SUV HD120/HD120E
And
Panel Antenna
Quick Use Guide

It is highly recommended that you read the Quick Use Guide before using this product to ensure that you get the most out of your SUV HD120/HD120E

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Precautions

Changes or modifications not expressly approved by the manufacturer are prohibited and will void the warranty.

Operating Temperature: 0 to +40◦ C / 32 to 104◦ F

Storage Temperature: -20 to +60◦ C / -4 to 140◦ F

Electrostatic discharge (ESD) sensitive electronics

Both the transmitter's and receiver's input /output ports are designed with ESD protection circuitry that can sustain +/- 8 KV transient voltage spikes; however it is recommended by the manufacturer to:

- Power off both transmitter and receiver prior to installation.

FCC & CE Statement

The following equipment have been tested and found to comply with part 15 of the FCC rules.

FCC ID: 2ADZC-HLWH005

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. However, there is no guarantee that interference will not occur in a particular installation.

Panel antenna has no active electronic components, no FCC certification is required.

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Limited Warranty

The manufacturer guarantees that every SUV HD120/HD120E set will be free from physical defects in material and workmanship under normal use for one (1) year from the date of purchase. This warranty does not cover any problem that is caused by: accident, abuse, neglect, shock, electrostatic discharge, heat or humidity, improper installation, operation, maintenance or modification; any product with removed, damaged or tampered labels, unauthorized opening of the enclosures, malfunctions caused by other equipment; or any misuse contrary to the instructions in the Quick Use Guide. If the product proves defective during the warranty period, contact customer support in order to obtain a Return Material Authorization Number. By sending the product for replacement to the manufacturer, the customer agrees to transfer the ownership of the original product to manufacturer. The manufacturer may choose not to return your original unit to you.

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Getting Started

Thank you for your purchase of the SUV HD120/HD120E, a wireless HD video transmission and receiving suite. Following are key benefits using this short range(up to 300 meters, 900 feet for HD120 and up to 400 meters, 1280 feet for HD120E) wireless video suite:

- Wireless - never worry about cable-tripping injuries
- Lightweight and easily mountable on a handheld/shoulder-mount camera, giving presenter total freedom to follow scenes easily
- Ideal for mobile camera shootings, such as reality TV shows, sports broadcasting, location scouting, outdoor discovery, and documentary shoots
- Makes planning event coverage quicker and easier by moving and positioning the camera without re-rigging the cables
- Dual format video inputs: Automatically detects any of the dual format video inputs, SDI or HDMI
- Dual format video outputs: Bilaterally sends the HDMI signal to the "Preview" monitor and SDI to production switcher
- Support point to point, and point to multiple(max. 4) points topology; work in 5.x GHz license-free band with maximum 10 frequency channels to choose

Manufacturer will share its on-site experiences with users with by illustration or pictures taken at the scenes in the Typical Installation Illustrations and a few examples.

Transmitter Installation will guide you step-by-step through installing the "T", and Receiver Installation will guide you to install the "R". The HD120E suites has identical transmitter with HD120 suite, but the receiver comes with 5 external antennas.

Additionally, "Frequently Asked Questions and Answers" comes with informative responses from user feedback.

The "Troubleshooting" section will help the user when encountering a problem setting up the product.

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Typical Installation and Examples

Auditorium - Concert - Banquet - Classroom

- Place one "R"'s at least 2 meters above ground standing close to the exit door, or clamped onto the hinge of the exit door. Should you need to walk the "T" outside the room, closer proximity to the receiver results in better reception.
- Run the "R"'s by Active Optical Fiber HDMI output cable to the switcher or directly to the Video Screen.
- Mount "T"'s on the camera; place the camera on a tripod or use it as a portable camera unit.

Indoor Sports

- Place one "R" close to the video screen input connector; sometimes it may not be right next to the video screen.
- Run the "R" HDMI Active Optical Fiber output cable to the Video Screen.
- Mount "T" with the camera and use it as a portable camera unit.

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Cable camera - "R" on top of broadcast truck

- Place "R" on top of the broadcast truck. Run the "R" HDMI output cable to the Video Screen.
- Mount "T" with the cable camera.

Outdoor events

- Place "R" on top of the truss and tilt it down about 10 degrees. Run the "R" HDMI output cable to the Video Screen.
- Mount "T" with either on the tripod or use it as a portable camera.

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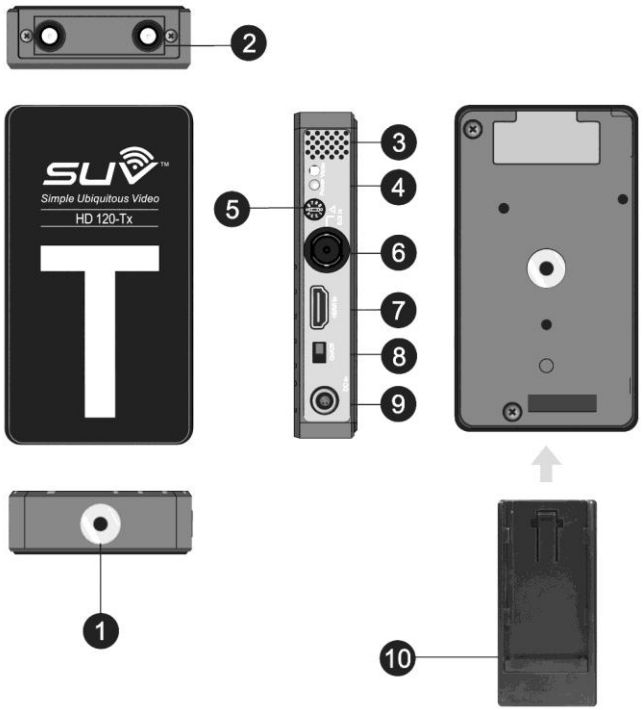
Transmitter Installation

Transmitter Connectors Layout



Item	Description	Note
1	¼-20 screw hole	Secured by using articulating arm or crab arm or swivel
2	RP-SMA male	Mount 2 x 5 dbi Duck antenna
3	Ventilation	
4	Power(Green) LED Video(Yellow) LED	Lit -- power is on Lit -- active video feed
5	Chanel 0 to 9 selection	Match with receiver's channel selection
6	SDI video input (BNC 75 ohm)	FullHD, HD and SD-SDI SMPTE-259/274/292/296/372/424/425
7	HDMI video input	Standard receptacle v1.3
8	Power on/off switch	
9	DC 7-36 volt input	One Lemo-4pin to DTap female battery cable included
10	Sony F970 battery back	Pre-installed

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Utilizing the female 1/4"-20 threaded receptacle

Tightly rotate the thread screw into transmitter's bottom ¼" threaded receptacle. Tighten it by turning the top thumbscrew counter clock-wise.

Mount the camera by sliding in the shoe adapter's bottom plate to camera's shoe. Then tighten them by rotating the bottom wheel clock-wise.

In addition to using two simple 1/4"-20 adapters and one articulating clamp arm provided by the manufacturer, the user is free to adopt any means such as: Triple Mount, Headrest Mount, Ultra Clamp, Car Window Mount, Easy Grip, BallHead Rig Mount, Car Window Pod, Camera Cage and many others as long as they lock with this 1/4"-20 receptacle.

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Mount both antennas on the "T"

Attach the antenna to the antenna connector by turning the antenna clockwise. You can bend and rotate the antennas into a position facing "R"'s top face. Double check the antennas are properly tightened.

Bend and spread both antennas 90 degrees apart to have the least interference between antennas, and place the unit's antennas parallel to "R"'s internal antenna (top front portion). However, if you are mounting the Tx on broadcasting truck's rim top, bend one leg straight up and the other leg right angle as the picture shown below.

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Choose and set the communication channel

Select the communication channel by using the screwdriver included. See page 13 for the list. Channels listed are primarily for North America; user should consult local regulations to find out if the desired channel is operable.

Power the "T" by the compatible NP-F570/-770 battery

Clip on the NP-F570 or compatible battery.
To remove the battery, press and hold the top tab to release the battery, then remove the battery.

Note: NP-F330/F530/F550/F570/F770/F970 all fit into the bracket and output DC +7.4V with varying capacities. A fully charged typical 2500 mAH battery can operate "T" for 90 minutes, and operate "R" for 120 minutes.

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Alternatively, power the "T" by V-/G-Brick battery

Align the LEMO4pin-Dtap power cord's RED dot with the RED dot of the LEMO-4pin receptacle, and plug in. To unplug it, hold and pull the dotted metal sleeve back, then remove the LEMO4pin connector.

Connect the extend Lemo-4pin power cord to the DTape receptacle on the V-/G-Lock battery.

Connect the SDI or HDMI signal from source, i.e. camera

SDI source can be "SD-SDI", "HD-SDI", "FullHD-SDI" from camera, production switcher and others, support formats:
1920x1080 - 60p, 60i/30p, 24p, 50p, 50i/25p
1280x720 - 60p, 60i/30p, 24p, 50p, 50i/25p
HDMI supports, in addition to above SDI format,
1440x1080 - 60i/30p/50i/25p and many other notebook's HDM I/DVI formats

SDI - up to 500 feet(160 meters) Belden 1694A 75-ohm cable
HDMI -- up to 45 feet(15 meters) double-shield cable
Note: There are Active Optical Fiber HDMI cables are able to run HDMI signal in a greater length, i.e. 100 meters.
Note: Cables are not included in the package.

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Connect the SDI or HDMI signal to "T"

Only one of the signal is active, and SDI has priority over HDMI if both signals are plugged in.

Power on the camera and "T", read the LED's status

Slide the power switch to ON position.

Bottom GREEN LED lights on either the clipped on battery or the extended V-/G-Lock battery is good; otherwise, it would turn ORANGE or not lit on at all.

Top ORANGE LED lights on when camera is fed in either the SDI or the HDMI signal. If bottom power LED lights ORANGE, this top LED would not turn on even the signal source is good.

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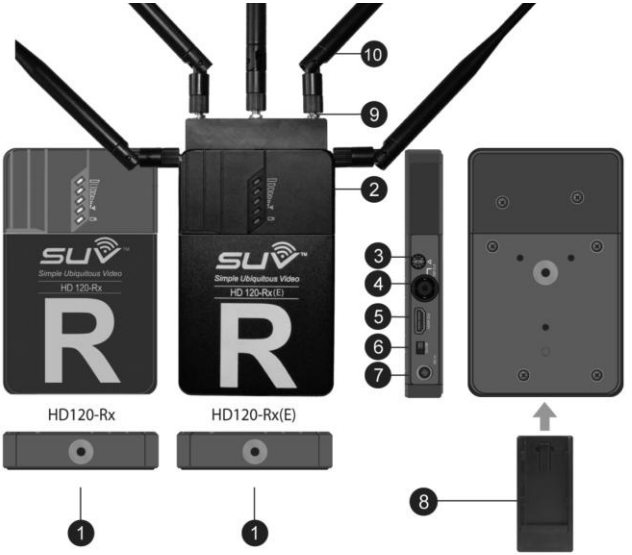
Receiver Installation

Receiver Connectors Layout



Item	Description	Note
1	Bottom ¼”-20 screw hole	Secured by mounting on light stand Note: Light stand is not included
2	RSSI: top 4 blue LED’s Power: bottom 1 yellow LED	All lit – highest strength, no LED lit – poor reception Lit – power on
3	Channel 0-9 selection	Non USA / USA only Channel 0 – 5.50 GHz / same Channel 1 – 5.59 GHz / same Channel 2 – 5.63 GHz / same Channel 3 – 5.67 GHz / same Channel 4 – 5.15 GHz / same Channel 5 – 5.19 GHz / channel 0 repeat Channel 6 – 5.23 GHz / channel 1 repeat Channel 7 – 5.27 GHz / channel 2 repeat Channel 8 – 5.31 GHz / channel 3 repeat Channel 9 – 5.51 GHz / channel 4 repeat
4	SDI video output	FullHD, HD and SD-SDI SMPTE-259/274/292/296/372/424/425
5	HDMI video output	Standard receptacle v1.3
6	Power on/off switch	
7	DC 7-36 volt input	One Lemo-4pin to DTap female battery cable included
8	Sony F970 battery back	Pre-installed
9	RP-SMA male	5 x external antenna connector
10	5 dbi HD120-Rx(E) antenna	5 x HD120-RxE Omini-directional antenna

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Choose and set the communication channel

Must select the same channel number as the "T".

Connect the SDI and/or HDMI outgoing signal

Connect the SDI outgoing signal to production switcher or monitor.

Connect the HDMI outgoing signal to monitor, projector or video wall.

Connect other end of SDI and/or HDMI cable

SDI output can be "SD-SDI", "HD-SDI", "FullHD-SDI" to monitor, production switcher, video wall and more, support formats:
1920x1080 - 60p, 60i/30p, 24p, 50p, 50i/25p
1280x720 - 60p, 60i/30p, 24p, 50p, 50i/25p
HDMI supports, in addition to above SDI formats,
1440x1080 - 60i/30p/50i/25p and many other notebook's HDM I/ DVI formats

SDI - up to 500 feet(160 meters) Belden 1694A 75-ohm cable
HDMI -- up to 45 feet(15 meters) double-shield cable
Note: There are Active Fiber and booster included HDMI cable is able to run HDMI signal in greater length.

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Mounting the "R" on a light stand or on hinge of the door

The "R" exhibits better reception when it is set at least 2-meters high and placed at least one foot away from metal objects.

If "T" looks down the "R", it is recommended to tilt up the "R" and bend "T"'s antennas toward "R", and vice versa, to tilt down the "R" and bend "T"'s antennas toward "R" if "T" looks up the "R".

HD120-RxE

HD120-RxE with optional panel antenna

HD120-Rx

Power the "R" by NP-F570,-770 compatible battery

Slide and click in the battery.
To remove the battery, press-and-hold tab to release the battery, then remove the battery.

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Power the "R" by V-/G-Brick battery

Align the LEMO4pin-Dtap power cord's RED dot with the RED dot of the LEMO4pin receptacle on the receiver, and plug in. To unplug it, hold the dotted metal sleeve and pull it back, then remove the LEMO4pin connector. Then connect the LEMO4pin-Dtap's DTap connector to the battery's DTap receptacle.

Power the "R" by wall-mount AC/DC adapter - Preferred

Now connect the Lemo4pin-Dtap's DTap connector to the wall-mount AC/DC adapter's DTap receptacle.

Power on the "R" and read LED's status & video

Slide the power switch to ON position. Bottom ORANGE LED lit indicates the reception of video is good, and it turns to GREEN or flashing ORANGE when video has been lost.

LED's lit	RSSI
4	Best video
2-3	Good reception
1	Weak reception
0	No reception

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Maximum Range and Antennas

HD120-Tx's Duck antenna

- Gain: 5 dbi
- Radiation pattern: Donut-like
- Azimuth: 360°
- Elevation: +/-45°
- Tilt & swivel: YES
- Dimension: 136x20x6 mm
- Included: YES

HD120-Rx's internal antenna

- Gain: 2 dbi
- Radiation pattern: Donut-like
- Azimuth: 360°
- Elevation: +/-30°
- Tilt & swivel: NO
- Dimension: N/A
- Included: YES

SUV HD120 Suite

Range 240 meters (790 feet)

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HD120-Tx's Duck antenna

- Gain: 5 dbi
- Radiation pattern: Donut-like
- Azimuth: 360°
- Elevation: +/-45°
- Tilt & swivel: YES
- Dimension: 136x20x6 mm
- Included: YES

HD120-RxE's external antenna

- Gain: 6 dbi
- Azimuth: 360°
- Elevation: +/-45°
- Tilt & Swivel: Yes
- Len: 200 mm Di: 14 mm
- Included: YES

SUV HD120E Suite

Range 360 meters (1200 feet)

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AP5G5149090-V Panel Antenna
(sold separately)

Gain: 14 dbi
Azimuth: 40˚
Elevation: 40˚
Tilt & Swivel: Yes
(L*W*H): 310*310x40mm

V-mount plate: Included

AP5G5149090-G Panel Antenna
(sold separately)

Gain: 14 dbi
Azimuth: 40˚
Elevation: 40˚
Tilt & Swivel: Yes
(L*W*H): 310*310x40mm

G-mount plate: Included

SUV HD120E Suite
+
Panel Antenna

Range 660 meters
(2120 feet)

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Transmitter's & Receiver's Specifications

	Transmitter	Receiver
3G-SDI & HDMI	In: BNC & standard HDMI	Out: BNC & standard HDMI
Video Resolution	1080p: 60/59.94/50/30/29.97/25/24/23.98 1080psf: 30/29.97/25/24/23.98 1080i: 60/59.94/50 720p: 60/59.94/50 480p: 59.94/576p50 (HDMI only) 480i: NTSC 576i: PAL	same
Audio resolution	Embedded 48 KHz 24-bit PCM first 2 channels only	same
Multi-cast	Yes – pair up to 4 Rx's	same
Compression	No	same
Encryption	AES-128 bit	
Color sampling	YCbCr: 4:2:2 10-bit	YCbCr: 4:2:2 10bit
RF Power	18 dbm	N/A
Sensitivity	N/A	-75 dbm
Antenna	2 External Omni RP-SMA 5 dbi	5 internal or 5 external antenna ports
Operating carrier Frequency Bandwidth Modulation	5.x GHz un-licensed band Non-DFS ISM 5.x GHz 40 MHz per channel OFDM 16-QAM	same
L.O.S. Range	Up to 900 feet (280 meters)	same
R.S.S.I. Power Video status Power switch	N/A 1 Green LED for power 1 Yellow LED for video On/Off	5 blue LED's 1 Yellow LED for power and video On/Off
Battery bracket	Pre-installed Sony F970 compatible	same
Wall-mount power adapter	N/A	One 100-240V AC input, DTap female socket +12V output
Power cable DC input voltage	One R/A Lemo-4pin to DTap male-socket coiled cable length 10" 7-36 Volt	Same same
Enclosure material	Milled aluminum	Top portion plastic Body milled aluminum
Dimension (L x W x H) Weight	115 x 67 x 23 mm 4.53" x 2.64" x 0.9" 270 grams 9.5 ounces	152 x 95 x 23 mm 6" x 3.74" x 0.9 355 grams 12.52 ounces
Operating Storage temperature	0-40◦C, 32-104◦F -20-60◦C, 4-140◦F	same
Plug-n-Play safe +/- 8KV ESD protection	Yes	same
FCC CE RoHS	Yes	same

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Frequently Asked Questions

Q: What do "T" & "R" stand for? How many "R"'s can pair with one "T"? How many "T" can co-exist at the same time?
A: "T" -- transmitter or Tx, "R" -- receiver or "Rx", up to 4 "R" can pair with one "T". As long as they all use the same communication channel, no performance degradation will occur". Maximum 10 sets of "T"+"R"'s are possible at the same time.

Q: What's the difference between HD120 and HD120E? Can I swap out HD120-Tx's and HD120-Rx(E)'s antennas?
A: HD120E includes HD120-Rx(E) receiver with five external antennas. Yes, please see page 19 for details.

Q: Are HD120-Tx and HD120-Rx/HD120-Rx(E) FCC/CE certified?
A: Yes, they are. Please find the "FCC & CE" statement in Page 2.

Q: Will the SUV HD120/HD120E work with 5.x GHz Wifi and other devices? And do I need to apply for licenses to operate?
A: Yes and No. Please consult page 12 for available channels.

Q: What is modulation scheme used and bandwidth required?
A: The system is MIMO and COFDM/16-QAM in 40 MHz bandwidth

Q: What does Line-of-Sight distance mean?
A: A straight line along with "T" and "R". Up to **260** meters(**860** feet) for HD120 and up to **400** meters(**1280** feet) for HD120E. outdoor tested by the manufacturer. Actual distance varies with surrounding interferences, blocking objects(landscape, size of metal object, wall and human bodies) and environment humidity, which attenuate signal strength in addition to path loss.

Q: What are the compatible battery models? How long do they run?
A: See page 10.

Q: Can I use a notebook's HDMI port as the source to "T"?
A: Yes. The "T"'s HDMI input covers a wider range of resolution compared to SDI, which covers SDI, HD-SDI and FullHD only. So you might see non-standard signal on HDMI monitor only. See page 11. Note: Use DVI-HDMI and HDMI-DVI adapters between HDMI and DVI.

Q: What is the maximum cable length to use in "T" and "R"?
A: 100-meter(300 feet) for SDI, 15-meter(45 feet) for HDMI; however, Active Optical Fiber HDMI or SDI cable can run the signal in a greater length.

Q: Will audio be transmitted together with video without latency?
A: Yes. Both video and the first two embedded audio are transmitted, no latency, both video and audio are AES 128-bit encrypted.

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Q: After running the "T" a while, the "T" surface is hot - is this normal?
A: Yes it is normal. The unit's heat is dissipated via the metal enclosure.

Q: Where to contact techsupport?
A: User can always contact Shining's techsupport at (714)3128998 or or write to techsupport@shining.com, and access http://www.shining.com, SUV page for additional information.

Q: Can I use full 10 channels assigned in USA?
A: Please check page 14 for each channel's frequency assignment.

Troubleshooting

Q: No video showing on the monitor attached with the "R".
A: They are many possible causes:

1). Check both T's and R's power lights status(page 11 and 16), make sure either the clicked in battery, or extended battery, or attached wall-mount adapter is in working condition.
2). Make sure both "T"'s and "R"'s power are ON.
3). Check both communication setting, they should be identical. Must re-cycle the power of the T or R if changed.
4). If the "T" is attached with a computer's HDMI output, and it's resolution is not HD(1920x1080 pixels) format, the HD-SDI output attached with the "R" would be turned off, but HDMI would still be on.

Q: "**Link connecting**" message showing on "R".
A: "R" is up running but not "T", refer to "Transmitter Installation".

Q: Video quality on the "R"'s monitor is noisy.
A: Make sure the HDMI cable is 100% double shielded.
Make sure the SDI cable is 75-ohm also 100% shield.
Bring in the "T" and "R" closer, and make sure RSSI is good(page 16).
Change different communication channel for both "T" and "R". Must re-boot both "T" & "R" to take in the new selection.

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HD120 Suite's Contents

- Two ¼"-20 thread screw adapter
- One crab arm
- One articulating arm
- Two Lemo4pin to DTap coiled power cords
- One universal AC/DC power adapter
- Two screw drivers
- One transmitter(T) + 2 detachable Omni antennas
  Width: 67 mm / 2.64" Height: 123mm / 4.84"
  Depth: 24 mm / 0.93" Weight: 200 gm / 7.05 oz
- One receiver(R)
  Width: 96 mm / 3.77" Height: 152 mm/ 6"
  Depth: 24 mm / 0.93" Weight: 400 gm / 14.11 oz
- One Quick Use Guide
- One hard black plastic hard plastic box with shoulder belt
  Net weight: 1.32 Kgs, 2.9 lbs
  Total weight: 2.63 Kgs, 5.8 lbs
  Dimension (W x L x H):
  385 mm x 280 mm x 115 mm
  15 5/32" x 11 1/31" x 4 17/32"

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HD120E Suite's Contents

- Two ¼"-20 thread screw adapter
- One crab arm
- One articulating arm
- Two Lemo4pin to DTap coiled power cords
- One universal AC/DC power adapter
- Two screw drivers
- One transmitter(T) + 2 detachable Omni antennas
  Width: 67 mm / 2.64" Height: 123mm / 4.84"
  Depth: 24 mm / 0.93" Weight: 200 gm / 7.05 oz
- One receiver(R) + 5 detachable Omni antennas
  Width: 96 mm / 3.77" Height: 186 mm/ 7.33"
  Depth: 24 mm / 0.93" Weight: 454 gm / 1 lb
- One Quick Use Guide
- One hard black plastic hard plastic box with shoulder belt
  Net weight: 1.32 Kgs, 2.9 lbs
  Total weight: 2.86 Kgs, 6.3 lbs
  Dimension (W x L x H):
  385 mm x 280 mm x 115 mm
  15 5/32" x 11 1/31" x 4 17/32"

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Panel Antenna Package Contents (sold separately)

1) One panel antenna with pre-installed V-mount bracket
   or
1) One panel antenna with pre-installed G-mount bracket
2) Five N-male right angle to RP-SMA male plug length 1 foot(30.48 cm)
3) One Camera/Umbrella bracket with three 5/8" receivers
4) One Universal 5/8"(16 mm) stud with 3/8"-16M and ¼"-20M threads
5) One 3/8" to ¼" screw adapter with reducer bushing

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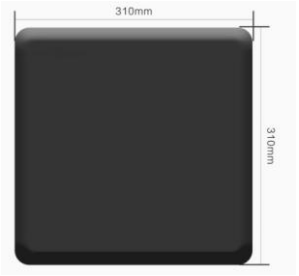

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