The ComNet CopperLine® Ethernet over copper line supports up to sixteen channels of 10/100Mbps Ethernet with Pass-through PoE over twisted pair cable (CAT-5, UTP), or over coaxial cable. The single channel units may be powered by a PoE switch or the included power supply. Four, eight, and sixteen channel units operate from local power. These units provide the ultimate flexibility for extending a powered device (PD) over long distance copper. DIP switches are provided for user-selection of local or remote, 10 or 100Mbps, and 1 pair or 4 pair (UTP) settings.

Bi-color (Red/Green) LED indicators are provided for rapidly ascertaining equipment operating status. Table 2 on Page 9 describes the LED indicators for each light on the unit.

The CLFE8EO(C,U) and CLFE16EO(C,U) are 1RU rack mountable units. The CLFE4EO(C,U) units are interchangeable between stand-alone or card mount configurations, or may be DIN-rail mounted by the addition of ComNet model DINBKT1 or DINBKT4 adaptor plate. The CLFE1EO(C,U) units are stand-alone, or may be DIN-rail mounted by the addition of ComNet model DINBKT4 adaptor. See Figures A through C on Page 11 for mounting instructions.
FIGURE 1 – CLFE1EOC SINGLE CHANNEL COAX UNIT

- Power: Operates on PoE power or 9 to 36 VDC or 24 VAC
- Power Consumption: 1.5 W

FIGURE 2 – CLFE1EOC SINGLE CHANNEL COAX UNIT

- Local/Remote push button (See Installation Instructions, Step 3)
- 10/100 data rate DIP switch
- Wire pair DIP switch

FIGURE 3 – CLFE1EOU SINGLE CHANNEL UTP UNIT

- Power: Operates on PoE power or 9 to 36 VDC or 24 VAC
- Power Consumption: 1.5 W

FIGURE 4 – CLFE1EOU SINGLE CHANNEL UTP UNIT

- Local/Remote DIP switch
- 10/100 data rate DIP switch
- Wire pair DIP switch
FIGURE 3 – CLFE4EOC FOUR CHANNEL SURFACE OR RACK MOUNT COAX UNIT

Operating Power: 9 to 15 VDC
Power Consumption: 5W

FIGURE 4 – CLFE4EOC FOUR CHANNEL SURFACE OR RACK MOUNT COAX UNIT

Local/Remote push button
See Installation Instructions, Step 3

10/100 data rate
DIP switch
See Installation Instructions, Step 1
Operating Power: 9 to 15 VDC
Power Consumption: 5W
FIGURE 7 – CLFE8EOC MULTICHANNEL RACK COAX UNITS

CH1 ETHERNET  |  CH2 ETHERNET  |  CH3 ETHERNET  |  CH4 ETHERNET  |  CH5 ETHERNET  |  CH6 ETHERNET  |  CH7 ETHERNET  |  CH8 ETHERNET

CH1 EXT DISTANCE  |  CH2 EXT DISTANCE  |  CH3 EXT DISTANCE  |  CH4 EXT DISTANCE  |  CH5 EXT DISTANCE  |  CH6 EXT DISTANCE  |  CH7 EXT DISTANCE  |  CH8 EXT DISTANCE

FIGURE 8 – CLFE8EOU MULTICHANNEL RACK UTP UNITS

CH1 ETHERNET  |  CH2 ETHERNET  |  CH3 ETHERNET  |  CH4 ETHERNET  |  CH5 ETHERNET  |  CH6 ETHERNET  |  CH7 ETHERNET  |  CH8 ETHERNET

CH1 EXT DISTANCE  |  CH2 EXT DISTANCE  |  CH3 EXT DISTANCE  |  CH4 EXT DISTANCE  |  CH5 EXT DISTANCE  |  CH6 EXT DISTANCE  |  CH7 EXT DISTANCE  |  CH8 EXT DISTANCE

Operating Power: 9 to 15 VDC
Power Consumption: 10W

Data rate DIP switch
See Installation Instructions, Step 1

Data rate DIP switch
See Installation Instructions, Step 1

Wire pair DIP switch
See Installation Instructions, Step 2

Wire pair DIP switch
See Installation Instructions, Step 2

Black (DC–)
Black w/ White Stripe (DC+)

Black (DC–)
Black w/ White Stripe (DC+)
FIGURE 9 – CLFE16EOC MULTICHANNEL RACK COAX UNITS

- Operating Power: 9 to 15 VDC
- Power Consumption: 20W

Data rate DIP switch
See Installation Instructions, Step 1

Black (DC-)
Black w/ White Stripe (DC+)

See Installation Instructions, Step 1
FIGURE 10 – CLFE16EOU MULTICHANNEL RACK UTP UNITS

Data rate DIP switch
See Installation Instructions, Step 1

Wire pair DIP switch
See Installation Instructions, Step 2

Operating Power: 9 to 15 VDC
Power Consumption: 20W
APPLICATION DIAGRAMS

Note: Coaxial applications use CLFE(X)EOC modules; UTP applications use CLFE(X)EOU modules.

PoE Pass-Through Mode

Non-PoE Mode

Multichannel PoE Application

Multichannel Non-PoE Application

**IMPORTANT NOTE. PLEASE READ.** The applications are shown as general representations only and are not intended to show detailed network topologies. Your actual network will differ, requiring changes or perhaps additional network equipment to accommodate the systems as illustrated. Please contact ComNet's Design Center to discuss your specific requirements.
INSTALLATION INSTRUCTIONS

1 - SET 10/100 SWITCH
Locate the 10/100 data rate DIP switch on the unit.
Set the data rate according to bandwidth required.
NOTE: The data rate must be set the same on both the local and remote units.

2 - SET WIRE PAIR DIP SWITCHES (UTP MODELS ONLY, FOR COAX MODELS SKIP TO STEP 3)
Locate the wire pair DIP switch on the unit.
Set the pair according to number of twisted wire pairs used (1 or 4).
NOTE: The number of pairs selected must be set the same on both the local and remote units.
PoE Pass-Through mode is only available in 4-pair mode and requires a PD device connected to
the ComNet remote unit to operate.

3 - SET LOCAL/REMOTE SWITCHES (1 AND 4 CHANNEL UNITS ONLY, FOR RACK UNITS SKIP TO STEP 4)
Locate the Local/Remote Dip switch and set to “LC” at the head end or “RM” at the camera end.
Locate the Local/Remote push button switch (coax units only), and set to the same setting as the dip switch.
The CLFE8EO(C,U) and CLFE16EO(C,U) units are preconfigured as Local devices.

4 - CONNECT EXTENDED WIRING
Connect Extended Distance Port to field wiring.

5 - CONNECT NETWORK WIRING
Using CAT5/5e, connect Local unit to network and Remote unit to camera.

6 - CONNECT POWER
Connect power to unit per the following table:

<table>
<thead>
<tr>
<th>Unit</th>
<th>Local Power</th>
<th>Pass-Through PoE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLFE1EO(C,U)</td>
<td>9 to 36 VDC or 18 to 32 VAC</td>
<td>No external power required</td>
</tr>
<tr>
<td>CLFE4EO(C,U)</td>
<td>9 to 15 VDC (9 VDC† when in a C1 or C2 rack)</td>
<td></td>
</tr>
<tr>
<td>CLFE8EO(C,U)</td>
<td>9 to 15 VDC</td>
<td></td>
</tr>
<tr>
<td>CLFE16EO(C,U)</td>
<td>9 to 15 VDC</td>
<td></td>
</tr>
</tbody>
</table>

† Contact ComNet pre-sales support, or refer to the appropriate installation and operation manual when configuring and specifying power for a deployment.

7 - VERIFY FUNCTIONALITY
See LED table below and Troubleshooting Guide if corrective action is needed. See figures beginning on page 6 for LED configurations for each model.

<table>
<thead>
<tr>
<th>Indicating LEDs</th>
<th>PWR</th>
<th>Ethernet Link</th>
<th>Ethernet Activity</th>
<th>EXT LNK</th>
</tr>
</thead>
<tbody>
<tr>
<td>GREEN</td>
<td>Power Applied</td>
<td>–</td>
<td>Activity Detected</td>
<td>10Mbps</td>
</tr>
<tr>
<td>YELLOW</td>
<td>–</td>
<td>Link Established</td>
<td>–</td>
<td>100Mbps</td>
</tr>
<tr>
<td>OFF</td>
<td>Power Off</td>
<td>No Link</td>
<td>No Activity</td>
<td>No Link</td>
</tr>
</tbody>
</table>

For 1-pair mode, use the first pair of pins (pins 1 and 2) of the “Extended Ethernet” RJ-45 port.
APPLICATION NOTES

1. Mixed PoE and Non-PoE systems can be implemented.
2. All Non-PoE systems require local power.
3. PoE powered operation requires that a PoE Camera be connected, and that the camera power requirements are understood.
4. Multiple Channel units (CLFE4EO(C,U), CLFE8EO(C,U), CLFE16EO(C,U)) require 9 to 15 VDC for proper operation. The CLFE4EO(C,U) can be used in a C1, C2, or C3.
5. Single Channel units (CLFE1EO(C,U)) require power for all Non-PoE applications. Local power can be used in PoE application to minimize PoE consumption.
6. Lower data rates generally provide longer operating distances.
7. Rack units (CLFE8EO(C,U), CLFE16EO(C,U)) are pre-configured for Local (LC) and have no configurable Local/Remote switch. Any unit connected to one of these rack units via an extended distance port must be configured as Remote (RM) for proper operation.

APPROXIMATE MAXIMUM EXTENDED DISTANCES

<table>
<thead>
<tr>
<th>Media</th>
<th>COAX - RG59/U</th>
<th>UTP - 4 pair</th>
<th>UTP - 1 pair</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Rate</td>
<td>10M</td>
<td>100M</td>
<td>10M</td>
</tr>
<tr>
<td>Source Power</td>
<td>15W</td>
<td>30W</td>
<td>15W</td>
</tr>
<tr>
<td>Non-PoE Max.Distance</td>
<td>5,000 ft 1,524 m</td>
<td>2,000 ft 610 m</td>
<td>3,000 ft 914 m</td>
</tr>
<tr>
<td>PoE CLASS2 (6.5W)</td>
<td>3,000 ft 914 m</td>
<td>3,000 ft 914 m</td>
<td>2,000 ft 610 m</td>
</tr>
<tr>
<td>PoE CLASS3 (13W)</td>
<td>750 ft 228 m</td>
<td>850 ft 259 m</td>
<td>750 ft 228 m</td>
</tr>
</tbody>
</table>

[1] Distance figures are based on a 50 V PSE PoE power source, and external power supplies for the extenders. Distance figures are obtained using in-house testing mirroring installations. Factors such as coaxial and copper cable quality, the number of connectors and splices in the cable run, the use of PoE, and environmental conditions encountered within the installation might affect the actual transmission distance and should be taken into consideration. Due to advanced negotiation signaling required in IEEE802.3at applications, pass-through applications are limited to IEEE802.3af PD devices only. When using UTP models Pass-Through PoE is only possible in 4-pair mode.

TROUBLESHOOTING GUIDE

<table>
<thead>
<tr>
<th>Problem</th>
<th>Steps to Take</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicating LEDs not lighting</td>
<td>Non-PoE: Check that power is properly applied to the unit PoE: Check that PoE camera is connected, PoE source is enabled.</td>
</tr>
<tr>
<td>No Communication</td>
<td>Check Ethernet Link LEDs, Extended Link LEDs, All Connections, Local/Remote and 10/100 switches are set properly. Verify that Local units are installed at the head end and that Remote units are installed in the field.</td>
</tr>
<tr>
<td>Bad Video</td>
<td>Make sure Data Rate Switch is set properly, and the extended distance is within specifications (see Table &quot;Approximate Maximum Extended Distances&quot;).</td>
</tr>
<tr>
<td>PoE Not Supplied to PD</td>
<td>Make sure camera is IEEE 802.3af rated, PoE Source switch is set properly, and the extended distance is within specifications (see Table “Approximate Maximum Extended Distances”).</td>
</tr>
<tr>
<td>Units not reaching estimated max distances over COAX or CAT5/UTP</td>
<td>Check extended distance cable and connections. Try connection on a short cable to eliminate possibility of faulty cabling. Check that the extended distance wire is connected to Extended Distance Port. Verify that there is no additional equipment (e.g. surge protector) on the Extended Link. The cable should be continuous from end to end, with no active components.</td>
</tr>
</tbody>
</table>
PRODUCT DIMENSIONS

The CLFE1EO(C,U) is supplied as a standalone/surface mount (small size) module.
The CLFE4EO(C,U) is supplied as a standalone/surface/rack (ComFit) module.
The CLFE8EO(C,U) and CLFE16EO(C,U) are supplied as 19" wide rack units for standalone or rack installation.

FIGURE A
Dimensions are for a small size module

FIGURE B
Dimensions are for a ComFit module

FIGURE C
Dimensions are for a 19" Rack Unit
INSTALLATION CONSIDERATIONS

These units are supplied as Standalone/Rack mounted module. Units should be installed in dry locations protected from extremes of temperature and humidity.

WARNING: Unit is to be used with a Listed Class 2 power supply.

IMPORTANT SAFEGUARDS:

A) Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature ($T_{ma}$) specified by the manufacturer.

B) Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.