

MDR-404-500
MDR-408-1000

Mobile Digital Recorder

Installation & Operation Guide

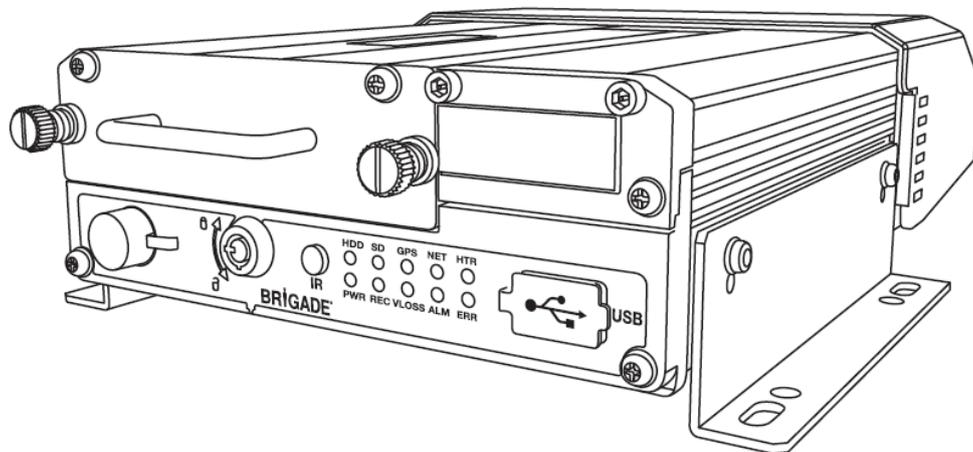
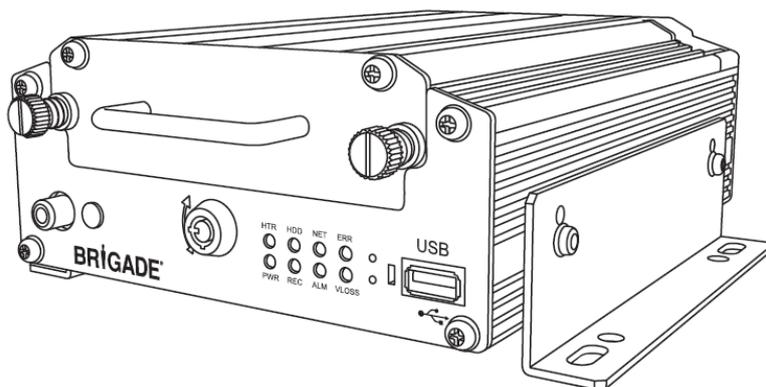


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1 Introduction

Brigade's MDR-408-1000 and MDR-404-500 are advanced Mobile Digital Recorders (MDRs), designed to record and playback 8 or 4 channels. The system uses PAL or NTSC cameras in CIF, HD1 or D1 format. Information related to recording parameters, alarms and trigger status can be recorded along with speed, location and G-force data. In addition, data related to the unit itself such as voltage and temperature are recorded and plotted graphically (MDR-Dashboard and-MDR Player).

Recordings can be searched, viewed and exported using the MDR-Dashboard program. This allows users to access all of the vehicle's travel information, including route tracking. Recordings can be easily exported in three different ways: as a simple audio/video AVI file playable by consumer media players; as native proprietary format clips or as a password protected .exe file with an MDR-Player embedded.

The main storage unit is a large capacity Hard Disk Drive (HDD). The secondary storage is an internal SD (Secure Digital) card for mirror (simultaneous) recording. The SD card stores all HDD data in lower image resolution. This is useful when there is a limitation of the primary storage media (e.g. a HDD write error during a collision).

It is imperative that the Brigade MDR is fitted and commissioned by competent and trained technicians. The installers are responsible for the correct setup of the overall system and must adhere to relevant regulations and legislation.

1.1 Product Features

1.1.1 Differences between MDR-404-500 and MDR-408-1000

MDR-404-500

- 500GB (1TB max) 2.5" HDD with anti-vibration mounting
- Industrial grade 32GB internal SD card for simultaneous recording
- Simultaneous 4 channel recording up to D1 @25fps (PAL) / @30fps (NTSC) each.
- Display split 1/4 channels
- 1x EIA/TIA 485 (RS485) for optional External G-Sensor or for Remote Status & Interface Panel
- 4x Select video connectors typical to camera inputs with audio
- Weight: 2.2Kg

MDR-408-1000

- 1TB (1TB max) 2.5" HDD with anti-vibration mounting
- Industrial grade 64GB internal SD card for simultaneous recording
- Simultaneous 8 channel recording up to HD1 @25fps (PAL) / @30fps (NTSC) each or 8 channels at D1 @12fps (PAL) / @15fps (NTSC)
- Built-in G-Sensor
- Display split 1/4/8 channels
- 2x EIA/TIA 485 (RS485) for optional External G-Sensor and for Remote Status & Interface Panel
- 8x Select video connectors typical to camera inputs with audio
- Weight: 2.75Kg

1.1.2 Common to MDR-404-500 and MDR-408-1000

- Internal anti-vibration mount for the HDD allows any mounting direction
- Embedded super-capacitor for finalisation of recording after unexpected power interruption (up to 10 seconds)
- Ruggedized metal case
- Individual channel configurations for recording resolution, frame rate and quality
- Anti-tampering feature – using digital code
- Recording operation log files for troubleshooting
- GPS for location monitoring and tracking with external antenna
- GPIO: 8x trigger input; 2x trigger output (12V max. 200mA)
- USB-B interface for displaying video recordings on a Windows™ operating system
- USB-A interface for downloading video recordings onto USB pen drive.
- Time-lapse and real time recording.
- Pre-alarm recording 1-60 min.
- Post-alarm recording 0-1800 seconds. (0 to 30 min.)
- Video quality selectable at 8 different levels for recording
- Video/Audio compression H.264/ADPCM
- Normal, Alarm or Timer recording modes
- Alarm recordings configurable for trigger, speed, G-Force, video loss, motion detection, blind detection, panic button and temperature
- Low voltage protection with configurable shut-down delay and minimum restart voltage
- Ethernet 10/100 RJ45 port for configuration and live view
- IR Remote control for configuration and recording/event search
- Shut-down delay configurable from 10min to 24hrs
- 12V Output max 1A load
- 9-36V Power Input
- Operating temperature: -25°C to +60°C
- Operating relative humidity: 10% to 90%

2 Contents

2.1 MDR-404-500 and MDR-408-1000 Kits

2.1.1 MDR-404-500



4-Channel Mobile Digital Recorder Control Unit, GPS, 500GB HDD and 32GB SD Card
MDR-404-500-CU (PN: 4886)



MDR 4 Series Brackets with 4x M4x8 Fixing Screws
MDR-400-BKT (PN: 4892)



MDR 404 16-pin Trigger Cable Loom
MDR-404-TRIG (PN: 4881)

2.1.2 MDR-408-1000



8-Channel Mobile Digital Recorder Control Unit, GPS 1TB HDD and 64GB SD Card
MDR-408-1000-CU (PN: 4897)



MDR 4 Series Brackets with 5x M4x8 and 1x M4x24 Fixing Screws
MDR-400-BKT (PN: 4892)



MDR 408 26-pin Trigger and EIA/TIA 485 Cable Loom
MDR-408-TRIG (PN: 4882)



MDR 408 Video Input Cable Loom
MDR-408-VIC (PN:4880)

2.1.3 Common for MDR-404-500 and MDR-408-1000



MDR 4 Series GPS Antenna
MDR-ANT-GPS-01 (PN: 4883)



MDR 4 Series USB A to B Cable
MDR-400-USB-B (PN: 4884)



MDR 4 Series 10 to 4 pin Video Output Cable
MDR-400-VOC (PN: 4879)



MDR-4 Series Installation Guide
MDR-400-IG (PN: 4894)



MDR 4 Series 9-pin Power Cable
MDR-400-PC (PN:4878)



MDR 4 Series Security Key
MDR-400-KEY (PN: 4891)



MDR 4 Series Installation CD for Microsoft Windows™ 7, 8.x and 10
MDR-400-CD (PN: 4895B)



MDR 4 Series Remote Control with 2x AAA batteries
MDR-400-RC (PN: 4893)

2.2 Optional Accessories

2.2.1 Remote Status & Interface Panel



MDR-4 Series Remote Status & Interface Panel
MDR-400-RP01 (PN: 4872)



MDR-4 Series 6m Cable for Remote Status & Interface Panel
MDR-06RPC (PN: 4873)

2.2.2 External G-Sensor



MDR-4 Series External G-Sensor (Non-IP rated)
MDR-400-GS01 (PN: 4871)



MDR-4 Series 3m External G-Sensor Cable
MDR-400-GS01 (PN: 4874)

2.2.3 SD Cards



32GB Industrial Grade Class 10
SD-32GB-IND (PN: 4875)



64GB Industrial Grade Class 10
SD-64GB-IND (PN: 4876)

2.2.4 Fireproof Box with 32GB SD Card



MDR-4 Series Fireproof Box with 32GB SD Card
MDR-400-FPB-32 (PN: 4896)

2.2.5 Uninterruptable Power Supply



MDR-4 Series Uninterruptable Power Supply
MDR-400-UPS (PN: 4870)

3 Hardware Installation

Warning

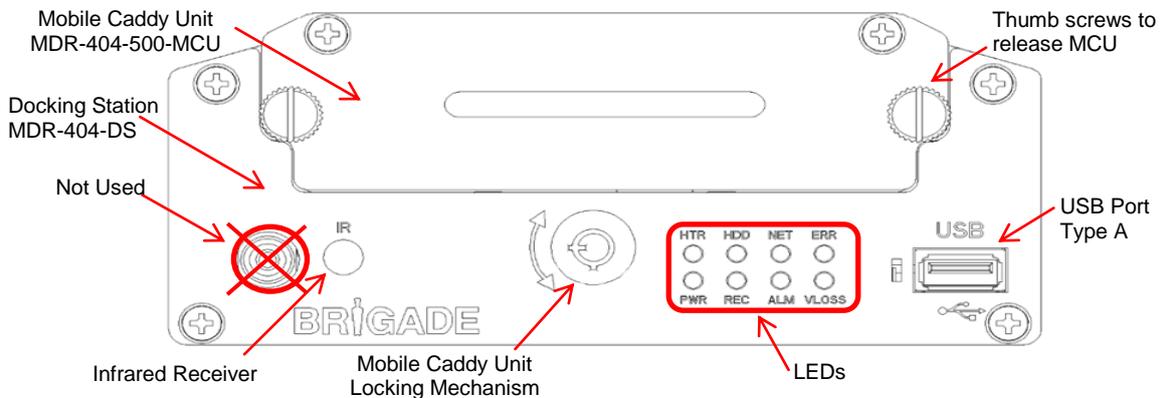
- MDR-404-TRIG (PN: 4881) and MDR-408-TRIG (PN: 4882) have 12V supply outputs. These wires are protected by heat-shrink. This is done to prevent the units from shorting to ground or to any other supply voltages. Connecting either of these output wires to any rail voltage or ground may damage the product. Brigade will not be responsible for any damage caused due to negligence.
- Do not connect audio/video inputs of MDR-404-500 and MDR-408-1000 to ground or high voltages. This may damage the product. Brigade will not be responsible for any damage caused due to negligence.

Note:

- The MDR 4 Series Remote Control (MDR-400-RC) may interfere with other devices (e.g. a monitor). Please cover the IR receiver on the monitor when operating the remote control e.g. by using black tape.
- The input trigger threshold for the MDR-404-500 is 9V. The input trigger threshold for MDR-408-1000 is 3.8V. When connecting any of the 8x trigger inputs to vehicle signals (e.g. reverse light), ensure the voltage is lower than 3.8V in an off state. If it exceeds the threshold voltage (e.g. due to bulb monitoring), insert an adequate resistor in series. If needed, contact Brigade to discuss these details further.
- Both MDRs can be mounted in any direction. The internal anti-vibration mount for the HDD allows for flexible installation. The MDR-408-1000 G-sensor needs to be calibrated before use, see 4.2.5 G-Force.

3.1 Front View

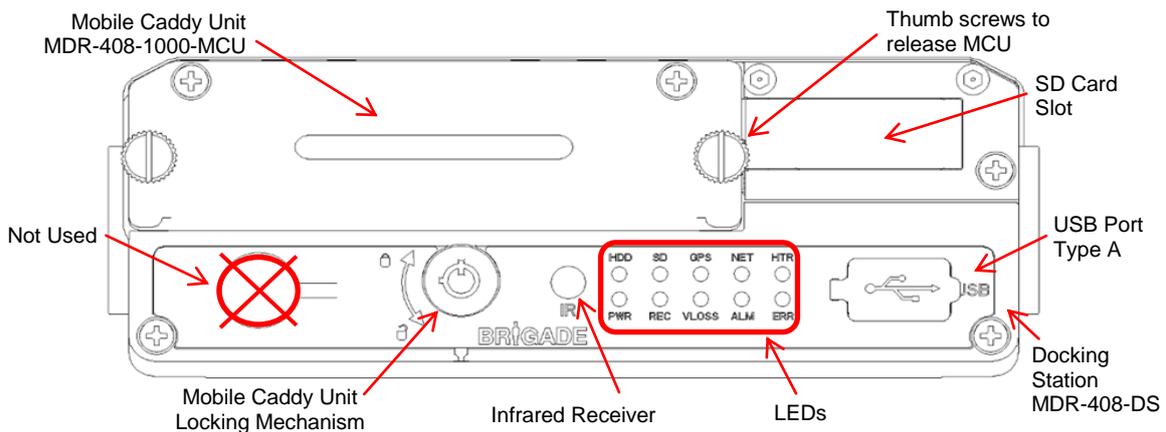
3.1.1 MDR-404-500



LEDs:

HTR	Heater Activation	PWR	Power Indicator
HDD	Hard Disk Drive Activity Indicator	REC	Recording Activity Indicator
NET	Network Interface Active (for MDRs equipped with 3G and/or Wi-Fi functions)	ALM	Alarm Activation
ERR	Error LED	VLOSS	Video Loss Indicator of input signal

3.1.2 MDR-408-1000

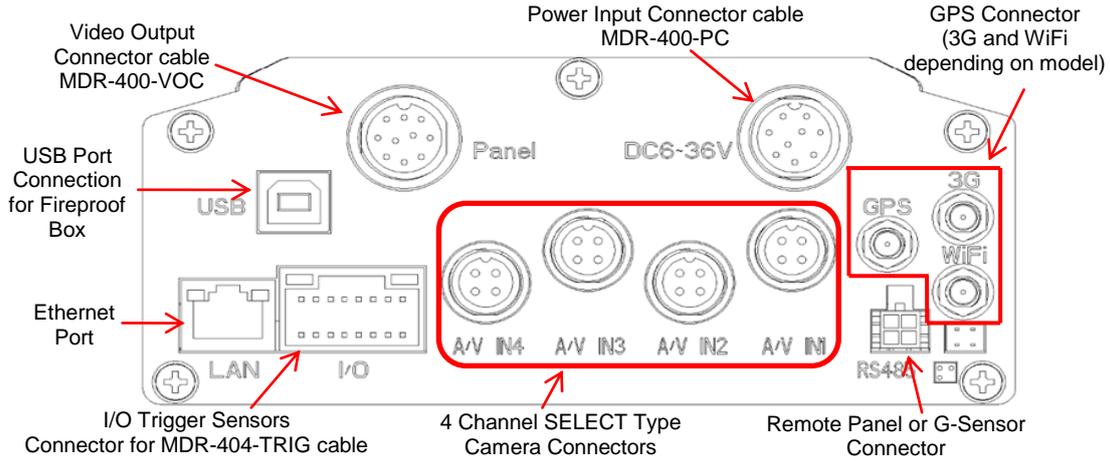


LEDs:

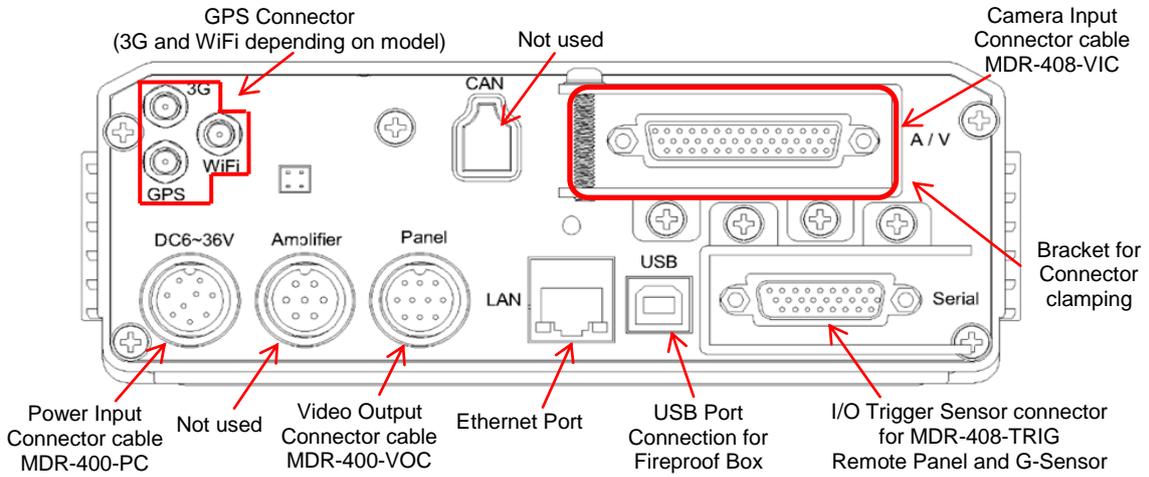
HDD	Hard Disk Drive Activity Indicator	PWR	Power Indicator
SD	SD Card Presence Indicator	REC	Recording Activity Indicator
GPS	GPS Module Presence Indicator	VLOSS	Video Loss Indicator of input signal
NET	Network Interface Active (for MDRs equipped with 3G and/or Wi-Fi functions)	ALM	Alarm Activation
HTR	Heater Activation	ERR	Error LED

3.2 Rear View

3.2.1 MDR-404-500



3.2.2 MDR-408-1000

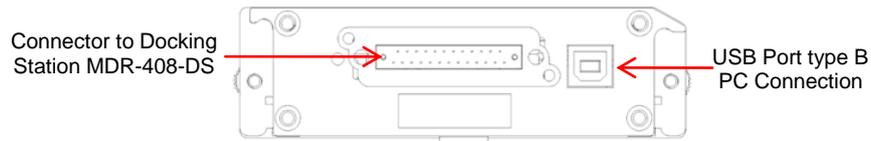


3.2.3 Mobile Caddy Unit (Containing HDD)

3.2.3.1 MDR-404-500

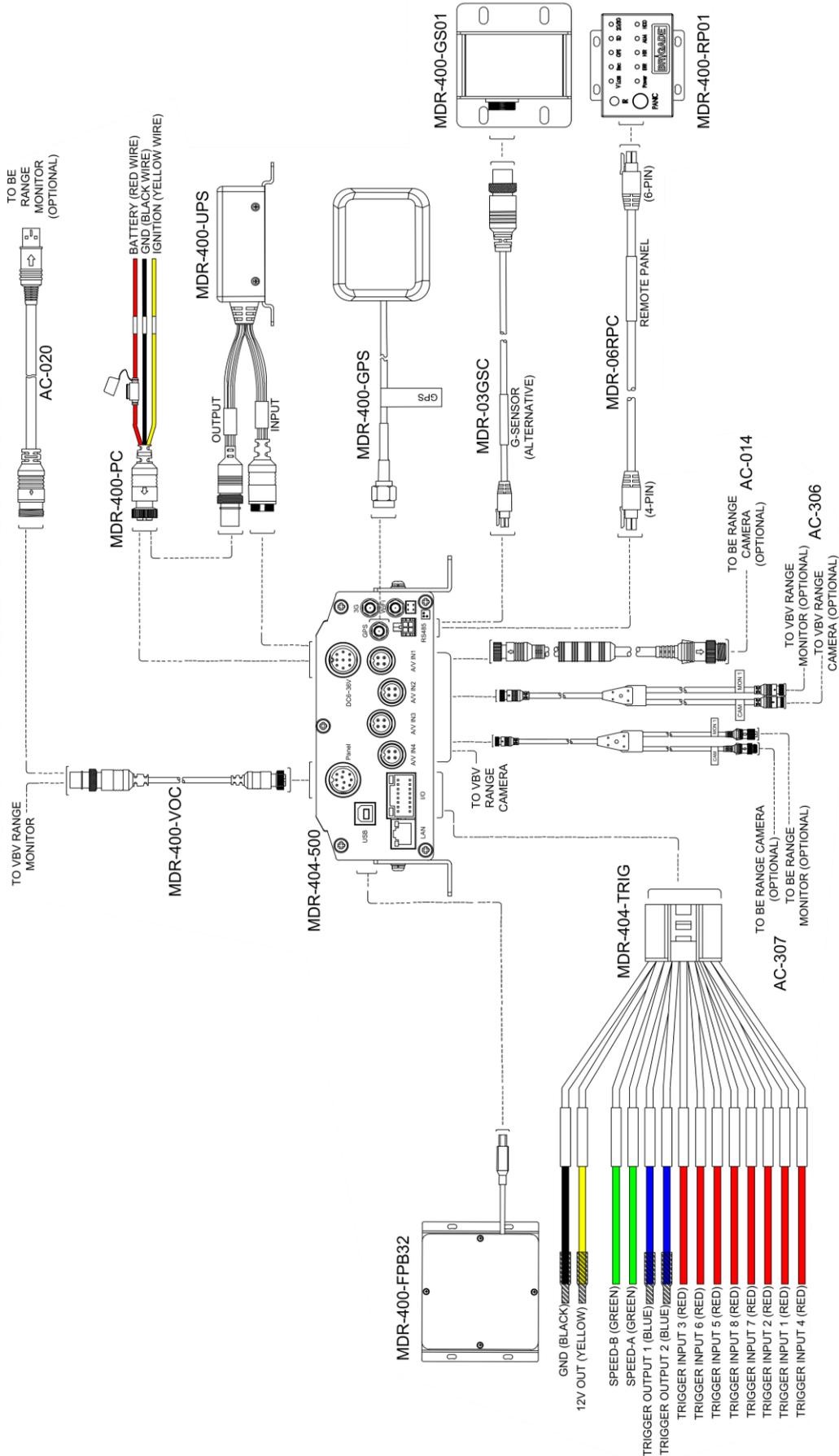


3.2.3.2 MDR-408-1000



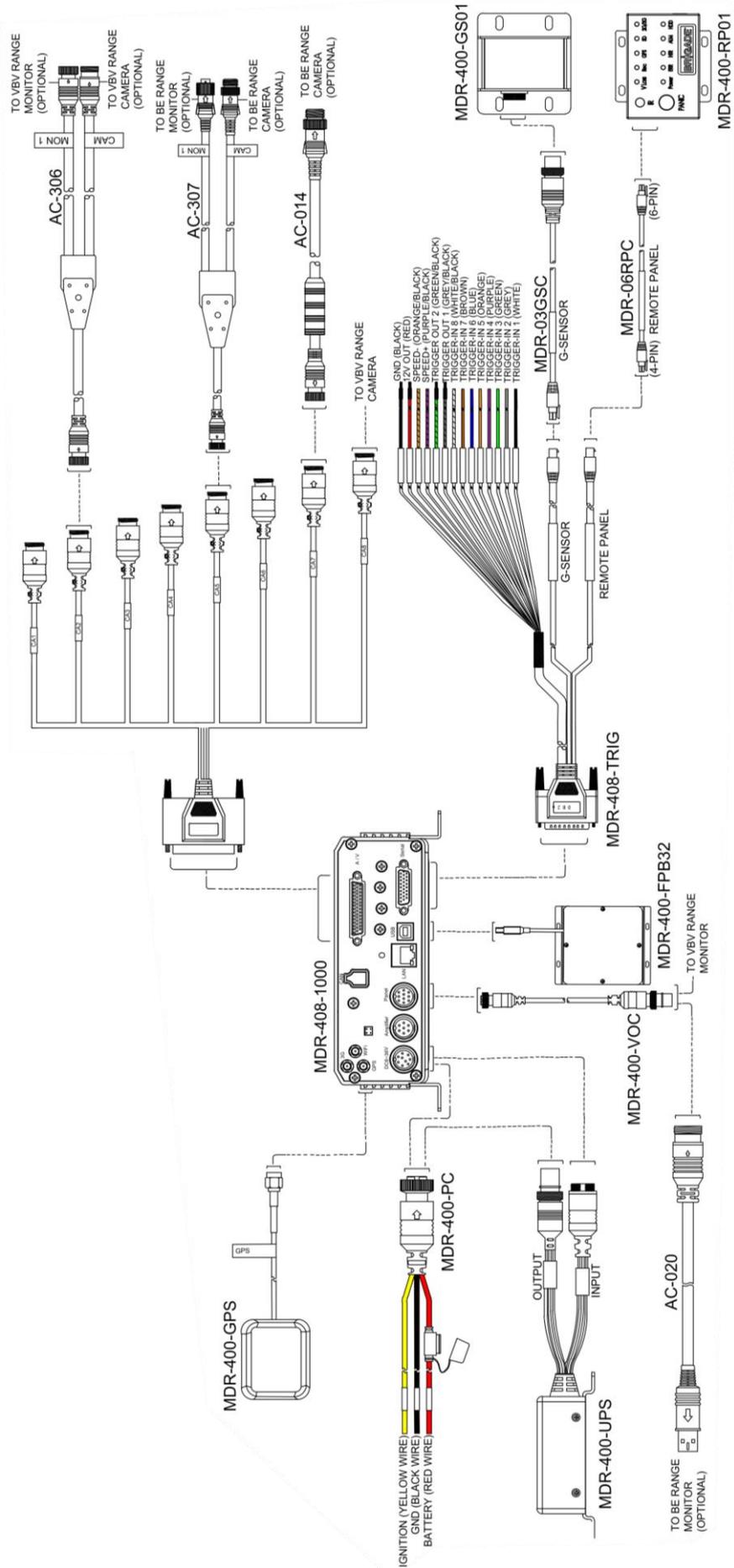
3.3 System Connectivity

3.3.1 MDR-404-500



Note: A Select 360 system may be connected to the MDR-404-500.

3.3.2 MDR-408-1000



Note: A Select 360 system may be connected to the MDR-408-1000.

3.4 Remote Control

Power button used to switch MDR On and Off.

Note: If security is enabled, password is required. When using Remote Panel MDR-400-RP01, On function works **only** from the IR receiver on the front of the MDR main

Navigation buttons are used browsing the OSD.
Rewind, Forward, Previous and Next are used for playback.

Record/STOP are used for manual recording when this option is activated.

F1 function allows users to export all events of the same day to a USB pen drive. See section 4.3.2 for more information.

Login/Lock is used for accessing the OSD. If security is enabled it requires password.

Number Keypad
Used for either entering numerical values or to trigger individual camera views.

Button 0 is used to either enter numerical value or to trigger split views in the following order: CH.1-4; CH. 5-8 and CH. 1-8 (MDR-408-1000 only).

Setup is used for accessing the OSD. If security is enabled it requires password.

Note: Remote control buttons that are not described above have no function with the MDR-404-500 and MDR-408-1000.

3.5 Mobile Caddy Unit Removal

Warning: Follow the removal steps shown below. Failure to do so over a prolonged period may damage the HDD. Ensure that the PWR LED indicates the MDR is OFF prior to removal.

3.5.1 MDR-404-500

Step 1
Unlock the MCU using the key MDR-400-KEY

Step 2
Confirm that the PWR LED is OFF

Step 3
Completely undo the two thumb screws (anti-clockwise)

Step 4
Gently pull the MDR-404-500-MCU by holding the front handle

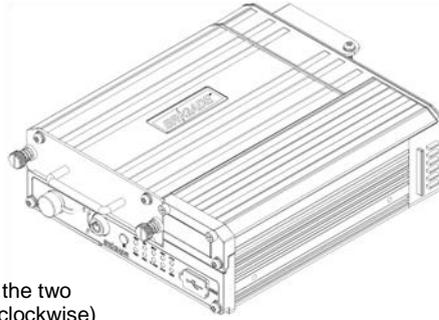
Note: If space is limited, the MCU can be removed in an upright direction

3.5.2 MDR-408-1000

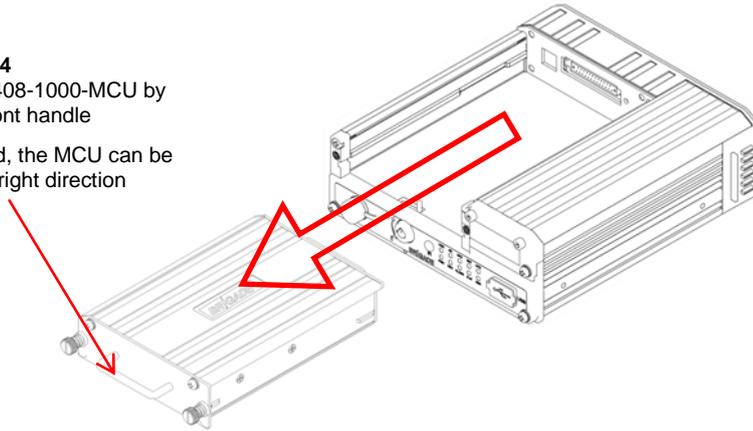
Step 1
Unlock the MCU using the key MDR-400-KEY

Step 2
Confirm that the PWR LED is OFF

Step 3
Completely undo the two thumb screws (anti-clockwise)



Step 4
Gently pull the MDR-408-1000-MCU by holding the front handle
Note: If space is limited, the MCU can be removed in an upright direction



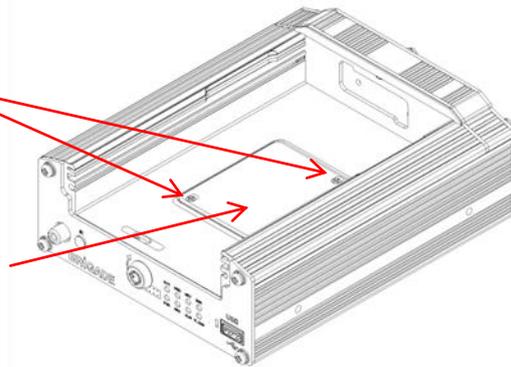
3.6 SD Card Removal

Note: In order to remove the SD card from both MDRs, the MCU needs to be removed first (see the detailed explanation above).

3.6.1 MDR-404-500

Step 1
Completely undo these two screws in order to remove the cover.

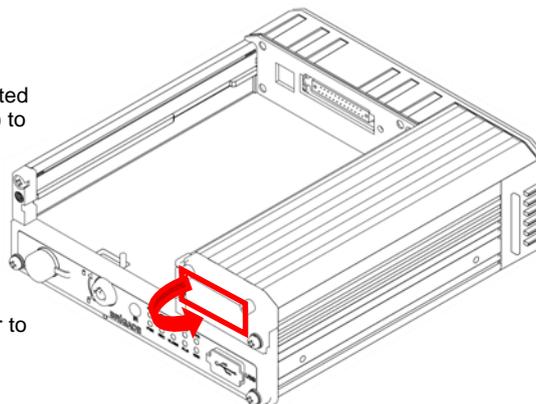
Step 2
The SD Card is placed in a SD card slot. Remove and discard the plastic tape covering the SD card. Push and depress the SD card in order to remove the card from its slot.



3.6.2 MDR-408-1000

Step 1
Gently open the door marked (as indicated by the arrow on front of MDR-408-EXP) to reveal the SD card slot.

Step 2
Push and depress the SD card in order to remove the card from its slot



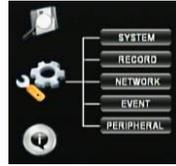
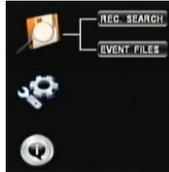
4 Setup

This chapter describes the typical configuration of the MDRs. For additional features and explanations of minor OSD functions, refer to Chapter 7: Additional OSD Features. The setup menu may be accessed by using the **Setup** button. A login screen is displayed which is shown below left. By default the UNIT ID is 0. The default PASSWORD for each user account is: Administrator: 88888888, Power User: 66666666 and User: 22222222. Once the login screen has been entered correctly, the menu is displayed (shown below right). The menu is navigated using the directional arrows, enter and exit buttons. See 4.3.4 User Security for further information.

Note: When accessing the menu, recording stops and only resumes when the setup menu is closed.

Prior to using the MDR please set the MDR to default settings and clear all history information, this is achieved by: **Settings → System → Config → Default** and **Settings → System → Config → Reset**. A complete OSD map is found in section 14.6.

Warning: Using the MDR for prolonged periods of time without ignition can drain the vehicle's battery.

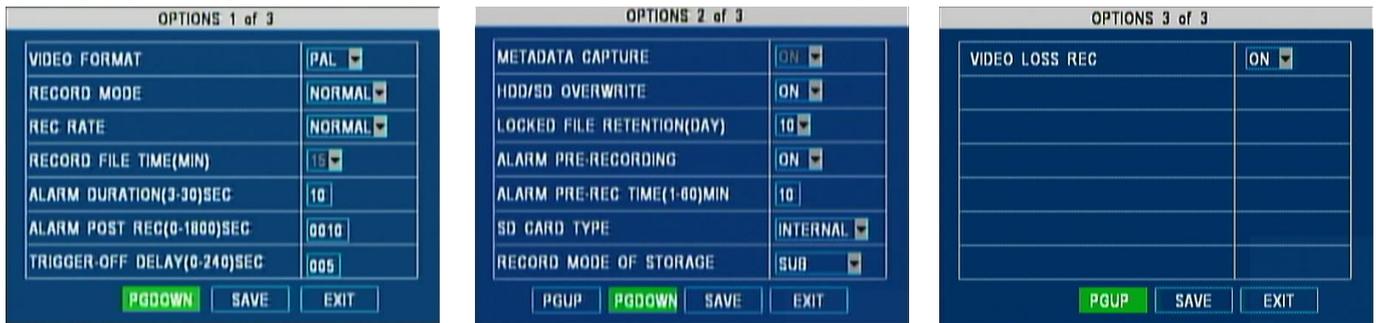


4.1 Configuring Standard Recording Settings

The following section explains how to configure recording parameters. This starts from the selection of main options, the variables to be displayed and the quality of recording for each individual camera.

4.1.1 Options

By navigating to **Settings → Record → Options** users will be presented with the following three options screens:



VIDEO FORMAT: This option allows the selection of either PAL or NTSC standards. This will be the same for all cameras.

Note: Brigade's monitors have automatic detection of these standards.

RECORD MODE: There are three modes available:

- **NORMAL** - allows continuous recording after powering up until the device shuts down (including the "shutdown delay" – see section 4.3.2 Options).

Note: Alarm recording is included in this mode.

- **ALARM** - allows users to record only when an alarm has been triggered. Alarms can be configured to be activated by triggers or other alarms (such as under/over speed, G-Force, Panic Button, etc.)
- **TIMER** - allows users to specify timeframes in which the recording will be activated. Refer to section 7.3 Scheduled Recording in order to program these timeframes.

Note: Refer to section 4.3.2 Options, if ON/OFF TYPE has been selected with a start-up option other than **IGNITION**; ensure the **Auto Boot Up** in **Schedule** is selected.

REC. RATE: Users may choose either **Normal** (refer to 4.1.4 Record Settings for further details) or **'I-Frame'**. 'I-Frame' allows the recording of 1 frame per second for all channels to save recording space although there is a loss of smoothness during playback.

RECORD FILE TIME: All recordings are broken in recording segments (15/30/45/60 minutes). This option allows users to choose the recording segment lengths. When mirror recording is active the only available option is 15 minute segments. See section 4.1.5 Sub-Stream Settings for details on mirror recording.

ALARM DURATION: Specifies different lengths between 3-30 seconds, which allows for longer/shorter alarm durations. If the alarm duration is set to 30 seconds and a short change in voltage is applied to the trigger sensor, this would be treated as a 30 second alarm. See Alarm pre and post recording options below.

Note: During the alarm if another alarm of the same type is triggered, the recording will then be reset and begin from the second alarm onwards.

ALARM POST REC: This specifies the period of recording appended at the end of an alarm. For instance if a sensor is triggered for 1 sec and the alarm duration is 30 seconds and the post recording is 15 seconds, the total amount of recording time will be 45 seconds.

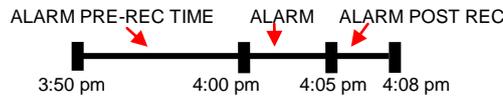
TRIGGER-OFF DELAY: This is a period of time in which rapid activations/deactivations can occur, which must not be considered. Commonly this option is applied when direction indicators or hazard lights are connected to a trigger sensor, in which case, the off-time should be ignored.

METADATA CAPTURE: This option should never be deactivated as it allows users to record tracking information, temperature, voltage and G-Force data. This is displayed on the MDR-Dashboard and MDR-Player.

HDD/SD OVERWRITE: This option is 'On' by default, therefore, once the HDD has 4GB of space remaining (1GB for SD card), older recordings are erased and replaced by newer recordings. This is valid with the exception of alarms that are locked for a time specified by locked file retention. By deactivating HDD/SD Overwrite the MDR will stop recording when the HDD reaches 2GB of free space. The user must either replace the storage or delete recordings manually.

LOCKED FILE RETENTION: This represents the length of time (in days) for which alarms cannot be overwritten by the MDR. When the retention expires, the locked files will automatically be unlocked and deleted.

ALARM PRE-REC TIME: This value specifies the length of time prior to an alarm recording. This will be added before the actual alarm. For example, if ALARM PRE-REC is set to 10 minutes, an alarm of 5 minutes is triggered at 4pm and ALARM POST REC is 180 seconds, the recording will begin at 3:30pm and will end after 4:08pm (see below).



SD CARD TYPE: This option is set to internal as Brigade's MDRs are provided with 32GB or 64GB internal SD cards. Choose 'external' if a fireproof box (optional accessory) (MDR-400-FPB-32) is connected to the MDR via its USB-B port on the back.

RECORD MODE OF STORAGE: Mirror (simultaneous) recording is active by default. Recordings at sub-stream quality are automatically saved onto the internal or external SD card (see SD card type above). Turn this option off when a SD card is not present in the unit.

Note: When SD cards are replaced, this must be formatted using an MDR as explained in 6.1 HDD/SD Formatting.

VIDEO LOSS REC: when this is set to On the MDR will record channels that have video loss (blank screen).

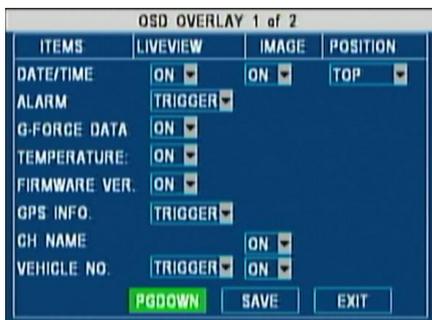
4.1.2 OSD Overlay

This section explains the options available for selecting information to be displayed on the monitor information window and on the recording. By selecting the ENTER button on the remote control, information such as temperature, voltage etc. is shown, as indicated below.



This information can be viewed by browsing to **Settings → Record → OSD Overlay**. These are configurable options ('On' or 'Off') which are found under the **LIVEVIEW** column as shown below (left).

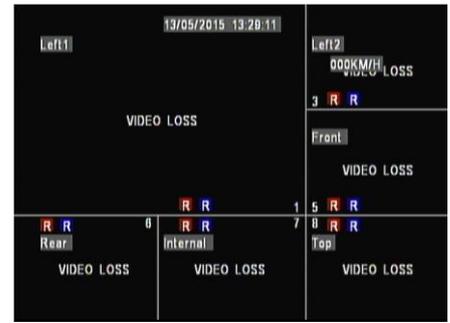
Note: Some fields have 'Trigger' and 'Fixed' in place of 'On'. 'Trigger' means that the value can be displayed only when the ENTER button is selected, whereas 'Fixed' means that this value is displayed on the monitor at all times.



The column named **IMAGE** means that the selected variable will be embedded in the recording itself. This has nothing in common with Metadata seen in the previous section. Metadata is a separate file containing information which will then be displayed using MDR-Dashboard or MDR-Player in dedicated areas of the Graphical User Interface (GUI). Embedding information in the video itself means that this will form part of the image replacing camera pixels. The advantage of embedding this data in the image is that the video file can be exported to .AVI and the video will contain the embedded information. These video files can be played by standard players like Windows Media Player™ or Video LAN Client™. The disadvantage in using this feature is that the area occupied by this text does not contain video information, which is lost. By selecting PGDOWN, users will enter the second page of the **OSD OVERLAY** which shows only one option related to displaying the Speed (above right).

4.1.3 Camera Channel Settings

This section explains common camera channel settings which can be found by browsing to **Settings → Record → Camera Settings**. A window will appear as shown below (left) showing a table with 4 (MDR-404-500) or 8 (MDR-408-1000) channels.



From left to right (on the same row), there are the following options:

- **ENABLE** allows the activation/deactivation of the camera channel.
- **NAME**: Field used for an 8 character name which each camera channel can be associated with. These can include lower/upper case letters and numerals.
- **AUDIO** activation allows users to enable/disable the audio recording from the camera channels individually. This setting depends on the utilised cameras having microphones.
- **LIVE** determines if a particular channel needs to be displayed or not. Such as, a particular camera will not be displayed but be recorded. This allows for larger spaces to be allocated to the remaining cameras. There are two examples (above) in which 8 cameras are activated (left image) and in which 2 camera channels (CH2 and CH4) have **LIVE** view turned Off (right image).

Note: Displaying of the channels changed to optimise the space (CH1 camera has been enlarged since it gained the space left by removing CH2 and CH4).

- **ENCODE** allows users to choose between Constant Bit Rate (CBR) and Variable Bit Rate (VBR). The difference is minimal as the Variable Bit Rate is not efficient as it involves more processing power and may introduce some visible artefacts due to higher compression rates.
- **CYCLE** activation and **CYCLE TIME** allows users to specify a periodic rotation in displaying the cameras in **LIVE** mode (i.e. the ones that have LIVE set to On). The rotation will start from a split view with all cameras then switch to each camera channel every X seconds (where X is specified in the **CYCLE TIME** box). This cycle skips cameras that have **LIVE** set to Off.
- **LIVE AUDIO** activation allows users to hear the audio coming from each camera every time a camera is selected manually (by selecting the number key on the remote control) or when cycling (see above).

Note: A Brigade monitor with audio function should be used.

4.1.4 Record Settings

This section explains the process of selecting the adequate image quality for individual camera channels. The following image illustrates the main window found by browsing to **Settings** → **Record** → **Record Settings**.

This appears as a table with 4 (MDR-404-500) or 8 (MDR-408-1000) channels.

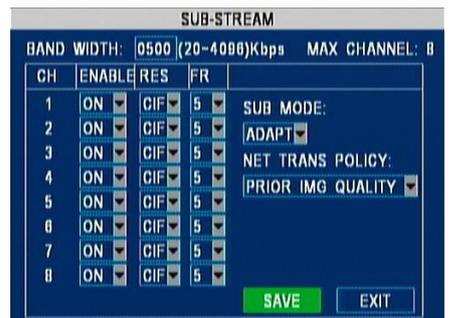


- **RES** allows users to choose the resolution for each channel. For MDR-404-500, the maximum resolution can be achieved for all the 4 channels at maximum frame rate (i.e. D1 @ 25fps (PAL) or D1 @ 30fps (NTSC) where D1 is 704x480 for PAL/ 704x576 for NTSC. For MDR-408-1000, the frame rate has to be lowered to 12fps (PAL) and 15fps (NTSC) for D1 resolution when used on more than 4 channels at the same time. In order to save storage space, HD1 and CIF options are available where HD1 is 704x240 for PAL/ 704x288 for NTSC and CIF is 354x240 for PAL/ 354x288 for NTSC. Both HD1 and CIF are available at 25fps (PAL) and 30fps (NTSC) for the maximum number of channels.
- **FR** allows users to choose different frame rates for different channels depending on RES setting (above).
- **QUALITY** levels are used for Normal and Alarm recording. Level 1 is the best quality whereas level 8 is the lowest quality. Brigade recommends using a higher quality for Alarms for a higher level of image detail.

Note: Refer to Appendix 14.1 Video Quality Table for further details.

4.1.5 Sub-Stream Settings

This section elaborates on the sub-stream configuration which allows different quality levels for mirror (simultaneous) recording onto the SD card. Mirror recording is used for recovery when the HDD recordings are inaccessible. This is due to the fact that SD cards have smaller storage capacities when compared to HDDs. The image below (right) illustrates the main window found by browsing to **Settings** → **Record** → **Sub-Stream**.



ENABLE this allows the users to choose which channels are being recorded onto the SD card. **RES** is default set to CIF. Framerate can have different values depending on the number of channels activated. Refer to Appendices 14.1 Video Quality Table for further details.

BANDWIDTH can be set to be between 20Kbps and 4096Kbps. It determines the total size of the recording for all active cameras. Refer to Appendices 14.1 Video Quality Table for further details.

For example, with a full bandwidth of 4096Kbps for recording 8 channels at CIF resolution and 16fps, the total size for 1 hour of recording is approximately 1.8GB. The default settings of 500Kbps has been chosen as a compromise between quality and space. This allows 1 hour of recording 8 channels at CIF resolution, 5fps and quality level 6 to occupy approximately 220MB. **SUB MODE** can be adaptive or fixed. The recommended setting is adaptive which alters the bitrate to optimise the memory required.

NET TRANS POLICY is set by default to PRIOR TRANS SPEED which allows users to dynamically change the bandwidth according to the image requirement to retain fluidity of the image. PRIOR IMG QUALITY gives priority to the quality of the image rather than the size of the sub-stream recording. BALANCE uses an optimum trade-off between recording size and image quality.

4.2 Configuring Events

The following section expands on the process of configuring event parameters for recording and alarm triggering.

4.2.1 Sensors

By navigating to **Settings → Event → Sensor** users will be presented with the following two screens:



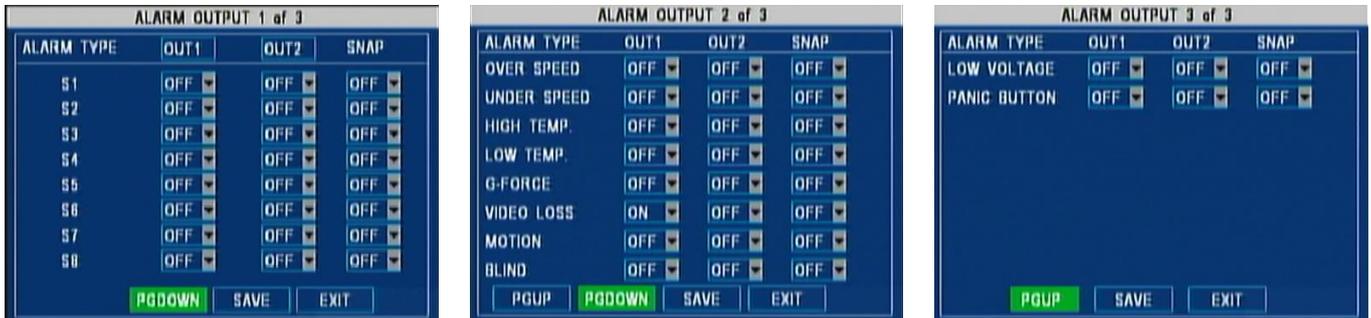
The first sensor screen (above left) and the second sensor screen (above right) are displayed. This represents an example where 4 sensors are connected to various signals of the vehicle. Trigger sensor 1 is connected to the left hand indicator and the other 3 are connected to the right hand indicator; the brake pedal and the hazard warning button. This is reflected in the **NAME** column which allows users to choose 6 alphanumerical characters including symbols. **NAME** will never appear anywhere aside from this window and is intended to provide a short description of the purpose. **ENABLE** allows users to set which trigger input wires are used. If a wires is not used, set **ENABLE** to Off. The **OSD** column provides 2 alphanumerical characters that will be shown on the monitor, MDR-Dashboard and MDR-Player as identifiers. These are highlighted once the sensors turn active. Users should choose two appropriate letters based on the sensor connected. **SET** determines whether the trigger sensor is activated with a high or low voltage. **ALARM** can be activated and will trigger recordings of the event. If it is left Off, the activation of the sensor will be recorded in the Metadata and displayed on the MDR-Dashboard or MDR-Player. No alarm recording will be triggered. **LOCK** feature allows users to choose whether an alarm recording will be locked with a specified time or will be overwritten (see **LOCKED FILE RETENTION** in section 4.1.1 Options).

The second sensor screen (above right - **SENSOR TRIGGER ACTION**) allows the user to choose a channel to be displayed in full screen once a particular trigger sensor is activated. It also allows the selection of the duration for which a full screen is displayed. In this example, Channel 1 will be displayed once the left hand indicator is active.

If any **SENSOR** above is set as an **ALARM** and the **OSD** contains two characters, it is possible to display these OSD characters when a sensor is triggered. In order to achieve this, set **ALARM LIVEVIEW** to **FIXED**. See 4.1.2 OSD Overlay.

4.2.2 Alarm Outputs

By navigating to **Settings → Event → Alarm Output** users will be presented with the following three option screens:



All 3 screens have the same layout with 3 columns dedicated to the activation of: TRIGGER OUT1; TRIGGER OUT2 and Snapshot function. Users can decide whether an event (such as applying a voltage to one of the 8 trigger sensors or by pressing the Panic Button etc.) activates an alarm output (TRIGGER OUT1 and/or TRIGGER OUT2 will go high, +12V).

If the **SNAP** option is On, snapshots will be recorded. The selection of the cameras which can be activated for snapshots are configured in 4.2.8 Snap Settings. Refer to the following sections: 4.2.3 to 4.2.7 and 7.1.1 to 7.1.2 for the configuration of the alarms in screens 2 (above middle) and 3 (above right). These configurations determine the conditions for which the trigger outputs and the snapshot would be activated.

4.2.3 Speed

By browsing to **Settings → Event → Speed** the following screen will appear:



SPEED SOURCE allows the choice of either a GPS source (above left) or the vehicle speedometer signal (above right). In majority of applications GPS signal is the simplest to use. The vehicle speed signal may be a more reliable source. Brigade's MDR 4 series comes as standard equipped with a GPS antenna.

The speed source from the vehicle is recommended when the GPS signal is absent or poor (e.g. mines or major city centres). Pulse per second (p/s) refers to the p/s the MDR receives at a set speed value. The speedometer option requires a chosen speed which is associated to a corresponding p/s. If using a standard European tachometer, the connections on pin **A6** and **B8** are used as reference ground and speed signal (4 pulses per meter). For European speed sources, enter the following values: 57 P/S and either 51 km/h or 32.0 mph. For non-European speed sources refer to the manufacturer's datasheet for the vehicle speed signal.

SPEED UNIT this option is set to miles per hour as default and can be changed to km per hour based on the country in which the vehicle is utilised.

CURRENT MILEAGE this represents the mileage of the vehicle at the time of the installation and is an extra option for additional tracking information. In order to configure this, select MILEAGE to On.

CALIBRATE this saves CURRENT MILEAGE to memory. This can be checked by navigating to **Information → History → Total Mileage**.

ALARM SETTINGS allows the user to activate alarms for under speed, over speed or both by changing the ENABLE field to On and inputting the limits into the THRESHOLD box. If the ALARM field is turned On, an under speed or over speed will be recorded as an alarm and can be locked by turning the LOCK field to On (see **LOCKED FILE RETENTION** in section 4.1.1 Options).

4.2.4 Temperature

By navigating to **Settings → Event → Temperature** users will be presented with the screen(below left):

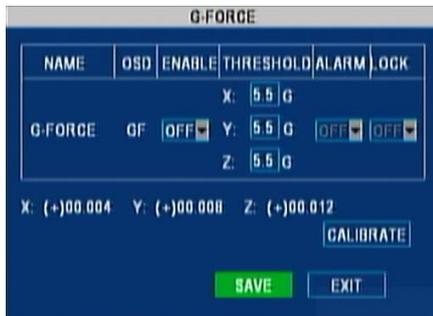


TEMPERATURE UNIT: this option is in degrees Celsius (°C) by default and can be changed to degrees Fahrenheit (°F) according to the country in which the vehicle is utilised.

ENVIRONMENT TEMPERATURE ALARM SETTINGS: this option allows users to set the thresholds for which the MDR temperature would be considered to be outside specified limits. Turn ENABLE On in order to activate one or both limits and specify the values under the **THRESHOLD** column. If the ALARM column is kept Off, the Low Temperature or High Temperature events would only be shown in the MDR-Dashboard and MDR-Player. By choosing to activate the ALARM, the recording for such an event would be treated as an alarm and the **LOCK** feature can be used (see **LOCKED FILE RETENTION** in section 4.1.1 Options). In order to show the alarm on the monitor (above right), it is necessary to configure the OSD where ALARM can be TRIGGER or FIXED (as explained in 4.1.2 OSD Overlay).

4.2.5 G-Force

The image below (left) illustrates the window displayed by browsing to **Settings → Event → G-Force**.



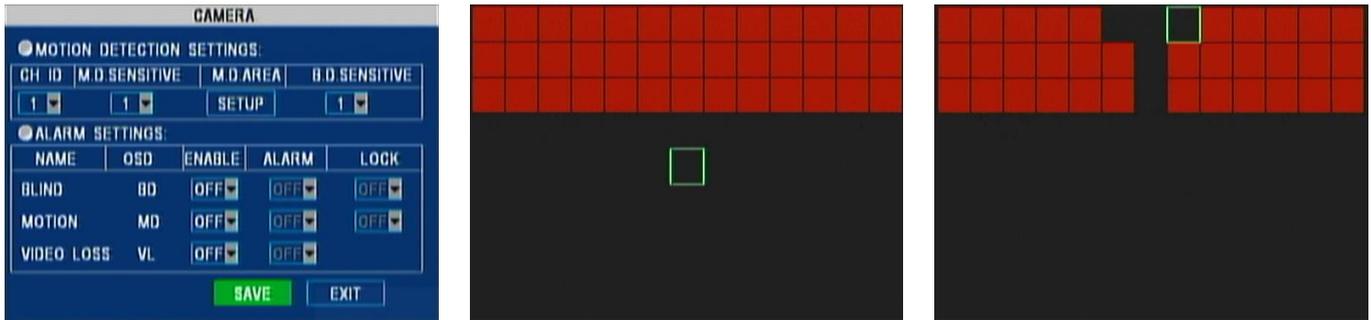
There are 3 values for the X, Y and Z axes, where: X represents the forward/backward axis (i.e. travelling with the MDR-408-1000 handle indicating the front and the connectors on the back indicating the rear); Y represents left/right; Z represents up/down. The MDR-404-500 needs an optional external G-sensor (MDR-400-GS01). The MDR-408-1000 has an internal G-sensor. Please refer to the MDR-400-GS01 drawing for mounting. In order to use the internal G-sensor on the MDR-408-1000, configure the External Communication to Off, which is the port dedicated to the G-Sensor (by default RS485-2). The unit would then restart with the internal G-Sensor activated. The internal or external G-sensor requires calibration before use. Once the unit is installed (on level horizontal ground) with the vehicle stationary (no vibrations/engine off), select the **CALIBRATE** button (above left). Refer to section 4.4 Peripheral Settings for the configuration of the G-Sensor.

Turn **ENABLE** On to activate the limits and specify the 3 **THRESHOLD** values. If the **ALARM** column is set as Off, high acceleration events would only be visible in the MDR-Dashboard and MDR-Player. By choosing to activate the ALARM, the recordings for such events would be treated as alarms which may be locked (see **LOCKED FILE RETENTION** in section 4.1.1 Options). In order to show the alarm on the monitor (as illustrated above right), it is necessary to configure the OSD where ALARM can be TRIGGER or FIXED (as explained in 4.1.2 OSD Overlay).

Note: G-Sensor values are digitally sampled and only provide an average indication of the shock data. For the MDR vibration and shock rating, see section 12 Specifications.

4.2.6 Motion Detection

In order to activate and configure motion detection features, browse to **Settings → Event → Camera**. Users will be presented with the following screens:



Motion detection can be activated per channel. Each channel can have different sensitivities and different areas of detection. First select the channel and its sensitivity (1 represents high sensitivity and 4 is the least sensitive). Select **SETUP**, and use the arrows in the remote control to select desired cells. Red cells are cells where detection occurs. By pressing the **ENTER** button users can toggle between selecting and deselecting cells. In the example shown, in the middle image (above), the top of the image is fully selected for detecting movements. The image on the right (above) illustrates a “T”-shaped area excluded from motion detection. Generally, sensitivity level 1 is a typical option for detecting unexpected movements. In the image above (left), users must enable **MOTION**. By choosing to activate the **ALARM**, the recording for such an event would be treated as an alarm. This can have a **LOCK** feature (see **LOCKED FILE RETENTION** in section 4.1.1 Options). In order to show the alarm on the monitor (with the letters **MD** appearing on the screen), it is necessary to configure the **OSD** where **ALARM** can be **TRIGGER** or **FIXED** (as explained in 4.1.2 OSD Overlay). Refer to section 4.2.2 which controls when this alarm should activate alarm outputs or snapshots.

4.2.7 Voltage

The image (below) illustrates the main window displayed by browsing to **Settings → Event → Voltage**:



In order to activate low voltage protection, turn the **ENABLE** cell On. This feature shuts down the MDR when the supply voltage falls below the Voltage specified in **LOW VOLTAGE**. **VOLTAGE OF START** is the minimum voltage required to power on the MDR. The MDR verifies this value (before powering on) to confirm the battery has been recharged/replaced and is fully operational. **SHUT DOWN DELAY** specifies for how long the MDR will count down before shutting down (expressed in minutes).

In this example **VOLTAGE OF START** has been left to its default value of 21.0V. **OBSERVE TIME** range is 1-300 minutes. This refers to the duration for which a voltage, lesser than **LOW VOLTAGE** must be observed before beginning the **SHUT DOWN DELAY**.

If the MDR is running on a 12V supply **LOW VOLTAGE** minimum is 8V and **VOLTAGE OF START** maximum is 13V. If the MDR is running on a 24V supply **LOW VOLTAGE** minimum is 16V and **VOLTAGE OF START** maximum is 26V.

Proposed Low Voltage Protection Settings (Note: Please check if these are suitable for the particular vehicle):

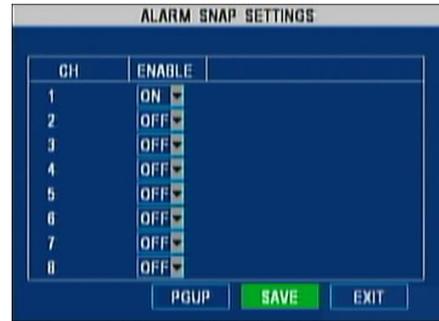
12V Vehicles	24V Vehicles
Low Voltage:11.7V	Low Voltage:23.7V
Voltage of Start:12.5V	Voltage of Start:24.5V
Observe Time:15 minutes	Observe Time: 15 minutes
Shut Down Delay:5 minutes	Shut Down Delay:5 minutes

Note: In this example, whenever the voltage of the battery connected to the MDR falls below 18.0V (sustained for 5 minutes), the MDR will automatically shut down after 10 minutes to protect the battery from any further drainage that could damage it.

4.2.8 Snap Settings

By browsing to **Settings → Event → Snap Settings → Alarm Snap Settings** the screens shown below will be displayed. This sub-menu allows users to select the cameras that snapshot when an alarm is triggered, as explained in section 4.2.2 Alarm Outputs.

For instance, the activation of a trigger sensor, such as S4, could trigger a snapshot of camera 1. The user can also snapshot camera 1 when other alarms are activated, such as motion detection, panic button or low voltage.



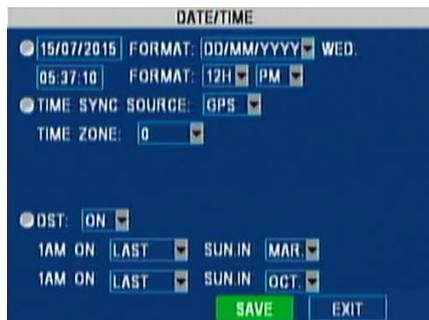
In order to export snapshots to a USB pen-drive, refer to sub-sections 6.4.3 and 6.4.4 under System Log.

4.3 System settings

The following section explains the process of configuring vehicle settings and security related parameters.

4.3.1 Date/Time

Browse to **Settings** → **System** → **Date/Time** the screen shown below will appear:



This screen allows users to select the format of the date and time according to the country in which the vehicle would be utilised. TIME SYNC SOURCE allows the selection of either a GPS source or to be entered manually. In majority of the applications, GPS signal is the simplest and more reliable option. Brigade's MDR 4 series systems are equipped as standard with GPS antenna. The manual option is recommended when a GPS signal is absent or poor (e.g. mines or major city centres). Entering the date and time can be set by completing the fields accordingly. In the example above, move the cursor to **15/07/2015** then to **05:37:10** and edit the current values. When selecting the time sync source as GPS, it allows users to enter the time zone (in the example above, 0 means that the vehicle is operating in the GMT zone). DST this field allows users to enter the date and time in which the Daylight Saving Time will be activated. In the U.K, it is the last Sunday of March at 1:00AM and the last Sunday of October at 1:00AM. Enter the correct time and date of the country in which the vehicle will be utilised. Whenever DST is not in use, turn this option to Off.

4.3.2 Options

Browse to **Settings** → **System** → **Options**, the screen shown below will appear.



ON/OFF TYPE: this option determines the conditions for which the MDR will power up. By default it is set to IGNITION, which means that the MDR only turns on when an ignition signal is applied (yellow wire on MDR-400-PC). Once the ignition is removed, the unit will start a countdown (in seconds) based on the SHUT DOWN DELAY setting. By default this value is 30 minutes based on Brigade's recommendation of typical applications. Enter a preferred value between 10 minutes and 24 hours if necessary.

Two more additional options are available for the on/off type:

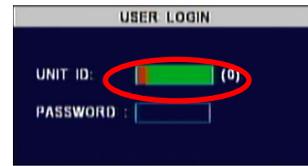
- **TIMER** where boot-up and shut down times are specified (ignition signal must be present prior to ensure MDR is in an ON state). In addition, a scheduled option is available that allows users to specify scheduled recording times. The MDR will not turn off during scheduled ON times. Refer to section 7.3 Scheduled Recording to configure these timeframes.
- **IGNITION OR TIMER** various combinations of these options are used to start up and shut down the MDRs.

Note: The ignition signal takes precedence in all scenarios, which means that if the MDR has no ignition signal applied then the unit cannot enter an ON state.

IDLE TIME: specifies the time of inactivity for which the OSD will remain on. By default it is set to 300 seconds (5 minutes). EVENT FILES AUTO-EXPORT (USB): this option is On by default and allows users to export all alarm recording files of the same day to a USB pen-drive plugged into the front of the unit by simply pressing the F1 key on the remote control. TRANSPARENCY: this option controls the opacity of the OSD menu.

4.3.3 Register Info

Browse to **Settings → System → Register Info**, the screen (below left) will be displayed:



UNIT S/N this represents a unique serial number which identifies each unit. This is not configurable by the user.

UNIT ID: enter a number from 00000 to 99999 to represent the “username”. By default, this is 0 as shown above right (circled in red). If multiple units are installed next to each other, Brigade recommends using different UNIT ID for each unit and user type passwords (see section 4.3.4). In addition, this number will appear on both the MDR-Dashboard and MDR-Player as depicted in the figure below:



Note: If password security is enabled, this value is a required input. Please, refer to the following section 4.3.4 User Security.

COMPANY NAME this field is discretionary, as the MDR can function without configuring this and the following two fields. Enter the name of the company in which the MDR will be utilised. There are 9 available characters to set using the following: a-z; A-Z; 0-9 and symbols.

VEHICLE NO. this is an optional field. It is typically used to store the registration plate of the vehicle in which the MDR is installed. Eight alphanumeric characters are accepted (a-z; A-Z and 0-9).

Company name and vehicle number are shown on both the MDR-Dashboard and MDR-Player, see below:

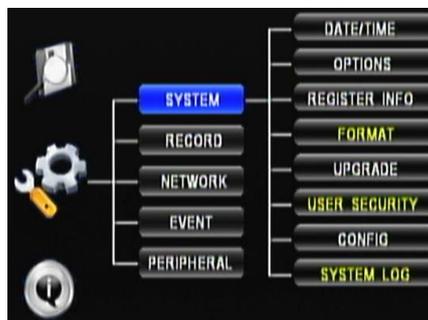


DRIVER/ROUTE NAME this is not a compulsory field for users. When the MDR is fitted in a vehicle that can be identified by a fixed name, it would be recommended to fill in this field. There are 8 available characters which are: a-z; A-Z; 0-9 and symbols.

DEVICE ID this field is vital when configuring the MDR-404GW-500 and MDR-408GW-1000 (and sub-variants equipped with 3G and/or Wi-Fi modules). Along with UNIT ID, these are the only means for the fleet management software to interact with the MDR and both fields must be completed. Eight alphanumeric characters are accepted (a-z; A-Z and 0-9).

4.3.4 User Security

Browse to **Settings → System → User Security**. The screen shown below (left) will be displayed.



By default the UNIT ID is 0. The password for each user type follows:

- Administrator Password: 88888888
- Power User Password: 66666666
- User Password: 22222222

There are three levels of security depending on the user account. The respective password can only be changed by logging in as Administrator. By logging in as a **Power User**, majority of the operations are available as per an Administrator account. FORMAT, USER SECURITY and SYSTEM LOG options (above middle) are not accessible. Formatting the storage media (FORMAT) and accessing/deleting system log or snapshots (SYSTEM LOG) are not allowed. It is not possible to browse to these sub-menus.

The image (above right) illustrates the two menus accessible by logging in as **User**. Recordings can be viewed, exported and information accessed regarding modules or historic data collection. By switching PASSWORD ENABLE Off, security is disabled and access is equivalent to an **Administrator** user which allows modifying every single parameter and deleting any data. Brigade encourages changing passwords periodically for all the three types of right access aforementioned and keeping these credentials secured.

4.4 Peripheral Settings

This section explains the process of configuring the communication port related to the optional accessories. By default on the MDR-408-1000, the Remote Panel (MDR-400-RP01) is configured to be plugged into port 1 of the RS485 and the External G-Sensor (MDR-400-GS01) to be plugged into port 2. The cable loom MDR-408-TRIG is labelled with labels for the G-SENSOR and REMOTE PANEL. No further action is necessary when the optional accessories are plugged into their relevant ports.

Regarding the MDR-404-500, there is a single option only as this device is equipped with a single RS485 port. By default, this option is set to NONE.

Browse to **Settings → Peripheral → Ext. Com Setup**, the screen (below) will be displayed.

Note: This image illustrates an example for the MDR-408-1000 where options are mutually exclusive. The equivalent for the MDR-404-500 will not have the RS485-2 option.



5 Recordings

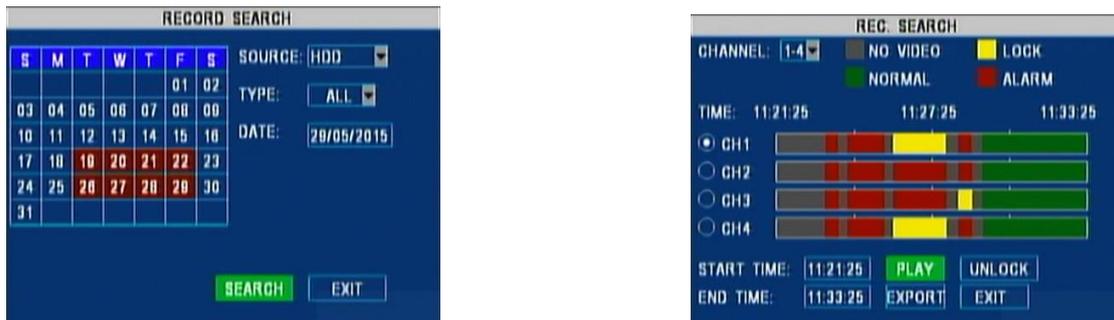
This chapter describes the operation of the MDR once it has been setup successfully.

Note: When accessing the menu, recording stops and only resumes when the setup menu is closed.

Warning: The start-up time to recording for the MDR-404-500 is approximately 80 seconds. The start-up time to recording for the MDR-408-1000 is approximately 90 seconds. Please wait at least 3 minutes after ignition is applied. Brigade will not be responsible for any events not recorded during this start-up period. There are three ways in which a user can tell if the MDR is recording: a visible red 'R' (HDD) and a blue 'R' (SD card) on each channel; MDR REC LED will be on; Remote Panel REC LED will be on (optional accessory).

5.1 Record Search by Type

The image below (left) illustrates the main window found by browsing to **Recordings → Rec. Search**



The image above (left) shows a calendar view for the current month. Change the DATE in order to move to any previous month view. Select the SOURCE, which can be either HDD or SD-BACK. The HDD contains recordings at normal quality whereas the SD card contains all recordings in sub-stream mode (i.e. at CIF resolution and lower frame rate – see section 4.1.5 Sub-Stream Settings). Finally select the TYPE of recordings to look for: ALL kinds of recordings; ALARM only recording (if users need to view/export event triggered alarms). Select SEARCH and proceed to the next screen (above right).

In this example: grey areas (11:21:25) represent a time period with no recordings; red areas (11:24:25) contain at least one alarm during the 15 minute RECORD FILE TIME interval (see section 4.1.1); yellow (11:27:25) represents locked alarm files and green periods (11:33:25) are normal recordings.

Note: For the MDR-408-1000 only, select CHANNEL in order to move to the remaining 4 channels (i.e. 5-8).

Channels can only be viewed/exported one channel at a time. Select the channel to be viewed/exported (in this example CH1) by browsing with the up/down arrows ▲ ▼ and then selecting the ENTER button (the radio button would move to the selected channel).

Select the timeframe by entering into START TIME and END TIME. Users will notice that the view of the channels will be refreshed and updated immediately after the cursor will move outside those boxes (i.e. to PLAY). Finally select PLAY and view the selected recording for the chosen channel.

In play mode:

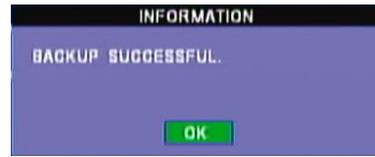
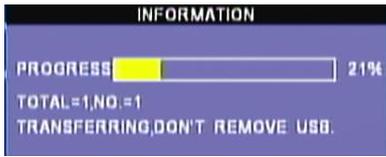
- ▶ is used as a **Pause** button. By pressing it repeatedly, it changes to STEP mode which enables a “frame by frame” playback.
- ▶ is the standard **Play** button.
- ⏪ is the **Slow** button and allows users to play at 1/2, 1/4 and 1/8 of the standard speed.
- ➔ is the **GoTo** button which allows users to enter a **time inside** the timeframe selected by START TIME and END TIME.
- ◀ is the **Rewind** button that can rewind the video at 2x, 4x and 8x.
- ▶ is the **Fast Forward** button that can playback the video at 2x, 4x and 8x.

UNLOCK is used to unlock recordings that were previously marked as locked (see LOCKED FILE RETENTION in section 4.1.1 Options).

Note: If playback of a particular video recording is in a different video format from the current settings, it cannot be played. Please, switch the VIDEO FORMAT to the correct format (see section 4.1.1 Options).

5.1.1 Exporting Recordings

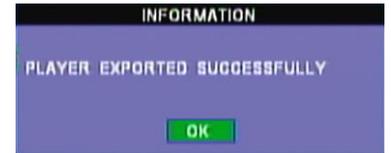
Plug a USB pen drive into the front USB port of the MDR and select **EXPORT**. An option to select a single channel or ALL channels will be shown. A progress bar below (left) is displayed, indicating the TOTAL number of files and the current file number exported.



Once the exporting is complete, a confirmation window will appear above (right), unless an error has occurred such as no external storage detected or a lack of memory space.

5.1.2 Exporting MDR-Player

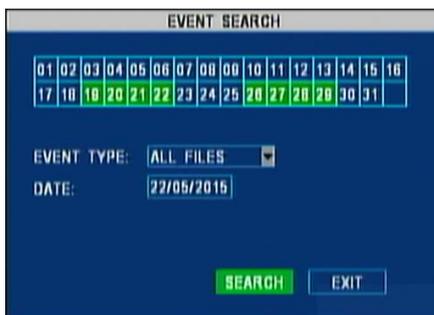
By browsing to **Settings** → **Record** → **Other Settings**, users will be presented with an option (below left) for exporting an executable MDR-Player onto a USB pen drive (plugged into the front USB port of the MDR). Ensure the pen drive is plugged in before selecting EXPORT MDR-PLAYER.



On the USB pen drive a folder called MDR-Player will be created containing the executable file. The images above illustrate the 3 steps for exporting the player. This feature is useful if data needs to be exported and sent to an end user without access to these players.

5.2 Event Files Search by Type

The image below (left) illustrates the main window found by browsing to **Recordings** → **Event Search**.



EVENT LIST						
SEL	TYPE	NAME	DATE	TIME	REC	FIRST
<input type="checkbox"/>	A	MD	2015-05-22	14:10:00	R	PGUP
<input type="checkbox"/>	E	VL	2015-05-22	14:00:47	R	PGDOWN
<input type="checkbox"/>	E	VL	2015-05-22	14:07:57	R	LAST
<input type="checkbox"/>	A	MD	2015-05-22	14:07:53	R	REV
<input type="checkbox"/>	A	SHK	2015-05-22	14:07:51	R	EX LOG
<input type="checkbox"/>	A	MD	2015-05-22	14:07:40	R	EXPORT
<input type="checkbox"/>	E	VL	2015-05-22	14:07:44	R	EXIT
<input type="checkbox"/>	A	MD	2015-05-22	14:00:00	R	

Similarly to the Rec. Search window, this shows a calendar view for the current month. Change DATE in order to move to any previous month. EVENT TYPE allows selecting the kind of event which can be as follows:

- IO ALARM for trigger sensor alarms. See section 4.2.1
- G-FORCE for alarms related to acceleration. See section 4.2.5
- SPEED for alarms related to low/high speed. See section 4.2.3
- TEMP. ALARM for alarms related to low/high temperature. See section 4.2.4
- MD ALARM for motion detection activation. See section 4.2.6
- BD ALARM for camera blinding detection.
- VIDEO LOSS for alarms triggered when no video is detected from cameras.

By selecting SEARCH the screen above (right) will be shown. This screen illustrates all events for the day. Using the up/down arrows ▲▼ and then pressing the ENTER button on the remote control, users can select the event (E) or alarm (A) and an X will appear under the SEL column. The TYPE column indicates if this is an event or an alarm, whereas the NAME gives an indication of the type of event. In the example above, there are motion detection (MD), video loss (VL) and G-Force shock (SHK). In addition there is a DATE and TIME of the event and a red letter **R** under the REC column to indicate if a recording is associated to the event.

For further details on the meaning of the event NAMES, please, refer to Events Table.

Four buttons allows users to browse pages. FIRST and LAST moves to the first and last entry respectively. PGUP and PGDOWN allows users to scroll up and down the pages

REV is a useful feature which allows users to inverse the selection of the entries on the same page. In other words, the cells already denoted with an X, will be blanked and the blanked ones will be marked with an X.

5.2.1 Exporting Log Files

There are two types of export functions:

- EX LOG allows users to export the selected entries (above right) onto a USB pen drive plugged into the front of the MDR in the form of a log file which will be stored in the folder containing the recordings for the same day. The location follows the format \MDVR-X05\UUUUU\YYYY-MM-DD\log\event and this will be read by the MDR-Dashboard and presented in a more user friendly.
- EXPORT allows users to export the selected event/alarm video files (above right) onto a USB pen drive.

Note: Ensure the red letter R is present for the selected event otherwise an error message will appear stating that no related video file is present.

6 Miscellaneous

This chapter explains features that are not frequently used, but constitute important information about configuration and diagnostic routines.

6.1 HDD/SD Formatting

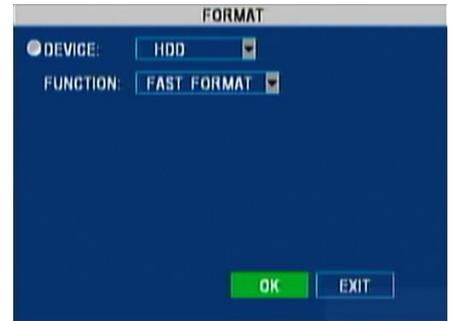
Browse to **Settings → System → Format** and the following screen (right) will appear. Devices to format are below:

- HDD – main storage medium.
- USB – whenever a USB pen drive is plugged to the front of the MDR.
- MIRROR SD – internal SD card or the fireproof box MDR-400-FPB-32.

The user chooses whether a fast format or slow format is suitable. In order to format the fireproof box, SD CARD TYPE must be set to external (see section 4.1.1 Options).

Note: Slow format is only available for HDD and will check whether the disk has any bad sectors and will attempt to repair them. If repairing is not possible, these sectors will not be used again to prevent data loss.

After formatting the device, the MDR will restart itself automatically.

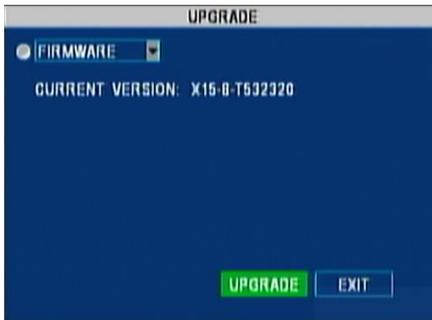


6.2 Firmware Upgrade

There are two kinds of software which may need upgrading. These are:

1. FIRMWARE – this is OSD related software and directly affects the user interface.
2. MCU – this is software related to hardware functions.

By using a PC, create a folder named **dvrupgrade** in the root directory of a USB pen drive and copy either the MCU or Firmware files (or both). Plug the USB pen drive onto the front of the MDR and then browse to **Settings → System → Upgrade** and the following screen will appear.

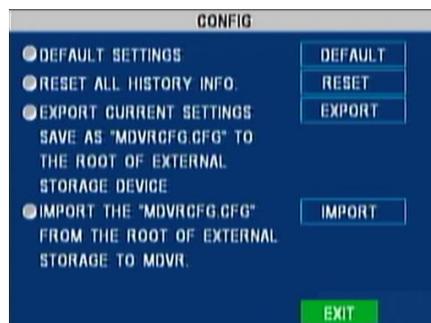


Select the appropriate upgrade as explained above and select UPGRADE. The screen on the right hand side above will appear. After the upgrade, the MDR will restart itself. Check if the Firmware/MCU has been upgraded successfully by pressing the ENTER button on the remote control.

Warning: Ensure the pen drive is not unplugged from the MDR during this process. Power must be supplied to the MDR without any interruption. Both firmware and MCU upgrades are very sensitive operations and any power loss may permanently damage the MDR.

6.3 Configuration

This section explains the four main functions related to configuration management. Browse to **Settings → System → Config** and the following screen will appear:



6.3.1 Restoring Default Settings

Use this feature to restore the configuration to its default factory settings. Any configuration will be lost, except from video recordings and historical data (highest/lowest temperature, mileage etc.). Select the DEFAULT button next to the DEFAULT SETTINGS.

6.3.2 Restoring History Info

This feature is used to clear any previous data relating to vehicle information such as minimum and maximum voltage, temperature, mileage etc.

6.3.3 Exporting Current Settings

In the case of using an existing vehicle configuration on several other vehicles, the MDR provides an 'export to USB' (current configuration) pen drive feature.

Plug an **empty** USB pen drive into the front USB socket of the MDR and then select EXPORT beside EXPORT CURRENT SETTINGS. A configuration file named MDVRCFG.CFG will be created on the root of the USB pen drive.

Note: Whenever another file with the same name is present, this file would be overwritten.

6.3.4 Importing Settings from USB

This process is used for duplicating particular settings onto several units.

Plug a USB pen drive into the front USB socket of the MDR containing a configuration file (named MDVRCFG.CFG) on the root and then select IMPORT to the right of IMPORT THE SETTING FILE. This file will be loaded onto the MDR and configuration will be applied after an automatic restart.

6.4 System Log

This section explains the four main functions related to system log and snapshots (see sections 4.2.2 and 4.2.8). Browse to **Settings → System → System Log** and the screen below will appear.



6.4.1 Exporting Log Files

Plug a USB pen drive into the front USB socket of the MDR and then select EXPORT SYSTEM LOG. A folder named **userlog** will be created containing subfolders related to the vehicle ID and unit ID (see section 4.3.3). A text file named userlog-YYYY-MM-DD-xxxxxxxxxx.log will be saved within the userlog folder. This file can be read using any text editor. It contains information such as log-in/out time, recording start/end, event time, GPS status and power on/off time.

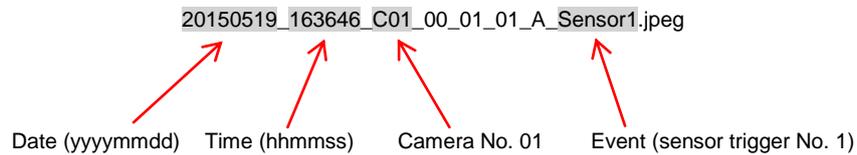
For a full description of all the messages contained in the file, please, refer to section 14.4 User Log Description.

6.4.2 Delete System Log Files

This operation will permanently delete all stored system information without any means of recovery.

6.4.3 Exporting Snapshots

Plug a USB pen drive into the front USB socket of the MDR and then select EXPORT SNAPSHOTS. A folder on the root of the pen drive named **snaphoto** with subsequent sub-folders (named with the date in the format YYYY-MM-DD) will be created. All the camera snapshots will be downloaded into their appropriate subfolders and named with a date, time and the event information as shown in the example below.



Please, refer to sections 4.2.2 and 4.2.8 for snapshot event configurations.

6.4.4 Delete Snapshots

This operation will permanently delete all the stored pictures triggered by events without any means of recovery.

7 Additional OSD Features

This section explains the usage of special alarm configurations.

7.1.1 Camera Alarms

Note: Blind detection is not recommended when using cameras with infrared illumination.

With reference to sections 4.1.1 Options, 4.2.6 Motion Detection and 4.2.2 Alarm Outputs, the screens illustrated below, allow users to configure video loss and blind detection behaviours.

VIDEO LOSS occurs due to an unexpected/unwanted disconnection of a particular camera. BLIND DETECTION occurs when a camera is obstructed by a large object or deliberately. These two alarms are mostly used in order to tackle acts of vandalism. It is useful to activate alarm recordings for all cameras in order to identify any possible issue.



Video loss recording is active by default (above left). When this recording has to appear as an alarm, this needs to be activated in the CAMERA settings (above centre). Additionally, such an alarm can enable the output triggers and snapshots (above right).

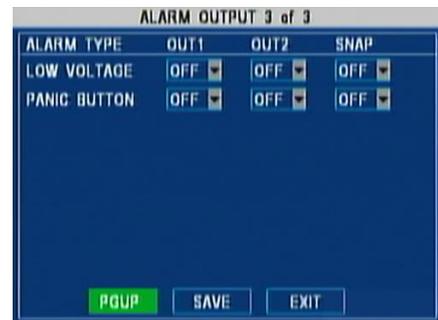
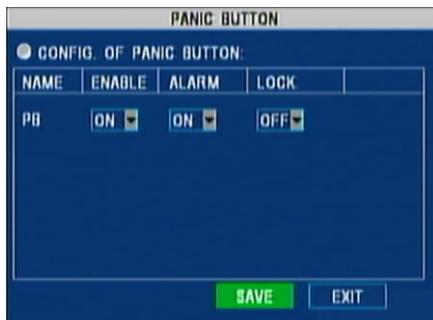
Note: By deactivating the Video Loss recording, the MDR records only from channels that produce a video signal.

Similarly, Blind detection can be activated and its sensitivity (B.D. SENSITIVE where 1 represents high sensitivity and 4 is the least sensitive) can be adjusted (above centre).

7.1.2 Panic Button

The panic button is a red button located on the optional MDR 4 Series Remote Status & Interface Panel (MDR-400-RP01). By pressing and holding it for more than 2 seconds, an alarm can be activated shown below (left).

Browse to **Settings** → **Event** → **Panic Button** in order to disable it. Alternatively, add the LOCK option (see LOCKED FILE RETENTION in section 4.1.1 Options).



Browse to **Settings** → **Event** → **Alarm Output** as explained in section 4.2.2 to configure the output triggers and snapshots (above right).

7.2 Language

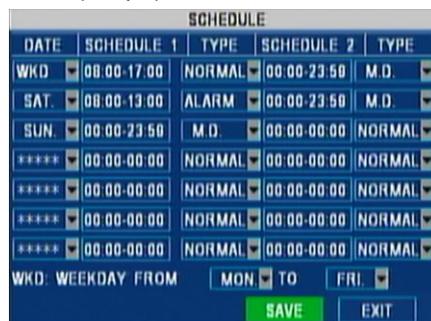
Browse to **Settings** → **Peripheral** → **Language Setting** in order to change the language from default English to one of the following options:

- Russian
- Spanish
- Polish
- Portuguese
- Turkish

Once the language has been selected press SAVE and then exit the OSD. The device will then reboot to activate the new OSD language.

7.3 Scheduled Recording

Browse to **Settings** → **Record** → **Schedule** in order to specify up to 7 x 2 scheduled recording combinations:



Note: Ensure that ON/OFF Type is on TIMER (or IGNITION OR TIMER) as explained in section 4.3.2 - ON/OFF TYPE. This will enable users to either select the time for the MDR boot-up and shutdown or otherwise use the AUTO BOOT UP ON SCHEDULE option. Also ensure that RECORD MODE is on TIMER as explained in section 4.1.1 - RECORD MODE.

The picture above illustrates an example of scheduling using only 3 out of 7 options. In this case, the WEEKDAY (WKD) is defined as Monday to Friday (see bottom line).

The first row specifies that during the weekdays, normal recording is activated between 8:00 and 17:00 and on motion detection for the rest of the time.

The second row instead specifies that Saturday between 8:00am and 1:00pm recording is only activated by alarms whereas the rest of the time by motion detection.

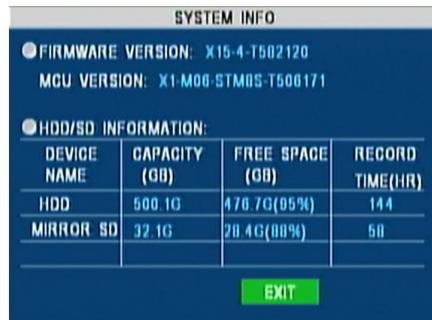
The third row specifies a single behaviour for the whole Sunday in which recording is activated uniquely by motion detection.

7.4 Information Menu

This section explains the content of the three groups of information as follows.

7.4.1 System Info

Browse to **Information** → **System** to display information about the firmware/MCU versions and the media storage. Firmware/MCU information can also be found by pressing the ENTER button on the remote control. The media storage section gives an estimation of the **remaining** recording time available. The image below shows an example:



7.4.2 History

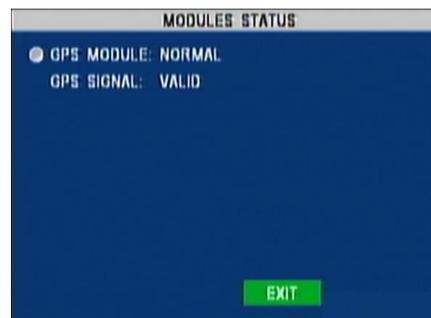
Browse to **Information** → **History** to display information related to speed, G-Force, Voltage and Temperature. The screen below illustrates the first page with information about speed and total mileage.



Highest speed contains the date and time of the occurrence. The total mileage is calculated by adding the recent mileage to the vehicle mileage at the time of the MDR installation (see section 4.2.3 - CURRENT MILEAGE). Use the CLEAR buttons to reset these values.

7.4.3 Module

Browse to **Information** → **Module** to display the GPS module status. This screen (below) provides information about the signal reception and if it is normal or abnormal operation.



8 MDR-Player

MDR-Player is a simple and portable player which allows visualisation of fundamental recording information. It can be utilized in three different forms:

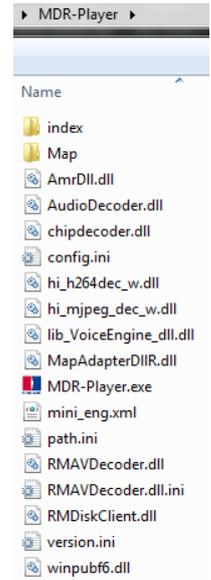
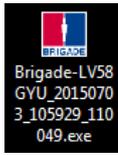
- Storing a folder containing the executable file which is supplied on the CD with the MDR.
- By exporting the folder to a USB pen drive directly from the MDR. Please, refer to section 5.1.2 - Exporting MDR-Player.
- By loading a video clip with an embedded MDR-Player using MDR-Dashboard. Please, refer to section 9.8.

8.1 PC System Requirements

The system is compatible with a PC running Microsoft Windows™ 7, 8.x (32-bit or 64-bit version) and 10 operating systems, a USB 2.0 Type-A connector, which will be used to connect the mobile caddy unit containing the HDD. A USB cable with USB standard type A plug to standard B plug (MDR-400-USB-B) is provided with the MDR.

8.2 Embedded MDR-Player

The embedded MDR-Player is a single executable file that can be password protected (user choice) which is generated by the MDR-Dashboard. The file contains an exported clip with the MDR-Player. By double-clicking on the .exe file, the MDR-Player is launched and automatically displays the recordings with the embedded data as explained in further details in section 8.4 below. The following images below show the appearance of the icon for a generated clip and the password.



8.3 Setting up MDR-Player

MDR-Player does not require any installation. It is sufficient to copy the folder found on the CD provided with the MDR and paste it into a safe location on the PC.

Alternatively the MDR can export the whole folder to a USB pen drive. Both methods produce a folder named MDR-Player with the content as illustrated (right). Refer to section 5.1.2 - Exporting MDR-Player for the second method. Double click on the Brigade logo named MDR-Player.exe to start the program.

8.4 Basic Operations

MDR-Player allows three ways of loading the data:

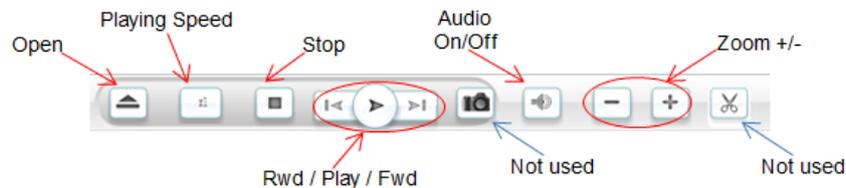
- From a clip with embedded MDR-Player (as explained in section 8.2)
- Opening a file
- Opening a directory

The following interface will appear as shown below. The picture (below) illustrates a multiple camera view, a timeline with control buttons, a Google Maps view and an information panel.

Note: In order to use the maps feature, an internet connection is required.

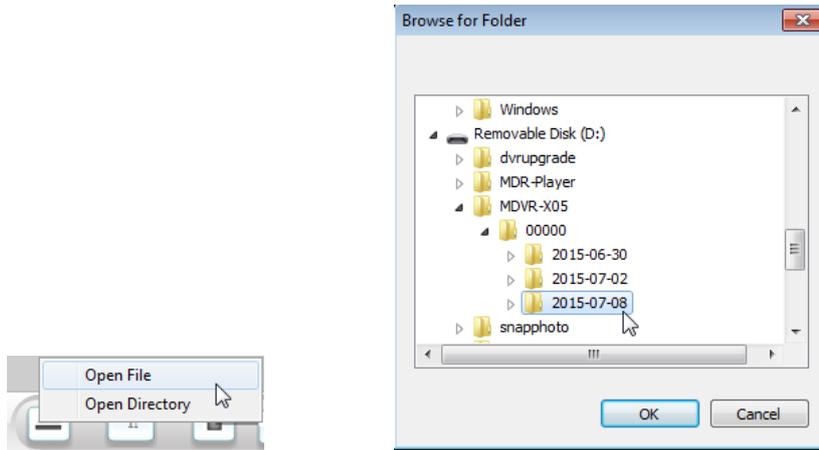


By clicking the Open button (below) users can load a file or directory.



Selecting **Open File** (below left), a Windows™ Explorer browsing dialogue is displayed. Navigate to the folder where the **.h264 native files** are. If users select the file for one single channel, MDR-Player will automatically load the other channels (if present) corresponding to the same time frame.

Selecting **Open Directory** requires users to browse and select a **folder by date** as illustrated (below right).



Once the data has loaded, users can play the videos (maximum 4 channels for the MDR-404-500 or 8 channels for the MDR-408-1000). Double clicking on a single channel image would trigger this channel into full screen. Audio playback from channel 1 is played when multiple channels are displayed. Users can select a different audio source by single clicking another channel image. During playback, users can zoom in/out on the timeline by either using the +/- button or by using the mouse scroll wheel.

Note: The background of the timeline moves and the yellow line stays stationary. Drag the background of the timeline to the desired point (marked by the yellow vertical line).

The screenshots below (right) illustrates how the mouse pointer changes shape (double arrows), when holding down the left button and dragging it left or right on the timeline.

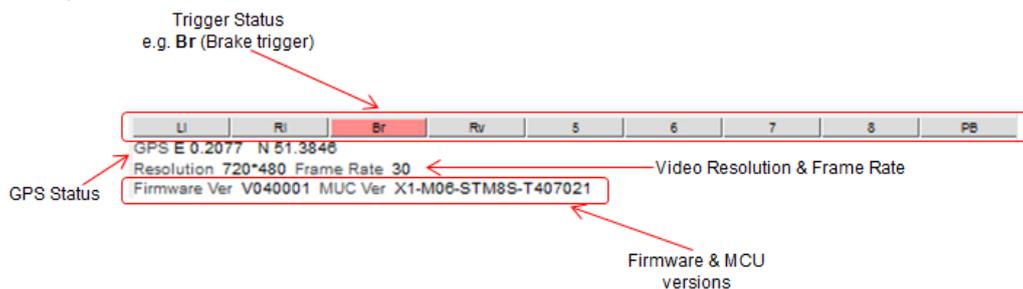


The graphs displayed in the screenshots (above) are related to the vehicle speed. Other graphs can be shown by clicking on the data panel (below the Map area). The pictures (below) illustrate the graphs of Voltage, Temperature and G-Force.



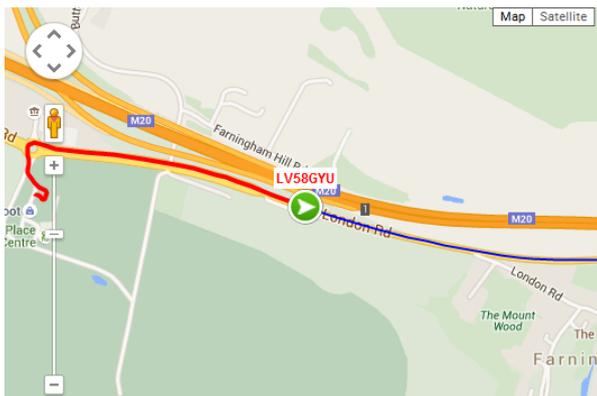
The data panel located in bottom right corner in main window (above right) shows the corresponding values for speed, MDR supply voltage, temperature and G-Force at the time marked by the yellow line.

Below the data panel, other information concerning sensor trigger status, GPS location, Firmware/MCU and video recording parameters are displayed (shown below).



In the maps (below) tracking information refreshes continuously while playing and displays the vehicle number (in this example LV58GYU – see also section 4.3.3 to set this). Zooming in and out on the map can be done by the +/- buttons; by dragging the slider or by using the mouse scroll wheel.

Note: The Hand tool allows users to move the map, but the image is periodically refreshed in order to keep the vehicle in the centre of the map.



The red trace indicates the route that has been travelled while the blue represents the route ahead. Google Maps Satellite and Street View are also supported on the MDR-Player.

9 MDR-Dashboard

MDR-Dashboard software is used for advanced local playback, analysis, clipping, GPS tracking, vehicle information and events/log display. Remote playback is possible with 3G and Wi-Fi capable MDRs. It allows exporting video clips in three different ways:

- As proprietary format (readable only by MDR-Dashboard and MDR-Player).
- As an executable file containing an embedded version of the MDR-Player.
- As a standard .AVI (without metadata) format.

Aside from exporting features and event/log display, the MDR-Dashboard can read directly from the HDD caddy or the internal SD card. These features are not available on the MDR-Player.

9.1 PC System Requirements

The system requires a PC with a USB 2.0 Type-A connector, which will connect the mobile caddy containing the HDD to the PC. A USB cable with USB standard type A plug to standard B plug (MDR-400-USB-B) is provided with the MDR. The MDR-Dashboard is compatible with Microsoft™ Windows™ 7, 8.x (32-bit or 64-bit version) and 10 operating systems.

Note: In order to use the maps feature, an internet connection is required.

9.2 Installing MDR-Dashboard

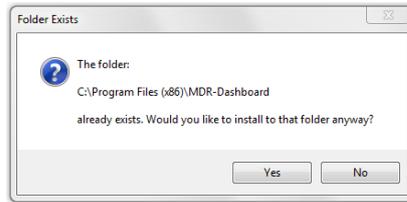
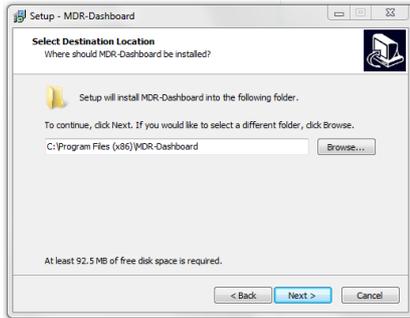
In order to install the MDR-Dashboard, follow these steps:

- Double click on the executable installation file found on the CD.
 MDR-Dashboard(1.0.0.0)_English_Brigade.exe
- Acknowledge the User Account Control window (Depending on the Microsoft Windows configuration).
- Click **Next >** button in order to start the Setup Wizard

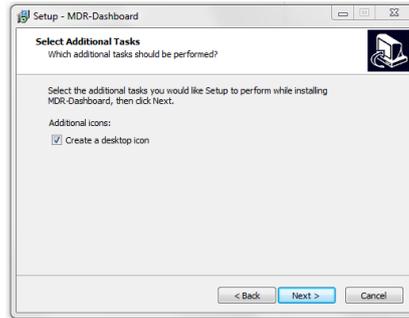
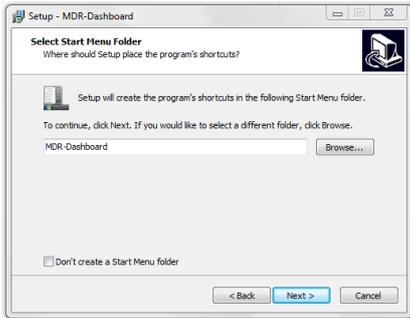


d) Follow the steps in order to complete the installation.

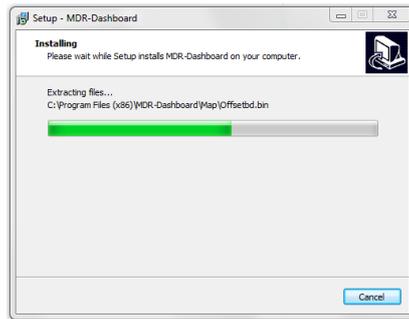
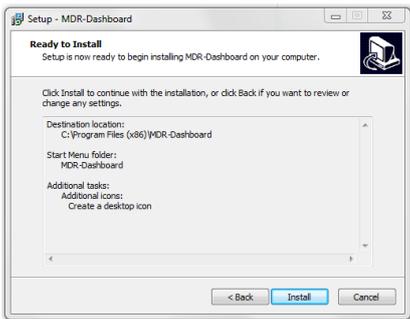
Note: If the folder has been already created by a previous installation, it will ask users to install it in the same folder (as shown in the image below right). Click **Yes** to proceed.



e) The Setup Wizard will create a START Menu folder named MDR-Dashboard (if this is ticked). Click **Next >** button once ready. Subsequently it will create a Desktop icon (if this is ticked) (below right).



f) Once the previous options are confirmed click **Install** (below left) in the next window and observe the installation progress (below right).



g) Once the installation is complete, click **Finish** and it will launch the MDR-Dashboard automatically.

Note: An icon has now been created on the Desktop.

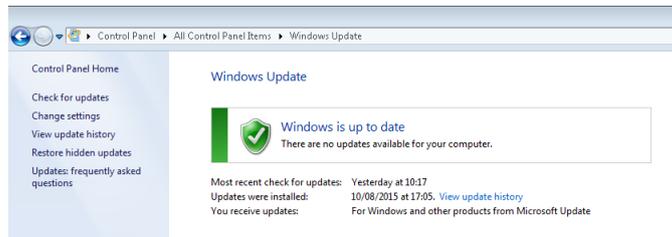


9.3 Connecting the MCU to the PC

9.3.1 Pre-Connection Procedure (Preferred)

Users may follow the below procedure if an internet connection is present.

- Run **Windows Update** in order to have the latest driver database available.
- PC must be up to date with **Windows Update**. Browse to **Control Panel** and then click on **Windows Update** to confirm this. See the below window:



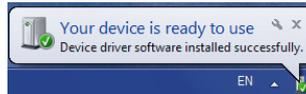
9.3.2 MCU Connection Procedure (Required)

Users must follow the procedure listed below in order to correctly mount the MCU to their PC.

- Connect the USB-B connector to the MCU USB port.
- Connect the USB-A (data and power) connector to a USB port on the PC.
- The pop-up window below will be shown.



- Once the pop-up window below is shown the two drivers and device have installed successfully.



- Users may now open MDR-Dashboard and the HDD will now appear.

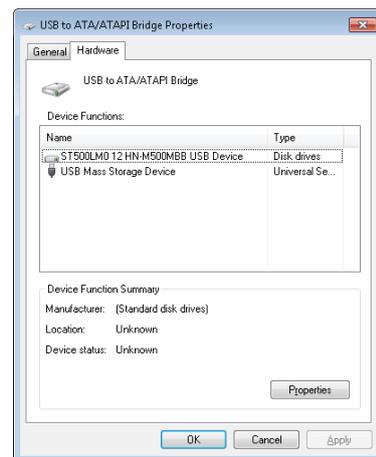
Warning: Premature removal of the MCU USB-A cable from the PC (during driver installation process) will cause this process to fail. This will cause the HDD to not appear in the MDR-Dashboard.

9.3.3 Connection Confirmation

- Open **Control Panel**.
- Browse to **Device and Printers**, the device **USB to ATA/ATAPI Bridge** must show as below.

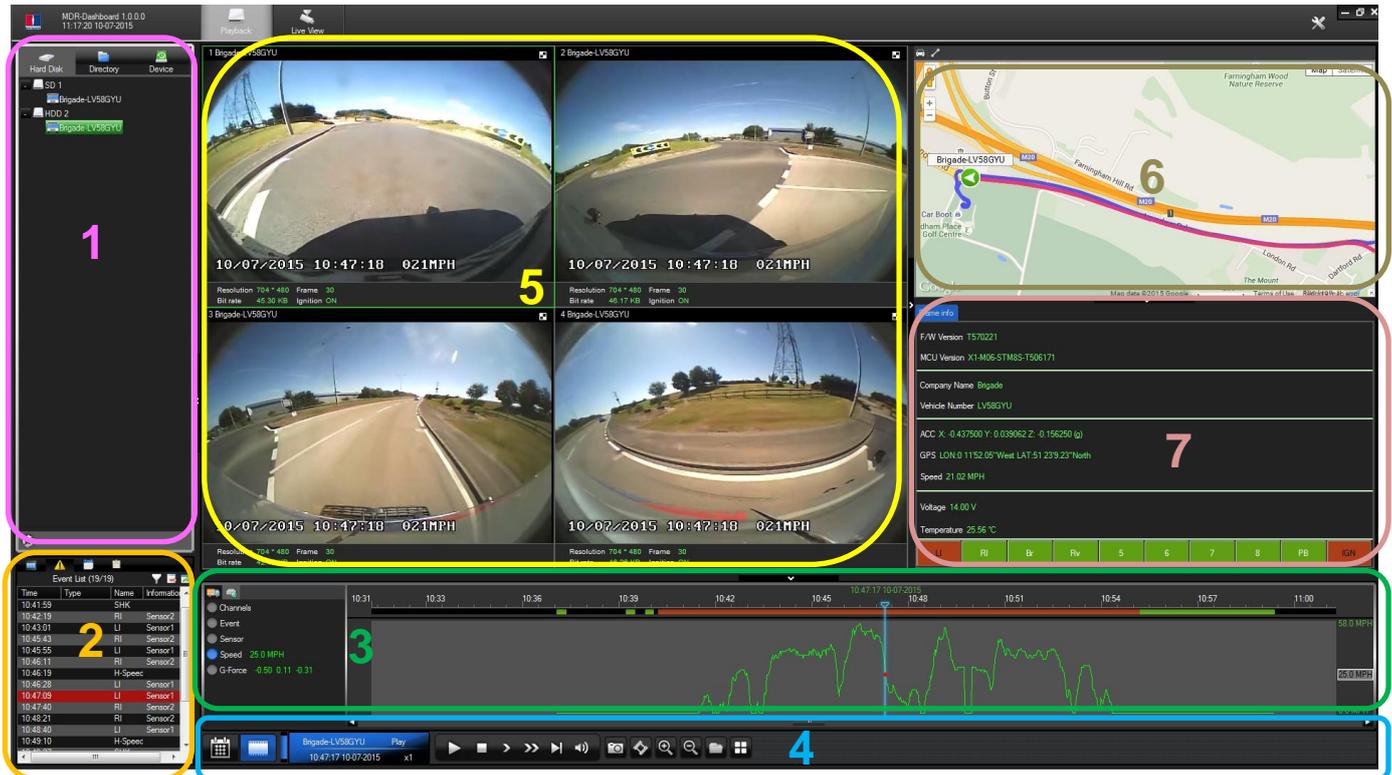


- View the drivers associated with this device, right click the above **USB to ATA/ATAPI Bridge** icon and browse to **Properties**.
- The below window will be presented which shows **General** and **Hardware information**.
- Two drivers must be listed under **Hardware information**, one that represents the USB interface and one for the HDD.



Note: If failure occurs a manual removal of the drivers and a re-start of the PC is required. Please contact Brigade if support is needed.

9.4 User Interface Overview



The MDR-Dashboard user interface is sub-divided into several numbered areas as illustrated in the picture above:

1. Data Source Access
2. Record Panel
3. Graphs Panel
4. Controls Panel
5. Media Playback
6. Map
7. Frame Info.

All of the above areas are explained in greater detail in the following section. During playback, users can zoom in/out on the timeline by either using the +/- buttons or the mouse scroll wheel. The vertical blue line can be positioned to the desired time by either dragging it or by clicking on the timeline directly.

9.4.1 Channel Info

Information about resolution, frame rate and streaming bit rate are shown in all of the 4 or 8 quadrants (area 5). On the top left of each image, users can see the channel number followed by the company number and vehicle number (in the below example) camera 1 shows: "1 Brigade-LV58GYU").

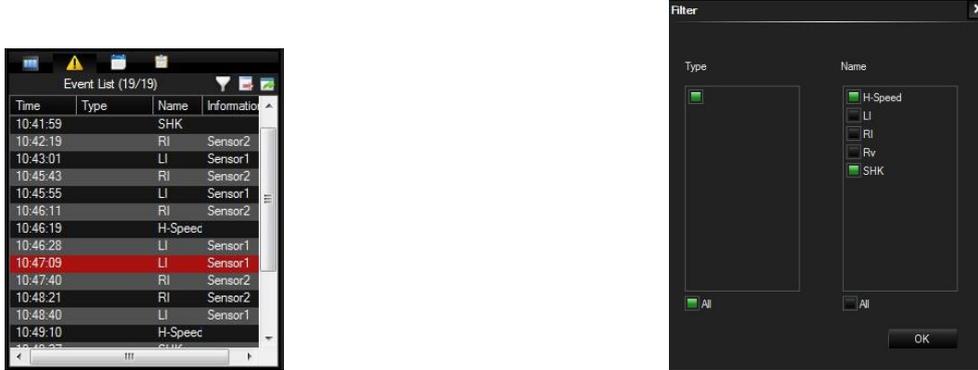


The blur icon  (top right corner) of each channel is used to create a mosaic setting of an area which will be blurred throughout the playback. See below figures for the process. Once users click **OK** (below left) the blur will be applied as an overlay to that channel. See below right for the resulting video channel.



9.4.2 Events, Graphs and Log List

Information about events can be viewed in the Record Panel (area 2) by clicking on the yellow “Hazard sign” (below left). This will provide a list of all the events. Events can also be filtered by clicking on the funnel symbol (on the top right) of the Record Panel (area 2). In the image (below right), high speed (H-Speed) and G-Force (SHK) events are filtered.



Users can also display them graphically by selecting Event from the Graph Panel (area 3) as illustrated below. For further details about the meaning of each entry, please, refer to Events Table, see Appendix 14.5. The events are expressed graphically as narrow bars. The height of each bar varies depending on the type of event.



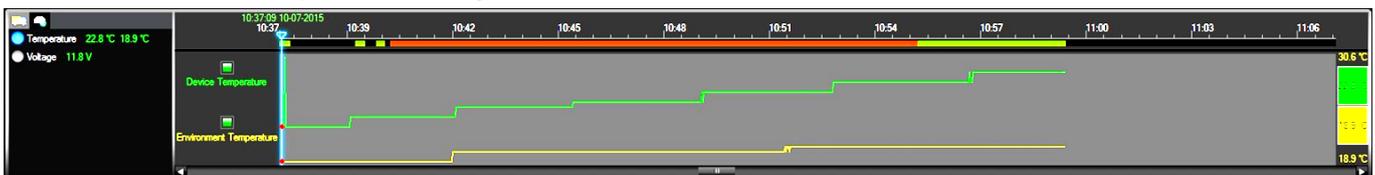
Information about vehicle speed is also displayed as a graph in the Graph Panel (area 3) as shown below.



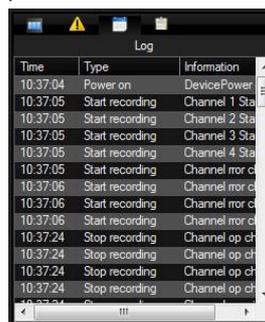
G-Force is displayed as a triple graph with red, green and yellow lines where each colour represents the X, Y and Z axes respectively. There are peaks in both speed and G-Force graphs. These correspond to events (H-Speed and SHK) and can be accessed by double-clicking on an event from the Graphs Panel (area 3). The timeline will move to the appropriate position.



All the variables explained above are related to vehicle information. By clicking on the device icon (to the right of the lorry icon), users can access information such as temperature and voltage as illustrated below:



Clicking on the Notepad™ icon in the Record Panel (area 2) will display main log entries. This is a concise representation of the log file explained in section 6.4 and User Log Description, see Appendix 14.5.



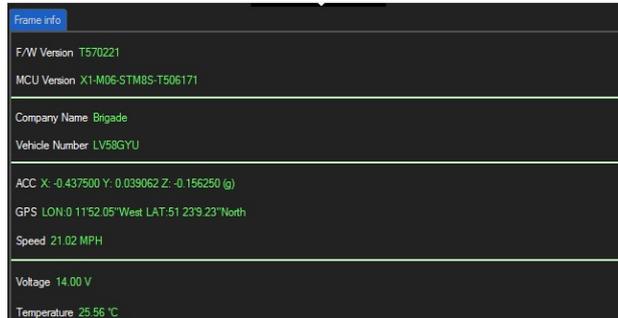
9.4.3 Sensor Status

MDR-Dashboard displays the status of the sensor triggers at the bottom of the Frame Info (area 7). The example below shows the ignition (IGN) and the sensor input named LI (left indicator) triggered.



9.4.4 Frame Info

The Frame Info panel (below) provides information about firmware/MCU version, Register Info, vehicle tracking and vehicle information (temperature and voltage).



9.4.5 Map Tracking

The map (area 6) refreshes the position of the vehicle continuously during playback and displays the vehicle number (in this example named to LV58GYU – see also section 4.3.3). Zooming in and out on the map can be done using the +/- buttons; by dragging the slider or by using the mouse scroll wheel.

Note: The Hand tool allows users to move the map, but the image is periodically refreshed in order to keep the vehicle in the centre of the map.



The two icons on the top left in the image above are used for the following purposes:

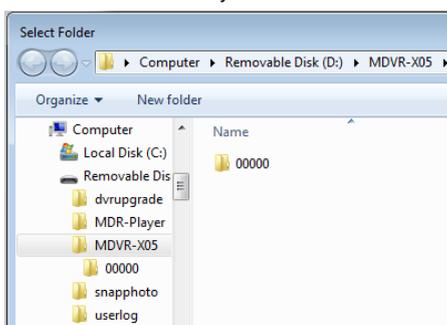
- The car icon can be toggled to have a red disabled sign . In this mode, the map can be freely moved away from the vehicle. If the car symbol is shown without the disabled sign, the map can be temporarily moved, it will return to the vehicle position after a few seconds.
- Two route icon connected by a line  is used to indicate that the vehicle's route is shown. By toggling to this icon  the route will be hidden.

The red trace indicates the route that has been travelled while the blue represents the route ahead. Google Maps Satellite and Street View are also supported on the MDR-Player. As an alternative, MS Bing maps can be chosen (see section 9.10). Functions and operation remain the same as per Google Maps.

Note: Changing maps requires restarting the MDR-Player which will be requested once the setting has been changed.

9.5 Loading from a USB pen drive or a Folder

This procedure applies to recordings previously downloaded from the MDR and saved onto a USB pen drive or recordings manually saved directly onto a PC. In order to read exported files click on the Directory tab found on the Data Source Access (area 1). Click on the + sign at the bottom of the panel. This brings up a Windows™ Explorer dialogue box (below left) which allows users to select the folder that contains the recordings. The folder **selected** is always named **MDVR-X05**.



Once the folder has been successfully loaded, it will appear as shown in the MDR-Dashboard (above right). In this example, 00000 is the vehicle number.

9.6 Loading from HDD/SD

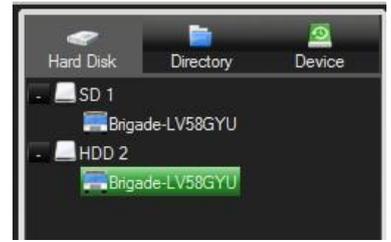
This process allows users to load the content of either a connected HDD Caddy (using the MDR-400-USB-B cable) or a mirror recording from the internal/external SD Card.

Note: In order to read the HDD and SD card ensure MDR-Dashboard is run with **Administrator** rights. Right click on the MDR-Dashboard icon and select  **Run as administrator**.

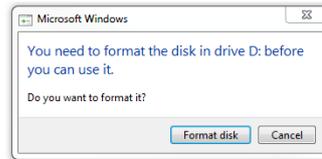
Reading these media storage devices may be slow depending on the amount of data recorded and the speed of the interface.

Note: HDD are hot pluggable, so the HDD can be removed and reconnected. Click on the refresh icon

 at the bottom of the Data Source Access (area 1) to refresh the panel list. SD cards are **not** hot pluggable. In order to safely remove the SD card, click on the Safe Removal icon at the bottom right of the Windows™ bar (see picture bottom left).

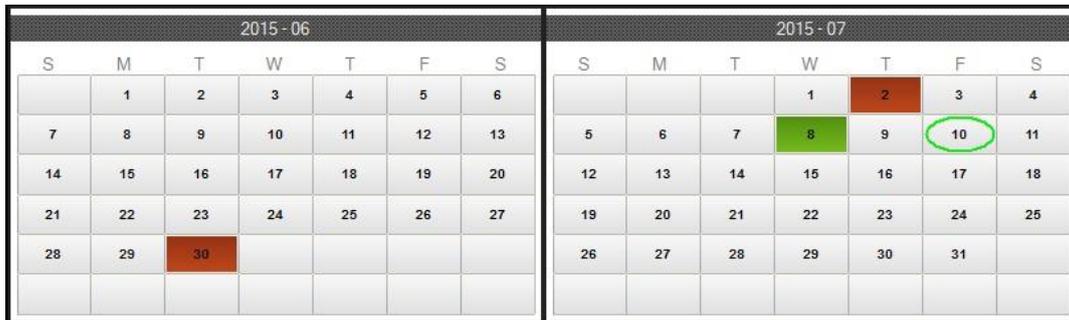


Warning: After inserting SD cards into a SD card reader, Windows™ may request to format them as shown below (right). Click **Cancel**.



9.7 Reading Data

Double click on the vehicle icon as shown above in 9.6. A calendar view will appear for all months where recordings are present. Days marked in orange contain at least one Alarm recording whereas days marked in green contain only Normal recordings. The current day is circled in green or marked in orange/green if there are recordings present.

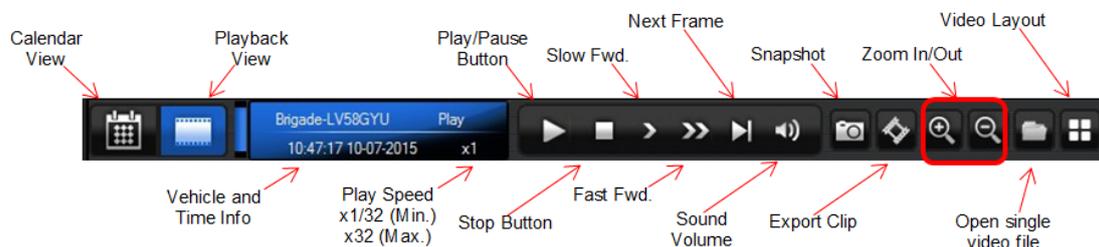


Click on any of the dates containing recordings which will open the timeline as shown below.

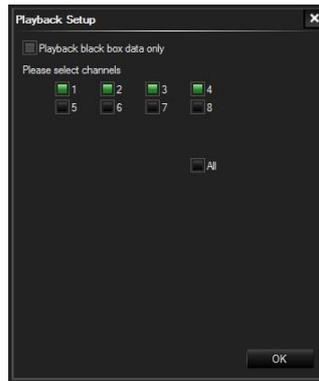


Note: The red areas contain at least one alarm during the 15minute RECORD FILE TIME (see section 4.1.1). In the Record Panel (area 2) the list of recordings are loaded as shown (above right).

At this stage, click the **Play** button (as shown below) in order to display the data.



After clicking Play, a window shows selection options of camera playback. By ticking the first option (*Playback black box data only*), users can opt to display data only (i.e. events, log file, tracking and vehicle information).



At this stage the recording should be displayed. Recordings may be played at different speeds (1x, 2x, 4x, 8x, 16x, 32x) by clicking on the **Fast Fwd.** Users should move the blue time line to the desired position. By clicking on the Video Layout icon, six different video layouts can be chosen. Playback speeds can be reduced down to x1/32 by clicking on the **Slow Forward** button.

9.8 Exporting Videos

There are three options for exporting video clips. All options begin with the same procedure:

- Click on the Clip button (below)
- Orange clip markers appear (below)
- Select the start and end time for the clip
- Once satisfied click on the Tick symbol (illustrated below)



The following window will appear to choose the channels, clipping time (when unhappy with the markers) and the kind of exporting function. There are three types of exporting:

- Clip
- Export
- AVI

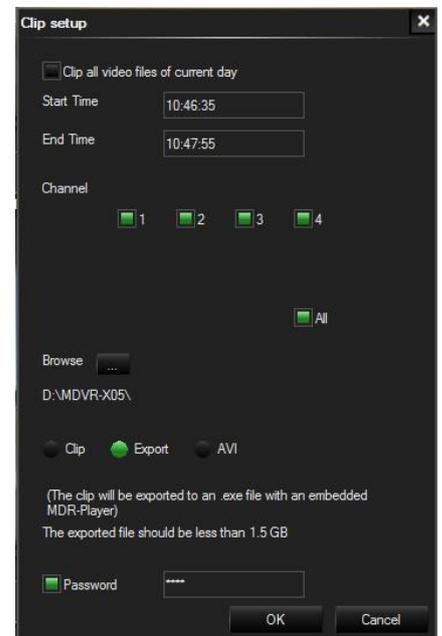
The **Clip** option cuts the clip and creates a folder structure containing the video files in original proprietary format (H264) onto a local storage device (e.g. HDD).

Note: Users are not allowed to use the same location as the original folder. Once clipped, the files will be found in a folder named with the following format:
\Company_Name-Vehicle_Number\YYYY-MM-DD\record

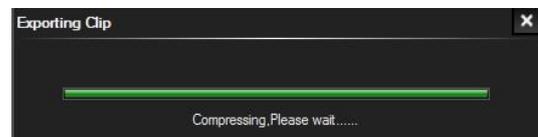
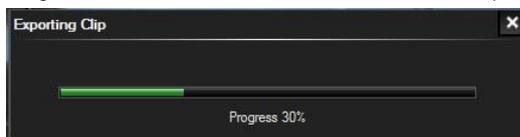
The **Export** option allows users to export clips into a single .exe file with an embedded MDR-Player. This option is the recommended solution as it contains metadata and the Clip. It also can be password protected and played without the need of any additional player software.

The **AVI** option creates .AVI files playable by common players such as Windows Media Player (WMP™) and Video Lan Client (VLC). The advantages of this solution are the portability of the format. The disadvantage is the lack of protection and missing metadata. These files can be played and edited by anyone. The only information contained in the video image is selected by the OSD options (see section 4.1.2 - OSD Overlay).

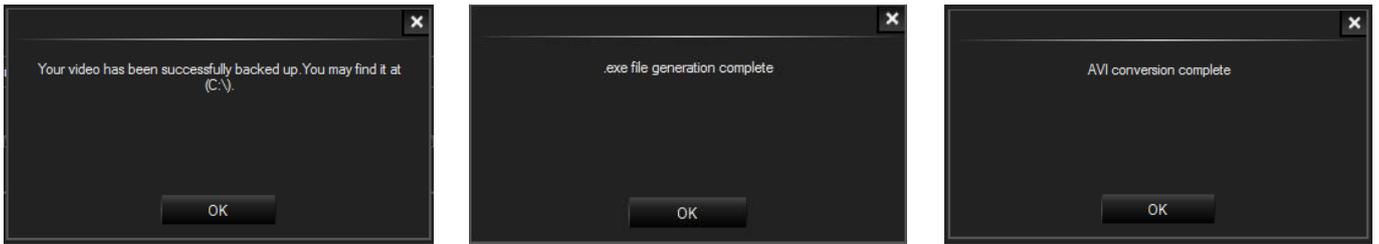
The example on the right, illustrates the process of the Export option.



The following two screens are common to the above three options.



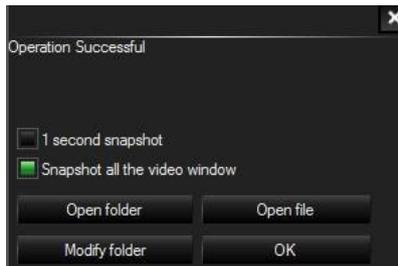
The following screens (below) appear once the files are generated for the **Clip** (left), **Export** (middle) and **AVI** (right) options. A window containing the exported files will automatically open.



9.9 Saving Snapshots

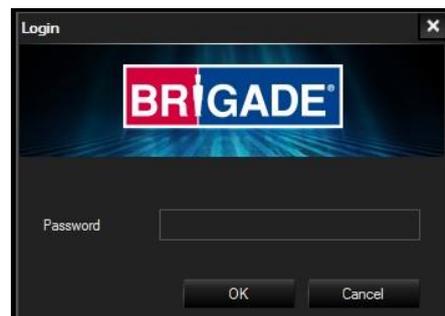
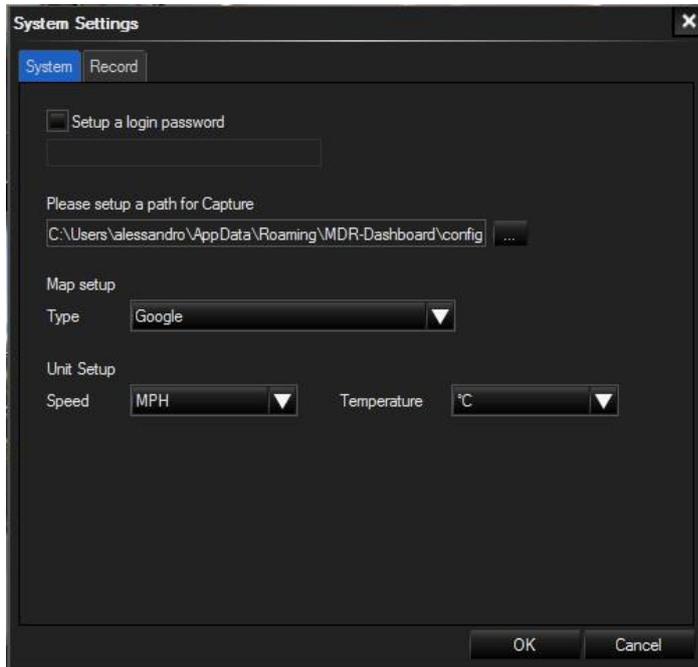
Click on the Snapshot icon  in the Controls Panel (4) in order to take a screenshot of all the channels. The window, below, appears to indicate that snapshots have been taken for each channel and stored in the default folder. Users can either open the folder or change its location (as shown below).

Note: By selecting the *1 second snapshot* while playing, snapshots of each channel are taken every second. In order to take a single set of screenshots pause playback before clicking on the Snapshot icon.



9.10 System Settings

System settings can be accessed by clicking the setting icon  on the top right of the window. The image (below left) represents the system settings in which a login password can be set. By enabling this option a login window (below right) will appear during the start-up of the MDR-Dashboard. This will require the user to type the correct password in order to progress.



A capture location can be defined for the snapshot feature. Maps can be changed from Google to MS Bing. Speed can be either miles per hour (MPH) or km per hour (KM/H). Temperature unit can be either degree Celsius (°C) or degree Fahrenheit (°F). Changing map type or unit requires restarting the MDR-Dashboard to apply the changes.

Note: Record tab is not used.

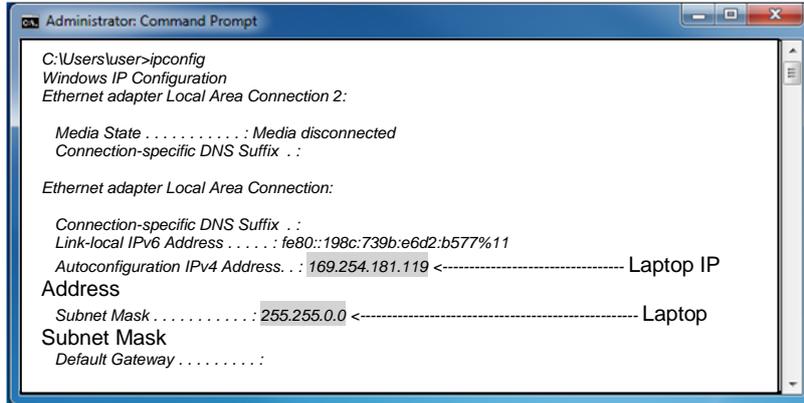
10 Advanced Ethernet Configurations

This section is dedicated to an advanced feature for individuals with networking knowledge which enables access to all MDR functionalities from a Web Browser interface. Typically a Domain Name System (DNS) server is not present in the field or during maintenance activities. This feature is recommended for field operations, diagnosis and configuration.

Note: The configuration requires a Cat5e Cross-Over cable, a Microsoft Windows™ Operating system; a PC with an Ethernet RJ45 port and a wireless adapter with Internet Access (may be needed to download the plugin).

10.1 Setup:

1. Connect the cross-over cable to the laptop and the Ethernet LAN port on the back of the MDR.
2. Open the Command prompt by typing **cmd** within the start-up menu.
3. Type **ipconfig** and the information below will be displayed.

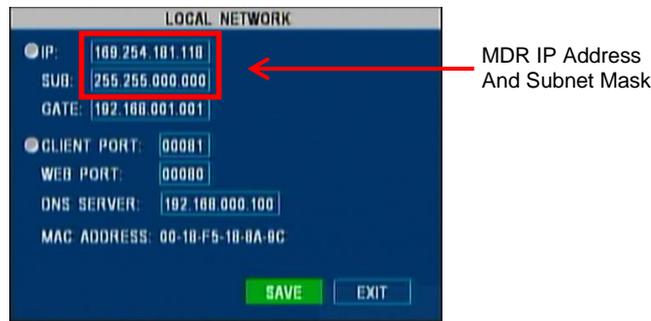


4. Take note of the laptop's Ethernet adapter IP address (169.254.181.119) and the subnet mask (255.255.0.0). In the example above, this is a "Windows self-assigned" IP address.

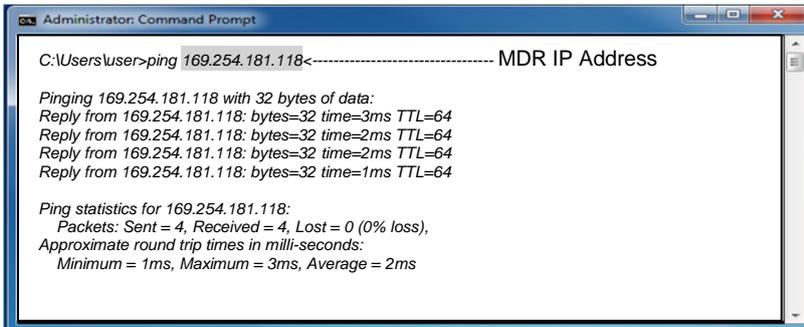
Note: Windows™ self-assigned IP addresses always follow the format of 169.254.xxx.xxx.

5. On the MDR, browse to **Settings** → **Network** → **Local** using the remote control.
6. Setup the MDR IP address (169.254.181.118) and MDR subnet mask (255.255.0.0). Ensure that this falls within the laptop network range.

Note: The IP address can be one digit lower than the laptop IP address. Always use the same subnet mask as the laptop.



7. From the laptop open the Command prompt by typing **cmd** within the start-up menu.
8. Ping the MDR IP address (169.254.181.118) typing **ping 169.254.181.118**. These results are shown below:



9. If unsure, repeat the ping command a few times. Unplug the network cable to prove that the correct IP address is being reached.
10. Open Internet Explorer and Type **http://169.254.181.118** in the address bar. This is the IP address of the MDR (as shown below).

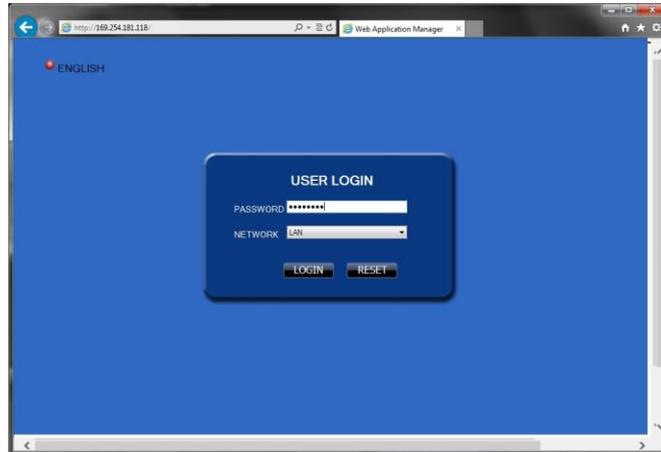
Note: The web interface is ONLY compatible with Internet Explorer.



11. At this point, a pop-up window will appear Internet Explorer requesting permission to allow the installation/running of a plug-in "X155".



- 12. Allow the plug-in and its installation.
- 13. After the plug-in is successfully installed, the login window (below) will appear.



14. There are 3 different types of login users (as explained in section 4.3.4) i.e. Administrator, Power User and User. Enter the appropriate password to grant the correct permissions, and then click **LOGIN**.

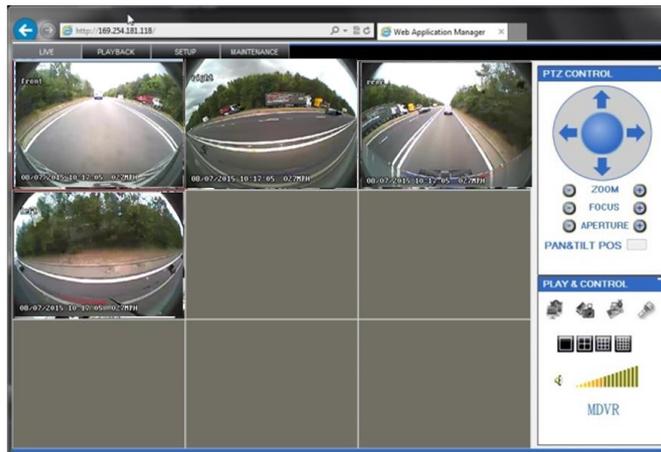
Note: If MDR security is disabled, click **LOGIN** directly.

15. Once logged in, 4 tabs will be displayed as follows: LIVE; PLAYBACK; SETUP and MAINTENANCE.

10.2 Operation:

- 1. LIVE tab allows users to view the live cameras as shown below.

Note: The panel to the right (PTZ control and Play & Control) is not used currently.

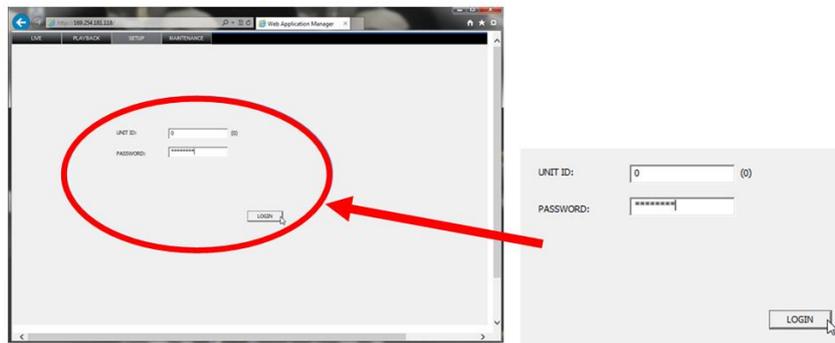


- 2. **PLAYBACK** tab allows users to view and play recordings. Users can **SEARCH** by selecting the date from the calendar (top right area), the type of recording and the source of the recording. Alternatively, scroll the list of recordings and select the recording. Another method of viewing the recordings is by entering the date, the time and selecting the channel from the bottom left of the window. The advantage of this method is viewing multiple channels without having a monitor connected. In the window shown below (left) users can select which channel to be viewed. The image on the right (below) illustrates the playback of 4 recorded channels.

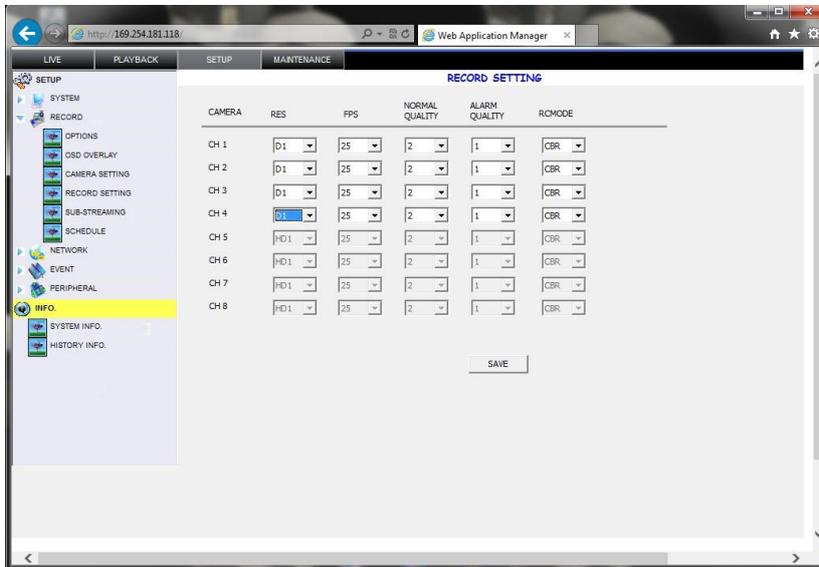
Note: The playback may incur a short delay due to the limited bandwidth available (Ethernet cross-over cable). *Waiting for data* will be displayed on the bottom of the screen during loading.



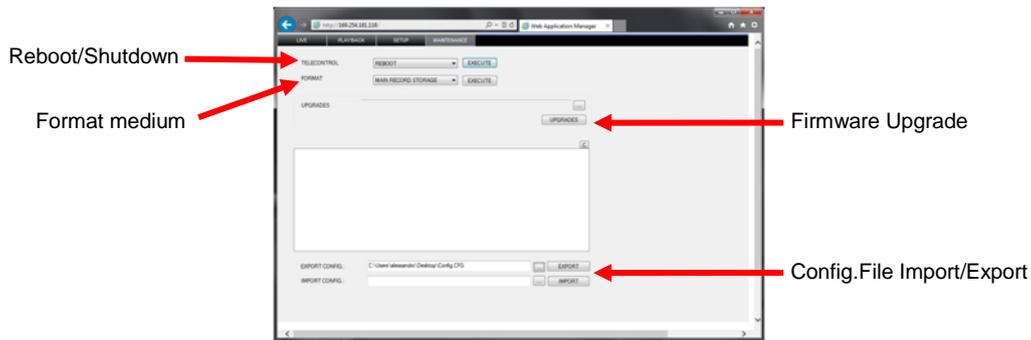
3. SETUP tab reproduces the MDR GUI as a Web application. This is a convenient method when configuring long values/text. When the security is turned off (not recommended by Brigade), the setup tab is immediately shown. When the security is turned on, the following window will appear, requesting the Unit ID and Password (see section 4.3.4).



After entering the appropriate password, the web interface below will appear. The screenshot below (left) illustrates the corresponding menu for OSD record settings (right image from section 4.1.4).



4. MAINTENANCE tab is used for the following purposes: Reboot/shutdown; storage media formatting (see section 6.1); firmware upgrade (see section 6.2); importing/exporting configuration files (see sections 6.3.3 and 6.3.4). The image below shows the exporting of a configuration file from the MDR to the specified location of the Laptop PC.



11 Testing and Maintenance

11.1 Operator Instructions

This information is addressed to the operator of the vehicle where a Brigade MDR 4 Series System is installed:

- 1) The Brigade MDR 4 Series is intended to be used as a mobile digital recorder. Drivers and operators should not interact with the MDR setup menu. The remote control should be strictly used by technically trained operators when the vehicle is stationary.
- 2) Testing and inspection of the system should be carried out in accordance with this manual. The driver or operator is responsible for ensuring the Brigade MDR 4 Series System is working as intended.
- 3) Operators using this equipment are strongly recommended to check the system's operation at the beginning of every shift.
- 4) Improved safety can be achieved when used in conjunction with Brigade's camera-monitor systems. This may allow triggering camera views and providing additional vehicle information during manoeuvring. It is necessary to read, understand and follow all instructions received with the Brigade MDR 4 Series System.
- 5) The Brigade MDR 4 Series System for digital recording is intended for use on commercial vehicles and machinery equipment. Correct installation of the system requires a good understanding of vehicle electrical systems and procedures along with a proficiency in installation.
- 6) Keep these instructions in a safe place and refer to them when maintaining and/or reinstalling the product.

11.2 Maintenance and Testing

This information is addressed to the operator for maintenance and testing of a vehicle with the Brigade MDR 4 Series System installed. This is also to familiarise the operator with the features and behaviour of the system. More frequent inspections should be performed in cases where:

- The vehicle is operating in a particularly dirty or harsh environment.
- The operator has reason to suspect the system is not working or has been damaged.

Procedure:

- 1) Clean the camera lens and housing of any accumulation of dirt, mud, snow, ice or any other debris.
- 2) Visually inspect the cameras and MDR unit and verify that they are securely attached to the vehicle and are not damaged.
- 3) Visually inspect the system's cables and verify that they are properly secured and not damaged.
- 4) Ensure the area in front of the cameras is clear of obstacles and has the right coverage area to view objects.

If any of the following tests fail, follow the appropriate sections of this instruction guide or contact Brigade if still in doubt.

- 5) Activate the Brigade MDR 4 Series System and verify the LEDs (on the MDR unit front) will illuminate in the following order: PWR constant blue; HDD constant blue (MDR-408) green (MDR-404); SD irregularly flashing green (only MDR-408); REC constant green; GPS flashing green with 2 seconds intervals. REC LED indicates any kind of recording (either SD or HDD). MDR-408-1000 should take approximately 90 seconds and MDR-404-500 around 75 seconds for HDD recordings to start after a file-system check.
- 6) This tests can only be performed when the MDR video output is displayed on a Brigade monitor. Ensure that both the SD card and HDD are recording. Recording is shown with letter R with red for HDD or blue for SD.
- 7) Other tests can be performed depending on the configuration. For instance, if Video Loss is activated, any disconnected or malfunctioning camera is detected.
- 8) Sensor trigger activation can also be diagnosed. For instance, if a particular trigger is setup to turn a channel on full screen or set an alarm. This will be identified by the channel occupying the full screen or a red letter A (if a Brigade monitor is connected).
- 9) GPS, G-Sensor, Supply Voltage and Heater functioning can be easily viewed by pressing the ENTER button on the remote control (if a Brigade monitor is connected).

12 Specifications

Features

Video System	PAL/NTSC
Video Input	4x (MDR-404-500) / 8x (MDR-408-1000) Channels - Select Connector
Video Output	1x Channel - Select Connector
Video Compression	H.264
Setup or Control	IR Remote Control and Ethernet
Display Split	1 to 4 (MDR-404-500) / 1 to 9 (MDR-408-1000) Cameras Split View
Audio Input	4x (MDR-404-500) / 8x (MDR-408-1000) - Select Connector (if frame rate set above 6fps)
Audio Output	1x Channel - Select Connector
Audio Compression	ADPCM

On-Screen Display	GPS information, alarm, temperature, acceleration, voltage, firmware version, MCU version, device information, network information
Operation Interface	OSD Graphical User Interface
Image View	Normal View
Installation Direction	Any mounting direction (internal HDD anti-vibration mount)
Image Frame Rate Minimum - Maximum	1-25 FPS (PAL); 1-30 FPS (NTSC)
Image Resolution	PAL: D1 (704x576), HD1 (704x288), CIF (352x288) NTSC: D1 (704x480), HD1 (704x240), CIF (352x240) configurable for each channel
Image Quality	1-8 Adjustable Levels (1 is the Best)
Recording Mode	Normal, Alarm, Timer
Pre-alarm Recording	Range 1 to 60 minutes
Post-alarm Recording	Range 1 to 30 minutes
Shut-down delay (Post-recording)	Range 10 minutes to 24hrs
Time Duration Options per Stored File	15 (Default if Mirror recording ON)/30/45/60 minutes
Mirror Recording	SD Card
Playback of Recordings	1 Channel a time using MDR video output to monitor 1-4 (MDR-404-500) / 1-8 (MDR-408-1000) Channels using MDR-Dashboard/MDR-Player
File Search Mode Options via OSD	Date/Time/Channel/File Type
Built in Heater	At -25°C HDD records after approx. 9 minutes, SD records after 1 minute Threshold temperature is 0°C for heater to turn ON
Built-in GPS	GPS location tracking, speed detection and sync clock
G-Sensor	Optional external for MDR-404-500 / standard internal or optional external for MDR-408-1000
Storage Capacity (GB)	500GB for MDR-404-500 / 1TB for MDR-408-1000, 2.5" SATA HDD (1TB maximum) 32GB for MDR-404-500 / 64GB for MDR-408-1000, Class 10 SD Card (128GB maximum)
Storage Capacity (Hours of Recordings)	Best - 142 hours (Quality 1; Res. D1; 25/30fps) Typical - 1164 hours (Quality 8, Res. CIF; 25/30fps) Longest - 1862 hours (Quality 8, Res. CIF, 1fps)
Access Mode	Password Protected Access and 3x User Levels
Languages	OSD in English, Russian, Spanish, Polish, Turkish and Portuguese MDR-Dashboard and MDR-Player in English only.
MDR Status LEDs (Front of the Unit)	Heater, HDD, Network, Error, Power, Recording, Alarm, Video Loss, SD (only MDR-408-1000) GPS (only MDR-408-1000)

Connections/Interfaces

USB-A Interface	USB 2.0 x 1
USB-B Interface Docking Station	USB 2.0 x 1 - Connect to Fireproof Box
USB-B Interface Mobile Caddy Unit	USB 2.0 x 1 - Connect to PC
Serial Interface (4CH Only)	RS485 x 1 for G-Sensor or Remote Panel on MDR-404-500 RS485 x 2 for G-Sensor and Remote Panel on MDR-408-1000
Network Ethernet	RJ45 port (10/100Mbps/s)
Panel Interface	10 pin panel connector with cable to Select type connector for Brigade monitor
AV Input	4x (MDR-404-500) / 8x (MDR-408-1000) Select type connectors
Trigger Input/output	Trigger inputs x 8, Trigger outputs x 2, 12V OUT x 1, GND x 1
GPS	1x SMA Connector to external antenna
Power Input	9 pin power connection with tail cable

Mechanical Specification

Dimensions typ. Assembly (W x H x D) including brackets	190mm x 75mm x 212mm for MDR-404-500 215mm x 78mm x 292mm for MDR-408-1000
Weight (Docking Station and Mobile Caddy Unit)	2.2kg for MDR-404-500 2.75kg for MDR-408-1000

Materials

Finish or Coating of Outside Surface	Black Gloss Textured
Material of Caddy Unit	Aluminium
Material of Mobile Caddy Unit	Aluminium
Material of Bracket	Aluminium

Electrical Interface

Operating Voltage (min. / typ. / max.)	9V / 12V / 32V (without any cameras and any accessories)
Current Consumption (min. / typ. / max. per mode)	MDR-404-500: 270mA (stable @ 32V) / 620mA (stable @ 12V) / 6.9A (inrush @ 9V) (without any cameras and any accessories) MDR-408-1000: 290mA (stable @ 32V) / 800mA (stable @ 12V) / 5.47A (inrush @ 9V) (without any cameras and any accessories)
Power Consumption	12W (without any cameras and any accessories)
Trigger Inputs	8 trigger inputs MDR-404-500: Approx. 9V input voltage threshold MDR-408-1000: Approx. 3.9V input voltage threshold
12V Supply Output	1x 12V @ 1A Maximum Load
Trigger Outputs	2x 12V at 200mA Maximum Load
Video Input/output	1.0 Vp-p / 75Ω
Maximum Camera Supply Current	500mA
Power-up Time to Recording	72 Seconds for MDR-404-500 90 Seconds for MDR-408-1000

Software

File Download via	USB 2.0
Image Search by time/date	MDR-Dashboard
Review Alarm Events	MDR-Dashboard

Test and Environmental Specification

Operating Temperature Range	-25°C to +60°C (built-in heater active for HDD if temperature below 0°C)
Storage Temperature Range	-40°C to +70°C
Vibration Rating (Peak Acceleration in g and Test Standard)	1G
Shock Rating (Peak Acceleration in g and Test Standard)	40G
Ingress Protection	IP30
Operating Relative Humidity	10% to 90%

Approvals

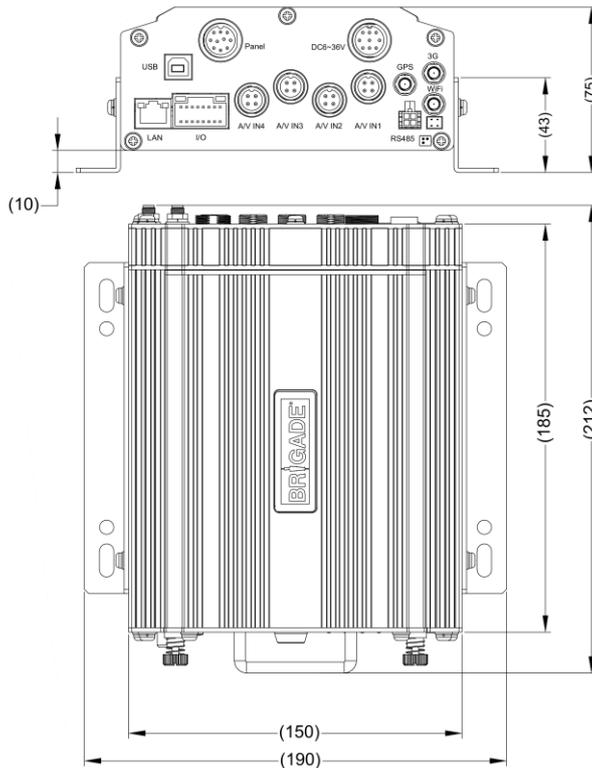
CE
 UNECE Regulation No. 10 Revision 4 (“E-marking”)
 FCC



This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Any change or modifications not expressly approved by the responsible party responsible for compliance could void the user’s authority to operate the equipment.

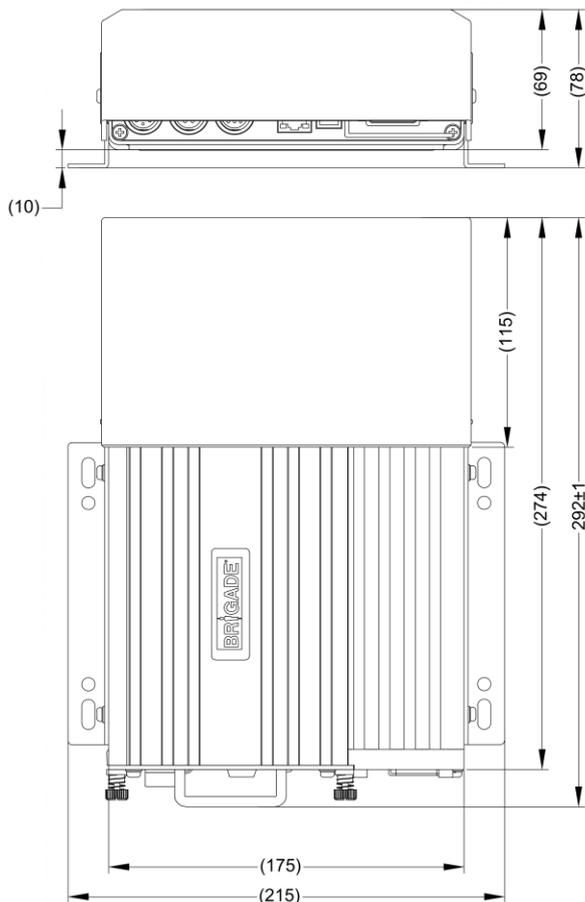
13 Mounting Dimensions

13.1 MDR-404-500



For mounting centre holes please refer to MDR-400-BKT drawing.

13.2 MDR-408-1000



For mounting centre holes please refer to MDR-400-BKT drawing.

14 Appendices

14.1 Video Quality Table

Quality level		1 (Highest)	2	3	4	5	6	7	8 (Lowest)
Video Streaming Data Rate (Kbps) depending on resolution	D1 (Highest)	2048	1536	1230	1024	900	800	720	640
	HD1	1280	960	768	640	560	500	450	400
	CIF (Lowest)	800	600	480	400	350	312	280	250

Example: Recording file size for 1 hour @ quality level 1 with resolution D1 will be:
 60 minutes * 60 seconds = 3600 seconds
 3600 seconds * 2048Kbps / 8 / 1024 = 900MB

Note:

- The streaming bandwidth can vary considerably according to the level of variations in the image. Static images are more efficiently compressed than dynamic ones. The values below are for reference only.
- Frame rates are assumed to be set to maximum which is 25fps for PAL and 30fps for NTSC.
- PAL: D1 (704*576), HD1 (704*288), and CIF (352*288),
 NTSC: D1 (704*480), HD1 (704*240) and CIF (352*240)

14.2 Normal / Alarm Recording Parameters

The table below summarises typical recording sizes for 1 channel at different qualities and resolutions for a one hour duration:

Quality level		1 (Highest)	2	3	4	5	6	7	8 (Lowest)
Recording data size (MB per hour) depending on resolution	D1 (Highest)	900	675	540	450	395	351	316	281
	HD1	562	422	337	281	246	219	198	176
	CIF (Lowest)	351	264	211	176	153	137	123	110

The following table is valid for both the **MDR-404-500** using all 4 channels and **MDR-408-1000** using all 8 channels. It illustrates approximate HDD recording times in hours:

Quality level		1 (Highest)	2	3	4	5	6	7	8 (Lowest)
Recording Time onto HDD (hours) depending on resolution	D1 (Highest)	142	190	237	284	324	365	405	456
	HD1	228	303	380	456	520	584	646	727
	CIF (Lowest)	365	485	607	727	837	934	1041	1164

14.3 Sub-Stream Recording Parameters

The following table is valid for both the MDR-404-500 using all 4 channels and MDR-408-1000 using all 8 channels. It illustrates approximate SD recording times in hours at CIF resolution and different frame rates. Refer to section 4.1.5 Sub-Stream Settings.

Quality Level	1 (Highest)	2	3	4	5	6	7	8 (Lowest)	
Recording Time onto SD (hours) depending on frame rate	15 fps (fastest)	39	52	65	78	89	100	111	124
	12 fps	49	65	81	97	379	125	139	155
	10 fps	58	78	97	116	134	149	167	186
	9 fps	65	86	108	129	149	166	185	207
	8 fps	73	97	121	145	167	187	208	233
	7 fps	83	111	139	166	191	214	238	266
	6 fps	97	129	162	194	223	249	278	310
	5 fps	117	155	194	233	268	299	333	372
	4 fps	146	194	243	291	335	374	416	465
	3 fps	194	259	324	388	446	498	555	621
2 fps	292	388	485	582	669	747	833	931	
1 fps (slowest)	583	776	971	1164	1339	1495	1665	1862	

14.4 User Log Description

Reason	Log Description	Example	Description
MDR boot up	record the time of MDR boot up	09:24:03 01 poweron;	MDR powers on
MDR power off	record the shut down time	poweroff	MDR powered off by accident. Record signal XX, thread ID YY.
		SignalHandler(signal:XX)(pid:YY);	
		poweroff timer;	MDR Powered off by scheduled timer
		poweroff key;	MDR Powered off due to vehicle ignition off
		poweroff tork;	MDR Powered off because off time up or vehicle key pulled out
		poweroff remote;	MDR Powered off by remote control
		poweroff hddkey;	MDR Powered off by MCU key
		poweroff hdd error;	MDR Powered off by HDD error
		poweroff upgrade;	MDR Powered off because of system upgrade
video loss	record video loss information It is considered power cut off when the voltage value falls under 7V.	1.vloss channel 1 vloss;	Record how many channels lost video
		2.vloss electricity was cut off;	MDR Powers off when circuit protection kicks in
		3.vloss electricity was cut off stop record fail;	Power is cut off, and MDR processing video.
		4.vloss power was supply;	Voltage was pulled up to normal level and MDR stops using internal capacitance.
start to record	Logs when and which channel start recording. These are main record and mirror record.	1.s-record ch1;	Channel 1 starts to record.
		2.s-record mirror ch1;	Channel 1 starts to record mirror recording.
		3.s-record ch1 RCT_STARTING;	Starting to record (this kind of log record sometimes does not get stored).
record stop	Logs when and which channel stop recording. These are main record and mirror record.	1.e-record ch1;	Channel 1 stopped recording.
		2.e-record stop mirror ch1 over;	Channel 1 stopped mirror recording.
		3.e-record stop ch1 over type:1;	Channel 1 stopped recording because the system parameters were changed.
		3.e-record stop ch1 over type:2;	Channel 1 stopped recording because the system time is changed.
		3.e-record stop ch1 over type:3;	Channel 1 stopped recording because the system was upgraded.
		3.e-record stop ch1 over type:4;	Channel 1 stopped recording because the HDD has been formatted.
		3.e-record stop ch1 over type:5;	Channel 1 stopped recording because HDD has not recovered by the end of the video recording.
		3.e-record stop ch1 over type:6;	Channel 1 stopped recording because of an encoding malfunction.
		3.e-record stop ch1 over type:7;	Channel 1 stopped recording because the MDR rebooted.
		3.e-record stop ch1 over type:8;	Channel 1 stopped recording because of the CPU or RAM resource limited.
		3.e-record stop ch1 over type:10;	Channel 1 stopped recording because of time settings (systime).
		3.e-record stop ch1 over type:11;	Channel 1 stopped recording because time settings (systime of Daylight saving time).
		3.e-record stop ch1 over type:12;	Channel 1 stopped recording because of copying the record log automatically.
3.e-record stop ch1 over type:13;	Channel 1 stopped recording because the system record parameters changed.		

Reason	Log Description	Example	Description
		3.e-record stop ch1 over type:14;	Channel 1 stopped recording because the HDD was changed.
		3.e-record stop ch1 over type:15;	Channel 1 stopped recording because of a power fault.
		3.e-record stop ch1 over type:16;	Channel 1 stopped recording because the MDR fell into sleep mode.
		3.e-record stop ch1 over type:17;	Channel 1 stopped recording because of a reload of HDD drivers.
user log in parameter setting page.	user log in parameter setting page.	1.login;	Logging in
user log out parameter setting page.	user log out parameter setting page.	1.logout;	Logging out
reboot MDR to fix video records fault.	Information of fixing record files and logs.	1.09:24:03 16 abt_pwf del XXX, size YYY;	Cut off power to delete small files, XXX stands for file names, YYY stands for sizes of files.
		2.09:24:03 16 abt_pwf mod XXX.nvr,endT:YYY;	XXX stands for file name, YYY stands for end time.
		3.09:24:03 16 abt_pwf del lawless XXX;	Delete faulty recordings when rebooting MDR.
Delete record files	Usually, while stop recording or shear records, MDR will delete files which are shorter than 5 seconds (consider to be useless) then create a log.	1.r-del (XXX.nvr) t(YYY), s(ZZZ);	XXX stands for file name YYY : stands for time range of record file ZZZ : stands for size of file
Plugged in USB	N/A	1.u-insert;	USB plugged in
Unplugged USB	N/A	1.u-pull;	USB removed
Unlock HDD lock	Unlock HDD lock	1.hddkey unlock;	N/A
Modify time	Modify system time	1.set 2014-09-12 08:51:20 save type[2] MDR set time to rtc	Modify system time manually

14.5 Events Table

The following table illustrates the type of events recorded. This is illustrated on both the event list search of the MDR and on the MDR-Dashboard (see below).

SEL	TYPE	NAME	DATE	TIME	REC
<input type="checkbox"/>	A	MD	2015-05-22	14:10:00	1
<input type="checkbox"/>	E	VL	2015-05-22	14:00:47	1
<input type="checkbox"/>	E	VL	2015-05-22	14:07:57	1
<input type="checkbox"/>	A	MD	2015-05-22	14:07:53	1
<input type="checkbox"/>	A	SHK	2015-05-22	14:07:51	1
<input type="checkbox"/>	A	MD	2015-05-22	14:07:40	1
<input type="checkbox"/>	E	VL	2015-05-22	14:07:44	1
<input type="checkbox"/>	A	MD	2015-05-22	14:00:00	1

Time	Type	Name	Information
0:00:00	Temp alarm	H-Temp	High temp
0:00:00	Wlose alarm	VL	1234567
0:33:24	Temp alarm	H-Temp	High temp
0:34:01	Temp alarm	H-Temp	High temp
0:34:14	Temp alarm	H-Temp	High temp
0:34:45	Temp alarm	H-Temp	High temp
0:35:12	Temp alarm	H-Temp	High temp
0:35:27	Temp alarm	H-Temp	High temp
0:35:52	Temp alarm	H-Temp	High temp
0:36:19	Temp alarm	H-Temp	High temp
0:36:35	Temp alarm	H-Temp	High temp
0:36:49	Temp alarm	H-Temp	High temp
0:37:03	Temp alarm	H-Temp	High temp

Event Type	Event Name	MDR-Dashboard Reference		Description
		Type	Information	
Video Loss	VL	Vlose alarm	Camera No. separated by “.”	Video loss alarm (e.g. the camera has been either deliberately or inadvertently disconnected). Refer to section 7.1.1.
Blind Detection	BD	BD alarm	Camera No. separated by “I”	Blind camera alarm (e.g. the camera has been intentionally obstructed or a large object is obstructing the entire view). Refer to section 7.1.1.
Motion Detection	MD	MD alarm	Camera No. separated by “I”	Motion detection for video capturing when vehicles are unattended. Refer to section 4.2.6.
Triggers	Name of the Trigger (e.g. S1, S2 etc. or PB for Panic Button)	Sensor Event	Sensor No. (e.g. Sensor8) or PB for Panic Button	GPIO (general purpose input/output) trigger sensor alarm. Refer to section 4.2.1.
Speed Alarm	H-Speed	Speed alarm	High speed	Over and under speed can be flagged and recorded. Refer to section 4.2.3.
	L-Speed	Speed alarm	Low speed	
G-Force	SHK	Acc alarm	No information associated to this event	Excessive G-Force can be flagged and recorded. Refer to section 4.2.5.
Temperature Alarm	H-Temp	Temp alarm	High temp	High and low temperature can be flagged and recorded. Refer to section 4.2.4.
	L-Temp	Temp alarm	Low temp	

14.6 On-screen Display Map



Recordings



Settings



Information

Note: Green represents default settings.

Orange represents settings that differ between the MDR-404-500 (e.g. 1-4) and MDR-408-1000 (e.g. 1-8).

14.6.1 Recordings

14.6.1.1 REC. SEARCH

REC.SEARCH	
TITLE	OPTION No 1
SOURCE	HDD
	SD-BACK
TYPE	ALL
	ALARM
DATE	today's date

REC.SEARCH	
TITLE	OPTION No 1
CHANNEL	1-4
	5-8 (X5-8CH only)
START TIME	-
END TIME	-
PLAY	-
UNLOCK	-
EXPORT	Channel selection SELECT
	ALL

14.6.1.2 Event Files

EVENT SEARCH	
TITLE	OPTION No 1
EVENT TYPE	ALL FILES
	IO ALARM
	G-FORCE
	SPEED
	TEMP ALARM
	MD ALARM
	BD ALARM
	VIDEO LOSS
DATE	today's date

EVENT LIST	
TITLE	OPTION No 1
FIRST	
PGUP	
PGDOWN	
LAST	
REV.	
EX LOG	
EXPORT	

14.6.2 Settings

14.6.2.1 System

14.6.2.1.1 Date/Time

DATE/TIME	
TITLE	OPTION No 1
(DATE) FORMAT	DD/MM/YYYY
	YYYY-MM-DD
	MM/DD/YYYY
(TIME) FORMAT	24H
	12H/AM
	12H/PM
TIME SYNC SOURCE	GPS
	NONE
TIME ZONE	0
	-12 to +14

DST	ON----->	if DST is ON			
	OFF	TITLE	OPTION No 1	TITLE	OPTION No 2
		1AM ON	LAST	SUNDAY IN	MAR.
			FIRST		APR.
			SECOND		MAY
			THIRD		JUN.
			FOURTH		etc.
		1AM ON	LAST	SUNDAY IN	OCT.
			FIRST		NOV.
			SECOND		DEC.
			THIRD		JAN.
			FOURTH		etc.

14.6.2.1.2 Options

OPTIONS			
TITLE	OPTION No 1	TITLE	OPTION No 1
ON/OFF TYPE	IGNITION ----->	IGNITION	
		TITLE	OPTION No 1
		SHUT DOWN DELAY (0-24)H	30min (10min to 24H)
		TIMER	
		TITLE	OPTION No 1
		BOOT UP TIME	06:00:00 (HH:MM:SS)
		SHUT DOWN TIME	18:00:00 (HH:MM:SS)
		AUTO BOOT UP ON SCHEDULE	OFF
			ON
		IGNITION OR TIMER	
		TITLE	OPTION No 1
		BOOT UP TIME	06:00:00 (HH:MM:SS)
	SHUT DOWN TIME	18:00:00 (HH:MM:SS)	
	AUTO BOOT UP ON SCHEDULE	OFF	
		ON	
	SHUT DOWN DELAY (10min-24h)	00:30:00 (HH:MM:SS)	
IDLE TIME (30-300)SEC	300		
	30-300		
EVENT FILES AUTO-EXPORT(USB)	ON		
	OFF		
TRANSPARENCY	25%		
	0%; 50%; 75%		

14.6.2.1.3 Register Info

REGISTER INFO		
TITLE	OPTION No 1	
UNIT S/N	Unique S/N (Read Only)	
UNIT ID(00000-99999)	00000 (00000-99999)	
COMPANY NAME	Empty (yyyyyyyy)	
VEHICLE NO.	Empty (xxxxxxx)	
DRIVER/ROUTE NAME	Empty (yyyyyyyy)	
DEVICE ID	Empty (xxxxxxx)	

where **x** can be any alphanumerical value
and **y** any alphanumerical value including symbols

14.6.2.1.4 Format

FORMAT		
TITLE	OPTION No 1	
DEVICE	HDD	
	USB	
	MIRROR SD	
	FIXED SD	
FUNCTION	FAST FORMAT	
	SLOW FORMAT	(only if HDD is selected)

14.6.2.1.5 Upgrade

UPGRADE		
TITLE	OPTION No 1	
-	FIRMWARE	
	MCU	

14.6.2.1.6 User Security

USER SECURITY			
TITLE	OPTION No 1	TITLE	OPTION No 1
PASSWORD ENABLE	ON----->	ON	
	OFF	SELECT USER	ADMINISTRATOR
			POWER USER
			USER
		PASSWORD	88888888 (00000000-99999999)
		RE-ENTER	88888888 (00000000-99999999)

14.6.2.1.7 Configuration

CONFIG		OPTION No 1
TITLE		
DEFAULT SETTINGS		DEFAULT
RESET ALL HISTORY INFO.		RESET
EXPORT CURRENT SETTINGS SAVE AS "MDVRCFG.CFG" TO ROOT OF EXTERNAL STORAGE DEVICE		EXPORT
IMPORT THE "MDVRCFG.CFG" FROM THE ROOT OF EXTERNAL STORAGE TO MDR		IMPORT

14.6.2.1.8 System Log

SYSTEM LOG		OPTION No 1
TITLE		
EXPORT SYSTEM LOG		
DELETE SYSTEM LOG		
EXPORT SNAPSHOTS		
DELETE SNAPSHOTS		

14.6.2.2 Record

14.6.2.2.1 Options

OPTIONS 1 of 3		OPTION No 1
TITLE		
VIDEO FORMAT		PAL NTSC
RECORD MODE		NORMAL ALARM TIMER
REC RATE		NORMAL I FRAME
RECORD FILE TIME(MIN)		15 30; 45; 60
ALARM DURATION(3-30)SEC		10 (3-30)SEC
ALARM POST REC(0-1800)SEC		0010 (0-1800)SEC
TRIGGER-OFF DELAY(0-240)SEC		005 (0-240)SEC
OPTIONS 2 of 3		OPTION No 1
TITLE		
METADATA CAPTURE		ON OFF
HDD/SD OVERWRITE		ON OFF
LOCKED FILE RETENTION(DAY)		10 7; 15; 20; 30; 45;
ALARM PRE RECORDING		ON OFF
ALARM PRE-REC TIME(1-60)MIN		10 (1-60)MIN
SD CARD TYPE		INTERNAL EXTERNAL
MIRROR REC. TO SD CARD		SUB OFF
OPTIONS 3 of 3		OPTION No 1
TITLE		
VIDEO LOSS REC		ON OFF

14.6.2.2.2 OSD Overlay

OSD OVERLAY 1 of 2			
TITLE	LIVEVIEW	IMAGE	POSITION
DATE/TIME	ON OFF	ON OFF	TOP BOTTOM
ALARM	TRIGGER OFF FIXED		
G-FORCE DATA	ON OFF		
TEMPERATURE	ON OFF		
FIRMWARE VER.	ON OFF		
GPS INFO.	TRIGGER OFF FIXED		
CH. NAME		ON OFF	
VEHICLE NO.	TRIGGER OFF FIXED	OFF ON	

OSD OVERLAY 2 of 2			
TITLE	LIVEVIEW	IMAGE	POSITION
SPEED	FIXED	OFF	
	OFF	ON	
	TRIGGER		

14.6.2.2.3 Camera Settings

CAMERA SETTINGS (top of the screen)					
TITLE	ENABLE	NAME	AUDIO	LIVE	ENCOD E
CH[1-8]	ON	xxxxxxx	ON	ON	CBR
	OFF	where x is any alphanumeric value including symbols	OFF	OFF	VBR
CAMERA SETTINGS (bottom of the screen)					
TITLE	OPTION 1				
AUTOSN	OFF ON				
AUTOSN DELAY (5-300)SEC	120 between 5 and 300 sec.				
LIVE AUDIO	OFF ON				

14.6.2.2.4 Record Settings

RECORD SETTINGS				
PARAMETERS	RES	FR	NORMAL QUALITY	ALARM QUALITY
CH[1-8]	HD1	25	2	1
	D1	1-25	1-8	1-8
	CIF			

14.6.2.2.5 Sub-Stream

SUB-STREAM (top of the screen)			
TITLE	OPTION 1		
BAND WIDTH (20-4096)Kbps	0500 20-4096		
SUB-STREAM (left of the screen)			
TITLE	ENABLE	RES	FR
CH[1-8]	ON	CIF	5
	OFF		1-8
SUB-STREAM (right of the screen)			
TITLE	OPTION 1		
SUB MODE	ADAPT FIX		
NET TRANS POLICY	PRIOR TRANS SPEED PRIOR IMG QUALITY BALANCE		

14.6.2.2.6 Schedule

SCHEDULE (top of the screen for 7x rows)				
DATE	SCHEDULE 1	TYPE	SCHEDULE 2	TYPE
EVERY	00:00-23:59	NORMAL	00:00-00:00	NORMAL
MON-SUN	00:00-00:00	BLIND		BLIND
WKD		M.D		M.D
*****		ALARM		ALARM
SCHEDULE (bottom of the screen)				
TITLE	OPTION 1			
WKD: WEEKDAY FROM	MON TO FRI "Any combination of the two cells (e.g. TUE TO SUN)"			

14.6.2.2.7 Other Settings

OTHER SETTINGS	
TITLE	OPTION No 1
EXPORT MDR-PLAYER	

14.6.2.3 Network

14.6.2.3.1 Local

LOCAL	
TITLE	OPTION No 1
IP	192.168.001.100
SUB	255.255.255.000
GATE	192.168.001.001
CLIENT PORT	00081
WEB PORT	00080
DNS SERVER	192.168.000.100
MAC ADDRESS	Unique to each NIC of the Ethernet port

14.6.2.4 Event

14.6.2.4.1 Sensor

SENSOR 1 of 2					
NO	ENABLE	NAME	OSD	SET	ALARM
S[1-8]	ON	xxxxxx	Li, Ri, Br, 4, 5, 6, 7, 8	HIGH	OFF
	ON	LftInd	Li	HIGH	OFF
	ON	RgtInd	Ri	HIGH	OFF
	ON	Brake	Br	HIGH	OFF
	OFF	xx where x is any alphanumerical value including symbols	yy where y is any alphanumerical value	LOW	ON --->
SENSOR TRIGGER ACTION 2 of 2 (top of second page)					
NO	FULL SCREEN				
S[1-8]	NONE				
	CH1-4				
	CH5-8				
	CH1; CH2; CH3; CH4				
	CH5; CH6; CH7; CH8	This option is valid for MDR-408			
SENSOR TRIGGER ACTION 2 of 2 (bottom of second page)					
TITLE	OPTION No1				
FULL SCREEN TIME	03				
	03-30 seconds				

if ALARM ON	
LOCK	OPTION No 1
	OFF
	ON

14.6.2.4.2 Alarm Output

ALARM OUTPUT 1 of 3			
ALARM TYPE	OUT1	OUT2	SNAP
S[1-8]	OFF	OFF	OFF
	ON	ON	ON
ALARM OUTPUT 2 of 3			
ALARM TYPE	OUT1	OUT2	SNAP
OVERSPEED	OFF	OFF	OFF
	ON	ON	ON
UNDER SPEED	OFF	OFF	OFF
	ON	ON	ON
HIGH TEMP	OFF	OFF	OFF
	ON	ON	ON
LOW TEMP	OFF	OFF	OFF
	ON	ON	ON
G-FORCE	OFF	OFF	OFF
	ON	ON	ON
VIDEO LOSS	OFF	OFF	OFF
	ON	ON	ON
MOTION	OFF	OFF	OFF
	ON	ON	ON
BLIND	OFF	OFF	OFF
	ON	ON	ON
ALARM OUTPUT 3 of 3			
ALARM TYPE	OUT1	OUT2	SNAP
LOW VOLTAGE	OFF	OFF	OFF
	ON	ON	ON
PANIC BUTTON	OFF	OFF	OFF
	ON	ON	ON

14.6.2.4.3 Speed

SPEED (top and centre of the page)			
TITLE	OPTION No 1		
SPEED SOURCE	GPS		
	VEHICLE----->		
SPEED UNIT	MPH		
	KM/H		
MILEAGE	ON----->		
	OFF		

if SPEED SOURCE is VEHICLE	
TITLE	OPTION No 1
SPD	032
	speed in either mph or km/h
P/S	00057
	pulse per second

if MILEAGE is ON	
TITLE	OPTION No 1
CURRENT MILEAGE	0000000 MILE

SPEED (bottom of the page)			
NAME	OSD	ENABLE	THRESHOLD
UNDER SPD	SPDU	OFF	010
		ON----->	speed in either mph or km/h
OVER SPD	SPDO	OFF	100
		ON----->	speed in either mph or km/h

if ENABLE is ON	
TITLE	OPTION No 1
ALARM	OFF
	ON

if ALARM is ON	
TITLE	OPTION No 1
LOCK	OFF
	ON

14.6.2.4.4 G-Force

G-FORCE			
NAME	OSD	ENABLE	THRESHOLD
G-FORCE	GF	OFF	X=5.5; Y=5.5; Z=5.5
		ON----->	acceleration in G

if ENABLE is ON	
TITLE	OPTION No 1
ALARM	OFF
	ON

if ALARM is ON	
TITLE	OPTION No 1
LOCK	OFF
	ON

14.6.2.4.5 Temperature

TEMPERATURE (top of the page)	
TITLE	OPTION No 1
TEMPERATURE UNIT	C
	F

ENVIRONMENT TEMP. ALARM SETTINGS (bottom of the page)			
NAME	OSD	ENABLE	THRESHOLD
HIGH TEMP.	HT	OFF	+95F ; +35C
		ON----->	Temp. in Fahrenheit or Celsius
LOW TEMP.	LT	OFF	-4F ; -20C
		ON----->	Temp. in Fahrenheit or Celsius

for both Hi/Lo - if ENABLE is ON	
TITLE	OPTION No 1
ALARM	OFF
	ON

if ALARM is ON	
TITLE	OPTION No 1
LOCK	OFF
	ON

14.6.2.4.6 Camera

MOTION DETECTION SETTINGS (top of the page)			
CH ID	M.D. SENSITIVE	M.D. AREA	B.D.SENSITIVE
1	1	SETUP	1
2 to 8	(2 to 4 for MDR-404)	2 to 4	2 to 4

ALARM SETTINGS (bottom of the page)			
NAME	OSD	ENABLE	
BLIND	BD	OFF	
		ON----->	
MOTION	MD	OFF	
		ON----->	
VIDEO LOSS	VL	OFF	
		ON----->	

for all - if ENABLE is ON	
TITLE	OPTION No 1
ALARM	OFF
	ON

for BD/MD - if ALARM is ON	
TITLE	OPTION No 1
LOCK	OFF
	ON

14.6.2.4.7 Voltage

LOW VOLTAGE PROTECTION	
TITLE	OPTION No 1
ENABLE	OFF
	ON
LOW VOLTAGE	18.0 V
VOLTAGE OF START	21.0 V
OBSERVE TIME	005 MIN
SHUT DOWN DELAY	010 MIN

14.6.2.4.8 Panic Button

PANIC BUTTON			
NAME	ENABLE	ALARM	LOCK
PB	ON	ON	OFF
	OFF	OFF	ON

14.6.2.4.9 Snap Settings

ALARM SNAP SETTINGS --> button	
CH	ENABLE
1 to 8	OFF
	ON

14.6.2.5 Peripheral

14.6.2.5.1 External Communication Setup

EXT. COM SETUP		OPTION No 1
<u>TITLE</u>		
RS485-1 <i>Options are mutually exclusive with RS485-2</i>		REMOTE PANEL
		G-SENSOR
		NONE
RS485-2 <i>Options are mutually exclusive with RS485-2</i>		G-SENSOR
		REMOTE PANEL
		NONE

14.6.2.5.2 Language Settings

LANGUAGE SETTING		OPTION No 1
<u>TITLE</u>		
CHOOSE LANGUAGE		ENGLISH
		RUSSIAN
		SPANISH
		POLISH
		PORTUGUESE
		TURKISH

14.6.3 Information

14.6.3.1 System

SYSTEM INFO (top of the page)			
TITLE	INFORMATION		
FIRMWARE VERSION	xxx-x-xxxxxxx		
MCU VERSION	xx-xxx-xxxxx-xxxxxxx		
SYSTEM INFO (bottom of the page)			
HDD/SD INFORMATION	CAPACITY (GB)	FREE SPACE (GB)	RECORD TIME (HR)
<u>DEVICE NAME</u>			
HDD	xxx.xG	xxx.xG (xx %)	xxx
MIRROR SD	xx.xG	xx.xG (xx %)	xx

14.6.3.2 History

HISTORY INFO 1 of 3	
TITLE	INFORMATION
HIGHEST SPEED IN HISTORY	MPH; DATE; TIME
TOTAL MILEAGE	xxx.x MILE
HISTORY INFO 2 of 3	
TITLE	INFORMATION
LOWEST VOLTAGE IN HISTORY	x.xV; DATE; TIME
HIGHEST VOLTAGE IN HISTORY	x.xV; DATE; TIME
HISTORY INFO 3 of 3	
TITLE	INFORMATION
LOWEST TEMP. IN HISTORY	x.XF/C; DATE; TIME
HIGHEST TEMP. IN HISTORY	x.XF/C; DATE; TIME

14.6.3.3 Module

MODULE STATUS	
TITLE	INFORMATION
GPS MODULE	NORMAL
	NONE
GPS SIGNAL	INVALID

15 Glossary

MDR – Mobile Digital Recorder

MCU – Mobile Caddy Unit

DS – Docking Station

CU – Control Unit

GUI - Graphical user interfaces

HDD – Hard Disk Drive

SD – Secure Digital

IO – Input/output

GPIO – General Purpose Input/output

USB – Universal Serial Bus

NTSC - National Television System Committee

PAL - Phase Alternating Line

EIA - Electronic Industries Alliance

TIA - Telecommunications Industry Association

PN – Part Number

GHz – Gigahertz

CPU – Central Processing Unit

TB – Terabyte

MB – Megabyte

GB – Gigabyte

MAC - Media Access Control

IP – Internet Protocol

SIM – Subscriber Identity Module

3G – Third Generation

VGA – Video Graphics Array

APN - Access Point Name

ID – Identification

GPS – Global Positioning System

D1 - D1 is full standard resolution for 25FPS (PAL) and 30FPS (NTSC)

HD1 – half definition compared to full definition (See D1)

LED – Light Emitting Diode
AC – Adaptor Cable
UPS – Uninterruptable Power Supply
SPD - Speed
IT – Information technology
PC – Personal Computer
SQL - Structured Query Language
G-Sensor - measure of acceleration/shock of the vehicle
VIC – Video Input Cable
VOC – Video Output Cable
FPB – Fireproof box
TRIG - Trigger
CH - Channel
Wi-Fi – Wireless Fidelity
PWR - Power
EXP - Expansion
RES - Resolution
BD – Blind Detection
MD – Motion Detection

CIF – Common Intermediate Format (¼ D1 format)
NET – Network
Km/h – Kilometres per hour
MPH – Miles per hour
ADPCM - Adaptive Differential Pulse-code Modulation
H.264 - video compression standard
AVI - Audio Video Interleaved
IR – Infra-red
RP – Remote Panel
GSC – G-sensor Cable
RPC – Remote Panel Cable
OSD – On-screen Display
REC - Record
LAN – Local Area Network
CBR – Constant Bit Rate
VBR – Variable Bit Rate
VL – Video Loss
DST – Daylight Saving Time
S/N – Serial Number

16 Disclaimer

Disclaimer

This System is an invaluable driver aid but does not exempt the driver from taking every normal precaution when conducting a manoeuvre. No liability arising out of the use or failure of the product can in any way be attached to Brigade or to the distributor.

Avertissement

Le système est une aide précieuse pour le conducteur, mais celui-ci doit toutefois prendre toutes les précautions nécessaires pendant les manoeuvres. Brigade ou ses distributeurs n'assument aucune responsabilité résultant de l'utilisation ou d'un défaut du produit.

Haftungsausschluss

Das System ist für den Fahrer eine unschätzbare Hilfe, ersetzen aber beim Manövrieren keinesfalls die üblichen Vorsichtsmaßnahmen. Für Schäden aufgrund der Verwendung oder eines Defekts dieses Produkts übernehmen Brigade oder der Vertriebshändler keinerlei Haftung.

Condizioni di utilizzo

Il sistema costituisce un prezioso ausilio alla guida, ma il conducente deve comunque assicurarsi di prendere tutte le normali precauzioni quando esegue una manovra. Né Brigade né il suo distributore saranno responsabili per eventuali danni di qualsiasi natura causati dall'utilizzo o dal mancato utilizzo del prodotto.

Aviso legal

Aunque el sistema constituye una valiosa ayuda, no exime al conductor de tomar todas las precauciones normales al hacer una maniobra. Brigade y sus distribuidores comerciales no se responsabilizan de cualquier daño derivado del uso o de un mal funcionamiento del producto.

Declinação de responsabilidade

O sistema é uma ajuda incalculável ao motorista, mas não dispensam o motorista de tomar todas as precauções normais ao realizar uma manobra. Nenhuma responsabilidade decorrente do uso ou falha do produto pode de forma alguma ser atribuída ao Brigade ou ao distribuidor.

Verwerping

Systeem is een waardevolle hulp voor de bestuurder, maar ontheffen hem echter niet van de verplichting om het voertuig zorgvuldig te manoeuvreren. Brigade en zijn distributeurs zijn niet aansprakelijk voor schade door gebruik of het niet functioneren van het product.

Ограничение ответственности

Данная система препятствий являются дополнительным средством помощи водителю, но не освобождает от соблюдения водителем всех необходимых мер предосторожности при совершении маневров. Brigade Electronics или дистрибьюторы продукции не несут ответственности вытекающей из невозможности эксплуатации или неисправности продукции.

Specifications subject to change. Sous réserve de modifications techniques. Änderungen der technischen Daten vorbehalten. Specifiche soggette a variazioni. Las especificaciones están sujetas a cambios. Wijzigingen in specificaties voorbehouden. As especificações estão sujeitas a alterações. Спецификация может изменяться.

Serial No:	Part No:
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