University of Global Village (UGV)
Barishal, Bangladesh

Lectures On:

Media Converter (MC)

Lectures By

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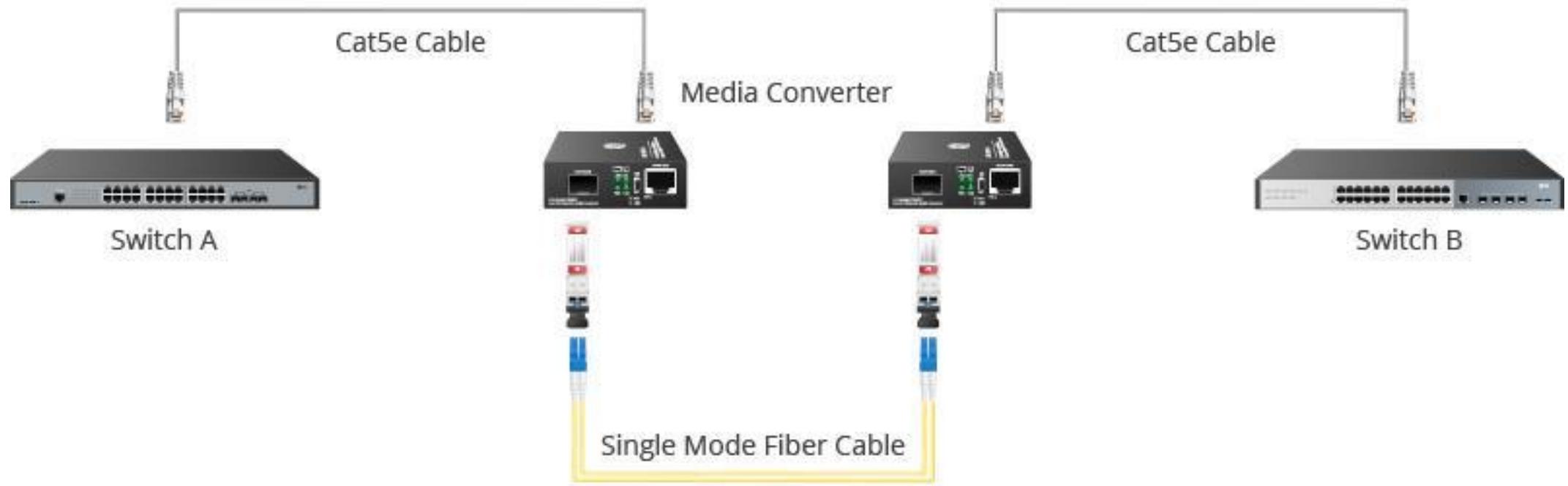www.cse.ugv.edu.bd, 874/322, C&B Road, Barisal, Bangladesh.

Media Converter (MC)

What is a Media Converter?

- Media converters are **flexible and cost-effective** **devices** for implementing and optimizing fiber links in all types of networks.

- The most common type of **media converter** is a device that functions as a transceiver converting the **electrical signal** used in copper Unshielded Twisted Pair (UTP) network cabling into light waves used in fiber optic cabling.
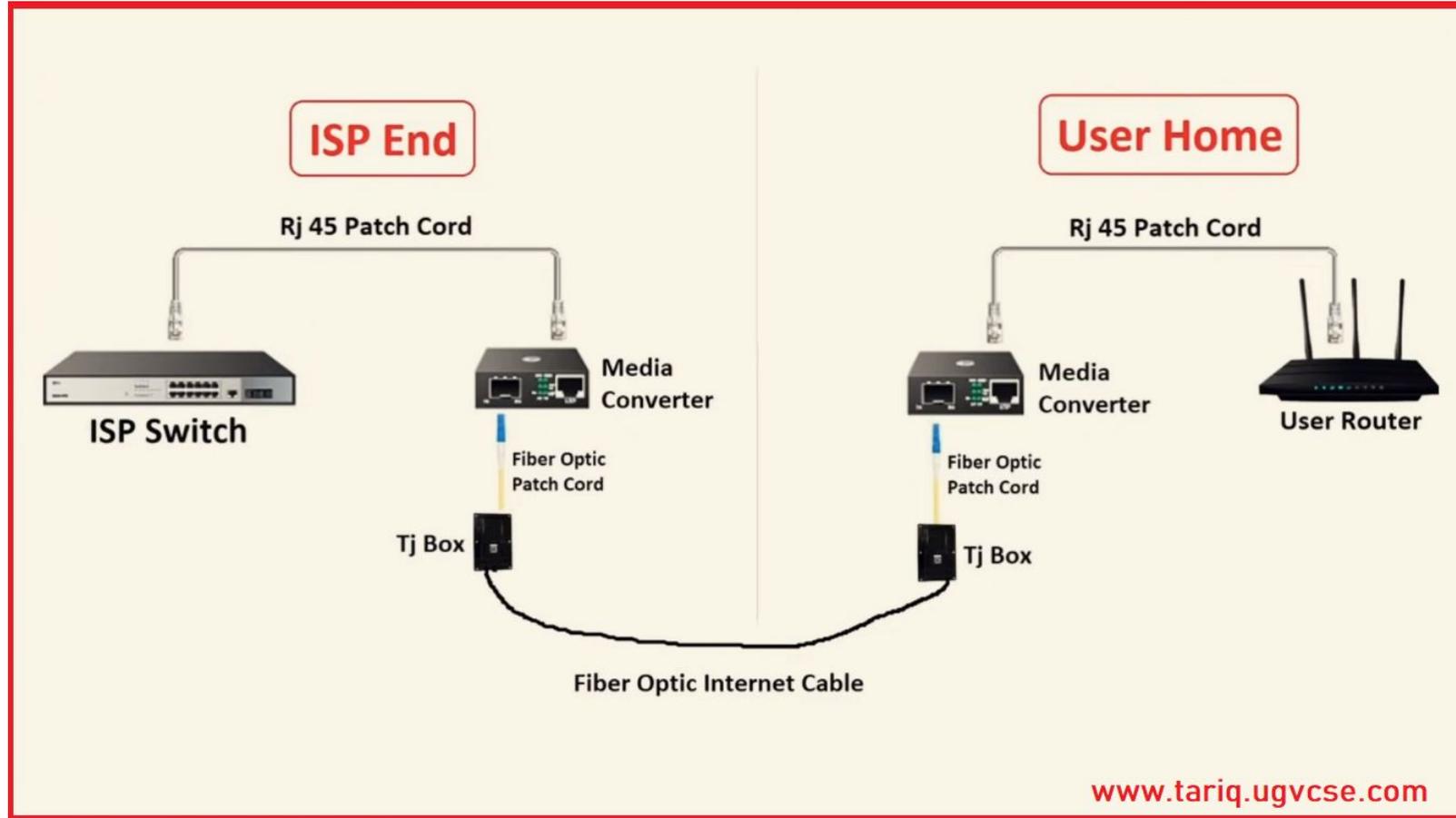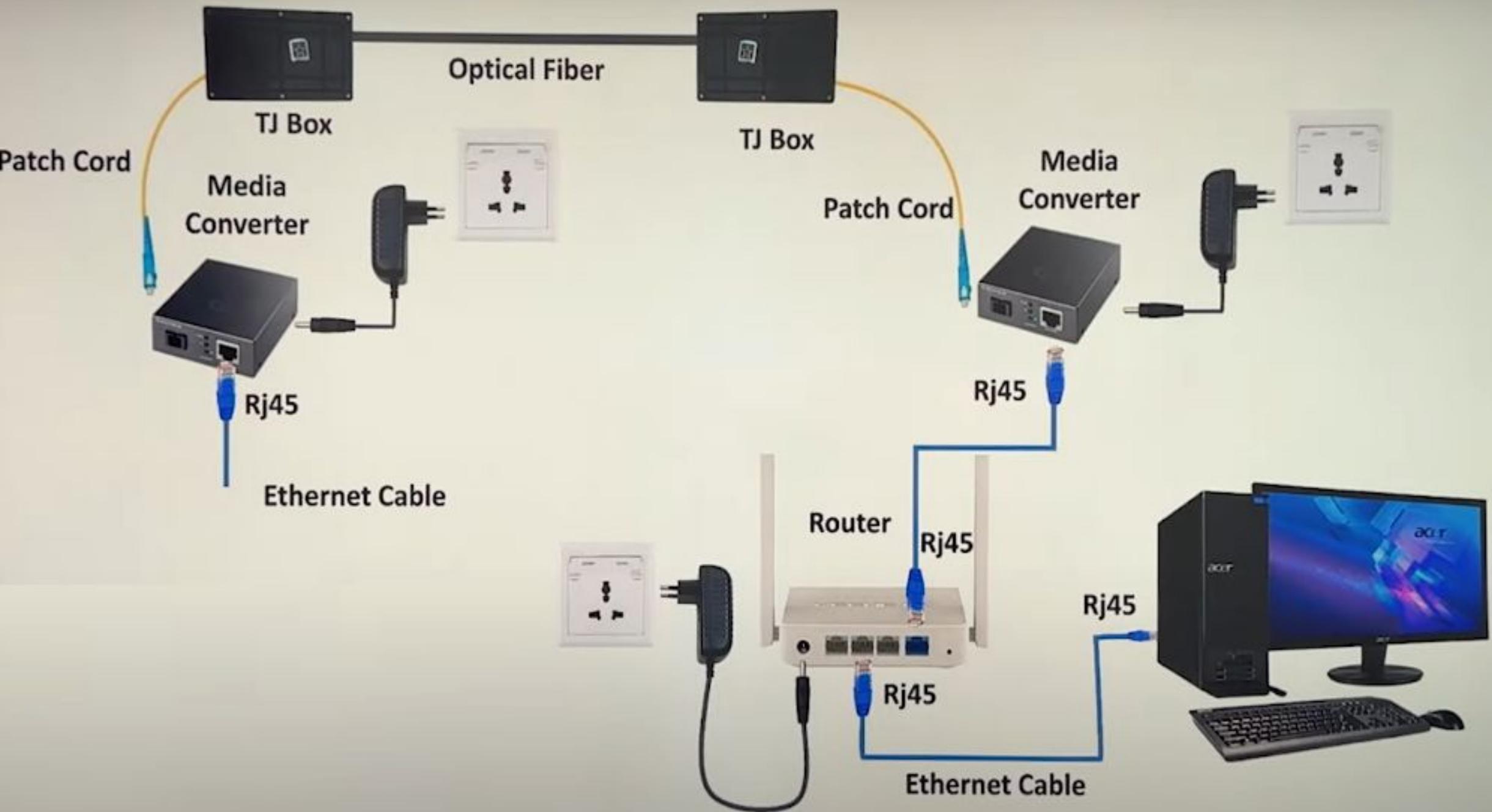
What is a Media Converter?

- Fiber optic connectivity is necessary when the distance between two network devices exceeds the transmission distance of copper cabling.

- **Copper-to-fibber** conversion using media converters enables **two network devices** with **copper ports** to be connected over extended distances via fibber optic cabling.

- Media converters are available as **Physical Layer or Layer 2** switching devices, and can provide rate-switching and other advanced switching features like VLAN tagging.

- Media converters are typically protocol specific and are available to support a wide variety of network types and data rates.

How Media Converter Works

How Media Converter Works

IP Bullet Camera

IP Dome Camera

IP Bullet Camera

IP Dome Camera

IP Dome Camera

Media Converter

Power Connection

T J Box

T J Box

POE Switch

Media Converter

LAN Connection

Wi-Fi Router

NVR (Network Video Recorder)

Mouse

TV/Monitor

HDMI Cable

VGA Cable

Power Connection

Power Connection
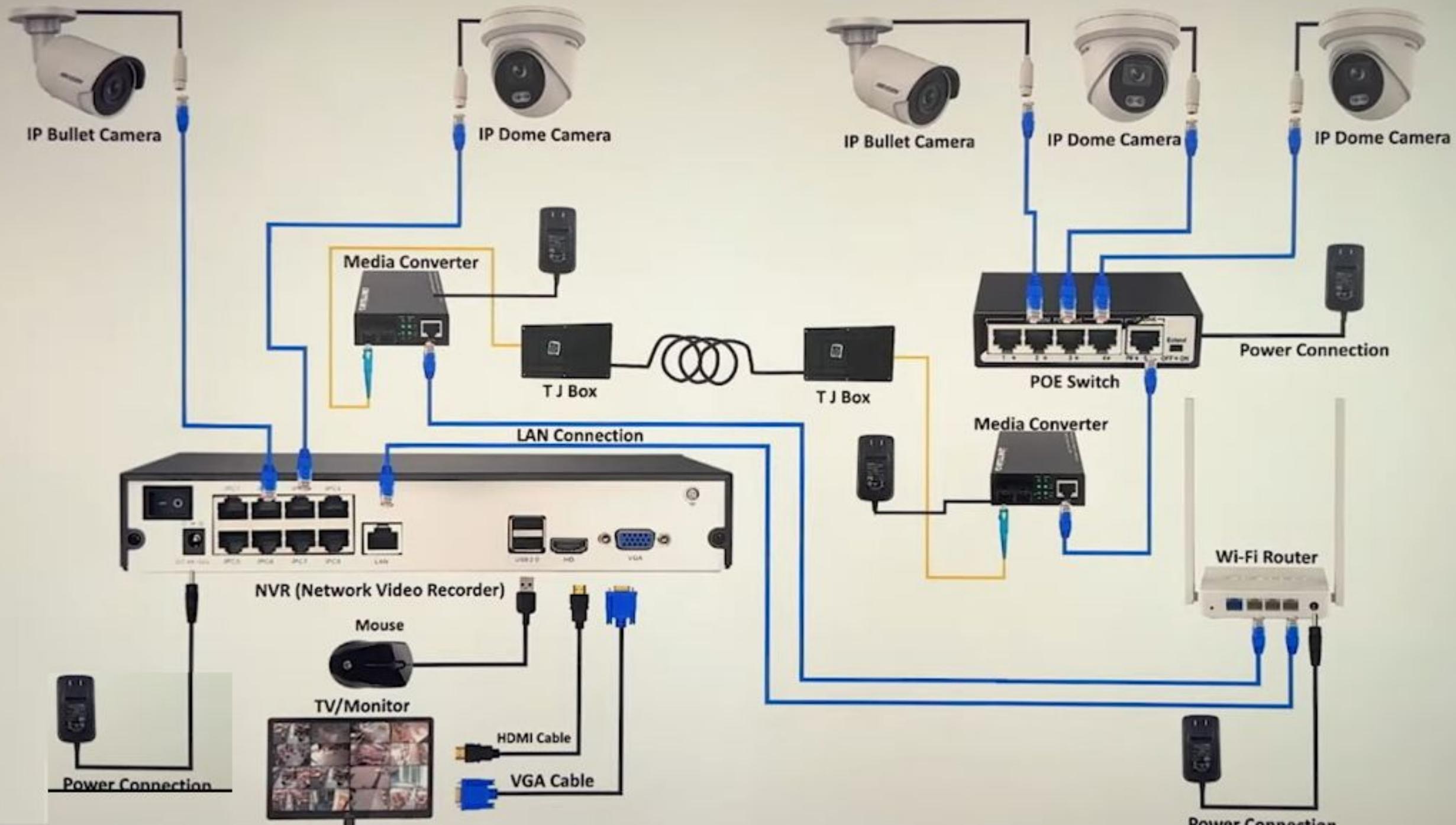
The Benefits of Media Converters

- Network complexity, demanding applications, and the growing number of devices on the network are driving network speeds and bandwidth requirements higher and forcing longer distance requirements within the Local Area Network (LAN).

- Media converters present solutions to these problems, by allowing the use of fiber when it is needed, and integrating new equipment into existing cabling infrastructure.

- Media converters provide seamless integration of copper and fiber, and different fiber types in Enterprise LAN networks.

- They support a variety of protocols, data rates and media types to create a more reliable and cost-effective network.

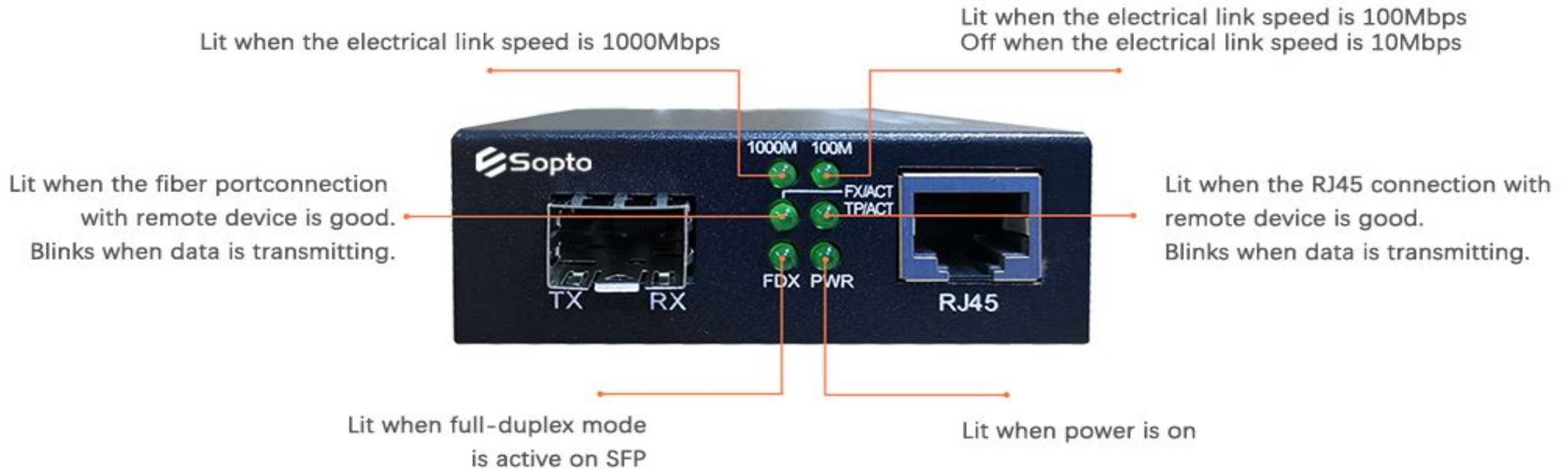# Demands on the Network are Increasing:

- LANs and WANs are converging, and networks are growing in physical area
- **Budget constraints** are pushing preservation of capital investment in legacy **switches and routers**
- New network services are driving up bandwidth demand

Solutions Provided by Media Converters:

- Increase network distances by converting UTP to fiber and extending fiber links Maintain investments in existing equipment

- Increase the capacity of existing fiber with WDM wavelengths (when used with multiplexers)

Indicator of MC

10/100/1000Mbps SFP Fiber Media Converter

Lit when the electrical link speed is 1000Mbps

Lit when the electrical link speed is 100Mbps
Off when the electrical link speed is 10Mbps

Lit when the fiber portconnection
with remote device is good.
Blinks when data is transmitting.

Lit when the RJ45 connection with
remote device is good.
Blinks when data is transmitting.

Sopto

1000M 100M

FX/ACT
TP/ACT

FDX PWR

TX   RX

RJ45

Lit when full-duplex mode
is active on SFP

Lit when power is on

Types of Media Converters

There are a wide variety of **copper-to-fiber** and **fiber-to-fiber media** converters available that support different network protocols, data rates, cabling and connector types.

Copper-to-Fiber Media Converters

- Supporting the IEEE 802.3 standard, Ethernet copper-to-fiber media converters provide connectivity for Ethernet, Fast Ethernet, Gigabit and 10 Gigabit Ethernet devices.

- Some converters support 10/100 or 10/100/1000 rate switching, enabling the integration of equipment of different data rates and interface types into one seamless network.

Copper-to-Fiber Media Converters

Copper-to-Fiber Media Converters

Copper-to-Fiber Media Converters

- Fiber-to-fiber media converters provide connectivity between multimode and single-mode fiber, and between dual fiber and single-fiber.

- In addition, fiber-to-fiber media converters support conversion from one wavelength to another, including standard wavelengths (1310, 1550) and CWDM wavelengths.

- Fiber-to-fiber media converters are typically protocol independent and available for Ethernet, and TDM applications.

Copper-to-Fiber Media Converters

Fiber to Fiber Media Converters

Standalone and Chassis-Based Media Converters

- Media converters are available as compact standalone units that can be **AC or DC powered**.

- Standalone media converters are deployed to convert one copper connection to fiber in a point-to-point deployment.

- **Chassis-based media converters** are **plug-in modules** that can be installed in a variety of chassis configurations.

- **High-density, rack-mount chassis** enable multiple fiber runs from copper switches in a star topology.

- Compact chassis provide a fiber uplink and multiple copper for network edge deployments.

- Chassis feature multiple power supplies for redundant power protection and data backplanes that provide connectivity between modules for flexible and scalable multi-port deployments.

Chassis-Based Media Converters

Chassis-Based Media Converters

Unmanaged and Managed Media Converters

Unmanaged Media Converters

- <u>Unmanaged media converters</u> are easy-to-use plug-and-play devices, but most unmanaged converters require minimal configuration.

- After connecting an unmanaged media converter to the power supply, they combine the hardware with auto-negotiation of data rates and duplex modes.

- The basic configuration of duplex modes, auto-negotiation and crossover can be configured with DIP switches.

- Unmanaged media converters can be configured with DIP switches such as remote fault indication, fault propagation and loopback modes.

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Managed Media Converter

- A managed media converter provides network monitoring, fault detection and remote configuration, which bring substantial benefits such as reduced operating costs and improved network reliability.

- [Managed media converters](#) demand supplemental hardware to enable management, including SNMPv1, SNMPv2c, and SNMPv3. The additional hardware installed in the same chassis can be a management module or a media converter with integrated management capabilities.

- Easily accessible DIP switches or Web, Telnet, SSH, SNMPv1/v2c/v3 or Serial Console management interfaces can be used to configure the mode of operation.

Benefits Managed Media Converter

Remote configuration

- Managed media converters' remote configuration feature enables the device to troubleshoot and configure network equipment remotely. Remote configuration reduces network administrator trips to edge equipment, which reduces network operating costs (OPEX).

Network Monitoring

- Network monitoring is the process of continuously inspecting the network for potential problems. Network monitoring informs the network engineer of problems such as slow traffic or component failure via text, email or other applications.

Fault Detection

- In addition to being actively responsible for network problems, error management quickly isolates network errors to ensure security in the network and prevent them from spreading to other departments.

Managed Media Converter

- https://www.youtube.com/watch?v=QUYIo3eT0ig
- https://www.youtube.com/watch?v=mrB67v_mNGA
- https://www.youtube.com/watch?v=89cN17LRLVc

MC vs ONU

Feature	Media Converter (MC)	Optical Network Unit (ONU)
Functionality	Converts media types (e.g., copper to fiber)	Part of the passive optical network (PON)
Placement	Typically used at network edges	Placed at the customer premises
Role in Network	Helps integrate different network segments	Terminates the passive optical network
Communication	Bi-directional communication	Uni-directional communication (downstream)
Data Rate	Typically supports lower data rates	Supports higher data rates for FTTH
Power Supply	May require external power supply	Powered through the PON from OLT
Managed vs Unmanaged	Can be either managed or unmanaged	Generally managed for PON networks
Cost	Usually less expensive compared to ONU	Cost may vary, but generally higher than MC

"Thank You"