



Video & Fiber Optic Systems

INSTRUCTION MANUAL

HUT

Hybrid Universal Transceiver

SMPTE Hybrid Cable Elimination System for Broadcast Camera Systems



MultiDyne

Harnessing The Power of Light

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This product was designed and manufactured in the
UNITED STATES of AMERICA

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Important Safety Information





- Read these instructions.
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water.
- Clean only with dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purposes of the grounding-type plug. A ground type plug has two blades and a third grounding prong. The third prong is provided for your safety. If the provided plug does not fit in to your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinching particularly at plugs, convenience receptacles, and point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer.
- Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
- Throughout this manual, a number of warning and caution notes may be presented to alert the user to important safety or operating information. Please read and comply with any and all warning and caution notes in this manual.
- Always adhere to local building, safety and fire prevention codes during the installation and operation of this product.
- Use only power cords specified for this product and certified for the country of use.
- Connect the unit only to a power source with the specified voltage rating.
- Use only fuses of the type and rating specified.
- In case of an emergency ensure that power is disconnected.

	Warning –indicate danger that requires proper procedures or practices to prevent injury or death to personnel.
	Cautions indicate proper procedures or practices to prevent damage to equipment or property.
	Warning –The safe operation of this product requires that a protective earth connection be provided. A grounding conductor in the equipment's mains supply cord provides this protective earth. To reduce the risk of electrical shock to the operator and service personnel, this ground conductor must be connected to an earthed ground. The mains plug shall remain readily operable.
	Warning –The apparatus shall not be exposed to dripping or splashing and that no objects filled with liquids, such as vases, shall be placed on the apparatus.
	Warning - This symbol on the equipment indicates for use at altitudes not exceeding 2000 m.

Laser Safety Information

This unit is classified as a **CLASS 1 LASER PRODUCT** according to EN60825-1 (EU) and FDA 21CFR 1040.10 (USA). Class 1 laser products are considered safe and do not result in biological hazard if used according to these instructions.



	Warning – Use of controls, adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
	Warning – Never look directly into the end of the optical fiber while either end of the system is operating.
	Warning – Never clean an optical fiber connector on equipment or cable that is carrying light.
	Warning – Always use dust caps on fiber optic connectors when cables are not connected. This will protect the connector from damage and accidental exposure of a human eye to an operating laser.

INTRODUCTION

The SMPTE HUT system enables you to replace long runs of the bulky and expensive hybrid fiber cable that connects your camera and CCU with inexpensive fibers alone. It does this by moving the camera power injection from the CCU side to the cam side. It consists of a breakout adapter, known as the HUT-CCU, that attaches to the SMPTE connector on your CCU. This enables you to connect 2 fibers going to the cam side using ST connectors, and it also tricks the CCU into thinking that your camera is still attached by the hybrid fiber cable.

At the cam side of these fibers is the CAM HUT, which takes these 2 fibers with ST connectors and routes them to a SMPTE hybrid fiber connector. It also plugs into local mains power and injects 230 VAC for your camera into that same SMPTE connector which now connects to the camera via a much shorter length of hybrid fiber cable. The CAM HUT performs the same safety checks on this cable as your CCU does, and it optionally allows remote powering down of your camera from the CCU side as well as optical repeating and remapping of the wavelengths to and from the CCU.

FEATURES AND OPERATION

CAM HUT (cam side) unit

The CAM HUT basic version is shown in Fig. 1. There are 3 versions of the CAM HUT, described below.



CAM HUT

There are 2 versions of the CAM HUT, and each has its own front panel. These are shown in Fig. 2. The basic configuration, which is the first panel, is to have the SMPTE hybrid fiber connector to the camera and the 2 ST/UPC or duplex LC fiber connectors populated on the front panel. These are labeled FROM CCU and TO CCU. Optionally, the optical connectors can be located on the rear panel instead, as shown in Fig. 3. In systems with

the optional optical repeater, it is important that the user be sure that his up-link and down-link signals are matched to the proper connectors consistently throughout the link.

Front Panel

RESET: This button resets a 2A thermal circuit breaker in series with the SMPTE hybrid connector output. In the event of an over-current fault that causes power to the cam to be removed, as evidenced by the HV PRES LED being dark, and the button popped out. Pressing this button restores power after the fault is removed. Note that RESET does not restore functionality if a SMPTE cable fault exists.

SMPTE CABLE Status LEDs:

SHORT: Glows red upon short or leakage of hybrid fiber cable to ground. Upon power up, this LED may glow red for a few seconds even if no short exists. This is normal.

OPEN: Glows red when cable is open or cam not connected. If using a Hitachi camera, be sure to set the CAM TYPE switches to the Hitachi positions, to bypass the OPEN cable test. Otherwise, it will always fail. For Panasonic, Sony or Ikegami, set switches for those cameras.

OK: Glows green indicating a properly connected hybrid fiber cable.

HV ENAB: Glows green when the HUT attempts to apply 230VAC to the hybrid fiber cable. This occurs only after all cable checks have been completed successfully.

HV PRES: Glows green when 230VAC is actually present on the hybrid cable. If HV ENAB is green but HV PRESS is off, check to see if the circuit breaker has been tripped. If so, the RESET button may need to be pressed after removing the fault. Otherwise, there could be a failure of either the HUT relays or power transformer, and the HUT will require service.

CAM TYPE: Selects cameras according to table below:

	Switch A (leftmost)	Switch B (rightmost)
Sony or Ikegami	down	down
Hitachi	down	up
Panasonic 3500 or 3800	up	down
Panasonic 3000 or 5000	up	up

Optional Front Panel Features

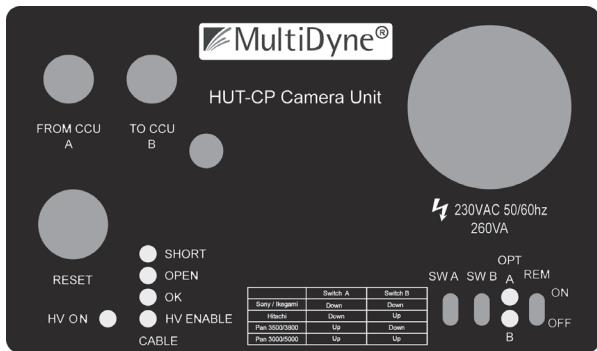
If ordered with the optional Optical repeater, besides the features of the basic unit, the front panel will have these additional features as shown in the second panel:

Optical Status Leds:

If the complete optical repeater option that allows optical remapping is fitted, there are 2 LEDs labeled **FROM CCU** and **TO CCU** for the 2 optical fibers. Each glows red if the received optical strength of its fiber is less than -18db, and green if greater. However, if only the remote shutdown feature is fitted, only the **FROM CCU** LED will be shown on the front panel. The **TO CCU** fiber path will be entirely passive, and is passed straight thru the CAM HUT.

REMOTE enable switch:

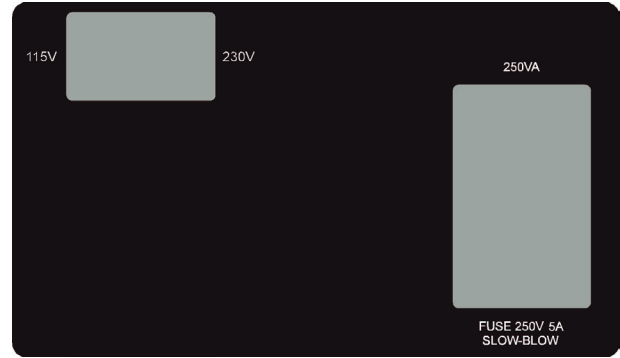
Set to on to enable the Cam HUT to prevent HV from being applied to the camera if fiber **FROM CCU** is not illuminated. Fiber **FROM CCU** is assumed to be the fiber up-linking from the base to the camera. This effectively places the camera in standby, as only standby voltage can be applied. If fiber **FROM CCU** is illuminated, the Cam HUT will enable the application of HV if all other cable checks have been passed. If the **REMOTE** switch is set to off, this feature is bypassed and the application of HV will be determined by the cable checks alone. Functionality will then be identical to the basic unit.



CAM HUT - front panel

Rear Panel Features

The rear panel is shown in Fig. 3. This drawing shows an optional location of the optical connectors on the rear. The same considerations concerning the fiber optic connectors should be observed as on the front panel. Also on the rear is a fused, filtered power entry module that accepts an IEC cord and a primary power switch. If the optical connectors are located on the front panel as shown in Fig. 2, then the rear would be completely blank except for the power entry. If pressing the RESET button after an over-current fault has occurred does not restore power, please check the fuse.



CAM HUT - back panel

Configuring the Operating Voltage:

The unit is configurable for either 115 or 230V operation. The CAM HUT must be set for the correct mains voltage or damage may result. The default configuration is for 115V operation. To reconfigure the CAM HUT for a different mains voltage, using a screwdriver, slide the red voltage select switch on the rear panel to the correct mains voltage.

Base (CCU side) Unit

The Base unit, known as HUT-CCU, has a SMPTE hybrid receptacle panel mount connector for connection to the CCU and 2 ST/UPC or duplex LC connectors for the fibers to the CAM HUT. The base unit is shown here in Fig. 4 with ST connectors As on the CAM HUT, the ST or LC connectors are labeled either **FROM CCU** and **TO CCU**. The same considerations concerning the fiber labels should be observed, as on the CAM HUT.



Base Unit

The HUT-CCU acts as a breakout for the optical ports in the CCU SMPTE connector. It also tricks the CCU into thinking a camera is attached by a SMPTE hybrid fiber cable. This is necessary to enable the CCU to leave standby mode so that it can accept video from the camera. It has 2 LEDs located on the panel with the ST connectors, labeled Power and HV. The Power LED is green the CCU is supplying power to the HUT-CCU, and the HUT-CCU is attempting to spoof the CCU. The HV LED is green when the CCU is supplying high voltage. This means that the HUT-CCU has successfully spoofed the CCU into thinking a camera is attached. Otherwise, the CCU will not leave standby mode.

For proper operation, the HUT-CCU must be set for the type of camera system being used. There are 2 versions of HUT-CCU: one with dip switches, and a rugged version with metal bat handle switches. Set the HUT-CCU for the camera type according to the following tables:

CCU Unit (HUT BS)

Front Panel Camera Select DIP Switch Settings:

	SW1	SW2	SW3	SW4	SW5	SW6	SW7
Ikegami	down	up	up	up	down	up	up
Hitachi	down	up	up	up	up	up	up
Sony	down	up	up	up	up	down	down
Panasonic 3500 or 3800	up	down	up	down	up	up	up
Panasonic 3000 or 5000	down	up	down	up	up	up	up

CCU Unit (HUT BS)

Front Panel Camera Select BAT HANDLE Switch Settings:

	SW1	SW3	SW4	SW5	SW6	SW7
Ikegami	down	up	up	down	up	up
Hitachi	down	up	up	up	up	up
Sony	down	up	up	up	down	down
Panasonic 3500 or 3800	up	up	down	up	up	up
Panasonic 3000 or 5000	down	down	up	up	up	up

Note there are only 6 switches in this version. SW2 is eliminated.

Connections

SDI Standards Supported, repeater	SMPTE 259M/292M/297M/425M, DVB/ASI
SDI Added Jitter, repeater	< .03 UI, < 1 MHz
Laser Safety, repeater	Class 1
Optical Wavelengths, nm, repeater	1310. 1550 or CWDM optional
Optical Sensitivity, repeater	-18 dBm
Optical Output Power, repeater	-2 ~ -8 dBm
Fiber Optic cable length, standard	Limited by camera/CCU
Fiber Optic cable length, repeater	Up to 20km
Indicators, CAM HUT Unit, standard	Cable open/short, HV/status
Indicators, CAM HUT Unit, repeater	As above + optical power ok/bad/laserfail
Electrical Output, CAM HUT Unit	230VAC @ up to 250VA, active,
24VAC @ up to 25VA, standby	
Certifications	FCC class B and UL/CE

Mechanical, Environmental

Dimensions	(LxWxH), Weight
HUT-CP	11.25 x 5.75 x 3.5 inches, 10.3 lbs.
Operating Temperature	0 to 70 deg C
Power Requirement, CAM HUT Unit	115/230VAC, 50/60HZ, 260VA
Optical Connectors, CAM HUT	SMPTE 311 Plug + 2 ST/UPC or LC
HUT-BS, BA, CS, CA	7 x 2.5 x 2 inches, 0.7 lb.
Power Requirement, HUT CCU Unit	Uses power from CCU
Optical Connectors, HUT-CCU	SMPTE 311 Receptacle + 2 ST/UPC or LC

Note: the length of hybrid cable that can be supported between the powered HUT and the camera is a function of many variables including thickness of the hybrid cable, number of connections, and current draw of camera accessories and lens size/type/servo.