HDBaseT Compact Extender Set 70m with ARC User Guide

Model HDBaseT CM-BT20-COMPACT-70-TX and HDBaseT CM-BT20-COMPACT-70-RX

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Trademarks and patents

HDBaseT Compact Extender Set 70m with ARC, Model HDBaseT CM-BT20-COMPACT-70-TX and HDBaseT CM-BT20-COMPACT-70-RX name is a trademark of Clare Controls, LLC.

Other trade names used in this document may be trademarks or registered trademarks of the manufacturers or vendors of the respective products.

Manufacturer

Clare Controls, LLC.
7519 Pennsylvania Ave., Suite 104, Sarasota, FL 34243, USA

Contact information

For contact information, see www.clarecontrols.com.

FCC compliance

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC compliance

Class A: This equipment has been tested and 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 or her own expense.

FCC compliance

Class B: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

There is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

EU compliance

CE

Complete additional sections according to the governing laws and standards for the intended marketplace.

EU directives

1999/5/EC (R&TTE directive): Hereby, Clare Controls, LLC . declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

2002/96/EC (WEEE directive): Products marked with this symbol cannot be disposed of as unsorted municipal waste in the European Union. For proper recycling, return this product to your local supplier upon the purchase of equivalent new equipment, or dispose of it at designated collection points. For more information, see: www.recyclethis.info.

2006/66/EC (battery directive): This product contains a battery that cannot be disposed of as unsorted municipal waste in the European Union. See the product documentation for specific battery information. The battery is marked with this symbol, which may include lettering to indicate cadmium (Cd), lead (Pb), or mercury (Hg). For proper recycling, return the battery to your supplier or to a designated collection point. For more information, see: www.recyclethis.info.

Content

Safety precautions and operation

Read all instructions carefully before using the device. Save this manual for future reference. To guarantee equipment reliability and personal safety, please follow the procedures listed below.

- Unpack the equipment carefully. Save the original box and packing material for future shipping.
- Follow basic safety precautions to reduce the risk of fire, electrical shock, and injury to persons.
- Only qualified professionals should service this product. Do not open or modify the device; it may result in electrical shock or burn. Do not attempt any repairs. There are no user-serviceable parts inside. Any attempt to open the equipment will result in a complete void of any warranty and may result in serious injury or death.
- Only use parts that meet the device's specifications. If you use parts that do not match, it may cause damage to the device.
- Do not expose this device to rain, moisture, chemicals (including aerosol cleaners), or any form of liquid to avoid fire or shock damage. If exposure occurs, unplug the device immediately.
- Do not disrupt the device's cables or power source.
- Do not twist or use force to pull the optical cable, this can cause damage or malfunction in the device.
- Do not leave this device plugged in and unused for long periods.
- Do not burn or mix this device with general household waste. Treat the device as electrical waste.
- Do not place the device in a place that is abnormally hot/cold or does not have proper temperature control and ventilation.
- The HDBaseT CM-BT20-COMPACT-70-TX and RX generate heat when operating. The environment should be well ventilated to prevent damage caused by overheating.
- Before cleaning or making/removing connections to the device, ensure that the power supply has been disconnected.

Caution: The HDBaseT CM-BT20-COMPACT-70-TX RX must be used as a pair. Do not use the RX separately or in combination with HDBaseT switches, as using it may cause damage to the unit.

Limitation of liability

To the maximum extent permitted by applicable law, in no event will Clare Controls, LLC. be liable for any lost profits or business opportunities, loss of use, business interruption, loss of data, or any other indirect, special, incidental, or consequential damages under any theory of liability, whether based in contract, tort, negligence, product liability, or otherwise. Because some jurisdictions do not allow the exclusion or limitation of liability for consequential or incidental damages the preceding limitation may not apply to you. In any event the total liability of Clare Controls, LLC. shall not exceed the purchase price of the product. The foregoing limitation will apply to the maximum extent permitted by applicable law, regardless of whether Clare Controls, LLC. has been advised of the possibility of such damages and regardless of whether any remedy fails of its essential purpose.

Installation in accordance with this manual, applicable codes, and the instructions of the authority having jurisdiction is mandatory.

While every precaution has been taken during the preparation of this manual to ensure the accuracy of its contents, Clare Controls, LLC. assumes no responsibility for errors or omissions.

Introduction

The extender set (p/n CM-BT20-COMPACT-70) consists of a transmitter and receiver pair. HDMI signals are input into the transmitter and HDBaseT technology is used to transmit the signals to the receiver up to 230 ft. (70 m) via a Cat5e/Cat6 cable. The receiver then outputs the HDMI signal.

Bi-directional IR is also transmitted across the Cat5e/Cat6 cable. The extender set supports ARC (audio return channel), IR control, and PoH (Power Over HDBaseT), which can be used to power the receiver via the Cat5e/Cat6 cable. This eliminates the need for power at the receiver end.

Features

- Supports full HD: Delivers high-resolution images (1080p at 60Hz, 3D, 4Kx2K at 30Hz)
- Maximum transmission distance is 230 ft. (70m) for 1080p or 131 ft. (40m) for 4Kx2K over a CAT5e/CAT6 cable

  Note: When using ARC, the maximum transmission distance is 131 ft (40m).
- High bandwidth: 10.2 Gbps
- HDTV compatible: Uses HDMI 1.4 and is HDCP-2.2 compliant
- Supports PoH, bi-directional IR, and ARC
- Uses HDBaseT technology for extended capability and reliability
- LED indicators show working status to aid in troubleshooting
- Wall or table mount steel enclosure

Package contents

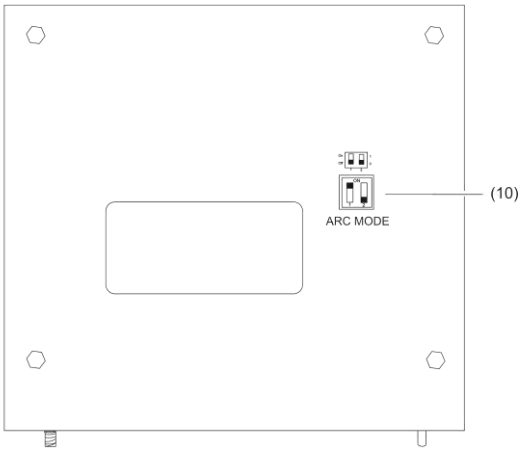
- 1 x CM-BT20-COMPACT-70-TX
- 1 x CM-BT20-COMPACT-70-RX
- 4 x detachable mounting brackets
- 8 x rubber feet
- 4 x screws
- 1 x power supply (12 VDC)
- 4 x power plug adapters
- 1 x quick start guide
- 1 x IR emitter
- 1 x IR adapter cable

Notes: Ensure all the accessories are included. If not, contact your dealer.

Product appearance

Figure 1: The HDBaseT CM-BT20-COMPACT-70-TX (front and rear panels)

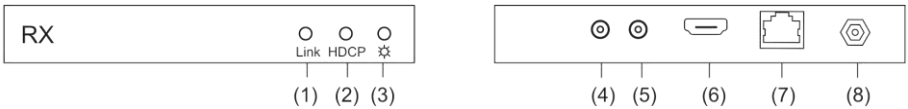
Figure 2: The HDBaseT CM-BT20-COMPACT-70-TX (bottom panel)



(1) LINK:	The HDBT Link status indicator. It illuminates when the CM-BT20-COMPACT-70-TX and RX are linked and communicating.
(2) HDCP:	The HDCP compliant indicator. • Illuminates when the input signal is HDCP • Blinks when the input signal is not HDCP • Extinguishes when there is no input
(3) Power LED:	Illuminates when the device is receiving power.
(4) ARC:	ARC Output port.
(5) IR IN:	Connects to a 12v IR receiver. The IR signal received from this port will be transmitted via HDBaseT to the transmitter unit for use at the source location.
(6) IR OUT:	IR signals received by receiver and sent via HDBaseT to the transmitter are available for emitter use from this port.

(7) HDMI IN:	Connect to the HDMI source device.
(8) HDBT OUT:	Connects via a single Cat5e/Cat6 cable to the HDBaseT port on the receiver and supports bi-directional PoH.
(9) 12 VDC:	Connects to the power supply.
(10) ARC Switcher:	Set the switch for ARC mode.

Figure 3: The HDBaseT- CM-BT20-COMPACT-70-TX (front and rear panels)



(1) LINK:	The HDBT Link status indicator. It illuminates when the CM-BT20-COMPACT-70-TX and RX are linked and communicating.
(2) HDCP	The HDCP compliant indicator. • Illuminates when the output signal is HDCP • Blinks when the output signal is not HDCP • Extinguishes when there is no output
(3) Power LED:	Illuminates when the device is receiving power.
(4) IR IN:	Connects to a 12v IR receiver, or the provided adapter cable. The IR signal received from this port is transmitted via HDBaseT to the HDBaseT CM-BT20-COMPACT-70-TX unit for use at the source location.
(5) IR OUT:	IR signals received by the HDBaseT CM-BT20-COMPACT-70-TX and sent via HDBaseT to the HDBaseT CM-BT20-COMPACT-70-RX are available for emitter use from this port.
(6) HDMI OUT:	Connect to the HDMI display device.
(7) HDBT IN	Connects via single Cat5e/Cat6 cable to the HDBaseT port on the transmitter and supports bi-directional PoH.
(8) 12 VDC	Connects to the power supply.

System connection

Usage precautions

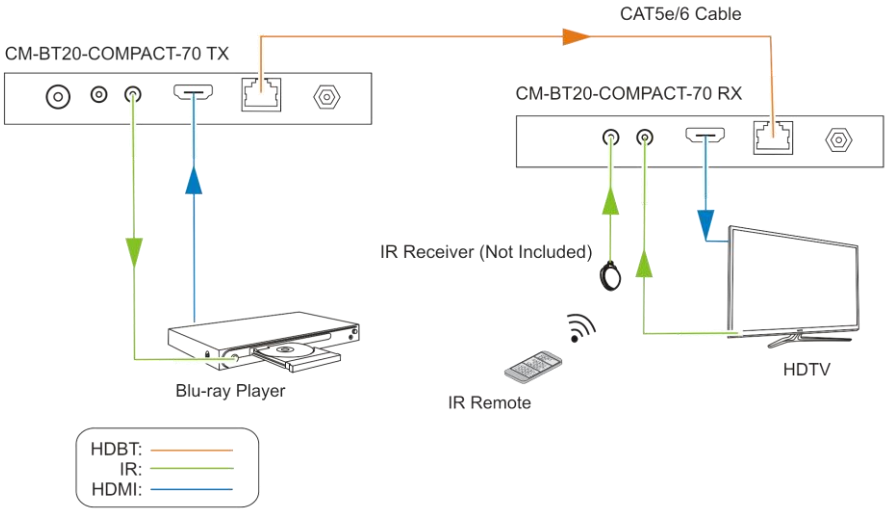
- The system should be installed in a clean environment and have proper temperature and humidity controls.
- All of the power switches, plugs, sockets, and power cords should be insulated for safety.
- All devices should be connected before powering on.
- The Cat5e/Cat6 terminations for HDBaseT devices must be a straight-thru TIA/EIA T568B standard.

Application examples

The HDBaseT CM-BT20-COMPACT-70-RX receiver works in conjunction with the HDBaseT CM-BT20-COMPACT-70-TX transmitter. By transmitting signals across reliable Cat5e/Cat6 cables, the video signal can be used at far greater distances from the source device than would be capable with traditional HDMI cables. Additionally, control signals can be sent bi-directionally across the same Cat5e/Cat6 cable. The following figures show you some application examples for the HDBaseT CM-BT20-COMPACT-70-TX and RX.

Note: When using a control system, such as Clare Controls, Crestron, or URC, the 3.5mm male mono to 3.5mm male stereo adapter cable (included) must be used. The male mono end connects to the control system; the male stereo end connects to CM-BT20-COMPACT-70-TX.

Figure 4: System connection



Connection procedure

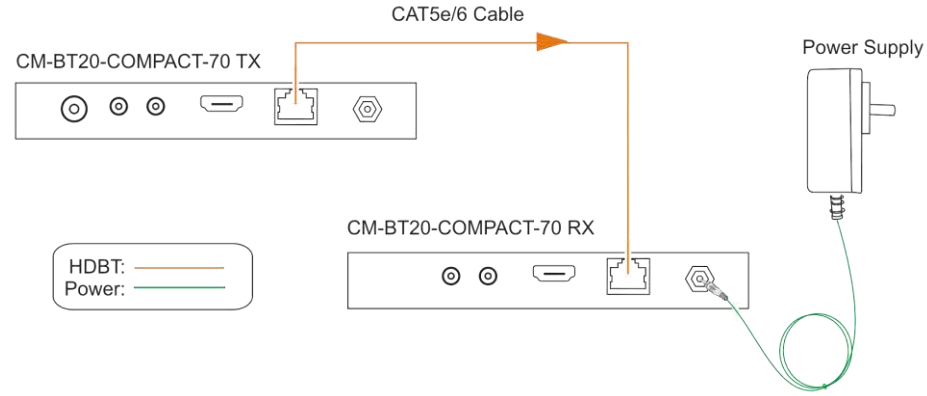
To connect the HDBaseT Compact Extender Set 70m:

1. Connect HDMI from the source (such as Blu-ray) to the HDMI IN port of the transmitter using an HDMI cable.
2. Connect the HDBT OUT port of the HDBaseT CM-BT20-COMPACT-70-TX to the HDBT IN port of the receiver with a single CAT5e/CAT6 cable using TIA/EIA T568B terminations at each end.
3. Connect the HDMI OUT port of the HDBaseT CM-BT20-COMPACT-70-RX to an HDMI in port on the display using an HDMI cable.
4. When using the bi-directional IR control, do the following.
   a. Connect the IR emitter at either end to the IR TX port on the HDBaseT CM-BT20-COMPACT-70-TX or RX.
   b. When using a powered IR receiver, connect via a 3.5mm stereo plug to the IR RX on either the HDBaseT CM-BT20-COMPACT-70-TX or RX.
5. Connect the 12 VDC power adapter to the power port on the HDBaseT CM-BT20-COMPACT-70-TX transmitter. The HDBaseT CM-BT20-COMPACT-70-RX receiver is powered through PoH.

PoH

The CM-BT20-COMPACT-70 supports PoH. Connect the DC adapter to either CM-BT20-COMPACT-70-TX or RX for power.

Figure 5: PoH connection

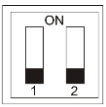
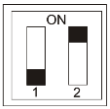
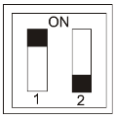
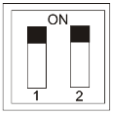


ARC

The coax audio and HDMI ports have an ARC (Audio Return Channel) function. When enabled, audio is returned from the connected device in the RX to the HDMI or digital coax out on the TX.

The CM-BT20-COMPACT-70-TX provides an ARC switcher on the bottom panel to set/change ARC mode selection. For ARC options, see the Table 1.

Table 1: ARC modes

Image	ARC Mode	Description
	00	This mode sends ARC through HDMI. **Notes** • This mode limits the transmitting distance. • The display device must support ARC. • Both the display device and AVR must have ARC enabled.
	01	Mode 01 is reserved for future use.
	10	This mode removes ARC from the HDMI and sends the audio through digital coax.
	11	Mode 11 is reserved for future use.

The following graphics show the system connection in varying ARC modes.

Note: When using ARC, ensure that the switcher is in the correct ARC mode.

Figure 6: System connection ARC mode 00

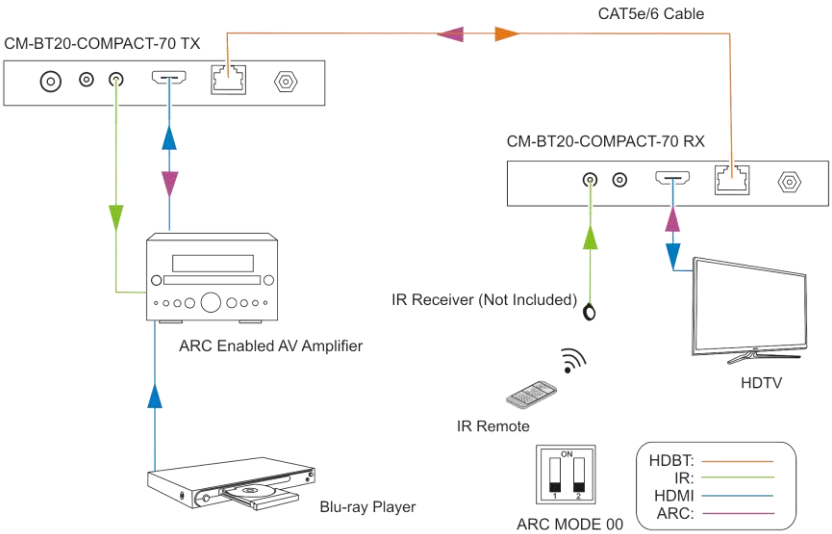
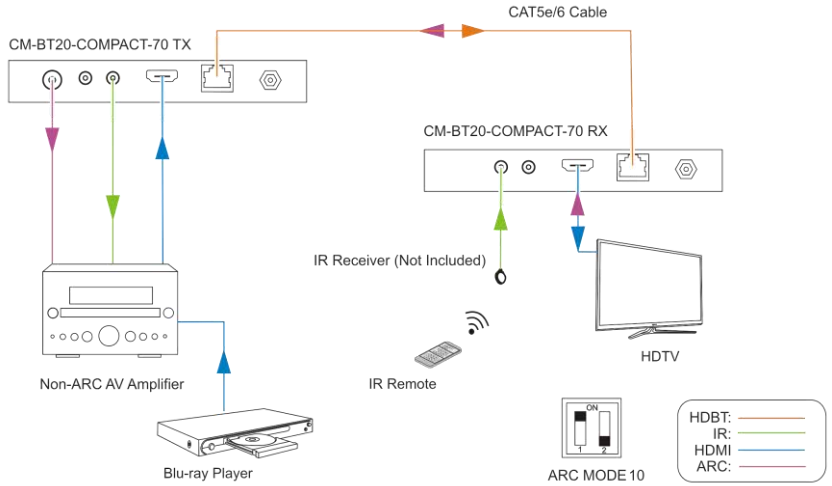


Figure 7: System connection ARC mode 10



Application

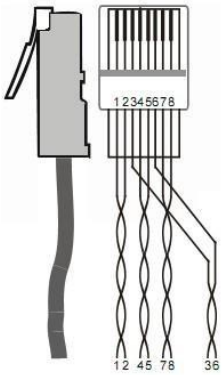
The HDBaseT extender pair is useful in any scenario when an HDMI signal (along with control signals) must be transmitted reliably across greater distances than is practical using traditional HDMI cables. They may be used in both residential and commercial applications when centrally locating the source equipment and displaying HD video in remote locations.

Twisted pair cable connection

The Cat5e/Cat6 terminations for HDBaseT devices should be a straight thru TIA/EIA T568B standard. TIA/EIA T568A standard is NOT recommended.

Table 2: T568B cable standards

TIA/EIA T568B	
Pin	**Cable color**
1	orange white
2	orange
3	green white
4	blue
5	blue white
6	green
7	brown white
8	brown



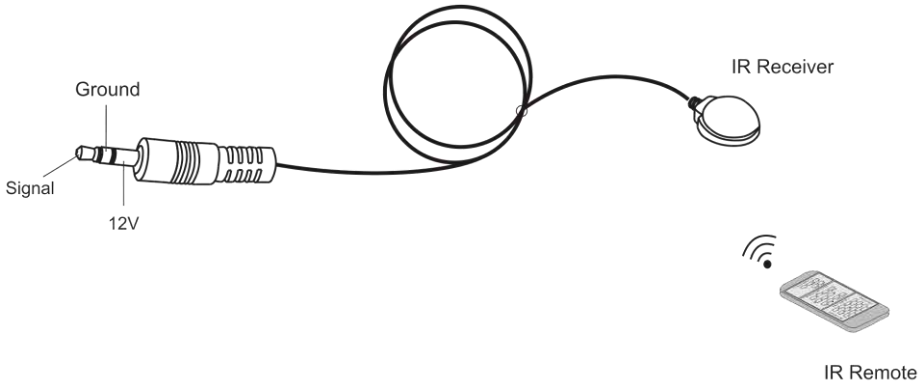
1st Ground	4-5
2nd Ground	1-2
3rd Group	3-6
4th Group	7-8

Note: RJ45 EZ connectors should not be used at any time.

IR IN pinout

The following figure displays the IR IN pinout for the CM-BT20-COMPACT-70-RX and TX.

Figure 8: CM-BT20-COMPACT-70-RX and TX IR IN pinout



Specifications

	HDBaseT CM-BT20-COMPACT-70-TX transmitter	HDBaseT CM-BT20-COMPACT-70-RX receiver
Input		
Signal	1 HDMI and 1 IR	1 RJ45 and 1 IR
Connector	HDMI female and 3.5mm mini jack	3.5mm mini jack and RJ-45
Output		
Output	1 ARC, 1 IR, and I HDBaseT	1 HDMI and 1 IR
Connector	SPDIF, 3.5mm mini jack, and RJ45	HDMI female and 3.5mm mini jack
General		
Resolution range	800 x 600 at 60Hz to 4Kx2K at 30Hz	
Transmission mode	HDBaseT	
Transmission distance	1080p ≤ 70m (without ARC) 1080p ≤ 40m (with ARC) 4Kx2K ≤ 40m	
Bandwidth	10.2 Gbps	
HDMI standard	Support HDMI 1.4 and HDCP 2.2	
Temperature	32 to 122ºF (0 to 50ºC)	
Humidity	10 to 90%	
Power supply	12 VDC 2A	
Power consumption	14 W	
Case dimension (W×H×D)	4.53 × 0.63 × 4.49 in. (115 × 16 × 114mm)	4.53 × 0.63 × 4.49 in. (115 × 16 × 114mm)
Net weight	.44 lb. (0.2kg)	.44 lb. (0.2kg)

Note: All nominal levels are at ±10%.

Supported resolution

Display Ration	Resolution	Refresh Rate
4Kx2K	4096 × 2160	24/25/30Hz
	3840 × 2160	24/25/30Hz
16:9	1920 × 1080	60Hz
	1600 × 900	60Hz
	1366 × 768	60Hz
	1280 × 720	60Hz
	1024 × 576	60Hz
16:10	1920 × 1200	60Hz
	1680 × 1050	60Hz
	1440 × 900	60Hz
	1360 × 768	60Hz
	1280 × 800	60Hz
4:3	1600 × 1200	60/65/70/75/85Hz
	1400 × 1050	60Hz
	1280 × 1024	60/75/85/96Hz
	1024 × 768	60/70/75/85Hz
	800 × 600	56/60/72/75/85Hz
	640 × 480	60/72/75Hz

Note: The HDBaseT CM-BT20-COMPACT-70-TX and RX supports 4K HDMI signal. Use HDMI cables compliant with HDMI1.4.

Panel drawings

Figure 9: HDBaseT CM-BT20-COMPACT-70-TX

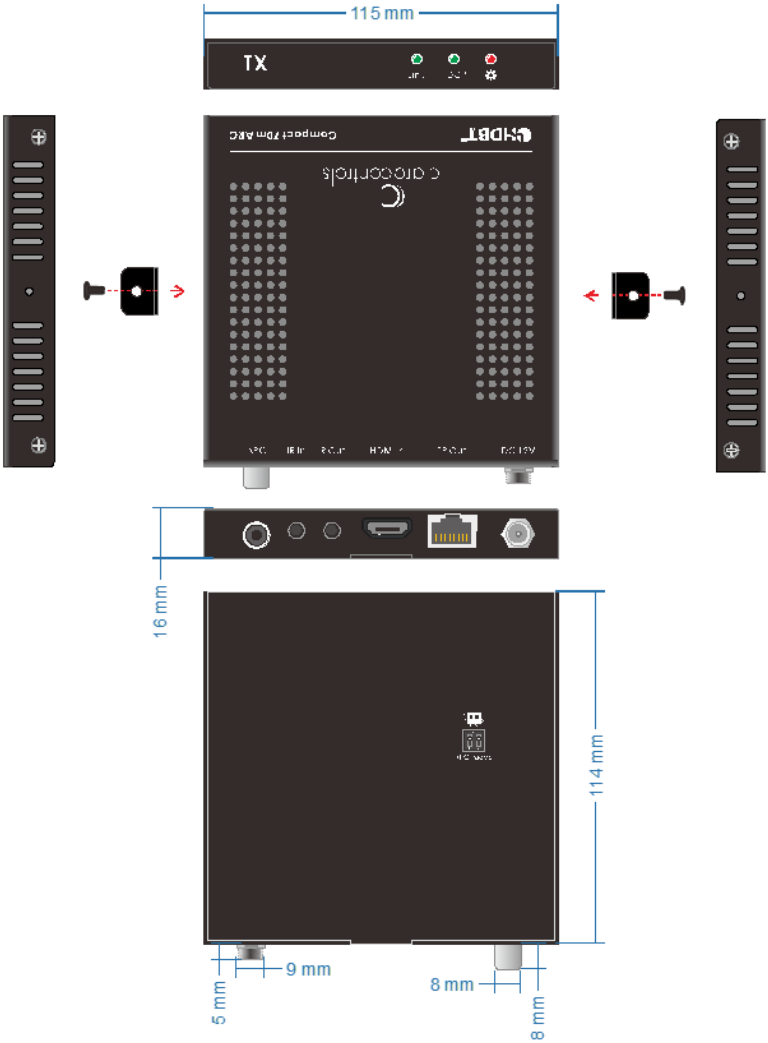
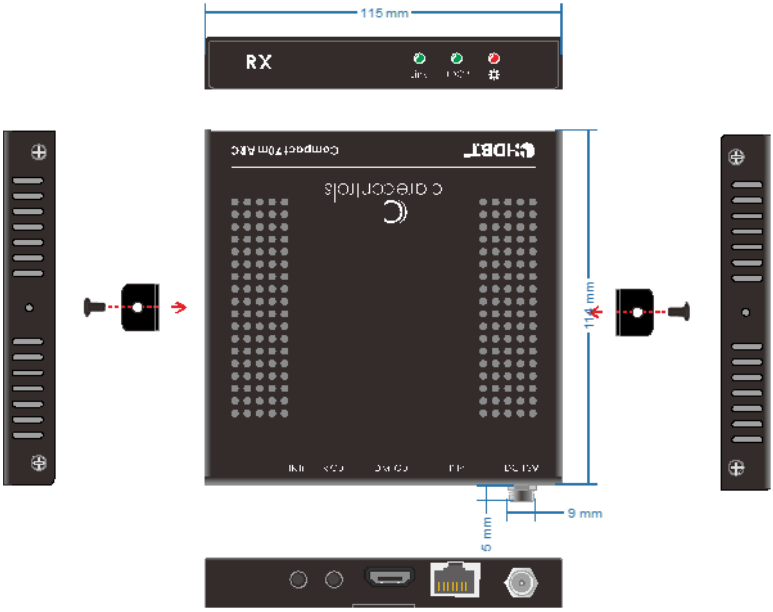


Figure 10: HDBaseT CM-BT20-COMPACT-70-RX



Troubleshooting and maintenance

No image on display

- Ensure that the display device has been set to the correct input.
- Ensure that the HDMI cables used for both the source/transmitter and the receiver/display are properly connected and working. Test the HDMI cables directly from a source to display and ensure their operation.
- Ensure that the Cat5e/Cat6 cable has not been damaged and that it has been terminated correctly with T568B on both ends. A temporary length of Cat5e/Cat6 can be used for testing to ensure that all devices are compatible and working properly.

No output at the ARC port

- In Bypass CEC mode:
    - Loose or failed HDMI or ARC connection;
    - Ensure HDMI IN port of the TX connects with an ARC device;
    - There is connection at the ARC port of the TX and the device is working normally.
- In Force ARC mode:
    - Loose or failed HDMI or ARC connection;
    - There is connection at the ARC port of the TX and the device is working normally.

Color loss or poor picture quality:

- Ensure that the HDMI cables used for both the source, transmitter, the receiver, and display are properly connected and are of good quality. Test the HDMI cables directly from a source to display and ensure picture quality.
- If the static becomes stronger or picture quality becomes worse when connecting the video connectors, this may be caused by improper external grounding. Verify that your system/rack is grounded properly.
- If using ARC over HDMI, ensure the T5/6 cable length is less than 131 ft. (40m).

IR signal problems

- When using a control system such as Clare Controls, the 3.5mm male mono to 3.5mm male stereo adapter cable (included) must be used. The male mono end connects to the control system; the male stereo end connects to HDBaseT CM-BT20-COMPACT-70-TX.

Known issues with HDMI 1.2 source devices

- Older compatibility (HDMI 1.2) may result in HDBaseT transmission issues. Please contact your local distributor.

After-sales service

If there appears to a problem when using the device(s), refer to the “Troubleshooting and maintenance” section in this manual. Return shipping costs are not covered by this warranty.

- You can contact Customer Support at http://support.clarecontrols.com. Please be ready to provide the following information.
    - Product model number, version and serial number
    - A detailed description of the trouble issues
    - A description of all connections and third-party equipment in use
- A valid invoice of purchase via an authorized dealer shall be required for any warranty coverage.

Warranty information

Clare Controls offers a three (3) year limited warranty on original Clare Controls components, from the date of shipment from Clare Controls. To view complete limited warranty details, including limitations and exclusions, www.clarecontrols.com/warranty.

Scan the code to view product warranty details.