Category 6 & Category 6A Cable Applications

Hitachi Cable America Inc.

900 Holt Avenue, Manchester, NH 03109 USA

Tel: +1-603-669-4347 Fax: +1-603-669-9621

TIA 568.2-D Balanced Twisted Pair Cabling Media

Cat 6 or Cat 6A?

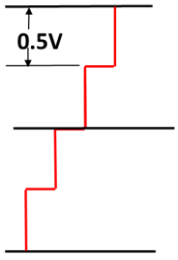
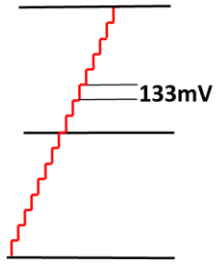
Though there can be some discussion regarding when Category 6 or Category 6A is necessary to support the needs of a user, there is much less to debate when it comes to supporting network applications and future proofing. Category 6 is designed to accommodate 1 gigabit Ethernet (1Gbit) and all legacy applications, such 10 and 100 megabit Ethernet installations. Category 6A supports applications up to 10 gigabit Ethernet and is the solution for future and undetermined high data rate solutions. More specifically, today's Wireless Access Points and other high-data/high-power PoE devices already rely on Category 6A infrastructure.

Telecommunications Industry Association (TIA) Category Cable Recommendations

- TIA recommends Category 6 (class E) cabling as the minimum performance level for horizontal balanced twisted-pair cabling to service most current applications.

- TIA recommends Category 6A (class Ea) cabling for wireless access points (WAP) and future high bandwidth and remote powering applications such as Power over Ethernet (PoE).

Category Cat 6 / Cat 6A Cable 1G and 10G Ethernet Transmission Comparisons

Ethernet Standard	Ethernet Signal Encoding Voltage Separation	Balanced Twisted Pair Performance Requirement TIA 568.2-D (568-C.2)
1G Ethernet **IEEE802.3ab** **1000Base-T** • PAM 5 encoding • 4 Pairs bi-directional • 250 Mbps/pair TX/RX **Category 6**	1000 Base-T  PAM 5	**Category 6** **1000BaseT Ethernet** **250Mhz Bandwidth** • 4 Pair transmission • 1G @ 100m length • TIA Tests ○ Insertion Loss (IR) ○ NEXT ○ PSNEXT ○ ACR ○ PSACR ○ ACRF ○ PSACRF ○ Return Loss (RL)
10G Ethernet **IEEE802.3an** **10GBase-T** • PAM 16 encoding • 4 Pairs bi-directional • 2.5 Gbps/pair TX/RX **Category 6A**	10G Base-T  PAM 16	**Category 6A** **10GBaseT Ethernet** **500Mhz Bandwidth** • 4 Pair transmission • 10G @100m length • TIA Tests ○ Insertion Loss (IR) ○ NEXT ○ PSNEXT ○ ACR ○ PSACR ○ ACRF ○ PSACRF ○ Return Loss (RL) ○ PSANEXT ○ PSAACRF

Category 6
Category 6 cabling is the current workhorse for Ethernet environments and will satisfy most cable to the workstation requirements including data rates found in currently installed Power over Ethernet applications in use today.

1 gigabit Ethernet applications use all four pairs for bidirectional transmit and receive each pair transmitting 250 Mbps (megabits per second) times (x) 4 pairs to provide a total of 1 Gbps (gigabit per second). Due to the 0.5V signal encoding separation, the inherent noise-cancelling effect of balance twisted pair cabling works well against electrical interference found in most commercial environments. There is no cable to cable interference, also known as alien crosstalk, performance requirements for Category 6 which limits its use to 1 gigabit Ethernet and below.

Category 6A
Category 6A, initially designed to support data center backbone applications, is now the TIA recommended cable for all new and future Ethernet applications, especially Wireless Access Points.

10G Ethernet utilizes all four pairs for bidirectional transmit and receive each pair transmitting up to 2.5 Gbps times (x) 4 pairs to provide a total of 10G. Due to the narrow 133 millivolt signal encoding separation the application is more susceptible to electromagnetic interference (EMI) noise levels so additional TIA cable-to-cable testing was introduced to measure immunity to alien crosstalk. With the introduction of high data rate Power over Ethernet applications such as high-speed Wireless Access Points and high definition video such as HDBaseT, Category 6A is the only cable designed to transmit the combined high level of data as well as remote powering for the growing number of data-hungry and power-hungry applications.

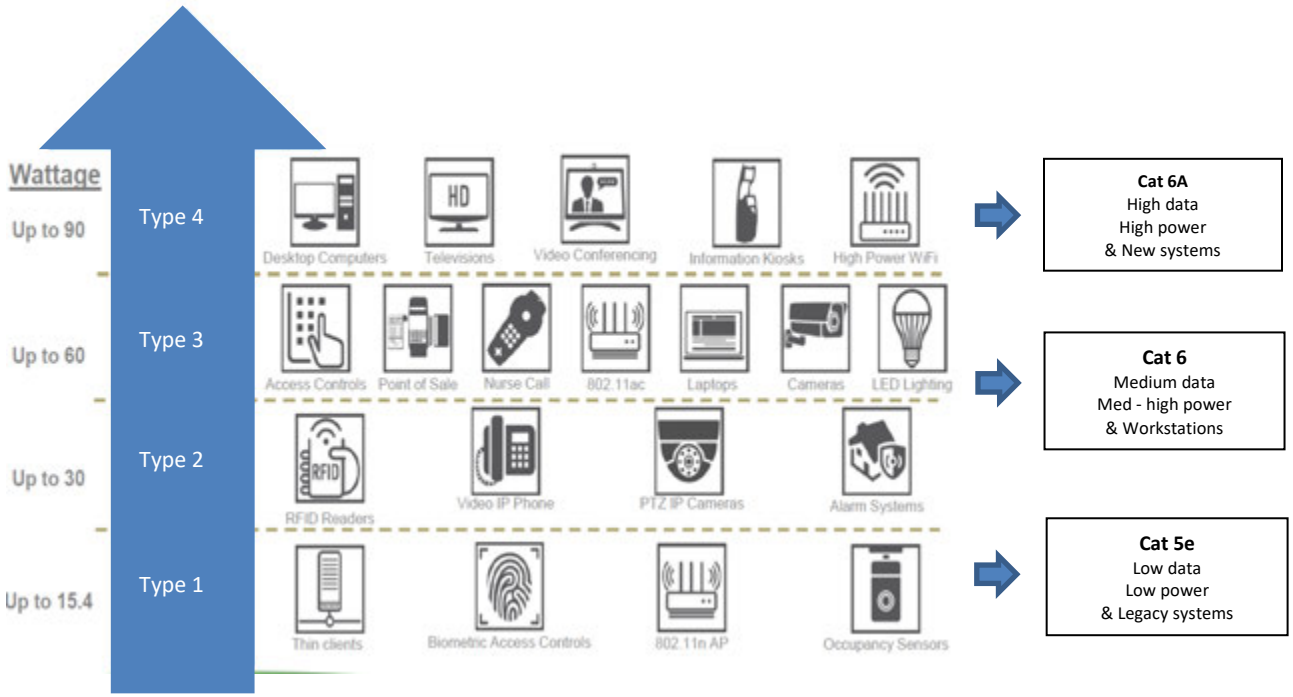
Power over Ethernet (PoE) IEEE 802.3bt Applications for Category 6A

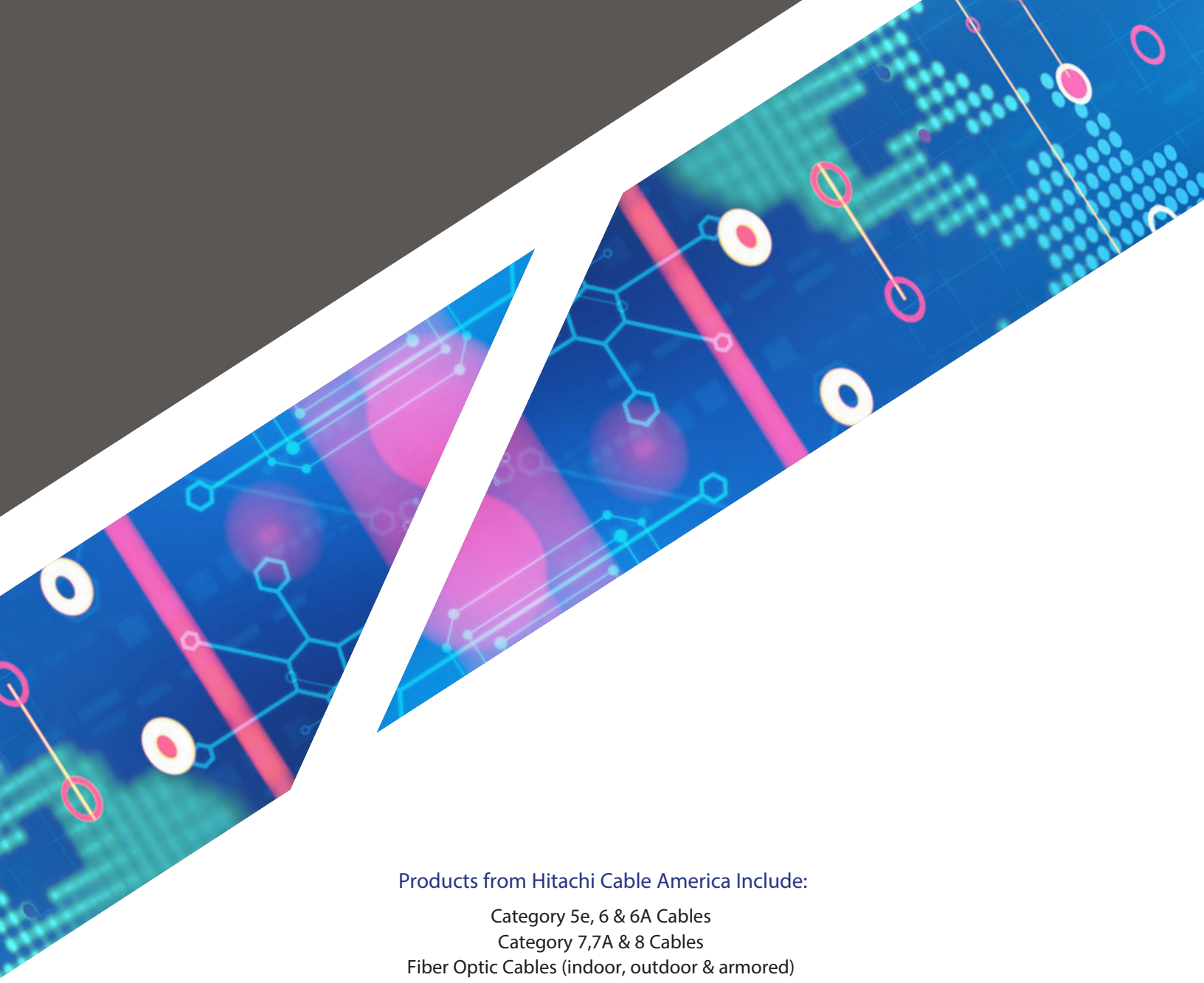
60 Watts (type 3) 2018 supports
- Laptop Computers / HD PTZ cameras + heat / Nurse Call systems /
- IEEE 802.11ac wave 2 WAPs (Wi-Fi 5 at 1.3 Gbps)

90 Watts (type 4) 2018 supports
- Desktop Computers / Video conferencing / Televisions / Video Kiosks

IEEE 802.11ax WAPs (Wi-Fi 6 at 10 Gbps)

Cabling for Power over Ethernet





Products from Hitachi Cable America Include:

Category 5e, 6 & 6A Cables
Category 7,7A & 8 Cables
Fiber Optic Cables (indoor, outdoor & armored)
NanoCore™ Micro Distribution Fiber Optic Cables
Industrial Ethernet Cables
Coaxial & Mini-coaxial Cables
Distributed Antenna System Cables
Round & Ribbon Electronic Cables
MudGuard-EX™ Drilling Mud Resistant Cables

For more information about Open System Architecture, please contact us.

HITACHI
Inspire the Next

Hitachi Cable America Inc.

900 Holt Avenue • Manchester, New Hampshire 03109 USA
Tel: 603.669.4347 • Sales: 800.772.0116 • Fax: 603.669.9621
www.hca.hitachi-cable.com