CTC Union Technologies Co., Ltd.

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Quick Installation Guide

XMC-10GC

10G Media Converter

sales@ctcu.com

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CTC Union Technologies Co., Ltd.
Far Eastern Vienna Technology Center
(Neihu Technology Park)
8F, No. 60 Zhouzi St.,
Neihu, Taipei 114, Taiwan

T +886-2-26591021
F +886-2-26590237
E sales@ctcu.com
H www.ctcu.com

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Introduction

XMC-10GC media converters are equipped with one 1G/2.5G/5G/10G Base-T RJ-45 port and one 10G Base-R SFP+ slot. These media converters are designed to extend the electrical signals of a new generation of 'copper' 10G Ethernet by converting to optical signals transmitted through fiber optical cables. XMC-10GC media converters support pluggable 10G SFP+ modules and can be locally managed via USB Type-C™ console port. These media converters can be configured to enable/disable the device, provide diagnostic loopback, cable diagnostics, packet generation, Link Fault Pass-Through, Auto Laser Shutdown functions and read the inserted optical module's information.

To achieve the best transmission performance, it is suggested that XMC-10GC media converters should use CAT.7 and CAT.6A twisted pair cable as copper transmission media and 10G optical solution with SFP+ LC connector for fiber transmission. The SFP+ slot supports a wide range of optical modules to address any 10 Gigabit Ethernet network application, including Single-mode, Multi-mode, Single fiber bi-directional, Coarse and Dense Wave Division Multiplexing (CWDM and DWDM).

***WARNING**: Fiber optic equipment may emit laser or infrared light that can injure your eyes. Never look into an optical fiber or connector port. Always assume that fiber optic cables are connected to a laser light source.*

Package List

- One XMC-10GC media converter
- One power adapter
- Four rubber feet pads

Features

- Metal case enclosure with wall-mountable design
- Supports 12V/1A power supply
- Supports USB Type-C™ Console Management for configuring and viewing status
- Supports various diagnostic tools including Loopback, Cable Diagnostics and Packet Generation
- Supports Link Fault Pass-Through & Auto Laser Shutdown function

Access to Console Management

All XMC-10GC media converters have a USB Type-C™ connector on the front panel which may be connected to a host computer for accessing Console Management. If your host computer has a USB Type-C™ port, use a USB Type-C™ to USB Type-C™ cable to connect the XMC-10GC to the host. If the host has a regular USB Type-A™ connector (USB® v1.0, v2.0, v3.0), then use a standard USB Type-A™ to USB Type-C™ adapter cable to connect the XMC-10GC to the host computer.

Console Connection

Use the appropriate cable to connect the "USB CONSOLE" port to the PC terminal communications port. Run any terminal emulation program (HyperTerminal, PuTTY, TeraTerm Pro, etc.) and configure the communication parameters as follows:

Baud Rate: 115,200
Data Bits: 8 bits
Parity Bits: None
Stop Bits: 1
Flow Control: None

From a cold start, the following screen will be displayed. By default, there is no need to enter password. If the password prompt appears, press “Enter” key to proceed to the Main Menu of the Console Management page.

```
      ****************************************
      ***  CTC UNION TECHNOLOGIES CO.,LTD.  ***
      ***  XMC-10GC                         ***
      ****************************************
      Ver:[1.100-1.000-5.6D3]  [LFP-LAN]

Uptime            [0 Day   00:52:17]
Chip  Temperature [ 37 C]
(SFP) 10GBase-R   [Down][    ]
(LAN) 10GBase-T   [Down][    ][    ]

< 1 > (SFP) 10GBase-R Status And Configuration
< 2 > (LAN) 10GBase-T Status And Configuration
< 3 > Device          Status And Configuration
< 4 > Diagnostic
< S > Store Parameters
< U > Update with X-Modem
< P > Password Setup

[ESC] Logout
```

For more detailed descriptions of the Console Management, please proceed to page 12.

Specifications

Ethernet Interface

- Standards: IEEE 802.3 (10Base-T), IEEE 802.3u (100Base-TX), IEEE 802.3ab (1000Base-T), IEEE 802.3bz (2.5G/5GBase-T), IEEE 802.3an (10GBase-T)
- Number of RJ-45 (shielded) Port: 1
- Speed: 10M/100M/1G/2.5G/5G/10Gbps

10GbE Optical Interface

- Standard: IEEE 802.3ae (10Gbit/s Ethernet over fiber)
- Number of SFP+ Slot: 1
- Speed: 10Gbps
- SFP+ slot supports DDMI function

Switch Features

- Store & Forward Switch
- IEEE802.3x Flow Control
- Auto MDI/MDI-X
- Full Duplex mode
- Auto-negotiation
- Jumbo Frame: 16K Bytes
- Network Cable (10GBase-T): 100meters over CAT.6A and CAT.7; 55meters over CAT.6; Best effort over CAT.5e

Power

- Support 12VDC/1A power input
- Consumption: 6W (Max.)

Mechanical

- Compact size and metal case
- Dimensions: 95 mm (W) x 23 mm (D) x 73.4 mm (H)
- Desktop and wall mountable
- Weight: 280g (225g Net Weight)

Environmental

- Operating Temperature: 0°C~45°C
- Storage Temperature: -10°C~70°C
- Humidity: 5%~95% (Non-condensing)

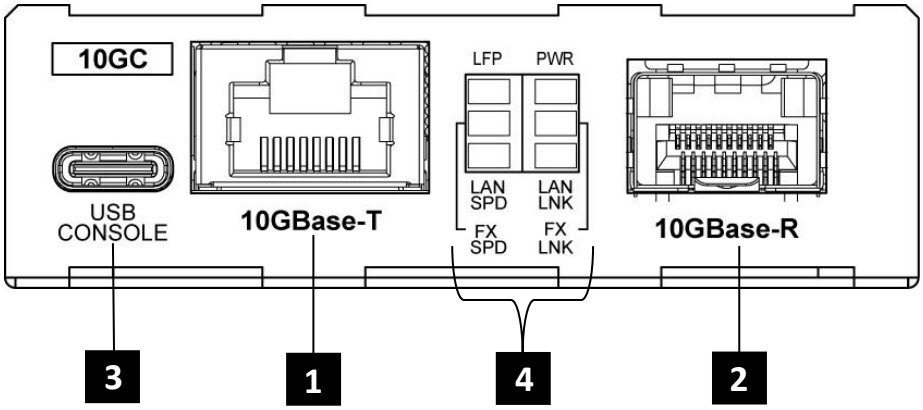
Certifications

- FCC Part 15 Class A, CE

MTBF (MIL-HDBK-217)

- > 65,000 Hours

Panels



+

Figure 1. Front Panel

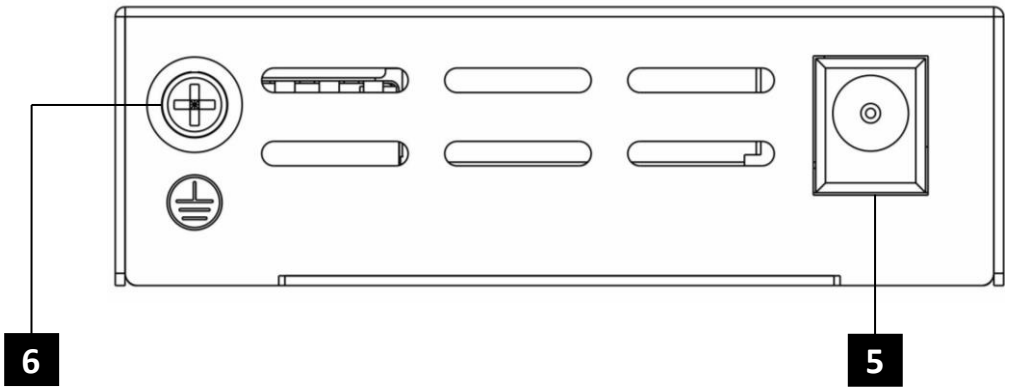


Figure 2. Rear Panel

No.	Description
1	10GBase-T RJ-45 connector
2	10GBase-R SFP+ slot
3	USB Type-C™ console port
4	LED indicators
5	Power input
6	Grounding connector

Earth Ground Connection

An earth ground connector is provided on the rear panel. Grounding the device can help to release leakage of electricity to the earth safely so as to reduce injuries from electromagnetic interference (EMI).

Prior to connecting to the power, it is important to connect the ground wire to the earth. Follow steps below to install ground wire:

1. Remove the grounding screw.
2. Attach the grounding screw to the ring terminal of the grounding cable. Make sure that the grounding cable is long enough to reach the earth.
3. Use a screwdriver to fasten the grounding screw.

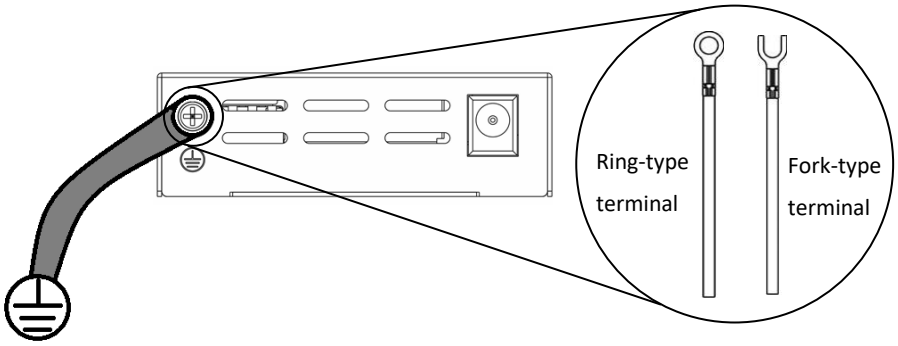


Figure 3. Grounding Connection

Figure 4. Grounding Cable Type

Rubber Feet Pads

The standard package includes four self-adhesive rubber feet pads that are designed to be installed at the bottom of the device. If you place the media converter on the flat surface such as workstation table, the non-slip rubber feet pads can not only prevent sliding but also reduce possibilities of scratches. Furthermore, if the temperature of the device is high (90°C or higher), the rubber feet pads can elevate the device a little bit to allow hot air to flow so as to prevent overheating. With all these aforementioned benefits, it is highly recommended to install these four self-adhesive rubber feet pads before starting to use the media converter.

Wall Mounting

XMC-10GC media converters have the option of adding wall mount capability. One wall mount kit is required for installing a single standalone unit on the wall. Each wall mount kit provides all the necessary hardware for a complete installation.

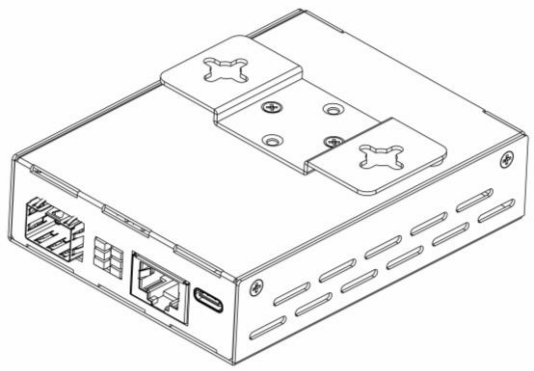


Figure 5. Converter with Wall Mounting Bracket

XMC-10GC media converters can be hung either in horizontal or vertical direction depending on your actual installation needs. In the following illustrative diagram, the device is hung horizontally. Before hanging the device, you have to install two appropriate screws into the wall leaving less than 0.5cm or 1/4 inch exposed. Make sure these two screws are securely fixed on the wall. Then, hang the device on the inserted screws to complete wall-mount installation.

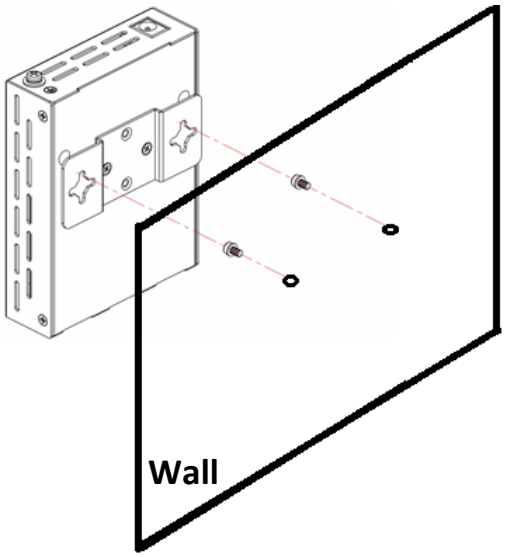


Figure 6. Fixing Two Screws on the Wall

LED Indicators

LED	Color	Status	Definition
PWR	Green	On	Power is connected and system is active.
		Blinking	Firmware is upgrading.
		Off	No power input.
	Amber	On	System is abnormal (Temperature is too high or System initial fail).
		Off	No power input.
LFP	Green	On	Under LFP condition.
		Off	Working normally.
LAN SPD	Green	On	The connected LAN speed is 10M, 100M, 1G, 2.5G or 5G.
		Blinking	Blinking when there is Ethernet traffic.
		Off	No Ethernet link.
	Amber	On	The connected LAN speed is 10G.
		Blinking	Blinking when there is Ethernet traffic.
		Off	No Ethernet link.
LAN LNK	Green	On	LAN link is up.
		Off	LAN link is down.
	Amber	On	LAN is on Test mode (Loopback, Packet Generation, Cable Diagnostic).
		Off	LAN link is down.
FX SPD	Amber	On	The connected fiber speed is 10G.
		Blinking	Blinking when there is data traffic.
		Off	No fiber link.
FX LNK	Green	On	Fiber link is up.
		Off	Fiber link is down.
	Amber	On	Fiber is on Test mode (Loopback, Packet Generation).
		Off	Fiber link is down.

Console Management

XMC-10GC media converters can be locally managed by connecting a simple serial terminal such as a notebook computer that has an USB Type-C™ port. In Windows® XP, HyperTerminal™ is an application available for emulating a serial terminal. You can also search for TeraTerm or PuTTY which are free alternatives, especially if your operating system is Vista, Win7 or above. Communication parameters are as follows:

Baud Rate: 115,200
Data Bits: 8 bits
Parity Bits : None
Stop Bits: 1
Flow Control: None

By default, there is no need to enter password. If the password prompt appears, press “Enter” key to proceed to the Main Menu of the Console Management page as shown in the following example.

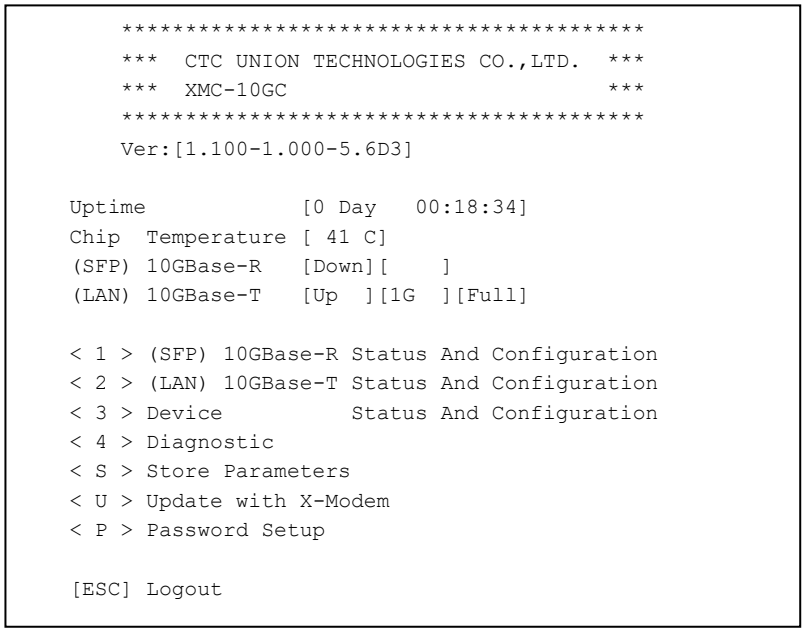


Figure 7. Example of Login Menu Console Screen

Main Menu Operation

Select any of the menu items by keying in the item number or letter. Use the [ESC] key to Logout. Any setting is immediately applied to the converter's circuitry. After all of the parameter settings have been selected, press "S" key at the Main Menu page to store the settings in non-volatile RAM (NVR).

```
      ****************************************
      ***  CTC UNION TECHNOLOGIES CO.,LTD.  ***
      ***  XMC-10GC                         ***
      ****************************************
      Ver:[1.100-1.000-5.6D3]  [LFP-LAN]

  Uptime            [0 Day   00:16:28]
  Chip  Temperature [ 35 C]
  (SFP) 10GBase-R   [Down][    ]
  (LAN) 10GBase-T   [Down][    ][    ]

  < 1 > (SFP) 10GBase-R Status And Configuration
  < 2 > (LAN) 10GBase-T Status And Configuration
  < 3 > Device          Status And Configuration
  < 4 > Diagnostic
  < S > Store Parameters
  < U > Update with X-Modem
  < P > Password Setup

  [ESC] Logout
```

Brief Explanation of Settings:

<1> (SFP) 10GBase-R Status and Configuration: Enter this menu to gain configuration access to the optical section of the converter. Under this menu, the ALS (auto laser shutdown) function can be enabled or disabled and information of SFP+ Digital Diagnostics Monitoring Interface can be viewed.

<2> (LAN) 10GBase-T Status and Configuration: Enter this menu to gain configuration access to the LAN section of the converter. Under this menu, the port which operates under auto-negotiation mode can be forced to 10M/100M/1G/2.5G/5G/10G speed.

<3> Device Status and Configuration: Enter this menu to gain access to device's specific settings. See page 17 for more detailed explanation of device settings.

<4> Diagnostic: Enter this menu to enable or disable loopback functions for the SFP and LAN port, run cable diagnostic tests and run packet generation tests.

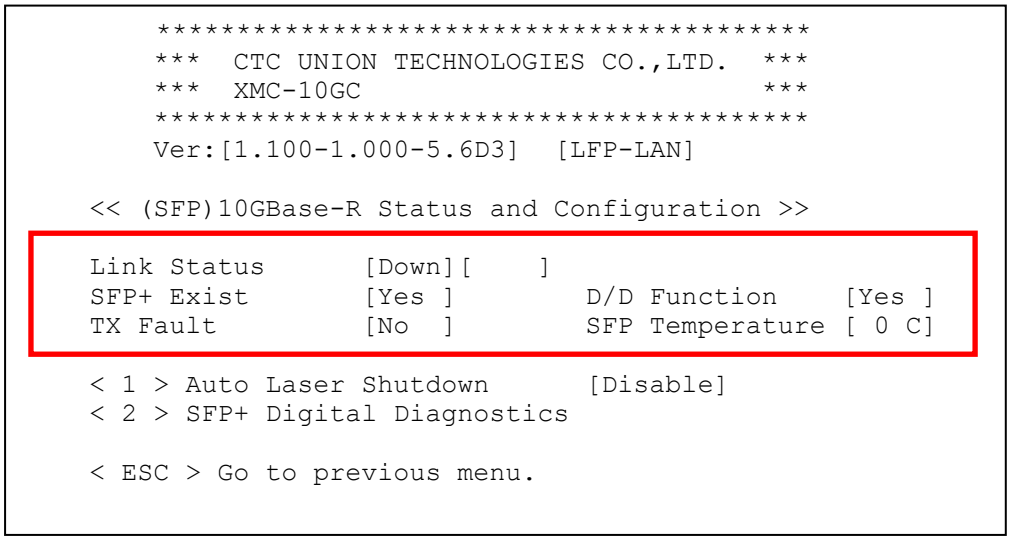
<S> Store Parameters: Press "s" key and then press "y" key to store current parameters.

<U> Update with X-Modem: Update FW and PHY via X-Modem.

<P> Password Setup: Enter this menu to change the login password. The old password must be entered which is followed by entering the new password twice. If the password is ever forgotten, please contact customer support for details on resetting the password.

(SFP) 10GBase-R Status and Configuration

From the Main Menu page, press "1" key to enter (SFP) 10GBase-R Status and Configuration page.



The upper part (circled in red) shows the current status of the SFP+ module including the link status, SFP+ existence, D/D Function supported or not, TX Fault and SFP temperature.

<1> Auto Laser Shutdown: Press "1" key to enable or disable Auto Laser Shutdown function.

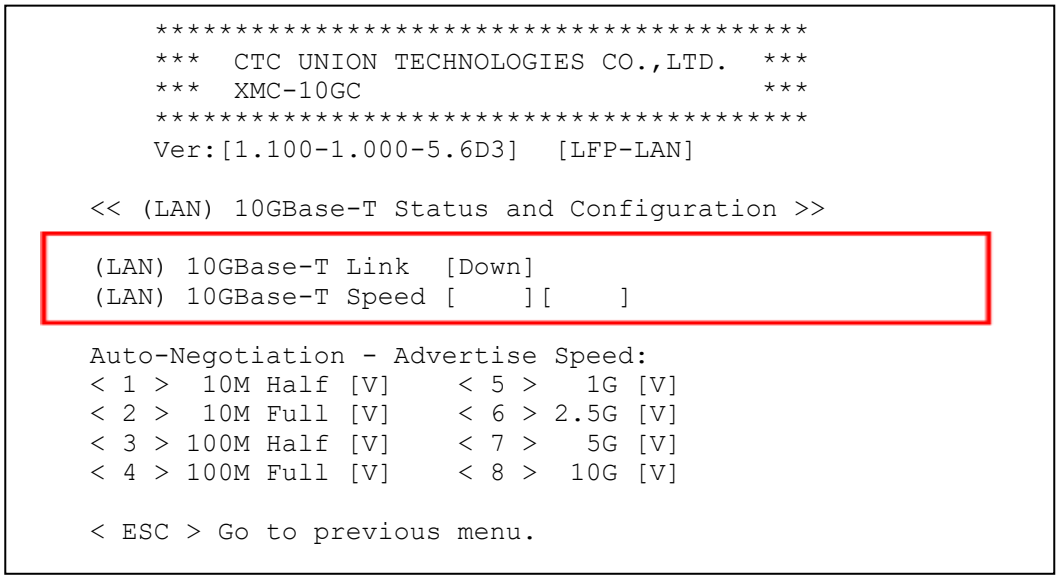
Automatic Laser Shutdown (ALS) is a technique used to automatically shut down the output power of the transmitter in case of fiber break according to ITU-T G.664. This is a safety feature that prevents dangerous levels of laser light from leaking out of a broken fiber, provided ALS is provisioned on both ends of the fiber pair. The sequence of events is as follows. If a fiber is cut, the receiver will detect a Loss Of Signal (LOS). The ALS agent will turn off the transmitter. The receiver at the far end will then detect an LOS and its ALS agent will turn off the transmitter. In this way the entire fiber will go dark.

<2> SFP+ Digital Diagnostics: Press “2” key to view detailed information of the inserted SFP+ module.

```
         ****************************************
        ***  CTC UNION TECHNOLOGIES CO.,LTD.  ***
        ***  XMC-10GC                         ***
        ****************************************
        Ver:[1.100-1.000-5.6D3]  [LFP-LAN]

    << SFP+ Digital Diagnostics >>

    Vendor Name     [ CTC UNION         ]
    Vendor Number   [ SFS-7020-WB       ]
    Vendor SN       [ 2471006           ]
    Fiber Type      [ Single Mode       ]
    Tx Wave Length  [ 1550 nm  ]
    Rx Wave Length  [ 1550 nm  ]
    Link Length     [   20 Km  ]
    TX Power        [-41.00 dBm ]
    RX Power        [-41.00 dBm ]
    Tx Bias         [  0.0 mA  ]
    Supply Voltage  [ 0.00 V   ]
    Temperature     [    0 C   ]

    < ESC > Go to previous menu.
```

(LAN) 10GBase-T Status and Configuration

From the Main Menu Page, press “2” key to enter (LAN) 10GBase-T Status and Configuration page.

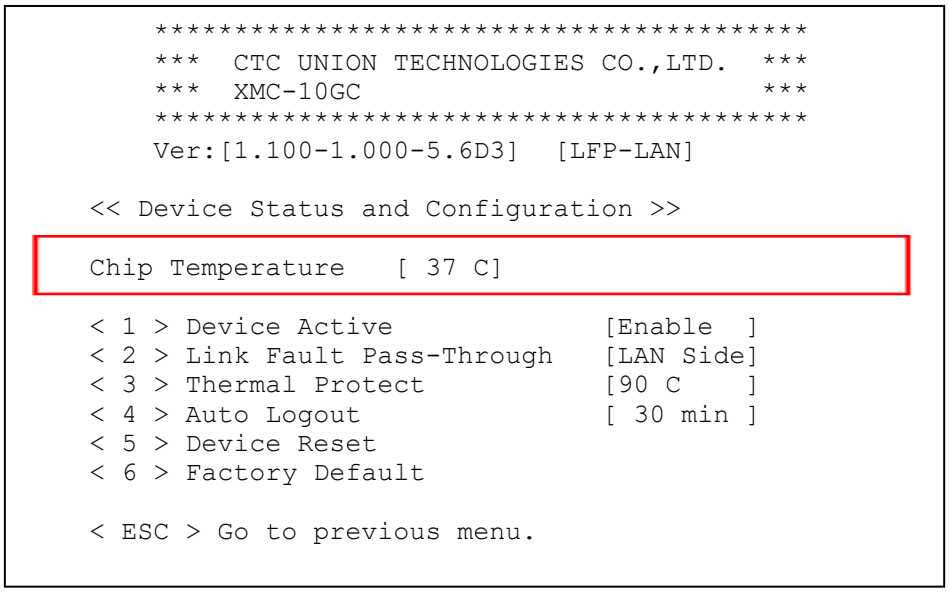


The upper part (circled in red) shows the current status of the LAN link including the link status and speed.

If you want the LAN port to accept different speed options, press any one of the keys “1” to “8” to select the speed (when selected, the screen will show V). If you want to force the LAN port to a certain speed, for example force to 1G (5 must be checked), then you must uncheck other options (1, 2, 3, 4, 6, 7, 8 unchecked).

Device Status and Configuration

From the Main Menu Page, press “3” key to enter Device Status and Configuration page.



The upper part (circled in red) shows the current chip temperature.

<1> Device Active: Press “1” key to toggle the device between Enable and Disable. While in Disable state, all traffic will be blocked and all links brought down.

<2> Link Fault Pass through: Press “2” key to toggle the device between “LAN Side” and “LAN and SFP Side” LFP mode. When this function is enabled and activated (link loss occurs), the LFP LED on the front panel will light in green.

Link Fault Pass-through (LFP) is a method of forwarding a link loss from one media to the other over the converter. LFP function of XMC-10GC supports both “LAN Side” and “LAN & SFP Side” link fault pass-through application. LAN side LFP is enabled by default and cannot be disabled. However, “LAN & SFP Side” LFP is disabled by default but can be enabled under the "Device Status and Configuration" menu.

LFP is a troubleshooting feature that can forward SFP or LAN Link Loss from both the local and remote devices. This feature, when "LAN and SFP Side" LFP enabled, will pass a fiber link fault through the converter to the LAN segment. Therefore, if a link fails on the fiber side of the media converter, the media converter will force the LAN link down. Likewise, if a link fails on the LAN side of the media converter (LAN Side LFP is enabled by default), the media

converter will force the SFP link down. When LFP is enabled and activated (link loss occurs), the LFP LED glows green.

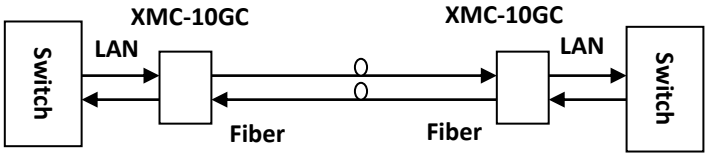


Figure 8. LFP Application

Take the above diagram for example, if a fault should occur on the fiber link without LFP enabled, both managed switches would remain linked to the media converters even though a link has failed between the XMC-10GC media converters. Since neither switch would sense a failed link they would not send out any traps.

When "LAN & SFP Side" LFP is enabled and a fault occurs on the fiber link, both media converters would pass that fault through to the LAN ports. This would force the links down on the LAN ports of the managed switches and they would then send trap messages.

An administrator would be able to take appropriate actions after network management receives traps from the switches that have suffered link loss on their ports. A check of the XMC-10GC media converter would reveal the fiber link loss and corrective action could be performed.

<3> Thermal Protect: The default temperature threshold for automatically shutting down the LAN interface of the media converter is 90°C. This threshold may be set higher to 100°C or 110°C. Note that running at higher temperature will reduce the MTBF of the converter but may be unavoidable in some applications. In the event the LAN interface of the media converter is automatically shutdown due to an over temperature condition, the device can be returned to normal operation when the temperature is 10°C below the temperature threshold.

<4> Auto Logout: Press "4" key and then specify auto-logout interval. 0 is disabled which means that the device will never logout. 1~255 minutes mean that the device will automatically logout when it is inactive for the specified interval.

<5> Device Reset: Press “5” key and then press “Y” key to reset the device. This will cause the soft reboot of the device and parameters settings stored in NVR to be reloaded.

<6> Factory Default: Press “6” key and then press “Y” key to restore all settings to factory default settings.

Diagnostic

From the Main Menu page, press “4” key to enter Diagnostic page.

```
      ****************************************
      ***  CTC UNION TECHNOLOGIES CO.,LTD.  ***
      ***  XMC-10GC                         ***
      ****************************************
      Ver:[1.100-1.000-5.6D3]  [LFP-LAN]

  << Diagnostic >>

  < 1 > Loopback [Disable]
  < 2 > LAN Cable Diagnostics
  < 3 > Packet Generation

  < ESC > Go to previous menu.
```

<1> Loopback: Press “1” key and then select “Disable”, “LAN Side”, or “SFP Side” loopback mode. Only one interface (LAN or SFP) can be in loopback mode at a time.

Loopback is a diagnostic function that tests the connectivity of the specified interface. XMC-10GC offers two kinds of loopback test methods. One is SFP loopback; the other is LAN loopback. When either SFP or LAN loopback is enabled, all data received on the receiver connection will be loop-backed to the transmitter connection.

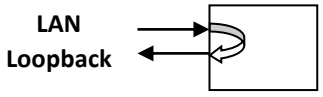


Figure 9. LAN Side Loopback

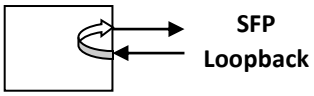


Figure 10. SFP Side Loopback

Please note that only one mode (either SFP or LAN mode) can be used at one time for loopback test.

<2> LAN Cable Diagnostics: Press “2” key and then press <1> key to run cable diagnostics test. This test will take approximately 5 seconds. When completed, the page refreshes automatically, and you can view the cable diagnostics results in the cable status table. Please note that Cable Diagnostics is only accurate for cable length of 1 to 100 meters.

<3> Packet Generation: This function is generally used to test physical layer transmission quality over LAN or fiber optic cable, especially for 10G applications. There are two packet generation modes, these are “LAN Side” and “SFP Side” mode. When “LAN Side” mode is selected, a stream of packets will be transmitted to the LAN interface. On the other hand, when “SFP Side” is selected, a stream of packets will be transmitted to the SFP interface.

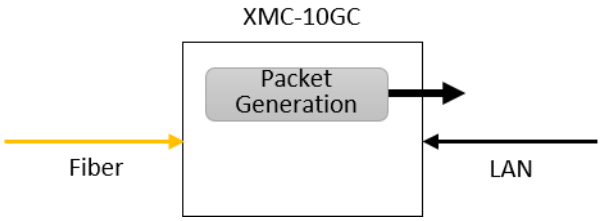


Figure 11. Packet Generation (LAN Side)

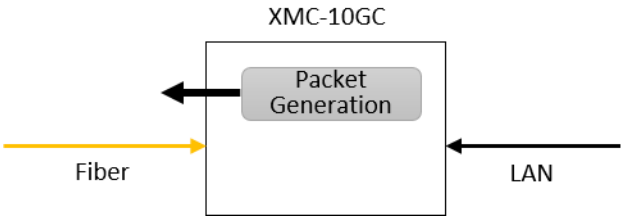


Figure 12. Packet Generation (SFP Side)

In Console Management page, both “Goode Frames” and “Error Frames” are displayed. Press “1” key in this page to clear all statistics of the current packet generation test. Press “2” key to toggle between “Disable”, “LAN Side” or “SFP Side” packet generation mode.

```
     ****************************************
     ***  CTC UNION TECHNOLOGIES CO.,LTD.  ***
     ***  XMC-10GC                         ***
     ****************************************
     Ver:[1.100-1.000-5.6D3]  [LFP-LAN]

<< Packet Generation >>

-- Good  Frame --

   (SFP) Base-R TX    [                          0]
                RX    [                          0]
   (LAN) Base-T TX    [                          0]
                RX    [                          0]

-- Error Frame --

   (SFP) Base-R TX    [                          0]
                RX    [                          0]
   (LAN) Base-T TX    [                          0]
                RX    [                          0]

< 1 > Clear Counter
< 2 > System Interface [Disable]

< ESC > Go to previous menu.
```

Note: *Loopback, LAN Cable Diagnostics and Packet Generation are all diagnostic tools and they should not be used for normal operation.*

Store Parameters

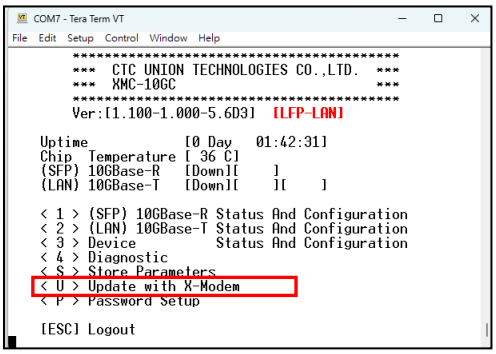
From the Main Menu page, press “S” key and then press “Y” key to save all changed settings.

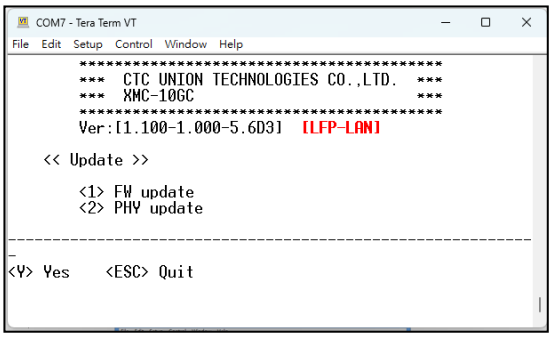
Update with X-Modem

XMC-10GC can be firmware or PHY upgraded using X-Modem. From the Main Menu page, press “U” key to enter Update page.

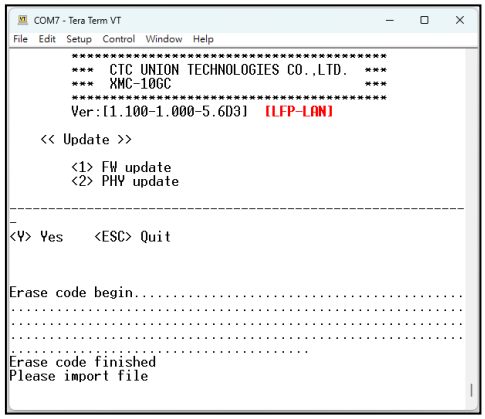
Quick Procedure:

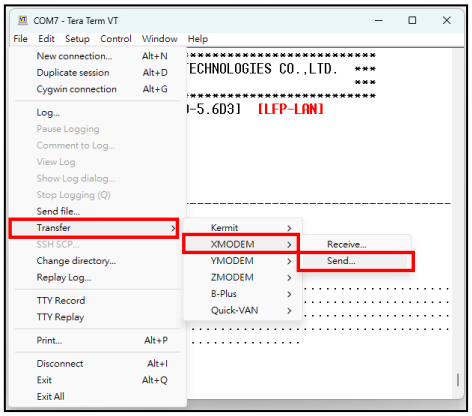
In the Main Menu page, press “U” to enter Update page. Then, press “1” key to start uploading Firmware.



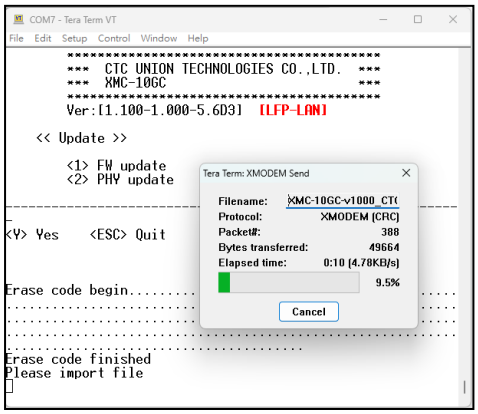


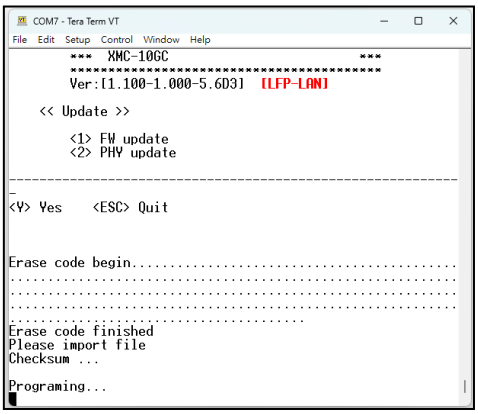
1. **Send Firmware file via X-Modem and select the Firmware file that you want to upload.**





2. **Start upgrading new Firmware image.**





3. Check the Firmware version after completing the Firmware upgrade process.

```
        ****************************************
        ***  CTC UNION TECHNOLOGIES CO.,LTD.  ***
        ***  XMC-10GC                         ***
        ****************************************
        Ver:[1.100-1.000-5.6D3]

    Username: admin
    Password:
```

Password Setup

From the Main Menu page, press “P” key to enter password setup page. Then, enter old password once followed by entering new password twice to change the password to the new one.