ST8380 Digital Video Recorder

Users Guide

Part No.. ST542081-005

Preface

Congratulations

Thank you for choosing the Stack Digital Video Recorder. This solid-state recorder will give you many opportunities to make video recordings in all kinds of harsh environments where *ordinary* video recorders cannot be used.

Related products from Stack

If you need information about other Stack products, these can be obtained from Stack or from your local Stack dealer. Products available from Stack include:

- Synchronised Video Systems
- Video Overlay Systems
- DataPro Display and Analysis Software
- Display and Data Logging Systems
- Data Logging Systems
- Radio Telemetry Systems
- Intelligent Tachometers
- Action Replay Tachometers
- Performance Analysers
- Speedometers
- Boost Gauges
- Analogue Sensors
- Digital Sensors

Who to contact in case of difficulty

Stack and its approved Technical Agents provide a comprehensive help service to assist with your enquiries. Contact your local Stack branch or Technical Agent, a list of whom can be found on the Stack web-sites.

United Kingdom Telephone Numbers:		United States Telephone Numbers:	
Sales:	01869 240404	Sales:	888-867-5183
Tech Support:	01869 240420		
Fax:	01869 245500	Fax:	888-364-2609
Email:	sales@stackltd.com	Email:	sales@stackinc.com
Web site:	www.stackltd.com	Web site:	www.stackinc.com

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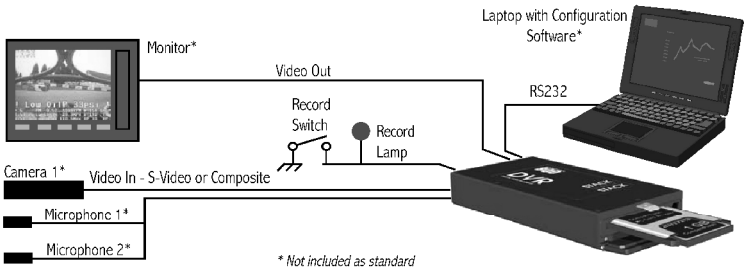
Chapter 1 - Introduction

The Stack Digital Video Recorder (DVR) is a compact, solid-state, digital video recorder designed specifically for use in harsh environments, where a standard video recorder or digital video recorder could not operate.

The unit is housed in a rugged, waterproof enclosure containing no moving parts making it ideal for use in harsh environments, such as exposure to continual shock and vibration over extended periods as well as extreme climate conditions and temperatures. The system is DC powered and has optional audio inputs at microphone or line level.



Typical Digital Video Recorder Application

Originally introduced to complement our award winning range of motorsport products, the DVR can be applied to a much broader spectrum of mobile engineering applications where protection from a harsh environment is required.

The DVR can be supplied with products from our own range of data display or data acquisition systems, including a video kit incorporating a bullet CCD camera, and even a full Synchronised Video or Video Overlay Data Acquisition System. Alternatively the DVR can be supplied as a stand-alone, harsh environment Digital Video Recorder for use with an existing video system.

The DVR utilises broadcast standard MPEG-2 video compression to record high quality Real-time video and audio to a PC Flash Disk. This incorporates the ability to burn the date and time on to the recorded video. Once a recording has been made, the Flash Disk may be removed and played on a PC or laptop using a standard media player application. Recordings may also be archived to DVD using standard DVD burning software.

Chapter 2 - Essential User Information

Please read the important information in this chapter before using the Stack Digital Video Recorder (DVR).

Standard Components

Digital Video Recorders are supplied with the following standard components:

Quantity	Description
1	Digital Video Recorder (DVR) (ST8380-NTSC or ST8380-PAL)
1	System Harness (ST918066 & ST918070)
1	Input Harness (ST918067)
1	Monitor Harness (ST918068)
1	Record Switch
1	Recording Status Lamp

Optional Components

DVRs may be supplied with the following optional components:

Quantity	Description
1	DVR to VS Harness (ST900103) *replaces both Input and System Harnesses*
1	S-Video Harness (ST918069) *replaces Input Harness*
1	Bullet Camera & Microphone Kit (ST8390 PAL or ST8391 NTSC)
	Flash Disk

Video Standard

The DVR is configured by default either for the NTSC or PAL video standards depending on the intended country of use. If the equipment you have uses the other video standard (eg, the DVR is configured for NTSC but your equipment is PAL), you must reconfigure the DVR as described on page 212.

Only NTSC and PAL are currently supported.

Deleting Files

Deleting files on the removable Flash Disk / PCMCIA Card does not recover disk space. Only a reformat will recover space on the Flash Disk. A Quick Format is sufficient, see page 14. Once a recording has been made which you intend to keep, transfer the file to your PC's hard drive and then perform a reformat.

For the remainder of this guide the use of the term "Flash Disk" shall be used to include a PCMCIA Card device too.

Using a New Removable Flash Disk

The DVR will only operate with a Flash Disk formatted with a FAT32 (File Allocation Table) File System. Before using a new disk, check its File System by inserting it into a PC running Windows XP and display the disk properties by right clicking the disk icon in "My Computer". If supplied as FAT16, reformat to FAT32, see page 14.

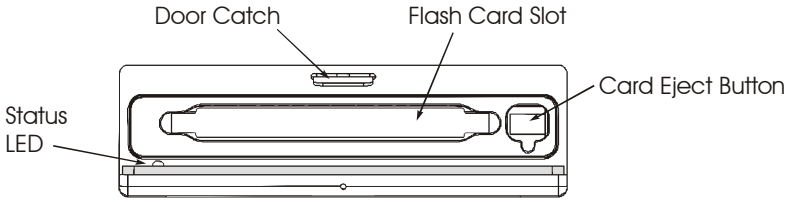
Playing a Recording

The files produced by the DVR are fully MPEG-2 compliant. They may be played directly from the card by inserting it into a PC with a suitable PCMCIA slot / adapter. However, better replay results are usually obtained by transferring the file to the PC's hard drive, see page 12.

Before Making a Recording

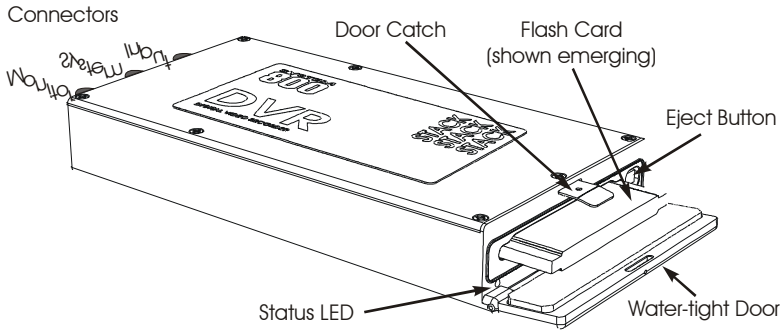
Before a recording session, if possible, clear the disk by performing a reformat so that maximum disk space is available. A reformat can only be achieved using a PC running Windows XP. Right-click on the disk icon in "My Computer" and select "Format". Ensure the "File system" is set to "FAT32", choose the "Quick Format" option and then click "Start".

Ensure any useful recordings have been archived before reformat.



Chapter 3 - Installation

Before installing the DVR, take a few moments to plan the installation. First identify all the components which came with your system. You may like to perform a *dry run* by connecting the components together to get a feel for how the final installation will be accomplished.



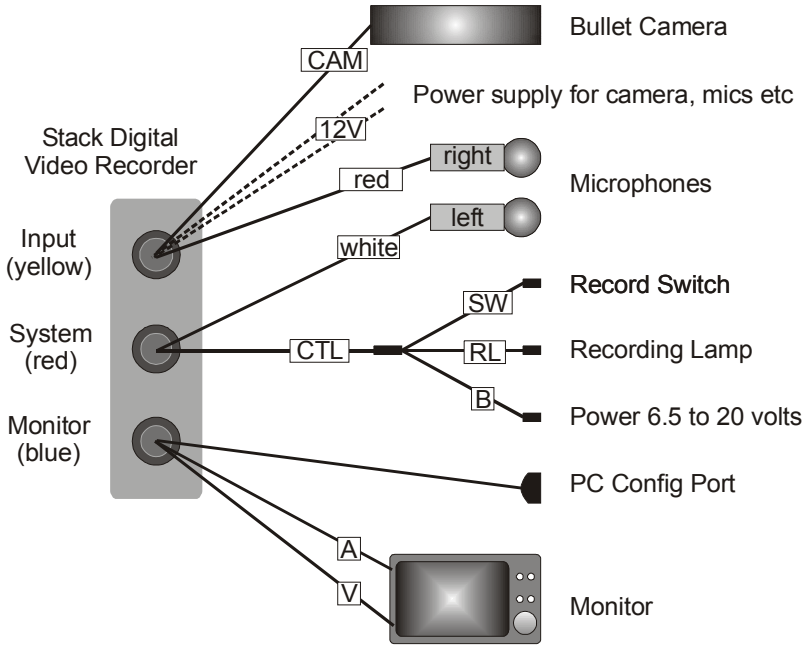
The Stack Digital Video Recorder

Now, identify a suitable location for the DVR. It can be mounted in any orientation but, when looking for a location, please bear in mind that there must be approximately 50mm clearance for the wiring harnesses at the back of the unit to ensure that the cables will not be bent too sharply. There must also be enough space to remove the Flash Card at the front. The module can be mounted by various means including using double-sided tape or Velcro™. A rigid mounting can be made to a suitable bracket using the six M3 tapped holes in its underside, see Appendix A for dimensions.

Standard Wiring Harnesses

Once a mounting position has been determined, the components should be connected using the wiring harnesses supplied. The figure below shows the standard electrical connections to the unit. If you are using the DVR with a Stack Video Overlay system, you should have received specific wiring harnesses for that system. The differences are described at the end of this chapter. Please contact your Stack distributor if you need different wiring harnesses.

The wiring harnesses supplied by Stack are terminated with the most commonly used connectors. If your equipment uses different connectors, you will need to obtain appropriate adapters from a TV, video or electronics supplier.



Standard Electrical Connections

Connect a camera to the CAM plug on the Input Harness. If your camera doesn't have its own power supply, semi-regulated +12v power can be taken from the two 2.1mm power plugs adjacent to the BNC. The power plugs supply 12 volts or the supply voltage -2 volts, whichever is smallest, up to a maximum of 0.5 amps. If the current required is greater than 0.5A, you must provide a separate power supply.

As standard the composite (NTSC or PAL) input is active. If your camera has a S-video connector, you will need to use the optional S-video harness and then re-configure the DVR as described on page 22.

Connect the Record Switch to the SW connector.

Connect a permanent DC supply of between 6.5 and 20 volts to the Power (B+ and B-) connector. As a guide, the system draws approximately 2.5 watts when recording. The current drawn will increase as the voltage supplied becomes lower (eg 210 mA approx. at 12 Volts, 390 mA approx. at 6.5 volts.) and with whatever other equipment is connected using the two 2.1 power plugs. Whilst the DVR is protected internally from over-voltage, you should provide a 3 amp fuse in the B+ connection to protect against short circuits in your own wiring.

Important: Whilst the DVR will operate over a wide voltage range, most cameras will only operate with power supplies of around 12 volts. Please check with your camera supplier.

A permanent power supply is required to ensure that recording finishes cleanly when the Record Switch is turned off. If the supply is obtained from a switched supply, eg, one controlled by a vehicle's ignition switch, the DVR could switch off before the recording has finished, see page 15.

The following connections are optional:

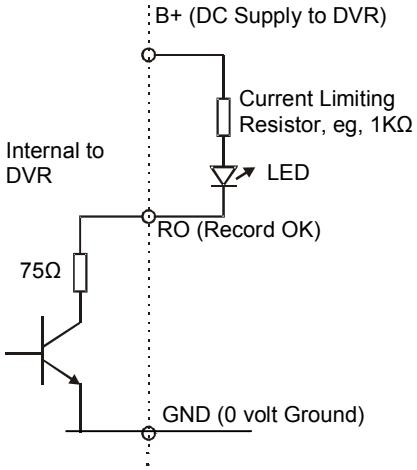
If monophonic audio recording is required, connect a microphone to the L (white) microphone input. An extra 2.1mm power connector has been provided if that microphone needs to be powered. Microphone gain can be adjusted by the PC configuration software, see page 22.

If stereophonic audio recording is required, a second microphone should be connected to the R (red) microphone input.

If audio recording is not required, it may be disabled to extend the record time, see page 22.

The DVR provides a status output to indicate the system is recording. Connect the optional Recording Status Lamp to the RL connector. This is active-low (pull-down to ground) when recording is OK and can be used to drive a LED with up to 50mA max. (see wiring schematic below).

Never connect this to a light bulb since that will damage the DVR's internal circuits.



A composite video output is provided for connection to an external monitor which can be used to help align the camera, etc. The video monitor output is the same as the input, with the addition of the date and time display that is superimposed on the video recording. Connect the yellow phono plug on the Monitor Harness to video input on your monitor.

An audio monitor output is provided, which combines both the left and right microphone inputs. This is used to aid the set-up of the microphone levels, see page 22. Connect the white phono plug on the Monitor Harness to the audio input on your monitor.

Video Overlay Wiring Harnesses

If connection of the DVR to a Stack Video Overlay system is required, then a specific harness should be supplied for that purpose. The Input Harness and the System Harness are replaced by a single harness which allows direct connection between the DVR and the Stack V/VS Module.

With this harness the signal from the camera is first directed to the V/VS Module, which overlays vehicle data on to the picture, before that signal is passed to the DVR.

Connect the various components as described above with the addition of connecting the 15-way MIL connector to the V/VS module and the 8-way connector to the Video Controller, see page 40.

The V/VS module and harness support composite video signals only; S-Video is not supported.

Chapter 4 - Operation

To make a recording:

Check that video, power and a Record Switch are connected as described in Chapter 3. Check that the Record Switch is set to the open (off) position.

Apply DC power and the LED on the front panel will light showing the status of the unit.

The status LED can only be seen when the water-tight door is open.

If the LED shows static green the system is ready to record.

If the LED is not static green, refer to the table below to find out the DVR's status.

If the Low Power Mode has been selected (see page 24), the LED will light for approximately six seconds on power up before entering the low current stand-by mode.

Important: Before making a recording, ensure there is enough disk space available or preferably, reformat the Flash Disk. Disk space may be checked on a PC or by making a trial recording and viewing the DVR's status LED, located inside the water-tight door (as described below). Reformatting may be achieved using a PC. See page 14 for more information regarding formatting options.

To start recording close the Record Switch. The LED will flash fast red for approximately 1 second as it prepares to record. Once recording, the LED will flash green for 3 seconds with a mark space ratio showing the disk capacity remaining:

- With an empty disk the LED will flash for approximately 3 seconds.
- With 50% disk capacity remaining it will flash 1.5 sec on, 1.5 off.
- With 10% remaining the LED will flash for 0.3 sec on, 2.7 sec off.

To stop recording, open (switch off) the Record Switch. The status LED will revert to showing static green.

The disk may now be removed and placed into a PC with a suitable PCMCIA card slot.

The table below shows the function of the DVR's front panel status LED. A green LED generally indicates the unit is functioning correctly and a red LED indicates a fault or reset condition.

LED Operation	Description
Static green	The Stack Digital Video Recorder is ready to record (video and disk OK).
Flashing long red / short green (with no gaps)	In stand-by (or unable to record) with disk not present, faulty or full. Video input OK.
Flashing long green / short red (with no gaps)	In stand-by (or unable to record) with video not present but disk OK.
Flashing equally green / red (0.5s red / 0.5s green with no gaps)	Digital Video Recorder is under external control of the PC Configuration software.
Static red	Unable to record as video and disk not present, faulty or full. Or system fault.
Flashing green External Recording Status Lamp also illuminated	Recording OK. The longer the green flash the greater the disk space remaining. With an empty disk the LED will flash for approx. 3 seconds. With 50% disk capacity remaining the LED will flash 1.5 sec on, 1.5 off. With 10% remaining LED will flash for 0.3 sec on, 2.7 sec off.
Fast flashing green / red	Recording but video is not present, ie, audio only is being recorded.
Flashing red (fast)	System reset / preparing to record or disk format.

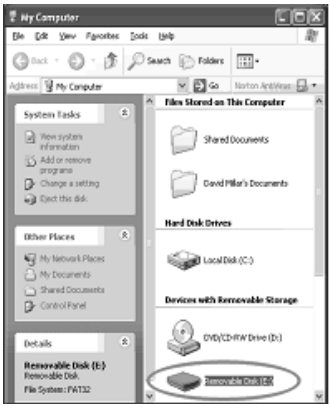
To play a recording:

To play DVR files with Windows Media Player, an MPEG-2 decoder must be installed on the PC. This should be present if a DVD drive or player is installed. The decoder is NOT included with the DVR Configuration Utility.

Other MPEG-2 compatible software players may be used.

Insert the Flash Disk into the PC's PCMCIA slot. If a slot is unavailable there are a number of USB to PC card adapters available from PC vendors.

Allow the PC a few seconds to recognise the new disk and then run "My Computer" or "Windows Explorer" to show the new drive. Double click to display the disk contents.



My Computer / Removable Drive

Digital Video Recorder Files

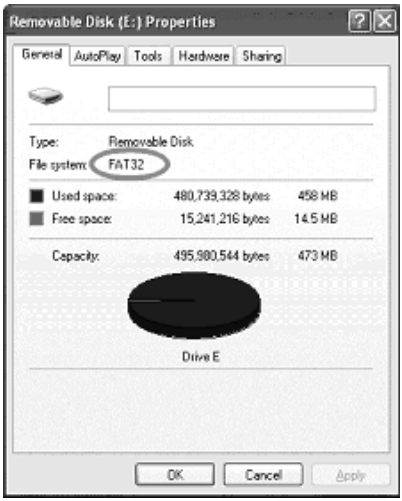
DVR video files are MPEG-2 compliant and filenames begin with "FB" and have a ".MPG" extension. The files are given sequential numbers starting from 0001. With a standard Windows configuration, they will be seen as Windows Media Player files (see above). To play, simply double-click the file and it will be displayed.

Due to the slow read speed of Flash Disks, better results are usually obtained by transferring the required file to the PC's hard disk before playing.

With an appropriate DVD burner and software, DVR files may also be burnt onto DVD or Video CD for archiving without requiring modification.

Operation with a new Flash Disk

Important: The DVR will only operate with Flash Disks formatted with a FAT32 (File Allocation Table) File System. Before using a new disk check its File System by inserting into a PC and displaying the disk properties by right clicking the disk icon in "My Computer".

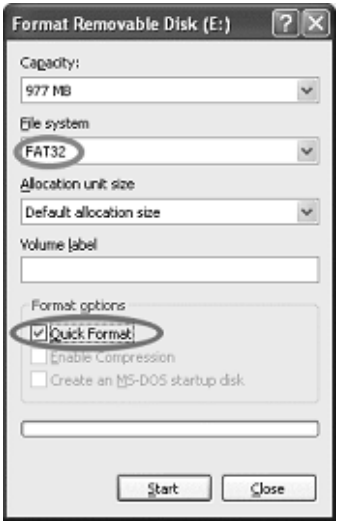


If the disk was supplied as FAT16, reformat to FAT32 using Windows XP's format utility to select the File System, see Formatting a Flash Disk below.

Formatting a Flash Disk

Important: If using a new Flash Disk, please ensure it has a **FAT32 File System**. See Operation with a new Flash Disk above.

To format the disk using Windows XP, right-click on the disk icon in "My Computer" and select "Format". Ensure the "File system" is set to "FAT32", choose the "Quick Format" option and then click "Start".



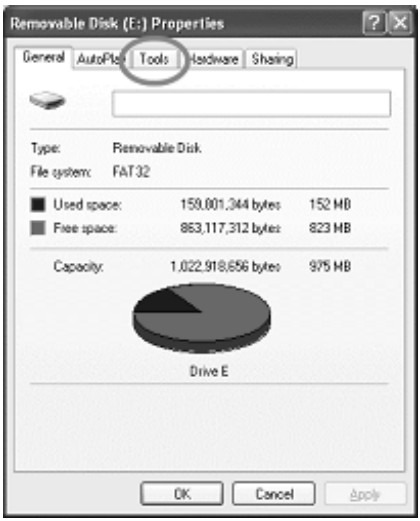
Deleting Files

Important: As far as the DVR is concerned, deleting files on the removable Flash Disk does not recover disk space. Only a reformat will recover disk space. So, once a recording has been made which you intend to keep, transfer this file to your PC's hard drive and then perform a reformat of the removable disk.

In summary, to regain Flash Disk space, do not delete files. Remove files for archiving and then reformat the Flash Disk as described above.

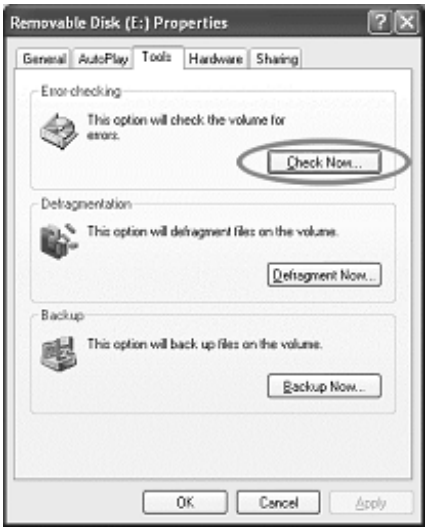
Corrupted Flash Disks

If the disk is removed, or if power is disconnected from the DVR during a recording, it is possible the disk may become corrupted or the files could be incomplete. In this case run Windows' Scan Disk routine which will help recover any missing data.



To run Scan Disk, right click on the Flash Disk icon in My Computer and select "Properties".

Select the “Tools” tab and, under “Error-checking”, click “Check Now”.



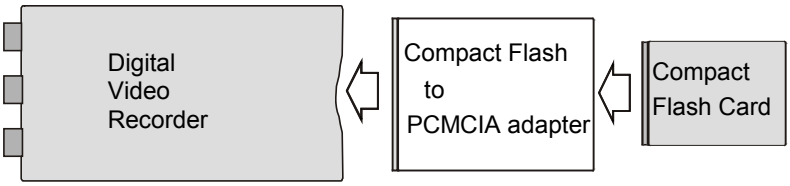
The Check Disk dialog will now be shown. Check “Automatically fix file system errors” and click the “Start” button.

Chapter 5 - Flash Memory Cards

The DVR is compatible with most fast PCMCIA or Compact Flash (CF) cards up to 8 GB. Stack recommends Pretec and Sandisk Extreme or Ultra cards as they have been shown to give excellent results in harsh conditions.

Important: For the highest quality recording it is essential that Flash Cards have a sustained write speed of ×16 or faster. If the card is too slow, video will play back with missing frames. This problem can be alleviated by recording at a lower video quality, see page 22.

Compact Flash Cards can be used with an adapter.



Using a Compact Flash Card via an Adapter.

Important: Flash Cards will only operate if formatted as FAT32. Check any new disk before using with the DVR. If supplied as FAT16, reformat to FAT32.

Chapter 6 - Configuration

The DVR may be configured from a PC when connected via a serial lead.

Important: Once you have finished configuring the DVR, exit the Configuration Utility to update the DVR and return it to normal operation. Alternatively, you can upload the new configuration by clicking the "Write Config" button.

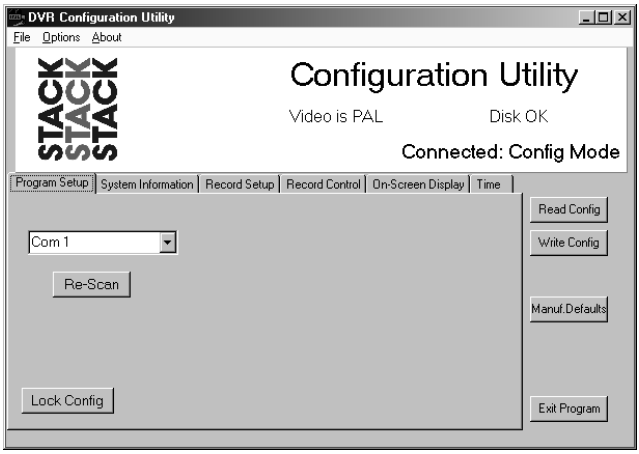
PC Connection

Ensure your PC has a suitable serial (Com) port. Some PCs are no longer supplied with dedicated serial ports. In this case, a USB to Serial Adapter should be used; obtainable from PC shops.

Install the DVR Configuration Utility which can be found on the CD-ROM supplied with the DVR system.

Once installed, connect the 9-way D-type cable on the System Harness to a Com port on the PC.

Run the DVR Configuration Utility on the PC and select the appropriate serial port, see below.



Program Setup Screen

Connect DC power to the system via the connector on the System Harness.

The Configuration Utility will now recognise the DVR and show that it has established a connection.

The DVR status LED will now flash 50:50 red / green to indicate that it is under control of the PC software.

The Configuration Utility is only able to establish connection with the DVR when it is powered-up and not in stand-by mode. It may be necessary to "wake up" the DVR by briefly toggling the Record Switch or by switching the DC power off and then back on to establish a connection.

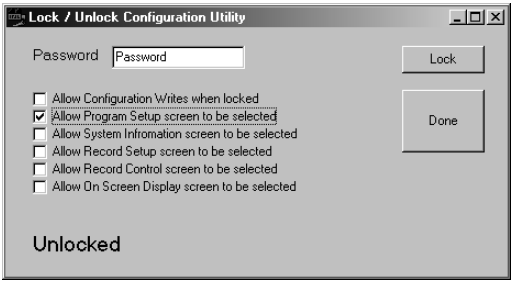
Re-Scan

Click this button to cause your PC to search for COM ports. This is particularly useful if you have a USB to RS232 adapter which isn't connected permanently to the PC.

This should only be used when the DVR is not connected since it will disrupt communications.

Lock Config

Click this button to allow you to restrict access to the Configuration Utility.



Check the boxes to allow access to individual parts of the Configuration Utility. For example, checking "Allow Program Setup…" will prevent access to all parts of the utility except the Program Setup tab.

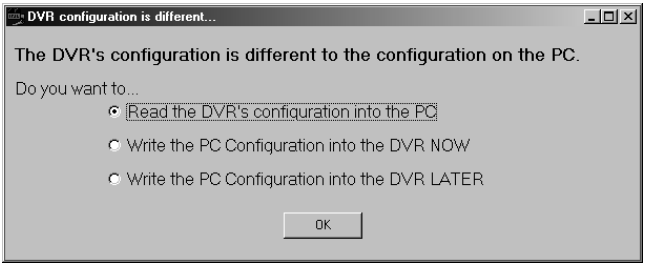
Once you have selected the items to be accessible, enter a password and click the "Lock" button. Then click "Done" to redisplay the main screen. Now, if you try to access a tab which is locked, a popup will tell you that that tab is unavailable.

Unlocking the application requires you to enter your password and click the "Unlock" button.

Manuf. Defaults

Clicking this button causes the DVR to reset back to its manufacturing default settings. It should only be necessary to do this in the unlikely event that the DVR's internal set-up has become corrupted.

Once this action has been performed, the Configuration Utility will check to see if the set-ups are the same between the DVR and the PC. If they are different, the following dialog box will pop-up:



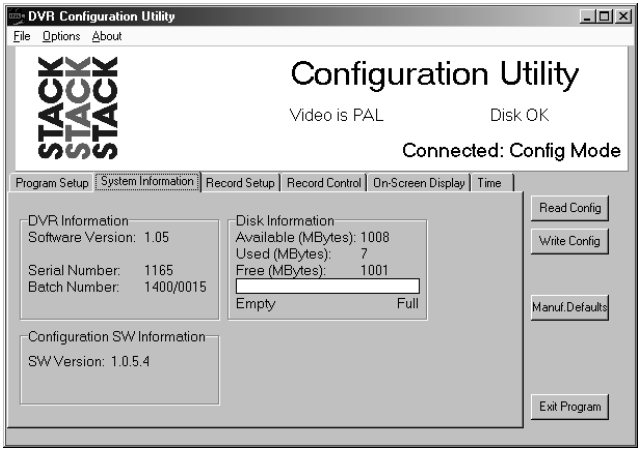
You should select the "Read the DVR's configuration…" line and click OK to read the default settings into the PC.

This dialog will pop up whenever there is a difference between the set-up in the PC and the DVR, eg, if you have changed the PC set-up before connecting it to the DVR.

To prevent this dialog box from popping up, uncheck the "Poll for Changes" item in the Options menu. However, you will then have to click the "Read Config" button to manually re-align the set-ups.

System Information

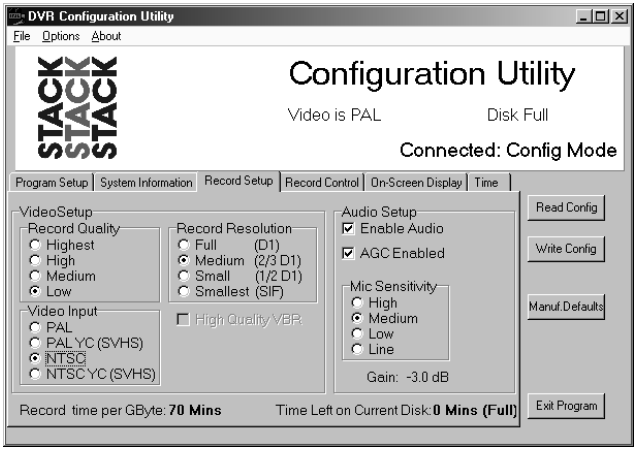
This screen shows the serial numbers of the DVR and the PC Configuration Utility software. It also gives an indication of the amount of Flash Disk space which has been used.



System Information Screen

Record Set-up

This screen allows you to configure the various aspects of the video and audio recorder.



Record Set-up Screen

Record Quality

Allows you to configure the amount of compression employed by the system. The "Highest" setting is similar to DVD quality. The software shows an estimate of the record time at the bottom of the screen, depending upon configuration.

Video Input

Configures the system to either NTSC or PAL, with either the standard composite or S-Video (YC) input enabled.

If the system is to be used with monochrome cameras only, the best performance will be achieved by setting the input to YC and connecting the camera to the standard video input.

Record Resolution

Adjust the resolution of the recordings from Full (PAL or NTSC) resolution to SIF.

Resolution		PAL	NTSC
Full	(D1)	720 x 576	720 x 480
Medium	(2/3 D1)	480 x 576	480 x 480
Small	(1/2 D1)	352 x 576	352 x 480
Smallest	(SIF)	352 x 288	352 x 240

Always test that the recordings which are made will play correctly on your video equipment. Many DVD players will not play back correctly unless the recordings were made at Full Resolution.

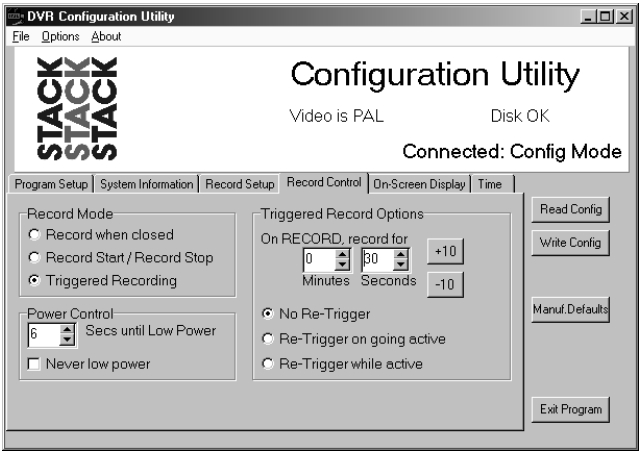
Audio Setup

Allows you to configure the microphone inputs for gain and sensitivity. If you uncheck AGC Enabled (Active Gain Control), you can adjust the gain manually.

Uncheck Enable Audio if you do not want to record audio; that will free more disk space for video recording.

Record Control

This screen allows you to configure who the recordings will be controlled, ie, how the DVR will respond to the Record Switch.



Record Control Screen

Record When Closed

When this mode is selected, the DVR will record only when the Record Switch is switched on, ie, when the contacts on the external switch are closed. As soon as the Record Switch is switched off, (contacts opened) the DVR stops recording.

The DVR takes approximately two seconds to start recording from the instant the Record Switch is activated.

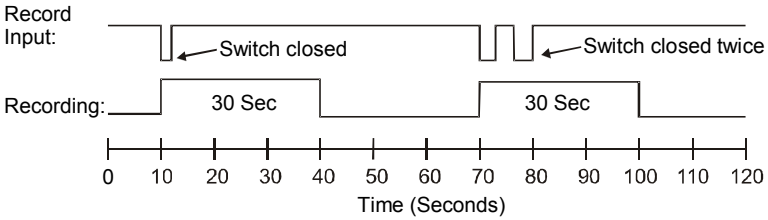
Record Start / Record Stop (not currently available)

This recording mode is not available in the current version of the Digital Video Recorder. Attempting to use this Record Mode will result in incomplete or corrupted recordings.

Triggered Recording

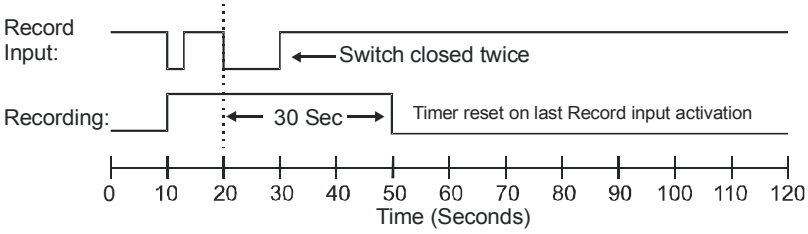
It is possible to configure the DVR to record for a pre-set duration each time the Record Switch is activated. This mode is used when the SW input is connected to external sensors, such as when motion or PIR detectors, are used to start the DVR, eg, for video surveillance installations.

No Re-Trigger



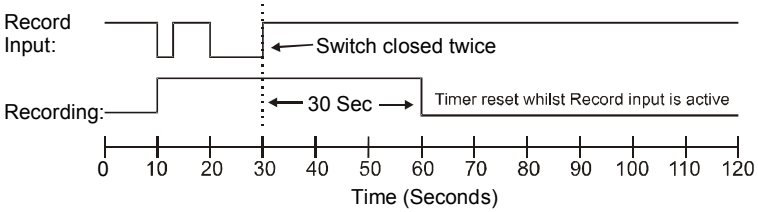
In the example above, the DVR has been configured for Triggered Recording of 30 seconds duration with no re-trigger. As soon as the Record Switch is switched on (its contacts close), the DVR will start recording. It will continue to record for 30 seconds no matter how long or how many times the Record Switch is operated during that period. See Triggered Record Notes on page 26.

Re-Trigger on Going Active



In this mode, the DVR timer is re-set every time the Record Switch is activated (its contacts close). This will increase the record time to 30 seconds from the last activation of the Record input. See Triggered Record Notes on page 26.

Re-Trigger while Active



In this final example the timer is constantly re-set whilst the Record Switch is on. This effectively adds 30 seconds to the point where the Record Switch was last switched off. See Triggered Record Notes below.

Triggered Record Notes

- If the Record Switch is switched on when the trigger time is complete, the DVR will continue to record.
- The DVR takes approximately two seconds to start recording from the moment the Record Switch is switched on. In Triggered Mode the recording timer starts when the recording actually starts.

Power Control

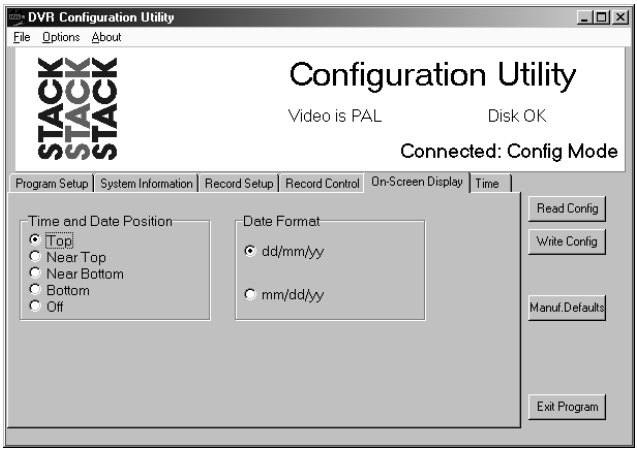
Set the time of inactivity in seconds after which the DVR should power down, ie, change to low power stand-by mode. The DVR will power back up when the Record Switch is next activated.

Setting this value to zero will power down the DVR immediately after recording finishes.

Only choose "Never low power" if the DVR is being powered from a permanent power source such as a vehicle battery or a mains power supply.

On-screen Display

This screen allows you to configure the on-screen display that is superimposed on the recorded video. The on-screen display may be viewed in real-time via the "Video Monitor Output" as described on page 10.



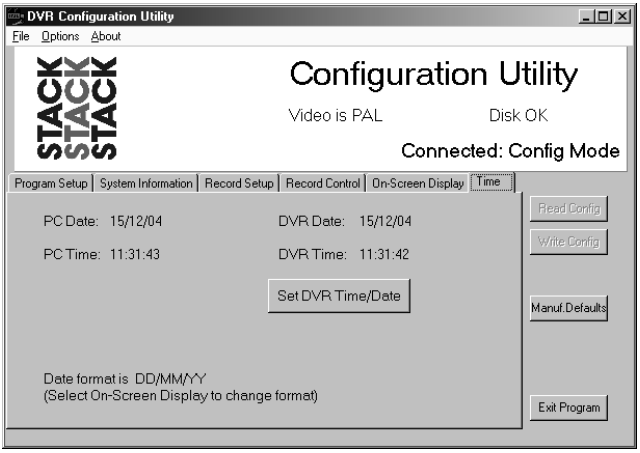
On–screen Display Set-up Screen

If you are using the DVR with a Stack Video Overlay System you should specify a Time and Date Position which does not obscure the vehicle data being shown on the picture.

If you have a Stack Synchronised Video System it would be best to select Off to prevent the time and date being displayed. If you do decide to show the time and date, you MUST NOT select the "Top" or "Near Top" position because those positions will prevent the video from being synchronised with the logged data.

Date and Time

This screen allows you to synchronise the DVR's internal clock with that on the PC, eg, to cope with changes due to Summer Time etc.



Time and Date Set-up Screen

To set the DVR's internal clock, simply click the "Set Time/Date" button.

This operation uses the current PC clock so, before uploading the time and date, ensure the PC clock is correct and adjust it if necessary.

Chapter 7 - Video and Data Systems

The DVR may be supplied as part of a Stack Video Logger System:

Synchronised Video Logger Systems

When using these systems, the control of the DVR recording mode is automatic. The DVR will start recording when the Data Logging system starts recording.

Make sure the configuration includes a 'Stop Log' command which will also stop the DVR recording.

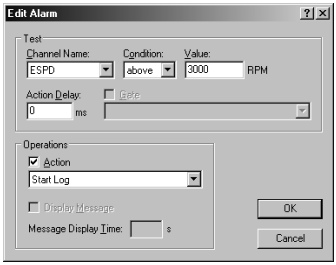
Video Overlay Systems

If the DVR is part of a data overlay system that does NOT include a recorder then the V/VS will need to be configured with an action to start the DVR recording.

Automatic recording start control

The recording status of the DVR is automatically controlled by the V/VS module. Shown is a test based on ESPD (Engine RPM) which causes a 'Start log' command when the Engine speed is greater than the specified RPM.

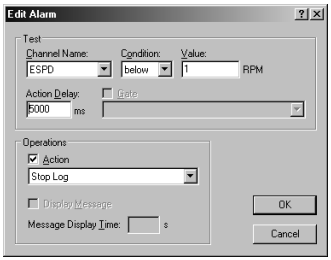
The 'Start Log' command will cause the DVR to start recording.



Automatic recording stop control

The system must also include a 'Stop Log' command. This is because recording MUST be stopped before power is removed.

Without this, the video that was recording will be lost when the power is removed.



Manual recording status control

Additionally, recording can be initiated by either the V/VS Video Controller 'Record' button or by the DVR Recorder Switch.

The Video Controller's 'Record' button causes the V/VS module's recording output to toggle, ie, press it once to start recording and press again to stop recording.

The V/VS module's recorder control output is wired in parallel with the DVR record switch such that either the V/VS output or the DVR record switch can cause the DVR to start recording.

To stop the DVR recording both the V/VS output and the DVR record switch must be off to stop recording.

Recording Lamp

The DVR recording status output is directly connected to both the DVR Recording Lamp and the V/VS Video Controller lamp. When the DVR is recording, both lamps will be illuminated.

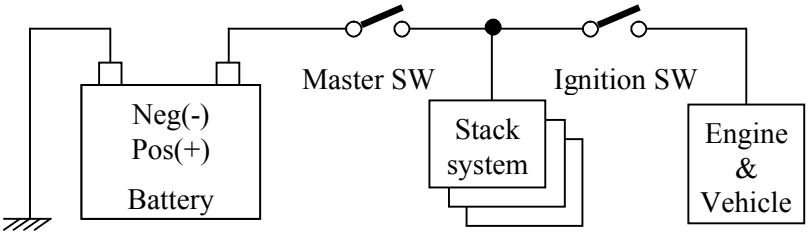
It is not necessary to connect the Recording Lamp when using the Video Controller.

Recommended Vehicle System Power connections

Power for the Stack Video/Data System and DVR must be connected to the Master switch supply and not to the switched Ignition supply. This arrangement allows the engine to be switched off before the power to the Stack system.

This is necessary so that the system can detect that, for instance, the Engine Speed (RPM) has fallen to zero and will have sufficient time to stop the DVR from recording before power is removed from the Stack system.

Important: Failure to stop the DVR from recording before the power is removed will cause the video recording in progress to be lost!



Chapter 8 - Troubleshooting

Symptom	Possible Cause	Remedy	Notes
The DVR will not operate with a new Flash Disk.	The new Flash Disk has an incorrect file system.	Set the Flash Disk to the FAT32 file system.	To check the disk's file system, insert the disk into a PC and display the disk's properties. See page 14
The DVR indicates the disk is full even though all the files have been deleted on the disk.	Deleting files on the removable Flash Disk does not recover disk space.	Reformat the disk to recover disk space.	Once a recording has been made which you intend to keep, transfer the file to your PC's hard drive and then perform a reformat. See page 14
Video files are corrupted or missing.	The DVR was switched off before recording finished.	Ensure recording has finished before switching off the DVR.	Use Windows Check Disk utility to recover damaged recording files. See page 15
Windows Media Player will not play DVR files.	DVR files have a MPEG-2 format and Windows Media Player can only play MPEG-1 by default.	Install a MPEG-2 decoder on your PC or use a third-party MPEG-2 player.	If the PC does not have a DVD drive / player installed, it may be necessary to purchase a plug-in for Media Player which can most easily be obtained via the Windows Update web-site.
Video will not play back correctly on a DVD player.	Record Resolution is too low.	Increase Record Resolution to Full.	Many DVD players will not work with low resolution video files.

Symptom	Possible Cause	Remedy	Notes
Video Playback is "jerky" or "hesitates".	The transfer rate from the Flash Disk to the PC is not fast enough.	Copy the video file to the computer's hard drive and play the copied file from that location.	In some situations where the transfer rate is nearly high enough, it is sufficient to pause playback for a few seconds to allow Media Player to fill its buffers and then play. Often the file will play correctly from then on and that saves the time-consuming transfer to the PC's hard drive.
Video Playback is "jerky" and the picture is incomplete or has extra lines.	Incorrect video standard selected.	Check that the DVR is configured for video of the same standard as the video source (NTSC or PAL).	This can be checked using the DVR Configuration Utility which will report both how the DVR is configured and also the standard of the video source.
Communications is lost between the PC and the DVR.	The "Re-Scan" button was clicked on the Program Setup tab.	Click the "Read Config" button. If that doesn't work, Exit the Configuration Utility and re-start it.	The "Re-Scan" button causes the PC to stop communications and search for COM ports.
Other PC applications run slowly when no DVR is connected.	The Configuration Utility is constantly trying to establish communications with the DVR.	Uncheck the "Poll for Changes" item in the Options menu.	The communication status is shown below the program title. Remember to re-check the "Poll…" item when you connect the DVR.

Chapter 9 - Specifications

General

Recording Media	PCMCIA (or CF card via adapter)
Video Format	PAL / NTSC
Analogue Resolution	550TVL
Power on to record delay	2.0 sec max.
Power Input	6.5V to 20V DC
Power Over-voltage	+/- 60v for less than 100mS
Power Consumption	~3.0 W (typ 200mA from 13.5v DC)
Maximum load	3.5A for 10mS. Inrush current at power on.
Power Standby mode	15mA max.
Internal Battery backup	5 Years minimum
Case Dimensions	152 x 76 x 22.5 mm
Case Material	Black hard anodised Aluminium.
Weight	290g (without Flash Card)
Electrical Connectors	Souriau. Composite glass fibre loaded Plastic 5w plugs & sockets. Fixed: 8STA0X0635PN Plug Red 8STA0X0635SA Socket Yellow 8STA0X0635SB Socket Blue Free: (mating part) 8STA6X0635SN Socket Red 8STA6X0635PA Plug Yellow 8STA6X0635PB Plug Blue
Recording time	See Table 2.

Configuration Interface

Serial	RS232	Configuration uploaded from PC to recorder over RS232 cable
Commands	N/A	No real time commands available.
Status	N/A	No real time status available.

Discrete Control Interface

Record switch	TTL Compatible 100k pull up to 3.3v	Contact closure to 0v.
Record LED	Open collector (16v @ 20mA max)	LED + series resistor

Video

Signal Standards	CCIR, PAL, NTSC
Frame Rate	PAL = 25Hz, NTSC = 30Hz
S-Video Input	1.0 Vp-p 75 Ohm, ±10%
Composite Video Input	1.0 Vp-p 75 Ohm, ±10%
Composite Video Output	1.0 Vp-p 75 Ohm, ±10% (includes on-screen display)

Video encoding

Recording format	Digital 4:2:2 YCrCb
Digital Colour Space	YUV
Sampling Rate	27MHz
Pixel Resolution	See Table1
S/N Ratio	53dB
Bandwidth	13MHz (-3dB)
Compression Method	MPEG-2
Constant bit rates	3-5Mb/s User Configurable. 4x Quality settings
Variable bit rates	4-8Mb/s User Configurable. 4x Quality settings
Compression Ratio	1:12 to 1:24 in 4 ranges.
Transport Stream	Program Stream (PS)
Group of Pictures (GOP)	19 (Factory Configurable)

Audio

Channels	2 In, 2 Out
Analogue Input	1.0 V RMS (0dBV) gain +3 to –30dBV
Analogue Output	1.0 V RMS (0 dBV)
Input Impedance	> 10 kOhms
Output Impedance	< 100 Ohm
Resolution	16 bit
Sampling Rate	44.1 kHz
Dynamic Range	74dB

Real Time Clock

Accuracy +/- 0.006%. = 5s / day max. Typical +/-2 sec / day

Recording Media

Minimum Media size	512Mbyte	
Maximum Media size	128Gbyte Theoretical.	16Gbyte tested
Maximum File size	2Gbyte	Larger recordings are automatically fragmented into 2 GB files with 0.5 second gaps.

File Format	MPEG2 <file_name>.MPG files	Windows Media player compatible
Total recording time	>4 hours (depending on card size)	See Table 2
Media supply voltage	3.3v DC	
Media format	PC. FAT32	
Recommended Cards	Pretek, Sandisk Ultra II & Extreme III	
Card read/write speed	Minimum ×32 (approx. 5 Mbyte/s)	
Random access time	10mS max	

Software

System Configuration software supplied. Connection via RS232 port Recorded video files can be played on most media player software, e.g. Windows Media Player etc.

Environment

Operating temperature range*	-20 to +70ºC	-4 to 160F
Storage temperature range*	-40 to +80ºC	-40 to 175F
Sealing	IP67	
Vibration*	20 G, 3 axis × 12 hours each	
Shock*	50 G, 15 mS	
Altitude 30000 feet with reduced temp spec:		-20 to +50ºC
Humidity	0 – 100% RH	
EMI Emissions	EN55025B / CISPR25	
EMI Immunity	EN55024B	

* *Specifications are for the Digital Video Recorder only. When combined with the media, the specifications will be reduced to the lesser of the two.*

Table 1.

Resolution	PAL	NTSC
Full	720 x 576	720 x 480
Medium (2/3 D1)	480 x 576	480 x 480
Small (1/2 D1)	352 x 576	352 x 480
Smallest (SIF)	352 x 288	352 x 240

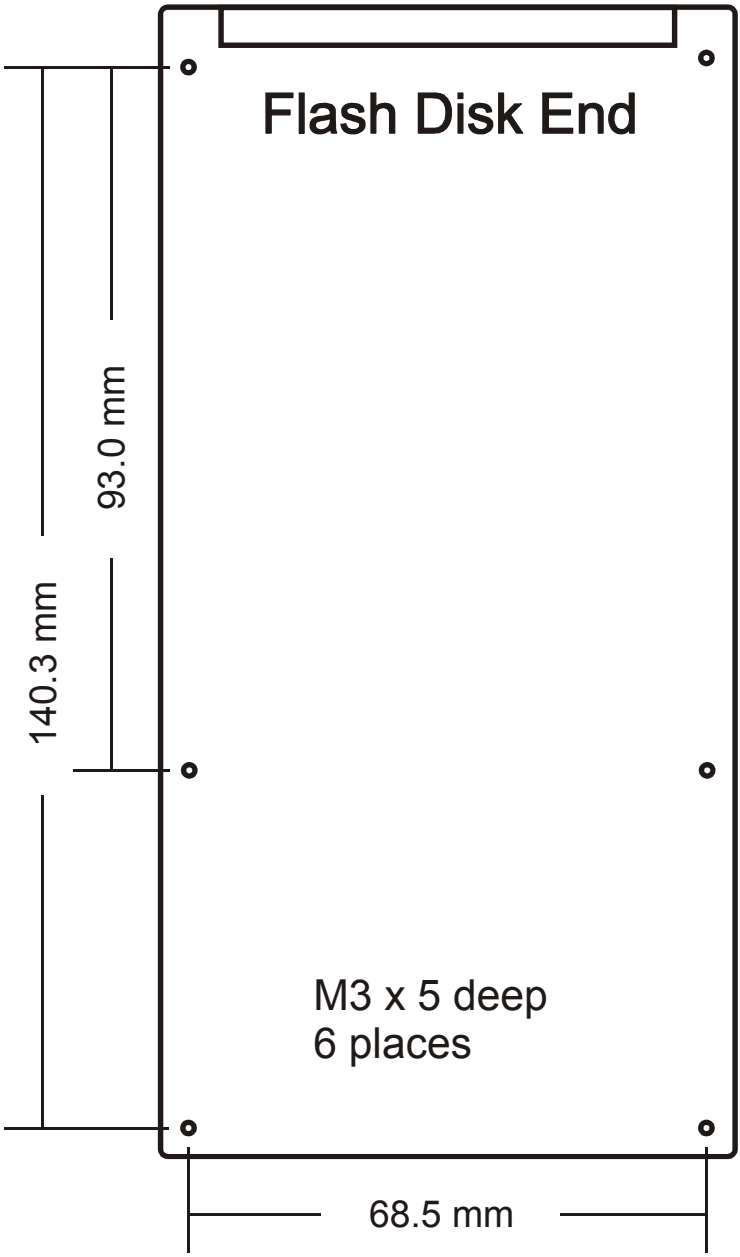
Table 2.

Recording Time Mins/Gbyte. Constant bit rate (CBR)				
	Recording Quality			
Resolution	Low	Medium	High	Highest
Full	55	39	30	24
Medium (2/3 D1)	70	48	37	30
Small (1/2 D1)	83	60	47	39
Smallest (SIF)	111	83	66	55

Appendix A - Mounting Template

Use the template on the next page for mounting the DVR.

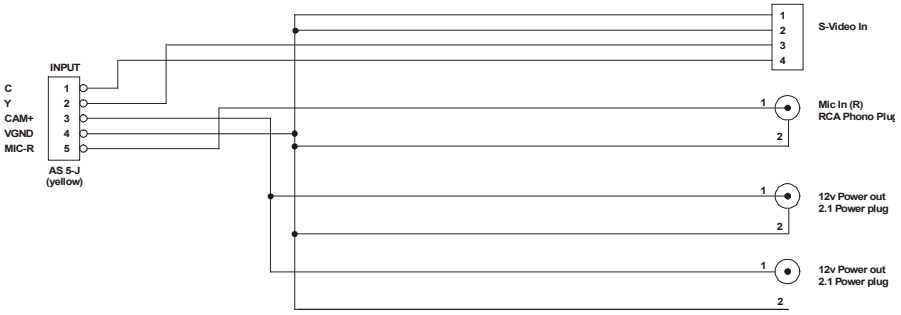
Remember to leave room for card insertion and removal.


Flash Disk End
93.0 mm
140.3 mm
M3 x 5 deep
6 places
68.5 mm

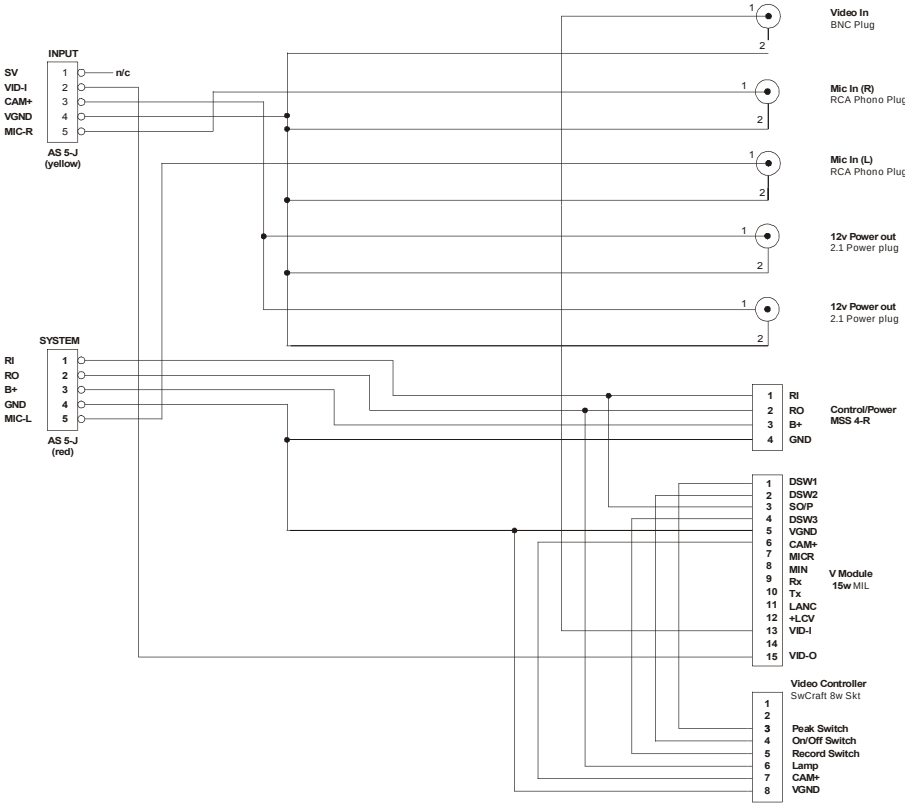
Appendix B - Wiring Harness Diagrams

Standard Input Harness (ST918067)

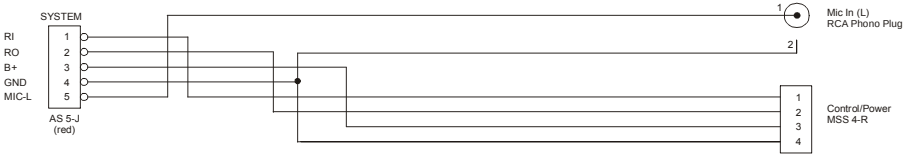
S-Video Input Harness (ST918069)



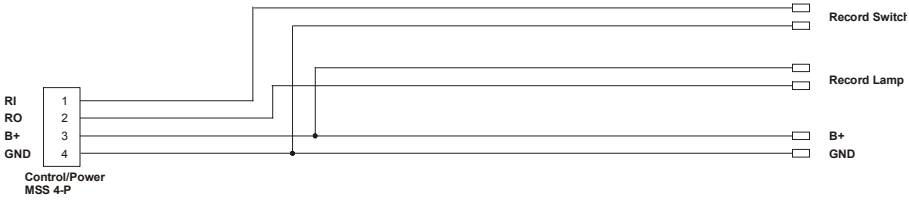
DVR to V/VS Module Harness (ST900103)



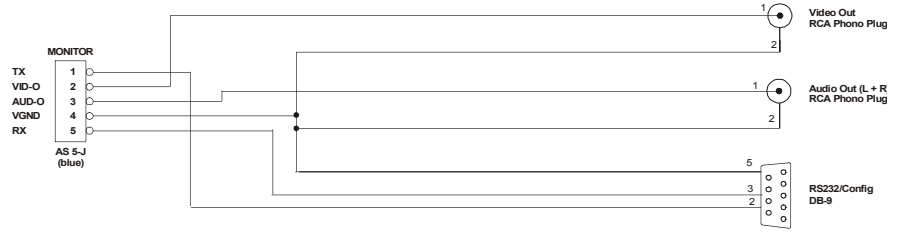
System Harness (ST918066)



Power / Control Harness (ST918070)



Monitor / Configuration Harness (ST918068)



Returned Goods Procedure

In the unlikely event of a Stack part developing a fault and requiring repairs, you are kindly requested to contact your distributor or Stack Ltd for a **R**eturns **A**uthorisation **N**umber (RAN).

A returns goods form and RAN will be supplied by email/Fax/Post to fill in. Please return the faulty part back to Stack Ltd either direct or via the distributor with this completed form.

*Please Note: Returning a part **without** this form and **RAN** will lengthen the repair times and possibly increase the cost of the repair.*

For a current list of distributors log onto the Stack websites at www.stackltd.com or www.stackinc.com click on the "Where to buy" tab at the top of the home page and select Distributors.

To Contact Stack Ltd:

Email: sales@stackltd.com
Service Administrator: Tel: +44(0)1 869 240404
Tech Support: +44(0)1 869 240420
Fax: +44(0)1 869 245500

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