USER MANUAL

DKM SERIES (CROSS) REPEATERS

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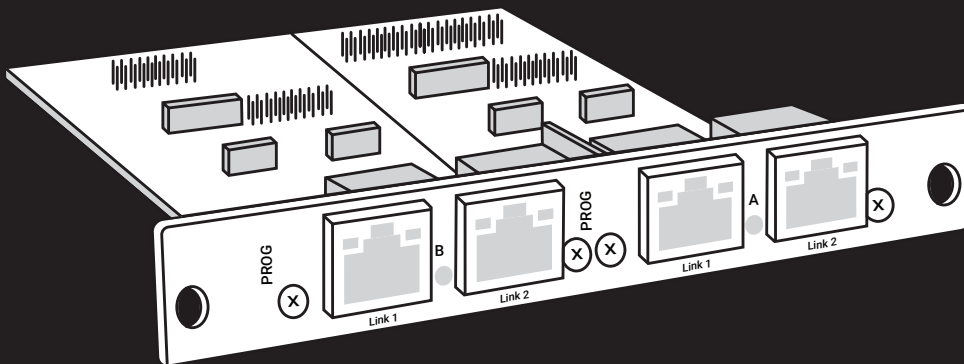
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SAFETY INSTRUCTIONS

To ensure reliable and safe long-term operation of your Repeater please note the following guidelines.

INSTALLATION

- Only use in dry, indoor environments.
- The Repeater and the power supply units can get warm. Do not install components in an enclosed space without any airflow.
- Do not place the power supply directly on top of the device.
- Do not obscure ventilation holes.
- Only use power supplies originally supplied with the product or manufacturer-approved replacements. Do not use a power supply if it appears to be defective or has a damaged chassis.
- Connect all power supplies to grounded outlets. In each case, ensure that the ground connection is maintained from the outlet socket through to the power supply's AC power input.
- Do not connect the link interface to any other equipment, particularly network or telecommunications equipment.
- Take any required ESD precautions.

NOTE: To disconnect the device completely from the electric circuit, all power cables have to be removed.

REPAIR

- Do not attempt to open or repair a power supply unit.
- Do not attempt to open or repair the Repeater. There are no user serviceable parts inside.
- Please contact Black Box Technical Support at 877-877-2269 or info@blackbox.com if there is a fault.

CHAPTER 1: SPECIFICATIONS

1.1 INTERFACES

1.1.1 RJ-45 (INTERCONNECT)

For CATx communications, the repeater requires a 1000BASE-T connection.

Connector wiring must comply with EIA/TIA-568-B (1000BASE-T), with RJ-45 connectors at both ends. All four cable wire pairs are used.

1.1.2 FIBER SFP TYPE LC (INTERCONNECT)

The communication of fiber devices is performed via Gigabit SFPs that have to be connected to suitable fibers fitted with type LC connectors.

NOTE: The correct function of the device can only be guaranteed with SFPs provided by Black Box.

CAUTION: SFP modules can be damaged by electrostatic discharge (ESD). When handling, take care not to damage devices.

1.2 INTERCONNECT CABLE

1.2.1 CATX

NOTE: A point-to-point connection is required. Operation with several patch fields is possible. Routing over an active network component, such as an Ethernet hub, router, or switch, is not allowed.

- Avoid routing CATx cables along power cables.
- If the site has 3-phase AC power, make sure that the CPU module and CON module are on the same phase.

CAUTION: To maintain regulatory EMC compliance, you must use correctly installed shielded CATx cable throughout the interconnection link. Also, all CATx cables need to have ferrites on both cable ends close to the device.

TYPE OF INTERCONNECT CABLE
The (Cross) Repeater requires interconnect cabling specified for Gigabit Ethernet (1000BASE-T). The use of solid-core (24 AWG), shielded, CAT5e (or better) is recommended.

TABLE 1-1. CATX INTERCONNECT CABLE

CABLE TYPE	DESCRIPTION
CATx solid-core cable 24 AWG	S/UTP (CAT5e) cable according to EIA/TIA-568-B. Four pairs of 24 AWG wires. Connection according to EIA/TIA-568-B (1000BASE-T).
CATx patch cable 26/8 AWG	S/UTP (CAT5e) cable according to EIA/TIA-568-B. Four pairs of 26/8 AWG wires. Connection according to EIA/TIA-568-B (1000BASE-T).

NOTE: You can use flexible cables (patch cables) type 26/8 AWG; however, but you'll only get half the maximum possible extension distance (Table 1-2).

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TABLE 1-2. MAXIMUM ACCEPTABLE CATX CABLE LENGTH

CABLE TYPE	MAXIMUM LENGTH
Solid-conductor 24 AWG CATx cable	400 feet (140 m)
Stranded-conductor 26/28 or 27/28 AWG or CATx cable	200 feet (70 m)

1.2.2 FIBER

NOTE: A point-to-point connection is necessary. Operation with multiple patch panels is allowed. Routing over active network components, such as Ethernet hubs, switches, or routers, is not allowed.

TABLE 1-3. FIBER INTERCONNECT CABLE

CABLE TYPE	DESCRIPTION
Single-mode fiber 9 µm	• Duplex. • Indoor patch cable (EFN092)
Multimode fiber 50 µm	• Duplex. • Indoor patch cable (EFN6020)
Multimode fiber 62 µm	• Duplex. • Indoor patch cable (EFN116-LCLC)

TABLE 1-4. MAXIMUM ACCEPTABLE FIBER CABLE LENGTH

CABLE TYPE	MAXIMUM LENGTH
Single-mode fiber 9 µm	32,800 feet (10,000 m)
Multimode fiber 50 µm (OM3)	3280 feet (1000 m)
Multimode fiber 50 µm	1300 feet (400 m)
Multimode fiber 62.5 µm	650 feet (200 m)

NOTE: If you use single-mode SFPs with multimode fibers, you can normally double the maximum acceptable cable length.

CONNECTOR TYPE
The ACX1M-CS, ACX1M-SS, ACX1M-2C2S, and ACX1M-2S2S have fiber LC connectors.

1.3 CONNECTOR PINOUTS

TABLE 1-5. MINI USB TYPE B CONNECTOR PINOUT

PICTURE	PIN	SIGNAL	COLOR
1....5	1	VCC (+5 VDC)	Red
	2	Data -	White
	3	Data +	Green
	4	Not connected	—
	5	Ground	Black

TABLE 1-6. RJ-45 CONNECTOR PINOUT

PICTURE	PIN	SIGNAL	PIN	SIGNAL
8........1	1	D1+	5	D3-
	2	D1-	6	D2-
	3	D2+	7	D4+
	4	D3+	8	D4-

TABLE 1-7. FIBER SFP TYPE LC CONNECTOR PINOUT

PICTURE	PIN	SIGNAL
1 2	1	Data OUT
	2	Data IN

TABLE 1-8. CONNECTORS ON THE REPEATERS/CROSS REPEATERS

PART NUMBER	CONNECTORS
ACX1M-CC	(2) RJ-45 interconnect, (1) Mini USB (programming port)
ACX1M-SS	(2) Fiber LC, (1) Mini USB (programming port)
ACX1M-CS	(1) RJ-45, (1) Fiber LC, (1) Mini USB (programming port)
ACX1M-2C2C	(4) RJ-45, (2) Mini USB (programming ports)
ACX1M-2S2S	(4) Fiber LC, (2) Mini USB (programming ports);
ACX1M-2C2S	(2) RJ-45, (2) Fiber LC, (2) Mini USB (programming ports)

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1.4 POWER SUPPLY

TABLE 1-9. AC POWER SUPPLY

PART NUMBER	MAX. CURRENT	MAX. VOLTAGE	FREQUENCY
ACXMODH2R-P-R2	700 mA max.	100 to 240 VAC	50/60 Hz
ACXMODH6R-R2	1400 mA max	100 to 240 VAC	47 to 63 Hz
ACXMODH6BPAC-R2	800 mA max.	100 to 240 VAC	50/60 Hz
ACXMODH6FPAC-R2	800 mA max.	100 to 240 VAC	50/60 Hz
ACXMODH21R	4000 mA max.	(2) 100 to 240 VAC	50/60 Hz

TABLE 1-10. DC POWER SUPPLY

PART NUMBER	MAX. CURRENT	MAX. VOLTAGE	FREQUENCY
ACXMODH2-R2	3000 mA max.	5 VDC	50/60 Hz
ACXMODH2R-R2	3000 mA max	5 VDC	47 to 63 Hz
ACXMODH2R-P-R2	5000 mA max.	5 VDC	50/60 Hz
ACXMODH4-R2	5000 mA max.	5 VDC	50/60 Hz
ACXMODH4R-R2	5000 mA max.	5 VDC	50/60 Hz
ACXMODH6R-R2	8000 mA max.	5 VDC	50/60 Hz

NOTE: The power requirement per (cross) repeater is 300 mA max.

1.5 ENVIRONMENTAL CONDITIONS

TABLE 1-11. ENVIRONMENTAL SPECIFICATIONS

SPECIFICATION	DESCRIPTION
Operating Temperature	41 to 113° F (5 to 45°C)
Storage Temperature	-13 to +140° F (-25 to +60° C)
Relative Humidity	Max.80%, noncondensing

1.6 DIMENSIONS

TABLE 1-12. DKM FX MODULAR REPEATERS

ITEM	DIMENSIONS
Repeater/Cross Repeater	1.7"H x 5.81"W x 5.75"D (4.3 x 14.8 x 14.6 cm)

TABLE 1-13. DEVICES IN THE 2-SLOT CHASSIS (ACXMODH2-R2)

ITEM	DIMENSIONS
CPU Unit/CON Unit	1.7"H x 5.8"W x 5.7"D (4.1 x 14.7 x 14.5 cm)
Shipping Box	6.5"H x 5.5"W x 8.3"H (16.5 x 14 x 21 cm)

TABLE 1-14. DEVICES IN THE 2-SLOT CHASSIS (ACXMODH2R-R2, ACXMODH2R-P-R2)

ITEM	DIMENSIONS
CPU Unit/CON Unit	1.7"H x 5.8"W x 8.3"D (4.1 x 14.7 x 22.1 cm)
Shipping Box	4.5"H x 14.4"W x 21.7"D (11.5 x 36.5 x 55 cm)

TABLE 1-15. DEVICES IN THE 4-SLOT CHASSIS (ACXMODH4-R2, ACXMODH4R-R2)

ITEM	DIMENSIONS
CPU Unit/CON Unit	1.7"H x 5.8"W x 11.5"D (4.1 x 14.7 x 29.3 cm)
Shipping Box	4.5"H x 14.4"W x 21.7"D (11.5 x 36.5 x 55 cm)

TABLE 1-16. DEVICES IN THE 6-SLOT CHASSIS (ACXMODH6R-R2)

ITEM	DIMENSIONS
CPU Unit/CON Unit	1.7"H x 5.8"W x 17.4"D (4.1 x 14.7 x 44.2 cm)
Shipping Box	4.5"H x 14.4"W x 29.9"D (11.5 x 36.5 x 76 cm)

TABLE 1-17. DEVICES IN THE 6-SLOT CHASSIS (ACXMODH6BPAC-R2, ACXMOD6FPAC-R2)

ITEM	DIMENSIONS
CPU Unit/CON Unit	1.7"H x 9.8"W x 17.4"D (4.1 x 25 x 44.2 cm)
Shipping Box	6.1"H x 14.6"W x 21.7"D (15.5 x 37.2 x 55 cm)

TABLE 1-18. DEVICES IN THE 21-SLOT CHASSIS (ACXMODH21R)

ITEM	DIMENSIONS
CPU Unit/CON Unit	6.9"H x 18.2"W x 19"D (17.6 x 46.2 x 48.2 cm)
Shipping Box	14.5"H x 22.6"W x 25.4"D (36.8 x 57.4 x 64.5 cm)

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1.7 SHIPPING WEIGHT

TABLE 1-19. DKM FX MODULAR REPEATERS

ITEM	DIMENSIONS
Repeater/Cross Repeater	0.6 lb. (0.3 kg)
Shipping Box	4.9 lb. (2.2 kg)

TABLE 1-20. DEVICES IN THE 2-SLOT CHASSIS (ACXMODH2-R2)

ITEM	SHIPPING WEIGHT
CPU Unit/CON Unit	0.9 lb. (0.4 kg)
Shipping Box	4.9 lb. (2.2 kg)

TABLE 1-21. DEVICES IN THE 2-SLOT CHASSIS (ACXMODH2R-R2, ACXMODH2R-P-R2)

ITEM	SHIPPING WEIGHT
CPU Unit/CON Unit	1.8 lb. (0.8 kg)
Shipping Box	5.7 lb. (2.6 kg)

TABLE 1-22. DEVICES IN THE 4-SLOT CHASSIS (ACXMODH4-R2, ACXMODH4R-R2)

ITEM	SHIPPING WEIGHT
CPU Unit/CON Unit	2.0 lb. (0.9 kg)
Shipping Box	7.5 lb. (3.4 kg)

TABLE 1-23. DEVICES IN THE 6-SLOT CHASSIS (ACXMODH6R-R2)

ITEM	SHIPPING WEIGHT
CPU Unit/CON Unit	3.1 lb. (1.4 kg)
Shipping Box	10.1 lb. (4.6 kg)

TABLE 1-24. DEVICES IN THE 6-SLOT CHASSIS (ACXMODH6BPAC-R2, ACXMOD6FPAC-R2)

ITEM	SHIPPING WEIGHT
CPU Unit/CON Unit	5.5 lb. (2.5 kg)
Shipping Box	7.7 lb. (3.5 kg)

TABLE 1-25. DEVICES IN THE 21-SLOT CHASSIS (ACXMODH21R)

ITEM	SHIPPING WEIGHT
CPU Unit/CON Unit	22.1 lb. (10.0 kg)
Shipping Box	32.0 lb. (14.5 kg)

2.1 APPLICATION

The (Cross) Repeater is used to double the maximum cabling distance between a KVM extender CON or CPU Unit or even a KVM matrix. The device can also be used for media conversion from CATx to fiber or vice versa.

The device is available as a pure CATx or fiber version (repeater) and as a hybrid version of CATx and fiber (cross repeater) for an additional electrical/optical signal conversion.

2.2 SYSTEM OVERVIEW

The (Cross) Repeater consists of at least one module depending on the application.

The device is connected between a KVM extender CON and CPU Unit via the interconnect cable or can be alternatively connected between a KVM extender unit and a KVM matrix.

The (Cross) Repeater communicates with both the KVM extenders and a KVM-Matrix via the interconnect cables.
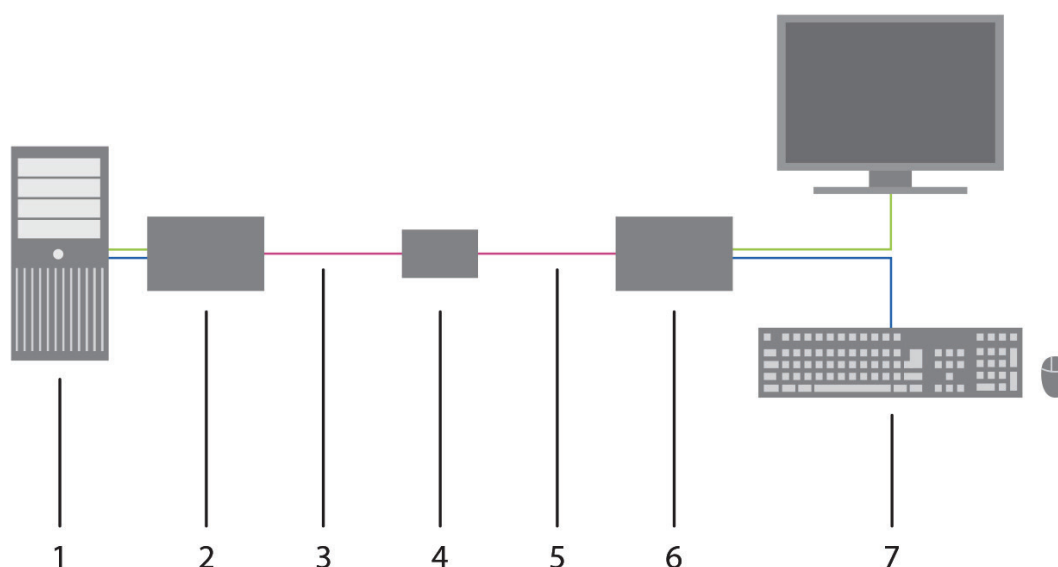
FIGURE 2-1. SYSTEM OVERVIEW

TABLE 2-1. SYSTEM COMPONENTS

NUMBER IN FIGURE 2-1	COMPONENT
1	Source (computer, CPU)
2	KVM Extender CPU Unit
3	Interconnect cable (CATx or fiber)
4	(Cross) Repeater
5	Interconnect cable (CATx or fiber)
6	KVM Extender CON Unit
7	Console (monitor, keyboard, mouse)

NOTE: See Chapter 3 for installation examples.

2.3 PRODUCT RANGE

2.3.1 CHASSIS

TABLE 2-2. AVAILABLE CHASSIS

PART NUMBER	DESCRIPTION
ACXMODH2-R2	Empty chassis for up to 2 boards, 1 external power supply unit
ACXMODH2R-R2	Empty chassis for up to 2 boards, 1 external power supply unit, preparation for redundancy for a second power supply unit (external)
ACXMODH2R-P-R2	Empty chassis for up to 2 boards, 1 internal power supply unit, preparation for redundancy for a second power supply unit (external)
ACXMODH4-R2	Empty chassis for up to 4 boards, 1 external power supply unit
ACXMODH4R-R2	Empty chassis for up to 4 boards, 1 external power supply unit, preparation for redundancy for a second power supply unit (external)
ACXMODH6R-R2	Empty chassis for up to 6 boards, 1 internal power supply, preparation for redundancy for a second power supply unit (external)
ACXMODH6BPAC-R2	Empty chassis for up to 6 boards, active backplane, 2 internal power supplies (redundancy)
ACXMODH6FPAC-R2	Empty chassis for up to 6 boards, active backplane, 2 internal power supplies (redundancy) with connectors on rear side
ACXMODH21R	Empty chassis for up to 21 boards, 1 internal power supply unit, preparation for redundancy for a second power supply unit (internal)

2.3.2 (CROSS) REPEATER MODULES

TABLE 2-3. AVAILABLE REPEATER MODULES

PART NUMBER	DESCRIPTION
ACX1M-CC	Repeater module CATx for range extension up to 896 ft. (280 m)
ACX1M-SS	Repeater module fiber (Single-Mode) for range extension up to 12.4 mi. (20 km)
ACX1M-CS	Cross Repeater module CATx/fiber (Single-Mode) for an electrical/optical media conversion, maximum extension up to 6.3 mi. (10.14 km)
ACX1M-2C2C	Dual Repeater module CATx for range extension up to 896 ft. (280 m)
ACX1M-2S2S	Dual Repeater module fiber (Single-Mode) for range extension up to 12.4 mi. (20 km)
ACX1M-2C2S	Dual Cross Repeater module CATx/fiber (Single-Mode) for an electrical/optical media conversion, maximum extension up to 6.3 mi. (10.14 km)

CHAPTER 2: DESCRIPTION

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2.4 ACCESSORIES UPGRADE KITS

TABLE 2-4. ACCESSORIES UPGRADE KITS

PART NUMBER	DESCRIPTION
ACXMODHEAR2	19"/1U rack mount kit for 2-slot chassis
ACXMODHEAR2P	19"/1U rack mount kit for 2-slot chassis with internal PSU
ACXMODHEAR4	19"/1U rack mount kit for 4-slot chassis
ACXMODHEAR6	19"/1U rack mount kit for 6-fold chassis
ACXMODH2-PS	Power supply for 2-slot chassis (spare or redundancy)
ACXMODH4-PS	Power supply for 4-slot chassis (spare or redundancy)
ACXMODH6-PS	Power supply for 6-slot chassis (spare or redundancy)
ACXMODH21-PS	Power supply for 21-slot chassis (spare or redundancy)
ACXMODH21-4S	Blind plate 3U/4HP for 2-, 4- and 6-slot chassis
ACXMODH21-8S	Blind plate 3U/8HP for 2-, 4- and 6-slot chassis

CAUTION: (Cross) Repeaters and the power supply units can get warm and must not be installed in closed rooms with no air circulation. For rackmount installations, at least 0.5 U (height unit) is required above the (Cross) Repeater for ventilation.

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2.5 DEVICE VIEWS

2.5.1 2-SLOT CHASSIS WITH ONE EXTERNAL POWER SUPPLY UNIT (ACXMODH2-R2)

TABLE 2-5. ACXMODH2-R2 SPECIFICATIONS

SPECIFICATION	DESCRIPTION
Connectors	(1) 2.5-mm barrel connector for power
Power	Primary Power Output: 5 V, 3 A; Secondary Power Output: Does not support redundant power
Dimensions	1.7"H x 5.7"W x 5.75"D (4.3 x 14.5 x 14.6 cm)
Weight	0.6 lb. (0.3 kg)

TABLE 2-6. ACXMODH2-R2 ACCESSORIES

ACCESSORY	DESCRIPTION
Rackmount Option	ACXMODHEAR2
Optional Redundant Power Supply	Does not support redundant power
Blanking Panel Options	ACXMODH21-4S or ACXMODH21-8S
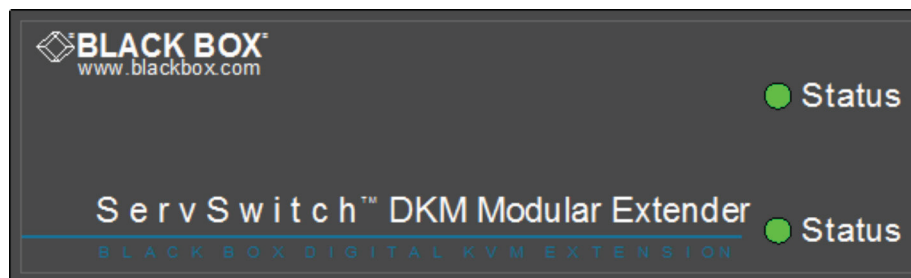
ACXMODH2-R2 FRONT VIEW

ACXMODH2-R2 BACK VIEW

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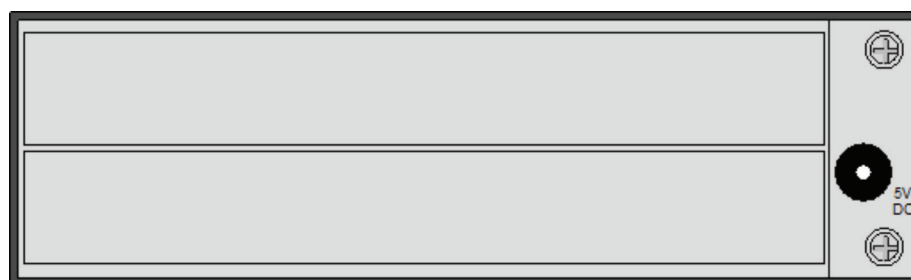
2.5.2 2-SLOT CHASSIS, EXTERNAL POWER AND REDUNDANT POWER OPTION (ACXMODH2R-R2)

TABLE 2-7. ACXMODH2R-R2 SPECIFICATIONS

SPECIFICATION	DESCRIPTION
Connectors	(2) 2.5-mm barrel connectors for power
Power	Primary Power Output: 5 V, 3 A; Secondary Power Output (optional): 5 V, 3 A
Dimensions	1.7"H x 5.7"W x 5.75"D (4.3 x 14.5 x 14.6 cm)
Weight	0.6 lb. (0.3 kg)

TABLE 2-8. ACXMODH2R-R2 ACCESSORIES

ACCESSORY	DESCRIPTION
Rackmount Option	ACXMODHEAR2
Optional Redundant Power Supply	ACXMODH2-PS
Blanking Panel Options	ACXMODH21-4S or ACXMODH21-8S

ACXMODH2R-R2 FRONT VIEW
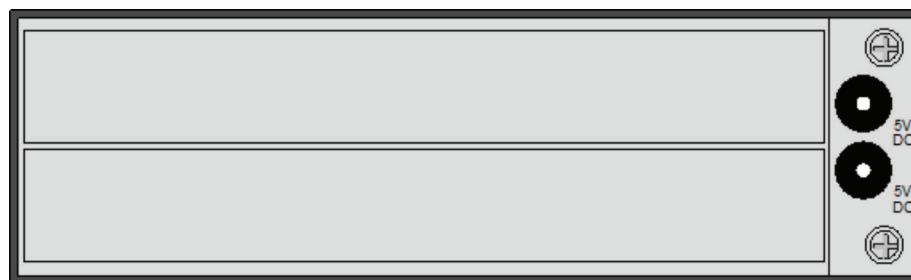
ACXMODH2R-R2 BACK VIEW

CHAPTER 2: DESCRIPTION

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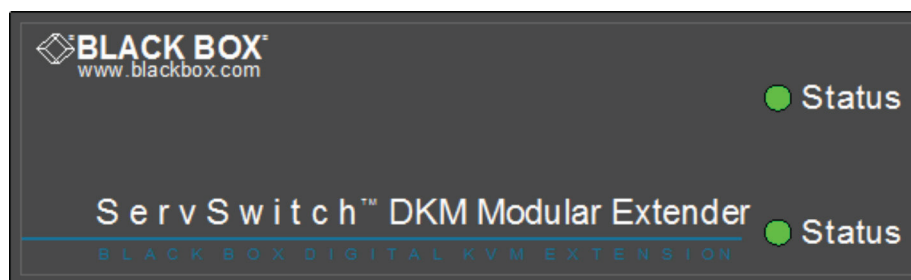**TECHNICAL**
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2.5.3 2-SLOT CHASSIS, INTERNAL POWER AND REDUNDANT POWER OPTION (ACXMODH2R-P-R2)
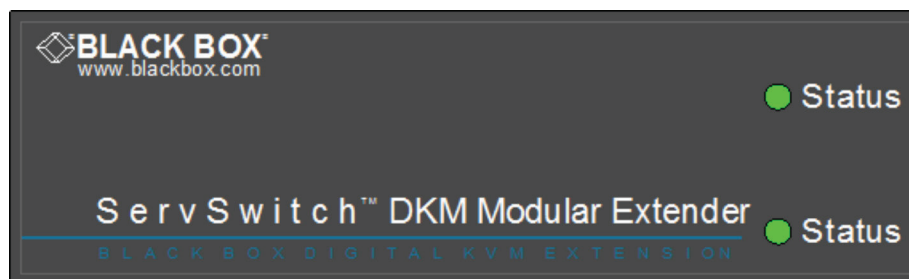
TABLE 2-9. ACXMODH2R-P-R2 SPECIFICATIONS

SPECIFICATION	DESCRIPTION
Connectors	(1) 2.5-mm barrel connector for power; **NOTE**: If you are using this chassis as an 8-Port DKM FX Switch, use a higher amperage power supply sucha s ACXMODH6-PS or the main IEC-320 power input. (1) IEC-320, C14
Power	Primary Power Output: 5 V, 3 A; Secondary Power Output (optional): 5 V, 3 A
Dimensions	1.7"H x 8.75"W x 5.75"D (4.3 x 22.2 x 14.6 cm)
Weight	0.8 lb. (0.4 kg)

TABLE 2-10. ACXMODH2R-P-R2 ACCESSORIES

ACCESSORY	DESCRIPTION
Rackmount Option	ACXMODHEAR2P
Optional Redundant Power Supply	ACXMODH2-PS (5 V, 3A, for standard cards); ACXMODH4-PS (5 V, 5 A, for load sharing
Blanking Panel Options	ACXMODH21-4S or ACXMODH21-8S

ACXMODH2R-P-R2 FRONT VIEW

ACXMODH2R-P-R2 BACK VIEW

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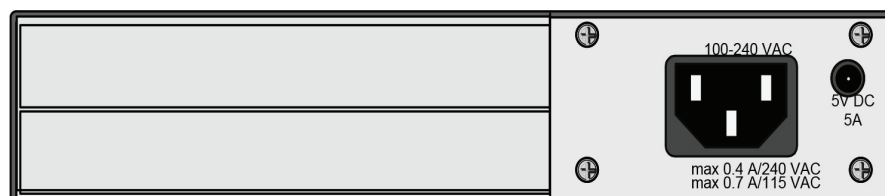
CHAPTER 2: DESCRIPTION

2.5.4 4-SLOT CHASSIS WITH ONE EXTERNAL POWER SUPPLY (ACXMODH4-R2)

TABLE 2-11. ACXMODH4-R2 SPECIFICATIONS

SPECIFICATION	DESCRIPTION
Connectors	(1) 2.5-mm barrel connector for power;
Power	Primary Power Output: 5 V, 5 A; Secondary Power Output: Does not support redundant power
Dimensions	1.7"H x 11.5"W x 5.75"D (4.3 x 29.2 x 14.6 cm)
Weight	0.9 lb. (0.4 kg)

TABLE 2-12. ACXMODH4-R2 ACCESSORIES

ACCESSORY	DESCRIPTION
Rackmount Option	ACXMODHEAR4
Optional Redundant Power Supply	Does not support redundant power
Blanking Panel Options	ACXMODH21-4S or ACXMODH21-8S

ACXMODH4-R2 FRONT VIEW

ACXMODH4-R2 BACK VIEW

CHAPTER 2: DESCRIPTION

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2.5.5 4-SLOT CHASSIS WITH EXTERNAL POWER AND REDUNDANT POWER OPTION (ACXMODH4R-R2)

TABLE 2-13. ACXMODH4R-R2 SPECIFICATIONS

SPECIFICATION	DESCRIPTION
Connectors	(2) 2.5-mm barrel connectors for power
Power	Primary Power Output: 5 V, 5 A; Secondary Power Output (Optional): 5 V, 5 A
Dimensions	1.7"H x 11.5"W x 5.75"D (4.3 x 29.2 x 14.6 cm)
Weight	0.9 lb. (0.4 kg)

TABLE 2-14. ACXMODH4R-R2 ACCESSORIES

ACCESSORY	DESCRIPTION
Rackmount Option	ACXMODHEAR4
Optional Redundant Power Supply	ACXMODH4-PS
Blanking Panel Options	ACXMODH21-4S or ACXMODH21-8S

ACXMODH4R-R2 FRONT VIEW
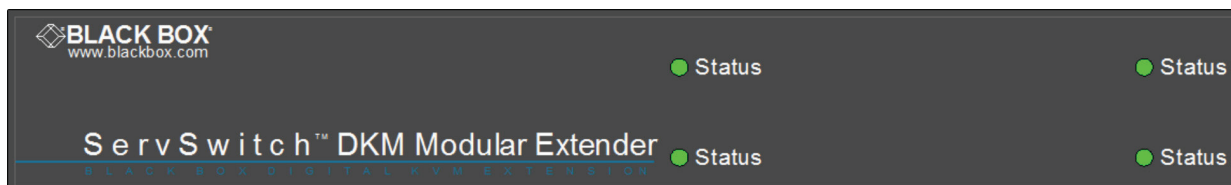

ACXMODH4R-R2 BACK VIEW

CHAPTER 2: DESCRIPTION

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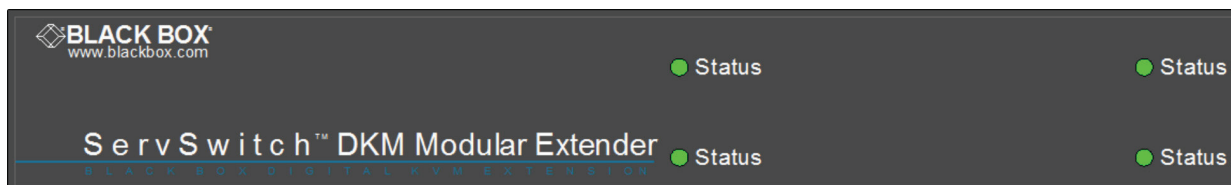SUPPORT
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2.5.6 6-SLOT CHASSIS WITH INTERNAL POWER AND REDUNDANT POWER OPTION (ACXMODH6R-R2)

TABLE 2-15. ACXMODH6R-R2 SPECIFICATIONS

SPECIFICATION	DESCRIPTION
Connectors	(1) IEC-320 main power input; (1) 2.5-mm barrel connector for redundant power
Power	Primary Power Output: 5 V, 8 A; Secondary Power Output (Optional): 5 V, 8 A
Dimensions	1.7"H x 17.5"W x 5.75"D (4.3 x 44.5 x 14.6 cm)
Weight	1.75 lb. (0.8 kg)

TABLE 2-16. ACXMODH6R-R2 ACCESSORIES

ACCESSORY	DESCRIPTION
Rackmount Option	ACXMODHEAR6
Optional Redundant Power Supply	ACXMODH6-PS
Blanking Panel Options	ACXMODH21-4S or ACXMODH21-8S

ACXMODH6R-R2 FRONT VIEW
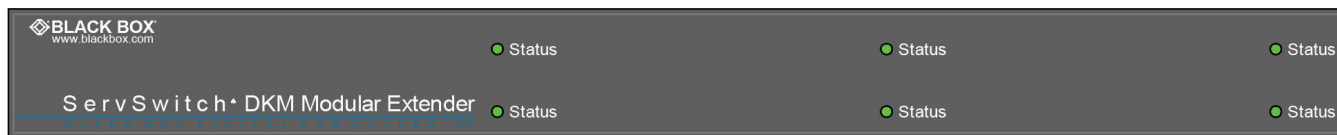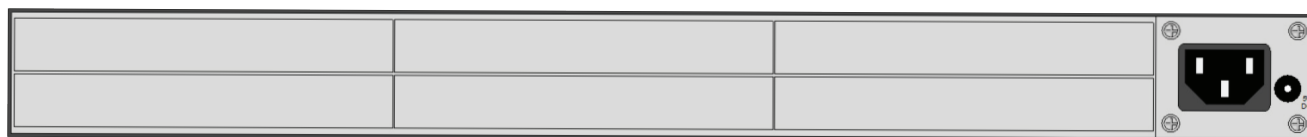

ACXMODH6R-R2 BACK VIEW

CHAPTER 2: DESCRIPTION

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2.5.7 6-SLOT CHASSIS WITH BACKPLANE AND TWO INTERNAL POWER SUPPLIES (ACXMODH6BPAC-R2)

TABLE 2-17. ACXMODH6BPAC-R2 SPECIFICATIONS

SPECIFICATION	DESCRIPTION
Connectors	(2) IEC-320 main power inputs
Power	Primary Power Output: 5 V, 10 A; Secondary Power Output (Optional): 5 V, 10 A
Dimensions	1.7"H x 17.5"W x 5.75"D (4.3 x 44.5 x 14.6 cm)
Weight	1.75 lb. (0.8 kg)

TABLE 2-18. ACXMODH6BPAC-R2 ACCESSORIES

ACCESSORY	DESCRIPTION
Rackmount Option	ACXMODHEAR6FPAC
Redundant Power Supply	Included
Blanking Panel Options	ACXMODH21-4S or ACXMODH21-8S
Optional Fan	ACXMODH6FAN

ACXMODH6BPAC-R2 FRONT VIEW

ACXMODH6BPAC-R2 BACK VIEW

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CHAPTER 2: DESCRIPTION

2.5.8 6-SLOT CHASSIS WITH BACKPLANE, 2 INT. PS AND BACK SIDE CONNECTORS (ACXMODH6FPAC-R2)

TABLE 2-19. ACXMODH6FPAC-R2 SPECIFICATIONS

SPECIFICATION	DESCRIPTION
Connectors	(2) IEC-320 main power inputs
Power	Primary Power Output: 5 V, 10 A; Secondary Power Output (Optional): 5 V, 10 A
Dimensions	1.7"H x 17.5"W x 8"D (4.3 x 44.5 x 20.3 cm)
Weight	1.75 lb. (0.8 kg)

TABLE 2-20. ACXMODH6FPAC-R2 ACCESSORIES

ACCESSORY	DESCRIPTION
Rackmount Option	ACXMODHEAR6FPAC
Redundant Power Supply	Included
Blanking Panel Options	ACXMODH21-4S or ACXMODH21-8S
Optional Fan	ACXMODH6FAN

ACXMODH6FPAC-R2 FRONT VIEW
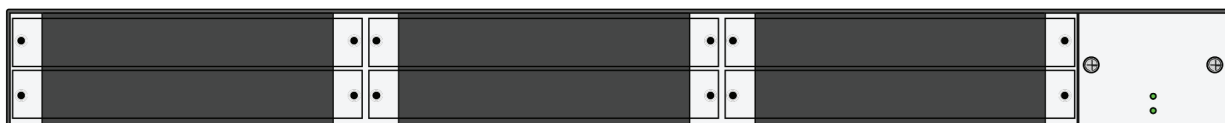
ACXMODH6FPAC-R2 BACK VIEW

2.5.9 21-SLOT CHASSIS WITH REDUNDANT POWER OPTION (ACXMODH21R)

TABLE 2-21. ACXMODH21R SPECIFICATIONS

SPECIFICATION	DESCRIPTION
Connectors	(2) IEC-320 main power inputs; (21) 20-position headers for cards
Power	Primary Power Output: 5 V, 50 A; Secondary Power Output (Optional): 5 V, 50 A
Dimensions	7"H x 19"W x 18.25"D (17.8 x 48.3 x 46.4 cm)
Weight	16 lb. (7.3 kg)

TABLE 2-22. ACXMODH21R ACCESSORIES

ACCESSORY	DESCRIPTION
Rackmount Option	Included
Optional Redundant Power Supply	ACXMODH21-PS
Blanking Panel Options	ACXMODH21-4S or ACXMODH21-8S
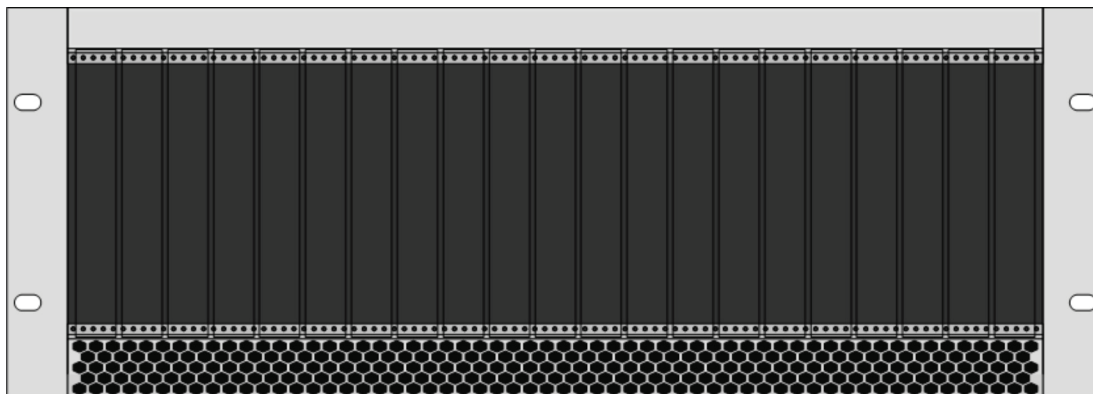
ACXMODH21R FRONT VIEW

ACXMODH21R BACK VIEW

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CHAPTER 2: DESCRIPTION

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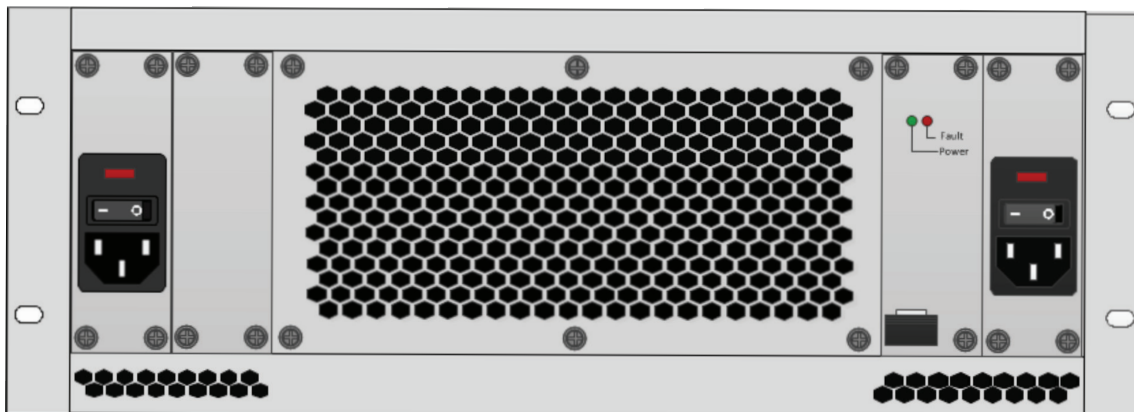
2.5.10 CATX REPEATER MODULE (ACX1M-CC)
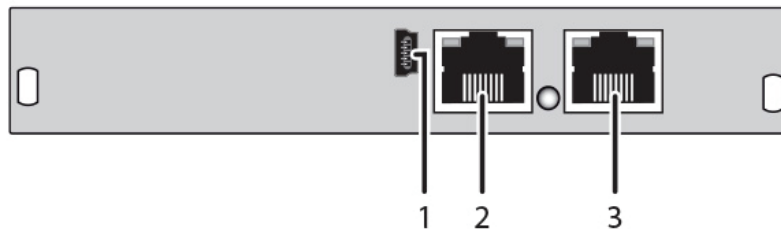
CATX REPEATER MODULE (ACX1M-CC)

TABLE 2-23. CATX REPEATER MODULE (ACX1M-CC) COMPONENTS

NUMBER IN FIGURE ABOVE	DESCRIPTION
1	Service port
2	Connect to interconnect cable 1
3	Connect to interconnect cable 2

2.5.11 SINGLE-MODE FIBER REPEATER MODULE (ACX1M-SS)
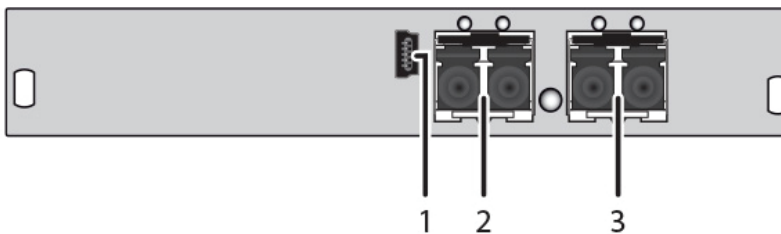
SINGLE-MODE FIBER REPEATER MODULE (ACX1M-SS)

TABLE 2-24. SINGLE-MODE FIBER REPEATER MODULE (ACX1M-SS) COMPONENTS

NUMBER IN FIGURE ABOVE	DESCRIPTION
1	Service port
2	Connect to interconnect cable 1
3	Connect to interconnect cable 2

CHAPTER 2: DESCRIPTION

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2.5.12 CATX/SINGLE-MODE FIBER REPEATER MODULE (ACX1M-CS)

CATX/SINGLE-MODE FIBER REPEATER MODULE (ACX1M-CS)

TABLE 2-25. CATX/SINGLE-MODE FIBER REPEATER MODULE (ACX1M-CS) COMPONENTS

NUMBER IN FIGURE ABOVE	DESCRIPTION
1	Service port
2	Connect to interconnect cable 1
3	Connect to interconnect cable 2

2.5.13 CATX DUAL REPEATER MODULE (ACX1M-2C2C)
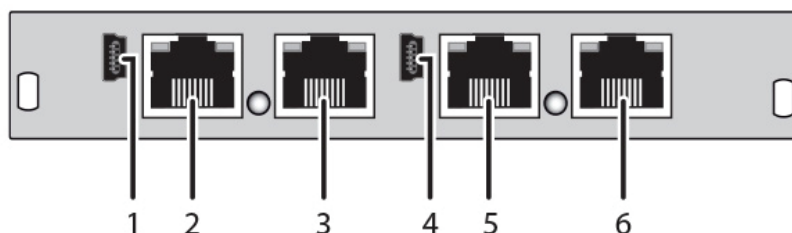
CATX DUAL REPEATER MODULE (ACX1M-2C2C)

TABLE 2-26. CATX DUAL REPEATER MODULE (ACX1M-2C2C) COMPONENTS

NUMBER IN FIGURE ABOVE	DESCRIPTION
1	Service port (repeater 1)
2	Connect to interconnect cable 1 (repeater 1)
3	Connect to interconnect cable 2 (repeater 1)
4	Service port (repeater 2)
5	Connect to interconnect cable 2 (repeater 2)
6	Connect to interconnect cable 2 (repeater 2)

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2.5.14 SINGLE-MODE FIBER DUAL REPEATER MODULE (ACX1M-2S2S)
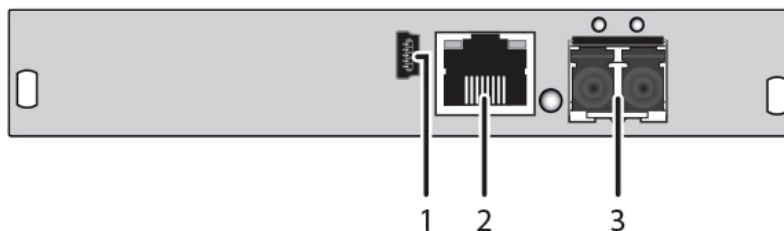

SINGLE-MODE FIBER DUAL REPEATER MODULE (ACX1M-2S2S)

TABLE 2-27. SINGLE-MODE FIBER DUAL REPEATER MODULE (ACX1M-2S2S) COMPONENTS

NUMBER IN FIGURE ABOVE	DESCRIPTION
1	Service port (repeater 1)
2	Connect to interconnect cable 1 (repeater 1)
3	Connect to interconnect cable 2 (repeater 1)
4	Service port (repeater 2)
5	Connect to interconnect cable 2 (repeater 2)
6	Connect to interconnect cable 2 (repeater 2)

## 2.5.15 CATX/SINGLE-MODE FIBER DUAL REPEATER MODULE (ACX1M-2C2S)
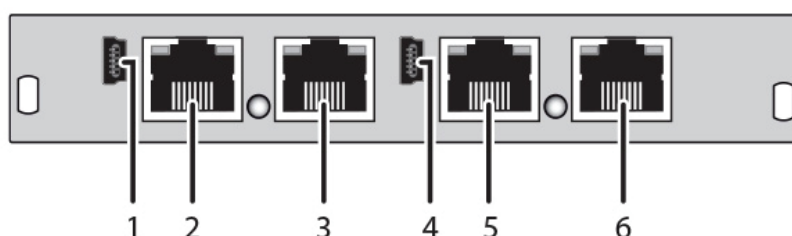
CATX DUAL REPEATER MODULE (ACX1M-2C2S)

TABLE 2-28. CATX/SINGLE-MODE FIBER DUAL REPEATER MODULE (ACX1M-2C2S) COMPONENTS

NUMBER IN FIGURE ABOVE	DESCRIPTION
1	Service port (repeater 1)
2	Connect to interconnect cable 1 (repeater 1)
3	Connect to interconnect cable 2 (repeater 1)
4	Service port (repeater 2)
5	Connect to interconnect cable 2 (repeater 2)
6	Connect to interconnect cable 2 (repeater 2)

2.6 STATUS LEDS

2.6.1 STATUS (CROSS) REPEATER MODULE

The (Cross) Repeater module is fitted with a multi color LED for overall status indication and with two further LEDs for indication of the connection status.
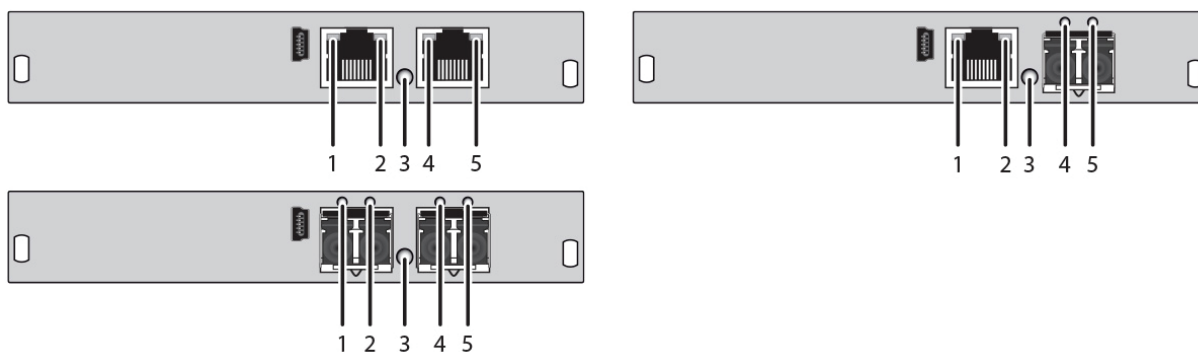
LEDS ON THE BACK OF THE (CROSS) REPEATER MODULES

TABLE 2-29. LEDS 1/2 AND 4/5: STATUS

POSITION	LED	STATUS	DESCRIPTION
1/4	Failure LED (green)	OFF	Connection available
		ON or Flashing	Connection failure (flashing for abot 20 seconds following a connection failure
2/5	Status LED (green)	Flashing	No connection via interconnect cable
		ON	Connection available

TABLE 2-30. LED 3: DEVICE STATUS

LED COLOR	STATUS
Red	Device ready
Blue	Link 1 (left connector) available, Link 2 (right connector) not detected
Green	Link 2 (right connector) available, Link 2 (left connector) not detected
Light Blue	Link 1 (left connector) available, Link 2 (right connector) available

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CHAPTER 3: INSTALLATION

3.1 PACKAGE CONTENTS

Your extender package contains the following items:

(Cross) Repeater:

◆ (Cross) Repeater in the chassis

◆ (1) or (2) 5-VDC international power supply unit(s) per KVM

Extender unit (depending on chassis):

◆ (1) or (2) country-specific power cord(s) (depending on chassis)

If anything is missing or damaged, contact Black Box Technical Support at 877-877-2269 or info@blackbox.com

3.2 SYSTEM INSTALLATION

First-time users are recommended to setup the system in the same room as a test setup. This will allow you to identify and solve any cabling problems, and experiment with your system more conveniently.

NOTE: Please verify that interconnect cables, interfaces, and handling of the devices comply with the requirements (see Chapter 1).

3.2.1 (CROSS) REPEATER SETUP

1. Switch off all devices.

2. Connect the (Cross) Repeater with the interconnect cable(s).

3. Connect the chassis of the (Cross) Repeater to the power supply.

4. Power up the system.

To power up the system, the following sequence is recommended:

Monitor –> CON Unit –> (Cross) Repeater –> CPU Unit – >source.

3.3 EXAMPLE APPLICATIONS

This section illustrates typical installations of (Cross) Repeaters.

FIGURE 3-1. SINGLE MEDIA CONVERSION APPLICATION

TABLE 3-1. SINGLE MEDIA CONVERSION APPLICATION SYSTEM COMPONENTS

NUMBER IN FIGURE 3-1	COMPONENT
1	Source (computer, CPU)
2	KVM Extender CPU Unit
3	Interconnect cable (CATx)
4	(Cross) Repeater
5	Interconnect cable (fiber)
6	KVM Extender CON Unit
7	Console (monitor, keyboard, mouse)

NOTE: The example shown in this application scenario will be primarily recommended, if connections through KVM matrix must be bypassed in case of major matrix problems. KVM extenders with CATx and with fiber connectors can be directly connected to each other.

CHAPTER 3: INSTALLATION

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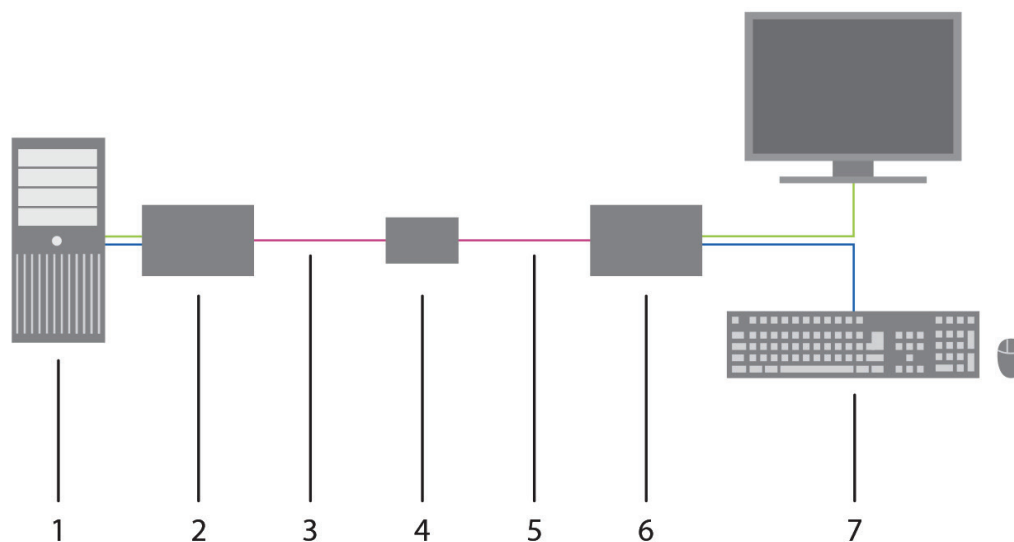**TECHNICAL**
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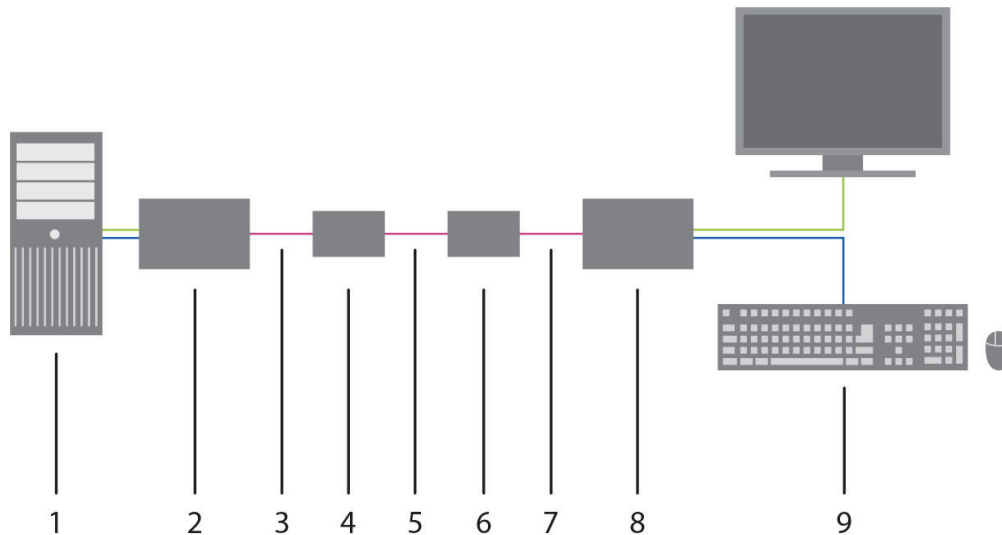
FIGURE 3-2. DUAL MEDIA CONVERTER APPLICATION

TABLE 3-2. DUAL MEDIA CONVERSION APPLICATION SYSTEM COMPONENTS

NUMBER IN FIGURE 3-2	COMPONENT
1	Source (computer, CPU)
2	KVM Extender CPU Unit
3	Interconnect cable (CATx)
4	(Cross) Repeater #1
5	Interconnect cable (fiber)
6	(Cross) Repeater #2
7	Interconnect cable (CATx)
8	KVM Extender CON Unit
9	Console (monitor, keyboard, mouse)

3.4 CONFIGURATION

The (Cross) Repeater does not require any configuration and is ready for use per default.

3.5 OPERATION

The (Cross) Repeater does not have any adjustable operating modes andis ready for use per default.

CHAPTER 4: TROUBLESHOOTING

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GENERAL FAILURES
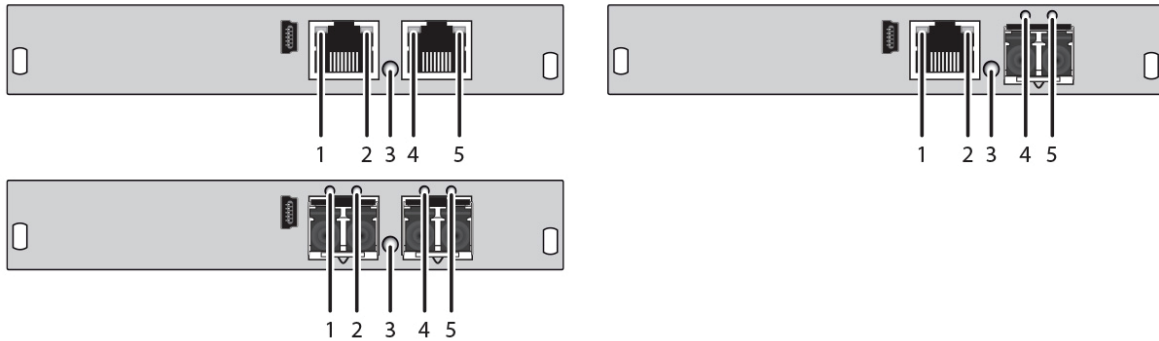
FIGURE 6-1. REPEATER MODULES, BACK VIEWS

TABLE 6-1. LEDS STATUS

DIAGNOSIS	POSSIBLE REASON	MEASURE
LED 3 OFF	Power Supply	Check power supply units and the connection to the power network
LED 2 OFF or LED 5 OFF	Connection between (Cross) Repeater and KVM Extender Unit or KVM Matrix	Check interconnect cables and connections

CHAPTER 5: CONTACTING TECHNICAL SUPPORT

5.1 SUPPORT CHECKLIST

To efficiently handle your request, make sure that you have the following information available before you call:

- Company, name, phone number and email
- Type and serial number of the device (see bottom of device)
- Date and number of sales receipt, name of dealer if necessary
- Issue date of the existing manual
- Nature, circumstances and duration of the problem
- Components included in the system (such as graphic source/CPU, OS, graphic card, monitor, USB-HID/USB 2.0 devices, interconnect cable) including manufacturer and model number
- Results from any testing you have done

Contact Black Box Technical Support at 877-877-2269 or info@blackbox.com

5.2 SHIPPING CHECKLIST

1. To return your device, contact Black Box Technical Support at 877-877-2269 or info@blackbox.com to obtain a RMA number (Return-Material-Authorization).
2. Package your devices carefully, preferably using the original box. Add all pieces that you received originally.
3. Note your RMA number visibly on your shipment. Devices that are sent in without a RMA number cannot be accepted. The shipment will be sent back without being opened, postage unpaid.

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APPENDIX A: REGULATORY INFORMATION

A.1 CE DECLARATION OF CONFORMITY

These products as delivered comply with the provisions of the following European Directives:

2004/108/EG Council Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility

CE Marking 2009

The products comply with the following harmonized standards for Information Technology Equipment:

- EN 55022:2010 + A1:2007 (Class A)
- EN 55024:2010 + A1:2001 + A2:2003

This declaration certifies the conformity to the specified directives but contains no assurance of properties. The safety instructions and installation guidelines noted in this manual shall be considered in detail. Compliance with the specifications for cable lengths and types is mandatory.

Use in a Domestic Environment

This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

A.2 FCC STATEMENT

This equipment has been found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Shielded cables must be used with this equipment to maintain compliance with radio frequency energy emission regulations and ensure a suitably high level of immunity to electromagnetic disturbances.

All power supplies are certified to the relevant major international safety standards.

A.3 PRODUCT SAFETY

The product safety of the devices is proven by the compliance to the following standards:

- IEC 60950-1A1:2010
- EN 60950-1/A12:2011
- UL 60950-1-2007
- CAN/CSA-C22.2 60950-1-07

A.4 WEEE

The manufacturer complies with the EU Directive 2012/19/EU on the prevention of waste electrical and electronic equipment (WEEE). The device labels carry a respective marking.

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APPENDIX A: REGULATORY INFORMATION

A.5 ROHS/ROHS2

This device complies with the Directive 2011/65/EU of the European Parliament and of the council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS 2, RoHS II).

The device labels carry a respective marking.

A.6 NOM STATEMENT

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc.
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
    A: El cable de poder o el contacto ha sido dañado; u
    B: Objectos han caído o líquido ha sido derramado dentro del aparato; o
    C: El aparato ha sido expuesto a la lluvia; o
    D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
    E: El aparato ha sido tirado o su cubierta ha sido dañada.

APPENDIX B: GLOSSARY

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The following terms are commonly used in this guide or in video and KVM technology.

AES/EBU: Digital audio standard that is officially known as AES3 and that is used for carrying digital audio signals between devices.

CATx: Any CAT5e (CAT6, CAT7) cable

CGA: Color Graphics Adapter (CGA) is an old analog graphic standard with up to 16 displayable colors and a maximum resolution of 640 x 400 pixels.

Component Video: Component Video (YPbPr) is a high-quality video standard that consists of three independently and separately transmittable video signals, the luminance signal and two color difference signals.

Composite Video: Composite Video is also called CVBS and it is part of the PAL TV standard.

CON Unit: Component of a KVM Extender or Media Extender to connect to the console (monitor(s), keyboard and mouse; optionally also with USB 2.0 devices)

Console: Keyboard, mouse and monitor

CPU Unit: Component of a KVM Extender or Media Extender to connect to a source (computer, CPU)

CVBS: The analog color video baseband signal (CVBS) is also called Composite Video and it is part of the PAL TV standard.

DDC: Display Data Channel (DDC) is a serial communication interface between monitor and source (computer, CPU). It allows a data exchange via monitor cable and an automatic installation and configuration of a monitor driver by the operating system.

Dual Access: A system to operate a source (computer, CPU) from two consoles

Dual Link: A DVI-D interface for resolutions up to 2560 x 2048 by signal transmission of up to 330 MPixel/s (24-bit)

Dual-Head: A system with two video connections

DVI: Digital video standard, introduced by the Digital Display Working Group (http://www.ddwg.org). Single Link and Dual Link standard are distinguished. The signals have TMDS level.

DVI-D: A DVI-D connector on a graphics card sends out a digital signal only

DVI-I: A combined signal (digital and analog) that allows running a VGA monitor at a DVI-I port—in contrast to DVI-D (see DVI).

EGA: The Enhanced Graphics Adapter (EGA) is an old analog graphic standard, introduced by IBM in 1984. A DB9 connector is used for connection.

Fiber: Single-mode or multi-mode fiber cables

HDMI: An interface for an all-digital transmission of audio and video data. It is differentiated between the HDMI standards 1.0 to 1.4a. The signals have TMDS level.

KVM: Keyboard, video and mouse

Mini-XLR: Industrial standard for electrical plug connections (3-pole) for the transmission of digital audio and control signals

Multi-mode: 62.5μ multi-mode fiber cable or 50μ multi-mode fiber cable

OSD: The On-Screen-Display is used to display information or to operate a device.

Quad-Head: A system with four video connections

RCA (Cinch): A non-standard plug connection for transmission of electrical audio and video signals, especially with coaxial cables

S/PDIF: A digital audio interconnect that is used in consumer audio equipment over relatively short distances.

SFP: SFPs (Small Form Factor Pluggable) are pluggable interface modules for Gigabit connections. SFP modules are available for CATx and fiber interconnect cables.

Single Link: A DVI-D interface for resolutions up to 1920 x 1200 by signal transmission of up to 165 MPixel/s (24-bit). Alternative frequencies are Full HD (1080p), 2K HD (2048 x 1080) and 2048 x 1152.

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Single-Head: A system with one video connection

Single-mode: 9μ single-mode fiber cable

S-Video (Y/C): S-Video (Y/C) is a video format transmitting luminance and chrominance signals separately. It has a higher quality standard than CVBS.

TOSLINK: Standardized fiber connection system for digital transmission of audio signals (F05 plug connection)

Triple-Head: A system with three video connections

USB-HID: USB-HID devices (Human Interface Devices) allow for data input. There is no need for a special driver during installation; "New USB-HID device found" is reported. Typical HID devices include keyboards, mice, graphics tablets and touch screens. Storage, video and audio devices are not HID.

VGA: Video Graphics Array (VGA) is a computer graphics standard with a typical resolution of 640 x 480 pixels and up to 262,144 colors. It can be seen as a follower of the graphics standards MDA, CGA and EGA.

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APPENDIX C: DISCLAIMER/TRADEMARKS

C.1 DISCLAIMER

Black Box Corporation shall not be liable for damages of any kind, including, but not limited to, punitive, consequential or cost of cover damages, resulting from any errors in the product information or specifications set forth in this document and Black Box Corporation may revise this document at any time without notice.

C.2 TRADEMARKS USED IN THIS MANUAL

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