

# **Residential “Low Voltage” Construction Standard**

Prepared For

## ***The Olds Institute for Community and Regional Development***

***April 27, 2009***

These specifications were developed by the Olds Institute for Community and Regional Development (OICRD) and have been prepared exclusively for use by persons involved in the construction of homes within the Town of Olds community. The specifications were developed using all reasonably available information with the goal of providing a minimum platform for the delivery of voice, data, and video services. However, telecommunication service definitions have undergone rapid change in the past and are expected to continue to do so. Therefore, it is the responsibility of each person involved in the construction of homes in the Town of Olds community to review these specifications periodically for any necessary updates as the content is subject to change. In addition, all persons involved in the construction of homes in the Town of Olds community are expected to possess the requisite skills and expertise to determine the necessary specifications required for the delivery of voice, data, and video services. While every care has been taken in developing this document, OICRD accepts no liability for any loss or damage caused, arising directly or indirectly, in connection with reliance on its contents except to the extent that such liability may not be excluded by law.

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## Executive Summary

As residential development begins to adapt to changes in technological innovation, builders may require information to assist them in their house construction plans. This document has three objectives: (1) to provide a valuable information resource to the builders in the Town of Olds community; (2) to act as a management tool for the OICRD and (3) to support the sales and marketing efforts for the Town of Olds community.

OICRD may establish preferred marketing relationships with technology based companies to deliver high quality video, voice, data and other home products and services by aggregating the impending home owners and negotiating on their behalf. As OICRD completes these arrangements, additional directions will be forwarded to the builders on the particular In-Home Network products and services to be utilized.

This document covers for the most part the low voltage requirements for the in home network and security/alarm systems. It is expected later this year, additional in home design recommendations may be added to the document to support the opportunities resulting from the efforts OICRD is undertaking to support its Intelligent Community initiatives.

The Town of Olds administration may wish to consider this document as part of a residential ARCHITECTURAL DESIGN GUIDELINE that the Town of Olds administration may wish to issue in the future. This document is specific to the low voltage pre wire requirements for voice/data and entertainment systems.

### Highlights of the Town of Olds Home Pre-wiring Standard

- To satisfy the minimum requirements for the Town of Olds wiring system, a minimum of:
  - Four Universal outlets for single family style homes.
  - Three Universal outlets for Townhomes.
  - Two Universal outlets for apartments.must be installed.
- A Service Center or Central Point of Connection (CPC) Box **is not required**.
- In all cases, a 4-foot by 4-foot by three quarter inch thick plywood board panel - (which in this document will be called a Central Point of Connection Area) – is required and must be installed immediately adjacent to the electrical breaker panel. This Central Point of Connection Area is required to accommodate network connections for the telephone and entertainment providers and for future security and CPC panels. The plywood panel is required even if the homeowner or builder chooses in the beginning not to install a CPC.
- A 110 VAC non-GFI (preferably dedicated, 20 amps) double duplex outlet must be provided on the Central Point of Area plywood panel.
- If the homebuilder or new homeowner wishes to have a CPC installed, then the CPC shall be placed on the Central Point of Connection Area plywood panel.

- Where no CPC is installed, proper connection to service provider Network Interface Devices (NIDs) are required.
- Roughed in Security Cameras are required. Two Cat 5E non-terminated cables must be provided from either the Central Point of Connection Area or the installed Security Panel to front and back door. (See specification for proper placement and installation.)
- Two RG-6 non-terminated cables with appropriate grounding conductors are to be installed for a future satellite dish that will run from the Central Point of Connection Area to the Attic.
- A 1.5" conduit is to be installed between the Central Point of Connection Area and the attic for installation of enhanced services in the future. The ends of the conduit must be clearly visible. A pull cord must be attached at both ends of the conduit.
- Only RG-6 and CAT 5E wiring may be used within the home, regardless of placement.
- All connections must meet minimum criteria for RG-6 and CAT 5E termination.
- The following [EIA/TIA Standards](#) shall be met for each of the following: [Bulletin 607](#) grounding, [Bulletin 568 & 570-B-1](#) for residential structures, and [Bulletin 606A](#) for administration and marking of cabling components.
- Recent experience points to a need to require proper labeling of wires at the Central Point of Connection Area.
- Telephone locations are not a part of this wiring specification. The location of telephone Jacks will be left up to the builder to decide *but should follow the minimum CAT5E cabling standard as adopted within this document.*
- Roughed-in wiring for security systems is required.
- Additional runs of CAT 5E must be run from the Central Point of Connection Area. These runs of CAT 5E are left without termination, for the addition of enhanced services.
- The minimum security wiring rough in program will consist of: (1) two key pads - main entrance and back door; (2) 2 motion detectors - main floor and basement; (3) 3 door contacts - garage, main entrance and back door; (4) 1 smoke detector – main floor and (5) 1 siren that is optional.

## Description Hardware/wires/outlets

The following table is a **summary** only of the minimum wiring requirements. Readers are advised to review the details found in the body of the document.

Quantity	<b>Single Family Home</b>
2	<b>Required</b> – Cat 5E Single Non Terminated from the existing or future security panel location at the Central Point of Connection area to the front and back door for security cameras.
3	<b>Required</b> - CAT5E Single Non Terminated from the Central Point of Connection area to the security panel, thermostat and breaker panel.
3	<b>Recommended</b> - CAT5E Single Non Terminated from the Central Point of Connection area to the electricity meter, water and Gas meter.
4	<b>Required</b> - Universal Outlets ( 2*CAT5E / 2* RG6) located in the kitchen, living/family room, master bedroom and one other bedroom or home office
1	<b>Required</b> - Satellite Rough in
1	<b>Required</b> - Central Point of Connection Area
1	<b>Required</b> - Conduit to the Attic
1	<b>Required</b> - Security Rough in program
1	<b>Required</b> - Installation Inspection Report

Quantity	<b>Town Home/CONDO</b>
3	<b>Same as Single Family Home except</b> <b>Required</b> - Universal Outlets ( 2*CAT5E / 2* RG6)

Quantity	<b>Apartment</b>
2	<b>Same as Single Family Home except</b> <b>Required</b> - Universal Outlets ( 2*CAT5E / 2* RG6)
6	<b>Recommended</b> - CAT5E Single Non Terminated from the CPC to the electricity meter, security panel, thermostat, breaker panel, water meter and gas meter
1	<b>Recommended</b> - Security Rough in Program

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## WHY IS CONNECTIVITY IMPORTANT?

Fiber optics will help push the telecommunications system into hyperdrive. But only when broadband connections reach all the way into the home will the technology's promises be fully realized.

Some of this technology can be found in well-equipped laboratories today, but not in homes. Today's information superhighway lacks the bandwidth to deliver the required signals, deteriorating into a muddy footpath as it reaches your front yard.

These leading-edge systems are still rare. Most telephone and cable television companies rely on fiber only as a "backbone" technology for piping signals between their own facilities. In fact, fibers are the standard links to and from the switching offices serving each community, and often stretch from there to large business customers or neighborhood distribution nodes. A single pair of fibers now can carry up to hundreds of gigabits per second, with each fiber transmitting separate signals at dozens of wavelengths in one direction. Yet the rest of the distribution network is virtually all copper and phone and cable companies are not eager to abandon it.

Phone and cable companies each promise a different cure for the World Wide Wait suffered by home users of dialup modems. Cable systems can deliver up to 36 megabits per second through the same coaxial cable that pipes CNN and HBO to the television set. The phone companies have devised DSL as a ploy to trick ordinary copper wire into behaving as if it were a fatter info-pipe, carrying up to several megabits per second.

People who switch from ordinary Net connections to cable modems typically traverse an arc of experience that begins with delight: The link is always on, just like electricity in a socket, and information flows at speeds that leave dialup modems in the dust. Then the drawbacks become apparent: cable bandwidth is shared among a group of users, so the lightning-fast connections experienced at first start to drag as more of your neighbors sign on. The higher signal frequencies that carry DSL's digital data fade as they travel through copper wire, restricting these connections to homes within about five kilometers of cable from a phone switching station. Wireless systems—an emerging high-bandwidth alternative—can suffer blockages from bad weather, trees and buildings.

If the past is any guideline, moreover, demand for bandwidth will soon outstrip the capacity of these jury-rigged alternatives. The need for higher capacity into the home is likely to intensify as companies roar ahead with e-commerce. Why show just a static picture and product specifications for a refrigerator if you can have a top salesman deliver a video pitch while demonstrating it on the screen? A reasonable target may be 100 megabits/second, which should enable full-screen, full-motion video and would probably satisfy high end users.

The OICRD has begun a planning process that ensures the Town of Olds community will be the first community to have a broadband connection. The ground work is being laid to ensure new home owners will be able to connect from their homes to the public switch systems at broadband speeds.

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The remarkable convergence of television, telephone, satellites, and the personal computer has created a dynamic world of interactive communications. OICRD plans to enable Town of Olds homes with an advanced digital broadband communications network linking offices, retail outlets, healthcare and public facilities in the Town of Olds community. In addition to cable television and local telephony services, the infrastructure must provide high bandwidth network facilities including high-speed data, video conferencing, and real-time transactional services such as video, distance learning and energy information services.

This document is to assist in following the construction obligation for design and construction of homes within the Town of Olds community. Voice, data, and video-based information require transmission at high volume and high speeds. Only high performance cable and connectors can handle the job. The key to any complete home system is wiring. Wiring considerations extend not only to the capacity, quality, and proper installation of the wiring product, but also to the placement of connections throughout the residence.

## **WHY IS PRE-WIRING IMPORTANT?**

Advanced wiring allows such options as viewing a VCR or security camera image in multiple locations; reliance on a centralized computer or printer for the family (rather than on individual computers or printers); distribution of television and audio signals to any room; and access to the myriad applications that will soon be available to residents and businesses within the Town of Olds community.

OICRD has incorporated an obligation to install advanced home pre-wiring to facilitate the delivery of broadband speed information services, entertainment, home automation and educational programs. The goal of this exercise has been to address the needs of an interactive community where home, office, retail and commercial needs are met through cooperative planning and network service strategies.

Realistically, in today's residential market, every new home built without an internal wiring network is obsolete and represents a missed opportunity. Proper in-home wiring systems are just as important as plumbing or electrical systems in today's world. High-capacity, high-quality coaxial cable and data/voice wiring will not only accommodate today's home systems but also provide forward compatibility. The cost of installation to fulfill these capabilities post-construction is enormous. Because the cost for advanced pre-wiring is a relatively low price to pay to embrace the future and marketing of a high tech home, the Town of Olds community can differentiate their community from the competition.

Through joint marketing efforts, OICRD and its preferred local service provider(s) will support awareness and use of network-based services. With this in mind, we believe the wiring and connection specifications will become a sales and marketing tool for both OICRD and the builders. Compliance with these guidelines will enhance the image of the Town of Olds community. Compliance creates an infrastructure that should increase the rate of home sales,

and support the rapid development of offices and retail facilities around these Olds Alberta property developments.

Aside from the lure and convenience of high-tech gadgetry, the practical benefits of in home technology systems include reduced energy costs, increased flexibility in configuring home electronics in harmony with user needs, and the ability to act as a gateway, affording home owners the capacity to receive, distribute, and manage on-line computer connections, interactive television, and many other forms of information and entertainment.

With this in mind, the requirements provided in this document assist in the development of a community designed for true telecommuting. The Town of Olds community will provide a connected, truly interactive location for remote educational services and begins to weave a digital, technologically sophisticated community fabric.

OICRD is confident that this platform for delivering advanced communication services will provide both a competitive advantage over other local development interests and the necessary infrastructure to support the communication needs of the Community. Most importantly, however, enhanced pre-wire is a value-added tool to assist OICRD with a positive and profitable role in creating this exciting new community.

All homes built within the Town of Olds community are expected to incorporate these specifications to ensure the delivery of telephone services, cable television, data, and broadband services. Compliance with these specifications will accomplish a number of objectives:

- Homes will be able to receive the services envisioned.
- Only high quality components will be used.
- Buyers wishing to upgrade at the time of initial construction will find the specifications drafted to accept home automation, Local Area Network (LAN) configurations, digital video and broadband speed Internet access services.

The design group has attempted to provide guidance, where appropriate, in all phases of construction. It is crucial that homebuilders review these specifications, drawings, and guidelines carefully to ensure compliance.

Although this document outlines, in detail, the construction requirements and installation procedures, there are a number of diagrams that will assist in explaining the specifications. They can be found as an addendum to this document.

## **Traditional vs. Advanced Pre- Wire**

Traditional home wiring systems installed in the majority of homes in Olds are not adequate to support many of the applications envisioned. The key is to install a high-quality, high

performance wiring system, which provides the infrastructure to deliver the information services to residents anywhere in their home. For example, these specifications provide for:

- Computer resource sharing, allowing printers, files, hard drives, and modems to be conveniently shared among family members and to/from the office.
- Distribution of video, including satellite dish or security camera signals, to all TV's in the house.
- Potential to integrate disparate home systems, for example using security sensors to monitor and control lighting or temperature settings, or accessing a home control system remotely over a telephone or Internet connection.
- High-speed data connectivity throughout the house to commercial on-line services or to work systems for telecommuting applications.
- High-speed data connectivity throughout the house to commercial security surveillance companies.

While not all services will be immediately available, the advanced pre-wiring plans will assure homebuyers easy access to future applications.

In order to take full advantage of highly advanced telecommunication services, homes that are compliant with these pre-wire specifications will have the capacity to easily access basic services and may upgrade their wiring systems and hardware to support a local LAN and/or home control functions.

## **Don't Install Outdated Pre-wire**

There are many reasons to install the latest pre-wire:

- Analog cable and telephone lines commonly installed today will need to be upgraded in the near future.
- Digital technology requires finite tolerance wiring.
- The quality of wiring impacts data access speed to the information superhighway.
- Signal leakage within the system results in ghosting and interference, while signal leaks outside of the system are illegal.
- As the digital broadband network is installed more cable channels will require greater bandwidth and old style wiring will not pass all channels.

## How is this Program Unique?

There is not much of an incentive on the part of the home builder to commit the additional resources necessary to support state-of-the-art pre-wiring, based simply on the communication companies' plan to deliver these services. OICRD considers information services key to the linkage of homes, offices, retail, recreational and medical sites within and around the community. OICRD believes homeowners will demand easy access and connectivity to the community and to the rest of the world. The pre wiring design is just one strategy that will ensure the Town of Olds community continues to be at the forefront of residential community design.

## The Advantages are Significant

- The fantastic growth of the Internet has dramatically impacted business and personal communication needs and opportunities. The assurance that homebuyers will have built-in high-speed access capabilities will address a growing market trend.
- The ability to access the office, browse healthcare tips, make restaurant reservations, and schedule lawn maintenance “on the net” will be an added enticement for people to consider living in The Town of Olds community.
- Information is the “industry” of the 21st century. Homes built today, with this fact in mind, will have higher resale values in the future.
- Homeowners can manage, control, and reprogram their home systems to monitor security, reset light fixtures, and automatically control appliances to achieve advanced energy efficiency.
- People working for companies located in and around the Town of Olds community will need to live in homes wired to transmit high-speed information services. Accessing work from home will provide these residents the flexibility of telecommuting and provide substantial relief to traffic engineers and space planners. In addition, air quality standards can be positively affected as the metropolitan area continues to grow.

## COMPETITION & LICENSED SERVICE PROVIDERS

While it may be a number of years before a final definition of “effective competition” in telecommunication emerges, support for these initiatives could assure the Town of Olds community residents FIRST ACCESS to competitive applications.

## Telephone Service

Historically, Telus has been the sole local telephone company (ILEC) in this market. Competitive Local Exchange Carriers (CLECs) have formed to deliver services, however most of the CLECs currently focus on business services.

## Cable Service

Although cable television has been substantially deregulated, Shaw Cable and TELUS are the sole Broadcasting Distribution Undertakings (BDU) in Olds. CRTC regulations allow ISP's to use the Shaw Coaxial Network. Convergent technology does allow entertainment programs to be delivered over data networks allowing other providers to enter the market.

**COMPETITION IN PROVIDING LOCAL CABLE, TELEPHONY AND TELEVISION SERVICES IS CERTAIN TO BRING INNOVATIVE SERVICES TO THE MARKET**

## GLOSSARY OF TERMS

*The following are terms that may be helpful to the reader.*

**Blank Universal outlet:** An outlet location containing a minimum of two RG6 and two CAT 5E cables, left without termination and covered with a blank plate.

**CAT 5E:** Category 5E, highest accepted standard of performance for twisted pair cabling, to be defined.

**CAT 5E Outlet:** A single CAT 5E cable installed as one optional device, voice or data.

**Central Point of Connection (CPC):** Service center or wiring distribution panel.

**CCTV:** Closed Circuit TV, usually a security or safety video link.

**CEBus:** Consumer Electronics Bus, a standards-based home control network.

**DBS:** Direct Broadcast Satellite.

**EMT:** Extruded Metal Tubing.

**Endpoint:** Any user device connected to the wiring system, such as TV, VCR, telephone, computer (modem), fax machine, etc.

**FTTC:** Fiber to the Curb.

**In Home Network Hub:** A combination of a service centre and a switch.

**IR:** Infrared, used by most TV and VCR remote controls.

**IW:** Residential Inside Wiring.

**LAN:** Local Area Network.

**NIC:** Network Interface Card.

**NID:** Network Interface Device. The network provider companies will install a NID, which is a point of demarcation (on the interior/exterior of the home) for each service provider.

**ONT;** Optical Network Termination device. The network provider companies will install an ONT which is a point of demarcation (on the interior/exterior of the home) for the service provider. ONT's are capable of delivering voice, data and video.

**PAN:** Personal Area Network. Typically describing a localized, wireless network.

**PBX:** Private Branch Exchange (on-site telephone switch).

**PLC:** Power Line Carrier or Control. A protocol to distribute automation information and functions via 110 VAC power lines.

**POTS:** Plain Old Telephone Service; includes voice and low speed fax and modems.

**SERVICE CENTER:** Wiring system distribution panel or CPC.

**RCDD:** Registered Communication Distribution Designer. Designation is issued by BICSI, an internationally recognized not-for-profit telecommunications association.

**Universal Outlet:** Combination data/voice and dual coax outlet.

**UTP:** Unshielded Twisted Pair Wire.

**VDSL:** Very high speed Digital Subscriber Line.

## INTRODUCTION TO THE TOWN OF OLDS COMMUNITY WIRING ARCHITECTURE

These specifications serve as a base line for pre-wire installation for voice, data, cable TV, entertainment transmission, remote meter reading, and security requirements.

Basic considerations include the following:

- CAT 5E twisted pair cable and RG-6 coaxial cable must be used throughout the home, without exception.
- Where conduit is installed, it must include a pull string and be labeled "For Communication Use Only".
- Labels and tape markings with this identifier should be supplied by the approved contractor.
- It is recommended new residential accommodations upgrade to CAT 6 cable.

### Outlet Requirements

The Town of Olds community uses one standard outlet configuration. It is called a Universal Outlet and has two coaxial F-connectors and two four-pair (CAT 5E) modular jacks. In order to avoid damage to network devices, associated four-pair modular jacks must be uniquely identified, and preferably keyed to prevent attaching voltage sensitive network components to the telephone platform.

**TO SATISFY THE MINIMUM REQUIREMENTS FOR Town of Olds community WIRING SYSTEM, A MINIMUM OF FOUR UNIVERSAL OUTLETS FOR A SINGLE FAMILY HOME, THREE UNIVERSAL OUTLETS FOR A TOWNHOME AND TWO UNIVERSAL OUTLETS FOR AN APARTMENT, MUST BE INSTALLED.**

Universal outlets must be used wherever a video connection is desired.

A minimum of Four Universal outlets must be installed in each single family home. It is recommended that Universal outlets be installed in the following locations, depending upon the needs of the homeowner.

- Family Room
- Bedrooms
- Home office/study
- Kitchen
- All additional living spaces, *plus attached garages*

Universal outlets for Coax broadband video services, or twisted pair outlets for IPTV, voice and data may be installed in additional rooms or locations throughout the house. Additional twisted pair outlets could be installed in the home office, all bedrooms, and the workshop area. Outdoor patio or garage connections are possible, although requirements for weatherproof outdoor outlets are not addressed in this specification.

## Garages and Studios/Home Office

When a residence is constructed within Town of Olds community with a detached studio/home office, garage, or an attached garage engineered for a second level to be constructed later, care must be given to provide for forward compatibility within these environments.

As a minimum, when a garage or studio/home office is not attached to the central living space, it is necessary to install a 1.5" (one and one-half inch) conduit from the NID point of the central living space to a termination point (determined by floor plan) within the detached structure. If a detached structure is initially constructed as a secondary living space or home office, then at least one Universal Outlet must be installed from the CPC of the central living space. These outlet feeds must be placed within conduit, and may have a maximum electrical distance of 150' (one hundred and fifty feet).

## Inside Wiring (IW)

Inside wiring specifications are based on the IPTV, voice and data services provided via copper (CAT5E) IW. RF coax video and some high-speed data services are assumed to be provided on coax (RG6) IW. The system is designed to provide maximum growth, to accept enhanced services, and to reduce (where possible) the complexity and cost of the installation process.

The standard wiring described herein illustrates the minimum requirement. Additional detail regarding patch panels, connecting blocks and modular jacks should be available from the manufacturer or installer. All wiring and CPC's must be installed to comply with the following:

- If a CPC is installed, it must be grounded to meet [EIA/TIA Bulletin 607](#).
- Cabling shall meet [EIA/TIA Bulletin 568 and 570-B-1](#) for residential buildings.
- Administration and labeling shall comply with [EIA/TIA Bulletin 606A](#).

## Cable Requirements

The Town of Olds Community Wiring System uses twisted pair (CAT 5E) cable to distribute

Video voice and data signals. Coaxial cable will distribute broadband video and data signals. The universal outlet cable is a combination of two 4-pair (CAT 5E) twisted pair cables with two coaxial (RG6) cables.

A hybrid cable design, with all four cables wrapped inside a common sheath, simplifies provisioning and installation, and, for these reasons is recommended.

The twisted pair cable is a 100-ohm 4-pair CAT 5E compliant cable. All connections are made with 8-position 8-conductor (commonly referred to as RJ45) modular plugs and jacks wired according to [EIA 568A standard pin-out](#). Interconnection devices shall utilize only properly installed modular jacks and plugs. All cables, plugs, jacks, and connecting hardware used in a point to point data network must be rated for CAT 5E performance. It is required that all cables, plugs and jacks used in the telephone network be rated to CAT 5E performance to assure future use in high speed applications. The installation must use techniques that comply with CAT 5E guidelines to maintain high performance.

## Cable Installation Requirements

All wiring system components shall be installed in compliance with applicable local, provincial, and national building codes. In any case where these guidelines conflict with building codes, the building codes apply.

All Wiring System cables shall be installed according to manufacturers' instructions adhering to minimum bending radius and cable pulling specifications. Hard fasteners must not be used, as they may distort the cable jacketing, thereby compromising cable performance. 1 8" (eighteen inches) of cable slack shall be left at all outlets to facilitate installation, testing, and maintenance. All Wiring System cables must be at least 12" (twelve inches) from parallel 110 VAC cable runs, and must never pass through the same holes.

Where possible, the horizontal routing of the Wiring System cables shall be done in the basement, crawlspace, or attic of the house rather than through the studs.

The Service Center is the wiring system distribution panel. If a Service Center is installed, it must be installed on the Plywood panel acting as the Central Connection Point Area. Central Connection Point areas should be placed immediately adjacent to the Electrical Breaker Panel. There must be a connection between the future or existing Service Center location at the Central Point of Connection area panel to each NID.

A Network Interface Device will be installed by both the telephone & cable companies outside of the house at the point where the line comes into the house.

Service Center product recommendations may be made in the future by the OICRD.

## Cable TV Wiring Distribution

Hex crimp connectors must be used consistent with the manufacturer recommendation for the particular cable installed. No staples or hard fasteners shall be used to secure coaxial cables or data wiring.

### ***PROPER INSTALLATION WILL PREVENT PINCHING AND/OR CRUSHING OF CABLE WHICH WILL CHANGE THE IMPEDANCE AND RESULT IN POOR PERFORMANCE***

All unused coax connectors and network ports connected to an active network must be terminated into a 75-ohm termination device. Unused cables in the Central Connection Point area must be properly identified and neatly organized and retained.

The cable run of each outlet line (RG6 and CAT 5E) connecting an individual outlet back to the Central Connection Point area must be IDENTIFIED and RECORDED. A Tab must be attached to each line at the Central Connection Point area identifying the room served. The builder or the electrical contractor must provide a list of this configuration to the local cable/telephone/data company representative at time of construction. This information is required to comply with [EIA/TIA Bulletin 606A](#) for administration of cabling and records.

Twist-on and reusable type F connectors are not appropriate, as they will create problems for digital video services, disrupting the overall network or causing signal leakage in violation of Canadian or FCC rules. Thus, push-on, crimp or radial compression connectors must be used.

## Satellite Rough In

Two standard RG-6 coax non-terminated cables with appropriate grounding conductor are to be installed from the future location of the satellite dish to the Central Connection Point area. Cable to run from the CPC to the attic with sufficient length to reach any corner of the attic.

## Data and Voice Requirements

If the NID is installed outside the home, CAT 5E cabling installation shall begin at the telephone NID and connect to the Central Connection Point area (two CAT 5E). In addition, the data and voice service must be home run from the Central Connection Point area to each outlet. Unobstructed, mechanically free access between the NIDs and Central Connection Point area must be provided. If a NID is not installed adjacent to the building entry, a 1" (one-inch) conduit must be installed from the NID to the Central Connection Point area. An additional 18" (eighteen-inch) coil of CAT 5E, 4-UTP systems cable is required at each outlet.

CAT 5E connectors will allow homebuyers to upgrade to advanced CAT 5E home automation systems and must be standard. CAT 5E-rated components are required for all Data/Voice and Universal outlets.

**ADDITIONAL RUNS OF CAT 5E CABLING MUST BE PLACED FROM THE CENTRAL CONNECTION POINT AREA TO THE FOLLOWING LOCATIONS: PROXIMATE TO THE 110 VAC CIRCUIT BREAKER PANEL, TO THE HVAC THERMOSTAT LOCATION AND THE MAIN SECURITY PANEL LOCATION. RUNS TO THE ELECTRICITY, WATER AND GAS METERS ARE CONSIDERED OPTIONAL. THESE RUNS OF CAT 5E ARE LEFT WITHOUT TERMINATION, AND ARE PLACED FOR THE ADDITION OF ENHANCED SERVICES.**

Homeowners may choose to upgrade this minimum requirement to include additional outlets, home automation and security systems.

**CAT-5E 4-PAIR WIRE REFERS TO GENERALLY AVAILABLE TELEPHONE TWISTED-PAIR WIRE. IT IS THE BUILDER OR ELECTRICAL CONTRACTOR'S RESPONSIBILITY TO PURCHASE AND INSTALL ONLY CAT-5E THROUGHOUT THE HOUSE.**

<b>CAT5E NON TERMINATED REQUIREMENTS/OPTIONS</b>			
<b>LOCATION</b>	<b>APARTMENT</b>	<b>TOWNHOME</b>	<b>SINGLE FAMILY</b>
<b>SECURITY PANEL</b>	Optional	Required	Required
<b>THERMOSTAT</b>	Optional	Required	Required
<b>BREAKER PANEL</b>	Optional	Required	Required
<b>WATER METER</b>	Optional	Optional	Optional
<b>GAS METER</b>	Optional	Optional	Optional
<b>ELECTRICITY METER</b>	Optional	Optional	Optional

Where it is necessary to drill through wall studs, rafters, and plates, the cable must not exceed the manufacturer's recommended minimum bend radius. Where it is necessary to penetrate a fire-rated wall, the hole must be sleeved with EMT. The sleeve and penetrating hole must be sealed with a fire retardant sealant. Where it is necessary to place an outlet in a fire-rated wall, a metal junction must be used to house the outlet.

A parallel run of CAT 5E cable must be at least 12" (twelve inches) from a parallel 110 VAC cable and must never pass through the same holes. If the CAT 5E cable must cross the 110

VAC cable, it must do so at a 90-degree angle.

***ALL DATA & VOICE INSTALLATION MUST CONFORM TO THE STANDARDS  
& CONDITIONS NOTED IN THE CABLE MODEM OPTIONS SECTION.***

## Testing and Certification of System

The integrity of the Residential Structured Wiring System is dependent on its ability to meet the objective of this set of guidelines. To maintain operability and functionality, a baseline testing protocol must be followed.

As a minimum, all installed cable runs must be tested individually end to end for parity and continuity after final termination. It is recommended that all CAT 5E cabling be mapped and certified to then current, industry accepted standards for the cabling grade. Proper records must be maintained for cable mapping and identification.

The builder is to provide an independent report to the Town of Olds prior to the occupancy permit application to the Town of Olds from a person holding a current RCDD certification. This report must verify that the installation of the in home network system has met all the professional practices, applicable codes and installation requirements as set forth by OICRD and the Town of Olds.

## Drop Routing

RG6 and CAT 5E drop cables will be run from the Service Center, through to the attic, crawl space or basement, and routed to each outlet.

At least one of the Four Universal outlets should be installed at the location of the home computer to facilitate the use of high-speed data services with desk-side equipment. The Universal outlet location may also be used for a secondary TV feed to the computer. The telecommunications company will establish what kind of hardware will be necessary, how it will be hooked up and what services will be provided.

One 1.5" (one and a half inch) conduit shall be installed between the Central Connection Point area and the attic to facilitate future enhanced system installations.

## Service Center Housing

If a Service Center is installed, an identifying label or placard must be placed on or in the Central Connection Point area to assist the homeowner with information on the product installed and contacts for upgrades and changes. The following information must be included as a minimum:

- The name of the Manufacturer of the Structured Wiring products installed.
- The installing company name, address, phone number and contact person.

- The date of finished installation and length of warranty.
- A statement of compliance with Town of Olds community Pre-wiring Guidelines.

Service Center boxes are to be installed on the plywood in the Central Connection Point area preferably located next to or adjacent to the electrical panel.

## HIGH SPEED DATA CONNECTIONS

There are a variety of transport protocols that increase the transmission speeds generally available today for data and access to the Internet. High transmission speeds will attract many customers to use high-speed access services.

It is planned that broadband speed access can be terminated within a Service Center enclosure in order to maintain the network plant signal integrity and to provide for ease of networking of computers and other services.

As of this writing, the broadband speed access technology intended for use in Town of Olds community is currently being defined. This document anticipates several possible configurations for installation.

A 110 VAC, non-GFI (preferably dedicated, 15/20 amps) double duplex outlet must be available within the Central Connection Point area or if a Service Center is installed, within the Service Center housing. By virtue of its placement, the outlet should be protected from exposure to water or other elements. Particular attention should be paid to applicable building code guidelines, which must be followed to ensure that the outlet is sufficiently elevated above the floor.

The builder should be aware that loss of electrical service to this outlet due to circuit breaker trip, ground or other fault will cause failure of TV and other advanced telecommunications services in the home, requiring that the circuit breaker be reset. This might necessitate interaction between the customer and the local telecommunications company.

If required, it is strongly recommended to physically secure any necessary amplifier's power supply/surge suppresser to the outlet (i.e. by means of a captive nut in the outlet). In case of failure, the power supply should remain accessible to technical or telecommunications personnel.

Heat generated by the power supply will be minimal; thus no special cooling is required. However, some heat will be generated, so the power supply should be installed following the manufacturer's specifications to accommodate the maximum expected heat.

## Customer Supplied Splitters

IT IS CRITICAL THAT THE CUSTOMER CONSULT THE LOCAL TELECOM COMPANY TO CHOOSE SPLITTER AND WIRING PRODUCTS THAT MEET CANADIAN OR FCC TECHNICAL QUALITY SPECIFICATIONS. FAILURE TO USE APPROVED PRODUCTS MAY RESULT IN SERVICE CHARGES TO THE CUSTOMER. THE CUSTOMER SHOULD BE SPECIFICALLY INSTRUCTED OF THIS, VERBALLY AND IN WRITING, WHEN CABLE TV AND HIGH-SPEED SERVICES ARE ACTIVATED.

If a customer chooses to install a splitter to increase the number of activated CATV outlets throughout the house, certain precautions must be taken, specifically relating to the installation of the cable modem or other future high-speed devices.

Cable modems **MUST NOT** connect through a splitter after video amplification or distribution, unless a bi-directional amplifier is installed. The cable modem must be served from its own dedicated feed via a directional coupler, installed prior to video amplification and distribution.

## SECURITY

To provide for comprehensive interoperability, including ease of home control and energy management, certain criteria must be followed for the installation of wired and wireless security capabilities. The majority of home control and automation desired by consumers today can be managed via PLC technologies incorporated within appropriate security panels and ancillary products. Advanced automation, management and control capabilities require that the structured wiring CPC and subsequent subsystems have interconnectivity to allow for remote access and the addition of future enhanced services.

It is required that CAT 5E cabling be placed from the Central Connection Point area proximate to the 110 VAC service panel, to the thermostat location(s) and the security system main control panel. As future technologies emerge, these CAT 5E cables will provide the pathways for true system integration and control.

The following requirements encompass the majority of scenarios present within the Town of Olds community plans for construction of residential environments. Careful attention must be given to fully understand the following guidelines to appropriately provision the unique variations of residences planned for Town of Olds community.

### Pre-wiring of security system

Two (2) standard CAT 5E non-terminated cables must be provided from the security panel to the front and back door. .Locate these cables adjacent to the eave elevation for cameras.

The minimum security wiring rough in program will consist of: (1) two key pads - main entrance and back door; (2) 2 motion detectors - main floor and basement; (3) 3 door contacts - garage,

main entrance and back door; (4) 1 smoke detector – main floor and (5) 1 siren that is optional. As a baseline, all keypads, sensors and switches included in this minimum requirement must be hardwired; all pre-wiring to sensors and ancillary equipment must be homerun to the security system main control panel.

Regional grounding and coding requirements must be followed for all security pre-wiring and trim out. If any requirements listed here are in conflict with local codes, the local codes apply.

All security system wiring, and the security system main control panel must be placed on the plywood panel located at Central Connection Point area. This will facilitate the separate systems integration, and will allow for the utilization of the two (2) 2" (two-inch) conduits placed at the CPC for future additions and enhancements to the security system. The security system control panel must be powered by the same non-GFI circuit as the structured wiring CPC.

It is required that the two (2) keypad locations be pre-wired with a minimum of CAT 5E wire, placing one in the main entrance and one in the back entry. Should motion detectors be installed, the sensors must have pet immunity circuitry. (1 each main and lower level)

The main entrance, back door and garage walk-in door openings must be pre-wired for intrusion sensors. The door openings must be wired with independent, homerun wires. If the residence has a second floor, it is recommended that all openings follow the above requirements.

The pre-wired switches and sensors must be wired with a minimum of four (4)-wire, 22 gauge wire. When fire detection sensors are installed, these sensors must be hardwired with a minimum of four (4)-wire, 18 gauge solid fire rated cabling, must be fully supervised and looped back to the control panel location.

Wire runs must be clearly labeled and recorded as to termination location.

## Trim-out of Security System

Should a builder provide a security system, the following requirements must also be satisfied.

The security panel must include a panel lock and key, a minimum of one (1) 7 amp-hour battery backup, minimum of 6 zones of detection and must have both hardwired and wireless sensor capability (for the addition of enhanced products at a later date), and must include a PLC interface.

If a fire sprinkler system is installed, the riser must utilize a double pole flow switch (to be supplied by sprinkler installation company), must be fully supervised and looped back to the security panel.

As a minimum, fixed English keypads must be installed, however, it is recommended that true alphanumeric keypads be utilized. Installed keypads must include independent buttons for

activation of audible police alert and audible fire alert. A minimum of one (1) interior siren is recommended to be installed, and should be located on the ground floor.

The finished system must include a RJ-31X jack installed with line seizure configuration. The system must be powered up, fully tested and if the resident has not made a selection on monitoring of the system, it must be left "data unlocked" and must be configured as a local system.

A copy of all documentation of zoning, sensors installed and system-programming configuration must be left in the control panel.

## SUMMATION AND CONCLUDING REMARKS

- Single family homes must contain a minimum of four universal outlets, Townhouses three universal outlets and apartments two universal outlets:
- Universal outlets contain a minimum of two RG6 coaxial cables and two CAT 5E twisted pair cables.
- Homes must contain a Central Connection Point area located adjacent to the electrical panel with a 110 VAC supply.
- Wiring systems must include additional conduit from the Central Connection Point area to the first floor or ceiling plane (1.5").
- All conduits must contain a pull string labeled "For communication use only".
- Additional runs of CAT 5E must be run from the Central Connection Point area. These runs of CAT 5E are left without termination, for the addition of enhanced services.
- Only RG6 and CAT 5E wiring may be used within the home, regardless of placement.
- All cable runs must adhere to minimum bend radius specifications and must include a minimum of 18" additional cable behind box or mud ring.
- All cable runs must be at least 12" from parallel 110 VAC runs and if crossing, must do so at 90-degree paths.
- All cable runs must utilize modular jacks and plugs for cross-connection, be home run, and must be labeled to identify termination location.
- No hard fasteners may be used in the pre-wiring or trim-out stages.

- Cabling exiting the house at the NID location must exit at the same point, and must include at least 30” of additional cabling.
- If a CPC is installed, the cabling and connectors must meet manufacturer approved criteria.
- All connections must meet minimum criteria for RG6 and CAT 5E termination.
- The following *EIA/TIA Standards* shall be met for each of the following: *Bulletin 607* grounding, *Bulletin 568 & 570-B-1* for residential structures, and *Bulletin 606A* for administration and marking of cabling components.
- The minimum security wiring rough in program will consist of: (1) two key pads - main entrance and back door; (2) 2 motion detectors - main floor and basement; (3) 3 door contacts - garage, main entrance and back door; (4) 1 smoke detector – main floor and (5) 1 siren that is optional.

OICRD recognizes that technology will become the economic development driver for the 21st century. Technology will sell homes; technology will bring new business and jobs to this community. Effective planning and high quality construction today ensures that technology extends far beyond the television, computer or the Internet. Once these specifications are in place, and homes in this community have been constructed with the capability of receiving advanced services, future alliances between property developers and telecommunications firms to provide services and build networks to meet consumer needs can be realized.