AL412H/AL413H Micro-Node Installation Guide

APPLICATIONS:

- Perfect for PEG RF return requirements
- RF return upstream insertion port for applications such as distance learning, live events coverage, and security or traffic monitoring
- Cost affective for use in high density application such as business parks, hospitals, schools/universities, PEG and MDU applications
- Perfect for high security LAN network applications
- Perfect for temporary node applications to keep the system up and running while the permanent node is repaired or replaced
- Can be used to expand the return path bandwidth by node splitting
- HE/Hub/Remote TVRO site interconnects

FEATURES:

- Forward 870 MHz / Reverse 5 to 42 or 65 MHz
- Return Path Transmitter options available: 1310/1550 nm FP
- Forward and reverse -20 dB RF & 1 V/mW input/output optical test points
- Forward receiver operates at -5 to +1 dBm optical input and from 1200 to 1600 nm wavelength

Materials Supplied

- AverLux Micro-Node
- Wall outlet power adapter (120 VAC, 28 VDC)
- Two # 6 X ½" mounting screws

Materials Not Supplied

- Ground wire
- Coax connectors and cables
- Lint free swabs (or other fiber connector tool)
- 99% isopropyl alcohol (if lint free swabs are used to clean fiber connectors)

Tools Required

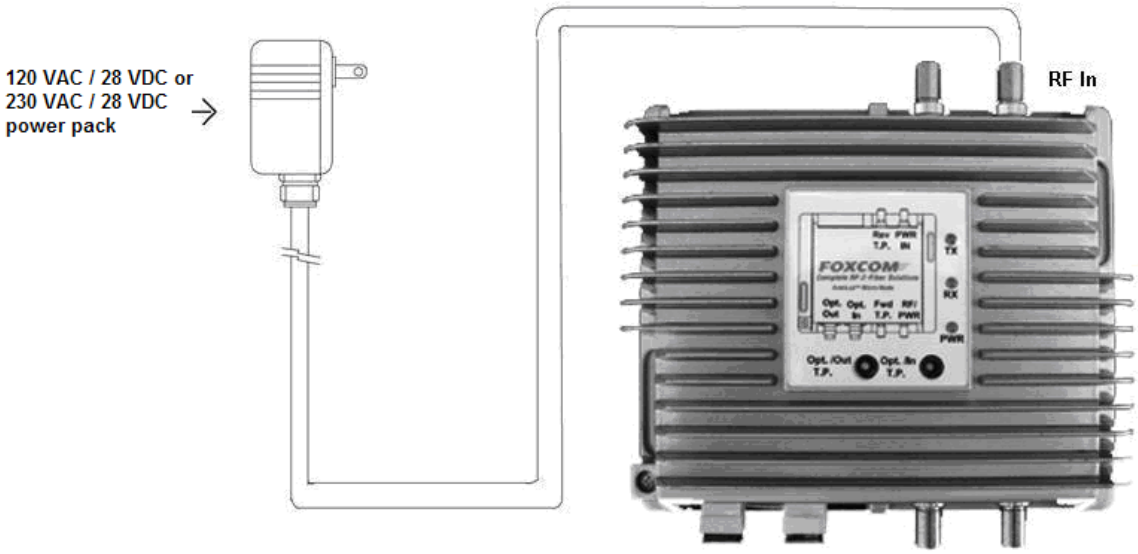
- Phillips head screwdriver
- Volt ohm meter (VOM) or optical power meter
- Signal level meter (SLM) or spectrum analyzer

Visual Inspection

1. Unpack the AverLux Micro-Node. Verify that all parts listed above are enclosed.
2. Inspect the fiber connector. Ensure that it matches the connector type required.
3. Inspect the wall power adapter. Ensure that it is compatible with your power source requirements.

Direct Powering

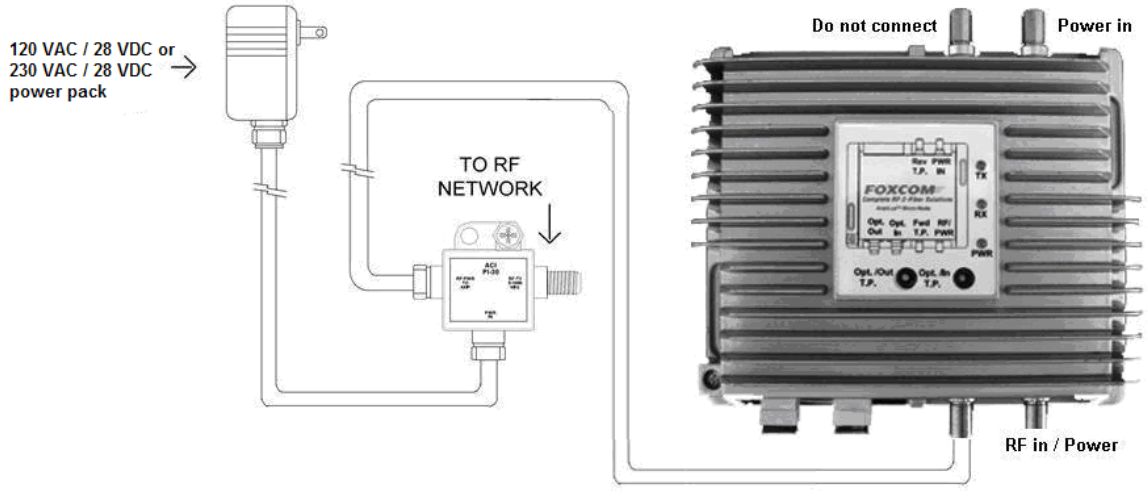
1. Choose a location for mounting the AverLux Micro-Node. Mount the node in the selected location using two #6 mounting screws.
2. To ground the AverLux Micro-Node optical, insert a #6 - #14 gauge grounding wire in the hole at the top left edge of the AverLux Micro-Node (near the power LED). Secure the ground wire in place by tightening the seizure screw with a Phillips head screwdriver. Connect the other end of the #6 - #14 gauge wire to a suitable ground as per NEC or local electrical code.
3. For powering the AverLux Micro-Node, prepare a length of coaxial cable with a male F-type connector at each end. The cable must not exceed 100 feet (30 meters).
4. Connect one end of the prepared coaxial cable to the wall adapter. Connect the other end of the prepared coaxial cable to the AverLux Micro-Node PWR IN connector.
5. Plug the wall adapter into a power outlet located indoors. (Do not plug in wall adapter outdoors unless it is within a weatherproof enclosure.) If properly connected, the AverLux Micro-Node's red LED in the upper left corner will be lit, indicating that power is present.



AverLux Micro-node: Direct Powering

Remote Powering

1. Chose a location for mounting the AverLux Micro-Node. Mount the AverLux Micro-Node in the selected location using two #6 mounting screws.
2. To ground the AverLux Micro-Node, insert a #6 - #14 gauge grounding wire in the hole at the top left edge of the AverLux Micro-Node (near the power LED). Secure the ground wire in place by tightening the seizure screw with a Phillips head screwdriver. Connect the other end of the #6 - #14 gauge wire to a suitable ground as per NEC or local electrical code.
3. Mount the power inserter (Part Number PI-30) to the wall or other surface with a #6 mounting screw (this location should be near an AC outlet).
4. Run a coaxial cable from the RF TV Connector on the power inserter to the network requiring the RF signal.
5. Connect the AverLux Micro-Node to the power inserter using a length of coaxial cable with a male F-type connector on each end. Connect one end of the prepared coaxial cable to the power inserter's RF-PWR TO AMP connector. Connect the other end of the prepared coaxial cable with PWR IN / RF OUT to the AverLux Micro-Node on the upper right F-connector.
6. Using coaxial cable with a male F-type connector at each end, connect one end to the wall adapter. Connect the other end of the prepared coaxial cable to the power inserter's PWR IN connector. The total length of the coaxial cable from the wall outlet to the AverLux Micro-Node must not exceed 100 feet (30 meters).
7. Plug the wall adapter into a power outlet located indoors. (Do not plug wall adapter in outdoors unless it is within a weatherproof enclosure). If properly connected, the AverLux Micro-Node's red LED light will be lit, indicating that power is present.



AverLux Micro-node: Remote Powering

The Optical Connection

1. Clean the incoming fiber.
2. If using an optical power meter connect to incoming fiber and record optical power level.
3. Re-clean fiber optic connector and connect to optical input (lower right corner) of AverLux Micro-Node. The green LED near the optical input connector should light showing that optical power is received by the AverLux Micro-Node.
4. If using a VOM, clean the incoming fiber. Connect to optical input (lower right corner) of AverLux Micro-Node. The green LED near the optical input connector should light showing that optical power is received by the AverLux Micro-Node.
5. Connect the (+) lead off the VOM to the optical test point with the (–) lead grounded. Record the DC voltage: 1 VDC equals 1mW of optical power.

The RF Connection

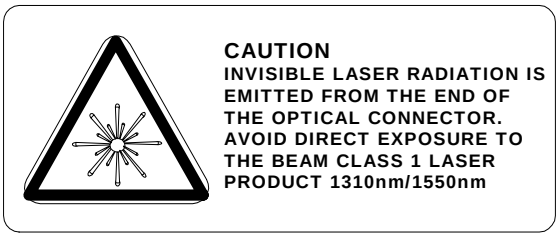
1. Prepare a 75-Ohm coaxial cable. Connect one end to the RF output on the AverLux Micro-Node. Connect the other end to the network requiring RF signal.
2. Using a signal level meter (SLM) or spectrum analyzer, measure and record the RF level of any reference frequency carried on the network at the -20 dB forward test point on the AverLux Micro-Node.
3. Compare optical input power recorded from Step 5 of the **Optical Connection** section above, and the RF output level recorded. The RF output level should be close to the RF level listed in Table 1.

Optical Input [dBm]	DC Test Point [VDC]	RF Output Level [dBmV]
-5	0.297	25| 32
-4	0.364	27 | 34
-3	0.454	29 | 38
-2	0.568	31 | 38
-1	0.720	33 | 40
0	0.901	35 | 42
1	1.11	37 | 44

Table 1: AverLux Micro-Node: RF Input / Outpul Levels

4. Make sure that all F-connectors are tight to prevent any ingress or egress.

Reverse Laser Setup for Analog Signals



Set laser drive using Reverse TP (lower left corner of AverLux Micro-Node). The FP laser drive level is specified as 20 dBmV (FP-two channels) at the laser transmitter Reverse TP (this is a -20 dB test point, +40 dBmV will then be driving the laser).

Reverse Laser Setup for Digital Signals

It is important that the laser drive be set at a level that allows additional digital services to be added at a later date without over-driving the laser. The recommended method is to set the RF drive level at a power-per-Hz basis. This will set up all signals to be transmitted via the reverse laser according to their digital transmission bandwidth. Services with greater bandwidths will have higher drive levels, and signals with lower bandwidth requirements will have lower drive levels. This ensures that the laser is never overdriven, regardless of the number of signals applied to the reverse path.

To set the laser drive using the above power-per-Hz method:

1. Determine the total available power: -60 dBmV / Hz @ TX test point.
2. Assign power to each channel based upon the service's transmission bandwidth. **Example:** All reverse laser drive levels are specified as -60 dBmV / Hz at the laser transmitter. Using this specification, the total drive available for the entire 5 - 42 MHz bandwidth is -60 dBmV / Hz + 10 log 37 MHz.
3. As a result, a 37 MHz full power bandwidth = 15.7 dBmV composite power.

Based on the power-per-Hz number, the drive level of any arbitrary transmission bandwidth signal may be easily determined as follows:

1. Assuming a transmission bandwidth of 400 KHz, the drive level would be -60 dBmV/Hz + 10 log 400 KHz = -60 + 56 = -4 dBmV.
2. Using the above analysis, the drive level of any arbitrary signal with known bandwidth can be determined if the laser drive specification is known.
3. Installation is complete for the AverLux Micro-Node.

Foxcom reserves the right to discontinue the manufacture or change specifications without prior notice on any parts illustrated in this publication. Current drawings are available upon request.
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