17 support

   With your IBM 8285, you can create a PVC from your LEC to the LECS using the Well-Known PVC 0:17 at the LEC side, if this LEC requires it.

Related Commands:

CLEAR LAN_EMUL CONFIGURATION_SERVER
SET LAN_EMUL CONFIGURATION_SERVER
SET PVC
SHOW LAN_EMUL CONFIGURATION_SERVER
SHOW PVC [VERBOSE]

8.4 CLEAR TRACE_LOG

The CLEAR command defined in the *8285 Command Reference guide (DA33-0381)* has a new option **TRACE_LOG** allowing the clearing of the main trace before being restarted.

8.5 Setting up a LAN Emulation Client

1. The **SET DEVICE** command defined in the *8285 Command Reference guide (SA33-0381)* has new optional parameters, in order to define the LES,LECS ATM address or let the 8285 follow the ATM Forum to find this LES ATM address.

   The following choices are offered :

   a. **LES ATM address definition :** if you want to define the LES ATM address for a LEC , you must issue the following command :

```
SET DEVICE LAN_EMULATION_CLIENT (TR|ETH) NO_LECS_WITH_LES les_atm_address
```

Figure 1. Set device lan_emulation_client (part 3)

   b. **LECS ATM address definition :** If you want to define the LECS ATM address for a LEC , you must issue the following command :

```
SET DEVICE LAN_EMULATION_CLIENT (TR|ETH) NO_LES_WITH_LECS lecs_atm_address
```

Figure 2. Set device lan_emulation_client (part 4)

   c. **No specific LES or LECS definition :** The default value for the NO_LECS_WITH_LES or NO_LES_WITH_LECS keywords is NONE. For example :

SET DEVICE LAN_EMULATION_CLIENT (TR|ETH) NO_LES_WITH_LECS NONE

Figure 3. Set device lan_emulation_client (part 5)

Note: If no LES or LECS ATM address have been set, then the 8285 will search for the LECS ATM address , first using ILMI, then if it does not work the Well Known Address (WKA). In this case , you must not forget to define a WKA active in the Well Known Address table. If an LES ATM address has been defined then the LECS ATM address will never be used.

2. This paragraph replaces the paragraph "Setting Up a LAN Emulation Client" at page 111, in Chapter 14 ("Configuring LAN Emulation Parameters") of the IBM 8285 Installation and User's guide (SA33-0381-01).

   To configure the LEC, use the SET DEVICE LAN_EMULATION_CLIENT with the following parameters :

   LAN type (Ethernet, Token-Ring)

   Ethernet type (802.3 or DIX) if LAN type was set to Ethernet.
   The default setting is 802.3 .

   IP address

   Subnetwork mask

   Individual MAC address

   Associated LES ATM address or LECS ATM address

   Notes :

   a. The MAC address must be in 802.3 format for Ethernet LAN-Emulation, and 802.5 format (non-canonical, Most Significant Byte first) for Token-Ring LAN-Emulation. Local and universal administered MAC addresses are supported.

   b. The associated LES ATM address is the address of the LES monitoring the emulated LAN. The LES may be internal to the 8285 or external.

      In the case of an internal LES, you should start the LES before you configure the LEC, in order to be able to get its ATM address (via SHOW LAN_EMUL SERVERS).

   c. The Maximum Frame Size and emulated LAN Name are provided by the associated LES.

   d. The SET DEVICE LAN_EMULATION_CLIENT TR/ETH command automatically starts the LEC (once all the parameters are provided).

   e. For Ethernet LAN-type, by default, an 802.3 LEC is started. To start the Ethernet V.2 (DIX) LEC, use the ETH_TYPE DIX keywords.

   f. No command to stop the LEC is available.

      If you really need to clear the LEC parameters, you may use the CLEAR CONFIGURATION command available in the Maintenance Mode. Be aware that it will clear all the definitions of the 8285.

   a. **Example 1 : Ethernet DIX LAN-Emulation Client :**

```
8285> set device lan_emulation_client eth eth_type dix
                                        (cont) ip_address 9.1  .2 .55 mac_address
 2    123456 no_lecs_with_les
Enter ATM address :
      39.99.99.99.99.99.99.  .  .99.99. 1.5 .5 .5 .5 .5 .5 .5 . 2

Client starting.
8285>
```

After the 'eth' parameter, the other parameters may be entered in any order.

b. **Example 2 : Token-Ring LAN-Emulation Client :**

```
8285> set device lan_emulation_client tr ip_address 9.1  .3 .55 mac_address
4   FCFCFC   no_lecs_with_les
Enter ATM address :
      39.99.99.99.99.99.99.  .  .99.99. 1.3 .3 .3 .3 .3 .3 .3 . 2

Client starting.
8285>
```

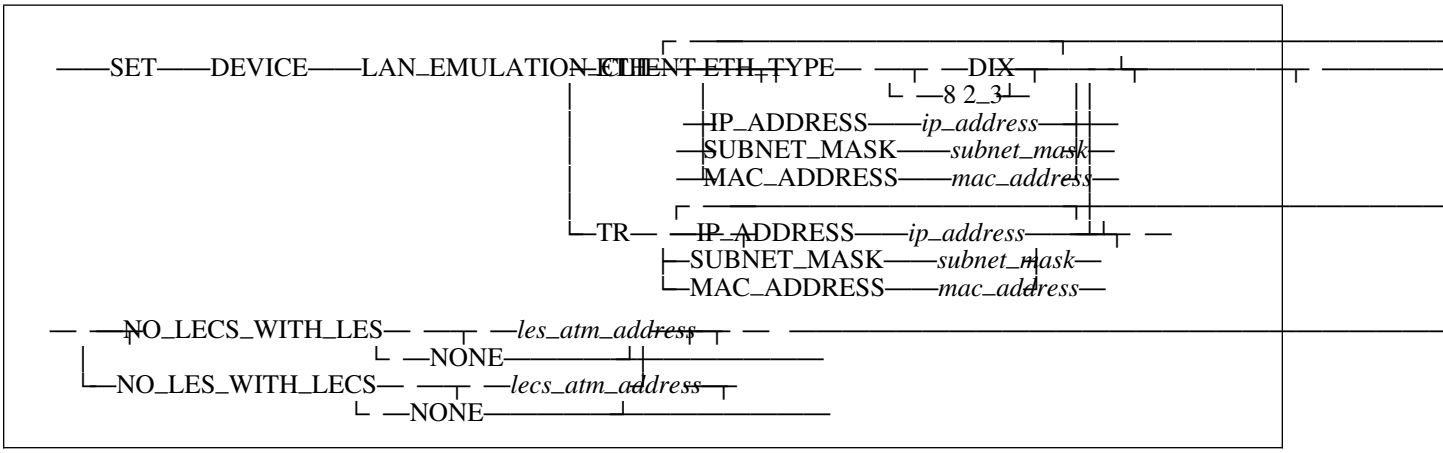
The first time the SET DEVICE LAN_EMULATION_CLIENT command is used, you must configure all four parameters before saving the configuration settings (no default values are provided). Once the configuration settings have been saved, it is possible to change only one parameter at a time using the SET DEVICE LAN_EMULATION_CLIENT command.

WARNING

Changing the MAC address will force the IBM 8285 to reset, after confirmation.

8.6 New SET DEVICE LAN_EMULATION_CLIENT command syntax

The command **SET DEVICE LAN_EMULATION_CLIENT** shown in the chapter 2 ("Quick Reference") and in the chapter 3 ("ATM Commands") of the IBM 8285/8260 ATM Command Reference Guide **has been changed :**



8.7 New syntax for SET PORT command

The syntax for the "SET PORT" command has been *slightly* changed :

The keywords NNI, SSI, UNI, and DISABLE, ENABLE can be entered *in any order*.

You can now enable, disable, configure several ports at a time, by separating the port numbers by spaces.
Attention, if you specify in a row different types of ports (25 Mbps and 155 Mbps ports, for example), you will not be allowed to configure their specific parameters on the same command line.

1. The **SET PORT** command defined in the *IBM 8285 Nways ATM Workgroup Switch Command Reference guide (SA33-0381)* has a new option **VPI_VCI** that defines the range of VPC/VCC values for the ATM ports. This range can be defined for each individual ATM port, if desired.

```
SET PORT 1.1 UNI ENABLE VPI_VCI: nb_bits_vpi.vci
```

Figure 4. Set module VPI_VCI function

The preferred values for the different ATM ports are :

For all ATM modules, except the 25Mbps ports :

a. VPC/VCC 0/14 (VPC value equal to 0; VCC value comprised between 0 & 16383)

b. VPC/VCC 4/10 (VPC value comprised between 0 and 15; VCC value comprised between 0 & 1023)

c. VPC/VCC 6/8 (VPC value comprised between 0 and 63; VCC value comprised between 0 & 255)

For the 25Mbps ports :

a. VPC/VCC 0/12 (VPC value equal to 0; VCC value comprised between 0 & 4095)

b. VPC/VCC 2/10 (VPC value comprised between 0 and 3; VCC value comprised between 0 & 1023)

c. VPC/VCC 4/8 (VPC value comprised between 0 and 15; VCC value comprised between 0 & 255)

Rules to follow

For the parameter "VPI_VCI: nb_bits_vpi.vci", the command is accepted if vpi and vci values follow certain rules :

1. vpi and vci must both be **less or equal** to one of the supported modes above
2. vci must **greater or equal** to 6
3. For example : 3.10 is accepted , 2.11 is not accepted

Like other parameters, you cannot keep your port enable and change this parameter.

MANDATORY : You must define **the same VPI/VCI range on both sides of a SSI or NNI link.**

In previous releases, the ranges were set to :

For all ATM ports, except the 25 Mbps ports :

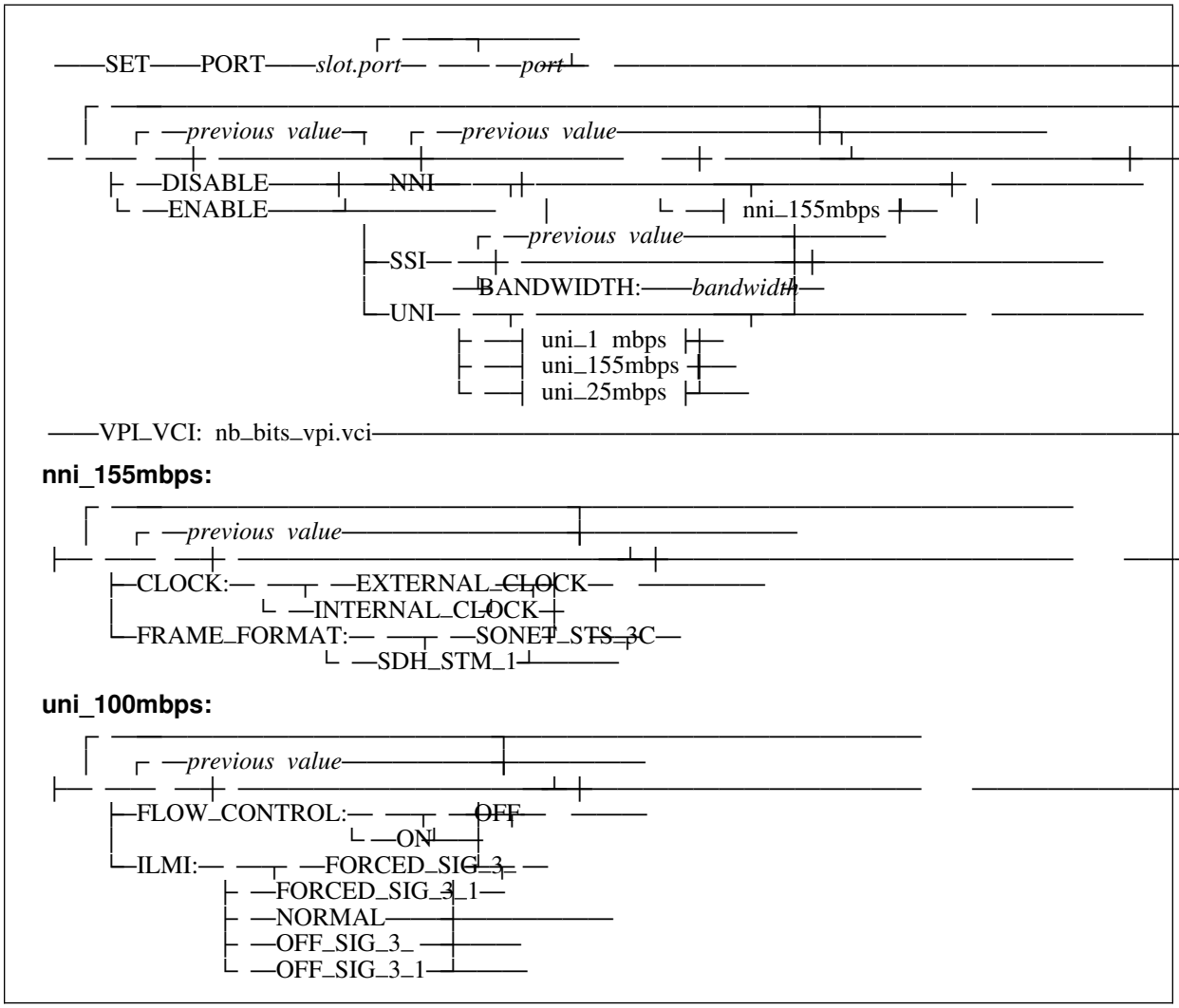
VPC/VCC 4/10 (VPC value comprised between 0 and 15; VCC value comprised between 0 & 1023)

For the 25 Mbps ports :

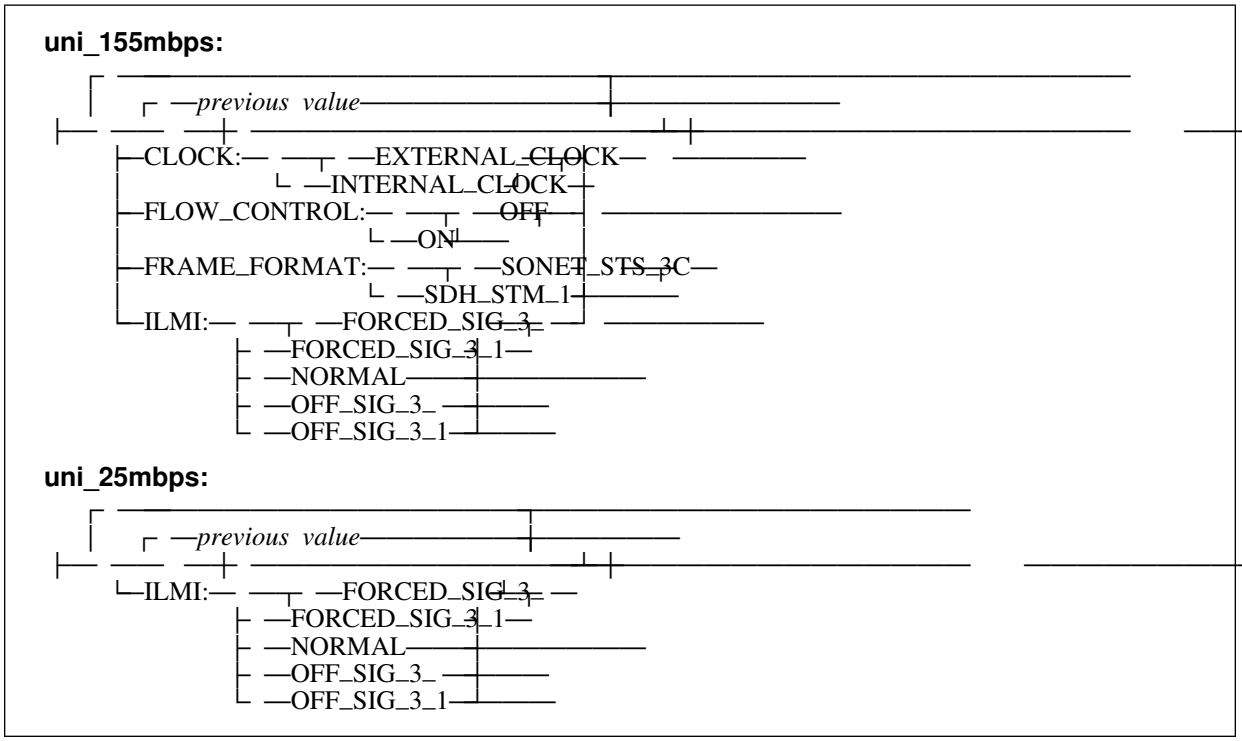
VPC/VCC 2/10 (VPC value comprised between 0 and 3; VCC value comprised between 0 & 1023)

2. The **SET PORT** command defined in the *ATM 25 Mbps Concentration module , Installation and User's guide (SA33-0383)* has an incorrect information concerning the setting of the 25 Mbps port. The 25 Mbps ports do no support the ILMI Flow control. The value is set to : **FLOW_CONTROL_DISABLED**.

3. Here is the summary of the SET port command :



SET PORT command (part 1 of 2)



SET PORT command (part 2 of 2)

8.8 New information for SWAP MICROCODE command

The **SWAP MICROCODE** command defined in the *IBM 8285 Nways ATM Workgroup Switch Command Reference guide (SA33-0381)* is erroneous, the example was showing that after the SWAP MICROCODE , the user was returning to the PROMPT , however this is not the case. Furthermore a new information field appears **Press Enter** informing you that the SWAP is over , and that you can login again by pressing the ENTER key.

```
ATMPROMPT>SWAP MICROCODE

You are about to change operational microcode version and reset the hub
The saved hub configuration may be lost...
Are you sure ? (Y/N) Y
Press Enter
```

Figure 5. SWAP MICROCODE

8.9 New option for the SET DEVICE command

1. The **SET DEVICE** command defined in the *IBM 8285 Nways ATM Workgroup Switch Command Reference guide (SA33-0381)* has a new option **MIGRATION** allowing the 8285 to check the FPGA level of all the blades in the 8285 expansion, and automatically perform during the ATM Firmware kit upgrade the SWAP for the blades that are not at the correct level after the next reset.

```
SET DEVICE MIGRATION: (ALLOWED | NOT_ALLOWED)
```

Figure 6. SET DEVICE MIGRATION

8.10 New result of the SHOW MODULE, SHOW PORT command

1. The **SHOW MODULE slot VERBOSE** command defined in the *IBM 8285 Nways ATM Workgroup Switch Command Reference guide (SA33-0381)* has a new information displayed. When the levels of the ATM blades and the 8285 modules are not compatible, the FPGA level displayed for an ATM blade is marked **"BAD LEVEL"**, for example :

```
OPERATIONAL FPGA VERSION : B5
BACKUP FPGA VERSION      : 8 (BAD LEVEL)
```

Figure 7. SHOW MODULE slot VERBOSE

2. The **SHOW MODULE slot VERBOSE** command defined in the *IBM 8285 Nways ATM Workgroup Switch Command Reference guide (SA33-0381)* has a new information displayed. When the level in backup for a A12-TP25 or for the 8285 can not be swappped, because of the limited swap of this blades and therefore must be downloaded once again on the blade, the 8285 displays for this blades **"none"** , for example :

```
OPERATIONAL FPGA VERSION : C3
BACKUP FPGA VERSION      : none
```

Figure 8. SET MODULE slot VERBOSE

3. The **SWAP FPGA_PICOCODE slot** command defined in the *IBM 8285 Nways ATM Workgroup Switch Command Reference guide (SA33-0381)* has a new return message. When the level in backup for a A12-TP25 or for the 8285 can not be swappped, because of the limited swap of this blades and therefore must be downloaded once again on the blade, the 8285 displays the following for this blades :

```
8285ATM> swap fpga_picocode 1
You are about to change operational FPGA version..
Are you sure ? (Y/N) Y
Processing slot 1 ... Swap rejected : swap count limit reached.
8285ATM>
```

Figure 9. SWAP FPGA_PICOCODE message

4. The **SHOW PORT slot.ALL VERBOSE** command defined in the *IBM 8285 Nways ATM Workgroup Switch Command Reference guide (SA33-0381)* has a new information displayed. When the levels of the ATM blade and the 8285 module are not compatible, the status displayed for this ATM blade is **"BAD FPGA LEVEL"**,for example :

```
2. 1 : SSI enabled BAD FPGA LEVEL
2. 2 : UNI enabled BAD FPGA LEVEL
2. 3 : UNI enabled BAD FPGA LEVEL
2. 4 : SSI enabled BAD FPGA LEVEL
```

Figure 10. SHOW PORT slot.ALL VERBOSE

5. The **SHOW PORT** command defined in the *IBM 8285 Nways ATM Workgroup Switch Command Reference guide (SA33-0381)* has a new information displayed regarding the VPI_VCI range.

```
8285ATM> show port 1.1 verbose


        Type    Mode          Status
-------------------------------------------------
2. 1: UNI enabled    UP-OKAY

Signalling Version      : with ILMI
Flow Control              : Off
VPI.VCI range             : 15.1 23 (4.1  bits)
Connector                 :  MIC
Media                      :  fiber
Port speed                : 1      kbps
Remote device is active
IX status                 : IX OK

8285ATM>
```

Figure 11. SHOW PORT VERBOSE command

8.11 New result of the SHOW DEVICE

1. In the result of the **SHOW DEVICE** command defined in the *IBM 8285 Nways ATM Workgroup Switch Command Reference guide (SA33-0381)* the following information have been added :

New ATM Control Point Information	
ATM Control Point Information	Description
Subnet Lan Emulation	Status of the Lan Emulation Token Ring subnetwork.
Name	Emulated Lan name
MAC address	MAC address of the ATM Control Point LEC in the LE subnetwork (configured with the SET DEVIVE LAN_EMULATION_CLIENT command).
IP address	IP address of the ATM Control Point LEC in the LE subnetwork (configured with the SET DEVIVE LAN_EMULATION_CLIENT command).
Subnet mask	Subnet mask used by the ATM Control Point in the LE subnetwork (configured with the SET DEVIVE LAN_EMULATION_CLIENT command).
ATM address	ATM address of the ATM Control Point LEC in the LE subnetwork.
Config LES address	LES ATM address defined via the SET DEVICE command
Actual LES address	Actual LES ATM address to which the ATM Control Point LEC is connected.
BUS ATM address	ATM address of the BUS to which the ATM Control Point LEC is connected. (assigned by the LES).

Figure 12. (Page 1 of 2) New ATM Control Point Information

New ATM Control Point Information	
ATM Control Point Information	Description
Config LECS address	LECS ATM address defined via the SET DEVICE command
Actual LECS address	Actual LECS ATM address which will be used to find the LES ATM address (see the SET DEVICE command defined in point 8.2 page 9)
LEC Identifier	Identifier of the Control Point LEC in its emulated LAN (assigned by the LES).
Maximum Transmission Unit	Maximum IP datagram size supported by the ATM Control Point LEC (computed by the LEC according to the maximum SDU size supported on its emulated LAN).

Figure 13. (Page 2 of 2) New ATM Control Point Information

Example : The information displayed in the previous pages appear in the result of the SHOW DEVICE command (see next page).

```
ATMxxx> show device
8285 ATM Control Point and Switch Module
Name : ATM_xxx
Location : IBM lab

For assistance contact :

Manufacture id: VIME
Part Number: xxxxxxx EC Level: xxxxxx
Boot EEPROM version: v.1.4.3
Flash EEPROM version: v.1.4.3
Flash EEPROM backup version: v.1.4.3
Last Restart : 13:5 :3  Wed  8 Oct 96 (Restart Count:   )

A-8285
------------------------------------------------------------------------
 ATM address: 39.99.99.99.99.99.99.  .  .88.88. 1.13.88.88.88.88.88.88.

 > Subnet atm: Up
 IP address: 9.1  .94.88. Subnet mask: FF.FF.FF.8

 > Subnet lan emulation ethernet/8 2.3
    UP
    Name  :"LANETH"
     MAC Address: 4 1122334455
     IP address : 9.1  .93.233. Subnet mask: ff.ff.ff.8
    ATM  address       :
            39.99.99.99.99.99.99.  .  .88.88.12.33.5 .  .  .  .94.61.
     Config LES addr:
            39.99.99.99.99.99.99.  .  .88.88. 6.33.6 .  .  .  .94.61. 2
     Actual LES addr:
            39.99.99.99.99.99.99.  .  .88.88. 6.33.6 .  .  .  .94.61. 2
     BUS ATM address:
              .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
     Config LECS add: none
     Actual LECS add:
              .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
     LEC Identifier: 2 . Maximum Transmission Unit: 1492
 > Subnet lan emulation token ring
    UP
    Name  :"LANTOKEN"
     MAC Address: 4 5544332211
     IP address : 9.1  .93.3. Subnet mask: ff.ff.ff.8
    ATM  address       :
            39.99.99.99.99.99.99.  .  .88.88.12.33.5 .  .  .  .94.61. 1
     Config LES addr:
            39.99.99.99.99.99.99.  .  .88.88. 6.33.6 .  .  .  .94.61. 3
     Actual LES addr:
            39.99.99.99.99.99.99.  .  .88.88. 6.33.6 .  .  .  .94.61. 3
     BUS ATM address:
              .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
     Config LECS add: none
     Actual LECS add:
              .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
     LEC Identifier: 34. Maximum Transmission Unit: 449
```

Figure 14. (Page 1 of 2) New ATM Control Point Information display

```
Default Gateway : OK
-------------------------------------------------------------------------
 IP address: 9.1  .94.68

ARP Server:
-------------------------------------------------------------------------
 ATM address: 39.99.99.99.99.99.99.  .  .88.88. 1. 2.5 .  .  .  .94.76.

Dynamic RAM size is 8M. Migration: off. Diagnostics: enabled.
```

Figure 15. (Page 2 of 2) New ATM Control Point Information display

8.12 New option for the SET PVC command

1. The **SET PVC** command defined in the *IBM 8285 Nways ATM Workgroup Switch Command Reference guide (SA33-0381)* has new options defined in order to support the PVC/PVP point-to-point and point-to-multipoint.

   a. New set of parameters

```
ATM8285> SET PVC local_slot.port pvc_id remote_slot.port

Possible completions:
        CHANNEL_POINT_TO_MULTI_POINT
        PATH_POINT_TO_MULTI_POINT
        CHANNEL_POINT_TO_POINT
        PATH_POINT_TO_POINT
```

Figure 16. SET PVC command

You can now define :

channel_point_to_multi_point : this parameter is for the PVC point to multipoint definition.

path_point_to_multi_point : this parameter is for the PVP point to multipoint definition.

channel_point_to_point : this parameter is for the PVC point to point definition.

path_point_to_point : this parameter is for the PVP point to point definition.

b. Set a PVC point to multipoint

The **SET PVC** command defined in the *IBM 8285 Nways ATM Workgroup Switch Command Reference guide (SA33-0381)* has new options defined in order to support the PVC point-to-multipoint. Using the following command , you can create the root for the multicast tree.

```
The syntax is :

set PVC local_slot.port pvc_id remote_slot.port remote_hub_number
          CHANNEL_POINT_TO_MULTI_POINT (local_vpi.vci or  )
          (remote_vpi.vci or  ) (best_effort or reserved_bandwidth)

for example :

ATM8285> set pvc 1.2 3 1.3 1  CHANNEL_POINT_TO_MULTI_POINT       best_effort
PVC set and started.
ATM8285>
```

Figure 17. SET PVC point-to-multi-point

c. Add a leaf on a PVC point to multipoint

The **SET** command defined in the *IBM 8285 Nways ATM Workgroup Switch Command Reference guide (SA33-0381)* has new options **PARTY_PVC** in order to add leaves to the PVC point-to-multipoint.

```
The syntax is :

set PARTY_PVC local_slot.port pvc_id party_id remote_slot.port
                  remote_hub_number (remote_vpi.vci or  )


For example :

ATM8285> set party_pvc 1.2 3 1 1.4 1
PVC set and started.
ATM8285>
```

Figure 18. SET PARTY_PVC for PVC point to multipoint

d. Display a PVC point to multipoint

The **SHOW PVC** command defined in the *IBM 8285 Nways ATM Workgroup Switch Command Reference guide (SA33-0381)* has new information displayed concerning the PVC point to multi-point.

```
ATM8285> show PVC all

        Local end point          ! Remote end point          !
-------------------------+-----------------------+
Port   id    type    Vpi/Vci  !  Port  Vpi/Vci  HNb  Party!    role   !QOS!  Status
-------------------------+-----------------------+---------+---+-------
1. 2       3 PTM-PVC    /54     ! 1. 3      /21    1          ! Primary ! BE!Active
                                 !  1. 4     /32    1     1    !  Primary  !  BE!Active
1. 4 1  1 PTM-PVC    /32     ! 1. 2      /54     1      1    !Secondary! BE!Active
1. 3 1  1 PTM-PVC    /21     ! 1. 2      /54     1          !Secondary! BE!Active

ATM8285>
```

Figure 19. SHOW PVC ALL for PVC point to multipoint

e. Set a PVP point to multipoint

The **SET PVC** command defined in the *IBM 8285 Nways ATM Workgroup Switch Command Reference guide (SA33-0381)* has new options defined in order to support the PVP point-to-multipoint. Using the following command , you can create the root for the multicast tree.

```
The syntax is :

set PVC local_slot.port pvc_id remote_slot.port remote_hub_number
            PATH_POINT_TO_MULTI_POINT (local_vpi or  )
            (remote_vpi or  ) (best_effort or reserved_bandwidth)

for example :

ATM8285> set pvc 1.4 1 1.5 1  PATH_POINT_TO_MULTI_POINT 1 1 best_effort
PVC set and started.
ATM8285>
```

Figure 20. SET PVP point-to-multi-point

f. Add a leaf on a PVP point to multipoint

The **SET** command defined in the *IBM 8285 Nways ATM Workgroup Switch Command Reference guide (SA33-0381)* has new options **PARTY_PVC** in order to add leaves to the PVP point-to-multipoint.

```
The syntax is :

set PARTY_PVC local_slot.port pvc_id party_id remote_slot.port
                    remote_hub_number (remote_vpi or  )


For example :

ATM8285> set party_pvc 1.4 1 1 1.6 1  2
PVC set and started.
ATM8285>
```

Figure 21. SET PARTY_PVC for PVP point to multipoint

g. Display a PVP point to multipoint

The **SHOW PVC** command defined in the *IBM 8285 Nways ATM Workgroup Switch Command Reference guide (SA33-0381)* has new information displayed concerning the PVP point to multipoint.

```
ATM8285> show pvc all

        Local end point          ! Remote end point          !
-------------------------+----------------------+
Port   id    type    Vpi/Vci  !  Port  Vpi/Vci  HNb  Party!    role   !QOS!  Status
-------------------------+----------------------+---------+---+-------
1. 4       1  PTM-PVP    1/     !  1. 5    1/       1         !  Primary  !  BE!Active
                                    ! 1. 6    2/       1       1    ! Primary ! BE!Active
1. 5 1  1 PTM-PVP     1/      ! 1. 4     1/       1          !Secondary! BE!Active
1. 6 1  1 PTM-PVP     2/      ! 1. 4     1/       1       1   !Secondary! BE!Active
ATM8285>
```

Figure 22. SHOW PVC ALL for PVP point to multipoint

h. Clear a PARTY PVC

The **CLEAR** command defined in the *IBM 8285 Nways ATM Workgroup Switch Command Reference guide (SA33-0381)* has new parameter **PARTY** concerning the point to multipoint PVC and PVP.

```
CLEAR PARTY slot.port pvc_id party_id
```

Figure 23. CLEAR PARTY PVC/PVP point to multipoint

i. SHOW PVC VERBOSE

You can issue the **SHOW PVC VERBOSE** command in order to get further information concerning a **failing** point to multipoint PVC/PVP.

```
ATM8285> show pvc all verbose

        Local end point          !      Remote end point        !
-------------------------+-----------------------+
Port    id     type     Vpi/Vci!  Port  Vpi/Vci  HNb  Party!    role  !QOS!  Status
-------------------------+-----------------------+-------+---+---------
2. 1      13 PTM-PVC      2/34 ! 2. 3      2/36      12      2    !Primary! BE!Not Ready
Remote address : 39.99.99.99.99.99.99.  .  .88.88.12.12
Quality of Service : Best Effort.
Last Active Date : 11:53:18 19 Sep 96 (  failures)
Status Cause : PVC failure.
   Q93B Cause : 47 ( x2F).

ATM8285>
```

Figure 24. SHOW PVC VERBOSE

8.13 Twisted-pair figure (IBM 8285 Installation and User's guide)

The figure showing the Twisted-pair cable pinout (Figure 39 of IBM 8285 Installation and User's guide (SA33-0381-01), and Figure 24 of the previous IBM 8285 Installation and User's guide (SA33-0381-00)) is **wrong**.

The wires connecting pins 1-1 and 2-2 should be *twisted together*, because they are differential signals. The wires connecting pins 7-7 and 8-8 should be *twisted together* as well, for the same reason.

8.14 ATM Addressing

The first edition (SA33-0381-00) and second edition (SA33-0381-01) of the IBM 8285 Installation and User's guide are saying (in pages 38 and 31 respectively) that the ATM Cluster Number (ACN) and Hub Number (HN) can have the range [0-255].
On the IBM 8285, you cannot use the value 0 : the range is limited to [1-255] for both ACN and HN.

8.15 NNI connections between two ATM Switches

The first edition (SA33-0381-00) and second edition (SA33-0381-01) of the IBM 8285 Installation and User's guide are stating a limitation on the number of NNI connections between two ATM switches (page 39 and page 32 respectively); it says : *"you can define only one NNI connection between two ATM switches"*.

This is wrong : you can define several NNI connections in parallel between two ATM switches.

8.16 NNI Configuration example

The previous IBM 8285 Installation and User's guide (SA33-0381-00) is showing an example on how to configure your switches in an NNI configuration (page 43, Chapter 4 : "ATM Addressing in the ATM Workgroup Switch").

That example is containing erroneous information; the errors have been *fixed in the new version* of the IBM 8285 Installation and User's guide **(SA33-0381-01)**.

9.0 Warnings

1. The LAN-Emulation Servers integrated in your IBM 8285 **now check** the ELAN Name registered by all LAN-Emulation Clients (LECs), and reject all clients which provide a non-empty name different from the LES ELAN Name.

   As a result, you have to make sure that all your LECs are either using the same ELAN name as the integrated LES, or are not configured with any ELAN name.

2. Your IBM 8285 Nways ATM Workgroup Switch does not do policing on the ATM connections. Therefore, if some devices do not comply to their bandwidth contract, the performance of the Reserved-Bandwidth service, and even of the entire switch, will be impacted.

   If you are using PVCs and if you think the traffic will reach the limits of the ports or of the box or module, we recommend that you define these PVCs as *reserved_bandwidth*.

3. After an unplug or a power-off of a station, re-plugging the station to the port may be unsufficient: the port may become "NOT-IN-SERVICE".

   To recover from that situation, it may be necessary to disable and re-enable that port.

4. If you change the ATM address of a IBM 8285 being attached to other switches through SSI links, the other switches will not notice that change unless you disable the SSI links for at least 15 seconds, before the ATM address change.

5. If you reset the IBM 8285 (during an ATM address change, or a microcode swap, for example), the modules plugged in the Expansion Unit may disappear from the list of connected modules (SHOW MODULE ALL). In that case, the command SHOW MODULE ALL VERBOSE shows them as "*connection pending*".

   To connect these modules back to the switch, you need to isolate them and re-connect them, using these commands :

   - SET MODULE slot ISOLATED
   - SET MODULE slot CONNECTED

6. Your IBM 8285 Nways ATM Workgroup Switch privileges traffic against maintenance tasks. The Download service being at a lower priority, this service may take time when you have some traffic through your IBM 8285 : it may take up to 45 minutes (rarely, in certain cases, when there is traffic through the IBM 8285).

   We recommend that you stop the traffic before performing a Download.

7. The wiring of the 25 Mbps twisted-pair cables has been newly defined by the ATM-Forum. Your IBM 8285 Nways ATM Workgroup Switch complies to this new standard. If you bought IBM Turboways 25 adapters in the past, their wiring is probably not conforming to this new standard: your IBM 8285 will show the port as "NO ACTIVITY".

   In such a case, you may build your own converter, using the wiring description in the IBM 8285 Installation and User's guide (SA33-0381-01) (page 189 : "Connecting to 25.6 Mbps ports"), or you may order the converter to IBM : P/N 10H3904 .

8. **In Ethernet LAN-Emulation**, the IBM product "TCP/IP for DOS", if installed over the IBM Turboways 25 adapter driver on a PC, will configure the Ethernet protocol as Ethernet v2, whereas the 8285 configures the Ethernet protocol as 802.3 by default.

As a result, *you may be in the situation where you cannot ping the 8285 from a DOS TCP/IP station, using the default parameters*.

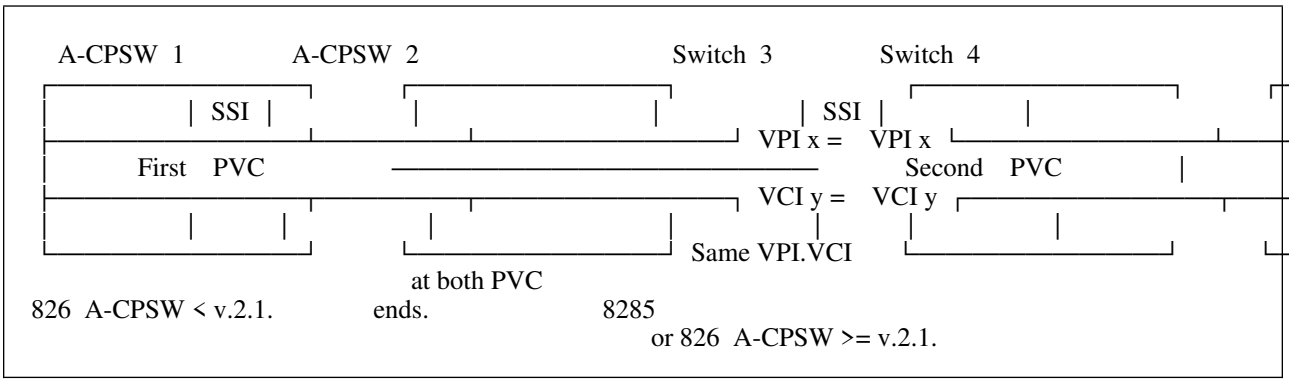
In such a case, you need to configure the DOS TCP/IP driver as using the **802.3** layer. With IBM TCP/IP for DOS, use the configurator 'CUSTOM.EXE' to do so.

Another possibility is to define the LAN-Emulation Client of your 8285 as 'DIX' instead of 802.3 .

9. **Make sure the Expansion cable is securely plugged** into the Base Unit and the Expansion Unit : if that cable is badly plugged, after a Reset, the Base Unit may enter the Maintenance mode, with the code >>0035>> .
10. The Permanent Virtual Circuit (PVC) "smart" management is not compatible with versions of IBM 8260 A-CPSW Module anterior to v.2.1.0.

    Note: This applies to **PVCs only**. The SVCs (Switched Virtual circuits) are **totally compatible** with all versions of IBM 8260 A-CPSW Module .

    Nevertheless, you can bypass this incompatibility by splitting the PVC into two sub-PVCs : one being defined among IBM 8260 A-CPSW Modules anterior to v.2.1.0, and one being defined among IBM 8260 A-CPSW Modules v.2.1.0. and IBM 8285 Nways ATM Workgroup Switches, like this :



Just make sure that both PVCs are joined by a fiber or cable, and that they end by the same VPI:VCI at the corresponding ports.

11. If you swap the microcode back to v.1.0.0, v.1.0.1 or v.1.2.0 you will lose your 8285 configuration.
12. You must define **the same VPI/VCI range on both sides of a SSI or NNI link.**
13. **WARNING :**

    The file resulting from an UPLOAD of CONFIGURATION on a TFTP server, should only be DOWN-LOADED on a 8285 with the same level of operational code. Otherwise, you might encounter strange behaviours on the 8285.

10.0 General Information

10.1 Connecting and Powering up the Expansion Unit

- The 8285 Expansion Unit should be connected to the same Power source (**same phase**) as the 8285 Base Unit, in order to be more robust against power defects.
- When you will connect the Expansion Unit to the Base Unit (by using the Expansion cable while the Expansion Unit is powered, or by powering up the Expansion Unit while the cable is connected), the Base Unit will reset automatically.
- If you disconnect the Expansion Unit from the Base Unit (by unplugging the Expansion cable while the Expansion Unit is powered on, or by powering off the Expansion Unit while the cable is connected), the Base Unit will reset automatically.
- Make sure the Expansion cable is securely plugged into the Base Unit and the Expansion Unit.

  If that cable is badly plugged, the Base Unit may enter the Maintenance mode, with the code >>0035>> .
- If the Base Unit does not recognize the Expansion Unit, or if you notice strange behaviours, check that the Expansion-connector of the Base Unit is operational, using the Wrap-plug shipped with the Expansion Unit.
  Once the wrap-plug is connected to the Base Unit, reset the Base Unit. It should switch to the Maintenance Mode, with no error code (prompt >>). If the prompt is showing an error-code (>>0035>> for example), call your IBM representative.
  The information on the wrap-plug is provided at page 194 of the IBM 8285 Installation and User's guide (SA33-0381-01). The wrap-plug can be ordered to IBM with the Part Number 58G9869.

10.2 Usage Notes

- If any TRACE options are ON, the system performance will be impacted.
- You can manage the IBM 8285 Nways ATM Workgroup Switch with the IBM Nways Campus Manager products, providing graphical interfaces and value-added functions, and listed below :
  - Nways Campus Manager ATM for AIX Version 1
  - Nways Campus Manager ATM for HP-OV version 1
  - Nways Campus Manager for Windows (**) Version 1

  The above Network Management support is provided by the means of a PTF (Program Temporary Fix) as follows:
  - Nways Campus Manager ATM for AIX, version 1.1.2
  - Nways Campus Manager for Windows (**), version 1.1
- The Network Management station should NOT poll the IBM 8285 more often than every 10 seconds. If this rule is not followed, the Switch performance may be impacted.
- If you decide to configure the LAN-Emulation Server using SNMP MIBs, you have to follow these rules :

1. Configure all the LES parameters in the ATM-Forum MIB Table *lesConfTable*, except the variable *lesAdminStatus*
2. Set the number of LES clients using the variable *lesMaxNumberOfClients* of the IBM private MIB.
3. Start the LES by setting the variable *lesAdminStatus* (ATM-Forum MIB) to 'up'.
4. Every time you need to start again the LES, you need to specify the variable *lesMaxNumberOfClients* of the IBM private MIB before setting the variable *lesAdminStatus* to 'up' in the ATM-Forum MIB.

- Because the IBM 8285 Nways ATM Workgroup Switch is giving higher priority to traffic performance, some Maintenance services like the Microcode Download may be affected by a high LAN-emulation and Broadcast traffic.

  We recommend that you stop the traffic before attempting a Download.

- Before you remove an ATM media module from a 8285 hub, first isolate the module by entering the command "SET MODULE slot ISOLATED". **Warning:** If you remove the module without entering this command, you may reset the ATM subsystem.

- If the LAN-Emulation Client has stopped with the cause 0x02, it will not try to connect to the LES again : you will have to start it using the SET DEVICE LAN_EMULATION_CLIENT TR/ETH command.

10.3 Equipment

The following equipment operating requirements apply to the IBM 8285 :

- To connect an ASCII terminal to the console port of a IBM 8285, use the cable and adaptors shipped with the 8285 switch :

  RS-232 cable DB9/DB25 Part numbers 59G0278 or 6323741
  Gender changer interposer Part number 58G4422
  Null Modem Part number 58F2861

  If you decide to build your own cable, be sure to follow the instructions in Appendix B of *IBM 8285 Installation and User's guide (SA33-0381-01)*.

- In order to run the WRAP EXTERNAL command, you must use the correct wrap device: the IBM wrap plug shipped with the product, Part number 42H0540. The WRAP EXTERNAL command lets you diagnose hardware problems on the 25 Mbps ports.

- The wiring of the 25 Mbps ports of your IBM 8285 is ATM-Forum compliant; as a result, old twisted-pair cables (Ethernet, Token-Ring) need a converter/interposer to connect to your IBM 8285.

  This converter is shipped with the IBM Turboways 25 ATM adapters having a green label.

  25 Mbps converter/interposer Part number 10H3904

  If you decide to build your own cable, be sure to follow the instructions in Appendix B of the *IBM 8285 Installation and User's guide (SA33-0381-01)*.

- The Expansion Wrap-plug should be used only in the case when the Base Unit does not recognize the Expansion Unit.
  First, check that the cable connecting Expansion and Base is securely plugged. Then, replace the cable by the wrap-plug, and reset the Base Unit; it should switch to the Maintenance Mode, with no

error code (prompt >>). If the prompt is showing an error-code (>>0035>> for example), call your IBM representative.
The information on the wrap-plug is provided at page 194 of the IBM 8285 Installation and User's guide (SA33-0381-01).

Expansion Connector Wrap Plug Part number 58G9869

10.4 8285 Specifications

This section lists the 8285 specifications, in terms of number of connections, and LAN-Emulation Configuration Server support.

10.4.1 Maximum Number of Connections

The following maximum number of connections apply to Switched Virtual Circuits (SVC) and Permanent Virtual Circuits (PVC).

Maximum number of connections per switch

The maximum number of connections depends on their type, Point-to-Point (PtP) or Point-to-Multipoint (PtM), and for PtM connections on the number of branches per connection. The following rules apply:

- The switch has 4096 control blocks
- 2 control blocks are required per PtP connection (up to 2048 PtP connections)
- 1 control block is required per branch of a PtM connection
- The switch has 2048 party control blocks (2 party control blocks are required per party)
- The maximum number of parties over point-to-multipoint connections is 1024.
- The maximum number of point-to-multipoint is 127.
- The maximum number of PVC,PVP and PARTY that can be defined and saved per switch is 100. PVC definitions are stored in non-volatile RAM for automatic restart

Maximum number of connections per port

The maximum number of PtP plus PtM connections is 2048

Maximum number of connections per Base Unit, and per ATM module

The maximum number of PtP plus PtM connections on each module (Base Unit included) is 2048

Maximum number of VPIs per port

Up to 4 VPIs (0-3) can be used on each 25 Mbps port.

Up to 16 VPIs (0-15) can be used on the 100 and 155 Mbps ports.

10.4.2 LAN-Emulation Server (LES) and Broadcast Unknown Server (BUS)

- Maximum number of Clients in the LAN-Emulation Server

  The integrated LAN-Emulation Server can accept up to 128 client registrations. The sum of the clients of both LESs cannot exceed 128 clients.

- Multicast trees used by the LAN-Emulation Server

Each LAN-Emulation Server is using one Control-Distribute Vcc for the non-proxy LECs, and one Control-Distribute Vcc for the proxy LECs.

- Multicast trees used by the Broadcast Unknown Server

  Each Broadcast Unknown Server is using one Multicast-Forward Vcc for all LECs (non-proxy and proxy LECs).

- The LAN-Emulation Servers integrated in your IBM 8285 now check the ELAN Name registered by all LAN-Emulation Clients (LECs), and reject all clients which provide a non-empty name different from the LES ELAN Name.

  As a result, you have to make sure that all your LECs are either using the same ELAN name as the integrated LES, or are not configured with any ELAN name.

10.4.3 IP Over ATM (RFC 1577)

The IBM 8285 provides in-band management with an IP-over-ATM interface for SNMP, Telnet, TFTP, and Ping. For that purpose the actual supported MTU size is 944 bytes.

The IP over ATM client imbedded in the IBM 8285 supports up to 64 concurrent IP over ATM connections.

10.4.4 LAN Emulation Client (LEC)

- The IBM 8285 provides also in-band management with both an Ethernet LAN-Emulation Client (Ethernet/802.3 or Ethernet v2/DIX) and a Token-Ring LAN-Emulation Client (802.5).

  Both LAN-Emulation Clients can run **concurrently**.

- Each LEC supports up to 30 connections to other LAN-Emulation Clients.

- The management functions (SNMP, Telnet, TFTP, and PING) are using the IP layer over the emulated LAN layer.

  The maximum length of PING and TELNET messages depends on the maximum SDU size supported on the corresponding emulated LAN. The Table 1 on page 32 lists the correspondence (in bytes) :

Table 1. Maximum PING and TELNET lengths.

Maximum SDU	Maximum Length PING - 802.3 LEC	Maximum Length PING - DIX LEC	Maximum Length PING - 802.5 LEC
1516	1492	1500	1462
4544	4520	4528	4490
9234	9210	9218	9180
18190	18166	18176	18136

10.5 Networking Rules

This section lists the IBM 8285 rules to follow, in order to build and validate your network.

10.5.1 User to Network Interface (UNI)

ILMI is not required for ATM connection through PVC.

The maximum number of ILMI registered addresses per switch is 512.

The connection identifiers (VPI:VCI) for SVCs are selected with a VPI value equal to 0.

Both PVCs and SVCs can be defined on the same physical port

Permanent virtual path (VP) connections and permanent virtual channel (VC) connections are supported. VP identifiers (VPI) are in the range 0-3 for 25 Mbps ports and 0-15 for the 100 and 155 Mbps ports, and VC identifiers (VCI) are in the range 32-1023.

The Well-Known PVC (ATM-Forum LAN-Emulation) 0:17 is supported.

It can be defined using the "SET PVC ...." command, or using the Nways Campus Manager ATM for AIX version 1.1.2 .

10.5.2 ATM Addressing

The ATM Cluster Number (ACN, 12th byte) and Hub Number (HN, 13th byte) have to be in the range [1-255], **not** in the range [0-255] as stated in the IBM 8285 Installation and User's guide. This limitation is due to the SSI Topology management (TRS).

10.5.3 ATM connections Inside a Cluster (SSI)

An ATM cluster is a group of ATM IBM Switches interconnected by switch to switch interfaces (SSI). The SSI supports networking functions such as routing, node failure and recovery, backup and topology management.

When configuring SSI ports on the IBM 8285, please consider the following:

- The bandwidth you specify, or which is taken by default, must be identical at both ends of the SSI link.
- The bandwidth budget of the aggregated SSI ports defined in each module (including the Base Unit) must not exceed 212 Mbps.

  Note: The total *Reserved Bandwidth* of the 8285 box (example : class-A PVCs, NNI ports) cannot exceed 180 Mbps.

Parallel SSI links between switches are supported for high availability and (or) throughput increase.

Configuration recommendations for optimal performance:

- Up to 25 switches per cluster
- Up to 5 hops (call set up and cell transit time are proportional to the number of hops)

10.5.4 ATM connections Between Clusters (NNI)

Network to network interface (NNI) defines the interface between two 8285 belonging to different ATM clusters in the same subnetwork or in different subnetworks.

NNI links are supported both over physical links and Virtual Path connections (VP tunneling)

Parallel NNI links can be enabled between two clusters.

The following limitations apply when configuring NNI ports:

- 4 logical links per NNI 25 Mbps port or 16 logical links for the 100 and 155 Mbps ports, with a VPI in the range 0-3 and 0-15 respectively.
- The total bandwidth reserved for NNI links is limited to 21.2 Mbps per 25 Mbps port, 85 Mbps per 100 Mbps port, and 131 Mbps per 155 Mbps port.
  Notes :
  1. The total Reserved Bandwidth (class-A PVC and NNI ports, for example) for each module (and also for the Base Unit) cannot exceed 180 Mbps.
- PVCs cannot cross NNI links, according to the ATM Forum. If you want a PVC to go through an NNI link, you have to define two PVCs, each one ending at the NNI port, and both having the same VPI/VCI values on these NNI ports.
- Multicast Vccs are also supported on NNI links, with VPI values varying from 0 to 3 (25 Mbps ports) or 0 to 15 (100 and 155 Mbps ports).
- The maximum number of static route to ATM Cluster Number (ACN) associations is 50.
- You are **not limited** to only one NNI connection between two ATM switches (this overrides the statements of the IBM 8285 Installation and User's guide (SA33-0381-00) : page 39, and of the IBM 8285 Installation and User's guide (SA33-0381-01) : page 32).

  Indeed, you can define parallel NNI connections between two ATM Switches.

Due to the lack of dynamic routing on NNI links, it was mandatory that you designed networks where all the clusters were adjacent, if they were belonging to the same subnetwork. However, this release of code allows you to design networks where all the clusters are not adjacent by introducing the static route definition at the Cluster level.

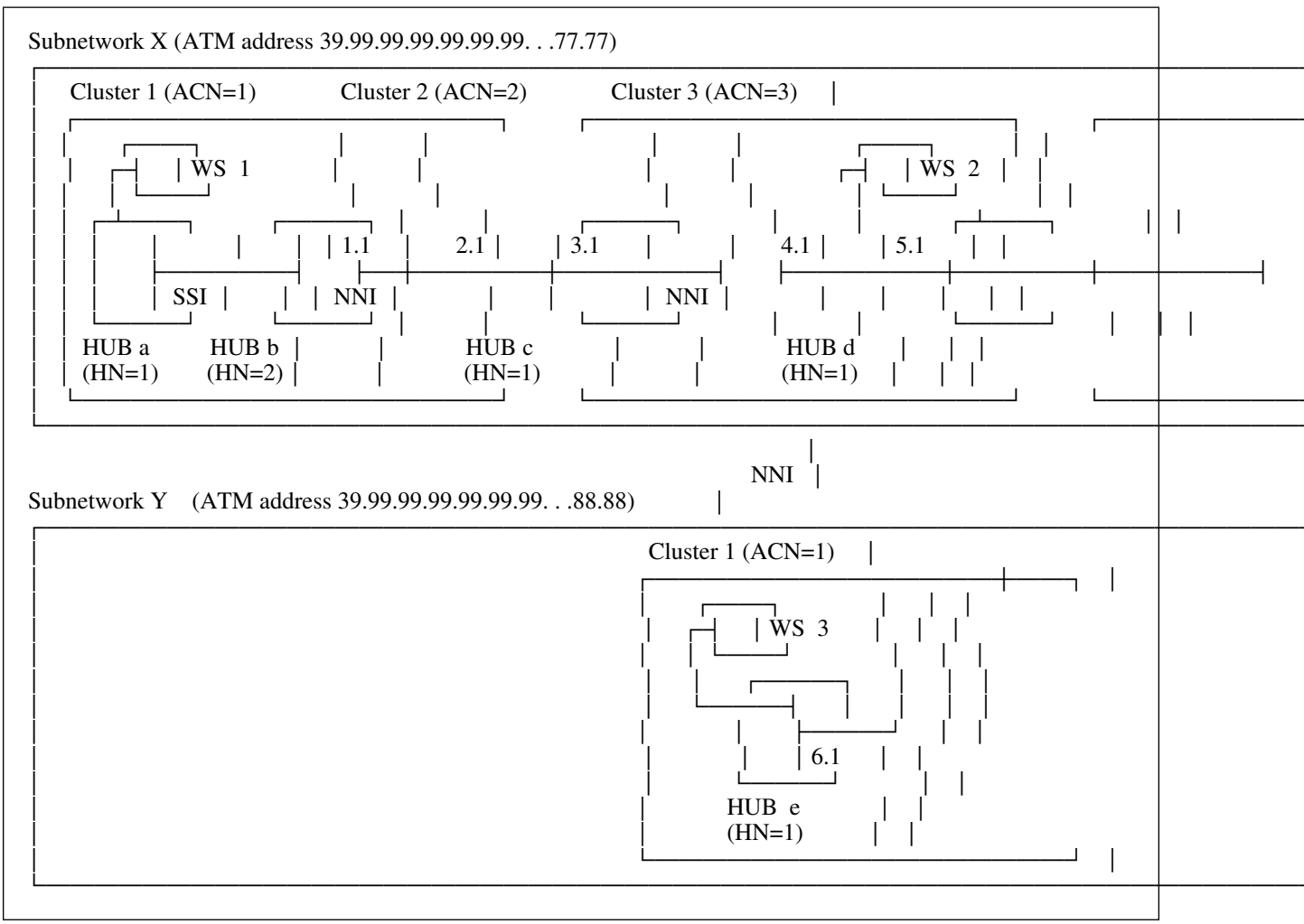


Figure 25. Using Static Routes and Logical Links

Examples :

1. **for WS 1 to communicate with WS 2 (inside same Subnetwork)**

   WS 1 is in Cluster 1 and WS 2 is in Cluster 3, those 2 clusters are not adjacent.

   - "HUB a" and "HUB b" are in the same Cluster 1. You must enter on the border node "HUB b" , the LOGICAL_LINK with Real ACN for Cluster 2.
     - SET LOGICAL_LINK (port) 1.1 (vpi) 1 (acn) 2 (bandwidth) 20000 (role) NETWORK
   - From "HUB a" and "HUB b", you must enter the STATIC_ROUTE with the Real ACN for Cluster 2 and the first 12 bytes of the ATM address of "HUB d" which is in Cluster 3.
     In brief, that means : "in order to reach Cluster 3 (ACN=3), go through Cluster 2".
     - SET STATIC_ROUTE (static route) 399999999999990000777703 (acn) 2
   - On "HUB c" which is a border node , you must enter the LOGICAL_LINK with the real ACN for Cluster 1 and the LOGICAL_LINK with the real ACN for Cluster 3.
     - SET LOGICAL_LINK (port) 2.1 (vpi) 1 (acn) 1 (bandwidth) 20000 (role) USER

    - SET LOGICAL_LINK (port) 3.1 (vpi) 2 (acn) 3 (bandwidth) 20000 (role) NETWORK

- On "HUB d" which is a border node, you must enter the LOGICAL_LINK with the Real ACN for cluster 2, as well as the STATIC_ROUTE with the Real ACN for Cluster 2 and the first 12 bytes of the ATM address of "HUB a" which is in Cluster 1.
    - SET LOGICAL_LINK (port) 4.1 (vpi) 2 (acn) 2 (bandwidth) 20000 (role) USER
    - SET STATIC_ROUTE (static route) 399999999999990000777701 (acn) 2

2. **for WS 1 to communicate with WS 3 (inside two different Subnetworks)**

   WS 1 is in Cluster 1 , Subnetwork X and WS 3 is in Cluster 1, Subnetwork Y (Y different from X).

   - "HUB e" is the Gateway node to go to Subnetwork X; you must enter the SET LOGICAL_LINK with a **Fictitious** ACN for Subnetwork X, as well as the STATIC_ROUTE with the Fictitious ACN for Subnetwork X and the first 11 bytes corresponding to the Subnetwork X ATM address.
       - SET LOGICAL_LINK (port) 6.1 (vpi) 1 (acn) 33 (bandwidth) 20000 (role) USER
       - SET STATIC_ROUTE (static route) 399999999999900007777 (acn) 33
   - "HUB d" is the Gateway node to go to Subnetwork Y; you must enter the SET LOGICAL_LINK with a Fictitious ACN for Subnetwork Y, as well as the STATIC_ROUTE with the Fictitious ACN for Subnetwork Y and the first 11 bytes corresponding to the Subnetwork Y ATM address.
       - SET LOGICAL_LINK (port) 5.1 (vpi) 1 (acn) 22 (bandwidth) 20000 (role) NETWORK
       - SET STATIC_ROUTE (static route) 399999999999900008888 (acn) 22
   - "HUB c" is in Subnetwork X; you must enter the STATIC_ROUTE with the Real ACN for Cluster 3 and the first 11 bytes of the Subnetwork Y ATM address.
       - SET STATIC_ROUTE (static route) 399999999999900008888 (acn) 3
   - "HUB a" and "Hub b" are in Subnetwork X; you must enter **on all hubs of the cluster** the STATIC_ROUTE with the Real ACN for Cluster 2 and the first 11 bytes of the Subnetwork Y ATM address.
       - SET STATIC_ROUTE (static route) 399999999999900008888 (acn) 2

Appendix A. Summary of functions integrated in previous versions

In 8285 operational microcode version v.1.2.0:

- Support of 8285 NWAYS Expansion Unit
- Support of NWAYS 8260 25 Mbps 12-Port Module in Expansion Unit
- Support of NWAYS 8260 155 Mbps 2-Port Module in Expansion Unit
- Support of NWAYS 8260 ATM WAN Module in Expansion Unit
- Support of NWAYS 8260 ATM/LAN Bridg Module in Expansion Unit
- Support of MIB version 1.5
- LAN Emulation Client (LEC) Token Ring 802.5

Appendix B. New Maintenance codes

Due to the installation migration process for the ATM FIRMWARE kit upgrade, you might encouter the following maintenance codes :

>>0050>> No FPGA picocode level (active or backup) in the 8285 matches the active microcode level, and the backup microcode of the 8285 is either unavailable or identical to the active one.

>>0051>> The SWAP of the 8285 FPGA picocode terminated in error.

NOTICE

The two maintenance codes above will not appear once the migration parameter is off. In order to do so , you must issue the **SET DEVICE MIGRATION: NOT_ALLOWED** command followed by a **SAVE DEVICE** command.

End of Document

DSMLBR529E 'KP' WOULD EXCEED MAXIMUM SIZE.
DSMMOM395I '.EDFEFIG' LINE 220: .kp off
DSMMOM397I '.EDFEFIG' WAS IMBEDDED AT LINE 842 OF 'DSMT0002'
DSMMOM397I 'DSMT0002' WAS IMBEDDED AT LINE 30 OF 'RELU152'
DSMBEG323I STARTING PASS 2 OF 2.
+++EDF248W Page check: document requires more passes or extended cross-reference to resolve corre
ctly. (Page 4 File: 8285R152 RNMODEL)
DSMMOM397I '.EDFPGCK' WAS IMBEDDED AT LINE 320 OF '.EDFHEAD1'
DSMMOM397I '.EDFHEAD1' WAS IMBEDDED AT LINE 75 OF 'DSMT0002'
DSMMOM397I 'DSMT0002' WAS IMBEDDED AT LINE 30 OF 'RELU152'
DSMLBR529E 'KP' WOULD EXCEED MAXIMUM SIZE.
DSMMOM395I '.EDFEFIG' LINE 220: .kp off
DSMMOM397I '.EDFEFIG' WAS IMBEDDED AT LINE 842 OF 'DSMT0002'
DSMMOM397I 'DSMT0002' WAS IMBEDDED AT LINE 30 OF 'RELU152'