UNDERCARPET CABELING SYSTEM
For Power and Communications

Linking Everything Together – Power, Voice, and Data

December 5, 2007
Undercarpet Cabling System – Overview

- What is Undercarpet Cabling?
- Primary Applications
- Features
- Component List
- Specifications/Agency Approvals
- Frequently Asked Questions
- Installation Example
- Summary
- Additional Information and Resources
What is Undercarpet Cabling?

• A low profile, flexible, power and communications cabling system that makes even the most complex office and retail wiring simple, economical, and invisible.

• All power, voice and data networks can be routed virtually anywhere under the carpet without the restrictions encountered with under floor ducts, walls, partitions and power/data poles.

• Office equipment and retail fixtures can be handled with ease – from desk lamps or fixture lights to computer connections.

• Easy changes to accommodate new requirements – nearly as simply as moving the furniture…
What is Undercarpet Cabling?

Making changes is as easy as 1,2,3…

✓ Step 1 = Remove a few sections of carpet squares

✓ Step 2 = Change the routing of the Undercarpet Cabling

✓ Step 3 = Relocate the floor fittings

Presto! You’re back in business
Primary Applications – Where Can Undercarpet Cabling Be Used?

- **Permitted** Uses:
  - Branch Circuits – Permitted both for general purpose and appliance circuits, and for individual branch circuits.
  - Floors – Permitted on level, sound, smooth, continuous floor surfaces made of concrete, ceramic or composition flooring, wood and similar materials.

- **NOT Permitted** Uses:
  - Rough, uneven floor surfaces.
  - Outdoors or in wet locations.
  - Where subject to corrosive materials.
  - In any hazardous (Classified) location.
  - In hospitals, residential buildings or schools.
Undercarpet Power System
Undercarpet Power System – Features

- U.L. Listed to 300 volt rating
- 3- and 5-conductor power cable available:
  - 10 AWG (30 amperes) or
  - 12 AWG (20 amperes)
  - Standard Ground or Isolated Ground
  - 0.010” steel protective top shield
- 15A and 15/20A Direct Connecting Receptacles (DCR) available:
  - 15/20A – NEMA 15R/20R receptacles
  - 15A – CSA standard single rating, 15 amp
  - Standard Ground or Isolated Ground
  - Sliding receptacle plug opening covers
- Low-profile floor fittings available
- Flush floor boxes available
- Easily interfaced to building wiring
- Suitable for slab-on-grade applications
- Meets 2005 NEC Article 324
- Meets 2006 CEC Rule 12-800
Undercarpet Power System – Typical Layout & Component Overview
Undercarpet Power System – Component List

- Transition box (flush wall, surface wall, flush floor, surface floor, or floor duct)
- Transition block
- Flat Conductor Cable (FCC)
- Floor preparation
- Top shield
- Top shield bonding clips
- Taps & Splice Connectors
- Insulator Kits (for taps & splices)
- Tap/Splice hand tool
- Hold down tape
- Spray adhesive
- Low profile floor fittings
- Direct Connecting Receptacles (DCR)
- DCR circuit adapters (for 5-conductor applications)
Undercarpet Power System – Transition Box

- Typically used to transition from round power supply wiring to Flat Conductor Cable (FCC)

Flush Wall Box

Surface Wall Box

Floor Duct Fitting

Flush Floor Service Box
Undercarpet Power System – Transition Box

- Accepts Power Transition Block, 3-conductor or 5-conductor
- Can also be used for wall transition of communications/data cabling system

Sold separately:
- 8-32 screw
- Top Shield Bonding Clip (Part No. 554178-1)

Universal Flush Wall Box
- Universal Flush Wall Box can be used for Category 5E and Category 6 communications transition also

Surface Wall Box
- Surface Wall Box can be used for Category 5E communications transition also
Undercarpet Power System – Power Transition Block

- Transitions from round conductors to flat conductors at the transition fitting

- Features a plastic block, copper–alloy terminals, a zinc plated steel base plate, and screws.

- A common screwdriver is used to terminate the flat conductors.

- Uses insulation–piercing contacts to penetrate the Flat Conductor Cable for termination – no special tools required for termination.

- Same block accepts 3- or 5-conductor cable.
Undercarpet Power System – Flat Conductor Cable

- Available in sizes corresponding to 10 AWG (30A) or 12 AWG (20A) round wire.
- 3- or 5-conductors available, depending on the load circuit to be serviced.
- Isolated Ground available on 5-conductor cables.
- All conductors marked to maintain proper polarity.
- Insulation between adjacent conductors is perforated so that the conductors may be separated easily without exposing bare copper conductors.
- Tough vinyl shield is bonded to both sides of the cable:
  - Cushions and protects the cable from abrasion.
Undercarpet Power System – Tap and Splice Connectors

- Splice Connectors:
  - Used with 3- and 5-conductor cables
  - 10 AWG or 12 AWG rating

Electrically connect conductors across the splice
Undercarpet Power System – Tap and Splice Connectors

• Tap Connectors:
  – Used with 3- and 5-conductor cables
  – 10 AWG or 12 AWG rating

✓ Electrically connect conductor on the tap cable to a conductor on the main cable run
Undercarpet Power System – Tap and Splice Connectors

AMP / “T&B” INTERFACE

- Interface between AMP Flat Conductor Cable and Thomas & Betts flat cable easily achieved with taps or splices

**Preferred Approach, Using Tap Connectors**

**Inline Approach, Using Splice Connectors**
Undercarpet Power System – Tap and Splice Connectors

AMP / “T&B” INTERFACE

- Interface between AMP Flat Conductor Cable and Thomas & Betts flat cable easily achieved
- Refer to Instruction Sheet
  - #408-3128 for guidance

Finished Installation, Using Splice Approach

Undercarpet Power System – Direct Connecting Receptacle (DCR)

- User Interface:
  - The low-profile receptacle is terminated directly to the flat conductor cable.
  - Tightening the screws allows the terminal tines to pierce the cable insulation and engage the conductors.
  - The spring-loaded receptacle covers are closed (to protect the contacts) until a plug is inserted.
Undercarpet Power System – Direct Connecting Receptacle (DCR)

**Power Whip Kit**

- Power Whip Kit can be used to transition from AMPINNERGY Modular Power Distribution to Undercarpet power.

**DCR with Adaptor**

- Adapter required for 5-conductor applications

**Single Duplex**

**Dual Duplex**

- Blank side can be used for data
Undercarpet Communications System
Undercarpet Communications System – Features

- Category 5e and Category 6 System cable and components available
- Protective cable wings
- One-step installation

- Low profile floor fittings
- Floor fittings accept SL Series and 110Connect Jacks, and ACO inserts
- Multimedia applications – Most of the jacks and inserts that are available in the main catalog can be used with the Undercarpet system
- Meets 2005 NEC Article 800.179(F)
- Meets 2006 CEC Rule 60-322

Tyco Electronics
Undercarpet Communications System – Typical Layout & Component Overview

- Flush Wall Box (Transition Fitting)
- Combination DCR Kit
- Multimedia Floor Fitting Kit
- 2-Port Low-Profile Floor Fitting Kit
Undercarpet Communications System – Component List

- Transition box
  - Flush, surface, or floor
- Transition block
  - Enhanced Category 5E
  - Category 6 (backwardly compatible with Category 5E)
- Cable
  - Enhanced Category 5E
  - Category 6
- Hold down tape
- Communications floor fitting
- Multimedia floor fitting
- Voice/Data jacks or ACO fittings
Undercarpet Communications System – Transition Box

• Transitions from round conductors to flat conductors

• Several box types available:
  – Flush wall box
  – Flush wall box, open frame
  – Flush floor service box
  – Multimedia floor fitting

Universal Flush Wall Box

Three or More Cable Runs

Hold-Down Tape 553481–1

7.92 [0.312] (Typ)

One or Two Cable Runs

Hold-Down Tape 553481–1

152.4 [6.00] (Typ)
Undercarpet Communications System – Transition Block

- Transitions from round conductors to flat conductors.

- Termination is made with a standard 110Connect impact tool.

- Transition blocks can be terminated to either T568A or T568B.

- Category 6 transition block is backwardly compatible, allowing it to be used with new or existing Enhanced Category 5E or Category 6 installations that use 22-24 AWG, solid conductors.
Undercarpet Communications System – Multimedia Application

• SL Series Multimedia Jacks
  - RCA Multimedia Jack
    - For audio and video
    - Uses one pair UTP Cable
    - White, Red, or Yellow

• SL Series 110Connector Jack
  - Thin profile
  - For data
  - Available with dust cover
  - Universal wiring, T568A or T568B

SVGA Assembly

Multimedia Floor Fitting
Undercarpet Communications System – Multimedia Application Example

Multimedia
Audio
Data
Video

Transition Block
Wall box/Cover

CAT5E Round Cable

CAT5E Flat Cable
Undercarpet Cabling System – Specifications

• Power Cabling Voltage Rating:
  – Maximum voltage between ungrounded conductors: 300 volts
  – Maximum voltage between ungrounded and grounded conductors: 150 volts

• Power Cabling Current Rating:
  – 12 AWG rated 20 amperes
  – 10 AWG rated 30 amperes

• Communications Cabling Voltage Rating:
  – 300 volts AC or DC

• Communications Cabling Category Performance:
  – Enhanced Category 5E
  – Category 6
Undercarpet Cabling System – Approvals

*Undercarpet Power Cabling meets the following:*

- Complies with 2005 National Electrical Code –
  - Article 324

- UL Listed –
  - Flat Conductor Cable, Type FCC (UL File E73212)
  - FCC Fittings (UL File E73213)

- Complies with CSA C22.1-06, “Canadian Electrical Code, Part I” –
  - Section 12, Rule 12-800

- Certified by Canadian Standards Association –
  - Flat Conductor Cable, Type FCC (File 7189)
  - FCC Fittings (File 7189)
  - 15 amp receptacles are standard for Canada installations
Undercarpet Cabling System – Approvals

*Undercarpet Communications Cabling meets the following:*

- Complies with 2005 National Electrical Code –
  - Article 800.179(F)

- UL Listed –
  - Communications Cable, Type CMUC (UL File E138034)
  - UL 444 – Communications Cables

- Complies with CSA C22.1-06, “Canadian Electrical Code, Part I” –
  - Section 60, Rule 60-320

- Certified by Canadian Standards Association –
  - Communications Cable, Type CMH (File 60814)
  - FCC Fittings and Modular Jacks (File 7189)
  - CSA C22.2 No. 214-02 – Communications Cables
Undercarpet Cabling System – Frequently Asked Questions

- Can Undercarpet cabling be used in a hospital?
  - NO – per NEC 324.12(4) and CEC 12-806.

- Can Undercarpet cable be used in an office or computer room within a hospital?
  - NO – per NEC 324.12(4) and CEC 12-806.

- Can Undercarpet cabling be used in damp conditions?
  - YES – per NEC 324.10(E), CEC 12-804 and CEC 60-324.

- Can Undercarpet cabling be used in wet locations?
  - NO – per NEC 324-12(1), CEC12-806 and CEC 60-326.

- Can Undercarpet cabling be installed with rolled goods carpet?
  - NO – The system is designed to be used with Carpet Squares only; per NEC 324.1, NEC 324.10(H), CEC 12-808 and CEC 60-324.

- Can Undercarpet cabling be used with the AMPINNERGY Modular Power Distribution System?
  - YES – per NEC 324, NEC 604/605, and CEC 12-800.
Undercarpet Cabling System – Installation Example

Multimedia Floor Fitting and Dual Duplex DCR
Undercarpet Cabling System – Summary

- Use on hard, smooth floors where carpet squares will cover the cabling system.
- Route power, voice and data virtually anywhere under the carpet.
- Change circuit arrangement with ease.
- Low-profile floor fittings and flush transition boxes available.
- Interface with T&B flat conductors with ease.
- Connect to AMPINNERGY Modular Power Distribution System with ease.
- Data/Communications – Category 5E and Category 6 cable and components available.
- Connect to main catalog twisted-pair jacks with ease.
- Approved by NEC, UL, and CSA.
Undercarpet Cabling System – Additional Information and Resources

- Conforms to **2005 National Electrical Code** (NFPA 70), Article 324 and Article 800
- **UL Listed**: File Number E73212 – Flat Conductor Cable, Type FCC; E73213 – Flat Conductor Cable Fittings; E138034 – Communications Cable
- Conforms to **2006 Canadian Electrical Code, Part I** (CSA C22.1-06), Section 12 and Section 60
- **CSA Certified**: File Number 7189 – Flat Conductor Cable, Type FCC and Flat Conductor Cable Fittings; File Number 60814 – Communications Cable, Type CMH
- **Product Information Center**: (800) 522-6752
- Customer Service (Pricing Inquiries): (800) 553-0938
- Undercarpet Cabling Planning and Installation Manual, #409-5566
- Application Specification for Undercarpet, #114-6008