

X500 and R500

INSTRUCTION MANUAL



TIMESPACE



DESIGNED AND MANUFACTURED
IN THE UK

X500 OPERATING SOFTWARE

THE X500 MANUAL IS AVAILABLE
ONLINE: www.tspace.co.uk

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List of Abbreviations

| Abbreviation | Meaning |
|---------------------|--|
| AUX | Auxiliary |
| bps | Bits per second |
| CAN | Controller Area Network |
| CD | Compact Disk |
| CE | European Conformity |
| COM | Communication (port) |
| COMMS | Communications |
| DVR | Digital video recorder |
| EEC | European Economic Community |
| EMC | Electro-magnetic compatibility |
| EMG | Emergency (EMG Splash Screen) |
| FAT | File Allocation Table |
| FMS | Fleet Management System |
| FTP | File Transfer Protocol |
| FPS | Frames Per Second |
| GB | Gigabytes |
| GMT | Greenwich Mean Time |
| GND | Ground |
| GPS | Global positioning System |
| GSM | Global system (or standard) for mobile |
| HDD | Hard Disk Drive |
| HR | Hour |
| IP | Internet Protocol |
| IPS | Images per second |
| kHz | Kilohertz |
| KPH | Kilometres Per Hour |
| LAN | Local Area Network |
| LED | Light-Emitting Diode |

| | |
|-------|--|
| MAC | Media Access Control |
| MB | Megabytes |
| MBR | Master Boot Record |
| MED | Medium |
| mics | Microphones |
| MIN | Minute |
| MPH | Miles Per Hour |
| NTSC | The television broadcasting system used in North America and Japan |
| OSD | On-screen display |
| ONVIF | Open Network Video Interface Forum |
| PAL | Phase Alternating Line |
| PC | Personal Computer |
| PCB | Printed Circuit Board |
| PoE | Power over Ethernet |
| PTZ | Pan Tilt Zoom (camera) |
| RES | Resolution |
| RH | Relative Humidity |
| RMS | Root Mean Square |
| RTSP | Real Time Streaming Protocol |
| s | Second |
| SD | Secure Digital (card) |
| SDHC | Secure Digital High Capacity |
| SEC | Second |
| SMART | Self-Monitoring, Analysis and Reporting Technology |
| SMS | Short Message System |
| TB | Terabyte |
| TCP | Transmission Control Protocol |
| UK | United Kingdom |
| URL | Uniform Resource Locator (address of specific website or file on the internet) |
| USA | United States of America |
| USB | Universal Series Bus (cable system) |

| | |
|------|-----------------------------|
| UTC | Co-ordinated Universal Time |
| V | Volts |
| VOR | Voice Operated Recording |
| Vrms | Root-mean-square Voltage |
| W | Watts |
| WiFi | Wireless local area network |

1. About This Manual

This manual contains the information required for the installation and operation of the Timespace Technology X500 and R500 Digital Video Recorders (DVRs).

The X500 and R500 DVRs utilise the same software. The software menus are therefore largely the same, and are covered in the same section of this manual (User Guide – X500/R500 Menu System). Where there are differences in the menu screens/settings, different screenshots will be given for the X500 and the R500 and the options/settings explained accordingly.

However there are differences between the X500 and the R500 in number and type of cameras, number and type of audio connections etc. The photographs, diagrams, connection details and installation instructions in this manual are therefore specific to either the X500 or R500 and are labelled as such.

1.1 DVR Models – identification and distinction

The X500 and the R500 have identical front panels, other than the X500/R500 DVR model labelling.



Figure 1 - X500/R500 Identification and distinction

A summary of the main feature differences between the X500 and the R500 is below:

| Feature | X500 | R500 |
|---------------------------------|-----------------------------|--------------------|
| Analogue (SD) video inputs | 4 | 4 |
| IP Video inputs | 4 (PoE) | 4 (non PoE) |
| Video outputs | 2 | 1 |
| Audio inputs | 1 standard + 4 High Quality | 1 standard quality |
| Alarms in | 6 | 10 |
| Built in camera power/connector | No | Yes (GX12 4-way) |
| Motion Detection | Yes, IP and analogue | No |

Figure 2 - X500 and R500 - Features and differences

1.2 Structure of this manual

This manual is divided into the following sections:

- (Chapter 1 – About this manual)
- [Chapter 2 – Quick Start Guide](#)
- [Chapter 3 – User Guide – X500/R500 Menu System](#)
- [Chapter 4 – System Information and Security](#)
- [Chapter 5 – System Interfaces](#)
- [Chapter 6 – Installation Guide](#)
- [Chapter 7 – Service and Maintenance](#)
- [Chapter 8 – Software](#)
- [Appendices](#)

Where text in the body of the manual is shown in CAPITALS, this relates to one of the menu choices in the DVR menu system, eg MAIN MENU > NORMAL RECORDING.

Within the [User Guide](#) section of the Manual, links from menus to other menus or sub-menus are given as hyperlinks.

Detailed technical information can be found in the [Appendices](#), along with [certificates of conformity and type approval](#).

2. Quick Start Guide

2.1 System Overview



Figure 3 X500/R500 Digital Video/Audio Recorder

2.1.1 X500/R500 Digital Video/Audio Recording System

The X500 and R500 are digital video/audio surveillance recorders (DVRs) for use in covert, portable and mobile applications.

Recordings are made on a removable hard disk cartridge inserted in the DVR. Optionally, recordings can be simultaneously written to a removable SD card.

The recordings can be accessed by connecting the cartridge to a PC using the USB interface kit or cartridge station (both available from Timespace). Timespace [PCLink](#) application is a proprietary reading and archiving software package used to review the recordings.

The Timespace [X301 Reviewer](#) is used to program the menu settings on the DVR, to check camera views, to playback footage and to list the recorded files on the installed Hard Disk Cartridge.

The DVR's integral [GSensor](#) records the vehicle's movement for the X, Y & Z axes.

2.1.2 Programming – X301 Reviewer

The DVR is configured using a tiered menu system. The menu system is accessed using the X301 Reviewer (pictured below).



Figure 4 X301 Reviewer

To enter the Menu System press any of the four MENU arrow buttons.

To exit the Menu System or to move back up a level press the MENU EXIT button.

See the separate X301 Reviewer manual at www.tspace.co.uk for detailed information on the Reviewer's functions / controls, including PTZ controls.

2.1.3 Help Screens

Each page on the DVR menu system has an associated Help screen which describes the features on that page.

Pressing the HELP key on the [Reviewer](#) front panel will display the Help page. Use the UP/DOWN arrow keys to scroll through each help page.

The help pages included on the DVR are intended as a quick reference with more detailed descriptions contained in this manual.

3. User Guide – X500/R500 Menu System

The DVR is configured using a tiered menu system. There are two top level menus through which all features and settings are configured.

The [MAIN MENU](#) relates to the recording functions, files and video output:



The [SETTINGS MENU](#) is where the DVR and any connected equipment are configured:



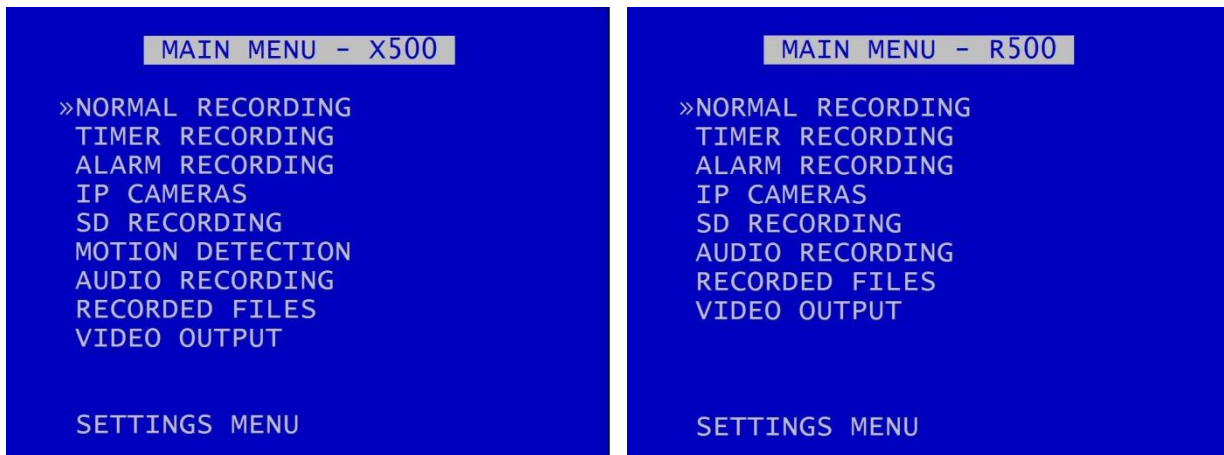
A help system is included and can be displayed for each menu by pressing the HELP key on the [Reviewer](#).

Navigation of the menu system is by using the arrow keys on the [Reviewer](#).

All menu configuration items are changed instantly with the exception of the following which require a reboot:

- [VIDEO STANDARD](#) – switching between PAL/NTSC.
- BAUD RATE – changing the baud rate for GPS, [GSensor](#) and RS232.
- [LANGUAGE FILE](#) – when loading a language file from the hard disk cartridge.

3.1 Main Menu



X500 Main Menu

R500 Main Menu

Recording modes in order of priority are:

- 1) ALARM RECORDING
- 2) TIMER RECORDING
- 3) NORMAL RECORDING

[SD RECORDING](#) can be running in parallel to any of the above recording modes.

[MOTION DETECTION](#) is used as a trigger to start one of the recording modes - it is not a recording mode on its own.

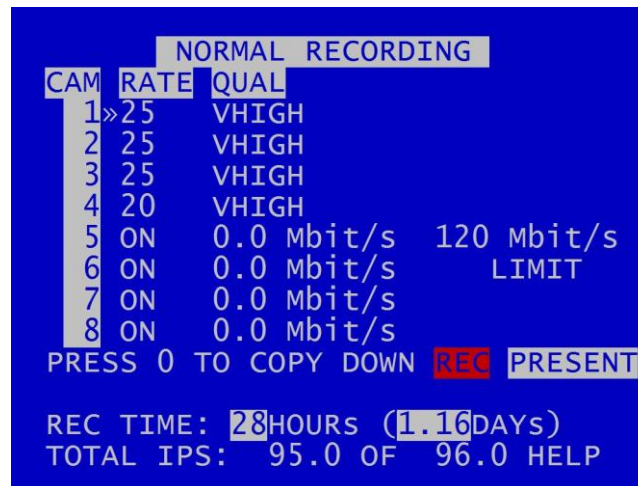
HINT: A MANUAL OVERRIDE feature exists. If the DVR is recording from a configured recording setting, eg TIMER RECORDING or ALARM RECORDING, and a user attempts to stop recording (by pressing the REC button on the Reviewer or on the X500 front panel), a warning message will be displayed. "MANUAL OVERRIDE ENABLED". To disable MANUAL OVERRIDE, press the record key again. To cancel the action, press the MENU EXIT key.

Audio recording can be turned on or off for all recording modes. This selection is found on the [AUDIO RECORDING](#) menu where other specific audio settings can be configured.

Only one mode is active at any one time. For example if ALARM RECORDING occurs during NORMAL RECORDING, ALARM RECORDING takes control but reverts back to NORMAL RECORDING once ALARM RECORDING has finished.

NB: Across the different recording modes, the DVRs have some common settings, e.g. Images per Second (IPS). The IPS can be configured from 1 to 25 per camera. To save duplication, these options will only be documented in the first instance and subsequent features should be assumed to be the same unless explicitly stated.

3.1.1 Normal Recording



This menu sets the Normal Recording configuration. Recording is activated by pressing the record button on the front of the DVR or the Reviewer. In addition, recording can be activated on ignition or with an [ALARM INPUT](#).

The X500 and the R500 each have 8 camera inputs:

Cameras 1-4 are the analogue (SD) cameras.

Cameras 5-8 are the IP cameras.

It is possible to “dual record”, ie record analogue and IP cameras at the same time.

Connected cameras are identified by highlighting the relevant camera number with either a red background (indicating camera recording) or a white background (camera present but not recording).

Analogue (SD) cameras:

Images per second IPS (RATE) and image quality (QUAL) can be set individually for each analogue camera.

RATE can be set to; “-” (OFF), 1, 1.5, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12.5, 15, 20, 25. The global (total) maximum IPS limit on the X500/R500 is 100 IPS.

QUAL can be set to; LOW, MEDIUM, HIGH, V.HIGH, VV.HIGH, SUPER

HINT: A “copy down” feature is available for configuring multiple analogue camera settings. The settings for the currently selected camera will be copied down to all remaining cameras, subject to the global IPS limit. Press 0 to copy down.

IP cameras:

To configure IP Cameras, eg IP addresses, see the separate menu section MAIN MENU > [IP CAMERAS](#)

NB: if IP cameras are enabled, IP camera streams will be recorded along with the analogue recording streams configured in eg [NORMAL RECORDING](#), [TIMER RECORDING](#), [ALARM RECORDING](#) etc.

In addition, IP Cameras can record as a stand-alone function even if no analogue cameras are configured. Ensure that the desired number of IP Cameras are selected in the NORMAL, TIMER or ALARM RECORDING menus.

3.1.1.1 REC TIME AND TOTAL IPS

The global (total) recording resource available on the X500/R500 is 100 IPS.

For each recording mode, the total number of configured IPS (images/sec) is displayed along with the maximum. Any adjustment to the camera IPS, image quality or number of recorded cameras will affect the REC TIME. The REC TIME is an indication of the number of Days, Hours, Minutes that the DVR will record for based upon the current settings and entire installed cartridge capacity.

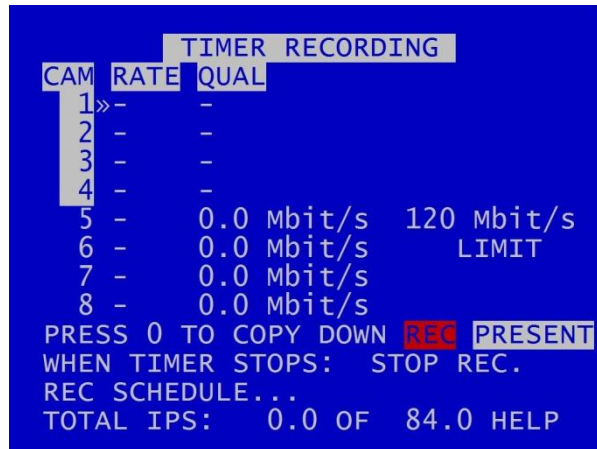
HELP – provides details of currently configured [RESOURCE ALLOCATION](#) across the various functions.

By default the DVR is set to NORMAL RECORD on all connected analogue (SD) cameras, enabling quick deployment - just connect cameras and press the record button.

IP cameras need to be configured separately, see [IP Cameras](#) section.

NB: the DVR is set to default record at power up. Options to enable/disable recording at power-up are found in the SETTINGS > ADVANCED > [POWER STATE](#).

3.1.2 Timer Recording



Daily on/off timers can be set to provide timed recording. This menu sets the recording configuration and the time. During TIMER RECORDING the settings in this menu apply.

Images per second (RATE) and image quality (QUAL) can be set for each analogue camera (Cameras 1-4) in the same way as for NORMAL RECORDING.

HINT: A “copy down” feature is available for configuring multiple analogue camera settings. The settings for the currently selected camera will be copied down to all remaining cameras, subject to the global IPS limit. Press 0 to copy down.

IP Cameras can be used for TIMER RECORDING and can be configured at MAIN MENU > [IP CAMERAS](#)

WHEN TIMER STOPS: At the end of a period of TIMER RECORDING the DVR can either STOP RECORDING or record in NORMAL RECORDING record mode. The latter can be used if two recording styles are required based on time.

Enter the daily start and end times in the [REC \(RECORDING\) SCHEDULE](#) menu

TOTAL IPS – provides details of current IPS allocation within TIMER RECORDING, ie configured images per second, as well as the total IPS available for TIMER RECORDING.

HELP – provides details of recording [RESOURCE ALLOCATION](#) across the various functions.

3.1.2.1 Recording Schedule



A RECORDING SCHEDULE can be set. This can be used e.g. to record between a start date and end date. If both DAILY TIMES and PERIOD TIMES are selected, the DVR will record only in the period and also only in the daily times shown.

DAILY TIMER DISABLED – disables timer recording.

RECORD BETWEEN DAILY TIMES – sets the unit to record between the daily times specified in the schedule.

RECORD OUTSIDE DAILY TIMES – sets the unit to record at all times other than those specified in the daily times schedule.

A COPY DOWN features is available to copy the times set for Monday on to all other days of the week.

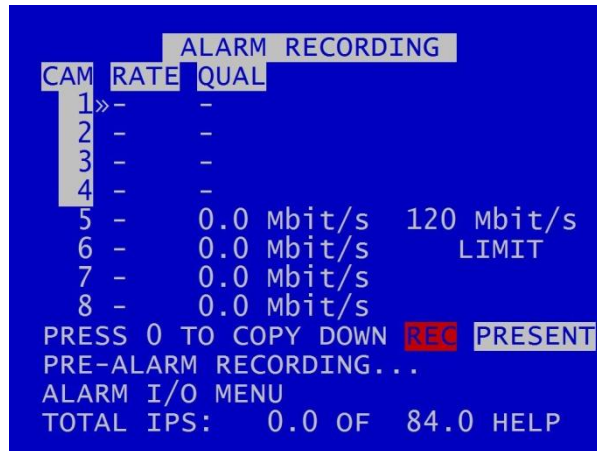
A period of TIMER RECORDING can be set e.g. to record between a start date and end date. Options for this are PERIOD TIMER DISABLED, RECORD INSIDE PERIOD, RECORD OUTSIDE PERIOD.

NB: By default the TIMER SCHEDULE is set to Mon-Fri 9-5 and all day Sat/Sun.

HINT: Times are entered in the SCHEDULE using the digit keys on the front panel of the [Reviewer](#) for number input.

If the daily timer and the period timer are both enabled, then recording occurs in the intersection of the daily timer and period timer settings.

3.1.3 Alarm Recording



Alarm recording is activated by the alarm inputs. This menu sets the alarm recording configuration. Configure camera RATE and QUAL, and configure IP cameras, as for [NORMAL](#) or [TIMER RECORDING](#).

Alarm recording can be triggered by setting the function of one or more [ALARM INPUTS](#) to be ALARM REC. [ALARM INPUTS](#) can also be used to trigger other functions and modes of recording.

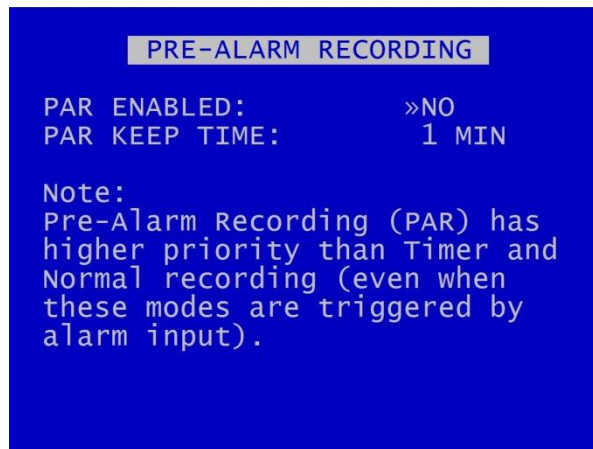
[PRE-ALARM RECORDING](#) – configures the DVR to capture and retain a period of recording prior to an alarm input being triggered.

[ALARM I/O](#) sub menu configures Alarm Recording options and INPUT / OUTPUT options.

Total IPS – provides details of current IPS allocation within ALARM RECORDING, as well as the total IPS available for ALARM RECORDING.

HELP – provides details of currently configured recording [RESOURCE ALLOCATION](#) across the various recording functions.

3.1.3.1 Pre-Alarm Recording



Pre-Alarm Recording (PAR), if enabled, configures the DVR to record for a set period of time prior to an alarm input being triggered, and for the DVR to keep the PAR files. This is useful in order to ensure that the lead-up to an alarm event is recorded. It avoids the need to have the DVR recording permanently, and it maximises the amount of available hard disk space, while ensuring that the recorded files for alarm event lead-up are kept.

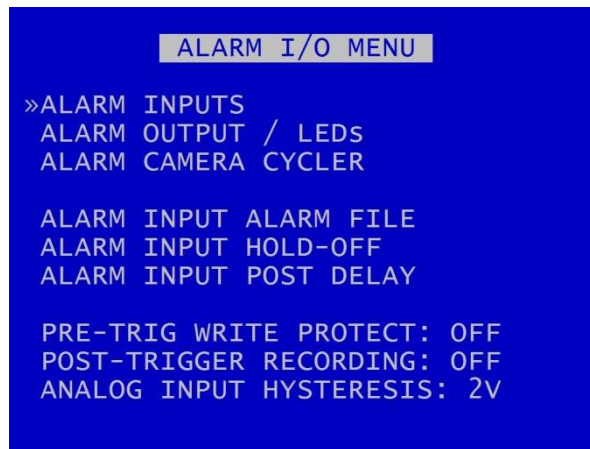
PAR ENABLED – to allow PRE-ALARM RECORDING, select YES. To disable PAR, select NO.

PAR KEEP TIME – select the length of pre-alarm footage which you wish to retain on the disk. Options are 1MIN, 2, 3, 4, 5, 10, 20, 30, 40, 50MINS, 1HOUR, UNLIMITED.

The DVR will record all cameras specified for ALARM RECORDING for the duration specified in the PAR KEEP TIME setting. The DVR will be recording continuously, but will only keep the recordings for the specified time.

NB: Pre-Alarm Recording (PAR) has a higher priority than [TIMER](#) and [NORMAL RECORDING](#) (even when these modes are triggered by an alarm input).

3.1.3.2 Alarm Inputs/Outputs



[ALARM INPUTS](#) – sets the active/inactive status of each alarm input and defines the function (action) of the DVR when the selected alarm is active.

[ALARM OUTPUT/LEDs](#) – sets the conditions for the alarm outputs.

[ALARM CAMERA CYCLER](#) – configures the options for the DVR to automatically switch between cameras and the Health Page.

[ALARM INPUT ALARM FILE](#) – provides an option for files to be marked as alarm recordings.

[ALARM INPUT HOLD-OFF](#) – controls the number of seconds for which ALARM RECORDING is delayed after an alarm input has been triggered.

[ALARM INPUT POST-DELAY](#) – controls the number of seconds for which the alarm state is held once the alarm input has changed state.

PRE-TRIG WRITE PROTECT specifies the duration prior to the alarm recording for which files will be marked as write protected. This assumes that another mode of recording was already writing files to disk. Select from available values: 1SEC, 2, 5, 10, 20, 30, 40, 50, 1MIN, 2, 5, 10, 20, 30, 40, 50MINS, 1HOUR, 2HOURS.

POST-TRIGGER RECORDING – specifies the duration of recording after the alarm trigger. Once post-trigger has elapsed, recording will stop or return to the previous recording mode. Post-trigger values are: OFF, 1SEC, 2, 5, 10, 20, 30, 40, 50, 1MIN, 2, 5, 10, 20, 30, 40, 50MINS, 1HOUR, 2HOURS.

ANALOG INPUT HYSTERESIS – specifies the voltage value difference that must occur in order to change the alarm state, eg if the trigger is set to 14V, when 14V is met the trigger will switch. In order to switch back, a change of 2V must occur, ie 14-2 = 12V. Available values are: 1V, 2, 3, 4, 5, 6, 7 and 8V.

3.1.3.3 Alarm Inputs

The X500 has 6 alarm inputs on the screw terminal block – see Figure 10 - X500 Connections/Wiring.

The R500 has 10 alarm inputs on the screw terminal block – see Figure 12 - R500 Connections/Wiring.

| ALARM INPUTS | | | |
|--------------|--------|----------|------|
| IN | ACTIVE | FUNCTION | CAMS |
| 1 | »> | 12V | NONE |
| 2 | > | 12V | NONE |
| 3 | > | 12V | NONE |
| 4 | > | 12V | NONE |
| 5 | > | 12V | NONE |
| 6 | > | 12V | NONE |

EMBED ALARM STATE MENU...
ALARM 1 IS INACTIVE @ (0.0V)

X500 Alarm Inputs

| ALARM INPUTS | | | |
|--------------|--------|----------|------------------|
| IN | ACTIVE | FUNCTION | CAMS |
| 1 | »> | 12V | NONE |
| 2 | > | 12V | NONE |
| 3 | > | 12V | NONE |
| 4 | > | 12V | NONE |
| 5 | > | 12V | NONE |
| 6 | > | 12V | NONE |
| 7 | > | 12V | NONE |
| 8 | > | 12V | NONE |
| 9 | > | 12V | NONE |
| 10 | > | 6V | ALARM REC 1 TO 3 |

EMBED ALARM STATE MENU...
ALARM 1 IS INACTIVE @ (0.0V)

R500 Alarm Inputs

ALARM INPUTS menu sets the alarm inputs to be ACTIVE or INACTIVE. If an alarm input number is highlighted with a white background, this indicates its current state is active. No highlight indicates the state is inactive.

Use the left and right menu buttons on the [Reviewer](#) to set the active voltage. For a 12V input, use typically <6V or >6V to ensure a clear change in state triggers the alarm.

NB: There is a priority order on the Alarm Inputs. The lower numbered Alarm Inputs take priority over the higher numbers. For example, if Alarm Input one is wired to the Reversing sensor, and is set to trigger [NORMAL RECORDING](#) when the Reversing sensor is activated, this alarm will take priority over any other alarm currently triggered.

FUNCTION lists the available [ALARM INPUT FUNCTIONS](#) for selection. The FUNCTION defines the action of the DVR when the selected alarm input is active. The function is active for the duration of the alarm (plus post trigger time if selected):

[EMBED ALARM STATE](#) menu configures options for adding text to recorded images.

ALARM 1 IS INACTIVE @ - Shows the current state of each of the alarm inputs. The corresponding number for each alarm input will be highlighted (white background) for ACTIVE and not highlighted for INACTIVE. To view the current state for each alarm input, use the arrow keys on the [Reviewer](#) to move up and down to each alarm number. The voltage is also shown.

Alarm Input Functions

| | |
|----------------------------|---|
| NONE | - No action |
| NORM REC | - Switches NORMAL RECORDING on |
| ALARM REC | - Switches ALARM RECORDING on. |
| TIMER REC | - Switches TIMER RECORDING on |
| MAIN OUT | - Sets the main video switcher (MAIN OUT) to the selected camera. Alternatively select the multi-camera screen (MULTI) or Emergency Splash Page (EMRSPL) to be displayed. |
| AUX1OUT | - (X500 only) Sets the auxiliary video switcher (AUX VIDEO OUT) to the selected camera. |
| EMAIL | - Instructs the DVR to send an email. Configure this in EXTERNAL EQUIPMENT > SMTP EMAIL . |
| HEALTH PAGE | - Displays the DVR Health Page . |
| PTZ PRESET | - Accesses the PTZ preset camera positions. 8 presets are available (setup using the PTZ menu) and a trigger can be used to invoke that position upon alarm state change. |
| IGNITION | - Linked to POWER OPTIONS menu to control how the DVR behaves on ignition |
| OVERLAYS | - Various vehicle alarm inputs - tags the particular alarm inputs as used for: INDICATOR L, INDICATOR R, BRAKE, SIDE LIGHTS, HEAD LIGHTS, FOG LIGHTS, HORN, BULL HORN, SIREN, BLUES, HAZARD WARN, DOOR, REVERSE, HANDBRAKE, ACCEL'TION, DOOR1, DOOR2, DOOR3, RAMP |
| CAM CYCLER | - Automatically switches between cameras and the Health Page as configured in the ALARM CAMERA CYCLER menu from the ALARM I/O menu page. |
| AUDIO REC | - Must be used in conjunction with the AUDIO RECORDING menu, i.e. enabling AUDIO RECORDING FOR NORMAL, TIMER, ALARM or SD RECORDING . |
| BEEP TEST | - This is used for test purposes only and is not required by users. |
| POWER DOWN | - Instructs the DVR unit to power down when the alarm is triggered |
| PUSHBUTTON1 & 2 | - tags the alarm inputs as used for additional buttons/triggers specified by the user |

Each of the alarm inputs can be set to turn on/off the selected FUNCTION. The FUNCTION defines the action of the DVR when the selected alarm input is active. The FUNCTION is active for the duration of the alarm (plus POST-TRIGGER time if selected – see ALARM [INPUTS/OUTPUTS](#) menu).

If a recording mode is used as an alarm FUNCTION, the settings are as per the settings in the relevant recording mode menu, eg if [NORMAL RECORDING](#) is selected as an alarm FUNCTION, the settings configured in [NORMAL RECORDING](#) are used when that alarm is triggered.

3.1.3.4 Embed Alarm State

| EMBED ALARM INPUT STATE | | |
|-------------------------|-------|---------|
| ALARM IN | EMBED | TEXT |
| 1 | »NO | ALARM 1 |
| 2 | NO | ALARM 2 |
| 3 | NO | ALARM 3 |
| 4 | NO | ALARM 4 |
| 5 | NO | ALARM 5 |
| 6 | NO | ALARM 6 |
| POSITION: | | TOP |

X500 Embed Alarm State

| EMBED ALARM INPUT STATE | | |
|-------------------------|-------|----------|
| ALARM IN | EMBED | TEXT |
| 1 | »NO | ALARM 1 |
| 2 | NO | ALARM 2 |
| 3 | NO | ALARM 3 |
| 4 | NO | ALARM 4 |
| 5 | NO | ALARM 5 |
| 6 | NO | ALARM 6 |
| 7 | NO | ALARM 7 |
| 8 | NO | ALARM 8 |
| 9 | NO | ALARM 9 |
| 10 | NO | ALARM 10 |
| POSITION: | | TOP |

R500 Embed Alarm State

Text can be embedded into recorded images using the EMBED ALARM INPUT STATE menu.

8 user-defined characters can be entered per input, and positioned either top or bottom of the image. The text will display on the footage for the duration of the alarm, plus any post-alarm duration which has been configured.

EMBED – select YES or NO.

TEXT – default text is the alarm number. The default text is the number of each alarm, eg ALARM 1, ALARM 2 etc. Alternative text can be entered using the [Reviewer](#).

POSITION – select TOP or BOTTOM

The text will be embedded on all camera views simultaneously and will appear on all selected cameras during playback in [PCLink](#).

3.1.3.5 Alarm Outputs



X500 Alarm Outputs

R500 Alarm Outputs

The ALARM OUTPUT menu sets the conditions for the external alarm outputs.

The X500 has 3 alarm outputs: LED1 (LD1), LED2 (LD2) and ALARM (ALM).

The R500 has one alarm output: ALARM (ALM).

ACTIVE – CLOSED contact means alarm terminals connected, OPEN contact means alarm terminals unconnected. When CLOSED, the alarm output number will be highlighted in white. When open, no highlight is shown.

Select WHEN the alarm will change state/be activated:

- | | | |
|------------------|---|---|
| TEST OPEN/CLOSED | - | Sets the input to OPEN/CLOSED for testing purposes |
| ALARM OCCURRED | - | An ALARM event has occurred |
| RECORD LED | - | The front panel record LED is active |
| DISK LED | - | The front panel disk LED is active |
| SD RECORDING | - | SD recording is occurring |
| FAIL LED | - | The front panel fail LED is active |
| SERVICE LED | - | The front panel service LED is active |
| FRONT LEDS | - | Any of the front panel LEDs are active |
| CAM DISCONNECTED | - | Any camera is disconnected |
| GSENSOR TRIGGER | - | Any of the GSensor configured thresholds are reached / exceeded |
| LAN ACTIVE | - | Files are being transferred via the LAN interface |

- HD WP % - A percentage of the hard disk cartridge contains Write-Protected files: 25, 50, 60, 70, 80, 90 and 99%.
- HD FULL % - A percentage of the hard disk cartridge if full; 25, 50, 60, 70, 80, 90 and 99%.
- AUDIO VOR - Voice Operated Recording. If the detected level of audio input reaches a certain percentage (25%, 50%, 75%) the alarm output can be triggered (using ALARM OUTPUTS). If using this trigger as an alarm *input*, a wire link will need to be in place on the X500 rear panel green block (see Figure 10 - X500 Connections/Wiring and Figure 12 - R500 Connections/Wiring). If the VOR output is being used as an alarm input to trigger recording, it can only be used to trigger ALARM recording mode. Example setup of VOR;

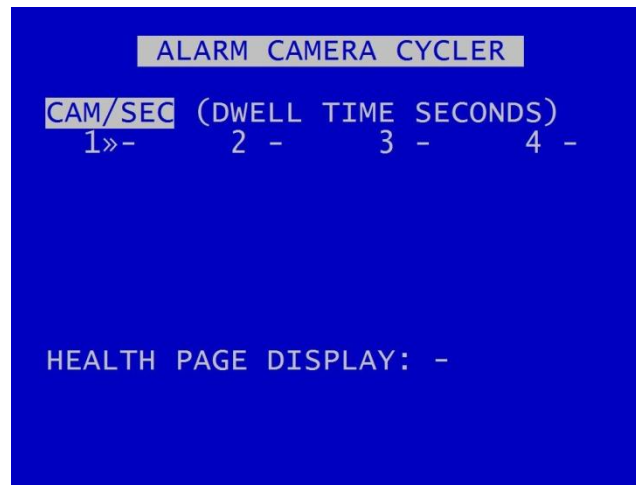
1. ALARM OUTPUT: ALM, CLOSED, AUDIO VOR 75%
2. ALARM INPUT: LD1, CLOSED, FUNCTION – ALARM REC, CAMS 1

The above example assumes that there is a wire link on the green block between ALARM OUT and ALARM IN1. The POST TRIGGER time can also be set to record for x seconds after the audio trigger has finished.

- MOTION DETECTED - **(X500 ONLY)** Motion has been detected.
- GPS SPEED ALARM - GPS has detected speed above a certain designated threshold. Configure this in the [GPS](#) menu.

CURRENT STATE – Describes how each alarm output is CLOSED (highlighted white) or OPEN (no highlight) (CLOSED showing alarm terminals are connected; OPEN showing alarm terminals are not connected).

3.1.3.6 Alarm Camera Cycler



The ALARM CAMERA CYCLER function can be used as a test/auditing function to cycle through the cameras and [HEALTH PAGE](#).

NB: This function is currently only provided for the analogue (SD) cameras.

Set the ALARM input function and attach an external trigger then setup how many seconds the CAMERA CYCLER ALARM function will dwell on each camera and [HEALTH PAGE](#) before returning to the SWITCHER function. Available values are 1, 2, 3, 4, 5, 10, 20, 30 seconds.

HEALTH PAGE DISPLAY – sets the number of seconds for which the camera cycler shows the [HEALTH PAGE](#) in the Camera Cycler cycle. Available values are 1, 2, 3, 4, 5s, 10s, 20s and 30 seconds

3.1.3.7 Alarm Input Alarm File

| ALARM INPUT ALARM FILE | |
|------------------------|------------|
| IN | ALARM FILE |
| 1 | >NO |
| 2 | NO |
| 3 | NO |
| 4 | NO |
| 5 | NO |
| 6 | NO |

X500 Alarm Input Alarm File

| ALARM INPUT ALARM FILE | |
|------------------------|------------|
| IN | ALARM FILE |
| 1 | >NO |
| 2 | NO |
| 3 | NO |
| 4 | NO |
| 5 | NO |
| 6 | NO |
| 7 | NO |
| 8 | NO |
| 9 | NO |
| 10 | NO |

R500 Alarm Input Alarm File

The Alarm Input Alarm File feature provides an option for files to be marked as ALARM recordings if recording in any mode – ie [NORMAL RECORDING](#) or [TIMER RECORDING](#) modes rather than just in [ALARM RECORDING](#).

If any of the numbered ALARM INPUTS have the ALARM FILE setting set to YES, then the current recording file will be marked as an ALARM recording if this alarm is active.

NB: The currently configured recording mode (i.e. NORMAL, TIMER, etc) will not change. The alarm event will simply be marked as an alarm event file. This will make the alarm event easier to identify when finding files on the HDD or viewing in [PCLink](#).

An example scenario where ALARM INPUT ALARM FILE may be useful:

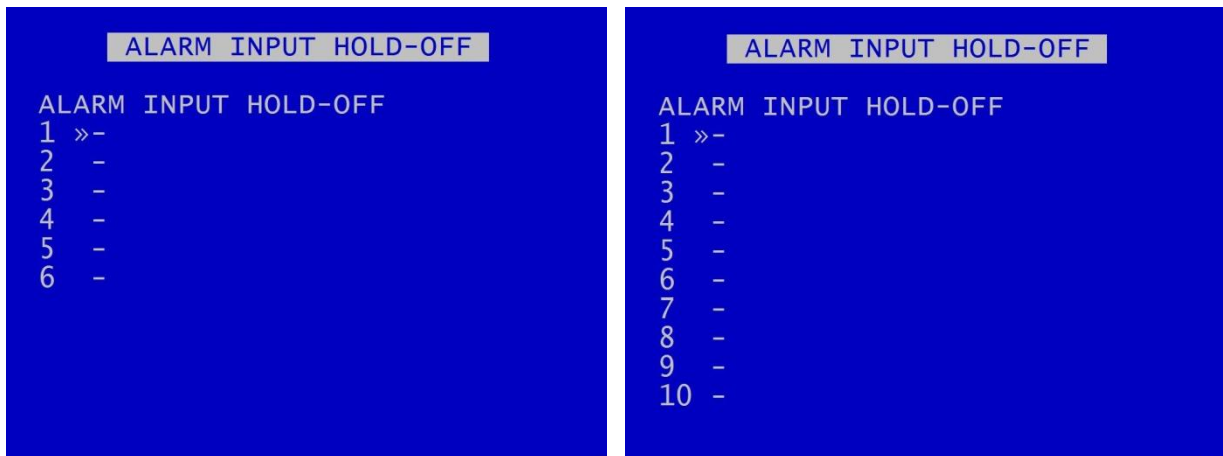
A fire engine has a DVR which is configured for NORMAL RECORDING (Note: no ALARM INPUT FUNCTIONS have been configured for NORMAL or ALARM RECORDING).

[ALARM INPUT 3](#) has been configured for SIREN, and ALARM INPUT ALARM FILE 3 has been set to YES.

When the SIREN becomes active, this triggers ALARM 3. Note: the recording mode does not change, and NORMAL RECORDING continues as per prior to the alarm trigger.

On file close, the recording file is marked as an alarm event file (A). All subsequent files created when the alarm is active are marked as ALARM files at file creation.

3.1.3.8 Alarm Input Hold-off



X500 Alarm Input Hold-off

R500 Alarm Input Hold-off

The ALARM INPUT HOLD_OFF controls the number of seconds for which ALARM RECORDING is delayed after an alarm has triggered.

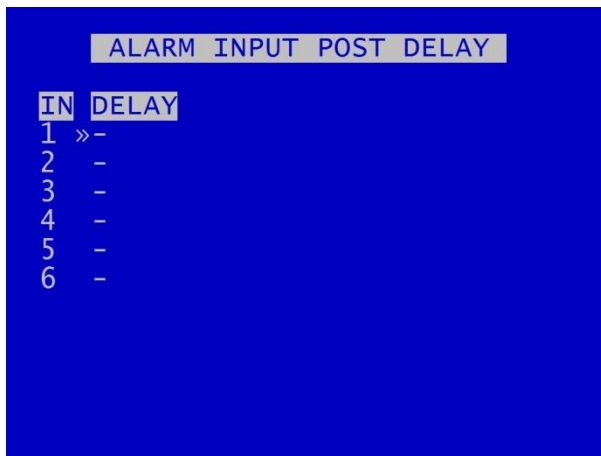
Available values are 1 SEC, 2, 3, 5, 10, 15, 20, 30, 45 60 SECS.

This may be useful in scenarios where accidental or very short-term action would otherwise trigger an alarm. In these cases, the user may not wish the alarm to be triggered, or the alarm event to be marked in the [RECORDED FILES](#).

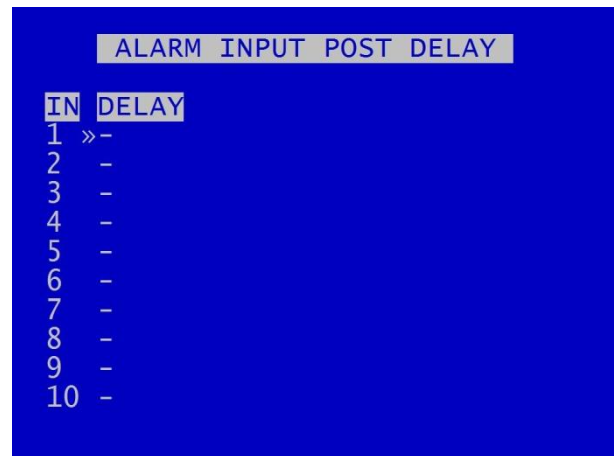
Examples of scenarios where ALARM INPUT HOLD-OFF may be useful:

1. A camera is recording activity at the rear door of a retail premises. The door is alarmed and the DVR configured to begin ALARM RECORDING if the door is open. The user may decide to implement an ALARM HOLD-OFF period so that ALARM RECORDING does not begin until the door has been open for eg 3 seconds – thus avoiding recording whenever a staff member opens the door accidentally, but ensuring that recording takes place whenever the door is held open for a delivery.
2. A waste disposal truck has a DVR which is configured to trigger ALARM RECORDING whenever reverse gear is engaged. This is to ensure that managers can view all reversing footage and check that drivers are complying with the reversing speed limit. The user may choose to set an ALARM INPUT HOLD-OFF for eg 2 seconds in order to avoid triggering ALARM RECORDING when the driver accidentally engages reverse gear without actually moving the vehicle.

3.1.3.9 Alarm Input Post Delay



X500 Alarm Input Post Delay



R500 Alarm Input Post Delay

ALARM INPUT POST DELAY menu controls the number of seconds for which the alarm state is held active once the alarm input has changed state to inactive.

Available values are 0.5SEC, 1, 2, 3, 4, 5, 10, 30SECS, 1MIN, 5MINS, 10, 15, 20MINS.

3.1.4 IP Cameras

| IP CAMERAS | | | |
|------------|-----------------|------|--|
| CAM | IP ADDRESS | TYPE | |
| 5 | » 10. 0. 20. 30 | A | |
| 6 | 192.168. 10.201 | A | |
| 7 | 192.168. 10.202 | A | |
| 8 | 192.168. 10.203 | A | |

| RECORDING | PRESENT | HELP | | | |
|----------------|---------------|------|--|--|--|
| LOCAL IP ADDR: | 10. 0. 20. 40 | | | | |
| TYPE SETTINGS | A B C D | | | | |

The IP CAMERAS menu configures settings for the 4 IP camera inputs supported by the DVR (camera numbers 5-8 on the DVR menu screens).

The following steps are required:

1. setting up the IP cameras via PC/laptop according to the camera manufacturer's instructions
2. configuring the IP cameras on the DVR
3. setting the DVR's local IP address
4. configuring the VLAN Scheme
5. enabling the IP cameras on the DVR and setting the recording requirements

3.1.4.1 Setting up the IP cameras according to the manufacturer's instructions

Firstly, the cameras themselves must be set up by connecting to them directly with a PC or Laptop and using the interface supplied by the camera manufacture in order to change settings.

How to configure the actual camera depends upon the specific model. The camera manufacturer's documentation should be consulted to determine whether this is best achieved using ONVIF (*Open Network Video Interface Forum*) or whether a webpage is made available by an HTTP server running as part of the camera's software.

NB: As part of this configuration process it is important to bear in mind the record limitations imposed by the DVR; the maximum total bitrate must not exceed 100 Mbit/s.

Timespace has produced IP camera setup guidance for some cameras; contact support@tspace.co.uk for further information.

Camera Security – Set the Username and Password for the camera.

N.B. these details will be required when setting the camera up in the X500 DVR.

Camera Network –Pre-configure each camera so that they are each on a different IP address within the same subnet for which the DVR is configured.

Set the IP addresses of the cameras.

Camera “On-Screen Display” Settings – Amend the "On-Screen Display" (OSD) settings as required, eg to turn off time and date or display the Name which you set for the IP Address.

The settings below are an example from a HIK Camera:

| | |
|--|----------------|
| <input checked="" type="checkbox"/> Display Name | |
| <input type="checkbox"/> Display Date | |
| <input type="checkbox"/> Display Week | |
| Camera Name | 192.168.10.201 |

Camera Video Settings – Two streams are required for the camera to be utilised to its full with the X500 DVR.

Stream 1 Must be set up as an H264 stream
(Used for recording IP Camera)

Stream 2 Must be set up as an MJPEG Stream
(Used for live viewing the IP camera whilst NOT recording)

The following settings are recommended (but not exclusive).

| Stream 1 (Usually the Main Stream) | | Stream 2 (Usually the Sub Stream) | |
|--|----------------------------|---|-------------------------------|
| <i>Video Encoding</i> | H 264 | <i>Video Encoding</i> | MJPEG |
| <i>Resolution</i> | 1280 x 720P (or higher) | <i>Resolution</i> | 640 x 360 (max 720 x 576)* |
| <i>Bitrate Type</i> | Constant | <i>Bitrate Type</i> | Constant |
| <i>Frame Rate</i> | 25 IPS | <i>Frame Rate</i> | 4 IPS (5IPS max)** |
| <i>Max Bitrate</i> | 4096 Kbps | <i>Max Bitrate</i> | 512 Kbps |
| <i>I Frame Interval</i> | 50 | <i>I Frame Interval</i> | n/a |

* Please ensure that Stream 2 has a frame rate of 4 IPS if possible, and 5 IPS max

** Please ensure that Stream 2 has a max resolution of 720 x 576

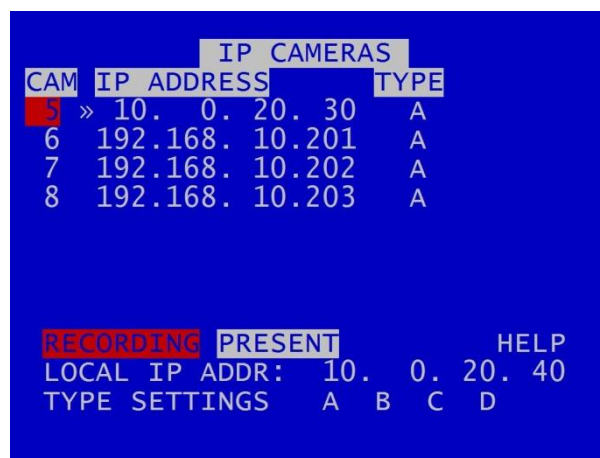
3.1.4.2 Configuring the IP cameras on the DVR

Once the Cameras have been set up according to camera manufacturer's instructions, they need to be configured on the DVR.

The following information about each IP Camera will be required:

- a) The name of the Main Stream.
- b) The name of the Sub Stream.
- c) The Username.
- d) The Password.

Navigate to the IP camera menu on the DVR via MAIN MENU > IP CAMERAS.



Entering camera IP addresses on the DVR – Enter the IP addresses of the required IP Cameras, cameras numbered 5 to 8 (The IP address for each camera should have been pre-configured when setting up the IP cameras according to the manufacturer's instructions).

Selecting camera Type – for each IP required camera, select the correct TYPE. Types are used to configure the username, password and camera stream URL in order for the DVR to receive data from the IP camera.

The camera details for each type are input in the [TYPE SETTINGS](#) menu pages.

Testing camera connectivity – to test connectivity of the IP cameras, configure the unit so it is not recording, configure the IP camera(s) and select the relevant IP Camera number (in NORMAL/TIMER/ALARM RECORDING). If the IP camera(s) is/are present, the CAM number(s) will be highlighted with a white background.

To check if the IP camera(s) is/are recording, enable recording. If recording, the IP CAM number will be highlighted with a red background.

IP camera live footage (“live view”) can be viewed using the [Reviewer](#). Use the Camera Switcher keys to select the relevant IP Camera.

NB: IP camera live view on the Reviewer is not possible if the DVR is currently recording both SD and IP cameras. Either stop all recording, or configure the DVR so no analogue (SD) cameras are recording, while leaving IP cameras recording. It will then be possible to view live IP cameras on the Reviewer.

3.1.4.3 Type Settings



The IP Camera “type” allows quick configuration of different camera makes/models.

Navigate to MAIN MENU > IP CAMERAS > TYPE SETTINGS to edit the camera TYPE SETTINGS (in the example above for TYPE D).

NB: the [TYPE SETTINGS](#) cannot be changed while recording is in progress – an “IP CAMERA WARNING” will be displayed. Stop recording, and amend the settings as required before recommencing recording.

3.1.4.3.1 Pre-configured camera settings

TYPE – The DVR is pre-configured with the default settings for a number of different camera types. Knowing the camera make and model, scroll through the TYPES to check if settings have been pre-loaded in the Configuration File (often referred to as the TSCONFIG file). If the camera you require is listed, select the camera and then select APPLY; the defaults for stream, user and password will be copied to the appropriate menu entries where they can be further edited if necessary.

The master TSCONFIG file will be updated periodically by Timespace, and the updated files will be part of subsequent Timespace DVR software releases. Users can also add camera details manually to the TSCONFIG file, as described in the following section.

NB: subsequent releases of Timespace’s master TSCONFIG file, if uploaded to a DVR as part of a software upgrade, would over-ride any camera details entered manually by a user. The user’s camera details would then need to be re-entered manually. Users should therefore save a copy of any manually-entered camera details prior to upgrading the DVR software.

3.1.4.3.2 Configuring camera settings manually

If the required camera isn't listed in TYPE, it will be necessary to enter the full settings manually.

Enter correct information for:

STREAM1 (recommended for H264; used for recording IP Cameras)

STREAM2 (is recommended for MJPEG; (used for live viewing the IP Cameras whilst recording)

USER – enter the username.

PASS – enter the password

Details of default USER name and PASSWORD should be found in the camera manufacturers' support documentation.

Information can be entered via the [Keyboard](#). If the stream name is very long it may be easier to use the [Configuration File](#) to enter the information.

3.1.4.3.3 Using the Configuration File



Navigate to the following menu:

MAIN MENU > SETTINGS MENU > ADVANCED > SAVE SOFTWARE / SETTINGS > SAVE CONFIG DATA

This will save a file onto the hard drive named – TSCONFIG.EXT

This can be opened in a text editor on a PC/laptop (e.g. Notepad) and the stream names etc. typed in.

Each line is a Camera Type and the syntax is as follows for the example of a Hik camera:

```
{IPC;3;Hik;DS-2CD2542FWD-IS;Streaming/Channels/101?transportmode=unicast&profile=Profile_1;Streaming/Channels/102?transportmode=unicast&profile=Profile_1;admin;Password}
```

Where:

- **Hik;DS-2CD2542FWD-IS** – Is the Make and Model of the camera that appears in the TYPE field of the Type Settings.
- **Streaming/Channels/101?transportmode=unicast&profile= Profile_1** - Is the name of the Main Stream.
- **Streaming/Channels/102?transportmode=unicast&profile=Profile_1** - Is the name of the Sub Stream.
- admin – Is the Username of the Camera.
- Password – Is the Password of the Camera.

Each section should be separated by semi-colons.

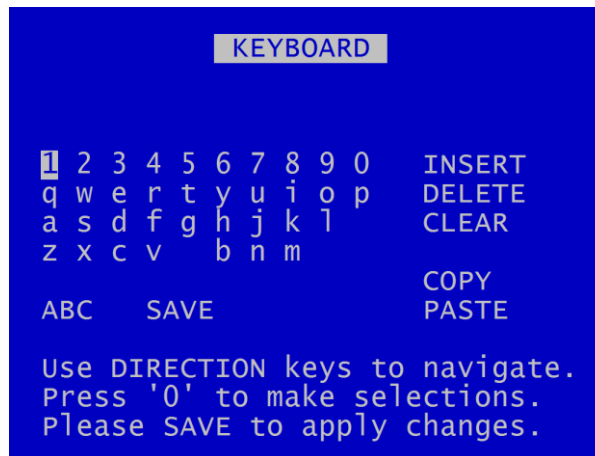
Save the configuration file and then use the following menu option to load it back into the X500:

MAIN MENU > SETTINGS MENU > ADVANCED > LOAD SOFTWARE / SETTINGS > LOAD CONFIG DATA

Your new setting will now be available in the Type Settings.

NB: Available camera options will be updated by Timespace and included in subsequent software releases. Users can also obtain a current list of cameras by contacting Timespace at support@tspace.co.uk. The update will be provided as a TCONFIG file which can be uploaded using the [LOAD SOFTWARE/SETTINGS](#) option in the [ADVANCED](#) MENU.

3.1.4.4 Keyboard



A keyboard is available to facilitate the text input, eg, for IP camera types, camera streams, camera text, vehicle ID. Use the Reviewer right navigation button to access the keyboard from the position where text is to be entered.

Once on the keyboard screen, use the Menu Navigation direction keys on the Reviewer to navigate the keyboard.

Press '0' to make selections.

Pressing '0' will add the selected character to the text edit at the current position (shown by the flashing cursor).

Press SAVE to apply changes. The edited text must be saved before exiting the menu or any changes will be discarded.

If the text edit is longer than the display area, then the icon <> will be displayed to indicate that the text is scrollable.

NB: a space character exists on the abc/ABC keyboards.

Select abc/ABC/!@# to toggle the keyboard mode.

Select INSERT to right-shift the text at the current position and enter a space. Note: the character at the end of the text will be discarded if the maximum length has been reached.

Select DELETE to delete the current highlighted character.

Select CLEAR to clear the text edit.

Select COPY to copy the text edit to the clipboard.

Select PASTE to paste the clipboard text to the edit. The clipboard text can be copied from one menu item and pasted to another. Note: the pasted text will be truncated or space-padded to fit within the bounds of the text edit.

3.1.4.5 Setting the DVR's Local IP address

| IP CAMERAS | | | |
|------------|-----------------|------|--|
| CAM | IP ADDRESS | TYPE | |
| 5 | » 10. 0. 20. 30 | A | |
| 6 | 192.168. 10.201 | A | |
| 7 | 192.168. 10.202 | A | |
| 8 | 192.168. 10.203 | A | |

| RECORDING | PRESENT | HELP | |
|----------------|---------------|------|--|
| LOCAL IP ADDR: | 10. 0. 20. 40 | | |
| TYPE SETTINGS | A B C D | | |

LOCAL IP ADDRESS – the LOCAL IP ADDRESS and the CAM IP ADDRESSES must be configured for the same network. The LOCAL IP ADDRESS for the IP CAMERAS is in the VLAN 2 menu (SETTINGS > EXTERNAL EQUIPMENT > [VLAN2](#)).

NB: the local IP address cannot be changed while recording is in progress – an “IP CAMERA WARNING” will be displayed. Stop recording, and amend the IP address as required before recommencing recording.

3.1.4.6 Configuring the VLAN Scheme



Navigate to the VLAN Menu (SETTINGS MENU > EXTERNAL EQUIPMENT > VLAN > [VLAN SCHEME](#)).

The physical ports for the four IP CAMERAS can be separated from the COMMS physical port by means of a tag-based VLAN.

The VLAN scheme can be ENABLED or DISABLED as follows:

VLAN SCHEME - ENABLED

When the VLAN SCHEME is ENABLED, the COMMS port is segregated from the IP CAMS ports. The COMMS port can then be used for remote access (such as FTP/Telnet transfers).

The IP CAMS ports can then be used to connect up to 4 IP cameras for recording.

Please Note: The COMMS port is not intended for use with an IP camera.

VLAN SCHEME - DISABLED

When the VLAN scheme is DISABLED, the COMMS port can be used to access the IP CAMERAS connected to ports IP CAMS 1-4.

Typically usage is for configuration of the IP cameras via a laptop

NB: Default configuration is with the VLAN scheme ENABLED.

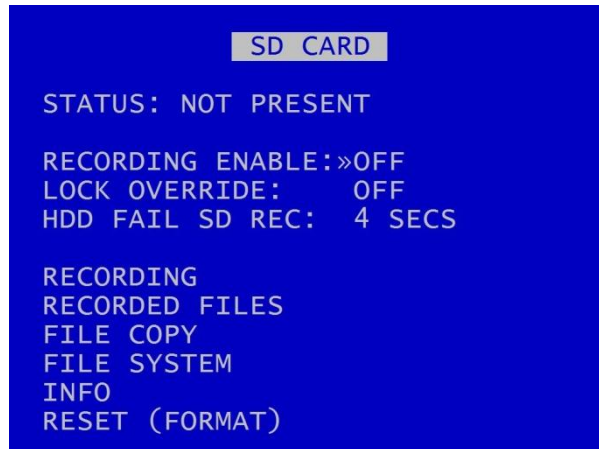
VLAN IP Address

With the VLAN scheme ENABLED, the IP address of VLAN1 (COMMS) can be set to any IP address desired.

With the VLAN scheme DISABLED, in order to access the IP cameras for configuration, both the VLAN1 (COMMS) and the VLAN2 (IP CAMERAS) IP addresses must be set to the same range (e.g. the first 3 octets of the IP addresses must match).

NB: it is necessary to 'APPLY IP SETTINGS ABOVE' or they will be lost upon exit of the menu.

3.1.5 SD Recording



NB: Camera type: only analogue (SD) cameras can be recorded onto the SD card.

The DVR supports a single SD card for two functions;

RECORDING - The DVR can be configured to record up to 25 images per second to the SD card in addition to the primary recording to the hard disk cartridge (30IPS if in NTSC mode, see [VIDEO SETTINGS](#)). All additional data, for example Audio and GPS, are also included within the SD recorded files.

FILE COPY - Files that are recorded on the DVR cartridge can be selected and copied to the SD card for review on a PC.

The SD Card menu shows the current Status of the SD card i.e. PRESENT, NOT PRESENT, LOCKED or RECORDING TO SD.

NB: There are some limitations on the use of the SD card for back-up recording if the DVR is also configured for Motion Detection – this is due to recording resource limitations.

If the DVR is configured for Motion Detection on IP cameras, it is not possible to record any cameras (either analogue (SD) or IP) to the back-up SD card. A warning banner will be displayed:



RECORDING ENABLE lists the available modes of recording for the SD card.

- OFF – SD recording is OFF, no SD recording.
- ON – SD recording onto SD card all the time.
- IF NORMAL REC – SD recording only occurs if the DVR is recording in Normal mode.
- IF TIMER REC – SD recording only occurs if the DVR is recording in Timer mode.
- IF ALARM REC – SD recording only occurs if the DVR is recording in Alarm mode.

LOCK OVERRIDE options OFF or ON can be used to override the physical lock status of the SD card. For example if an SD card is inserted with the lock enabled, this usually prevents any data being written, however the DVR can override this.

HDD FAIL SD REC sets the number of seconds that the DVR will continue to record to the SD card when a FAIL to write to the hard disk drive (HDD) is detected. Available values are 4SECS, 6, 10, 20, 40SECS, 1MIN, 2, 5MINS. After the configured time has elapsed, the DVR will reboot in an attempt to continue writing to the HDD after boot up. If the HDD fails due to a crash the SD will carry on recording for the selected period so that the crash events are stored.

[RECORDING](#) menu configures the SD card recording setup.

[RECORDED FILES](#) menu displays a list of the files on the SD card.

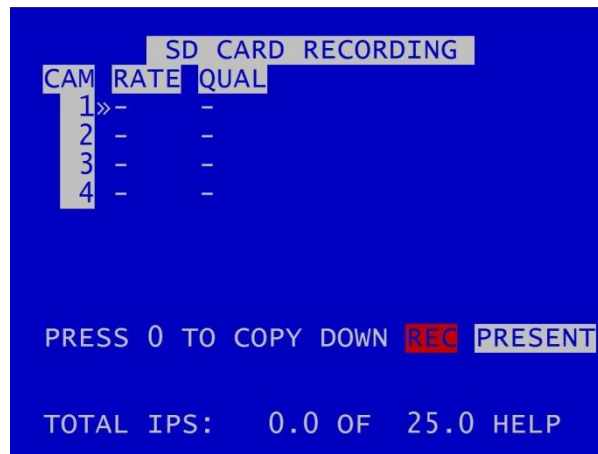
[FILE COPY](#) menu is used when copying files from the DVR cartridge to the SD card.

[FILE SYSTEM](#) menu configures options for recording on the SD card.

[INFO](#) page includes details such as; Size, % used, SD serial number etc.

[RESET](#) gives options for deleting files on the SD card .

3.1.5.1 SD Card Recording



SD CARD RECORDING menu - The DVR can be configured to record up to 25 images per second (IPS) to the SD card in addition to the primary images per second being recorded to the cartridge. All additional data e.g. audio and GPS are also included within the SD recorded files.

NB: A maximum of 25 IPS is available for SD card recording. If the user attempts to configure SD recording for a higher than this, eg for 4 cameras at 7 IPS each, the DVR will limit the allocation to a value close to but below the maximum of 25 IPS – eg 3 cameras at 7 IPS each. The user can then adjust the allocation for each camera as preferred.

Images per second and Resolution can be set independently, per channel, from the DVR's primary mode of recording e.g. if the DVR is Normal Recording with a QUAL of SUPER, the SD recording files could be set to MED.

For details of resolution quality options see the section on [NORMAL RECORDING](#).

TOTAL IPS – provides details of current IPS allocation within SD CARD RECORDING, as well as the total IPS available for SD CARD RECORDING.

HELP – provides details of recording [RESOURCE ALLOCATION](#) across the various functions.

3.1.5.2 SD Card Recorded Files



The SD CARD RECORDED FILES menu lists the files recorded on the SD card.

The files cannot be played back on the DVR, and must be viewed through [PCLink](#). Navigation of the file list pages are via the left/right arrow menu keys on the [Reviewer](#) when PAGE or FIRST/LAST page is highlighted.

HINT: Files can be write-protected by scrolling down to the file and pressing the left arrow key on the [Reviewer](#), a W should appear next to the file. Pressing left again will remove the write-protect.

3.1.5.3 SD Card File Copy



SD CARD FILE COPY is used to copy recorded files from the DVR cartridge to the SD card. A link to the main cartridge HDD files give quick access to see what is on the cartridge. Some SD statistics are given to aid in the select process e.g. size and capacity used.

Use [HDD RECORDED FILES](#) to view the files on the hard disk.

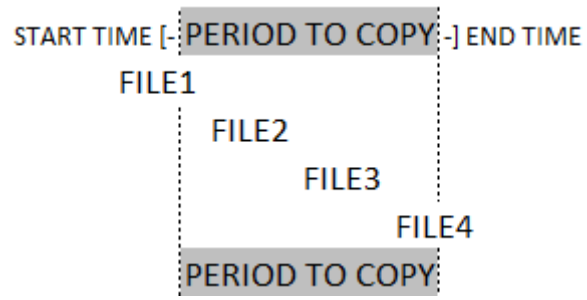
COPY HDD FILES TO SD CARD by entering the start/end date & time of the period you wish to copy and then move the cursor down to select COPY FILES.

If there is enough free capacity on the SD card, the copy will begin. Progress of the copy will be displayed as a percentage and incremental file count as each file is copied.

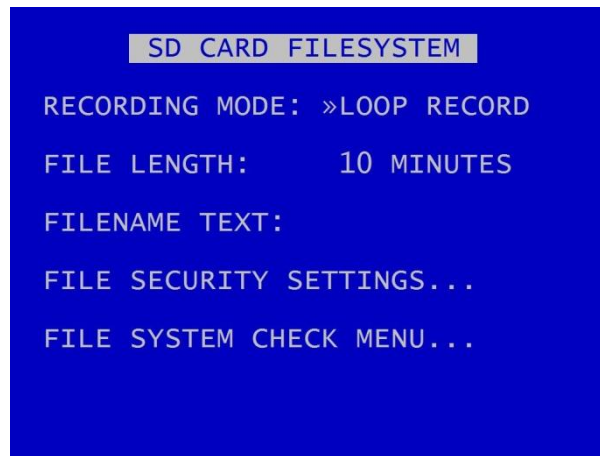
WARNING: If other Menu buttons are pressed during the FILE COPY, the action will be aborted. It is necessary to allow the FILE COPY to finish before attempting any other Menu/programming options.

A message will be displayed on the SD CARD FILE COPY menu screen when the FILE COPY is complete.

If the period requested spans multiple files, all files are copied to the SD card for that period. Files are not cut / clipped. In the following example, all four files would be copied, even though files 1 & 4 only include a portion of the period requested;



3.1.5.4 SD Card File System



SD CARD FILE SYSTEM menu configures options for recording on the SD card.

RECORDING MODE can be set to LOOP RECORD (oldest files will be overwritten first when the SD card is full); or SINGLE PASS recording (recording will stop when the SD card is full).

FILE LENGTH controls how often a new file is created. A new file is created each time recording starts. The file will be named with the date/time when the recording started. The next file will be started as per the file length settings or when next time boundary is met.

File length options are 1MINUTE, 5MINUTES, 10MINUTES, 1HOUR. For further details refer to [FILE SYSTEM](#) menu for the main hard disk cartridge.

FILENAME TEXT - prefixes the recording files with user-defined characters . Characters can be entered using the Text and Number Input keys on the [Reviewer](#).

FILE SECURITY SETTINGS – configures options for file passwords and encryption

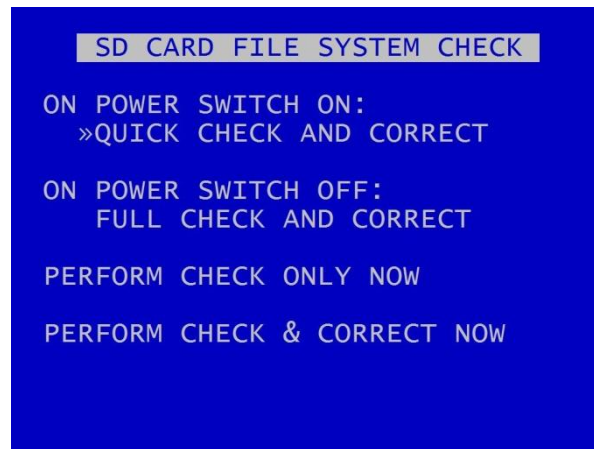
[FILE SYSTEM CHECK MENU](#) configures system checking and the creation of system logs for SD CARD RECORDING.

3.1.5.5 File Security Settings

File security passwords and encryption can be set for files recorded on the SD card in the same way as for files recorded on the HDD.

See SETTINGS > SYSTEM SETTINGS > FILE SYSTEM > [FILE SECURITY SETTINGS](#) for details.

3.1.5.6 SD Card File System Check



SD CARD FILE SYSTEM CHECK menu configures whether the file system is checked and/or corrected at power-up and whether a system log is created.

ON POWER SWITCH ON – options are NO CHECK, QUICK CHECK AND CORRECT, FULL CHECK AND CORRECT.

ON POWER SWITCH OFF – NO CHECK, QUICK CHECK AND CORRECT, FULL CHECK AND CORRECT.

PERFORM CHECK ONLY NOW – will check the files and file system and report any errors but will not attempt to fix anything.

PERFORM CHECK & CORRECT NOW – will perform a file and file system check and fix any errors that are found. It also rewrites the FAT and BOOT sectors.

NB: No files/data are deleted during the CHECK & CORRECT function.

3.1.5.7 SD Card Info



SD CARD INFO menu provides information about the use of the SD card:

- Size in Gigabytes
- Gigabytes used
- Write protection status
- Files
- Start date
- End date
- Days Recording
- Card Manufacturer ID
- Card Name
- Card Serial Number

3.1.5.8 SD Card Reset



SD CARD RESET gives 2 options for deleting files:

[DELETE ALL RECORDING FILES](#)

[SECURE CARD WIPE](#)

3.1.5.9 Delete All SD Recording Files



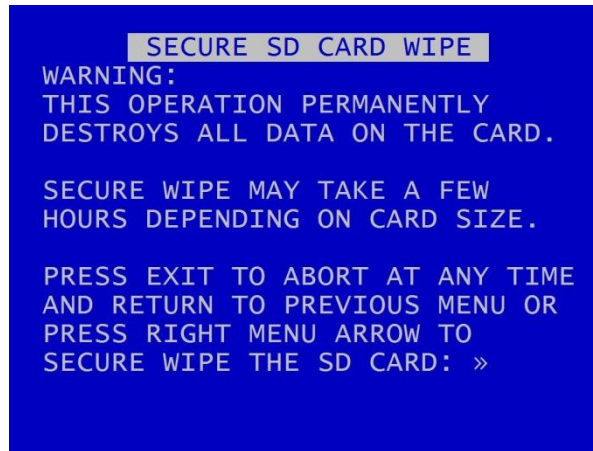
DELETE ALL SD RECORDING FILES will erase the directory of files from the SD card, **including write-protected files**. Only do this if you want to erase all recordings – there is NO undo option*.

Press the right menu button to go to a warning screening, press right again to carry out this action. Pressing Menu Exit on the [Reviewer](#) will abort this procedure.

WARNING: THERE IS NO “UNDO” OPTION. SELECTING “DELETE ALL FILES ON SD CARD” WILL ERASE THE DIRECTORY ON THE SD CARD.

*in some circumstances Timespace may be able to recover some file data from the disk, but this is not always possible, and is therefore not to be relied upon.

3.1.5.10 Secure SD Card Wipe



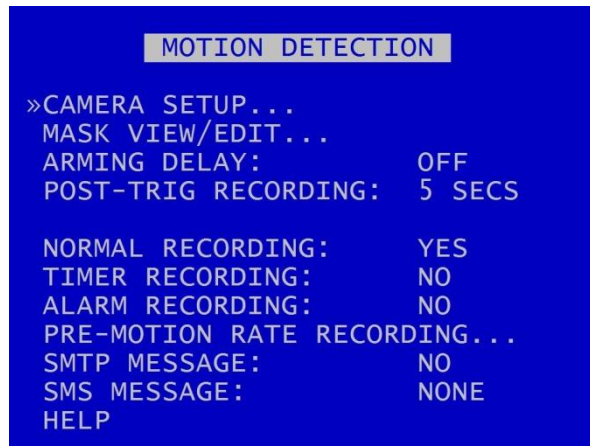
SECURE SD CARD WIPE will permanently delete all recording files on the SD card. This should only be used if files need to be completely destroyed – the actual file data is deleted, and no recovery by Timespace is possible.

A final warning message will appear before this function is carried out. Pressing Menu Exit on the [Reviewer](#) will abort.

WARNING: THERE IS NO “UNDO” OPTION. SELECTING “SECURE WIPE THE SD CARD” WILL COMPLETELY REMOVE ALL RECORDINGS ON THE SD CARD.

3.1.6 Motion Detection – X500 only

NB: Motion Detection is available on the X500 DVR. The R500 DVR *does not* support Motion Detection.



3.1.6.1 Understanding Motion Detection functionality

The X500 is a hybrid recorder which supports both analogue (SD) and IP cameras. However, if the X500 is configured to Motion Detect, this places some limitations on available functions. This is due to the way the data is processed, and the processing resource required:

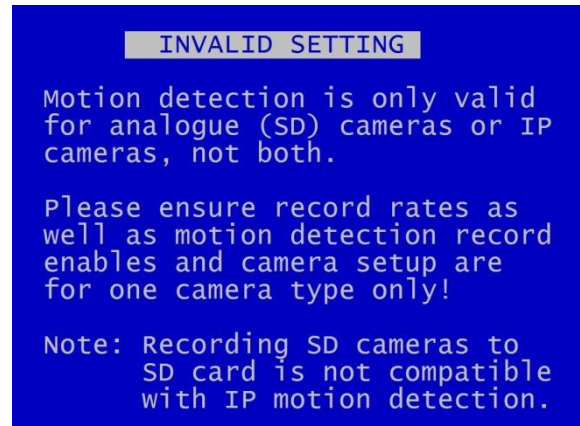
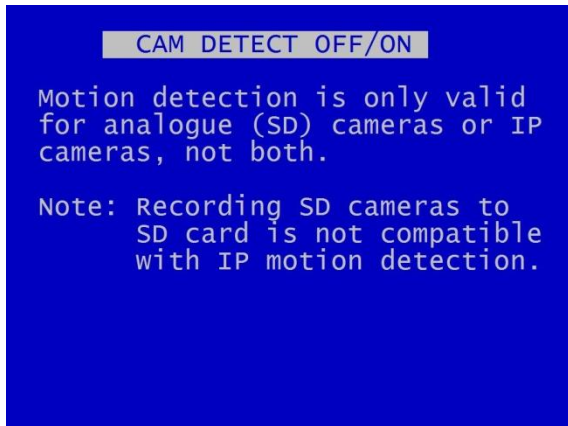
Motion Detection Functionality

If Motion Detection is required, this is only available on *either* analogue (SD) cameras *or* IP cameras. The X500 does not provide simultaneous motion detection on both analogue (SD) and IP cameras.

If Motion Detection is required, other recording is only possible on the same type of camera. For example, if Motion Detection is configured for IP cameras on NORMAL RECORDING, it will not be possible to record analogue (SD) cameras on NORMAL RECORDING at the same time. This also applies for TIMER and ALARM RECORDING settings.

If the X500 is configured for Motion Detection on IP cameras, it is not possible to record any cameras to the back-up SD card.

If the user attempts to configure any settings which are outside of the possible Motion Detection functionality, the following warning screens will be displayed:



3.1.6.2 Configuring Motion Detection

Motion Detection is used to monitor defined areas for levels of motion above a defined threshold and then to trigger the DVR recording modes: [NORMAL](#), [TIMER](#) or [ALARM RECORDING](#).

NB: Motion Detection is used as a trigger to start one of the recording modes; it is not a recording mode on its own.

Motion Detection is set up by using the [MASK/EDIT](#) tool to specify areas of each camera's view which are to be monitored for motion, and selecting the level and duration of change which must occur to produce a motion event.

When MOTION DETECTION is set up, the RECORD LED on the [Reviewer](#) will flash on and off. When motion is triggered, the LED will remain on (solid) for the duration of motion (plus any configured post-trigger time), then return to flashing.

Motion Detection Quick Set-up:

1. Select the camera(s) you wish to monitor. Set these to ON in the [MOTION DETECTION CAMERA SETUP](#) menu.
2. Also in the [CAMERA SETUP](#) menu, set the camera(s) sensitivity using PERCENTAGE and DURATION.
3. In the [MASK VIEW/EDIT](#) menu, move/size the cursor box to select the area(s) to be monitored.
4. Select the recording mode you wish to trigger, ie NORMAL, TIMER or ALARM in the MOTION DETECTION menu.
5. Press record.

See the following pages for more detailed instructions for [MOTION DETECTION CAMERA SETUP](#) and using the [MASK VIEW/EDIT](#) function.

ARMING DELAY - is typically used to allow the operator to exit a monitored area without triggering motion detection. Available values are OFF, 5SECS, 10SECS, 30SECS, 1MIN, 2MINS, 5MINS.

POST TRIGGER RECORDING – specifies the duration of recording after motion has ended; select values between 1 second – 2hours.

[PRE-MOTION RATE RECORDING](#) – configures the recording settings in advance of any motion-triggered recording.

SMTP MESSAGE - If motion is detected, send an SMTP Email with a camera snapshot image as per settings in the [SMTP EMAIL](#) menu in EXTERNAL EQUIPMENT.

When in detect mode, the RECORD LED will **flash** on and off. When motion is triggered, the LED will remain solid for the duration of motion plus post trigger time, then return to flashing.

3.1.6.3 Motion Detection Camera Setup

| MD CAMERA SETUP | | | |
|-----------------|--------|-------------|----------|
| CAM | DETECT | PERCENTAGE | DURATION |
| 1 | »OFF | 0.0 | 0.2 SECS |
| 2 | OFF | 0.0 | 0.2 SECS |
| 3 | OFF | 0.0 | 0.2 SECS |
| 4 | OFF | 0.0 | 0.2 SECS |
| 5 | OFF | 64.0 | 0.8 SECS |
| 6 | OFF | 60.0 | 0.8 SECS |
| 7 | OFF | 36.0 | 0.8 SECS |
| 8 | OFF | 24.0 | 0.8 SECS |
| TOTAL IPS: | | 0.0 OF 32.0 | HELP |

CAMERA SETUP allows a selection of cameras to be monitored by the motion detection system.

Cameras that are OFF are ignored by motion detection.

PERCENTAGE is used to set the level of change that must occur between successive frames to produce a motion event.

DURATION is the time period for which consecutive motion events must occur to trigger the motion system.

NOTE: Users will need to define the PERCENTAGE and DURATION as required in each individual case. The [BAR GRAPH](#) tool can assist in determining the required PERCENTAGE – see following pages.

If any individual camera is set to **OFF** in the CAMERA SETUP, it will not be controlled by MOTION DETECTION even if the record mode is set to **YES** within the MOTION DETECTION menu.

Example, if:

NORMAL RECORDING is set to record on cameras 1 – 4

NORMAL RECORDING is set to YES in MOTION DETECT MENU

Cameras 1 & 2 are set to YES in MOTION DETECT CAMERA SETUP

Cameras 3 & 4 are set to NO in MOTION DETECT CAMERA SETUP

then; normal recording will be constant on cameras 3 & 4. Cameras 1 & 2 will only record when motion detection is triggered (for the duration of motion plus the post-trigger time).

3.1.6.4 Mask View/Edit

MASK VIEW/EDIT allows the user to define the area of each camera to be monitored for motion detection. This is done using a moveable and variable size box cursor.

The box cursor is moved and resized using controls on the Reviewer.

By default, when a camera view is first selected, the entire view is activated and is therefore included in motion detection.

NB: Any areas set to be included/excluded will be saved to the X500 and maintained, even after a reboot.

Menu keys to move / size the box cursor:



| | |
|------------------|---------------------|
| Play key | increase box width |
| Fast Forward key | increase box height |
| Back key | decrease box width |
| Rewind key | decrease box height |

When the **GREEN** box is shown:

0 key = activate/include area (camera view is clear).

When the **RED** box is shown:

0 key = deactivate/exclude area (camera view is greyed out).

Multiple areas can be defined.

Excluded areas will be greyed out.

The STOP key is used to switch the select box between **GREEN**, **RED** and [BAR GRAPH](#) modes.

3.1.6.5 Bar Graph Tool

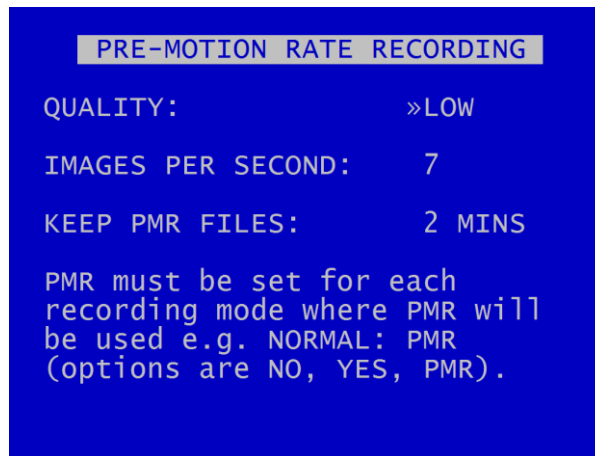
The BAR GRAPH tool assists the user in determining the PERCENTAGE and DURATION settings. It is useful to test the active and inactive areas for motion detection when setting these up on a [Reviewer](#).

When the BAR GRAPH is shown:

0 key = reset red maximum marker to zero
Up/Down increase/decrease PERCENTAGE

As the marker on the BAR GRAPH is moved, the corresponding percentage for the relevant camera view will change on the [MOTION DETECTION CAMERA SETUP](#) page.

3.1.6.6 Pre-Motion Rate Recording

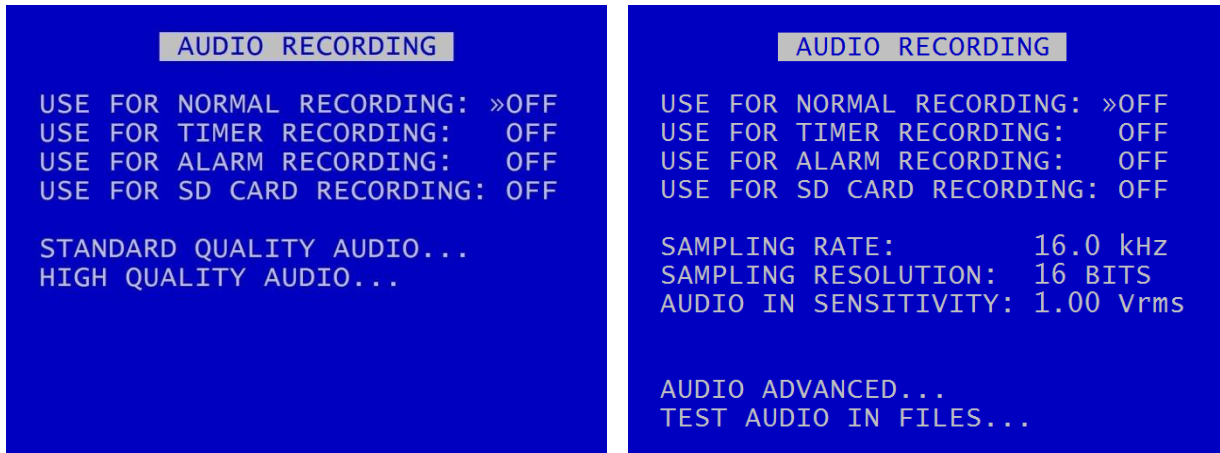


PRE-MOTION RECORDING (PMR) - Pre motion recording feature enables a user to configure the DVR to record files at a lower IPS Rate and Quality during non motion periods, then increase the IPS when recording is triggered by motion. In this instance, a file may consist of low IPS, then higher IPS, then low IPS footage as the motion trigger is set on/off.

When PMR is active, the RECORD LED will be on continuously.

Within the [MOTION DETECTION](#) menu, PMR must be set for each recording mode where PMR will be used e.g. NORMAL:PMR (options are NO, YES, PMR). DVR recording priorities still apply i.e. Alarm takes over from Normal, even when motion or PMR is set.

3.1.7 Audio Recording



X500 Audio Recording

R500 Audio Recording

This menu allows configuration of the audio recording parameters. Audio can be enabled or disabled (ON / OFF) for the following recording types; Normal, Timer Alarm and SD Recording.

The X500 and R500 DVRs have different Audio provisions so are dealt with separately in the following sections.

3.1.8 X500 Audio



The X500 provides one [STANDARD QUALITY AUDIO](#) input and 4 [HIGH QUALITY AUDIO](#) inputs (see Figure 10 - X500 Connections/Wiring).

Audio can be enabled or disabled (ON / OFF) for [NORMAL RECORDING](#), [TIMER RECORDING](#), [ALARM RECORDING](#) and [SD CARD RECORDING](#).

NB: The X500 inputs are mic-level therefore no preamplifier is required, as the DVR amplifies the signal.

3.1.8.1 Standard Quality Audio



The STANDARD QUALITY AUDIO menu allows the configuration of the audio recording parameters for the one Standard Quality Audio input on the X500.

MIC INPUT – select ON/OFF

SAMPLING RATE – can be set to kHz RATES; 8, 16, 32, 44.1kHz (CD quality) and 48 kHz. Changing the RATE will affect the X500 recording time before the cartridge loops and begins overwriting the oldest footage.

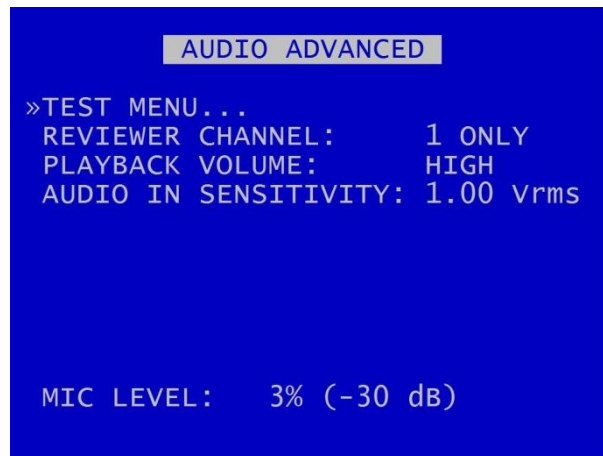
SAMPLING RESOLUTION – fixed at 16bits.

AUDIO IN SENSITIVITY – The X500 is configurable so that the input range can be set from 0.002 - 2.0Vrms (sensitivity).

[AUDIO ADVANCED](#) – configures settings for audio testing.

TEST AUDIO IN FILES – allows the user to play recorded files with *just* the audio so as to test the audio function. No video will play during the audio test.

3.1.8.2 Audio Advanced (Standard Quality Audio)



NB: Standard Quality Audio playback from the DVR via the Reviewer is only available for test purposes.

To listen to audio from recorded video footage, recorded files must be played back via [PCLink](#).

For full details on Audio playback via PCLink, consult the PCLink manual at www.tspace.co.uk.

[TEST MENU](#) – gives options for testing the Audio function.

Playback via the Reviewer is in mono via channel 1 only (Left). Playback volume of the Reviewer's built in speaker can be adjusted between; MUTE, LOW, MEDIUM, HIGH, FULL.

AUDIO IN SENSITIVITY – the X500 is configurable so that the input range can be set from 0.002 - 2.0Vrms (sensitivity).

MIC LEVEL – when recording, input levels will be shown as NOT RECORDING or as a percentage so the X500 can be setup to avoid distortion. The sensitivity configuration will be dependent on the environment of the installation.

3.1.8.3 Audio Test Menu



The AUDIO TEST MENU sets the parameters for carrying out an audio test.

TEST WAVE – for Timespace test purposes only.

TEST DURATION – select 1 SEC, 2, 3, 4, 5,10, 20, 30, 40, 50, 60 SECS, PERPETUAL.

HPOUT LOOPBACK (**for X500 Standard Quality Audio and R500 only**) – can be selected to OFF/ON. This provides high power output for listening to live audio being recorded using the speaker on the [Reviewer](#).

NB: this Audio test function is available only for the Standard Quality Audio. For information on testing High Quality Audio, see the [HIGH QUALITY AUDIO](#) section.

3.1.8.4 High Quality Audio



The HIGH QUALITY AUDIO menu allows configuration of the audio recording parameters for the four High Quality Audio inputs on the X500.

INPUTS 1 – 4 – select ON/OFF

SAMPLING RATE is fixed at 48.0kHz and SAMPLING RESOLUTION is fixed at 24 bits.

AUDIO OUT GAIN – the audio out gain can be adjusted as required; select a value from -96 to +96dB.

Testing the High Quality Audio:

Microphones – to check that microphones are functioning, use headphones and a lead connected to the Audio Out connector (Figure 9 - X500 Rear Interface).

Audio in recorded files – to check that audio has recorded along with video in files, view a file in [PCLink](#) software

3.1.8.5 R500 Audio

The R500 has one standard quality audio input (see Figure 12 - R500 Connections/Wiring)

NB: The X500 inputs are mic-level therefore no preamplifier is required, as the DVR amplifies the signal.

```
AUDIO RECORDING
USE FOR NORMAL RECORDING: »OFF
USE FOR TIMER RECORDING:  OFF
USE FOR ALARM RECORDING:  OFF
USE FOR SD CARD RECORDING: OFF

SAMPLING RATE:           16.0 kHz
SAMPLING RESOLUTION:    16 BITS
AUDIO IN SENSITIVITY:   1.00 Vrms

AUDIO ADVANCED...
TEST AUDIO IN FILES...
```

AUDIO RECORDING menu allows configuration of the audio recording parameters on the R500. Audio can be enabled or disabled (ON / OFF) for the following recording types; [NORMAL](#), [TIMER](#), [ALARM](#) and [SD CARD](#).

SAMPLING RATE can be set to 8kHz, 16, 32, 44.1 or 48kHz.

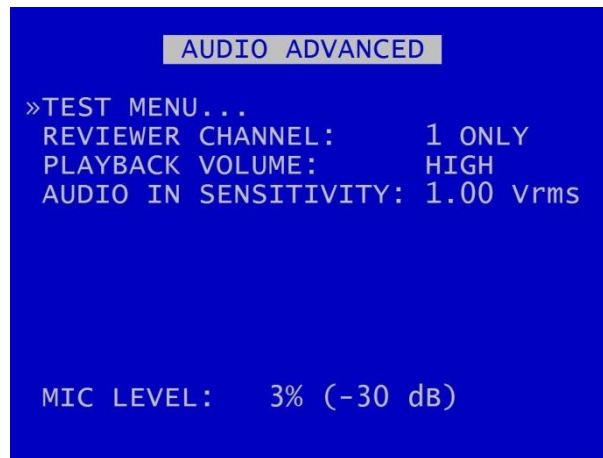
SAMPLING RESOLUTION is set to 16BITS, giving CD-quality audio recording.

AUDIO IN SENSITIVITY – The R500 is configurable so that the line-level input range can be set from 0.002 - 2.0Vrms (sensitivity).

[AUDIO ADVANCED](#) – configures settings for Audio testing.

TEST AUDIO IN FILES – allows the user to play files with *just* the audio so as to test the audio function. No video will play during the audio test.

3.1.8.6 Audio Advanced (R500)



NB: Audio playback from the R500 via the Reviewer is currently only available for test purposes.

To listen to audio from recorded video footage, recorded files must be played back via [PCLink](#).

For full details on Audio playback via PCLink, consult the PCLink manual at

<https://www.tspace.co.uk/pdf/pclink%20suite.pdf>.

TEST MENU – provides options for testing the Audio function.

Playback via the Reviewer is in mono via channel 1 only (Left). Playback volume of the Reviewer's built in speaker can be adjusted between; MUTE, LOW, MEDIUM, HIGH, FULL.

AUDIO IN SENSITIVITY – the R500 is configurable so that the input range can be set from 0.002 - 2.0Vrms (sensitivity).

MIC LEVEL – when recording, input levels will be shown as NOT RECORDING or as a percentage so the R500 can be setup to avoid distortion. The sensitivity configuration will be dependent on the environment of the installation.

3.1.9 Recorded Files

| RECORDED FILES | | | |
|----------------|----------|----------|---------|
| »FIRST | / | LAST | PAGE |
| PAGE | 1 | OF | 3 |
| W_MGA | FILTER | OFF | SIZE MB |
| _____ | 11:50:00 | 18/02/19 | 10.5 |
| _____ | 11:49:00 | 18/02/19 | 136.7 |
| _____ | 11:48:00 | 18/02/19 | 136.7 |
| _____ | 11:47:00 | 18/02/19 | 136.7 |
| _____ | 11:46:00 | 18/02/19 | 136.7 |
| _____ | 11:45:00 | 18/02/19 | 136.9 |
| _____ | 11:44:00 | 18/02/19 | 136.9 |
| _____ | 11:43:00 | 18/02/19 | 136.6 |
| _____ | 11:42:00 | 18/02/19 | 136.8 |
| _____ | 11:41:00 | 18/02/19 | 136.7 |

RECORDED FILES menu lists the recorded files on the HDD (most recent first) and allows the user to select a file to play or to change the write-protect status of a file.

Files are shown in chronological order, most recent file first. Files are displayed by;

HH:MM:SS DD/MM/YY SIZE MB

File status indicators include;

- W** - Write protected
- A** - Alarm
- M** - Motion detection
- P** - Motion detection (pre trig)
- G** - GSensor
- K** - Alarm PAR Keep

A file may have multiple statuses. For example, a write protected alarm file that was triggered by motion could have A W M indicators.

A file with a W status will not be overwritten on [Loop Recording](#).

HINT: The W status can be added or removed by pressing the Left Menu Navigation key when the cursor is next to the recorded file.

Navigation is using the Menu Navigation keys on the [Reviewer](#) as follows:

FIRST / LAST PAGE – Left key = go to last page; Right key = go to first page

PAGE – Left key = go to next page; Right key = go to previous page
Up/Down keys - move cursor to a file

When a file is selected, Right key = play file

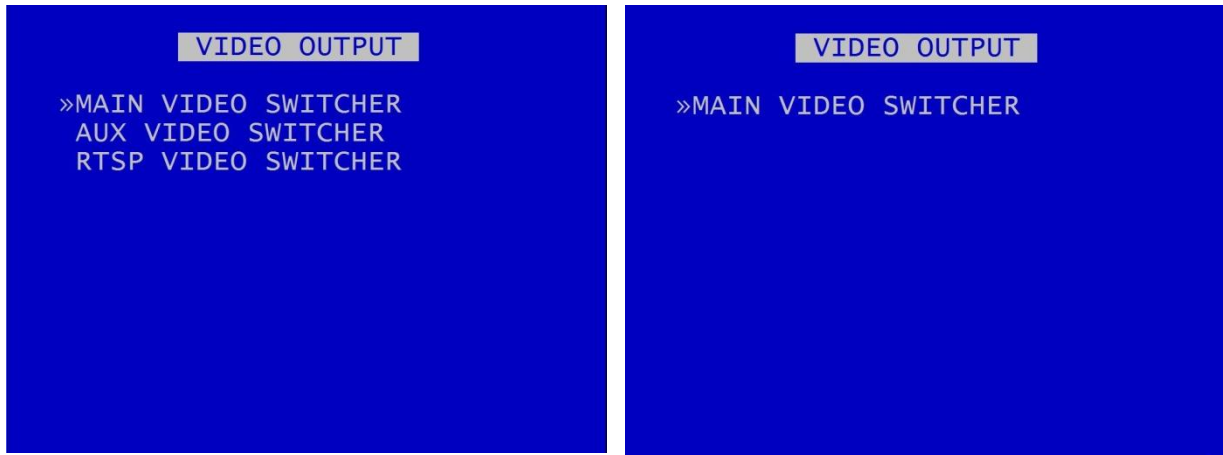
FILTER ON/OFF - The recorded files list can be quickly filtered in order to display *only* a certain file type e.g. only those that are **Alarm** files.

By highlighting the letter (file status indicator), RECORDED FILES will be filtered by that status, e.g. show all Write-protected files, all GSensor Alarm files or all Alarm Recording files..

HINT: To highlight a file status indicator, use the right arrow key to scroll through W, M, G, A. The selected letter will have a white background, and a message “FILTER ON” will be displayed.

Continuing to scroll with the right arrow button will take the selection back to “FILTER OFF”.

3.1.10 Video Output



X500 Video Output

R500 Video Output

VIDEO OUTPUT menu controls the automatic switching and dwell time of cameras on the various video outputs:

[MAIN VIDEO SWITCHER](#) – controls automatic switching and dwell time of analogue (SD) cameras (1-4) on the Main Switcher (main video out).

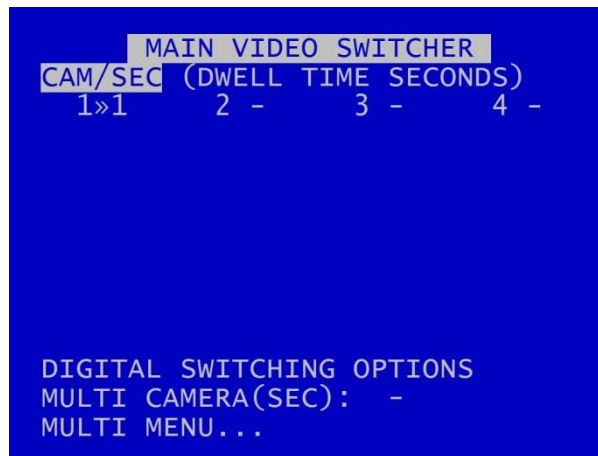
[AUX VIDEO SWITCHER](#) – controls automatic switching and dwell time of analogue (SD) cameras on the auxiliary (secondary) video output (**X500 only; not available on the R500**).

RTSP VIDEO SWITCHER – RTSP is offered as standard on the X500. RTSP is offered as an option on the R500; contact Timespace for more details.

When in Auto mode (selected by pressing the Auto key on the [Reviewer](#)), the video output will switch between the configured cameras for the set period of time.

Single camera output is selected by pressing the camera number on the [Reviewer](#).

3.1.10.1 Main Video Switcher



NB: Switchers can show analogue (SD) cameras only.

MAIN VIDEO SWITCHER menu controls automatic switching and dwell time of cameras on the Main Switcher (main video out).

When in AUTO mode (selected by pressing the AUTO key on the [Reviewer](#)), the video output will switch between the configured cameras for the set period of time.

CAM/SEC – Set the desired camera DWELL time (in seconds) next to each camera that is to be included in the switcher sequence (1-30 SECONDS).

[DIGITAL SWITCHING OPTIONS](#) – configures the use of the digital switcher on the MAIN video output.

MULTI CAMERA (SEC) – Set the number of seconds for which the MULTI CAMERA view is displayed. Available options are: 1 SEC, 2, 3, 4, 5, 10, 20, 30SECS,

[MULTI MENU](#) – configures which cameras are to be displayed simultaneously on the MULTI CAMERA view. The output is split into tiles per camera. MULTI CAMERA can be included in the Auto switching sequence.

3.1.10.2 Digital Switching Options



Digital Switching Options menu – configures the use of the digital switcher on the MAIN VIDEO SWITCHER output.

MAIN USE DIGITAL SWITCHER – select YES/NO

NB: X500 only - Digital switching priorities – selecting DIGITAL SWITCHING on the MAIN SWITCHER will prevent use of the Multi-Camera on the X500 Auxiliary Switcher. This is due to recording resource limitations.

If DIGITAL SWITCHER is **not** selected, the video source will be the live analogue image from the selected camera.

When DIGITAL SWITCHING is selected, time/date information and recording status text can be shown.

TEXT POSITION – select from NO TEXT, BOTTOM HIGH, BOTTOM MIDDLE, BOTTOM LOW, TOP HIGH, TOP MIDDLE, TOP LOW to display Time/date information in the selected position.

SHOW REC STATUS – select from YES/NO (note that if TEXT POSITION is set to NO TEXT, then SHOW REC STATUS will be set to default of NO. To enable selection of YES for SHOW REC STATUS, ensure that one of the BOTTOM or TOP TEXT POSITION options is selected above).

NB: Time/date information and recording status can not be shown on the switcher without use of DIGITAL SWITCHING, i.e. if live analogue images are used as the video source.

3.1.10.3 Multi Menu



MULTI MENU – configures the settings for the MULTI CAMERA setup.

TEXT POSITION – sets the position of the time/date text on the MULTI CAMERA view. Select from NO TEXT, BOTTOM HIGH, BOTTOM MIDDLE, BOTTOM LOW, TOP HIGH, TOP MIDDLE, TOP LOW.

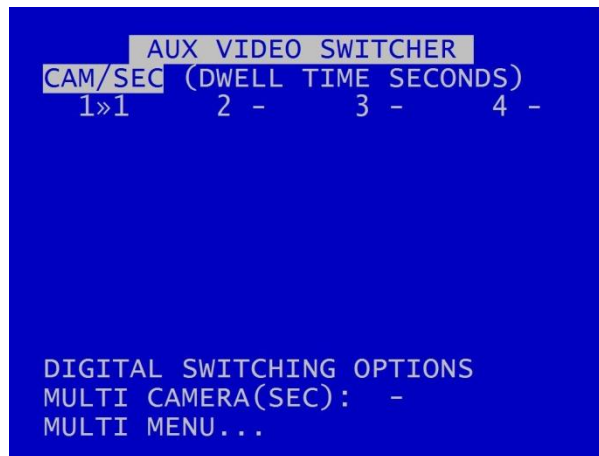
SHOW REC STATUS – Select YES/NO to determine whether the recording status is shown on the embedded text in MULTI CAMERA setup.

[MULTI CAMERA SETUP](#) - configures which cameras are to be displayed simultaneously in the MULTI camera view. The output is split into tiles per camera, each tile is a quarter of the MULTI CAM view. Cameras for each tile are selected using the left/right Menu Navigation keys on the [Reviewer](#) to scroll through the camera number options. Move along/up/down the tiles using the up/down Menu Navigation keys.

[MULTI CAMERA VIEW](#) – provides a “preview” of the multi camera setup.

HINT: Pressing the Auto key on the Reviewer will switch the video output between the configured cameras for the set period of time. Single camera output is selected by pressing the camera number on the Reviewer.

3.1.10.4 Aux Video Switcher (X500 only)

**X500 Aux Video Switcher**

AUX VIDEO SWITCHER configures the settings for the auxiliary (secondary) video output.

AUX VIDEO SWITCHER settings, e.g. for [MULTI CAMERA](#) and TIME/DATE POSITION are configured in the same way as for [MAIN VIDEO SWITCHER](#).

NB: Digital switching priorities – selecting DIGITAL SWITCHING on the MAIN SWITCHER will prevent use of the Multi-Camera on the Auxiliary Switcher. This is due to recording resource limitations.

3.1.10.5 RTSP Video Switcher



The Real Time Streaming Protocol (RTSP) is a network protocol allowing video to be streamed to an RTSP client.

If the DVR has the resources to enable RTSP then the server URL will be displayed, otherwise the menu will show “RTSP disabled”. See [Resource Allocation](#) for further information on recording and streaming resource requirements.

Individual analogue (SD) cameras can be configured to stream their video for a pre-set time before switching to the next camera.

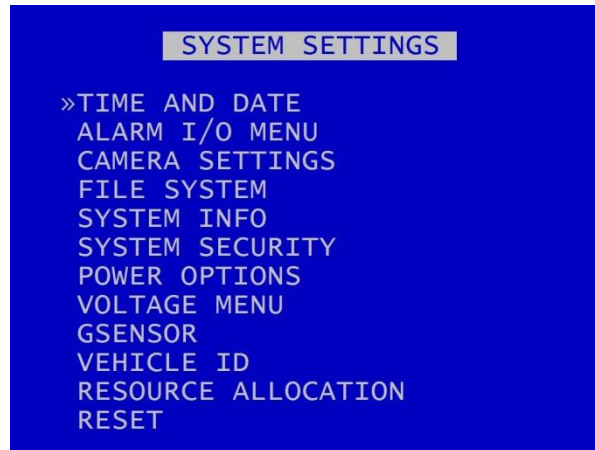
NB: IP Cameras cannot be streamed over RTSP.

CAM / SEC – Select the required dwell time for each camera from 4, 6, 8, 10, 20, 30 SEC.

If in use, the RTSP stream will be shown. Otherwise the RTSP screen will display “RTSP disabled”.

3.2 Settings Menu

3.2.1 System Settings



The SYSTEM SETTINGS MENU gives access to configure various system settings and to view system information.

3.2.2 Time and date



TIME AND DATE menu displays the current time/date. New times/dates can be set by entering new values using keys 0-9 on the [Reviewer](#).

MODE – The date display can be switched between DD/MM/YY and MM/DD/YY. The chosen format will be used for date entry and display throughout the system.

SET CLOCK TO THESE SETTINGS – confirms and sets the new time/date.

NB: date and time settings cannot be changed while the unit is recording.

SUMMERTIME ADJUST – can be selected for UK, EUR USA, NZ or OFF. Automatically updates the system to daylight saving time, valid for the country selected. Adjustments are applied even if the system was powered off during the time change.

SUMMER/WINTER TIME – displays the current season, dependant on the SUMMERTIME ADJUST selected above.

When the clock is put forward, the time is now summer time, which is winter time +1 hour. When the clock is put back, time reverts to winter time.

UK - At 1am on the last Sunday in March, the clock is put forward an hour. At 2am on the last Sunday in October, the clock is put back and hour.

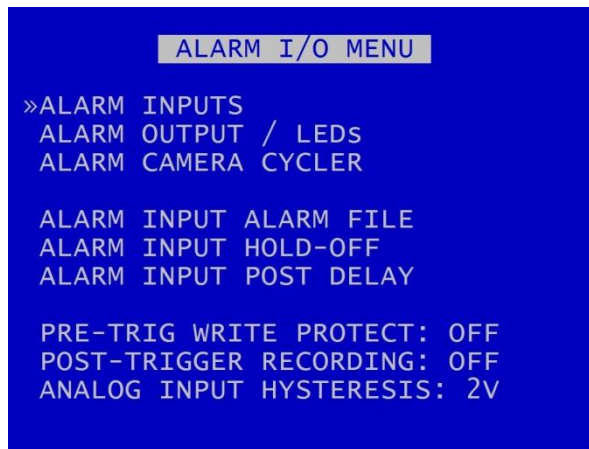
Central Europe - At 2am on the last Sunday in March, the clock is put forward an hour. At 3am on the last Sunday in October the clock is put back an hour.

USA - At 2am on the second Sunday in March, the clock is put forward an hour. At 2am on the first Sunday in November, the clock is put back an hour.

NZ – at 2am on the last Sunday in September, the clock is put forward an hour. At 3am on the first Sunday in April, the clock is put back an hour.

NB: when time or date are changed, a hard disk re-format is recommended in order to reset the meta file.

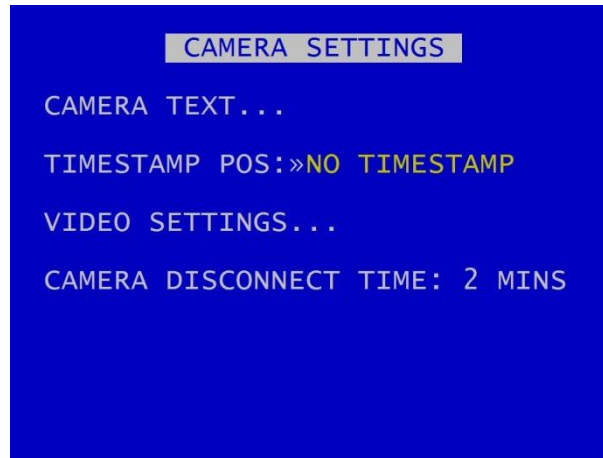
3.2.3 Alarm Inputs/Outputs Menu



ALARM INPUTS/OUTPUTS (I/O) menu configures Alarm Recording and INPUT / OUTPUT options.

Alarm Inputs and Outputs can also be configured as per the [ALARM INPUTS/OUTPUTS](#) menu in settings for [ALARM RECORDING](#).

3.2.4 Camera Settings



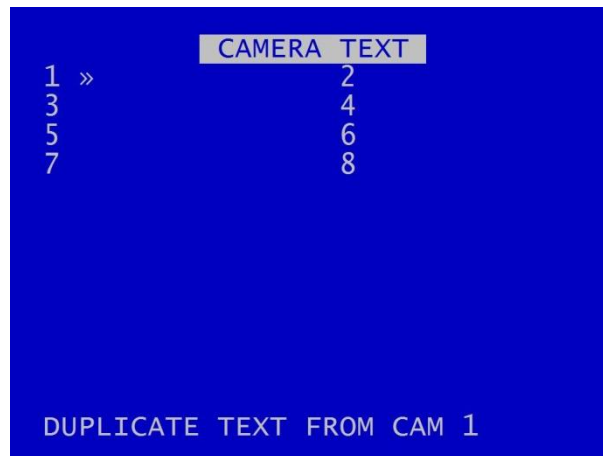
CAMERA SETTINGS menu configures the [CAMERA TEXT](#) labels, timestamp position, [VIDEO SETTINGS](#) and camera disconnect time.

TIMESTAMP POS - the timestamp can be positioned either below (BOTTOM) or above (TOP) the main area of the recorded image and fine adjustment of position made with LOW/MIDDLE/HIGH settings. The timestamp can also be turned off (select NO TIMESTAMP) and will not be written in to the recorded images.

[VIDEO SETTINGS](#) - controls the video standard (PAL or NTSC).

CAMERA DISCONNECT TIME – this option allows disconnected cameras to be reported as connected for a set time period. This is useful in cases where a camera can take a while to boot and send its signal. If there is no signal after the timeout, the camera is treated as disconnected and is flagged in the service log. Available options are OFF, 10SEC, 30SEC, 1MIN, 2MIN, 5MIN.

3.2.4.1 Camera Text



Individual text for each camera can be inserted above the timestamp. This text, along with timestamp, will be shown on recorded images.

12 user-defined characters can be input per camera. Enter text using the [keyboard](#).

DUPLICATE TEXT – feature is available for copying down text from camera 1 to all remaining cameras.

3.2.4.2 Video Settings



VIDEO SETTINGS menu controls the video standard, i.e. whether the unit is to operate with PAL or NTSC cameras.

NB: After changing the video standard setting, the unit will automatically reboot after 5 seconds for the change of setting to take effect. A red “Reboot Required” warning will flash on the screen before the reboot commences.

3.2.5 File System



FILE SYSTEM MENU Sets the parameters of the file system and how files are laid to disk.

RECORDING MODE sets either:

- LOOP RECORD (oldest files will be overwritten first when the hard disk cartridge is full) or
- SINGLE PASS recording (recording will stop when the hard disk cartridge is full).

FILE LENGTH – controls how often a new file is created. A new file is created each time recording starts. The file will be named with the date/time when the recording started. If continuous recording, the next file will be started as per the file length settings or when next time boundary is met. For example when using 10min files, if recording starts at 10:03, the first file will contain 7minutes of video and the second file will be started at 10:10. New files will then be created every 10 minutes, i.e.10:20, 10:30 etc. Files can be configured for: 1 min, 5 min, 10 min, or 1 hour.

NB: File size is limited to 4GB. After this limit is reached, a new file will be created.

FILENAME TEXT – prefixes the recording files with up to 12 user defined characters (0-9, A-Z, space). Text and numbers are entered using the [Reviewer](#).

WRITE PROTECT ALARM REC – selects whether alarm recording files are write protected. If alarm files are write-protected they will not be deleted on LOOP recording. Select YES/NO.

[FILE SECURITY SETTINGS](#) – configures options for file password and encryption.

[FILE SYSTEM CHECK](#) menu – configures whether the file system is checked (and possibly corrected) at power up and also if a system log is created.

3.2.5.1 File Security Settings



This menu provides options for setting file security on the DVR.

NB: any settings configured here on the DVR menu will be over-written by LANLink if LANLink is managing the security settings for the DVR. See LANLink Manual or contact Timespace for further details.

Select from the 3 available levels of file protection:

DISABLED – No file protection.

PASSWORD – the files are password protected.

PASS. & ENCRYP. – the files are password protected and the audio and video data in the file is encrypted.



3.2.5.2 Setting a password

A password length from 1 – 14 characters is valid. Timespace recommends a password of 5 or more characters. All characters that can be entered from the [Reviewer](#) are valid:

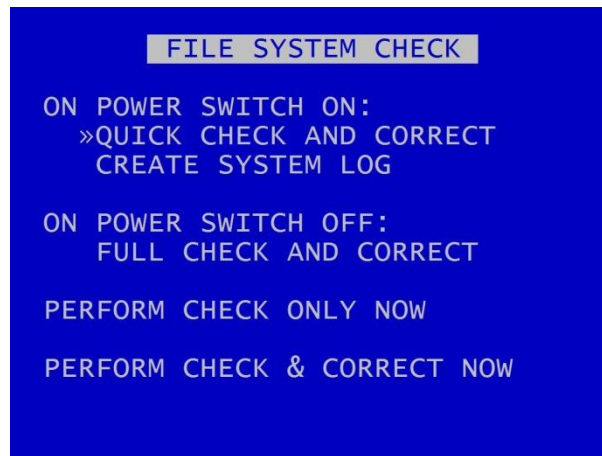
NB: the default old password is 0000 (four zeros).

SET PASSWORD will set the new password and activate the selected File Security Settings.

3.2.5.3 DVR Menu and Playback Protection:

Optionally set a MENU and PLAYBACK Pin can be set (see SETTINGS MENU > SYSTEM SETTINGS > [SYSTEM SECURITY](#)). This prevents unauthorised access to the DVR menu settings, but permits controlled access eg for engineers in the field to review camera angles on a Reviewer and amend settings.

3.2.5.4 File System Check



FILE SYSTEM CHECK menu configures whether the file system is checked (and possibly corrected) at power up and also if a system log is created.

ON POWER SWITCH ON – select from options:

- No check / Quick check and correct / Full check and correct
- Create system log / do not create system log

ON POWER SWITCH OFF:

- No check / Quick check and correct / Full check and correct

PERFORM CHECK ONLY NOW will check the files and file system and report any errors but will not attempt to fix anything.

PERFORM CHECK AND CORRECT NOW will perform a file and file system check and fix any errors that are found. It also rewrites the FAT and BOOT sectors.

NB: No XBA files/data are deleted during the check and correct function.

See also POWER OPTIONS > ADVANCED POWER OPTIONS MENU > [ADVANCED IGNITION OFF MENU](#) for further details of when CHECK AND CORRECT may be aborted due to selection of SHUTDOWN or STANDBY settings.

3.2.6 System Info

| SYSTEM INFO | |
|---------------|-------------------|
| 1.2.1.96 | OPERATING SYSTEM |
| 104/5.08.19/A | FIRMWARE |
| 120.03 | SIZE IN GIGABYTES |
| 6.40 % | USED |
| 0.12 % | WRITE PROTECTED |
| 56 | FILES |
| 18/02/19 | START DATE |
| 18/02/19 | END DATE |
| 0.04 | DAYS RECORDING |
| 61 DEG C | TEMP |
| X500-08 | H/W VERSION |
| 174423 | SERIAL NUMBER |

SYSTEM INFO menu displays information about the system;

OPERATING SYSTEM – Currently installed/running software version.

FIRMWARE – Currently installed/running firmware version (FPGA build / H264 codec / PCB Rev).

SIZE IN GIGABYTES - Total size of installed hard disk cartridge.

USED - Percentage of hard disk cartridge used by any files.

WRITE PROTECTED – Percentage of cartridge used by write protected files.

FILES – Number of XBA files on the hard disk cartridge.

START DATE - The date of the first (oldest) file on the cartridge.

END DATE - The date of the last (newest) file on the cartridge.

DAYS RECORDING - The number of days between the start/end date. **NB:** there may not be continuous recording files between the start/end dates.

TEMP – temperature of the unit during operation.

H/W VERSION – hardware version, ie the model number of the DVR unit.

SERIAL NUMBER - Displays the X500 serial number.

3.2.7 System Security



The SYSTEM SECURITY menu sets a password to restrict user access to five key areas of the system. A read-only access can be set that allows files to be viewed and limited features to be used. For each area, select YES/NO.

NB: File Security Settings – file access password and encryption protection – are set separately at SYSTEM SETTINGS > FILE SYSTEM > [FILE SECURITY SETTINGS](#).

RECORD - If set to YES, the record button on the front panel and the [Reviewer](#) are pin code protected.

MENU - If set to YES, access to the menu system is pin code protected.

SWITCHER - If set to YES, the button to activate auto switcher mode is pin code protected.

PLAY – If set to YES, the controls to review recorded footage are pin code protected.

READ ONLY - If set to YES, the user cannot change any setting on the DVR. The menu system can be browsed but no settings changed. If a setting change is attempted, the element will flash in RED for 2 seconds and not be changed. To exit read only mode, change read only to NO, at which point you will be prompted for the pin code.

If access to a pin code protected function is attempted, the user is prompted with the “enter pin code” screen. On correct pin code entry the pin code protection is temporarily disabled while that function is being used.

[CHANGE SYSTEM PIN](#) – provides options for changing the pin code.

[FTP/TELNET USERS](#) – gives options to access the DVR by FTP/Telnet.

3.2.7.1 Change PIN



CHANGE PIN menu provides options for changing the pin code.

The pin code can be changed by first entering the current pin code, followed by the new one (entered twice for verification). The pin code format is four digits only 0-9. Enter numbers using the [Reviewer](#).


NB: the default old pin code is 0000 (four zeros).

Set the new PIN by selecting SET PIN.

In the event of a complete password lockout, contact your installer or Timespace for a master unlock code; email support@tspace.co.uk

NB: File Security Settings – file access password and encryption protection – are set separately at SYSTEM SETTINGS > FILE SYSTEM > [FILE SECURITY SETTINGS](#).

3.2.7.2 FTP/Telnet User Passwords



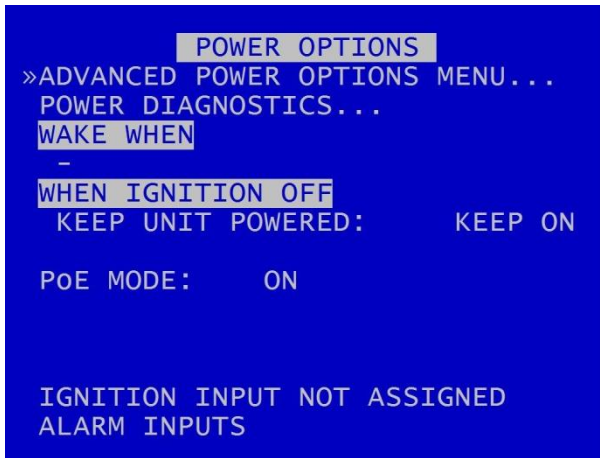
The screenshot shows a blue background with white text. At the top, the title 'FTP/TELNET USERS' is centered in a white box. Below the title, there are two columns of text: 'USERNAME' and 'PASSWORD', each in a white box. Under 'USERNAME', there are three entries: 'user01', 'user02', and 'user03'. Under 'PASSWORD', there are three entries: '»PASS01', 'PASS02', and 'PASS03'.

| USERNAME | PASSWORD |
|----------|----------|
| user01 | »PASS01 |
| user02 | PASS02 |
| user03 | PASS03 |

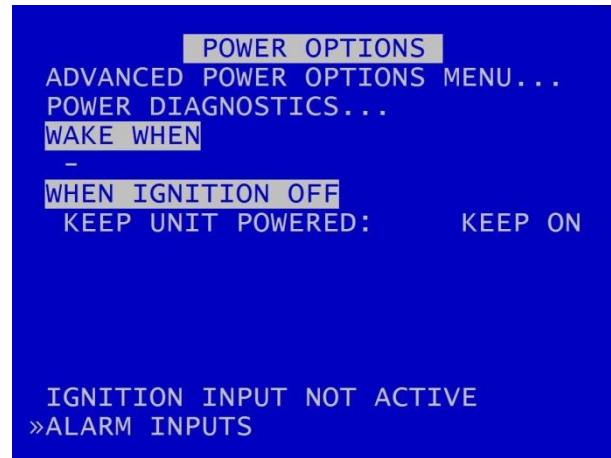
FTP/TELNET USERS menu gives the option to have three different passwords to access the DVR via FTP/TELNET.

The usernames are fixed; however the passwords can be set as required, and are case sensitive. Use the [keyboard](#) to enter text.

3.2.8 Power Options



X500 Power Options



R500 Power Options

POWER OPTIONS menu configures the behaviour of the DVR when power is applied, when power is removed and when an input trigger is detected. The DVR has a built-in GSensor for detecting motion, and can use the GSensor readings to wake up and/or shutdown the DVR.

The DVR can be configured for different power scenarios, eg:

- to stay powered for a period of time when the ignition is off and
- to then wake upon ignition,
- to sleep when no motion is detected and
- to then wake upon motion,
- to wake at a specified time of day

In addition, the DVR can be configured to either SHUTDOWN or STANDBY when ignition is off, and for cameras to stay ON or switch OFF if the unit is in STANDBY mode.

[ADVANCED POWER OPTIONS MENU](#) – provides further selections for waking the DVR, and for configuring behaviour when the ignition is switched on or off, and in low-battery situations.

[POWER DIAGNOSTICS](#) menu displays the current power consumption, broken down into components.

WAKE WHEN – displays current wake prompts, ie those selected in the [ADVANCED POWER OPTIONS MENU](#). Depending on the settings the user has configured, WAKE WHEN will show either IGNITION, MOTION, TIME or a combination of these.

WHEN IGNITION OFF – sets the behaviour of the DVR when ignition is turned off. Options for SHUTDOWN or STANDBY are selected in the [ADVANCED POWER OPTIONS MENU](#) > [ADVANCED IGNITION OFF MENU](#)

NB: In order for the DVR to operate on ignition, the ignition feed should be connected to one of the DVR's [ALARM INPUTS](#) and the [ALARM INPUT FUNCTION](#) set to IGNITION with the active voltage set accordingly.

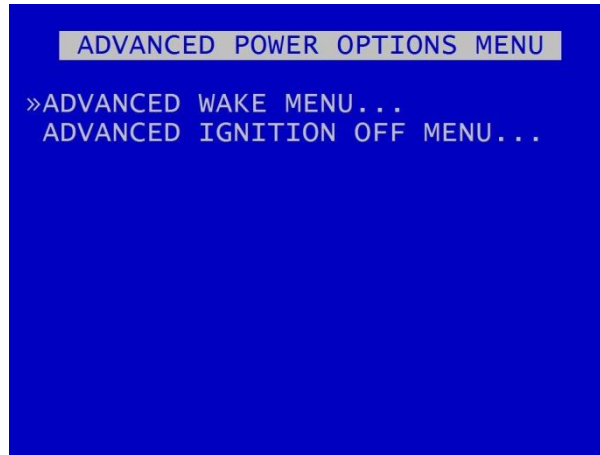
If this has not been done, the POWER OPTIONS menu will display either:

- IGNITION INPUT NOT ASSIGNED
- IGNITION INPUT NOT ACTIVE
- IGNITION INPUT ACTIVE

KEEP UNIT POWERED –Select from options KEEP ON, 1MIN, 5, 10, 15, 20, 30, 35, 40, 45, 50MINS, 1HOUR, 2HOURS, 3HOURS, 4HOURS. (NB this option is only available if STANDBY has not been selected in [ADVANCED POWER OPTIONS MENU](#) > [ADVANCED IGNITION OFF MENU](#). If STANDBY has been selected, this line on the menu screen will display UNIT STANDBY instead of KEEP UNIT POWERED).

POE MODE – **(X500 ONLY)** – select from ON, ON WITH IP CAMERAS, OFF . The default is with PoE set to ON.

3.2.8.1 Advanced Power Options



ADVANCED POWER OPTIONS MENU – provides links to the [ADVANCED WAKE MENU](#) and the [ADVANCED IGNITION OFF MENU](#).

3.2.8.2 Advanced Wake Menu



The DVR has a built in [GSENSOR](#) for recording and detecting motion. The DVR can use the GSENSOR readings to wake up and/or to shutdown.

SLEEP WHEN – sets the DVR to sleep when NO MOTION is detected. Select options 1MIN, 2, 5, 10, 30, 35, 40, 45, 50MINS, 1HR, 2HRS.

NB: When setting the DVR to sleep on NO MOTION, the WAKE WHEN MOTION setting will automatically turn to YES to ensure that the DVR wakes on MOTION.

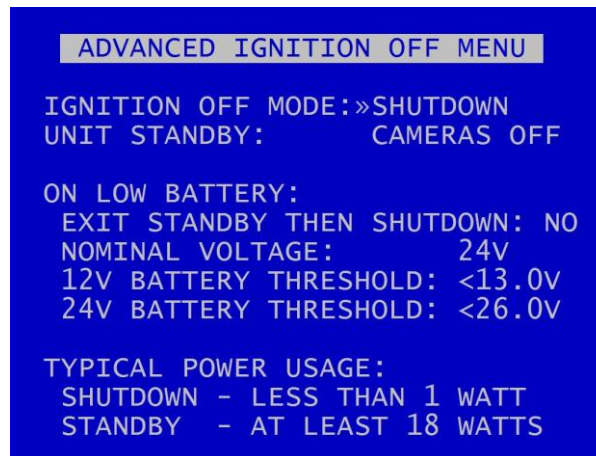
WAKE WHEN - sets the DVR to wake upon given triggers.

MOTION – *this setting is not selectable by the user.* It will be set to YES if the SLEEP WHEN option has been selected by the user. Otherwise, the default MOTION setting is NO.

TIME OF DAY – can be set to trigger the DVR to wake at a particular time. Times can be set using the right and left Menu Navigation buttons on the [Reviewer](#) to scroll through times in 15min increments.

HINT: Setting the wake up time is a useful feature for waking the DVR up during the night to download recorded footage via LANLink (part of Timespace’s proprietary software suite). For further details about LANLink, contact Timespace at support@tspace.co.uk.

3.2.8.3 Advanced Ignition Off Menu



ADVANCED IGNITION OFF MENU provides options for the unit to be set to SHUTDOWN or STANDBY mode when ignition is off.

NB: In order for the DVR to operate on ignition, the ignition feed should be connected to one of the DVR's [ALARM INPUTS](#) and the [ALARM INPUT FUNCTION](#) set to IGNITION with the active voltage set accordingly.

IGNITION OFF MODE – see the ignition scenarios 1 and 2 below.

UNIT STANDBY – select from options CAMERAS ON or CAMERAS OFF.

1. Ignition ON > OFF

IGNITION OFF MODE – select SHUTDOWN or STANDBY. If set to SHUTDOWN, after the timeout period specified by KEEP UNIT POWERED (see main [POWER OPTIONS](#) menu page), the DVR will shut down and run in a low-power mode. The power requirements will depend on the MAIN and AUX POWERED settings (see main [POWER OPTIONS](#) menu page).

If set to STANDBY, after the timeout period specified by UNIT STANDBY settings (see main [POWER OPTIONS](#) menu page), the DVR will enter STANDBY mode where recording is disabled (the DVR otherwise functions normally).

If STANDBY is selected, an advisory warning will be displayed as below:

WARNING
STANDBY is NOT a low-power mode!

In STANDBY mode there is also a power-saving option to switch CAMERAS OFF (NB this only applies to the analogue cameras).

ON LOW BATTERY – when in STANDBY mode, the DVR can be set to exit STANDBY mode and to SHUTDOWN if the battery voltage level dips below the threshold voltage.

Set the nominal voltage of the battery (input voltage) to either 12V or 24V. Then the relevant 12V or 24V battery threshold as required.

The voltage must dip below the threshold for a few seconds before STANDBY mode will be exited and the DVR will SHUTDOWN.

Typical power usage for the SHUTDOWN and STANDBY options are:

SHUTDOWN – tbc

STANDBY – tbc

2. Ignition OFF > ON

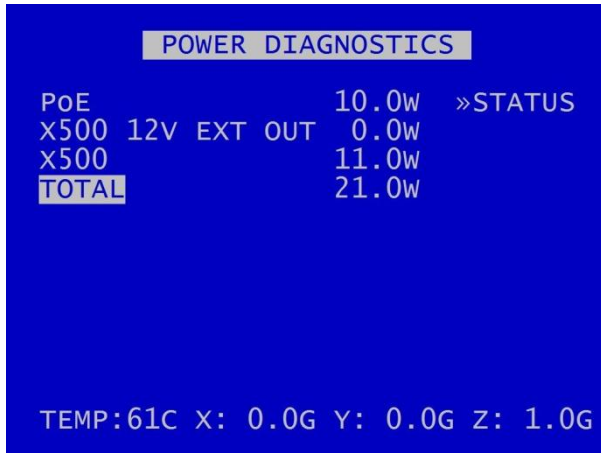
If the DVR is SHUTDOWN and in low-power mode, the DVR will power-up.

If the DVR is STANDBY, the standby mode will be exited and standard operation is resumed. The power to analogue cameras will be restored.

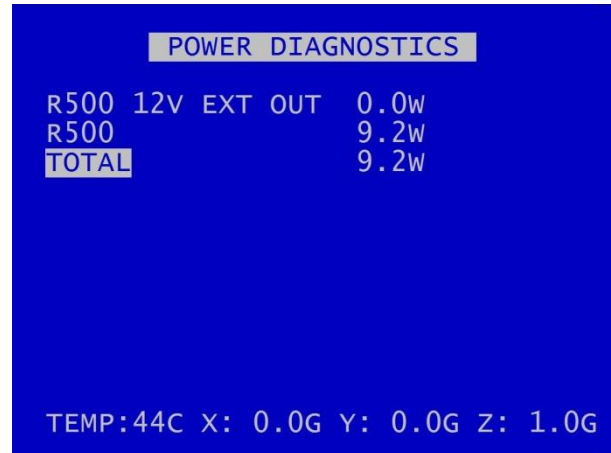
Notes

- i. If the DVR is set to perform a file system check ON POWER SWITCH OFF (see FILE SYSTEM > FILE SYSTEM CHECK MENU > ON POWER SWITCH OFF), the DVR will perform this check in both SHUTDOWN and STANDBY modes.
- ii. If the ignition is switched on during the file system check the check is aborted.
- iii. If the ignition is switched on during the SHUTDOWN before the DVR enters low-power mode, then the SHUTDOWN is aborted and standard operation is resumed.

3.2.8.4 Power Diagnostics



X500 Power Diagnostics



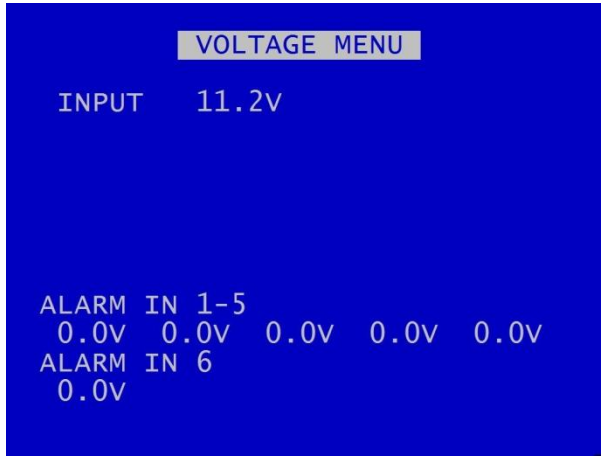
R500 Power Diagnostics

POWER DIAGNOSTICS page displays the current power consumption, broken down into various sections e.g. Cameras, GPS.

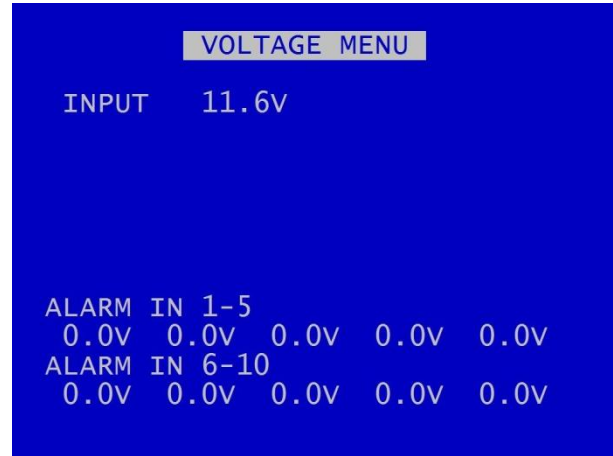
The X500 Power Diagnostics screen also shows the status and power use of the PoE connectors (there is no PoE on the R500).

It also displays current temperature and GSensor X, Y and Z readings.

3.2.9 Voltage Menu



X500 Voltage Menu

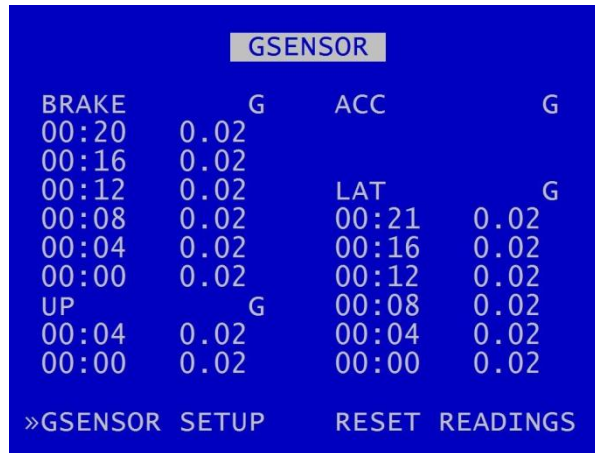


R500 Voltage Menu

VOLTAGE MENU page displays the current Voltage supply, broken down into various sections e.g. Main video output, Alarm Inputs etc.

NB: The [POWER DIAGNOSTICS](#) and VOLTAGE MENU pages may be useful during installation and troubleshooting.

3.2.10 GSensor



GSENSOR menu configures settings for the DVR’s built-in accelerometer.

The GSensor provides X, Y and Z axes data internally to the DVR. Data is displayed and recorded into each image along with optional GPS data.

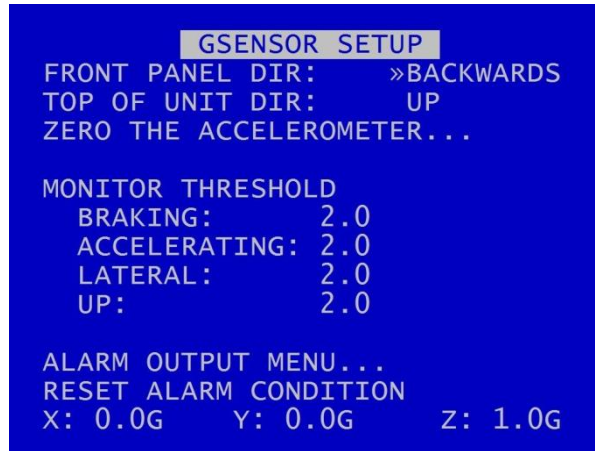
GSensor readings are displayed for;

- BRAKE - Measurement of decreasing forward motion.
- ACC - Measurement of increasing forward motion.
- LAT - Measurement of lateral movement.
- UP - Measurement of upwards motion.

GSENSOR SETUP - sets up the GSensor positioning.

RESET READINGS - Clears all current readings within this hour.

3.2.10.1 GSensor Setup



GSENSOR SETUP menu displays the GSensor configuration. The GSensor is calibrated as part of the manufacturing process in a controlled environment and should not require calibration during the installation process.

However once the DVR is installed in a vehicle, the direction of the front panel and connector panel must be set in order to orientate the GSensor .

Set the FRONT PANEL DIRECTION, e.g. front panel set to FORWARDS means the DVR front panel is facing the front of the vehicle. Select from FORWARDS, BACKWARDS, LEFT, RIGHT, UP, DOWN.

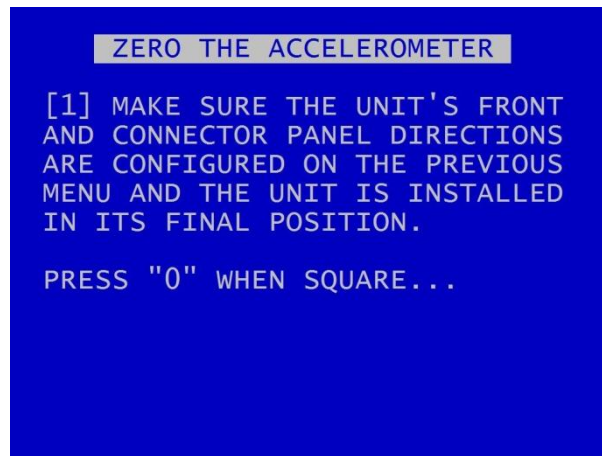
The TOP OF THE UNIT DIRECTION must then be set to LEFT, RIGHT, UP, DOWN, FORWARDS or BACKWARDS depending on the mounting position.

ZERO THE ACCELEROMETER– Once the panel directions are set, the GSensor orientation must be confirmed. Select [ZERO THE ACCELEROMETER](#) and follow the instructions on the screen.

GSensor threshold triggers (for BRAKING, ACCELERATING, LATERAL and UP) can be configured from 0.1 - 2.0. If the set value is exceeded an alarm can be raised (used in conjunction with alarm outputs). A link to the [ALARM OUTPUT](#) menus gives quick access to configure the required action.

RESET ALARM CONDITION – clears the alarm condition.

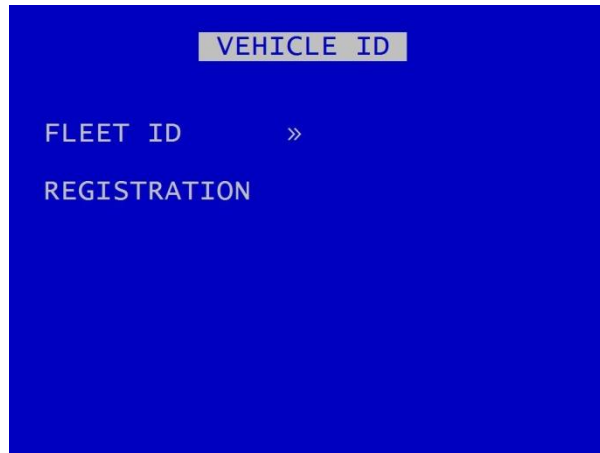
3.2.10.2 Zero The Accelerometer



Once the DVR is installed in its final operating position, the GSensor readings must be zeroed by entering "0" when on the ZERO THE ACCELEROMETER screen.

A second screen will confirm that this has been done.

3.2.11 Vehicle ID



This menu page allows entry of the vehicle's fleet ID number and registration number. This is recorded in system and health logs and makes it easier when using LANLink to identify the vehicle in which the recorder is fitted.

Vehicle ID and registration number details can be entered using the Text and Number Input keys on the [Reviewer](#).

3.2.12 Resource Allocation

```

RESOURCE ALLOCATION

The global images per second
(IPS) for the DVR is 100.
The current allocation is shown
below. Configure the total
IPS via the Normal, Timer,
Alarm and SD recording menus.

MOTION CAM DETECT: 0.00
DISK RECORDING: 0.00
SD RECORDING: 0.00
REMOTE LIVE VIEW: 0.00
▶HELP [ 0.0 / 100.0]

```

X500 Resource Allocation Menu

```

RESOURCE ALLOCATION

The global images per second
(IPS) for the DVR is 100.
The current allocation is shown
below. Configure the total
IPS via the Normal, Timer,
Alarm and SD recording menus.

DISK RECORDING: 0.00
SD RECORDING: 0.00
REMOTE LIVE VIEW: 0.00
▶HELP [ 0.0 / 100.0]

```

R500 Resource Allocation Menu

The RESOURCE ALLOCATION page provides details of the images per second (IPS) allocation as currently configured on the DVR. The IPS allocation values shown indicate the quantity of IPS currently assigned to [MOTION DETECTION](#), Disk Recording, [SD RECORDING](#) and Remote Live View.

HELP – links to the RESOURCE ALLOCATION MENU to provide further explanations on IPS allocation.

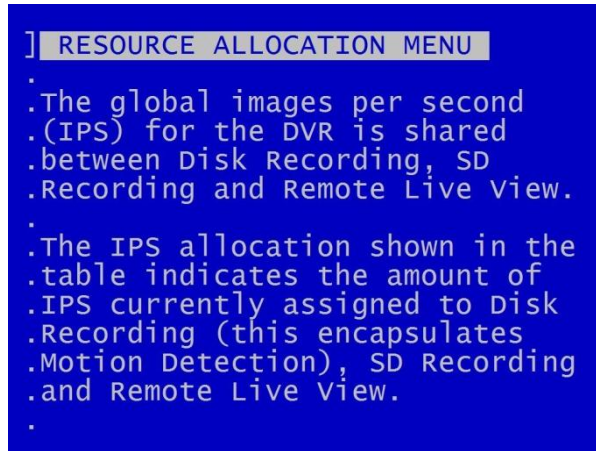
NB: Total resource allocation cannot exceed the global total. Therefore the availability of some features may be affected depending on resource allocation in the other currently configured settings.

The table on the following page details the resource requirement for the various recording modes and features.

| | | |
|--|--------------------|---|
| Motion Detection (X500 only) | 4.0 IPS per camera | The IPS value shown for Motion Detection is a fixed IPS configured when cameras set for Motion Detection have DETECT set to ON and at least one of the recording modes is set to motion record or PMR RECORDING . This IPS is necessary for the motion detection algorithm to determine when motion is active, and utilises 4.0 IPS per camera. |
| Disk Recording | up to 100IPS | The IPS value shown for Disk Recording is the highest IPS configured on the NORMAL RECORDING , TIMER RECORDING OR ALARM RECORDING menus. |
| SD Recording | up to 25IPS | The IPS value shown for SD Recording is the IPS configured on the SD Recording menu. Up to 25 IPS can be allocated to SD Recording. |
| Remote Live View | 2.0IPS per camera | The IPS value shown for Remote Live View is automatically allocated and is the actual IPS currently set for this mode. If is not in use, the table will display 0.0IPS. A minimum of 2.0IPS is required to show each camera over Remote Live View (although a higher number will be automatically allocated to Remote Live View if available). RTSP will use 5.0IPS (multiplied by the number of cameras when switching). |

Figure 5 - Recording Resource Requirements and IPS Allocation

3.2.12.1 Resource Allocation Menu



The RESOURCE ALLOCATION MENU page provides more information about how the global recording resource for the DVR is shared between the various recording functions and DVR features.

The global images per second are shared between Disk Recording (incorporating Motion Detection, SD card recording and Remote Live View).

Details of the resource allocation across various recording modes/camera types as currently configured for your DVR unit is given on the [RESOURCE ALLOCATION](#) page (found by selecting SETTINGS MENU > SYSTEM SETTINGS > RESOURCE ALLOCATION).

NB: Total resource allocation cannot exceed the global total. Therefore the availability of some features may be affected depending on resource allocation in the other currently configured settings.

If the total global IPS is allocated to Disk Recording (including any IPS allocated to Motion Detection) then no IPS will be available for SD Card Recording or Remote Live View.

If the total global IPS is allocated to Disk Recording and SD Card Recording then no IPS will be available for Remote Live View.

If the IPS available for Remote Live View does not meet the camera requirements for Remote Live View, then as many cameras as possible will be shown using the available IPS. If a priority camera is required, then it will be configured first. Remaining cameras are configured by camera number, lowest to highest. A minimum of 2.0 IPS is required to show each camera over Remote Live View.

HINT: Configure the DVR IPS via the [NORMAL RECORDING](#), [TIMER RECORDING](#), [ALARM RECORDING](#), [SD RECORDING](#) and [MOTION DETECTION](#) menus. The remaining available IPS (up to the global maximum) will be available for Remote Live View.

3.2.13 Reset



The RESET menu provides options for resetting the system and/or deleting files. The following options are available.

[DELETE ALL RECORDING FILES](#)
[SECURE DISK WIPE](#)

WARNING: THERE IS NO “UNDO” FUNCTION IF THESE OPTIONS ARE SELECTED.

[USER PROFILES](#) – three User Profiles can be configured with different settings for different uses or recording modes.

MENU LANGUAGE – can be set between ENGLISH (default) or FROM DISK.

When FROM DISK is selected, the DVR will load a language file from the cartridge with MENU and HELP text translated into a given language. The language template is pre-loaded to the cartridge by the user at the point of installation.

The language file will not be removed when running [DELETE ALL RECORDING FILES](#).

NB: A power cycle is required before the new language settings will take effect.

3.2.13.1 User Profiles

Three User Profiles can be configured with different settings for different uses or recording modes. This gives the user an easy way of quickly switching between types of recording required without having to setup the DVR each time. Each profile can be named individually.

In addition to the three user profiles, the DVR Default menu settings can be loaded.

PROFILE – select between DEFAULT and USER 1, 2 or 3.

LOAD PROFILE – loads the profile selected above.

SAVE PROFILE will write the currently loaded settings back to the flash memory, using the selected PROFILE name.

Example; User sets up NORMAL recording with 1 camera 5IPS, HIGH resolution. Go to the RESET menu and overwrite USER 1 with "1CAM HIGH", then change the PROFILE to 1CAM HIGH and select SAVE PROFILE. Change settings for ALARM on 2 cameras, then overwrite USER 2 with "2CAM ALARM", change the PROFILE to 2CAM ALARM and select SAVE PROFILE. You now have 2 user defined profiles to easily switch between by LOADING the specified profile.

HINT: Save up to 3 of your most common settings using the USER PROFILES to allow quick switching between different types of recording mode for different installations. e.g.

USER PROFILE 1 - Normal record 8 cameras with audio.

USER PROFILE 2 - Normal record 14 cameras with GPS and SMS alert.

USER PROFILE 3 - Alarm record 4 cameras based on an external input.

3.2.13.2 Delete All Recording Files



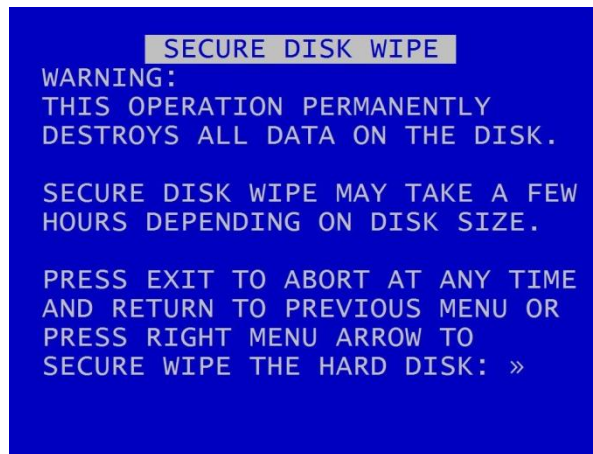
DELETE ALL RECORDING FILES – will erase the directory of files from the hard disk, **including write-protected files**. Only do this if you want to erase all recordings – there is NO undo option*.

Press the right menu button to go to a warning screening, press right again to carry out this action. Pressing [Menu Exit](#) will abort this procedure.

WARNING: THERE IS NO “UNDO” OPTION. SELECTING “DELETE ALL FILES ON SD CARD” WILL ERASE THE DIRECTORY ON THE SD CARD.

*in some circumstances Timespace may be able to recover some file data from the disk, but this is not always possible, and is therefore not to be relied upon.

3.2.13.3 Secure Disk Wipe

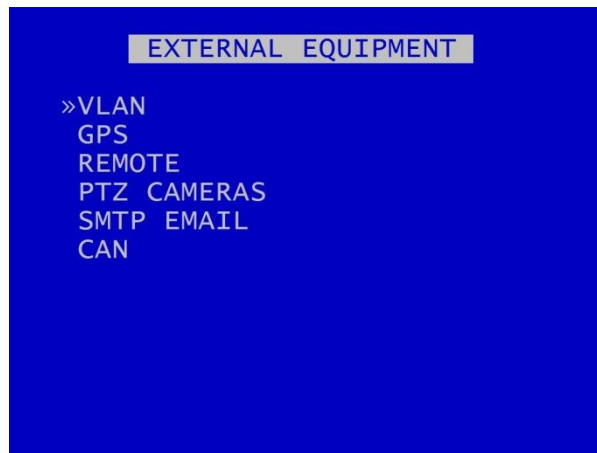


SECURE DISK WIPE – will permanently delete all recording files on the hard disk. This option should only be selected if files need to be completely destroyed – the actual file data is deleted, and no recovery by Timespace is possible.

A final warning message will appear before this function is carried out. Pressing Menu Exit on the Reviewer will abort.

WARNING : THERE IS NO “UNDO” OPTION. SELECTING “SECURE WIPE THE SD CARD” WILL COMPLETELY REMOVE ALL RECORDINGS ON THE SD CARD.

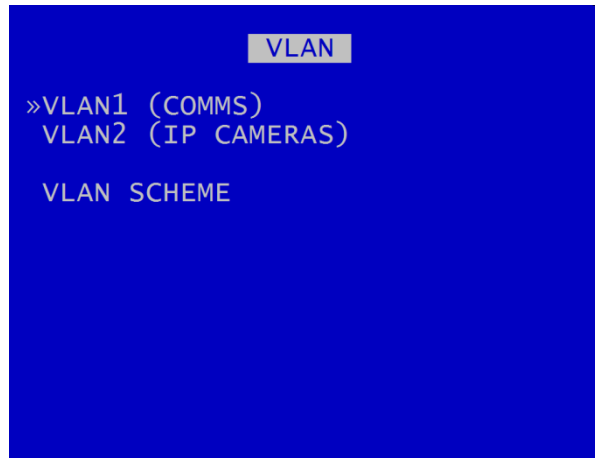
3.3 External Equipment



The DVR provides some common interfaces so that external equipment can be connected and configured for use with the DVR.

Connections for external equipment are shown on Figure 10 - X500 Connections/Wiring and Figure 12 - R500 Connections/Wiring.

3.3.1 VLAN



The physical ports IP Cams 1-4 can be separated from the COMMS physical port by means of a tag-based VLAN.

The VLAN settings are pre-defined, and users need only enter IP addresses for each of the required VLAN connections as follow:

[VLAN1 COMMS](#)

[VLAN2 \(IP CAMERAS\)](#)

[VLAN SCHEME](#) - the VLAN Scheme can be ENABLED or DISABLED.

3.3.2 VLAN1 (COMMS)

```

VLAN1 (COMMS)
STATUS: CONNECTED      --  --
IP ADDRESS:           10.  0.  6. 40
SUBNET MASK:          255.255.  0.  0
GATEWAY:              10.  0.  0.254
DNS PRIMARY:          8.  8.  8.  8
DNS SECONDARY:        8.  8.  4.  4
USE DHCP:             NO

APPLY IP SETTINGS ABOVE
PING TEST...

MAC:                  00:0f:b4:02:ab:f3

```

The VLAN 1 menu allows the user to change the parameters of the VLAN 1 system.

The VLAN 1 connection is a single-port connection which is assigned to COMMS. The COMMS connection must be connected to the COMMS port on the DVR (see Figure 10 - X500 Connections/Wiring and Figure 12 - R500 Connections/Wiring).

STATUS indicates whether the DVR is currently connected to a LAN or not.

IP ADDRESS - Enter the static (fixed) IP address that the DVR is to be assigned on the local area network. The default IP address is **10.0.0.200**

SUBNET MASK - Enter the subnet mask as applicable for the LAN the DVR is connected to. The default is 255.255.0.0

GATEWAY - Enter the gateway IP address of the default gateway the DVR will communicate with on the LAN.

DNS PRIMARY and SECONDARY – The Domain Name System (DNS) is set by default to Google's primary and secondary servers. The DNS assigns domain names to IP addresses.

USE DHCP – select YES/NO. If there is a DHCP server on the network it will assign an IP address to the DVR.

APPLY IP SETTINGS ABOVE – select to confirm and apply configurations set above.

[PING TEST](#) - enables the user to enter a destination IP address to send a network packet to testing connectivity.

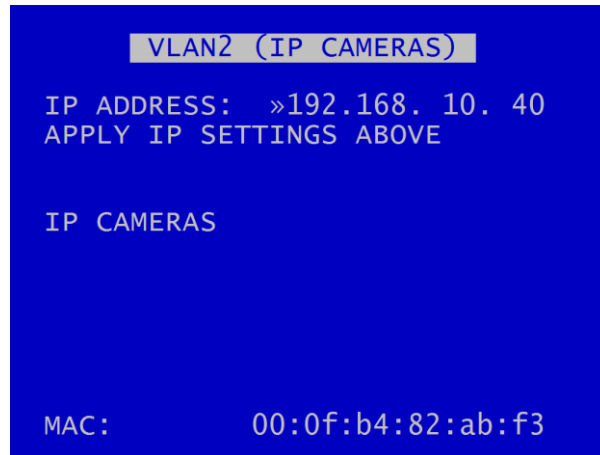
MAC is the unique hardware identifier for the network interface on the DVR.

3.3.2.1 Ping Test

PING TEST menu enables the user to enter a destination IP address to send a network packet to testing connectivity.

FRAMES SENT / RECEIVED updates in real-time to show how many data packets are being transferred to and from the DVR. These are global values and not specifically related to only the ping test.

3.3.3 VLAN2 (IP CAMERAS)

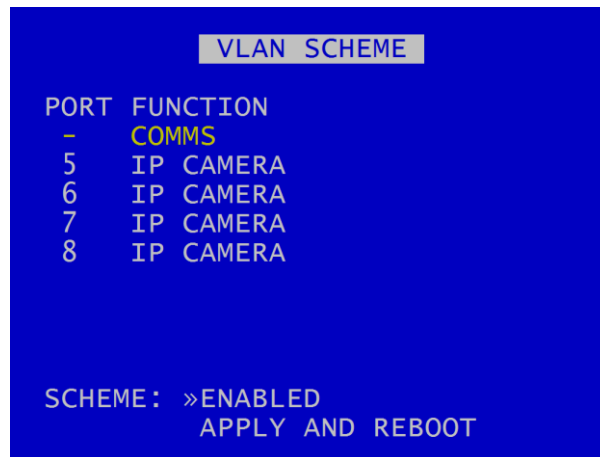


The VLAN 2 menu allows the user to change the IP address of the VLAN2 channels.

IP ADDRESS – enter the static (fixed) address that the DVR is to be assigned to on the secondary local area network. The default IP address is 192.168.10.40.

MAC is the unique hardware identifier for the network interface on the DVR. The VLAN2 port is assigned to the [IP CAMERAS](#).

3.3.4 VLAN Scheme



When the VLAN scheme is ENABLED, the COMMS port is segregated from the IP CAMERA ports. The COMMS port can be used for remote access (such as FTP/Telnet transfers).

The IP CAMERA ports can be used to connect up to 4 IP cameras for recording.

When the VLAN scheme is DISABLED, the COMMS port can be used to access the IP cameras connected to ports IP Cams 1-4. Typically, usage is configuration of the IP cameras.

Default configuration is with the VLAN scheme ENABLED.

If the user changes the selection from ENABLED to DISABLED or vice versa, a reboot is required - select APPLY AND REBOOT.

NB: The COMMS port is not intended for use with an IP camera.

3.3.4.1 VLAN IP Address

With the VLAN scheme ENABLED, the IP address of VLAN1 (COMMS) can be set to the any IP address desired.

With the VLAN scheme DISABLED, in order to access the IP cameras for configuration, both the VLAN1 (COMMS) and the VLAN2 (IP CAMERAS) IP addresses must be set to the same range (e.g. the first 3 octets of the IP addresses must match).

3.3.5 GPS



Global Positioning System setup menu.

The DVR is compatible with the standard NMEA-0183 GPS protocol. A suitable GPS serial unit can be wired to specific pins on the DVR – see Figure 10 - X500 Connections/Wiring and Figure 12 - R500 Connections/Wiring.

The DVR can receive GPS data and embed the data into recorded images. GPS data includes positioning and speed and users can optionally turn these on or off. When turned on, the data will be recorded with each image.

EMBED GPS POSITION - When set to YES will embed the position information in recorded images.

EMBED GPS SPEED - When set to YES will embed the speed information in recorded images.

SPEED UNITS can be set for miles per hour (MPH) or kilometres per hour (KPH).

SYNC CLOCK WITH GPS - The DVR can be configured to synchronize the clock with the data and time information received from the GPS unit. When set to YES the DVR will synchronize the clock on power up.

GMT OFFSET – When syncing with GPS time outside the UK, it is necessary to set the GMT offset for the country / region that the DVR is in, +/- to GMT.

GPS BAUD set the baud rate at which the DVR will communicate with the GPS.

SPEED ALARM – sets the figure at which speed reported by the GPS will trigger an alarm, eg a dashboard warning light is triggered if the vehicle speed exceeds 30mph. Select GPS as one of the [ALARM OUTPUTS](#) if required.

NB: If the baud rate is changed, a reboot of the DVR may be required in order for the GPS unit to be detected.

STATUS indicates whether or not a GPS unit has been detected. The status will be DISCONNECTED if not unit is detected, TRACKING SATELLITES if connected but no GPS lock has been established yet and if CONNECTED, GPS data/coordinates will appear.

3.3.6 Remote



The RS232 connection is provided via the Tx / Rx connections on the green block (Figure 10 - X500 Connections/Wiring and Figure 12 - R500 Connections/Wiring).

RS232: Select from 2400bps, 4800bps, 9600bps, 14400bps, 19200bps, 38400bps, 57600bps, 115200bps.

X200 COMPATIBILITY MODE - for certain customers using older command formats. Select from YES/NO

3.3.7 PTZ Cameras



The DVR supports analogue and IP PTZ cameras.

Analogue (SD) PTZ cameras are controlled via the RS232 connection.

IP PTZ Cameras are via the IP camera ports.

See Figure 10 - X500 Connections/Wiring and Figure 12 - R500 Connections/Wiring

The PTZ menu allows control over one or more Pan, Tilt, Zoom cameras when connected to the X500's serial port. An RS232-to-RS485 convertor will be required.

Supported PTZ protocols are listed; navigate and select accordingly.

BAUD RATE – A selection of baud rates are available for the cameras: 2400, 4800, 9600, 14400, 19200, 38400, 57600, 115200bps. Please refer to the Camera manufacturers' instructions on how to configure the camera baud rate.

PTZ CAMERAS – The DVR can support multiple PTZ cameras assuming that they are all the same protocol and baud rate (NB baud rate is not applicable to IP Cameras). PTZ has its own addressing system. Set each required PTZ camera to YES and navigate down to the required camera number in order to enter the PTZ mode. PTZ mode will enable PTZ controls and functions using the [Reviewer](#).

IP PTZ cameras are configured as for normal IP Cameras, see [IP Cameras](#) section for further details.

[PTZ PATROL SETUP](#) – configures the PTZ camera to switch between its PRESET positions (as defined by the user). This is similar to the main video switcher, but the DVR is instructing the PTZ camera to move to different positions / zoom level.

MAIN VIDEO SWITCHER – **for analogue (SD) PTZ cameras only** – provides a link to the main video output to configure the required cameras for display.

3.3.7.1 PTZ Patrol Setup



PTZ PATROL – configures the PTZ camera to switch between its PRESET positions (as defined by the user). This is similar to the [MAIN VIDEO SWITCHER](#), but the X500 DVR is instructing the PTZ camera to move to different positions / zoom level.

The main PTZ functions are to move the camera Left, Right, Up, Down, Zoom in and Zoom out. There are advanced features for setting up focus behaviour and additionally the DVR can access the camera's internal menus (if the camera supports it).

The DVR can also store 8 different user defined camera positions, for example preset position 1 could be a scene view overlooking a car park, preset position 2 could be zoomed in close to the entrance, preset position 3 could be pointed at the exit. The presets can be accessed by pressing the number keys on the Reviewer for quick panning to locations. The presets can also be triggered via [ALARM INPUTS](#).

NB – Some PTZ cameras will self enumerate in terms of PTZ addressing, some require physically setting using dip-switches (see manufacturer's instructions for details). You must connect the camera to the same DVR channel number as the PTZ addressing. If not, the controls within PCLink and the Reviewer may be associated with different connected cameras. If you are connecting self addressing PTZ cameras, they should be connected consecutively starting on channel 1.

DEFAULT AUTO CAMERA – if the switcher is not being used, select the PTZ camera number to show as default on start-up. NB this setting initially takes priority over the switcher, unless or until the switcher is activated.

3.3.8 SMTP Email



SMTP Email allows the DVR to send an email to a known email address when an event occurs. The message will contain text entered in the email SUBJECT and BODY as well as the current GPS position.

The following events can trigger an email to be sent; POWER UP, AT DAILY TIME, on MOTION DETECTION, on ALARM. Configure the latter two options via the [MOTION DETECTION](#) and [ALARM INPUT](#) menus.

NB GPS position is not available if the email is set to send on power up.

There is a SEND NOW feature for testing.

[SMTP SERVER](#) – configures settings for the SMTP Email feature.

3.3.8.1 SMTP Server



SMTP Server settings must be setup in order to use this feature. These settings are specific to the email server that you are using, not anything that the DVR/Timespace provides.

SERV - Your email server e.g. myemailserver.com or smtp.gmail.com

PORT - DVR supports sending email over port 25 (standard SMTP) or port 465 (SSL).

AUTH - Select whether or not to use authentication (recommended to use authentication).

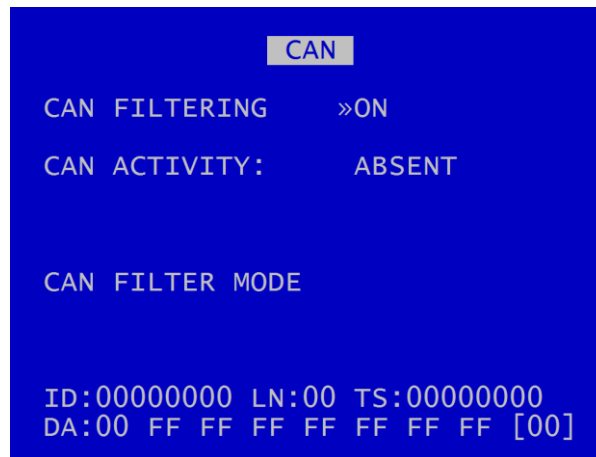
USER - Enter your email account username.

PASS - Enter your email account password.

Characters can be entered by using the [keyboard](#).

NB: the password is shown in clear text on the DVR menu in order to ensure that it is entered correctly. It is not stored in any log files or accessible by anyone unless they have a [Reviewer](#) - consider password protecting the DVR menu system for additional security (SETTINGS MENU > SYSTEM SETTINGS > [SYSTEM SECURITY](#)). Select YES for "System PIN required for MENU").

3.3.9 CANLink



Timespace has developed a vehicle CAN (Controller Area Network) reporting system. The Timespace CANLink unit is separate from the DVR, and is available as a stand-alone unit, or a version to be used in connection with Timespace DVRs. Contact Timespace or your installer for further details of the CANLink unit.

NB: Timespace’s CANLink is compatible with the X500 and the R500 DVR. However, at the time of publication of this manual, the X500 DVR **does not** have a VCA E-11 certificate approving it for use in vehicles.

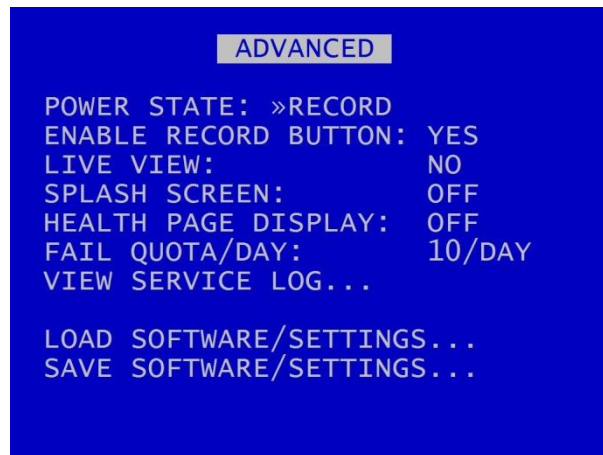
A secure CAN interface enables the DVR to record CAN data and download vehicle CAN information via the vehicle depot’s WiFi/LANLink system.

The CAN menu screen shows CAN activity as either ABSENT or DETECTED. This is useful for diagnosing connection issues.

CAN FILTERING can be selected to be OFF or ON. When filtering is turned ON, only a subset of messages is recorded. These are mainly FMS, bus, truck and other J1939* messages. With filtering OFF, all CAN messages are recorded.

The default is for CAN filtering to be ON when the DVR is rebooted or powered up .

3.4 Advanced Menu



ADVANCED menu contains advanced options that normally do not need to be edited after installation.

POWER STATE – Set if the DVR will RECORD, DO NOT RECORD or USE LAST STATE on power-up. If USE LAST STATE is selected the unit will record on power up if it was recording when power was disconnected. If it was not recording when power was disconnected, it will not record on power up.

ENABLE RECORD BUTTON – controls whether the record button on the [front panel](#) of the DVR can be used to start and stop recording (enable/disable). Select YES/NO.

LIVE VIEW – if set to YES, live view of camera will be displayed even if the disk cartridge is removed. If set to NO and the cartridge is not present, the initialisation screen is shown.

SPLASH SCREEN controls the length of time an operator logo will be displayed. Available options are OFF, 5 SECS, 10, 30, 60 SECS. A .bmp file can be loaded / displayed on boot up. The .bmp must be in a specific format and copied onto the cartridge. See APPENDIX 3– Splash Screen for further details.

[HEALTH PAGE DISPLAY](#) – controls the length of time the unit health status will be displayed for on boot up.

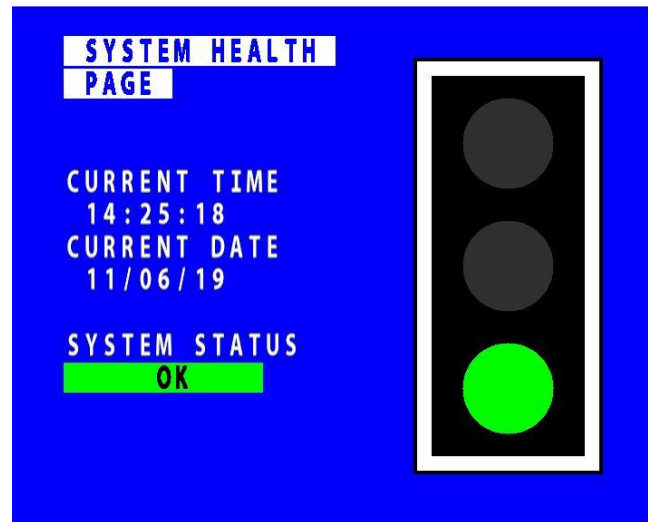
FAIL QUOTA/DAY – sets how many fail messages that must occur for any given day before the FAIL LED is lit. During normal operation it may be acceptable to receive a certain number of fail events before action is required. Set as applicable. Available options are NEVER, 1/DAY, 2, 5, 10, 20/DAY.

[VIEW SERVICE LOG](#) – displays any service messages that have been logged by the system.

[LOAD SOFTWARE/SETTINGS](#) and [SAVE SOFTWARE/SETTINGS](#) – click link to see details.

3.4.1 Health Page Display

HEALTH PAGE DISPLAY controls the length of time the unit health status will be displayed for on boot up. The health page includes a simple traffic light status and may include service/fail code conditions as well as the current recording state. The health page can also be activated via an alarm input.



Select from OFF, 5 SECS, 10, 20, 30, 60 SECS, UNTIL EXIT.

3.4.2 Service Log

```

SERVICE LOG
»LOG ENTRY 1 OF 33
18/02/19 14:46:16
MODE: Service
CODE: 0305
DEVICE: Camera
DETAIL: NO SIGNAL 5

RESET SERVICE LOG...
WRITE LOG TO: HD SD
```

VIEW SERVICE LOG – displays any service messages that have been logged by the system.

Messages can be scrolled through and reviewed. Details of date/time and service/fail codes are shown.

A full list of Service Codes is in Chapter 8 ([Service And Maintenance](#)).

[RESET SERVICE LOG](#) – clears the service log.

WRITE LOG TO – select from HD or SD. The screen will show **DONE** when this is complete.

NB: when saved to the HD/SD, the log files are encrypted but can be sent to Timespace for analysis if required. Contact support@tspace.co.uk for further information.

3.4.2.1 Reset Service Log



SERVICE LOG RESET menu – clears any service log messages.

Press the right arrow key, and then again to confirm.

HINT: Clearing the service log will clear the front panel service/fail LEDs. If the fault condition still exists, the LEDs will illuminate again.

3.4.3 Load Software/Settings



LOAD SOFTWARE/SETTINGS menu provides options for loading new/upgraded software and/or settings. An .XOS file should be copied onto the cartridge or SD card using a PC then inserted into the DVR.

LOAD FROM – select either HD (to load from the Hard Disk cartridge) or SD (to load settings from the SD card)

LOAD SYSTEM SOFTWARE – select from the options to load software either:

WITH FACTORY SETTING (load the XOS software with Timespace factory default settings).

WITH CURRENT SETTINGS (load the XOS software but retain settings currently configured in the DVR).

WITH XOS SETTINGS (load the XOS software with settings from the HD cartridge or an SD card).

LOAD MENU SETTINGS – used to copy menu settings from another DVR unit and replicate these on the second DVR.

LOAD CONFIG DATA – load eg settings for a new IP Camera via a TSCONFIG file. See IP Camera [TYPE SETTINGS](#) menu and the [TSCONFIG](#) section for more information.

WARNING: Caution should be taken to ensure that power is not lost during an upgrade.

3.4.4 Save Software/Settings



SAVE SOFTWARE/SETTINGS provides options for saving the current settings. The current software and settings will be written to the HD cartridge or SD card.

- SAVE TO – select either HD (to save to the Hard Disk cartridge) or SD (to save settings to the SD card).
- SAVE SYSTEM SOFTWARE – save the .XOS file.
- SAVE MENU SETTINGS – save menu settings to transfer to another unit. NB: it is possible to save the menu settings and remove parts not required, retaining only the small section which includes the required settings.
- SAVE CONFIG DATA – save the CONFIG data on to either the selected HD or SD card.

This CONFIG file (also referred to as the TSCONFIG file) holds the IP camera settings that have been set up on the DVR. This can be saved onto the HD cartridge or the SD card and loaded onto other DVRs so that predefined IP cameras can be selected from a list.

The DVR is shipped from the factory with a default list of Timespace-tested cameras. See [IP CAMERA](#) and [TSCONFIG FILE](#) sections for further details.

4. System Information And Security

4.1 Language Selection

By default Timespace DVR menu systems are displayed in the English language.

Timespace Technology can provide a language template file which the user can translate and return to Timespace Technology for incorporation into the DVR software. This will allow all text displayed on the [Reviewer](#) to be in the user's preferred language.

Language is selected in the SYSTEM SETTINGS > [RESET](#) menu. The DVR requires a power cycle before the new language settings will take effect.

4.2 Video Standard - PAL and NTSC

Timespace DVRs offer the ability to switch between the different video standards, PAL and NTSC.

PAL (Phase Alternating Line) is the standard used in most European countries with the exception of France. The DVR, when configured to use PAL, offers a maximum capture rate of 25 fields per second (per channel).

NTSC (*National Television Standards Committee*) is the standard used in the United States of America. The DVR, when configured to use NTSC, offers a maximum capture rate of 30 fields per second (per channel).

The video standard is selected at SETTINGS MENU > SYSTEM SETTINGS > CAMERA SETTINGS > [VIDEO SETTINGS](#).

Note that if the unit is configured for PAL and an attempt is made to play back NTSC recordings, the image will appear vertically 'squashed'. Similarly, if the unit is configured for NTSC and an attempt is made to playback PAL recordings, the image will be clipped.

4.3 Timespace File System

Timespace DVRs use a proprietary file type with the file extension .XBA. Images from multiple cameras along with audio, GPS and other meta data are stored in these files. The DVR stores XBA files on the cartridge in a loop over the physical disk and does not use a fragmented file structure. The DVR uses a linking mechanism (FAT area) for PC compatibility. This compatibility conforms to the Microsoft standard FAT32 file system that is compatible on all PCs and many other systems.

Two types of File System behaviour are available on the DVR; Loop and Single Pass.

Loop Recording

The DVR will automatically delete the oldest recordings first when the Hard Disk Cartridge is full (with

the exception of write-protected files). Write-protection can be used to keep Alarm recordings but loop the background (Normal) recording.

Single Pass Recording

The records until the Hard Disk Cartridge is full and then stops.

Recordings may be deleted in the SETTINGS > SYSTEM SETTINGS > RESET menu or loop recording enabled so that the oldest files will be overwritten first. The File System Recording Mode is set in the SETTINGS > SYSTEM SETTINGS > [FILE SYSTEM](#).

4.4 Video Compression

The DVR records images, audio, GPS and other meta data into 1 Minute, 5 minute, 10 minute or 1 hour proprietary format files ending with the .XBA file extension. For security and optimisation reasons .xba files can only be viewed on a PC using the proprietary [PCLink200](#) software or authorised Timespace partner software.

The images are compressed using **H264** video compression giving best of class quality and lowest image size. H264 is by its nature a predictive compression scheme meaning old images are used to predict future images. Every 2 seconds a new keyframe is recorded (an unpredicted image that stands on its own) and the remaining 2 seconds worth of images are predicted from this and from each other. The images can be searched easily with a granularity of 2 seconds (using the key frame) during playback.

A trade-off between image quality and file size can be made by selecting different levels of video quality on the DVR: LOW, MEDIUM, HIGH, V.HIGH, VV.HIGH AND SUPER. The low setting uses greater compression than the higher settings and consequently less disk space is used.

As image quality rises however so does the resultant file size so a decision has to be made as to the level of image quality needed and the length of recording required to be stored on any given size of Hard Disk Cartridge. For analogue (SD) cameras, the DVR uses a constant bit-rate scheme so every image has a constant average size in bits relating to the quality setting. The following table lists the qualities and the corresponding average kbits per image that results:

| | |
|---------|--------------------|
| SUPER | 200kbits per image |
| VV.HIGH | 140kbits per image |
| V.HIGH | 100kbits per image |
| HIGH | 70kbits per image |
| MEDIUM | 50kbits per image |
| LOW | 35kbits per image |

Figure 6 - Image quality and bit rates (Analogue (SD) cameras)

An example duration of recording is easy to calculate:

1TByte disk, 10 images per second, V. High Quality
1,000,000,000 kBytes / (3600 seconds per hour x 10 IPS x 100kbits per image / 8 bits per byte)
= 1,000,000,000 / 450,000
= 2222 hours or 92 days

The DVR records in 2CIF Frame Resolution 720 x 288 (pixels).

The DVR provides an on-screen calculator during setup when using the [Reviewer](#). It shows how long the recordings will last before they are overwritten. This is based on the current quality, images per second settings and the installed cartridge size.

4.5 Audio

4.5.1 X500 Audio

The X500 has one “budget” mic input (on the screw terminal connectors) and four recording-studio-quality mic inputs (via Mini XLR connectors). It has four line level output channels via a Mini XLR (4-pin) connector. These connections are all show on Figure 9 - X500 Rear Interface and Figure 10 - X500 Connections/Wiring.

Audio recording is configured in the DVR menu settings at MAIN MENU > [AUDIO RECORDING](#).

The audio channels can be played back individually or in combinations when viewing footage in [PCLink200](#) PC software. They can also be disabled during playback. Full details of PCLink’s audio controls are found in the PCLink manual at www.tspace.co.uk .

The X500 has a built in microphone pre-amp to amplify the microphone signal. The audio input sensitivity is also adjustable in the DVR menu settings from 0.002V RMS to 2V RMS (MAIN MENU > AUDIO RECORDING > STANDARD QUALITY AUDIO > AUDIO IN SENSITIVITY)

4.5.2 R500 Audio

The R500 has one mic input on the screw terminal. This is shown on Figure 11 - R500 Rear Interface and Figure 12 - R500 Connections/Wiring.

4.6 PC Access Precautions

The DVR file system uses a standard FAT32 file system so that a PC can read the contents. The PC will access the cartridges in a different way to the DVR. The DVR will not be able to read every FAT32 file system written by the PC and it is therefore important to restrict what the PC does to the file system.

Permitted on a PC

- Reading the .xba files
- Modifying the write-protect status of files
- Performing disk utilities that read the disk (e.g. Scandisk) but do not modify disk

Not Permitted on a PC

All write accesses to the disk if it is to be reused in a DVR . These include:

- Formatting the disk on PC (including any Disk Manager MBR checks/fixes)
- Defragmenting the disk
- Deleting files
- Renaming files
- Generating new files
- Creating a recycle bin on the disk

NB: if any of the above non permitted actions are used, the cartridge will need to be reformatted on the DVR using the [Reviewer](#). This will erase all data on the cartridge and format it correctly for further use in the DVR.

4.7 PC Network Access

The DVR can be accessed through a number of PCLink Suite Applications, included in the USB Kit. Files can be downloaded, images viewed, the DVR controlled and settings adjusted over LAN.

Each feature runs over the LAN using a specific protocol and on a specific network port.

Security measures on a network such as Firewalls, encryption and MAC address filtering may need to be adjusted in order to achieve this. Security applications such as Norton and Symantec on the PC may need to be configured to allow the PCLink Suite applications to operate correctly. Any installed network or local PC firewalls (including Windows Firewall) may have to be instructed to allow the use of these ports to communication between the PC and the DVR.

Ports:

| Port | Protocol | Function | Used By | DVR | Description |
|-----------|----------|----------|-------------------|-----------------|---------------------|
| 7 | UDP | Echo | LANLink / PCLink | All | Unit discovery |
| 21 | TCP | FTP | LANLink | All except X200 | File download |
| 23 | TCP | Telnet | PCLink | All | Unit commands |
| 69 | UDP | TFTP | LANLink / PCLink | X200 only | File download |
| 2055-2058 | TCP | Custom | PCLink | All except X200 | Live video and menu |
| 5465-5468 | UDP | Custom | PCLink/RemoteLink | X200 only | Live video and menu |

Figure 7 - Network ports

4.8 Watermark and Sequencing

4.8.1 Watermark

The DVR uses a fragile watermark. Any modification to the recorded file will destroy the watermark.

The image, audio and ancillary (meta) data that makes up the recorded file is passed through a function that generates a "magic number" or hash code from the data. A hash code is created automatically by the DVR every $\frac{1}{4}$ of a second for each $\frac{1}{4}$ second of data. Each hash is then passed through an encryption function and then stored in the file.

A sequencing number ensures that all hash codes and corresponding data are present and where multiple files exist that no files are missing.

To check that a number of files have not been altered or modified in any way, the watermark checking program (e.g. PCLink) recalculates the encrypted hashes (watermarks) and checks these against the watermarks provided in the file. If all the watermarks match the recorded file has not been tampered with. The watermark is "destroyed" when the encrypted hash code stored in the file and the encrypted hash code of the data do not match. PCLink produces a report which can be used in court to validate recorded files.

The watermark is always on the DVR i.e. all recordings have the watermark embedded in real-time as the footage is laid to disk, it cannot be turned off. Within PCLink200, you can generate a report for a number of files. You can also select a file for watermark checking.

Encryption type;

- Hashing function: SHA256
- Encryption function: AES256

4.8.2 Sequencing

In addition to every $\frac{1}{4}$ second being protected by a Watermark, each watermark has its own unique sequence number. This protects any images being removed from a file and protects any files being removed from a sequence of files.

4.8.3 Watermark / Sequencing Report

Within [PCLink200](#), a report can be produced against an image, file and/or sequence of files.

PCLink will analyse the data against the encrypted hash and analyse the data's sequence numbering. If any images have been modified, any images removed or any files removed, PCLink will identify them and report accordingly.

Files fail if:

- Any video/audio/meta data frame (other than the last in a non-closed file) had an invalid watermark
- Video/audio/meta frames were missing or out of sequence (in newly generated files)
- Files passed to the checker were not in sequence (in newly generated files)
- Files are missing their sequence frame (in newly generated files) in properly closed files.
- Time Adjust TCP port 8463 (can be configured within the DVR menu system).

Authentication

FTP / Telnet username; tspace01

FTP / Telnet password; TS01480

5. System Interfaces

5.1 GPS interface

The GPS setup is covered in Chapter 4 – User Guide – Menu System – [GPS](#)

The Global Positioning System (GPS) is a worldwide radio-navigation system able to calculate position using triangulation based upon satellite signals. The GPS must be positioned so its antennae have a clear line of sight of the sky – obstructions such as foliage and reflected signals in built-up areas can reduce the accuracy.

The DVR can be fed GPS data and embed coordinates into images for location identification and real-time mapping playback in PCLink200.

The DVR uses the NMEA-0183 Interface Standard. GPS data is received into the DVR GPS port using a single serial data line.

The DVR has been tested with the following GPS receivers:

- Garmin GPS16 LVS & GPS18 LVC & GPS18x LVC
- Sure24 GPS Receiver [EXTERNAL LINK](#)
- Byonics GPS2 - [EXTERNAL LINK](#)

NB: When using the Garmin GPS18 LVC the DVR baud rate must be set to 19,200.

Connection

The GPS receiver is connected to DVR through the green block connectors (see Figure 10 - X500 Connections/Wiring and Figure 12 - R500 Connections/Wiring. The DVR can provide +5V or 12V power to the GPS mouse on the green block connector.

Options

The DVR GPS menu options allow the embedding of GPS position and speed, assuming a valid GPS signal is being received and the data passed correctly to the DVR.

If a GPS receiver is connected but satellite lock has been lost then it is still possible to record the data but it will not indicate position, speed, date or time and the actual content may vary according to the type of GPS receiver employed.

The DVR includes a clock which is used to timestamp recording files and overlay the date and time on recorded images. Although accurate, the DVR can be configured to synchronize the clock with the date and time information received from the GPS receiver.

When a GPS unit is plugged into the DVR, and it has locked onto the satellites it then sends GPS time and position and other data every second. If after 10 seconds the DVR's internal clock is consistently

+/- 2 seconds compared to the GPS unit then the time error is noted. On the next power cycle the time error is corrected.

Local Standard Time - The time received from the GPS receiver is always UTC (Coordinated Universal Time) which is the same as GMT (Greenwich Mean Time). In order to correctly work out the error between the local standard time (used by the DVR's internal clock) and that received from the GPS receiver, the system must be set with the correct time zone offset.

GPS Baud Rate - Set the DVR data rate according to the GPS mouse you are using. Rates configurable include; 2400, 4800, 9600 and 19200, 38400 bps.

NB: It may be necessary to change the baud rate on the GPS mouse and set it to a specific rate in line with the DVR setting. Reference the GPS mouse product instructions to configure the baud rate then power off/on the DVR (whilst connected to the GPS).

5.2 Remote Operation (LAN / Wifi / 3G) – Telnet / FTP

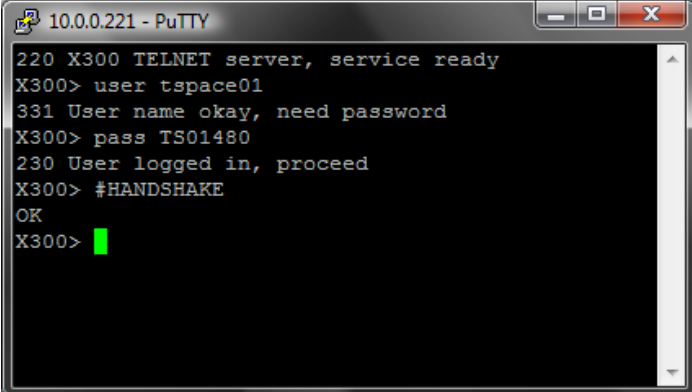
The DVR system provides a number of interfaces to remotely control and configure the recorder as well as reviewing recorded footage and displaying live camera views.

The DVR has a comprehensive set of **RS232** control commands. This open architecture allows full integration with third party hardware/software. Refer to the [RS232](#) Control section of this manual for details.

In addition to the RS232 support, the X500 provides a **Telnet** interface over TCP/IP. The same command set detailed in the RS232 section can be used over ethernet using the Telnet protocol.

A simple test to check connectivity between PC and DVR you can try following with a Telnet client (e.g. Putty, Termite);

- Telnet (port 23) to 10.0.0.200 (default DVR IP)
- Enter the username; tspace01
- Enter the password; TS01480
- Type **#HANDSHAKE**; you should receive **OK**.



```

10.0.0.221 - PuTTY
220 X300 TELNET server, service ready
X300> user tspace01
331 User name okay, need password
X300> pass TS01480
230 User logged in, proceed
X300> #HANDSHAKE
OK
X300>

```

The DVR supports **FTP** over TCP/IP using the Ethernet (LAN) socket. The [FTP/Telnet User Password](#) menu screen is also covered in Chapter 4 – DVR Menu System.

The DVR FTP server allows video files to be downloaded using either a hard-wired, wireless or 3G IP connection. A web browser can be used to FTP onto the DVR 0 by typing the following in the address bar:

ftp://user01@10.0.0.200/ (default IP). This will prompt for the password.

ftp://user01:TS01480@10.0.0.200/ (default IP). This will log straight in.

Supported browsers are: Microsoft **Internet Explorer** & Mozilla **FireFox**. A third party FTP client can also be used, for example **FileZilla**.

PCLink Remote features include; Live View, Playback, Configuration. A brief overview of the applications included in PCLink Suite can be found on the PCLink Suite page of this manual. For detailed application instructions, see the separate PCLink Suite manual available at www.tspace.co.uk.

5.3 RS232 / TELNET External Control

The DVR software includes external control via RS232 (Tx / Rx on green block connectors, see Figure 10 - X500 Connections/Wiring and Figure 12 - R500 Connections/Wiring) or via Telnet over Remote Live View and provides functions:

- Files can be created and written into on the DVR hard drive. The files can also be read back.
- The DVR can be controlled via Commands. This allows many displays and recording functions to be carried out by an external device.

Baud rates can be set in the [Remote](#) menu. Baud rates of 2400, 4800, 9600, 14400, 19200, 38400, 57600, 115200 can be selected. The external commands operate over the RS232 port. The commands can be found in [Appendix 4](#).

Connect the DVR RS232 port to a PC using a bespoke cable.

5.4 USB Interface Kit

The purchase of a Timespace USB Kit or cartridge station includes the necessary licence for use of PCLink Suite software including free of charge updates on a single PC (reasonable use policy allows installation on a secondary portable PC; laptop). Timespace Technology does not authorise the unlicensed usage of PCLink Suite software.

The USB Kit provides all hardware and software necessary to review and archive recordings on a PC from a Hard Disk Cartridge when it has been removed from the DVR. No additional device drivers are required for the USB Interface Kit when using Windows 2000, XP, Vista, Windows7 or Windows 10.

Kit Contents:

- 1x USB / IDE Interface Lead
- 1x PCLink200 Software CD

Connecting to a PC using the USB Interface Kit

1. Remove the Hard Disk Cartridge from the DVR.
2. Plug the multi-pin D shaped IDE USB lead into the rear of the cartridge and then plug the smaller USB connector into an available USB port on the PC.

Once the disk has been connected, the PC should take a few seconds to detect the disk and Windows should automatically assign a drive letter to it. The drive should be viewable in Windows Explorer with .XBA files visible with their associated icon (assuming PCLink Suite is installed);



Recording files can now be viewed using [PCLink200](#);

- Individual files can be opened directly from Windows Explorer by double clicking.
- Up to 15 files can be opened by selecting them and using RIGHT CLICK > OPEN WITH PCLINK200.
- .XBA files can be dragged from a Windows Explorer window and dropped onto the main area of the PCLink200 window.
- The entire cartridge can be loaded by opening PCLink200 and selecting the AUTOLOAD option.

A specific folder can be loaded from within PCLink200; FILE menu, LOAD FOLDER

6. Installation Guide

6.1 Safety

The DVR meets the requirements of BS EN60950 (Safety Requirements of Information Technology Equipment).

The DVR is designed to be powered from an external power source which complies with the Low Voltage Directive (73/23/EEC).

The DVR is designed for indoor use in the temperature range -10° to +50°C, 20% to 80% RH (non-condensing).

6.2 Environmental

The DVR may be operated in ambient temperatures from -10°C to +50°C. This specification applies in still air and ambient temperature measured 15cms above the centre of DVR.

If the DVR is to be mounted in an enclosure it is important that the internal temperature inside the enclosure does not exceed the specification above and any new enclosure design should be tested.

6.2.1 Shock And Vibration

Consideration should be paid to the mounting position so that the levels of shock and vibration that may be encountered are minimized.

6.2.2 EMC

The DVR complies with the relevant EEC, Automotive 'E' Mark and EMC standards for this type of product.

6.2.3 Conformity

EMC Conformity (CE Mark); Meets the European Council Directive 2014/30/EU (EMC Directive) relating to EMC Emissions - EN55032:2012 and EMC Immunity – EN55024:2010.

(Conformity certificates can be found in [Appendix 2](#)).

6.2.4 Recycling

When the product has reached its end of life and requires disposal, recycling instructions are available upon request.

6.3 Warnings

- The use of hard disk cartridges other than those supplied by Timespace Technology will invalidate the warranty of the X500 and/or R500 recorder and will constitute a breach of the X500/R500 operating software copyright.
- The purchase of USB kit includes the necessary license for use of PCLink Suite software on one PC, including free of charge updates. Reasonable use allows a second installation on a portable computer provided both installations are not used simultaneously. Timespace Technology does not authorise the unlicensed usage of PCLink Suite software.
- The X500/R500 recorder must always be mounted so that there is a free flow of air around it. If it is mounted in an enclosure, it is essential that adequate ventilation is provided, and it is recommended that a fan is incorporated in the enclosure design.
- Hard disk cartridges are sensitive to shock, vibration and humidity and must be used within operating temperature range as detailed in the X500/R500 specification in the [Appendices](#).
- It is highly recommended that recording is stopped before power is removed from the DVR to avoid loss of data. It is also recommended to stop recording before the cartridge or SD card is removed.
- Cartridges should be safely removed from windows operating system environment prior to removing power/USB cable. Data loss or corruption may occur if this is not followed.
- Do not wet the product when cleaning.
- This product contains a lithium battery. Do not recharge, open, heat or dispose of in fire. Dispose of according to local regulations.
- The X500/R500 may become unusable if power to the unit is lost during a software upgrade.

6.4 X500/R500 Connections

6.4.1 X500/R500 Front Panel

The X500 and the R500 DVRs have the same front panel, as shown below (the name label of the DVR will be shown as X500 or R500 as applicable).



REC (RECORD) BUTTON

Turns configured recording mode on and off. Button can be disabled within menu settings (SETTINGS MENU > ADVANCED > ENABLE RECORD BUTTON).

LEDs

| | |
|-------------|--|
| Power | Illuminated when the DVR is powered (Green LED). |
| Rec | Illuminated Red when the DVR is recording (flashing in Motion Detect mode). |
| Disk | Pulses Green/Red when the DVR is reading/writing to/from the Cartridge. |
| SD | Pulses Orange when the DVR is reading/writing to/from the SD card. |
| Fail | Illuminated Red when any of the Fail conditions are met (refer to Service / Fail page). |
| Service | Illuminated Orange when any of the Service conditions are met (refer to Service / Fail page) |
| At Power On | All LEDs will illuminate whilst the DVR initialises and will remain lit during system check (menu disabled) until the unit is operational. Once operational only the Power LED will remain illuminated unless recording is taking place. |

🔒 CARTRIDGE LOCK

- Locked - Securely locks the removable cartridge in place and enables it for use.
- Unlocked - Turns off the cartridge lock, releasing the cartridge lock for removal.

SD CARD

The DVR supports a single SD card for two configurable functions – [SD CARD RECORDING](#) and [SD CARD FILE COPY](#).

SD Compatibility: The DVR supports **SanDisk SDHC** (Secure Digital High Capacity) cards (**including Extreme and Ultra types**) **only**. Sizes include 4GB, 8GB, 16GB and 32GB.

6.4.2 [Reviewer](#) Connector



Figure 8 - X500/R500 with Reviewer

Connect the Reviewer to X500 Reviewer socket using a RJ45 Ethernet cable with a ferrite.

Signals for this connector are as follows:

| | | | |
|---|--------------|---|------------------------|
| 1 | Video out | 5 | RS232 Tx |
| 2 | Video ground | 6 | Audio out (line level) |
| 3 | Audio ground | 7 | Power ground |
| 4 | RS232 Rx | 8 | 12V |

12V is supplied (regulated) to the Reviewer from the DVR.

WARNING: using greater than 12V may damage both the DVR and the Reviewer. **Never** connect a laptop or PC to the front panel Reviewer socket; this will damage the laptop/PC.

6.4.3 X500 Rear Interface



Figure 9 - X500 Rear Interface

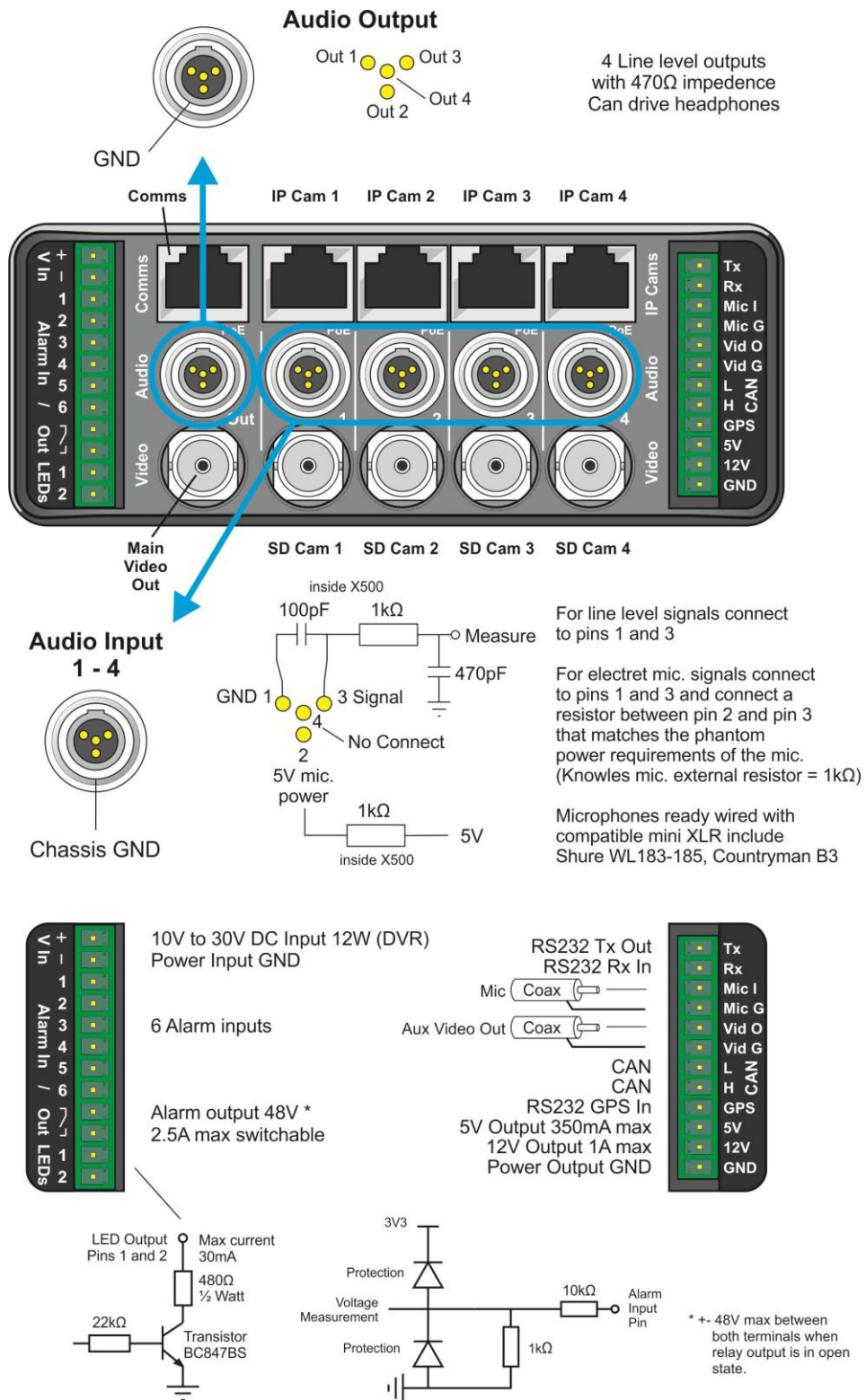


Figure 10 - X500 Connections/Wiring

6.4.4 R500 Rear Interface



Figure 11 - R500 Rear Interface

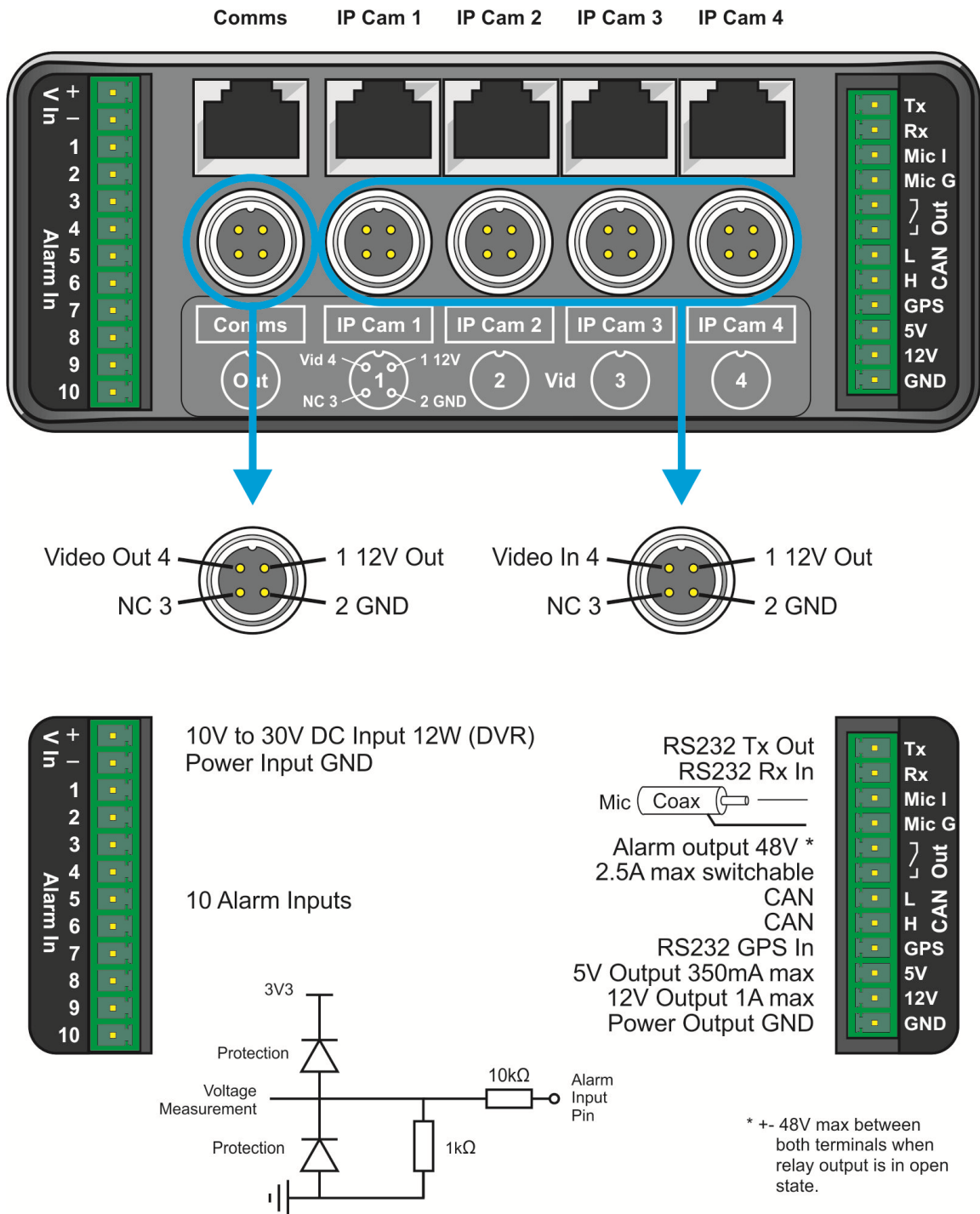


Figure 12 - R500 Connections/Wiring

6.5 Installation Instructions

The X500 is supplied without any mounting kits. It can be used free-standing, or it can be mounted using either of Timespace's two [mounting kits](#).

The R500 is supplied pre-mounted on the Timespace Vehicle Mounting Plate System. This can then be screwed to a vehicle's mounting surface as required.

The DVR is designed to be mounted horizontally or vertically in any axis, but on a strict perpendicular angle.

It is necessary to leave clearance around the final mounted products. See [X500 and R500 – Final Mounted Clearances Required](#) for further details.

6.5.1 GSensor configuration

The DVR's built-in [GSensor](#) must be configured during the installation process. Once the DVR is installed, the direction of the front and side panel must be set e.g. Front panel FORWARDS means the DVR front panel is facing the front of the vehicle, therefore the Connector Panel must be either LEFT, RIGHT, UP or DOWN depending on the mounting position. After configuring the DVR orientation, the GSensor readings must be zeroed using [ZERO THE ACCELEROMETER](#) in SYSTEM SETTINGS > GSENSOR > GSENSOR SETUP > [ZERO THE ACCELEROMETER](#).

6.5.2 Installation Check List (Example)

REQUIRED / RECOMMENDED

- Mount the DVR in position on the base plate or right angle bracket
- Set the GSENSOR orientation (which way is the DVR mounted)
- Zero the GSENSOR readings
- Setup camera rate/quality as required e.g. [NORMAL RECORDING](#)
- Configure and enable IP Cameras.
- Setup the [ALARM INPUTS](#) for ignition, indicator L/R, brake, reverse, other...
- Set the POWER OPTION to WAKE WHEN IGNITION “YES”
- Enable AUDIO and set the sensitivity (if mics being used)

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OPTIONAL

- Setup the [SD RECORDING](#) parameters if SD is being used (format SD card)
- Setup the [VIDEO OUTPUT](#) for MAIN to display camera output
- Add vehicle ID / Registration number to the [CAMERA TEXT](#)
- Connect to GPS and/or WiFi router as required.

| |
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6.5.3 Mechanical Data

(Measurements show in mm)

X500

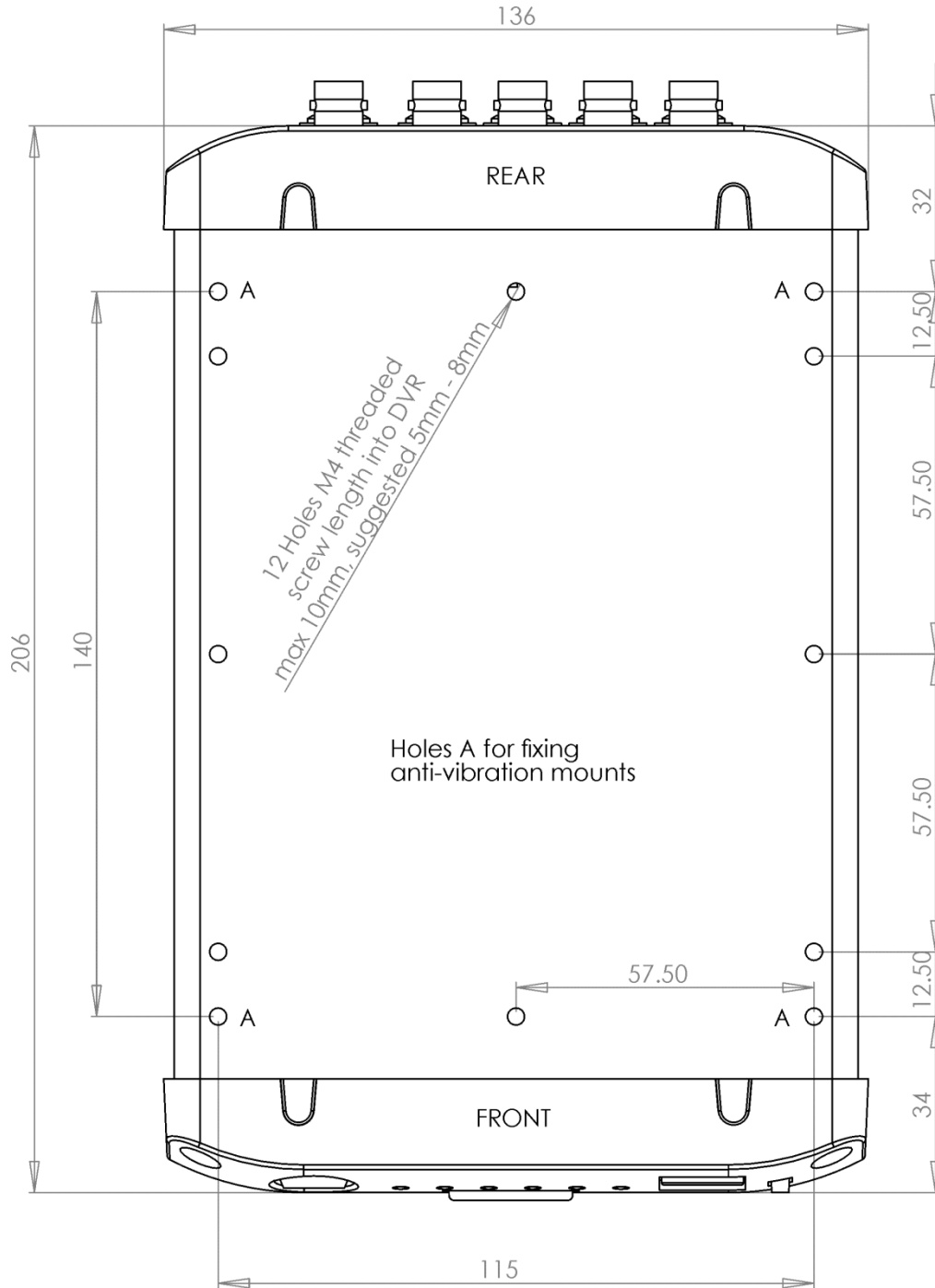


Figure 13 - X500 Mechanical Data

R500

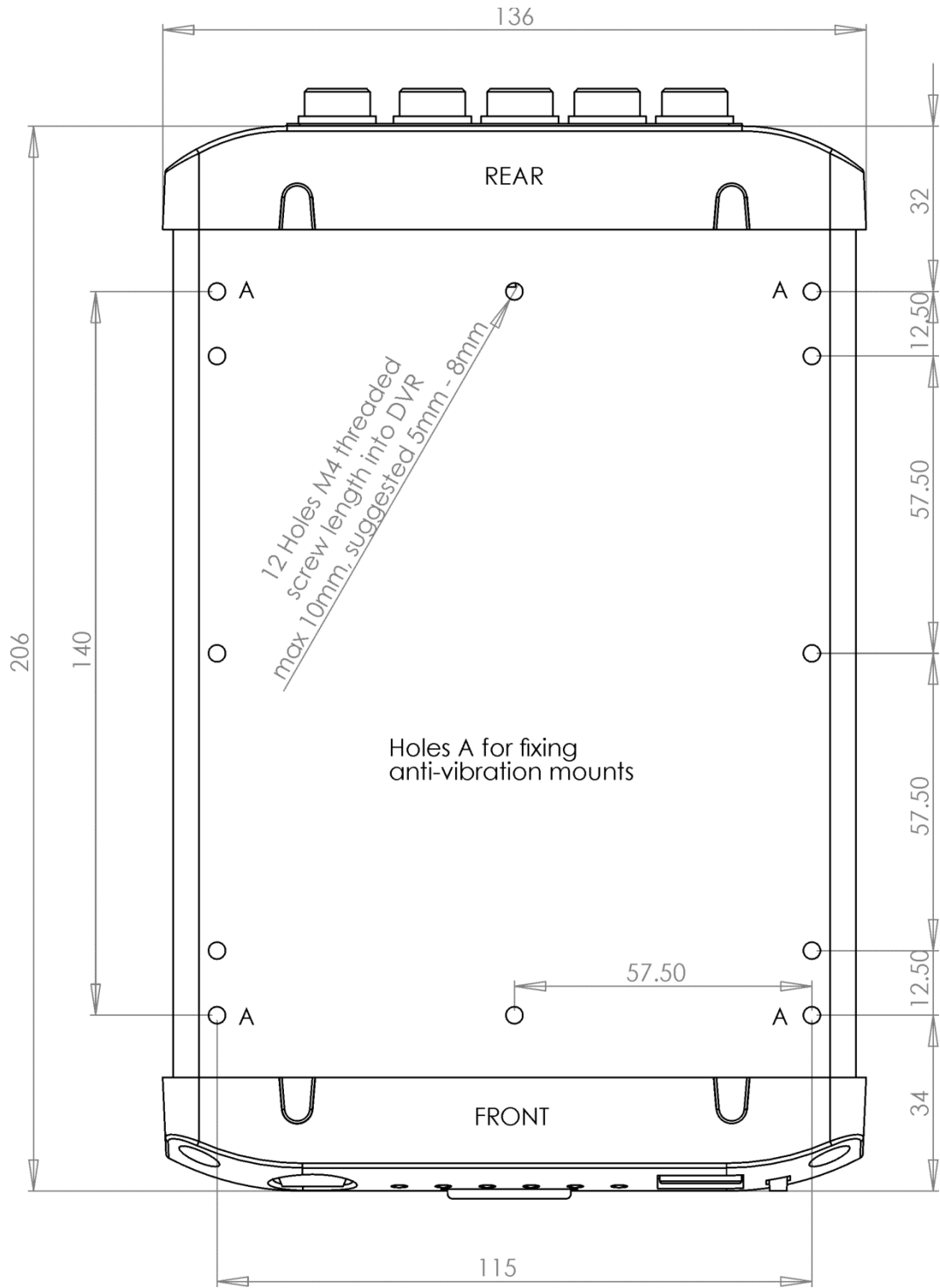


Figure 14 - R500 Mechanical Data

6.5.4 Mounting kits

The R500 comes pre-mounted on the Timespace Vehicle Mounting Plate system (Timespace product number T907).

The X500 is delivered un-mounted. Timespace can provide 2 different kits for mounting the X500 in mobile installations subject to shock and vibration. Please adhere to the following instructions for the installation of the mounting kits, as failure to do so may result in the kits not working correctly.

6.5.4.1 Timespace T408 Vehicle Mounting System

| Quantity | Description |
|----------|--|
| 4 | Wire Rope Mounts |
| 1 | Stabiliser Coupling |
| 8 | M4 x 12mm Counter-Sunk Hex-Head Screws |

In addition you will require a standard 'L' shaped hex key. This is essential, as when all of the other screws have been tightened, there is no room for any other tool to tighten the front lower pair of screws.

Mounting Hole Preparation

Drill four mounting holes to attach the Wire Rope Mounts. If you intend to use the M4 x 12mm screws into blind holes, then the holes will have to be drilled and tapped to accept an M4 screw, with a thread depth of no less than 8mm.

If mounting the Wire Rope Mounts through a metal plate, then longer screws may have to be used in order to allow a washer and nut to be attached on the other side of the plate. The length of these screws will have to be chosen depending on the thickness of the plate and the height of the washer and nut.

Please note that any screw used for mounting the wire rope mounts to an enclosure surface must have an M4 thread and have a counter-sunk hex-head.

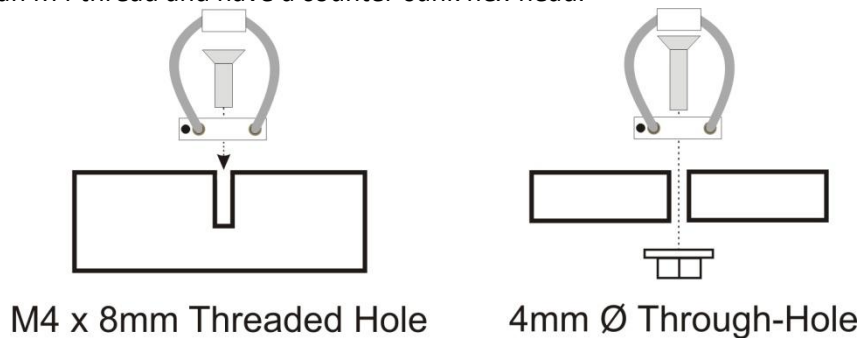


Figure 15 - Vehicle Mounting System - Mounting Hole Preparation

Mounting Hole Location

The mounting holes must be drilled on 140mm and 115mm centres (Figure 13 - X500 Mechanical Data).

Installation Procedure

It is advised that some form of thread-lock compound should be used on the screws securing the wire rope mounts to both the DVR and mounting surface. This is in order to prevent loosening due to vibration. **WARNING** - Ensure only a small amount of adhesive is added to the screw points. Excessive amounts will leak onto the circuit board and damage components.

Attach the Wire Rope Mounts to the DVR with four of the countersunk M4 hex-head screws provided and L-shaped hex key. When attaching the rear pair of mounts please ensure that the stabilizer is 'sandwiched' between the mounts and the DVR by aligning the stabilizer holes with the mounting holes in the DVR.

Please note that the 'open' end of the C-shaped plastic stabiliser should be attached to the rear wire rope mounts and face backward – see Figure 16 - Wire Rope Mounts.

Once all of the Wire Rope Mounts have been securely attached to the DVR, use a pair of countersunk M4 hex-head screws to attach the bottom 'feet' of the front Wire Rope Mounts to the mounting surface/enclosure.

Secure the lower 'feet' of the rear Wire Rope Mounts to the mounting surface/enclosure using the remaining pair of countersunk M4 hex-head screws and a standard L-shaped hex key. Ensure that the stabilizer is 'sandwiched' between the lower feet and the mounting surface/enclosure by screwing through the Wire Rope Mount feet, then the stabilizer and into the mounting surface/enclosure.

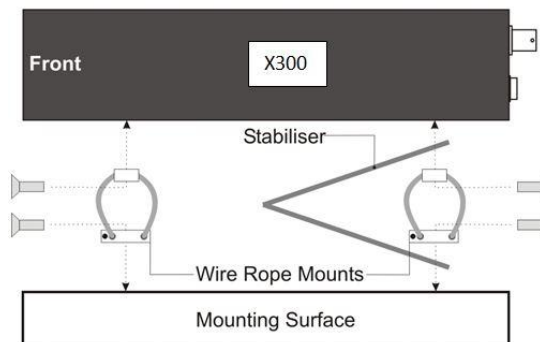


Figure 16 - Wire Rope Mounts

6.5.4.2 Timespace T907 Vehicle Mounting Plate System

Inventory of parts

| <i>Qty</i> | <i>Description</i> |
|------------|--|
| 4 | Wire Rope Mounts |
| 1 | Latching plate with pre-drilled holes |
| 1 | Base plate with pre-drilled holes |
| 1 | M8 bolt with shake-proof washer |
| 8 | M4 x 12mm Counter-Sunk Hex-Head Screws |

In addition you will require a standard “L” shaped hex key or a ball-nose hex driver.

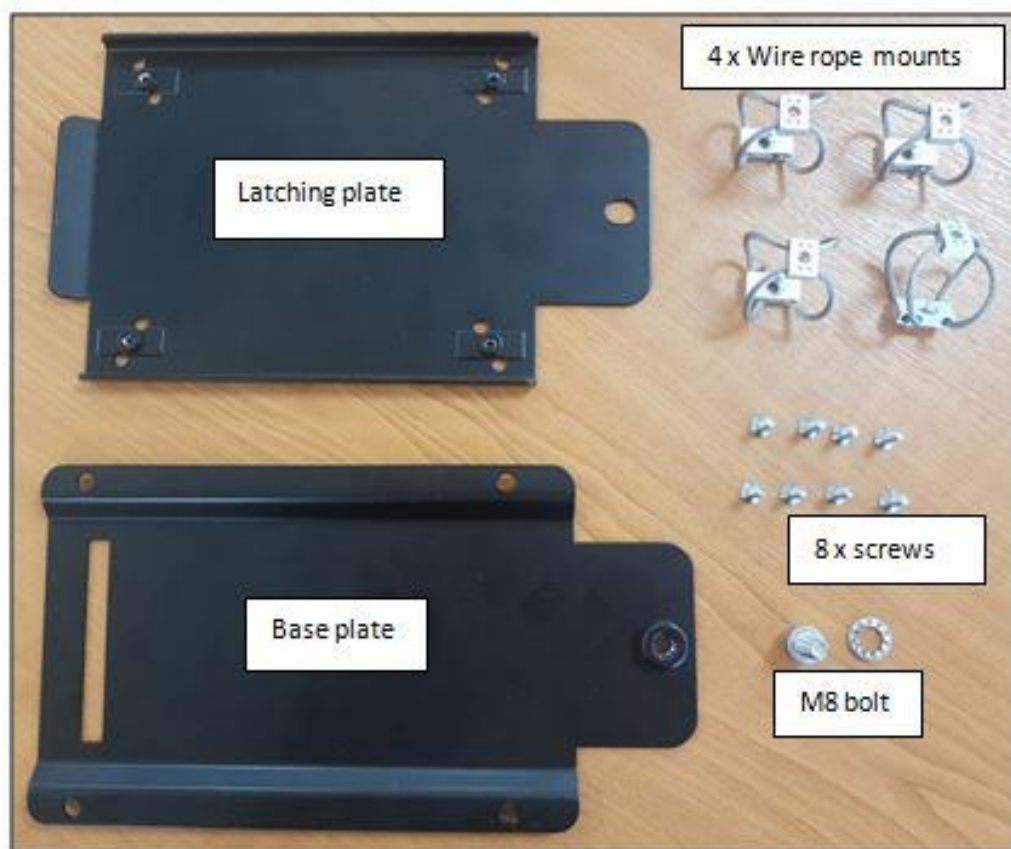


Figure 17 - Timespace Vehicle Mounting Plate System parts

6.5.5 X500 on Vehicle Mounting Plate

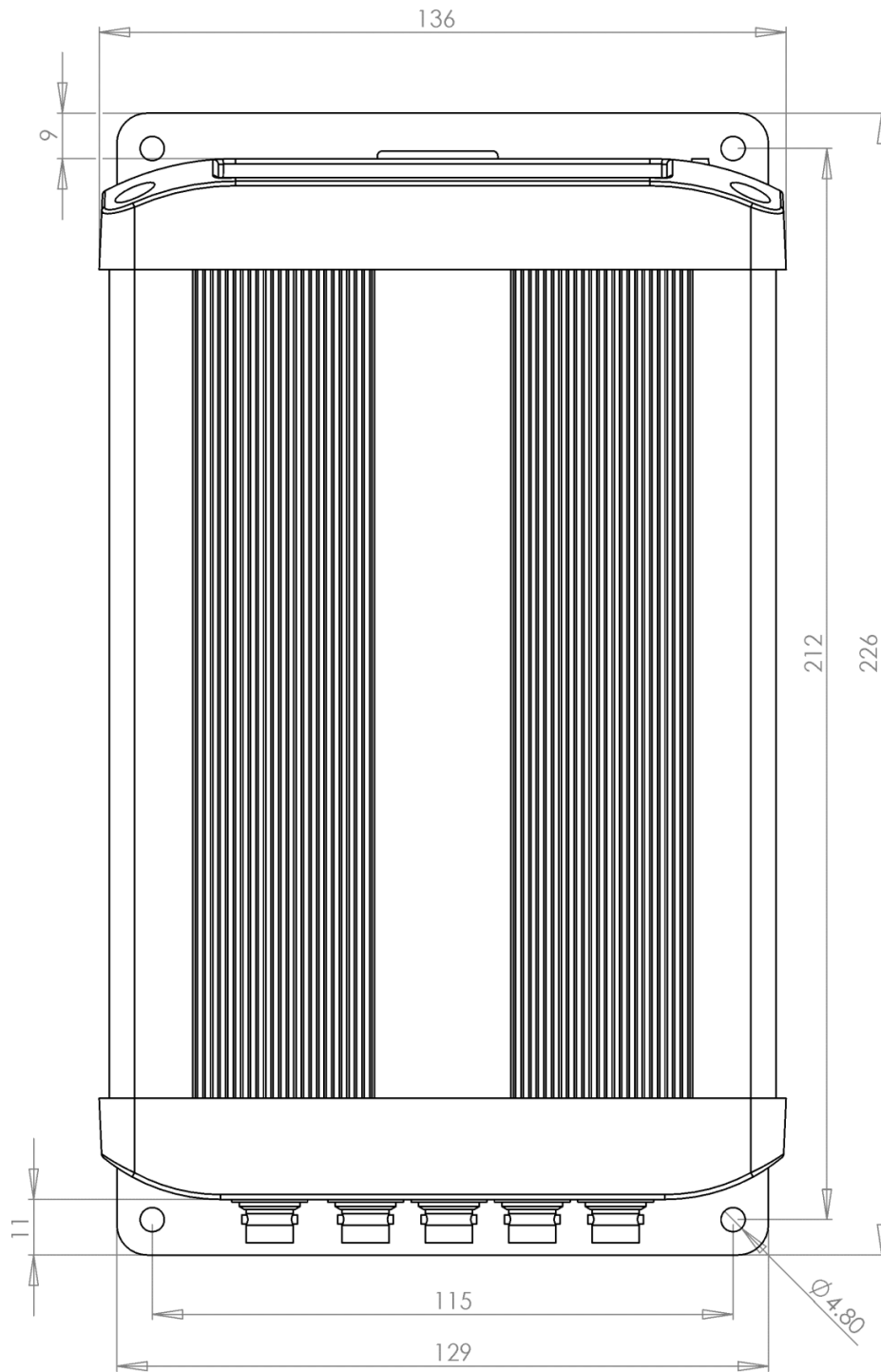


Figure 18 – X500 on Vehicle Mounting Plate – (front-back)

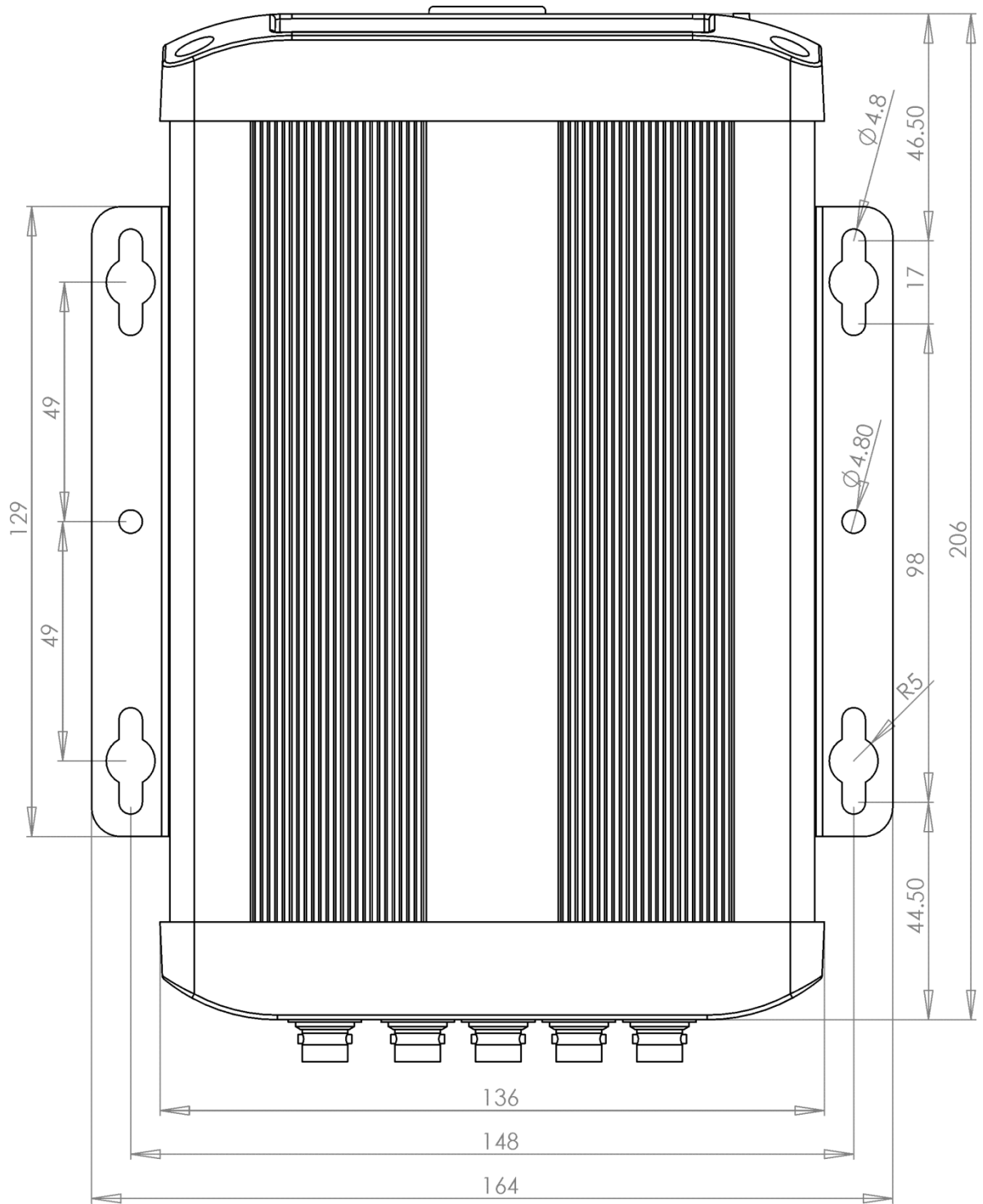


Figure 19 - X500 on Vehicle Mounting Plate (left-right)

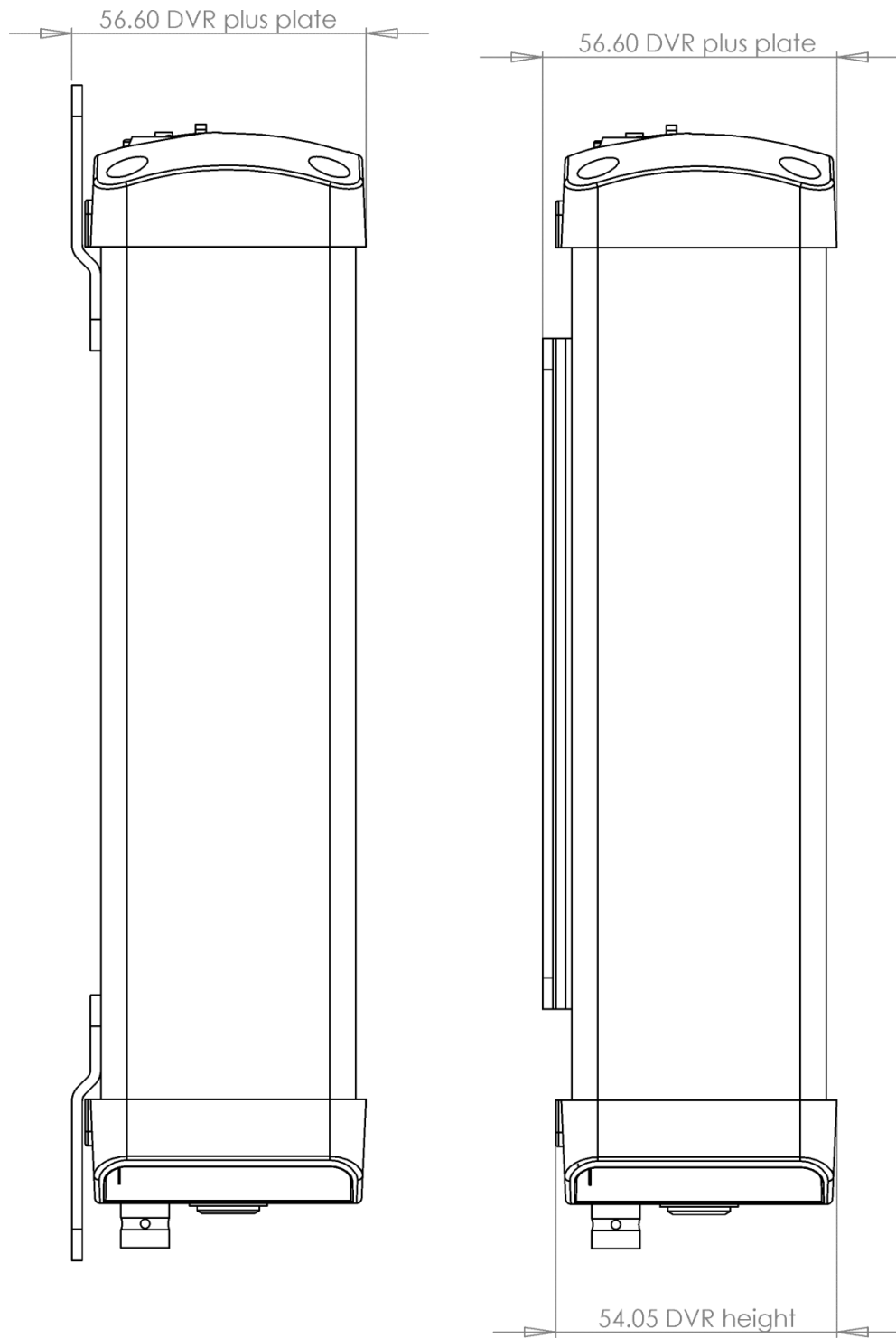


Figure 20 - X500 on Vehicle Mounting Plate (side)

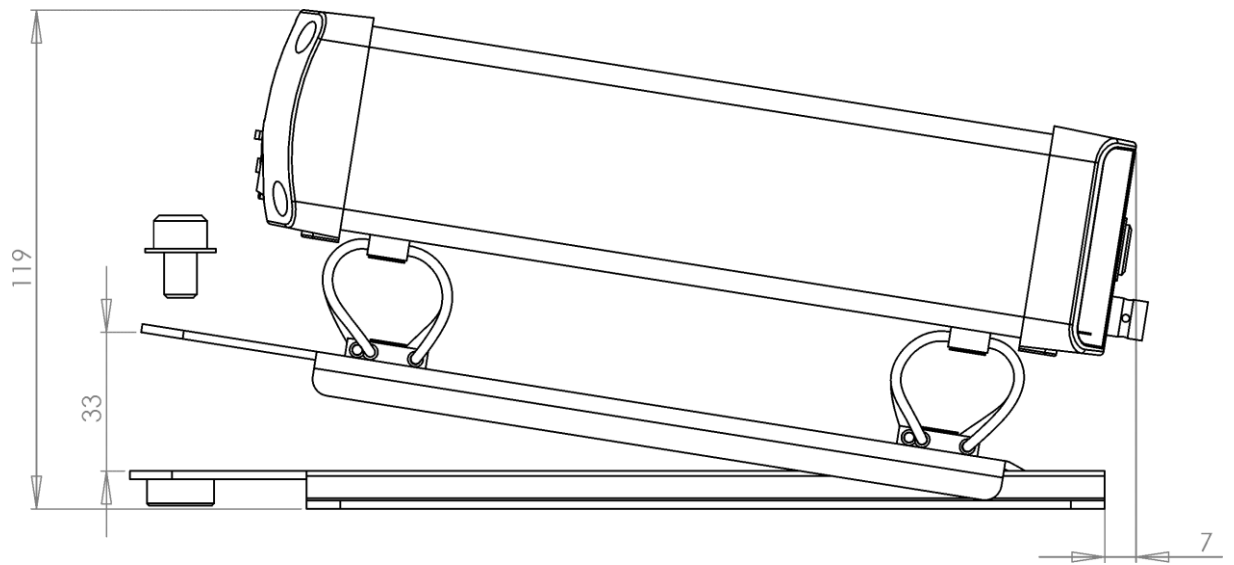


Figure 21 - X500 on Vehicle Mounting Plate – open

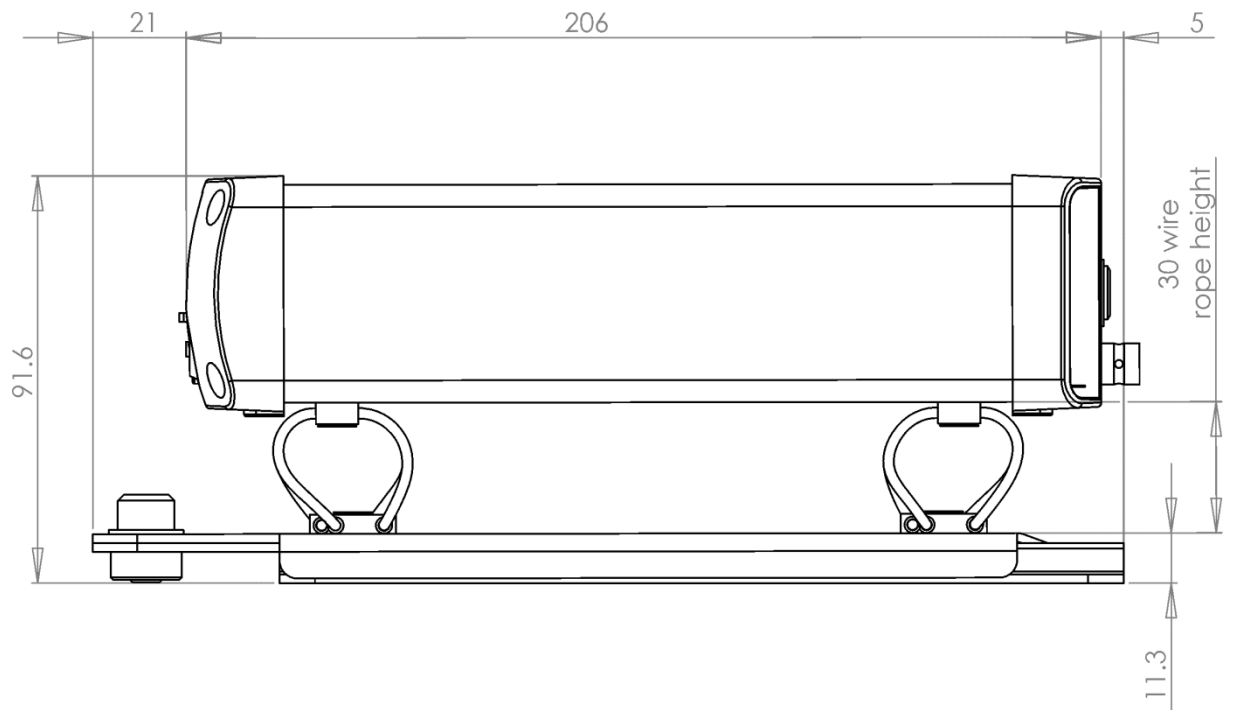


Figure 22 - X500 on Vehicle Mounting Plate – closed

6.5.6 R500 on Vehicle Mounting Plate

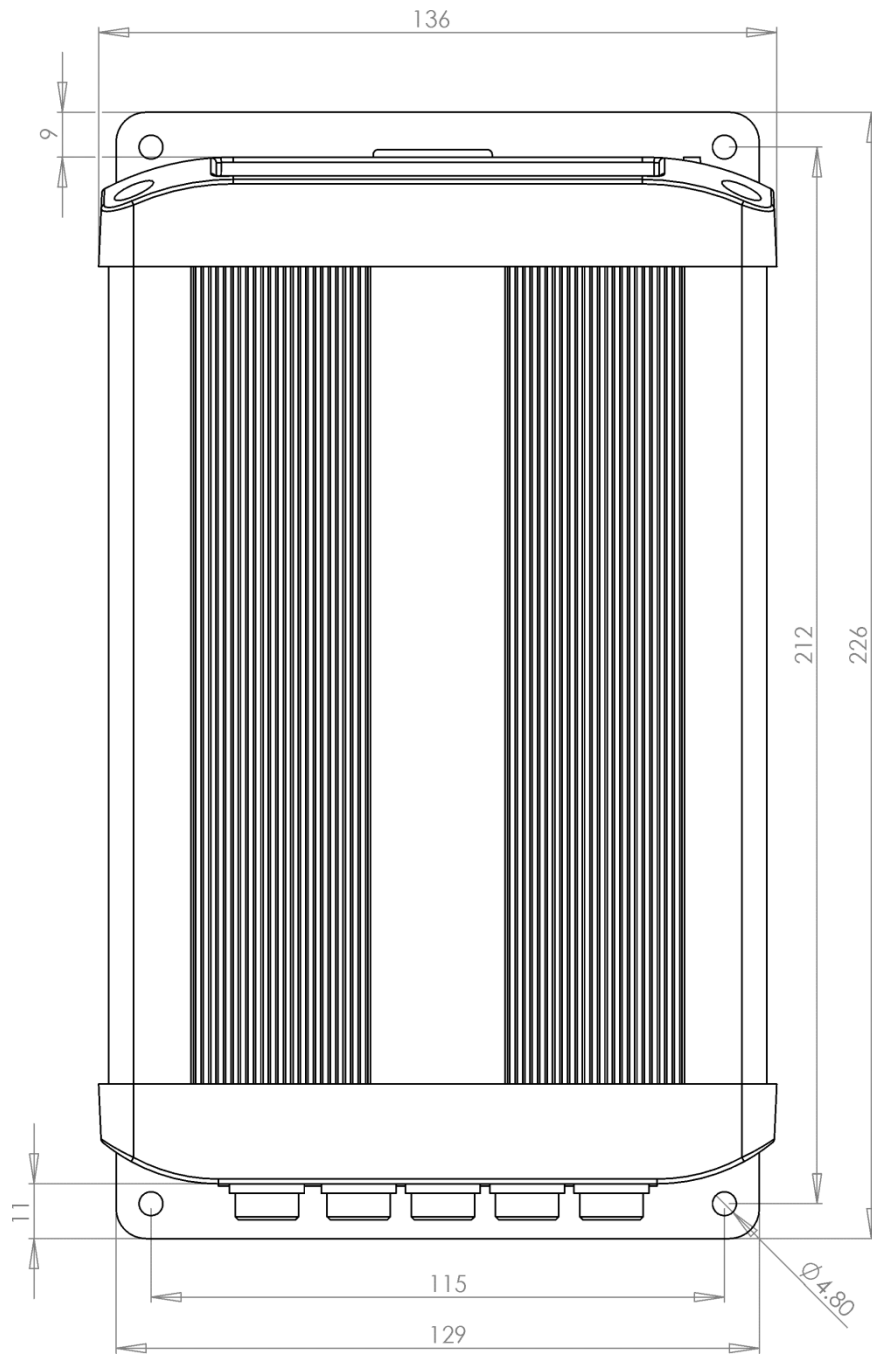


Figure 23 - R500 on Vehicle Mounting Plate (front-back)

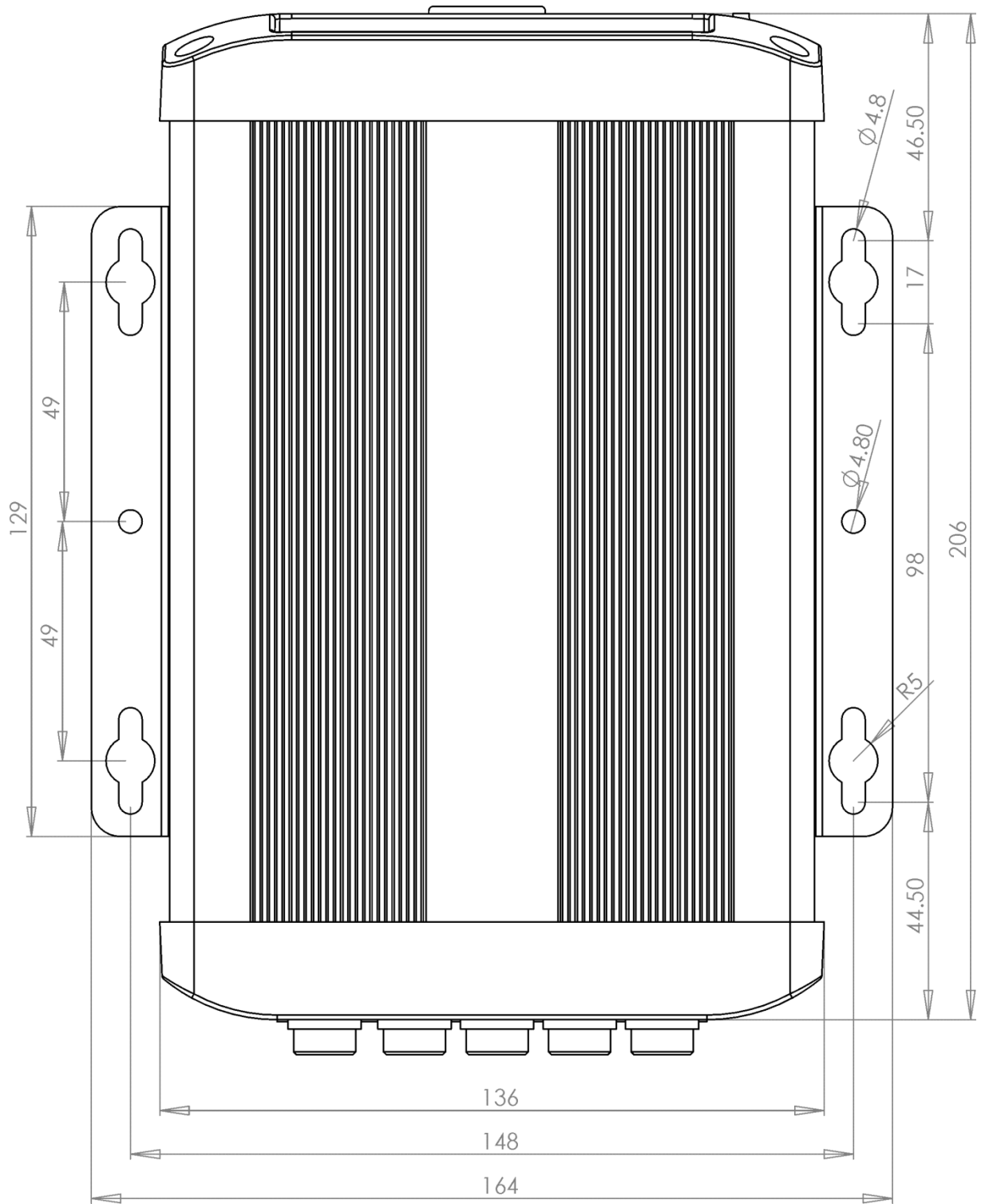


Figure 24 - R500 on Vehicle Mounting Plate (left-right)

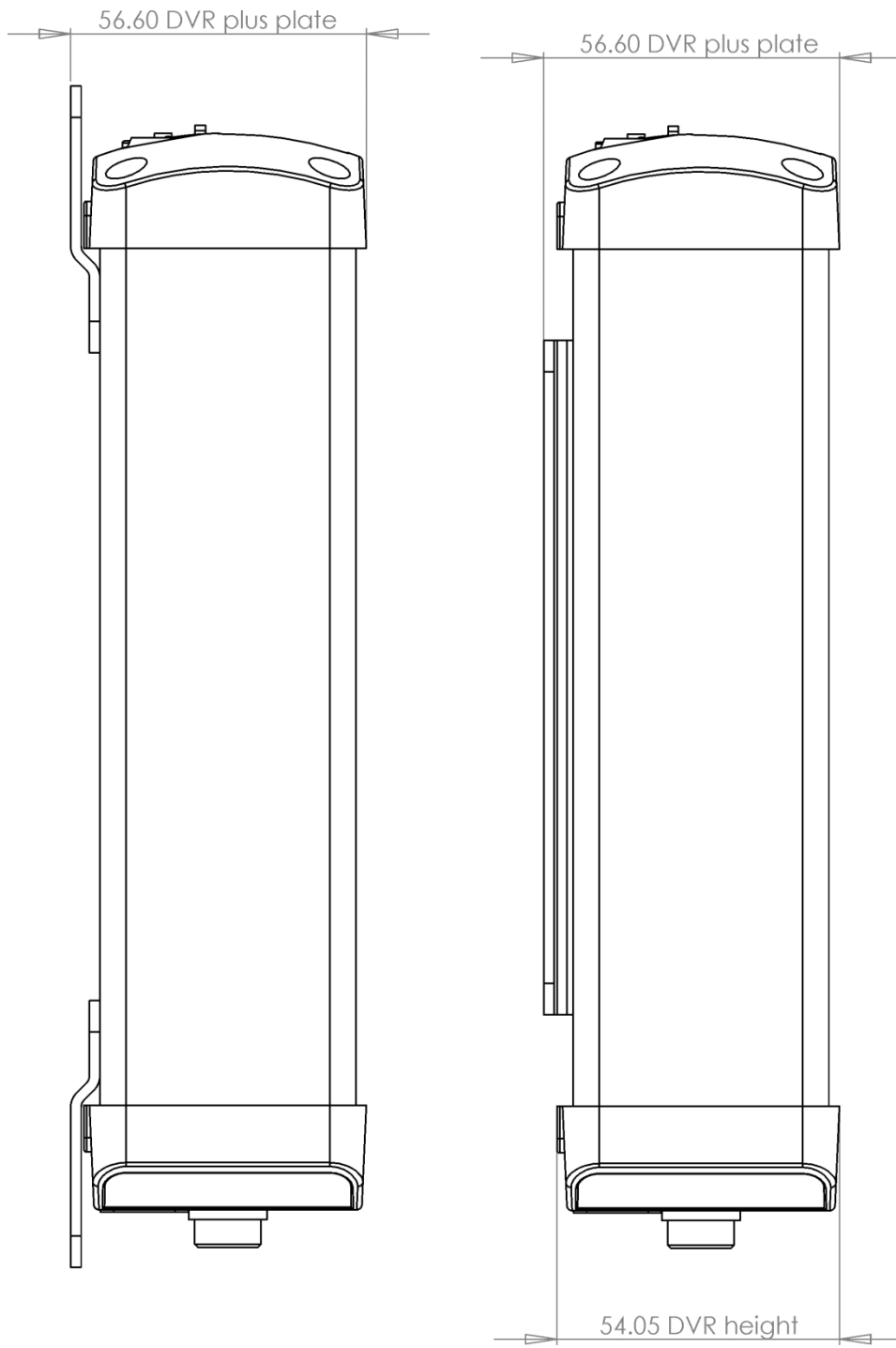


Figure 25 - R500 on Vehicle Mounting Plate (side)

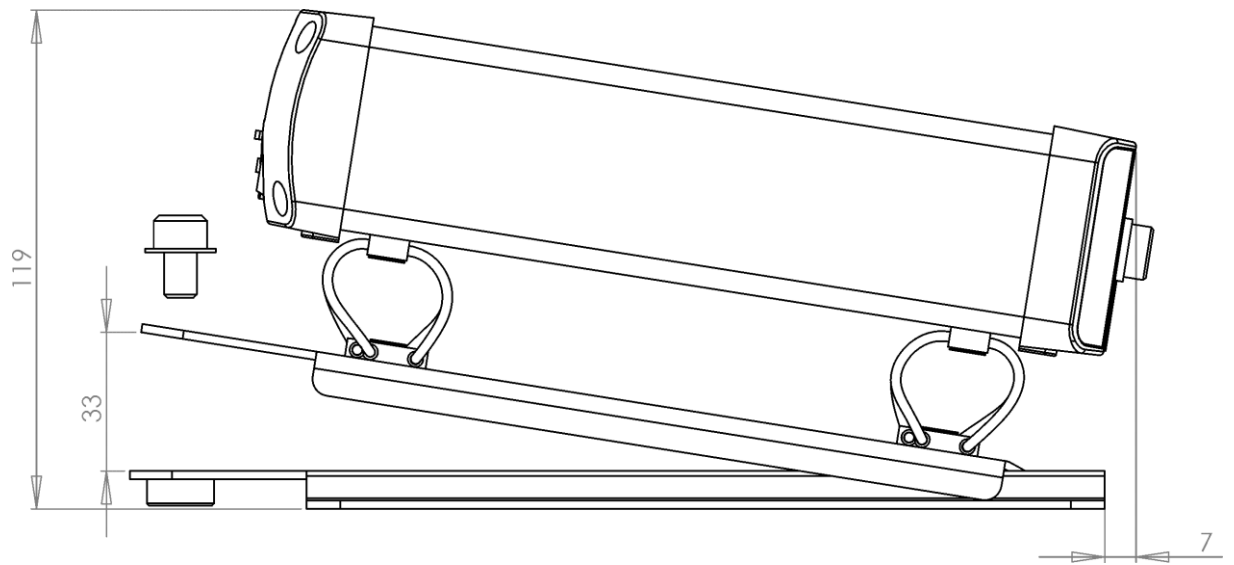


Figure 26 - R500 on Vehicle Mounting Plate – open

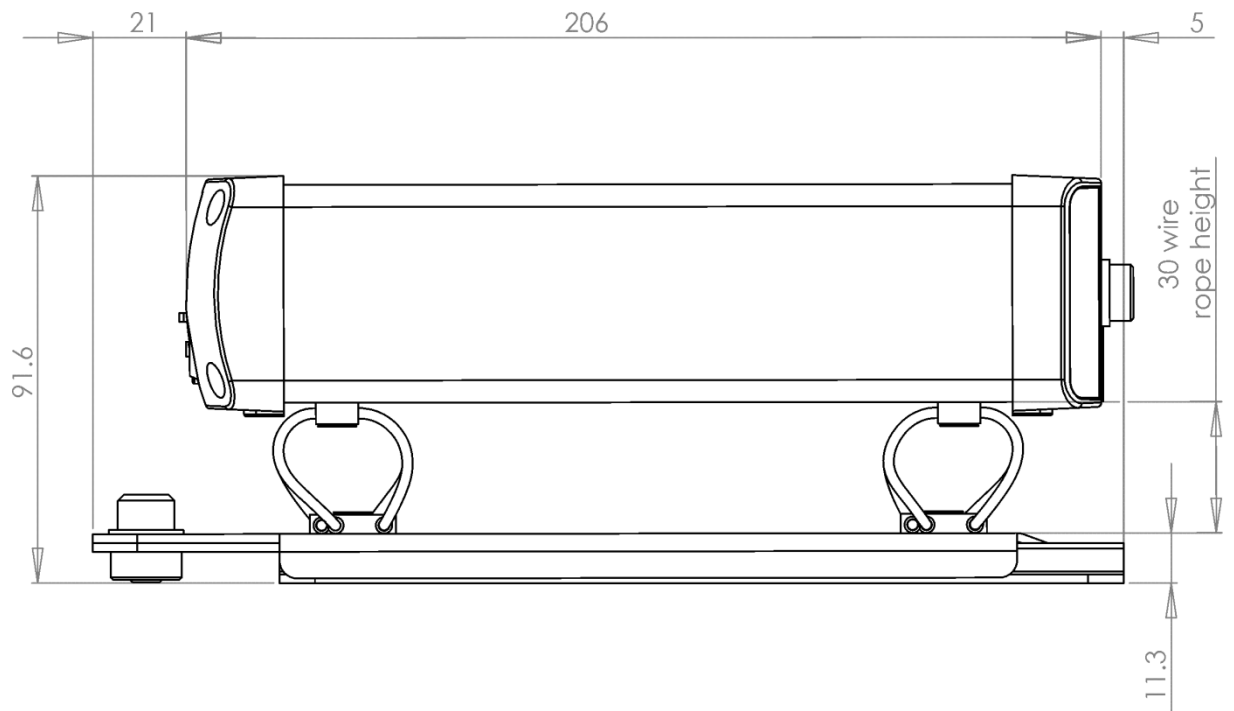


Figure 27 - R500 on Vehicle Mounting Plate - closed

6.5.7 X500 and R500 – Final Mounted Clearances Required

It is necessary to allow a clearance around the body of the DVR when mounted on the Vehicle Mounting Plate System, see below. This is to allow free movement of the DVR on the anti-vibration mounts and to prevent collision with either the enclosure or peripheral systems due to vertical and lateral movement under extreme shock and vibration conditions.

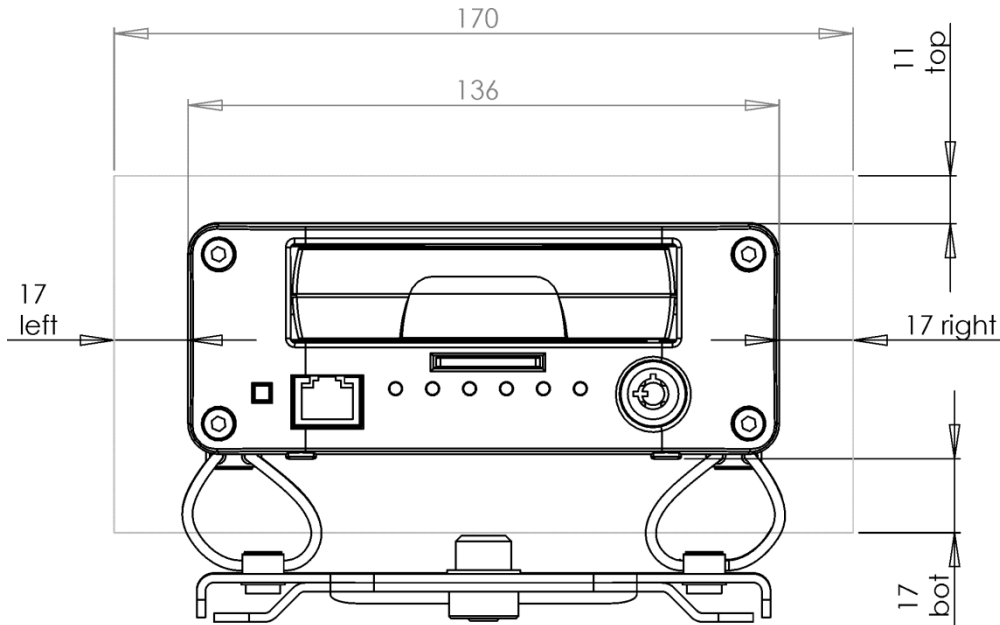


Figure 28 - X500 on Vehicle Mounting Plate – final mounted clearance (front)

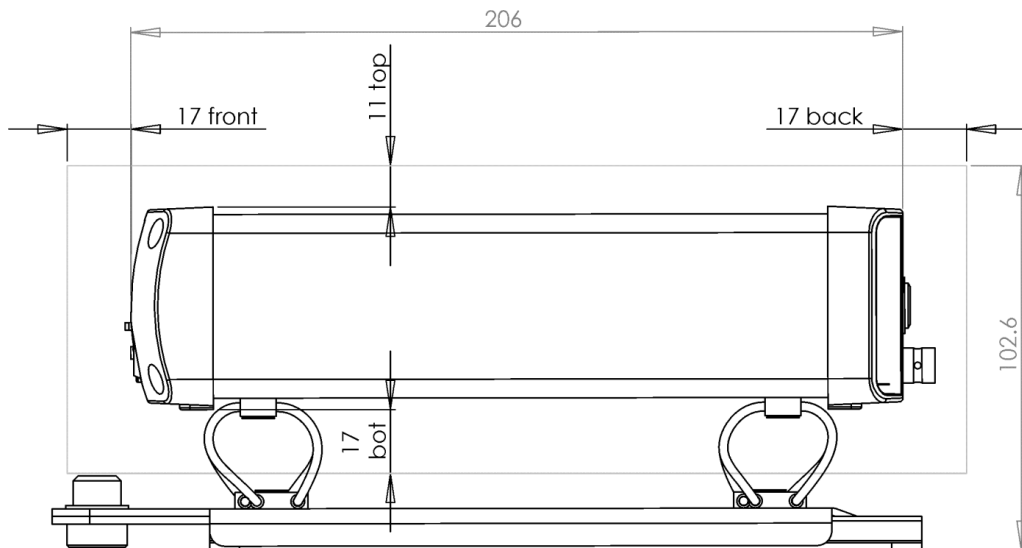


Figure 29 - X500 on Vehicle Mounting Plates - final mounted clearance (side)

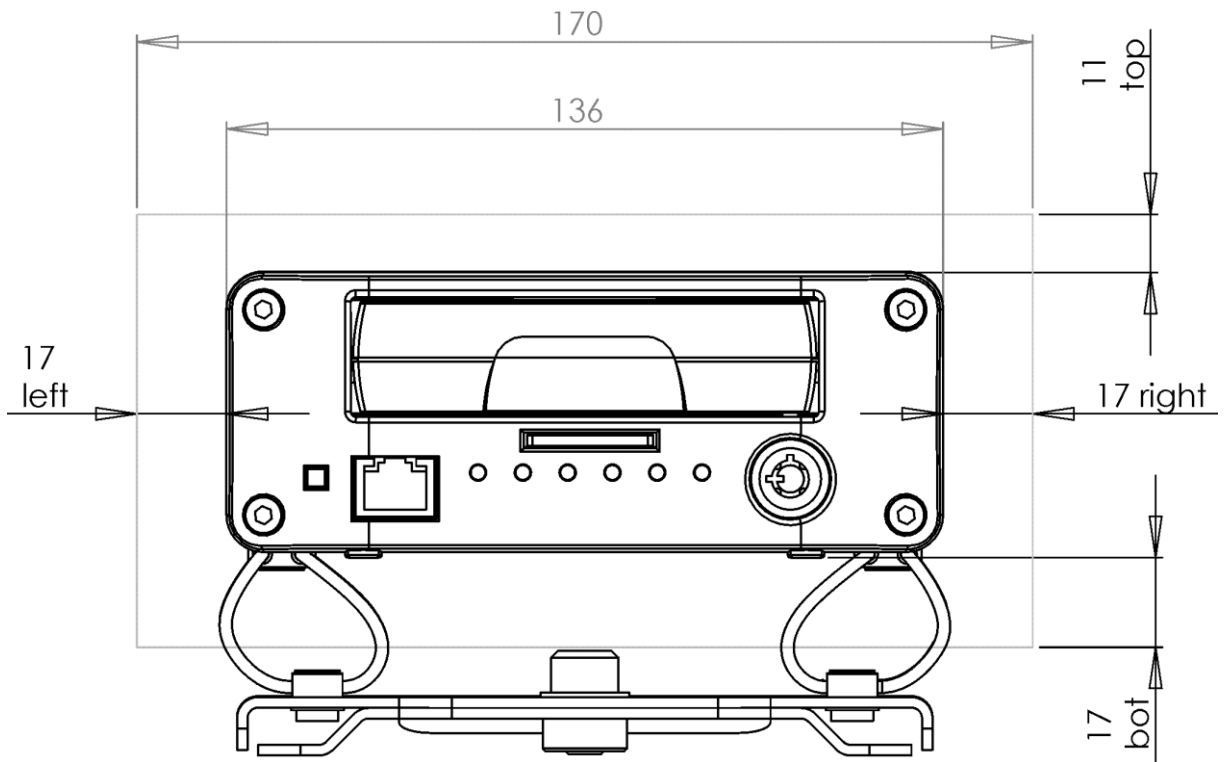


Figure 30 - R500 on Vehicle Mounting Plates - final mounted clearance (front)

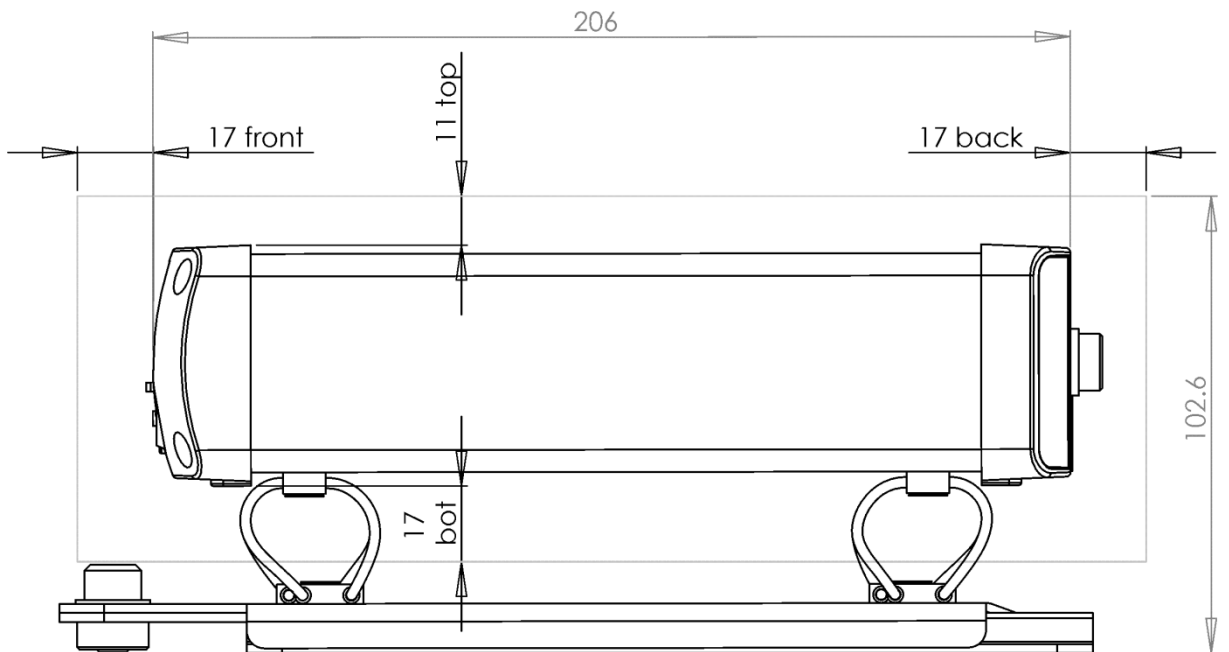


Figure 31 - R500 on Vehicle Mounting Plates - final mounted clearance (side)

6.5.8 Installation Spare Parts List

X500 Spare Parts

Green Block

Power In/ Alarm In/ Alarm Out/LEDs Toby MC420-381-12

Power Out/ Aux Vid Out/ CAN/ GPS Toby MC420-350-12

Camera Input

IP Cameras RJ45 Plug Ethernet Cable

SD Cameras BNC Plug 75 ohm coaxial cable

Audio

Mic. inputs/ Audio out 4-Way Mini XLR Socket Farnell 1715955

R500 Spare Parts

Green Block:

Power In/ Alarm In Toby MC420-381-12

Power Out/ Alarm Out/ CAN/ GPS Toby MC420-350-12

Camera Input

IP Cameras RJ45 Plug Ethernet Cable

SD Cameras 4-Way GX12 Aviation Straight Socket (female) Renhotec GX12-A-4S

7. Service And Maintenance

7.1 Maintenance

There is no requirement for regular maintenance or returning the DVR to Timespace Technology.

There are no user-changeable parts in the DVR. The battery in the DVR is designed for a life in excess of 15 years.

7.2 Service And Fail LED

The Service and Fail LEDs on the DVR front panel give a positive indication that a system fault has occurred.

If the Service LED is lit then the system will most likely be functional but may not be performing as intended. An example may be one of the cameras has failed.

If the Fail LED is lit then the system will not be functioning and requires immediately attention. An example may be that the hard disk cartridge has failed.

The Service/Fail conditions are stored on the DVR for review. Each condition has an identifiable code and associated description. The service log can be viewed here; SETTINGS MENU > ADVANCED > [VIEW SERVICE LOG](#) menu.

The LED will remain lit and the problem which caused the Service LED to light will be listed in the log until the log is reset by selecting RESET SERVICE LOG.

A full list of [Service Codes](#) is in the table on the next page.

7.3 Service Codes

| SERVICE CODE / NUMBER | DESCRIPTION |
|----------------------------|--|
| SERV_CAMOPEN | 1** No current on power input to camera ** and no camera signal. |
| SERV_CAMSHORT | 2** Over-current on power input to camera ** and no camera signal. |
| SERV_CAMSIGNAL | 3** Camera disconnected for cameras 1-16 => codes 301-316. |
| SERV_CAMTYPE | 4** Check camera 1-16 /camera type unknown => codes 401-416. |
| SERV_CAMDISC | 811 Camera disconnected for camera. |
| SERV_HDDSMART | 812 S.M.A.R.T Info. |
| SERV_LOWFPS | 813 FPS lower than threshold. |
| SERV_TIMEERROR | 815 Time error. |
| SERV_RTC_ERROR | 816 RTC error. |
| SERV_CHECKSIM | 817 Modem send error - check simcard. |
| SERV_DIAL_OUT_FAIL | 818 Modem error - dial out failed (image over gsm). |
| SERV_SMTP_FAIL | 819 SMTP error - failed to send email. |
| SERV_MAIN_VOUT | 820 Incorrect voltage on Main video output. |
| SERV_AUX1_VOUT | 821 Incorrect voltage on Aux1 video output. |
| SERV_AUX2_VOUT | 822 Incorrect voltage on Aux2 video output. |
| SERV_AUX3_VOUT | 823 Incorrect voltage on Aux3 video output. |
| SERV_EXT_LOG | 835 External control log (ext command). |
| SERV_CAMDISC_REPEAT | 840 Intermittent camera connection. |
| SERV_USR_RESET | 863 Log reset by user. |
| SERV_HDD_DELETE_FILES | 864 Operation to delete all recording files on HDD did not complete. |
| SERV_HDD_SECURE_WIPE | 865 Secure disk wipe on HDD did not complete. |
| SERV_SD_DELETE_FILES | 866 Operation to delete all recording files on SD did not complete. |
| SERV_SD_SECURE_WIPE | 867 Secure disk wipe on SD did not complete. |
| SERV_BRIDGE_ALERT_NC | 868 Bridge Alert controller is not connected. |
| SERV_UNSAFE_SHUTDOWN | 870 Unit was not shutdown gracefully. |
| SERV_LOW_BATTERY | 897 Low battery detected (<= 11.0V) |
| SERV_ACC_NO_CALIBRATION | 898 Accelerometer not calibrated. |
| SERV_NOTRECORDING | 899 special for IBUS - not recording |
| SERV_FAIL_HDD_PACKET_WRITE | 900 HDD packet write fail. |
| SERV_FAIL_HDD_PACKET_READ | 901 HDD packet read fail. |
| SERV_FAIL_HDD_SECTOR_WRITE | 902 HDD sector write fail. |
| SERV_FAIL_HDD_SECTOR_READ | 903 HDD sector read fail. |
| SERV_FAIL_SD_READ_WRITE | 904 SD card read/write fail. |
| SERV_FAIL_SD_FAIL | 905 SD card failure (replace and format SD card.) |
| SERV_FAIL_SD_ERROR | 906 SD card error (replace SD card.) |
| SERV_FAIL_H264_CODEEC_0 | 907 H264 Codec (0) Error (rebooting). |
| SERV_FAIL_H264_CODEEC_1 | 908 H264 Codec (1) Error (rebooting). |
| SERV_FAIL_LOW_BATTERY | 909 Low battery - recorder stopped. |

| | | |
|-------------------------|-----|---|
| SERV_FAIL_HDD_DIR_FULL | 910 | HDD full, failure to create file on Hard Disc. |
| SERV_FAIL_SD_DIR_FULL | 911 | SD card full, failure to create file SD Card. |
| SERV_FAIL_IPCAM_IPERR | 912 | IP Camera address incorrectly configured, doesn't match VLAN2 subnet. |
| SERV_FAIL_H264_CODEEC_2 | 914 | H264 Codec (2) Error (rebooting). |
| SERV_FAIL_H264_CODEEC_3 | 915 | H264 Codec (3) Error (rebooting). |
| SERV_FAIL_QUOTA_TEST | 998 | In-house fail quota testing. |

8. Software

8.1 X500/R500 Software and Updates

Timespace recorders use proprietary embedded software in the form of **.XOS** files. Software updates for Timespace DVRs and PCLink Suite are available through authorised distributors or by contacting Timespace support at support@tspace.co.uk. From PCLink V7.2 onwards, DVR software updates can be automatically downloaded within [PCLink](#).

Software can be uploaded to the DVR by copying an XOS file onto the removable cartridge using the PC/USB interface, then inserting the cartridge into the recorder and navigating to the relevant menu (see below). An example of the .XOS file name is **X500 V1.1.0.xos**

8.1.1 Software Upload

1. Using the USB interface kit, copy the .XOS file from the PC to the cartridge, ensuring that no other XOS files exist on the disk.
2. Insert the cartridge into the DVR and turn the key lock to the locked position.
3. Once the DVR has initialised, use the [Reviewer](#) to navigate to the SETTINGS MENU > ADVANCED > and select [LOAD SOFTWARE/SETTINGS](#).
4. There are three LOAD SYSTEM SOFTWARE options to choose from;

LOAD WITH FACTORY SETTINGS (all menu settings will be reset to default values).

LOAD WITH CURRENT SETTINGS (menu settings will be maintained where possible).

LOAD WITH XOS SETTINGS (menu settings will be loaded from the cartridge).

In all LOAD instances, the XOS will be loaded from the cartridge into the DVR internal flash memory. The “with cartridge settings” option will also load the *Settings* from the cartridge e.g. if replicating settings from another DVR. The load will take approximately 30 seconds and when the DVR reboots, the current software version is displayed on screen. It can also be checked in the SETTINGS MENU > SYSTEM SETTINGS > SYSTEM INFO menu.

WARNING – THE DVR MAY BECOME UNUSABLE IF POWER TO THE UNIT IS LOST DURING A SOFTWARE UPGRADE.

Software can be downloaded from the recorder to the cartridge. This feature can be used to replicate settings from one recorder to another when setting up multiple units.

8.1.2 Software Download

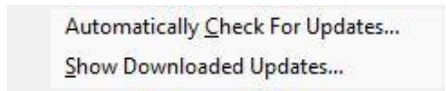
With the cartridge locked in place in the DVR, go to the SETTINGS MENU > ADVANCED and select the [SAVE SOFTWARE/SETTINGS](#) option.

This will save the current DVR Software and Settings to the **current.xos** file on the cartridge. The cartridge could then be used in another DVR to load the Software and Settings (using the above LOAD WITH XOS SETTINGS option). Also, the current.xos file could be copied from the cartridge onto a PC using the USB kit and kept as a master settings file.

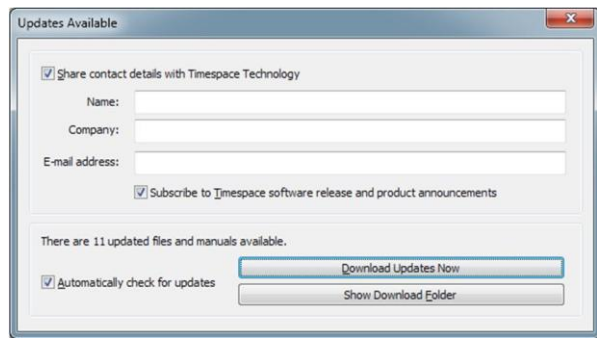
8.1.3 Loading software from PCLink

PCLink Suite V7.2 onwards includes a software download feature for acquiring the current and future software release for PCLink Suite and Timespace Digital Video recorders.

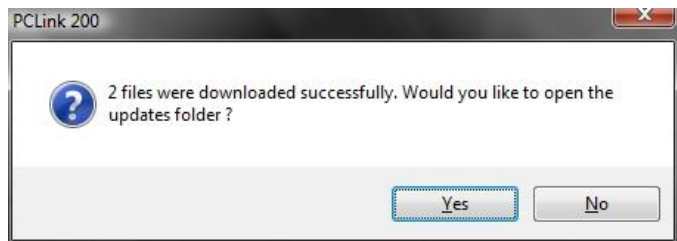
From the **Help** menu within PCLink, select **Updates** and choose from the following;



Check for Latest Unit Updates... PCLink will connect to the internet and check for updates for PCLink and DVR software. If this is the being run for the first time, updates will be found and downloaded. If on subsequent checks no new versions are available, the download will be skipped. Some basic user information will be collected and the option to be included in future software and product notifications.

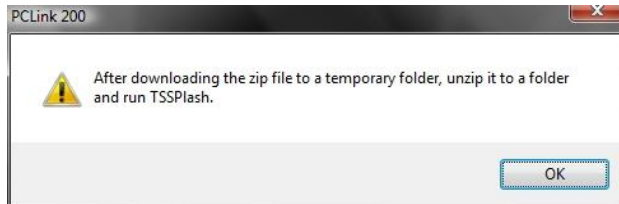


Show Downloaded Updates... PCLink will open the local folder that the updates were downloaded to.

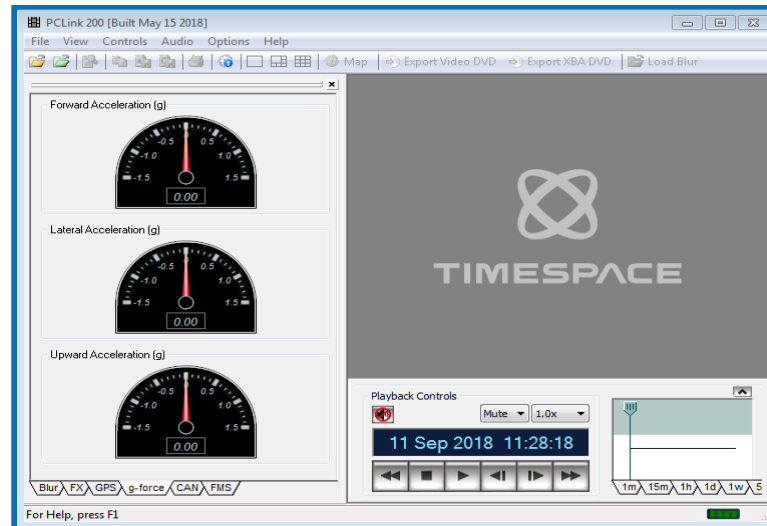


If updates are available for Timespace DVRs, the downloaded **.xos** files will be stored in the DVR sub folder e.g. *Update\X300\X300 V1.5.0.xos*

If a PCLink Suite update is available it will be downloaded as a .zip file using the PC's Internet browser, giving the user the opportunity to **save** the file to their preferred folder. Once complete, the file must be unzipped to a temporary folder and **TSSplash.exe** run (double clicked). This will initiate the PCLink installer.



8.2 PCLink Suite



Timespace PCLink Suite consists of applications that allow Playback, Live View, Configuration and Download of recorded files from Timespace digital video recorders.

Detailed instructions of each application within PCLink Suite can be found in the PCLink Suite manual, available on our website www.tspace.co.uk

NB: Connection of an IP Camera to enable Remote Live View (ie viewing camera images and/or menu settings on remote DVR units) will reduce the available IPS for other recording methods. For further details see [RESOURCE ALLOCATION](#) and [RESOURCE ALLOCATION MENU](#).

Application overview;

- PCLink200 - Review recorded footage via USB cable connected to removable cartridge.
- Review recorded footage over IP connection to the DVR.
- Live view of cameras (multi channel support).
- Remote configuration of DVR menu settings.
- Download file remotely (separate FTP client can also be used to download files).
- Remotelink - Review recorded footage over GSM / IP connection to an X200.
- Live view of cameras (single channel support).
- Remote configuration of X200 menu settings.
- LANLink - Automatic Health checking over IP connection.
- Automatic and scheduled downloading of footage.
- XCommunicate - Download X200 files remotely (single file download support).

Final page of main manual

9. Appendices

APPENDIX 1 – X500 and R500 specifications and technical data



| Performance | | Security Features | |
|--|------------------------------------|---|---|
| PAL/NTSC (analogue) Cameras | | <ul style="list-style-type: none"> Proprietary single file video format XBA User and Admin password protected functions Each image watermarked (SHA-2 AES Authentication - 256 bit) Embedded camera number, date and time in each image 12 user programmable embedded characters per channel | |
| Video recording global image rate (analogue only) | 100 FPS | Optional Features | |
| Analogue video inputs | 4 | <ul style="list-style-type: none"> 25 FPS global SD dual recording - SDHC 4GB up to 32GB 24 hours loop recording at 25 FPS super, to SD card No Audio) File download via SD card Wi-Fi / 3G / GPRS router CANLink data recording (view in sequence with recorded footage) | |
| Image rates Min - Max | 1 - 25 FPS PAL, 1 - 30 FPS NTSC | Connections / Interfacing | |
| Image Resolution (pixels) | 2QF - 720 x 288 2GF - 720 x 240 | Analogue Camera | 4 BNC Plug |
| IP Cameras | | IP Camera | 4 RJ45 with PoE |
| Image bit rate - quality setting | 50 - 200 mbits / image | Video out (Main and Aux) | 1 BNC Plug, 1 Screw terminal |
| IP video inputs | 4 | Audio microphone in | 4 Mini XLR |
| IP Camera Resolution | 1080p, 4k & higher | Audio line out | 1 Mini XLR (4 output) |
| Image rates Min - Max | 1 - 30 FPS | Timespace reviewer | 1 RJ45 |
| IP Cameras (global bit rate max) | 100 Mbits/s | LAN WLAN/3G | 1 RJ45 with PoE |
| Audio | | GPS/RS232 | Screw terminal |
| Audio microphone input | 4 | Alarm inputs | Screw terminal |
| Audio line out | 4 | Alarm/LED output | Screw terminal |
| Other | | Power input | Screw terminal |
| Video out | 2 | Power output | 12V and 5V Screw terminal |
| Video Streaming Live view - multi channel | 25 FPS via RTSP | Physical Characteristics | |
| SD Card recording rate - multi channel | 25 FPS | Enclosure | Extruded Aluminium, with moulded end caps |
| Hard disk capacity options | 500Gb, 1TB, 2TB, 3TB, 4TB | Dimensions (mm) | 200(l) x 130(w) x 53(h) |
| SD card capability | 4-32GB | IP rating | IP50 |
| G Sensor | 3 axis | Operating temperature range (temperature sensor enabled) | -10 to 50°C |
| Alarm input | 6 selectable 2V - 24V Level | Humidity | 10 - 90% r.h., non condensing |
| Alarm output | 1 relay, 2 logic out | Mounting plate hardware (included) | Screw-mounted any axis orientation |
| General Features | | Power supply input | 10 - 30V DC polarity protected |
| <ul style="list-style-type: none"> Auto record on power-up or single button start/stop recording Recorder status indicators (6 LEDs) Simultaneous record, live view and file download H264 (MPEG-4 Part 10) compression Removable hard disc media cartridge - lockable Simple, intuitive menu system with help screens Optional embedded GPS for position & speed Normal, alarm and motion-triggered recording Vehicle data recording 7 day programmable timer recording Local set-up and configuration using Timespace Reviewer Remote control via RS232 interface Timer shutdown for power saving wake up on motion for security PTZ camera control for remote viewing Short circuit protection - video inputs Multi ranging PSU with power monitoring diagnostics | | Continuous power - without Reviewer | tbc |
| PCLink/LANLink | | Continuous power - camera on (typical) | tbc |
| <ul style="list-style-type: none"> Remote set-up via LAN or Wi-Fi connection File download via Ethernet (FTP) PC Multi Cam LiveView (analogue only), playback, via optional Wi-Fi or 3G router Image search by time/date or file name - PCLink Quick review alarm event footage markers Camera and DVR health check via simple traffic-light colour indicators | | Continuous power - without Reviewer and in sleep mode | tbc |
| | | Maximum current - start-up | 1.5A with camera and reviewer |
| | | Continuous power (maximum) | 60W Ancillary equipment dependent |
| | | PoE Camera continuous power (maximum) | 20W IP camera dependent |
| | | External power output | 5V DC 1A / 12v 1.2A |
| | | Weight - including removable cartridge | 1040g |
| | | Regulatory Approvals | |
| | | CE Mark (EN 50932:2012, EN 5034:2010) | |
| | | ISO 9001: 2015 | |
| | | RoHS | |
| | | WEEE | |

Timespace Technology Ltd reserves the right to amend product specifications without notice and without incurring obligation.



TIMESPACE

Timespace Technology Ltd Lakeview Court Ermine Business Park Huntingdon PE29 6JA England

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TT0721 Issue 4



| Performance | | Optional Features | |
|--|------------------------------------|--|---|
| PAL/NTSC (analogue) Cameras | | <ul style="list-style-type: none"> 25 IPS global SD dual recording – SDHC 4GB up to 32GB File download via SD card Wi-Fi / 3G / GPRS router | |
| Video recording global image rate (analogue only) | 100 IPS | Connections / Interfacing | |
| Analogue video inputs | 4 | Analogue Camera | 4 GX-12 Avionics sockets |
| Image rates Min – Max | 1-25 IPS PAL, 1–30 IPS NTSC | IP Camera | 4 RJ45 |
| Image Resolution (pixels) | 2CF – 720 x 288 2CF – 720 x 240 | Video out (Main and Aux) | 1 GX-12 Avionics socket |
| IP Cameras | | Audio microphone in | 1 screw terminal |
| Image bit rate – quality setting | 50 – 100 kbits / image | Timespace Reviewer | 1 RJ45 |
| IP video inputs | 4 | LAN WLAN/3G | 1 RJ45 |
| IP Camera Resolution | 1080p, 4k & higher | GPS/RS232 | Screw terminal |
| Image rate Min – Max | 1 – 30 IPS | Alarm inputs | Screw terminals |
| IP Cameras (global bit rate max) | 120 Mbits/s | Alarm relay output | Screw terminal |
| Audio | | Power input | Screw terminal |
| Audio microphone input | 1 | Power output | 12V and 5V Screw terminal |
| Other | | Physical Characteristics | |
| Video out | 1 | Enclosure | Extruded Aluminium, with moulded end caps |
| Video Streaming Live view – multi channel | 25 IPS | Dimensions (mm) | 206(l) x 136(w) x 53(h) |
| SD Card recording rate – multi channel | 25 IPS | IP rating | IP50 |
| Hard disk capacity options | 500GB, 1TB, 2TB | Operating temperature range (temperature sensor enabled) | -10 to 50°C |
| SD card capability | 4-32GB | Humidity | 10 – 90% r.h., non condensing |
| G Sensor | 3 axis | Mounting plate hardware (included) | Screw-mounted any axis orientation |
| Alarm input | 10 | Power supply input | 10 – 30V DC polarity protected |
| Alarm output | 1 | Continuous power – without Reviewer | tbc |
| General Features | | Continuous power – cameras on (typical) | tbc |
| <ul style="list-style-type: none"> Auto record on power-up or single button start/stop recording Recorder status indicators (6 LEDs) Simultaneous record, live view and file download H264 (MPEG-4 Part 10) compression Removable hard disc media cartridge – lockable Simple, intuitive menu system with help screens Optional embedded GPS for position & speed Normal and alarm triggered recording Vehicle data recording 7 day programmable timer recording Local set-up and configuration using Timespace Reviewer Remote control via RS232 interface Timer shutdown for power saving wake up on motion for security PTZ camera control for remote viewing Short circuit protection – video inputs Multi ranging PSU with power monitoring diagnostics | | Continuous power – without Reviewer and in sleep mode | tbc |
| | | Maximum current – start-up | 1.9A with camera and reviewer |
| | | Continuous power (maximum) | 60W Ancillary equipment dependent |
| | | External power output | 5V DC 1A / 12v 1.2A |
| | | Weight – including removable cartridge | 1040g |
| | | Regulatory Approvals | |
| | | CE Mark (EN55032:2012, EN55024:2010) | |
| | | E Mark | |
| | | ISO 9001; 2015 | |
| | | RoHS | |
| | | WEE | |

Timespace Technology Ltd reserves the right to amend product specifications without notice and without incurring obligation.



TIMESPACE

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TT0725 Issue 2

APPENDIX 2 – EC conformity certificates

EC Declaration of Conformity (CE)

We Timespace Technology Ltd
Lakeview Court
Ermine Business Park
Huntingdon
PE29 6UA
United Kingdom

declare that the

X500 Digital Video Recorder

Meets the intent of the European Union Directive 2014/30/EU referred to as the Electromagnetic Compatibility (EMC) Directive. The product conforms to the following standards which have been listed in the Official Journal of the European Union.

EMC

Emissions - EN55032:2012

Electromagnetic compatibility of Multimedia equipment – Emission Requirements.

Conducted - EN55024:2010

Information technology equipment – Immunity characteristics – Limits and methods of measurement.



.....
Dr ROBERT HEYLEN
TECHNICAL DIRECTOR

14th February 2018

EC Declaration of Conformity (CE)

We Timespace Technology Ltd
Lakeview Court
Ermine Business Park
Huntingdon
PE29 6UA
United Kingdom

declare that the

R500 Digital Video Recorder

Meets the intent of the European Union Directive 2014/30/EU referred to as the Electromagnetic Compatibility (EMC) Directive. The product conforms to the following standards which have been listed in the Official Journal of the European Union.


EMC

Emissions - EN55032:2012

Electromagnetic compatibility of Multimedia equipment – Emission Requirements.

Conducted - EN55024:2010

Information technology equipment – Immunity characteristics – Limits and methods of measurement.



.....
Dr ROBERT HEYLEN
TECHNICAL DIRECTOR

30th April 2018

E-11 Approval – R500

Vehicle
Certification
Agency

THE UNITED KINGDOM VEHICLE APPROVAL AUTHORITY

COMMUNICATION CONCERNING THE APPROVAL GRANTED ⁽¹⁾/ APPROVAL EXTENDED ⁽¹⁾/
APPROVAL REFUSED ⁽¹⁾/ APPROVAL WITHDRAWN ⁽¹⁾/ PRODUCTION DEFINITELY
DISCONTINUED ⁽¹⁾ OF A TYPE OF ELECTRICAL/ ELECTRONIC SUB-ASSEMBLY ⁽¹⁾ WITH
REGARD TO REGULATION NO. 10.05



Approval No: E11*10R05/01*10477*00


1. Make (trade name of manufacturer): Timespace Technology Limited
2. Type and general commercial description(s): T958 (R500) Digital Video Recorder
3. Means of identification of type, if marked on the ~~vehicle/component/separate technical unit~~: ⁽¹⁾
Self-adhesive serial number: label containing the part number.
 - 3.1. Location of that marking: Label located on the left hand side near the rear of the DVR when looking front facing
4. Category of vehicle: Not applicable
5. Name and address of manufacturer:
Timespace Technology Limited
Lakeview Court
Ermine Business Park
Huntingdon
PE29 6UA
United Kingdom
6. In the case of components and separate technical units, location and method of affixing of the approval mark: Self-adhesive label located on the left hand side near the rear of the DVR when looking front facing.

EAU421157

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April 2018 Revision 7
Page 1 of 1



E11*10R0501*10477*00

7. Address(es) of assembly plant(s):
Timespace Technology Limited
Lakeview Court
Ermine Business Park
Huntingdon
PE29 6UA
United Kingdom
8. Additional information (where applicable): See Appendix
9. Technical Service responsible for carrying out the tests: HORIBA MIRA Limited
10. Date of test report: 09 July 2018
11. No. of test report: 1217015#01
12. Any remarks: None
13. Place: BRISTOL
14. Date: 12 NOVEMBER 2018
15. Signature:  D LAWLOR
Chief Technical and Statutory Operations Officer
16. The index to the information package lodged with the Approval Authority, which may be obtained on request, is attached.
17. Reasons for extension: Not applicable
- (1) Strike out what does not apply.

EAU421157

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April 2018 Revision 7
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E11*10R05/01*10477*00

Appendix

to type-approval communication form No. E11*10R05/01*10477*00

concerning the type-approval of an electrical/electronic sub-assembly under Regulation No. 10.05

1. Additional information:
 - 1.1. Electrical system rated voltage: 12V. ~~pos~~/neg ground ⁽¹⁾
 - 1.2. This ESA can be used on any vehicle type with the following restrictions: Negative earth vehicles only
 - 1.2.1. Installation conditions, if any: Manufacturer's instructions to be followed.
 - 1.3. This ESA can be used only on the following vehicle types: Not applicable
 - 1.3.1. Installation conditions, if any: Not applicable
 - 1.4. The specific test method(s) used and the frequency ranges covered to determine immunity were: (Please specify precise method used from Annex 9): Not applicable (no immunity related function)
 - 1.5. Laboratory accredited to ISO 17025 and recognized by the Approval Authority responsible for carrying out the tests: HORIBA MIRA Limited, Watling Street, Nuneaton, Warwickshire, CV10 0TU, United Kingdom.
 2. Remarks: None
- (1) Strike out what does not apply.

EAU421157

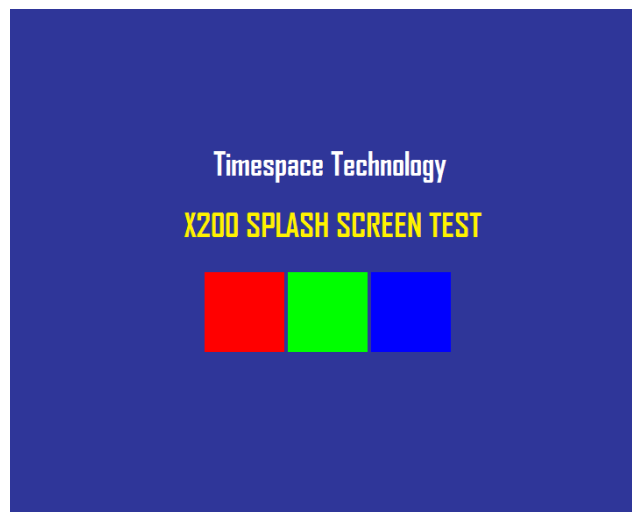
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APPENDIX 3 – Splash Screen

SPLASH SCREEN – Enables use of a .BMP file to be displayed, for example an Operator/Company logo. Can be set to 5, 10, 20, 30, 60 seconds, or Until Exit (which requires user interaction to clear).

A tool can be provided on request to create the Splash Screen image in the correct format, from an input source. The input source should not be more than 1.5mb and should be a simple image with plain colours, approx 720x576. An example images is show below;



Once in the correct format (using the Timespace conversion tool), the image is placed on the DVR cartridge, named; Splash.ext. Once configured in the menu, the Splash Screen will be read from the disk and displayed.

Please contact support@tspace.co.uk for the conversion tool.

APPENDIX 4 – Tokens / Protocol

The DVR is always looking for tokens to perform actions but no responses are monitored. The remote device should monitor the OK<R> messages that are returned. It is looking for all tokens apart from when writing file data. In this case only the “#ENDFILE<R>” is searched for.

All commands sent to the DVR are acknowledged, for example if the client sends #RECSTART<R>, OK<R> will be returned to the client to signify that the command was successfully carried out. In the case of commands like GETTIME and GETDATE, OK<R> will not be returned, but the data requested, followed by a <R>. In the case of PREVIOUSFILE and NEXTFILE, OK<R> will be replaced with either LAST<R> or FIRST<R> if there are no more files to play next or previous, respectively. When sending commands, the sender to the DVR can wait for an OK before sending another command, or one of the other variants listed above.

There may be a need for a hold off time between certain commands (e.g. 10 mS), as the DVR may take a finite time to do certain tasks. To add delay you could simply put spaces between one command and the next and these are ignored. The DVR does have a FIFO queue of 2048 bytes so can buffer data. Certain commands can be followed immediately with other commands for example:

```
#CAMERA_<1-16><R>#PLAY<R>           -play a given camera
#SETTIME_<12:23:45><R>#SETDATE_<23/09/10><R>   -set time and date
```

Definitions

- A space
- <> - Parameter, don't include brackets
- <R> - return (char 13)
- FAIL - File system failed to create file, aborted
- FAIL - File name is illegal
- OK - Acknowledgement, Command carried out
- CLIENT - The external equipment that is connected to the DVR via RS232 or Telnet
- BAUD Rate - This shall be selectable from within a menu
- <TEXT> - Textual data

Writing files

Write File command: **#WRITEFILE,<FILENAME><R>**

Close File command: **#ENDFILE<R>**

A return <R> character at the end of the “#WRITEFILE” command will signify the beginning of the writing process. All data from this point onwards will be written into the

file specified. If the file system fails to create the file for any reason, FAIL<R> will be returned to the client.

A check is done on the file name length, if the user overruns (number of characters in total is greater than 60), FAIL<R> will be transmitted to the client, and the write command is aborted. The user should only use uppercase letters and numbers in the filename and the space character. The extension “.EXT” is automatically applied by the DVR, for example

| | |
|-----------------------------------|--------------|
| Command | Created file |
| #WRITEFILE,REPORT<R> | REPORT.EXT |

| | |
|---|----------------------------|
| #WRITEFILE,TICKET DATA 6 DEC 2010<R> | TICKET DATA 6 DEC 2010.EXT |
|---|----------------------------|

If the file has been created effectively, OK<R> will be sent to the client. The client may now proceed to send the file data. When the token #ENDFILE<R> is received, the file is closed, and the client will be sent OK<R>. A new file may now be opened if required. In the example below, all the text in BOLD is written to the file “TICKETS.EXT”

```
#WRITEFILE,TICKETS<R>
DATE: 24/12/2011
TIME: 11:48:00
LOCATION: KINGS CROSS
#ENDFILE<R>
```

Reading files

Read File command: **#READFILE,<FILENAME><R>**

A return <R> character at the end of the #READFILE<R> command will signify the beginning of the reading process. Data will now be transmitted from the DVR to the client. The handshaking line CTS on port 1 may be used if required to pause the data flow. If the file system fails to open the file for any reason, FAIL<R> will be returned to the client. A check is done on the file name length, if the user overruns, FAIL<R> will be transmitted to the client, and the read command is aborted. If all is good, OK<R> is sent followed by the file data followed the token #ENDFILE<R>. The following example reads the file “TICKETS.EXT”.

| | |
|----------------------|-----------------------|
| Sent to DVR | Received from DVR |
| #READFILE,TICKETS<R> | DATE: 24/12/2011 |
| | TIME: 11:48:00 |
| | LOCATION: KINGS CROSS |
| | #ENDFILE<R> |

Recording

If for any reason recording stops, even if instructed to, the X500 will return
#RECSTOP<R>

#DISKREMOVED<R> will be sent under two conditions.

- 1) The disk is removed from the X500 at anytime post X500 initialization.
- 2) Live view always has been enabled and the X500 boots without a disk.

#DISKIN<R> will be sent under two conditions.

- 1) The disk is inserted into the X500 at anytime post X500 initialization.
- 2) Live view always has been enabled and the X500 boots with a disk.

Control Commands

| | |
|------------------------------|---|
| #RECSTART<R> | - start recording |
| #RECSTOP<R> | - stop recording |
| #STOP<R> | - stop playback |
| #PLAY<R> | - start playback (standard) |
| #REPLAY<R> | - play backwards (standard) |
| #WIND<R> | - fast forwards (standard) |
| #REWIND<R> | - rewind (standard) |
| #XPLAY_<FACTOR><R> | - plays at the specified factor speed (-/+) |
| #CAMERA_<1-16><R> | - camera to control |
| #LIVEVIEW<R> | - switch to live view |
| #AUTOLIVEVIEW<R> | - switch to live view automatic mode |
| #JOGFORWARD<R> | - one frame backwards |
| #JOGBACKWARD<R> | - one frame forwards |
| #GOTONEWESET<R> | - go to the newest recording |
| #GOTOOLDEST<R> | - go to the oldest recording |
| #GOTO_<HH:MM- DD/MM/YY><R> | - go to time DD:MM:YY_HH:MM |
| #GOTO_<HH:MM:SS-DD/MM/YY><R> | - go to time DD:MM:YY_HH:MM:SS |
| #SETTIME_<HH:MM:SS><R> | - sets the time |
| #SETDATE_<DD/MM/YY><R> | - sets the date |
| #GETTIME<R> | - gets the time |
| #GETDATE<R> | - gets the date |
| #NEXTFILE<R> | - when playing, skips to the beginning of the next file |
| #PREVIOUSFILE<R> | - when playing, starts at the beginning of the currently playing file. When stopped and #PREVIOUSFILE is issued twice, followed by a play, the previous file will begin playing from the beginning. |
| #GETFILETIMEDATE | - gets the current playing position of the currently play file. |
| #GETSTATS | - returns statistics |
| #DELETEALLREC | - removes all recording files from disk |
| #ALARMOUT<1-4>_0/1 | - Turns ALARMOUT LED Output ON (1) or OFF (0) |
| #ALARMOUT<1-4><R> | - Returns the status of ALARMOUT, 0 or 1 |
| #ALARMIN<1-10><R> | - Returns the status of ALARMIN, 0 or 1 |
| #ALARMIN<1-10>1_0/1 | - sets the state of the Digital input 1 ON(1) or OFF(0) |
| #CAMTEXT_<1-16>_<TEXT><R> | - writes text to the console at record time, Char 255 moves to the beginning of a new line. Maximum 49 characters per camera. |
| #DISKSTATUS | - returns #DISKREMOVED or #DISKIN |
| #MODESTATUS | - Returns #RECORD, #PLAY or #IDLE |
| #SETCAMTEXT_<1-16>_<TEXT><R> | - sets the camera text. This is fixed to 12 characters per camera. |
| #SETFILETEXT_<TEXT><R> | - sets the filename text. Max 12 characters. |
| #LOGRESET<R> | - resets the service log |
| #LOGREAD<R> | - reads the service log and returns up to the 10 latest entries |

| | |
|----------------|---|
| #MULTIVON<R> | - Turns Multiview On |
| #MULTIVOFF<R> | - Turns Multiview Off |
| #LOG_<TEXT><R> | - Logs a text message to the X500's service log (does not light service LED). Sending RESET LOG as the text marks off the LANLink should read the messages up to. OK<R> is returned if the daily quota of 10 has not been reached, other wise 10/DAY<R> is returned |

Commands in Detail

#GETFILETIMEDATE

Gets the current playing position of the currently playing file. Please use #MODESTATUS to tell if the time you are reading is live play or if in idle mode, as the time you receive will ways be the current/last position played.

#GETSTATS

Will return the following stats in the same format. #END<R> signifies end of file. The stats may possibly grow in the future, but will be append to this list. Scanning for #END after the data has been retrieved. Data may be scanned for by capturing just after the colon (:) and just before the end of line <R>

```
Capacity: 500.11GB
Used: 0.38 %
Write Protected: 0.00 %
First File: 16:09:00 - 21/12/10
Last File: 16:50:00 - 21/12/10
Days Recording: 0.03
Model Number: Hitachi HTS545050B9A
Serial Number: 100924PBN400B7F2LW7L
#END
```

#DELETEALLREC

The #DELETEALLREC command will stop the current recording and delete all recording files. When complete, OK<R> will be returned
#LED1, #LED2, #ALARMOUT

The following 3 commands control the 2 digital outputs and the Alarm output. These settings will be OK'd with the current hardware states of the X500.

#ALARMOUT1_0/1<R> – Sets the active state for the alarm output CLOSE/OPEN.

..

#ALARMOUT10_0/1<R>

#ALARMOUT<R> - Returns the status of the ALARMOUT port, 0 = off, 1 = on

#ALARMIN1 - #ALARMIN10

Each one of the alarm inputs can be virtually activated by using the following commands, which control each alarm input independently. These settings will be OK'd the current hardware states of the X500.

#ALARMIN1_0/1<R>

..

#ALARMIN10_0/1<R>

By using these commands, a camera may be assigned to each alarm input, thereby allowing recording on each channel to be selective and/or allow for a different set of recording rates between Normal and Alarm recording

The following commands will READ the status of the ALARMIN pots:

#ALARMIN1<R> - Returns the status of the ALARMIN1, 0 = off, 1 = on

..

#ALARMIN10<R> - Returns the status of the ALARMIN10, 0 = off, 1 = on

#CAMTEXT

#CAMTEXT_1_HELLO WORLD<R> - "Hello world" will be written at the top left hand corner

#CAMTEXT_3_<255><255><255>HELLO<R> - "Hello" will be written on the 4 line on camera 3

If text has been assigned to a camera, simply issuing blank text will clear all RS232 overlay text from that camera. A maximum of 49 characters may be sent to the screen including new line control codes. e.g. **#CAMTEXT_3_<R>** will clear the text (please note the space after 3)

#SETCAMTEXT_<1-16>_<TEXT><R>

Sets the camera text as via the Camera Options menu on the X500. 1-16 is the camera selection followed by the actual text. This is fixed to 12 characters per camera.

#SETFILETEXT_<TEXT><R>

Sets the filename text for the X500 file system to use. Max 12 characters.

#LOGRESET<R> Resets the service log

#LOGREAD<R> Reads the service log and returns up to the 10 latest entries

Examples

| | |
|----------------------|--|
| CAMERA_1<R> | switch to camera 1 (either in live/auto view or during playback) |
| XPLAY_0.5<R> | plays forward at half speed |
| XPLAY_-3.2<R> | plays in reverse at 3.2 times real time rate |
| XPLAY_10<R> | plays forwards at 10x speed |
| SETTIME_12:23:23<R> | sets the time in the format HH:MM:SS |
| SETDATE_23/09/05<R> | sets the date in the format DD:MM:YY |
| #GETTIME<R> | to which 12:23:23<R> is returned |
| #GETDATE<R> | to which 23/09/05<R> is returned |
| #LED1_1<R> | turn LED1 on |
| #CAMTEXT_1_Hello><R> | writes "Hello" to the console at record time in the top left corner. |

A windows demonstration tool is available with source code upon request by emailing support@tspace.co.uk

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