PMG1005-T20B

Application Note

Edition v1.0

Table of Content

Revision History

Date	Release	Author	Description
2018/02/27	1.0	Alice Yu	First version

General Application

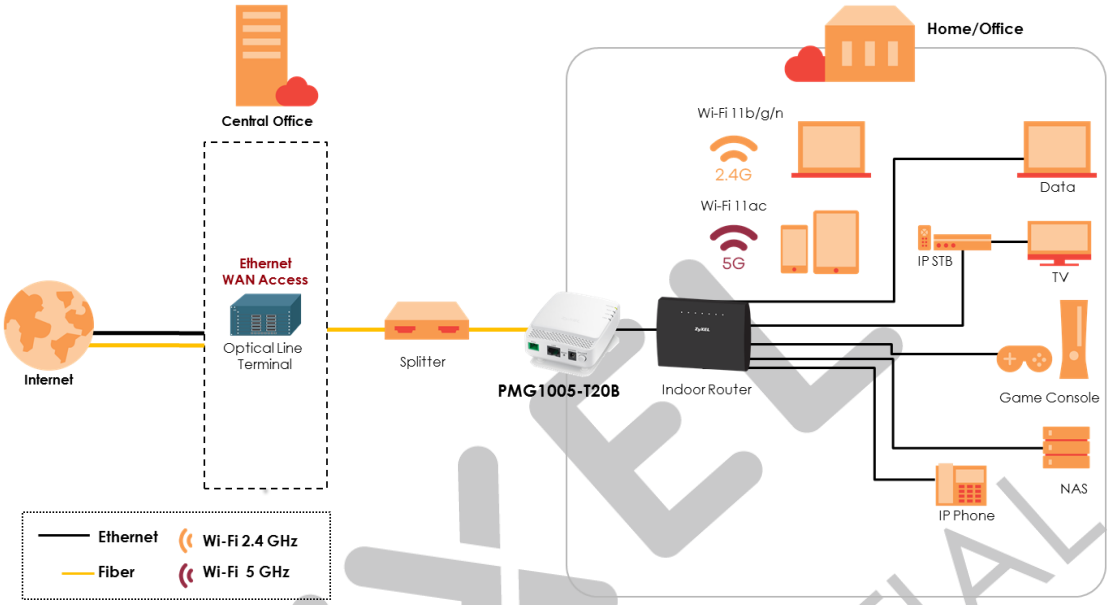
Getting to know the device

The Zyxel PMG1005-T20B GPON SFU with 1-port GbE LAN comes with one GPON uplink and one GbE LAN downlink to serve as a simple bridge to offer Gigabit data access to subscribers. GPON Device provides shared Internet access through a fiber optic line connected to the PON port's built-in optical transceiver.

1. Support hardware reset button in case you forget your password or cannot access the web GUI and telnet session for configuration
2. WAN support one optical interface(SC/APC)
3. LAN port support 10/100/1000Mbps Ethernet ports.
4. Power supply provide 12DC 0.5A

Application diagram

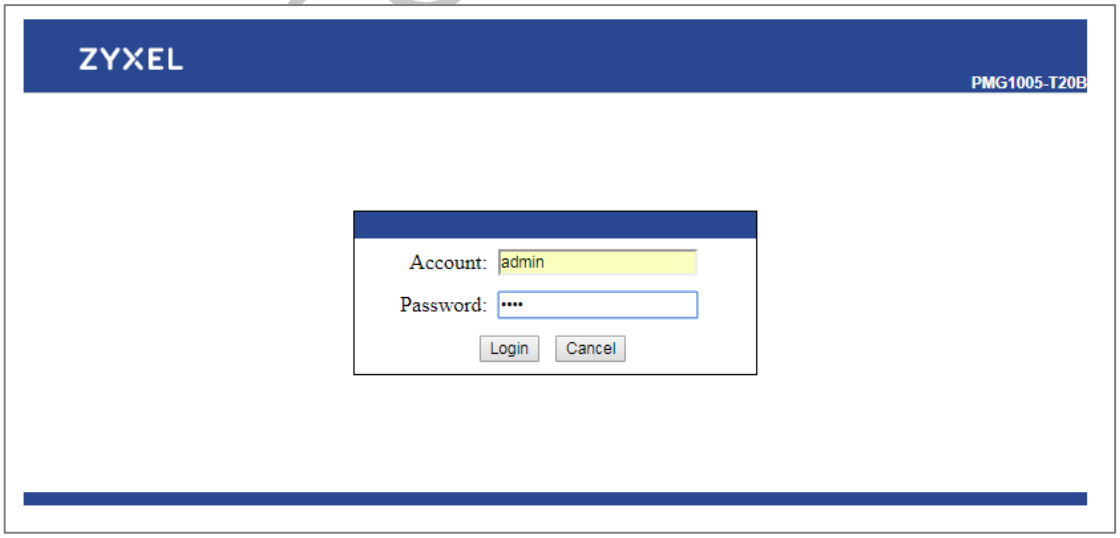
With the P2MP structure, service providers are able to provide various service packages to fulfill different user requirements into single deployment sites with the most cost-effective product combinations. The Zyxel PMG1005-T20B can perform as a Layer-2 Optical Network Terminal (ONT) followed by any Layer-3 devices such as routers, Wi-Fi APs, and home gateways, and more depending on individual subscriber's preference.



Initial Setup

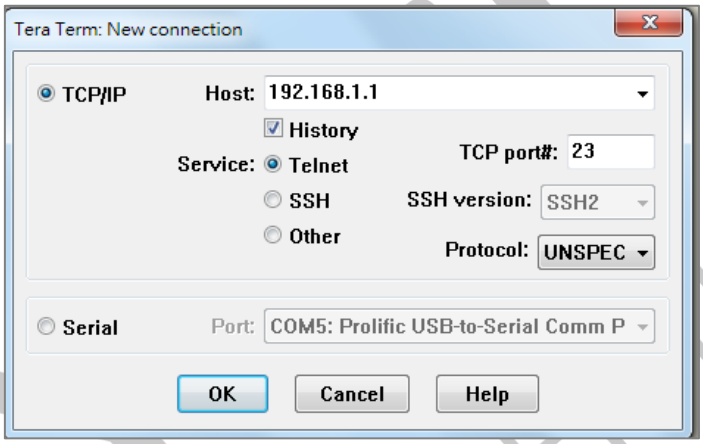
Access by Web GUI

Connect computer which set static IP address (192.168.1.x) to the LAN port and launch the web browser to go to management IP address (http://192.168.1.1 is default). Type default username admin and password 1234 then login.



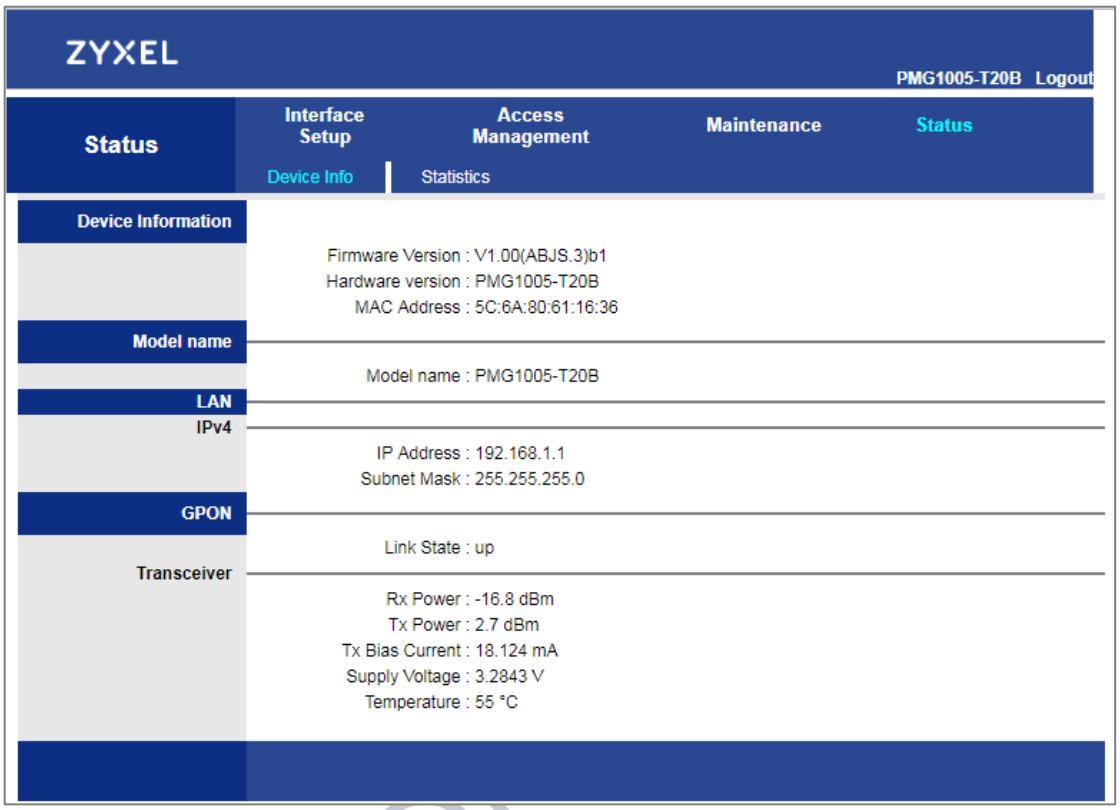
Access by telnet

Connect a computer to the LAN port and open the telnet session by terminal tool (e.g. Tera Term). Create the connection with device management IP address 192.168.1.1 and type correct username and password (admin/1234). Then you will get login access.



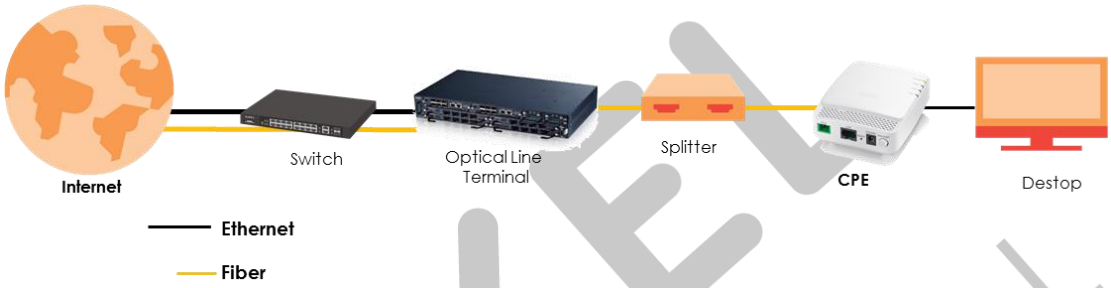
Device information

After login and check out all device status include basic Device Information, Model name, LAN, GPON status.



Internet Service

Topology and equipment



	Device Name	Firmware
COE	GPON OLT2406	V4.02(AAVA.1)C0
CPE	PMG1005-T20B	V1.00(ABJS.3)b1
Switch	MSG3520-28	V4.10(AATN.1)C0

Before settings, please make sure CPE and COE already have fiber connection. In this case, we deployed GPON scenario for follow CLI setup procedure, so the PON port need to be activation, and QoS profile need to be ready before configuration.

COE configuration

1. Configure the QoS ingress profile and bandwidth profiles

We create a "1G" QoS bandwidth profile which sets the pir to 1024000 kbps. QoS queue to manage the bandwidth of individual traffic classes within the bandwidth groups. In this case, we configure one "alltc1" QoS ingress profile to map all of IEEE 802.1p tags (from 0 to 7) to traffic class 1.

- # config
- (config)# qos bwprof <name>
  sir <0~2400000> //committed bandwidth.
  air <0~2400000> //assured bandwidth.
  pir <0~2400000> //greatest bandwidth.
- (config)# exit

- # show gpon qos bwprof
- # config
- (config)# gpon qos ingprof <name>
- [dot1p0tc <value>] //traffic class.
- [dot1p1tc <value>]
- [dot1p2tc <value>]
- [dot1p3tc <value>]
- [dot1p4tc <value>]
- [dot1p5tc <value>]
- [dot1p6tc <value>]
- [dot1p7tc <value>]
- (config)# exit
- # show gpon qos ingprof

```
OLT2406#
OLT2406# configure
OLT2406(config)# qos bwprof 1G sir 0 air 0 pir 1024000
OLT2406(config)# exit
OLT2406# show qos Bwprof
Index            Name  Ustype    SIR    AIR      PIR
-----  --------------  ------  -----  ----  -------
    1            100m       4      0     0   102400
    2             10M       4      0     0    10240
    3              1G       4      0     0  1024000
    4             20M       4      0     0    20480
    5             30M       4      0     0    30464
    6           30_10       5  27392  3008    30464
    7             50M       4      0     0    51200
```

```
OLT2406#
OLT2406# config
OLT2406(config)# qos ingprof alltc1 dot1p0tc 1 dot1p1tc 1 dot1p2tc 1 dot1p3tc 1 dot1p4tc 1 dot1p5tc 1 dot1p6tc
1 dot1p7tc 1
OLT2406(config)# exit
OLT2406# show qos ingprof
Index            Name  DOT1P0TC  DOT1P1TC  DOT1P2TC  DOT1P3TC  DOT1P4TC  DOT1P5TC  DOT1P6TC  DOT1P7TC
-----  --------------  --------  --------  --------  --------  --------  --------  --------  --------
    1   Brige_Intranet         0         0         0         0         0         0         0         0
    2          DEFVAL         1         1         1         1         1         1         1         1
    3          alltc0         0         0         0         0         0         0         0         0
    4          alltc1         1         1         1         1         1         1         1         1
    5  internet_allto0         0         0         0         0         0         0         0         0
    6       iptv_p4to2         2         2         2         2         2         2         2         2
    7             tc0         0      null      null      null      null      null      null      null
```

From the newest OLT firmware version V4.02x and after, OLT will auto assigned T-cont type for upstream based on the bandwidth group you configured.

2. Configure VLAN with fixed port on the uplink NNI port

Configure VLAN with the uplink port and PON port as fixed member (msc-1-1 and ge-3-1 are example in this case)

- # config
- (config)# vlan <VLAN ID>
- (config)# fixed msc-<slot>-<port> //setup uplink port into this group.
- (config)# fixed ge-<slot>-<port> //setup PON port into this group.
- (config)# exit

```
OLT2406# config
OLT2406(config)# vlan 10
OLT2406(config-vlan)# fixed msc-1-1
OLT2406(config-vlan)# fixed ge-3-1
OLT2406(config-vlan)# exit
OLT2406(config)# exit
OLT2406# show vlan
  The Number of VLAN :     1
  Idx.  VID   Status     Elap-Time
  ----  ----  ---------  -----------
     3    10     Static      0:49:53
    TagCtl Tagged   :
       ge-3-1
       msc-1-1
    TagCtl Untagged :
```

3. Adding a new ONT

To add a new ONT by CLI start by finding the Serial Number and Password after connecting the PON Port and turning on the device. It will show the ONT information which register requirement. In this case, we setup an ONT 3-1-3(3 is ONT ID) and assigned bandwidth profile 1G both upstream and downstream.

Start from OLT version V4.02x, OLT will compare the ONT information which reported by ONT itself and auto get model name based on default ONU-model profile in the device.

- # show remote ont unreg //checking un-register ONT
- # config
- (config)# remote ont <slot>-<port>-<ONT ID>
- (config)# sn <ONT series number>
- (config)# password <ONT register password>
- (config)# bwgroup <1-40> usbwprofname <bandwidth profile name> dsbwprofname < bandwidth profile name>
- (config)# no inactive

- (config)# exit

```
OLT2406# sh remote ont unreg
  Pon_AID              |     Type          SN              Password              Status
  ---------------------+-------------------------------------------------------------------
  pon-3-1              |    UnReg 5A594F4380611636          DEFAULT               Active
  ---------------------+-------------------------------------------------------------------
  Total: 1
OLT2406# config
OLT2406(config)# remote ont ont-3-1-3
OLT2406(config-ont)# sn 5A594F4380611636
OLT2406(config-ont)# password DEFAULT
OLT2406(config-ont)# bwgroup 1 usbwprofname 1G dsbwprofname 1G
OLT2406(config-ont)# no inactive
OLT2406(config-ont)# exit
```

4. ONT UNI-port configuration

In this case, ONT is running as bridge mode for following settings. Start from OLT version V4.02x, OLT fixed ontcard number for Giga Ethernet bridge mode as card ID 1. The uniport will deploy on Ethernet interface ID 1. So, directly access into ONT uniport by 3-1-3-1-1. (Please reference **Appendix** for finding card number for different mode)

Create a traffic queue on the uniport first. We need to assign the bandwidth profile 1G for up and down stream in previously and assign the bwgroup number corresponding to the one that created at the ONT side. Add VLAN 10 for internet service, and VLAN ID is tagged by default. We will deploy this VLAN to the queue using the ingress profile.

- # config
- (config)# remote uniport <slot>-<port>-<ONT ID>-1-1 // Giga Ethernet bridge
- (config)# queue tc <traffic class> priority <0-7> weight <0-7> usbwprofname <qos bwprof> dsbwprofname <qos bwprof> dsoption <olt/ont> bwsharegroupid <group ID>
- (config)# vlan <VLAN ID> txtag <untag> ingprof <qos ingprof>
- (config)# pvid <VLAN ID>
- (config)# no inactive
- (config)# exit

```
OLT2406# config
OLT2406(config)# remote uniport uniport-3-1-3-1-1
OLT2406(config-remote-giga-uniport)# queue tc 1 priority 0 weight 0 usbwprofname 1G dsbwprofname 1G dsoption olt bwsharegroupid 1
OLT2406(config-remote-giga-uniport)# vlan 10 txtag untag ingprof alltc1
OLT2406(config-remote-giga-uniport)# pvid 10
OLT2406(config-remote-giga-uniport)# no inactive
OLT2406(config-remote-giga-uniport)# exit
OLT2406(config)# exit
```

After above setup, checking the ONT status is "In Service".

- # show remote ont ont-<slot>-<port>-<ONT ID>

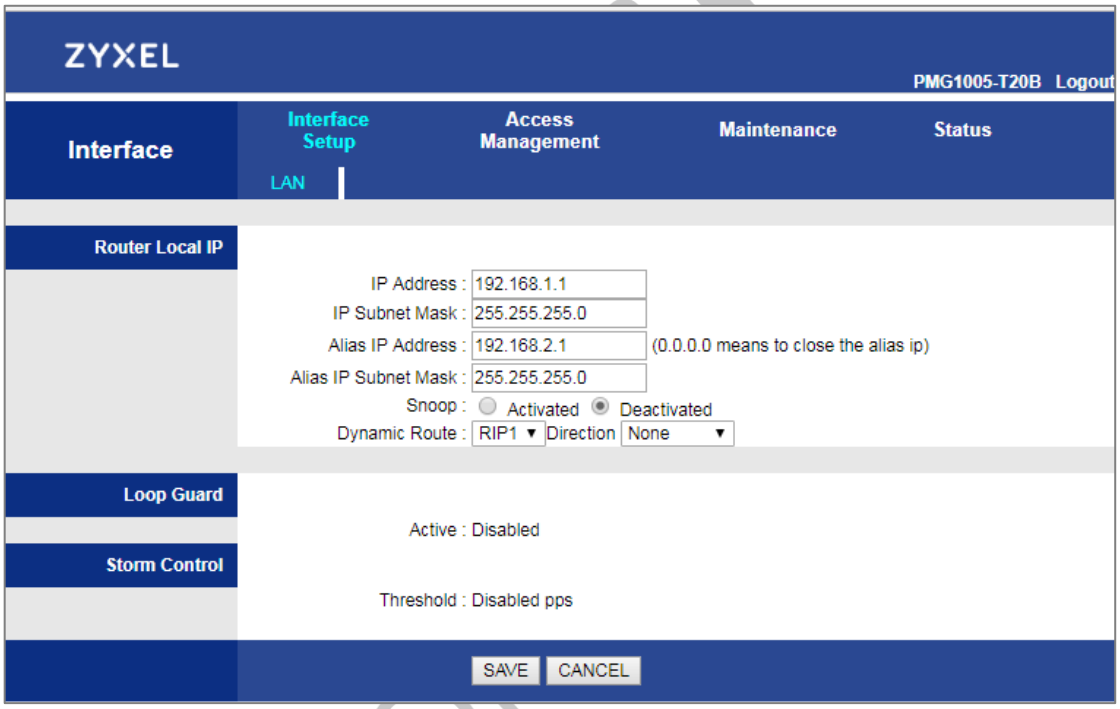
```
OLT2406# sh remote ont ont-3-1-3

---------------------+-----------------------------------------------------+-------------------------+-----------------
AID                  |   Type              SN            Password   Status  Image Active     SW Version     Vendor/Version
---------------------+-----------------------------------------------------+-------------------------+-----------------
ont-3-1-3            | Config 5A594F4380611636             DEFAULT   Active |    1      V    V100ABJS3b1 |            ZYOC
                     | Actual 5A594F4380611636             DEFAULT       IS |    2           V100ABLU1C0 |     PMG1005-T20B
                     +-------------------------------------------------------------------------------------------------
                     | Details
                     +-------------------------------------------------------------------------------------------------
                     | Status                            : IS (14m 31s)
                     | Estimated distance                : 0 m
                     | OMCI GEM port                     : 3
                     | Model name                        : PMG1005-T20B
                     | Model ID                          : 1
                     | Full bridge                       : disable
                     | US FEC                            : disable
                     | Alarm profile                     : DEFVAL
                     | Anti MAC Spoofing                 : disable
                     | Planned Version                   :
                     | Description                       :
                     | Template Description              :
                     | Management IP Address             : N/A
                     +-------------------------------------------------------------------------------------------------
                     | Wan 1                             : Disable
---------------------+-----------------------------------------------------+-------------------------+-----------------
```

LAN Setting

LAN

LAN: Click Interface Setup > LAN to open the LAN setting page. We could configure the local Area Network IP address and subnet mask of your GPON device.

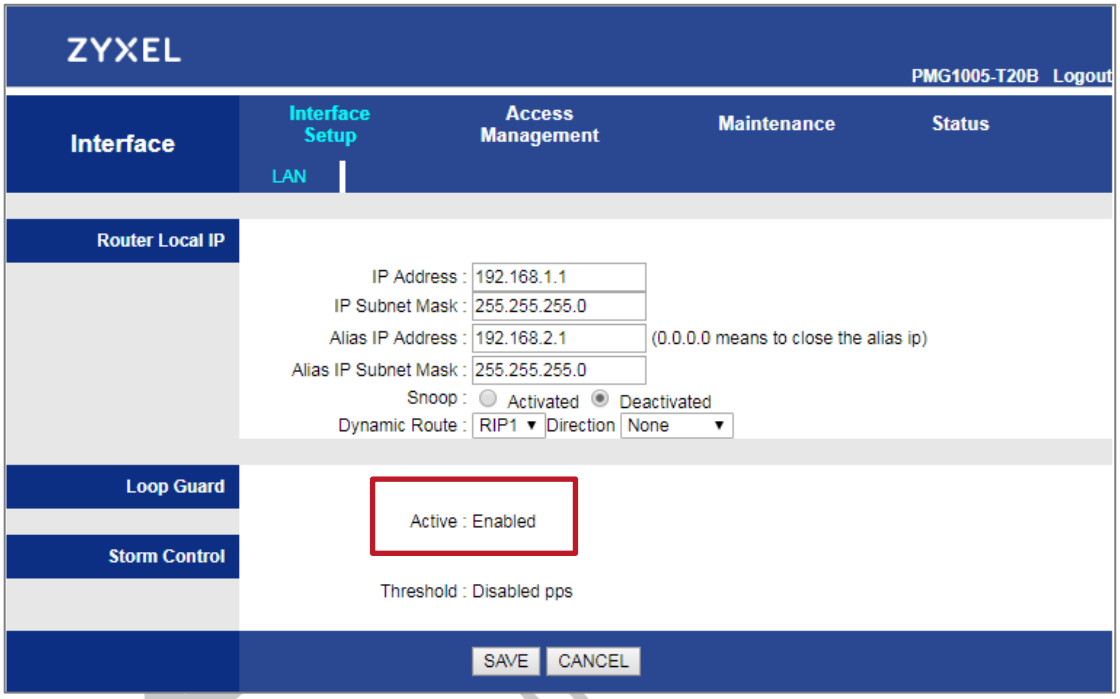


Snoop: Select Activated to enable IGMP Snooping to forward group multicast traffic only when the LAN port is the members of that group. Otherwise, select Deactivated.

Loop Guard: Default setting is disabled. This setting is read only on ONT and control by OLT.

```
OLT2406# config
OLT2406(config)# remote ont ont-3-1-3
OLT2406(config-ont)# loopguard enable
OLT2406(config-ont)# exi
OLT2406(config)# exit
OLT2406#
```

```
OLT2406# sh remote ont ont-3-1-3 loopguard
  ---------------------+-----------------------------------------------------------------
   AID                 |
  ---------------------+-----------------------------------------------+-----------------
   ont-3-1-3           | Loopguard Enable                              | Enable
                       | Loopguard Detected                            | No
  ---------------------+-----------------------------------------------+-----------------
```



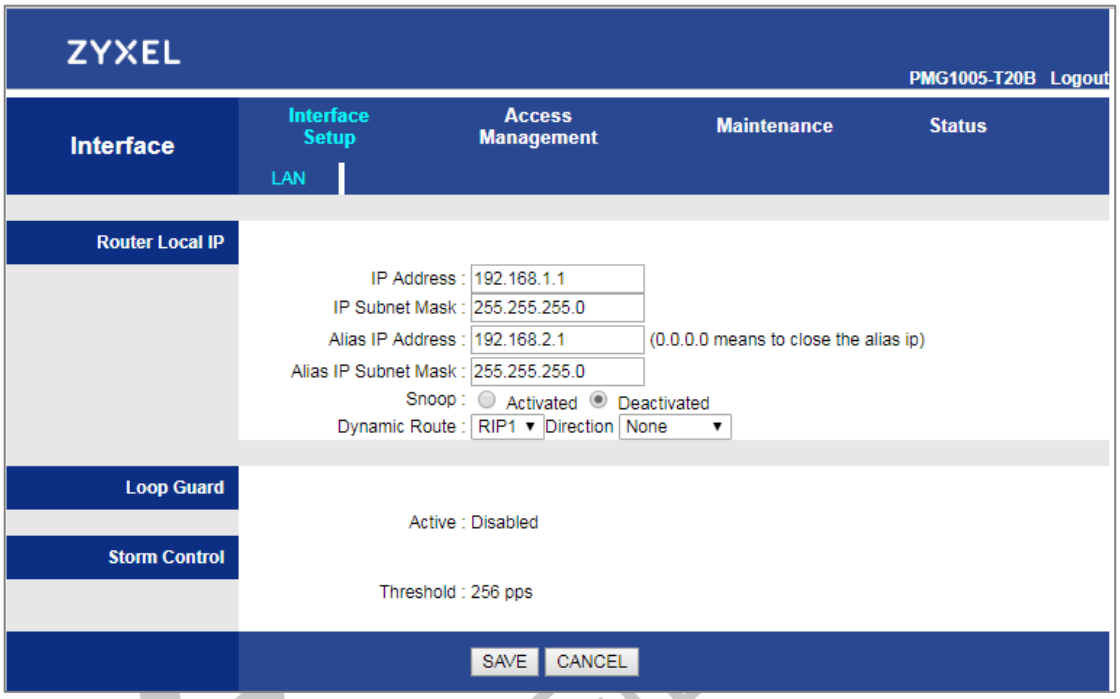
If the loop detect on this LAN port, the port will be block 5 minutes, then recovery.

```
OLT2406# sh remote ont ont-3-1-3 loopguard
  ---------------------+-----------------------------------------------------------------
   AID                 |
  ---------------------+-----------------------------------------------+-----------------
   ont-3-1-3           | Loopguard Enable                              | Enable
                       | Loopguard Detected                            | Yes
  ---------------------+-----------------------------------------------+-----------------
```

```
OLT2406# sh logging
  1 Feb 13 17:18:19 WA interface: Storming loopguardDetect clear: ont-3-1-3
  2 Feb 13 17:16:17 WA omci-alarm: LanLos (MEId-11) alarm clear: uniport-3-1-3-1-1
  3 Feb 13 17:16:35 WA omci-alarm: HighTxOpticalPower (MEId-263) alarm set: ont-3-1-3
  4 Feb 13 17:16:34 WA omci-alarm: HighTxOpticalPower (MEId-263) alarm clear: ont-3-1-3
  5 Feb 13 17:13:25 WA interface: Storming bcastOverThr clear: ont-3-1-3
  6 Feb 13 17:13:22 WA interface: Storming loopguardDetect set: ont-3-1-3
  7 Feb 13 17:13:16 WA omci-alarm: LanLos (MEId-11) alarm set: uniport-3-1-3-1-1
```

Storm Control: Default setting is disabled. This setting is read only on ONT and control by OLT.

```
OLT2406#
OLT2406# config
OLT2406(config)# remote ont ont-3-1-3
OLT2406(config-ont)# stormThreshold 256
OLT2406(config-ont)# exit
```



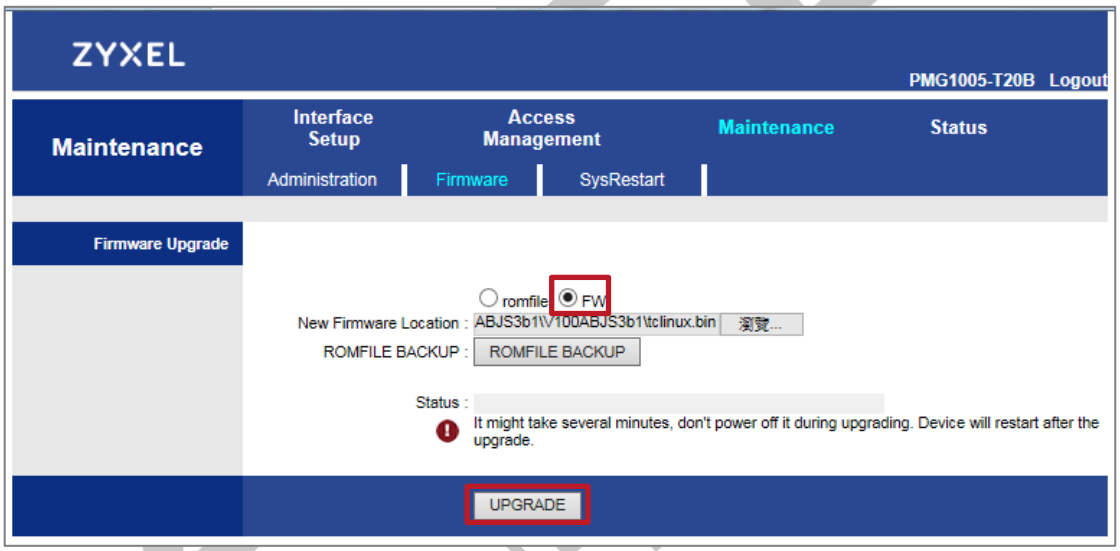
PMG1005-T20B support the notification for storm control (Broadcast, Multicast and unknown unicast over threshold, DDoS ARP, TCP and UDP flood detected). When storming occurring, PMG1005-T20B only sends "Broadcast over threshold" notification ME to OLT and would not shut down LAN port.

```
OLT2406# sh logging
  1 Feb 13 17:16:35 WA omci-alarm: HighTxOpticalPower (MEId-263) alarm set: ont-3-1-3
  2 Feb 13 17:16:34 WA omci-alarm: HighTxOpticalPower (MEId-263) alarm clear: ont-3-1-3
  3 Feb 13 17:13:25 WA interface: Storming bcastOverThr clear: ont-3-1-3
  4 Feb 13 17:13:22 WA interface: Storming loopguardDetect set: ont-3-1-3
  5 Feb 13 17:13:16 WA omci-alarm: LanLos (MEId-11) alarm set: uniport-3-1-3-1-1
  6 Feb 13 17:13:16 WA interface: Storming bcastOverThr set: ont-3-1-3
  7 Feb 13 17:06:46 WA omci-alarm: LanLos (MEId-11) alarm clear: uniport-3-1-3-1-1
  8 Feb 13 17:06:41 WA omci-alarm: LanLos (MEId-11) alarm set: uniport-3-1-3-1-1
  9 Feb 13 17:06:41 WA omci-alarm: LanLos (MEId-11) alarm clear: uniport-3-1-3-1-1
```

Maintenance

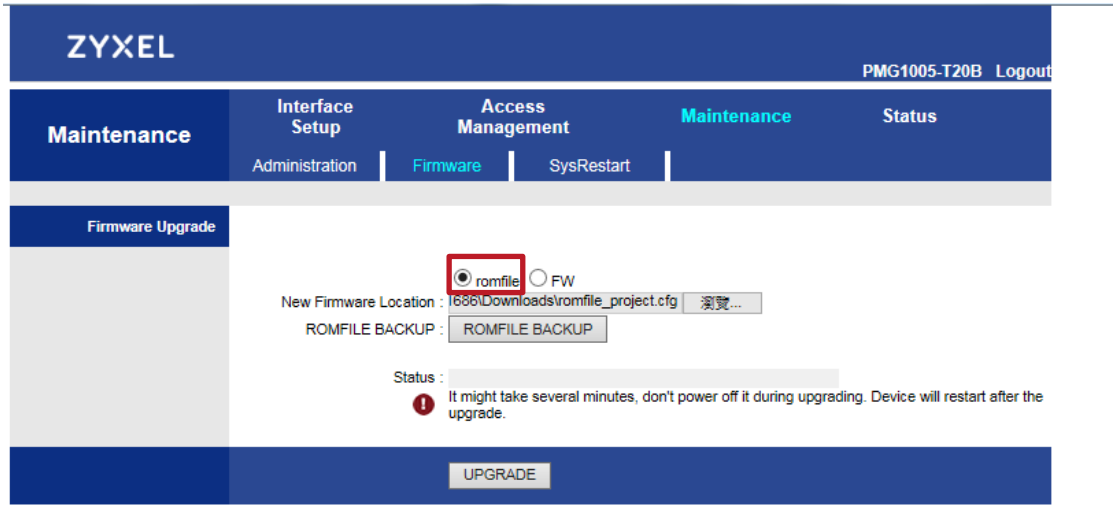
Firmware upgrade

Go to **Maintenance > Firmware >** to open the below screen and select FW. Click "Browse" button to select the target firmware file from local PC then click "UPGRADE" button. The upload process may take 2~3 minutes. The system will auto reboot after firmware upgrade successful.



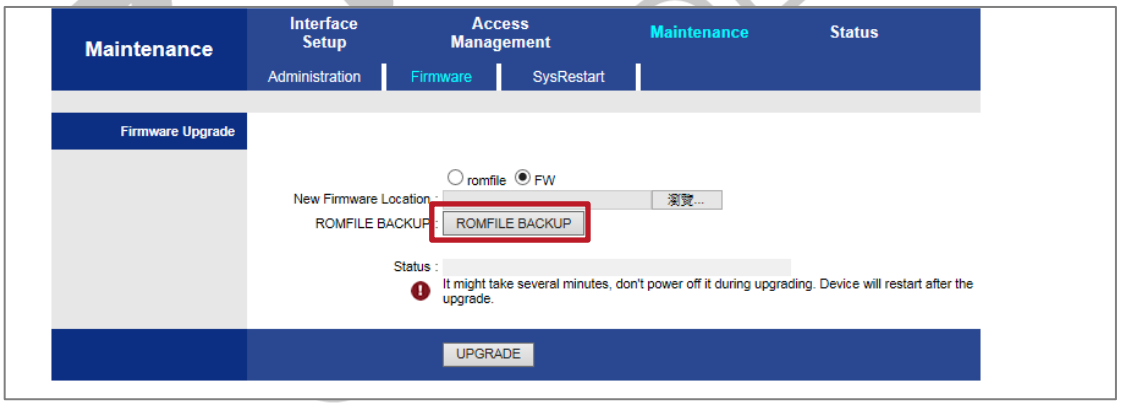
Romfile Restore

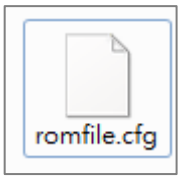
Go to **Maintenance > Firmware >** to open the below screen and select romfile. Click "Browse" button to select the target configuration file from local PC then click "UPGRADE" button. The configuration file will restore to device.



Romfile backup

Go to **Maintenance > Firmware >** to open the below screen and click "ROMFILE BACKUP" button. The romfile.cfg will pop up and then save the configuration to local PC.





Troubleshooting

To get environment information

In order to further clarify, please collect below task information.

- COE (OLT) model and firmware version.

- COE (OLT) configuration
- CPE (ONT) firmware version

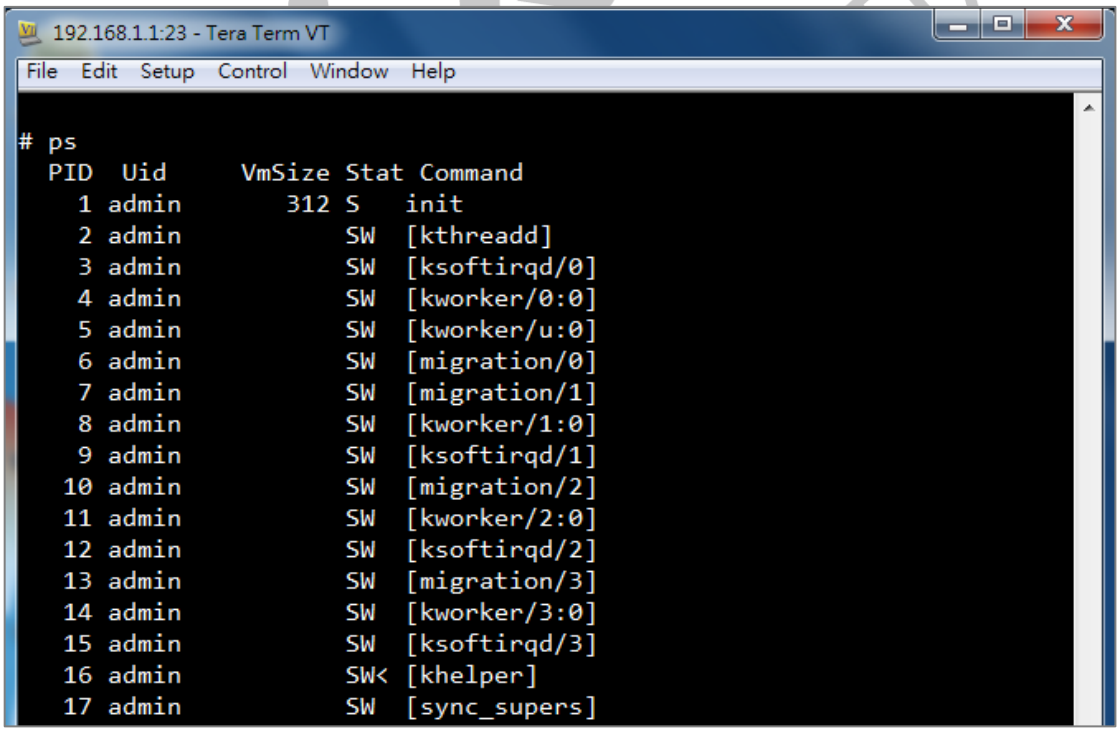
To get general system information

Use telnet connection (The default username and password are admin/1234) to login into device and capture dump message for further checking or save relate information to Zyxel HQ to do analysis.

Process information

We could get all processing information which device using via Linux command.

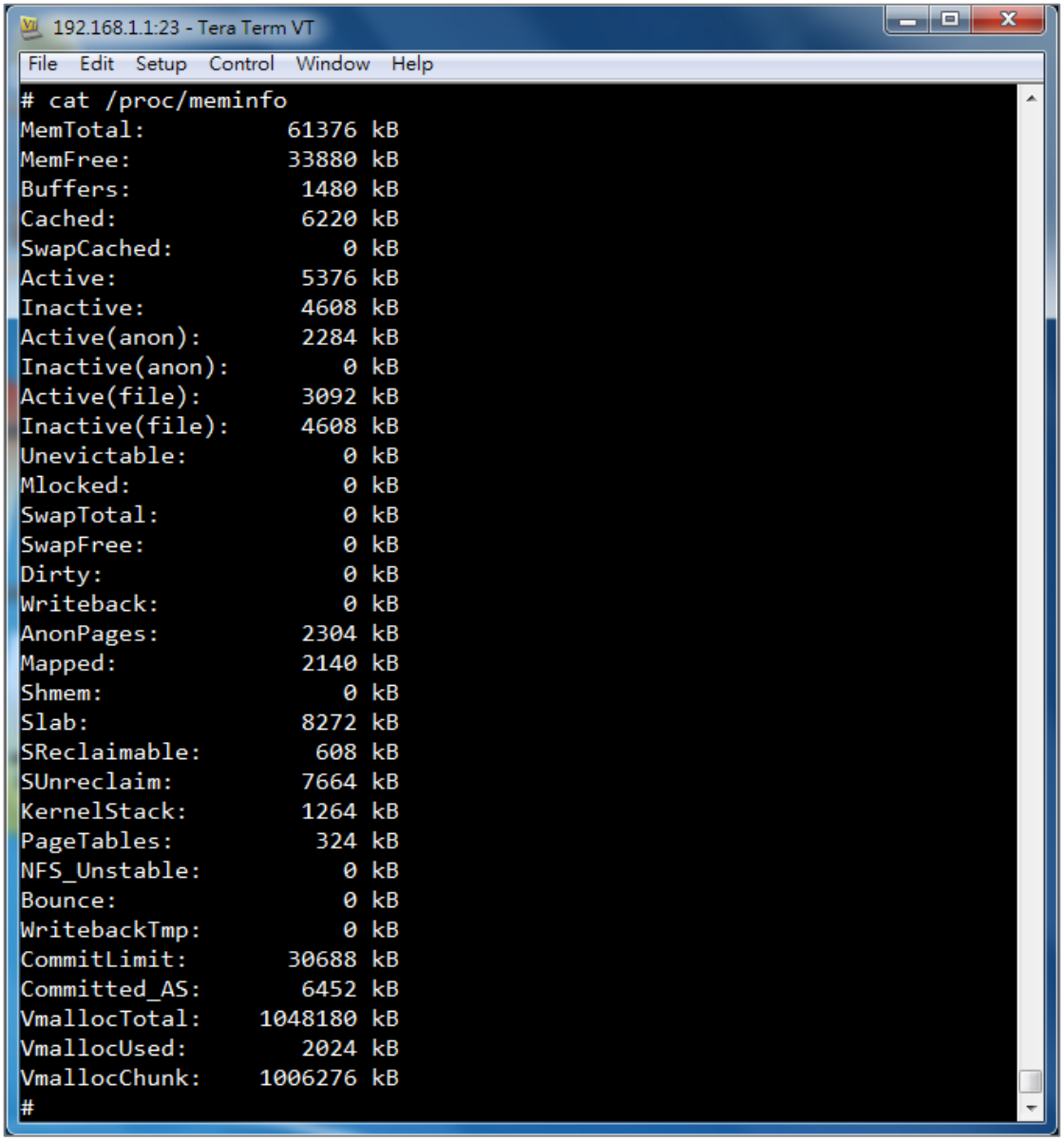
- # ps



Memory information

Use command to check memory usage.

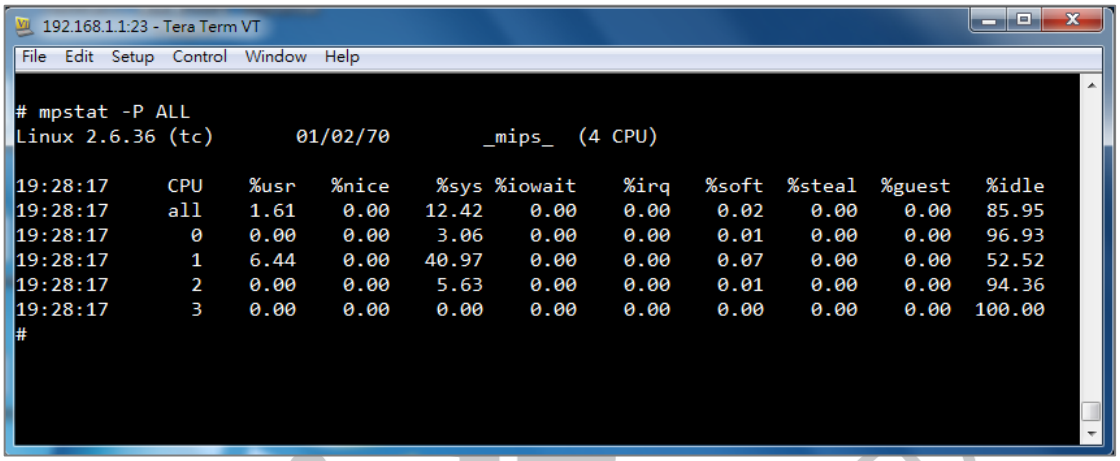
- # cat /proc/meminfo



CPU usage

Use command to get CPU information.

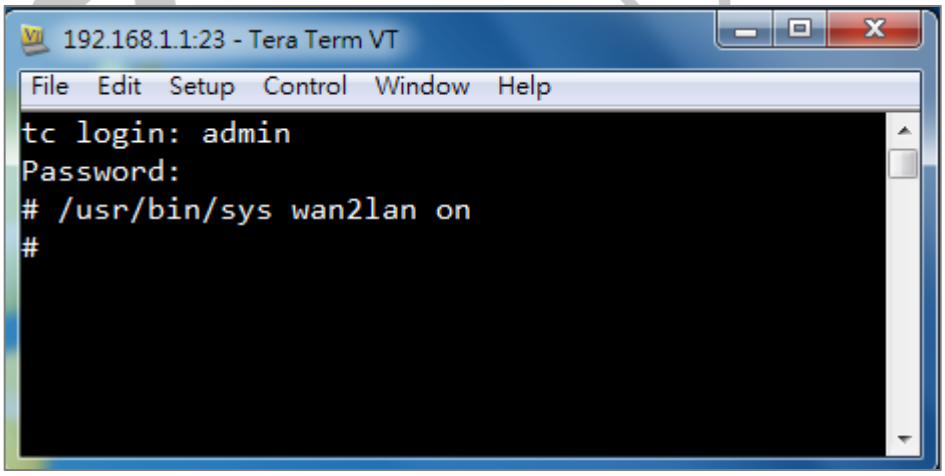
- # mpstat –P ALL



To mirror WAN packet

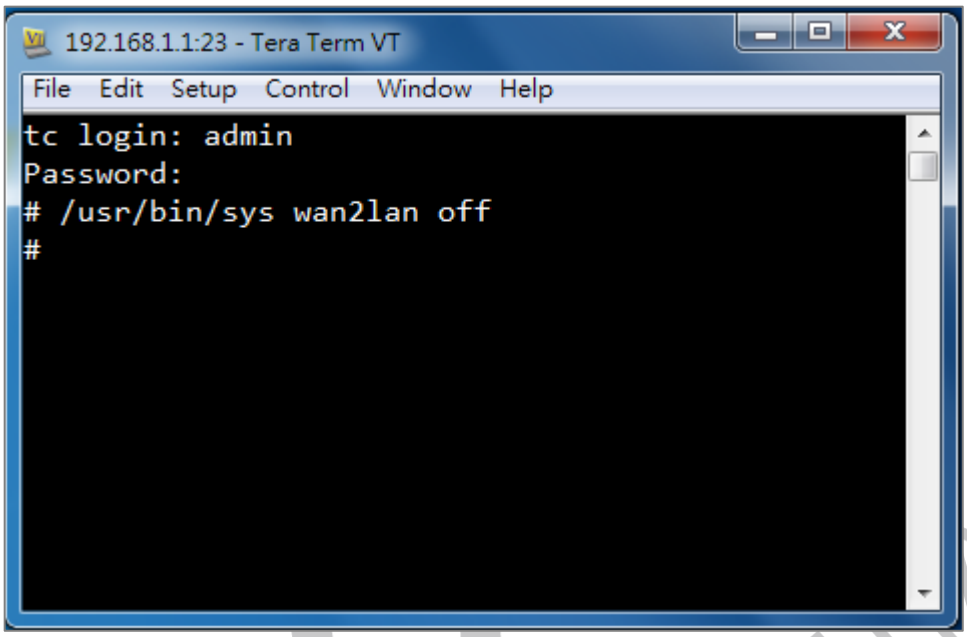
Enable WAN mirror function.

- # /usr/bin/sys wan2lan on



Disable WAN mirror function.

- # /usr/bin/sys wan2lan off



Appendix

OLT2406 ONU model

Start from OLT version V4.02x, we fixed the ontcard number as specific mode like VEIP, Giga Ethernet, and POTS…etc. For example, ONT VEIP mode will use card ID 2 for uniport port provision, and card ID 3 represents POTS interface.
Moreover, OLT has recorded ONU model ID information which published from Zyxel by default. No need to assign model ID when we setup ONT.

- # show onu-model

```
OLT2406# sh onu-model
                                +------+------+------+-------+------+
                                |  C1  |  C2  |  C3  |  C4   |  C5  |
                                +------+------+------+-------+------+
                                | GIGA | VEIP | POTS | VIDEO | 100M |
                                +------+------+------+-------+------+
ONU Model Table Entry:[18]                                      Entity-ID
Model-Name      Vendor-version                 Software-ver    ID C1  C2  C3  C4  C5
--------------- ------------------------------ --------------- -- --- --- --- --- ---
PMG5318-B20B-1                ********** 100ABBF*******  5   0   0   0   0   0
PMG5318-B20C-1                ********** 100ABGR*******  5   0   0   0   0   0
PMG5318-B20C-2                ********** 100ABGS*******  5   0   0   0   0   0
PMG5318-B20A-2                ********** PLA_NAT_******  2   0   0   0   0   0
PMG5318-B20A-3                ********** V100AANC******  2   0   0   0   0   0
PMG5318-B20A-1                ********** V100AATJ******  2   0   0   0   0   0
PMG5318-B20A-4                ********** V100ABAU******  2   0   0   0   0   0
  PMG1005-T20A                PMG1005-T20A**             1   0   0   0   0   0
  PMG1005-T20B                PMG1005-T20B**             1   0   0   0   0   0
  PMG1006-B20A                PMG1006-B20A**             1   0   0   0   0   0
  PMG1006-B20B                PMG1006-B20B**             2   0   0   0   0   0
  PMG3000-D20B                PMG3000-D20B**             5   0   0   0   0   0
  PMG5317-T20A                PMG5317-T20A**             5   0   0   0   0   0
  PMG5317-T20B                PMG5317-T20B**             5   0   0   0   0   0
  PMG5318-B20A                PMG5318-B20A**             2   0   0   0   0   0
  PMG5318-B20B                PMG5318-B20B**             5   0   0   0   0   0
  PMG5318-B20C                PMG5318-B20C**             5   0   0   0   0   0
  PMG5323-B20B                PMG5323-B20B**             5   0   0   0   0   0
```