

CAT 6A Product Specifications and Submittal

Connect with the Black Box guaranteed-for-life CAT6A structured cabling channel solution.

- » Patch Cable
- » Bulk Cable
- » Patch Panels
- » Jacks



When it comes to a CAT6A channel, come to Black Box for the

Guaranteed for life | Guaranteed best prices | Guaranteed performance

Guaranteed for life.

Our CAT 6A channel components are guaranteed for life! Our unbeatable Warranty covers everything from manufacturing defects to accidental damage—including water and surge damage.



Plus, all Black Box® brand copper cables and most fibre cables and infrastructure components are also guaranteed for life.

Guaranteed best prices.

Our Best Price Guarantee means you can buy with confidence from Black Box. You probably won't find a lower price elsewhere. But if you do find another manufacturer's product at a lower price than the Black Box equivalent, provide us with a copy of the competitor's quote, and we'll try to beat it with our own Black Box solution. (Certain custom products are excluded.) For more details, call Customer Service on 0118 965 6150 or go to www.blackbox.co.uk



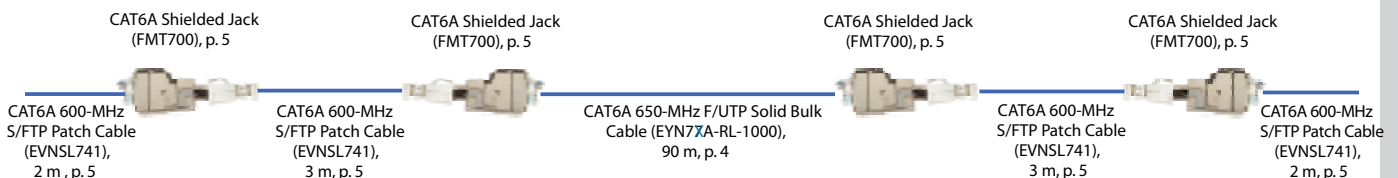
Guaranteed performance.

To ensure consistent top quality, Black Box cable is tested. Plus, because Black Box cable is guaranteed for life, you get application assurance. Your Black Box cable is guaranteed to perform to CAT6A specifications.



Black Box Explains

CAT6A four-point testing.



Black Box conducts its own four-point test on its CAT 6A shielded channel to ensure compliance with TIA 568-C.2 specifications.

best value anywhere —guaranteed.

e Black Box Explains

CAT6A.

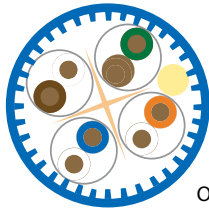
Augmented Category 6 (CAT6A) –Class E A was ratified in February 2008. This standard calls for 10-Gigabit Ethernet data transmission over a 4-pair copper cabling system up to 100 metres. CAT6A extends CAT6 electrical specifications from 250 MHz to 500 MHz. It introduces the ANEXT requirement. It also replaces the term Equal Level Far-End Crosstalk (ELFEXT) with Attenuation to Crosstalk Ratio, Far-End (ACRF) to mesh with ISO terminology. CAT6A provides improved insertion loss over CAT6. It is a good choice for noisy environments with lots of EMI. CAT6A is also well-suited for use with PoE+.

CAT6A UTP cable is significantly larger than CAT6 cable. It features larger conductors, usually 22 AWG, and is designed with more space between the pairs to minimise ANEXT. The outside diameter of CAT6A cable averages 0.29–0.35" compared to 0.21–0.24" for CAT6 cable. This reduces the number of cables you can fit in a conduit. For example, at a 40% fill ratio, you can run three CAT6A cables in a 3/4" conduit vs. five CAT6 cables.

CAT6 vs. CAT6A



CAT6
OD: 0.21"–0.24"



CAT6A UTP
OD: 0.29"–0.35"

10-GbE and CAT6A

CAT6A UTP

CAT6A UTP is constructed in a certain way to minimise crosstalk and ANEXT. This includes larger conductors, (23 AWG minimum), tighter twists, an internal separator between the pairs, and a thicker outer jacket designed to provide extra internal air space. These features increase the outer diameter of the cable, typically to 0.354 inches in diameter, up from 0.25 inches for CAT6 cable. This creates a greater distance between pairs in adjacent links, thus reducing the between-channel signal coupling. ANEXT can be improved by laying CAT 6A UTP cable loosely in

pathways and raceways with space between the cables. CAT6A UTP also needs to be tested for ANEXT—a complex and time-consuming process where it can take up to 50 minutes to test one link in a bundle of 24 CAT6A UTP cables.

CAT6A F/UTP

ANEXT can be greatly reduced, if not eliminated completely, by using shielded cables and equipment. CAT6A F/UTP cable does a much better job of eliminating ANEXT than CAT6A UTP and thus provides significantly more headroom (as much as 20 dB) for 10-GbE over copper. The foil shield acts as a barrier, preventing EMI/RFI from coupling onto the twisted pairs from other adjacent cables. It also reflects the noise from machinery, lights, motors, and other sources of EMI, as well as RFI from cell phones, wireless access points, and radios.

CAT6A UTP vs. F/UTP

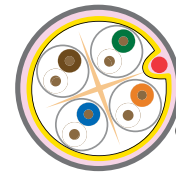
Although shielded cable has the reputation of being bigger, bulkier, and more difficult to handle and install than unshielded cable, this is not the case with CAT6A F/UTP cable. It is easier to handle, requires less space to maintain proper bend radius, and uses smaller conduits, cable trays, and pathways. CAT6A UTP has a larger outside diameter (0.354") than CAT6A F/UTP cable (0.265"–0.30"). This creates a great difference in the fill rate of cabling pathways. An increase in the outside diameter (O.D.) of 0.1", from 0.25" to 0.35" for example, represents a 21% increase in fill volume. In general, CAT6A F/UTP cable provides a minimum of 35% more fill capacity than CAT6A UTP cable.

Plus, innovations in connector technology have made terminating CAT6A F/UTP cable easier than terminating bulkier CAT6A UTP cable.

CAT6A UTP vs. CAT6A F/UTP



CAT6A UTP
OD: 0.354"



CAT6A F/UTP
OD: 0.290"

Buyer's Guide | Performance standards for channels

TIA/EIA-ISO/IEC	CAT5e—Class D	CAT6—Class E	CAT6A *—Class E _A
Frequency (MHz)	1–100	1–250	1–500
Insertion Loss (dB)	24.0	21.3—21.7	20.9
NEXT (dB)	30.1	39.9	39.9
PS-NEXT (dB)	27.1	37.1	37.1
ACR (dB)	6.1	18.6	18.6
PS-ACR (dB)	3.1	15.8	15.8
ACRF † (dB)	17.4	23.3	23.3—22.5
PS-ACRF ‡ (dB)	14.4	20.3	20.3—22.5
Return Loss (dB)	10.0	12.0	12.0
PS-ANEXT (dB)	—	—	60.0
PS-AACRF (dB)	—	—	37.0
Propagation Delay (ns)	548	548	548
Networks Supported	1000BASE-T	1000BASE-TX	10GBASE-T

* The TIA/EIA Category standards are nearly identical to the ISO/IEC Class standards. Where there is a difference, it's noted.

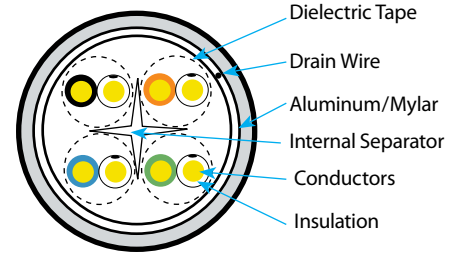
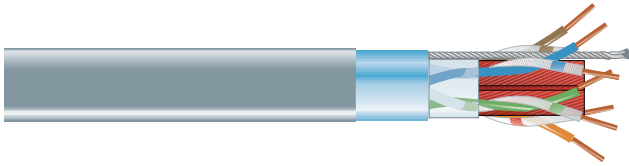
† CAT7 and CAT7a are not recognized by the TIA/EIA. They are listed in the ISO/IEC 11801 2nd Ed Standard.

‡ ACRF (Attenuation to Crosstalk Ratio Far End) was specified as EL-FEXT (Equal-Level Far-End CrossTalk) for CAT5e/Class D and CAT6/Class E.

§ PS-ACRF (Power Sum Attenuation to Crosstalk Ratio) was specified as PS-ELFEXT (Power Sum Equal-Level Far-End CrossTalk) for CAT5e—Class D and CAT6—Class E.

CAT6A Shielded Solution

CAT6A 650-MHz F/UTP Bulk Cable



The backbone of your shielded CAT6A channel.

- Use with shielded CAT6A components for a 10GBASE-T channel.
- Tested up to 650 MHz.

Construction facts.

- Foil shield construction virtually eliminates alien crosstalk.
- Internal separator, FEP insulation, dielectric tape, drain wire, aluminum/Mylar[®] tape.
- A center isolation member maintains pair separation for optimal ANEXT performance.
- Insulation: polyolefin.
- Both have a longitudinal rip cord for easy jacket opening.

Applications

- 10-GbE data centres:
 - Server to server.
 - Server to storage.
 - Server to switch.
- High-bandwidth network applications:
 - Distributed backbone.
 - Floor to floor backbone.
 - 10-GbE to the desktop.
 - Active zone cabling.
- PoE, PoE+:
 - WAP.
 - VoIP.
 - Security devices.
- High-bandwidth applications:
 - Video on-Demand (VoD).
 - Real-time security surveillance.
 - High-res 3D modeling.
 - On-line publishing.
 - Broadband video.

Compliance

- ANSI/TIA/EIA-568-C.2-Category 6A.
- UL 444, 1666.
- ISO/IEC 11801 Class E.
- ETL Verified.

- **WARRANTY** — Lifetime

Buyer's Guide | Electrical Specifications/100 m

MHz	NEXT (dB) Min.	PS-NEXT (dB) Min.	ACRF* (dB) Min.	PS-ACRF (dB) Min.	ACR (dB) Min.	PS-ACR (dB) Min.	Return Loss (dB) Min.
100	45.3	43.3	28.0	25.0	26.2	24.2	20.1
250	40.8	38.8	22.0	19.0	13.2	11.2	18.0
300	38.1	36.3	18.5	15.5	3.8	2.0	16.8
400	36.3	34.3	16.0	13.0	—	—	15.9
500	34.8	32.8	14.0	11.0	—	—	15.5

* Attenuation to Crosstalk Ratio Far End (ACRF) we previously referred to as Equal-Level Far-End Crosstalk (ELFEXT).

TECH SPECS

Bend Radius — 36 mm
 Capacitance Unbalance (Pair Ground) — 330 pF/100 m max.
 Characteristic Impedance — 100 ohm ± 10% (10–500 MHz)
 Conductor — 4 pairs, 23 AWG solid bare copper
 Construction — Internal separator, FEP insulation, dielectric tape, drain wire, aluminum/Mylar tape
 Delay Skew — 45 nS/100 max.
 DCR Unbalance — 3% max.
 Drain Wire — Tinned copper
 Insertion Loss (dB/100 m) — 18.6 @ 100 MHz; 43.8 @ 500 MHz; 50.6 @ 650 MHz
 Insulation — HDPE
 Jacket — Low-smoke, flame-retardant LS0H/PVC
 Mutual Capacitance — 56 pF/100 m max.
 Nominal Velocity of Propagation — 66%;
 Outside Diameter — 7.7 mm
 Propagation Delay Skew — 45 ns/100 m max.
 Return Loss (dB/100 m) — 21.1 @ 100 MHz; 16.5 @ 500 MHz; 15.7 @ 650 MHz
 Shield — Aluminum/Mylar
 Test Range — 1–650 MHz
 Weight — Not on reel: 19 kg

Item	Code
CAT 6A 650-MHz F/UTP Bulk Cable, 23 AWG, Solid, 4-Pair, 304.8-m, Blue PVC CMR	EYN770A-RL-1000

CAT 6A Patch Panel

- Features built-in rear cable management bar and an attached grounding wire.
- Large port numbers make ID easy.
- Shielded jacks (facing page) snap in from the rear.
- **WARRANTY** — Lifetime

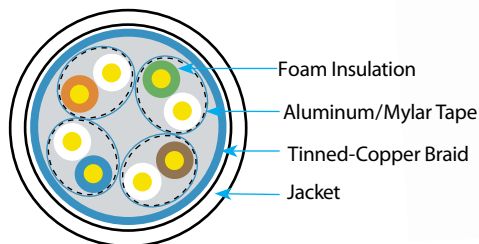
TECH SPECS

House — SPCC Metal
 Standards — UL[®] 1863; E191644
 Weight — 2.4 lb. (1.1 kg)



Item	Code
CAT 6A Patch Panel, 24-Port, Blank, 19"W, 1.75" H (1U) x 4.375"D	JPMT700 A
* Includes (1) panel; (1) ground wire; and cuphead screws (4) 4-24 and (4) 10-32.	

CAT6A 600-MHz S/FTP Patch Cable



Your data centre and desktop connection.

- Meets or exceeds all augmented CAT 6A TIA-568-C.2 requirements.
- Tested to 600MHz.
- Fully shielded construction virtually eliminates ANEXT.

Construction facts.

- Cable features four individually aluminum/Mylar[®] wrapped (metal side out) twisted pairs, an overall tinned-copper braided shield, foamed PE insulation, and an FRPVC jacket.
- 26 AWG stranded copper conductors.
- Specially designed RJ-45 shielded plug.
- Plug body features metal shield with built-in strain relief on the back and a plastic tab.
- Plug body is designed to make contact with the braided shield.
- Removable, snagless boot provides tab protection. (Removal is not recommended.)

Applications

- 10-Gigabit Ethernet.
- High-bandwidth network applications.
- High-performance digital video applications.

Compliance

- TIA/EIA-568-C.2 CAT6A.
- ISO/IEC 11801.
- IEC 61156-6.
- E196163-C.
- UL 444 CM.
- **WARRANTY** — Lifetime



Buyer's Guide | Electrical Specifications at 100 m

MHz	Attenuation (dB) Min.	NEXT (dB) Min.	PS-NEXT (dB) Min.	ELFEXT (dB) Min.	PS-ELFEXT (dB) Min.	Return Loss (dB) Min.
100	28.5	72	69	54	51	19
200	41.2	68	65	48	45	16.4
250	46.5	66	63	46	43	15.6
300	51.3	65	62	44	41	15.6
600	75.1	61	58	38	35	15.6

TECH SPECS

- Bend Radius — ≥ 5 times O.D.
- Capacitance Unbalance — Pair to ground: 330 pF/100 m at 1 kHz (max.)
- DC Resistance — 14.5 watts/100 m at 68° F (+20° C)
- Delay Skew — 25 ns
- Diameter (Outside) — 0.224" (0.57 cm)
- Insulation Resistance — 500 V (min.); 150 MW/km at +68° F (20° C)
- Mutual Capacitance — 4.6 pF/100 m at 1 kHz
- Nominal Velocity of Propagation — 78%
- Pinning — Straight-through T568B
- Resistance Unbalance — 2% at +68° F (+20° C) (max.)
- Temperature Ratings — Operating: -4° to +140° F (-20° to +60° C); Installation: +32° F to +122° F (0° to +50° C)

Item	Code
CAT6A S/FTP Patch Cable, 26 AWG, Stranded, PVC, Blue	
3-ft. (0.9-m.)	EVNSL741-000 3
6-ft. (1.8-m.)	EVNSL741-000 6
10-ft. (3.0-m.)	EVNSL741-001 0
15-ft. (4.5-m.)	EVNSL741-001 5

CAT 6A Shielded Jack

- Meets and exceeds CAT6A requirements.
- Fully shielded to protect against EMI and alien crosstalk.
- Accepts shielded or foiled 22–24 AWG cable with a diameter of 0.196"–0.354".
- To terminate, slip the cable through the stuffer cap. Lace the wires. Press onto the jack body. Close the outer butterfly doors. Secure with the cable tie.
- No punchdown tool needed.
- Feature RJ-45 to IDC terminal block connectors.
- Fits CAT6A Patch Panel (facing page).
- **WARRANTY** — Lifetime

TECH SPECS

- Housing and Stuffer Cap — High-impact polycarbonate (PC resin), UL [®] 94V-0
- Insulation Diameter — 0.032" (0.8 mm) to 0.055" (1.4 mm)
- Overall Shield — Zinc alloy
- Pinning — Straight-through T568B
- Port — RJ-45 female



Item	Code
CAT6A Shielded Jack, Universal Wiring, 4-Pair	FMT700
* Includes the jack body, (1) stuffer cap, and (1) cable tie.	

CAT6A Unshielded Solution

10-Gigabit CAT6A Solid Bulk Cable (UTP)

The backbone of your unshielded CAT6A channel.

- Use with unshielded CAT6A components for a 10GBASE-T channel.
- Exceeds TIA-568-C.2 Category 6 A standards.
- Provides component-compliant ANEXT performance.
- Delivers 10-GbE headroom beyond 750 MHz.

Construction facts.

- Conductor: 23 AWG, solid-bare copper.
- Jacket: CMR: PVC; CMP: low-smoke PVC.
- Insulation: PVC: polyolefin.
- Internal separator for optimal ANEXT performance.
- Interior wall of jacket features a ribbed pattern to control ANEXT.
- Insulation: PVC: polyolefin.
- Has a longitudinal rip cord for easy jacket opening.
- Easy-pull cable features reverse sequential numbering.

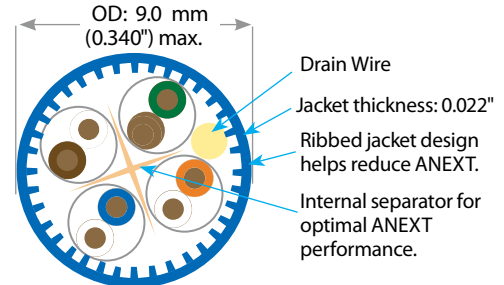
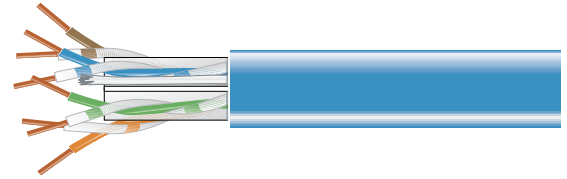
Applications

- 10-GbE data centres:
 - Server to server.
 - Server to storage.
 - Server to switch.
- High-bandwidth network applications:
 - Distributed backbone.
 - Floor-to-floor backbone.
 - 10-GbE to the desktop.
 - Active zone cabling.
- PoE, PoE+:
 - WAP.
 - VoIP.
 - Security devices.
- High-bandwidth applications:
 - Video-onDemand (VoD).
 - Real-time security surveillance.
 - High-res 3D modeling.
 - On-line publishing.
 - Broadband video.

Compliance

- ANSI/TIA/EIA-568-C.2 Category 6A.
- IEEE 802.3af (PoE) and IEEE 802.3at (PoE+).
- Exceeds 802.3an IEEE 10GBASE-T link segment.
- NEC Article 800 compliant.
- UL verified Category 6 A.
- Third-party verified.

- **WARRANTY** — Lifetime



Buyer's Guide | Electrical Specifications/100 m

MHz	Insertion Loss (dB) Min.	NEXT (dB) Min.	PS-NEXT (dB) Min.	ACRF* (dB) Min.	PS-ACRF (dB) Min.	Return Loss (dB) Min.	Delay (ns) Max.
100	18.4	59.0	59.1	43.1	41.8	32.0	538
200	26.7	54.1	55.3	38.8	35.2	29.4	537
300	33.3	51.5	50.0	34.6	31.4	27.5	536
400	39.4	45.8	45.4	32.4	28.5	25.4	536
500	44.8	43.2	42.8	29.3	27.3	24.1	536

* Attenuation to Crosstalk Ratio Far End (ACRF) we previously referred to as Equal-Level Far-End Crosstalk (ELFEXT).

TECH SPECS

Capacitance Unbalance (Max) — 330 pF/100 m max.
 Conductor — 4 pairs, 23 AWG solid bare copper
 Conductor Resistance — 9.38 ohms/100 m at 68° F (20°C)
 Characteristic Impedance — 100 MHz: 100 ± 15 ohms; 250 MHz: 100 ± 22 ohms; 500 MHz: 100 ± 32 ohms
 Delay Skew — 45 ns/100 m max.
 Insulation — PVC: polyolefin (PE)
 Jacket — PVC or Low-smoke, flame-retardant LS0H/PVC
 Mutual Capacitance — 5.6 nF/100 at 1 KHz
 Nominal Velocity of Propagation — 68%
 Outside Diameter — 0.355" (9.01 mm)
 Resistance Unbalanced — 3% max.
 Temperature Ratings — Operating: -4° to +122° F (-20° to +50° C); Storage: -40° to +140° F (-40° to +60° C); Installation: +32° F to +122° F (0° to +50° C)

Item	Blue	White	Yellow	Gray	Green
10-Gigabit CAT6A Solid Bulk Cable (UTP), 4-Pair, 304.8-m PVC, Riser	EYN10G10A-1000	EYN10G11A-1000	EYN10G12A-1000	EYN10G13A-1000	EYN10G14A-1000

10-Gigabit CAT6A Patch Cable (UTP)



Your data centre and desktop connection.

- 10-Gigabit Ethernet (10-GbE) qualified.
- Maximum bandwidth exceeds 625MHz.
- Category 6A ANEXT component compliant.
- Exceeds 10GBASE-T link segment requirements.
- Use for analogue and digital (VoIP) voice and audio/video.

Construction facts.

- Conductor: 26 AWG, stranded copper.
- Snagless hood design.
- Internal separator improves ANEXT.
- Jacket: PVC.
- Insulation: PVC: polyolefin.

10-Gigabit CAT6A Patch Panels



JPM10G24:
top: front view;
bottom: rear view

- Has controlled Alien Crosstalk (ANEXT).
- PoE rated to four times the standard.
- Make fast, one-punch terminations.
- RJ-45 female to 110 punchdown.
- Accepts 22–26 AWG solid wire.
- Uses standard 1/2" x 1/4" labels.
- Sealed adapter protects circuit board from damage.

Construction facts.

- Beryllium copper nose contacts have 50-microinch gold plating.
- 14-gauge rolled-edge steel construction.

Compliance

- ANSI/TIA/EIA-568-C.2 Category 6 A.
- IEEE 802.3af (PoE) and IEEE 802.3at (PoE+).

10-Gigabit CAT6A Jacks

- Support 10-Gigabit Ethernet applications to 100-m.
- Usable bandwidth beyond 625 MHz.
- Category 6A ANEXT component compliant.
- Works with 22 and 24 AWG cable.
- Terminate with a 110 punchdown tool or the stuffer cap.

Construction facts.

- RJ-45 female to 110 punchdown.
- Beryllium copper nose contacts have 50-microinch gold plating.
- Phosphor IDC bronze contacts.

Compliance

- ANSI/TIA/EIA-568-C.2 Category 6A.
- IEEE 802.3af (PoE) and IEEE 802.3at (PoE+).

Cable Type — 4-pair UTP
Construction — 26 AWG stranded
Insulation — Flame-retardant polyolefin
Jacket — PVC
Plug — Body: Polycarbonate UL* 94V-0; Boot: PVC
Plating — 50-microinch gold with 100-microinch underplating

Compliance.

- ANSI/TIA/EIA-568-C.2 Category 6A.
- IEEE 802.3af (PoE) and IEEE 802.3at (PoE+).
- Exceeds IEEE 802.3an 10GBASE-T link segment requirements.
- ISO/IEC 11801 2nd ed. Class E compliant.

- **WARRANTY** — Lifetime

Item	Code
10-Gigabit CAT 6A Patch Cable (UTP), 26 AWG, Stranded	
3-ft. (0.9-m)	EVNSL6A-00 3
5-ft. (1.5-m)	EVNSL6A-005
7-ft. (2.1-m)	EVNSL6A-00 7
10-ft. (3.0-m)	EVNSL6A-01 0
15-ft. (4.5-m)	EVNSL6A-01 5
20-ft. (6.0-m)	EVNSL6A-020

- ISO/IEC 11801 2nd ed. Class E compliant.
- IEC-603-7.
- UL 1862.
- FCC part 68.5, subpart F

- **WARRANTY** — Lifetime

Item	Code
10-Gigabit CAT6A Patch Panels, 19", Universal Wiring	
24-Port, 1.75 " H, 1U	JPM10G2 4
48-Port, 3.5 " H, 2U	JPM10G4 8
* Includes (1) patch panel, a universal wiring insert, clear plastic label holders, and hardware.	



- **WARRANTY** — Lifetime

Item	Code
10-Gigabit CAT 6A Jacks	
Black	FM10G2 0
Blue	FM10G2 1
Grey	FM10G2 2
Off White	FM10G2 3
Orange	FM10G2 4
White	FM10G2 5

Comprehensive Cabling and Infrastructure Solutions

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your next project under budget
and ahead of schedule.



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