



Fiber to the Home (FTTH) Guidelines and Recommendations for Pre-wiring New Homes

This document provides guidelines and recommendations for pre-wiring new homes during the construction stage, prior to the installation of drywall with CAT5e, RG-6 Coax for set runs and both CAT5e and fiber for the run from the side of the house to the star distribution point within the house. The guidelines are best used when combined with a Multi-Media Enclosure, where all telecommunications cabling comes together in the home.

As technology continues to evolve, so should the cabling systems to support homeowners' changing needs. During the framing and pre-wiring stage, it is important to ensure that all set run wiring is done in an inside star method and that the inside star is in a warm and dry location for the electronic equipment used to provide the latest technology. Further, it is important to place non-metallic Rigid conduit" (complete with string) within the stud wall or concrete slab and pre-wire Fiber and a single CAT5e from the Network Interface Device (NID) on the outside of the house to the inside wire Star Configuration inside the home. Balsamwest recommends an integrated end-to-end solution for all category 5e wiring cabling by fully trained and certified electricians and wiring contractors.

Purpose of guide

This guide is intended for use in new construction, additions and remodeled single dwellings for telephone, broadband Internet or home networking. This guide specifically applies to wood frame residences.

Description of pre-wiring

Pre-wiring is a method of installing communications and data cabling such that it is concealed within the interior partition walls of your home. Prewiring is done at the framing (or hollow frame) stage at the same time as the electrical wiring, and before the application of insulation, vapor barrier and drywall. Once the walls have been surfaced, existing wiring cannot be removed or replaced without disturbing the wall integrity.

During the framing or pre-wiring stage, it is important to place a non-metallic "Rigid conduit PVC" (complete with string) pathway in the stud wall or concrete slab from the Network Interface Device (NID) on the outside of the house to the inside wire Star Configuration or Multi-Media Enclosure inside the home. (See figure 1).

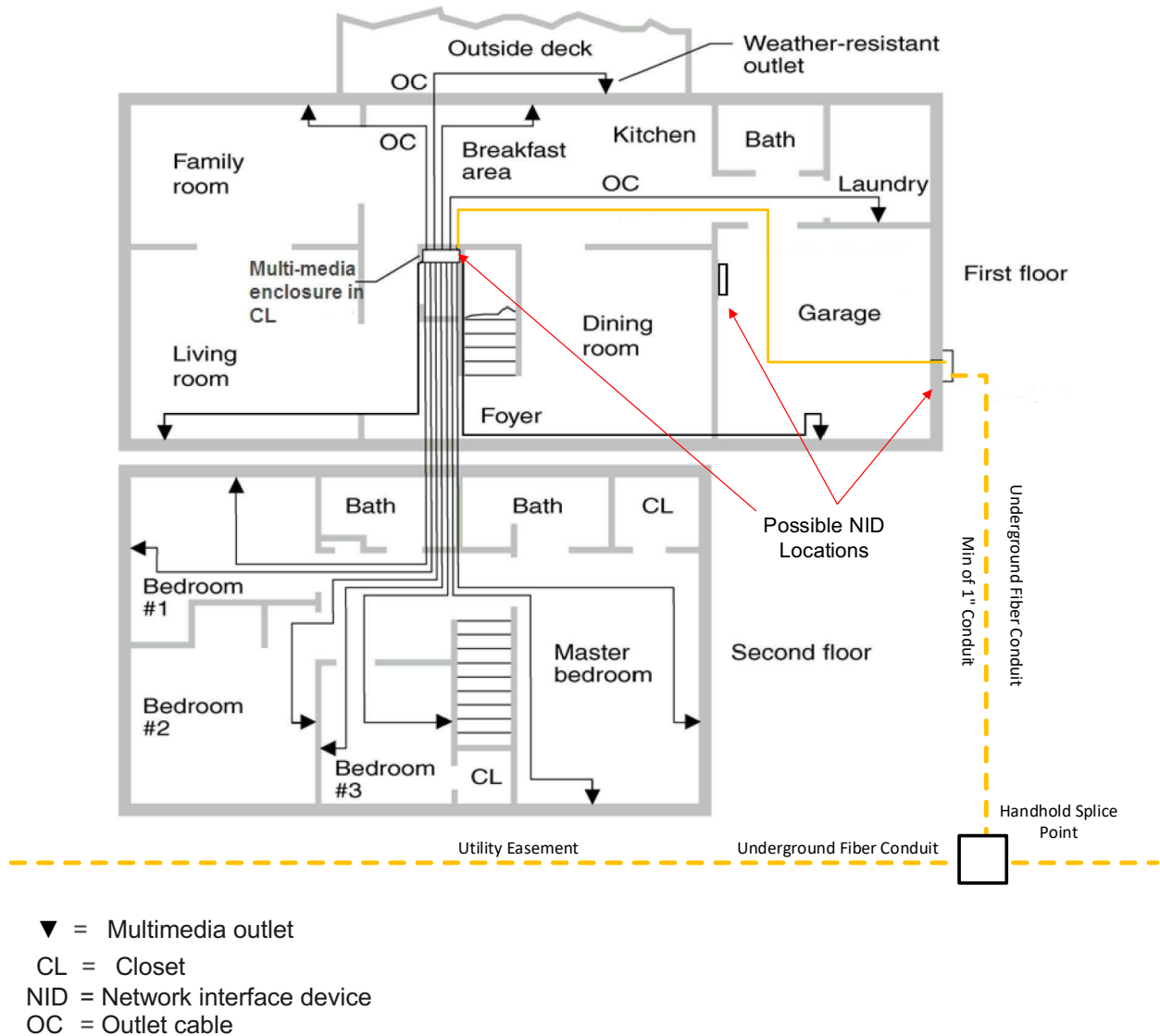
A 1" Inch conduit is sufficient for cabling from the NID to the inside wire Star Configuration inside the home. When using rigid conduit, a maximum of four sweeping 90-degree bends or a total of 360 degrees.

Recommendations and Best Practices

Suggestions for locating NIDs can be found in Diagram 1.

1. Outside Wall of the Home
2. Inside the Garage
3. Inside a Closet or Storage Room (Preferred)

Diagram 1: Typical Residential Premises Cabling System (Physical View)



Underground conduit can be run directly to the NID locations inside the home.

Structural Requirements

- **Optical Network Terminal (ONT) or Media Converters (MC):** The ONT or MC is required and provided by Balsamwest as the network interface device between Balsamwest communications network and customer structured inside wiring for the FTTH architecture.
- **Uninterruptible Power Supply (UPS) and Multi-Media Enclosure Location:** A UPS is required and provided by customer or by Balsamwest for an extra fee, which must be placed in an environmentally controlled location, capable of meeting the following space requirements: 24 in. wide x 24 in. tall x 12 in. deep, 50 in. above ground level. The recommended location of the UPS is in a dry area typically at or near the ONT or MC, but can be no more than 50ft wire run distance in length, from UPS to ONT or MC. The builder shall supply and install a 2'x2'x1/2" plywood backboard. The builder shall install the Multi-Media Enclosure at this location.
- **UPS Power:** The Builder is required to provide a 110 volt, AC non-GFCI electrical outlet within 5ft wire run distance of the UPS, this circuit must be on a common building feed. The required UPS location shall not be supported or provisioned on a Ground Fault Interrupted (GFI) electrical circuit.
- **Smart Panel:** The Builder is required to provide a Multi-Media Enclosure in each living unit to provide a broadband distribution location for supporting voice and data services. It is recommended that the Multi-Media Enclosure be centrally located in either the basement or on the first floor of the structure.
- **Conduit:** The Builder is required to provide a 1" PVC conduit, no longer than 50ft, from the Multi-Media Enclosure location to the side of the house with the power meter. The conduit shall have no more than 4-90 degree sweeps (no hard 90 bends). The conduit should be terminated on the outside of the home with a 4"x4"x2" junction box.
- **Ethernet High Speed Data:** Minimum of one Cat5e cable is required from Multi-Media Enclosure to an RJ45 jack located at a location in the home where the router will be placed for internet access. Each data cable run is to be no more than 328' in length. Data cable is to be terminated on the data portion of the Multi-Media Enclosure
- **Voice:** Minimum of one Cat5e cable from Multi-Media Enclosure to RJ11 voice jack at a location in the home where a phone will be placed for voice service. Voice cable is to be terminated on the voice portion of the Multi-Media Enclosure.

Things not to do

- Do not run parallel to power cables within the same stud or joist space, otherwise transmission and interference problems may be experienced.
- Do not run communications and data cables through holes occupied by electrical cables.
- Do not run communications and data cables in parallel with any power wiring.
- Multimedia outlets **should not** be located within the same studs as a power outlet.
- Never run power in same conduit as communications and data cables.
- If power cables are housed in (metal) armored sheathing, then the above limitations may not apply, likewise minimum separations may not apply since damaging power emissions (EMI) are shielded by the sheathing.
- Do not bend communications and data cables sharply - minimum bend radii are ten times the diameter of cable for CAT5e.

Thing to do

- Ensure avoidance of fluorescent light fixtures - see Table 1 below for minimum separations.
- Ensure avoidance of low-voltage style track light fixtures containing transformers.
- Ensure "Cable Protector" plates are used when mechanical protection of the wiring is required

Interferer	Clearance
Fluorescent lighting	12 " (305 mm)
Power cables (110 V)	12 " (305 mm)
Unshielded power <2kVA	5 " (127 mm)
Unshielded Power >5kVA	24 " (610 mm)
Transformers / motors / elevators	40 " (1016 mm)

Minimum Wiring Requirements

The wiring standards information being provided will assist Developers and Builders in providing their home-owners with the latest communication technology. In the event a dwelling does not comply with the Minimum Wiring Standards, Balsamwest will not be able to provide the full benefits of a FTTH network. Inadequate structured wiring can limit Internet access speeds and entertainment options on the fiber network Balsamwest will be deploying for your community. In addition, the homeowner may incur additional costs to upgrade the dwelling to the minimum requirements.

NOTE: Contractor shall comply with all applicable governmental regulations to include federal, state, county, city and all other applicable codes and ordinances. The contractor shall furnish without extra charge any additional material and labor which may be required for compliance with these laws, rules, and regulations.