



## One connection. Endless possibilities.®

For years, TELUS has been providing excellence through ongoing development of existing and future products and services for our community. As part of the TELUS Future Friendly Home, we would like to introduce you to our Warm Home and associated wiring changes to support the Warm Home concept. To enjoy the benefits of a Warm Home it does not have to be expensive, time-consuming, or complicated.

The TELUS Warm Home Program works along with the TELUS Home Solutions Partner Program to help residential builders and developers provide premium telecommunications solutions via a possible cost sharing arrangement. As a result of this wiring the building is multimedia ready allowing it to be marketed as such with potentially a premium price. The Warm Home enables the delivery of TELUS services to the homeowner at the time of move in, allowing the homeowner to focus more on other pressing matters. These services span across three primary types of media: telephone, high-speed internet access, and television. With such services available at consumers' fingertips almost immediately, they'll have an extra incentive to confirm their purchase.

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 fibre 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 the TELUS 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 located in a warm and dry location for the electronic equipment used to provide the latest technology. Further, it is important to place either a non-metallic "Flexible or Rigid conduit" (complete with string) within the stud wall or concrete slab and pre-wire a Bend Insensitive Fibre (BIF) and a single CAT5e from the Network Interface Box (NIB) on the outside of the house to the inside wire Star Configuration inside the home. TELUS recommends an integrated end-to-end solution for all category 5e wiring cabling by fully trained and certified electricians and wiring contractors. TELUS will continue to make changes to this document to ensure alignment with the Residential Cabling Standards CSA T525.

For more information about the Warm Home Program, potential cost sharing opportunities and how we can help you differentiate a residential development project in your community, please call us today at 1-866-844-1544 or visit our website: <http://www.mytelus.com/mdu/index.do>

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1. Any installation of premise wire shall be in accordance with the laws, rules, regulations, technical standards and codes in effect at the time of installation, whether federal or provincial.
2. The prewiring of a premise will have an immediate impact on the service to the premise as well it could affect the network system of TELUS. As a result TELUS advises that any design, installation and wiring are to be carried out by a trained telecommunication technician. All telecommunications technicians are to be trained and certified by the manufacturer and supplier of the product or equipment to be installed.
3. This document makes references to and summaries of the rules as provided in the *Canadian Electrical Code (CEC)*. The reference and summaries of these rules are provided for brevity and convenience. Prior to any design, installation or prewiring of a premise, every trained technician is to be familiar with the CEC.
4. The CEC and the Provincial or Municipal Electrical Inspection Branch may require a permit prior to any prewiring, adding to, or rearranging the communications and data interior wiring. They may also require that the work be inspected upon completion. Contact your local (Provincial or Municipal) Electrical Inspection Branch for further information regarding these requirements. If outlets are to be located in exterior walls (or walls between suites) obtain advice on maintaining the integrity of the vapour barrier or fire-rated wall.
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## General Information

### Purpose of guide

This guide is intended for use in new construction, additions and remodeled single dwellings for telephone, TELUS multimedia services (TELUS TV), 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, vapour 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 "Flexible or Rigid conduit" (complete with string) pathway in the stud wall or concrete slab from the Network Interface Box (NIB) on the outside of the house to the inside wire Star Configuration or Multi-media Enclosure inside the home. (See figure 1).

A **25mm** conduit for is sufficient for TELUS "only" or **32mm** is required for "shared" TELUS & CATV cabling from the NIB 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 is allowable without additional pull boxes. The maximum length without a pull box is 30 m.

### What you are responsible for

1. correcting any service difficulty that the installation or prewiring creates and which harms the telecommunications network;
2. paying a service charge when TELUS makes a repair visit to your premises in order to remedy problems resulting from wiring that has been improperly installed or maintained.

# Planning Multimedia Outlet Locations and Cable Routing

## Introduction

**To enable your home for enhanced systems, TELUS Fibre Optic multimedia services, or as a smart home**, all installed runs of CAT5e and coax must be terminated at a centralized location which is a cross-connect location between incoming service wire and in dwelling runs. TELUS will install various active devices (switch/routers and termination devices) at this location. This centralized location is identified by the Multi-media Enclosure in most diagrams (see Diagrams 1, 2, and 4, Figure 1) and is to be in a heated environment where there is no risk of the ambient air temperature falling below 0° (zero) Celsius and is accessible for servicing and takes into consideration all other factors that could limit or degrade the services provided on the cabling, see Table 1 for recommended clearances from other electrical interferers.

It is important to place a non-metallic "Flexible or Rigid conduit" (complete with string) pathway in the stud wall or concrete slab from the Network Interface Box (NIB) on the outside of the house to the inside wire Star Configuration or Multi-media Enclosure inside the home. This has to be done for all suites that may be within the same property or structure. Plan this (these) routes to be as short as possible, with the least amount of bends (sweeping 90), four 90 or a total of 360 degrees of bends allowed in one section without an extra pull box location.

When selecting Multimedia Outlet (MO) locations, select those that suit both your present and future needs. TELUS suggests you consider a minimum of two (2) outlets in each of the areas shown here in Diagram 4. A separate cable run will be required for each service or device at each outlet. For example, if the outlet contains two jacks, one for telephone and one for Internet service, then two sets of four-pair cable will need to be run to this outlet. For rooms designated as likely candidates for the location of entertainment or multimedia equipment (e.g. living room, family room, home office, home theatre room or den), additional wall outlets should be allocated, and the MO should contain both Cat5e and RG 6 coaxial cable. In considering the future, be aware that there are smart appliances and entertainment equipment that will be using the internet and in home networking.

It is not necessary to have a communications and data device connected at every prewired location, however, by planning ahead it reduces future costs and creates flexibility for the Home Owner. Unsightly surface wire, additional installation time and inflexibility of device arrangements are consequences of not planning. Adequate wiring will give customers flexibility in arranging their telephone, second line, FAX lines, and multimedia services such as TELUS TV or Computers networked and other devices that utilize the internet or the home network.

Please refer to Form P546 (BC) or P630 & P730 (AB) for connection to TELUS service and owner / developer's support and housing requirements. ([See the Additional information section](#))

At this stage of planning, Security wiring, in home theatre, intercom and any other conveniences should be considered so that their wiring can be installed while the home is in the construction stage.

TELUS must be contacted when the pathway is in place to install the service entrance wire and the demarcation block.

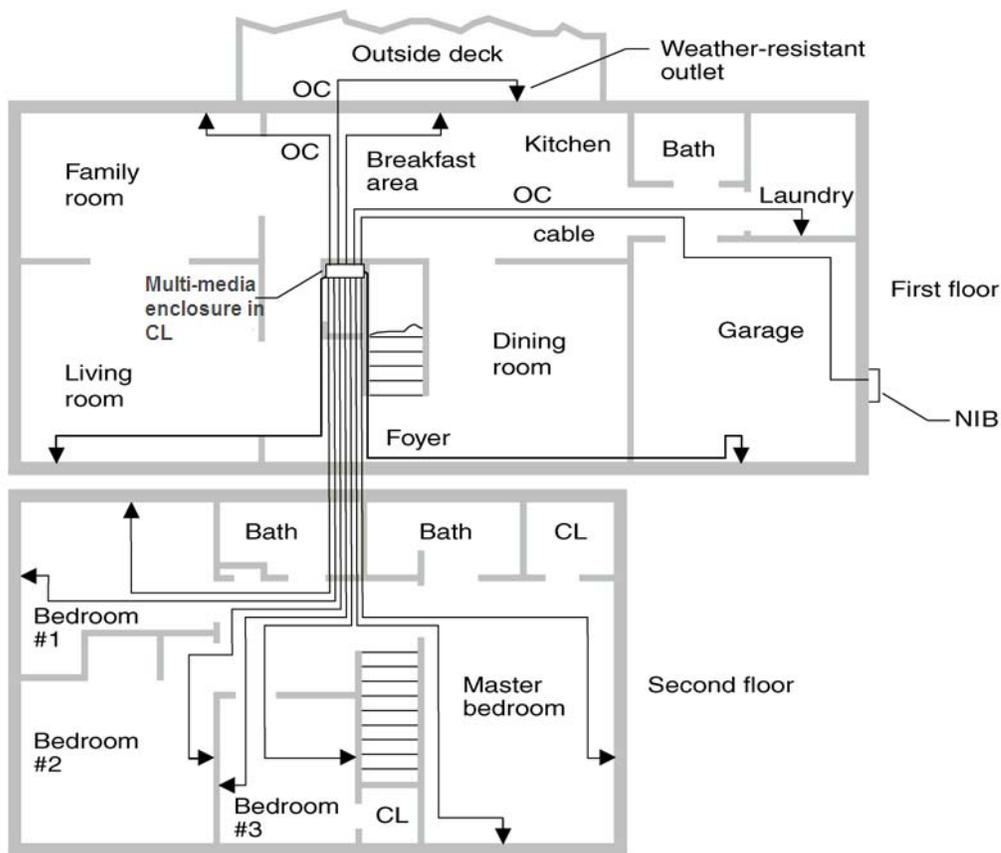
## Outlet Locations - Recommendations and Best Practices

Suggestions for locating outlets can be found in Diagram 1.

In each room, locate outlets as follows:

1. to allow two per room minimum, at least one near the Television and one for the PC or telephone;
2. on walls that make up a corner where Television or PC might be located;
3. to prevent cross-room or cross doorway cable runs – see Diagram 1; and
4. to suit present and future needs, e.g. TELUS multimedia services use in the kitchen.

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



Courtesy of BICSI®  
/ Modified by TELUS

- ▼ = Multimedia outlet
- CL = Closet
- NIB = Network interface box
- OC = Outlet cable

Diagram 2: Typical Single Family Residential Home with an Attached Front Garage

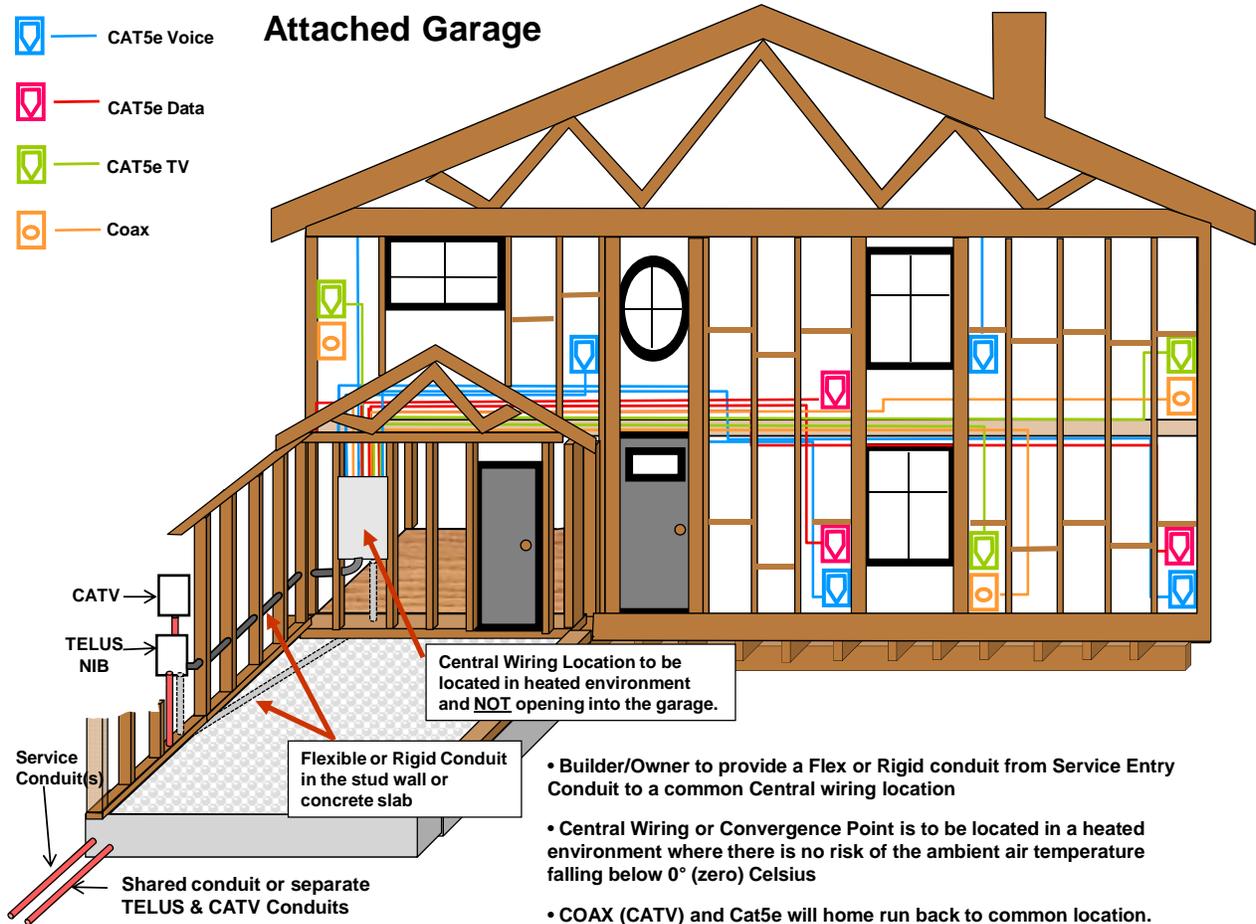
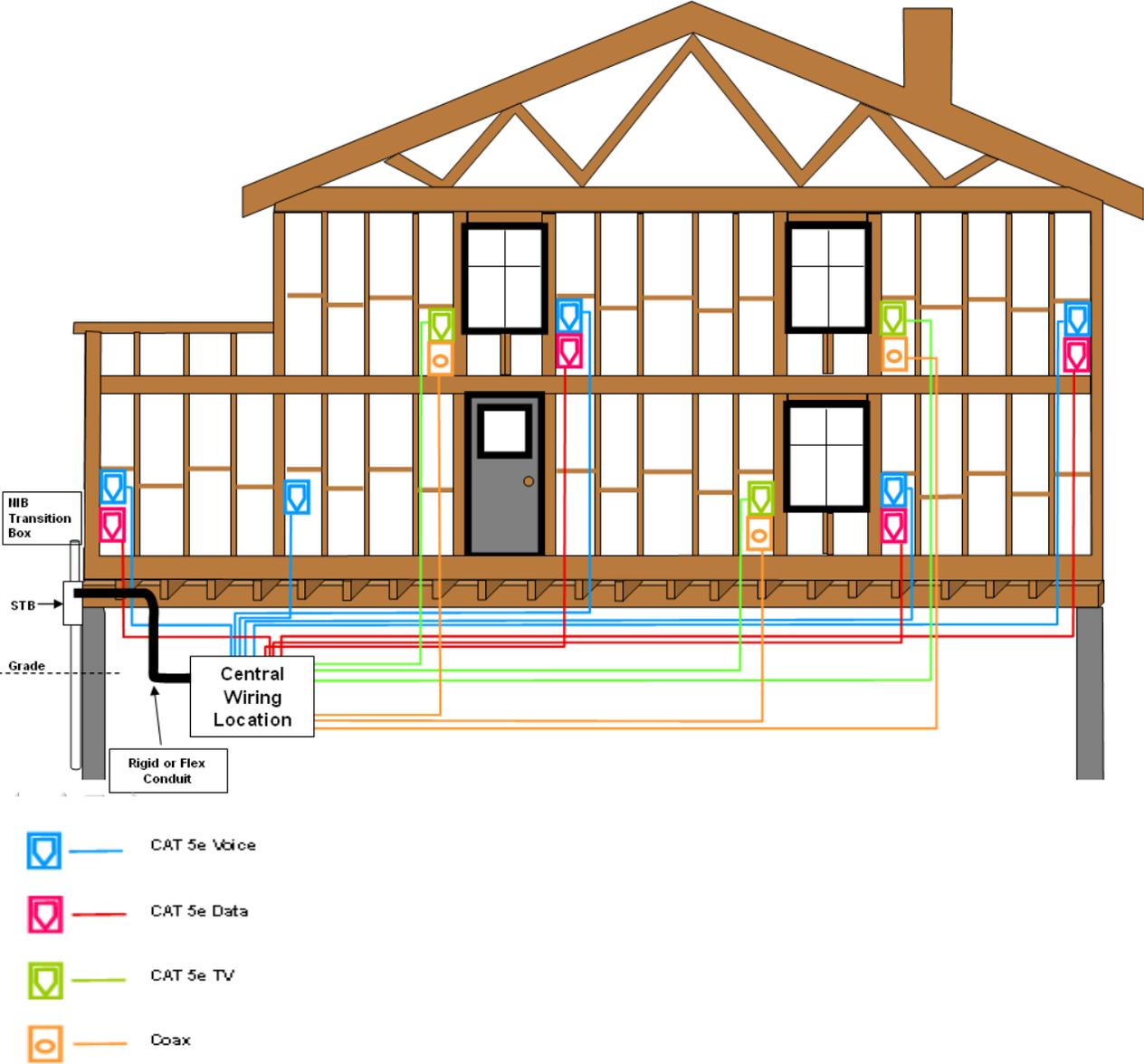
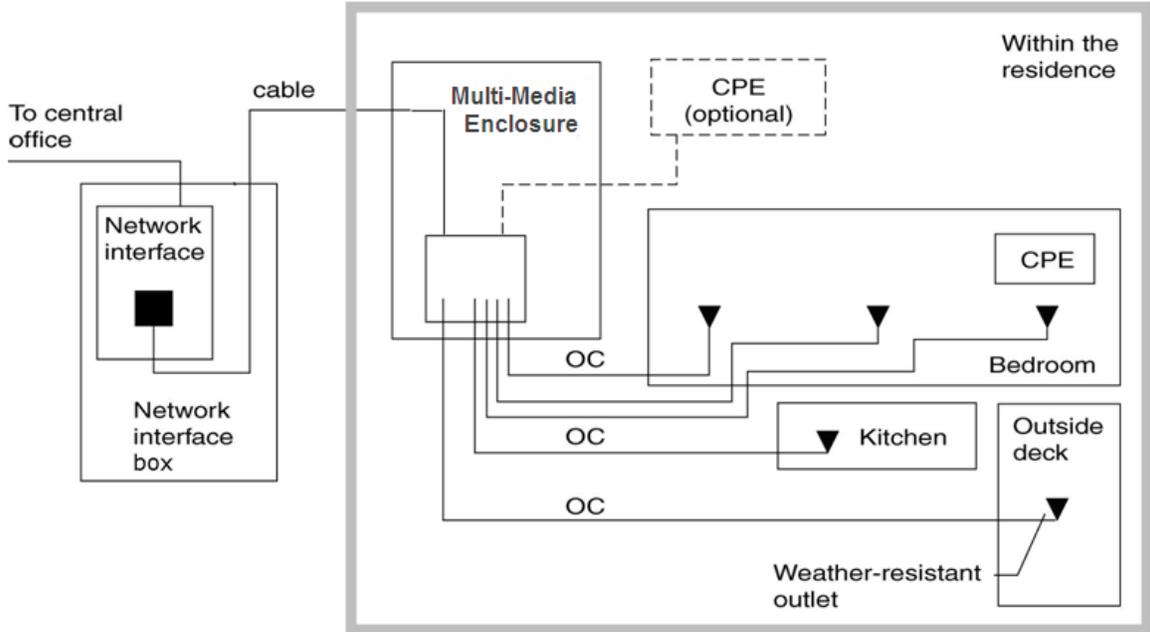


Diagram 3: Typical two story house



**Diagram 4: Typical Residential: LOGICAL VIEW**



Courtesy of BICSI® / Modified by TELUS

- = Test Jack (RJ 11)
- ▼ = Multi-media Outlet

CPE = Customer-provided equipment  
 OC = Outlet cable

## Other Considerations for New Homes

Install a standard electrical outlet box to a stud at each location that a computer, television, powered phone, or smart appliance may be required to accompany each multimedia outlet.

### Cable Routing

Plan the route to avoid possible damage from future construction, rubbing, overheating, dampness, or contact with power wires. The Canadian Electrical Code, Part 1, (Rule 60-300) requires a minimum of 50 mm (approximately 2") separation from power cables. TELUS recommend 12 inches.

The cable route must follow a supported path through floor joists, over ceilings, through wall studs, and behind baseboards without compromising the structural integrity of the building. If possible, the route you select should conceal the cable.

**TELUS recommends a minimum of two cable runs (i.e. two separate four-pair cables and or RG-6 Coax) to each multimedia outlet to provision for future growth or upgrade of the multimedia outlet (faceplate).**

Separate runs will allow for ease of movement and arrangement of an occupants telephone, Internet or advanced multimedia services; will reduce time to locate faults and allow sufficient cable pairs for maintenance and provide for future service additions.

### 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. Refer to Diagram 5 for suggested correct installation.
- 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, and for RG-6 coax.

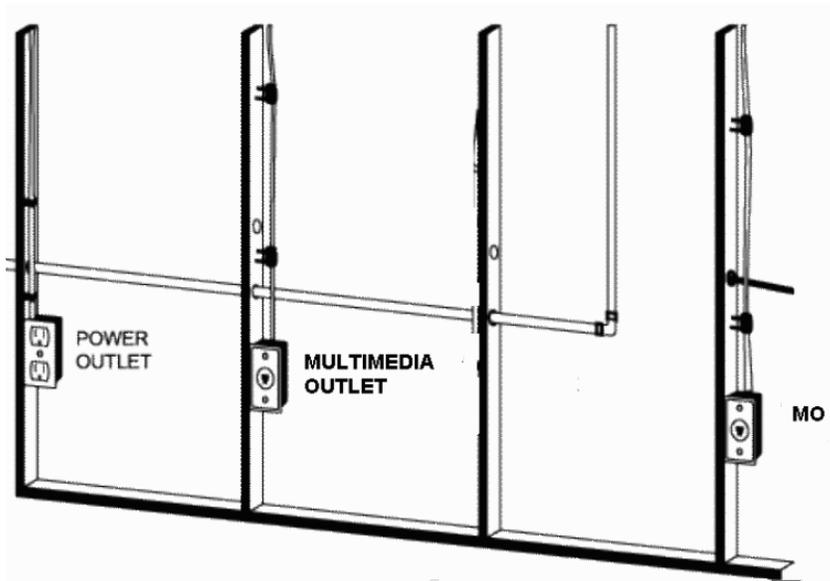
### Things to do

- 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

**Table 1 – Minimum Separations Guide**

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

**Diagram 5: Correct placement of cables and outlets**



### Telephones and Communications Devices in Bathrooms

The Canada Electrical Code, Rule 60-400 in summary provides: Communication equipment located in a bathroom shall be permanently fixed on the wall, and shall be located so that no part may be reached or used from the bath or from the shower enclosure.

TELUS recommends that Telephone jacks are not installed in bathrooms.

### What Type of Telephony Devices to Connect?

Telephony devices shall be certified and approved by CSA International (CSA) identified by the following mark.



Note:

Faulty customer-owned telephony equipment could result in a service charge if TELUS is called to diagnose the problem.

Figures 3 and 4 are extracted, courtesy of BICSI®, from BICSI® Telecommunications Distribution Methods Manual (TDMM), 10<sup>th</sup> edition, Chapter 17 (Residential Cabling).

## Wire / Cable and Outlet Hardware

### Wire or Cable Selection

Telecommunications wiring must comply with all laws and regulations, whether federal or provincial and the Canadian Electrical Code.

The minimum grade of inside wiring TELUS recommends is (CAT-5e) Inside Wiring Cable (IWC) or Premises Communication Cable (PCC) that is Canadian Standards Association (CSA) approved, designated CMR (formerly FT4 (fire-rated)) per CSA standard C22.2 No. 214-M90. The cable should have a minimum of four pairs twisted 24 AWG solid copper wires. The outside cover of the wire should be clearly stamped "CSA IWC CMR 24 AWG", and have a Category 5 (voice and data) transmission rating (CAT-5e) except where the local electrical authority states that CMP (formerly FT6) is required.

**Do not use flat wire such as telephone set line cord or lamp wire for prewiring, as it can cause transmission problems, errors and low throughput.**

### Identifying Conductors in Cabling and Multimedia Outlets

To identify the conductors in new CAT5e cable, strip off a portion of the outer sheath. This will expose the four color coded pairs, which are twisted together to increase performance and reduce interference. Each working telephone line requires one pair of conductors (pair 1, connected on pins 5 and 4), and each pair consists of a Tip (T) and a Ring (R) conductor. Each MO required for Internet / home networking use requires all eight conductors or wires (i.e. four pairs). The manufacturer identifies each conductor by a standard colour code as shown in Table 2. All conductors must be connected to the correct pin position.

**Table 2 – Identifying Conductors in Outlet Cable (TIA/EIA-568-A wiring configuration)**

PAIRS (LINES)		4 AND 8 WIRE COLOR CODE		JACK HARDWARE (PINS)
1	TIP	GREEN	WHITE WITH BLUE BAND	5
	RING	RED	BLUE WITH WHITE BAND	4
2	TIP	BLACK	WHITE WITH ORANGE BAND	3
	RING	YELLOW	ORANGE WITH WHITE BAND	6
3	TIP	WHITE	WHITE WITH GREEN BAND	1
	RING	BLUE	GREEN WITH WHITE BAND	2
4	TIP	BROWN	WHITE WITH BROWN BAND	7
	RING	ORANGE	BROWN WITH WHITE BAND	8

## Outlet Types

A multimedia outlet (MO) provides the means to connect to the following:

- Advanced Multimedia Services;
- Broadband/High-Speed Internet, Data Networking and TELUS Optic TV;
- Telephone; and/or
- Optional (Coax) for Cable-TV.

Multimedia outlets may combine a multitude of sockets, jacks or connectors of any of the following types: 8-pin modular jack; RCA; S-Video; F-connectors for Cable-TV coax; or fibre optics with their associated cable type. This would be called a multifunction Multi-Media outlet; (Manufacturers e.g. Leviton and Belden/CDT).

All 8-pin modular jacks must be wired to match the TIA/EIA-568-A pinout configuration. This industry standard has been adopted by Canada.

Exterior outlets must be weatherproof.

## Installation Best Practices

See Section, Planning Multimedia Outlet Locations and Cable Routing.

## Multimedia Outlet (MO) Tips

- Connect the 8-pin modular jacks within each multimedia outlet according to the TIA/EIA-568-A standard as above using the Cat5e cable, making sure all conductors are connected correctly.
- The pairs within CAT5e cabling have twists in them. It is important to insure all pairs have the correct twist ratios maintained right up to the jack or outlet terminations. Do not leave longer pieces straight and untwisted. This will ensure maximum data rates and minimize interference.
- When running outlet cable (four pair, 24 GA CAT5e minimum) from multimedia outlets to your Multi-media enclosure, ensure each run is a home run (that means a single direct unbroken cable length). No daisy chaining. This may be referred to as Star Topology or Star Wiring. (see Diagram 1 and 4).
- **Again we recommend a minimum of two cable runs (i.e. two separate 4-pair cables) to each MO to provision for future growth or upgrade of MO faceplate, one of the runs could consist of a RG-6 Coax to expand flexibility for service providers.**
- Keep cable runs direct and unbroken between MO and Multi-media enclosure. Although it may be tempting to splice two short lengths together to economize on cable costs, doing so will cause interference, limit flexibility and degrade network performance.
- Place outlets prior to cladding the wall.
- If possible, protect terminations with plastic bags tied on at both MO and Inside Wire Star ends, prior to completing drywall and painting.
- Coloured jacks for installation into MO may be a useful option for identifying services e.g. black for LAN/internet or white for phone.

## Cable or Wiring Tips

- Do not pull communications and data cables through holes occupied by electrical cables.
- **Maximum run length is 90m.**
- Cables that cross should be at 90 degrees to each other.
- Do not exert > 25lbs of pulling force on 4-pairs (CAT5e and 6).
- **Do not splice wires on runs** – pull another if things go wrong.
- Where required, secure the cable every 600 mm, (24") with a round staple designed for the wire. Careful to not pinch the wire which could introduce a micro bend in the cable affecting transmission
- Or use plastic non-metallic staples to support wire and leave the wire loose in the staples.
- Avoid sharp edges and turns and do not kink the cable, minimum bend radii is 10 x diameter of cable for CAT5e and for coax RG-6. If a staple pierces the cable, the entire length of cable must be replaced to prevent transmission problems. Where sheet metal framing is used, install grommets to protect the cable from the sharp metal edges.
- When drilling through floor joists, ensure that the structural integrity is not being jeopardized. For example, prefabricated joists may have manufacturers' specification/location for drilling holes. Check with your design engineer/manufacturer or building inspector.
- Leave at least 30 cm, (12") of excess cable at the outlet end.
- For new homes consider using conduit to allow for easy pulling of future wiring.
- Exterior cabling must use exterior grade cable.
- Do not kick cabling under baseboards, cabling is loose and can become snagged and damaged.

## Multi-media Enclosure Tips

- Leave a minimum of 1.5m excess on all cable runs at the multi-media enclosure.
- At a minimum, install two cable runs (CAT5e and Bend Insensitive Fibre (BIF) from your multi-media enclosure to the NIB in the flexible conduit.
- TELUS recommends IDC style strips or blocks and jumpers/patchcords required for cross-connects.
- It is critical to ensure all pairs have the correct twist ratios maintained right up to the IDC strip or block terminations. Do not leave longer pieces straight and untwisted. This will ensure maximum data rates and minimize interference.

## Multimedia Outlets

### Examples of Multimedia Outlets



The 8-pin modular jacks (RJ-45) must use the TIA/EIA 568 A pin out standard (most outlets have both color codes printed on them 568 A and B) in order to meet industry certification and cabling standards. Combination 8-pin modular & F-connector jacks (e.g. Leviton / Belden/CDT MDVO multimedia module) may be installed at each location.

## Multi-media Enclosure

### Hardware

Builders and homeowners will require hardware to terminate in-home wiring from outlets; a means to patch or distribute smart home services through to outlets, and provide flexible reconfiguration. All suites (basement, cottage house, nanny suite, etc.) must be wired as a separate unit with its own "Inside Wire Star" in a warm and dry location with a connection back to the NIB through a conduit (Figure 1).

The Inside Star location is where the in-home set runs (CAT5e and coax) converge and connect to the service feed from outside the home. This is also the location for in-home electronic distribution devices, equipment cords and fibre equipment when required.

The Inside Wire Star must be installed inside each home in a warm dry location that is accessible for cabling maintenance and should be centralized within the home to minimize the length of outlet cables.

Initial surface requirements should be sized at a minimum 600 mm (24") X 900 mm (36"). It should be positioned such that sufficient unobstructed clearance will be available for some potential protrusion of equipment on the wall surface. If the location necessitates security or physical protection, for example, if located in a closet or a high traffic area, an enclosure is recommended. The enclosure should be sized at a minimum 350 mm (14") X 750 mm (30"). Clearance is necessary to always ensure access to the cabinet.

A 15A, 120 VAC nominal, non-switchable duplex electrical outlet must be provided inside the multi-media enclosure or within 450 mm (18") of the Inside Wire Star. The height of the electrical outlet should be suitable for the associated equipment being installed and shall be in compliance with the Canadian Electrical Code.

The conduit, flexible or rigid, placed from the NIB location to the Multi Media, inside Star location shall be **25mm** for TELUS "only" or **32mm** for "shared" TELUS & CATV cabling. When using rigid conduit a maximum of four sweeping 90 degree bends or a total of 360 degrees is allowable, less is preferred. If more sweeps are needed and or the length of the pull is longer than 30 meters, placement of pull boxes would be needed.

### **Recommended Solution**

TELUS recommends the installation of an approved TELUS Structured Media Box as the Multi-media enclosure.



14"Wx30"Hx3.5"D

### **Alternative to Multi-media Enclosure**

If a multi-media enclosure is not used, the inside wire star location should be located at a suitable working height of 1200 mm (48") off the floor in a warm, dry location within 450 mm (18") of a duplex receptacle. Total surface space required for the mounting of inside wire termination modules and the mounting of the electronics and/or fibre equipment will be a minimum 600 mm (24") X 900 mm (36").

### **Installation Best Practices**

1. Required Space – 30" Enclosure
2. Distribution Panels – Standard Voice and Data Termination Modules
3. Entry points to Multi-media Enclosure for runs from Multimedia Outlets in rooms and copper or fibre cable run from NIB
4. Multiple CAT5e runs from rooms and NIB
5. A single Bend Insensitive Fibre from the NIB to each suite(s) Inside Wire Star location
6. Reserved area to mount Modem and Router
7. Un-switched 120V Duplex outlet
8. For larger homes with more runs, additional components may be required.

To reiterate how important this is, all suites (basement, cottage house, nanny suite, etc.) must be wired as a separate unit with its own "Inside Wire Star" in a warm and dry location and further it is important to place a non-metallic "Flexible or Rigid conduit" (complete with string) pathway in the stud wall or concrete slab and pre-wire a CAT5e cable along with a single Bend Insensitive Fibre (BIF) from the Network Interface Box (NIB) on the outside of the house to the inside wire Star Configuration or Multi-media Enclosure inside the home.

Locate your Inside Wire Star or Multi-media enclosure no closer than 12" (30cm) to a power distribution panel, suggested distance is 24" or 60cm, to protect network equipment from sources of interference.

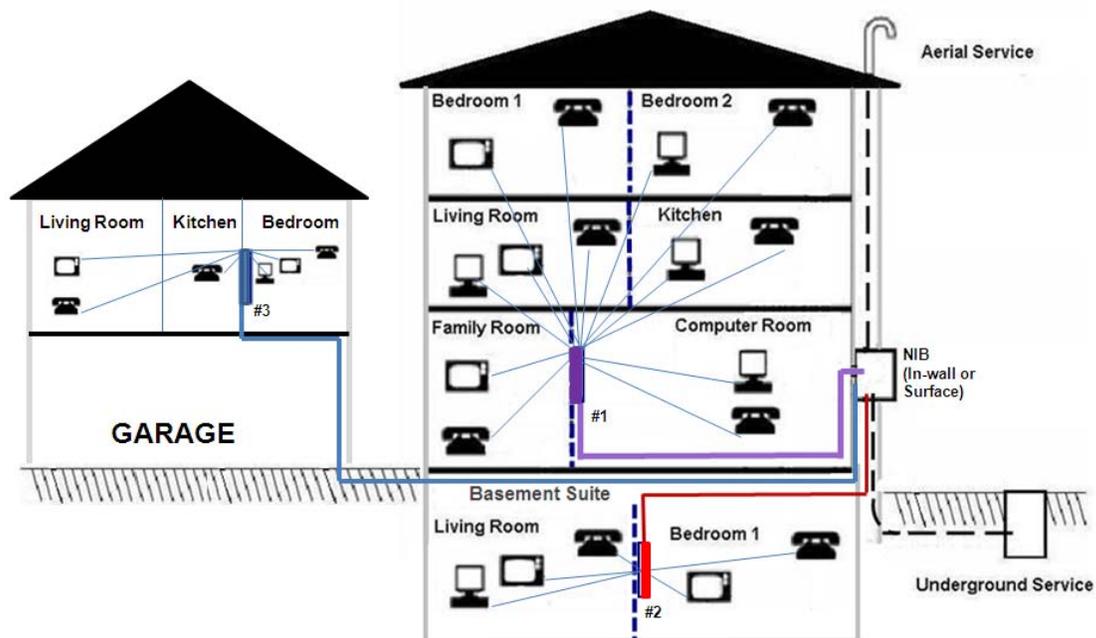
Clearly mark all set runs, with MO location id and type of service on each (if known) **suggested e.g. MBR01, KTCH01, DNGR01, LIVR01a LIVR01b**. Clearly identify and mark all services and ports.

Use a tone generator to assist in determining which cable runs connects to which room. See instructions supplied with your tool.

## Suites

### Basement, Coach / Cottage Houses

Figure 1 – NIB to Multi Media wiring locations with conduit runs



#### Inside Wire Multi Media Star Locations:

- #1 – Main Household
- #2 – Basement Suite
- #3 – Coach House / Nanny Suite above garage

Figure 2 - In-wall Multi-media Enclosure

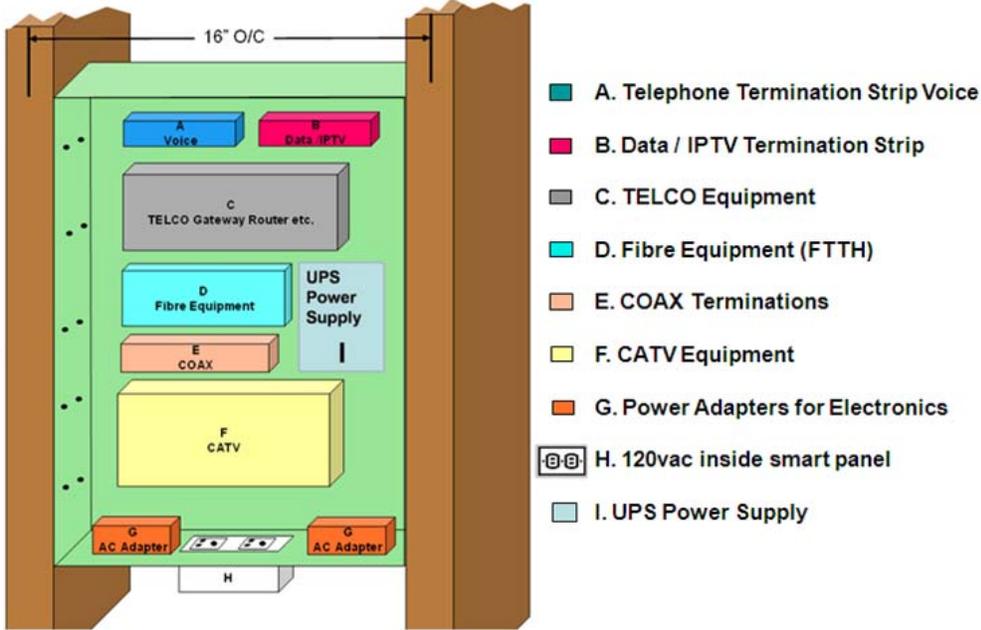


Figure 3 - Surface Mounting – Alternative to Multi-media Enclosure

## Connecting Telephone Service

### Safety Precautions

Remember, when working on existing telephone service it is possible to come in contact with electrical currents. Again, TELUS recommends that installations be carried out by a trained technician. Work on telephone or any wiring should never be undertaken during thunder and lightning storms.

To reduce possible feedback of potentially hazardous voltages either caused by lightning strikes or contact with high voltage power lines, the Canadian Electrical Code requires the installation of a primary protector as per Rule 60-200 as noted below:

#### **60-200 Provision of Primary Protectors:**

1. A primary protector shall be provided on each electrical communication circuit, except as provided in Subrule (4).
2. The primary protector shall be located in, on, or immediately adjacent to the structure or building served and as close as practicable to the point at which the conductors enter or attach.
3. The primary protector shall not be located in any hazardous location as defined in Sections 18, 20 and 24, nor in the vicinity of flammable or explosive materials.
4. A primary protector need not be provided if no portion of the circuit is considered exposed plant.

Primary protection must be provided on circuits considered exposed plant. Where located outdoors, the *circuit* shall be located below grade level and installed in a conduit. These circuits shall not have any exposure to lightning or contact with power lines at all times. Direct buried cable/*conductors* are generally classed as *exposed plant* because they are usually susceptible to lightning strikes.

### Service Connection

In new homes fed by the traditional “copper” telephone entrance cable (aerial or underground), it will terminate in the NIB box located on the outside walls of your single-family residential buildings. It is usually located close to the electrical meter. To gain access to the NIB box or NIB lid and to the demarcation jacks, loosen the screws and optional customer lock located on the right hand side of the NIB box or lid. With the outer door swung open, access to the demarcation jacks and/or inside wire is now possible.

In new homes fed by the new “Fibre” telephone entrance cable (aerial or underground), the fibre drop will terminate inside the home in a warm and dry location.

In accordance with regulations, TELUS must be contacted to determine the proper demarcation point.

## Copper Demarcation Point

The terminals found on demarc blocks and protectors could be marked in a number of ways:

Conductor	Colour	Identification	TELUS side	Customer side
TIP	Green	T1	T <sub>in</sub>	T <sub>out</sub>
RING	Red	R1	R <sub>in</sub>	R <sub>out</sub>

### WARNING!

Altering or adding to the telephone protector could be hazardous to your property or person and should never be undertaken except by a trained telephone technician.

**See Section 5.3.X.X for demarcation and service entrance requirements.**

## Testing the Copper Wiring and Multimedia Outlets

Verification testing should be performed on all outlet and cable installations. Test for the following faults:

- opens
- shorts
- grounds
- mis-wires
- discontinuities, pin-to-pin or other

Example Test steps:

No.	Step	Expected Result	Pass/Fail
1	Insert test cable from test instrument into Modular 8-pin Jack (RJ-45) socket of Multimedia Outlet		
2	Run Wiremap test to ensure correct cable/socket wiring.	Pass	
3	Run Length test: Length required less than 90m (295 ft)	Less than 90m	
4	Check for cable faults (indicated by distance Open or Short is away from outlet under test)	No faults or zero distance	
5	Check far-end connector (at Inside Wire Star) is not faulty	No faults	

**Note:** This verification check for residential wiring does not test the information carrying capacity of the link. Network cables installed in typical residences are shorter than those found in commercial installations and do not suffer as much from losses. Good capacity can be expected when the guidelines for cable routing and best installation practices have been adhered to.

Suggested testing devices include but not limited to:

- FLUKE MicroScannerPro (or better)
- FLUKE DSP4300
- Agilent Wirescope 350
- ResiTester

## Appendix A: Sample Test Summary Report

Home Network Certification – Verification Check Sheet and Install Record

Installation date: \_\_\_/\_\_\_/\_\_\_ Crew: \_\_\_\_\_

Service contact Ph.: (\_\_\_\_) \_\_\_\_\_

Installation #:	Installer Company Name:
Development Name:	Address:
Address:	City:
Lot/Block:	Prov:            Post Code:
City:	Phone:
Province :            Postal Code:	Email:

Example is shown on first line with number of drops per cable type.

**Note** C3 = category 3            C5= category 5    C5e= category 5e    C6 = category 6

Test – V = Verified for continuity, wiremap, and length, C = Certified to cabling performance specified per the ANSI/TIA/EIA-570-A Standard

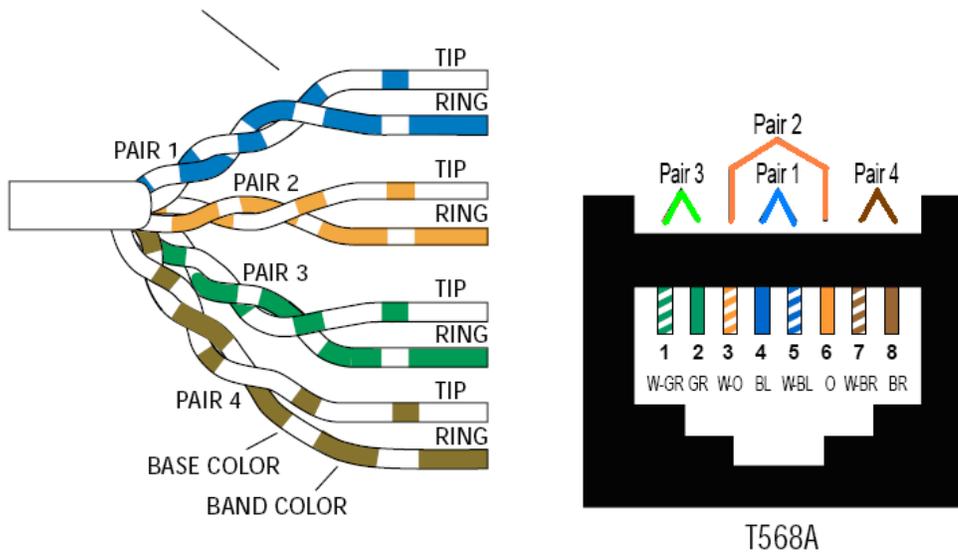
Outlet / Drop	Voice					Data					Coax			Other / Note	Init.
Location	C3	C5	C5e	C6	Test	C3	C5	C5e	C6	Test	RG-6	RG-11	Test		
Example: MBR01			1		V			1		C	2		V	primary TELUS outlet	

## Appendix B: 8-PIN Modular Jack Terminating Instructions

The (RJ-45) jacks are to be terminated according to TIA-568-A standards as shown below.

Standard 4-Pair Wiring Color Codes		
Pair 1	T	White/Blue
	R	Blue/White
Pair 2	T	White/Orange
	R	Orange/White
Pair 3	T	White/Green
	R	Green/White
Pair 4	T	White/Brown
	R	Brown/White

### A. Band-Striped Twisted Pair Wire

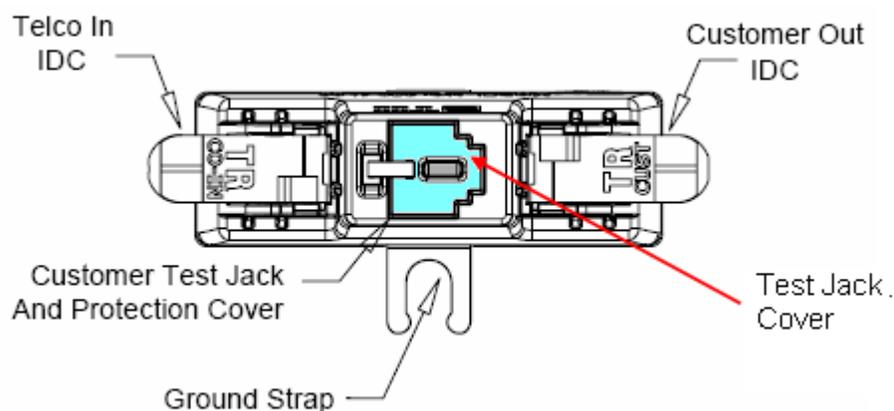


## Customer Testing

### Testing Instructions

Once service has been provided by TELUS, each jack and wire run should be checked as follows:

1. Plug in a telephone, lift the handset and listen for dial tone. If clear dial tone is heard, proceed directly to step 5. If no dial tone is heard or if excessive noise is heard after dialling a digit, proceed to step 2.
2. Ensure that all wire connections are secure. If dial tone is still not heard or excessive noise is heard, proceed to Step 3.
3. Test the line at the demarcation jack in the NIB (Network Interface Box) on the exterior of the home. Using a Phillips or Slotted screwdriver, open the NIB and lift the Customer Test Jack Cover located on the center of the Protection/Demarcation device and plug a standard telephone set in the test jack. Wait 1 minute before lifting the receiver and listening for dialtone. Proceed to Step 4.



4. Dial a digit and listen. Dial tone should stop and the line should be quiet.
  - If NO dial tone is heard or if excessive noise is heard after dialling a digit replace the Test Jack Cover, close the door of the NIB and secure with the screw and call TELUS Repair Service at 611 to report the trouble. End of testing.
  - If clear dial tone is heard and a test call can be completed, the fault is within the home and it is the responsibility of the homeowner to have the fault repaired. TELUS can be contacted to complete the repairs at additional time and charges.
5. Dial a digit and listen. Dial tone should stop and the line should be quiet. Try an outgoing call to ensure proper operation. Next try receiving a call, letting the telephone ring a minimum of 3 rings before answering it. If no noise is heard the test is complete and all wiring should be OK.

## Appendix C: Industry standards

Standards pertaining to the creation of this TELUS wiring guide:

- National Building Code of Canada
- Canadian Electrical Code and British Columbia / Alberta Electrical Code
- CAN/CSA No.T525-94 – Residential Wiring for Telecommunications
- CAN/CSA C22.2 No.182.4 – M plugs, Receptacles Connectors for Communication System
- CAN/CSA T530 – M90 Building Facilities Design Guidelines for Telecommunications
- CAN/CSA T528 – Design Guidelines for Telecommunications
- CN/CSA T528 – Design Guidelines for Administration of Telecommunications Infrastructure in Commercial Buildings
- CS-03 – Terminal Attachment Program
- TIA/EIA-568-A – 8-pin modular jack wiring configurations
- TIA-570-A and TIA-570-B "Residential Telecommunications – Infrastructure Standard"

## Acknowledgements

Diagrams 2 and 3 in this guide are extracted, courtesy of BICSI®, from BICSI® Tele-communications Distribution Methods Manual (TDMM), 10<sup>th</sup> edition, Chapter 17 (Residential Cabling).

## Additional Information

Please call 310-2255 for more information about products and services offered by TELUS or visit <http://www.telus.com/bics> for other sections of information.

For British Columbia, Section 5 - **Residential - [Single Family Dwellings, up to 3 units, Service Standards](#)**

- use Form [P546 - Residential Service Entrance Requirements](#)

For Alberta, Section - **Residential - [Single Family Dwellings, up to 3 units, Service Standards](#)**

- use Form [P630 - Residential Service Entrance Requirements](#)
- use Form [P730 - Alberta Residential Conduit Service Requirements - up to 2 Units](#)

Common Information – Section 5:

- [Single Family Residential Types](#)