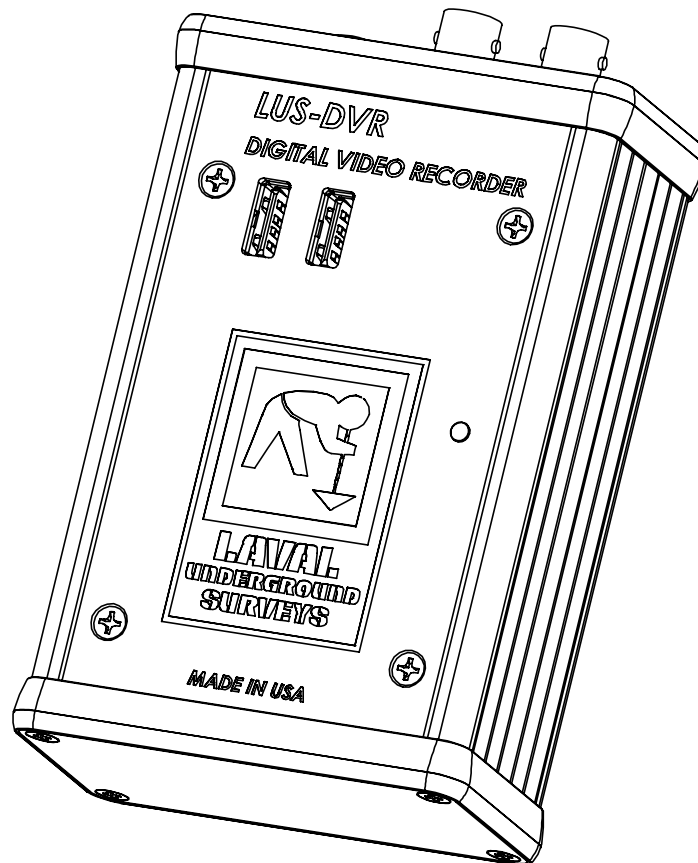
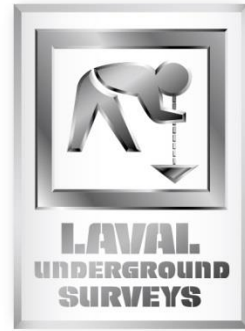


LAVAL UNDERGROUND SURVEYS

LUS-DVR OPERATION MANUAL



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Table of Content

Description of Equipment	1
Keyboard Use and Charging	1
Keyboard Functions.....	2
Getting Started	3
Menu Structure	3
Play Video	3
View Snapshots.....	4
Overlays	4
File Management.....	5
Setup.....	6
Helpful DVR Tips	8
WARRANTY	9

Description of Equipment

The Digital Video Recorder (DVR) records video and audio to USB storage media and can capture snapshot images on-the-fly without interrupting recording. It has an internal real-time clock with battery backup that provides date and time information. Videos and snapshots are saved to a folder called DCIM on the USB devices. The DCIM folder is created if not present. The videos are recorded as .ts files and the snapshots are .jpeg files. File names are automatically generated by the real-time clock. The video bit rate can be tailored to match the user requirements and storage capacity.

Text overlays reflecting current date and time can be applied to appear in the recorded video. A single line of user defined text comments can be overlaid in the video. There are 5 user entered custom text lines.

The DVR has an internal 16GB USB storage device. This internal memory will store at least 8 hours of video. There is a USB jack on the panel for an external storage device. There is no limit on capacity of the USB storage devices; however, the devices need to be FAT 32 format. The DVR will simultaneously record to both the internal and external USB storage devices.

When either internal or external memory becomes full, an on-screen message will prompt the user to address the capacity of the internal or external memory before the recording option will resume.

There is also a USB jack on the panel for plugging in a standard PC-type USB keyboard. A wireless mini keyboard is supplied with the DVR. There is a black 'receiver' for the provided mini keyboard inserted in a USB space on the control unit. It will have two letters on it that correlate with the mini keyboard. Without the receiver plugged into the control unit, the keyboard will not be able to function. **NOTE:** the keyboard and its USB receiver are paired and cannot be mixed with another set.

Keyboard Use and Charging

The internal battery is a non-replaceable Polymer Lithium-ion type. If no keys are pressed for more than 3 minutes, the keyboard goes into Sleep Mode. Because of Sleep Mode, the keyboard's battery will last many hours and even many days on one charge. The battery will retain a charge in Sleep Mode from 500 to 700 hours. To re-charge the battery, plug the charging cable into the keyboard and into any standard USB jack. The charging cable can be plugged into the RCAM panel to charge the battery and simultaneously operate the keyboard; however, the keyboard receiver must be plugged in to either the RCAM panel or the female-

USB jack on the charging cable. The Green Power LED will flash when the battery power is low. The Red Battery LED will light up when the keyboard is being properly charged.

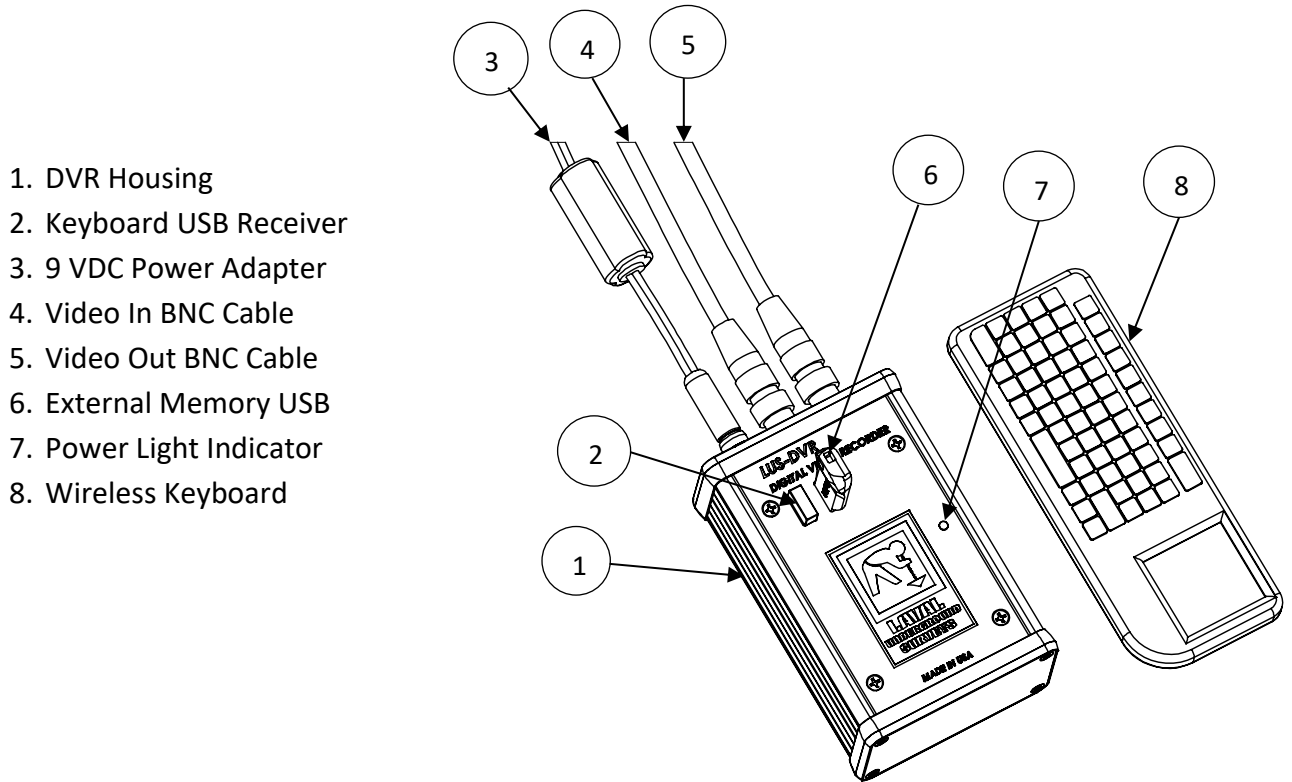


Figure 1

Keyboard Functions

<u>Key</u>	<u>Function</u>
Enter or Space Bar	Menu or OK
Up Arrow	Rewind Playback or Move Text Up
Down Arrow	Fast Forward Playback or Move Text Down
ESC (Escape)	Stop/Finalize Recording, Menu Back, or Playback Stop
R	Record Start or Pause Recording
S	Snapshot
P	Pause Record or Playback

Keyboard LED Indicators		Meaning
YELLOW	RF Signal	ON=Transmitting
RED	Battery	Cable plugged in: ON=charging OFF=Fully charged
GREEN	Power	ON=Power on, OFF=Sleep Mode, FLASHING=Low Power
WHITE	CAPS LOCK	ON=Caps Lock Active, OFF=Caps Lock Inactive

The DVR is controlled using the keyboard and an on-screen menu system. After initial power-up, press the Space Bar or the Enter key to bring up the Top Menu. Then again, press the Space Bar or Enter key to go into one of the Sub Menus.

Getting Started

To start a recording press **R**. Press **R** a second time to pause a recording, before pressing **R** a third time to resume recording again to create one continuous video. To stop and finalize recordings press **ESC**. Finalization can take up to 2 minutes for long recordings. It is important to note that powering down before stopping/finalizing the recording can result in losing the recording. **A maximum video length of 1.5 hours is recommended to manage file size.** Press **S** at any time to take a snapshot image of the video. To add a text overlay before recording see the Overlays Section on page 4.

Menu Structure

Top Menu:

Play Video

View Snapshots

Overlays

File Management

Setup

Help With Keys

Play Video

Play from internal

Play from external

If only the internal device is present, the files list from the internal device is displayed.

File selection is made using the up and down arrow keys. Pressing Enter or Space starts playback.

View Snapshots

Behavior is similar to “Play video”

Overlays

Primary Overlay

Allows selection of the size of the text from either 8x14 or 16 x 16. You can also select OFF which turns off the text display. The default setting is 16 x 16.

Setup Primary Overlay

Text

Allows selection of which text is displayed from date only, time only, time and date, custom text 1, custom text 2, custom text 3, custom text 4, or custom text 5. The default setting is time and date.

Custom Text

Allows the user to enter up to 5 custom text comment lines. Each line has a maximum of 40 characters.

Date Format

Allows selection of the format of the date display. The default setting is MM – DD – YYYY.

Time Format

Allows selection of the format of the time display. The default setting is 24 hour format in HH: MM : SS.

Background

Allows selection of the background of the text from Black, Transparent, 50% black, or 75% black.

Move Up, Move Down, Move Left, Move Right

Allows the text to be moved on the screen.

Secondary Overlay

Allows selection of Title overlay, Coded overlay, Extra overlay, or off.

Setup Title/Coded/Extra Overlay

Edit Text

Allows the user to edit the preloaded text

Load

Allows the user to edit text that has been saved.

Save

Allows the user to keep any changes to the text.

Text Size

Allows selection of the size of the text from either 8x14 or 16 x 16. You can also select OFF which turns off the text display. The default setting is 16 x 16.

Background

Allows selection of the background of the text from Black, Transparent, 50% black, or 75% black.

Move Up, Move Down, Move Left, Move Right

Allows the text to be moved on the screen.

File Management

Copy video from internal

Copy video from external

Copy snapshots from internal

Copy snapshots from external

Delete files from internal

Delete files from external

Rename files on internal

Rename files on external

If only the internal device is present, the external choices will not be shown.

Setup

Set Date/Time

This setting allows for setting up the battery backed-up real-time clock. The real-time clock is used to automatically generate file names for saved video files and snapshots. There is also an option of having the date/time overlay present in recorded video and snapshots.

Video

Video Standard

Allows selecting between NTSC and PAL video formats.

Interpolate

Turning interpolation on gets rid of motion artifacts at an expense of some vertical resolution loss. The default setting is ON.

Video Bit Rate

Determines the compression level of recorded video. The higher the bit rate, the higher is the quality, the more space is required on the storage device. The selection is from 1000kbps to 5000kbps. The default setting is 3500kbps. At the default setting of 3500kbps, a minimum of 8 hours can be recorded onto a 16GB storage device.

Playback Seek

Adjust the amount of the time skipped when using Rewind and Fast Forward functions. Default is 10.

Snapshot Quality

Determines the compression level of snapshot. The higher the quality, the more space is required on the storage device. The available settings are 97 (best) down to 50. Default is 90.

Snapshot Overlay

Turning on this setting allows the text overlay to be shown in Snapshots. Default is On.

Recording Format

Determines the video format .ts or .mp4. Default is .ts, because there is no loss of data in the event of recording interruption, such as a loss of system power.

Record Storage Device

Allows the selecting the recording destination devices: internal, external, or both. The default setting is BOTH.

Set Language

Language can be set to English, French, German, Portuguese, or Spanish for the DVR menus only. Default is English.

System Information

Displays various system information, including firmware version, detected storage devices with free space available and allows system parameters to be reset, saved and loaded as follows.

Reset System Parameters

Resets all the parameter settings to Basic default settings. This option restores the DVR back to the Laval Underground Surveys factory settings.

Save System Parameters

Saves all the parameter settings to USB memory storage. *Only use this option if you wish to change the factory settings from Laval Underground Surveys.*

Load System Parameters

Loads all the parameter settings from USB memory storage. This option restores the DVR back to the saved settings.

Turn WiFi on

Setting allows streaming video over an unsecured network with a WiFi adapter when set up and turned on, for more information on how to set up please contact Laval.

Helpful DVR Tips

- Press ESC to stop all recordings, playbacks, and to back out of menus. Pausing a recording and powering off will erase the unfinished recording.
- **A MAXIMUM VIDEO LENGTH OF 1.5 HOURS IS RECOMMENDED.**
- Turn the keyboard power off at the end of your use of the system to preserve longer battery life.
- After 3 minutes of not using the keyboard, the keyboard goes into Sleep Mode and all LED indicators will go out. Keys will not work until it wakes up which takes a few seconds. After it wakes up, the Green Power LED will light and the keys will work again.
- If the unit is not operating properly, restoring the setup settings back to Laval Underground Surveys factory settings may fix it. See *“Reset System Parameters”* in the *System Information* section.
- Monitor available free memory for both the internal and external storage in the System Information screen. If more space is need on the internal storage you can move files to the external storage by copying and then deleting them.
- Stop the movement of the camera (reeling up/down or rotating) when using the snapshot function for clearer pictures.
- Text overlays must be setup and typed in prior to the recording.
- **IMPORTANT**: When renaming video files, do not change or delete the file extension, the “.mp4” or “.ts” part of the name, as this may make the file in-accessible to the system. All video files must have the “.mp4” or “.ts” at the end of their file name. Likewise, the “.jpg” at the end of snapshots file names must be treated the same.
- Always keep the keyboard and its USB receiver paired together with one system, refer to the serial codes on them in the event that they are mixed with another set.
- Larger storage devices such as external hard drives will most likely need formatting to FAT32 to work with the DVR. Keep this in mind and test recording before going into the field.
- Video files recorded as .ts can be converted if they are not compatible with a video player, using a video converter. Converted files may not play back on the DVR.

WARRANTY

LAVAL UNDERGROUND SURVEYS warrants all products and materials manufactured by it and described herein to be free from defects in workmanship and materials for a period of one year from date of shipment, with the exceptions of fuses, improper battery maintenance, connectors, plugs, cable head, and the Imager.

Any article not manufactured by LAVAL UNDERGROUND SURVEYS and described herein is sold with only such warranties as are made by the manufacturer thereof. No other warranties expressed or implied, of merchantability, fitness for a particular purpose, or otherwise, are made by LAVAL UNDERGROUND SURVEYS other than those set out in the immediately preceding paragraphs.

All repairs shall be made by LAVAL UNDERGROUND SURVEYS at its factory or as otherwise authorized by LAVAL UNDERGROUND SURVEYS in writing. All unauthorized repairs will void warranties.

Warranty is void on any equipment that is abused, modified, or mishandled by customer.

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