IBM Release Note

# IBM 8260 Nways Multiprotocol Switching Hub

# Release Note

# for

# A-CPSW Module (FC 5000+MES5001 or FC 5100)
# FPGA level C31, C30, B50
# Operational Microcode Version v.2.5.2
# Boot Microcode Version v.2.5.2
# MES 5099
# (File RLSE252M)



© Copyright IBM Corp. 1997

# 1.0 Contents

**2.0 Warning to Customers** . . . 3

**3.0 Trademarks and Service Marks** . . . 4

**4.0 References** . . . 4

**5.0 Upgrade Information** . . . 5
5.1 Installing the A-CPSW Upgrade Field BM . . . 5

**6.0 Corrected, New and Enhanced functions** . . . 6
6.1 LEC Configuration through LECS . . . 6
6.2 Support for the new firmware for the ATM media modules . . . 6
6.3 A3-MB155 module . . . 7
6.4 PVC multipoint . . . 7
6.5 MIB 1.7 . . . 8
6.6 A3-MB155 module . . . 8
6.7 CP/SW reset . . . 8
6.8 8271-8272 modules . . . 8
6.9 FIBERCOM I/O card . . . 9

**7.0 Known Problems** . . . 10

**8.0 Documentation Update** . . . 11

**9.0 Configuring LAN Emulation Parameters** . . . 24
9.1 Procedure : . . . 24
9.2 Choosing your operating mode . . . 25
9.3 Setting Up LAN Emulation Servers . . . 26
9.3.1 Starting a LES . . . 26
9.3.2 Display status of the LESs . . . 27
9.3.3 Stopping a LES . . . 27
9.3.4 Displaying the LECs Connected to the LES . . . 28
9.4 Setting Up a LAN Emulation Client . . . 29
9.5 Setting the LECS ATM Address . . . 31
9.5.1 ILMI MIB . . . 31
9.5.2 LECS Well Known Address . . . 31
9.5.3 Fixed PVC (0,17) . . . 32
9.5.4 Checking the LECS Configuration . . . 32

**10.0 General Information** . . . 33
10.1 Usage Notes . . . 33
10.2 Operating Requirements . . . 33
10.3 PVC Management . . . 33
10.4 Networking Rules . . . 34
10.4.1 Maximum Number of Connections . . . 34

10.4.2 User to Network Interface (UNI) . . . . . 34
10.4.3 ATM Cluster Intraconnection . . . . . 35
10.4.4 ATM Cluster Interconnection . . . . . 35
10.4.5 IP Over ATM (RFC 1577) . . . . . 36
10.4.6 ATM Forum Compliant Lan Emulation Client (LEC) . . . . . 36
10.4.7 ATM Forum Compliant LES/BUS . . . . . 36

**Appendix A. Summary of functions integrated in previous versions** . . . . . 37

**Appendix B. New Maintenance codes** . . . . . 40

# 2.0 Warning to Customers

**DUE TO NEW FUNCTIONS INTEGRATED in this release, the A-CPSW operational microcode v.2.5.2 and its corequisite boot microcode v.2.5.2, imply the following:**

**Corequisites:**

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

**Prerequisites:**

**The DMM subset function that allows Chassis monitoring from the ATM Switch/Control point module will run ONLY with the operational code level of the 8260 Redundant Controller Module (FC 8000) at level 1.10 or higher**

**Warning:**

**New functions such as the Chassis monitoring and the Switch Redundancy run only on the new A-CPSW module (FC 5100). In the case of Redundant Switch upgrade, be careful to have both Control Point/Switch modules at the same upgraded level , otherwise NO MIRRORING of the configuration will occur.**

**Incompatibility:**

**The Permanent Virtual Circuit (PVC) management involving several Switches is not compatible with releases of A-CPSW modules before v.2.1.0 (see PVC management below).**

# 3.0 Trademarks and Service Marks

The following terms, denoted by an asterisk (*) in this Release Note, are trademarks or service marks of the IBM Corporation in the United States or other countries.

| | |
|---|---|
| IBM | AIX |
| Nways | OS/2 |

The following terms, indicated by an double asterisk (**) in this Release Note, are trademarks of other companies:

Windows (TM) is a registered trademark of Microsoft Corporation

ChameleonNFS (TM) is a trademark of NetManage (TM) Inc.

# 4.0 References

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

*ATM Control Point and Switch Module Installation and User's guide (SA33-0326)*.

*ATM Control Point and Switch Module Command Reference guide (SA33-0385)*.

They both have useful sections on either Troubleshooting or description of error codes for specific functions.

# 5.0 Upgrade Information

## 5.1 Installing the A-CPSW Upgrade Field BM

**CAREFULLY APPLY THE INSTALLATION INSTRUCTIONS provided in the companion document file name : INS252U**

# 6.0 Corrected, New and Enhanced functions

**Hereunder are the corrected, new and enhanced functions delivered with this new level.**

**Note:** The summary of the functions that have been included in previous versions can be found in the Appendix section.

## 6.1 LEC Configuration through LECS

The 8260 is provided with a Forum Compliant protocol stack for both Token-Ring and Ethernet, for management purposes. Registration of the LAN Emulation Client (LEC) to a LAN Emulation Configuration Server is now possible.

System configuration is now simplified through the dynamic discovery of LECS ATM address in the network. In addition, in case of presence of multiple LECS's or multiple LES's for redundancy reasons,the 8260 LEC can now dynamically switch from primary to secondary LAN emulation server. This allows network administrators to keep the monitoring of the ATM network even in case of failure.

## 6.2 Support for the new firmware for the ATM media modules

A-CPSW ATM modules include firmware that provides ATM traffic management functions. A new level of firmware is now available that increases the functionality of ATM modules. This new firmware can be added through code download to ATM modules **(4-p 100Mbps, 2-p 155 module, ATM Kit carriers, 8281 ATM/LAN Bridge ATM WAN module, MSS Server module, 3-port 155 module, 12-port 25Mbps module, A12-TP25/A1-MB155, A-CPSW)**, on either existing or new installations.

**Note:** If an end user wishes to install the firmware on a given module, to get the benefits of the new functions, the entire set of ATM modules within the same chassis needs to be upgraded as well.

The new firmware brings the following extensions:

**Increase of number of connections:**

For all ATM modules, including the newly announced modules, it increases the number of connections from 992 to 4,064 per ATM module.

**Variable range of VPC/VCC values:**

It introduces a variable range for number of Virtual Path connections (VPC) and Virtual Circuit connections (VCC); the following ranges are supported per port type:

1. For all ATM ports, except the 25Mbps ports :
   a. Mode 0/14 (VPC value equal to 0; VCC value comprised between 0 & 16383)
   b. Mode 4/10 (VPC value comprised between 0 and 15; VCC value comprised between 0 & 1023)
   c. Mode 6/8 (VPC value comprised between 0 and 63; VCC value comprised between 0 & 255)
2. For the 25Mbps ports :

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

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

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

In addition to the benefits described previously, network administrator can define upper limits for VP/VC values to meet specific ranges supported by some ATM UNI devices. ATM Forum Compliant UNI stations inform the ATM switch about the supported values of VP/VC; In case a station fails to do so, this may prevent interworking with the IBM ATM switches. The A-CPSW solves this problem by allowing the network administrator to set the VP/VC range on a given ATM port on the ATM switch, thereby enabling the interworking with non-compliant devices.

**MANDATORY**

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

**ABR flow control:**

On the 25Mbps module and the A3-MB155 module, end user can add ATM Forum Available Bit Rate flow control through Explicit Forward Notification Indication (EFCI) marking. When congestion condition occurs due to excessive traffic flow, the 8260 modules can now mark the EFCI bit in the ATM cells to indicate a congestion condition, asking the destination station to notify the source device to reduce its traffic.

**Larger buffer size:**

When multiple ATM sources try to send traffic over one link (for instance the one to which is attached a server), using UBR or ABR class of service, congestion condition might occur because the aggregate traffic exceeds the capacity of the output link. The duration of this excess traffic can be short because of the bursty nature of the LAN traffic over ATM. By having a larger buffer size (8,000 cells) the A12-TP25 module and A3-MB155 module are able to absorb bursts of traffic of longer duration, thereby delaying the trigger of congestion control mechanism, such as Early Packet Discard. This improves the overall response time and relieves end systems from extra frame retransmissions.

## 6.3 A3-MB155 module

This new feature allows the support of the 3 port OC3 module. Please refer to the A3-MB155 module user's guide.

## 6.4 PVC multipoint

In addition to the existing support of point-to-multipoint SVC's, this new level of A-CPSW introduces "smart PVC point-to-multipoint" function. Point-to-multipoint trees can be defined now with either fixed Permanent Virtual Circuits or fixed Virtual Permanent Paths; user needs only to define the parameters (VP or VP/VC values) for the root of the tree and the leaves, without any definition for intermediate switches; in case of failure on these intermediate switches, the connections are automatically re-established.

## 6.5 MIB 1.7

Following are the MIB changes in v1.7 (compared to v1.5) related to 8260 and in the ATM Forum LAN Emulation mibs.

1. Changes in the MIB ibm-8260-atmSw

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

   A new attribute called ocPowerOutputUnmanagedWattageAllac for DMM subset always returns the value 0.

   8260 chassis related traps for DMM subset : chassisSlotDown, chassisSlotUp,chassisEnvironment,chassisRange,chassisModuleDown, chassisModuleUp.

   For moduleOperState : addition of incompatible-level value for modules that have FPGA levels incompatible with levels running in the A-CPSW module.

   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

## 6.6 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.

## 6.7 CP/SW reset

Corrected : A congestion situation was encountered (and then the CP/SW was reset) when a non IBM device was using an ILMI community name different from "ILMI".

## 6.8 8271-8272 modules

Integrated 8271 (Ethernet) and 8272 (T/R) modules are now supported, with up to 29 ports.

## 6.9 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 A-CPSW microcode version.

1. Changing the ATM address of a A-CPSW 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 A-CPSW 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 (default value is 0 which means "no timeout")

3. Ping -f of the LAN Emulation Client (LEC) in the 8260 creates a reset of the Control Point Switch.

   Bypass:

   Do not use Ping -f command

# 8.0 Documentation Update

1. **WARNING :** The file resulting from an UPLOAD of CONFIGURATION on a TFTP server, should only be DOWNLOADED on a A-CPSW with the same level of operational code. Otherwise, you might encounter strange behaviours on the A-CPSW.
2. The **SET DRAM** defined in the *ATM Control Point and Switch Module Command Reference guide (SA33-0385)* is no longer in usage (the microcode does an automatic detection of the memory size of the A-CPSW)
3. **CLEAR TRACE_LOG**: The CLEAR command defined in the *ATM Control Point and Switch Module Command Reference guide (SA33-0385)* has a new option **"TRACE_LOG"** allowing the clearing of the main trace before being restarted.

```
CLEAR TRACE_LOG
```

Figure 1. Clear trace_log

4. LAN Emulation Client documentation
   a. The **LAN Emulation Client** section described in the *ATM Control Point and Switch Module Installation and User's guide (SA33-0326)* refers to **Ethernet V2.0**. This should be replaced by **DIX Ethernet**.
   b. The **SET DEVICE LAN_EMULATION_CLIENT** command defined in the *ATM Control Point and Switch Module Command Reference guide (SA33-0385)* has a new option "TR" that allows to specify a LAN Emulation Client Token Ring 802.5.

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

Figure 2. Set device lan_emulation_client (part 1)

   c. The **SET DEVICE LAN_EMULATION_CLIENT** command defined in the *ATM Control Point and Switch Module Command Reference guide (SA33-0385)* has a new optional keyword "ETH_TYPE" that allows to specify the type (802.3 or DIX) used inside the Ethernet network. If not specified the default is **802.3**

```
SET DEVICE LAN_EMULATION_CLIENT ETH ETH_TYPE (DIX | 8 2_3)
```

Figure 3. Set device lan_emulation_client (part 2)

   d. The **SET DEVICE** command defined in the *ATM Control Point and Switch Module Command Reference guide (SA33-0385)* has new optional parameters, in order to define the LES,LECS ATM address or let the A-CPSW follow the ATM Forum to find this LES ATM address.

      **The following choices are offered :**

      1) **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 4. Set device lan_emulation_client (part 3)

2) **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 5. Set device lan_emulation_client (part 4)

3) **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 6. Set device lan_emulation_client (part 5)

**Note:** If no LES or LECS ATM address have been set, then the A-CPSW 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 a LES ATM address has been defined then the LECS ATM address will never be used.

5. The **SET DEVICE** command defined in the *ATM Control Point and Switch Module Command Reference guide (SA33-0385)* has a new option **CONFIG_FUNCTIONS** that defines the operating mode of the Control Point Switch. The ATM Switch/Control Point operates in one of either the following modes :

   Interim Inter Switch Protocol (IISP) and IBM pre-standard PNNI-1 Switch to Switch Protocol (SSI)

   Interim Inter Switch Protocol (IISP) and LAN Emulation Server/Broadcast Unknown Server (LES/BUS)

```
SET DEVICE CONFIG_FUNCTIONS ( NO_SSI_AND_WITH_LAN_EMULATION_SERVER |
                              SSI_AND_NO_LAN_EMULATION_SERVER )
```

Figure 7. Set device config_function

Changing the operating mode to NO_SSI_WITH_LAN_EMULATION_SERVER causes all the SSI interface to be re-configured to UNI.

Changing the operating mode to SSI_AND_NO_LAN_EMULATION_SERVER causes the LES to be stopped.

Please refer to the SHOW DEVICE command to find out the actual operating mode.

**WARNING :** Any change in the operating mode causes an automatic reset.

6. The **SET PORT** command defined in the *ATM Control Point and Switch Module Command Reference guide (SA33-0385)* 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 14.1 UNI ENABLE VPI_VCI: nb_bits_vpi.vci
```

Figure 8. Set module VPI_VCI function

The preferred values for the different ATM ports are :

For all ATM ports, 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 be **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 port, 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)

7. The **SET PORT** command defined in the *ATM Control Point and Switch Module Command Reference guide (SA33-0385)* has slightly changed syntax for the SSI definition. When setting the Bandwidth , the full keyword "**bandwidth:**" must be entered prior to the desired value in Kbps.

```
SET PORT slot.port mode type BANDWIDTH: bandwidth_value
```

Figure 9. Set port command

8. 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**.
9. The **SET** command defined in the *ATM Control Point and Switch Module Command Reference guide (SA33-0385)* has a new option for the Power definition. Use the **SET POWER SLOT CLASS** command to determine the order in which modules power down, if there is inadequate power to run the system. Modules with the lowest priority power down first , modules set to power class 10, do no power down automatically under any circumstances. The Class range is 1 to 10.

```
SET POWER SLOT slot CLASS class_number
```

Figure 10. Set power slot class

10. The **SWAP MICROCODE** command defined in the *ATM Control Point and Switch Module Command Reference guide (SA33-0385)* is erroneous, the example was showing that after the SWAP MICRO-CODE , 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 11. SWAP MICROCODE

11. The **SET DEVICE** command defined in the *ATM Control Point and Switch Module Command Reference guide (SA33-0385)* has a new option **MIGRATION** allowing the A-CPSW to check the FPGA level of all the blades in the 8260 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 12. SET DEVICE MIGRATION

12. The **SHOW MODULE ALL** command defined in the *ATM Control Point and Switch Module Command Reference guide (SA33-0385)* has a new information displayed regarding the standby A-CPSW . When the levels of the Control Point/Switch modules are not compatible, the status displayed is **"BAD LEVEL"** .

13. The **SHOW MODULE slot VERBOSE** command defined in the *ATM Control Point and Switch Module Command Reference guide (SA33-0385)* has a new information displayed. When the levels of the ATM blades and the A-CPSW 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 13. SET MODULE slot VERBOSE

14. The **SHOW MODULE slot VERBOSE** command defined in the *ATM Control Point and Switch Module Command Reference guide (SA33-0385)* has a new information displayed. When the level in backup for a A12-TP25 blade can not be swappped, because of the limited swap of this blade and therefore must be downloaded once again on the blade, the A-CPSW displays for this blade **"none"** , for example :

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

Figure 14. SET MODULE slot VERBOSE

15. The **SWAP FPGA_PICOCODE slot** command defined in the *ATM Control Point and Switch Module Command Reference guide (SA33-0385)* has a new return message. When the level in backup for a A12-TP25 blade can not be swappped, because of the limited swap of this blade and therefore must be downloaded once again on the blade, the A-CPSW displays the following for this blade :

```
826 ATM> swap fpga_picocode 14
You are about to change operational FPGA version..
Are you sure ? (Y/N) Y
Processing slot 14 ... Swap rejected : swap count limit reached.
826 ATM>
```

Figure 15. SWAP FPGA_PICOCODE message

16. The **SHOW PORT slot.ALL VERBOSE** command defined in the *ATM Control Point and Switch Module Command Reference guide (SA33-0385)* has a new information displayed. When the levels of the ATM blade and the A-CPSW module are not compatible, the status displayed for this ATM blade is **"BAD FPGA LEVEL"**, for example :

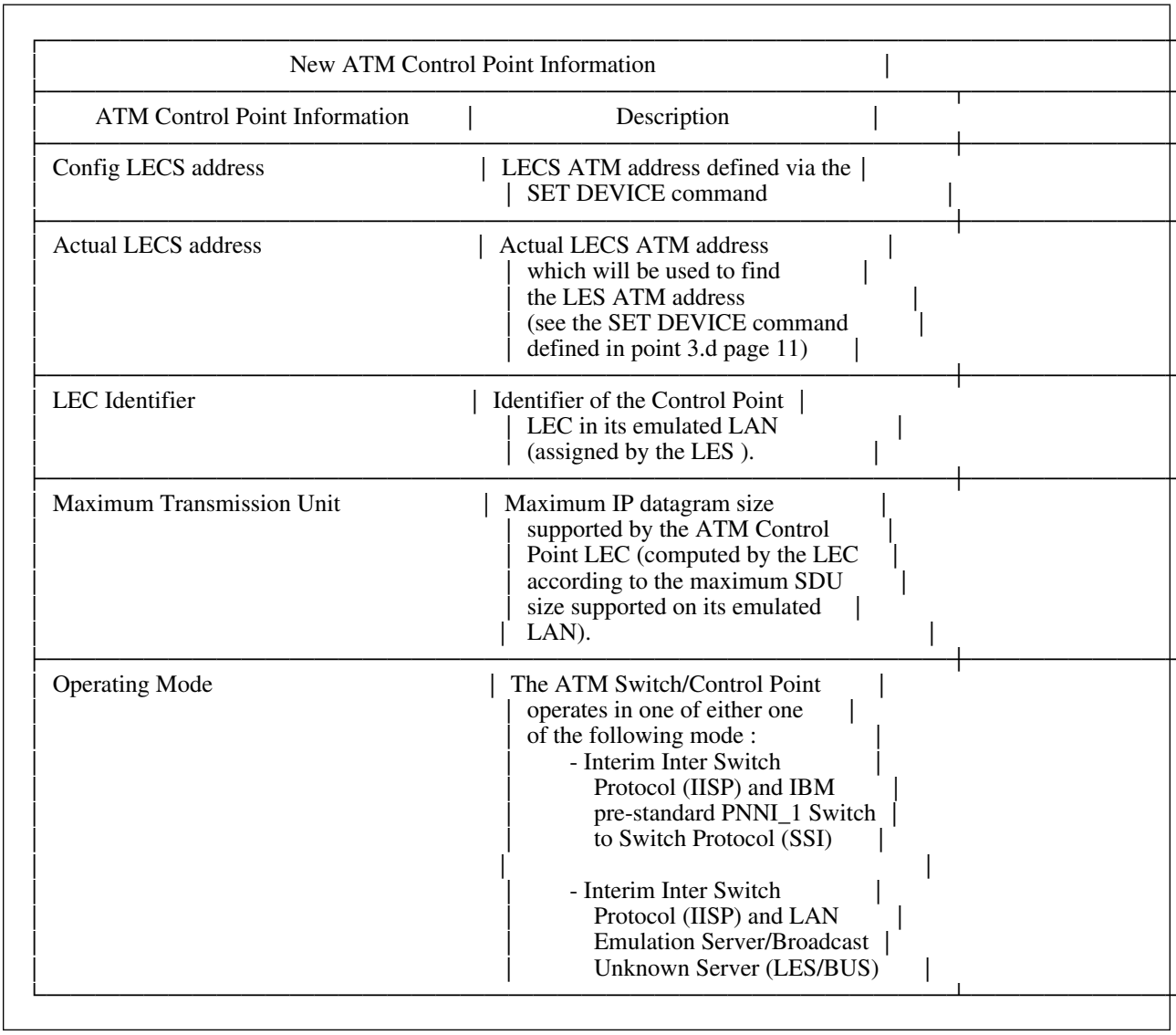
```
5. 1 : SSI enabled BAD FPGA LEVEL
5. 2 : UNI enabled BAD FPGA LEVEL
5. 3 : UNI enabled BAD FPGA LEVEL
5. 4 : SSI enabled BAD FPGA LEVEL
```

Figure 16. SET PORT slot.ALL VERBOSE

17. In the result of the **SHOW DEVICE** command defined in the *ATM Control Point and Switch Module Command Reference guide (SA33-0385)* 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 17. (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 3.d page 11) |
| 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). |
| Operating Mode | The ATM Switch/Control Point operates in one of either one of the following mode :<br>- Interim Inter Switch Protocol (IISP) and IBM pre-standard PNNI_1 Switch to Switch Protocol (SSI)<br>- Interim Inter Switch Protocol (IISP) and LAN Emulation Server/Broadcast Unknown Server (LES/BUS) |

Figure 18. (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
826  ATM Control Point and Switch Module
Name : ATM_xxx
Location : IBM lab

For assistance contact :

Manufacture id: VIME
Part Number: 51H3982 EC Level: E281 9
Boot EEPROM version: v.2.5.2
Flash EEPROM version: v.2.5.2
Flash EEPROM backup version: v.2.3.
Last Restart : 13:5 :3  Wed  8 Oct 96 (Restart Count:   )

A-CPSW
------------------------------------------------------------------------
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 add        : 4 1122334455
 IP add         : 9.1  .93.233. Subnet mask: ff.ff.ff.8
 ATM add        :
              39.99.99.99.99.99.99.  .  .88.88.12.33.5 .  .  .  .94.61.
 Conf. LES add:
              39.99.99.99.99.99.99.  .  .88.88. 6.33.6 .  .  .  .94.61. 2
 Act.    LES add:
              39.99.99.99.99.99.99.  .  .88.88. 6.33.6 .  .  .  .94.61. 2
 BUS ATM add :
              .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
 Conf. LECS add: none
 Act.    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
 Conf. LES addr:
              39.99.99.99.99.99.99.  .  .88.88. 6.33.6 .  .  .  .94.61. 3
 Act.    LES addr:
              39.99.99.99.99.99.99.  .  .88.88. 6.33.6 .  .  .  .94.61. 3
 BUS ATM addr    :
              .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
 Conf. LECS add: none
 Act.    LECS add:
              .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
 LEC Identifier: 34. Maximum Transmission Unit: 449
```

Figure 19. (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.

Device conf'ed for SSI port capability. Lan Emul Servers cannot start.
Dynamic RAM size is 16 MB. Migration: off. Diagnostics: enabled.
Device defined as primary.
```

Figure 20. (Page 2 of 2) New ATM Control Point Information display

18. The **SHOW PORT** command defined in the *ATM Control Point and Switch Module Command Reference guide (SA33-0385)* has a new information displayed regarding the VPI_VCI range.

```
826 ATM> show port 14.1 verbose


         Type    Mode          Status
-----------------------------------------------------
14. 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

826 ATM>
```

Figure 21. SHOW PORT VERBOSE command

19. The **SET PVC** command defined in the *ATM Control Point and Switch Module Command Reference guide (SA33-0385)* has new options defined in order to support the PVC/PVP point-to-point and point-to-multipoint.

    a. New set of parameters

```
ATM826 > 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 22. 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 *ATM Control Point and Switch Module Command Reference guide (SA33-0385)* 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 :

ATM826 >
        set pvc 5.2 3 13.1 1  CHANNEL_POINT_TO_MULTI_POINT     best_effort
PVC set and started.
ATM826 >
```

Figure 23. SET PVC point-to-multi-point

c. Add a leaf on a PVC point to multipoint

The **SET** command defined in the *ATM Control Point and Switch Module Command Reference guide (SA33-0385)* 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 :

ATM826 > set party_pvc 5.2 3 1 5.4 1
PVC set and started.
ATM826 >
```

Figure 24. SET PARTY_PVC for PVC point to multipoint

d. Display a PVC point to multipoint

The **SHOW PVC** command defined in the *ATM Control Point and Switch Module Command Reference guide (SA33-0385)* has new information displayed concerning the PVC point to multipoint.

```
ATM826 > show PVC all

          Local end point        !     Remote end point       !
---------------------------+-----------------------+
Port    id    type    Vpi/Vci  !  Port  Vpi/Vci  HNb  Party!    Role    !QOS!  Stat.
---------------------------+-----------------------+---------+---+------
  5. 2     3   PTM-PVC    /54     !13. 1      /21      1       !  Primary  !  BE!Active
                                    !  5. 4      /32      1    1   !  Primary  !  BE!Active
 5. 4 1  1 PTM-PVC     /32     ! 5. 2      /54      1     1    !Secondary! BE!Active
13. 1 1  1 PTM-PVC     /21     ! 5. 2      /54      1          !Secondary! BE!Active

ATM826 >
```

Figure 25. SHOW PVC ALL for PVC point to multipoint

e. Set a PVP point to multipoint

The **SET PVC** command defined in the *ATM Control Point and Switch Module Command Reference guide (SA33-0385)* 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 :

ATM826 >
          set pvc 13.4 1 13.5 1  PATH_POINT_TO_MULTI_POINT 1 1 best_effort
PVC set and started.
ATM826 >
```

Figure 26. SET PVP point-to-multi-point

f. Add a leaf on a PVP point to multipoint

The **SET** command defined in the *ATM Control Point and Switch Module Command Reference guide (SA33-0385)* 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 :

ATM826 > set party_pvc 13.4 1 1 13.6 1  2
PVC set and started.
ATM826 >
```

Figure 27. SET PARTY_PVC for PVP point to multipoint

g. Display a PVP point to multipoint

The **SHOW PVC** command defined in the *ATM Control Point and Switch Module Command Reference guide (SA33-0385)* has new information displayed concerning the PVP point to multipoint.

```
ATM826 > show pvc all

          Local end point          ! Remote end point             !
--------------------------+------------------------+
Port    id    type    Vpi/Vci  !  Port  Vpi/Vci    HNb  Party!    role    !QOS!  Stat.
--------------------------+------------------------+---------+---+------
13. 4     1   PTM-PVP   1/      !13. 5     1/          1          !  Primary  !  BE!Active
                                  !13. 6     2/          1       1    ! Primary ! BE!Active
13. 5 1   1 PTM-PVP    1/       !13. 4     1/          1          !Secondary! BE!Active
13. 6 1   1 PTM-PVP    2/       !13. 4     1/          1       1    !Secondary! BE!Active
ATM826 >
```

Figure 28. SHOW PVC ALL for PVP point to multipoint

h. Clear a PARTY PVC

The **CLEAR** command defined in the *ATM Control Point and Switch Module Command Reference guide (SA33-0385)* has new parameter **PARTY** concerning the point to multipoint PVC and PVP.

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

Figure 29. 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.

```
ATM826 > show pvc all verbose

        Local end point         !      Remote end point         !
-------------------------+-------------------------+
Port   id   type   Vpi/Vci   ! Port  Vpi/Vci   HNb  Party!   role   !QOS!  Stat.
-------------------------+-------------------------+---------+---+------
2. 1    13 PTM-PVC    2/34      ! 2. 3      2/36        12      2    ! Primary!BE!Not Rdy
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).

ATM826 >
```

Figure 30. SHOW PVC VERBOSE

# 9.0 Configuring LAN Emulation Parameters

**Carry out the procedures in this chapter only if you want use 'LAN Emulation Over ATM' functions on the A-CPSW.**

## 9.1 Procedure :

To configure the default local parameters for the A-CPSW , perform the following steps:

1. You must first define the operating mode of the Control Point Switch. The A-CPSW cannot run SSI and LES/BUS concurently. You must define your A-CPSW to run LES/BUS only, as described in **"Choosing your operating mode"** on point 9.2, using the command:

   **set device config_functions**

2. If you want to implement LAN emulation, configure the LAN Emulation Server and Broadcast Unknown Server (LES/BUS) parameters, as described in **"Setting Up LAN Emulation Servers"** on point 9.3, using the command:

   **set lan_emul server n start**

3. If you want to start a LAN Emulation Client, for example for TFTP functions, configure the LEC parameters, as described in **"Setting Up a LAN Emulation Client"** on point 9.4, using the command:

   **set device lan_emulation client**

4. If you want external LAN Emulation Configuration Server (LECS) support, configure the LECS ATM address or fixed PVC, depending on the configuration requirements of the LECS and external LECs (workstations, bridges, and so on).

   To configure the LECS ATM address, as described in **"Setting the LECS ATM Address"** on point 9.5, use the commands:

   **set lan_emul configuration_server**

   **set pvc**

## 9.2 Choosing your operating mode

**WARNING**

You must define the operating mode of the A-CPSW to run the LES/BUS only. The SSI link will be automatically disable and set to UNI.

```
826 >set device config_functions no_ssi_and_with_lan_emulation_server
This call will reset the ATM subsystem and at least one potential or
existing SSI port will be turn to disable UNI.
Are you sure ? (Y/N) Y
```

Figure 31. Choose operating mode

**Note: You must be aware that your A-CPSW will reset.**

## 9.3 Setting Up LAN Emulation Servers

You can define either one or two separate LAN Emulation Servers (LESs). Either one, or both, may be Token Ring or Ethernet.

**WARNING**

However only one LES/BUS can be started at a time. The maximum number of LECs attached to the LES is 128.

When you start a LES, its associated BUS is automatically started.

The sections below describe how to:

Start a LES

Display the status and current parameters for both LESs

Stop a LES.

Display the LECs connected to the LES

### 9.3.1 Starting a LES

**Token Ring** - The following sample command includes parameters to start a Token Ring LES :

```
826 >set lan_emul server 1 start tr 4 4544
Enter Emulated LAN name: LAN1tr
Starting server.
826 >
```

Figure 32. start LES Token Ring

**Ethernet** - The following sample command includes parameters to start a Ethernet LES :

```
826 >set lan_emul server 1 start eth 124 1516
Enter Emulated LAN name: LAN1eth
Starting server.
826 >
```

Figure 33. start LES Ethernet

**Note:**

1. The (optional) LAN name is case-sensitive.
2. Only the Maximum Frame Size and LAN Name parameters have default values. All other parameters must be entered when starting a LES.

## 9.3.2 Display status of the LESs

Use the SHOW LAN_EMUL SERVERS command to display the current status and parameters defined for both LESs:

```
826 > show lan emul servers
------------------------------------------------------------------------
------------------------- LAN Emulation Server 1 --------------------

Status : Running.
LAN type : Ethernet.
Actual LAN name : "LAN1eth".
Desired LAN name : "LAN1eth".
Actual max frame size: 1516.
Desired max frame size: 1516.
Max number of clients: 124.
ATM address : 39.99.99.99.99.99.99. .99.99. 1.5 .5 .5 .5 .5 .5 .5 . 2
Current number of operational LECs: 3

------------------------------------------------------------------------
------------------------- LAN Emulation Server 2 --------------------
Status : Not started.
LAN type : Token Ring.
Actual LAN name : "LAN2tr".
Desired LAN name : "LAN2tr".
Actual max frame size : 4544.
Desired max frame size: 4544.
Max number of clients: 4.
ATM address : 39.99.99.99.99.99.99. .99.99. 1.5 .5 .5 .5 .5 .5 .5 . 3
Current number of operational LECs:
826 >
```

Figure 34. SHOW LAN EMULATION SERVERS

**Note: You should see that only one LES is RUNNING.**

## 9.3.3 Stopping a LES

To stop the LES , you must issue the following command :

```
826 > set lan emul server 1 stop
```

Figure 35. SET LAN_EMUL SERVER STOP

**Note**

Stopping a LES also stops its associated BUS.

Depending on the number of LECs that are connected to the LES, there may be a delay from the time the command is issued and the time the LES is completely stopped. For this reason, you should verify that the LES has stopped using the SHOW LAN EMUL SERVERS command before trying to start the LES again.

### 9.3.4 Displaying the LECs Connected to the LES

By specifying the number of the LES in the SHOW LAN_EMUL SERVERS command, you can view all the LECs that are connected to that LES :

```
826 > show lan emul servers 1
------------------------------------------------------------------
---------------------- LAN Emulation Server 1 --------------------

Status : Running.
LAN type : Ethernet.
Actual LAN name : "LAN1eth".
Desired LAN name : "LAN1eth".
Actual max frame size: 1516.
Desired max frame size: 1516.
Max number of clients: 124.
ATM address : 39.99.99.99.99.99.99. .99.99. 1.5 .5 .5 .5 .5 .5 .5 . 2
Current number of operational LECs: 3
Local : 39.99.99.99.99.99.99. .99.99. 1.5
5 .5 .5 .5 .5 .5 . 1 (port  . ) OPERATIONAL Non Proxy
1 .11.11.  .29.35.   (port 1.1) OPERATIONAL Non Proxy
Remote : 39.99.99.99.99.99.99. .99.99. 1.51
51.44.32.51.44.32.   (port 1.13) OPERATIONAL Proxy
826 >
```

Figure 36. SHOW LAN EMULATION SERVERS 1

## 9.4 Setting Up a LAN Emulation Client

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

LAN type

IP address

Subnetwork Mask

LES ATM address, LECS ATM address or nothing

Individual MAC address

The A-CPSW follows the ATM Forum in order to find the LES ATM address, if no LES or LECS ATM address have been set, then the A-CPSW 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 a LES ATM address has been defined then the LECS ATM address will never be used.

**The following choices are offered :**

1. **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 37. Set device lan_emulation_client (part 3)

2. **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 38. Set device lan_emulation_client (part 4)

3. **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 39. Set device lan_emulation_client (part 5)

**Note:**

1. 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).
2. The maximum frame size and emulated LAN name are provided by the associated LES.

3. The SET DEVICE LAN EMULATION_CLIENT command automatically starts the LEC.
4. No command to stop the LEC is available.

**WARNING**

**Changing the MAC address will force the A-CPSW to reset, after confirmation.**

## 9.5 Setting the LECS ATM Address

Some LAN Emulation Clients (LECs) determine the ATM address of their associated LES from the LAN Emulation Configuration Server (LECS). The A-CPSW supports these LECs with three separate methods for establishing a connection to the LECS:

ILMI MIB

LECS Well Known Address

Fixed PVC (0.17)

### 9.5.1 ILMI MIB

The LEC can get the unicast ATM address by doing a GETNEXT on the variable atmSrvcRegATMAddress in the ILMI MIB.

For LECs that use this method of addressing, you must define the LECS ATM address in each ATM switch that deals with these LECs. You define the LECS ATM address with the SET LAN EMUL CONFIGURATION SERVER command.

```
826 > set lan_emul configuration_server active wka
39.99.99.99.99.99.99. . .99.99. 1.84. C.11.8 .95.4F.13.
```

Figure 40. Set lan_emul Configuration_server

### 9.5.2 LECS Well Known Address

The LEC can directly call the LECS Well Known Address, which is

47.00.79.00.00.00.00.00.00.00.00.00.00.A0.3E.00.00.01.00

For LECs that use this method of addressing, you must define the LECS unicast address to be substituted for the Well Known Address in each ATM switch on the Call-Setup path, using the same SET LAN_EMUL CONFIGURATION command as for ILMI MIB method.

**Note:**

1. You can define 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).
2. In order to use this method, the LECS must be able to accept calls to the WKA. If the LECS does not support calls to the WKA, you must use another addressing method.

## 9.5.3 Fixed PVC (0,17)

If the LEC requires a connection via fixed PVC, you must use the command SET PVC to define a PVC for virtual channel connection on the LEC side with vpi.vci equal to 0.17. When defining a PVC for virtual channel connection (VCC), the range of allowed VCI values includes the value 17.

Define a PVC on the LEC side with vpi.vci equal to 0.17 going to the LECS side, as shown here :

```
826 > set pvc 1.2 1 2.3 5 CHANNEL_POINT_TO_POINT  .17  .33 best_effort
```

Figure 41. Set PVC

**WARNING**

The A-CPSW internal LEC does not support the fixed PVC (0,17) in this release.

## 9.5.4 Checking the LECS Configuration

To see the Configuration of the LECS address, use the command :

```
826 > show lan_emul configuration_server
```

Figure 42. Show lan_emul configuration_server

# 10.0 General Information

## 10.1 Usage Notes

When you insert an A-CPSW module into an 8260 hub, be sure to first insert the module so that it touches the connectors on the backplane before you use the module levers.

In order to run the WRAP EXTERNAL command, you must use the correct wrap device: an 11dB attenuator (AMP 99593-1) or the IBM wrap plug (Part number 92F9003). The WRAP EXTERNAL command lets you diagnose problems on the ports of the A4-FB100 with MIC connectors.

You can manage ATM modules by using ATMC and optionally IHMP that provides SNMP-based management facilities for the 8260 hub.

The prerequisite versions of 8260 management modules (DMM or DMM with Ethernet Carrier) that support the ATM modules are as follows:

- Version 2.1 and higher for A-CPSW module and A4-FB100 module with MIC connectors
- Version 2.3 for A4-FB100 module with SC connectors and A2-MB155 module
- Version 3.01 for A04MB-BRG and A-CMU1s.

If the TRACE options are ON, system PERFORMANCE WILL DECREASE SIGNIFICANTLY.

**WARNING :** On the **A12-TP25 module**, in order to activate a new FPGA code after download, please issue the SWAP FPGA_PICOCODE command. If for some reason , you need to go back to a previous level , **download the previous FPGA code**, and issue the SWAP FPGA_PICOCODE command.

## 10.2 Operating Requirements

The following operating requirements apply to the A-CPSW and ATM media modules:

Before you remove an ATM media module from a 8260 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.

## 10.3 PVC Management

The Permanent Virtual Circuit (PVC) management over several Switches is not compatible with releases previous to version 2.1 of A-CPSW modules.

A conversion function is provided with the 2.2 code that converts previous PVC definitions to 2.2 during the upgrade.

Issue a Show PVC command to check that your PVCs have been successfully migrated .

**Note:** It is strongly recommended to save your current configuration before the upgrade.

In consequence

You will not be able to create PVC defined between a v.2.0.x or previous A-CPSW and a v.2.5.2 A-CPSW

If you add a A-CPSW v.2.5.2 into your existing ATM Campus Network with A-CPSW modules at previous levels, you will have to migrate those previous modules at least to v.2.4.3 to be able to use PVCs .

In case you have to swap back to the previous level for any reason you will have to clear your PVCs before to issue the swap. If not done unpredictable results may occur.

## 10.4 Networking Rules

This section lists the 8260 module performance and the rules to follow to build and validate your network.

### 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 12000 connection control blocks
- 2 control blocks are required per PtP connection (up to 6000 PtP connections)
- 1 control block is required per branch of a PtM connection
- The switch has 6000 party control blocks (2 party control blocks are required per party)
- The maximum number of parties over point-to-multipoint connections is 3000.
- The maximum number of point-to-multipoint is 127.
- The maximum number of PVC,PVP and PARTY that can be defined 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 4064.

Maximum number of connections per media module

The maximum number of PtP plus PtM connections is 4064.

### 10.4.2 User to Network Interface (UNI)

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

## 10.4.3 ATM Cluster Intraconnection

An ATM cluster is a group of ATM hubs 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 an ATM media module, 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 SSI ports defined on an ATM media module, must not exceed 212 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)

## 10.4.4 ATM Cluster Interconnection

Network to network interface (NNI) defines the interface between two 8260 ATM hubs 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:

- 64 logical links per NNI port, with a VPI in the range 0-63.
- For the 12 port 25Mbps there are 16 logical links per NNI port, with a VPI in the range 0-15.
- The total bandwidth reserved for NNI links is limited to 85 % of the full bandwidth of the media module per port (for example 85Mbps for the A4-FB100 modules). The limitation is 180 Mbps per media module.
- PVCs are defined over NNI links by defining PVC on each individual Switch involved in the connection.
- Multicast support over NNI links can now be on **ANY** VPs without the constraint of having a vpi value equal to 0.
- The maximum number of static route to ATM Cluster Number (ACN) associations that can be defined is 64.
- The maximum number of logical link that can be defined is 64.

## 10.4.5 IP Over ATM (RFC 1577)

The A-CPSW supports an IP client implementation to be managed over ATM (SNMP, Telnet, TFTP, Ping). For that purpose the actual supported MTU size is 944 bytes.

The IP over ATM client imbedded in the A-CPSW supports up to 64 concurrent IP over ATM connections.

## 10.4.6 ATM Forum Compliant Lan Emulation Client (LEC)

Each 8260 LEC supports up to 30 connections to other LECs

## 10.4.7 ATM Forum Compliant LES/BUS

The 8260 A-CPSW only supports one LES/BUS at a time.

The maximum number of LECs on the LES/BUS is 128.

The LES/BUS supports a maximum of 800 downstream LAN workstations with no more then 500 broadcast frames per second (512 bytes).

No classical IP traffic is supported while the LES/BUS is running in the 8260 A-CPSW, at the exception of the Network Management IP (SNMP) traffic when the LAN Emulation Client of the 8260 is disabled (LEC in the 8260 may be enabled in the LES/BUS configuration).

The use of 8260 LES/BUS is not recommended in a Redundant A-CPSW configuration.

# Appendix A. Summary of functions integrated in previous versions

**In A-CPSW operational microcode version v.1.1.5:**

- MIB Version 1.1.
- Support of 8260 10-slot chassis
- Code upgrade control
- Unlimited combination of UNI/SSI ports
- Automatic discovery of IBM 8282 workgroup concentrators
- Link Aggregate for SSI and NNI configurations

**In A-CPSW operational microcode version v.1.2.9:**

- A-CPSW boot performance improvements
- Support of the ATM 155 Mbps Flexible Concentration Module (A2-MB155) module
- pNNI phase 0
- Error log compression
- Enhanced status display
- Full multicast capability
- 16 Virtual Paths (VP) per NNI port (4-bit VPI)
- Early Packet Discard, Partial Packet Discard
- Reserved bandwidth support firewall.
- MIB Version 1.2

**In A-CPSW operational microcode version v.2.0.4/v.2.0.8:**

- Support of the UNI Version 3.1
- Optional ILMI Address Registration
- Optional Flow Control for UNI Port
- Support of SDH and SONET for A2-MB155 Module
- Fixed Scrambling Scheme for A2-MB155 Module
- Bandwidth Allocation Setting for SSI Interface
- LAN Emulation Configuration Servers Address Advertisement
- PVC Management from the A-CPSW Console
- Serial Line IP Support for A-CPSW Console Port
- Upload and Download of the A-CPSW Configuration
- New Commands in Maintenance Mode

- Compressed Image of the A-CPSW Operational Microcode
- Support of MIB Version 1.3
- Support of Nways 8260 TR/Ethernet LAN Bridge Module
- Support of Nways 8260 ATM Carrier Modules
- Improvements to Existing A-CPSW Commands

**In A-CPSW operational microcode version v.2.1.0:**

- LAN Emulation Client (LEC) Ethernet 802.3/DIX Ethernet
- Increased number of connections
- MIB version 1.4
- Full Chassis monitoring
- Redundant Switch support
- DMM subset

**In A-CPSW operational microcode version v.2.2.2:**

- LAN Emulation Client (LEC) Token-Ring 802.5
- Static Routes inside a single subnetwork
- MIB version 1.5
- DMM subset (full chassis monitoring)
- LAN emulation Server/Broadcast Unknown Server (LES/BUS)
- Switch Redundancy versus LES/BUS
- MSS module support
- 12 port 25 Mbps module support
- WAN module support

**In A-CPSW operational microcode version v.2.4.0 or v.2.4.3:**

- MIB version 1.6
- Variable range of VPC/VCC values
- ABR flow control
- Larger buffer size
- A3-MB155 module support
- PVC multipoint

**In A-CPSW operational microcode version v.2.5.0:** .

- MIB 1.7
- A12-TP25/A1-MB155

**In A-CPSW operational microcode version v.2.5.1:** .

– Forum compliant way of getting the LECS ATM address through ILMI. Automatic detection and adaptation for non ILMI Forum Compliant devices.

# 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 A-CPSW matches the active microcode level, and the backup microcode of the A-CPSW is either unavailable or identical to the active one.

**>>0051>>** The SWAP of the A-CPSW FPGA picocode terminated in error.

**>>0052>>** A connected ATM media module has no FPGA picocode matching the A-CPSW microcode level (This is a normal condition for the first A-CPSW of a redundant 8260 during the automatic migration process to level B50. It makes the second A-CPSW active, allowing the upgrade of the rest of the 8260. Once the whole 8260 is upgraded, the A-CPSW displaying >>0052>> becomes either active or standby at the next reset).

**NOTICE**

The three 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 1131 OF 'DSMT0002'
DSMMOM397I 'DSMT0002' WAS IMBEDDED AT LINE 29 OF 'REL8260M'
DSMBEG323I STARTING PASS 2 OF 2.
+++EDF248W Page check:  document requires more passes or extended cross-reference to resolve corre
ctly. (Page 4  File: 8260R252 RNMODEL)
DSMMOM397I '.EDFPGCK' WAS IMBEDDED AT LINE 320 OF '.EDFHEAD1'
DSMMOM397I '.EDFHEAD1' WAS IMBEDDED AT LINE 59 OF 'DSMT0002'
DSMMOM397I 'DSMT0002' WAS IMBEDDED AT LINE 29 OF 'REL8260M'
DSMLBR529E 'KP' WOULD EXCEED MAXIMUM SIZE.
DSMMOM395I '.EDFEFIG' LINE 220: .kp off
DSMMOM397I '.EDFEFIG' WAS IMBEDDED AT LINE 1131 OF 'DSMT0002'
DSMMOM397I 'DSMT0002' WAS IMBEDDED AT LINE 29 OF 'REL8260M'