

Modular connectivity for changing network services

Modular point-of-termination solutions can give customers the space savings and interconnect reliability they need today, and the flexibility they'll want tomorrow.

Higher data rates combined with customers' increased choice of service providers are presenting new challenges for installers of structured wiring systems that combine copper and fiber-optics.

The first challenge is terminating and distributing multiple incoming wire lines without single-purpose points of termination that take up lots of space in commercial wiring closets and are aesthetically undesirable in residential applications.

The second challenge is future-proofing interconnect infrastructures from changes in the type of inbound wire lines and/or connectors on the service provider side.

Incoming wire line variety

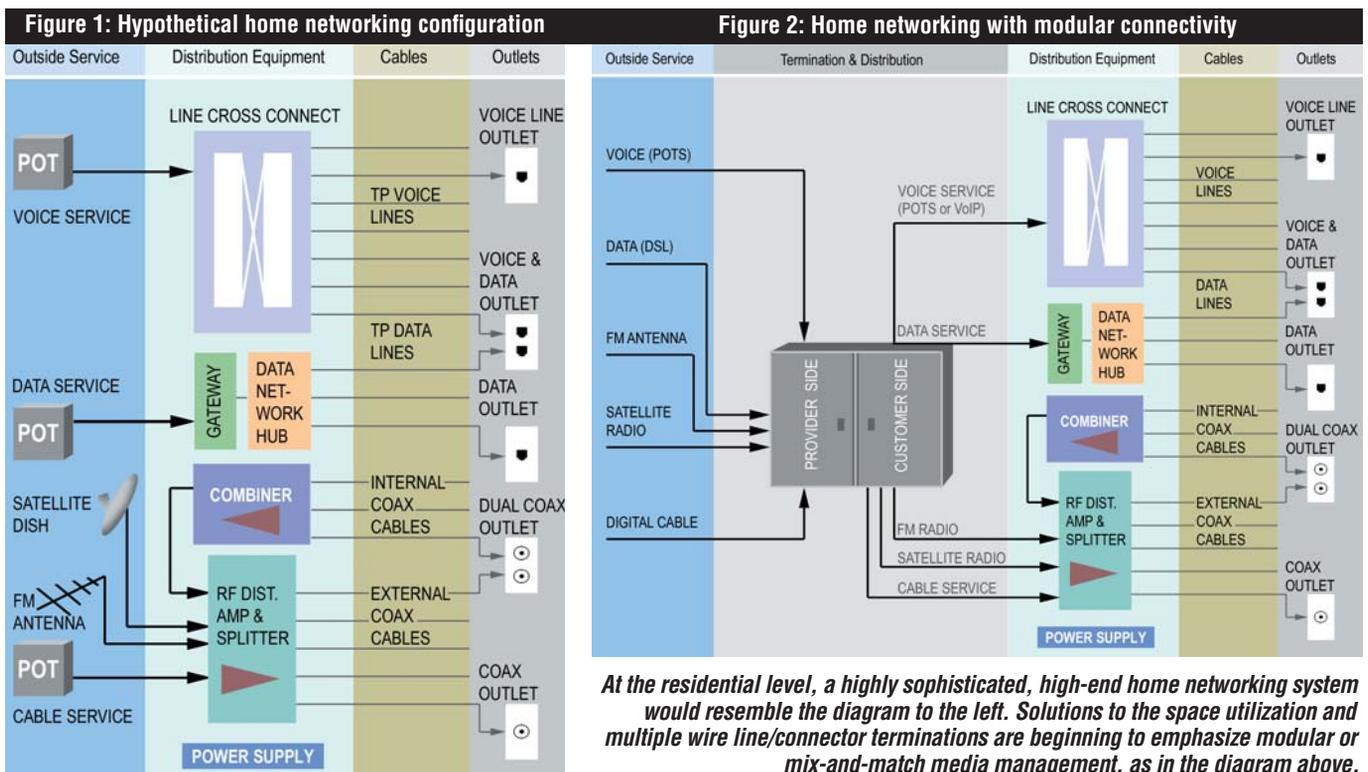
Telephone companies and cable system operators are vying for supremacy in providing the VDV triple play. Each is building on its core infrastructure to offer the same services, but the underlying technologies and inbound wire lines are different.

The telephone company's traditional wire line to the home is Cat 3 unshielded twisted pair (UTP), with each pair carrying a single voice line and/or DSL data service. Business-class broadband service (T1 or fractional T1) is also delivered to the premise via UTP cable. The inbound wire line is terminated to a Network Interface Device (NID) that the phone company installs on the side of the

house or commercial building, and is the "handoff point" to the customer.

The cable operator's inbound wire line is generally RG-6 coaxial cable, terminated to a premise or residential "head end," which establishes the handoff to the customer's internal wiring and also serves to split the incoming signal to the number of cable outlets in the house or building. Unlike traditional telephone wiring, which is routed in a "daisy chain" to all the interior outlets, cable TV is wired in a "home run" configuration, with each internal wire line terminated to the residential head end's signal splitter.

Customers generally have one cable TV provider available in their area, but can



have multiple voice and/or data service providers (known in the telecom industry as competitive local exchange carriers, or CLECs). Other external service providers—satellite TV and radio service and home security service, for example—have their own single-purpose terminations. And commercial and high-end residential customers could also purchase T1 service, a 1.544Mbps circuit that supports 24 voice channels, or a single high-speed Internet line.

Change is afoot

Wire line termination in the commercial marketplace has already been acutely impacted by the increase in types and providers of communications services. Service providers are also pushing network bandwidth closer to the edge to enable more capacity in the network. This “decentralization” is making premise connectivity a more important determinant of high data rate performance in private networks.

The convergence of these two developments has wiring closets in commercial premises bursting at the seams. Space savings is a critical need, and commercial users are looking for ways to reduce the number of single-purpose termination points.

At the residential level, a highly sophisticated, high-end home networking system would resemble the diagram in Figure 1. In this example, five different inbound wire lines all need to be terminated by the respective service provider at the residential boundary, and then routed to a structured wiring distribution center with both passive and active electronics.

From the service provider's perspective, each is only concerned with its individual termination point—the “residential head end” for the cable TV service, the voice-line cross-connect (which in older homes is a four-post cross-connect device set into a cavity within the wall studs), the DSL service (same as voice cross-connect if it's supplied by the voice service provider, distinct if it's not), the satellite antenna coax, and the FM antenna coax (all coax lines are 75-ohm, but may or may not be RG-6 cable). This all adds up to a real mess if a customer wants the full range of available services.

The modular connectivity solution

Solutions to the space utilization and multiple wire line/connector terminations for commercial high data rate customers are beginning to emphasize modular or mix-and-match media management—a single physical point of termination that can accept any combination of inbound wire lines and route them to the appropriate internal distribution equipment. This commercial wiring closet connectivity configuration is readily adaptable to robust home networking applications, like our hypothetical example (see Figure 2).

Mix-and-match media management is accomplished with two key building blocks. The first is a universal subpanel that enables mounting of a variety of cross-connect modules for industry-standard connectors. Currently available solutions accommodate up to five different modules on a single subpanel—BNC, F, RJ45, RCA, and SC (fiber-optic).

The second building block is the wire line distribution box—a double-lockable enclosure that accepts up to four subpanel modules, providing up to 20 wire line cross-connects. The double-lockable enclosure gives the service provider and the homeowner protected access to their respective sides of the point-of-termination handoff. It's easy to see that the single distribution box provides substantial space savings in the wiring closet environment and superior aesthetics in the residential application.

Furthermore, up until now, manufacturers of termination and distribution equipment have provided enclosures with fixed connector panels—just fine in an environment where it is set it up once and never changes. But in today's rapidly evolving VDV environment, the ability to accommodate new service types and incoming wire lines without having to rip out and replace termination equipment is more attractive than ever before. This is where the modular subpanel shines brightest.

For example, if a customer decides to switch from traditional voice service to VoIP from a cable TV provider, all the service provider's installer has to do is add the appropriate cross-connect module (in this case, an F-connector), terminate the inbound wire lines on the provider side,

and lock it up. If the customer's residence is equipped with an interior structured wiring distribution box, the interconnect becomes a simple straight line connection. This ease of accepting new service applies to fiber-to-the-home, Ethernet-based service, and coaxial wirelines for DS3 high data rate service (44.5Mbps) as well. ■■■

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