NEW PRODUCT

BULLETIN

NP 212

Brilliance® VideoTwist™ cables are the optimum solution for professional video/data installations — providing superior pure video, KVM (keyboard, video and mouse) and data transmissions over Unshielded Twisted Pairs (UTPs).

Belden® Brilliance® VideoTwist™ UTP Cables Offer Superior Low Skew Performance For Component Video Applications Plus They Adhere To Applicable TIA/EIA Category Standards

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.

To meet this new video/data UTP requirement, Belden has designed a new series of cables: Brilliance VideoTwist UTP cables. These cables offer the best low skew and return loss performance in the marketplace for superior video quality, plus they meet applicable TIA/EIA standards for data transmissions.

Component RGB and Skew

Component RGB video systems transmit each component of a video signal, i.e., red, green and blue, through separate cables. Such transmissions require that each signal arrive at the video display at the same time in order to produce a sharp and clear video image. UTP cables, by design, have different twist lengths for each pair which means that each pair has a different physical length. This difference in length causes a signal delay difference from pair to pair which is known as skew. The resulting skew limits the overall transmission distance of the UTP cable. The higher the skew, the shorter the distance.

For this reason, most UTP cables are limited to transmission distances of 328 to 600 feet, unless costly skew compensation equipment is utilized. Belden's new VideoTwist UTP cables can extend video transmission distances out to 1300 feet and beyond, depending on transmission equipment parameters.

Component Video and Return Loss

Cable return loss is another electrical component that can effect both video quality and transmission distance. Poor cable return loss can cause picture quality problems such as ghosting, poor pixel alignment and picture sharpness. VideoTwist's superior return loss performance minimizes these problems, ensuring the best video quality possible.

BRILLIANCE®

Brilliance® VideoTwist™ Applications Extend From The Traditional To State-of-the-Art

Brilliance VideoTwist Low Skew UTP cables perform reliably when used in component video displays, standard premise Ethernet installations and blade edge computing/KVM applications.

Blade edge computing and KVM are increasingly coming into play as companies centralize their CPU functioning into an air-conditioned, sound-proofed area/room. This allows them to equip their employees with blade edge computers and route KVM functions directly to their individual workstations. So, the employees' work areas are less cluttered, there is less data loss in the event of crashes by detecting instability and instantly transferring data to an adjacent hard disk with capacity. Blade edge computers, by their configuration and capacity to share and transfer data also facilitate good data backup management.

But running KVM functions reliably over long distances, while also maintaining a high quality video transmission, has proved to be a real challenge for cable manufacturers — a challenge that has been mostly unmet — until now. Belden® Brilliance VideoTwist cables are able to meet this challenge because they offer superior electrical characteristics. In fact, Styles 7988 and 7989 are ideally suited for blade edge computer/KVM applications.

Video Quality And Transmission Distance Comparisons

In comparison to typical video and data cables, Brilliance VideoTwist cables offer the following characteristics.

- Extended data transmission distances (exceeding 110m)
- Improved video quality
  - Better pixel alignment
  - Cleaner edges, a sharper picture
  - Reduced vertical shading bands
  - Reduced ghosting

The table (below) also provides a comparison between typical UTP cables, RGB coaxial cables and Brilliance VideoTwist cables relative to skew performance and transmission distance.

Brilliance VideoTwist Cables Offer Installable Performance®

A particular rule of thumb for UTP cables is that the cable's "physical properties equal its electrical properties." That is, to achieve good electricals UTP cable must be precisely designed and manufactured such that the conductor-to-conductor spacing is uniform and consistently maintained throughout the length of the cable.

Because UTP cables are stressed during a routine cable installation, unbonded-pair cables can experience a loss of uniform conductor-to-conductor spacing, or performance-robbing gaps can form between the two conductors of the pairs. This is not possible with Brilliance VideoTwist data-grade cables because they have Bonded-Pairs. In a patented Bonded-Pair construction, the conductors of each pair are bonded together, so they cannot separate. The result: Precise conductor-to-conductor spacing and precise impedance characteristics — even after the rigors of a typical installation. This is what Belden calls Installable Performance.

Applications

The Brilliance VideoTwist series of cables is comprised of three UTP cable types, available in both plenum- and riser-rated versions:

- Brilliance VideoTwist NanoSkew™ 7987R and 7987P utilize unbonded-pairs and provide the best low skew characteristics and the longest video transmission capabilities, making these cables ideal for high-performance, **video-only** transmissions.
- Brilliance VideoTwist 7988R and 7988P utilize Bonded-Pairs and can be used for component video, data and KVM applications. These cables provide high-resolution video, plus they meet all the data transmission requirements of the TIA/EIA Category 5e Standard.
- Brilliance VideoTwist 7989R and 7989P utilize Bonded-Pairs and provide the same exceptional video performance as Brilliance VideoTwist 7988 for component video, data and KVM, plus they meet all the data transmission requirements of the TIA/EIA Category 6 Standard.

Product Availability

Belden Brilliance VideoTwist is available as follows:

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

Skew and Transmission Distances Comparison

	Nonminal Skew (ns/100m)	Video Transmission Distance* (Ft.)
Typical UTP Data Cables	25 – 45	370 – 520
RGB Coax Cables	15.0	850
VideoTwist 7987	2.2	5900
VideoTwist 7988	9.0	1475
VideoTwist 7989	10.0	1300

*Based on broadcast standard of 40ns maximum total skew and the use of amplification equipment.

**Utilize patented Bonded-Pairs for Installable Performance.

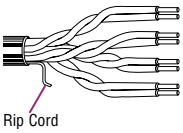
Brilliance® VideoTwist™

Low Skew UTP Cables for Video Transmission. Category and Non-Category Styles

NanoSkew™ • 24 AWG Twisted Pairs Solid Bare Copper • Skew 2.2ns/100m Nominal • Rip Cord

Non-Plenum • Polyolefin Insulation • Maroon PVC Jacket

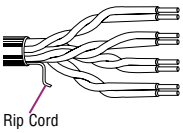
Description	Part No.	UL NEC/ C(UL) CEC Type	No. of Pairs	Standard Lengths Ft.	Standard Lengths m	Standard Unit Wt. Lbs.	Standard Unit Wt. kg	Insulation Thickness Inch	Insulation Thickness mm	Nominal OD Inch	Nominal OD mm	Max. DCR (Ω/100m)	Max. DCR Unbal. (%)	Max. Cap. Unbal. (pF/100m)	Freq. (MHz)	Max. Atten. (dB/100m)	Min. PSUM NEXT (dB)	Min. PSUM ACR (dB/100m)	Min. PSUM ELFEXT (dB/100m)	Input Imped. (Ω)	Min. RL (dB)
	7987R	NEC: CMR CEC: CMR FT4	4	U-1000 U-1640	U-304.8 U-500.0	22.0 36.0	10.0 16.4	.007	.178	.195	4.95	N/A	N/A	N/A	1	2.0	N/A	N/A	N/A	100±15	15.0
															4	4.1					
															8	5.8					
															10	6.5					
															16	8.2					
															20	9.3					
															25	10.4					
															31.25	11.7					
															62.5	17.0					
															100	22.0					
															155	28.1					
															200	32.0					
															250*	36.4					
															350*	44.8					



Rip Cord

Plenum • FEP Teflon® Insulation • Maroon Flamarrest® Jacket

	7987P	NEC: CMP CEC: CMP FT6	4	U-1000 U-1640	U-304.8 U-500.0	23.0 36.6	10.5 16.6	.007	.178	.200	5.08	9.0	3.0	N/A	(Same as 7987R above.)						

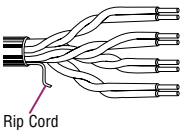


Rip Cord

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

Non-Plenum • Polyolefin Insulation • Green PVC Jacket

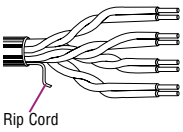
	7988R	NEC: CMR CEC: CMR FT4	4	U-1000 U-1640	U-304.8 U-500.0	22.0 36.0	10.0 16.4	.008	.20	.200	5.08	9.0	3.0	66.0	1	2.0	65.3	60.3	60.8	100±15	20.0
															4	4.1	53.3	49.2	48.7	100±15	23.0
															8	5.8	48.8	43.0	42.7	100±15	24.5
															10	6.5	50.3	40.8	40.8	100±15	25.0
															16	8.2	44.3	36.0	36.7	100±15	25.0
															20	9.3	42.8	33.5	34.7	100±15	25.0
															25	10.4	41.3	30.9	32.8	100±15	24.3
															31.25	11.7	42.9	28.2	30.9	100±15	23.6
															62.5	17.0	38.4	18.4	20.8	100±15	21.5
															100	22.0	35.3	10.3	23.8	100±15	20.1
															155	28.1	29.5	2.0	16.9	100±25	15.8
															200	32.0	27.8	1.0	14.7	100±25	15.0
															250*	36.4	29.3	—	18.0	100±20	12.8
															350*	44.8	27.2	—	17.0	100±22	9.9



Rip Cord

Plenum • FEP Teflon Insulation • Green PVC Jacket

	7988P	NEC: CMR CEC: CMR FT4	4	U-1000 U-1640	U-304.8 U-500.0	23.0 36.6	10.5 16.6	.008	.20	.200	5.08	9.0	3.0	66.0	(Same as 7988R above.)						



Rip Cord

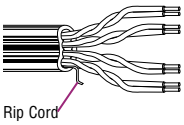
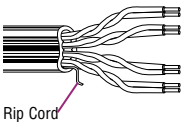
ACR = Attenuation Crosstalk Ratio • DCR = DC Resistance • ELFEXT = Equal Level Far-end Crosstalk • NEXT = Near-end Crosstalk • PSUM = Power Sum • RL = Return Loss • UTP = Unshielded Twisted Pair(s)

*Values provided for information only.

Teflon is a DuPont trademark.

Brilliance® VideoTwist™

Low Skew UTP Cables for Video Transmission. Category and Non-Category Styles

Description	Part No.	UL NEC/ C(UL) CEC Type	No. of Pairs	Standard Lengths		Standard Unit Wt.		Insulation Thickness		Nominal OD		Max. DCR (Ω/ 100m)	Max. DCR Unbal. (%)	Max. Cap. Unbal. (pF/ 100m)	Freq. (MHz)	Max. Atten. (dB/ 100m)	Min. PSUM NEXT (dB)	Min. PSUM ACR (dB/ 100m)	Min. PSUM ELFEXT (dB/ 100m)	Input Imped. (Ω)	Min. RL (dB)
				Ft.	m	Lbs.	kg	Inch	mm	Inch	mm										
Category 6 • 23 AWG Bonded-Pairs Solid Bare Copper • Skew 10.0ns/100m Nominal • Rip Cord																					
Non-Plenum • Polyolefin Insulation • Blue PVC Jacket																					
 Rip Cord	**7989R**	NEC: CMR CEC: CMR FT4	4	A-1000 1640	A-304.8 500.0	38.0 58.0	17.3 26.3	.009	.23	.365 x .165	9.27 x 4.19	9.0	3.0	49.2	1	2.0	72.3	70.3	64.8	100±15	20.0
															4	3.8	63.3	59.5	52.7	100±15	23.0
															8	5.3	58.8	53.4	46.7	100±15	24.5
															10	6.0	57.3	51.3	44.8	100±15	25.0
															16	7.6	54.3	46.7	40.7	100±15	25.0
															20	8.5	52.8	44.3	38.7	100±15	25.0
															25	9.5	51.3	41.8	36.8	100±15	24.3
															31.25	10.7	49.9	39.2	34.9	100±15	23.6
															62.5	15.4	45.4	30.0	28.8	100±15	21.5
															100	19.8	42.3	22.5	24.8	100±15	20.1
															155	25.2	39.5	14.3	20.9	100±22	18.8
															200	29.0	37.8	8.8	18.7	100±22	18.0
															250	32.8	36.3	3.5	16.8	100±32	17.3
															300*	35.2	35.2	>0	18.0	100±20	15.3
															350*	59.8	34.2	—	12.0	100±22	13.9
Plenum • FEP Teflon® Insulation • Blue Flamarrest® Jacket																					
 Rip Cord	**7989P**	NEC: CMP CEC: CMP FT6	4	A-1000 1640	A-304.8 500.0	41.0 61.0	18.6 27.7	.009	.23	.365 x .165	9.27 x 4.19	9.0	3.0	49.2	(Same as 7989R above.)						

ACR = Attenuation Crosstalk Ratio • DCR = DC Resistance • ELFEXT = Equal Level Far-end Crosstalk • NEXT = Near-end Crosstalk • PSUM = Power Sum • RL = Return Loss • UTP = Unshielded Twisted Pair(s)

*Values provided for information only.

Maximum Recommended Transmission Distance (without Using an Interface)

Resolution	VGA — 640 x 480			SVGA — 800 x 600			XGA — 1024 x 768			SXGA — 1280 x 1024			UXGA — 1600 x 1200			RGB	HDTV
Image Refresh Rate	60 Hz	75 Hz	85 Hz	60 Hz	75 Hz	85 Hz	60 Hz	75 Hz	85 Hz	60 Hz	75 Hz	85 Hz	60 Hz	75 Hz	85 Hz	—	60 Hz
Horizontal Scan Rate	31.5 KHz	39 KHz	45 KHz	38 KHz	50 KHz	54 KHz	48 KHz	60 KHz	68 KHz	64 KHz	80 KHz	91 KHz	75 KHz	94 KHz	107 KHz	—	—
Bandwidth Frequency	27.6 MHz	34.5 MHz	39.2 MHz	43.2 MHz	54 MHz	61.2 MHz	70.7 MHz	88.5 MHz	100 MHz	118 MHz	147.4 MHz	167 MHz	172.8 MHz	216 MHz	244.8 MHz	5 MHz	74.25 MHz
7987 dB/100 Ft. Loss @ Freq.	3.1	3.5	3.7	4.0	4.5	4.8	5.2	5.9	6.3	6.8	7.8	8.3	8.4	9.6	10.2	1.3	5.3
7988 dB/100 Ft. Loss @ Freq.	2.9	3.3	3.5	3.7	4.2	4.5	4.8	5.4	5.8	6.3	7.1	7.5	7.7	8.5	9.1	1.2	4.9
7989 dB/100 Ft. Loss @ Freq.	2.8	3.2	3.4	3.6	4.0	4.3	4.6	5.3	5.6	6.1	6.8	7.3	7.5	8.4	8.9	1.1	4.8
Part Number	Maximum Recommended Transmission Distance (Ft.) at -1 dB (3rd Harmonic)																
7987 Series	32	29	27	25	22	21	19	17	16	15	13	12	12	10	10	77	19
7988 Series	34	31	29	27	24	22	21	18	17	16	14	13	13	12	11	83	20
7989 Series	36	31	29	28	25	23	22	19	18	16	15	14	13	12	11	91	21
Part Number	Maximum Recommended Transmission Distance (Ft.) at -3 dB (3rd Harmonic)																
7987 Series	96	86	80	75	67	62	58	51	48	44	39	36	36	31	29	231	56
7988 Series	103	92	86	81	72	67	63	55	52	48	43	40	39	35	33	250	61
7989 Series	107	94	88	84	74	69	65	57	54	49	44	41	40	36	34	273	63
Part Number	Maximum Recommended Transmission Distance (Ft.) at -6 dB (3rd Harmonic)																
7987 Series	191	171	160	151	134	125	116	102	96	88	77	73	71	63	59	462	113
7988 Series	205	183	172	162	144	135	126	111	104	96	85	80	78	70	66	500	122
7989 Series	214	188	177	168	149	139	130	114	107	98	88	82	80	72	67	545	126

For More Information: **www.belden.com**

Belden Electronics Division Technical Support **1-800-BELDEN-1** or **1-800-BELDEN-3**

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