



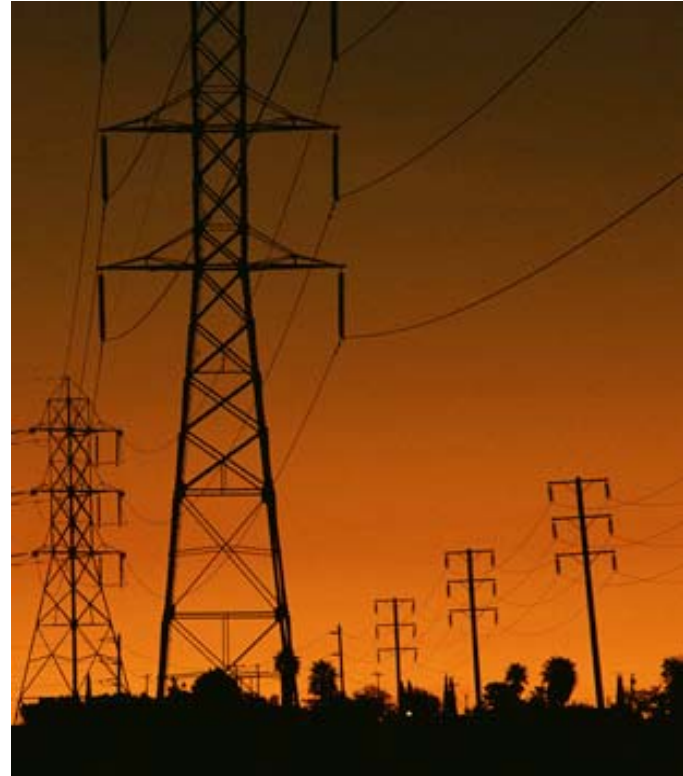
**SIMTRA™** FERRITE BARRIER POWER CABLE  
power + network, audio, and video in a single run

**One Cable**  
**One Conduit**  
**One Solution**

*Anthony R. Ursini, RCDD*  
*Regional Technical Manager*

# Industry Challenges

- **Energy efficiency**
- **Computer needs rising**
- **Data center power consumption rising**
- **Energy costs rising**
- **Computing and processing power drives business, so it drives costs**
- **More computing requires more energy**
- **Faster processors require more energy**
- **Demand for energy has risen dramatically**



# The Wire and Cable Paradox

- What causes a user to change what they have, when what they have seems to work just fine?



A background image showing several bundles of SIMTRA cables. The cables are wrapped in white, pink, and blue protective sleeves. The bundles are arranged in a way that shows the individual conductors and the ferrite barrier. The text "SIMTRA™ Cables" is overlaid on the top right of the image.

# **SIMTRA™ Cables**

- **SIMTRA Technology**
  - **Patented permanent ferrite barrier**
  - **Virtually eliminates electromagnetic fields, electrical transient interference and/or disturbances imposed on, or emanating from the current carrying conductor**
- **SIMTRA's Ferrite Characteristics**
  - **Ferrites are oxides and ceramic material (electrical insulator)**
  - **Ferrites are immune to fire, humidity and chemicals**
  - **They are non-conducting**
  - **No need for ground**
  - **Can be formed into a variety of geometric shapes**
  - **Ferrites become ceramic when exposed to high temperatures**
  - **Ferrites exhibit the quality of absorbing explosions such as a short circuit**



# Reality

- **Pathways**
  - Importance of proper sizing cannot be underestimated
  - Larger/deeper outlet boxes to accommodate more outlets and larger cable
- **Conduit and tray combination**
  - Conduit from tray to outlet
- **Minimum tray space and clearance (24" side, 12" above)**
  - Manage the exceptions to invade the space



# Reality

- **Spaces**
  - **Additional space needed to accommodate multiple systems**
  - **Segregated space, not shared space**
  - **Give them connections, but not space**
  - **Other systems migrating from wall-mount to rackmount**
  - **Redundant, segregated spaces for both**
- **Security of space**
- **Consolidation of technologies**
  - **Forces branch circuit and low voltage cables to compete for space and pathways**

# Moving from Static to Dynamic Infrastructure

Static  Dynamic

Power Capacity

Expansion through construction

Move capacity around while online in any size increment

Cooling Capacity

Add to total room capacity

Adjust for rack level capacity and move cooling to hot spots easily

Add Redundancy

Significant architecture change

Architecture ready made for conversion

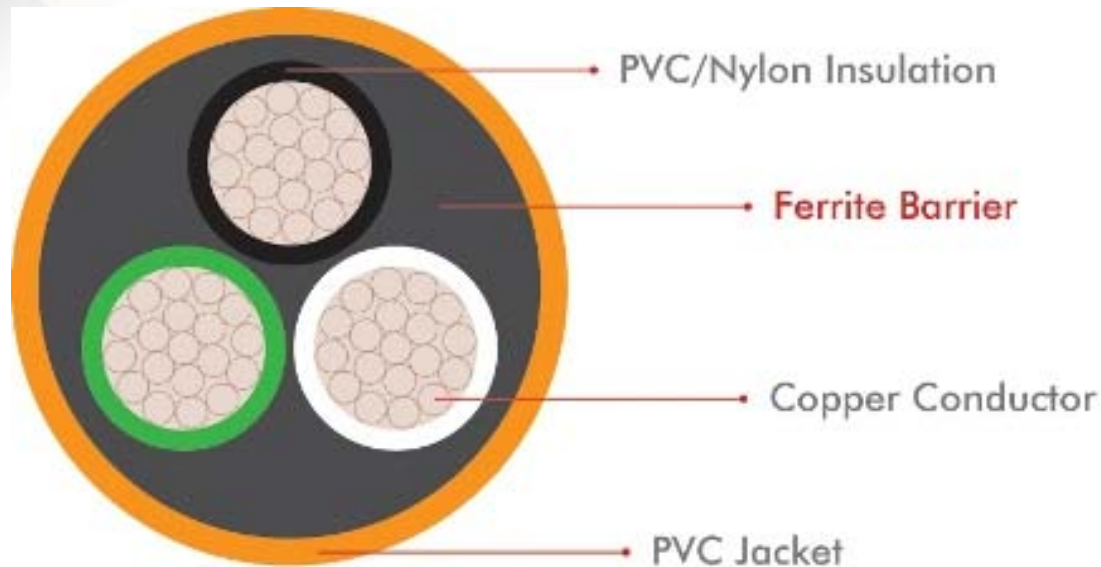
Monitoring

**Condition monitoring of critical components**

**Real-time feedback to make power and cooling changes for optimization**

*How do we effectively design and manage the SIMTRA product?*

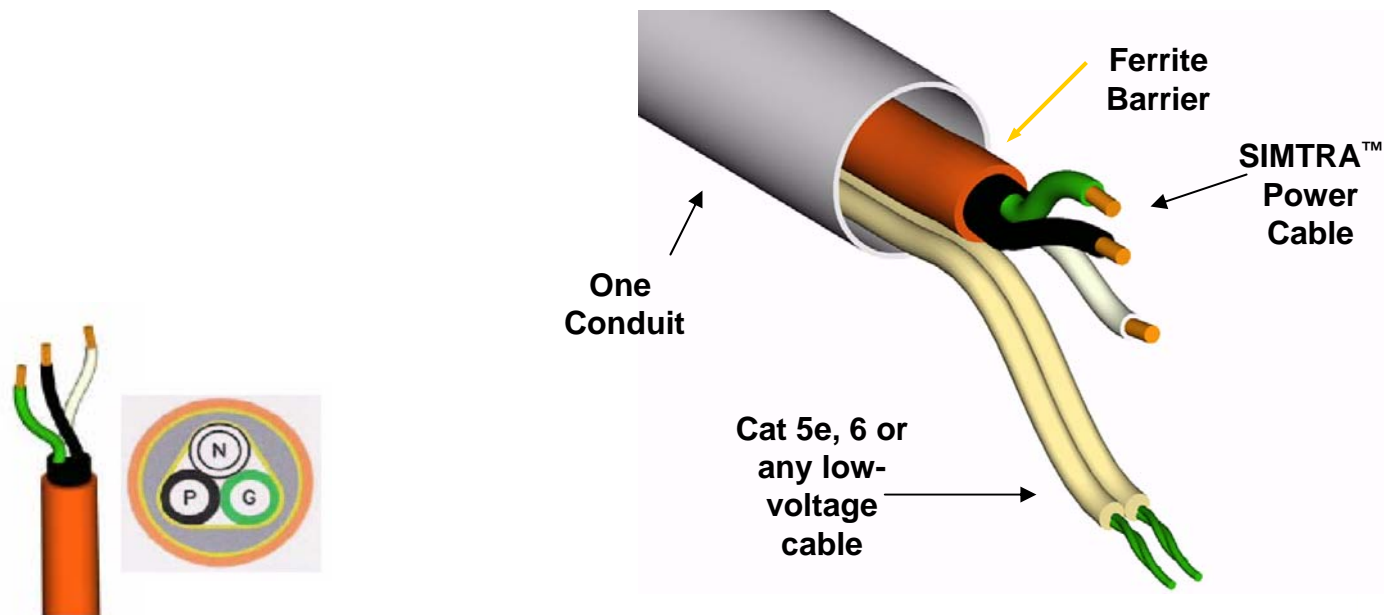
# What is the SIMTRA™ Technology?



**The SIMTRA Cable incorporates a ferrite barrier that has the ability to reduce and absorb electrical transients, interference and/or disturbances imposed on or emanating from that cable**

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**SIMTRA™ Power Cable is a Type NM-B or Type TC UL Listed cable. What makes SIMTRA unique is a ferrite barrier that surrounds the power conductors. SIMTRA complies with the National Electric Code, Sections 725.55, 760.55, 800.25 & 820.52**





# **SIMTRA™ Benefits**

- ✓ **Attenuates Surges and Transients**
- ✓ **Minimizes Interference from Noise and EMI**
- ✓ **Reduces Time, Disruption and Expense**
- ✓ **Improves Data and Voice Systems**
- ✓ **Increases System Flexibility for future changes**
- ✓ **High Speed telecommunications and data transmission is unaffected**
- ✓ **Less total cost of installation**
  - **New**
  - **Retro and maintaining**
  - **Removal and remediation**
- ✓ **Data integrity and security 24/7**

# Traditional Cable Routing

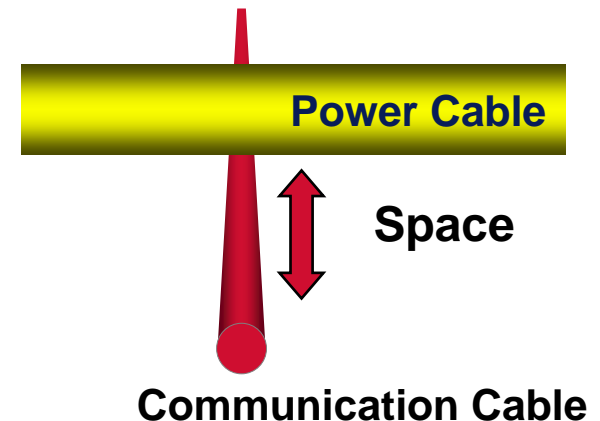
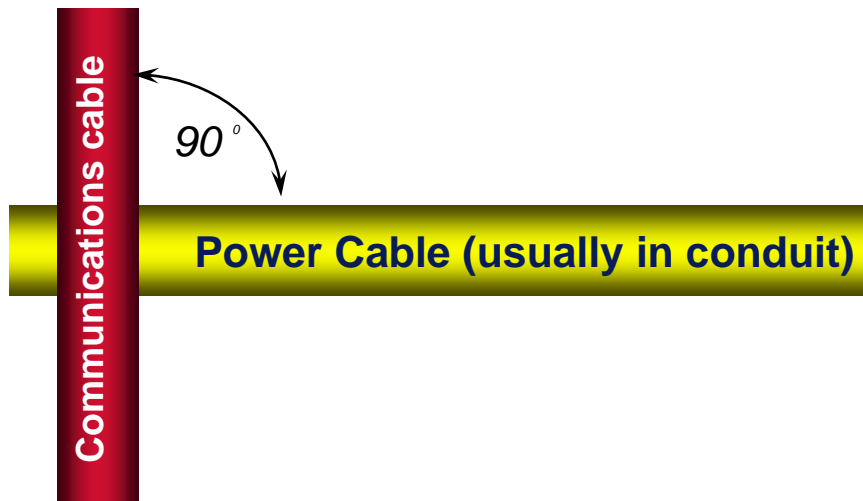
- Avoid all sources of EMI (Electromagnetic Interference) and RFI (Radio Frequency Interference)
- If telecom and power cables are together in a pathway they should be separated by a physical barrier
- Avoid sources of heat such as heating ducts and hot water pipes

# Low-Voltage Cable Routing – Conduit

- The use of conduit as a horizontal raceway system for telecommunications cabling is considered when:
  - it is required by code
  - outlet locations are permanent
  - device densities are low
  - special mechanical protection is required
  - or flexibility is not required
- Conduit sizing is directly related to the planned diameter of the cable and the maximum pull tension that can be applied to the cable without degradation of the cable transmission
- Maximum conduit fill ratio shall be 40%

# Traditional Routing of Power Cables

- Per NEC, electrical power cables that must cross communications cables shall cross perpendicular to such cables
- Vertical separation (**2" minimum**) is also recommended



# Traditional Guidelines for Separation

- From typical branch circuits (120/240v 20A) ANSI/NFPA 70 Article 800-52 shall be applied
  - Raceway barriers (metallic and non-metallic) are generally suitable for separating individual power conductors and voice/data cabling
  - Separation of 2" minimum is required from power conductors. More separation reduces the chances of electrical noise corrupting the data signals

# Traditional Guidelines for Separation

- **The following power requirements should also be met:**
  - The building itself shall be suitably protected from direct lightning (refer to ANSI/NFPA 780)
  - Surge protection shall be applied at the electrical service entrance (refer to ANSI/NFPA 70 Article 280 and IEEE Std. 1100 Section 9.11)
  - Keep telecommunications cable far away (>10 ft.) from bus duct (duct in which electrical conductors are separated) and other sources of high-current and/or high-voltage electrical power

# Traditional Guidelines for Separation

- **Separation from Noise Sources**
  - **Telecommunications Rooms and Equipment Rooms shall be located away from sources of electromagnetic interference (EMI)**
  - **Special attention shall be given to power transformers, motors and generators, x-ray equipment, MRI's, radio and radar transmitters. Also, routing should be away from ballasts and high intensity discharge devices**

# How Do Electrical Inspectors View This Product?



**THEY LOVED IT!** The entire state of Florida Inspectors (from all jurisdictions) reviewed this product and named it “Most Innovative New Product” in May, 2004. It was so well received that the Inspectors are currently recommending SIMTRA to many business professionals and have approved it with no problems.



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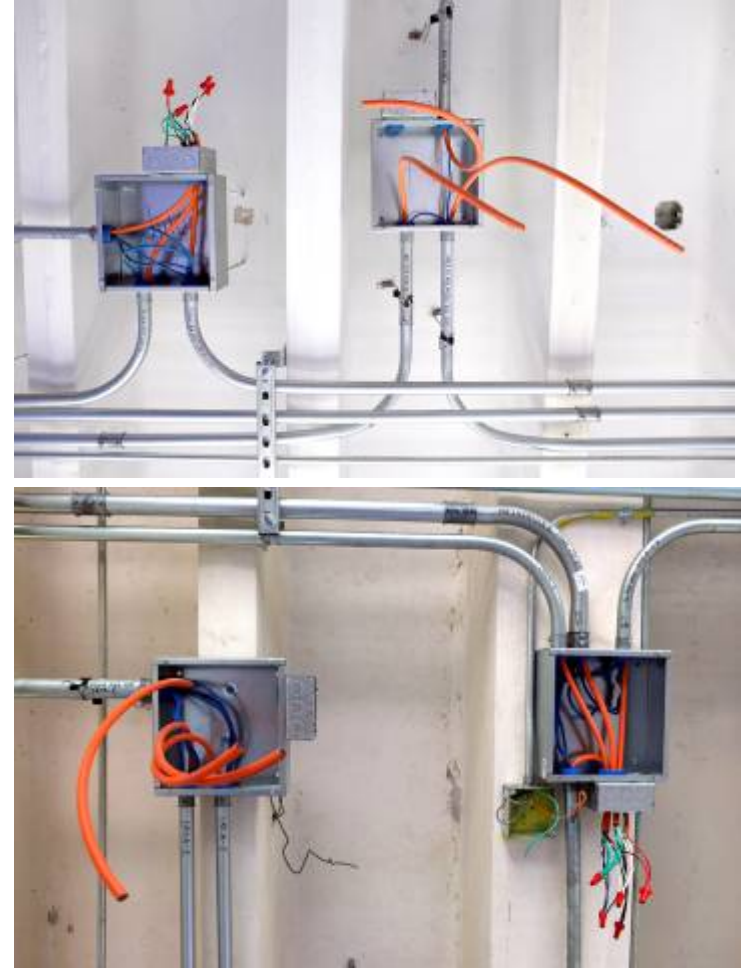
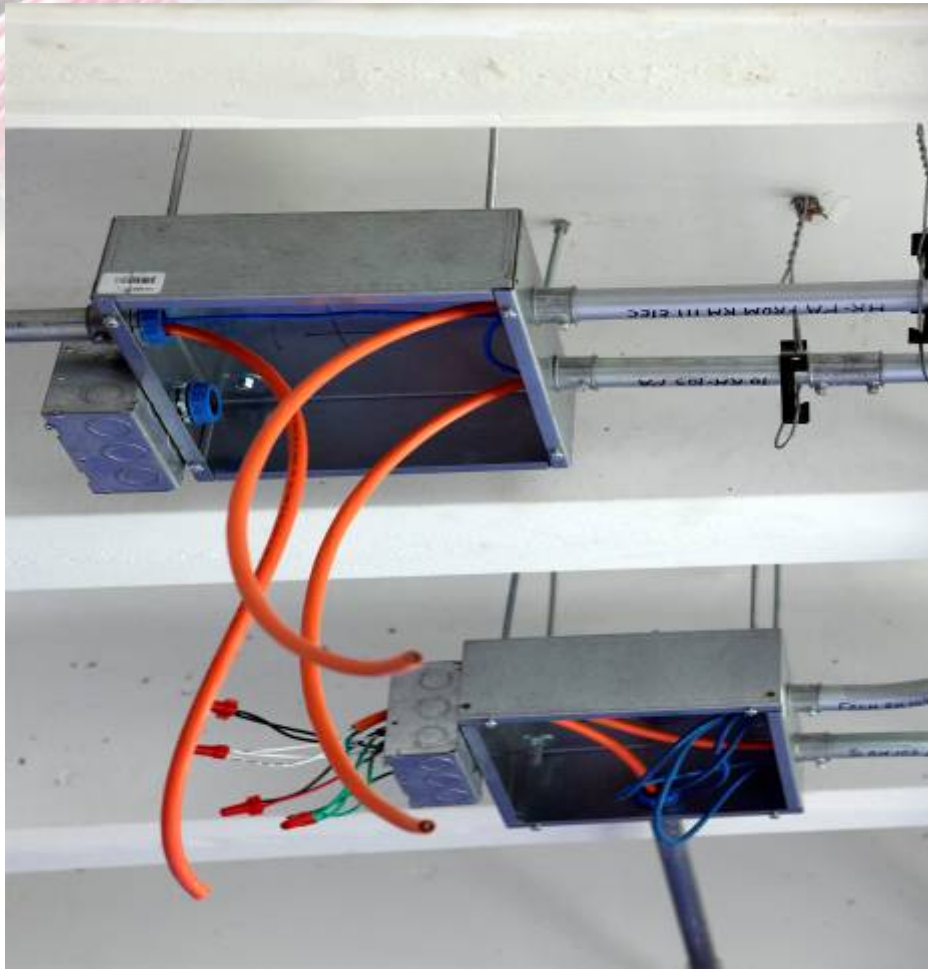
**SIMTRA™ by General Cable can be used for the following applications for new construction, or retrofitting a building's existing infrastructure:**

- **Computer network**
- **Telephone & Fax**
- **Television**
- **A/C Control**
- **Entertainment Audio & Video**
- **Fire Alarm Systems**
- **Security/Video Surveillance**
- **Lighting Control**
- **Remote Emergency Response Communication**
- **Kiosks Systems/P.O.S. Systems**
- **Intelligent Buildings/Smart Systems**
- **Building Touch-screen Directory**

# Individual Junction Box for Each Computer Terminal

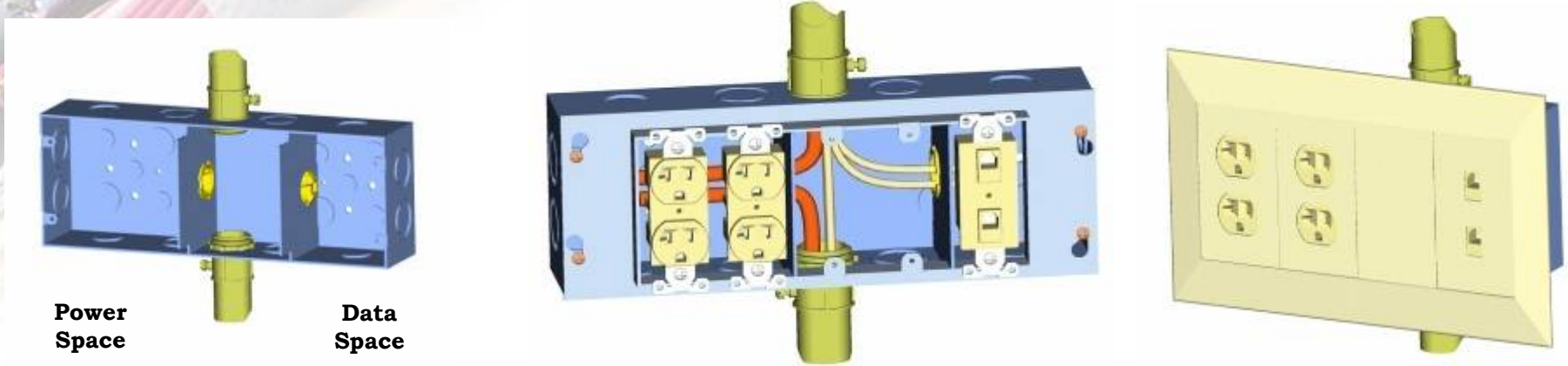


# Junction Box Feed Through

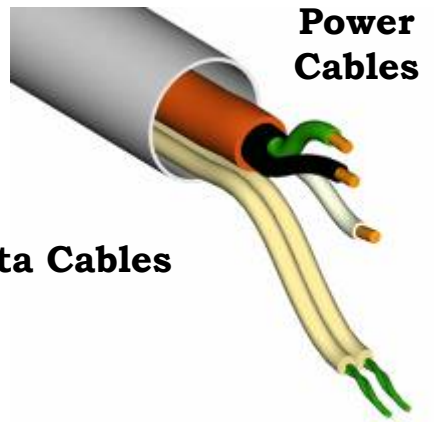
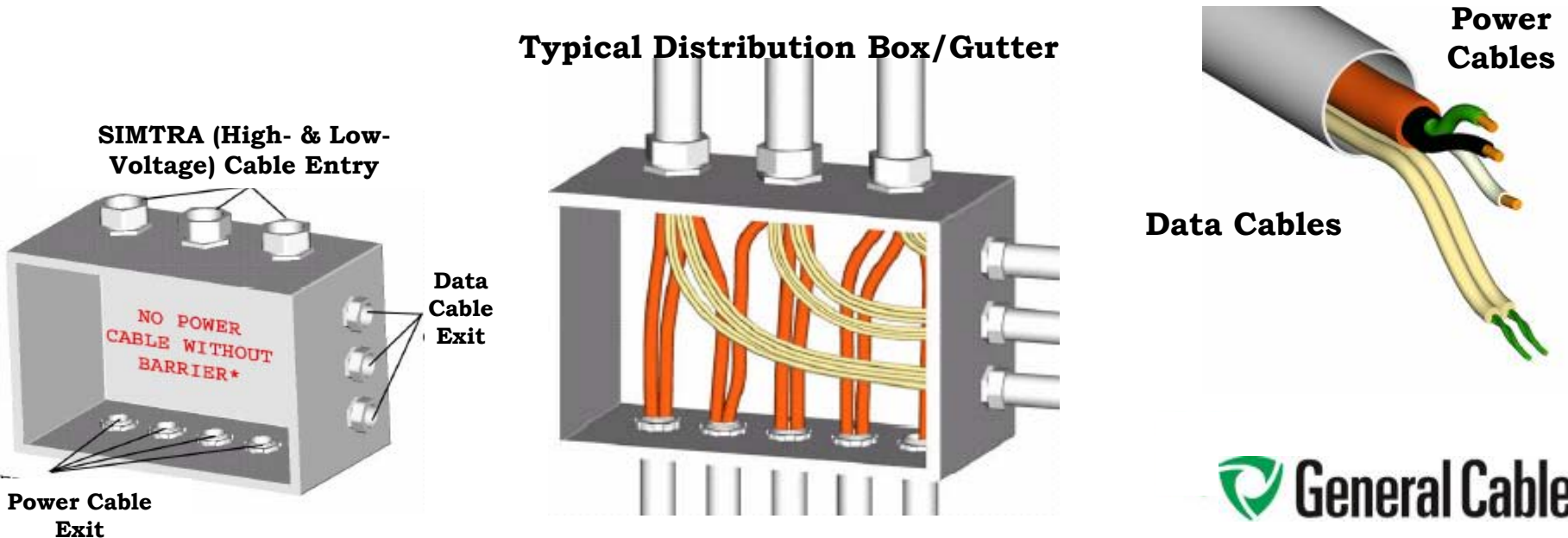


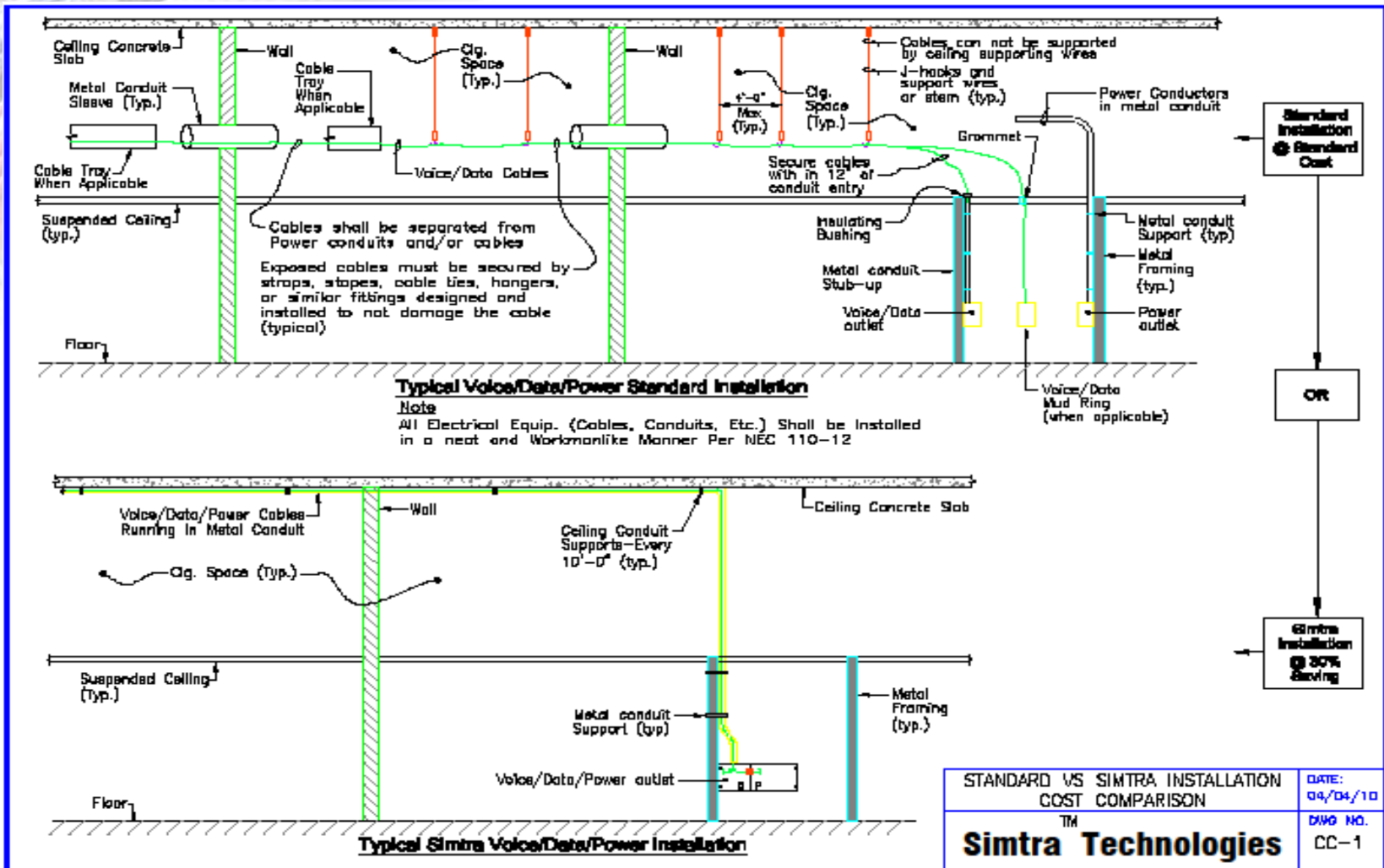
# Separation Requirements

## Typical Wall Box with SIMTRA Cables



## Typical Distribution Box/Gutter





The logo for SIMTRA™ is displayed in a bold, red, sans-serif font. The letters 'S', 'I', 'M', 'T', 'R', and 'A' are all in red, with a trademark symbol (TM) to the upper right of the 'A'. The background of the entire slide features a close-up, slightly blurred image of several electrical cables with different colored jackets (blue, yellow, red, white) and connectors.

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## Labor & Materials for \$100,000 Electrical Job

Amounts below are estimated

Labor	\$50,000	\$35,000	\$15,000
Materials other than Wire	\$45,000	\$25,000	\$20,000
Wire	\$5,000	\$12,500	(-) \$7,500
		Total Savings	\$27,500

**How Much  
Money Can  
You Save  
Going with a  
One Conduit  
System?**

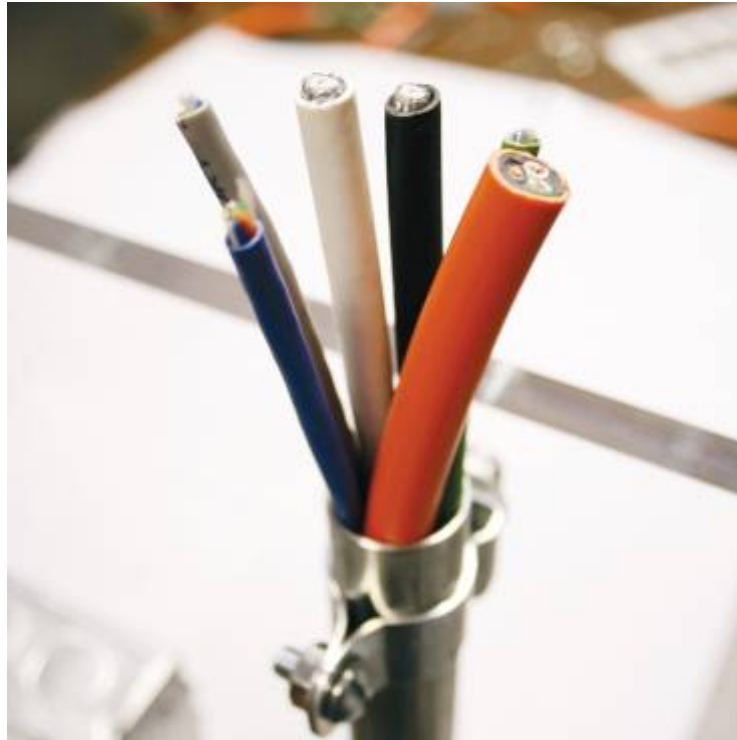
**Save 10 - 30%  
with SIMTRA**

# Why SIMTRA™ is a “Cool” Cable

- **When alternating current (AC) flows through a conductor, a pulsating or varying magnetic field is created around the conductor. This magnetic field is constantly expanding and contracting with the amplitude of the “AC” current. In the U.S., the frequency is 60 cycles per second. Since “AC” reverses polarity 120 times per second, the magnetic field that surrounds the conductor also reverses its direction 120 times per second. This expanding and collapsing magnetic field induces eddy currents in the ferrous metal parts (conduit, raceway, etc.) that surround the conductors, causing the metal parts to heat up from hysteresis.**
- **Hysteresis heating affects only ferrous metals with magnetic properties such as steel conduit, raceway, etc., but not “ferrite” (the barrier of the “SIMTRA Power Cable”). Simply put, the molecules of steel and iron align to the polarity of the magnetic field and when the magnetic field reverses, the molecules reverse their polarity as well. This back and forth alignment of the molecules heats up the metal and the greater the current flow, the greater the heat rises in the conduit or raceway.**
- **The ambient temperature is the maximum temperature that can be found anywhere along the conductor length. It directly affects the conductor’s ability to dissipate heat. The higher the ambient temperature, the more difficult it is for a conductor to dissipate heat affecting the conductor ampacity.**
- **The SIMTRA Power Cable has all its conductors twisted to create a round shaped cable. This twisting provides that the conductors of the same circuit are grouped together; the magnetic fields of the different current -carrying conductors cancel each other out, resulting in a reduced magnetic field around the current -carrying conductors.**
- **The SIMTRA Power Cable has a patented ferrite barrier that surrounds all conductors to virtually eliminate magnetic fields emanating from the current-carrying conductors. These fields will not induce electrical current (eddy current) in the conduit or enclosure. Ferrite is an oxide and ceramic material, or in other words a ferrite is an electrical insulator, non-conducting with no need to be grounded.**
- **Being cool, the SIMTRA Power Cable is more efficient than other cables.**



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**Complete Conduit Convergence**