Connect CATx cables between the Extender devices and the L3 Switch.

1. Connect CATx cables between the Extender devices and the L3 Switch.
2. Optionally for RS-232 serial transmission: connect the desired devices (e.g. a HDMI connector). Optionally connect a Local Display to the Output port of the Decoder.
3. Optionally for USB extension: connect USB devices to the USB ports of the Decoder. Connect the desired host device (e.g. Computer) to the Encoder and the Decoder device(s) or Network switch.
4. First of all, please set the parameters of the L3 Switch to meet with the requirements. Please turn the paper to see the list in the 'Preparing the Network' section.
5. Connect CATx cables between the Extender devices and the L3 Switch.
6. Connect an HDMI source device(s) to the HDMI input port of the Encoder. Optionally connect a Local Display to the Output port of the Encoder.
7. Connect the desired host device (e.g. Computer) to the Decoder via the USB mini-B type port. Please pay attention to the indicated port type.
8. Connect the power cord of the supplied adapter to the DC input first, then to the AC power socket.
9. Pin out the devices by the DIP switch or via the built-in website (see the Software Control section) and define the Video Wall.
Preparing the Network – The Requirements of the Switch

The recommended type of network device: 1GbE network with Layer 3 switch, Gigabit Ethernet. In TCP/IP terminology Layer 2 is the data link layer that is responsible for splitting up the information coming from higher layers in the TCP/IP stack into Ethernet frames. An Ethernet frame contains labeling information with source and destination physical addresses (called source and destination MAC address). These physical addresses uniquely identify the source and destination physical devices (e.g. a VXN encoder and a VXN decoder). Ethernet frames provide error resilience by incorporating a redundancy check field through which transmission errors can easily be detected. The decoder that does use only the physical address information found in the Ethernet frame to route the packet from one of its input ports to one or more if output ports is an unmanaged switch.

A managed switch, on the other hand, can handle the traffic and forward input packets to output packets by utilizing information from higher layers. This gives the managed switch more flexibility and also allows for more sophisticated functions like multiscasting. Since even a single VXN network where one VXN encoder supplies more VXN decoders relies on multiscasting, a multiscapable switch (i.e. a managed one) is a must. The managed switch shall offer the following capabilities:

- **GMPv2**
- **GMP snooping, GMP fast leave, GMP querier**
- **Multicast Filtering**
- **Jumbo frames**

For more information about the requirements and technologies please see the Application Note at the website of the product.

Arranging the Extenders to Groups

Encoder and Decoder devices have to be assigned to each other in order to transfer the desired video and control signals – by any of the following ways:

1. **Hand setting**: use the DIP switch at the front panel to set the Video Stream ID. Set the DIP switch states to the same value that the desired devices. If you set a DIP switch at a device, the other devices can be configured via the web page. Please note that the value of DIP switch assigned Video Stream ID can range from 1 to 15 inclusive.

2. **SW setting**: set the Video Stream ID via the built-in web page. Connect to the device as described in the Software Control section. The Video Stream ID shall be between 1 and 65535 inclusive. In this case make sure that the DIP switches of the affected devices are set to ‘0000’.

**Video Stream ID Rules**

The following rules are defined to avoid Video Stream ID conflicts:

- When the DIP switch is in ‘0000’ position the SW setting will be valid.
- When the DIP switch is set back to ‘0000’ the SW setting will inherit the ID (the previous DIP switch value).
- **SW setting and HW setting** can be combined within the group but in this case the DIP switch value will determine the common Video Stream ID.

- **The DIP switch state can be ignored by an LW3 command, see the User’s Manual.**

USB Transmission

The USB data transmission works as shown in the figure below. The USB devices are connected to the Decoder, the host device (computer) is connected to the Encoder by the supplied USB cable.

**Typical Application**

- **USB Transmission**

[Diagram showing USB connection between Encoder and Decoder]

- **Supported Devices**

  - USB HID devices (keyboard, mouse, presenter, etc.) and mass storage devices (Flash drive, external hard drive).

- **Establishing the Connection**

  The data transmission is working always between an Encoder and a Decoder. In Unicast mode (one Encoder and one Decoder) the transmission is enabled automatically. When the extenders are in Multicast mode the desired Decoder can be selected by:

  = Pressing the Connect button at the front panel of the Decoder, or

  = Pressing the Acquire USB connection button via the built-in website of the Decoder (Advanced Settings).

  Thus, the USB ports of the active Decoder are working as ports of an extended USB hub.

- **The data communication of the USB devices connected to the other Decoders is suspended, however, they are still powered over USB.**

**RS-232 Transmission**

The RS-232 data transmission is fully transparent between the Encoder and the connected Decoder devices. All data received at the serial port of the Decoders is transmitted to the serial port of the Encoder and vice versa: the data received at the serial port of the Encoder is transmitted to the serial port of all connected Decoders.

- **The data transmission works only if the serial port parameters settings to the same values in all the devices: serial data speed/character and the VXN Encoder and Decoder devices.**

**Video Transmission Quality**

When the network bandwidth is not enough to transmit the video signal the following modes are available in the Encoder and Decoder devices:

- **Movie mode** (Lower image quality | Less bandwidth): The image quality is adjusted to the available bandwidth. If the bandwidth is decreased the image quality will be lower, but the video streaming is continuous.

- **Graphics mode** (Best image quality | High bandwidth): The image quality is kept at a high level. If the bandwidth is decreased the image quality does not change, but frame drop may appear.

  The setting has an effect when the available bandwidth is less than required.

**Software Control – by Using the Built-in Webpage**

When the device and a computer are connected to the same network, the VXN can be connected to a web browser (Google Chrome and Mozilla Firefox are recommended): 1. Arrange the desired extenders with source/decoder devices.

2. Connect the extenders to the network switch and power them on.

3. Connect a suitable control device (e.g. computer, mobile device) to the same network.

4. Open the web browser and type the IP address of the desired device in the address line. If the address is not known try any of the following:

a. The factory default IP address is Dynamic (DHCP). Check the list of the connected devices (DHCP client list) on the DHCP server and note the IP address.

b. In the case of a Decoder, type the following in the address line:

   - http://IP_address/AABBCCDDEEFF/local

   - In the case of an Encoder, type the following in the address line:

     http://IP_address/AABBCCDDEEFF/local

   AABBCCDDEEFF is the MAC address of the device (without hyphens) – which can be seen on the housing of the extender.

**Video Wall Layouts**

The following examples show how the VXN devices can be arranged to video wall applications. For more details in the User’s Manual available at www.lightware.com.

- **Multicast Mode with Video Wall**

  **Features of the system:**

  - Displaying one of the video signals on the video wall and on a sink.
  - Displaying the other video signal on a sink.
  - The other video signals can be displayed on the video wall by using software tools (built-in web or LW3 protocol commands).

Factory Default Settings

- **IP address**

- **DIP switch state**

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Refresh Rate (Hz)</th>
<th>Resolution</th>
<th>Refresh Rate (Hz)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1280 x 900</td>
<td>60/50 JP, 70/60 NT</td>
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<td>59/59</td>
<td>1600 x 1200</td>
<td>59/59</td>
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<td>480</td>
<td>1920 x 1080</td>
<td>24/25/30/60</td>
</tr>
</tbody>
</table>

**Supported Resolutions**

- **Resolution**

- **Refresh Rate (Hz)**

- **Resolution**

- **Refresh Rate (Hz)**

- **Factory Default Settings**

- **IP address**

- **DIP switch state**

- **Video stream ID**

- **Connecting method**

- **Emulated EDID**

- **User mode**

- **Input video mode**

- **Output scaling (Encoder)**

- **Defined video walls**

- **Video stream ID**

- **Multiplies with Video Wall**

- **Features of the system:**

  - One Encoder is enough to supply the Decoders.
  - Displaying one video signal on two different video walls (e.g. in different rooms).
  - Displaying the video signal on 1:1 single sinks.