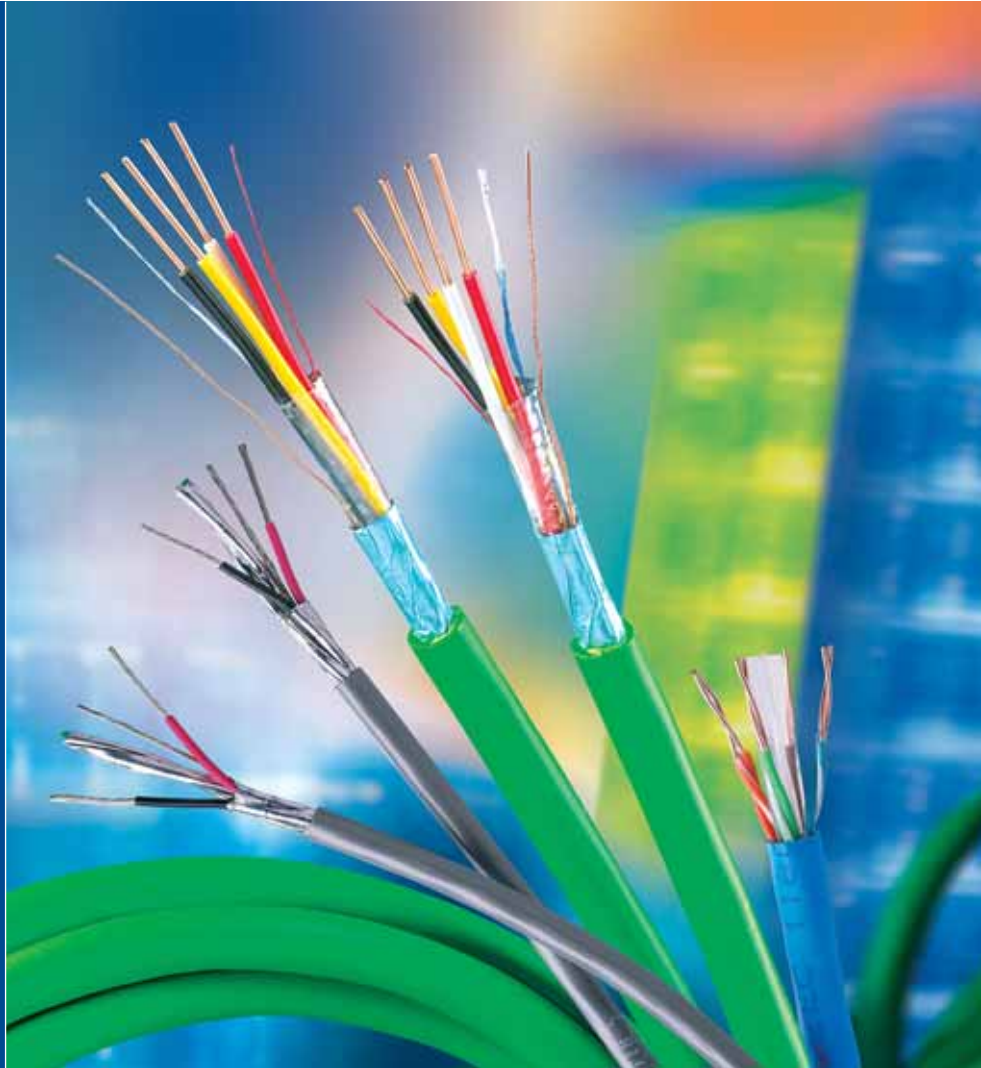








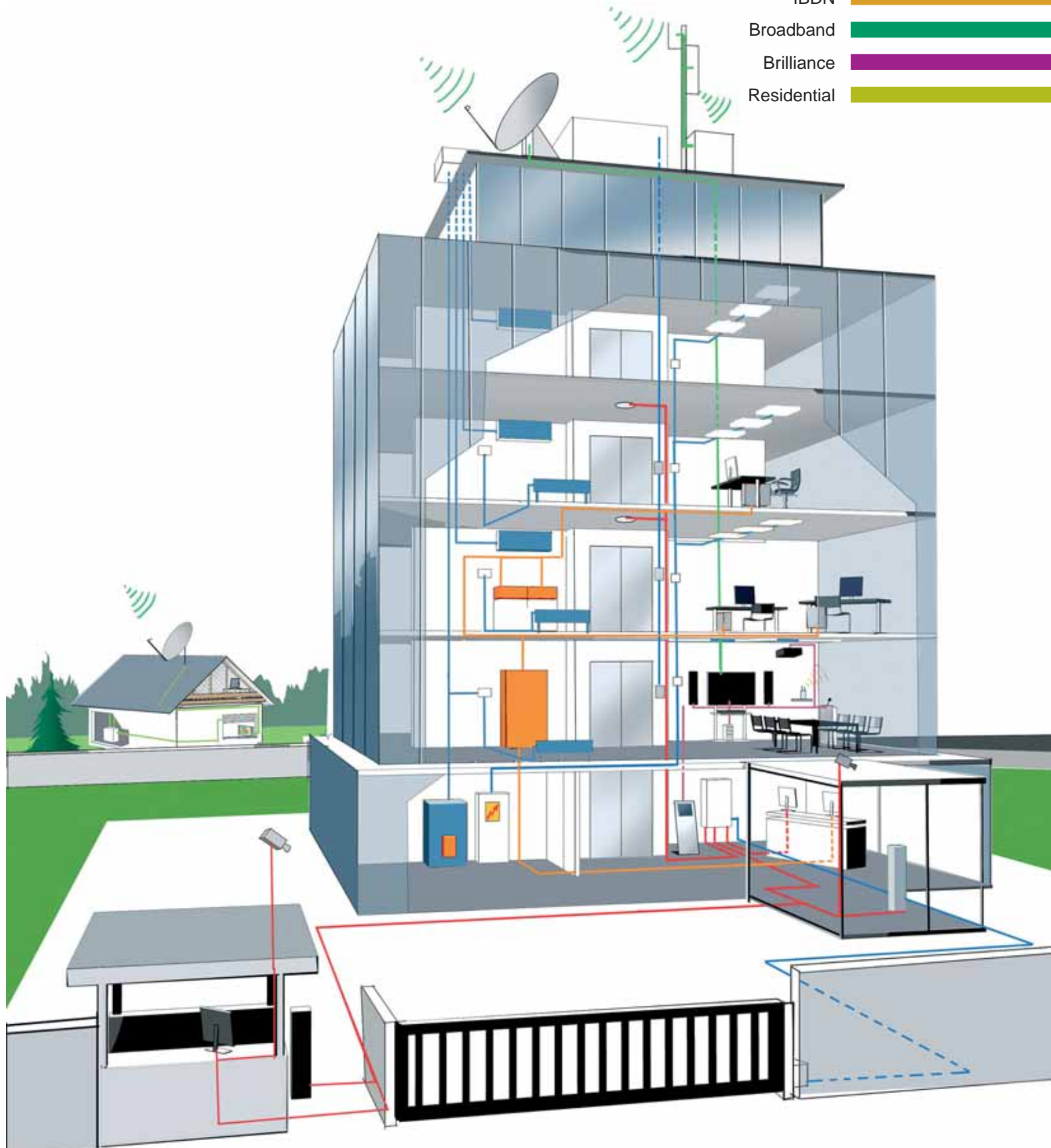
Building Management Systems



BELDEN
SENDING ALL THE RIGHT SIGNALS



- IndustrialTuff 
- New Generation 
- IBDN 
- Broadband 
- Brilliance 
- Residential 





The colours of cable How to use this guide

Cabling, never before, has been so tightly intertwined in our lives.

Every building, public sector or private sector, is a self-contained environment with a life of its own. Rarely are two buildings the same in the same way as no two people are similar. Different economics, design, function and performance requirements demand different solutions.

Belden is the ultimate common and very flexible thread which brings buildings to life and makes them work, driving and servicing high performance systems for business, leisure, entertainment, simple existence or complex communications.

This guide summarises the contribution which Belden provides for Building Management Systems in all its forms. It brings together in a simple and understandable way all those elements which go to make up the whole. With thousands of standard products to choose from, it solves the particular needs of everyone involved in the complex world of building – architects and designers, developers and contractors, professional consultants and service engineers, installers and specialists, business users and homeowners.

Follow blue ...

The Belden route for **IndustrialTuff Cables**

Cables which provide the solutions for the exchange and storage of information to keep businesses efficient, on top and performing.

Follow red ...

The Belden route for **New Generation Cables**

High performance cables used with equipment for personal safety and the physical security of buildings and their contents – access control systems, CCTV and alarms.

Follow orange ...

The Belden route for **IBDN**

Category and fiber optic cables which provide effective business environments with the best speed of transmission, bandwidth and headroom.

Follow green ...

The Belden route for **Broadband Cables**

CATV cables to maximise quality performance, sound and vision through analog, digital and interactive tv, video and internet.

Follow purple ...

The Belden route for **Brilliance Cables**

Audio and video cables assuring the best performance by matching the quality output of the professional broadcaster with the perfect enjoyment of the recipient

Follow olive ...

The Belden route for **Residential Cables**

Intelligent cables to make intelligent buildings work – supporting home offices, smart equipment, energy driven services, environmental comfort and security.



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Belden – Building Management Systems

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BELDEN

SENDING ALL THE RIGHT SIGNALS





The living environment

As the boundaries between our personal and professional lives are fading, our homes, places of work and leisure facilities are becoming more and more integrated. From the home office and entertainment centre, to multi-functional work spaces, managing our living environment is providing us with new opportunities. Our key challenge is to successfully control all aspects of our lives – and our spaces.

Controlling our lives

From fully integrated climate control to advanced computer systems to high definition audio-visual entertainment, the quality of modern living depends on our ability to manage increasingly complex systems. New and innovative technologies are driving the changes. Efficient building management systems can help us to integrate these.



Building management systems

With automation and advanced electronics setting the pace, equipment and installations are designed for the control, monitoring and optimisation of the various functions and services provided in a building. These include heating, ventilation, air-conditioning as well as lighting, security systems and the operation of electric/ electronic appliances. Although the basic control technologies have been in existence for some time, today's life-style revolution is driving the need for greater integration and efficiency.



Belden

As a front runner in the development and production of high-speed electronic cables, Belden is able to deliver the broadest cable package for advanced building management systems. With a choice of more than 10.000 standard products Belden is able to meet the needs of owners, developers, installers and users of high performance, technologically advanced systems.

If you are looking to create an effective building management system, make sure you talk to Belden. There is no Equal!

This brochure offers an overview of Belden's key products for applications and networks used in building management systems.



BELDEN
SENDING ALL THE RIGHT SIGNALS





The intelligent building

An efficient building management system will bring us greater levels of convenience in our living environments. Our day-to-day comforts are controlled so we can experience the right heating and lighting conditions around the clock; our physical needs are met by ensuring that our fridges are stocked or dinners are cooked on time. For both work and leisure, the intelligent building provides direct access to sources of global information and technology.



A safe place

An innovative building management system can help to control access by monitoring windows and doors. Sophisticated alarm systems can detect intruders, floods or fires and send out calls for assistance. Automatically lights and curtains may act as a deterrent, keeping homes and offices safe.



Better economy and ecology

An effective building management system will help save energy and drive down costs. Individual room control can help save 30% on heating/cooling costs – even more if used in combination with automatic window blind control.



Industrial Tuff
Multi Pair – Multi Conductor



Industrial Tuff cable for:

- Heating Ventilation & Air Conditioning
- Lighting Control
- Data Acquisition
- Sensor Actuator
- Motor Control



Stay in control

Reliable systems enable us to exchange vital industrial information, saving time and money. The quality of the systems depends on the performance of all individual components and the way in which we provide interfaces and exert control.

Industrial cables – providing a life line for your business

Belden offers the most comprehensive, economical and up-to-date range of reliable industrial cable products on the market today. Whether for automation, data exchange, interconnection or full networks, Belden has the right solution to keep your data – and your business – on the go.

Product Range and Applications

Beldfoil® shield

Our shielded industrial automation cables feature Belden's patented innovative, high performance Beldfoil® shield, for unique performance and utmost reliability.

Industrial Data Solutions®

Use Belden products with eg Konnex EIB or Echelon LonWorks Domotica to create intelligent building connections. Open system topologies (either in bus, star, daisy chain or free topology) of these networks allow a versatile configuration for all users, from home owners to large commercial building such as shopping-malls, offices or hospitals. Our cables are also available in LSNH constructions for effective use in public buildings.

Interconnect cable

Universal data transmission cables are used in a multitude of applications in Building Management Systems – from card readers at a gate in a security application to connecting a plc to a valve as part of the heating system. Different versions, PVC, LSNH, FEP are available as standard items fit for purpose.

EIA RS-485 networks

Our foil and braid shielded cables for EIA RS-485 networks are top of the line and allow the use of the total network length. The multi pair configurations allow maximum flexibility in designing your network and the broad range of products available ensures that you will always find the right product for your requirements.


Industrial Data Solutions® – Industrial Data LonWorks & KNX EIB Cables



De- scription	Part No.	UL NEC/ C(UL)CEC Type IEC	Standard lengths		Standard Unit Weight		Conductor (stranding) Diameter Nom. DCR	Nominal Insulation OD		Shielding Material Nom. DCR	Nominal OD		Nom. Imp. (Ω)	Nom. Vel. of Prop.	Nominal Capacitance		Nominal Attenuation	
			ft	m	Lbs.	kg		Inch	mm		Inch	mm			pF/Ft.	pF/m	MHz	dB/ 100 Ft.

16 AWG • Stranded (19x29) 1.5 mm Tinned Copper • Twisted Pair

PVC Insulation • Chrome PVC Jacket


	UL AWM Style 2598	8471	NEC	U-500	U-152	20.1	9.1	1.47 mm	0.105	2.67	Unshielded	0.274	6.96						
			CMG	500	152	20.1	9.1	16 AWG (19x29) TC											
			CEC	U-1.000	U-305	39.0	17.7												
			CMG FT4	1.000	305	40.1	18.2												

1-Pair

Color code: Black, White
For LSNH version of 8471, see 8471NH

20 AWG • Solid 0.8 mm Bare Copper • Twisted Pairs • Plastic Foil • 26 AWG Bare Copper Drain Wire

PVC Insulation • Green F-R LSNH/FRNC Jacket

	300V RMS 70°C	YE00906	NEC	100	30	12.3	5.6	0.81 mm	0.063	1.60	Alu-foil + drain wire 26 AWG BC	0.283	7.20	73	CDR/CDR CDR/SCR 66%	30	100		
			CMR	500	152	61.7	28.0	20 AWG Solid BC											
			CEC	1.000	305	123.5	56.0												
			CMR FT4																


Color code: Red, Black, White, Yellow
Pulling Tension: 50 N

For PVC version of YE00906, see YE00820

Industrial Data Solutions® – Interconnect Cable – Shielded Twisted Pair Cables

22 AWG • Stranded (7x30) 0.8 mm Tinned Copper • Twisted Pair • Beldfoil® • 24 AWG Stranded Tinned Copper Drain Wire

Polypropylene Insulation • Chrome FRNC/LSNH Jacket

	300V 80°C	8723NH	IEC 332-3C	1.000	305	23.1	10.5	0.76 mm	0.046	1.17	Beldfoil® + drain wire (24 AWG TC)	0.179	4.55	45	CDR/CDR CDR/SCR 66%	30.0	114.8		
			BS 7655	1.600	500	61.7	28.0	22 AWG (7x30) TC											
				3.280	1.000	75.0	34.0												

2-Pair

Pairs Cabled on Common Axis to Reduce Diameter

For PVC versions of 8723NH, see 8723


For Plenum versions of 8723, see 88723, 87723 or 82723

Overall Foil/Braid Shield – EIA RS-485 Applications, CAN

De- Description	Part No.	UL NEC/ C(UL)CEC Type IEC	Standard lengths		Standard Unit Weight		Conductor (stranding) Diameter Nom. DCR	Nominal Insulation OD		Shielding Material Nom. DCR	Nominal OD		Nom. Imp. (Ω)	Nom. Vel. of Prop.	Nominal Capacitance		Color code
			ft	m	Lbs.	kg		Inch	mm		Inch	mm			pF/Ft.	pF/m	

24 AWG • Stranded (7x32) 0.6 mm Tinned Copper • Twisted Pair • Beldfoil® • 90% Tinned Copper Braid • 24 AWG Tinned Copper Drain Wire

Polyethylene Insulation • Chrome PVC Jacket

	UL AWM Style 2919	30V 80°C	NEC					0.61 mm	0.068	1.73	Beldfoil® + 90% TC Braid + drain wire (24 AWG TC)			120	CDR/CDR CDR/SCR 66%	12.8	42.0	see chart below	
			CM				24 AWG (7x32) TC												
			CEC																
			CM																

9841 1-Pair


100 31 4.9 2.2
500 152 20.1 9.1
1.000 305 40.1 18.2

For LSNH version, see 9841A

Overall Foil/Braid Shield Low-Capacitance Computer Cables for EIA RS-232 and EIA RS-422 Applications

24 AWG • Stranded (7x32) 0.6 mm Tinned Copper • Twisted Pair • Overall Beldfoil® Shield • 65% Tinned Copper Braid • 24 AWG Tinned Copper Drain Wire

Datalene® Insulation • Chrome PVC Jacket

	UL AWM Style 2919	30V 80°C	NEC					0.61 mm	0.049	1.24	Beldfoil® + 65% TC Braid + drain wire (24 AWG TC)			100	78%			
			CM				24 AWG (7x32) TC											
			CEC															
			CM															

Color Code

Pair No.	Color Combination
1	White/Blue stripe & Blue/White stripe
2	White/Orange stripe & Orange/White stripe

For LSNH version, see 9841A

8102 2-Pair

100 31 4.2 1.9
500 152 17.0 7.7
1.000 305 38.1 17.3
10.000 3.048 380.7 172.7

0.270 6.86

CDR/CDR
CDR/SCR
13 41
22 72

*DC loop resistance • **DC resistance inner conductor • ***DC resistance outer conductor • BC = Bare copper • TC = Tinned copper

New Generation Cables
 CCTV – Access – Intrusion – Fire Alarm – Circuit – Integrity



New Generation Cable for:

- CCTV
- Access Control
- Intrusion Alarm
- Commercial Sound Systems
- Intercom System



The safest option

Vigilance is essential to help protect our virtual and physical property against willful and accidental intrusion. To do this effectively we need tried-and-tested safety and security equipment and systems – 24 hours a day.

New Gen cables – to help safeguard and protect

Belden's range of New Generation cables deliver the right performance for your access control systems, CCTV and alarm systems. You can rely on Belden to provide cable solutions to keep people, contents and buildings safe.



Product Range and Applications

Banana Peel® Jacketless Cables

The Belden Banana Peel® jacketless cable was developed by Belden to save time and decrease labour costs. Banana Peel is a line of composite cables featuring a patent-pending design that affixes the individual cables to a center spline, eliminating the need for an overall jacket. By eliminating the overall bundle's jacket, a whole step in the termination process can be removed. In addition, the individual cable components are all instantly identifiable thanks to colour coding and print legends. Individual cables can be "peeled" of the centre spline and terminated. The elimination of the overall jacket reduces the diameter of the composite, so the cable's overall bend radius is improved and use of a smaller size conduit is possible.

PTZ and Access Control Cables

PTZ (Pan Tilt and Zoom) and access control cables are available as both coaxial and Banana Peel versions. Various standard options are available to cover most of the application requirements, other configurations are available upon request.

CCTV cables

New Generation CCTV coaxial cables are designed to meet the highest standards in signal transmission whilst allowing DC feeding of the camera over the coax as well. Ranging from miniature RG 59 up to RG 11 and featuring new designed innovative coaxial cables with enhanced shielding characteristics to avoid EMI and RFI for a clear signal. Low attenuation and good signal noise ratios allow signal transmission over longer distances than comparable standard cables with changing to the next larger coax type.

Also available are designs with a control/power pair in a siamese design to feed the camera or to allow PTZ operation of the camera. And finally, we offer category cables with a Power/Control pair to hook up any number of digital cameras.

Safe-T-Line® cables

For applications such as Fire Detection and Alarm systems, Emergency Lightning or other essential systems Belden offers state of the art Safe-T-Line® Circuit Integrity cables that meet the most stringent requirements and are tested to IEC 60332 – 1 – 2, EN 50200, EN 50266 and EN 50267 standards. They are available with both solid and stranded conductors. The compounds used for these cables are halogen free, self extinguishing and flame retardant combined with low smoke emissions so that in case of fire the cables will not spread the fire or emit toxic or blinding smoke.

Security Coaxial Cable

Surveillance and CCTV Applications

Shielded or Flooded for Use in Underground Ducts



De-scription	Part No.	UL NEC/ C(UL)CEC Type IEC	Standard lengths		Standard Unit Weight		Conductor (stranding) Diameter Nom. DCR	Nominal Insulation OD		Shielding Material Nom. DCR	Nominal OD		Nom. Imp. (Ω)	Nom. Vel. of Prop.	Nominal Capacitance		Nominal Attenuation		
			ft	m	Lbs.	kg		Inch	mm		Inch	mm			pF/Ft.	pF/m	MHz	dB/ 100 Ft.	dB/ 100 m
20 AWG • Solid 0.8 mm Bare Copper • 95% Bare Copper Braid																			
Gas-injected Foam PE Insulation • Grey FRNC/LSNH Jacket																			
70°C	443945	IEC 60754-2	328	100	10.6	4.8	0.81 mm	0.145	3.68	95% BC Braid	0.232	5.90	75	83%	16.3	53.5	1	0.3	1.0
							20 AWG Solid BC				11.4 Ω/km***					5	0.7	2.1	
							32.8 Ω/km**								10	2.0	3.0		
							21.4 Ω/km**								50	1.9	6.2		
															100	2.6	8.5		
															200	3.6	11.8		
															400	5.0	16.4		
															700	7.0	23.0		
															900	8.0	26.2		
															1.000	8.5	27.9		



RG-59

Nominal Delay: 3.97 ns/m

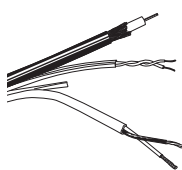
Pulling Tension: 218 N

For PVC version, see 543945

Security Composite Cables

Banana Peel™ PTZ Camera Cable Composite Cables Jacketless

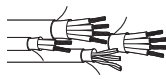
De-scription	Part No.	UL NEC/ C(UL)CEC Type IEC	Standard lengths		Standard Unit Weight		Color code	Nominal OD		Component	Description	Shielding Material & nom. DCR	Jacket Material & Colors	Outer Jacket Material & Colors	Component OD	
			ft	m	Lbs.	kg		Inch	mm						Inch	mm
Composite • (1) Coax 20 AWG 0.8 mm • (1) Pair unshielded 23 AWG 0.6 mm • (2) CDR unshielded 18 AWG 1.2 mm • Banana Peel® Unjacketed, bonded to central spline																
PVC Insulation (Pairs) • Foam Insulation (Coax) • Black PVC Jackets																
300V 75°C	500PTZ	NEC: CMR CEC: CMG FT4 Shaft UL 1666	500	152	36.8	17.5		0.409	10.40	Video	1-Coax RG59/U 20 AWG 0.81 mm Solid BC	95% BC	Foam Polyethylene 5.76 mm	F-R PVC Black	0.227	5.77
							White, Blue			Control	1-Pair 23 AWG 0.57 mm Solid BC	Unshielded	Polyolefin 1.04 mm	PVC Blue	0.118	3.00
							Red, Black			Power	2-Conductor 18 AWG 1.22 mm (7x26) BC	Unshielded	PVC 2.20 mm	PVC White	0.171	4.34



Banana Peel™ Access Control Composite Cables Jacketless

Composite • 4 CDR Beldfoil® 18 AWG 1.22 mm • 3 Pair Beldfoil® 22 AWG 0.8 mm • 2 CDR Beldfoil® 22 AWG 0.8 mm • 4 CDR Beldfoil® 22 AWG 0.8 mm • Banana Peel® Unjacketed, bonded central spline

De-scription	Part No.	UL NEC/ C(UL)CEC Type IEC	Standard lengths		Standard Unit Weight		Color code	Nominal OD		Component	Description	Shielding Material & nom. DCR	Jacket Material & Colors	Outer Jacket Material & Colors	Component OD	
			ft	m	Lbs.	kg		Inch	mm						Inch	mm
PVC Insulation (Pairs) • Foam Insulation (Coax) • Black PVC Jackets																
300V 75°C	558AFS	NEC: CMR CEC: CMG	500	152	58.4	26.5	White, Black, Red, Green	0.448	11.38	Lock Power	4-Conductor 18 AWG 1.22 mm (7x26) BC	Beldfoil®	PVC 2.89 mm	PVC Grey	0.202	5.13
							White & Green, Orange & Brown, Red & Black			Card Reader	3-Pair 22 AWG 0.76 mm (7x30) BC	Beldfoil®	PVC 1.25 mm	PVC Orange	0.233	5.92
							Black, Red			Door Contact	2-Conductor 22 AWG 0.76 mm (7x30) BC	Beldfoil®	PVC 2.00 mm	PVC White	0.140	3.56
							White, Black, Red, Green			Rex/ Spare	4-Conductor 22 AWG 0.76 mm (7x30) BC	Beldfoil®	PVC 2.00 mm	PVC Blue	0.161	4.09



TC = Tinned Copper • BC = Bare Copper

IBDN
Copper – OFC

Certified System Cable

IBDN for:

- Office Network
- Voice over Internet Protocol
- Terminals



IBDN – Single solution for excellent connections

Until recently, most structured cabling systems consisted of Local Area Networks (LAN) and/or were related to IT infrastructure, using transmission protocols such as Ethernet, enabling users to store and exchange information and perform basic functions including email. Therefore, the IT infrastructure of a building was usually kept separate from building management systems, for many reasons: building management may have been analog based, separate job functions for the people responsible for BMS and IT, and/or separate installers were responsible for the different systems. Increasingly, however, building management is being digitized. Today, structured cabling systems provide an easy, reliable and cost effective way to deploy BMS throughout a building.

Product Range and Applications

Belden IBDN offers complete end-to-end structured cabling solutions for fiber optic as well as Category 5e and Category 6 copper based systems. They include cables, connectivity modules, patch cords, in addition to cable management and accessories. Belden IBDN Category 5e and Category 6 systems offer a guaranteed industry-leading performance beyond the standard requirements. The fiber systems feature all fiber cable options as well as all of the currently popular connectivity options including LC, SC, and ST. Furthermore, all Belden IBDN systems are backed by a complete 25 year systems warranty and a lifetime applications warranty.

Belden has two ranges of IBDN cables: DataTwist® for effective modem communication and Beloptix® Fiber Optic cables. Belden cables provide the required bandwidth with headroom to spare and guaranteed optimum performance.

Keep in touch

Today's dynamic business environment requires us to send and receive information, quickly and efficiently. Effective communication depends on the quality of our sources and the speed of transmission as well as on our ability to respond fast – and frequently.

DataTwist® Category Cables

Office networks demand increasingly larger bandwidths to fulfil the needs of modern communication, whether it is exchanging e-mail, Voice over IP or simply surfing the web. Belden DataTwist® category copper cables deliver the maximum headroom on your data network. Our patented Bonded Pair® design maximises the performance of our category cables. The robust cable designs ensure Installable Performance™, with the same high performance on the reel as well as in the wall, regardless of whether you choose an unshielded or a shielded product.

Beloptix® Fiber Optic Cables

Belden Beloptix® Fiber Optic Cables support bandwidth demands that cannot be supported by copper systems, extreme noisy (EMI/RFI) environments, long distances between terminals or high security demands of the network, there are numerous reasons to decide to go for an optical fiber network. Belden offers a large range of Fiber Optic Cables all designed to the latest standards and using ISO/IEC 11801 type OM1 for 62,5/125 µm, type OM2 for 50/125 µm and type OS1 for single mode fibers.

Broadband Cable Drop



CATV cable for:

- Analog TV
- Digital TV
- Interactive TV
- Video
- Video-on-demand
- Internet



CATV cables – deliver the broadest range of applications

Belden produces CATV drop cables for broadband applications. To make sure that you do not miss that once-in-a-lifetime experience, Belden provides unparalleled access and outstanding performance.

Product Range and Applications

Duobond Plus®

Belden CATV drop cable is faster to install, because the outer tape shield is bonded to the jacket, it can be stripped easily in one step. Moreover, this construction gives Duobond Plus® a smaller bending radius, greater flexibility, and a 10 percent weight reduction, compared to Quad shielded coax. Better performance and easier installation make Duobond Plus® the coax cable of choice.

With growing digital services the demands for screening attenuation and transfer impedance of the CATV cables are now defined by European Standard EN50117-2. Class A products are recommended.



Sound and vision

Broadband is helping us to maximise performance. Crystal clear sound and vision give us new opportunities not just to see and hear – but to actually be part of the show, be in the middle of the performance and take part in the event.

Broadband Coax Drop Cable



De- scription	Part No.	UL NEC/ C(UL)CEC Type IEC	Standard lengths		Standard Unit Weight		Conductor (stranding) Diameter Nom. DCR	Nominal Core OD (Dielectric)		Shielding Material Nom. DCR	Nominal OD		Nom. Imp. (Ω)	Nom. Vel. of Prop.	Nominal Capacitance		Nominal Attenuation		
			ft	m	Lbs.	kg		Inch	mm		Inch	mm			pF/Ft.	pF/m	MHz	dB/ 100 Ft.	dB/ 100 m

H121C • Solid 0.8 mm Bare Copper • Copper-foil • 45% Bare Copper Braid

Gas-injected Polyethylene Insulation • White PVC Jacket																			
70°C	H121C00		B-328 1.640	B-100 500	6.0 29.8	2.7 13.5	1.0 mm Solid BC 59.0 Ω/km* 35.0 Ω/km**	0.138	3.50	Cu-foil + 45% BC Braid 24.0 Ω/km*** 4.1 mm	0.197	5.00	75	84%	16.2	53.0	5	0.5	1.7
																	50	1.6	5.3
																	100	2.3	7.5
																	230	3.5	11.4
																	400	4.6	15.1
																	800	6.6	21.7
																	862	6.9	22.6
																	1,000	7.5	24.5
																	1,350	8.8	28.7
																	1,750	10.1	33.0
																	2,150	11.3	36.9
																	2,400	12.0	39.2
Return loss at			5-470 MHz: ≥ 20 dB					Screening attenuation at 30-1,000 MHz: ≥ 80 dB											
			470-1,000 MHz: ≥ 18 dB					Transfer impedance at 5-30 MHz: ≤ 10.0 mΩ/m											
			1,000-2,000 MHz: ≥ 16 dB					Screening class: B											
			2,000-3,000 MHz: ≥ 15 dB					Pulling Tension: 40 N											

H125A • Solid 1.0 mm Bare Copper • Duofoil® • 70% Tinned Copper Braid

Gas-injected Polyethylene Insulation • Black Polyethylene Jacket																			
70°C	H125A08		1.640	500	45.2	20.5	1.0 mm Solid BC 41.0 Ω/km* 23.0 Ω/km**	0.189	4.80	Duofoil® + 70% TC Braid 18.0 Ω/km*** 5.5 mm	0.268	6.80	75	82%	16.5	54.0	5	0.5	1.8
																	50	1.4	4.7
																	100	2.0	6.5
																	230	3.0	9.8
																	400	3.9	12.9
																	800	5.7	18.6
																	862	5.9	19.3
																	1,000	6.4	20.9
																	1,350	7.5	24.6
																	1,750	8.7	28.4
																	2,150	9.7	31.9
																	2,400	10.4	34.0
Return loss at			5-470 MHz: ≥ 20 dB					Screening attenuation at 30-1,000 MHz: ≥ 85 dB											
			470-1,000 MHz: ≥ 18 dB					Transfer impedance at 5-30 MHz: ≤ 5.0 mΩ/m											
			1,000-2,000 MHz: ≥ 16 dB					Screening Class: A											
			2,000-3,000 MHz: ≥ 15 dB					Pulling Tension: 55 N											

H126D (RG6) • Solid 1.0 mm Bare Copper • Duobond Plus® • 50% Tinned Copper Braid

Gas-injected Polyethylene Insulation • White FRNC/LSNH Jacket																			
70°C	H126D03	IEC 332-3	B-328 1.640	B-100 500	10.8 54.0	4.9 24.5	1.0 mm Solid BC 37.0 Ω/km* 23.0 Ω/km**	0.180	4.57	Duobond Plus® + 50% TC Braid 14.0 Ω/km*** 5.4 mm	0.272	6.90	75	82%	16.5	54.0	5	0.5	1.8
																	50	1.4	4.7
																	100	2.0	6.5
																	230	3.0	9.8
																	400	4.0	13.0
																	800	5.7	18.7
																	862	5.9	19.5
																	1,000	6.4	21.1
																	1,350	7.6	24.9
																	1,750	8.8	28.8
																	2,150	9.8	32.3
																	2,400	10.5	34.4
Return loss at			5-470 MHz: ≥ 20 dB					Screening attenuation at 30-1,000 MHz: ≥ 100 dB											
			470-1,000 MHz: ≥ 18 dB					Transfer impedance at 5-30 MHz: ≤ 4.5 mΩ/m											
			1,000-2,000 MHz: ≥ 16 dB					Screening Class: A											
			2,000-3,000 MHz: ≥ 15 dB					Pulling Tension: 55 N											

* DC loop resistance • ** DC resistance inner conductor • *** DC resistance outer conductor • BC = Bare Copper • TC = Tinned Copper

Brilliance
Audio – Video



Audio/Video cables –
make the performance
perfect

We are in the midst of a digital revolution: the world is no longer analog – today most audio and video installations are wired for digital transmission. Belden understands the needs of both worlds and has the best performance cables for both systems.



Brilliance Audio/Video Cable for:

- Microphone
- Lighting, DMX
- Loudspeaker
- HD/SDI
- VGA on Large Screens
- Animation, Editing
- CAD



See the world

Today's technology allows us to witness many special events and forms of entertainment – without having to leave our familiar surroundings. Professional broadcasters from around the world use the latest equipment and the highest quality links to provide us with unique opportunities and experiences.

Product Range and
Applications

Banana Peel® Jacketless Cables

The Belden Banana Peel® jacketless cable was developed by Belden to save time and decrease labour costs. Banana Peel is a line of composite cables featuring a patent-pending design that affixes the individual cables to a center spline, eliminating the need for an overall jacket. By eliminating the overall bundle's jacket, a whole step in the termination process can be removed. In addition, the individual cable components are all instantly identifiable thanks to colour coding and print legends. Individual cables can be "peeled" of the centre spline and terminated. The elimination of the overall jacket reduces the diameter of the composite, so the cable's overall bend radius is improved and use of a smaller size conduit is possible.

HDTV RGB Video Cables

These high-frequency cables with optimum design features are ideally suited for higher frequency, longer distance transmissions. They have the ability to run more demanding applications such as high resolution VGA on large screens, HDTV, Hi-Res CAD, animation, editing and special effects. These cables are sweep tested to 3 GHz and their return loss levels are fully documented and guaranteed.

HD/SDI Video Cable

Many broadcasters, television production studios and post-production enterprises have adopted high definition, serial digital imaging (HD/SDI) as their format of choice because of its superior performance and other advantages. Precision digital video is processed in real time and is extremely stable, which reduces equipment adjustments and allows copies or reproductions to retain the same quality as the original. Moreover, signal degradation is virtually eliminated and noise immunity is greatly improved. Digital technology not only promises to improve picture and sound quality, but also paves the way for interactive on-demand TV and other digital services.

1080i format with 750 MHz/1.485 Gbps is not an end point. There are many emerging systems and formats that will require greater bandwidth, e.g. in the 1080p format means testing to a frequency of 4.5 GHz.

Brilliance® Audio Cables

Belden microphone cable – is used for connecting low level microphones or musical instruments. Key properties of microphone (MIC) cable are ruggedness, flexibility, flex life and interference immunity.

Speaker cables – are manufactured using oxygen-free copper conductors to deliver clear, precise sound. Easy installation features include the following: Brightly colored jackets for easy identification. Print legends that incorporate location information (Room 12345, Zone ABCDE). Cable jackets with ascending/descending sequential markings at two foot intervals. Extremely flexible, easy-to-pull constructions.

DMX512 cable – was designed with the idea that every lighting engineer, operator or designer could control systems with focus on moving light on one cable.

Home Cinema Audio Cable

High-Conductivity (Oxygen-free) Copper Speaker Cables



De- scription	Part No.	UL NEC/ C(UL)CEC Type IEC	Standard lengths		Standard Unit Weight		Conductor (stranding) Diameter Nom. DCR	Nominal Insulation OD		Shielding Material Nom. DCR	Nominal OD		Color code
			ft	m	Lbs.	kg		Inch	mm		Inch	mm	
12 AWG • Stranded (168x34) 2.4 mm Conductors • High-Conductivity (Oxygen-free) Bare Copper • Conductors Cabled													
Polyolefin Insulation • PVC Jacket (Grey, White and Black)													
	1311A	NEC CMR CL3R CEC CMG FT 4	500	152	80.9	36.7	2.41 mm 12 AWG (168x34) BC	0.018	0.46	Unshielded	0.352	8.94	Brightly colored jackets for easy identification.
			1.000	305	144.4	65.5							
2 CDR		For audio use only.		Print legends that incorporate location information (Room 12345, Zone ABCDE). Cable jackets with ascending/descending sequential markings at two foot intervals. Extremely flexible, easy-to-pull constructions (highly stranded conductors; PVC jackets)									
Direct Burial Sunlight resistant (White only)													

Microphone and Musical Instrument Cable – Two-Conductor, Low-Impedance Cables

De- scription	Part No.	UL NEC/ C(UL)CEC Type IEC	Standard lengths		Standard Unit Weight		Conductor (stranding) Diameter Nom. DCR	Nominal Insulation OD		Shielding Material Nom. DCR	Nominal OD		Nom. Imp. (Ω)	Nom. Vel. of Prop.	Nominal Capacitance		Color code	
			ft	m	Lbs.	kg		Inch	mm		Inch	mm			pF/Ft.	pF/m		
24 AWG • Stranded (28x0.1) 0.6 mm Bare Copper • Conductors Cabled with Fillers • 92% Bare Copper Spiral Serve Braid																		
Polyethylene Insulation • PVC Jacket (Red, Yellow, Green, Blue, Grey, White and Black)																		
	BE46349	100V RMS 60°C	328	100	9.3	4.2	0.6 mm 24 AWG (28x0.1) BC	0.059	1.50	Spiral Serve + 92% BC Braid	0.236	6.00	47	-	CDR/CDR CDR/SCR	18	60	Red, Blue
			1.640	500	46.3	21.0										34	110	
0.22 mm ²		Pulling Tension: 44 N																

HDTV/SDI Digital Coax

RGB Component Video Multicore Cables — Banana Peel™ Unjacketed Bundles

De- scription	Part No.	UL NEC/ C(UL)CEC Type IEC	Standard lengths		Standard Unit Weight		Conductor (stranding) Diameter Nom. DCR	Nominal Insulation OD		Shielding Material Nom. DCR	Nominal OD		Nom. Imp. (Ω)	Nom. Vel. of Prop.	Nominal Capacitance		Nominal Attenuation		
			ft	m	Lbs.	kg		Inch	mm		Inch	mm			pF/Ft.	pF/m	MHz	dB/ 100 Ft.	dB/ 100 m
25 AWG • Solid 0.5 mm Tinned Copper Conductors • Duobond® • 95% Tinned Copper Interlocked Serve Braid (Coaxes) • Banana Peel® Unjacketed, bonded to central spline																			
Foam HDPE Insulation • PVC Jackets in Colors																			
	HDTV/SDI Digital Video 75°C	NEC: CMR CEC: CMG					0.46 mm 25 AWG Solid TC 129.2 Ω/km* 111.5 Ω/km**	0.074	1.88	Duobond® + 95% TC Braid 17.7 Ω/km***	0.114	2.90	75	80%	17.0	55.8	5	1.2	3.8
					50	3.7											12.1		
					100	4.9											16.1		
					200	6.7											22.0		
					400	9.5											31.2		
					750	13.4											44.0		
		900	15.0	49.2															
		1.000	15.8	51.8															
Miniature 0.5/1.9		† Spools are one piece, but length may vary ±10% from length shown																	
1281S3 3 Coax		† 500	152	17.0	7.7					0.246		6.25				Pulling Tension: 400 N			
		† 1.000	305	31.0	14.1														
1281S4 4 Coax		† 500	152	23.5	10.7					0.275		6.99				Pulling Tension: 489 N			
		† 1.000	305	44.0	20.0														
1281S5 5 Coax		† 250	76	16.0	7.3					0.308		7.82				Pulling Tension: 578 N			
		† 500	152	28.5	12.9														
		† 1.000	305	55.0	24.9														
1281S6 6 Coax		† 500	152	33.5	15.2					0.342		8.69				Pulling Tension: 601 N			
		† 1.000	305	68.0	30.8														
100% Sweep tested. 5 MHz to 850 MHz. Patent Pending.										Nominal Delay: 4.068 ns/m									

Low Loss HDTV/SDI Digital Coax – 75 Ohm Coax

23 AWG • Solid 0.6 mm Bare Copper Conductor • Duofoil® • 95% Tinned Copper Braid

De- Description	Part No.	UL NEC/ C(UL)CEC Type IEC	Standard lengths		Standard Unit Weight		Conductor (stranding) Diameter Nom. DCR	Nominal Insulation OD		Shielding Material Nom. DCR	Nominal OD		Nom. Imp. (Ω)	Nom. Vel. of Prop.	Nominal Capacitance		Nominal Attenuation		
			ft	m	Lbs.	kg		Inch	mm		Inch	mm			pF/Ft.	pF/m	MHz	dB/ 100 Ft.	dB/ 100 m
Gas-injected Foam HDPE Insulation • PVC Jacket																			
	HDTV/SDI Digital Video 75°C	NEC: CMR CEC: CMG FT 4	500	152	9.0	4.1	0.57 mm 23 AWG Solid BC 90.8 Ω/km* 65.9 Ω/km**	0.102	2.59	Duofoil® + 95% TC Braid 24.9 Ω/km***	0.159	4.04	75	82%	16.3	53.5	1	0.4	1.3
					3.6	0.8											2.6		
					10	1.2											3.9		
					71.5	3.1											10.0		
					135	3.8											12.5		
					270	5.4											17.7		
		360	6.2	20.3															
		540	7.7	25.3															
		720	9.5	31.1															
		750	9.6	31.5															
		1.000	10.5	34.4															
		1.500	13.0	42.6															
		2.000	15.1	49.5															
		2.250	16.0	52.5															
		3.000	18.5	60.7															
		4.500	22.8	74.8															
Return loss at			5-1.600 MHz: ≥ 23 dB			Nominal Delay: 4.003 ns/m			100% Sweep tested. 5 MHz to 3 GHz.										
			1.601-4.0500 MHz: ≥ 21 dB			Pulling Tension: 160 N													
500 ft. put-up available in Black only.						Also available in multiples, bundled.													

* DC loop resistance • ** DC resistance inner conductor • *** DC resistance outer conductor • TC = Tinned Copper • BC = Bare Copper

Residential Cable Cresnet – Coax – Banana Peel



Residential cables – bring the world to your front door

The Belden residential range of products brings to the building future-proof capabilities for every application, supporting office (networking), home theatre, lighting, security lighting, security alarm (CCTV), intelligent equipment (vibration sensors, patch panels) and smart appliances – all through a 'single-pull' Banana Peel® cable.



Residential cable for:

- Audio/Video
- Conference Room Meeting Management
- Climate Control
- Energy Consumption Management
- Lighting
- Multimedia Control
- Security
- Window Shade Automation

Home sweet home

Our home is our castle. It can also be an office, an entertainment or activity centre and a place of learning, where we need to feel comfortable and safe. Where all strands of our increasingly more complex lives come together and where we control the environment.



Product Range and Applications

Banana Peel® Jacketless Cables

The Belden Banana Peel® jacketless cable was developed by Belden to save time and decrease labour costs. Banana Peel® is a line of composite cables featuring a patent-pending design that affixes the individual cables to a center spline, eliminating the need for an overall jacket. By eliminating the overall bundle's jacket, a whole step in the termination process can be removed. In addition, the individual cable components are all instantly identifiable thanks to colour coding and print legends. Individual cables can be "peeled" off the centre spline and terminated. The elimination of the overall jacket reduces the diameter of the composite, so the cable's overall bend radius is improved and use of a smaller size conduit is possible.

VideoTwist™ Low Skew UTP Cables for Video Transmission

Today's high resolution video displays require high performance cables that exhibit low signal skew and low return loss. Typically, these systems utilize bundled coax for the cable interconnect. Increasingly, however, system designers are turning to unshielded twisted pair (UTP) transmission equipment to distribute component RGB video due to UTP's economy over coax. The use of UTP cables also allows for the facility owner to use the same cable for premise LAN wiring – eliminating the need for two separate cables.

Belden Brilliance VideoTwist cables offer dramatically reduced installation costs, combined with the look, feel and familiarity of a standard category twisted pair cable.

Belden Brilliance VideoTwist™ is available as follows:

- > 7987R: Non-category, riser-rated, Nominal Skew 2.2ns/100m
- > 7988R: Category 5e, riser-rated, Nominal Skew 9.0ns/100m
- > 7989R: Category 6, riser-rated, Nominal Skew 10.0ns/100m

(typical Cat 5/6 cables: 25-45 ns/100m)

Brilliance® Multi-media Control cables

1502R is a new Multi-media Touch Panel Control cable for today's audio-video (A/V) and building management systems. When used in conjunction with a touch panel control, these cables facilitate the users' comfort, safety, security, convenience and personal entertainment.

Broad applications: A/V system, lighting system, window shade automation, climate control, energy consumption management, monitoring and control, security, conference room meeting management.

Composite Data, Audio, Video, Security and Control Cable

Banana Peel™ Jacketless Cables

Category 5e Bonded-Pairs

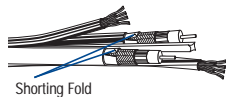


De-scription	Part No.	UL NEC/ C(UL)CEC Type IEC	Standard lengths		Standard Unit Weight		Color code	Nominal OD		Component	Description	Shielding Material & nom. DCR	Jacket Material & Colors	Outer Jacket Material & Colors	Component OD	
			ft	m	Lbs.	kg		Inch	mm						Inch	mm

Composite • (2) Cat 5e 4-Bonded-Pair UTP 24 AWG • (2) Series 6 Coax w/Duobond Plus® (1) 2-Fiber LANLite® • Banana Peel® Unjacketed, bonded to central spline

Polyolefin Insulation (Pairs) • Gas-injected FPE Insulation (Coax) • F-R PVC Jackets • No Overall Jacket

7978S	NEC	500	152	71.0	32.2		0.595	15.11	2xData	4-Pair UTP Bonded-Pairs 24 AWG 0.5 mm Solid BC	Unshielded	Polyolefin	F-R PVC (1) Blue (1) Green	0.200	5.08
	CMR OF CEC CMG OF FT4	1.000	305	142.0	64.4										
									2xCoax	Series 6 18 AWG 1.0 mm Solid BC	Duobond+ + 80% AL Braid + AL Foil w/shorting fold	Gas-Injected Foam Polyethylene	F-R PVC (1) Black (1) White	0.275	6.99
									2xFiber LANLite®	Gigabit Ethernet 62.5µ/125µ/900µ (core/clad/coating)		PVC (1) Blue (1) Orange Tight Bufferd	F-R PVC (1) Orange	0.175	4.45



Coax sweep tested to 2.25 GHz and jacket sequentially marked. Third party verified to TIA/EIA-568-B.2, Category 5e

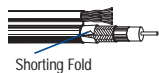
Color Code: see chart below

Siamese Cable

Composite • (1) Cat 5e 4-Bonded-Pair UTP 24 AWG • (1) Series 6 Coax with Duobond Plus® Bonded Tri-Shield

Polyolefin Insulation (Pairs) • Gas-injected FPE Insulation (Coax) • Overall Green F-R PVC Jackets

7911A	NEC	500	152	35.1	15.9		0.529	13.44	1xData	4-Pair UTP Bonded-Pairs 24 AWG 0.5 mm Solid BC	Unshielded	Polyolefin	F-R PVC (1) Green	0.200	5.08
	CMR OF CEC CMG FT4	1.000	305	60.0	27.2										
									1xCoax 18 AWG	Series 6 + 80% AL 1.0 mm Solid BC	Duobond+ Foam Braid + AL Foil	Gas-Injected (1) Green Polyethylene w/shorting fold	F-R PVC	0.275	6.99



Coax sweep tested to 2.25 GHz and jacket sequentially marked. Third party verified to TIA/EIA-568-B.2, Category 5e

Color Code: see chart below

Brilliance® VideoTwist™

Low Skew UTP Cables for Video Transmission

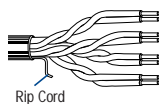
Category and Non-Category Styles

De-scription	Part No.	UL NEC/ C(UL)CEC Type IEC	Standard lengths		Standard Unit Weight		Conductor (stranding) Diameter Nom. DCR	Nominal Insulation OD		Shielding Material Nom. DCR	Nominal OD		Freq. MHz	Max. Atten. dB/100m	Min. PSUM			ACR dB/100m	Min. RL dB
			ft	m	Lbs.	kg		Inch	mm		Inch	mm			NEXT dB	ACR dB/100m	ELFEXT dB/100m		

Category 5e • 24 AWG Bonded-Pairs • Solid 0.5 mm Bare Copper • Skew 9.0 ns/100 m Nominal • Rip Cord

Polyolefin Insulation • Green PVC Jacket

7988R	NEC	U-1.000	U-305	22.0	10.0	0.51 mm	0.008	0.20	Bonded-Pair unshielded (UTP)	0.200	5.08	1	2.0	65.3	60.3	60.8	-	20.0
	CMR	U-1.640	U-500	36.2	16.4	24 AWG						4	4.1	53.3	49.2	48.7	-	23.0
	CEC					Solid BC						8	5.8	48.8	43.0	42.7	-	24.5
	CMR FT4											10	6.5	50.3	40.8	40.8	-	25.0
												16	8.2	44.3	36.0	36.7	-	25.0
												20	9.3	42.8	33.5	34.7	-	25.0
												25	10.4	41.3	30.9	32.8	-	24.3
												31.25	11.7	42.9	28.2	30.9	-	23.6
												62.5	17.0	38.4	18.4	20.8	-	21.5
												100	22.0	35.3	10.3	23.8	-	20.1
												155	28.1	29.5	2.0	16.9	-	15.8
												200	32.0	27.8	1.0	14.7	-	15.0
												250*	36.4	29.3	-	18.0	-	12.8
											350*	44.8	27.2	-	17.0	-	9.9	



4 Pairs

* Values provided for information only.

1-100 MHz Ohm 100 + 15%
100-200 MHz + 25%
200-250 MHz + 20%
250-350 MHz + 22%

Color Code

Pair No.	Color Combination
1	White/Blue stripe & Blue
2	White/Orange stripe & Orange
3	White/Green stripe & Green
4	Brown stripe & Brown

TC = Tinned copper • BC = Bare Copper

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