



DUC HD Camera

OPERATION AND MAINTENANCE MANUAL

P/N HD969 - MANUAL, OPERATION, DUC CAMERA HD380 & HD370

Revision: 5 01.10.20

**This manual includes operating instructions for the HD380 DUC camera. The HD380 camera replaces the obsolete HD300-1 & -2 DUC camera. This manual also covers the operation of the HD370 DUC camera, the SoLID FX version of DUC. The HD370 DUC camera replaces the HD300-3 DUC Camera.



CUES® equipment is designed to be easy to use during day to day operation. However, it is powered electrically and thus must be operated with care and safety. PLEASE READ THE INFORMATION ON SAFETY AND MAINTENANCE EVEN IF THE SYSTEM IS SET UP BY SOMEONE ELSE.

Care was taken in the design of this product and in the production of this document and related materials. However, **CUES**® makes no warranty for the use of its products and assumes no responsibility for any errors or omissions in this document or for incidental or consequential damages resulting from the use of the products or the information contained in this document. Specifications may change without notice.

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We would be pleased to hear from you. If you see any errors or desirable extensions or improvements, please write us at the following address, C/O Operator's Manuals: **CUES**® Corporate Office 3600 Rio Vista Avenue Orlando, Florida 32805

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Styles and specifications are subject to change without notice. First version published in 2019.
Printed in the United States of America.

SAFETY PRECAUTIONS

Precautions must always be taken when operating electronic equipment. Exposed wires, damaged equipment, or improper operation can lead to a dangerous situation.

Please take a few minutes and read this entire manual prior to operating the equipment. Follow all safety procedures and thoroughly inspect equipment prior to use each day. This will help the equipment retain it's full value and will reduce the risk of injury, property, and/or equipment damage.



- Read the entire manual before attempting to connect or operate any equipment.
- Connect and disconnect cables only when the electric power is turned OFF.
- Never remove protection covers from the equipment or power generator. Internal repairs should only be done by an authorized CUES technician.
- If using a portable generator, always place it in an open area away from other equipment, manholes or obstructions prior to start-up; do not use a portable generator in an enclosed area.
- Upon receipt of the equipment, check for visible damage. If there is any evidence of rough handling, if damage is found, or if any equipment is missing, please contact the CUES Customer Service at 1-800-327-7791.

PERSONAL SAFETY EQUIPMENT & TRAINING

CUES stresses the use of appropriate safety equipment while working in and around manholes and during system operation. Safety should constantly remain the utmost priority. NOTE: The user of CUES products is responsible for all training and operation under federal, state and local guidelines and regulations for both confined space entry and traffic control. Recommended safety equipment includes but is not limited to the following:

- Safety goggles
- Work gloves
- Steel-toed boots
- Reflective vests
- Hard hats
- Filter masks (full respirators may be necessary)
- Flashlights
- Safety lines
- Traffic warning signs
- Traffic cones
- Gas detectors
- Ventilation fans

CUES ® makes no warranty for the use of its products and assumes no responsibility for any errors or omissions in this document or for incidental or consequential damages resulting from misuse of the products.

01 . INTRODUCTION

This manual includes setup, operation and maintenance instructions for the CUES HD380 & HD370 DUC HD camera. This should not be confused with the now obsolete Cues HD300-1, -2, -3 DUC cameras for which the HD380 & HD370 cameras are replacements. This manual does not cover operating instructions for the GraniteNet Software, which is required to operate DUC cameras. This manual also does not cover installation of the camera on various transporters. Refer to the appropriate supplementary documentation in this manual for transporter configurations and operation.

The DUC Camera incorporates the latest video technology to provide views of sewer pipe walls, lateral openings and discharges by utilizing HD digital side-scanning technologies. The DUC HD camera is designed to run on CUES multi-conductor gold or yellow cable CCTV inspection systems. If you have any questions or are uncertain about your specific system, please contact the CUES Customer Service Department at 1-800-327-7791.

The DUC camera can be used in conjunction with CUES multi-conductor legacy or K2/K3/Summit TV inspection systems and/or can integrate directly into any CUES multi-conductor transporter with 3" diameter camera tube cradle to maximize transporter platform options. The camera electronics transfer the digital video on CUES standard TV gold or yellow cable to inspect 6" through 48" sanitary and storm sewers.

NOTE that the HD961 6" skid kit must be installed to allow clearance in 6" pipes. This kit is available through CUES Parts personnel.





02. SETUP/OPERATION/MAINTENANCE

WARNING: The polycarbonate window protecting the LEDs can be damaged by chemicals in cleaning solutions and/or disinfectants. This will generally manifest itself as, but not be limited to, a conditions noted as “crazing”: small parallel hairline cracks in the polycarbonate not readily visible in the frosted area, but visible in the clear areas for the SPOT LEDs. These can worsen causing splits in the window near the glass dome allowing a leak path into the camera.

For the polycarbonate LED window, it is recommended to use:

- Soap and water, Palmolive or Joy, for cleaning
- Isopropyl Alcohol for disinfecting

Alternatively, a lens cleaning kit, HW2280, is available through CUES Parts personnel.

Verify that power is OFF to the camera:

- PC600 in the OFF position
- K2/K3/Summit in the off position or in the “Configuration Screen”

Using the appropriate instruction sheet and adapter cable as outlined in the Transporter/Cable table within this document:

1. Connect the adapter cable to the camera.
2. Install the camera into the transporter.
3. Connect the adapter cable to the gold or yellow cable.

Power up the system per the applicable documents in respect to the system in use.

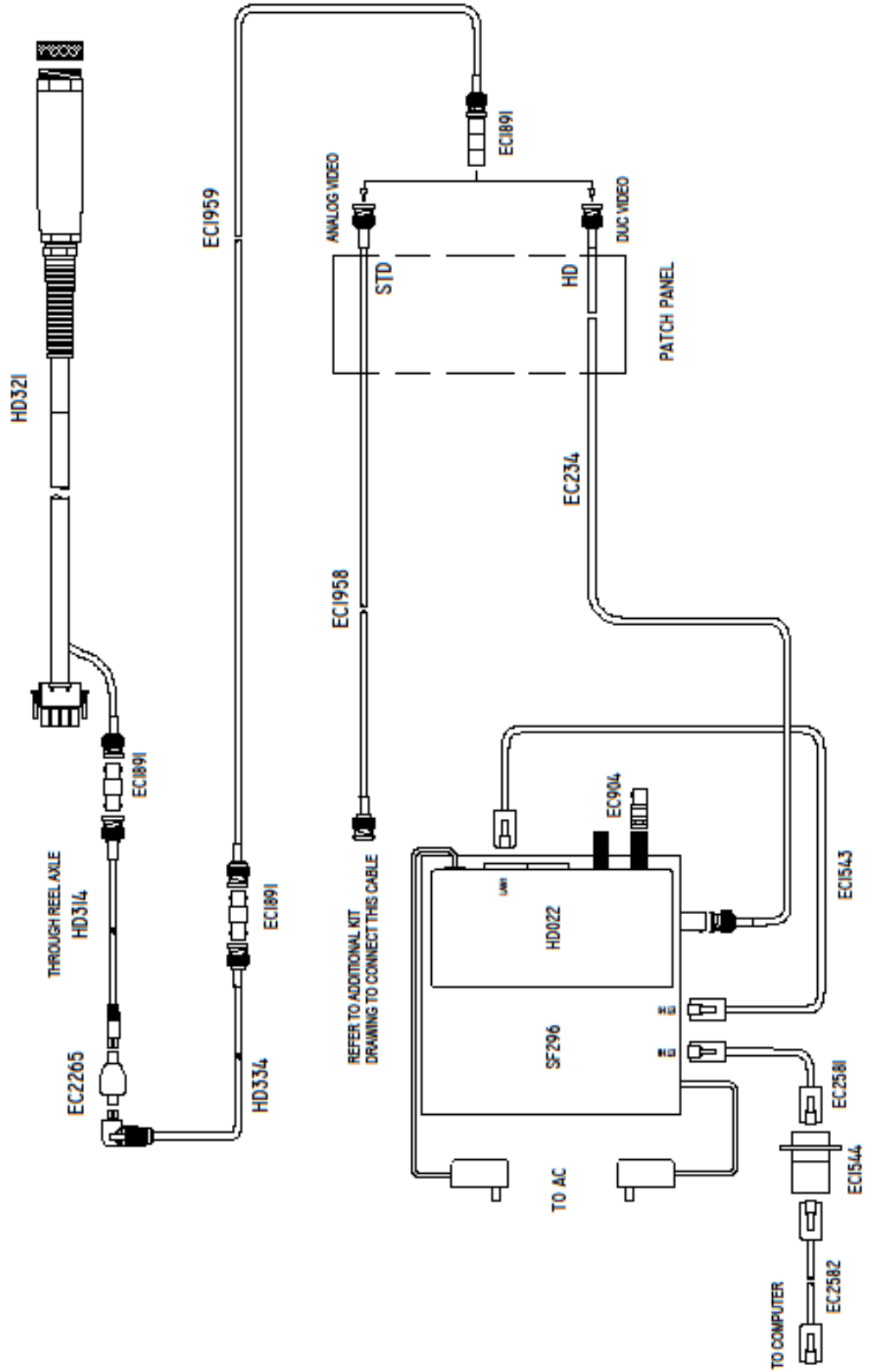
All camera controls and video are controlled by the GraniteNet application.

Verify that the camera video is present and that the three banks of LEDs (Top, Bottom, Spots) strobe correctly and can be varied.

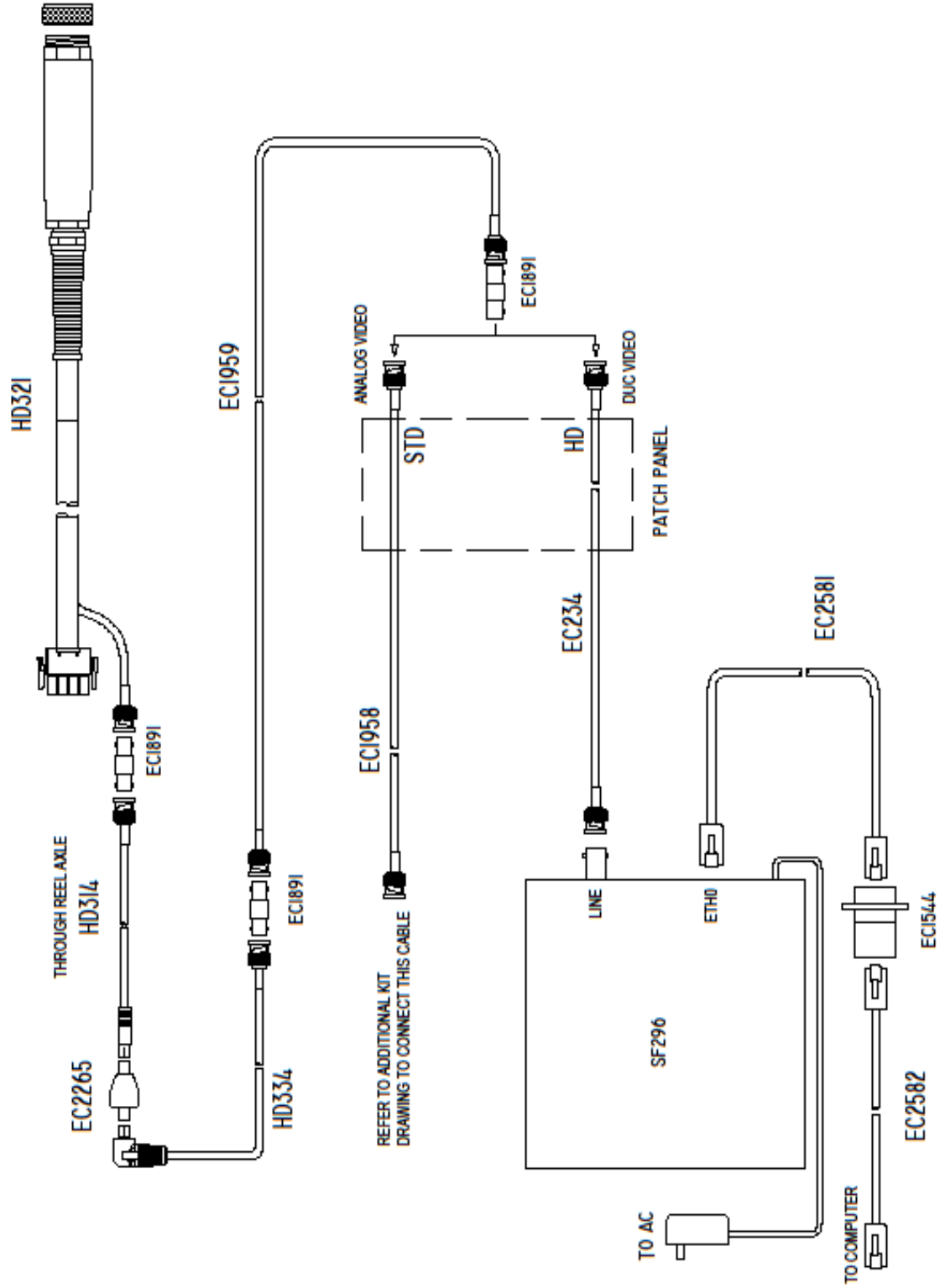
Verify that the transporter, and lift if present, operate correctly.

If the above is accomplished, the DUC camera is ready for use.

DUC VIDEO PATH WITH ALPHA (HD022) AND PATTON BRIDGES (SF296).
NOTE THAT THE ALPHA BRIDGE (HD022) IS FOR USE WITH THE OBSOLETE HD300, HD300-1 AND HD300-2 CAMERAS AND NOT REQUIRED FOR THE HD370 AND HD380 CAMERAS.



DUC VIDEO PATH WITH PATTON BRIDGE (SF296) ONLY.



03 . SPECIFICATIONS

FEATURE	DETAILS
IMAGE SENSOR:	1/2" format, 3.1 megapixel, CMOS, color, 7.7mm x 6.1mm array, 2048 x 1536, 3.2µm square pixels
MINIMUM ILLUMINATION:	1.5 lux @ F/1.0
RESOLUTION:	1500 lines of resolution, color, progressive scan
VIDEO OUTPUT:	4 frames per second, Image transfer via Ethernet
LENS:	1/2" Fish-eye, F1.5, 1.4mm, fixed iris & focus
FIELD OF VIEW:	187° fisheye lens
CAMERA FUNCTIONS CONTROL:	Virtual pan & tilt 187° with no moving parts Both real-time and / or post-processing within the GraniteNet application
DIGITAL ZOOM:	Virtual real-time zoom with no moving parts
OPERATING PIPE SIZE:	6" through 48" pipe
AUTO EXPOSURE:	Fixed @ 180mS
WHITE BALANCE:	Fixed
INTEGRATED LIGHTS:	12 x 5W white LED emitters, 8 flood, 4 spot. Strobe LED power consumption, 1200W peak, 5ms., 4 pulses/second, Color temp, 4500°K
INPUT CAMERA VOLTAGE:	42VDC, 250mA typical supplied from controller, 20-72VDC min/max
SONDE:	512Hz
INTERNAL DIAGNOSTICS:	Serial number identification , firmware identification, network diagnostics
OPERATING PRESSURE:	50 PSI maximum
OPERATING ALTITUDE:	15,000' maximum
OPERATING TEMPERATURE:	-10° to 50°C

FEATURE	DETAILS
COMPATIBLE CONTROLLERS:	<ul style="list-style-type: none"> • K2 Summit • K2 Portable • K3 Portable • 1208 mainline controller (PC600)
COMPATIBLE CABLES:	Up to 3000' of multi-conductor gold cable or 1000' of multi-conductor yellow cable with coaxial cable through pigtails and reel
DIMENSIONS:	<ul style="list-style-type: none"> • Overall length: 14.3" • Vertical clearance: 5.0" • Body tube diameter: 3" • Head diameter: 4 - 5/8"
WEIGHT:	9.62 lbs
CAMERA HOUSING:	Made from 6061-T6 black hard anodized aircraft aluminum and stainless steel

04 • TRANSPORTER CONFIGURATION INFORMATION

Use the table below to identify the appropriate instruction sheet for your configuration and follow those instructions for attaching the camera to the transporter.

Transporter & DUC Cable Configurations for HD380		
TRANSPORTER	HD380 INSTRUCTION SHEET P/N	CABLE FOR HD380
UltraShorty 21	HD903	HD355
* Pipe Ranger No Lift	HD911	HD342
* Pipe Ranger SPR Manual Lift	HD912	HD342-1
* Pipe Ranger SPR Electric Lift	HD913	HD342-1
Steerable Mudmaster	HD914	HD342-2

* Non-steerable Pipe Ranger, Steerable Pipe Ranger, Steerabel Pipe Ranger II

SoLID FX Cable Configurations for HD370	
TRANSPORTER/FLOAT	SoLID FX Instruction Sheet P/N
Mudmaster Electric Lift	SF971
Mudmaster Manual Lift	SF973
SF950 Float	SF950
SF970 Float	SF970



CUES STANDARD 12 MONTH WARRANTY

CUES (“CUES”) warrants that all parts, components, and equipment manufactured by CUES shall be free from defects in material and workmanship under normal use and service for which it was intended for a period of twelve (12) months from the date of shipment of materials by CUES to the purchaser. CUES’ obligation under this warranty is limited, at CUES’ option, to replacing or repairing, free of charge, any defective materials returned, freight prepaid, to the CUES designated service facility. For all warranty claims, the materials must be returned in accordance with CUES Material Return Policy.

Major items of equipment, such as vehicles, generators, etc., furnished, but not manufactured by CUES, will be covered only under the warranty of the third party manufacturer of such equipment. Expendable parts, such as light bulbs, fuses, connectors, etc., are excluded from this warranty.

Purchaser must notify CUES of a breach of warranty not later than the last day of the warranty period; otherwise, such claims shall be deemed waived.

CUES does not warrant the materials to meet the requirements of the safety codes of any federal, state, municipal or other governmental or administrative jurisdiction. Purchaser assumes all risk and liability whatsoever resulting from the use of its products, whether used singly or in combination with other products, machines or equipment.

This Warranty shall not apply to any materials, or parts thereof, which have; (a) been repaired or altered by anyone other than CUES without CUES’ written consent; (b) been subject to misuse, abuse, negligence, accident, or damage; (c) not been installed or operated in accordance with CUES’ printed instructions, or; (d) been operated under conditions exceeding or more severe than those set forth in the specifications of design tolerance of the equipment.

THIS WARRANTY AND THE OBLIGATION AND LIABILITIES OF CUES HEREUNDER ARE EXCLUSIVE AND IN LIEU OF (AND PURCHASER HEREBY WAIVES) ALL OTHER WARRANTIES, GUARANTEES, REPRESENTATIONS, OBLIGATIONS, OR LIABILITIES, EXPRESSED OR IMPLIED, ARISING BY LAW OR OTHERWISE, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, REGARDLESS WHETHER OR NOT OCCASIONED BY CUES’ NEGLIGENCE.

CUES SHALL NOT BE LIABLE FOR ANY LOSS OR DAMAGE RESULTING, DIRECTLY OR INDIRECTLY, FROM THE USE OR LOSS OF USE OF THE MATERIALS, OR FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, ECONOMIC LOSSES, LOSS OF PROFITS, LOSS OF BUSINESS, OR LOSS OF BUSINESS OPPORTUNITY. Without limiting the generality of the foregoing, this exclusion from liability embraces Purchaser’s expenses for downtime or for making up downtime, damages to property, and injury to or death of any persons.

CUES neither assumes nor authorizes any person (including employees, agents, or representatives of CUES) to assume for it any other liability, guarantee, or warranty in connection with the sale or use of the materials, and no oral agreements, warranties, or understandings exist collateral to or affecting this warranty.

This warranty shall not be extended, altered, modified, or waived except by a written instrument signed by CUES.

CUES MATERIAL RETURN POLICY

To ensure the orderly return of CUES products from our customers and to assure proper credit and warranty replacements handled in a timely manner, CUES has implemented a MATERIAL RETURN AUTHORIZATION (MRA) SYSTEM. Please read and follow the instructions below to ensure your MRA is handled properly and efficiently:

1. Once it is determined that a CUES product needs to be returned, call the CUES Parts Department in Orlando at 1-800-327-7791.
2. CUES will provide an MRA number by phone and ask a few questions.
3. CUES will then mail or fax the MATERIAL RETURN AUTHORIZATION (MRA) FORM with the MRA number, or include it with the replacement parts, if applicable.
4. Follow all instructions on the MRA Form. Make 2 copies - one for your records and the other will be used as a packing list.
5. Place an MRA sheet in with the parts that are shipped back to CUES along with a copy of the original packing slip or invoice, if possible. Send only the parts originally agreed upon with your Parts Representative. Any deviations/changes will require an additional MRA.
6. Make sure to include a copy of the MRA form for a packing slip.
7. Write the MRA number on the outside of the box.
8. Please take care in packing the parts that are to be shipped back to CUES. Parts must be individually protected from each other and appropriate packing material must be used to prevent damage during shipping.
9. Freight on the material returned is to be prepaid by the customer. Depending on the warranty determination, CUES, at its' option, may credit freight charges both ways.
10. The parts must be returned to CUES within 5 days of receipt of the MRA for credit to be granted.

Under normal circumstances, a warranty determination can be made within 30 days, and if under warranty, the part will be replaced at no charge. A credit will be issued if you have already received a replacement part. No credits will be issued until CUES receives the defective part.

*****NOTE*****

CUES will not warrant look-alike parts sold by competitors and reserves the right to charge a restocking fee. CUES shall not be liable for any loss or damage resulting, directly or indirectly, from the use of the materials, or for special, indirect, or consequential damages, economic losses, loss of profits, loss of business, or loss of business opportunity.

Without limiting the generality of the foregoing, this exclusion from liability embraces purchaser's expenses for downtime or for making up downtime, damages to property, and injury to or death of any persons.

CUES neither assumes nor authorizes any person (including employees, agents, or representatives of CUES) to assume for it any other liability, guarantee, or warranty in connection with the sale or use of the materials, and no oral agreements, warranties, or understandings exist collateral to or affecting this warranty. This warranty shall not be extended, altered, modified, or waived except by a written instrument signed by an authorized CUES representative.

CUES PARTS & SERVICE

At CUES, we realize your return on investment is directly related to daily production in the field. By stocking the largest inventory of OEM equipment in our industry, CUES strives to ship all parts orders on the same day or within 24 hours after receipt of the order.

Whether you need a camera or a fuse, CUES will quickly process and ship your order in accordance with your schedule requirements! Our experienced parts professionals can help you with parts identification, shipping methods, equipment operation questions, and connect you to the correct specialist for troubleshooting!

CUES offers four convenient stocking locations that contain a large assortment of parts, finished products, portable, and truck mounted systems. Texas, Arizona, Oklahoma and Louisiana customers can be serviced by our local dealerships. Contact us at your most convenient stocking location! For authorized dealer locations, log onto our website at www.cuesinc.com.

Parts can be ordered via phone or facsimile! For operating hours, contact information, and locations, log onto our website at www.cuesinc.com. Contact us at your most convenient stocking location! Log onto our website at www.cuesinc.com to view the CUES Parts Department & Dealers hours & locations.

CUES Parts Department: Parts turnaround is normally within 24 hours after receipt of order. Please note that special shipping arrangements can be made at the time of the order. All return shipments received at CUES freight collect will be refused upon delivery unless previously authorized by CUES personnel. Normal operating hours are 8am to 5pm, EST., Phone: 800-327-7791, Fax: 800-831-1184.

CUES Service Depot: Service turnaround is normally 72 hours or less upon receipt at our depot, excluding weekends and holidays. All return shipments received at CUES freight collect will be refused upon delivery unless previously authorized by CUES personnel. Normal operating hours are 8am to 5pm, EST., Phone: 800-327-7791.

West Coast

For West Coast Customers:

The parts and service depot is located at 1943 S. Augusta Court, Ontario, CA, 91761. Normal operating hours are 8am to 5pm, PST
Phone: 800-544-8695

Canada

For Canadian Customers:

The parts and service depot is located at 1675 Sismet Road, Unit 2 & 3, Mississauga, Ontario L4W1P9
Phone: 905-238-9178

Midwest

CUES Midwest:

www.cuesmidwest.com
2325 Parklawn Drive, Suite K
Waukesha, WI 53186
Phone: 262-717-3165
Fax: 262-717-3167

CUES RECORD OF REVISIONS

This Record of Revision page is designed to allow the manual user to determine the engineering/manufacturing level to which the manual is written. As engineering changes to this hardware are made at CUES, necessary information in the manual will be revised to reflect those changes. The latest change level and the rationale for any change(s) will be explained in tabular format on this page to allow the manual user to be better equipped should the need arise to call CUES regarding technical information.

Original Manual	Revision	Change Description
DUC HD Camera User Guide	033011	Initial preliminary release
	100411	Updated entire manual to current design/ configuration
	1-060412	Revised entire Chapter 7 and additional changes in Chapter 5
	2-090712	Added DUC Camera LAN Setting instructions to Chapter 5
	3-022813	Added Sonde information
	4-092013	Added DUC Skid Kit information; changed all places from 8" to 6" configuration
	5-011020	Revised the entire manual to current procedures and instructions

Innovation for over **50** Years

CUES is the world's leading manufacturer of closed circuit television video (CCTV) inspection, rehabilitation, pipe profiling equipment and asset inspection/decision support software. For over 50 years, CUES has provided innovative pipeline inspection technology and solutions to enable accurate condition assessment and proactive maintenance programs for buried infrastructure.

In addition to inspection equipment, CUES also designs, manufactures, and sells a broad range of pipeline rehabilitation and profiling equipment. These include chemical grouting systems for sewer line pipe joints capable of using a wide variety of grouting products. CUES also manufactures lateral reinstatement cutting systems which enable the reinstating of laterals in mainline sewers after they have been relined with any of a wide variety of liner materials. Pipe profiling is accomplished via Laser for Sonar based systems.

CUES has the most locations and dealers available to serve you! To find a local CUES facility, find the operating hours for a particular location, or to contact us at your most convenient stocking location, please log onto our website at www.cuesinc.com or call the CUES Corporate Headquarters in Orlando, Florida for more information.