PA−A3−OC12 Frequently Asked Questions

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Introduction

This document answers frequently asked questions for the Cisco PA−A3−OC12 ATM Port Adapter. The questions are related to LAN Emulation (LANE) support, bridged−style permanent virtual connection (PVC) support (including Variable Bit Rate Non−Realtime [VBR−nrt] PVCs), type of segmentation and reassembly (SAR) chip, available bit rate (ABR) and unspecified bit rate (UBR) service categories support, class−based weighted fair queueing (CBWFQ), and Low Latency Queuing (LLQ), among other things.

For more information on document conventions, refer to the Conventions Used in Cisco Technical Tips.

Q. Does the PA−A3−OC12 support LANE?

A. Yes. Cisco IOS® Software Release 12.1(3)E introduced support for LANE on the PA−A3−OC12. Refer to the Release Notes.

Q. Does the PA−A3−OC12 support bridged−style PVCs?

A. Yes, as of Cisco IOS Software Release 12.0(19)S.

Q. What is the meaning of the following messages from the output of the debug atm event command?

```
!--- Each of these timestamped lines appear on one line:

Jul  4 10:34:52.597: parse_vip_cm622_stat_ll(ATM5/0/0):
                     phy statistics 0x01010254
Jul  4 10:34:52.925: parse_vip_cm622_alarm_ll(ATM5/0/0):
                     state 4, old/new alarms 0x0/0x1000
Jul  4 10:34:52.925: parse_vip_cm622_alarm_ll(ATM5/0/0):
                     alarm 0x1000
Jul  4 10:34:52.925: parse_vip_cm622_alarm_ll(ATM5/0/0):
```

```
                        state 0, old/new alarms 0x1000/0x0
        Jul  4 10:34:52.925: parse_vip_cm622_alarm_ll(ATM5/0/0):
                        alarm cleared
```

A. These messages define Synchronous Optical Network (SONET) alarm states. The alarm field is a bitmap represented as a sum, and thus can simultaneously represent multiple failures (alarms). These are the various bit positions:

Failure Type	Hexadecimal Value
No Alarm	0x0
Section Loss of Signal (SLOS)	0x0001
Section Out of Frame (SOOF)	0x0002
Section Loss of Frame (SLOF)	0x0004
Line Alarm Indication Signal (LAIS)	0x0010
Line Remote Defect Indication (LRDI)	0x0020
Path Loss of Pointer (PLOP)	0x0100
Path Alarm Indication Signal (LAIS)	0x0200
Path Remote Defect Indication (PRDI)	0x0400
Out of Cell Delineation (OCD)	0x1000
Loss of Cell Delineation (LCD)	0x2000
C2 Byte Mismatch	0x4000

2^n Value	8	4	2	1	8	4	2	1
Binary Value	0	1	1	0	0	1	0	0

These are two examples of determining the alarms from a single alarm field value:

- **0x6400 = 0x4000 + 0x2000 + 0x0400**

  0x6400 indicates a C2 byte mismatch, a loss of cell delineation, and a PRDI.
- **0x7400 = 0x4000 + 0x2000 + 0x1000 + 0x0400**

  0x7400 means a C2 byte mismatch, a loss of cell delineation, an out of cell delineation, and a PRDI.

Q. What SAR chip does the PA−A3−OC12 use?

A. The PA−A3−OC12 uses the Maker CM622 SAR. Use the **show controller atm** command to display the SAR model as well as other interface−specific information. All other models of the PA−A3 family use a different SAR.

```
        VIP-Slot8# show controllers atm 0/0
```

```
                Interface ATM0/0 is up
                Hardware is OC-12 ATM PA - SONET OC12 (622Mbps)
                Lane client mac address is 0002.1783.0900
          Framer is PMC PM5355 S/UNI-622, rev: 16, SDH mode
                SAR is Maker CM622, FW Rev (RX/TX): 3.2.2.3/3.2.2.3
                  idb=0x6087EFE0, ds=0x60884500, framer_cb=0x608AA6A0
                  pool=0x609E4840, cache=0x60A2CB40, cache_end=2043
                  slot 0, unit 0, subunit 0, fci_type 0x0077
                Curr Stats:
                  VCC count: current=3, peak=3
                  RX errors:
                    len 0, chan_closed 9, timeout 0, partial_discard 0
                    aal5_len0 0, host_partial_rx_discard 0
                Devices base addresses:
                      rx_plx_base = 0x50800000 tx_plx_base = 0x54800000
                     rx_fpga_regs = 0x50810000 tx_fpga_regs = 0x54810000
                      dscc4_base = 0x50820000 dscc4_local_base = 0x50830000
                      batman_base = 0x50838000 framer_base = 0x50834000
                Ring base addresses/head/tail (ring size/head/tail index):
                  rx_desc = 0x38265200/0x3826B210 (2048/1537)
                  tx_desc = 0x3026D240/0x3026FB00/0x3026FBC0 (1024/652/664)
                  rx_shdw = 0x60A30B80/0x60A32384 (2048/1537)
                  tx_shdw = 0x60A32BC0/0x60A335F0 (1024/652)
                   tx_ind = 0x38271280/0x38280068 (16384/15226)
                rx_spin_sum 83079, rx_int 57777, avg spin: 1
                Control blocks:
                      vcs = 0x608AA780 (4096) vps = 0x609E2800 (256)
                    chids = 0x609227C0 (65536)
                Misc info:
                vc-per-vp: 1024, max_vc: 4096, max_vp: 15
                ds->tx_count 12, ds->vp_count 1
                RX SAR stats:
                  drop_pkts 0, unrecognized_cells 160200, aal5_pkts 1165286881
                TX SAR stats:
                  aal5_pkts 1625602913, drop_pkts 0
                Alarm: 0x0
```

Q. What is meant by the following log message?

```
          2d17h: %ATMPA-4-ADJUSTPEAKRATE: ATM2/0/0:
          Shaped peak rate adjusted to 299520
```

A. When configured with VBR−nrt PVCs, the PA−A3−OC12 supports a maximum peak cell rate (PCR) or sustainable cell rate (SCR) of 299520 kbps (half of the line rate).

The SAR assigns a lower internal priority value to UBR virtual channels (VCs) than to other VCs. The SAR first schedules a cell from a VBR−nrt VC in an available cell timeslot. If no VBR VCs have data for transmission or if the interface is supporting a single VC, then the entire link bandwidth is available for the UBR VC.

The command line range for the PCR is 37 to 299520 Kbps, as can be seen in this output:

```
          atm(config)# interface atm 2/0/0.1 point-to-point

          atm(config-subif)# pvc 5/100

          atm(config-if-atm-)# vbr ?

          <37-299520>  Peak Cell Rate (PCR) in Kbps
```

Q. Does the PA−A3−OC12 support the ABR ATM service category?

A. No. The PA−A3−OC12 supports UBR and VBR−nrt virtual channels (VCs) only.

Q. How does ATM−layer traffic shaping work on the PA−A3−OC12?

A. The PA−A3−OC12 supports VBR−nrt and UBR ATM service categories. The SAR assigns a lower internal priority value to UBR virtual channels (VCs) than VBR−nrt VCs. The SAR first schedules a cell from a VBR−nrt VC in an available cell timeslot. If no VBR VCs have data for transmission or if the interface is supporting a single VC, then the entire link bandwidth is available for the UBR VC.

Unlike the PA−A3−OC3 or PA−A3−DS3, the PA−A3−OC12 does not support the **transmit priority** command to manually change the priority level of a VC. When two VBR−nrt VCs compete for the same cell timeslot, the SAR reschedules one VC for a later cell timeslot. To ensure that such rescheduling does not lead to reduced throughput, the PA−A3−OC12 implements a bandwidth recovery algorithm in the SAR microcode v3.2. For more information, refer to the Understanding Traffic Shaping Accuracy section of Traffic Shaping on ATM Line Cards for the Cisco 12000 Series.

When no VBR−nrt VC needs to use a cell timeslot, the SAR assigns the timeslot to a UBR VC. As a result, the output rate of the UBR VC can exceed the configured peak cell rate (PCR) of the VC. As a workaround, configure the VC as VBR−nrt on the router, set PCR equal to sustainable cell rate (SCR), and leave any network provisioning of the VC as UBR.

Note: The ATM service category of a VC does not need to match on an ATM router endpoint and ATM network switches as long as equivalent traffic parameters are used.

Future Cisco IOS Software releases will not display an option for configuring a PCR parameter at the command line with the **ubr** command; all UBR VCs will be forced to use a PCR of the line rate (CSCdu83983 (registered customers only)).

Q. Does the PA−A3−OC12 support per−virtual−channel (per−VC) CBWFQ and LLQ?

A. Cisco IOS Software Release 12.0S introduced support for distributed quality of service (QoS) on the PA−A3−OC12 (CSCdv67540 (registered customers only)). CBWFQ is supported on the PA−A3−OC12 as of Cisco IOS Software Release 12.1(11b)E; and LLQ is supported on the PA−A3−OC12 as of Cisco IOS Software Release 12.1(12c)E1.

With per−VC queuing, the ATM interface driver exerts backpressure when the layer−2 hardware queue (known as the transmit ring) is full. Excess packets then are stored in the layer−3 queuing system, where a QoS service policy applies. By default, a UBR VC is assigned a transmit ring limit (tx_limit) value of 128 particles. A VBR−nrt VC is assigned a tx_limit value based on the following formula:

```
Average rate (SCR) × 2 × TOTAL_CREDITS / VISIBLE_BANDWIDTH

TOTAL_CREDITS = 8192
VISIBLE_BANDWIDTH = 599040
```

If this formula calculates a tx_limit value which is less than the default of 128, then the tx_limit of the VC is set to 128. Alternately, you can use the **tx−ring−limit** command to assign a non−default value. A configured value will be displayed in the output of the **show**

atm vc *vcd* command in an upcoming release of Cisco IOS Software (CSCdx12328 (registered customers only)).

Q. What commands can be used to troubleshoot input drops or output drops on the PA–A3–OC12?

A. The per–virtual–channel (per–VC) output packet automatically drops counter increments when the VC uses all of the particle buffers assigned to it. It does so based on the above formula or based on the value configured manually via the **tx–ring–limit** command. In other words, the value of tx_count (the number of buffers in use) has reached the value of tx_limit. A VC experiences this condition during bursts or during periods of sustained congestion, when the VC is presented with more packets than the shaping parameters allow and excess packets must be queued. If a VC experiences incrementing output packet drops when the average output rate is consistently less than the sustainable cell rate (SCR), capture several outputs of the **show interface atm** *slot/port–adapter/port* command to determine the Cisco IOS Software switching path of the traffic. For more troubleshooting tips, refer to Troubleshooting Output Drops on ATM Router Interfaces.

The PA–A3–OC12 may experience an incrementing value of the `InpktDrops` counter in the **show atm pvc** *vpi/vci* output when distributed Cisco Express Forwarding (DCEF) is enabled on the main interface. This problem is simply a counter issue and does not affect normal traffic flow (CSCdw78297 (registered customers only)). For more troubleshooting tips, refer to Troubleshooting Input Drops on ATM Router Interfaces.

Q. Does the Cisco 7200 router series support the PA–A3–OC12?

A. No.

Q. After configuring a PVC, the router reports the following log messages. What do they mean?

```
!--- This configuration was performed:

7500-II(config-if)# pvc 25/100

7500-II(config-if-atm-vc)# ubr 21000

7500-II(config-if-atm-vc)# exit


!--- Each of these timestamped lines appears on one line:

06:05:02: %ATMPA-3-SETUPVCFAILURE: ATM0/0/0:
          Platform Setup_vc failed for 25/100, vcd 3689
06:05:04: %ATMPA-3-SETUPVCFAILURE: ATM0/0/0:
          Platform Setup_vc failed for 25/100, vcd 3690
```

A. Processors residing on the Route/Switch Processor (RSP), Versatile Interface Processor (VIP), and the PA–A3–OC12 exchange messages to perform such functions as virtual channel (VC) setup and teardown, physical–layer statistics collection, and alarm generation. CSCdv12409 (registered customers only) (duplicated by CSCdu61631 (registered customers only)) resolves a rare condition in which VC setup failures occur because of how virtual path identifier (VPI) values are added and de–allocated by the PA–A3–OC12 driver. When this condition occurs, your router may also experience a VIP crash and router reload due to a software–forced crash.

Related Information

- **PA−A3 OC−12 ATM Port Adapter Installation and Configuration**
- **Cisco ATM Port Adapter**
- **ATM (Asynchronous Transfer Mode) Support Pages**
- **Technical Support − Cisco Systems**