TIMESPACE®

V400

Instruction Manual

Designed and Manufactured in the UK

The latest version of the V400 Manual is available online; www.tspace.co.uk

V400 Operating Software V1.0.0
PCLink Suite V7.3
- PCLink200 V1.7.9
- PCPlayer V1.7.9
- RemoteLink V1.7.9
- X-Communicate V1.7.9

Kstation V1.0.0.4
SafetyLink V1.0
ImageLink V1.0
LANLink V3.0

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Contents

SAFETY

The V400 is designed to be powered from an external power source which complies with the Low Voltage Directive (73/23/EEC).

The V400 is designed for indoor use in the temperature range -10° to +50°C, 20% to 80% RH (non-condensing).

ENVIRONMENTAL

The V400 may be operated in ambient temperatures from -10°C to +50°C. This specification applies in still air and ambient temperature measured 15cms above the centre of V400.

If the V400 is to be mounted in an enclosure is important that the internal temperature inside the enclosure does not exceed the specification above and any new enclosure design should be tested.

SHOCK AND VIBRATION

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

EMC

The V400 complies with the relevant EEC, Automotive 'E' Mark and EMC standards for this type of product.

CONFORMITY

EMC Conformity (CE Mark); Meets the European Council Directive 89/336/EEC (EMC Directive) relating to EMC Emissions - EN61000-6-3(2001) and EMC Immunity – EN61000-6-1(2001).

EMC Conformity (E Mark); Meets the Type Approval requirements of European Commission Directive 95/54/EC.

CFR47:2009 Class A, Part 15 - Radiated Emissions and Conducted Emissions.

RECYCLING

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

EC DECLARATION OF CONFORMITY

EC Declaration of Conformity (CE)

We Timespace Technology Ltd
Blackstone Road
Huntingdon
PE29 6TT
United Kingdom

declare that the

V400 Digital Video Recorder

Meets the intent of the European Council Directive 89/336/EEC referred to as the Electromagnetic Compatibility (EMC) Directive. The product conforms to the following standards which have been listed in the Official Journal of the European Union.

EMC

Emissions - EN55022:2006 + A1
Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement.

Conducted - EN55024:1998 +A1 +A2
Information technology equipment – Immunity characteristics – Limits and methods of measurement.

……
Dr ROBERT HEYLEN
TECHNICAL DIRECTOR
2nd November 2011

E11 TYPE APPROVAL

VCA Headquarters
1 The Eastgate Office Centre
Eastgate Road
Bristol, BS5 6XX
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Main Fax: +44 (0) 117 952 4103
Email: enquiries@vca.gov.uk
Web: www.vca.gov.uk

THE UNITED KINGDOM VEHICLE APPROVAL AUTHORITY

COMMUNICATION CONCERNING THE TYPE-APPROVAL (1), OF A TYPE OF COMPONENT (1) WITH REGARD TO RADIO INTERFERENCE SUPPRESSION DIRECTIVE 72/245/EC, AS LAST AMENDED BY DIRECTIVE 2009/19/EC.

Type Approval No: e11*72/245*2009/19*6098*00

Reason for Extension: Not applicable

EC type-approval mark to be affixed on ESA: e11 03 6098

SECTION I

0.1. Make (trade name of manufacturer): Timespace Technology Limited

0.2. Type and general commercial description(s): V400 Digital Video Recorder.
The V400DVR has three different versions, T716 (V400 with 16 cameras), T712 (V400 with 12 cameras), T708 (V400 with 8 cameras).

0.3. Means of identification of type, if marked on the component (1) (2):Self adhesive label containing the part number

0.3.1. Location of that marking: Top left of the digital video recorder

0.5. Name and address of manufacturer:
Timespace Technology Limited
Blackstone Road
Huntingdon
Cambridgeshire
PE29 6TT
United Kingdom

Name and address of authorised representative, if any: Not applicable

0.7. In the case of components and separate technical units, location and method of affixing of the EEC approval-mark: Self adhesive label on the bottom of the digital video recorder

0.8. Address(es) of assembly plant(s): See item 0.5

SECTION II

1. Additional information (where applicable): See Appendix

2. Technical service responsible for carrying out the tests: MIRA Limited

3. Date of test report: 02 November 2011

4. Number of test report: 1031658-001a

5. Remarks (if any): See Appendix

6. Place: BRISTOL

7. Date: 02 NOVEMBER 2011

8. Signature: A. W. STENNING
Head of Technical and Quality Group

9. The type approval file deposited at the Administrative Service having delivered the type approval may be obtained on request

(1) Delete where not applicable.

(2) If the means of identification of type contains characters not relevant to describe the vehicle, component or separate technical unit types covered by this type-approval certificate such characters shall be represented in the documentation by the symbol '?'(e.g. ABC??123??).

(3) As defined in Annex IIA to Directive 70/156/EEC.

APPENDIX

to EC Type Approval Certificate No: e11*72/245*2009/19*6098*00
concerning the type approval of an electric/electronic subassembly with regard to Directive 72/245/EEC as last amended by Directive 2009/19/EC

1. Additional information:

1.1. Electrical system rated voltage: 24V dc

1.2. This ESA can be used on any vehicle type with the following restrictions: Negative earth vehicles only

1.2.1. Installation conditions, if any: See manufacturer's instructions

1.3. This ESA can only be used on the following vehicle types: Not applicable

1.3.1. Installation conditions, if any: Not applicable

1.4. The specific test method(s) used and the frequency ranges covered to determine immunity were: (please specify precise method used from Annex IX): Not applicable (non immunity related function)

1.5. Laboratory accredited to ISO 17025 and recognised by the Approval Authority (for the purpose of this Directive) responsible for carrying out the test: MIRA Limited, Nuneaton, United Kingdom.

5. Remarks: None

SYSTEM OVERVIEW

V400 DIGITAL VIDEO/AUDIO RECORDING SYSTEM

V400 DIGITAL VIDEO / AUDIO RECORDER

REMOVABLE, SHOCK MOUNTED HARD DISK CARTRIDGE

REMOVABLE SD CARD FOR DUAL RECORDING & DOWNLOAD (OPTIONAL)

X201 REVIEWER / PROGRAMMER

The V400 is a digital video/audio surveillance recorder for use in mobile applications. The V400 includes an integrated Power Supply (11-50V) and can provide power to two external monitors, GPS, Modem and all 16 cameras.

Recordings are made on a removable hard disk cartridge inserted in the V400. Optionally recordings can be written to a removable SD card.

The recordings can be accessed by connecting the cartridge to a PC using the USB interface kit. Timespace PCLink200 application is a proprietary reading and archiving software package.

The X201 Reviewer is used to program the menu settings on V400, check camera views and list the recorded files on the installed Hard Disk Cartridge.

The V400's integral GSensor records the vehicles movement for X, Y & Z axis.

V400 SPEC / TECHNICAL DATA

Performance

Standard	V400-08 PAL	V400-12 PAL	V400-16 PAL
Video recording global image rate	100 ips	150 ips	200 ips
Video inputs	8	12	16
Image rates Min – Max selectable by camera	1 – 25 ips	1 – 25 ips	1 – 25 ips
Image Resolution (pixels)	2CIF – 720 x 288	2CIF – 720 x 288	2CIF – 720 x 288
Image bit rate – quality setting	6 (Tfl setting VHigh)	6 (Tfl setting VHigh)	6 (Tfl setting VHigh)
Audio microphone input	2	2	2
Audio line out	2	2	2
Video out Main / Aux – Configurable	2	2	2
Video Streaming Live view – multi channel	25 ips	25 ips	25 ips
SD Card recording global rate – multi channel	25 ips	25 ips	25 ips
Hard disk cartridge option (GB)	250, 500, 750 or 1TB	250, 500, 750 or	1TB 250, 500, 750 or 1TB
SD card capability	4-32GB	4-32GB	4-32GB
G Sensor	3 axis	3 axis	3 axis
Alarm input (multi-voltage)	10 selectable 2V - 24V level	10 selectable 2V - 24V level	10 selectable 2V - 24V level
Alarm output	4 (Logic output)	4 (Logic output)	4 (Logic output)

Connections / Interfacing

Camera	3 pin XLR	3 pin XLR	3 pin XLR
Video out (Main and Aux)	3 pin XLR	3 pin XLR	3 pin XLR
Audio microphone in	6 way Molex mini	6 way Molex mini	6 way Molex mini
Audio line out	Fit Jr Plug	Fit Jr Plug	Fit Jr Plug
Timespace reviewer	RJ45	RJ45	RJ45
LAN 1 WLAN/3G	RJ45	RJ45	RJ45
LAN 2 TfL IBUS	RJ45	RJ45	RJ45
GSM/GPS/RS232	18 way Molex mini Fit Jr Plug	18 way Molex mini Fit Jr Plug	18 way Molex mini Fit Jr Plug
Alarm inputs	10 way Molex mini Fit Jr Plug	10 way Molex mini Fit Jr Plug	10 way Molex mini Fit Jr Plug
Alarm/LED output – Configurable	18 way Molex mini Fit Jr Plug	18 way Molex mini Fit Jr Plug	18 way Molex mini Fit Jr Plug
Power input/output	5 pin XLR	5 pin XLR	5 pin XLR

General Features

- Auto record on power-up or single button start/stop recording
- Recorder status indicators (6 LEDs)
- Simultaneous record, live view and file download
- H.264 (MPEG-4 Part 10) compression
- Removable suspended hard disc media cartridge – lockable
- Simple, intuitive menu system with help screens
- Optional embedded GPS for position & speed
- Normal and alarm triggered recording
- Vehicle data recording
- 7 day programmable timer recording
- Local set-up and configuration using optional Timespace reviewer
- Remote control via RS232 interface
- Times shutdown for power saving wake up on motion for security
- Hibernate with wake up on LAN
- Low temperature sensor and heater
- PTZ camera control for remote viewing
- Short circuit protection video inputs
- Multi ranging PSU with power monitoring diagnostics

PCLink

- Remote set-up via LAN or Wi-Fi connection
- File download via Ethernet (FTP)
- PC Multi Cam LiveView, playback, via optional Wi-Fi or 3G router
- Image search by time/date or file name – PCLink
- Quick review alarm event footage markers

Security Features

- Proprietary single file video format XBA
- User and Admin password protected functions
- Each image watermarked (SHA-2 AES Authentication – 256 bit)
- Embedded camera number, date and time in each image
- 12 user programmable embedded characters per channel

Physical Characteristics

- Enclosure Extruded Aluminium, with moulded end caps
- Dimensions (mm) 292(l) x 132(w) x 143(h) including mounting plate
- IP rating IP50
- Operating temperature range -10 to +50 ºC (temperature sensor and heater function enabled)
- Humidity 10 – 90% r.h., non condensing
- Mounting options with quick release bracket Screw-mounted any axis orientation
- Power supply input 11 – 50V DC polarity protected
- Continuous power – without reviewer 12W
- Continuous power – Cameras on (typical) 33W
- Continuous power – without reviewer 0.5W hibernate mode
- Continuous power (maximum) 80W Ancillary equipment dependent
- Power up time to recording 20 seconds
- External power output 5V DC 2A / 12V 2A
- Weight – including removable cartridge and 2.61Kg mounting bracket

Optional Features

- 25ips global SD memory backup – SDHC 4GB up to 32GB (24 hours loop recording at 25ips super, no audio / 32GB SD card)
- File download via SD card
- CAN bus recording interface
- IBIS communication protocol
- Wi-Fi / 3G / GPRS router

Regulatory Approvals

CE Mark
89/336/EEC Generic
95/54/EC Commercial Vehicles
RoHS
WEEE

V400 DIGITAL RECORDER

V400 FRONT PANEL

RECORD BUTTON
Turns configured recording mode on and off. Button can be disabled within menu settings.

LED's
Power - Illuminated when the V400 is powered (Green LED).
Rec - Illuminated Red when the V400 is recording.
Disk - Pulses Green/Red when the V400 is reading/writing to/from the Cartridge. Solid Red indicates no disk is present / detected.
SD - Pulses Orange when the V400 is recording to the SD card.
Fail - Illuminated Red when any of the Fail conditions are met (refer to Service / Fail page).
Service - Illuminated Orange when any of the Service conditions are met (refer to Service / Fail page)

At Power On - All LED's will illuminate whilst the V400 initialises and will remain lit during system check (menu disabled) until the unit is operational. Once operational only the Power LED will remain illuminated unless recording is taking place.

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

SD CARD
The V400 supports a single SD card for two configurable functions:

Dual Recording - The V400 menu settings can be configured to record up to 25 images per second to the SD card in addition to primary images per second being recorded to the cartridge.

File Download - Files that are recorded on the V400 Cartridge can be selected and copied to the SD card for review on a PC.

SD Compatibility The V400 supports **SanDisk SDHC** (Secure Digital High Capacity) cards **only**. Sizes include 4GB, 8GB, 16GB and 32GB. Both 15 and 30MB/s SD cards are compatible however for best Audio playback results, 30MB/s is recommended.

REVIEWER CONNECTOR

Connect the Reviewer to V400 Reviewer socket using a standard RJ45 Ethernet cable.

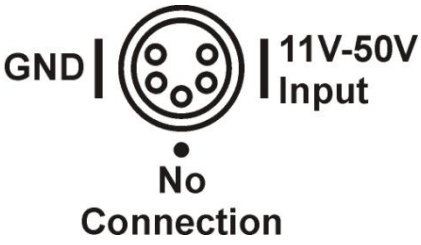
Signals for this connector are as follows:

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

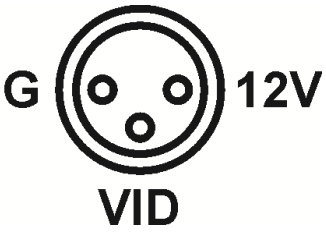
12V is supplied (regulated) to the Reviewer from the V400.

V400 SIDE PANEL INTERFACE / CONNECTIONS

POWER CONNECTOR



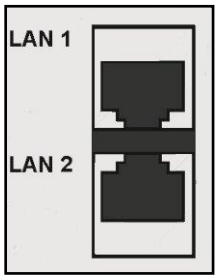
VIDEO CONNECTORS



POWER OUTPUTS

- 5V – 2A resettable fuse, 4A trip (10W global across the three 5V outputs on the Molex).
- 12V – 2A resettable fuse, 4A trip (24W global across the three 12V outputs on the Molex).
- 16 Camera outputs – 0.2A resettable fuse, 0.4A trip (2.4W per channel).
- Main video output – 12V 2A resettable fuse, 4A trip (24W)
- Aux video output – 12V 2A resettable fuse, 4A trip (24W)

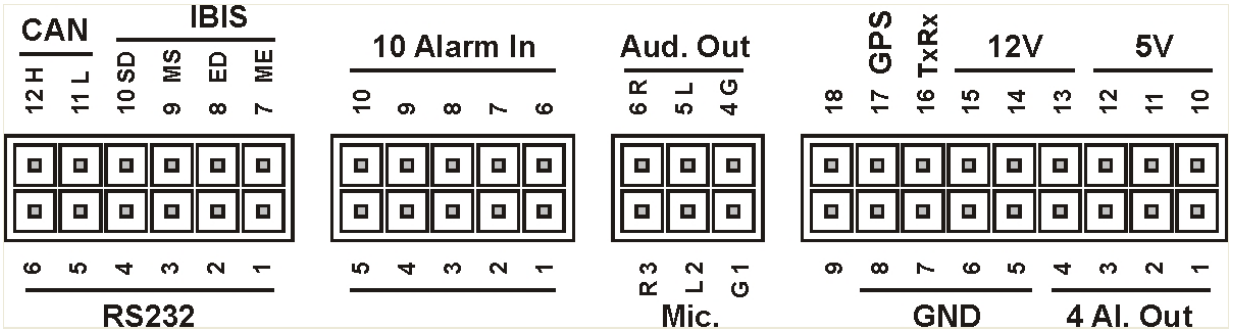
LAN PORTS



LAN1 - User configurable in menu settings.

LAN2 - TFL IBUS interface configurable in menu settings.

MOLEX SIDE PANEL CONNECTORS



	PIN	Description	I/O	Type
RS232	1	DCD, Data Carrier Detect	<	Detect modem status
	2	RD, Receive Data	<	Serial data
	3	TD, Transmit Data	>	Serial data
	4	RTS, Request to Send	>	Handshaking
	5	CTS, Clear to Send	<	Handshaking
	6	GND, Ground		
IBIS	7	ME		WBEM-
	8	ED		WBED+
	9	MS		WBMS-
	10	SD		WBSD+
CAN	11	L		Low output
	12	H		High output
ALARM IN	1-10	0-30V input range, switching configurable <2, 2-24, >24V		
MIC / AUDIO OUT	1	GND, Ground		
	2	Left channel audio in	<	
	3	Right channel audio in	<	
	4	GND, Ground		
	5	Left channel audio out	>	
	6	Right channel audio out	>	
ALARM OUT	1-4	Active pull to GND, Ground		
GND	5-8	GND, Ground		
	9	No connection		
5V	10-12	+5V 2A resettable fuse (10W global across the three 5V outputs).	>	
12V	13-15	+12V 2A resettable fuse (24W global across the three 12V outputs).	>	
TxRx	16	Expansion pin		
GPS	17	RD Receive Data	<	
	18	No connection		

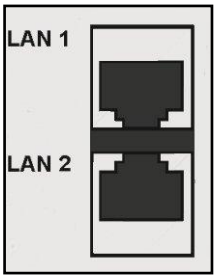
< to V400
> from V400

ETHERNET CONNECTOR
The V400 provides 2x RJ45 connectors;

LAN1 - User configurable standard network interface. Configurable IP address, Subnet and Gateway within the SETTINGS > EXTERNAL EQUIPMENT > LAN menu.

LAN2 - Transport for London IBUS diagnostic interface. Configurable IP address and Enable / Disable / Debug options. Proprietary interface; cannot be used for secondary LAN interface. See IBUS page for further information.

Connect via a standard RJ45 Ethernet cable (straight i.e. pins 1-1, 2-2, 3-3 etc.) to Ethernet hub, switch, router, wireless LAN adaptor or 3G modem.



Internal Connections: 1 Tx+, 2Tx-, 3 Rx+, 4 NC, 5 NC, 6 Rx-, 7 GND, 8 GND

INSTALLATION

The V400 is designed to be mounted on its base plate; horizontally or vertically in any axis, but on a strict perpendicular angle. For wall mounting with the V400 horizontal, the right angle plate accessory must be used.

It is recommended to power the V400 via the two power input pins on the 5 pin XLR connector. The power feed should be split and wired to both pins. In addition, it is recommended to wire an ignition feed to ALARM1 on the Molex connector.

The V400s built in GSensor must be configured during the installation process. Once the V400 is installed, the direction of the front and side panel must be set e.g. Front panel FORWARDS means the V400 front panel is facing the front of the vehicle, therefore the Connector Panel must be either LEFT, RIGHT, UP or DOWN depending on the mounting position. After configuring the V400 orientation, the GSensor readings must be zeroed.

INSTALLATION CHECK LIST (example)

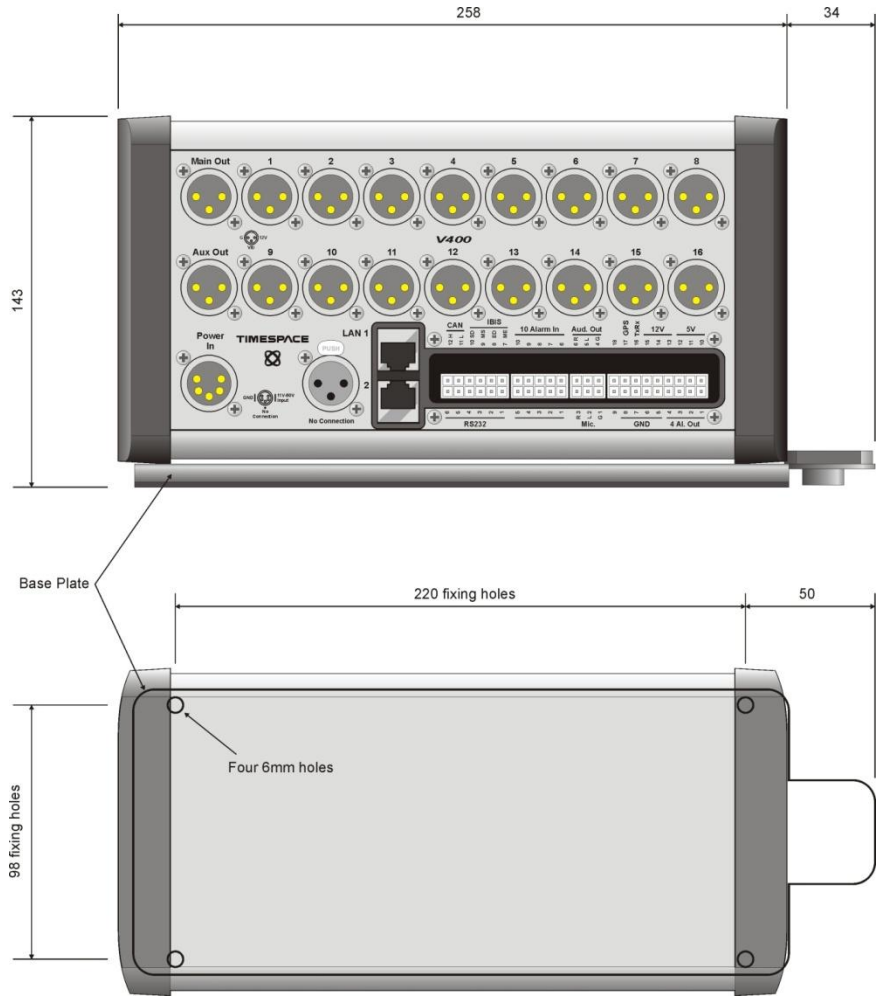
REQUIRED / RECOMMENDED

Mount the V400 in position on the base plate or right angle bracket	☐
Set the GSENSOR orientation (which way is the V400 mounted)	☐
Zero the GSENSOR readings	☐
Setup camera rate/quality as required e.g. NORMAL RECORD	☐
Setup the ALARM INPUTS for ignition, indicator L/R, brake, reverse, other…	☐
Set the POWER OPTION to WAKE WHEN IGNITION “YES”	☐
Set the POWER OPTION to WHEN IGNITION OFF “KEEP ON FOR 30 MINS”	☐
Set POWER STATE to RECORD	☐
Set ENABLE RECORD BUTTON to NO	☐

OPTIONAL

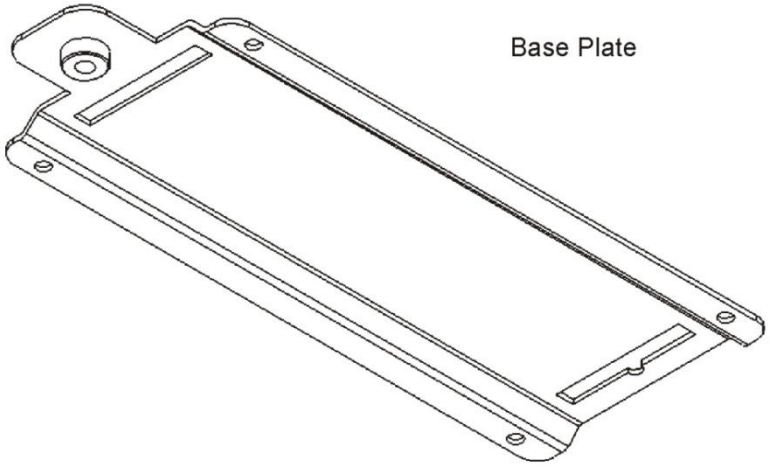
Setup the ALARM INPUTS for ignition, indicator L/R, brake, reverse, other…	☐
Setup the SD recording parameters if SD is being used (format SD card)	☐
Enable AUDIO and set the sensitivity (if mic’s being used)	☐
Setup the VIDEO OUTPUT for MAIN and AUX to display camera output	☐
Add vehicle ID / Reg number to the Camera text	☐
Enable GPS (and set correct BAUD rate)	☐
Enable IBUS (Transport for London diagnostic reporting)	☐
	☐

MECHANICAL DATA / FIXING SPECIFICATION (measurements shown in mm);

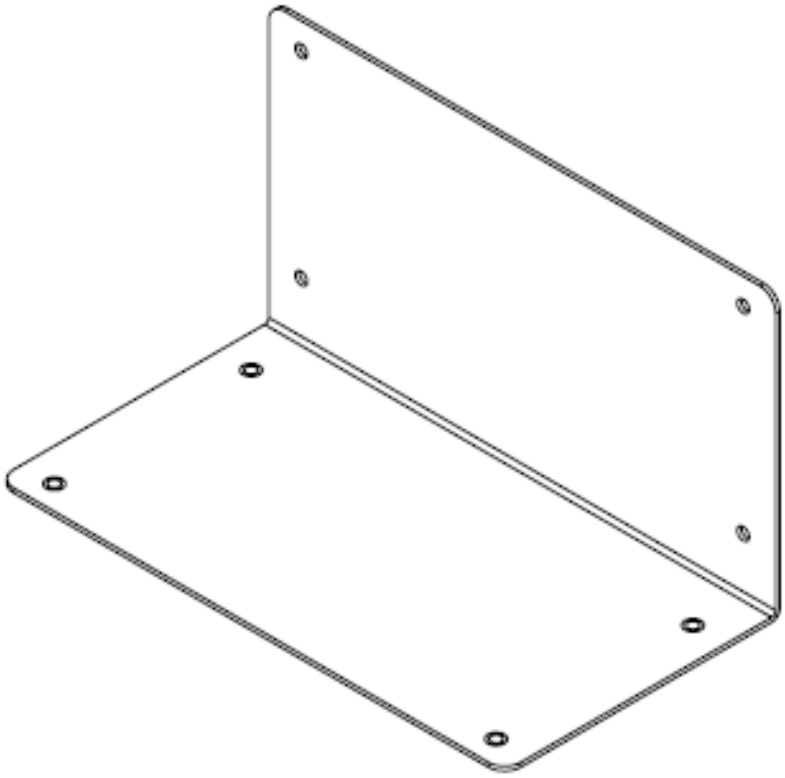


MOUNTING PLATES

The V400 has two wide pegs on the underside that hold it to the base plate, secured in place with an M8 countersunk screw and camlock.



Base Plate

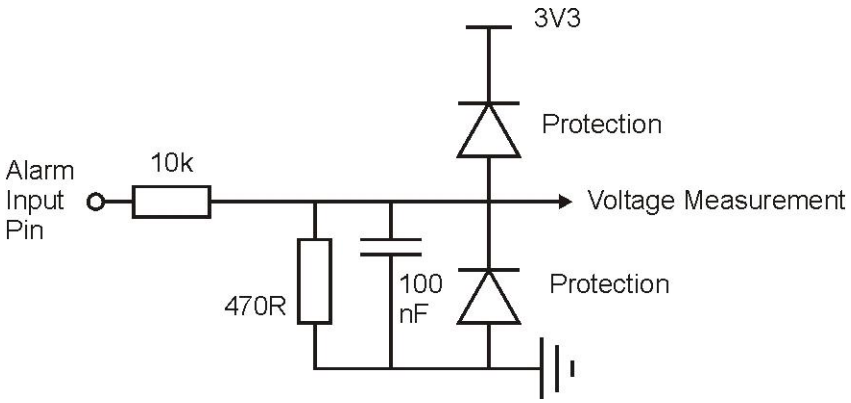


Right angle plate (for horizontal wall mounting)

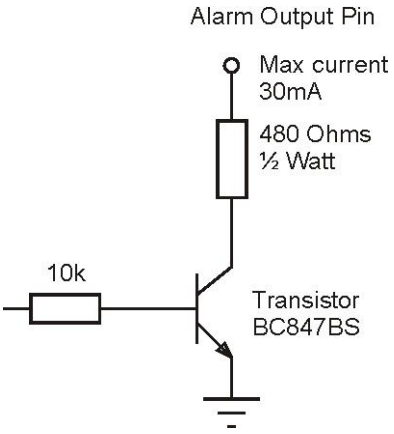
ALARM I/O WIRING

Alarm inputs are pulled to ground via a resistor so will read 0V if left disconnected or floating.

See Alarm **input** circuit below:



Alarm **output** circuit below:



See ALARM INPUTS and ALARM OUTPUT menu page for specific trigger settings.

INSTALLATION SPARE PARTS LIST

POWER CONNECTOR
Neutrik NC5FXX-B (solder bucket)

CAMERA INPUT / VIDEO OUTPUT
Neutrik NC3FXX-B (solder bucket)
Neutrik NC3FXX-HA (crimp)
Neutrik HA-3FXX (spare crimps, 50off per bag)

Crimp tool/Die (for the above) Neutrik HX-R-BNC / DIE-R-HA-1

	Molex PN	**Farnell PN**	**RS PN**
MOLEX CONNECTOR			
12 Way Molex Mini-Fit Jr Plug	39-01-2120	151-871	484-1805
10 Way Molex Mini-Fit Jr Plug	39-01-2100	151-870	484-1798
6 Way Molex Mini-Fit Jr Plug	39-01-2060	151-868	484-1760
18 Way Molex Mini-Fit Jr Plug	39-01-2180	996-3251	172-9027
Crimp Sockets for the above Molex (for wire size 18-24AWG)	39-00-0039	973-2195	172-9134
Crimp Tool (16-24AWG)	63819-0900	160-2636	501-083
Extraction Tool	11-03-0044	525-080	215-5900

MICROPHONES
Farnell – 335-9621
CPC – MP33125

Microphones must be wired with screened cable where the screen is connected to the GND and the centre core is connected to the microphone signal. Timespace have tested using 6m of Vandamme microphone cable (Vandamme part number 268001C, Farnell part number 798-289). Also possible is RG179 or RG59 video cable for short <6m runs

SERVICE AND FAIL LED

The Service and Fail LED's on the V400 front panel give a positive indication that a system fault has occurred.

If the Service LED is lit then the system will most likely be functional but may not be performing as intended. An example may be one of the cameras has failed.

If the Fail LED is lit then the system will not be functioning and requires immediately attention. An example may be that the hard disk cartridge has failed.

The Service/Fail conditions are stored on the V400 for review. Each condition has an identifiable code and associated description. The service log can be viewed here; SETTINGS MENU > ADVANCED > VIEW SERVICE LOG menu.

The LED will remain lit and the problem which caused the Service LED to light will be listed in the log until the log is reset by selecting RESET SERVICE LOG.

SERVICE CODE / NUMBER		DESCRIPTION
SERV_CAMOPEN	1**	No current on power input to camera ** and no camera signal.
SERV_CAMSHORT	2**	Over-current on power input to camera ** and no camera signal.
SERV_CAMSIGNAL	3**	Camera disconnected for cameras 1-16 => codes 301-316.
SERV_CAMDISC	811	Camera disconnected for camera.
SERV_HDDSMART	812	S.M.A.R.T Info.
SERV_LOWFPS	813	FPS lower than threshold.
SERV_TIMEERROR	815	Time error.
SERV_CHECKSIM	817	Modem send error - check simcard.
SERV_DIAL_OUT_FAIL	818	Modem error - dial out failed (image over gsm).
SERV_EXT_LOG	835	External control log (ext command).
SERV_USR_RESET	863	Log reset by user
SERV_NOTRECORDING	899	special for iBus - not recording
SERV_FAIL_HDD_PACKET_WRITE	900	HDD packet write fail.
SERV_FAIL_HDD_PACKET_READ	901	HDD packet read fail.
SERV_FAIL_HDD_SECTOR_WRITE	902	HDD sector write fail.
SERV_FAIL_HDD_SECTOR_READ	903	HDD sector read fail.
SERV_FAIL_SD_READ_WRITE	904	SD card read/write fail.

PROGRAMMING

The V400 is configured using a tiered menu system. The menu system is accessed using the Reviewer. To enter Menu System press any of the four MENU arrow buttons. To exit the Menu System or to move back up a level press the MENU EXIT button. See the X201 Reviewer section for details on how to its functions / controls.

HELP SCREENS

Throughout the menu system, each page has an associated Help screen and describes the features on that page. Pressing the HELP key on the X201 front panel will display the Help page. Use the UP/DOWN arrow keys to scroll through each help page. The help pages included on the V400 are intended as a quick reference with more detailed descriptions contained in this V400 Manual.

SOFTWARE UPDATES

Timespace recorders use proprietary embedded software in the form of **.XOS** files. Software updates for Timespace DVRs and PCLink Suite are available through authorised distributors or by contacting Timespace support; support@tspace.co.uk. From PCLink V7.2 onwards, updates can be automatically downloaded within PCLink.

Software can be uploaded to the recorder by copying an XOS file onto the removable cartridge using the PC/USB interface, then inserting the cartridge into the recorder and navigating to the relevant menu (see below). An example of the .XOS file name is **V400 V1.1.0.xos**

Software Upload

1. Using the USB interface kit, copy the .XOS file from the PC to the cartridge, ensuring that no other XOS files exist on the disk.
2. Insert the cartridge into the V400 and turn the key lock to the locked position.
3. Once the V400 has initialised, use the X201 Reviewer to navigate to the SETTINGS MENU > ADVANCED > and select LOAD SYSTEM UPGRADE.
4. There are three Load options to choose from;
    - LOAD WITH FACTORY SETTINGS (all menu settings will be reset to default values).
    - LOAD WITH CURRENT SETTINGS (menu settings will be maintained where possible).
    - LOAD WITH CARTRIDGE SETTINGS (menu settings will be loaded from the cartridge).

In all LOAD instances, the XOS will be loaded from the cartridge into the V400 internal flash memory. The “with cartridge settings” option will also load the *Settings* from the cartridge e.g. if replicating settings from another V400. The load will take approximately 30 seconds and when the V400 reboots, the current software version is displayed on screen. It can also be checked in the SETTINGS MENU > SYSTEM SETTINGS > SYSTEM INFO menu.

WARNING – V400 MAY BECOME UNUSABLE IF POWER TO THE UNIT IS LOST DURING A SOFTWARE UPGRADE.

Software can be downloaded from the recorder to the cartridge. This feature can be used to replicate settings from one recorder to another when setting up multiple units.

Software Download

1. With the cartridge locked in place in the V400, go to the SETTINGS MENU > ADVANCED and select the SAVE SYSTEM UPGRADE option.

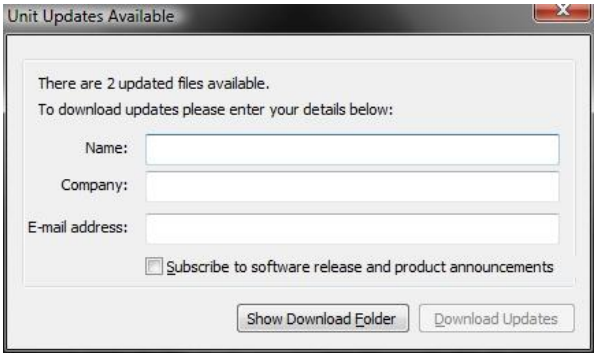
This will save the current V400 Software and Settings to the **current.xos** file on the cartridge. The cartridge could then be used in another V400 to load the Software and Settings (using the above LOAD WITH CARTIDGE SETTINGS option). Also, the current.xos file could be copied from the cartridge onto a PC using the USB kit and kept as a master settings file.

SOFTWARE UPDATES - PCLink

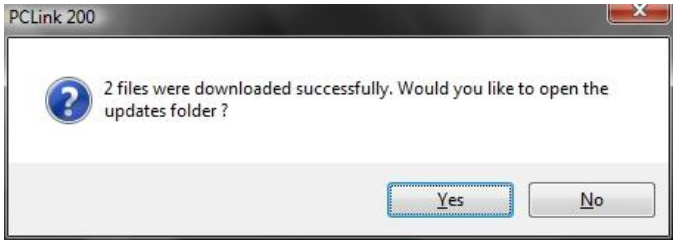
PCLink Suite V7.2 onwards includes a software download feature for acquiring the current and future software release for PCLink Suite and Timespace Digital Video recorders.

From the **Help** menu within PCLink, select **Updates** and choose from the following;

Check for Latest Unit Updates... PCLink will connect to the internet and check for updates for PCLink, X200, X300and V400. If this is the being run for the first time, updates will be found and downloaded. If on subsequent checks no new versions are available, the download will be skipped. Some basic user information will be collected and the option to be included in future software and product notifications.

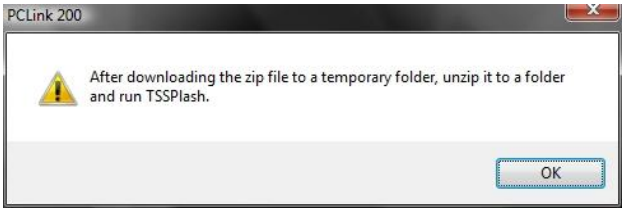


Show Downloaded Updates... PCLink will open the local folder that the updates were downloaded to.



If updates are available for Timespace DVRs, the downloaded **.xos** files will be stored in the DVR sub folder e.g. *Update\X200\X200 V1.9.0.xos*

If a PCLink Suite update is available it will be downloaded as a .zip file using the PCs Internet browser, giving the user the opportunity to **Save** the file to their preferred folder. Once complete, the file must be unzipped to a temporary folder and **TSSplash.exe** run (double clicked). This will initiate the PCLink installer.



LANGUAGE SELECTION

By default the V400 menu system is displayed in the English language.

Timespace Technology can provide a language template file which the user can translate and return to Timespace Technology for incorporation into the V400 software. This will allow all text displayed on the X201 Reviewer to be in the users preferred language.

Language is selected in the SYSTEM SETTINGS > RESET menu. The V400 requires a power cycled before the new language settings will take effect.

VIDEO STANDARD - PAL

Currently the V400 only offers PAL video standard.

PAL (Phase Alternating Line) is the standard used in most European countries with the exception of France. The V400, when configured to use PAL, offers a maximum capture rate of 25 fields per second (per channel), 200IPS Global.

FILE SYSTEM

The V400 uses a proprietary file type with the file extension .XBA. Images from multiple cameras along with audio, GPS and other meta data are stored in these files. The V400 stores XBA files on the cartridge in a loop over the physical disk and does not use a fragmented file structure. The V400 uses a linking mechanism (FAT area) for PC compatibility. This compatibility conforms to the Microsoft standard FAT32 file system that is compatible on all PC's and many other systems.

Two types of File System behaviour are available on the V400; Loop and Single Pass.

Loop Recording

The V400 will automatically delete the oldest recordings first when the Hard Disk Cartridge is full (with the exception of write-protected files). Write-protection can be used to keep Alarm recordings but loop the background (Normal) recording.

Single Pass Recording

The V400 records until the Hard Disk Cartridge is full and then stops.

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

VIDEO COMPRESSION

The V400 records images, audio, GPS and other meta data into 1 Minute, 5 minute, 10 minute or 1 hour proprietary format files ending with the .XBA file extension. For security and optimisation reasons .xba files can only be viewed on a PC using the proprietary PCLink200 software or authorised Timespace partner software.

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

A trade-off between image quality and file size can be made by selecting different levels of video quality on the V400: low, medium, high, v.high, v.v.high and super. The low setting uses greater compression than the higher settings and consequently less disk space is used.

As image quality rises however so does the resultant file size so a decision has to be made as to the level of image quality needed and the length of recording required to be stored on any given size of Hard Disk Cartridge. The V400 uses a constant bit-rate scheme so every image has a constant average size in bits relating to the quality setting. The following table lists the qualities and the corresponding kbits per image that results:

Super	200kbits per image	
VV.High	140kbits per image	
V.High	100kbits per image	← Transport for London approved quality
High	70kbits per image	
Medium	50kbits per image	
Low	35kbits per image	

An example duration of recording is easy to calculate:

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

The V400 records in 2CIF Frame Resolution 720 x 288 (pixels).

The V400 provides an on-screen calculator during setup when using the Reviewer. It shows how long the recordings will last before they are overwritten. This is based on the current quality, images per second settings and the installed cartridge size.

AUDIO

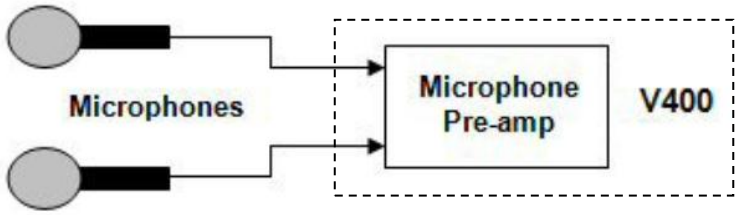
The V400 has two mic level audio inputs and two line level output channels via a 6 pin Molex connector.

The two input channels record in Stereo and can be assigned to different recording modes e.g. Normal Record, Timer Record, Alarm Record and SD Record. The audio channels can be played back individually or together when viewing footage in PCLink200 PC software. They can also be disabled during playback.

The V400 has a built in microphone pre-amp. This amplifies the microphone signal by 100 times. The gain of the audio input (post pre-amp) is also adjustable in the menu from 0.125V RMS to 2V RMS. This equates to a microphone levels of 1.25mV RMS to 20mV RMS.

Menu setting	**Microphone sensitivity (full scale)**
0.125V RMS	1.25mV RM
0.25V RMS	2.5V RMS
0.5V RMS	5V RMS
1.0V RMS	10V RMS
2V RMS	20V RMS

The microphone is also phantom powered at a voltage of 2.7V making it suitable for use with most electret or electret/condenser microphones including a wide range of small microphone cartridges



Audio sampling rate determines how much high frequency content there is in the recording. The V400 samples at 44.1kHz which offers near perfect reproduction. The audio sampling resolution determines the amount of noise in a system. The V400's 16 bit sampling resolution is C.D. quality with imperceptible noise, as long as the user sets the recording level to the maximum possible (without clipping) to use the full dynamic range.

PC ACCESS PRECAUTIONS

The V400 file system uses a standard FAT32 file system so that a PC can read the contents. The PC will access the cartridges in a different way to the V400. The V400 will not be able to read every FAT32 file system written by the PC and it is therefore important to restrict what the PC does to the file system.

Permitted on a PC

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

Not Permitted on a PC

All write accesses to the disk if it is to be reused in an V400. These include:

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

NB if any of the above non permitted actions are used, the cartridge will need to be reformatted on the V400 using the Reviewer. This will erase all data on the cartridge and format it correctly for further use in the V400.

PC NETWORK ACCESS

The V400 can be accessed through a number of PCLink Suite Applications, included in the USB Kit. Files can be downloaded, images viewed, V400 controlled and settings adjusted over LAN.

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

Security measures on a network such as Firewalls, encryption and MAC address filtering may need to be adjusted in order to achieve this. Security applications such as Norton and Symantec on the PC may need to be configured to allow the PCLink Suite applications to operate correctly. Any installed network or local PC firewalls (including Windows Firewall) may have to be instructed to allow the use of these ports to communication between the PC and the V400.

Ports:

- PCLink200 uses UDP, FTP and Telnet.
- UDP port 69 (standard TFTP port),
- FTP TCP port 21 (standard FTP port).
- Telnet TCP port 23 (standard Telnet port).
- RemoteLink UDP port 5465 (X200 only).
- LANLink UDP port 69 (standard TFTP port).
- Time Adjust TCP port 8463 (can be configured within the V400 menu system).

Authentication

FTP / Telnet username; tspace01
FTP / Telnet password; TS01480

WATERMARK

The V400 uses a fragile watermark. Any modification to the recorded file will destroy the watermark.

The image, audio and ancillary (meta) data that makes up the recorded file is passed though a function that generates a "magic number" or hash code from the data. A hash code is created automatically by the V400 every ¼ of a second for each ¼ second of data. Each hash is then passed though an encryption function and then stored in the file.

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

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

The watermark is always on the V400 i.e. all recordings have the watermark embedded in real-time as the footage is laid to disk, it cannot be turned off. Within PCLink200, you can generate a report for a number of files. You can also select a file for watermark checking.

Encryption type;

- Hashing function: SHA256
- Encryption function: AES256

SEQUENCING

In addition to every ¼ second being protected by a Watermark, each watermark has its own unique sequence number. This protects any images being removed from a file and protects any files being removed from a sequence of files.

WATERMARK / SEQUENCING REPORT

Within PCLink200, a report can be produced against an image, file and/or sequence of files.

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

Files fail if:

- Any video/audio/meta data frame (other than the last in a non-closed file) had an invalid watermark
- Video/audio/meta frames were missing or out of sequence (in newly generated files)
- Files passed to the checker were not in sequence (in newly generated files)
- Files are missing their sequence frame (in newly generated files) in properly closed files.

GPS

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

The V400 can be fed GPS data and embed coordinates into images for location identification and real-time mapping playback in PCLink200.

The V400 uses the NMEA-0183 Interface Standard. GPS data is received into the V400 GPS port using a single serial data line.

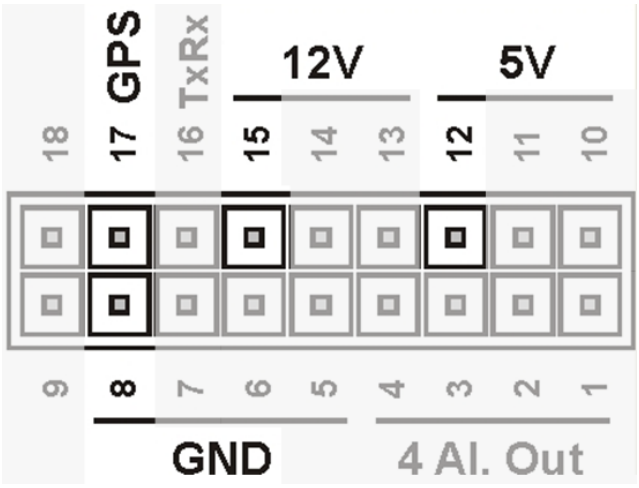
The V400 has been tested with the following GPS receivers:

- Garmin GPS16 LVS & GPS18 LVC & GPS18x LVC
- Byonics GPS2 - **EXTERNAL LINK**
- RoyalTek Sapphire Serial GPSr
- Fortuna U2 Smart GPS

NB When using the Garmin GPS18 LVC the V400 baud rate must be set to 192,00.

Connection

The GPS receiver is connected to V400 through the 18 way Molex connector. Pin 17 is used by the V400 to receive GPS data. The V400 can provide +5V or 12V power to the GPS mouse on the 18 way Molex connector.



Options

The V400 GPS menu options allow the embedding of GPS position and speed, assuming a valid GPS signal is being received and the data passed correctly to the V400.

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

Time Sync

The V400 Digital Video Recorder includes a clock which is used to timestamp recording files and overlay the date and time on recorded images. Although accurate, the V400 can be configured to synchronize the clock with the date and time information received from the GPS receiver.

When a GPS unit is plugged into the V400, and it has locked onto the satellites it then sends GPS time and position and other data every second. If after 10 seconds the V400's internal clock is consistently +/- 2 seconds compared to the GPS unit then the time error is noted. On the next power cycle the time error is corrected.

Local Standard Time - The time received from the GPS receiver is always UTC (Coordinated Universal Time) which is the same as GMT (Greenwich Mean Time). In order to correctly work out the error between the local standard time (used by the V400's internal clock) and that received from the GPS receiver, the system must be set with the correct time zone offset.

GPS Baud Rate - Set the V400 data rate according to the GPS mouse you are using. Rates configurable include; 2400, 4800, 9600 and 19200, 38400 bps.

NB It may be necessary to change the baud rate on the GPS mouse and set it to a specific rate in line with the V400 setting. Reference the GPS mouse product instructions to configure the baud rate then power off/on the V400 (whilst connected to the GPS).

REMOTE OPERATION (GSM / LAN / Wifi / 3G) – Telnet / FTP

The V400 system provides a number interfaces to remotely control and configure the recorder as well as reviewing recorded footage and displaying live camera views.

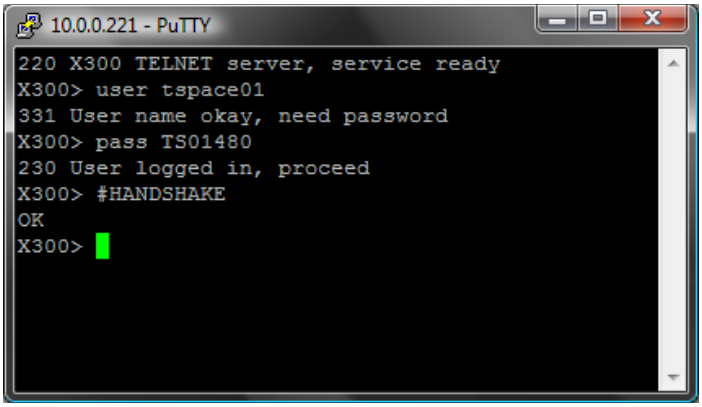
A **GSM** modem can be connected to the **Serial** port on the V400 and used to dial in to the V400 to view live camera images and configure the V400 menu settings. **SMS** messages can be configured to send texts alerts for example on an Alarm input. SMS messages can also be configured to send the system Health update upon power up or configured time.

The V400 has a comprehensive set of **RS232** control commands that run over the **Serial** port. This open architecture allows full integration with third party hardware/software. Please refer to the RS232 Control section of this manual for details on RS232 external control of the V400.

In addition to the RS232 support, the V400 provides a **Telnet** interface over TCP/IP. The same command set detailed in the RS232 section can be used over ethernet using the Telnet protocol.

A simple test to check connectivity between PC and V400 you can try following with a Telnet client (e.g. Putty, Termite);

- Telnet (port 23) to 10.0.0.200 (default V400 IP)
- Enter the username; tspace01
- Enter the password; TS01480
- Type **#HANDSHAKE**; you should receive **OK**.



The V400 supports **FTP** over TCP/IP using the Ethernet (LAN) socket. The V400 FTP server allows video files to be downloaded using either a hard-wired, wireless or 3G IP connection. A web browser can be used to FTP onto the V400 by typing the following in the address bar;

ftp://tspace01@10.0.0.200/ (default IP). This will prompt for the password.

ftp://tspace01:TS01480@10.0.0.200/ (default IP). This will log straight in.

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

Username: tspace01
Password: TS01480

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

RS232 EXTERNAL CONTROL

The V400 software includes external control via RS232 (rear connector) and provides two enhanced features:

- Files can be created and written into on the V400 hard drive. The files can also be read back.
- The V400 can be controlled via Commands. This allows many display and recording functions to be carried out by an external device.

NB Local playback is not currently supported on the V400. Playback is via PCLink Live/Remote connection or via the cartridge/USB on a PC.

These two features are enabled under the SETTINGS > EXTERNAL EQUIPMENT > GSM / REMOTE SETTINGS menu by changing the RS232 setting to a BAUD RATE e.g. 115,200.

Baud rates of 2400, 4800, 9600, 14400, 19200, 38400, 57600, 115200 can be selected. The external commands operate over the RS232 port. This port is also used for GSM modem control. GSM control cannot be performed at the same time as external control.

Connect the V400 RS232 port to a PC using a serial cable. Some modern PCs do not come with a serial port, you can however use a USB Serial Adaptor. Two adaptors that we have tested here are:

- NEWLink – www.newlinkproducts.co.uk
- FTDI - FT232R – www.ftdichip.com

The COM port number will vary depending on your PC and which cable you have. For example on a laptop the NEWLink cable was assigned COM10.

Tokens / Protocol

The V400 is always looking for tokens to perform actions but no responses are monitored. The remote device should monitor the OK<R> messages that are returned. It is looking for all tokens apart from when writing file data. In this case only the "#ENDFILE<R>" is searched for.

All commands sent to the V400 are acknowledged, for example if the client sends #RECSTART<R>, OK<R> will be returned to the client to signify that the command was successfully carried out. In the case of commands like GETTIME and GETDATE, OK<R> will not be returned, but the data requested, followed by a <R>. In the case of PREVIOUSFILE and NEXTFILE, OK<R> will be replaced with either LAST<R> or FIRST<R> if there are no more files to play next or previous, respectively. When sending commands, the sender to the V400 can wait for an OK before sending another command, or one of the other variants listed above.

There may be a need for a hold off time between certain commands (e.g 10 mS), as the V400 may take a finite time to do certain tasks. To add delay you could simply put spaces between one command and the next and these are ignored. The V400 does have a FIFO queue of 2048 bytes so can buffer data. Certain commands can be followed immediately with other commands for example:

#CAMERA_<1-16><R>#PLAY<R>	-play a given camera
#SETTIME_<12:23:45><R>#SETDATE_<23/09/10><R>	-set time and date

Definitions

_	- A space
<>	- Parameter, don't include brackets
<R>	- return (char 13)
FAIL	- File system failed to create file, aborted
FAIL	- File name is illegal
OK	- Acknowledgement, Command carried out
CLIENT	- The external equipment that is connected to the V400 via RS232 or Telnet
BAUD Rate	- This shall be selectable from within a menu
<TEXT>	- Textual data

Writing files

Write File command: **#WRITEFILE,<FILENAME><R>**
Close File command: **#ENDFILE<R>**

A return <R> character at the end of the "#WRITEFILE" command will signify the beginning of the writing process. All data from this point onwards will be written into the file specified. If the file system fails to create the file for any reason, FAIL<R> will be returned to the client.

A check is done on the file name length, if the user overruns (number of characters in total is greater than 60), FAIL<R> will be transmitted to the client, and the write command is aborted. The user should only use uppercase letters and numbers in the filename and the space character. The extension ".EXT" is automatically applied by the V400, for example

Command	Created file
#WRITEFILE,REPORT<R>	REPORT.EXT
#WRITEFILE,TICKET DATA 6 DEC 2010<R>	TICKET DATA 6 DEC 2010.EXT

If the file has been created effectively, OK<R> will be sent to the client. The client may now proceed to send the file data. When the token #ENDFILE<R> is received, the file is closed, and the client will be sent OK<R>. A new file may now be opened if required. In the example below, all the text in BOLD is written to the file "TICKETS.EXT"

#WRITEFILE,TICKETS<R>
DATE: 24/12/2011
TIME: 11:48:00
LOCATION: KINGS CROSS
#ENDFILE<R>

Reading files
Read File command: **#READFILE,<FILENAME><R>**

A return <R> character at then end of the #READFILE<R> command will signify the beginning of the reading process. Data will now be transmitted from the V400 to the client. The handshaking line CTS on port 1 may be used if required to pause the data flow. If the file system fails to open the file for any reason, FAIL<R> will be returned to the client. A check is done on the file name length, if the user overruns, FAIL<R> will be transmitted to the client, and the read command is aborted. If all is good, OK<R> is sent followed by the file data followed the token #ENDFILE<R>. The following example reads the file "TICKETS.EXT".

Sent to V400	Received from V400
#READFILE,TICKETS<R>	DATE: 24/12/2011
	TIME: 11:48:00
	LOCATION: KINGS CROSS
	#ENDFILE<R>

Recording
If for any reason recording stops, even if instructed to, the V400 will return #RECSTOP<R>

#DISKREMOVED<R> will be sent under two conditions.

1) The disk is removed from the V400 at anytime post V400 initialization.
2) Live view always has been enabled and the V400 boots without a disk.

#DISKIN<R> will be sent under two conditions.

1) The disk is inserted into the V400 at anytime post V400 initialization.
2) Live view always has been enabled and the V400 boots with a disk.

Control Commands

#RECSTART<R>	- start recording
#RECSTOP<R>	- stop recording
#STOP<R>	- stop playback
#PLAY<R>	- start playback (standard)
#REPLAY<R>	- play backwards (standard)
#WIND<R>	- fast forwards (standard)
#REWIND<R>	- rewind (standard)
#XPLAY_<FACTOR><R>	- plays at the specified factor speed (-/+)
#CAMERA_<1-16><R>	- camera to control
#LIVEVIEW<R>	- switch to live view
#AUTOLIVEVIEW<R>	- switch to live view automatic mode
#JOGFORWARD<R>	- one frame backwards
#JOGBACKWARD<R>	- one frame forwards
#GOTONEWESET<R>	- go to the newest recording
#GOTOOLDEST<R>	- go to the oldest recording
#GOTO_<HH:MM- DD/MM/YY><R>	- go to time DD:MM:YY_HH:MM
#GOTO_<HH:MM:SS-DD/MM/YY><R>	- go to time DD:MM:YY_HH:MM:SS
#SETTIME_<HH:MM:SS><R>	- sets the time
#SETDATE_<DD/MM/YY><R>	- sets the date
#GETTIME<R>	- gets the time
#GETDATE<R>	- gets the date
#NEXTFILE<R>	- when playing, skips to the beginning of the next file
#PREVIOUSFILE<R>	- when playing, starts at the beginning of the currently playing file. When stopped and #PREVIOUSFILE is issued twice, followed by a play, the previous file will begin playing from the beginning.
#GETFILETIMEDATE	- gets the current playing position of the currently play file.
#GETSTATS	- returns statistics
#DELETEALLREC	- removes all recording files from disk
#ALARMOUT<1-4>_0/1	- Turns ALARMOUT LED Output ON (1) or OFF (0)
#ALARMOUT<1-4><R>	- Returns the status of ALARMOUT, 0 or 1
#ALARMIN<1-10><R>	- Returns the status of ALARMIN, 0 or 1
#ALARMIN<1-10>1_0/1	- sets the state of the Digital input 1 ON(1) or OFF(0)
#CAMTEXT_<1-16>_<TEXT><R>	- writes text to the console at record time, Char 255 moves to the beginning of a new line. Maximum 49 characters per camera.
#DISKSTATUS	- returns #DISKREMOVED or #DISKIN
#MODESTATUS	- Returns #RECORD, #PLAY or #IDLE
#SETCAMTEXT_<1-16>_<TEXT><R>	- sets the camera text. This is fixed to 12 characters per camera.
#SETFILETEXT_<TEXT><R>	- sets the filename text. Max 12 characters.
#LOGRESET<R>	- resets the service log
#LOGREAD<R>	- reads the service log and returns up to the 10 latest entries
#MULTIVON<R>	- Turns Multiview On
#MULTIVOFF<R>	- Turns Multiview Off
#LOG_<TEXT><R>	- Logs a text message to the V400's service log (does not light service LED). Sending RESET LOG as the text marks off there LANLink should read the messages up to. OK<R> is returned if the daily quota of 10 has not been reached, other wise 10/DAY<R> is returned

Commands in Detail

#GETFILETIMEDATE
Gets the current playing position of the currently playing file. Please use #MODESTATUS to tell if the time you are reading is live play or if in idle mode, as the time you receive will ways be the current/last position played.

#GETSTATS
Will return the following stats in the same format. #END<R> signifies end of file. The stats may possibly grow in the future, but will be append to this list. Scanning for #END after the data has been retrieved. Data may be scanned for by capturing just after the colon (:) and just before the end of line <R>

Capacity: 500.11GB
Used: 0.38 %
Write Protected: 0.00 %
First File: 16:09:00 - 21/12/10
Last File: 16:50:00 - 21/12/10
Days Recording: 0.03
Model Number: Hitachi HTS545050B9A
Serial Number: 100924PBN400B7F2LW7L
#END

#DELETEALLREC
The #DELETEALLREC command will stop the current recording and delete all recording files. When complete, OK<R> will be returned
#LED1, #LED2, #ALARMOUT

The following 3 commands control the 2 digital outputs and the Alarm output. These settings will be OK'd with the current hardware states of the V400.

#ALARMOUT1_0/1<R> – Sets the active state for the alarm output CLOSE/OPEN.
..
#ALARMOUT10_0/1<R>
#ALARMOUT<R> - Returns the status of the ALARMOUT port, 0 = off, 1 = on

#ALARMIN1 - #ALARMIN10
Each one of the alarm inputs can be virtually activated by using the following commands, which control each alarm input independently. These settings will be OK'd the current hardware states of the V400.

#ALARMIN1_0/1<R>
..
#ALARMIN10_0/1<R>

By using these commands, a camera may be assigned to each alarm input, thereby allowing recording on each channel to be selective and/or allow for a different set of recording rates between Normal and Alarm recording

The following commands will READ the status of the ALARMIN pots:

#ALARMIN1<R> - Returns the status of the ALARMIN1, 0 = off, 1 = on
..
#ALARMIN10<R> - Returns the status of the ALARMIN10, 0 = off, 1 = on

#CAMTEXT
#CAMTEXT_1_HELLO WORLD<R> - "Hello world" will be written at the top left hand corner
#CAMTEXT_3_<255><255><255>HELLO<R> - "Hello" will be written on the 4 line on camera 3

If text has been assigned to a camera, simply issuing blank text will clear all RS232 overlay text from that camera. A maximum of 49 characters may be sent to the screen including new line control codes. E.G #CAMTEXT_3_<R> will clear the text (please note the space after 3)

#SETCAMTEXT_<1-16>_<TEXT><R>
Sets the camera text as via the Camera Options menu on the V400. 1-16 is the camera selection followed by the actual text. This is fixed to 12 characters per camera.

#SETFILETEXT_<TEXT><R>
Sets the filename text for the V400 file system to use. Max 12 characters.

#LOGRESET<R>	Resets the service log
#LOGREAD<R>	Reads the service log and returns up to the 10 latest entries

Examples

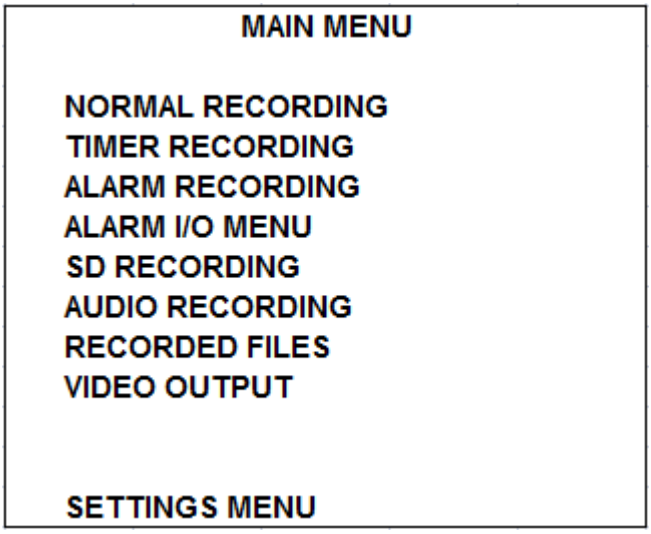
CAMERA_1<R>	switch to camera 1 (either in live/auto view or during playback)
XPLAY_0.5<R>	plays forward at half speed
XPLAY_-3.2<R>	plays in reverse at 3.2 times real time rate
XPLAY_10<R>	plays forwards at 10x speed
SETTIME_12:23:23<R>	sets the time in the format HH:MM:SS
SETDATE_23/09/05<R>	sets the date in the format DD:MM:YY
#GETTIME<R>	to which 12:23:23<R> is returned
#GETDATE<R>	to which 23/09/05<R> is returned
#LED1_1<R>	turn LED1 on
#CAMTEXT_1_Hello><R>	writes “Hello” to the console at record time in the top left corner.

A windows demonstration tool is available with source code upon request by emailing support@tspace.co.uk

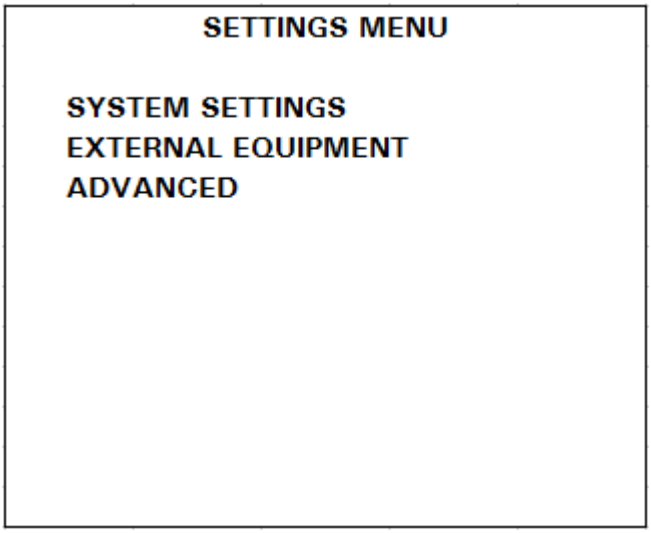
V400 MENU SYSTEM

The V400 is configured using a tiered menu system. There are two top level menus through which all features and settings are configured.

The MAIN MENU relates to the Recording functions, files and video output:

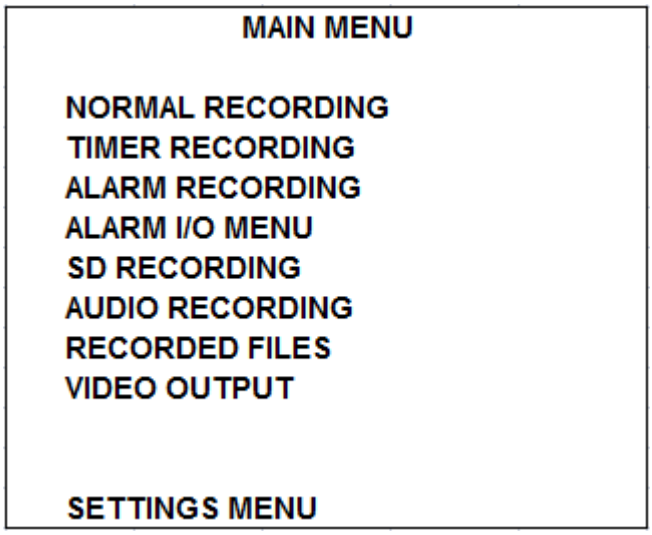


The SETTINGS MENU is where the V400 and any connected equipment are configured:



Each menu, feature and setting is detailed in the following pages.

Across the different recording modes, the V400 has some common settings for example Images per Second. The IPS can be configured from 1 to 25 per camera – to save duplication; these options will only be documented in the first instance and subsequent features should be assumed to be the same unless explicitly stated.

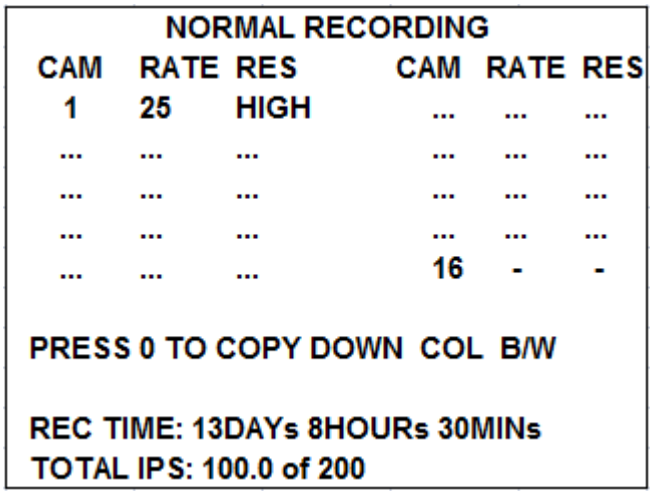


Recording modes in order of priority are:

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

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

NORMAL RECORDING



This menu sets the Normal recording configuration. Recording is activated by pressing the record button on the front of the V400 or the Reviewer.

Images per second (**RATE**) and resolution **(RES)** can be set individually for each camera.

RATE can be set to; "-" (OFF), 1, 1.5, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12.5, 15, 20, 25 ips

V400 maximum ips is 200 (not including SD ips which is an additional 25).

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

The total number of configured images/sec is displayed along with the maximum. Any adjustment to the camera ips, resolution or number of recorded cameras will affect the REC TIME. The **REC TIME** is an indication of the number of Days, Hours, Minutes that the V400 will record for based upon the current settings and entire installed cartridge capacity.

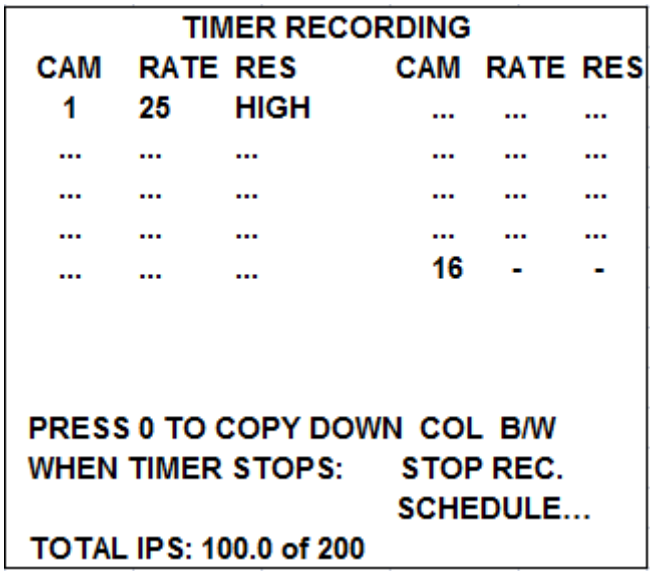
Connected cameras are identified by the relevant camera number being highlighted with either a red background (indicating colour) or a white background (indicating black & white).

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

Audio recording can be turned on or off for Normal Recording. This selection is found on the Audio Recording menu where other specific audio settings can be configured.

By default all cameras are set to record in NORMAL RECORD mode, enabling quick deployment – just connect cameras and press the record button.

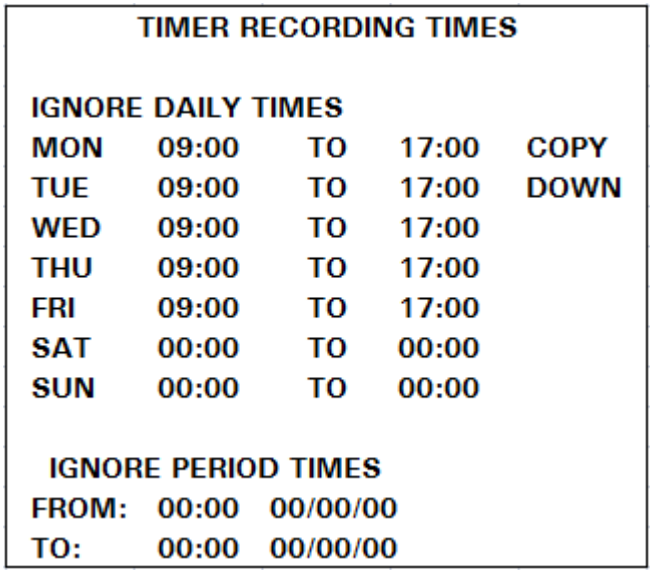
Hint – RECORD AT POWERUP is found in SETTINGS > ADVANCED.



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

WHEN TIMER STOPS: At the end of a period of Timer recording the V400 can either stop recording or record in Normal record mode. The latter can be used if two recording styles are required based on time.

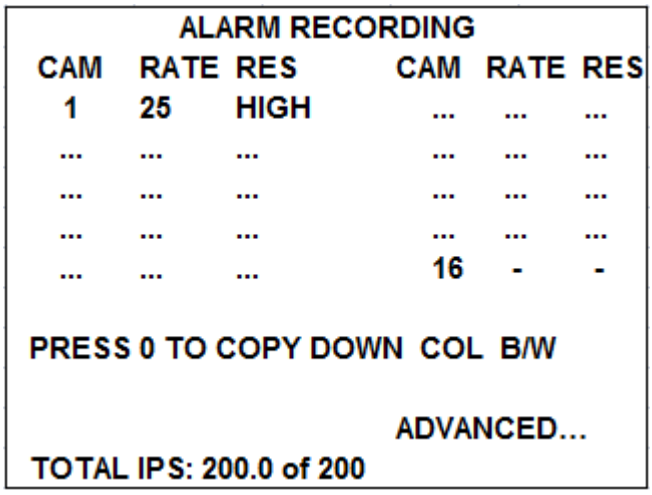
Enter the daily start and end times in the **SCHEDULE** menu. **IGNORE DAILY TIMES** disables timer recording. Select record **BETWEEN** or **OUTSIDE** daily times to enable the timer schedule.



A PERIOD of timer record can be set. This can be used for example to record between a start date and end date. If both DAILY TIMES and PERIOD TIMES are selected, the V400 will record only in the period and also only in the daily times shown.

By default the TIMER SCHEDULE is set to Mon-Fri 9-5 and all day Sat/Sun. Selecting RECORD OUTSIDE DAILY TIMES will give a quick outside office hours style recording.

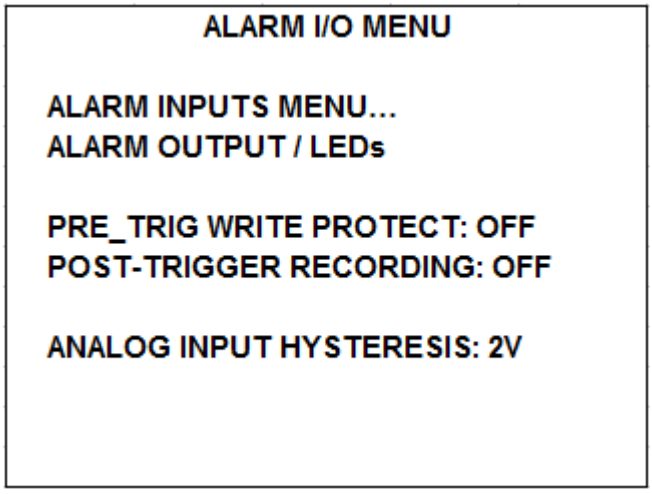
ALARM RECORDING



Alarm recording is activated by the alarm inputs. This menu sets the alarm recording configuration.

Alarm recording can be triggered by setting the function of the alarm input to be ALARM REC. Inputs can also be used to trigger other functions and modes of recording.

Alarm recording options and INPUT / OUTPUT configuration are located in the ADVANCED sub menu.

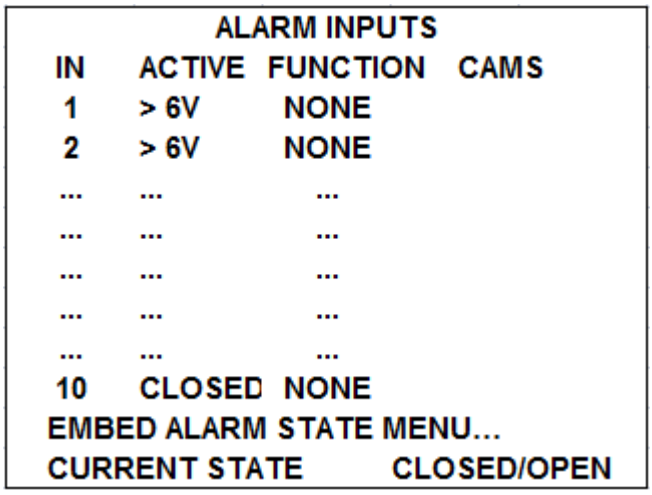


PRE-TRIG WRITE PROTECT specifies the duration prior to the alarm recording for which files will be marked as write protected. This assumes that another mode of recording was already writing files to disk.

POST TRIGGER RECORDING specifies the duration of recording after the alarm trigger. Once post trigger has elapsed, recording will stop or return to the previous recording mode. Post trigger values are; OFF, 5SECONDS, 10, 20, 30, 45, 1MIN, 5, 10, 20, 30, 45, 1HOUR, 2HOURS.

ANALOG INPUT HYSTERESIS specifies the voltage value difference that must occur in order to change the alarm state e.g. if the trigger is set to 14V, when 14V is met the trigger will switch. In order to switch back, a change of 2V must occur i.e. 14-2 = 12V.

The V400 has 10 alarm inputs and 4 outputs on the side panel Molex connector.



Inputs can be ACTIVE or INACTIVE. If an alarm input number is highlighted, this indicates its current state is active. No highlight indicates the state is inactive. Use the left and right menu buttons to set the active voltage. For a 24V vehicle system, use typically <12V or >12V. For a 12V vehicles system, use typically <6V or >6V.

The FUNCTION defines the action of the V400 when the selected alarm input is active. The function is active for the duration of the alarm (plus post trigger time if selected):

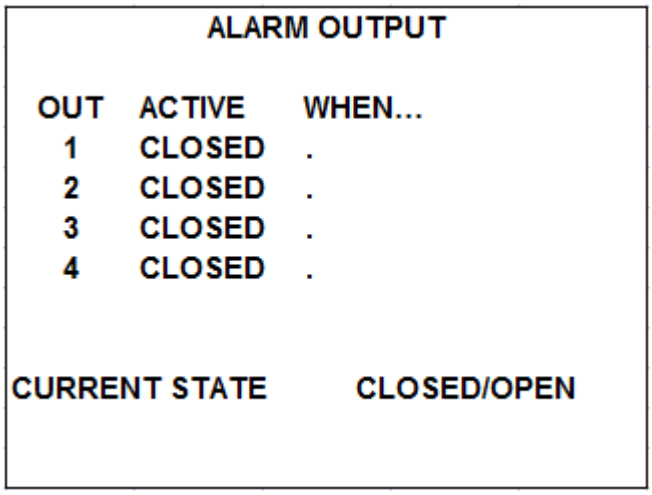
NONE – No action.
NORM REC – Switches Normal Recording on.
ALARM REC – Switches Alarm Recording on.
SWITCHER – Sets the Video Switcher (Main Video Out) to the selected camera.
SWITCHER 2 – Sets the Video Switcher2 (Aux Video Out) to the selected camera (V400-16 only).
TIMER REC – Switches Timer Recording on.
SMS MSG – Send one of the six user defined SMS text messages (GSM modem required).
GSEN RESET – Resets the GSensor alarm condition (XP200 required).
HEALTH PAGE – Displays the DVR Health page.
PTZ PRESET – Accesses the PTZ preset camera positions. 8 presets are available (setup using the PTZ menu) and a trigger can be used to invoke that position upon alarm state change.
IGNITION - Linked to POWER OPTIONS menu to control how the V400 behaves on ignition.
INDICATOR L - Tag this particular alarm input as used for a vehicle indicator, Left.
INDICATOR R - Tag this particular alarm input as used for a vehicle indicator, Right.
BRAKE - Tag this particular alarm input as used for a vehicle brake.

Alarm inputs tagged as INDICATOR L/R or BRAKE will be displayed accordingly in future releases of PCLink when playing back recorded footage.

CURRENT STATE – Shows the current OPEN / CLOSED state of each of the alarm inputs. The corresponding number for each alarm input will be highlighted for CLOSED and not highlighted for OPEN.

If a recording mode is used as an alarm function, the settings are as per the settings in the relevant recording mode menu e.g. If NORM REC is selected, the settings in NORMAL RECORDING are used.

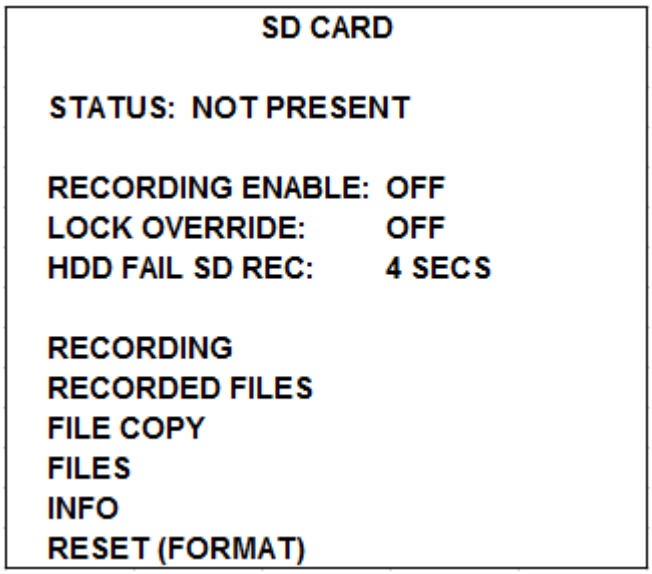
EMBED ALARM STATE MENU - Text can be embedded into recorded images using the EMBED alarm state menu. 8 user defined characters can be entered per input and positioned either top or bottom of the image. The text will display on the footage for the duration of the alarm, plus any post alarm duration. The text will be embedded on all camera views simultaneously and will appear on all selected cameras during playback in PCLink200.



This menu sets the conditions for the Alarm outputs. This determines whether the V400 alarm output goes closed (pull to GND) or open circuit when any of the set conditions are met.

ALARM OUTPUT CLOSED/OPEN **WHEN…**

TEST OPEN/CLOSED	- Sets the input to OPEN/CLOSED for testing purposes.
ALARM OCCURRED	- An ALARM event has occurred.
RECORD LED	- The front panel record LED is active.
DISK LED	- The front panel disk LED is active.
SD RECORDING	- SD recording is occurring.
FAIL LED	- The front panel fail LED is active.
SERVICE LED	- The front panel service LED is active.
FRONT LEDS	- Any of the front panel LEDs are active.
CAM DISCONNECTED	- Any camera is disconnected.
GSENSOR TRIGGER	- Any of the XP200 GSensor configured thresholds are reached / exceeded.
LAN ACTIVE	- Files are being transferred via the LAN interface.
HD WP %	- A percentage of the hard disk cartridge contains Write Protected files: 25, 50, 60, 70, 80, 90 and 100%.
HD FULL %	- A percentage of the hard disk cartridge if full; 25, 50, 60, 70, 80, 90 and 100%.
AUDIO VOR	- Voice Operated Recording. If the detected level of audio input reaches a certain percentage (25%, 50%, 75%) the alarm output can be triggered. If using this trigger as an alarm *input*, a wire link will need to be in place on the V400 rear panel to take the alarm out to an alarm input (see rear panel for wiring pinout).



The V400 supports a single SD card for two functions;

SD CARD RECORDING - The V400 can be configured to record up to 25 images per second to the SD card in addition to the primary recording to the cartridge. All additional data for example Audio and GPS are also included within the SD recorded files.

FILE COPY - Files that are recorded on the V400 cartridge can be selected and copied to the SD card for review on a PC. See next page for details.

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

LOCK OVERRIDE can be used to override the physical lock status of the SD card. For example if an SD card is inserted with the lock enable, this usually prevents any data being written, however the V400 can override this.

HDD FAIL SD REC sets the number of seconds that the V400 will continue to record to the SD card when a FAIL to write to the HDD (hard disk drive) is detected. After the configured time has elapsed, the V400 will reboot in an attempt to continue writing to the HDD after boot up. If the HDD fails due to a crash the SD will carry on recording for the defined period so that the crash events are stored.

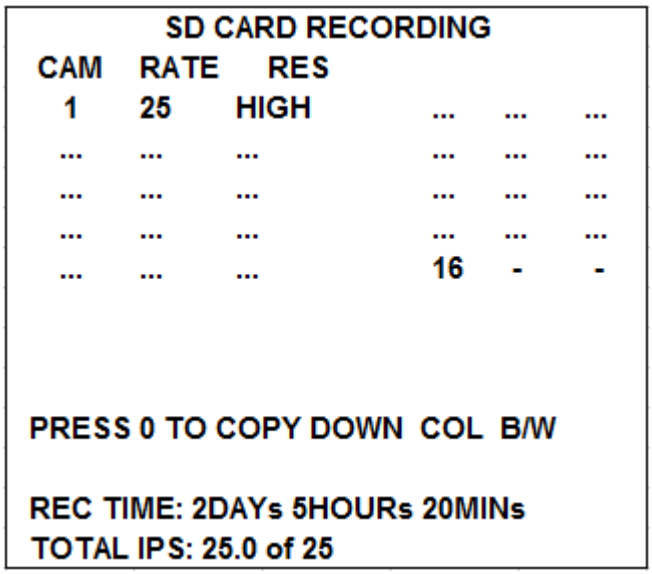
An SD INFO page includes details such as; Size, % used, SD serial number etc.

Within the SD card RESET menu, DELETE ALL RECORDING FILES will remove all recordings from the SD card including write protected files. Only do this if you want to completely remove all recordings – there is NO undo option. Press the right menu button to go to a warning screening, press right again to carry out this action. Pressing Menu Exit will abort this procedure.

SECURE DISK WIPE will permanently delete all recording files on the SD card This should only be used if files need to be completely destroyed. NO files will be able to be recovered. A final warning message will appear before this function is carried out. Pressing Menu Exit will abort.

SD FILES menu displays a list of the files on the SD card. The files cannot be played back on the V400. Navigation of the file list pages are via the left/right arrow keys when FIRST/LAGE page is highlighted. Files can be write protected by scrolling down to the file and pressing the left arrow key, a W should appear next to the file. Pressing left again will remove the write protect.

A link to the main cartridge HDD files give quick access to see what is on the cartridge. Some SD stats are given to aid in the select process e.g. size and capacity used.

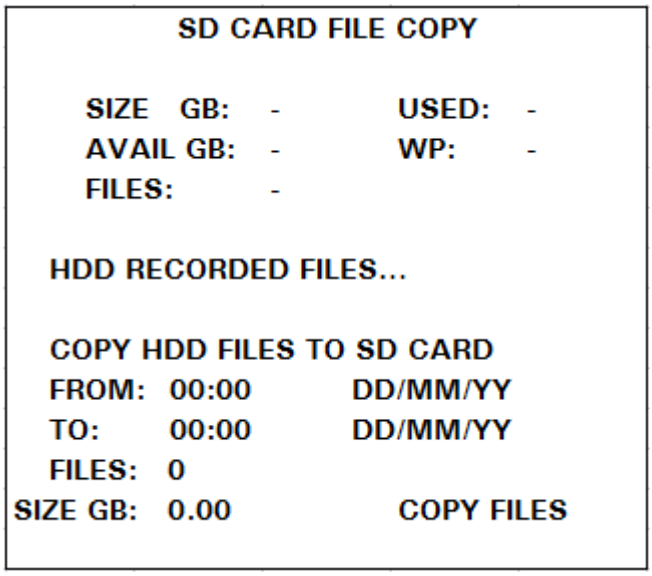


SD CARD RECORDING - The V400 can be configured to record up to 25 images per second to the SD card in addition to the primary images per second being recorded to the cartridge. All additional data for example Audio and GPS are also included within the SD recorded files.

Images per second and Resolution can be set independently, per channel, from the V400's primary mode of recording e.g. if the V400 is Normal Recording with a RES of SUPER, the SD recording files can be set to MED.

Modes of recording;

- OFF – SD recording is OFF, no SD recording.
- ON – SD recording onto SD card all the time.
- IF Normal Rec – SD recording only occurs if the V400 is recording in Normal mode.
- IF Timer Rec – SD recording only occurs if the V400 is recording in Timer mode.
- IF Alarm Rec – SD recording only occurs if the V400 is recording in Alarm mode.

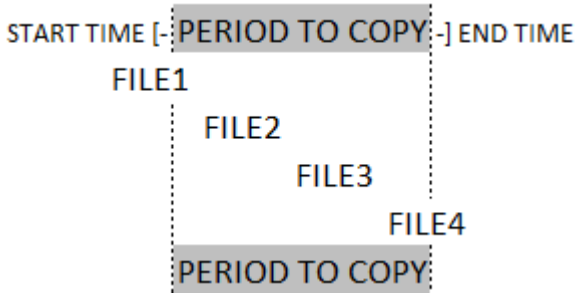


FILE COPY is used to copy recorded files from the V400 cartridge to the SD card.

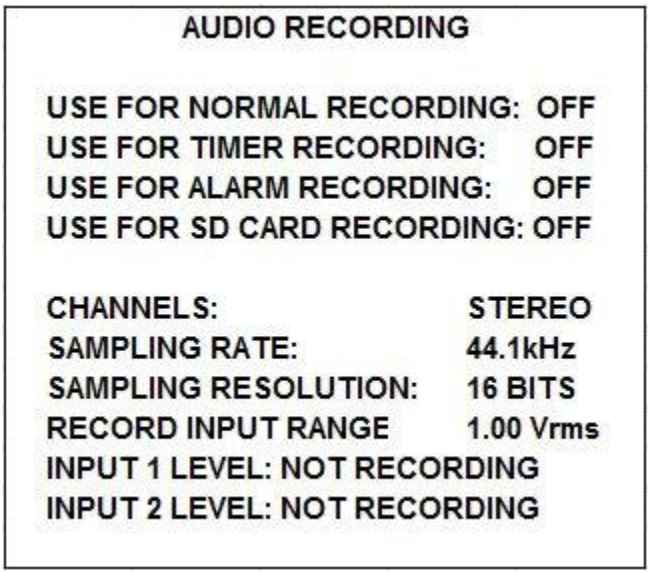
Enter the start/end date & time of the period you wish to copy and then move the cursor down to COPY FILES.

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

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



AUDIO RECORDING



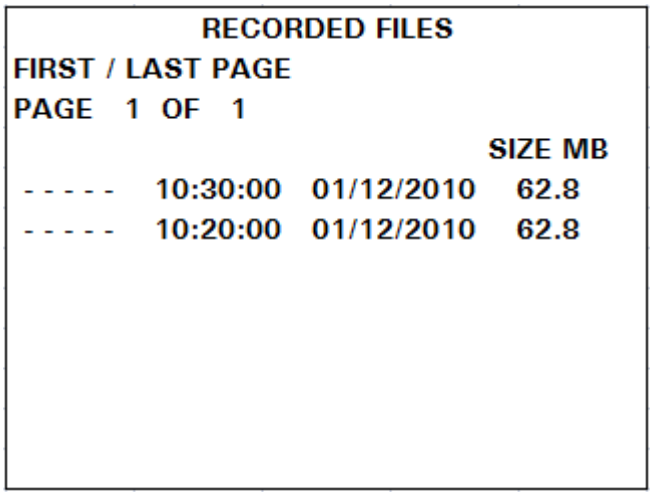
This menu allows configuration of the audio recording parameters. Audio can be enabled or disabled (ON / OFF) for the following recording types; Normal, Timer, Alarm and SD Card.

The V400 has a built in preamplifier so mics can be connected directly to the side panel interface.

The V400 is configurable so that the line-level input range can be set from 0.12 - 2.0Vrms (sensitivity). When recording, the INPUT LEVELS will be shown as a percentage so the V400 can be setup to avoid clipping. The sensitivity configuration will be dependent on the environment of the installation.

The V400 samples at 44.1kHz and 16bit resolution, giving CD quality audio recording.

Individual audio channels can be played back using PCLink200 PC software.



Lists the recorded files and allows the user to change the write protect state of a file.

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

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

File status indicators shown to the left of the file include;

A - Alarm
W - Write protected
G - GSensor

A file may have multiple statuses. For example a write protected alarm file could have; A W _ _ _

A file with a W status will not be overwritten on Loop Recording. The W status can be added or removed by pressing the Left key when the cursor is next to the recorded file.

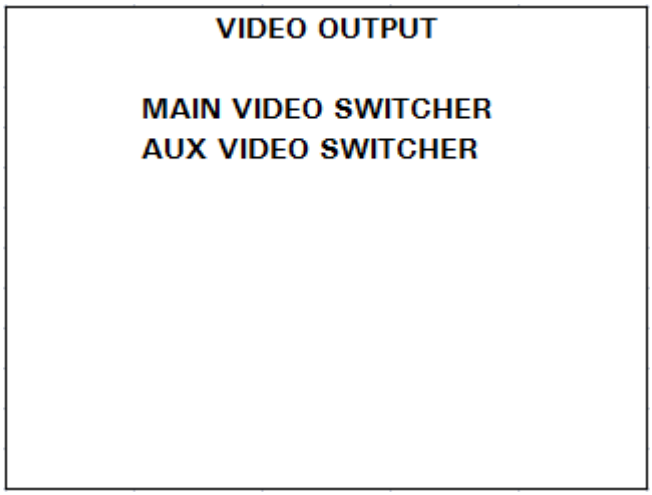
Navigation

First / Last page;

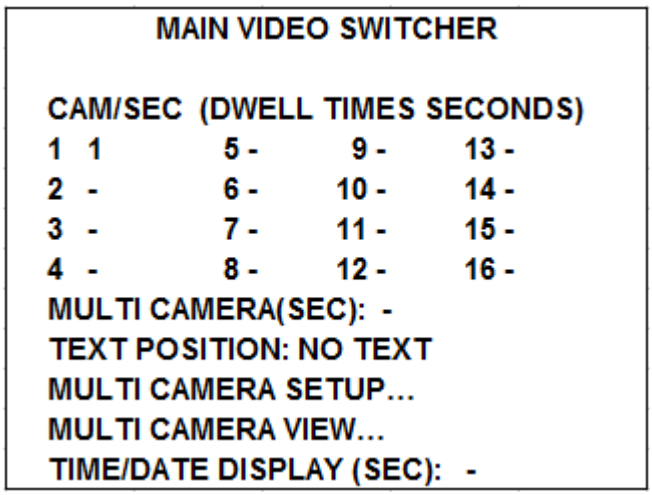
Left key - go to last page
Right key - go to first page

Page;

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



The V400 has two video outputs. These menus control the automatic switching and dwell time of cameras on the MAIN video out and the AUX video out.



Set the desired camera DWELL time (in seconds) next to each camera that is to be included in the switcher sequence. Set the MULTI CAMERA dwell time as required.

TEXT POSITION; Screen text can also be displayed on the output and includes the current date & time and if the V400 is recording. Set the position of the screen text accordingly. **NB** this does not affect the date/time being recorded into the images; that is set in SYSTEM SETTINGS > CAMERA OPTIONS.

Multi camera view allows the simultaneous viewing of a number of cameras at the same time. The output is split into tiles per camera. Multi view can be included in the Auto switching sequence.

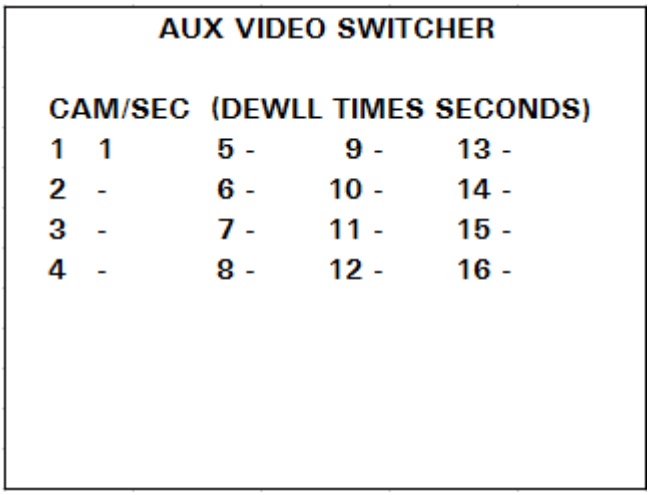
MULTI CAMERA SETUP; Configures which cameras are to be displayed simultaneously. Each tile can be set to display a sixteenth view of a camera. If the same camera number is set to four tiles in a square then a quarter view will be shown.

MULTI CAMERA VIEW; displays multi camera output as per the current settings.

TIME/DATE DISPLAY: Display the current time/date for a configurable time; 1, 2, 5, 10, 20, 30seconds.

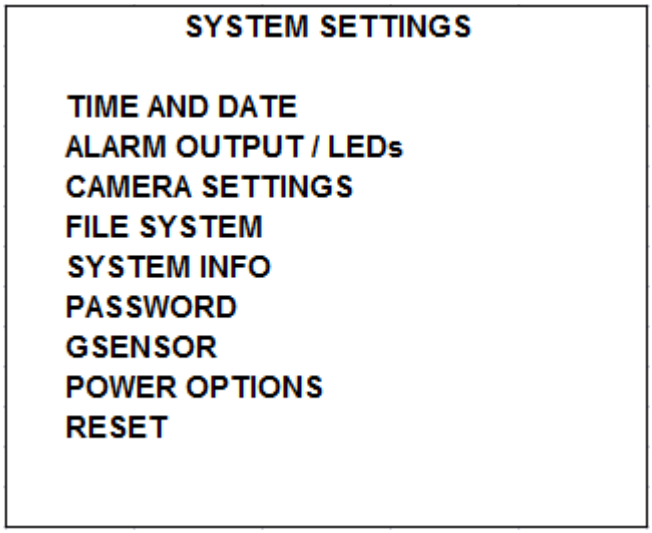
Pressing the Auto key on the Reviewer will switch the video output between the configured cameras for the set period of time. Single camera output is selected by pressing the camera number on the Reviewer.

AUX VIDEO SWITCHER

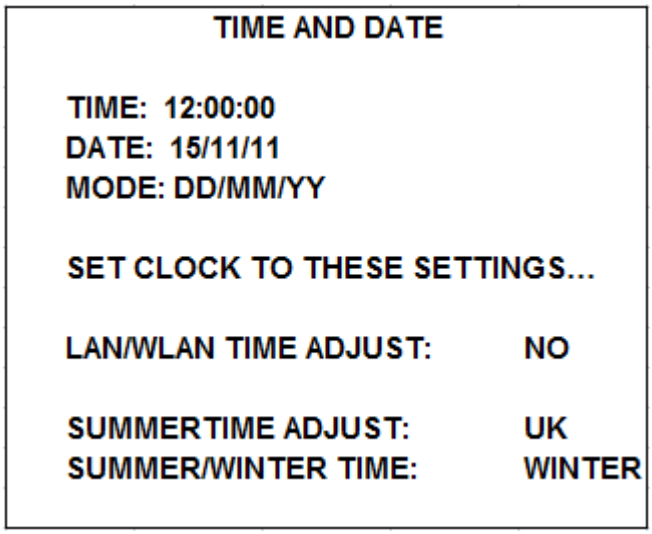


AUX video out provides a secondary video output. Multiview and screen text are also available for this output. Switcher is configured in the same way as for MAIN out.

SYSTEM SETTINGS MENU



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



Time and Date settings can be set here. Summer time adjustment can be selected for UK, EUR and USA.

The current time/date is displayed. Enter new values using keys 0-9. To set the new time/date select;

SET CLOCK TO THESE SETTINGS

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

LAN/WLAN TIME ADJUST allows the system to accept broadcasts over a LAN/WLAN to adjust its time. Time adjust network port can be configured in the External Settings > LAN menu.

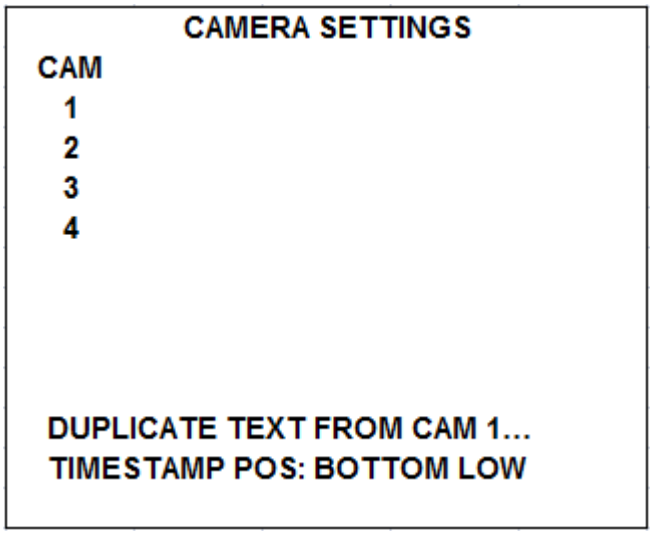
Summer time adjust automatically updates the system to daylight saving time, valid for the country selected. Adjustments are applied even if the system was powered off during the time change.

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

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

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

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



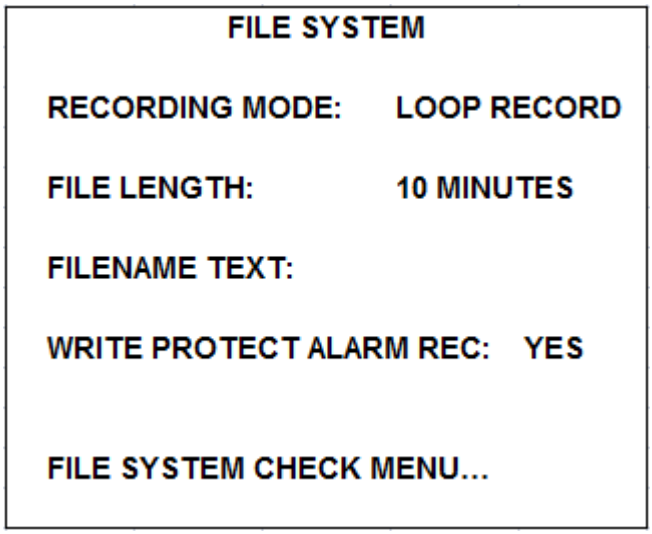
Individual text for each camera can be inserted above the timestamp. 12 user defined characters can be inputted per camera.

A duplicate text feature is available for copying down text from camera 1 to all remaining cameras.

The timestamp can be positioned either below or above the main area of the recorded image and fine adjustment of position made with LOW/MIDDLE/HIGH settings. The timestamp can also be turned off and will not be written in to the recorded images.

Text input on the Reviewer is similar to a mobile phone keypad. For example pressing **1** multiple times will sequence through **A B C 1 (blank)**.

See the text input section under Reviewer for full character map.



Sets the parameters of the file system and how files are laid to disk. RECORDING MODE sets either LOOP RECORD (oldest files will be overwritten first when the hard disk cartridge is full) or SINGLE PASS recording (recording will stop when the hard disk cartridge is full).

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

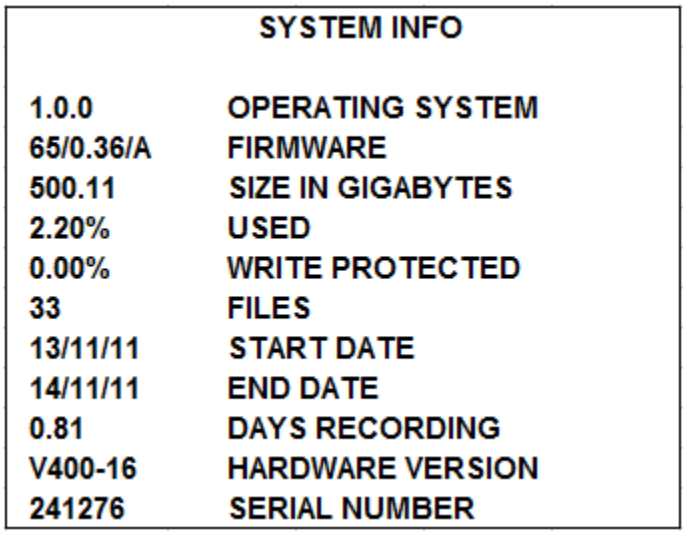
FILENAME TEXT prefixes the recording files with up to 12 user defined characters (0-9, A-Z, space).

WRITE PROTECT ALARM REC selects whether alarm recording files are write protected. If alarm files are write protected they will not be deleted on LOOP recording.

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

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

PERFORM CHECK AND CORRECT NOW will perform a file and file system check and fix any errors that are found. It also rewrites the FAT and BOOT sectors. **NB** No XBA files/data are deleted during this function.



Displays information about the system;

OPERATING SYSTEM – Currently installed/running software version.

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

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

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

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

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

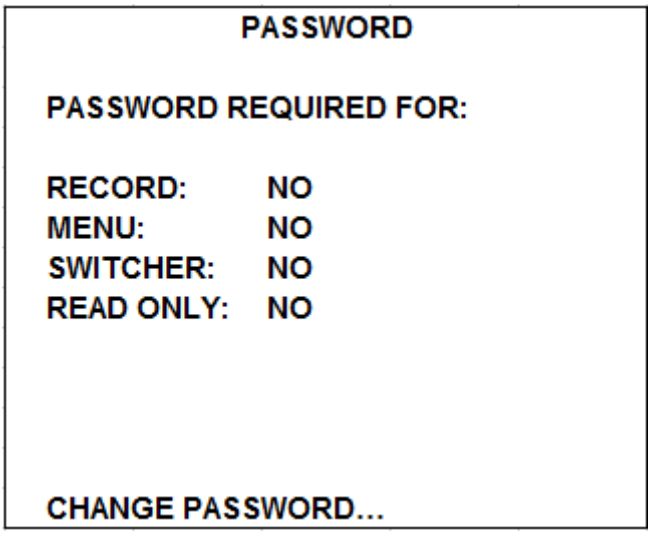
START DATE - The date of the first (oldest) file on the cartridge.

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

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

HARDWARE VERSION - The model number of the DVR.

SERIAL NUMBER - Displays the V400 serial number.



A password can be set to restrict user access to four key areas of the system. A read only access can be set that allows view and limited features to be used.

RECORD - If set to yes, the record button on the front panel and the reviewer are password protected.

MENU - If set to yes, access to the menu system is password protected.

SWITCHER - If set to yes, the button to activate auto switcher mode is password protected.

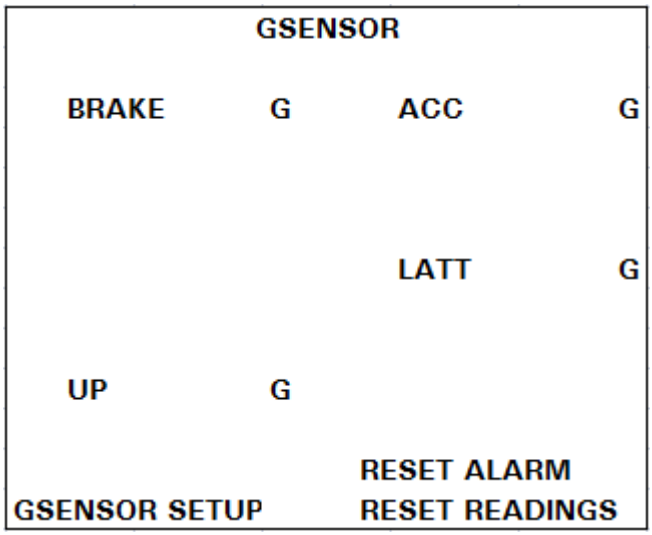
READ ONLY - If set to yes, the user cannot change any setting on the V400. The menu system can be browsed but no settings changed. If a setting change is attempted, the element will flash in RED for 2 seconds and not be changed. To exit read only mode, change read only to NO, at which point you will be prompted for the password.

If access to a password protected function is attempted the user is prompted with the enter password screen. On correct password entry the password protection is temporarily disabled whilst that function is being used.

Password can be changed by first entering the current password, followed by the new one (entered twice for verification). Password format is four digits only 0-9.

Default password is **0000** (four zeros).

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



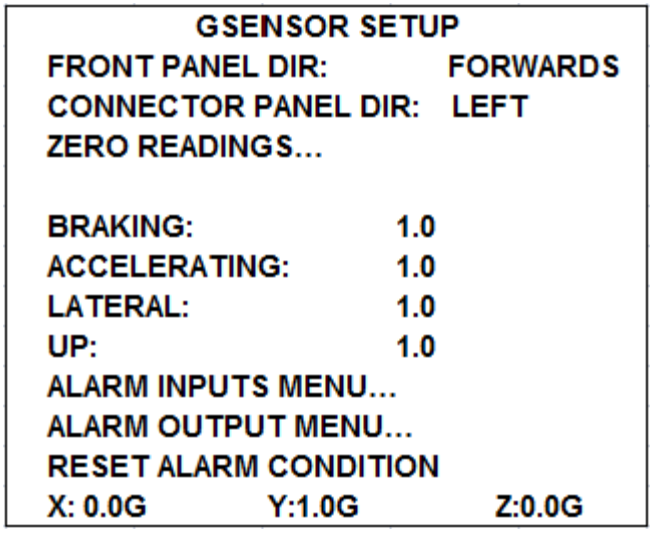
The V400 includes a built in Timespace XP200 Accelerometer. The XP200 is a GSensor device that provides X, Y and Z axes data internally to the V400. Data is displayed and recorded into each image along with optional GPS data. GSensor readings are displayed for;

BRAKE	- Measurement of decreasing forward motion.
ACC	- Measurement of increasing forward motion.
LAT	- Measurement of lateral movement.
UP	- Measurement of upwards motion.
RESET READINGS	- Clears all current readings within this hour.
RESET ALARM	- Clears the alarm condition.

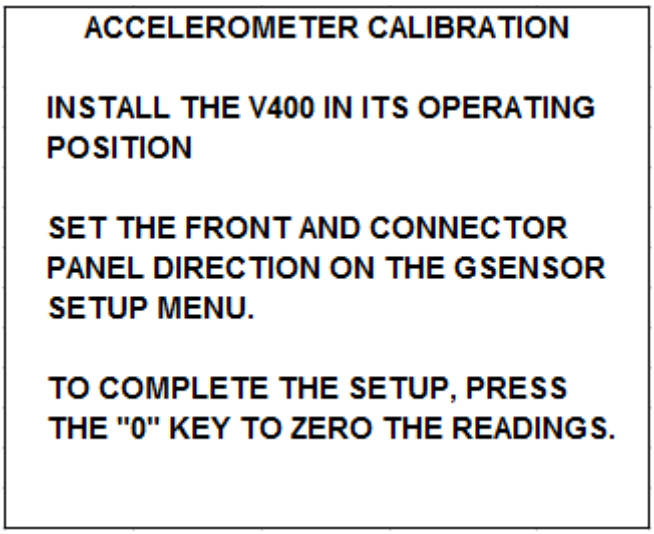
GSensor threshold triggers can be configured from 0.1 - 2.0. If the set value is exceeded an alarm can be raised (used in conjunction with alarm outputs). A link to both the Alarm input and output menu gives quick access to configure the required action.

GSENSOR POSITIONING SETUP

The GSensor is calibrated as part of the manufacturing process in a controlled environment and should not require calibration during the installation process. However once the V400 is installed in a vehicle, the direction of the front and side panel must be set e.g. Front panel FORWARDS means the V400 front panel is facing the front of the vehicle, therefore the Connector Panel must be either LEFT, RIGHT, UP or DOWN depending on the mounting position. After configuring the V400 orientation, the GSensor readings must be zeroed.

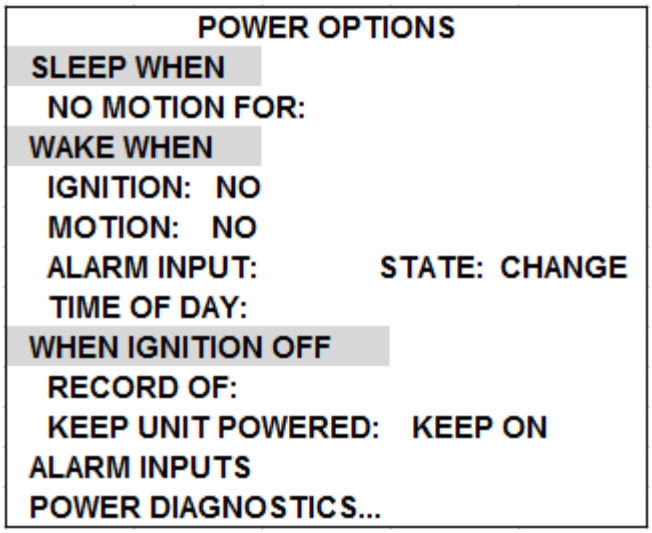


ZERO READINGS… Once the V400 is installed in its final operating position, the GSensor readings must be zeroed by pressing “0” on the ACCELEROMTER CALIBRATION menu;



During installation:

1. Set the V400 orientation e.g. Front panel FORWARD, Side panel LEFT.
2. Zero the readings once the V400 is in its installed position.



POWER OPTIONS configures the behaviour of the V400 when power is applied, when power is removed and when an input trigger is detected.

The V400 has a built in G-SENSOR for recording and detecting motion. The V400 can use the GSENSOR readings to wake up and/or to shutdown.

SLEEP WHEN: NO MOTION FOR: 1MIN, 2, 5, 10, 30, 1 HOUR, 2 HOURS.

Should the V400 WAKE WHEN:

IGNITION: the ignition input is detected? YES / NO
MOTION: GSENSOR motion is detected? YES / NO
ALARM INPUT: one of the 10 alarm inputs goes LOW / HIGH or CHANGE state?
TIME OF DAY: set wake up time, configurable in 15minute increments.

NB When setting the V400 to sleep on no motion, ensure that one of the following is turned on; WAKE WHEN ignition, motion or alarm input. If the WAKE WHEN setting is not enabled, the V400 will sleep until the next power cycle.

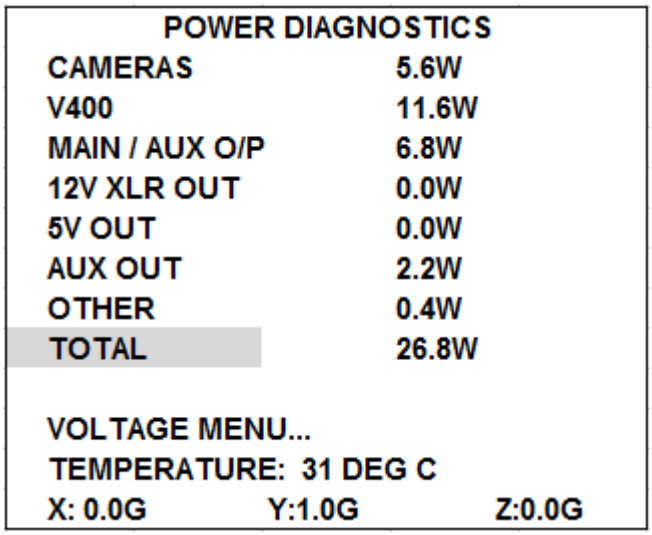
Set the behaviour of the V400 WHEN IGNITION OFF

KEEP UNIT POWERED: KEEP ON, 5MINS, 10, 15, 20, 30, 1HOUR, 2HOURS, 3, 4HOURS.

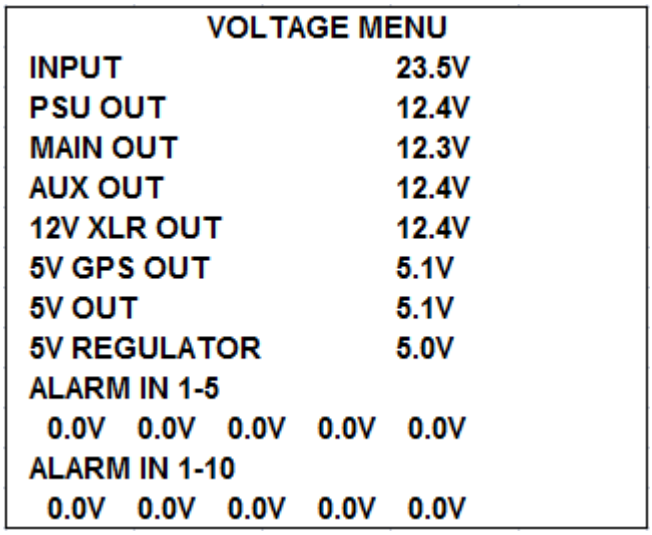
NB In order for the V400 to operate on ignition, the ignition feed should be connected to one of the V400 ALARM INPUTS and the ALARM INPUT FUNCTION set to IGNITION.

ALARM INPUTS – Link to the alarm inputs menu.

POWER DIAGNOSTICS...



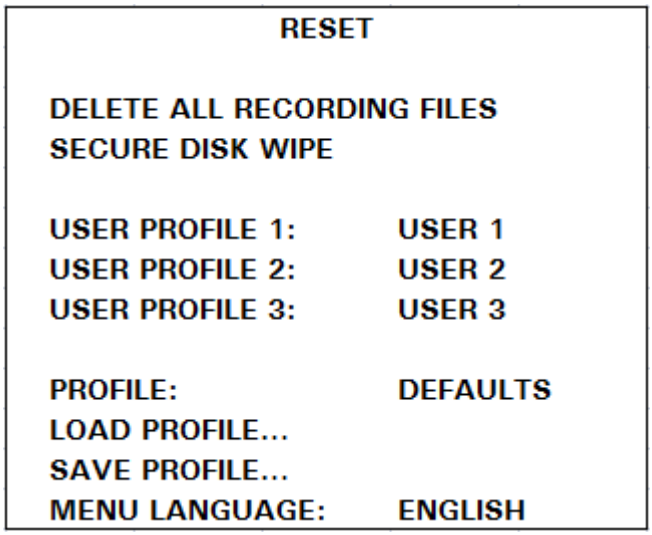
POWER DIAGNOSTICS page displays the current power consumption, broken down into various sections e.g. Cameras, GPS.



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

NB Both the above pages may be useful during installation and troubleshooting.

RESET



DELETE ALL RECORDING FILES will remove all recordings from the hard disk including write protected files. Only do this if you want to completely remove all recordings – there is NO undo option. Press the right menu button to go to a warning screening, press right again to carry out this action. Pressing Menu Exit will abort this procedure.

SECURE DISK WIPE will permanently delete all recording files on the hard disk. This should only be used if files need to be completely destroyed. NO files will be able to be recovered. A final warning message will appear before this function is carried out. Pressing Menu Exit will abort.

Three User Profiles can be configured with different settings for different uses or recording modes. This gives the user an easy way of quickly switching between types of recording required without having to setup the V400 each time. Each profile can be named individually.

In addition to the three user profiles, the V400 Default menu settings can be loaded.

Use the PROFILE: selection to choose between DEFAULTS and USER 1-3. Then select LOAD PROFILE to load those menu settings.

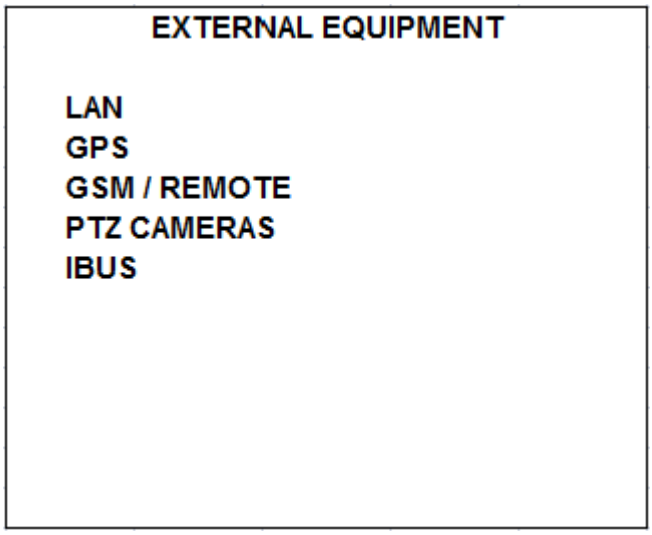
SAVE PROFILE will write the currently loaded settings back to the flash memory, using the selected PROFILE name.

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

MENU LANGUAGE can be set between ENGLISH (default) or FROM DISK. When FROM DISK is selected, the V400 will load a language file from the cartridge with MENU and HELP text translated into a given language. The language template is pre loaded to the cartridge by the user at the point of installation. The language file will not be removed when running DELETE ALL RECORDING above. A power cycle is required before the new language settings will take effect.

Save up to 3 of your most common settings using the USER PROFILES to allow quick switching between different types of recording mode for different installations. E.G;

USER PROFILE 1 - Normal record 8 cameras with audio.
USER PROFILE 2 - Normal record 14 cameras with GPS and SMS alert.
USER PROFILE 3 - Alarm record 4 cameras based on an external input.

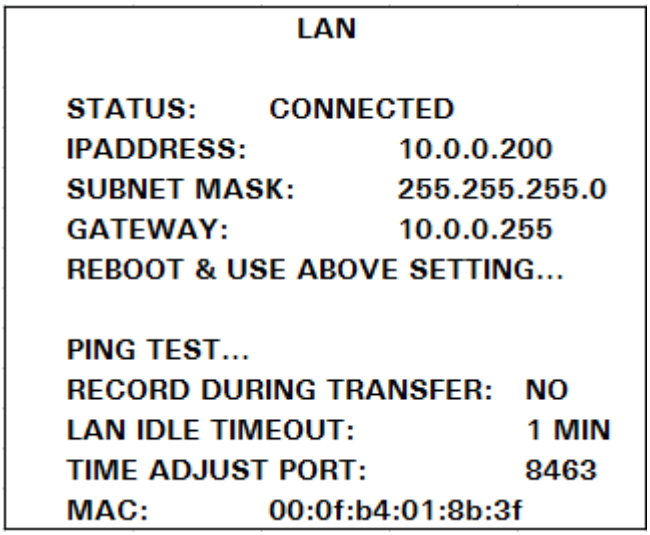


The V400 provides some common interfaces so that external equipment can be connected and configured for use with the DVR. For example;

LAN PORT 1 RJ45 Ethernet socket for hard wiring a network cable, linking to a Wifi bridge or 3G router.

LAN PORT 2 RJ45 Ethernet socket for connecting to the Transport for London diagnostic interface (**IBUS).**

Molex connector for wiring a GPS unit, GSM modem or other equipment to take advantage of the V400 RS232 commands.



Allows the user to change the parameters of the LAN system. LAN STATUS indicates whether the V400 is currently connected to a LAN or not.

IP ADDRESS - Enter static (fixed) IP address that the V400 is to be assigned on the local area network. The default ip address is **10.0.0.200**

SUBNET MASK - Enter the subnet mask as applicable for the LAN the V400 is connected to. The defaults is 255.255.255.0

GATEWAY - Enter the gateway IP address of the default gateway the V400 will communicate with on the LAN.

PING TEST - Enter a destination IP address to send a network packet to for testing connectivity.

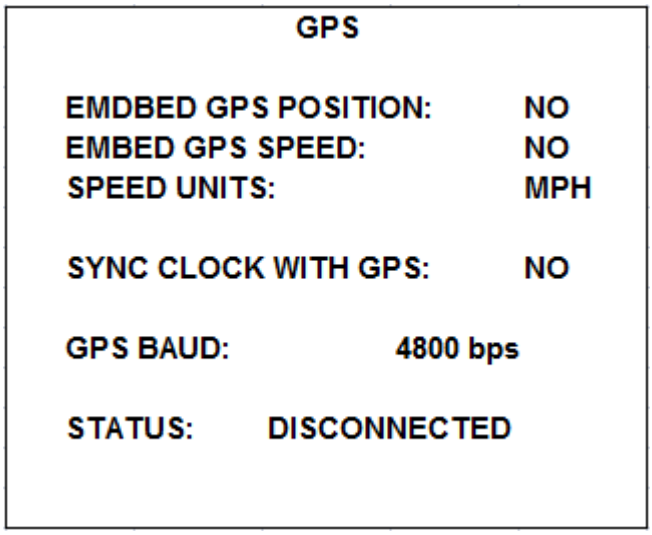
FRAMES SENT / RECEIVED updates in real-time to show how many data packets are being transferred to and from the V400. These are global values and not specifically related to only the ping test.

RECORD DURING TRANSFER allows or disallows the V400 to record whilst LAN transfer is taking place. If set to YES, then the V400 will continue to record during transfer. If set to NO, recording will stop during transfer and return to the previous recording mode after transfer.

LAN IDLE TIMEOUT - Sets the number of minutes after the last LAN activity an ALARM output will stay active for. This timeout is to be used in conjunction with the ALARM OUTPUTS.

TIME ADJUST PORT configures the network port number that the V400 will listen for time adjust broadcasts.

MAC is the unique hardware identifier for the network interface on the V400.



Global Positioning System serial connection setup menu.

The V400 can receive GPS data through the serial port and embed the data into recorded images. GPS data includes positioning and speed and users can optionally turn these on or off. Then turned on, the data will be recorded with each image.

If you decide not to embed GPS data then it will not appear on the screen during playback in PCLink but the data is still included in the XBA files therefore the speed dials will still operate in PCLink.

The V400 is compatible with the standard NMEA-0183 GPS protocol. A suitable GPS serial unit can be wired to specific pins on the V400 serial port (see V400 user manual for further information / wiring diagrams).

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

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

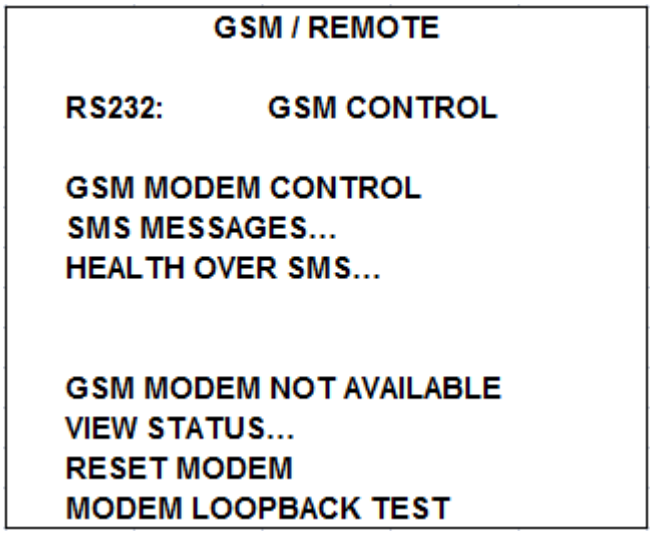
SPEED UNITS can be set for miles per hour (MPH) or kilometres per hour (KPH).

SYNC CLOCK WITH GPS - The V400 can be configured to synchronize the clock with the data and time information received from the GPS unit. When set to YES the V400 will synchronize the clock on power up.

GPS BAUD set the baud rate at which the V400 will communicate with the GPS. A reboot of the V400 may be required when changing the baud rate in order to detect the GPS unit.

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

GSM / REMOTE



Settings for the serial port behaviour can be configured here to either communicate with a GSM modem or other external equipment.

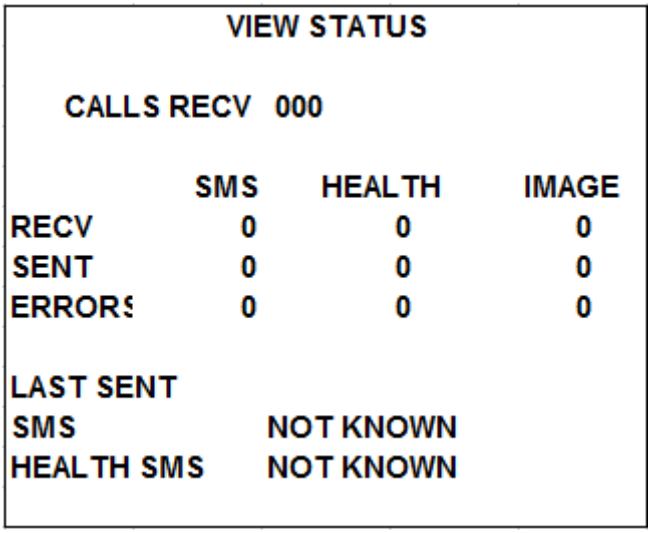
RS232:

GSM CONTROL - Set port to send/receive data to a modem.
BAUD RATE - Set port to a baud rate to communicate with external equipment

The V400 supports a token based command structure so that it can be integrated and controlled by 3rd party applications. A selection of data rate is available for external control: 2400, 4800, 9600, 14400, 19200, 38400, 57600, 115200. See RS232 EXTERNAL CONTROL section of the manual.

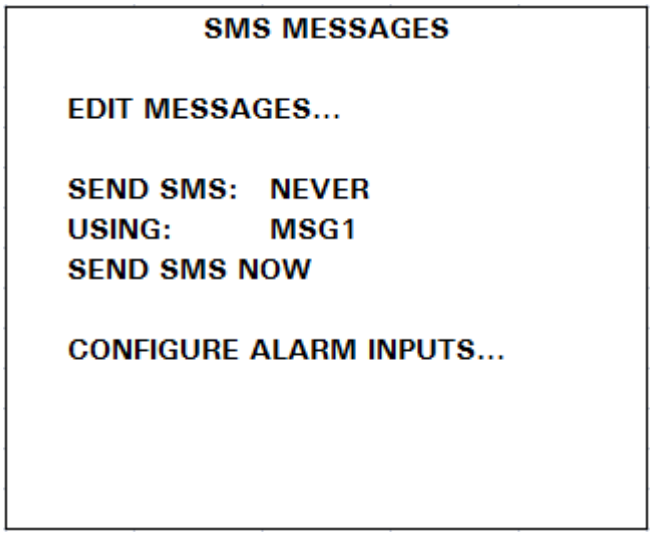
SMS messages can be setup and triggered by the V400.

VIEW STATUS gives statistics of SMS messages sent/received as well as calls and image transfers. Using the RESET MODEM function will clear the statistics and send a modem reset command to the GSM modem.



With a special test plug fitted on the modem port, it is possible to LOOPBACK test and confirm the hardware is functional.

SMS MESSAGES



SEND SMS - select when to send an SMS message;

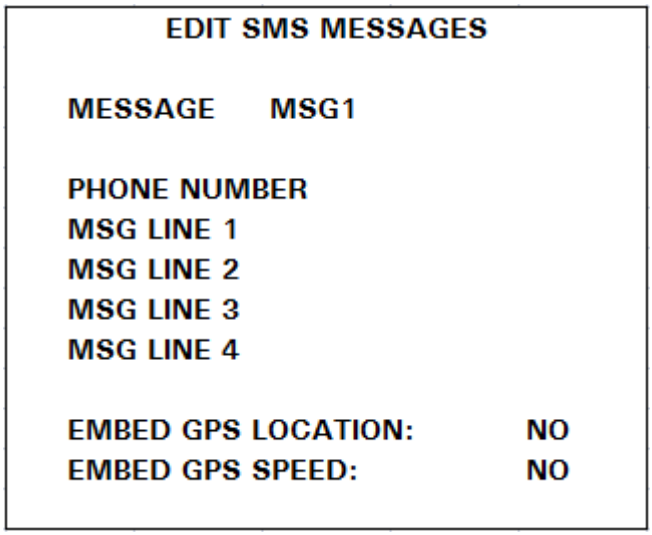
NEVER	- Never.
DAILY	- At midnight every day.
WEEKLY	- Every Monday (at midnight)
MONTHLY	- On the 1st of every month (at midnight).
POWER UP	- When the V400 powers up

This maybe useful as a test to let you know the V400/Modem is still on and functioning. It is also useful to keep alive a prepay SIM card as some timeout due to inactivity (subject to mobile operator rules).

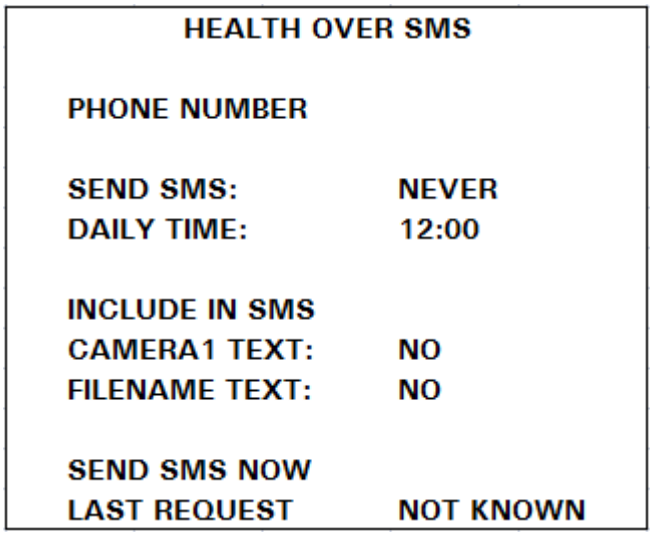
SEND SMS NOW - Test the GSM/SMS connection by sending a message using one of the six configured messages.

Six different SMS messages can be configured with different text and recipients. Four lines of text can be inputted and additionally GPS location and speed can included in the SMS.

EDIT SMS MESSAGES



HEALTH OVER SMS



HEALTH OVER SMS will send the V400 health status including recording state, last recorded file, camera status/faults, disk service conditions, GPS location and serial number.

The feature can be setup to send an SMS at a scheduled time or if queried by an incoming SMS. The incoming SMS must only include the words “SEND SMS NOW” and will then send an outgoing SMS to the phone number as configured in the menu settings.

SEND SMS selects when to send an SMS message. Select between NEVER, AT DAILY TIME and POWER UP.

DAILY TIME - Specify the daily time the SMS message is to be sent when AT DAILY TIME is selected on the menu.

PHONE NUMBER - Mobile number to send SMS health message to.

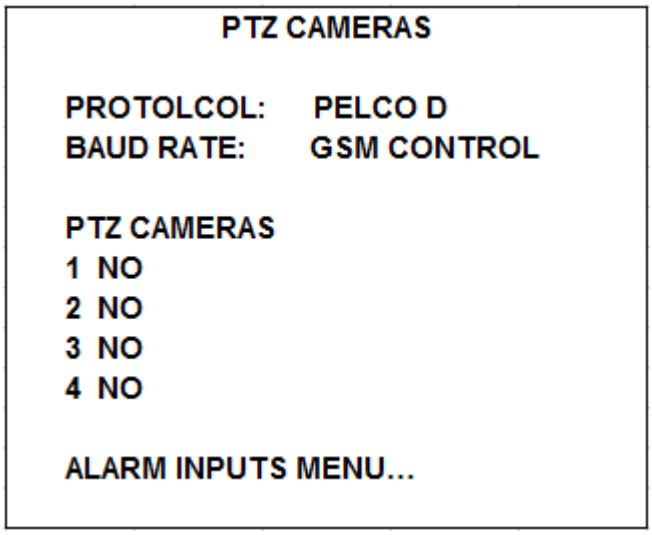
INCLUDE IN SMS - Set these options to YES to include the specified information in the SMS message.

SEND SMS NOW - Send a health message to the phone number specified now. **NB** The SEND SMS NOW option cannot be invoked if connected to the V400 via RemoteLink using the GSM modem connection. If this option is invoked, the RemoteLink connection will be dropped and no SMS will be sent.

The message contains:

1. Type or reason for health SMS
2. Sending unit info
3. GPS info
4. Camera info
5. Time info
6. LED info
7. Service log info (which may be related to service/fail LED):

See APPENDIX 1 – HEALTH SMS MESSAGE FORMAT for further details on how to read the messages and integrate with other systems.



The PTZ menu allows control over a Pan, Tilt, Zoom camera when connected to the V400's serial port. An RS232-to-RS485 convertor will be required – example convertor; **EXTERNAL LINK, Farnell code; 1683075.**

Supported PTZ protocols are;

- Pelco D
- Pelco P
- Visca (Sony)

A selection of baud rates are available for the cameras: 2400, 4800, 9600, 14400, 19200, 38400, 56000, 115200. This baud rate setting is linked to the baud rate under the GSM / REMOTE SETTINGS menu. Only one of GSM or PTZ can be used at a time. Please refer to the Camera manufactures instructions on how to configure the camera baud rate.

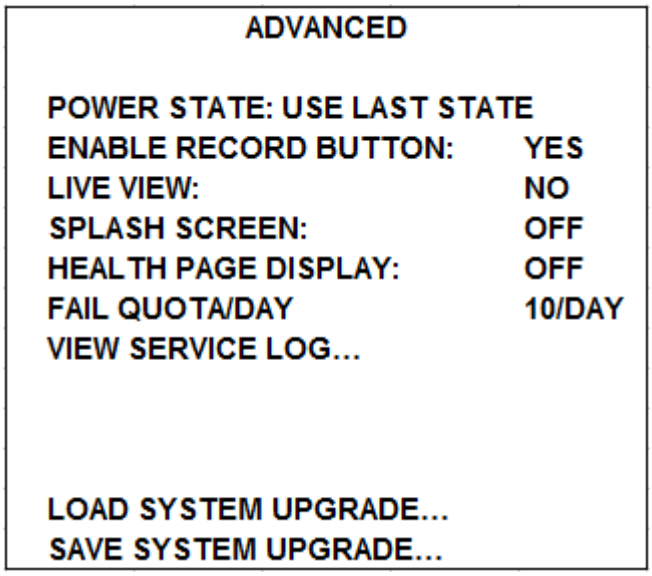
The V400 can support multiple PTZ cameras assuming that they are all the same protocol and baud rate. PTZ has its own addressing system. Set each required PTZ camera to YES and navigate down to the required camera number in order to enter the PTZ mode. PTZ mode will enable PTZ controls and functions using the Reviewer.

The main PTZ are functions are to move the camera Left, Right, Up, Down, Zoom in and Zoom out. There are advanced features for setting up focus behaviour and additionally the V400 can access the cameras internal menus (if the camera supports it). The V400 can also store 8 different user defined camera positions, for example preset position 1 could be a scene view overlooking a car park, preset position 2 could be zoomed in close to the entrance, preset position 3 could be pointed at the exit. The presets can be accessed by pressing the number keys on the X201 for quick panning to locations. The presets can also be triggered via ALARM INPUTS.

See REVIEWER section for PTZ key controls.

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

ADVANCED



Contains advanced option that normally do not need to be edited after installation.

POWER STATE - Set if the V400 will RECORD AT POWER UP, DO NOT RECORD or USE LAST STATE. If use last state is selected the unit will record on power up if it was recording when power was disconnected. If it was not recording when power was disconnected, it will return to this state on power up.

ENABLE RECORD BUTTON controls whether the record button on the front panel can be used to start and stop recording (enable/disable).

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

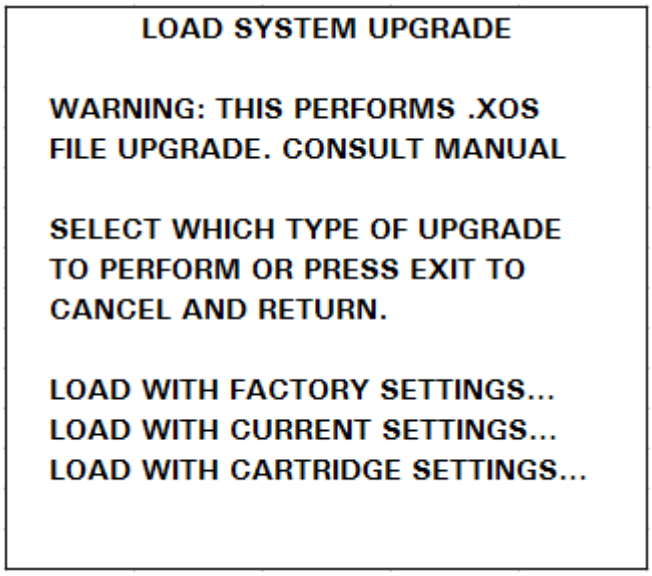
SPLASH SCREEN controls the length of time an operator logo will be displayed. A .bmp file can be loaded / displayed on boot up. The .bmp must be in a specific format and copied onto the cartridge. See APPENDIX 2 – Splash Screen for further details.

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

FAIL QUOTA/DAY sets how many fail messages that must occur for any given day before the FAIL LED is lit. During normal operation it maybe acceptable to receive a certain number of fail events before action is required. Set as applicable.

VIEW SERVICE LOG displays any service messages that have been logged by the system. Messages can be scrolled through and reviewed. Details of date/time and service/fail codes are shown. Service messages can be cleared by pressing the right key and then again to confirm. Clearing the service log will clear the front panel service/fail LEDs.

The Service LED on the V400 Front Panel can be cleared by resetting the Service Log.



LOAD SYSTEM UPGRADE loads a new V400 operating system from the hard disk cartridge. A .XOS file should be copied onto the cartridge using a PC then inserted into the V400.

Three loading options are available;

LOAD WITH FACTORY SETTINGS - load the XOS software with Timespace factory defaults.
LOAD WITH CURRENT SETTINGS - load the XOS software but maintain the current settings.
LOAD WITH CARTRIDGE SETTINGS - load the XOS software with settings from the cartridge.

SAVE SYSTEM UPGRADE will write the current software and settings to the cartridge (current.xos). This file could then be used to replicate a setup onto another V400 using LOAD WITH CARTRIDGE SETTINGS…

CAUTION should be taken to ensure that power is not lost during an upgrade.

X201 REVIEWER

FUNCTION
The X201 Reviewer is used to program the menu settings on the V400 and to review recordings on the installed Hard Disk Cartridge.

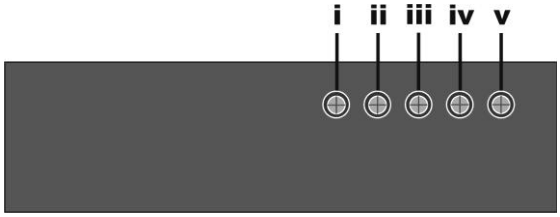
Connect data link cable (supplied with X201 Reviewer) from "Reviewer" socket on the V400 front panel to the "Recorder" socket on the X201. This connection provides power, video and audio from V400 to X201.

When power is applied to the V400 and fed to the reviewer the red LED on the bottom panel of the reviewer is illuminated.

The V400 display will be shown on the monitor.

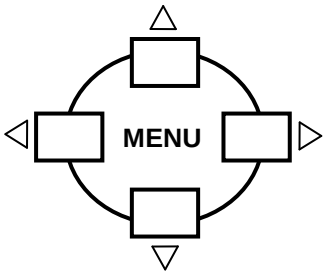
The X201 has 5 picture adjustment pots situated at the bottom left-hand side of the reviewer. These should not need adjusting from the factory settings however if necessary, gentle turn using a small screwdriver.

i) NTSC Tint (colour balance when using an NTSC feed)
ii) Colour
iii) Brightness
iv) Contrast
v) Sharpness (image pixel sharpness/smoothness adjustment)



MENU NAVIGATION CONTROLS

The keys on the X201 can be grouped into Menu Navigation, Playback & Recording, Camera Switcher and Search & Help.



Press any of the 4 menu buttons to enter the main menu. Once in the menu system, their function is as follows:

△ Move arrow cursor to the previous item.

▽ Move arrow cursor to the next item.

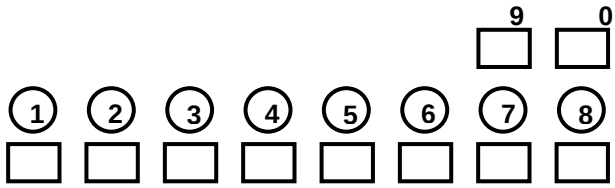
◁ If the arrow cursor is currently at a menu selection pressing the left button will cycle the value backwards

▷ If the arrow cursor is currently at a menu selection pressing the right button will cycle the value forwards

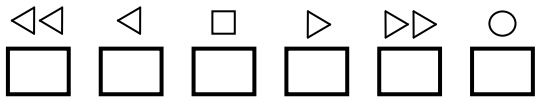
If the arrow cursor is currently at a sub-menu title pressing the right button will enter this sub-menu.

The **MENU EXIT** Key on the X201 reviewer will exit the current menu and move back up 1 level in the menu system when pressed. If already at the top level of the menu pressing this key will exit the menu system completely and return to the video switcher.

Once in the menu system the numbered keys are used for inputting data into fields which require a user entry such as times and dates.



PLAYBACK & RECORDING



◁◁ **Rewind** through recorded footage. Repeated presses increase the rewind speed in multiples of 1 second, up to a maximum of 20.

◁ **Reverse-play** through recordings.

□ **Stop** playback. If playback is already stopped, pressing this button again lights the LED above and the unit is in **Jog** mode, allowing image-by-image playback. Whilst in jog mode, the Rewind and Fast Forward buttons will skip to next/previous file.

▷ **Play** recorded footage.

▷▷ **Fast-forward** through recorded footage. Similarly to rewind, repeated presses of the fast forward enable rapid scan.

○ **Record** start or stop. If not currently recording (red LED off), pressing this button will begin recording from the end of the most recent footage. If the unit is currently recording (red LED on), this button will stop recording.

When pressing the control keys above, an **on-screen display** (OSD) will show each action. The OSD times out after 5 seconds. It will also display when switching between files, indicating which mode is being used. Modes displayed are;

- Play – normal play
- Replay – play backwards
- Stop
- Pause
- Jog
- Rewind
- Wind – fast forward

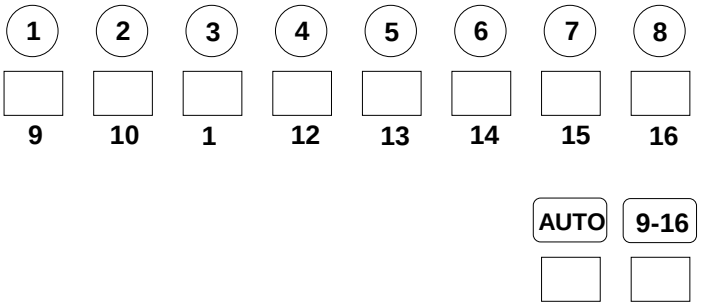
NB Local playback is not currently supported on the V400. Playback is via PCLink Live/Remote connection or via the cartridge/USB on a PC.

Text Input
The numbered keys have the following 4 characters attached to them, pressing the key repeatedly will cycle through the 4 available characters. The fifth character on each key is a blank space; use this to delete any unwanted characters.

Key	Number/Characters	
1	A B C 1	(blank)
2	D E F 2	(blank)
3	G H I 3	(blank)
4	J K L 4	(blank)
5	M N O 5	(blank)
6	P Q R 6	(blank)
7	S T U 7	(blank)
8	V W X 8	(blank)
9	Y Z 9	(blank)
0	0<>#,.*+@'	(blank)

Keep pressing keys 0 to 9 until the desired character appears. For example pressing key '1' gives the 'A' character, pressing again, the 'B' character, again the 'C' character, again the '1' character and finally a blank character. The sequence repeats. The camera text will appear above the time stamp on each image.

CAMERA SWITCHER

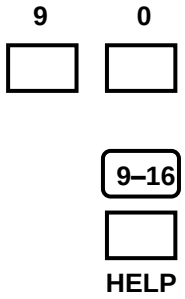


1-8 Switch the view to camera 1 to 8. When playing back recorded footage, pressing buttons 1 to 8 changes playback to that camera. If the AUTO LED is lit, buttons 1 to 8 change the live camera being viewed. This camera is held on the main monitor.

9-16 Press this button before pressing the number buttons 1-8 to access cameras 9-16 on the V400-16.

AUTO Activate the auto switcher mode. In this mode, the monitor will show a live view and the cameras are cycled as specified in the VIDEO OUTPUT menu. Press the AUTO button again to deactivate the auto switcher mode. If any of the buttons numbered 1-8 (or 9-16) are pressed while in auto switcher mode, the camera switching is stopped, and the selected camera view is held on screen. Control of the auto switcher does not affect any recording in progress.

SEARCH



SEARCH Go to a specific time and date in the recorded footage. Pressing this button will enter the PLAYBACK SEARCH screen. If the footage on a given camera cannot be found (it may not have been recorded), a "NO FOOTAGE FOR SELECTED CAMERA" message will be displayed.

TIME – Use the number keys to enter a time in 24hr format.
DATE – Use the number keys to enter a date in the format DD/MM/YY.
PLAY FROM SET TIME DATE – Plays the footage beginning from the time and date entered. If there is no footage at the time specified a jump is made to the nearest footage to the time given.

PLAY OLDEST – Plays the oldest available footage on the Hard Disk Cartridge.

PLAY NEWEST – Plays the most recent footage available on the Hard Disk Cartridge.

HELP – Applies when using any menu. Pressing this button will produce a help screen. Continue pressing any key to cycle through help screens until menu returns.

PTZ CONTROLS

X201 KEY	PTZ FUNCTION	
UP ARROW	TILT UP	
DOWN ARROW	TILT DOWN	
LEFT ARROW	PAN LEFT	
RIGHT ARROW	PAN RIGHT	
0	ZOOM IN	
9	ZOOM OUT	
REWIND	FOCUS FAR	(VISCA ONLY)
REPLAY	FOCUS NEAR	(VISCA ONLY)
STOP	FOCUS MANUAL	(VISCA ONLY)
PLAY	FOCUS AUTO	(VISCA ONLY)
HELP+0	ENTER CAMERA MENU	(Camera support required).
HELP	SHIFT FUNCTION	

There are 3 shifts states, indicated by the STOP LED;

OFF = shift not enabled
ON = set preset (or enter camera menu with +0)
FLASH = unset preset

Pressing the HELP key will move between the 3 states.

e.g. to set preset position 1, move the camera to the desired position, then press the HELP key (STOP LED ON), then number 1. Position now set, if you move to another position, then press number 1, it will return to the preset number 1 position.

e.g. to unset preset position 1, press the HELP key twice (STOP LED FLASHING), then press the number 1. The preset will now be unset.

1	PRESET 1
2	PRESET 2
3	PRESET 3
4	PRESET 4
5	PRESET 5
6	PRESET 6
7	PRESET 7
8	PRESET 8

USB INTERFACE KIT

The purchase of USB Kit T605-USB includes the necessary licence for use of PCLink Suite software including free of charge updates on a single PC (reasonable use policy allows installation on a secondary portable PC; laptop). Timespace Technology does not authorise the unlicensed usage of PCLink Suite software.

The USB Kit provides all hardware and software necessary to review and archive recordings on a PC from a Hard Disk Cartridge when it has been removed from the V400 Digital Recorder. No additional device drivers are required for the USB Interface Kit when using Windows 2000, XP, Vista or Windows7.

Kit Contents:

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

Connecting to a PC using the USB Interface Kit

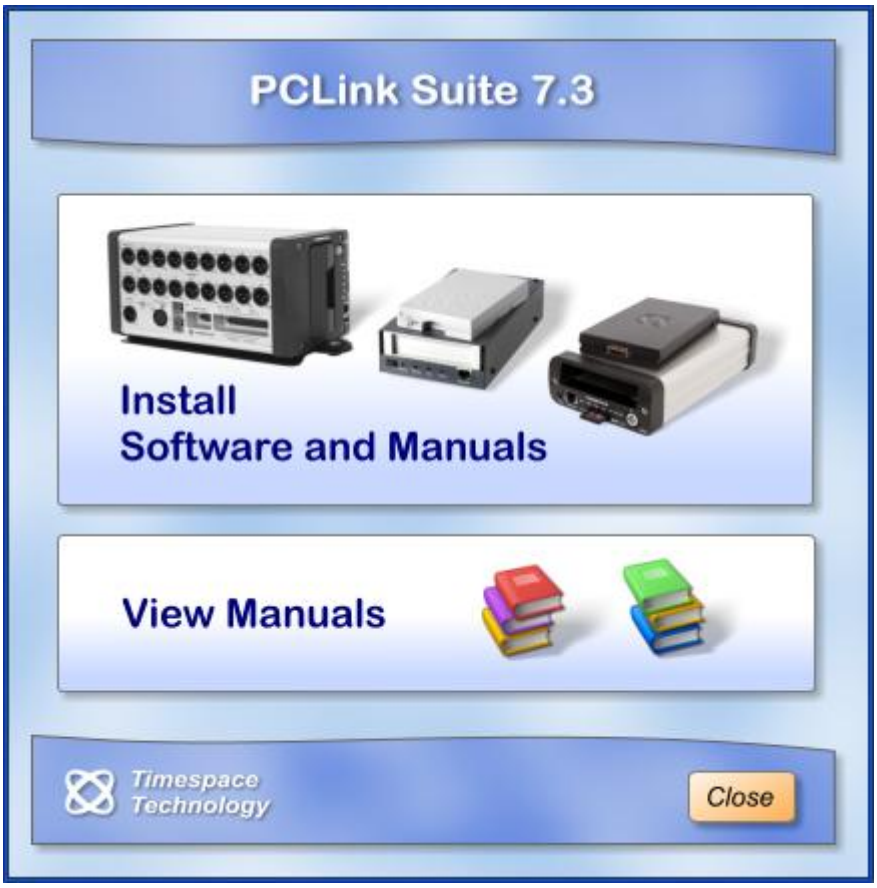
1. Remove the Hard Disk Cartridge from the V400.
2. Plug the multi-pin D shaped IDE USB lead into the rear of the cartridge and then plug the smaller USB connector into an available USB port on the PC.

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

Recording files can now be viewed using PCLink200;

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

PCLINK SUITE



Timespace PCLink Suite consists of applications that allow Playback, Live View, Configuration and Download of recorded files from the X, K and V series range of digital video recorders.

Detailed instructions of each application within PCLink Suite can be found in the PCLink Suite manual, available on our website www.tspace.co.uk

Application overview;

PCLink200
- Review recorded footage via USB cable connected to removable cartridge.
- Review recorded footage over IP connection to the X300/V400.
- Live view of cameras (multi channel support).
- Remote configuration of X300/V400 menu settings.
- Download file remotely (separate FTP client can also be used to download files).

RemoteLink
- Review recorded footage over GSM / IP connection to the X200.
- Live view of cameras (single channel support).
- Remote configuration of X200 menu settings.

LANLink
- Automatic Health checking over IP connection.
- Automatic and scheduled downloading of footage.

XCommunicate - Download X200 files remotely (single file download support).

ImageLink - X300/V400 can send a snapshot image to a PC using a connected GSM modem.

SafetyLink - Review G-Sensor events that have exceeded the configured threshold.

WARNINGS

- **THE USE OF HARD DISK CARTRIDGES OTHER THAN THOSE SUPPLIED BY TIMESPACE TECHNOLOGY WILL INVALIDATE THE WARRANTY OF THE V400 RECORDER AND WILL CONSTITUTE A BREACH OF THE V400 OPERATING SOFTWARE COPYRIGHT.**

- **THE PURCHASE OF USB KIT T605-USB INCLUDES THE NECESSARY LICENSE FOR USE OF PCLINK SUITE SOFTWARE ON ONE PC, INCLUDING FREE OF CHARGE UPDATES. REASONABLE USE ALLOWS A SECOND INSTALLATION ON A PORTABLE COMPUTER PROVIDED BOTH INSTALLATIONS ARE NOT USED SIMULTANEOUSLY. TIMESPACE TECHNOLOGY DOES NOT AUTHORISE THE UNLICENSED USAGE OF PCLINK SUITE SOFTWARE.**

- **THE V400 RECORDER MUST ALWAYS BE MOUNTED SO THAT THERE IS A FREE FLOW OF AIR AROUND IT. IF IT IS MOUNTED IN AN ENCLOSURE, IT IS ESSENTIAL THAT ADEQUATE VENTILATION IS PROVIDED, AND IT IS RECOMMENDED THAT A FAN IS INCORPORATED IN THE ENCLOSURE DESIGN.**

- **HARD DISK CARTRIDGES ARE SENSITIVE TO SHOCK, VIBRATION AND HUMIDITY AND MUST BE USED WITHIN OPERATING TEMPERATURE RANGE AS DETAILED IN THE V400 SPECIFICATION.**

- **IT IS HIGHLY RECOMMENDED THAT RECORDING IS STOPPED BEFORE POWER IS REMOVED FROM THE V400 TO AVOID LOSS OF DATA. IT IS ALSO RECOMMENDED TO STOP RECORDING BEFORE THE CARTRIDGE OR SD CARD IS REMOVED.**

- **CARTRIDGES SHOULD BE SAFELY REMOVED FROM WINDOWS OPERATING SYSTEM ENVIRONMENT PRIOR TO REMOVING POWER/USB CABLE. DATA LOSS OR CORRUPTION MAY OCCUR IF THIS IS NOT FOLLOWED.**

- **DO NOT WET THE PRODUCT WHEN CLEANING.**

- **THIS PRODUCT CONTAINS A LITHIUM BATTERY. DO NOT RECHARGE, OPEN, HEAT OR DISPOSE OF IN FIRE. DISPOSE OF ACCORDING TO LOCAL REGULATIONS.**

- **V400 MAY BECOME UNUSABLE IF POWER TO THE UNIT IS LOST DURING A SOFTWARE UPGRADE.**

APPEXDIX 1 – Health SMS Message Format

If a parameter is not known or not to be included (i.e. set to NO on the menu), then the char '-' is used in the message. Three examples are shown below;

1,076812,BUS AO52 WXA,-,-,L,CNCC,064253 280509,120510 240509,S,212756120509,S,17,MODEM SEND ERROR

1,076812,BUS AO52 WXA,HUNTINGDON12,-,L,CNCC,064518 280509,120510 240509,-,064353 280509,S,63,LOG RESET

1,076812,BUS AO52 WXA,HUNTINGDON12,-,L,CNCC,064518 280509,120510 240509,-,-,-,-,-

FIELD	DESCRIPTION	VALUE
<1. type>	Reason health SMS has been sent	"0" - SMS POWER-UP. "1" - SMS SEND DAILY. "2" - SMS SEND NOW. "3" - SMS SEND NOW via incoming SMS.
<2.serial_num>	Unit serial number.	"Serial num" - The V400 6-digit serial number.
<3.veh_id>	Optional camera 1 text.	"Camera1 text" - Camera1 text, up to 12 chars. "NO ID" - No camera 1 text specified.
<4.veh_id1>	Optional filename text.	"Filename text" - Filename text, up to 12 chars. "NO ID1" - No camera 1 text specified.
<5.gps_pos>	Current or last GPS position.	"ddmmm.mmmmX dddmm.mmmmX" - GPS position "NO GPS DATA" - No GPS data available.
<6.last_curr>	Indication that GPS position is last known or current GPS position.	"C" - GPS posn specified in 5 is the current position. "L" - GPS posn specified in 5 is the last know position i.e. NOT current.
<7.cams_conn>	List of cameras connected.	"C" - Colour camera is connected. "B" - Black and white camera is connected. "N" - Camera is NOT connected (i.e. disconnected).
<8.curr_ts>	Snapshot of current timestamp.	"Current timestamp" - Timestamp.
<9.last_rec_file_ts>	Timestamp of last recorded file.	"Last file timestamp" - Timestamp. "NO RECORDINGS" - There are no recordings on disk.
<10.led_status>	Service/Fail/Record LED status.	"R" - Record LED is ON. "S" - Service LED is ON.
<11.log_ts>	Timestamp of the last log entry.	"Log timestamp" - timestamp. "" - May be blank if no log.
<12.log_mode>	Log entry mode.	"Mode text" - Mode text. "NO MODE" - No mode text available. "" - May be blank if no log.
<13.log_code>	Log entry code.	"Code text" - Mode text. "NO CODE" - No code text available. "" - May be blank if no log.
<14.log_desc>	Log entry description.	"Desc text" - description text. "NO LOG" - No logs available.

DETAILED DESCRIPTIONS

A description of the expected content for each heading in the message follows:

<1. type>
Description: The type of message or the reason the message has been sent (the fleet mgmt may wish to know if it is the daily message or one they have just requested).
Content:
"0" – SMS POWER-UP
"1" – SMS SEND DAILY
"2" – SMS SEND NOW
"3" – SMS SEND NOW (via incoming SMS).

<2.serial_num>
Description: The serial number of the V400 unit.
Content:
Serial num – The V400 6-digit serial number.
'–' – Not known or not available.

<3.veh_id>
Description: Camera 1 optional text (OTHER>CAMERA OPTIONS).
This is selected for inclusion in the message via the Health over SMS hidden menu.
Content:
Camera1 text – Camera1 text, up to 12 chars.
'–' – No optional camera 1 text specified or not included in the menu.

<4.veh_id1>
Description: Filename optional text (OTHER>FILE SYSTEM).
This is selected for inclusion in the message via the Health over SMS hidden menu.
Content:
Filename text – Filename text, up to 12 chars.
'–' – No optional filename text specified or not included in the menu.

<5.gps_pos>
Description: The current or last known GPS posn (specified as longitude then latitude in degrees and minutes).
Content:
"ddmmm.mmmmX dddmm.mmmmX" – GPS posn
'– ' – No GPS data available.

<6.last_curr>
Description: An indication if the GPS posn is the current posn or last known.
Content:
"C" – GPS posn specified in 5 is the current posn.
"L" – GPS posn specified in 5 is the last know posn (i.e. NOT current).

<7.cams_conn>
Description: Camera status.
Content:
"C" – Colour camera is connected.
"B" – Black and white camera is connected.
"N" – Camera is NOT connected (i.e. disconnected)

Cameras are listed as 1234 etc, e.g. CCBN is a 4 camera system, where cam1,2=colour, cam3=B&W, cam4 disconnected.
Camera systems are either 4 or 16.

<8.curr_ts>
Description: Current V400 system timestamp.
Format is “hhmmss ddmmyy” or “hhmmss mmddyy” depending on menu setting (OTHER>TIME AND DATE mode option).
Note that there are no separator characters in the time and date strings due to message size limitations.
Content:
Current timestamp - Timestamp.

<9.last_rec_file_ts>
Description: The timestamp of the last recorded file (i.e. newest file).
Format is “hhmmss ddmmyy” or “hhmmss mmddyy” depending on menu setting (OTHER>TIME AND DATE mode option).
Note that there are no separator characters in the time and date strings due to message size limitations.
Content:
Last file timestamp - Timestamp.
‘–‘ - There are no recordings on disk.

<10.led_status>
Description: V400 front panel LED status.
Contents:
“R” - Record LED is ON.
“S” - Service LED is ON.
“F” - Fail LED is ON.
‘–‘ - No LEDs are on (with exception of the power LED).

The information under the remaining headings pertains to the last service or fail log (newest log).
If the Service and/or Fail LED are reported as ON under the previous heading, then the last service or fail log information is included in the message.

If no service or fail logs are available (e.g. if a service log reset has been performed), then no log information will be available.

<11.log_ts>
Description: The timestamp of the last service log.
Format is “hhmmss ddmmyy” or “hhmmss mmddyy” depending on menu setting (OTHER>TIME AND DATE mode option).
Note that there are no separator characters in the time and date strings due to message size limitations.
Contents:
Log timestamp – timestamp
“–” – May be blank if no log.

<12.log_mode>
Description: Service log mode, e.g. Service, Failure.
Contents:
Mode text – Mode text.
“–” – No mode available or no log available.

<13.log_code>
Description: Service log code relating to mode.
Contents:
Code text – Mode text.
“–” – No code available or no log available

<14.log_desc>
Description: Reason for service log.
Note: Due to message length constraints, this information may be partial or missing.
Desc text – Log description text.
“–” – No logs available.

SPECIAL NOTES

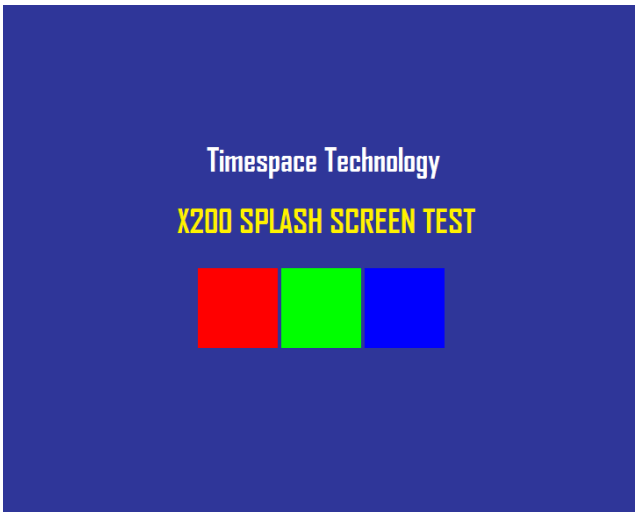
The timestamp format is either “hhmmss ddmmyy” or “hhmmss mmddyy” depending on the mode setting on the unit. Note the lack of ‘:’ and ‘/’ separators (the default setting is to include the separators).

If the message is too big for a single SMS, then the message is cut short starting with the Service Log entry description (i.e. the last entry). The service log info must be appended to the end as it is the only variable that has a changing length (with the exception of veh_id, veh_id1). All other variables (when available) are a fixed length. If they are not available (e.g. NO GPS DATA), then the info string is usually less chars than the real data, with the exception of NO LEDS for led_status.

APPEXDIX 2 – Splash Screen

SPLASH SCREEN – Enable’s use of a .BMP file to be displayed, for example an Operator/Company logo. Can be set to 5, 10, 20, 30, 60 seconds, or Until Exit (which requires user interaction to clear).

A tool can be provided on request to create the Splash Screen image in the correct format, from an input source. The input source should not be more than 1.5mb and should be a simple image with plain colours, approx 720x576. An example images is show below;



Once in the correct format (using the Timespace conversion tool), the image is placed on the V400 cartridge, named; Splash.ext. Once configured in the menu, the Splash Screen will be read from the disk and displayed.

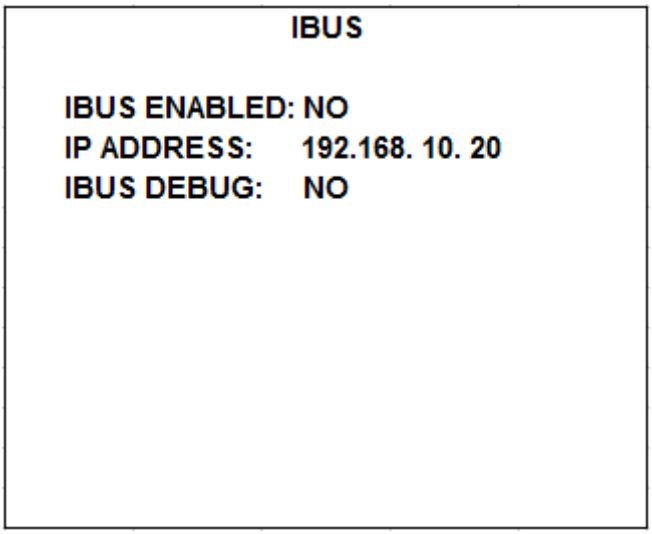
Please contact support@tspace.co.uk for the conversion tool.

APPEXDIX 3 – Transport for London IBUS diagnostic interface

Timespace has developed a diagnostic interface in conjunction with Transport for London (TFL) to monitor the status, performance and health of Timespace X200, X300 and V400 digital video recorders on London Buses.

Data strings are passed between the DVR and the IBUS system every 5 mins. In addition to the scheduled data packets, the DVR can be queried by sending it a proprietary text string. Several different data sets can be retrieved according to the input string.

The IBUS feature is available in software **X200 V1.9.0** onwards, **X300 V1.1** onwards and **V400 V1.0** onwards. The IBUS menu is accessed using the short code; **9001234** on the X200 and X300 and via the menu system on the V400. The short code can be entered from any menu using the number keys on the X201 Reviewer.



IBUS ENABLED - The IBUS interface can be enabled/disabled by setting YES/NO accordingly.
IP ADDRESS – Sets the IP address of the receiving device (default IBUS IP as above).
IBUS DEBUG - For testing purposes a debug mode can be enabled. This will increase the rate of messages sent out from the DVR to every 5 seconds. It is not recommended to leave debug turned on during normal operation.

The IBUS information can also be accessed using the RS232 command #IBUS. This command is only supported on the X300 & V400 over the serial port, no Telnet support.

Example setup of the IBUS interface on an **X200** DVR includes;
- Set recording parameters as required.
- Enter IBUS short code and set ENABLED to YES
- Navigate to the ALARM OUTPUT when… menu and set CAMERA DISCONNECTED to YES.
- Navigate to the LAN menu and set the IP ADDRESS to 192.168.10.30 and the GATEWAY to 192.168.10.20

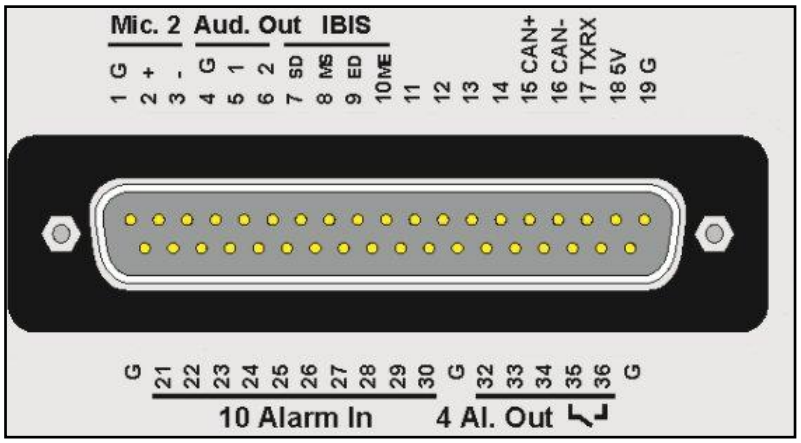
Example setup of the IBUS interface on an **X300** DVR includes;
- Set recording parameters as required.
- Enter IBUS short code and set ENABLED to YES
- Navigate to the LAN menu and set the IP ADDRESS to 192.168.10.30 and the GATEWAY to 192.168.10.20

Example setup of the IBUS interface on a **V400** DVR includes;
- Set recording parameters as required.
- Enter IBUS menu and set ENABLED to YES
- Navigate to the LAN menu and set the IP ADDRESS to 192.168.10.30 and the GATEWAY to 192.168.10.20

It is advised to set the correct date and time when enabling the IBUS feature and ensure no Service/Fail conditions are currently being displayed. **NB** currently the X200, X300 and V400 connect to the IBUS system's network port 4. In the case of the V400, LAN socket 1 is currently used for the IBUS interface.

APPEXDIX 4 – 37 Way D-Type connector / 9 pin serial port

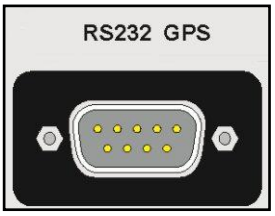
Very early versions of the V400 hardware had a 37 Way D-Type connector and 9 pin serial port in place of the Molex type connectors. Here are the details of the 37 way;



Pin		Pin	
1	MIC RGND	20	GND
2	MIC RP	21	ALARM INPUT 1
3	MIC RN	22	ALARM INPUT 2
4	AUDIO OUT GND	23	ALARM INPUT 3
5	AUDIO OUTPUT 1	24	ALARM INPUT 4
6	AUDIO OUTPUT 2	25	ALARM INPUT 5
7	IBIS WBSD+	26	ALARM INPUT 6
8	IBIS WBMS-	27	ALARM INPUT 7
9	IBIS WBED+	28	ALARM INPUT 8
10	IBIS WBEM-	29	ALARM INPUT 9
11		30	ALARM INPUT 10
12		31	GND
13		32	ALARM OUTPUT 1
14		33	ALARM OUTPUT 2
15	CAN High OUTPUT	34	ALARM OUTPUT 3
16	CAN Low OUTPUT	35	ALARM OUT RELAY PIN1
17	CAN TXRX	36	ALARM OUT RELAY PIN2
18	OUTPUT +5V	37	GND
19	GND		

RS232 GPS CONNECTOR

9 way male D-type connector (DB9) which can be used to support 1 or 2 RS232 peripherals.



PIN	TYPE	I/O	TYPE
3	TD, Transmit Data	>	Serial Data
2	RD, Receive Data	<	Serial Data
7	RTS, Request to send	>	Handshaking
8	CTS, Clear to send	<	Handshaking
4	DTR, Data terminal ready	>	V400 outputs 5V
6	DSR, Data set ready	<	Ignored by V400
1	DCD, Data carrier detect	<	Detect modem status
9	RI, Ring Indicator	<	Ignored by V400
5	GND, Ground		

> V400 output
< V400 input

Using a conventional cable (DB9 male to DB9 female straight through (1-1, 2-2, 3-3 etc.)) the V400 can be connected to a modem. Alternatively, two RS232 peripherals such as GSM modem and GPS device can be connected simultaneously. Here is an example of the wiring;

PIN	TYPE	I/O	TYPE
Device 1 (Modem)			
3	TD, Transmit Data	>	Serial Data
2	RD, Receive Data	<	Serial Data
7	RTS, Request to send	>	Handshaking
8	CTS, Clear to send	<	Handshaking
1	DCD, Data carrier detect	<	Detect modem status
5	GND, Ground		
Device 2 (GPS)			
4	5V, Supply (500mA max)	>	Power
9	RD, Receive Data	<	Serial Data
5	GND, Ground		

> V400 output
< V400 input

NB In order to meet the EMC standards with which the V400 is compliant it is important that shielded cables are exclusively used. All of the signal grounds should be common inside the D-Type connector and connected to a metal back-shell in order that the cable run and D-Type connector are shielded.

Parts list;

37 WAY D TYPE (legacy part – see Appexdix 4)
Farnell 154878 Multicomp

9 WAY RS232 (legacy part – see Appexdix 4)
Farnell 1099052 Multicomp

AUDIO CONNECTOR
Neutrik NC3MXX-BAG