

PMG1005-T20B

Application Note

Edition v1.0

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Table of Content

Revision History	3
General Application	4
Getting to know the device	4
Application diagram	4
Initial Setup	5
Access by Web GUI	5
Access by telnet	6
Device information	7
Internet Service	8
Topology and equipment	8
COE configuration	8
LAN Setting	13
LAN	13
Maintenance	16
Firmware upgrade	16
Troubleshooting	17
To get environment information	17
To get general system information	18
To mirror WAN packet	20
Appendix	22
OLT2406 ONU model	22

Revision History

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

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General Application

Getting to know the device

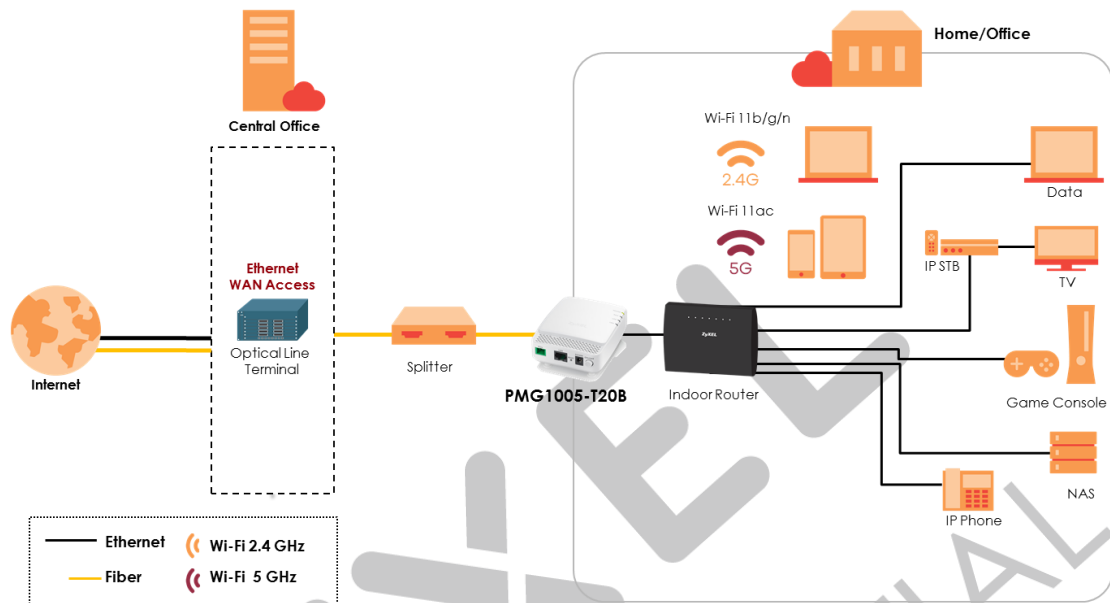
The Zyxel PMG1005-T20B GPON SFU with 1-port GbE LAN comes with one GPON uplink and one GbE LAN downlink to serve as a simple bridge to offer Gigabit data access to subscribers. GPON Device provides shared Internet access through a fiber optic line connected to the PON port's built-in optical transceiver.



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

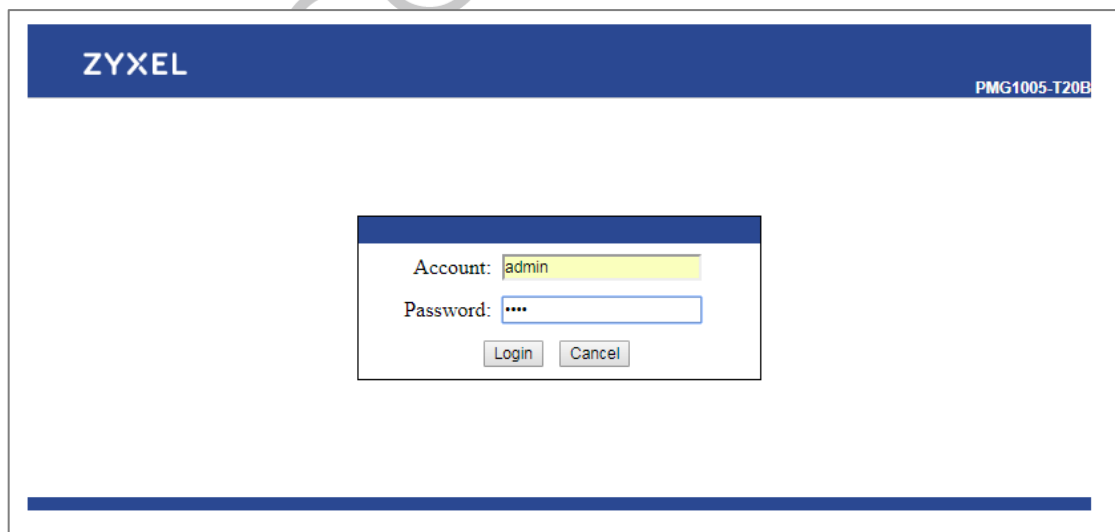
With the P2MP structure, service providers are able to provide various service packages to fulfill different user requirements into single deployment sites with the most cost-effective product combinations. The Zyxel PMG1005-T20B can perform as a Layer-2 Optical Network Terminal (ONT) followed by any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



Initial Setup

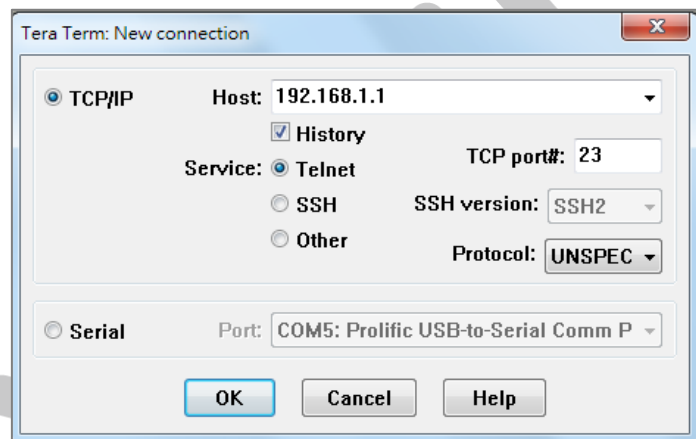
Access by Web GUI

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.



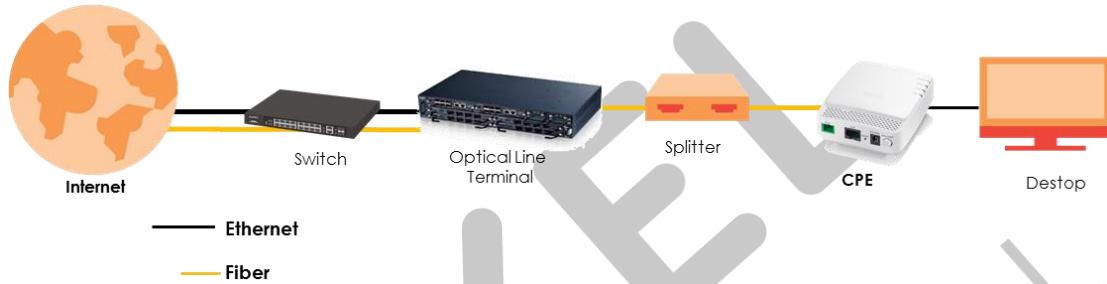
Device information

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

ZYXEL		PMG1005-T20B	Logout	
Status	Interface Setup	Access Management	Maintenance	Status
	Device Info	Statistics		
Device Information	Firmware Version : V1.00(ABJS.3)b1 Hardware version : PMG1005-T20B MAC Address : 5C:6A:80:61:16:36			
Model name	Model name : PMG1005-T20B			
LAN IPv4	IP Address : 192.168.1.1 Subnet Mask : 255.255.255.0			
GPON	Link State : up			
Transceiver	Rx Power : -16.8 dBm Tx Power : 2.7 dBm Tx Bias Current : 18.124 mA Supply Voltage : 3.2843 V Temperature : 55 °C			

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 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> tntag <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 tntag 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  
-----
```

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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.

Interface	Interface Setup	Access Management	Maintenance	Status
	LAN			
Router Local IP	IP Address : 192.168.1.1 IP Subnet Mask : 255.255.255.0 Alias IP Address : 192.168.2.1 (0.0.0.0 means to close the alias ip) Alias IP Subnet Mask : 255.255.255.0 Snoop : <input type="radio"/> Activated <input checked="" type="radio"/> Deactivated Dynamic Route : RIP1 Direction None			
Loop Guard	Active : Disabled			
Storm Control	Threshold : Disabled pps			
<input type="button" value="SAVE"/> <input type="button" value="CANCEL"/>				

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)# exit
OLT2406(config)# exit
OLT2406#
```



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

ZYXEL		PMG1005-T20B	Logout	
Interface	Interface Setup	Access Management	Maintenance	Status
	LAN			
Router Local IP	IP Address : 192.168.1.1 IP Subnet Mask : 255.255.255.0 Alias IP Address : 192.168.2.1 (0.0.0.0 means to close the alias ip) Alias IP Subnet Mask : 255.255.255.0 Snoop : <input type="radio"/> Activated <input checked="" type="radio"/> Deactivated Dynamic Route : RIP1 Direction None			
Loop Guard	Active : Disabled			
Storm Control	Threshold : 256 pps			
		SAVE	CANCEL	

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

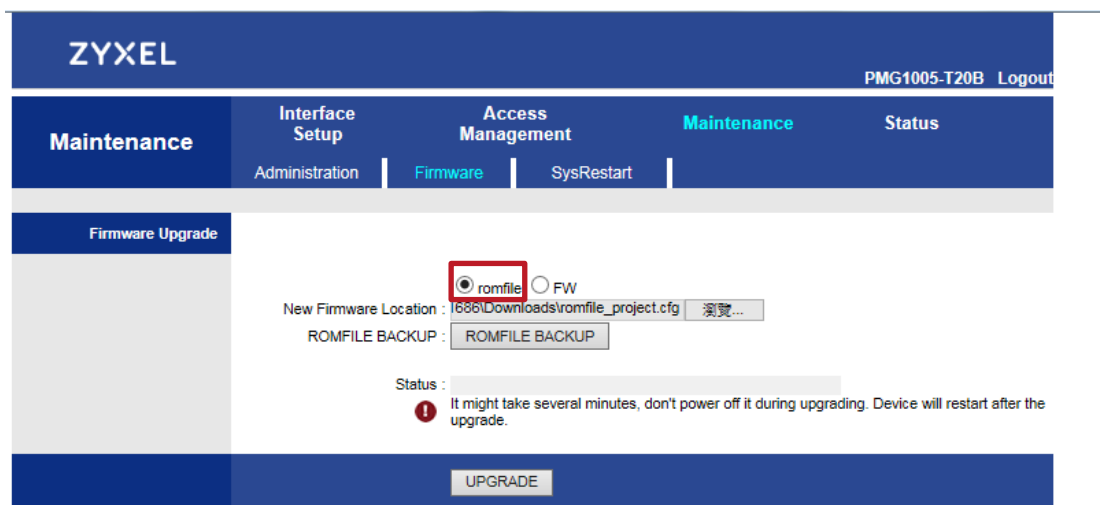
Firmware upgrade

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.

The screenshot shows the ZyXel web interface for the Firmware Upgrade process. The page title is 'ZYXEL' and the user is logged in as 'PMG1005-T20B'. The navigation menu includes 'Maintenance', 'Interface Setup', 'Access Management', and 'Status'. Under 'Maintenance', 'Firmware' is selected. The main content area is titled 'Firmware Upgrade' and contains a form with two radio buttons: 'romfile' and 'FW' (selected). Below the radio buttons is a text field for 'New Firmware Location' with the value 'ABJS3b1V100ABJS3b1tclinux.bin' and a '浏览...' button. There is also a 'ROMFILE BACKUP' button. A status message indicates that the upgrade might take several minutes and the device will restart. At the bottom, there is an 'UPGRADE' button.

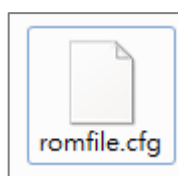
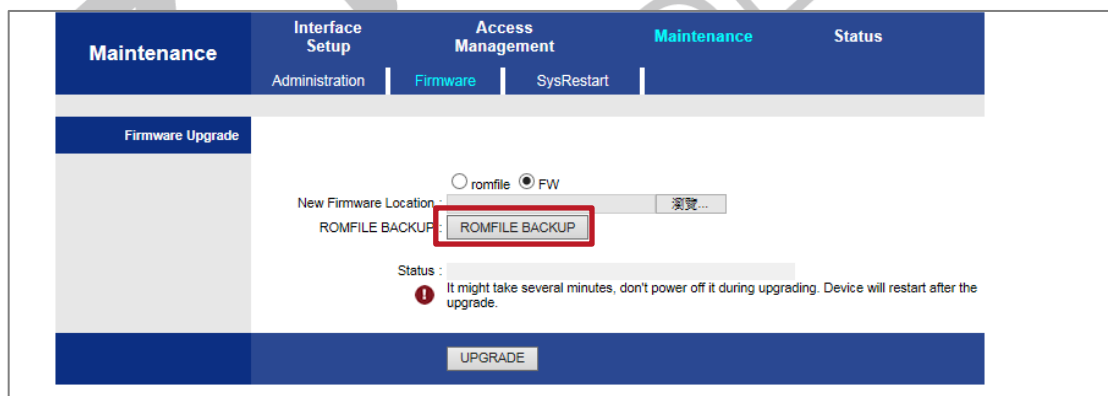
Romfile Restore

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

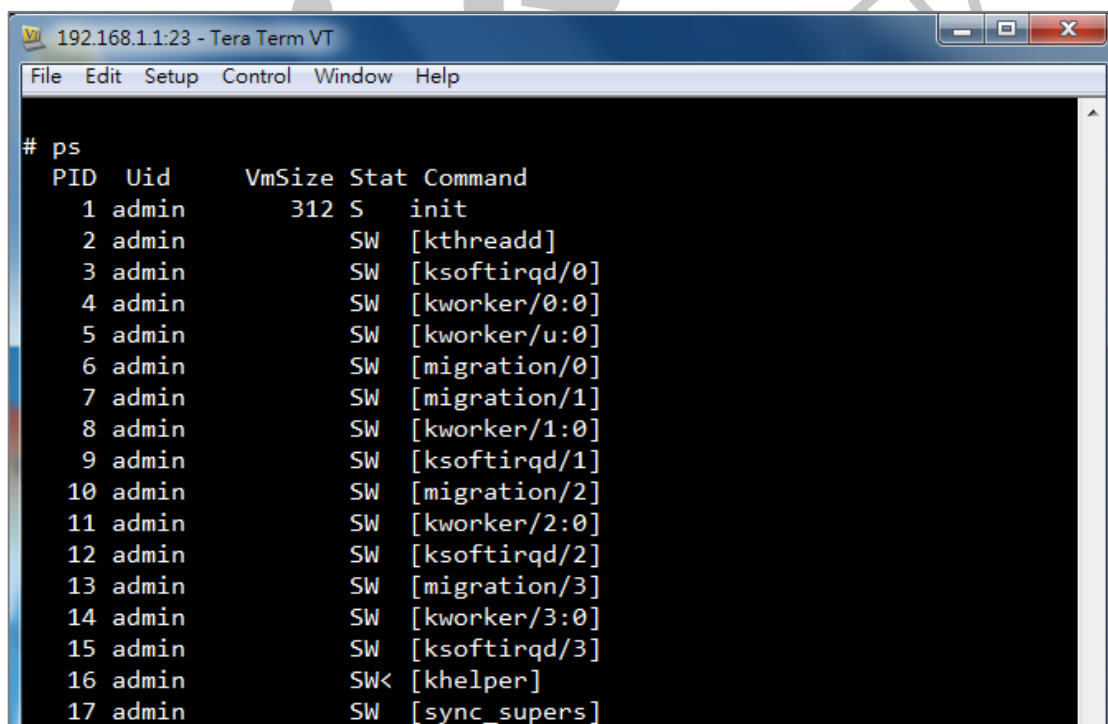
To get general system information

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

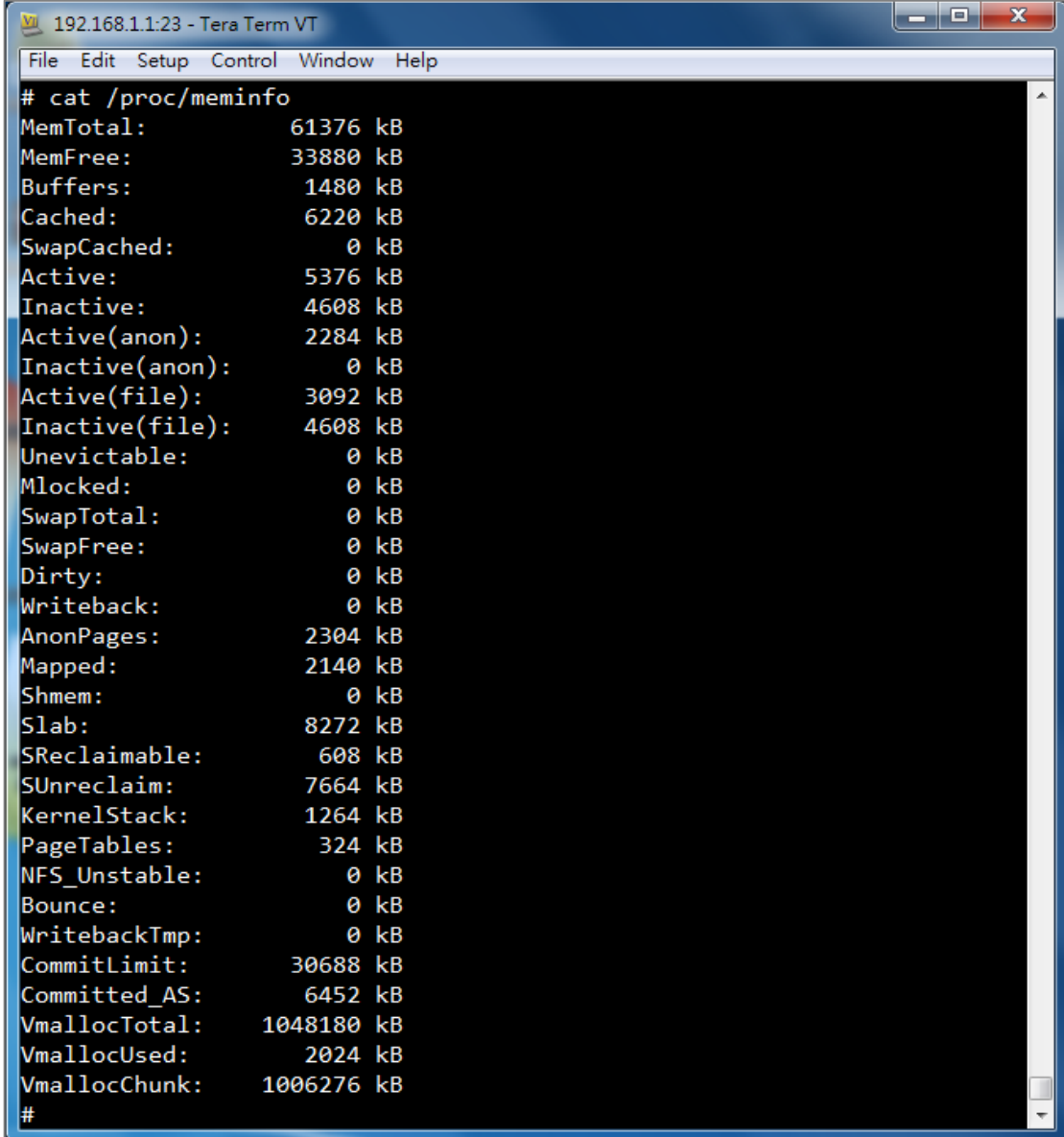


```
192.168.1.1:23 - Tera Term VT
File Edit Setup Control Window Help
# ps
  PID  Uid      VmSize  Stat  Command
   1  admin      312    S    init
   2  admin             SW    [kthreadd]
   3  admin             SW    [ksoftirqd/0]
   4  admin             SW    [kworker/0:0]
   5  admin             SW    [kworker/u:0]
   6  admin             SW    [migration/0]
   7  admin             SW    [migration/1]
   8  admin             SW    [kworker/1:0]
   9  admin             SW    [ksoftirqd/1]
  10  admin             SW    [migration/2]
  11  admin             SW    [kworker/2:0]
  12  admin             SW    [ksoftirqd/2]
  13  admin             SW    [migration/3]
  14  admin             SW    [kworker/3:0]
  15  admin             SW    [ksoftirqd/3]
  16  admin             SW<   [khelper]
  17  admin             SW    [sync_supers]
```

Memory information

Use command to check memory usage.

- # cat /proc/meminfo

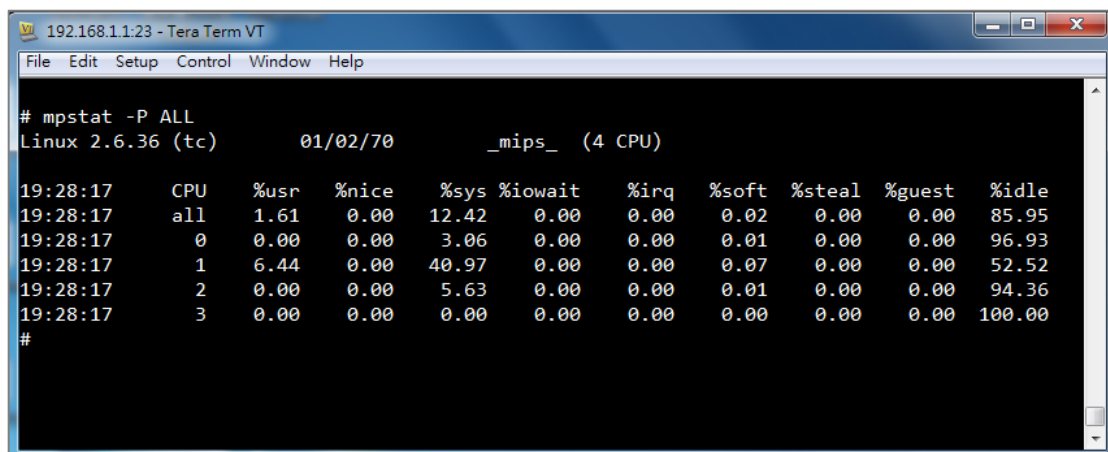


```
192.168.1.1:23 - Tera Term VT
File Edit Setup Control Window Help
# cat /proc/meminfo
MemTotal:          61376 kB
MemFree:           33880 kB
Buffers:           1480 kB
Cached:            6220 kB
SwapCached:        0 kB
Active:            5376 kB
Inactive:          4608 kB
Active(anon):      2284 kB
Inactive(anon):    0 kB
Active(file):      3092 kB
Inactive(file):    4608 kB
Unevictable:       0 kB
Mlocked:           0 kB
SwapTotal:         0 kB
SwapFree:          0 kB
Dirty:             0 kB
Writeback:         0 kB
AnonPages:         2304 kB
Mapped:            2140 kB
Shmem:             0 kB
Slab:              8272 kB
SReclaimable:      608 kB
SUnreclaim:       7664 kB
KernelStack:      1264 kB
PageTables:        324 kB
NFS_Unstable:     0 kB
Bounce:            0 kB
WritebackTmp:     0 kB
CommitLimit:      30688 kB
Committed_AS:     6452 kB
VmallocTotal:     1048180 kB
VmallocUsed:       2024 kB
VmallocChunk:     1006276 kB
#
```

CPU usage

Use command to get CPU information.

- # mpstat -P ALL

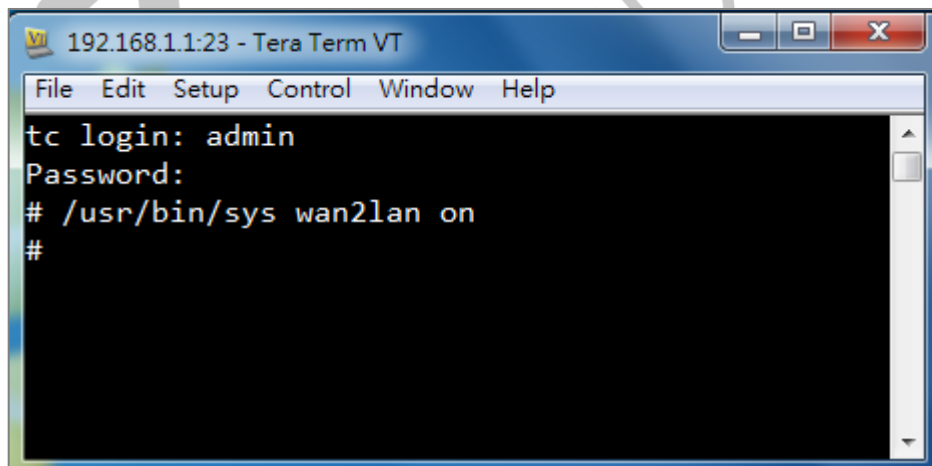


```
192.168.1.1:23 - Tera Term VT
File Edit Setup Control Window Help
# mpstat -P ALL
Linux 2.6.36 (tc)      01/02/70      _mips_ (4 CPU)
19:28:17   CPU   %usr  %nice  %sys %iowait  %irq  %soft  %steal  %guest  %idle
19:28:17   all   1.61  0.00 12.42  0.00   0.00  0.02  0.00  0.00  85.95
19:28:17    0    0.00  0.00  3.06  0.00   0.00  0.01  0.00  0.00  96.93
19:28:17    1    6.44  0.00 40.97  0.00   0.00  0.07  0.00  0.00  52.52
19:28:17    2    0.00  0.00  5.63  0.00   0.00  0.01  0.00  0.00  94.36
19:28:17    3    0.00  0.00  0.00  0.00   0.00  0.00  0.00  0.00 100.00
#
```

To mirror WAN packet

Enable WAN mirror function.

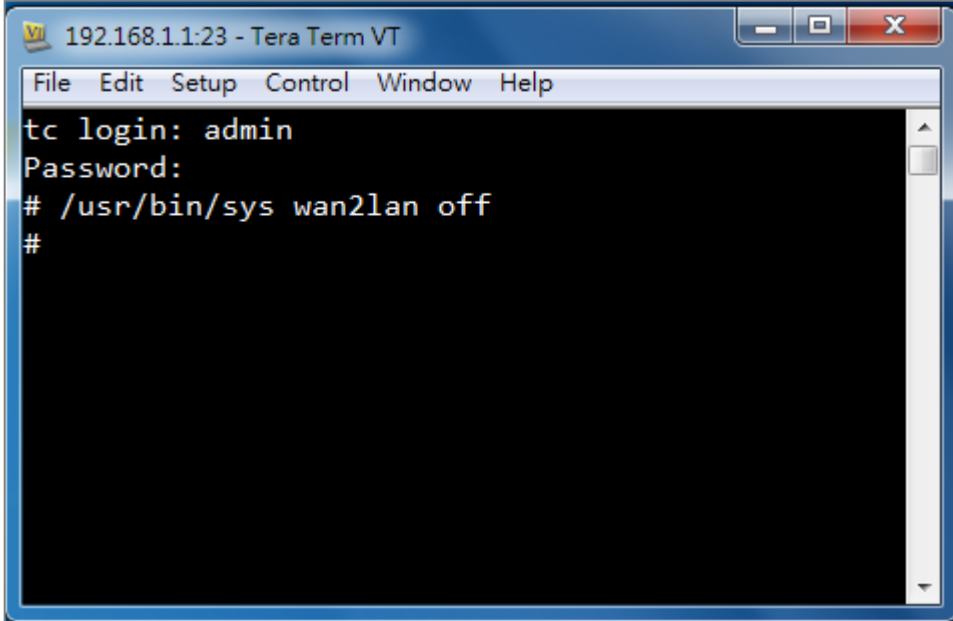
- # /usr/bin/sys wan2lan on



```
192.168.1.1:23 - Tera Term VT
File Edit Setup Control Window Help
tc login: admin
Password:
# /usr/bin/sys wan2lan on
#
```

Disable WAN mirror function.

- # /usr/bin/sys wan2lan off



```
192.168.1.1:23 - Tera Term VT
File Edit Setup Control Window Help
tc login: admin
Password:
# /usr/bin/sys wan2lan off
#
```

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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
```

		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