Timespace Technology

X200

Digital Video Recorder and Product Family Instruction Manual

Designed and Manufactured in the UK

This Instruction Manual is constantly updated. To download the latest version please go to www.tspace.co.uk

X200 Operating Software V1.3.1
PCLink200 V1.2.0

X200

Digital Video Recorder and Product Family Instruction Manual

CONTENTS

SAFETY

Meets the requirements of BS EN60950 (Safety Requirements of Information Technology Equipment).

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

Designed for indoor use in the temperature range 5° to 40°C, 20% to 80% RH (non-condensing).

WARNING: Do not wet the product when cleaning.

WARNING: This product contains a lithium battery. Do not recharge, open, heat or dispose of in fire. Dispose of according to local regulations.

WARNING: It is important to allow enough ventilation in any surrounding enclosure so that the operating temperature range is not exceeded. Any enclosure should incorporate a fan to assist in thermal dissipation.

WARNING

The use of Hard Disk Cartridges other than those supplied by Timespace Technology will invalidate the warranty of the X200 recorder, and will constitute a breach of the X200 operating software copyright.

ENVIRONMENTAL

Temperature

The X200 may be operated in ambient temperatures from 5°C to 40°C. This specification applies in still air, with the X200 mounted horizontally and ambient temperature measured 15cms above the centre of X200.

If the X200 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. A simple but effective test is to place a thermocouple inside the enclosure and one outside and measure the operating temperature difference. This difference must be deducted from the X200 40°C maximum.

Example

Temperature outside enclosure	25°C	
Temperature inside enclosure	35°C	
Difference	10°C	
Maximum inside enclosure	40°C	(X200 max)
Maximum outside enclosure	30°C	(40°C-10°C)

In the above example the 40°C max spec has been de-rated to 30°C due to the effect of the enclosure.

Forced Ventilation Within Enclosures

It is advisable to include a fan integral to any enclosure design. The goal of the fan is to remove air heated by the X200 and replace it by air at the outside temperature. The temperature difference shown in the above example of 10°C can be reduced to a few degrees using a small fan. Two small fans are typically better than one due to failsafe. Fans do need checking periodically and can draw in large amounts of dirt and dust, this should be removed periodically. To reduce dirt ingress a fan may typically be run slower than rated by reducing the voltage from that specified. This can typically be done with a single resistor in series with the fan. Alternatively air filters may be used but these impede airflow and require careful system design. The X200 does not incorporate a fan but instead uses an internal switch-mode power supply to reduce power consumption (and therefore heat).

Fans offer two immediate benefits:

1 Changing the air inside the case makes the air temperature inside the case within a few degrees to that outside.

2 If the airflow is channelled around the top surface of the X200 so that air is drawn particularly over the two sides and the top, further thermal improvement is gained and an X200 specification of 5°C to 45°C may be used. (The difference between the surface X200 case temperature and ambient temperature is typically 5°C and this is the extra maximum benefit).

Low Temperatures

Insulating the X200 (e.g. inside an enclosure) and leaving it powered up (but not necessarily recording) will allow it to be used at sub zero temperatures. To offer the best performance in low and high temperature environmental conditions, an insulated case can be used with a fan, which is thermostatically controlled to switch on when the temperature rises above 10°C. The fan speed can be increased or decreased based on a thermal feedback circuit (analogue thermostat).

Shock and Vibration

Due to the nature of hard disk drives it is essential that the X200 is isolated from vibration and shock as much as possible.

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

In situations where some exposure to shock and vibration are unavoidable it is strongly advised that the T406 Anti-Vibration System is used. This system is specifically designed to isolate the X200 from structure borne shock and vibration. Further details and fitting instructions can be found in the Anti-Vibration Kit section of this manual.

EMC

The X200 complies with the relevant EEC, Automotive 'E' Mark and Specification 5 (Emergency Vehicles) EMC standards for this type of product.

Conformity

X200 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).

X200 EMC Conformity (E Mark)

Meets the Type Approval requirements of European Commission Directive 95/54/EC.

X200 PITO Specification 5

Has met the requirements of automotive conformance regarding use in Emergency Vehicles.

EC Declaration of Conformity (CE)

We Timespace Technology Ltd.
Blackstone Rd
Huntingdon
PE29 6TT
United Kingdom

declare that the

X200 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: EN61000-6-3(2001) EMC Generic Emission Standard for residential, commercial and light industrial. Referring to:

a) EN55022(1998) Conducted, Class B
b) EN55022(1998) Radiated, Class A

Immunity: EN61000-6-1(2001) EMC Generic Immunity Standard for residential, commercial and light industrial. Referring to:

a) EN55024(1998) Information Technology Equipment – Immunity Characteristics
b) IEC 61000-4-6(2003) RF Field
c) EN60801-2(1993) Electrostatic Discharge
d) IEC 61000-4-4 (2004) Fast Transient

.....
Dr ROBERT HEYLEN
TECHNICAL DIRECTOR
27th July 2004

Carried out for:	Timespace Technology Ltd Blackstone Road Huntingdon Cambridgeshire PE29 6TT
On the Authority of:	Order N°: DP 129MB
Company Liaison Engineer:	Michael Black

Test Report No: 1006329
VCA Job No: EAE 058158

EMC Type Approval of a X200-16 Digital Video Recorder to 95/54/EC

VCA 28 JUL 2004 UK APPROVAL AUTHORITY

Author: _____
Shailash Patel, Project Leader

Approved: _____
Carl Wayland, Technical Manager, EMC Laboratories

Released: _____ Date: 8/7/2004
W Horn-Andrews, Assistant Director - Engineering

UKAS TESTING
1105

Tests marked "Not UKAS Accredited" in this report are not included in the UKAS Accreditation Schedule for our laboratory. Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation.

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PITO

COMMUNICATIONS DIRECTORATE
Automotive & Equipment Section

A &EMC E S

CERTIFICATE OF CONFORMANCE

Certificate No. ~ 3138 E

Date ~ 09/07/2004

Submitted by ~
Timespace Technolgy Ltd
Blackstone Rd
Huntingdon
Cambridgeshire
PE29 6TT

Manufactured by ~
Timespace Technolgy Ltd
Blackstone Rd
Huntingdon
Cambridgeshire
PE29 6TT

This is to certify, that a representative example of

Make ~ Timespace Technolgy Ltd

Model ~ Digital Video Recorder X200 ~ genre

Year ~ 2004

Identification No. (V.I.N./Serial) Number ~

has met the requirements of Automotive Conformance

Specification 5 *Issue* 9 *Class* 2 (AB) *pass**

in respect of Electromagnetic compatibility performance.
*(*see reverse of certificate for non-conformance)*

This Certificate is valid for a period (not exceeding 2 years) from the date of issue.

This Certificate does not indicate that the equipment is compliant with the Automotive EMC Directive 95/54EC

Issued by ~
Automotive and Equipment Section
Communications Directorate
PITO

Signed ~ C.R.M.Bottomley C.R.M.Bottomley

Produced in the UK for PITO 04/04, ref. 002700

SYSTEM OVERVIEW

X200 DIGITAL VIDEO/AUDIO RECORDING SYSTEM

X200 DIGITAL VIDEO / AUDIO RECORDER

REMOVABLE HARD DISK CARTRIDGE

X201 REVIEWER & PROGRAMMER

The X200 is a digital video/audio surveillance recorder for use in covert, portable and mobile applications.

Recordings are made on a removable Hard Disk Cartridge inserted in the X200. After the Hard Disk Cartridge has been removed, the recordings can be accessed by connecting the cartridge to a PC, using the USB Interface Kit, (which includes PCLink200, a proprietary reading and archiving software package).

The use of Hard Disk Cartridges other than those supplied by Timespace Technology will invalidate the warranty of the X200 recorder, and will constitute a breach of the X200 operating software copyright.

The X201 Reviewer is used to program the menu settings on X200, to check camera views and to review recordings on the installed X200 Hard Disk Cartridge. Recording will continue during this reviewing process.

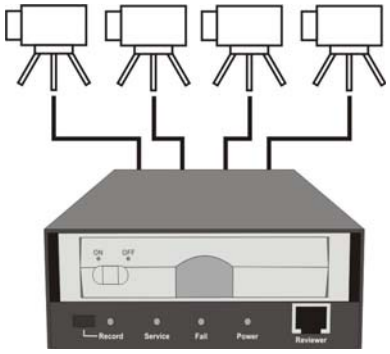
The 24-hour clock is used for all times and settings.

WARNING: The X200 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.

WARNING: If the X200 Recorder is mounted in a vehicle, or otherwise subject to vibration, suitable damping must be built into the mounting.

WARNING: Hard Disk Cartridges are sensitive to shock, vibration and humidity.

Diagrammatic Explanation of Use

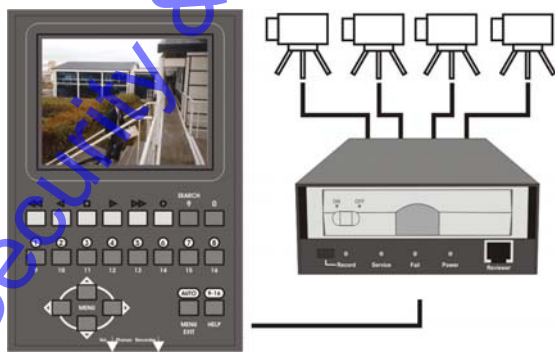


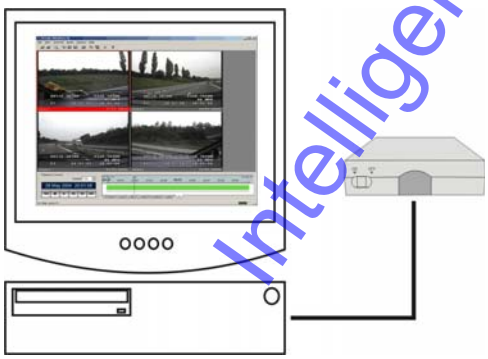
RECORDING

The X200 Digital Video Recorder is used With a removable Hard Disk Cartridge to Record from multiple video and audio sources.

REVIEWING / CONFIGURING

The X201 Reviewer is used for on-site reviewing of video/audio recordings and to configure the optional menu settings of the X200 Digital Video Recorder.





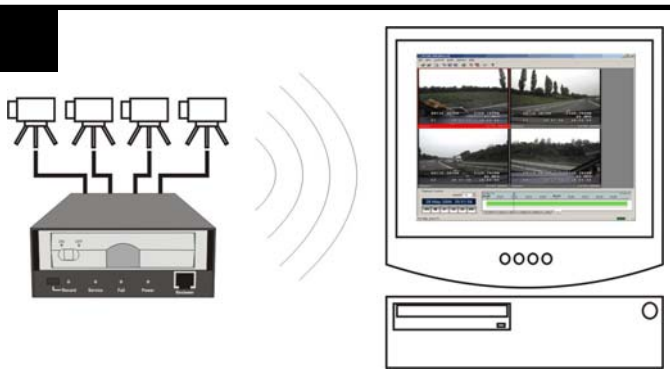
PC REVIEWING / ARCHIVING

The removable Hard Disk Cartridge is connected to a PC (via USB Kit) to analyse, copy or archive video/audio recordings and to download new operating software.

REMOTE OPERATION

A Wireless Local Area Network (WLAN) system can be used to download recordings from the X200 in a vehicle to a PC.

A GSM modem can be used in conjunction with the X200 and RemoteLink software to configure the X200 remotely.



X200 RECORDING TIME CALCULATION

The following table allows the calculation of recording time in hours and other parameters shown in bold below. Fill out 5 of the 6 entries A to F and calculate the missing entry.

Number of cameras **A**_____

Number of images/sec for each camera **B**_____

Amount of motion (%)

Enter 100	Full Update Recording	
Enter 80	High Motion Cond. Refresh	
Enter 60	Bus Market Cond. Refresh	
Enter 40	Med Motion Cond. Refresh	
Enter 20	Low Motion Cond. Refresh	**C**_____

Disk size in GBytes **D**_____

Amount of time in Hours **E**_____

Resolution (Kbytes)

Enter 35	V. High	
Enter 25	High	
Enter 15	Medium	
Enter 10	Low	**F**_____

Amount of time in hours **E = (27768 x D) / (A x B x C x F)**

Disk size if you know the time **D = A x B x C x E x F / 27768**

How much % motion **C = (27768 x D) / (A x B x E xF)**

Number of images on disk **(100,000,000 x D) / (C x F)**

If audio recording is enabled then an additional 0.12 GBytes per hour must be added to the total amount of disk space used.

COMPATIBILITY WITH X100 HARD DISK CARTRIDGES

The use of Hard Disk Cartridges other than those supplied by Timespace Technology will invalidate the warranty of the X200 recorder, and will constitute a breach of the X200 operating software copyright.

1) All Cartridges from an X100 can be used in an X200, as long as X100 Operating Software V1.5.0 or later is installed.

2) All Cartridges from an X200 can be used in an X100.

The X200 stores its operating system and menu settings internally in non-volatile flash memory whilst the X100 stores its operating system and menu settings on the Hard Disk Cartridge. Therefore all new Hard Disk Cartridges are supplied with the latest version of the X100 operating software already installed so that the cartridges can be used in both the X200 and X100 without modification.

Please note that as the X100 stores its menu settings on the cartridge as well as the operating software, using a new cartridge in the X100 will mean that all menu settings will revert to the factory default settings.

Older cartridges which have only previously been used with the X100 can be used with the X200 without modification as long as the X100 operating system stored on the cartridge is version 1.5 or later. The menu settings on the X200 will not be affected by using the cartridge.

If the X100 operating system stored on the Cartridge is previous to version 1.5 then version 1.5 or later will need to be loaded onto the Cartridge before it can be used with the X200.

It is possible to record both .oba* (X100 file) and .xba (X200 file) on the same cartridge without any compatibility problems. Please note however that the X100 will only list and play back .oba files and the X200 will only list and play back .xba files.

Where loop recording is selected, the X200 records over oldest files first, whether they are .oba or .xba files. The X100 on the other hand will overwrite files in an indeterminate manner (based on their physical location on disk). Consequently if disks are to be moved from an X200 system into an X100 system please ensure that all critical files have been archived onto a PC or write protected on disk.

Resetting the cartridge on the X200 and thus deleting all of the recording files on the disk (all .oba and .xba files will be deleted) will not affect the X100 operating software.

X200 DIGITAL RECORDER

Installation

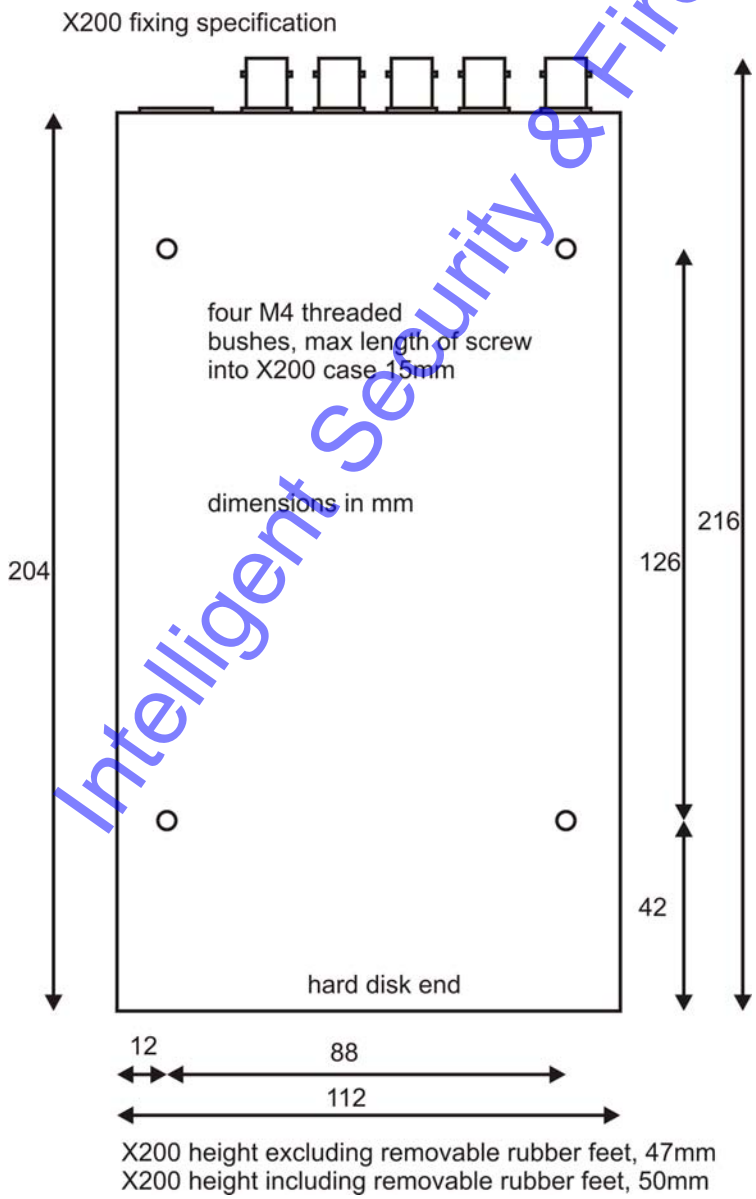
The X200 can be used freestanding or it can be mounted on a wall or bulkhead.

Power can be applied to X200 either via 12V DC jack socket (use PSU supplied with X200), or 12V screw terminals. **NB: Do not use both power inputs simultaneously.**

The Hard Disk Cartridge (supplied separately) with lock on the front in "Off" position should be inserted into receptacle in front panel of X200 and gently but firmly pushed into place, then lock switched to "On" position.

Mechanical Data

4 x threaded holes are available in the back panel of the X200 for mounting:



Anti-Vibration Kit

For use in mobile installations subject to shock and vibration. Please adhere to the following instructions for the installation of the Anti-Vibration Kit. Failure to do so may result in the Mounting System not working correctly.

Inventory of Parts

The Anti-Vibration Kit consists of the following parts -

QTY	Description
4	Wire Rope Mounts
1	Stabiliser Coupling
8	Zinc Plated M4 x 10mm Counter-Sunk Hex-Head Screws.

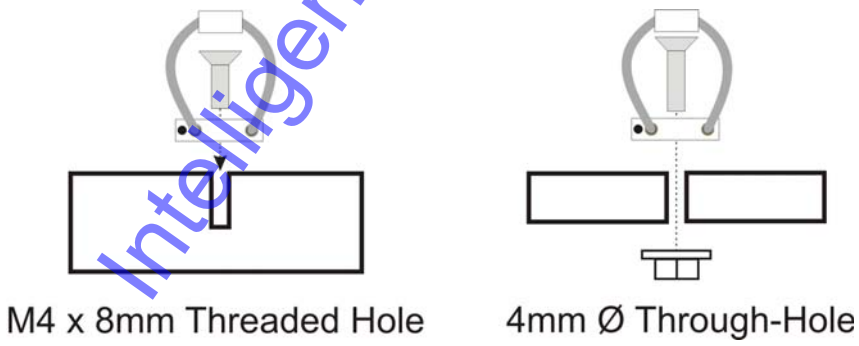
In addition you will require a standard 'L' shaped hex key. This is essential, as when all of the other screws have been tightened, there is no room for any other tool to tighten the front lower pair of screws.

Mounting Hole Preparation

Drill four mounting holes to attach the Wire Rope Mounts. If you intend to use the M4 x 10mm screws into blind holes, then the holes will have to be drilled and tapped to accept an M4 screw, with a thread depth of no less than 8mm.

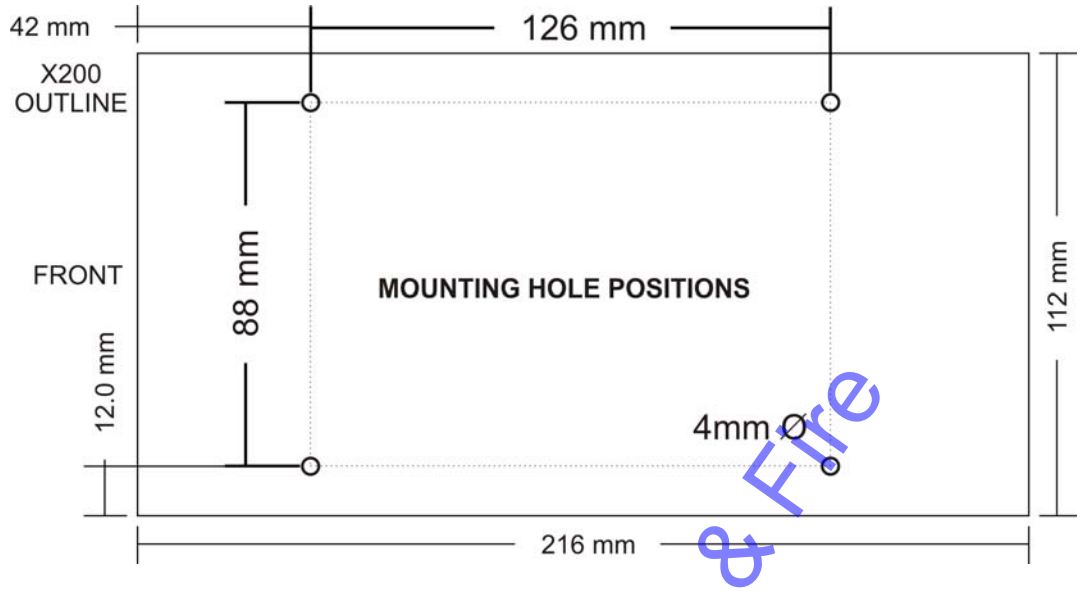
If mounting the Wire Rope Mounts through a metal plate, then longer screws may have to be used in order to allow a washer and nut to be attached on the other side of the plate. The length of these screws will have to be chosen depending on the thickness of the plate and the height of the washer and nut.

Please note that any screw used for mounting the wire rope mounts to an enclosure surface must have an M4 thread and have a counter-sunk hex-head.



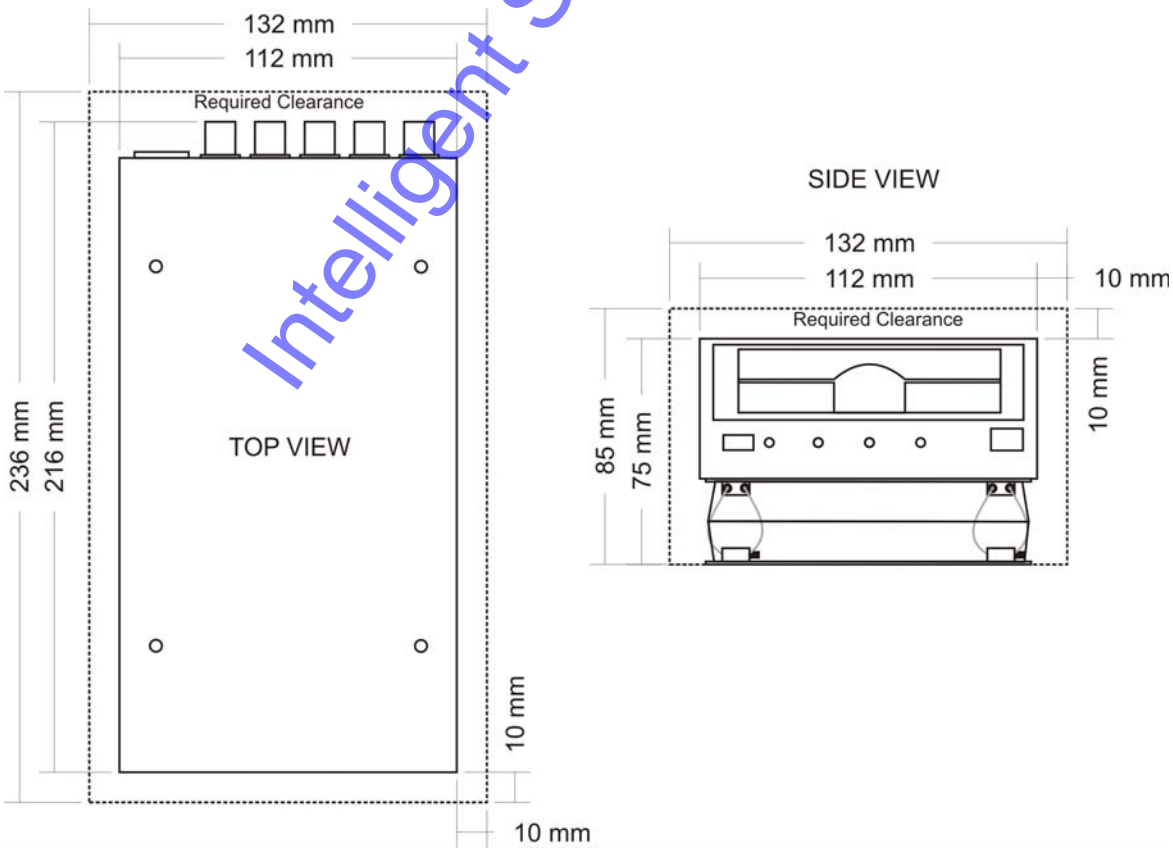
Mounting Hole Location

The mounting holes must be drilled on 126mm and 88mm centres.



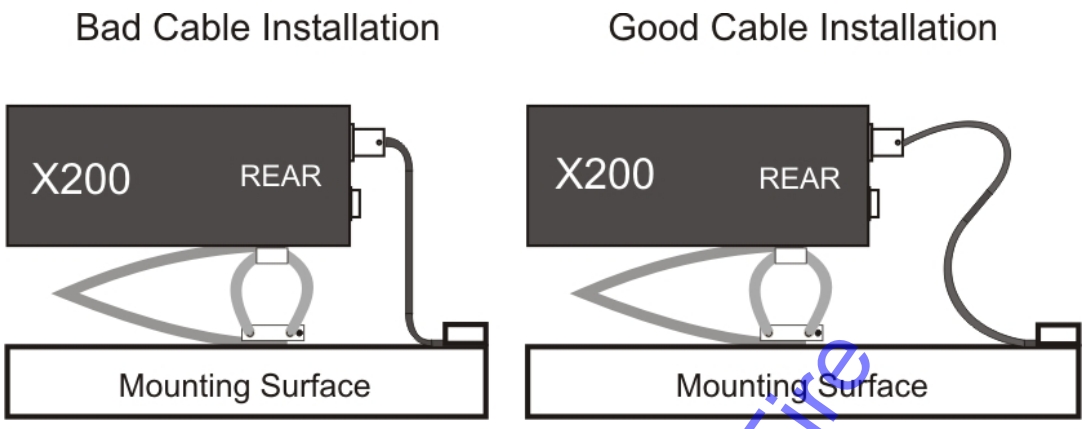
Total Mounting Volume Required

It is necessary to allow a minimum clearance of at least 10mm around the body of the X200 when mounted on the T406 Anti Vibration Kit. This is to allow free movement of the X200 on the anti vibration mounts and to prevent collision with either the enclosure or peripheral systems due to vertical and lateral movement under extreme shock and vibration conditions.



Cable Installation

Please note that when installing cables to the rear of the X200 it is important not to arrange or clamp them in such a way as to impede the free movement of the rear anti-vibration mounts.



Installation Procedure

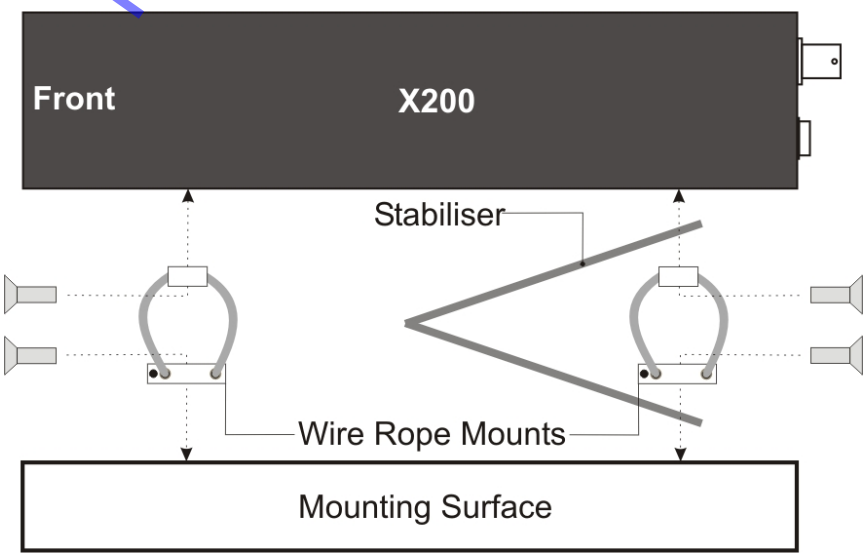
It is advised that some form of thread-lock compound should be used on the screws securing the wire rope mounts to both the X200 and mounting surface. This is in order to prevent loosening due to vibration.

1) Attach the Wire Rope Mounts to the X200 with four of the countersunk M4 hex-head screws provided and L-shaped hex key. When attaching the rear pair of mounts please ensure that the stabilizer is 'sandwiched' between the mounts and the X200 by aligning the stabilizer holes with the mounting holes in the X200.

Please note that the 'open' end of the C-shaped plastic stabiliser should be attached to the rear wire rope mounts and face backward.

2) Once all of the Wire Rope Mounts have been securely attached to the X200, use a pair of countersunk M4 hex-head screws to attach the bottom 'feet' of the front Wire Rope Mounts to the mounting surface/enclosure.

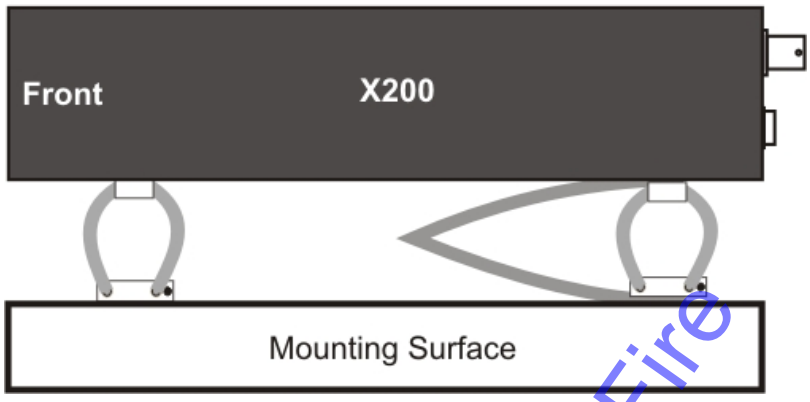
3) Secure the lower 'feet' of the rear Wire Rope Mounts to the mounting surface/enclosure using the remaining pair of countersunk M4 hex-head screws and a standard L-shaped hex key. Ensure that the stabilizer is 'sandwiched' between the lower feet and the mounting surface/enclosure by screwing through the Wire Rope Mount feet, then the stabilizer and into the mounting surface/enclosure.



Orientation of Unit

The X200 should be mounted in the following horizontal orientation. This is strongly advised for maximum vibration and shock isolation.

Horizontal



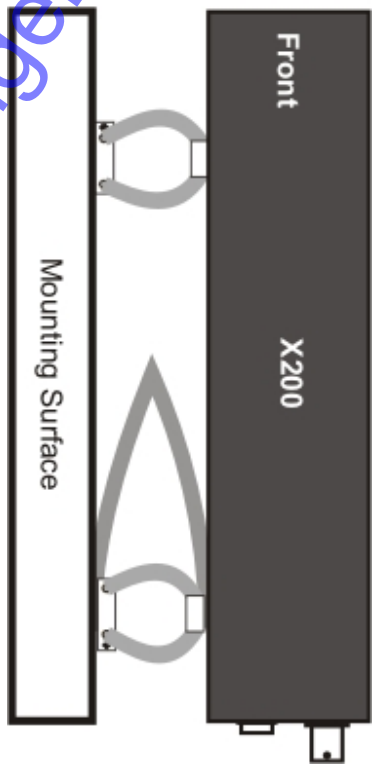
If it is not possible to mount the X200 in the horizontal orientation then the following vertical orientation may be used.

It must be noted however that this vertical orientation is not as effective at isolating the X200 from vibration and shock as the horizontal orientation.

The position of the plastic stabiliser, screw types and assembly order remain the same for this mounting orientation.

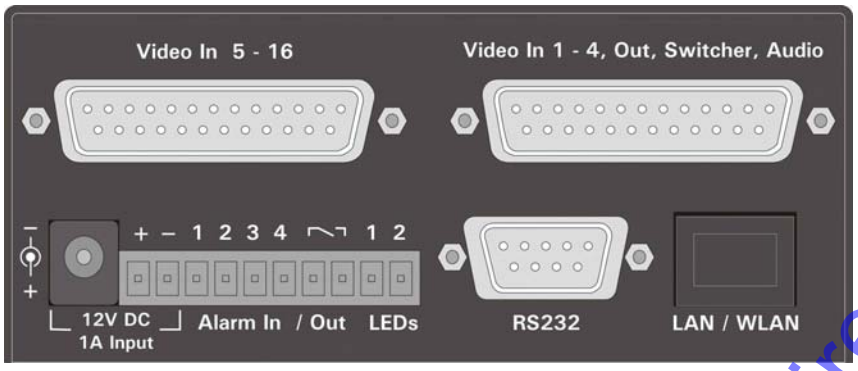
The X200 must never be mounted by hanging it upside down from a horizontal surface when using this mounting system.

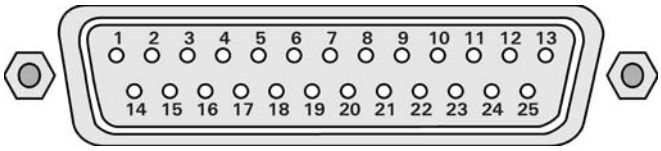
Vertical



Connector Specifications and Diagrams

X200-16 Rear Panel





Pin numbering of both 25 Way Male D type connectors on X200 (looking at rear panel).

Video 5 - 16 Connector

Pin		Pin	
1	Video GND In 5	14	Video In 5
2	Video GND In 6	15	Video In 6
3	Video GND In 7	16	Video In 7
4	Video GND In 8	17	Video In 8
5	Video GND In 9	18	Video In 9
6	Video GND In 10	19	Video In 10
7	Video GND In 11	20	Video In 11
8	Video GND In 12	21	Video In 12
9	Video GND In 13	22	Video In 13
10	Video GND In 14	23	Video In 14
11	Video GND In 15	24	Video In 15
12	Video GND In 16	25	Video In 16
13	Not Connected		

Video 1 - 4, Out, Switcher, Audio Connector

Pin		Pin	
1	Video GND In 1	14	Video In 1
2	Video GND In 2	15	Video In 2
3	Video GND In 3	16	Video In 3
4	Video GND In 4	17	Video In 4
5	Video GND Main Out	18	Video Main Out
6	Video GND Switcher Out	19	Video Switcher Out
7	Audio GND Out 2 (right)	20	Audio Out 2 (right)
8	Audio GND Out 1 (left)	21	Audio Out 1 (left)
9	Audio GND In 1 (left)	22	Audio In 1 (left)
10	Audio GND In 2 (right)	23	Audio In 2 (right)
11	Video GND Main Out S-Video Y	24	Video Main Out S-Video Y
12	Video GND Main Out S-Video C	25	Video Main Out S-Video C
13	Not Connected		

X200-16 Cable Harness Recommended Specification

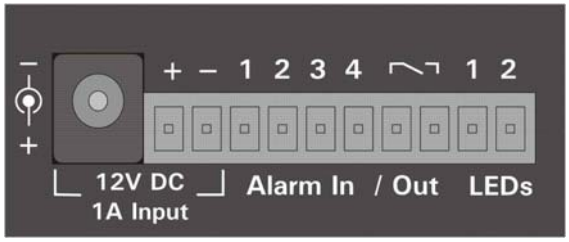
A common cable harness can be used for both 25 Way D type connections on the X200-16

Connector	25 Way Female D type
Shell	Recommended max overall width 56mm (the two 25 way connectors are 57mm apart)
Cables	12 individual RG179 cables of suitable length.

Connections		Shield pin	Core Pin
	Cable 1	1	14
	Cable 2	2	15
	Cable 3	3	16
	……..		
	Cable 12	12	25

Pin 13 not connected.

X200-04 and X200-16 Input/Output Connector



Connect power input to either + - terminals or to 2.1mm jack socket
Connect alarm inputs 1, 2, 3 and 4 to - terminal if closed, leave open circuit if open
Connect alarm output to Out terminal pair
Connect LED 1 between + and terminal LED 1, including a series resistor to limit current.
Connect LED 2 between + and terminal LED 2, including a series resistor to limit current.
Terminals LED 1 and LED 2 are high impedance (LAMP/LED off) or 0V (LAMP/LED on)

LED outputs 1 and 2 can be menu assigned to duplicate any of the 4 front panel LEDs (power, record, service and fail). Please refer to the Troubleshooting section of this manual for the operation of the Service and fail LED's.

X200-04 and X200-16 Ethernet Connector

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

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

X200-04 and X200-16 RS232 Connector

The X200 has a 9 way male D-type connector (DB9) which can be used to support 1 or 2 RS232 peripherals.

Conventional Cable

Using a conventional cable (DB9 male to DB9 female straight through (1-1, 2-2, 3-3 etc.)) the X200 can be connected to a modem:

Pins on the X200 Pin			→ X200 output ← X200 input	
3	TD	Transmit Data	→	Serial Data (0 = 10V, 1 = -10V)
2	RD	Receive Data	←	Serial Data (0 = 10V, 1 = -10V)
7	RTS	Request to send	→	Handshaking (please send signal = 10V)
8	CTS	Clear to send	←	Handshaking (please send signal = 10V)
4	DTR	Data terminal ready	→	X200 outputs 5V (data terminal is ready)
6	DSR	Data set ready	←	Ignored by X200
1	DCD	Data carrier detect	←	Used to detect that modem is on air (=10V)
9	RI	Ring Indicator	←	Ignored by X200
5	GND	Ground		

Proprietary Dual RS232 Device Cable

This supports the connection of two RS232 peripherals such as GSM modem and GPS (Global Positioning System).

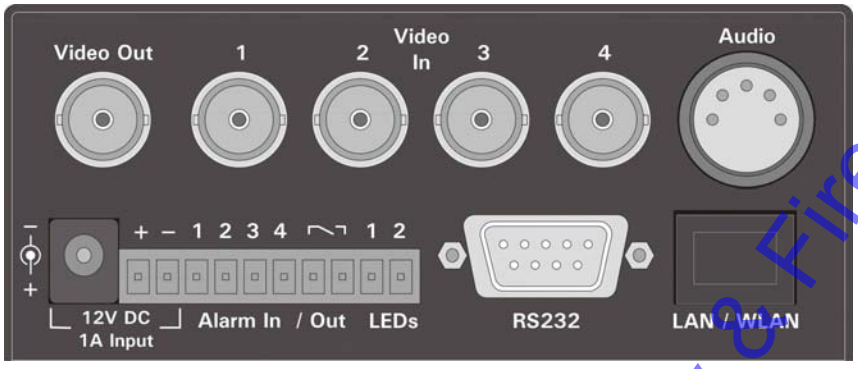
<u>RS232 port 1 (Modem)</u>

Pin			→ X200 output ← X200 input	
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	←	Used to detect that modem is on air (10V)
5	GND	Ground		

RS232 port 2 (other device)

4	5V	Power supply for GPS unit (500mA max)		
6	Ignored by X200		←	
9	RD	Receive Data	←	Serial Data
5	GND	Ground		

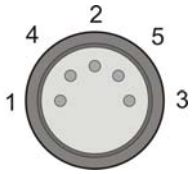
X200-04 Rear Panel



1 BNC video output
4 BNC video inputs

Audio Connector

5 pin 180° female DIN connector (DIN 41524)

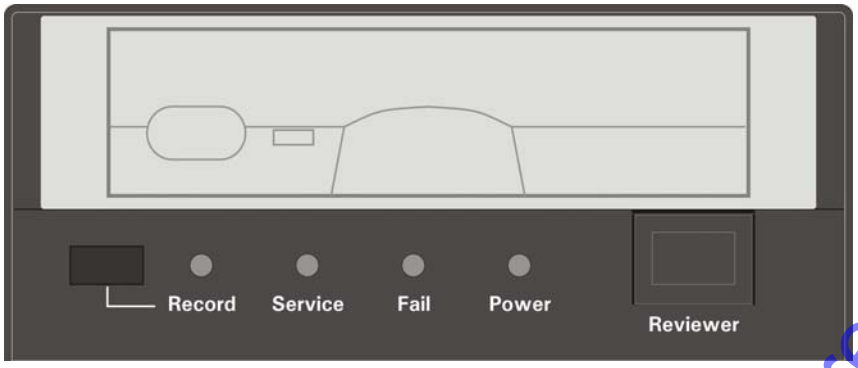


Pin	
1	Audio input 1 (left)
4	Audio input 2 (right)
2	Audio GND
5	Audio output 2 (right)
3	Audio output 1 (left)

The audio signals are at line level

A 5 pin DIN to 4 way RCA phono harness can be readily purchased from a number of suppliers. Suggested search via www.google.com for “5 pin din to rca phono audio”.

X200 Front Panel



Record Button

Turns Normal recording on and off. Can be menu disabled.

LED Indicators

Record LED
Illuminated when the X200 unit is recording.

Service LED
Not currently used.

Fail LED
Illuminated when the X200 video recorder is unable to make recordings. Check that the hard drive cartridge is properly inserted and locked in.

Power LED
Illuminated constantly while power is supplied to the X200.

At Power On
All four LED's will illuminate whilst the X200 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.

At System Reboot
If the Hard Disk Cartridge is switched off and then on (or replaced) or the Load System Upgrade has been performed the X200 will reboot. In this case as per at power on all four LED's will illuminate whilst the X200 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.

Reviewer Connector

Connect X101 or X201 reviewer to X200 using this socket. 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

Programming

The configuration of the X200 is by the menu system, this is accessed using the X201 Reviewer. Please refer to the section on the X201 Reviewer for details of its use.

Connect Data Link Cable (supplied with X201 Reviewer) from socket marked "Reviewer" on X200 to socket marked “Recorder” on X201. This connection will provide power and video to X201 from X200.

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.

Help Screens

Throughout the menu system, every item that the cursor points to has a Help screen. Place the cursor on the line requiring explanation and press the HELP key on the X201 front panel. Use any key to cycle through the screens for that line.

Help screens are available for each menu heading and for all items contained within the menu.

The help system is very comprehensive and it is strongly recommended as a reference to both new and experienced users.

Software Updates

Occasionally software improvements are made to X200 and a new version of software is made available. The software takes the form of a .xos file. Follow these steps to install new software:

Go to OTHER MENU > ADVANCED MENU in the X200 menu system.

- **LOAD SYSTEM UPGRADE –** This loads a new version of the X200 operating system from the Hard Disk Cartridge. Do the following.

  Delete all recordings on the Hard Disk Cartridge using the reset menu.
  Using the USB interface kit copy the new .xos file from the PC to the Hard Disk Cartridge.
  Right click the .xos file on the Hard Disk Cartridge and select properties.
  Left click to tick the 'Read-only' box at the bottom of the properties window and click OK.
  Insert the Hard Disk Cartridge into the X200 and stop it recording if it is currently doing so.
  Run LOAD SYSTEM UPGRADE by pressing the right menu button.

  Check the software version in the statistics menu to verify the new version has been loaded.

- **SAVE SYSTEM UPGRADE –** This saves the X200 operating system and current menu settings to the Hard Disk Cartridge as a .xos file.

  The Cartridge can then be used as a master to set up another X200 with the same software version and menu settings. Use LOAD SYSTEM UPGRADE on the other X200 with the master Cartridge inserted.

PAL/NTSC Switching

Introduction

From software version 1.2.0, the X200 offers the ability to switch between the different video standards; PAL and NTSC.

- **PAL** (*Phase Alternating Line*) is the standard used in most European countries with the exception of France. The X200, when configured to use PAL, offers a maximum capture rate of 25 fields per second.

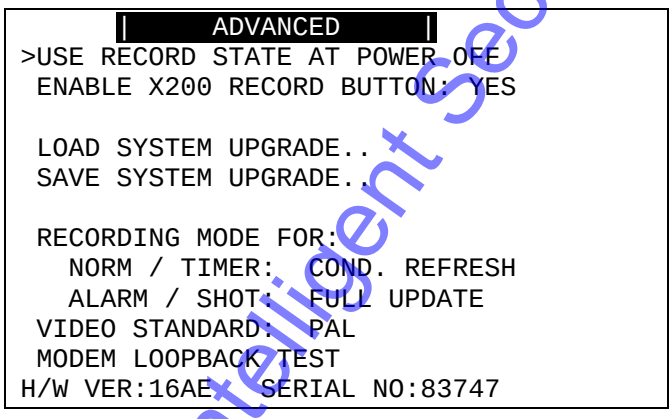
- **NTSC** (*National Television Standards Committee*) is the standard used in the United States of America. The X200, when configured to use NTSC, offers a maximum capture rate of 30 fields per second.

When configured to use one of these standards, the X200 must use it exclusively. This means that cameras of different types cannot be mixed on the device's inputs.

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

Switching Video Standards

To switch between the required video standard, the user must configure the unit using the ADVANCED menu. This is shown below:



After moving the cursor down the Video Standard line, the user can use the cursor keys to select between PAL and NTSC. Once the appropriate selection has been made the unit must be power-cycled before it comes into effect. During the power up sequence, the X200 will briefly display the software version installed along with the configured video standard.

File System

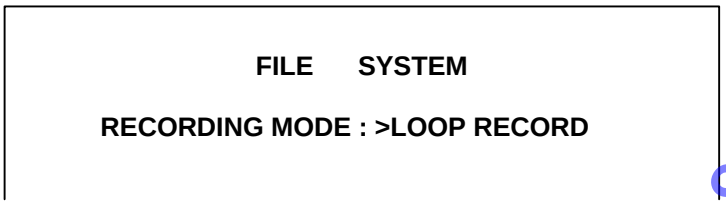
The X200 uses a proprietary file type with the file extension .xba

Images from multiple cameras along with audio, GPS and other data are stored in these files. The images are compressed using MPEG2 data compression in either non-predictive (full update) mode or predictive (conditional refresh) mode. For security and optimisation reasons .xba files can only be viewed on a PC using the proprietary PCLink200 software.

For most applications there are two types of normal recording available, loop and single pass.

Loop Recording

By selecting LOOP RECORD from the RECORDING MODE option in the file system menu.

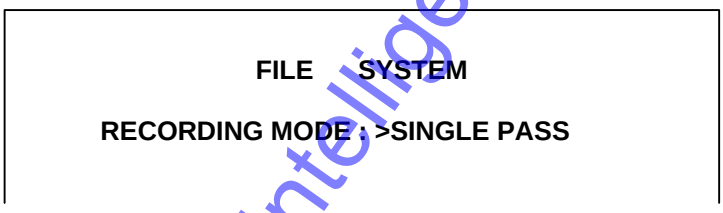


This will set the X200 to automatically delete oldest recordings first when the Hard Disk Cartridge is full (with the exception of write-protected files). The record position is stored and any playback will not affect the current record position (this is in contrast to a VHS tape).

Write-protection can be used to keep Alarm recordings but loop the background (Normal) recording.

Single Pass Recording

By selecting SINGLE PASS from the RECORDING MODE option in the file system menu.



The X200 records until the Hard Disk Cartridge is full and then stops. Recordings may be deleted in the RESET menu or loop recording enabled so that the oldest files will be overwritten first.

Transferring Images to Video Tape

It is possible to transfer recorded footage from an X200 to a video recorder.

Connections

X200-04
The X200 composite video out BNC connector marked ‘Video Out’ on the rear panel of the X200-04 is connected to the video recorders BNC composite video input using a BNC-BNC lead. If the video recorder does not have a BNC connector for video input then it is possible to use a suitable adaptor (for example BNC to RCA) as long as the video recorder input is of a composite video type.

X200-16
The ‘Video Main Out’ and ‘Video GND Main Out’ on the 25 way male D-type connector on the rear panel of the X200-16 are connected to the signal and GND connections of the composite video input of the video recorder with an appropriate lead.

Recording

Connect the X200 video out to the video recorders video input using a suitable lead. Insert a suitable tape into the video recorder and rewind / fast forward until it is in the desired recording position.

Using an X201 reviewer select the file to be transferred from the X200 by using the files menu. Scroll through the file list until the required file is found and then press the right menu button next to the file so that it appears on the screen of the X201 Reviewer.

Once selected, the footage will automatically begin to play, press the stop button immediately to avoid missing the first part of the footage. The footage may be rewound if necessary using the rewind control on the X201 (please refer to the chapter on the X201 Reviewer for specific details on playback controls). If a different camera view is required then this can be selected by pressing the appropriate number key on the X201 Reviewer relating to the camera input number on the X200.

When ready press record on the video recorder and then press play on the X201 Reviewer to restart the footage from the X200. The selected camera view from the file should now be seen playing on the X201.

When the file has been recorded press stop on the video recorder and on the X201 reviewer.

Video Compression

The X200 records images, audio, GPS and other data into 10 minute or 1 hour proprietary format files ending with the .xba file extension. A trade-off between image quality and file size can be made by selecting from the four levels of video quality: low, medium, high and v. high. The low setting uses greater compression than the high settings and consequently less disk space is used.

As image quality rises however so does the resultant file size so a decision will have 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.

Non-predictive compression (full update)

In the Advanced Menu the user can select between two compression styles. The first, "Full Update Recording" means that a full image is stored every time. Each image stands alone in its own right and uses no prediction from previous images – the recording type is termed non-predictive. The advantage of full update recording is that each image is independent and free from any inter-image distortion. The images can also be searched easily during playback. The disadvantage is that no use is made of any similarity between successive images and the compression performance can be up to 5 times worse (but typically 3 times worse) than conditional refresh recording.

Predictive Compression (conditional refresh)

With conditional refresh recording the X200 stores a full image followed by a sequence of partial images for each camera. When the file is searched, the full image (known as the keyframe) is used as a starting point for playback. The X200 uses a powerful algorithm that detects motion and for each partial image, only updates areas of the image that require it. Partial images may be 1/10th the size of the full images when there is little motion in a scene. There is no cumulative error (which can occur in some MPEG implementations) and the difference between full update recording and conditional refresh recording is designed to be imperceptible. The advantage of conditional refresh recording over full update recording is the compression performance is superior (typically 3 times).

The system defaults to using conditional refresh for normal and timer recording and full update for shot and alarm recording.

Audio

The X200 has two line-level audio input and output channels. Connection to the X200 is via a 5 pin 180° female DIN connector (DIN 41524) on the rear panel of the X200 which is detailed in the Connector Specifications section of this manual.

The two input channels can be assigned to all cameras or a single camera in order to associate recorded sound with the appropriate cameras and images for a particular installation.

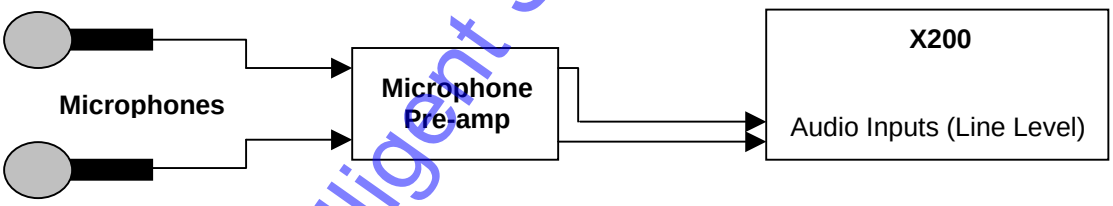
The audio channels can be played back individually or together when viewing footage in PCLink200 PC software. They can also be disabled during playback.

The X201 Reviewer can also be used for audio playback through its built in speaker. The audio signal is carried to the reviewer via the RJ45 reviewer cable, no other connections are necessary. It must be noted that at present playback via the X201 is in mono via channel 1 only.

The audio inputs on the X200 Recorder are line-level. Therefore some microphones will require the use of a dedicated preamplifier in order to raise their very low levels of output to line-level. The X200 is configurable so that the line-level input range can be set from 0.12 – 2.0Vrms.

For detailed information on configuring the audio settings in the X200 please refer to the Audio Recording Menu in the Menu System section of this manual.

2 Channel audio recording with 2 microphones and a pre-amplifier.



PC Access Precautions

It is important to understand that the X200 file system is a subset of the PC FAT32 file system. The PC will access the X200 disk cartridges with no problems but the X200 will not be able to read every FAT32 file system written by the PC.

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 X200. These include:

Formatting the disk on PC
Defragmenting the disk
Deleting files
Renaming files
Generating new files
Creating a recycle bin on the disk

Watermark

The X200 uses a fragile watermark. Any modification to the image data e.g. changing faces, lighting, contrast or other modifications will destroy the watermark. The image data that makes up the image set is passed though a function that generates a "magic number" or hash code from the images. The terms hash code and watermark are synonymous. A hash code is created automatically by the X200 for each image set and is then highly encrypted and stored in the information block.

The hash code can be de-encrypted and regenerated by passing the image data back though the function (i.e. in a watermark checking program). If the hash code thus obtained matches the hash code stored in the information block, the image data has not been altered or modified in any way. The watermark is "destroyed" when the hash code stored in the information block and the hash code of the data do not match.

GPS

The Global Positioning System (GPS) is a worldwide radio-navigation system formed from a constellation of 24 satellites (placed in orbit by the US Department of Defence; the first was launched in 1978) and their ground stations. Using accurate timing information, a GPS receiver (GPSr) is able to calculate its position using triangulation.
Anyone with a GPSr can use the system to determine their position anywhere in the world with an accuracy of around 15 metres.

The accuracy is determined by the quality of the satellite signals and the number of them 'in sight'. The GPSr 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.

NMEA-0183 Interface Standard

The National Marine Electronics Association (NMEA) develops and maintains a number of standards related to the marine electronics industry.
The NMEA-0183 Interface Standard defines electrical signal requirements, data transmission protocol and time, and specific sentence formats for a 4800-baud serial data bus. Each bus may have only one talker but many listeners. The *X200 Digital Video Recorder* supports GPS receivers that are NMEA-0183 compliant.

GPS Mice

A number of GPS receivers on the market are commonly referred to as *GPS Mice* because they consist of a GPS engine (GPS receiver and embedded antenna) in a compact case with a single power/data cable. Once powered up these devices send out the GPS data over the serial data connection using the NMEA-0183 protocol standard.
Since the *X200 Digital Video Recorder* provides +5V power out to the GPS mouse, only those which operate at this voltage and draw no more than 200mA should be used. The *X200 Digital Video Recorder* has been tested with the following GPS receivers:

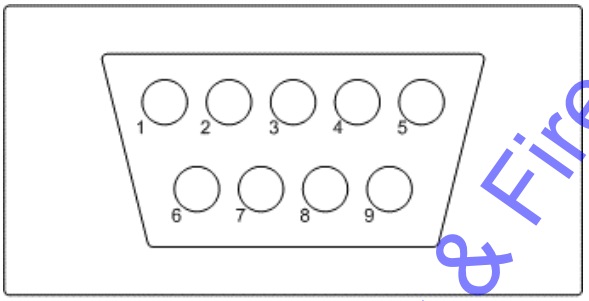
- Garmin GPS16 LVS
- RoyalTek Sapphire Serial GPSr
- Fortuna U2 Smart GPS

Configuration

Connection

The GPS receiver is connected to the *X200 Digital Video Recorder* through the RS232 port. The diagram below shows the 9 way D-type connector viewed from the back of the *X200* and details those pins to be used for the serial data connection and the +5V supply to the GPS receiver.

Note that the +5V supply is only intended to provide power to a GPS receiver with a current consumption of no more than 200mA.



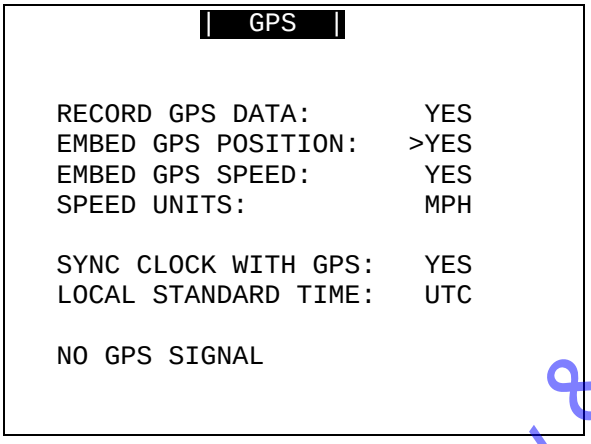
RS 232
(9 pin male d-type)

GPS Receiver Connections	
Pin	*Connection*
4	+5V supply
5	0V
9	Data

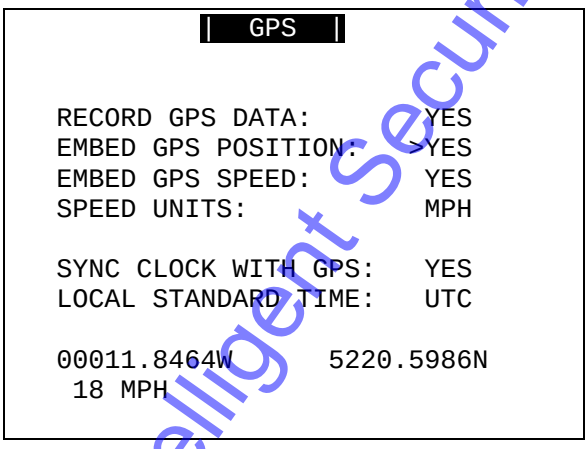
X200 GPS Options

Configuration of the X200's GPS options is done via the menu system accessed using a X201 reviewer. The GPS menu option presents the user with a number of options allowing the embedding of GPS position and speed and the units to be used.

If no valid GPS signal is being received then the X200's GPS menu page is similar to that shown below:



Or, if valid GPS data is being received, it is displayed towards the bottom of the screen:



Record GPS Data

This option determines whether the serial data from the GPS receiver will be recorded by the *X200 Digital Video Recorder*. Note that if no GPS data is received by the X200 (because no functional GPS receiver is connected) then there will be no data recorded either.

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.

Embed GPS Position

Selecting *YES* to 'EMBED GPS POSITION' will cause the position information to be embedded in the recorded image.

Embed GPS Speed

Selecting *YES* to 'EMBED GPS SPEED' will cause the speed information to be embedded in the recorded image.

Note that speed and position information will only be embedded in the video image when the GPS signal is valid and the position can be calculated.

Speed Units

Select either *KPH* for kilometres per hour or *MPH* for miles per hour.

Sync Clock with GPS

The *X200 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 system can be configured to synchronize the clock with the date and time information received from the GPS receiver.

Synchronization only occurs when the X200 is powered up and before it starts recording. At this time the built-in clock may be corrected by a maximum of 20 seconds if a previous discrepancy has been detected between the internal time and the GPS receiver time.

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 X200's internal clock) and that received from the GPS receiver, the system must be set with the correct time zone offset.

Troubleshooting

Satellite Signal Quality

In order to calculate its position, a GPS receiver must be receiving signals from at least 3 satellites and do to so it must have a clear view of the part of the sky in which they are located. **GPS receivers do not work indoors**.

When first powered up the GPS receiver will search for satellite signals. The signal includes information on the position of other satellites and all this information must be received before an accurate position calculation can be made. It can take a minute or two before a valid position can be determined after the GPS has been powered up.
Even when a signal is being received from a sufficient number of satellites, a number of factors can result in the degradation of the accuracy of the calculated position. These include:

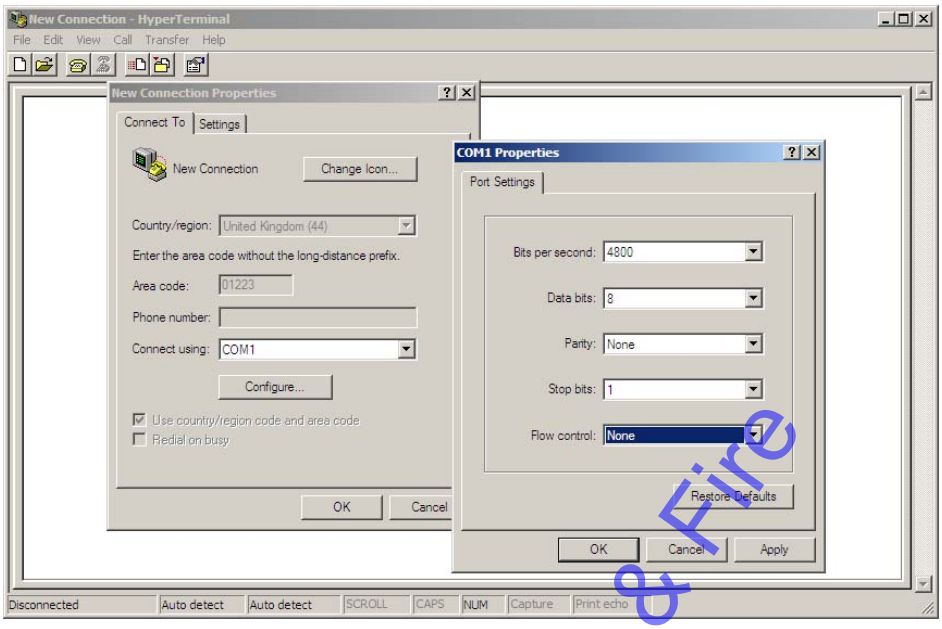
- ***Atmospheric Delays***. The satellite signal slows as it passes through the ionosphere and troposphere. A model built in to the GPS calculations compensates by an average delay to partially correct this error.
- ***Signal Multipath***. This occurs when the satellite signal is reflected before reaching the receiver. The delays caused by the additional travel time can cause errors.
- ***Receiver Clock Errors***. The GPS receiver's built-in clock is not as accurate as the atomic clock on the satellites and so slight timing errors can result.
- ***Orbital Errors***. Cause by inaccuracies of the satellites' reported position.
- ***Satellite Visibility***. The greater the number of satellites that the GPS receiver is able to receive a signal from, the better the accuracy of the calculated position. Buildings, terrain or electrical interference can block the signals.
- ***Satellite Geometry***. The GPS satellites are constantly moving, orbiting the earth at a height of around 11,000 miles. Each making at least two complete orbits in any 24 hour period. Ideal satellite geometry occurs when the satellites are located at wide angles relative to each other – poor geometry, when the satellites are close together or in a line, results in poorer accuracy.

GPS Receiver

A simple test to ensure that a 'GPS mouse' is functioning is to connect it to a PC's serial port and use an application such as *Microsoft® HyperTerminal®* which comes as part of the *Microsoft® Windows®* operating system.
HyperTerminal® is a terminal emulator application that can be used to connect to other devices using an RS232 serial port. Other similar applications are available but in each case the serial port to which the GPS receiver is to be connected should be configured to use the following settings:

Baud Rate (bits per second)	4800
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	None

The following display shows *HyperTerminal*® being configured with the GPS mouse connected to COM1:



Even if the GPS receiver is receiving no satellite data (for example, if it is being tested inside) then when it is connected to the serial port and a suitable power supply, it should start sending NMEA-0183 sentences similar to those shown below:

```
$GPGSA,A,1,,,,,,,,,,,,,50.0,50.0,50.0*05
$GPRMC,021341.581,V,36000.0000,N,72000.0000,E,,,270102,,*2B
$GPGGA,021342.581,36000.0000,N,72000.0000,E,0,00,50.0,0.0,M,,M,,0000*4C
$GPGSA,A,1,,,,,,,,,,,,,50.0,50.0,50.0*05
$GPRMC,021342.581,V,36000.0000,N,72000.0000,E,,,270102,,*28
$GPGGA,021343.581,36000.0000,N,72000.0000,E,0,00,50.0,0.0,M,,M,,0000*4D
$GPGSA,A,1,,,,,,,,,,,,,50.0,50.0,50.0*05
$GPRMC,021343.581,V,36000.0000,N,72000.0000,E,,,270102,,*29
$GPGGA,021344.581,36000.0000,N,72000.0000,E,0,00,50.0,0.0,M,,M,,0000*4A
$GPGSA,A,1,,,,,,,,,,,,,50.0,50.0,50.0*05
```

The above sentences were recorded when no satellite signals were being received. The first '0' after the 'E' character in the GPGGA sentence indicates invalid fix and the first 'V' character in the GPRMC sentence indicates navigation warning.

If no serial data is received then the GPS receiver is not functioning correctly and so the first course of action should be to either investigate the problem or replace it.

Embedded Information

If the option to embed the GPS data within the video image is selected then the information is seen above the data and time information. The example below shows both position and speed information embedded within the image:

The top line of the embedded information shows the position as longitude followed by latitude in the following format:

`DDDMM.MMMMH ddmm.mmmmh`

where the fields are:

`DDD`	The longitude degrees.
`MM.MMMM`	The longitude minutes (as a decimal)
`H`	The longitude hemisphere ('W' for west of the meridian, 'E' for east of the meridian)
`dd`	The latitude degrees
`mm.mmmm`	The latitude minutes (as a decimal)
`h`	The latitude hemisphere ('N' for north of the equator, 'S' for south of the equator)

In the above example, the current coordinates are 0° 11.8464'W, 52° 20.5986'N. Expressed as degrees, minutes, seconds this is 0° 11' 50.784"W, 52° 20' 35.916"N

The line below the position shows the camera name (blank in the above example) followed by the speed displayed in the selected units. The third and final line shows the camera number, the time and the date.

NMEA Sentences

The NMEA-0183 interface standard defines electrical signal requirements, data transmission protocol and time, and specific sentence formats for a 4800 baud serial data bus. Those sentences that are relevant to GPS data and recorded by the *X200 Digital Video Recorder* are detailed below:

GPGGA - Global Positioning System Fix Data

This sentence includes the positioning fix information with additional information about the accuracy of the fix and the satellites used in its determination.

```
$GPGGA,123519,4807.038,N,01131.324,E,1,08,0.9,545.4,M,46.9,M, , *42

          123519        Fix taken at 12:35:19 UTC
          4807.038,N    Latitude 48 deg 07.038' N
          01131.324,E   Longitude 11 deg 31.324' E
          1             Fix quality: 0 = invalid
                                     1 = GPS fix
                                     2 = DGPS fix
          08            Number of satellites being tracked
          0.9           Horizontal dilution of position
          545.4,M       Altitude, Metres, above mean sea level
          46.9,M        Height of geoid (mean sea level) above WGS84
                        ellipsoid
          (empty field) time in seconds since last DGPS update
          (empty field) DGPS station ID number
          *42           Mandatory checksum
```

GPGSA - GPS DOP and active satellites

This sentence

```
$GPGSA,A,3,04,05,,09,12,,,24,,,,,2.5,1.3,2.1*39

          A             Auto selection of 2D or 3D fix (M = manual)
          3             3D fix
          04,05...      PRNs of satellites used for fix (space for 12)
          2.5           PDOP (dilution of precision)
          1.3           Horizontal dilution of precision (HDOP)
          2.1           Vertical dilution of precision (VDOP)
            (DOP is an indication of the effect of satellite geometry on
            the accuracy of the fix.)
          *39           Mandatory checksum
```

GPRMC - Recommended minimum specific GPS/Transit data

This sentence includes the minimum recommended GPS data and includes the position (latitude and longitude), speed (in knots), date and time.

```
$GPRMC,225446,A,4916.45,N,12311.12,W,000.5,054.7,191194,020.3,E*68

          225446        Time of fix 22:54:46 UTC
          A             Navigation receiver warning A = OK, V = warning
          4916.45,N     Latitude 49 deg. 16.45 min North
          12311.12,W    Longitude 123 deg. 11.12 min West
          000.5         Speed over ground, Knots
          054.7         Course Made Good, True
          191194        Date of fix  19 November 1994
          020.3,E       Magnetic variation 20.3 deg East
          *68           Mandatory checksum
```

Glossary

Almanac Data	Contains information about the location of the GPS satellites and their orbital information at any time.
Ephemeris Data	Contains information about the status of the satellite, current date and time.
GMT	Greenwich Mean Time
GPS	Global Positioning System
GPSr	Global Positioning System Receiver
NMEA	National Marine Electronics Association
UTC	Coordinated Universal Time

The Menu System V1.3.1

The menu system is used to configure the X200 and gives control over recording resolution, camera sequencing, timer settings, alarm triggering and alarm triggered recording. There is also access to monitor options and password functions along with many other parameters.

A menu can contain the following types of entry:

- Sub-menu heading - press the right arrow menu key and the sub-menu is entered.
- Function - press the right arrow menu key and the function is performed (e.g. Reset System).
- Selection - press the left and right menu keys to cycle through the choices.
- Numeric item - input numbers 0 to 9 on the keypad (e.g. entering a time) and use the DEL button to correct mistakes.

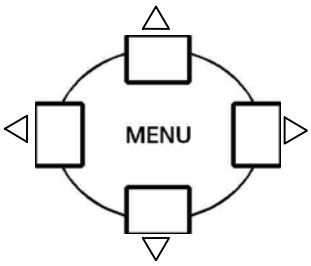
Any changes made to the menu system have immediate effect on the operation of the system. The menu is stored on non-volatile Flash memory inside the X200. To revert to the factory settings run a RESET MENU TO THE FACTORY DEFAULT STATE WITH: ENGLISH LANGUAGE function in the RESET SYSTEM menu.

Help Screens

Every menu and every item within the menu has a separate help screen. Place the cursor against the chosen item and press the HELP key. Where multiple pages of help are available, move from one to the next by pressing the HELP key. Use the MENU EXIT key at any time to leave the help menu.

Menu Navigation

The menu system on the X200 can be accessed by using the X201 Reviewer. Connect the dedicated 8 way (Ethernet style) cable (supplied with X201) to the recorder and consult the instructions for X201 Reviewer.



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 up to the next item.

▽ Move arrow cursor down to the next item.

◁ If the arrow cursor is currently at a menu selection,
(e.g. **RESOLUTION: > HIGH**),
pressing the left button will cycle the value backwards,
(e.g. to **RESOLUTION: > MEDIUM**),

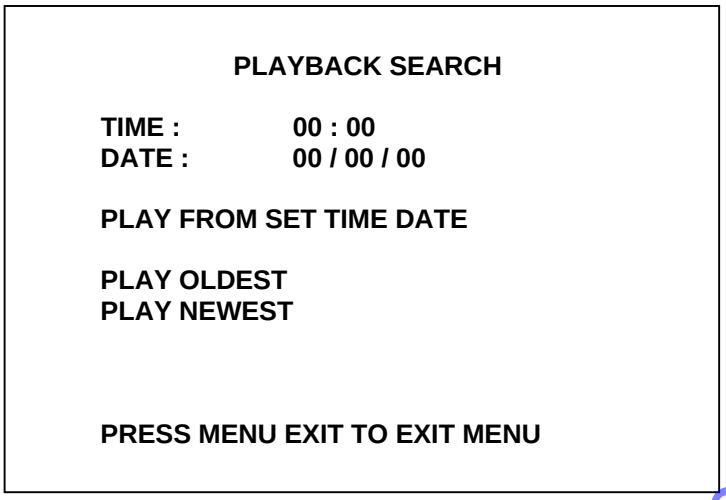
▷ If the arrow cursor is currently at a menu selection
(e.g. **RESOLUTION: > LOW**),
pressing the right button will cycle the value forwards,
(e.g. to **RESOLUTION: > MEDIUM**).

If the arrow cursor is currently at a sub-menu title
(e.g. **> OTHER OPTIONS**).
pressing the right button will enter this sub-menu.

The **MENU EXIT** key on the X201 Reviewer will exit the current menu and move 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.

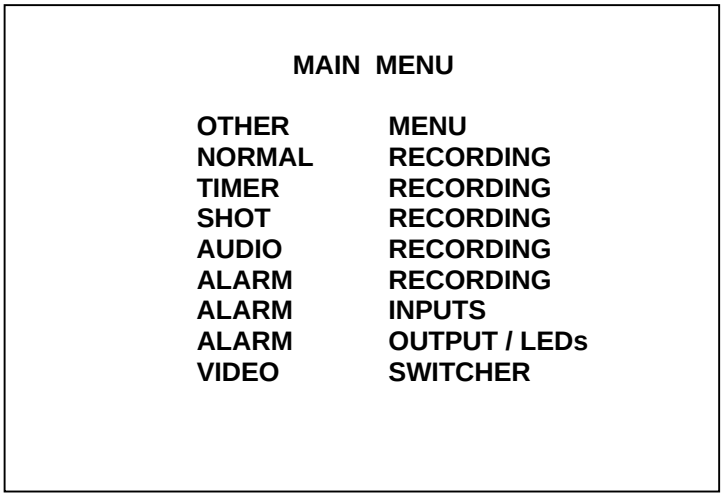
If the left and right menu keys have no effect, then numerical entry using keys 0 to 9 is required.

The **SEARCH** key on the X201 Reviewer accesses a menu allowing the user to go to a specific time and date in the recorded footage. Pressing this button will enter the **PLAYBACK SEARCH** screen as seen below. 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.

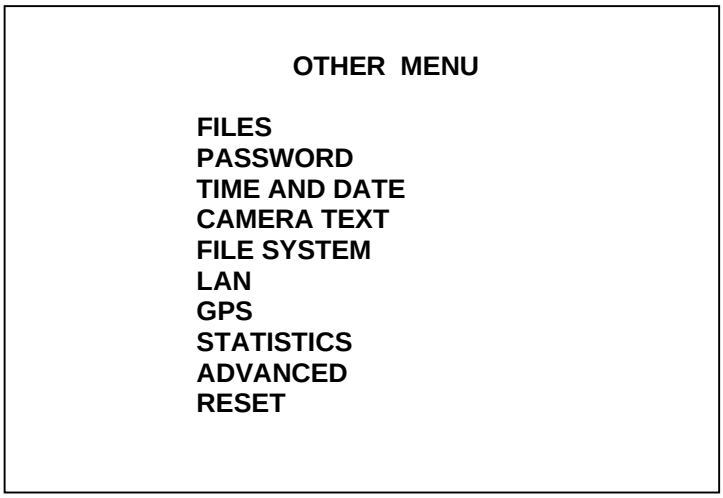
Main Menu



Sub-menus available from the MAIN MENU:

- **OTHER MENU –** Leads to the other menu items.
- **NORMAL RECORDING –** Default recording set-up activated by the record on/off button.
- **TIMER RECORDING –** Recording set-up activated by the inbuilt weekly interval timer.
- **SHOT RECORDING –** Shot Recording set-up activated by specified alarm inputs.
- **AUDIO RECORDING –** Set-up for audio recording.
- **ALARM RECORDING –** Recording set-up activated by the alarm inputs.
- **ALARM INPUTS –** Sets the open/closed conditions and actions for each of the 4 alarm inputs.
- **ALARM OUTPUTS –** Sets the open/closed condition and triggers for the alarm output. Sets the conditions for the external LED outputs.
- **VIDEO SWITCHER –** Sets the dwell times of individual or groups of cameras.

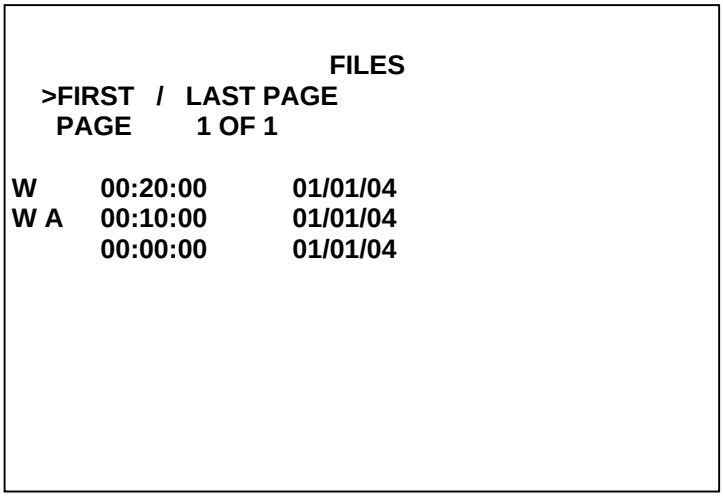
Other Menu



Sub-menus available from the OTHER MENU:

- **FILES –** Allows listing and access to all recordings on the Hard Disk Cartridge.
- **PASSWORD –** Settings for password protection and change password facility.
- **TIME AND DATE –** Change the system time and date plus summertime correction.
- **CAMERA TEXT –** Text labels for each camera can be entered in this menu.
- **FILE SYSTEM –** File organisation and health check.
- **LAN –** Set-up for LAN connection.
- **GPS –** Set-up to confirm connection of GPS device and format of GPS data.
- **STATISTICS –** General recoding and system statistics.
- **ADVANCED –** Advanced options.
- **RESET –** Reset recordings and/or return menu to factory default settings.

Files Menu



The files menu lists the files that are recorded on the Hard Disk Cartridge and allows the user to write-protect or remove write-protection for any file and provides instant jump to any file. The file listing is displayed on a number of pages with each page showing up to 10 files.

- **FIRST / LAST PAGE**

Use the left menu button to view the first page of the file listing. Use the right menu button to view the last page of the file listing.

- **PAGE**

Use the right menu button to advance to the next page of the file listing and the left menu button to move back to the previous page of the file listing. The current page and the total number of pages will be shown by 'x' OF 'x'. For example 1 OF 10 would indicate that page 1 is being shown out of a total of ten pages.

File Listing

The file listing shows files most recent first. Files marked with an 'A' indicate that it is an alarm recording and 'W' indicates that the file is write protected. In the above menu example there are 2 normal recording files and 1 alarm event file which has been write protected. All files are 10 minutes in duration.

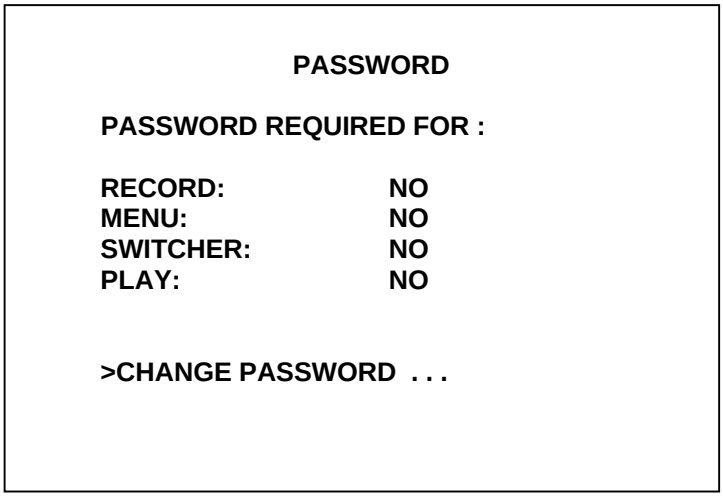
Voluntary Write-Protection

Any file can be write-protected to avoid it being erased on loop recording. For example there may be some critical footage that needs to be kept but the user may want to continue recording on the same disk once he has protected this file. To write protect any file move the arrow cursor next to it in the file listing and press the left menu button, "W" will then appear next to the file showing that it is protected. Write-protection can be removed by pressing the left menu button again. In the above example the file 00:20:00 has been voluntarily write-protected. Pressing the left menu button again removes write-protection (the left menu button toggles the write protect status). Write-protected files appear as write-protected (read only) on the PC. You can change the write-protect status either on the PC or as explained on the X200. Any files that are not write-protected on the X200 get overwritten (oldest first) during the process of recording.

Jump to File

Press the right menu button to jump to the start of the file indicated by the arrow cursor.

Password Menu



The password menu restricts user access to the four key parts of the system. Here is a summary of the menu selections available:

- **RECORDING** - If set to **YES**, the record button is 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.
- **PLAY** - If set to **YES**, the controls to review recorded footage are password protected.

If the user tries to access a protected function, he is asked to type in the password. The default password is 0000 when shipped. On correct password entry (four digits e.g. 3524 or 8912) the password protection is temporarily disabled. It is reinstated after 1 minute of no key presses. Protection is also automatically reinstated when leaving the password menu.

- **CHANGE PASSWORD** - The supervisor who knows the password is requested to type in the old password, followed by the new one. He is then requested to retype the new password. If he has done this successfully the new password is made the current one and the password protection is activated.

Hints

It is intended in a password protected system to at least protect the menu system. This ensures that important operating settings cannot be tampered with. Other protection may be required e.g. the record button may be disabled. Some examples are given overleaf.

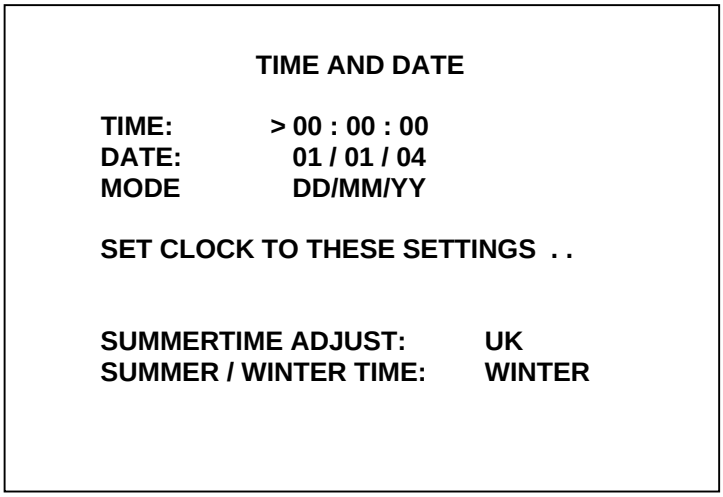
Examples

Selection	Set to		
RECORDING	**YES**	**YES**	**NO**
MENU	**YES**	**YES**	**YES**
SWITCHER	**YES**	**NO**	**NO**
PLAY	**YES**	**NO**	**NO**
Result:	Full protection - no functions available.	Allow the user to review footage and look at live cameras only.	Allow the user to carry out basic functions, but without access to any menus.

The password for the unit when the unit is shipped is 0000. This may be changed as described previously.

In the event of complete password lockout contact your installer / distributor for a code for the X201 Reviewer. The user can enter a code on the X201 Reviewer which will enable him to reset the unit and reset the password.

Time and Date Menu



The time and date menu sets up the date, time and seasonal correction.

- **TIME** - Type a time using the numbered keys. Invalid times are prohibited
- **DATE** - Type a date using the numbered keys. Invalid dates are prohibited
- **MODE –** Use the left and right menu buttons to toggle the format the date is displayed in between DD/MM/YY and MM/DD/YY.
- **SET THE CLOCK TO THESE SETTINGS** - Press the right menu button to set the time and date as entered above.

You must use leading zeros for the time and date where necessary, e.g. 09:45 and 04/07/98. The unit is shipped from the factory with date and time set to GMT (UCT).

- **SUMMER TIME ADJUST** - Set this to OFF if you do not want the unit to automatically correct for daylight saving time. Select UK / EUR / USA for the unit to automatically adjust for daylight saving time in the UK, Central Europe or USA.

  UK - At 1:00 am on the last Sunday in March the clock is put forward 1 hour (summer time) At 2:00 am on the last Sunday in October the clock is put back 1 hour

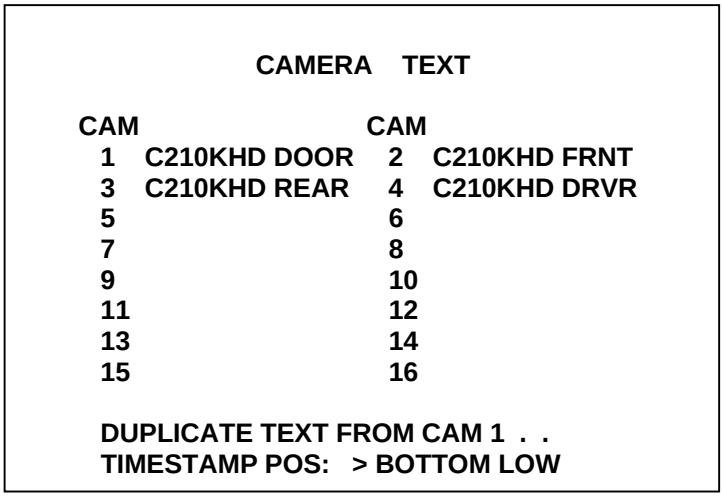
  EUR - At 2:00 am on the last Sunday in March the clock is put forward 1 hour (summer time) At 3:00 am on the last Sunday in October the clock is put back 1 hour

  USA - At 2:00 am on the first Sunday in April the clock is put forward 1 hour (summer time) At 3:00 am on the last Sunday in October the clock is put back 1 hour

Summer Time Adjust is automatically applied even if the unit is switched off during the time at which the clocks go forwards or backwards. In the latter case correction is applied on power-up. A message is displayed indicating to the user that the time has been modified.

The Current time period is shown as either **SUMMER** or **WINTER** at the bottom of the menu screen.

Camera Text Menu



Allows the user to create an optional text label of up to 12 characters per camera.

Use the up and down 'MENU' arrow keys to move to the previous or next camera. Use the numbered keys on the X201 reviewer to cycle through the available characters for that key and the left & right 'MENU' arrow keys to move the highlighted cursor to the previous or next character respectively.

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	(space)
2	D E F 2	(space)
3	G H I 3	(space)
4	J K L 4	(space)
5	M N O 5	(space)
6	P Q R 6	(space)
7	S T U 7	(space)
8	V W X 8	(space)
9	Y Z 9	(space)
0	0	(space)

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 the SPACE character. The sequence repeats.
The camera text will appear above the time stamp on each image. Like the time stamp it is embedded into each image and cannot be removed from the image.

- **DUPLICATE TEXT FROM CAM 1 –** Copies the current text from camera 1 to all other cameras. Move the arrow cursor next to this option and press either the left or right menu buttons to copy the text. This avoids repeat typing of vehicle registration numbers or other common text.

- **TIMESTAMP POS: -** The position of the timestamp can be moved to either bottom low/bottom-mid/bottom-high which are 3 positions below the main image or top-low/top-mid/top-high which are 3 positions above the main image. Select **NO TIMESTAMP** if you do not wish to see a timestamp on the recorded images.

A typical time stamp is shown below with camera text:

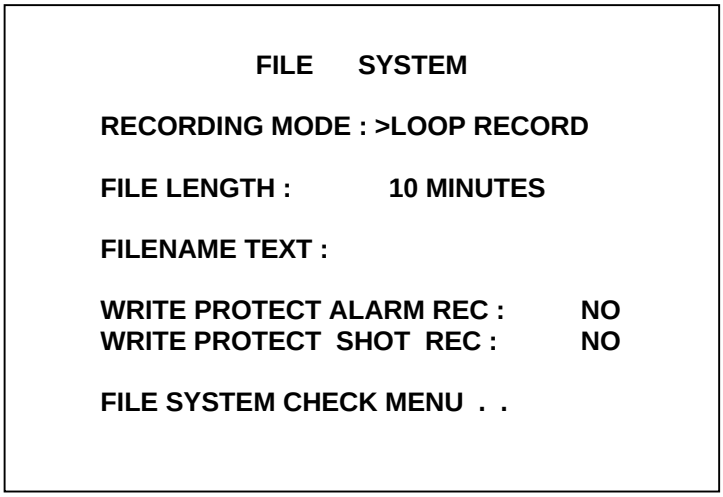
Camera Text

JKN456Y DOOR

C1	**12:00:00**	**27/07/01**
Camera Number	Time	Date

The camera number indicates which camera grabbed the image, and the time and date indicate when the image was grabbed.

File System Menu



The file system menu controls how files are laid onto the disk.

- **RECORDING MODE-** Sets either **LOOP RECORD** (oldest files will be overwritten first when Hard Disk Cartridge is full) or **SINGLE PASS** recording (recording will stop when Hard Disk Cartridge is full).

- **FILE LENGTH – 10 MINUTES / 1 HOUR**
  This controls how often new files are created, set the file length as appropriate. The 1 hour setting is useful if you are recording over a long period of time and it is desirable to have a smaller number of files to manage or archive. The 10 minute setting gives more files but each is of a small size and this may help in searching for specific short duration events.

- **FILENAME TEXT –** Enter up to 12 characters of text that will appear at the start of all files. For mobile applications a vehicle registration number could be used. The X200 serial number could also be used.

  This improves the audit trail. Please note that the filename and serial number are buried into each file for audit trail purposes and can be verified.

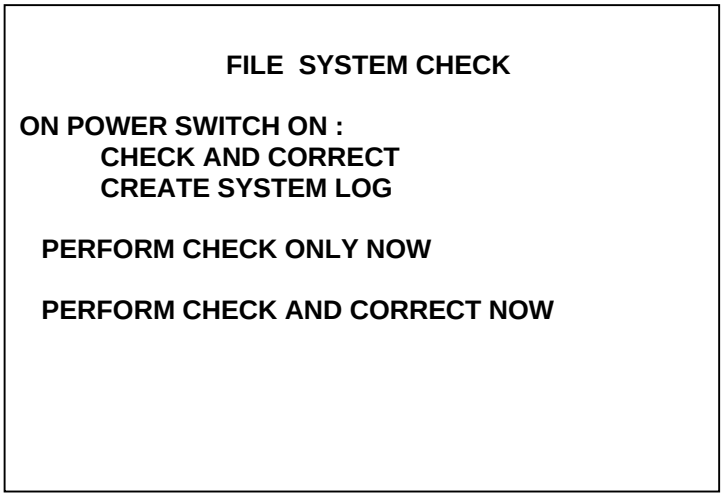
- **WRITE PROTECT ALARM REC –** Select whether alarm recording files are write protected. If alarm recording files are write protected they will not be deleted on loop recording (LOOP RECORD setting).

  To remove write-protection either use the files menu and the left menu button (toggle 'W' status) or delete all recordings via the reset menu.

- **WRITE PROTECT SHOT REC –** Select whether shot recordings are write protected. This is the same as per the **WRITE PROTECT ALARM REC** function but only affects shot recording files.

- **FILE SYSTEM CHECK MENU –** Accesses the file system check menu.

File System Check



This menu sets the default file checking and correcting action on switch on and can be used to check and/or correct files manually at any time.

- **ON POWER SWITCH ON**

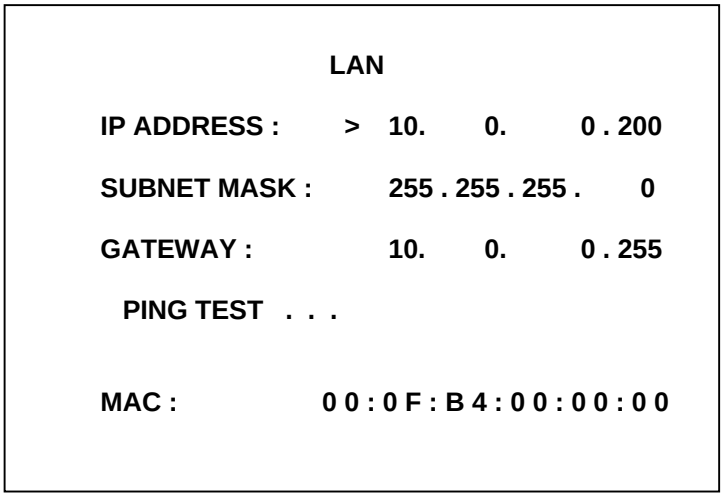
  NO CHECK / CHECK ONLY / CHECK AND CORRECT – Gives the option to check the file system at power on and optionally correct any errors. This is the recommended option as the X200 will check and correct both the file system and FAT of the Hard Disk Cartridge on start-up.

  CREATE SYSTEM LOG / DO NOT CREATE SYSTEM LOG – Determines whether a system log file is created and copied to the Hard Disk Cartridge when the X200 is powered-up. This file can be used by Timespace Technology as a diagnostic file to check system performance. It is highly recommended that the default option of CREATE SYSTEM LOG is used.

- **PERFORM CHECK ONLY NOW –** Pressing the right menu button will perform a file system check.

- **PERFORM CHECK AND CORRECT NOW –** Pressing the right menu button will perform a file system check and fix any errors that are found.

LAN Menu



- **IP Address –** For devices communicating on a network, messages must identify the source and destination with an address. The IP (internet protocol) address is a 32-bit number that uniquely identifies a device connected to the network and is usually represented in a dotted decimal form.

  e.g. `10.0.0.28`

  Use the right and left menu arrow keys to move across the input fields and the number keys to input the address.

- **Subnet Mask –** The subnet mask is used to determine what subnet an IP address belongs to. An IP address has two components, the network address and the host address. Subnetting enables a network administrator to further divide the host part of the address into two or more subnets. In this case, a part of the host address is reserved to identify the particular subnet.

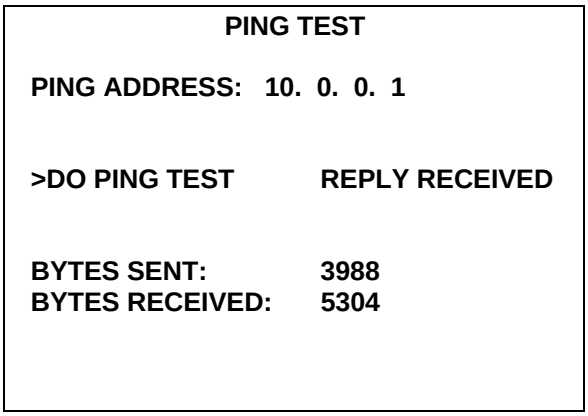
  The subnet mask is the network address plus the bits reserved for identifying the sub network. (By convention, the bits for the network address are all set to 1.) As a mask, it can be used to identify the subnet to which an IP address belongs by performing a bitwise AND operation the mask and the IP address. The result is the sub network address.

  Use the right and left menu arrow keys to move across the input fields and the number keys to input the address.

- **Gateway –** This is the address of the 'gateway' in a network that a computer will use to access another network if a gateway is not specified for use. In a network using subnets, it is the address of the router that forwards data traffic to a destination outside of the subnet of the transmitting device.

  Use the right and left menu arrow keys to move across the input fields and the number keys to input the address.

- **Ping Test ... –** Selecting this option by pressing the right menu button will bring up the 'ping test' menu which is shown below.



  Enter the destination IP address of the unit you want to test communication with on the ping address line by using the left and right menu buttons to move across the fields and the number keys and then select DO PING TEST .... If the destination receives the ping message and replies within 10 seconds then REPLY RECEIVED is displayed; otherwise 'NO REPLY' is displayed.

  The BYTES SENT and BYTES RECEIVED fields update in real-time to show how many bytes are being transferred to and from the X200 and can provide further indication of data transfer.

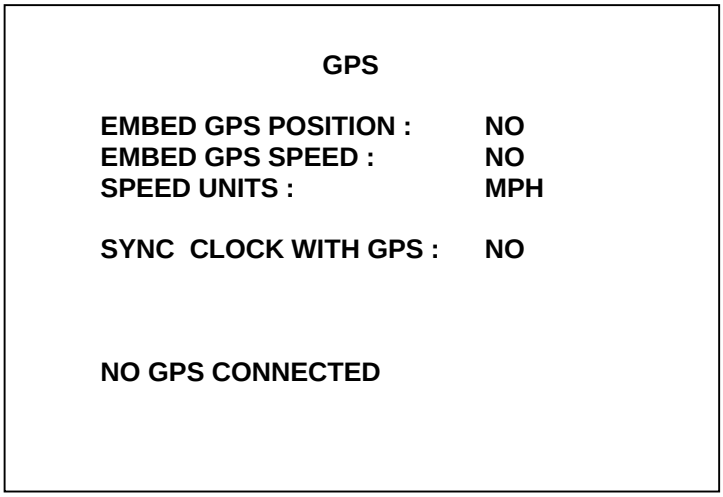
- **MAC –** All network devices include a unique media access control (MAC) address used to identify it on a network. The address is a 48 bit number, usually represented as 6 bytes – each byte written in hexadecimal notation.

  All Timespace Technology devices have a MAC address which begins 00 0F B4 followed by another three bytes.

  e.g. `00 0F B4 00 0A 48`

  The X200 LAN menu option allows the user to display its MAC address which may be useful in configuring access control with wireless networks.

GPS Menu



- **Embed GPS Position –** Selecting YES will cause the position information to be embedded in the recorded image.
- **Embed GPS Speed –** Selecting YES will cause the speed information to be embedded in the recorded image.
- **Speed Units –** Select either KPH for kilometres per hour or MPH for miles per hour.
- **Sync Clock with GPS –** The X200 Digital Recorder includes a clock which is used to timestamp recording files and overlay the date and time on recorded images. Although accurate, the system can be configured to synchronize the clock with the date and time information received from the GPS receiver.

  Synchronization only occurs when the X200 is powered up and before it starts recording. At this time the built-in clock may be corrected by a maximum of 20 seconds if a previous discrepancy has been detected between the internal time and the GPS receiver time.

  Selecting YES will synchronize the X200 clock on power up. The time received from the GPS receiver is always UTC (Coordinated Universal Time) which is the same as GMT (Greenwich Mean Time).

The current status of the attached GPS device (mouse) is show at the bottom of the screen which indicates whether it is connected and able to lock to the GPS satellites.

Statistics Menu

STATISTICS

OPERATING SYSTEM: 1.0

HARD DISK :

20.0	**SIZE IN GIGABYTES**
50%	**USED**
20%	**WRITE PROTECTED**
31	**FILES**
01 / 01 / 04	**START DATE**
31 / 01 / 04	**END DATE**
31.0	**DAYS RECORDING**

The statistics page gives the operating system version number, disk size, percentage used and percentage write protected. Recording statistics are updated every minute and are intended to be used for monitoring a camera system and to provide an indication of the capacity of the X200 in different recording environments.

The total number of files along with the start date, end date and total amount of days recording are shown.

Advanced Menu

```
                ADVANCED
> USE RECORD STATE AT POWER OFF
  ENABLE X200 RECORD BUTTON:  YES

  LOAD SYSTEM UPGRADE  . .
  SAVE SYSTEM UPGRADE  . .

  RECORDING MODE FOR :
    NORM / TIMER:       >COND. REFRESH
    ALARM / SHOT:        FULL UPDATE
  VIDEO STANDARD:       PAL
  MODEM LOOPBACK TEST
  H/W VER: 16AE         SERIAL NUMBER: 42
```

The advanced menu provides control over more sophisticated X200 functions.

- **USE RECORD STATE AT POWER OFF /**
  DO NOT RECORD AT POWER UP /
  RECORD AT POWER UP

  The default setting USE RECORD STATE AT POWER OFF means that if the unit was recording when it was switched off it will record when it is switched back on. Also if the unit wasn't recording when it was switched off it won't be recording when it is switched on. This setting is generally convenient for covert use where recording is switched on and off by pressing the record button and the unit continues the way it left off.

  The DO NOT RECORD AT POWER UP setting is useful if manual adjustments need to be made to the menu settings every time the unit is switched on prior to recording. Note that the unit will not do normal recording after a loss of power e.g. in a power cut so this setting should be used with caution.

  The RECORD AT POWER UP setting should be used if the unit is always to do normal recording on power up. This is important in vehicle applications where the user may have inadvertently switched the unit off in a non-recording state (e.g. he has just been playing back some footage and he switched off recording to make this easier). With this setting however the unit is left at switch off, it will record the next time it is powered up.

- **ENABLE X200 RECORD BUTTON –** If set to **YES** the 'Record' button on the front of the X200 will switch Normal Recording on and off. If set to **NO** this button is disabled.

- **LOAD SYSTEM UPGRADE –** This loads a new version of the X200 operating system from the Hard Disk Cartridge. Do the following.

  Delete all recordings on the Hard Disk Cartridge using the reset menu.
  Using the USB interface kit copy the new .xos file from the PC to the Hard Disk Cartridge.
  Right click the .xos file on the Hard Disk Cartridge and select properties.
  Left click to tick the 'Read-only' box at the bottom of the properties window and click OK.
  Insert the Hard Disk Cartridge into the X200 and stop it recording if it is currently doing so.
  Run LOAD SYSTEM UPGRADE by pressing the right menu button.

  Check the software version in the statistics menu to verify the new version has been loaded.

- **SAVE SYSTEM UPGRADE –** This saves the X200 operating system and current menu settings to the Hard Disk Cartridge as a .xos file.

  The Cartridge can then be used as a master to set up another X200 with the same software version and menu settings. Use LOAD SYSTEM UPGRADE on the other X200 with the master Cartridge inserted.

- **RECORDING MODE FOR:**

  NORM / TIMER :
  ALARM / SHOT :

  COND. REFRESH / FULL UPDATE – The recording mode is selectable for normal and timer recording and also for alarm and shot recording.

  Specify **FULL UPDATE** to record full image information or **CONDITIONAL REFRESH** to record only the parts of the image that have changed.

  In most cases conditional refresh will be the preferred option as the file size on disk is reduced from that required for full update.

- **VIDEO STANDARD**

  PAL / NTSC – After moving the cursor down the Video Standard line, the user can use the cursor keys to select between PAL and NTSC. Once the appropriate selection has been made the unit must be power-cycled before it comes into effect. During the power up sequence, the X200 will briefly display the software version installed along with the configured video standard.

  Please refer to the PAL / NTSC Switching section of this manual for further information about using the X200 in PAL and NTSC configurations.

- **MODEM LOOPBACK TEST**

  The modem loop back test checks that the internal X200 hardware is functioning correctly so that it can be successfully used with an external modem. A special female 9-way D socket is required with pins 2 & 3 connected together and pins 1, 7 & 8 connected together. This is connected to the male RS232 socket on the rear panel of the X200 before conducting the modem loop back test. The RS232 connector is detailed in the Connector Specifications section of the X200 manual.

  To start the test press the right menu button. If **PASS** is shown on the menu screen next to the **MODEM LOOPBACK TEST** then the internal hardware is functioning correctly.

The hardware version (H/W VER) and serial number of the X200 are also shown at the bottom of the menu screen for reference.

Remote Settings Menu

```
                REMOTE SETTINGS

  >  SMS OPTIONS

     LAST SMS SENT        :      UNKNOWN
     MODEM NOT AVAILABLE
     CALLS  RECV          000
     SMS RECV             000
     SMS SENT             000
     SMS ERRORS           000


     RESET MODEM
     SEND SMS NOW
```

The remote settings menu provides information about a connected GSM modem as well as operational statistics and SMS options.

- **SMS OPTIONS**

  Enters the SMS OPTIONS sub-menu.

- **LAST SMS SENT**

  The date of the last SMS sent from the X200.

- **MODEM IN AUTOANSWER MODE / MODEM NOT AVAILABLE**

  Shows whether a GSM Modem is attached and setup correctly in auto answer mode.

- **CALLS RECV**

  The number of calls received by the GSM Modem attached to the X200.

- **SMS RECV**

  The number of SMS text messages received by the X200.

- **SMS SENT**

  The number of SMS text messages sent by the X200.

- **SMS ERRORS**

  The number of failures to send an SMS text message at the user defined intervals.

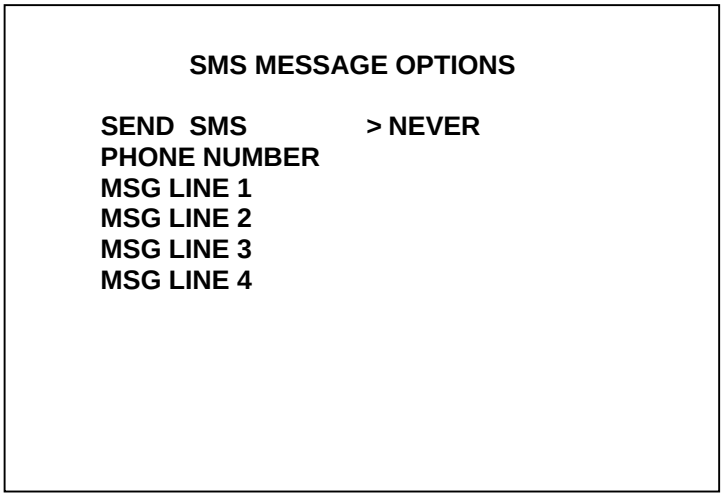
- **RESET MODEM**

  Resends the setup commands to reset a connected GSM Modem.

- **SEND SMS NOW**

  Tests the GSM/SMS connection by sending a user defined message to the phone number selected in the SMS OPTIONS menu.

SMS Options Menu



The SMS options menu allows the user to specify the phone number for the SMS text message to be sent to, the contents of the SMS text message and how frequently it will be sent.

- **SEND SMS**

  NEVER / MONTHLY / WEEKLY / DAILY / POWER UP – Determines how often the X200 will send the user defined SMS text message. It is possible to select once per month, week, day or every time the X200 is power-cycled.

- **PHONE NUMBER**

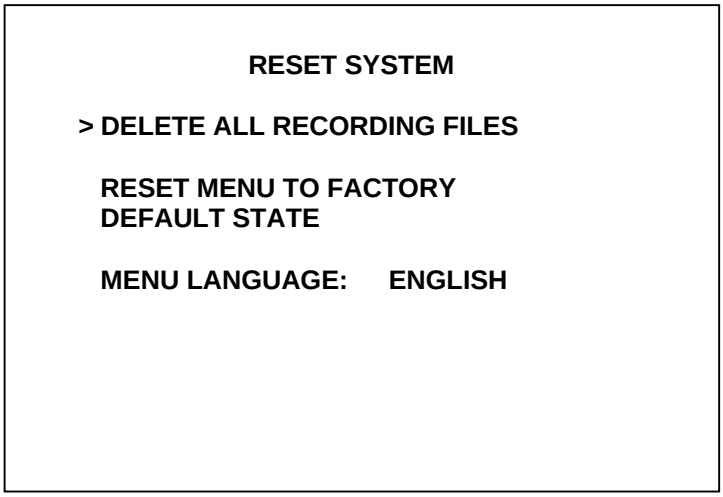
  The number keys on the Reviewer are used to enter the phone number to which the SMS text message will be sent. Do not leave any spaces in the phone number.

- **MSG LINE 1 / 2 / 3 / 4**

  The text to be sent is entered using the number keys 1-9 on the Reviewer; up to four lines of text can be entered. Use the left and right menu buttons to move to the previous or next character on each line respectively. Use the up and down menu buttons to move to the previous or next line of text respectively.

Key	Number/Characters	
1	A B C 1	(space)
2	D E F 2	(space)
3	G H I 3	(space)
4	J K L 4	(space)
5	M N O 5	(space)
6	P Q R 6	(space)
7	S T U 7	(space)
8	V W X 8	(space)
9	Y Z 9	(space)
0	0	(space)

Reset System Menu

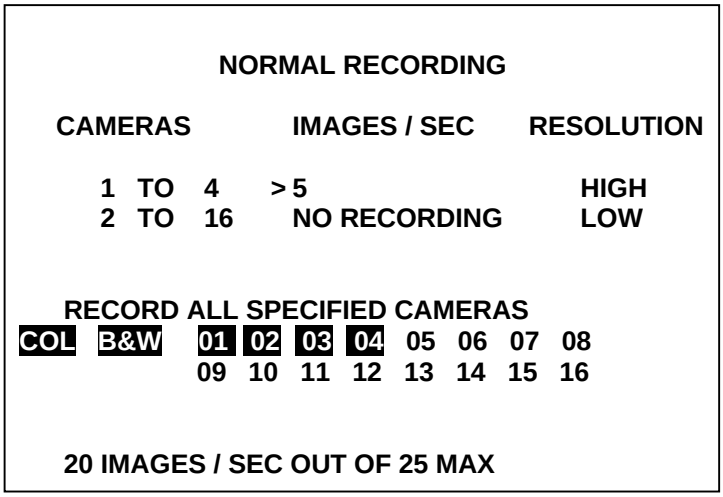


- **DELETE ALL RECORDING FILES –** Removes all recordings from the hard disk including write-protected files. Only do this if you want to completely remove all recordings from the hard drive as there is no undo option. Press the right menu button to go to a warning screen, pressing the right menu button again will carry out this action whilst pressing the MENU EXIT button will abort this procedure.

- **RESET MENU TO FACTORY DEFAULT STATE –** Pressing the right or left menu button will immediately reset the entire X200 menu system to its default settings. Please note that there is no undo option.

- **MENU LANGUAGE –** Sets the language that the menu is displayed in.

Normal Recording Menu



This menu sets the images per second and image resolution recorded by each camera during normal recording.

- **CAMERAS –** Use the up and down menu buttons to move between items in the menu. Pressing the right and left menu buttons next to a camera group will increase or decrease the number of cameras in that group respectively.

  Please note that this applies to the X200-16. The X200-04 lists each of the 4 cameras separately.

- **IMAGES / SEC**

  NO RECORDING / 0.1 / 0.2 / 0.3 / 0.4 / 0.5 / 0.6 / 0.7 / 0.8 / 0.9 / 1.0 / 1.2 / 1.5 / 2.0 / 2.5 / 3.0 / 4.0 / 5.0 / 6.0 / 7.0 / 8.0 / 9.0 / 10 / 12 / 15 / 20 / 25 / MAX RATE- This sets the number of images per second to be recorded by a camera during normal recording up to a total of 25 images per second for all cameras added together. If **MAX RATE** is selected then the X200 will automatically adjust the images per second for each of the specified cameras so that the total is equal to 25 images per second.

- **RESOLUTION – This can be set to:**

  LOW – This sets the highest level of compression. Although file sizes will be comparatively small, visible blocking artefacts may be seen.
  MEDIUM – This sets the medium compression level, images with little loss of quality which will be adequate for most applications.
  HIGH – This sets a medium-low level of compression with gains in image quality over medium resolution but with larger file sizes.
  V.HIGH – This sets the lowest level of compression with the best image quality but the largest file sizes.

- **RECORD ALL SPECIFIED CAMERAS**
  ONLY RECORD CONNECTED CAMERAS

  This sets whether the X200 will record on all cameras specified in the recording parameters shown at the top of the menu screen or whether the X200 will only record on connected cameras shown as highlighted on the connected camera list 01 – 16 at the bottom of the menu screen (01 – 04 on the X200-04).

- **COL B&W 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16**

  The connected camera list highlights all connected cameras in either red or white to indicate that either a colour (red highlight) or black and white (white highlight) camera is connected to the corresponding input number.

- **X IMAGES / SEC OUT OF 25 MAX –** This displays how many images per second will be recorded during normal recording out of the X200 25 images per second maximum limit. Although less than 25 images per second can be recorded, the X200 is not able to record more than 25 images per second.

  If the maximum of 25 images per second is exceeded by the sum of all the cameras then the **X IMAGES / SEC OUT OF 25 MAX** text will change to red as a warning. If this is not corrected then the X200 will still record but it will automatically adjust the images per second for each camera so that the total does not exceed 25.

  In the example menu screen shown above cameras 1 – 4 have been set to 5 images per second. This gives a total sum of 20 images per second out of the available 25.

Timer Recording Menu

```
                TIMER RECORDING

CAMERAS          IMAGES / SEC        RESOLUTION

   1  TO   4      > 5                    HIGH
   2  TO   16     NO RECORDING           LOW


SET TIMER START / STOP TIMES   . . .
WHEN TIMER STOPS :    STOP REC.

20 IMAGES / SEC OUT OF 25 MAX
```

This menu sets the images per second and image resolution recorded by each camera during timer recording. Preference for times of recording and dates to be excluded can also be set in the 'timer recording times' sub-menu accessible from this menu.

Use the up and down menu buttons to move between images per second and resolution for each camera and the left and right menu buttons to scroll between the options. Pressing the right menu button next to SET TIMER START / STOP TIMES accesses the timer recording times sub-menu.

- **CAMERAS –** Use the up and down menu buttons to move between items in the menu. Pressing the right and left menu buttons next to a camera group will increase or decrease the number of cameras in that group respectively.

  Please note that this applies to the X200-16. The X200-04 lists each of the 4 cameras separately.

- **IMAGES / SEC –** These settings are the same as described in the normal recording menu, except they apply only during timer recording.

- **RESOLUTION –** These settings are the same as described in the normal recording menu, except they apply only during timer recording.

- **SET TIMER START / STOP TIMES -** Pressing the right menu button nest accesses the timer recording times sub-menu described on the next page.

- **WHEN TIMER STOPS** – Pressing the left or right menu buttons chooses between **STOP REC.** and **NORMAL REC.** This option decides whether the X200 will stop recording when the defined timer recording period has ended (STOP REC.) or whether it will continue recording in normal recording mode (NORMAL REC.).

- **X IMAGES / SEC OUT OF 25 MAX** – This displays how many images per second will be recorded during timer recording out of the X200 25 images per second maximum limit. This display is the same as found in the normal recording menu, except it applies only during timer recording.

Timer Recording Times Menu

```
                TIMER RECORDING TIMES

> IGNORE DAILY TIMES
   MON    08:15   TO      17:00   COPY
   TUE    08:15   TO      17:00   DOWN
   WED    08:15   TO      17:00
   THU    08:15   TO      17:00
   FRI    08:15   TO      17:00
   SAT    00:00   TO      00:00
   SUN    00:00   TO      00:00

   IGNORE PERIOD TIMES
   FROM :00:00            00 / 00 / 00
   TO :   00:00           00 / 00 / 00
```

The timer recording times menu sets the times that will be included or excluded for timer recording. A period of exemption/inclusion can also be set by date. This menu is a sub-menu of the timer recording menu and is accessed by pressing the right menu button next to the SET TIMER START / STOP TIMES option in the timer recording menu.

- **IGNORE DAILY TIMES**
  RECORD BETWEEN DAILY TIMES
  RECORD OUTSIDE DAILY TIMES

  Use the right and left menu buttons to scroll between the available options. The default setting IGNORE DAILY TIMES disables timer recording, the setting RECORD BETWEEN DAILY TIMES will mean that timer recording will automatically take place between the start (left hand time column) and end times (right hand time column). The setting RECORD OUTSIDE DAILY TIMES does exactly the opposite with timer recording automatically taking place outside of the specified times.

Setting the daily times and using the COPY DOWN function.

Use the up and down menu buttons to move the arrow cursor up and down the list of start and end times for each day. When the cursor is next to a particular start / end time use the numbered keys on the X201 reviewer to enter a time in 24hr clock format. Please note that 4 digits must always be entered so single digit hour times such as 8am must be entered as 08:00 as per the normal 24hr clock. To exclude any particular day from timer recording simply type in 00:00 for both times as per SAT and SUN in the example above.

The **COPY DOWN** function allows the current times set for MON to be copied to all other days on the list. This avoids unnecessary repetition when entering timing periods where daily recording times are the same. Once the times for MON have been copied to all other days they may be individually changed as per normal. For instance in the above example the times for MON - 08:15 TO 17:00 – were copied to all other days using the COPY DOWN function and then SAT and SUN were individually set to 00:00 to exclude them from timer recording.

- **IGNORE PERIOD TIMES**
  RECORD INSIDE PERIOD
  RECORD OUTSIDE PERIOD

  This enables the user to set a period of time, by time and date which is to be excluded/included from the daily timer recording parameters. Use the menu up and down buttons to move between the times and dates and enter the time or date using the number keys. The time is in 24hr clock format and the date is in the format DD/MM/YY.

Examples of Timer Recording

The daily times and period times are able to work together or independently to record as and when required. For example -

Recording Monday to Friday from 9am to 5pm.

Select RECORD BETWEEN DAILY TIMES and set the daily times on Monday to Friday from 09:00 TO 17:00 and Saturday and Sunday to 00:00 TO 00:00. Select IGNORE PERIOD TIMES to disable the calendar period function.

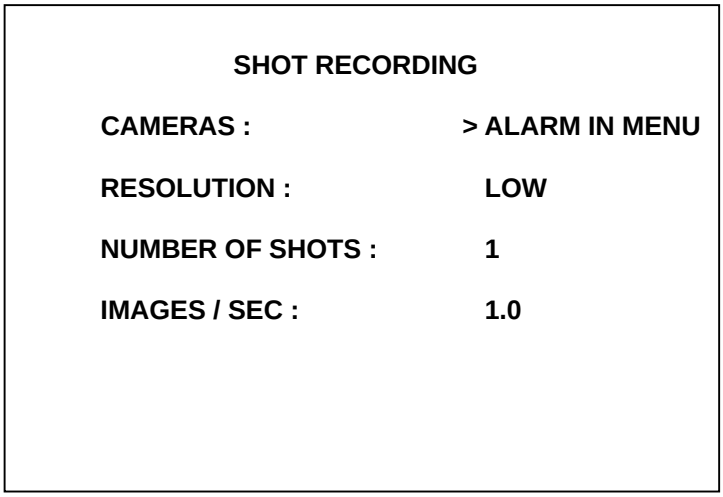
Recording Monday to Friday from 9am to 5pm but not in the month of June in 2004.

Select RECORD BETWEEN DAILY TIMES and set the daily times on Monday to Friday from 09:00 TO 17:00 and Saturday and Sunday to 00:00 TO 00:00. Select RECORD OUTSIDE PERIOD in the calendar period function and set the FROM and TO as 00:00 01/06/04 and 00:00 30/06/04 respectively. This will prevent recoding from midnight on the first of June to midnight on the 30th of June 2004.

Recording continuously for 3 weeks starting at 7am on the 21st of August 2004.

Select IGNORE DAILY TIMES to disable the daily recording times (this is necessary as recording is to take place for 24hours a day during the calendar period). Select RECORD INSIDE PERIOD and set the FROM and TO as 07:00 21/08/04 and 07:00 11/09/04 respectively.

Shot Recording Menu



Shot recording allows a defined number of shots (images) to be recorded from an alarm input trigger.

- **CAMERAS** – This takes the user to the alarm inputs menu in which they can which alarm inputs will be used as a trigger for shot recording and from which cameras to record images. Please see the section on the alarm inputs menu for a detailed description of the available settings.

- **RESOLUTION -** These settings are the same as described in the normal recording menu, except they apply only during shot recording.

- **NUMBER OF SHOTS**

  1 / 2 / 3 / 4 / 5 / 8 / 10 / 15 / 20 / 25 / 30 / 50 / 100 / 150 / 250 / 500 – This sets the number of shots to be taken from each camera during shot recording. Use the left and right menu buttons to scroll from between 1 to 500 shots.

- **IMAGES / SEC** – These settings are the same as described in the normal recording menu, except they apply only during shot recording.

Audio Recording Menu

```
AUDIO RECORDING

AUDIO RECORDING :          > OFF

INPUT 1 WITH  :              ALL CAMERAS
INPUT 2 WITH  :              CAMERA 1

SAMPLING RATE :              16 kHz
SAMPLING RESOLUTION :        16 BITS
RECORD INPUT RANGE :         1.00 Vrms
INPUT 1 LEVEL :         NOT RECORDING
INPUT 2 LEVEL :         NOT RECORDING

PLAYBACK VOLUME :            HIGH
```

- **INPUT 1 WITH**
  INPUT 2 WITH

  ALL CAMERAS / CAMERA 1 / CAMERA 2 / CAMERA 3 / CAMERA 4 / CAMERA 5 / CAMERA 6 / CAMERA 7 / CAMERA 8 / CAMERA 9 / CAMERA 10 / CAMERA 11 / CAMERA 12 / CAMERA 13 / CAMERA 14 / CAMERA 15 / CAMERA 16 – Associates audio inputs 1 and 2 with a specific single camera or with all cameras. The X201 reviewer will play back the audio recorded for this input with the camera specified.

  Please note that this applies to the X200-16. The X200-04 will only have cameras 1-4 listed.

- **SAMPLING RATE** – The X200 records audio at a sampling rate of 16 kHz.

- **SAMPLING RESOLUTION –** The X200 records audio at a sampling resolution of 16 bits.

- **RECORD INPUT RANGE**

  0.12 Vrms / 0.25 Vrms / 0.50 Vrms / 1.00 Vrms / 2.00 Vrms – This defines the maximum signal that can be accommodated before clipping occurs. If distortion due to clipping is experienced, increase the audio input range.

  For good noise performance reduce the audio input range until clipping is experienced and then increase the range by one increment.

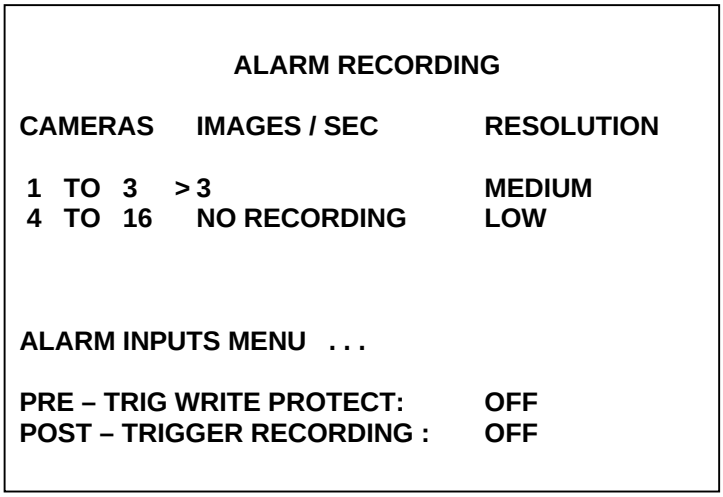
- **INPUT 1 LEVEL**
- **INPUT 2 LEVEL**

  This gives an indication of current audio input level for each channel whilst recording and will be of use when setting the record input range. The level is given in both dB and as a percentage of the maximum input level before clipping. **NOT RECORDING** will be shown if the X200 is not currently recording.

- **PLAYBACK VOLUME**

  LOW / MEDIUM / HIGH / FULL / MUTE – Select the volume level for audio play back via the X201 Reviewer and the line-level output on the rear of the X200.

Alarm Recording Menu



Camera groups for alarm recording can be created, the number of images per second and resolution of recording can be set for each group.

- **CAMERAS –** Use the up and down menu buttons to move between items in the menu. Pressing the right and left menu buttons next to a camera group will increase or decrease the number of cameras in that group respectively.

  Please note that this applies to the X200-16. The X200-04 lists each of the 4 cameras separately.

- **IMAGES / SEC –** These settings are the same as described in the normal recording menu, except they apply only during timer recording.

- **RESOLUTION –** These settings are the same as described in the normal recording menu, except they apply only during timer recording.

- **ALARM INPUTS MENU –** Pressing the right menu button enters the Alarm Inputs sub-menu.

- **PRE – TRIG WRITE PROTECT**

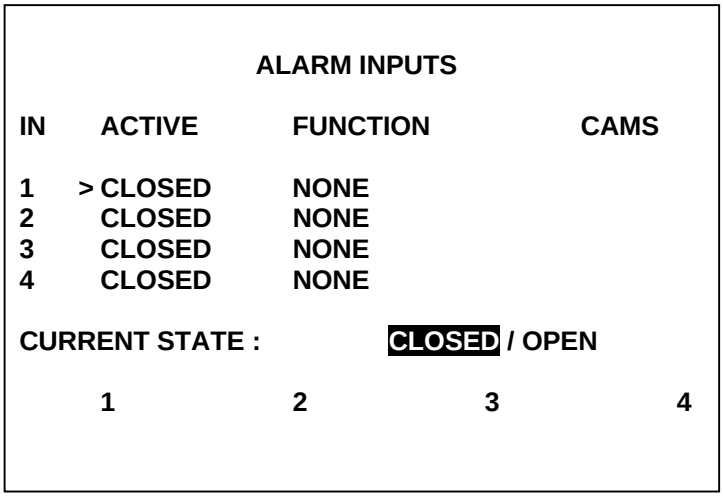
  OFF / 1 MIN / 2 MINS / 5 MINS / 10 MINS / 20 MINS / 30 MINS / 1 HOUR / 2 HOURS – All files recorded in the specified period before the alarm event are write protected (so they will not be overwritten during loop recording).

- **POST – TRIGGER RECORDING**

  OFF / 5 SECS / 10 SECS / 20 SECS / 30 SECS / 45 SECS / 1 MIN / 5 MINS / 10 MINS / 20 MINS / 30 MINS / 45 MINS / 1 HOUR / 2 HOURS – Alarm recording can take place only for the duration of an alarm event (OFF) or can continue for a specified period of time after the event has ceased.

  Therefore if an alarm input is only likely to be a momentary event but the ten minutes after that event are also important select 10 MINS for post trigger recording.

Alarm Inputs Menu



The Alarm Inputs menu defines what the X200 will do when the 4 alarm inputs are either in a closed or open state. Closed is defined as a connection to the '-' terminal of the X200 input/output connector, whilst open indicates that no contact is being made.

The 4 inputs are listed in order as shown in the screen shot above, for each of the 4 inputs the following options are available.

- **ACTIVE –** Use the left and right menu buttons to toggle between CLOSED and OPEN. This sets the state which triggers an alarm event and will cause the defined action to take place.

- **FUNCTION –** This defines the action of the X200 when the selected alarm input is active.

  NONE – No action.

  NORM REC – Switches normal recording on and off instead of the X201 record button.

  ALARM REC – Sets the X200 to do alarm recording with the settings for images per second and resolution as defined in the Alarm Recording Menu. The cameras to be recorded can be set in the right hand **CAMS** column by pressing the right and left menu buttons to raise or lower the current number respectively.

  In this way an alarm input can trigger recording on a single or a group or cameras. Multiple alarm input triggers will cause camera ranges to be combined.

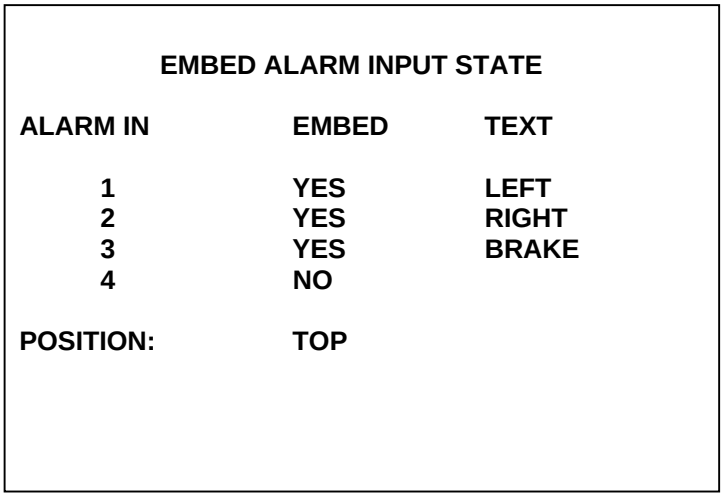
  SHOT REC – Sets the X200 to do shot recording with the settings defined in the Shot Recording Menu. As per ALARM REC a single or group of cameras can be specified.

  SWITCHER – Sets the X200 video switcher to view the selected camera for the duration of an alarm event (plus post trigger time if selected). Change the desired camera to be viewed during an alarm event using the right and left menu buttons to change the camera number in the **CAMS** column.

  TIMER REC – Sets the X200 to timer recording as per the settings in the Timer Recording Menu.

- **CURRENT STATE –** Shows the current OPEN / CLOSED state of each of the 4 alarm inputs. The corresponding number for each alarm input will be highlighted for **CLOSED** and not highlighted for **OPEN**.

Embed Alarm State Menu



The Embed Alarm State menu allows embedded text to be shown as part of recorded images whilst the corresponding alarm input is active.

The alarm inputs active state (closed or open) is set from the Alarm Inputs menu. When active the user defined text is shown in the images at the position designated (top or bottom). The text will be embedded on all camera views simultaneously and will appear on all selected cameras during playback in PCLink200.

The 4 alarm inputs are listed in order as shown in the screen shot above, for each of the 4 inputs the following options are available.

- **EMBED –** Determines whether the text is embedded in the recorded images when the corresponding alarm input is active.
- **TEXT –** Up to 8 characters can be entered in this field to be embedded in the recorded images when the corresponding alarm input is active. The text is entered using the numbered keys on the X201 Reviewer as per the Camera Text menu.
- **POSITION** - TOP embeds the text across the top edge of the recorded images and BOTTOM embeds the text at the bottom of the recorded images above the timestamp and GPS information if these options are active.

Alarm Output / LEDs Menu

```
                ALARM OUTPUT / LEDs

LED1 OUTPUT :                  > RECORD
LED2 OUTPUT :                    OFF

ALARM OUTPUT :                 > OPEN
      WHEN  . . .
FRONT LEDS :                     NO
CAMERA DISCONNECTED :            NO
HARD DISK WRITE PROTECT :        NO
HARD DISK FULL :                 NO
ALARM OCCURRED :                 NO
```

This menu sets the conditions for the external LED outputs and alarm output.

- **LED1 OUTPUT**
- **LED2 OUTPUT**

  OFF / FAIL / SERVICE / RECORD / ON – LED output 1 can be set to be permanently off or on or to duplicate the state or the fail, service or record LED's on the front panel of the X200.

- **ALARM OUTPUT**

  FRONT LEDS – Can be set to **NO / SERVICE / RECORD** to make the alarm output active if either the service or record LED's are lit on the X200 front panel.

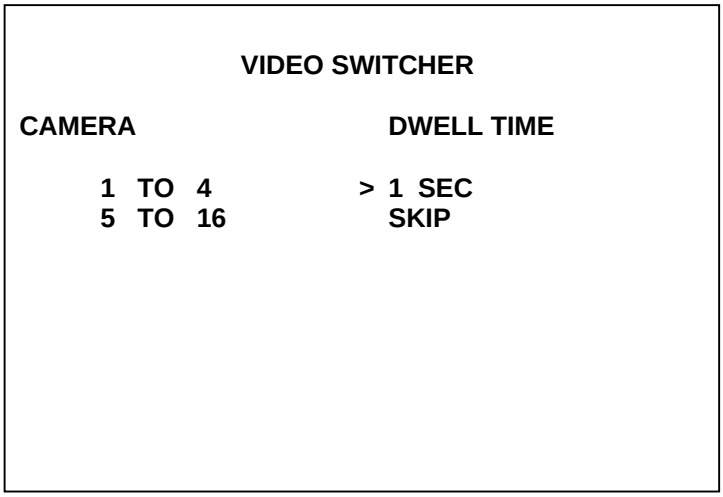
  CAMERA DISCONNECTED – When set to **YES** the alarm output is activated when a camera is disconnected from the X200 whilst recording on that camera. The alarm output will become inactive 5 seconds after the camera is reconnected.

  HARD DISK WRITE PROTECT – If all the disk is write protected then recording will stop. To give the user warning the alarm output can be used to signal when the disk is either **25% / 50% / 60% / 70% / 80% / 90% / 100%** write protected.

  HARD DISK FULL – If all of the disk is full and single pass recording has been enabled then recording will stop. To give the user warning the alarm output can be used to signal when the disk is either **25% / 50% / 60% / 70% / 80% / 90% / 100%** full.

  ALARM OCCURRED – When set to **YES** the alarm output is activated when an alarm event has occurred. A battery and sounder may be connected to the alarm output terminals so that the user is audibly informed of any new alarm event. The alarm condition is cleared when the triggering condition has cleared.

Video Switcher Menu



The video switcher menu controls the automatic switching of cameras on the switcher output at the back of the X200 (X200-16 only) and also on the main video output when the unit is in AUTO mode (selected by pressing the AUTO key on the X201 Reviewer). On the X201 the number key LED is illuminated for the camera shown (1-8 number keys for cameras 1-8 with the addition of the 9-16 LED lit for cameras 9 – 16) and the live picture is viewable on the monitor.

- **CAMERAS –** Use the up and down menu buttons to move between items in the menu. Pressing the right and left menu buttons next to a camera group will increase or decrease the number of cameras in that group respectively.

  Please note that this applies to the X200-16. The X200-04 lists each of the 4 cameras separately.

- **DWELL TIME –** The dwell time can be set from 1 – 30 seconds by using the right and left menu buttons to scroll through the options. Dwell time is how long the switcher will stay on a camera before moving to the next camera. If a camera or group of cameras does not need to be included in the switcher set this option to **SKIP.**

HARD DISK CARTRIDGE

The use of Hard Disk Cartridges other than those supplied by Timespace Technology will invalidate the warranty of the X200 recorder, and will constitute a breach of the X200 operating software copyright.

The X200 records onto a 2.5" IDE hard disk contained in a cartridge. This cartridge is removable and can be swapped between X200's.

The cartridge contains custom electronics. Only T401-series Hard Disk Cartridges can be used with the X200.

The cartridge is connected to a PC for accessing and archiving files using the USB Interface Kit. Please refer to the section on the USB Interface Kit for detailed instructions.

WARNING: Hard Disk Cartridges are sensitive to shock, vibration and humidity.

X201 REVIEWER

Function

The X201 Reviewer is used to program the menu settings on X200 and to review recordings on the installed Hard Disk Cartridge.

Connect Data Link Cable (supplied with X201 Reviewer) from socket marked "Reviewer" on X200 to socket marked "Recorder" on X201. This connection provides power, video and audio from X200 to X201.

When power (12V ±1.2V) is applied to the X200 and fed to the reviewer via the Data Link Cable the red LED on the bottom panel of the reviewer is illuminated.

The X200 display will be shown on the X201 monitor.

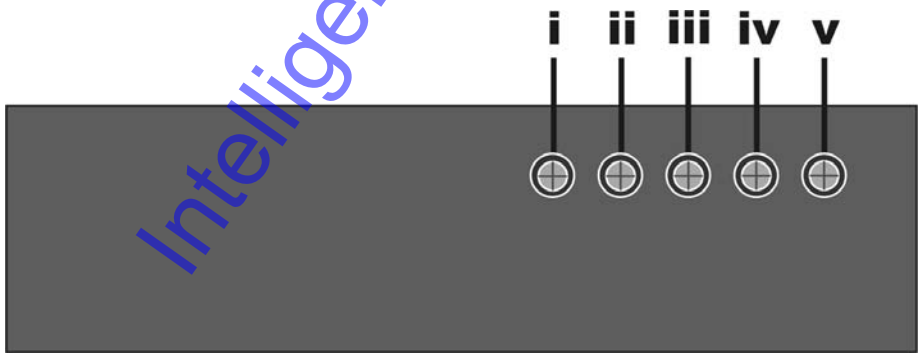
Press the buttons on the X201 to control the X200.

WARNING: When X201 is connected to X200 the power supplied to the X200 must be 12V+/-1.2V.

The X201 has 5 picture adjustment pots situated at the bottom of the left-hand side of the reviewer; these should not under most circumstances need adjusting from the factory settings. If however an adjustment is necessary then please ensure that an appropriate plastic trimmer tool is used in a gentle manner.

These 5 picture adjustment pots are classified as follows.

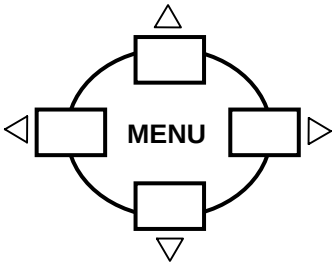
i) NTSC Tint (colour balance when using an NTSC feed)
ii) Colour
iii) Brightness
iv) Contrast
v) Sharpness (image pixel sharpness/smoothness adjustment)



Controls

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

Menu Navigation

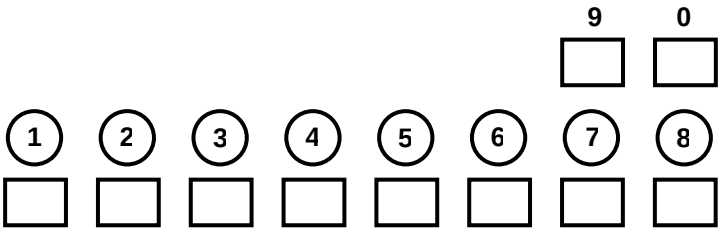


Press any of the 4 menu buttons to enter the main menu. Once in the menu system, their function is as follows:

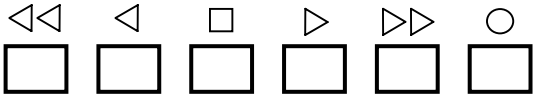
△	Move arrow cursor to the previous item.
▽	Move arrow cursor to the next item.
◁	If the arrow cursor is currently at a menu selection, (e.g. **RESOLUTION: > HIGH**), pressing the left button will cycle the value backwards, (e.g. to **RESOLUTION: > MEDIUM**),
▷	If the arrow cursor is currently at a menu selection (e.g. **RESOLUTION: > LOW**), pressing the right button will cycle the value forwards, (e.g. to **RESOLUTION: > MEDIUM**). If the arrow cursor is currently at a sub-menu title (e.g. **> OTHER OPTIONS**). 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. The normal wind interval is 1 minute. Pressing the button again increases the wind interval to 5 minutes. Repeated presses increase the interval to 10 / 20 and finally 60 minutes. This rapid scan mode enables fast, flicker-free searching through recorded material. If the LED above the stop button is lit the unit is in jog mode and the rewind button will rewind through recorded footage image by image, with intervals of 1 minute.

◁ **Reverse-play** through recordings. If the LED above the stop button is lit (jog mode), the reverse-play button will jog to the previous keyframe. If the oldest keyframe has been reached, reverse playback will stop. Note that reverse play only operates on images that have been first played in a forward direction.

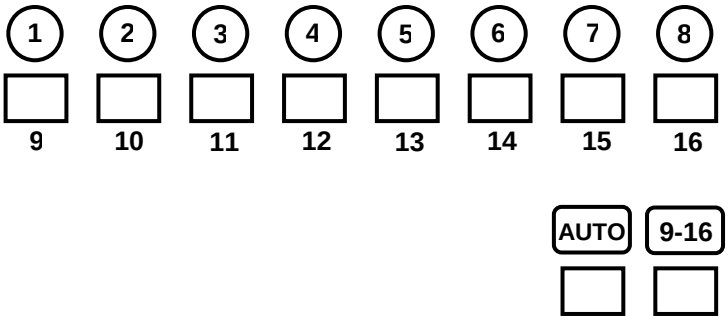
□ **Stop** playback. If playback is already stopped, pressing this button again lights the LED above and the unit is in jog mode, allowing image-by-image playback.

▷ **Play** recorded footage. Pressing play for a second time switches to fast play enabling all the footage to be played through at the fastest rate. If the LED above the stop button is lit, the play button will jog to the next image. If the most recent image has been reached, playback will stop.

▷▷ **Fast-forward** through recorded footage. If the LED above the stop button is lit the unit is in jog mode and pressing the fast-forward button will jog forward. Similarly to rewind, repeated presses of the fast forward enable rapid scan in 5 / 10 / 20 / 60 minute intervals.

○ **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, using the settings specified in the Normal Recording menu (see page). If the unit is currently recording (red LED on), this button will stop recording.

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 X200-16.

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 Switcher" 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 & Help

SEARCH

9 **0**

9–16

HELP

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.

SEARCH Go to a specific time and date in the recorded footage. Pressing this button will enter the PLAYBACK SEARCH screen as seen below. 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.

PLAYBACK SEARCH

TIME : **00 : 00**
DATE : **00 / 00 / 00**

PLAY FROM SET TIME DATE

PLAY OLDEST
PLAY NEWEST

PRESS MENU EXIT TO EXIT MENU

- **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.

Audio

The X201 Reviewer can also be used for audio playback through its built in speaker. It must be noted that at present playback via the X201 is in mono via channel 1 only.

The audio signal from the X200 is transferred along with the video signal via the reviewer cable to the X201. No other cabling is required.

The speaker is located on the rear panel of the X201 reviewer and a headphone output jack is located on the bottom panel. Volume can be controlled via a trimmer pot located next to the headphone output jack. Very little force and the correct trimmer tool must be used with the volume control to avoid possible damage to the trimmer pot.

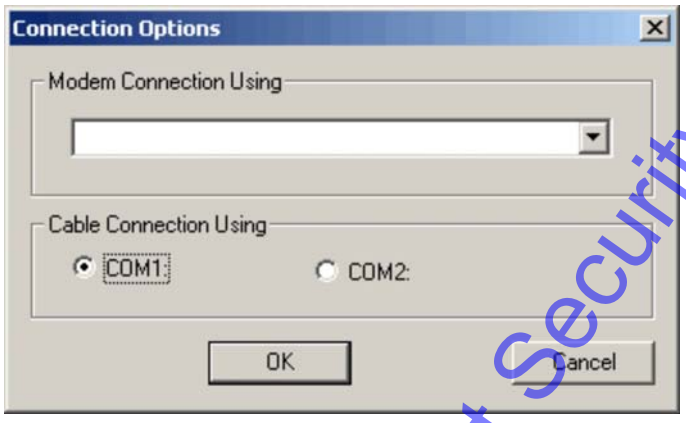
USING A PC TO CONFIGURE THE X200

It is possible to use RemoteLink software to configure the X200 with a serial connection from the PC to the rear panel of the X200.

RemoteLink software comprises of a virtual X201 Reviewer and is able to emulate the majority of its functions. This is primarily used via the GSM network to contact and configure the X200 remotely, although the provision for direct serial connection can be used to connect a PC to the X200 via this interface.

To connect to the X200 using RemoteLink via the serial connection firstly connect the X200 serial port (9-way D-Type connector on the rear panel of the X200) to either COM1 or COM2 serial ports on the PC. Start RemoteLink software on the PC (included as part of the PCLink200 installation V1.2.0 or higher) and go to the Tools menu > Options.

The following dialogue will appear.



Select either COM1 or COM2 as required and click OK.

To connect to the X200 go to the File menu > Connect using Cable. This will contact the X200 and if a successful connection is made the X200 menu screen should appear in the RemoteLink window.

The virtual X201 can now be used as per the X201 Reviewer to configure the X200. Please refer to the X201 Reviewer section of this manual for a detailed description of its functions.

When finished go to the File menu > Disconnect and then exit RemoteLink.

Please note that there is no audio functionality in RemoteLink software and that when connected the X200 video switcher dwell times will be multiplied by 10 in order to take into account the inherent time delay in the serial/GSM connection.

USB INTERFACE KIT

Transferring Files to PC

The USB Interface 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 X200 Digital Recorder.

No additional device drivers are required for the USB Interface Kit when using Windows 2000 or XP. Additional device drivers which can be obtained separately from Timespace Technology will need to be installed if using Windows 98 or Millennium. The USB interface is not compatible with Windows 95 or NT.

Kit Contents

1x USB / IDE Interface Lead
1x T401-PSU Mains to 5VDC Power Adaptor
1x PCLink200 Software CD
1x X200 Manual CD (Word document)

Connecting to a PC using the USB Interface Kit

To connect a T401-series Hard Disk Cartridge to a PC via USB you will require a USB Interface Kit which is supplied with the necessary lead, external cartridge power supply, PCLink200 software and Windows drivers.

1) Remove the Hard Disk Cartridge from the X200.
2) Use the T401-PSU to supply power from a mains outlet to the 5V DC input on the rear of the cartridge and slide the power switch on the front of the cartridge to the on position.
3) Wait for approximately 5 seconds until the LED on the front of the cartridge settles to a steady green colour.
4) 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 will then automatically assign a drive letter to it. Recording files can now be viewed by accessing the new drive letter using Windows Explorer or loaded directly from PCLink200 by using the ‘Load XBA file’, ‘Load XBA folder’ or ‘Cartridge Autoload’ options. It is also possible to drag .xba files or folders from a Windows Explorer window and drop them onto the main area of the PCLink200 window.

Installing USB Interface Kit Drivers (Windows 98 and ME Only)

USB / IDE Interface Drivers only need to be installed when running Windows 98 and ME. They are not included as standard in the USB Interface Kit and can be obtained from Timespace Technology if required.

It is strongly advised that the drivers are not installed when running Windows 2000 and XP as they already have appropriate drivers as part of the original Operating System installation. Windows 95 and NT are not compatible with the USB Interface Kit.

1 Plug the T401-PSU Mains to 5VDC Power Adaptor into an available mains socket and connect the DC output jack to the 'DC5V' socket on the rear of the Hard Disk Cartridge. Switch the cartridge power switch to the 'ON' position. The Power LED will flash amber and then turn green.

2 Connect the IDE end of the USB / IDE Interface Lead to the Hard Disk Cartridge and the USB end to an available USB port on the PC.

3 Windows should automatically detect the new hardware. Select 'Cancel'.

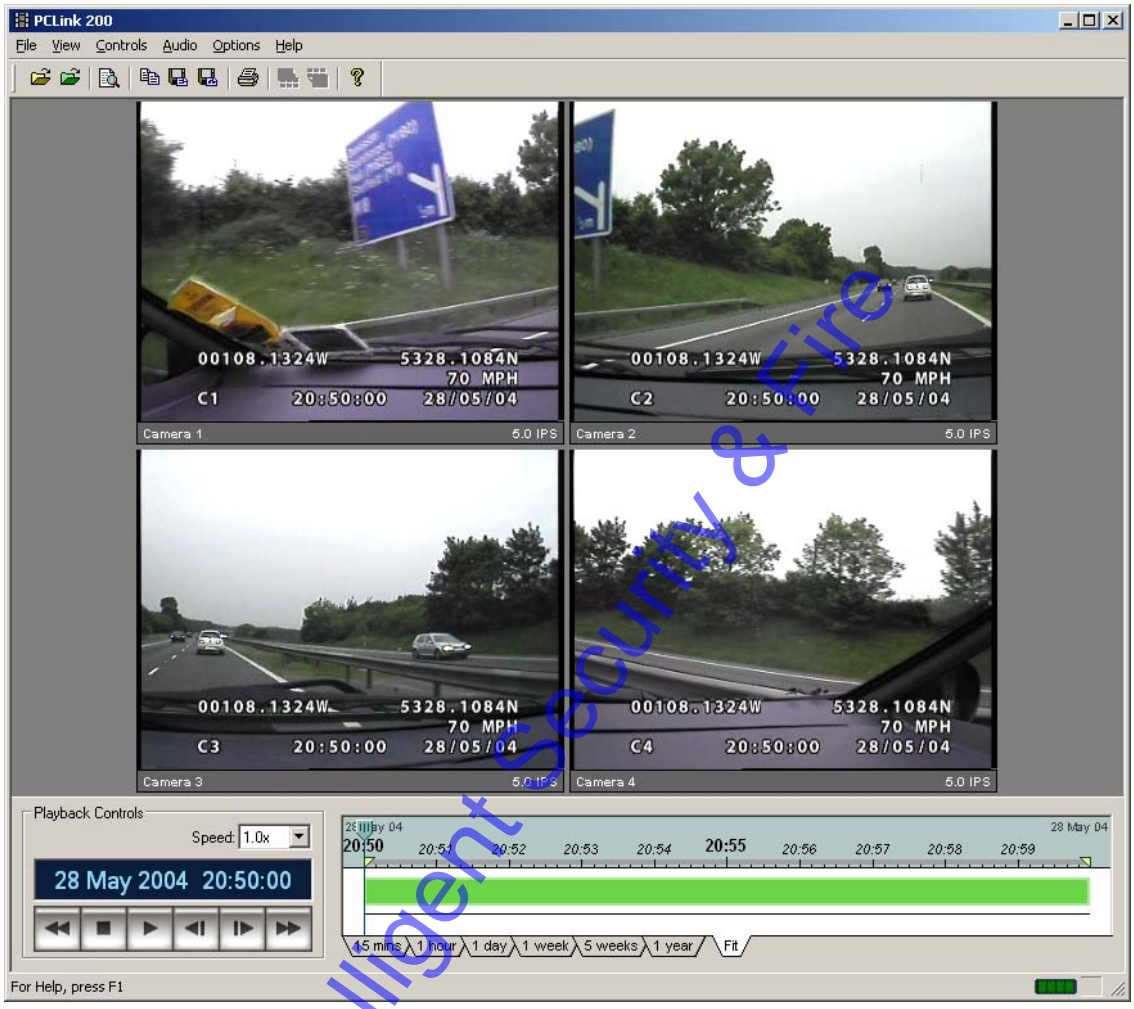
4 Insert the USB / IDE Driver CDROM version CD50.4. Use Windows explorer to open the directory 'USBIDE(ISD)' and then open the directory '98&ME'. Select and run the file 'TPPINST_5_04'. Follow the onscreen instructions to install the drivers.

5 Select and run the file 'setup.exe' from the CDROM and follow the onscreen instructions.

PCLink200 software can now be installed from its installation CDROM and used to review and archive footage from a Hard Disk Cartridge. Once PCLink200 has been installed a Hard Disk Cartridge can be connected to the PC by following steps 1 and 2 as described above.

Windows automatically detects and assigns the connected cartridge a drive letter and the drive can be accessed as per normal in Windows Explorer. If Windows has a problem locating a driver or accessing the drive then please refer to the relevant Windows update site and check that all the necessary components for USB compatibility are installed. Windows XP in particular requires at least Service Pack 1 to have been installed and may require further updates for USB compatibility.

PCLINK200 V1.2.0 REVIEWING AND ARCHIVING SOFTWARE



Accessing / Storing Images

Introduction

PCLink200 is a Windows based application included in the USB Interface Kit that allows .xba files to be viewed on a PC. These files are automatically created by the X200 recorder on its removable disk cartridge. The cartridge must be connected to the PC to access the files on the cartridge.

Playback options include play, forward-wind, rewind, jog control, jump to markers, time line jumping and stop.

Screen shots can be written to the Windows clipboard and pasted into most art packages in the BMP (Windows standard) image file format or saved directly to a BMP format disk file.

Sections of video footage can be selected and exported directly to an independent .avi disk file

Minimum Hardware Requirements

PCLink200 runs on Windows 98SE, Millennium, 2000 & XP.

It is recommended that the minimum hardware requirement is a 2GHz Pentium processor, 256MByte RAM, USB2 for optimum playback speed.

Installation

PCLink200 is a utility allowing the user to review and export .xba video footage created using the X200 digital video recorder.

To install the software insert the PCLink200 CD ROM into your computers CD ROM drive. In most cases the installation program will run automatically. If this does not happen use Windows explorer to select the CD ROM drive and the installer will start.

Starting

To start running PCLink200 click Start on the bottom left of the Windows screen and then follow **Start>Programs>PCLink200 >PCLink200**. Note that this location is only valid if the default settings were used during installation.

Installing Cartridge

Remove cartridge with recordings by unlocking slider on front of cartridge and pulling from the recorder.

To access recordings on cartridge, take to PC with PCLink200 already installed on PC. Connect cartridge to PC using USB Interface Kit and provide power to the cartridge with the supplied 5V dc power supply. Switch the cartridge power switch to the on position.

Windows should after a few seconds list the Hard Disk Cartridge as a new drive and automatically assign it with a drive letter.

Please refer to the USB Interface Kit section of this manual for detailed instructions on installing and using the USB Interface Kit.

Operating

Loading .xba files can be accomplished in a number of ways.

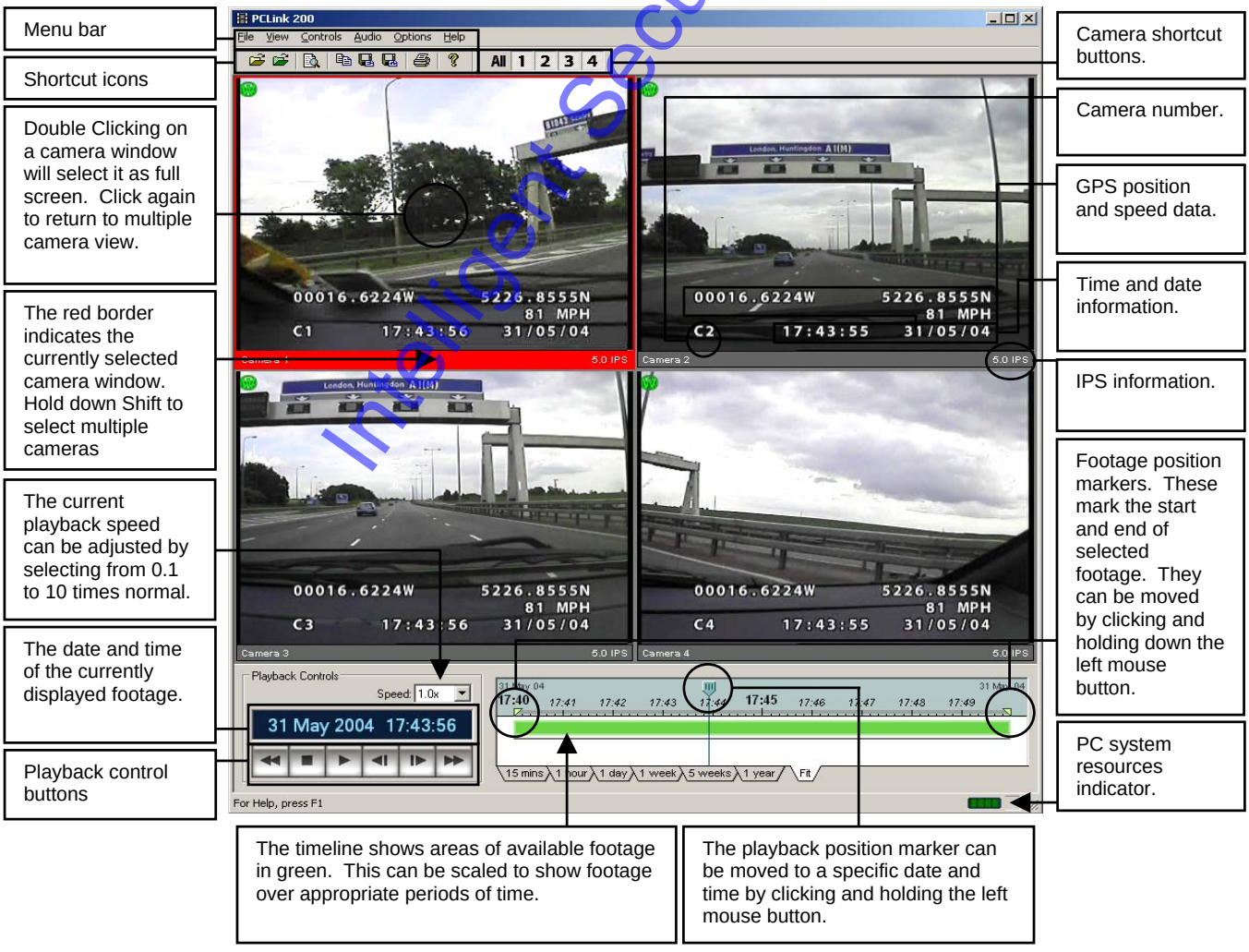
1. If “Cartridge Autoload” has been selected in the Options menu the user will be asked if they want to load all footage from a Hard Disk Cartridge which is attached to the PC before or after PCLink200 is started. If this option is checked when PCLink200 is running it will look for an attached cartridge and ask the user if they want to load all of the .xba files on the cartridge.

2. “Load XBA file” from the file menu. This will display a file selection box and allow a single .xba file to be selected and loaded.

3. “Load XBA folder” from the file menu. This will display a file selection box and allow the selection of a folder containing multiple .xba files. If the entire contents of a cartridge is to be loaded then the drive letter of the cartridge should be selected. Pressing ‘OK’ will then load the entire contents of the folder or cartridge into PCLink200.

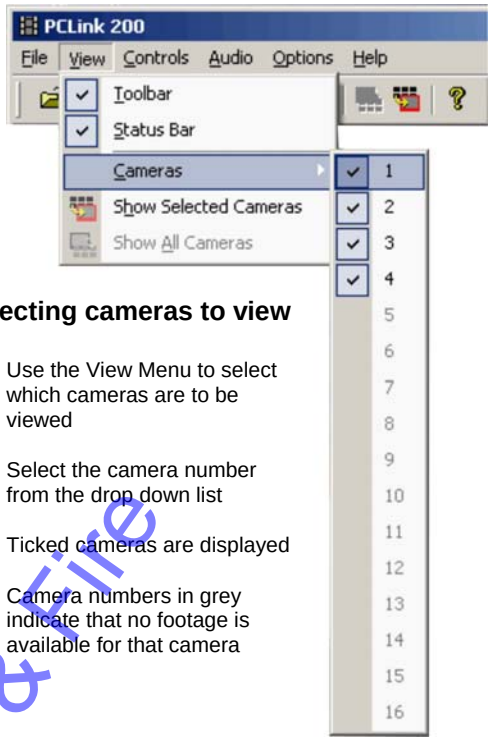
4. .xba files or folders containing .xba files can be dragged from a Windows Explorer window and dropped onto the main area of the PCLink200 window.

User Interface Quick Reference



File Menu

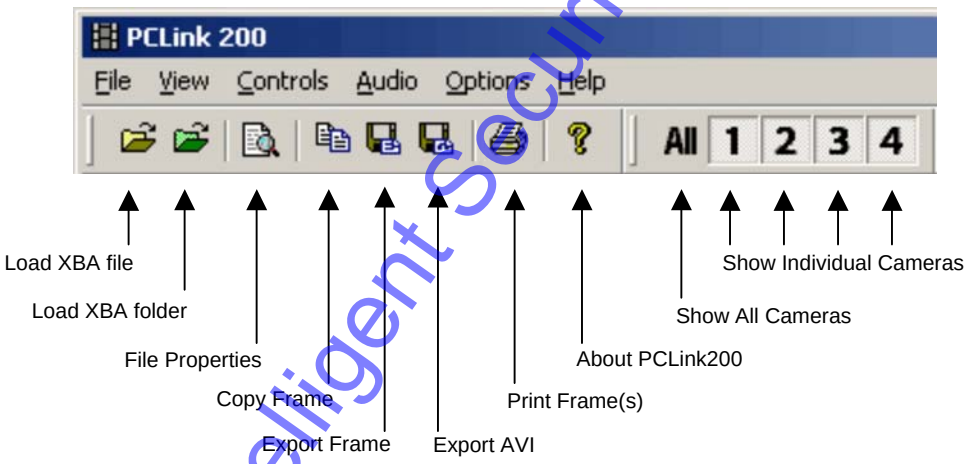
- Load single or multiple XBA files
- Close currently open XBA files
- Print the currently selected camera screen
- Copy current camera screen to clipboard as a Windows bitmap
- Export current camera screen as a Windows bitmap
- Export video between start and end markers as either XBA or AVI
- Bring up a list of recently viewed XBA files
- View the properties of the current XBA file
- Exit PCLink200



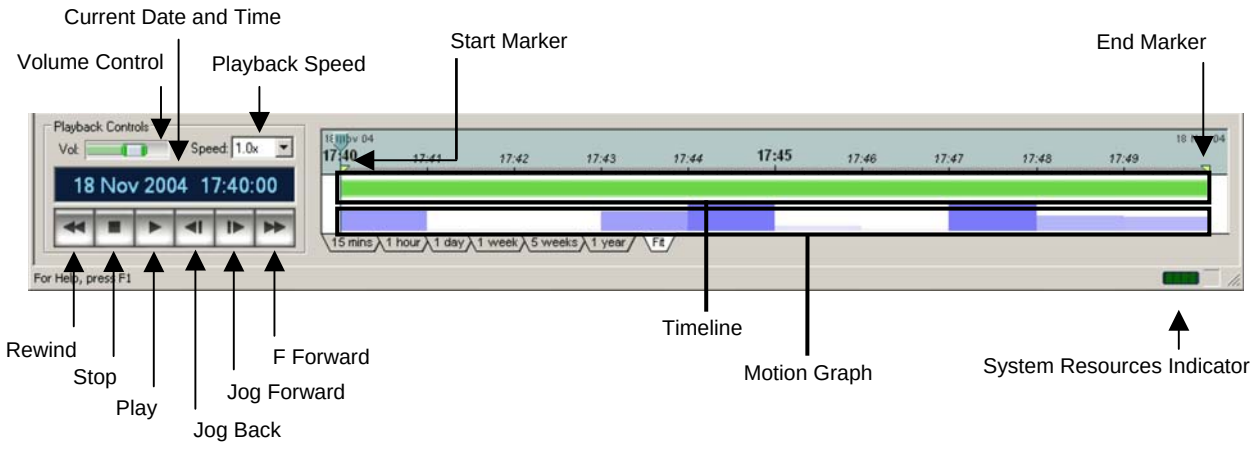
Selecting cameras to view

- Use the View Menu to select which cameras are to be viewed
- Select the camera number from the drop down list
- Ticked cameras are displayed
- Camera numbers in grey indicate that no footage is available for that camera

Menu Bar and Shortcut Buttons



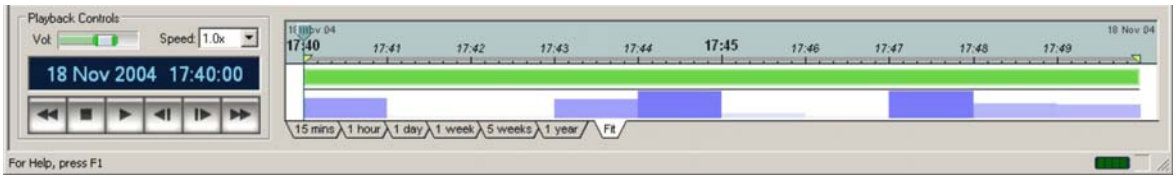
Play Controls and Timeline



User Interface in Detail

Play Controls

The Play controls are situated in the bottom left hand corner of the PCLink200 window.



- **Rewind –** click once to rewind the footage by a few seconds whilst playing or stopped. Hold down to fast rewind the footage. The size and speed of this rewind is relative to the amount you are zoomed in.
- **Stop –** Click once to stop the footage at any time.
- **Play –** Click once to play footage. If clicked whilst footage is playing the play button will stop the footage.
- **Jog back –** Click once to rewind the footage by 1 second (to the nearest available keyframe) whilst playing or stopped.
- **Jog forwards –** Click once to advance the footage by 2 images whilst stopped.
- **Fast forward –** click once to advance the footage by 5 seconds whilst stopped. Hold down to fast forward the footage whilst playing or stopped.

Additionally the space bar on the keyboard may be used to toggle the footage between playing and stopped.

Playback Speed Selector

Just above the play controls is the Playback speed selector. This allows the footage to be played back from between 0.1 and 10 times its normal playback speed. Please note that at higher playback speeds than 1 times the smoothness of playback will be affected by the size of the footage window and the host PC's processing capability.

In order to optimise the PC's ability to play back footage at faster than 1x, it is advisable to shut down any other programs that are currently running and which may be utilising some of the system resources. If there is no audio present on the recording then it is also advisable to disable audio playback (selected in the Audio Menu) so that playback speed is maximised.

Volume Control

To the left of the Playback Speed Selector is the volume control. Slide to the right and left to increase and decrease playback volume respectively. Please note that when audio is disabled in the Audio Menu the volume control will be hidden.

Timeline

To the right of the play controls is the Timeline. This can be used to select and view the footage at a particular point in time. Click once on this bar and the footage will jump to this time, the playback position indicator can also be dragged by holding down the left mouse button. The two yellow triangles at the beginning and end of the timeline are the start and end markers. By default these will appear at the start and end of the available footage when it is loaded, but they can be dragged by holding down the left mouse button to other points of the footage if desired. This is useful when using the 'Export video' option on the File menu, which exports section of footage between these two markers.

Below the timeline and motion graph are a series of buttons used to select the scale of the timeline. This can be selected to cover from 15 minutes to 1 year; the 'Fit' option scales the timeline to cover all of the currently loaded footage from beginning to end.

Motion Graph

The motion graph bar is shown below the timeline bar in the PCLink200 window. This bar indicates the relative level of motion (change) in the recording. The level of motion is indicated by the height and intensity of colour of the bar, higher and darker indicates higher motion and lower and lighter indicates lower motion.

The motion graph bar will show the level of motion for the currently highlighted camera. If a number of cameras are highlighted then the graph will display the data for the camera which has the highest level of motion and not the average level across all cameras. If no cameras are highlighted then the graph will display the data for the camera which has the highest level of motion from all of the recorded cameras.

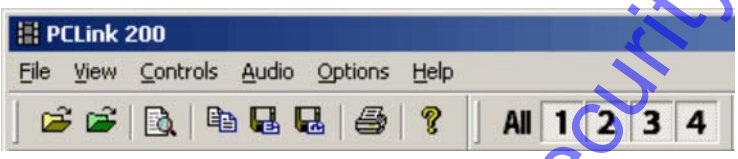
The motion graph feature will only be active with recordings made on X200 operating software V1.2.0 and later.

Time and Date

The current time and date of the footage shown on the screen is displayed directly above the play controls.

Main menu and Toolbar.

There are a number of menus available in the main menu bar across the top of the PCLink200 window. There are also a number of icons on the Toolbar below the menus.



File Menu.

Load File – Opens a single .xba file from a user specified location. Select the file and press open.

If an .oba (X100) file is selected then PCLink100 will automatically start in a new window and the file can be opened from there.

Load Folder – Opens a group of .xba files from a user specified folder. Select the file and press open. This can also be used to load all the files from a cartridge connected to the PC. To do this select the drive letter in My Computer assigned to the cartridge and press open. All of the available footage from the cartridge will then be loaded.

If a folder containing both .xba (X200) and .oba (X100) files is selected then PCLink200 will ask which type of files are to be viewed. If XBA is selected then PCLink200 will load all of the available .xba files. IF OBA is selected then PCLink100 will automatically start in a new window and the .oba files can be opened from there.

If a folder containing only .oba (X100) files is selected then PCLink100 will automatically start in a new window and the files can be opened from there.

Close Files – Closes currently opened .xba files. Use this option before switching Cartridges if PCLink200 is not to be closed and restarted.

Print – Prints the currently selected camera view.

Copy Image – Copies the currently selected camera view to the clipboard in Windows Bitmap format.

Export Image – Exports the currently selected camera view as a Windows Bitmap to a location specified by the user.

Export AVI (audio <u>not</u> supported) – Exports the section of footage between the start and end markers as either a compressed or uncompressed AVI file. A dialogue box will appear allowing the user to select the codec for compression (or uncompressed) and manually set the footage start and end times if desired. The camera selected for export can also be chosen from this dialogue.

Export XBA (audio supported) – Exports the section of footage between the start and end markers as an XBA file. A dialogue box will appear allowing the user to select which cameras, audio channels and data (GPS and motion) is included in the exported XBA.

The maximum file size can also be limited in order to fit the resultant parts to certain media (CD, Zip disk etc.). In this case if the total size of the exported footage exceeds the maximum file size selected then a number of files will be created all with the same name as entered in the 'File Name' box, but having a suffix to the file name (-part2, -part3 etc.) so that the correct order of the parts can be easily determined from the file name. For example – If a 50MB section of XBA footage is exported and the maximum file size is set to 20MB then three files will be created, two 20MB in size and one 10MB. If the user entered the name 'Export' into the 'File Name' box then the resulting files would be Export.xba, Export-part2.xba and Export-part3.xba.

It is also possible to set the start and end times of the exported XBA using the 'Start Time' and 'End Time' options at the bottom of the export dialogue, to do this press the '…' button next to the relevant option and manually enter the date and time. This will override the start and end markers on the timeline.

If the PCPlayer box is checked then PCPlayer200 software will be copied along with an autorun file at the same time and to the same folder as the exported .xba file. The .xba file (or files), PCPlayer.exe and Autorun.inf files can then be copied to a CD. When this is inserted into a PC, PCPlayer200 will automatically start and load the available .xba files on the CD. This allows playback of .xba files without the need to install PCLink200 software.

For more information on PCPlayer200 please refer to the PCPlayer200 section in this manual.

Recent Files – Displays a drop-down list of recently opened .xba files, click on an item to load the file. Please note that this will not work if the file has been moved since it was last opened.

Properties – Brings up a summary of the current .xba file properties such as start/end times and file size.

Exit – Exits the PCLink200 program.

View menu.

Toolbar / Status Bar – These can be checked or unchecked to either view or hide the Toolbar and Status Bar in the PCLink200 window.

Cameras – This will display a drop-down list of cameras. Either check or un-check each camera to determine whether it is currently displayed or not displayed in the PCLink200 window. Cameras with available footage will have their number displayed in black, all others will be displayed in grey and are not accessible.

Additionally double left-clicking on any displayed camera window in a multiple camera view will display it full screen. Left-clicking again will revert back to a multiple camera view. Multiple camera views can be selected by holding down the Shift key whilst left clicking on the desired camera windows. If multiple camera windows are selected then double left clicking whilst holding down the Ctrl key will display only the selected cameras, left clicking any part of the grey area of the PCLink200 window will revert to all camera windows being displayed.

Show Selected Cameras – This will display all of the currently checked cameras in the Camera list.

Show All Cameras – This will display all cameras for which there is available footage.

Controls menu.

Play / Stop – This will toggle the footage from playing to stopped and vice-versa. Also controlled directly by the **Space Bar** on the keyboard.

Jog Forwards – Causes the footage to jog forwards. Also controlled directly by the **L** key on the keyboard.

Jog Backwards – Causes the footage to jog backwards. Also controlled directly by the **J** key on the keyboard.

Jump to Start Marker – Causes the footage to jump to the start marker. Also directly controlled by the **I** key on the keyboard.

Jump to End Marker – Causes the footage to jump to the end marker. Also directly controlled by the **O** key on the keyboard.

Jump to – Brings up a dialogue box allowing the user to input a time and date to jump to. If no footage is present at the selected time and date then the nearest footage will be selected. The jump to dialogue can also be brought up by left clicking on the time and date display above the play controls.

Confine Markers to Displayed Footage – Sets the start and end markers to the beginning and end of the currently displayed Timeline. This is useful if only a portion of the total footage Timeline is currently being displayed. Also directly controlled by the **M** key on the keyboard.

Set Left Marker To Play Position – Sets the left (start) marker to the current play position on the Timeline. Also directly controlled by the **[** key on the keyboard.

Set Right Marker To Play Position – Sets the right (end) marker to the current play position on the Timeline. Also directly controlled by the **]** key on the keyboard.

Audio menu.

Audio Enabled – Enables audio playback on both channels.
Left Channel Only – Enables audio playback on the left channel (channel 1) only.
Right Channel Only – Enables audio playback on the right channel (channel 2) only.
Audio Disabled – Disables audio playback (Mute).

Options menu.

Cartridge Autoload – Check this option to auto load all footage from a Hard Disk Cartridge which is attached to the PC before or after PCLink200 is started. If this option is checked when PCLink200 is running it will look for an attached cartridge and ask the user if they want to load all of the .xba files on the cartridge.

If a Cartridge containing both .xba (X200) and .oba (X100) files is connected then PCLink200 will ask which type of files are to be viewed. If XBA is selected then PCLink200 will load all of the available XBA files. IF OBA is selected then PCLink100 will automatically start in a new window and the OBA files can be opened from there.

If a Cartridge containing only .oba (X100) files is connected then PCLink100 will automatically start in a new window and the files can be opened from there.

Passwords – Allows the user to set passwords for operation of PCLink200 or just the export function. The password is blank spaces by default and setting it back to this will remove any password protection. When changing passwords the user will be prompted for the old password before a new one can be entered.

Preferences – This brings up a menu allowing the user to specify a number of display and export preferences.

Help menu.

Access to the Help Menu and information about PCLink200.

Toolbar

There are a number of icons on the toolbar which mirror functions from the menu.


Open XBA file


Open XBA folder


Displays properties for all the currently loaded .xba files. It also highlights the file currently playing and allows the user to double-click files to jump to their start times


Copy current image to clipboard

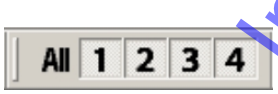

Export current image


Export video between start and end markers


Print current image


About PCLink200

All / Individual Camera Buttons – All shows all of the available camera views, clicking on the numbered buttons displays that individual camera view. Hold down CTRL to select multiple camera buttons.



PCPLAYER200 V1.2.0 REVIEWING SOFTWARE

Introduction

PCPlayer200 is a stand-alone Windows based application included with PCLink200 Software that allows .xba files to be viewed on another PC which does not have PCLink200 installed.

PCPlayer200 is run directly from a CD containing the PCPlayer200.exe, an Autorun.inf file and .xba files.

The PCPlayer200 .exe file and an Autorun.inf file are saved to the same location as .xba files exported from PCLink200 software. When these files are written to a CD, PCPLayer200 will automatically start, and load all .xba files on the CD when it is inserted into a PC.

Playback options include play, forward-wind, rewind, jog control, jump to markers, time line jumping and stop.

Screen shots can be written to the Windows clipboard and pasted into most art packages in the BMP (Windows standard) image file format or saved directly to a BMP format disk file.

Minimum Hardware Requirements

PCPlayer200 runs on Windows 98SE, Millennium, 2000 & XP.

It is recommended that the minimum hardware requirement is a 2GHz Pentium processor, 256MByte RAM, USB2 for optimum playback speed.

Starting

A CD containing the PCPlayer.exe file, Autorun.inf file and .xba files should automatically start PCPLayer200 and load all .xba files on the CD when it is inserted into a PC. If PCPlayer200 does not start automatically use Windows Explorer to view the contents of the CD and then double left-click the PCPlayer.exe file to start PCPlayer200.

Differences from PCLink200

Although PCPlayer200 and PCLink200 are very similar in most respects, PCPlayer200 does **not** have the following features which are incorporated into PCLink200.

- Audio playback
- Load Meter
- Motion-data display
- XBA or AVI export
- Cartridge auto load
- Password protection

User Interface Quick Reference

Menu bar

Shortcut icons

Double Clicking on a camera window will select it as full screen. Click again to return to multiple camera view.

The red border indicates the currently selected camera window. Hold down Shift to select multiple cameras

The current playback speed can be adjusted by selecting from 0.1 to 10 times normal.

The date and time of the currently displayed footage.

Playback control buttons

Camera number.

GPS position and speed data.

Time and date information.

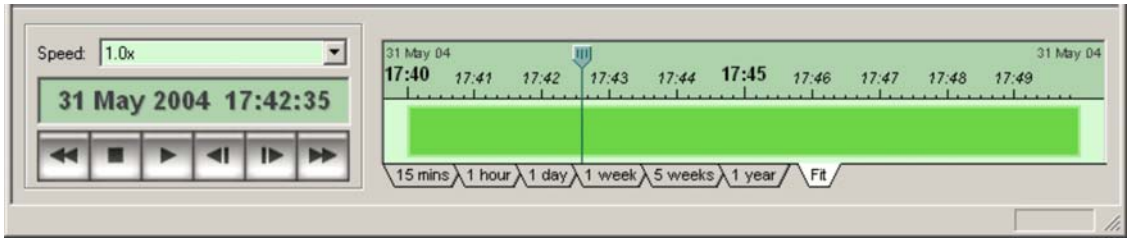
The timeline shows areas of available footage in green. This can be scaled to show footage over appropriate periods of time.

The playback position marker can be moved to a specific date and time by clicking and holding the left mouse button.

User Interface in Detail

Play Controls

The Play controls are situated in the bottom left hand corner of the PCPlayer200 window.



- **Rewind –** click once to rewind the footage by a few seconds whilst playing or stopped. Hold down to fast rewind the footage. The size and speed of this rewind is relative to the current scale of the timeline.
- **Stop –** Click once to stop the footage at any time.
- **Play –** Click once to play footage. If clicked whilst footage is playing the play button will stop the footage.
- **Jog back –** Click once to rewind the footage by 1 second (to the nearest available keyframe) whilst playing or stopped. When displaying only 1 camera window this will jog back a single image instead of 1 second.
- **Jog forwards –** Click once to advance the footage by 1 image whilst stopped.
- **Fast forward –** click once to advance the footage whilst stopped. Hold down to fast forward the footage whilst playing or stopped.

Additionally the space bar on the keyboard may be used to toggle the footage between playing and stopped.

Playback Speed Selector

Just above the play controls is the Playback speed selector. This allows the footage to be played back from between 0.1 and 10 times its normal playback speed. Please note that at higher playback speeds than 1 times the smoothness of playback will be affected by the size of the footage window and the host PC's processing capability. To play footage back at the PC's maximum rate select the Max option.

In order to optimise the PC's ability to play back footage at faster than 1x, it is advisable to shut down any other programs that are currently running and which may be utilising some of the system resources.

Timeline

To the right of the play controls is the Timeline. This can be used to select and view the footage at a particular point in time. Click once on this bar and the footage will jump to this time; the playback position indicator can also be dragged by holding down the left mouse button.

Below the timeline and motion graph are a series of buttons used to select the scale of the timeline. This can be selected to cover from 15 minutes to 1 year; the 'Fit' option scales the timeline to cover all of the currently loaded footage from beginning to end.

Time and Date

The current time and date of the footage shown on the screen is displayed directly above the play controls. To go to a particular time and date in the footage click the current time and date with the left mouse button and enter the required time and date into the dialogue box which appears.

Main menu and Toolbar.

There are a number of menus available in the main menu bar across the top of the PCPlayer200 window. There are also a number of icons on the Toolbar below the menus.

File Menu.

Load File – Opens a single .xba file from a user specified location. Select the file and press open.

Load Folder – Opens a group of .xba files from a user specified folder. Select the file and press open. This can also be used to load all the files from a cartridge connected to the PC. To do this select the drive letter in My Computer assigned to the cartridge and press open. All of the available footage from the cartridge will then be loaded.

Close Files – Closes the currently open .xba files.

Print – Prints the currently selected camera view.

Copy Image – Copies the currently selected camera view to the clipboard in Windows Bitmap format.

Export Image – Exports the currently selected camera view as a Windows Bitmap to a location specified by the user.

Recent Files – Brings up a list of recently opened .xba files.

Properties – Brings up a summary of the current .xba file properties such as start/end times and file size.

Exit – Exits PCPlayer200

View menu.

Toolbar / Status Bar – These can be checked or unchecked to either view or hide the Toolbar and Status Bar in the PCPlayer200 window.

Cameras – This will display a drop-down list of cameras. Either check or un-check each camera to determine whether it is currently displayed or not displayed in the PCPlayer200 window. Cameras with available footage will have their number displayed in black, all others will be displayed in grey and are not accessible.

Additionally double left clicking on any displayed camera window in a multiple camera view will display it full screen. Left clicking again will revert back to a multiple camera view. Multiple camera views can be selected by holding down the Shift key whilst left clicking on the desired camera windows. If multiple camera windows are selected then double left clicking whilst holding down the Ctrl key will display only the selected cameras, left clicking any part of the grey area of the PCPlayer200 window will revert to all camera windows being displayed.

Show Selected Cameras – This will display all of the currently checked cameras in the Camera list.

Show All Cameras – This will display all cameras for which there is available footage.

Controls menu.

Play / Stop – This will toggle the footage from playing to stopped and vice-versa. Also controlled directly by the **Space Bar** on the keyboard.

Jog Forwards – Causes the footage to jog forwards. Also controlled directly by the **L** key on the keyboard.

Jog Backwards – Causes the footage to jog backwards. Also controlled directly by the **J** key on the keyboard.

Jump to – Brings up a dialogue box allowing the user to input a time and date to jump to. If no footage is present at the selected time and date then the nearest footage will be selected. The jump to dialogue can also be brought up by left clicking on the time and date display above the play controls.

Options menu.

Preferences – This brings up a menu allowing the user to specify a number of display preferences.

Help menu.

Access to information about PCPlayer200 and help text.

Toolbar

There are a number of icons on the toolbar which mirror functions from the menu.


Open XBA file


Open XBA folder


Displays properties for all the currently loaded .xba files. It also highlights the file currently playing and allows the user to double-click files to jump to their start times


Copy current image to clipboard


Export current image


Print current image


About PCPlayer200 and help text

All / Individual Camera Buttons – All shows all of the available camera views, clicking on the numbered buttons displays that individual camera view. Hold down CTRL to select multiple camera buttons.

REMOTE OPERATION

The X200 includes Ethernet Local Area Network (LAN) technology. It also incorporates a TFTP (trivial file transfer protocol) server which allows the video files to be downloaded using either a hard-wired or wireless network connection. The files can be accessed and downloaded using any TFTP client application such as Timespace Technology X-Communicate software.

A GSM Modem can also be connected to the serial port of the X200 in order to provide remote access with the ability to check live camera views and configure the X200 menu system. RemoteLink software is used in order to dial-up the GSM Modem and provides a virtual X201 Reviewer and all of its associated functions. It is also possible to use RemoteLink software with a direct serial connection from a PC to the X200. The direct serial connection is described in detail in the 'Using a PC to Configure the X200' section of this manual.

LAN

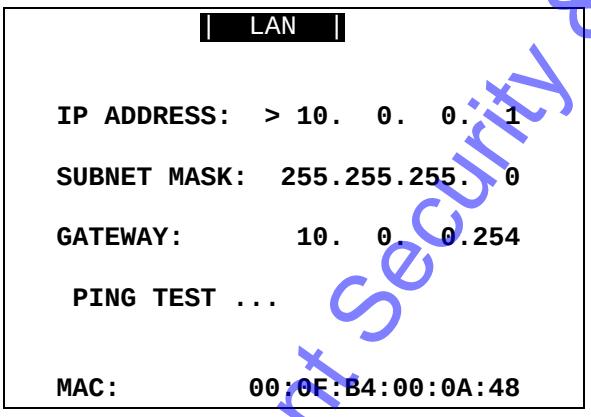
Introduction

This document is intended to provide an introduction to the networking facilities provided by the X200 Digital Video Recorder and to assist with the configuration and interoperation between it and other networked computers.

Connection to the X200 built-in 10Mb/s Ethernet network adapter is via a standard RJ45 socket and from this a connection can be hardwired or via a wireless bridge device such as the Netgear ME101.

Configuration

Configuration of the X200 networking parameters is done via the menu system accessed using a X201 reviewer. The LAN (local area network) menu option presents the user with fields which allow the IP address, the subnet mask and the default gateway values to be set. It also allows the user to interrogate the unit's unique MAC address.
The X200 LAN menu page is similar to that shown below:



Unit MAC Address

All network devices include a unique media access control (MAC) address used to identify it on a network. The address is a 48-bit number, usually represented as 6 bytes – each byte written in hexadecimal notation.

[On the menu, each hexadecimal byte value is separated by a colon.]

All Timespace Technology devices have a MAC address which begins 00 0F B4 followed by another three bytes.

e.g. `00 0F B4 00 0A 48`

The X200 LAN menu option allows the user to display its MAC address which may be useful in configuring access control with wireless networks.

IP Address

For devices communicating on a network, messages must identify the source and destination with an address. The IP (internet protocol) address is a 32-bit number that uniquely identifies a device connected to the network and is usually represented in a dotted decimal form.

e.g. `10.0.0.28`

[The IP addressing scheme is defined by the Internet Engineering Task Force (IETF) document RFC 791]

Subnet Mask

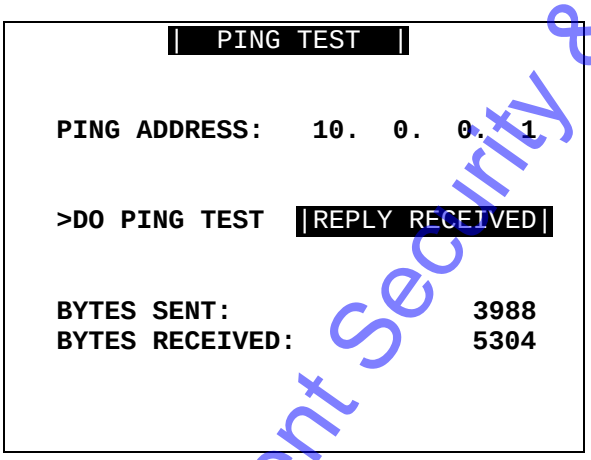
The subnet mask is used to determine what subnet an IP address belongs to. An IP address has two components, the network address and the host address. Subnetting enables a network administrator to further divide the host part of the address into two or more subnets. In this case, a part of the host address is reserved to identify the particular subnet.
The subnet mask is the network address plus the bits reserved for identifying the sub network. (By convention, the bits for the network address are all set to 1.) As a mask, it can be used to identify the subnet to which an IP address belongs by performing a bitwise AND operation the mask and the IP address. The result is the sub network address.

Default Gateway

This is the address of the 'gateway' in a network that a computer will use to access another network if a gateway is not specified for use. In a network using subnets, it is the address of the router that forwards data traffic to a destination outside of the subnet of the transmitting device.

Ping Test ...

Selecting this option will bring up the 'ping test' menu which is similar to that shown below.



Enter the destination IP address of the unit you want to test communication with on the ping address line and then select 'DO PING TEST ...'. If the destination receives the ping message and replies within 10 seconds then 'REPLY RECEIVED' is displayed; otherwise 'NO REPLY' is displayed.

[See the troubleshooting section for further details about 'ping' and instructions on how to initiate a communications test from a computer attached to the network.]

The 'BYTES SENT' and 'BYTES RECEIVED' fields update in real-time to show how many bytes are being transferred to and from the X200 and can provide further indication of data transfer.

WLAN

Wireless Ethernet Bridge

Connection

The X200 Digital Video Recorder is connected to a network via a standard RJ45 network socket. For a wireless LAN, a direct connection can be made from this port to a wireless bridge device (such as the Netgear ME101) using a cross-over cable (usually supplied with the wireless bridge.)

Configuration

Because wireless devices from different manufacturers provide different facilities, configuration is usually performed using a proprietary utility supplied with the device. The configuration process usually involves connecting the device to a network equipped PC and running the utility to set up the security and encryption settings. It will also be necessary to select the correct SSID (service set identifier) which is a 32 character string used to identify one wireless network from another. Refer to the installation guide included with the network bridge for more specific details.

Wireless Router

Configuration

Two standards are typically in use for the encryption of data transferred over a wireless network – WPA (wireless protected access) and the older legacy system; WEP (wired equivalent privacy). The use of either necessitates the configuration of all wireless devices employed on the network.

[Where problems are being experienced establishing connection between wireless network devices, it is recommended, where possible, to first establish reliable communication with encryption turned off.]

WEP (Wired Equivalent Privacy)

The WEP security standard uses a key (64 or 128 bits long) to encrypt and decrypt data sent over the wireless connection. All devices on the same network must be configured with the same key.

WPA (Wireless Protected Access)

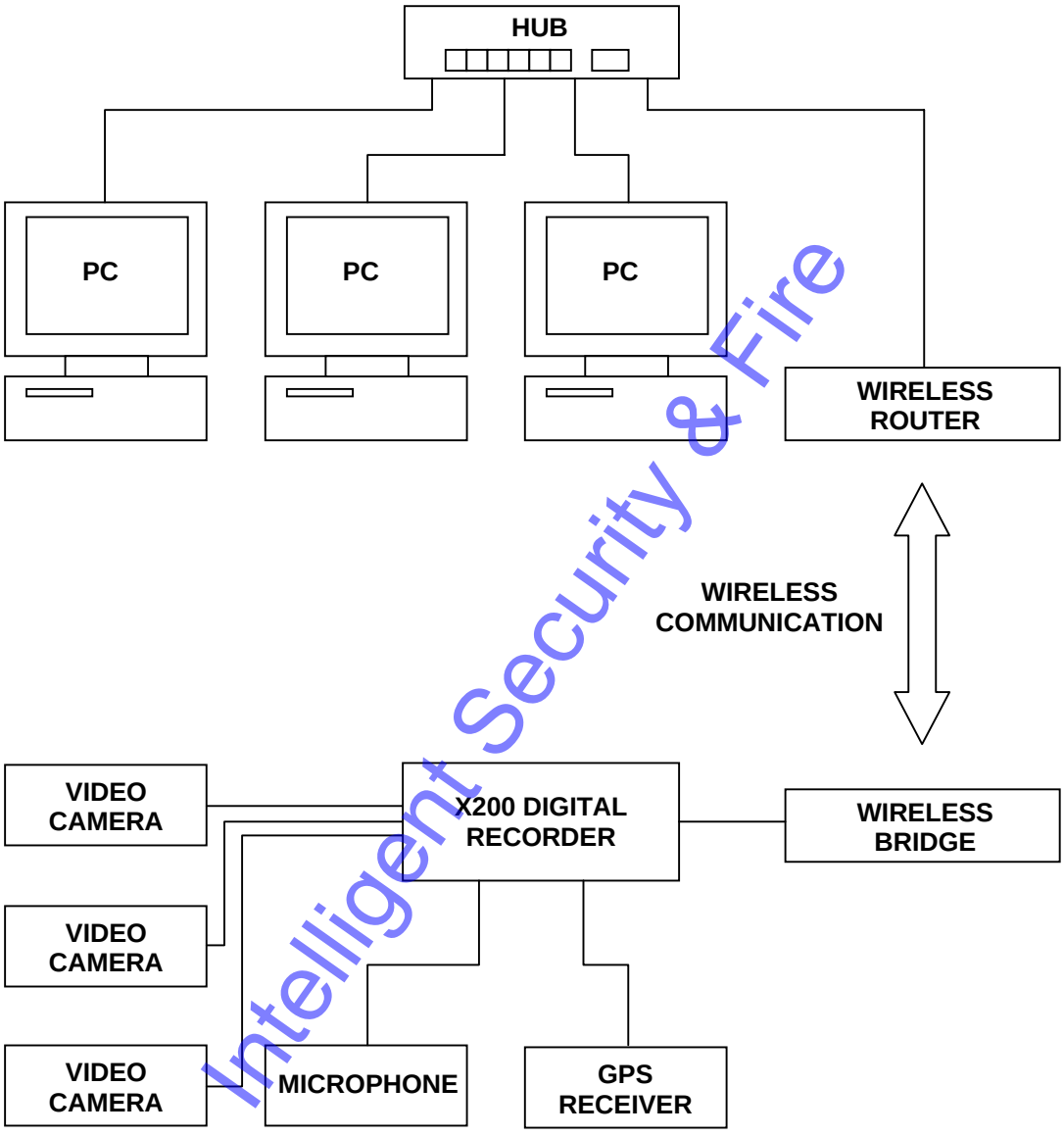
The WPA security standard uses a pass-phrase key to encrypt and decrypt data sent over the wireless connection to ensure privacy. All devices on the same network must be configured with the same key and encryption technique (TKIP or AES).

MAC Address Filtering

MAC address filtering is a security feature which allows you to specify which computers are allowed on your network. Any computer attempting to access the network that is not specified in the filter list will be denied access. When using this feature, the MAC address of each client must be added to the list in the router.

[It may be necessary to add both the MAC address of the X200 and the wireless bridge to which it is connected.]

Typical X200 Wireless LAN Configuration



Troubleshooting

Hardwired Connection

If it is suspected that the wireless connection is causing problems, the X200 standard RJ45 socket allows connection to the network using a standard UTP network cable.

[Note that if a hardwired cable connection is made directly to a single computer then a cross-over cable may be necessary.]

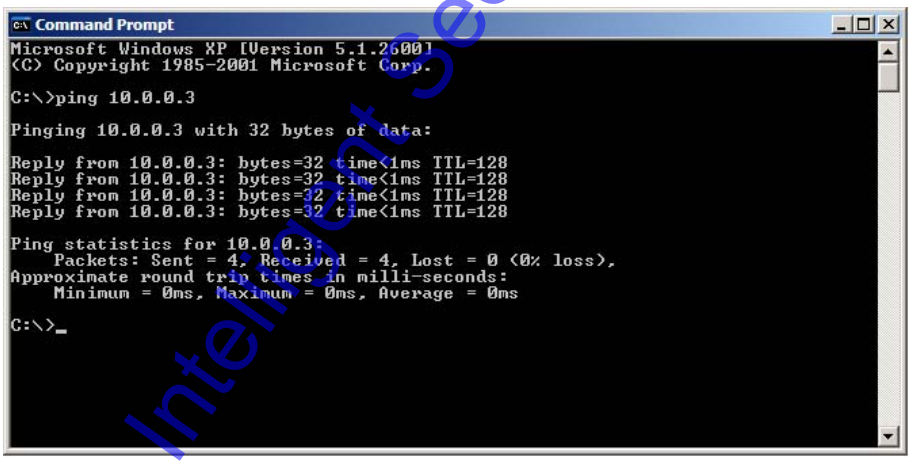
Ping

The 'ping' utility is a software tool used to see if a network device is operating and also to see if connections to it are intact. A small packet of data is sent through the network to a particular IP address and the computer that sent the packet then waits (or 'listens') for a return packet. If the connections are good and the target is working, a good return packet will be received.

[Ping uses the Internet Control Message Protocol (ICMP) Echo function which is detailed in RFC 792.]

The 'ping' utility is provided in versions of the Microsoft® Windows® operating system. It can be run by following the instructions below:

- Press the 'Start' button.
- From the menu, select 'Run...'
- In the dialogue window type `command` where it says Open.
- When the command window opens, at the prompt type `ping` followed by the IP address of the device to be tested. In the example below the IP address of the unit being tested is 10.0.0.3 and the unit is replying. If no response is received the ping application will display 'Request timed out.'



Operation

Single Client

The X200 Digital Video Recorder will allow file download to one client at a time. During file transfer, any attempt by another client to download a file will be rejected or ignored. A transfer can be explicitly aborted with a Timespace extension to the TFTP protocol and implicitly aborted if no acknowledgement is received in response to a data packet within 20 seconds.

TFTP

TFTP (trivial file transfer protocol) is a simple protocol used to transfer files. The X200 Digital Video Recorder includes a TFTP server which follows the protocol as described in the following documents:

- The basic TFTP protocol RFC 1350
- TFTP option extension RFC 2347 (1782)
- Block size option RFC 2348 (1783)
- Time-out and transfer size options RFC 2349 (1784)

Timespace Extensions

While the X200 implementation of the trivial file transfer protocol follows the standards closely, it extends upon it to allow the client to interrogate the files stored locally in the recorder. These extensions are:

- Explicit transfer abort
- Directory listing request

Explicit Transfer Abort

Since the X200 Digital Video Recorder only supports transfers to one client at a time, provision has been made to abort a transfer should either client or source become unable to continue.

- The X200 will assume that a data transfer has been aborted if no acknowledgement is received in response to a data packet within 20 seconds.
- The X200 will abort a transfer currently in progress if it receives an ABORT command (op code 7). This will allow the same (or another) client to initiate a new transfer.

Directory Listing Request

The standard TFTP read request (RRQ) packet takes the following form:

2 bytes	*string*	*1 byte*	*string*	*1 byte*
Op Code (1)	Filename	0	Mode	0

The Timespace Technology implementation of TFTP on the X200 responds to read request packets where the *Filename* is either `dir` or `dir,`n (where n is an integer used to identify the index into the directory listing). The response to such a request is a packet containing information about the requested directory entry in the following form:

```
iii/nnn→lllllllllllllllllllllll→sssssssssss→cccccccc→mmmmmmmm→zzzzzzzz
```

where the fields are separated by tab characters (→) and they represent:

i - the index number of the file in the X200 directory
n - the total number of files in the X200 directory
l - the long filename
s - the short filename
c - the creation time and date
m - the modification time and date
z - the file size in bytes.

Data Transfer

Transfer Rate

The X200 Digital Video Recorder is equipped with a 10Mb/s network interface controller and this could be a limiting factor when using with a wireless LAN connection. Current wireless standards include:

- IEEE 802.11g – provides networking with speeds up to 54Mb/s
- IEEE 802.11b – provides networking with speeds up to 11Mb/s

where these are maximum rates. In practice, the rate adapts according to the S/N (signal to noise ratio) and the signal strength – the further apart the two communicating wireless devices, the lower the transfer data rate.

Transfer Range

The IEEE 802.11b standard limits the radiated power to 0.5W and in general a range of up to 100m is considered possible when there are no obstructions. Besides distance, performance can be degraded by radio interference, humidity, air temperature, resource contention (if many devices are accessing the wireless network simultaneously) and objects that block the signal.

Antenna

Antennas direct Radio Frequency (RF) power into a coverage area. Antennas are available which produce differing coverage patterns and to maximize the transmission range, the design of the antenna connected to your card is crucial. The majority of supplied antennas are omni-directional - that is, they radiate energy more or less equally in all directions. The correct antenna for a site is chosen by determining the antenna that provides the coverage pattern best matched to the site coverage requirements. If the supplied antenna is replaced with a directional antenna then a range of up to 3km or more may be possible although this will be limited again by any obstructions.

The increase in coverage within the RF beam width is called the antenna gain, and is measured in dB (decibels). Antenna gain improves the range of the signal for better communications (for both transmission and reception). As a general rule of thumb, each 1 dB increase in antenna gain can result in a range increase of 2.5% indoors or 5% outdoors. Actual results will vary depending on the amount and type of obstructions at the site.

Channels

The 802.11 standard defines a number of channels which operate at different frequencies in the 2.4GHz spectrum. However, the spectrum allocation means that many of these channels overlap. Additionally, interference from other devices in the 2.4GHz spectrum, such as wireless phones, Bluetooth devices and microwave ovens, can make that part of the airwaves quite crowded.

Channel	*Lower Frequency (GHz)*	*Central Frequency (GHz)*	*Upper Frequency (GHz)*
1	2.401	2.412	2.423
2	2.404	2.417	2.428
3	2.411	2.422	2.433
4	2.416	2.427	2.438
5	2.421	2.432	2.443
6	2.426	2.437	2.448
7	2.431	2.442	2.453
8	2.436	2.447	2.458
9	2.441	2.452	2.463
10	2.446	2.457	2.468
11	2.451	2.462	2.473
12	2.456	2.467	2.478
13	2.461	2.472	2.483
14	2.473	2.484	2.495

Improving Transfer Range

The following tips may help in increasing the transfer range or the signal strength and signal to noise ratio which can help improve the transfer rate.

- Put the router or access point close to the centre of the area to cover.
- Reduce the distance between the wireless devices.
- Keep wireless devices in line of sight, as much as possible.
- Place routers and access points high, and as clear of obstructions as practical. Try to keep antennas at least a metre away from metal fixtures. Note that antennas on roofs do not necessarily give the best results.
- Keep routers, access points, and antennas away from large amounts of water such as fish tanks and water coolers.
- Put routers and access points near windows only if you want to communicate between buildings.
- Avoid the weaker signals heading downward from routers and access points.
- If there is a removable antenna, make sure it is fastened securely.
- For outdoor mounting of antennas note that the coax RF cable should be kept as short as possible to minimize RF loss. Note that the length of cable that comes with the antenna is often optimized.
- Put antennas as close to vertical as practical.
- If there are possible interfering devices nearby (such as mobile phones or microwave ovens) try changing the equipment to use another channel.
- If there are more than one wireless routers in range of each other, space the channels out as much as possible. E.g., for two routers, choose channels 1 and 11. For three routers choose 1, 6, and 11.
- Use access points in areas without coverage.
- In highly critical situations professional installers may be able to help by doing a site survey and following professional installation processes.

Glossary

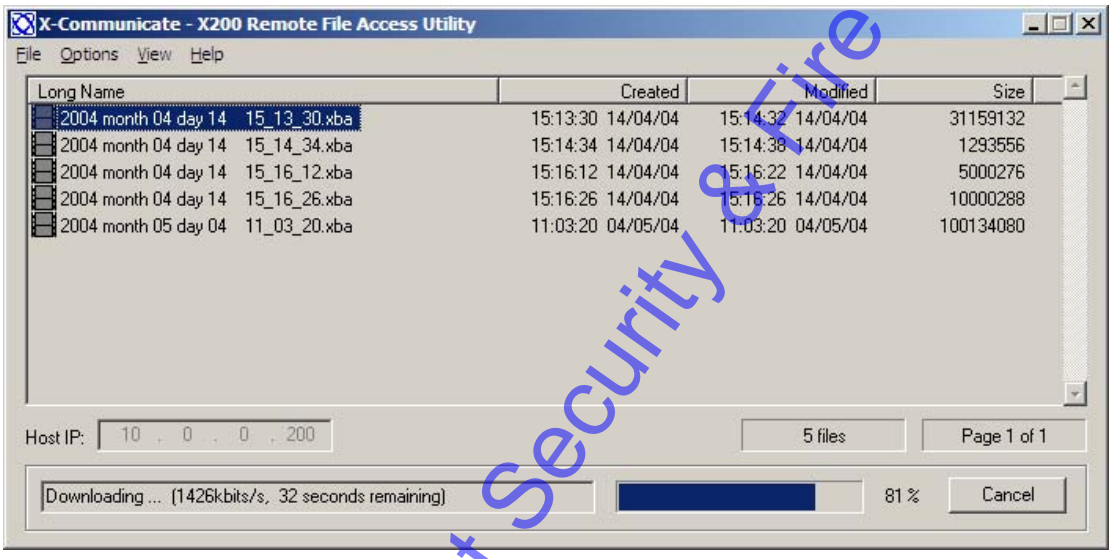
Bridge	A device which forwards traffic between network segments based on data link layer information.
ICMP	Internet Control Message Protocol
IP	Internet Protocol
LAN	Local Area Network
MAC	Media Access Control
Ping	A software application used to determine whether two network devices are capable of communication.
RF	Radio Frequency
Router	A device in a network that handles message transfer between computers.
SSID	Service Set Identifier
S/N	Signal to Noise Ratio
TCP	Transmission Control Protocol
TFTP	Trivial File Transfer Protocol
UTP	Unshielded Twisted Pair
WEP	Wired Equivalent Privacy
WPA	Wireless Protected Access
WLAN	Wireless Local Area Network

LAN/WLAN File Transfer Software (X-Communicate V1.4)

Introduction

The X200 Digital Video Recorder includes Ethernet local area networking (LAN) technology. It also incorporates a TFTP (trivial file transfer protocol) server which allows the stored video files to be downloaded using either a hard-wired, or wireless, network connection. The files can be accessed and downloaded using any TFTP client application.

X-Communicate is a simple TFTP client application which runs under the Windows operating system to allow the listing and transfer of files from the X200. The screenshot below shows how the application appears during file download.



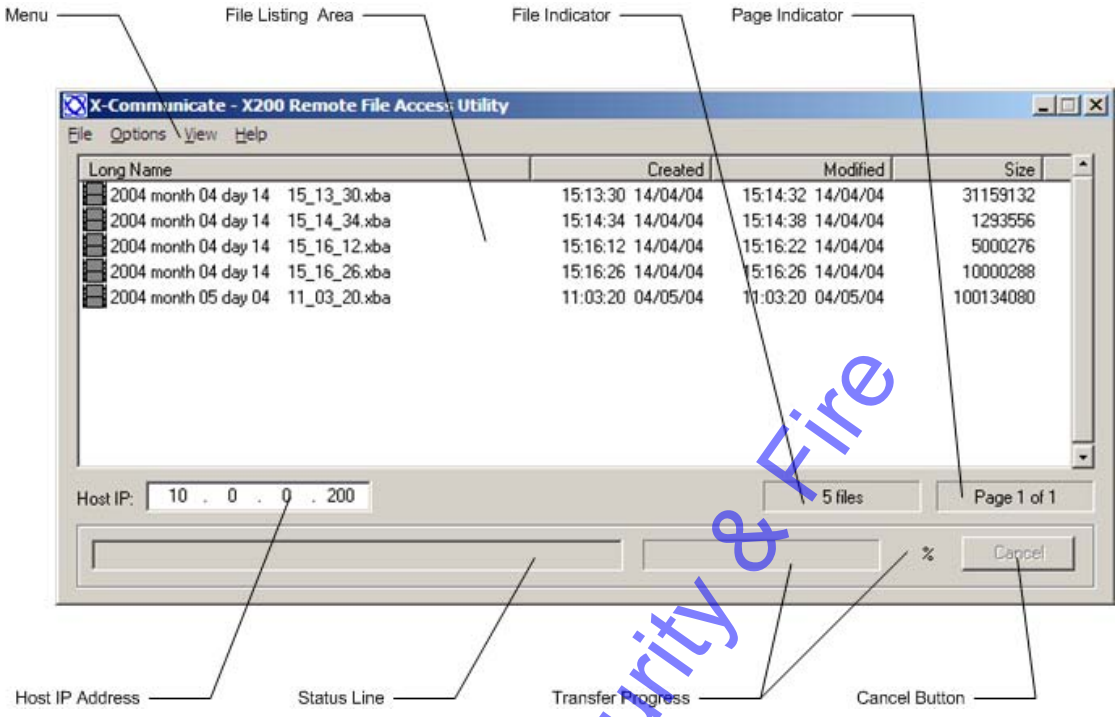
Quick Start

To download a video file from an X200 follow the steps below:

- Start the X-Communicate application
- Enter the X200 IP address in the host IP address field.
- Wait until communication has been established (files displayed).
- Select the required file (scrolling through the pages if necessary)
- From the menu, select File and then Download.
- Select a local name for the transferred file.
- Wait as the file is transferred.

Operation

The screenshot below shows the main areas of the X-Communicate application.



Menu

The menu allows the user to configure and control the X-Communicate application. Each of the menus and options are detailed below:

File

Download

This menu selection is enabled when a file has been selected (highlighted) in the File Listing Area. When selected, a dialogue is displayed which prompts the user to select the name of the file to be used locally. By default, the same filename as on the X200 is displayed.

If the file with the same already exists then the user is prompted to confirm that it is their intention to overwrite that file. Note that it is also possible to initiate a file download by double clicking the required file in the File Listing Area.

Exit

Selecting this option closes the X-Communicate application.

Options

Multiple Acks

File download from the X200 using TFTP is accomplished by the transfer of a number of blocks, each of which is acknowledged before the next is sent. To speed up transfer, the protocol permits a number of blocks to be in transit which have not been explicitly acknowledged. This approach can improve transfer rates and so the default is for it to be selected.

1024byte Blocks
The X200 implementation of the file transfer protocol supports different size blocks. If this option is selected then blocks of 1024 bytes will be transferred; if it is deselected then the files will be transferred in blocks of 512 bytes. In general, the larger block size will incur less overhead if the transfer of data is reliable and so will give better transfer rates; hence, this is the default.

View

Small Icons
Selecting this option displays the files on the X200 as small icons.

Icons
Selecting this option displays the files on the X200 as large icons.

List
Selecting this option displays the files on the X200 as a list.

Details
This view option is the default. Selecting it displays the files on the X200 with details including:

- Filename
- Creation Date and Time
- Modification Date and Time
- Size (in bytes)

Refresh
The X-Communicate application interrogates the number of files on an X200 when it firsts connects. To update the file listing, or to re-establish connection with an X200 which may have been temporarily disconnected, select this menu option.

Help

About
Selecting this option display a dialogue window displaying the application name. The version of the application also appears in the dialogue. In the example below, the version number is 1.2.

X-Communicate Window

File Listing Area

The file listing area displays the files stored on the remote X200 that are available for download. Using the menu View options, the files can be displayed as small icons, large icons, in a list or with details including creation and modification time and file size.
A file must be selected in the file listing area before it can be downloaded. Double-clicking a file will initiate the file transfer process.

Where more files are available than can be displayed in the file listing area, the vertical scrollbar to the right can be used to move between pages.

File Indicator

This field shows the number of files available for download on the remote X200 specified by the entered IP address.

Page Indicator

This field shows the current and total page numbers. Use the vertical scrollbar to the right of the File Listing Area to move between pages.

Host IP Address

Each device connected to a network must be configured with a unique IP address. Enter the IP address of the X200 you wish to connect to in order to download video files.

Status Line

Displays any status messages should the X-Communicate application be unable to connect to the specified X200 and also the transfer rate and time remaining during file download.

Transfer Progress

A progress bar and a percentage indicator update as a file is downloaded.

Cancel Button

During file transfer, the download can be aborted at any point by selecting the cancel button.

Glossary

IP	Internet Protocol
LAN	Local Area Network
TCP	Transmission Control Protocol
TFTP	Trivial File Transfer Protocol

GSM (RemoteLink V1.2 Software)

Introduction

RemoteLink allows the user to connect via a modem to a remote X200 unit equipped with a GSM modem, and control it as if using an X201 Reviewer. All features of the X201 Reviewer are supported (excluding audio), but image display is slow due to the speed limitations of the GSM network. Menus can be accessed and modified, live video displayed (please note that the X200 video switcher dwell times will be multiplied by 10 in order to take into account the inherent time delay in the GSM connection) and recorded footage viewed.

RemoteLink PC software allows the user to have the functionality of the X201 reviewer as if it were connected to the X200, except from a remote location.

The user can dial up any number of X200's in turn from a single remote location allowing checks and menu changes to be done when vehicles are in operation and not currently accessible to an operator equipped with a reviewer.

The X200 can be contacted whenever it is powered and wherever a GSM signal is available.

Facilities

Connect to X200 remotely from any PC with a dial up modem and an available phone line
Configure X200 menu system remotely
Verify correct operation of X200 remotely
Send SMS text messages from X200 to a mobile phone to confirm X200 operation
Check live camera views

Practical benefits

Check and change menu settings in real-time without having to physically visit the installation and connect a reviewer
Check camera health and views
Ensure that recorder is performing as expected and either change menu settings or alert the need for maintenance of the installation

Overview

If the user is familiar with setting up the X200 using an X201 reviewer there is little further to learn - you have the same functionality but remotely. The software allows the PC to dial up an X200 unit and once the connection is made the control as the reviewer.

It is important to bear in mind that the data rate is 920 bytes per second (a typical full image is 50,000 bytes) so playing back images, or displaying a live view takes time.

The hardware of a remote link system consists of an X200 connected to a GSM modem and a PC with internal or external telephone modem (PSTN) connected to a telephone socket. For every X200 you need a GSM modem, but you may only require one PC to access a number of X200 remote systems.

RemoteLink V1.2 PC software will run on Windows 98, ME, 2000 and XP and is included as part of the PCLink200 installation V1.2.0 or later.

Hardware Required

GSM modem (Dual-band model suitable for UK and European use)
SIM card (pre-inserted into GSM modem above)
Antenna for GSM modem
Serial cable (see specification below)
Power supply for GSM Modem
X200 with V1.3.0 software or later

Further items required for PC side

PC with dial-up modem connected to phone line able to make outgoing calls
RemoteLink V1.2 Software

Specification of Cabling

RJ12 Power Cable

Pins	Connect to	Function on modem
1	12V	+V
2	12V	free
3	GND	PD_IN (reset input active high)
4	12V	IGT_In (Ignition input active high)
5	GND	free
6	GND	GND

RS232 Serial Cable

Female DType9
Connected to X200

Male DType9
Connected to GSM modem

Pin	Pin	Function
1	1	DCD
2	2	RX
3	3	TX
4	4	DTR
5	5	GND
6	6	DSR
7	7	RTS
8	8	CTS
9	9	RI

Installation

1 Configure the SIM card

A SIM card needs to be plugged into the GSM modem for it to work. The SIM card provides the GSM modem its identity i.e. its phone number and any account information that may be needed. You may need a mobile phone to configure the SIM card.

RemoteLink requires the user to obtain the analogue data number for the SIM card.

The analogue data number is what Remote Link dials to access the GSM unit. Remote Link cannot use the normal mobile phone number that comes with the SIM, but needs a specifically assigned data number obtained from the SIM card provider.

Timespace have only used Vodafone SIMs for which an analogue data number is obtainable from Vodafone (correct as of May 2005). Some SIM card providers may not offer this service and it should be determined whether this is possible before purchasing a SIM card.

To obtain the analogue data number for a SIM card, contact the provider directly. You may need to register with them and you will need to provide them with the SIM card telephone number.

You cannot use the normal mobile phone number of the SIM for GSM modem use. You may also be given a fax number and a digital data number (ISDN number). Neither can be used for the RemoteLink application.

To activate the SIM you will usually need to put it into the mobile phone and make a call to any phone number. Someone should pick up the call. This initiates the SIM into activity.

If you are dealing with multiple modems it is recommended that you keep a list for each SIM of the SIM number (written on the SIM, 24 - digit) and analogue data number and normal phone number. If a modem doesn't answer, the SIM provider may be at fault - to fix it they will need this information.

Some SIM cards may expire after 3 months or 6 months if no outward calls have been made. It is essential that either the SIM you are using does not expire or the X200 is set to send an SMS message at an appropriate interval. This is set in the SMS OPTIONS sub menu accessed via the REMOTE SETTINGS menu in X200 software V1.3.0 or later.

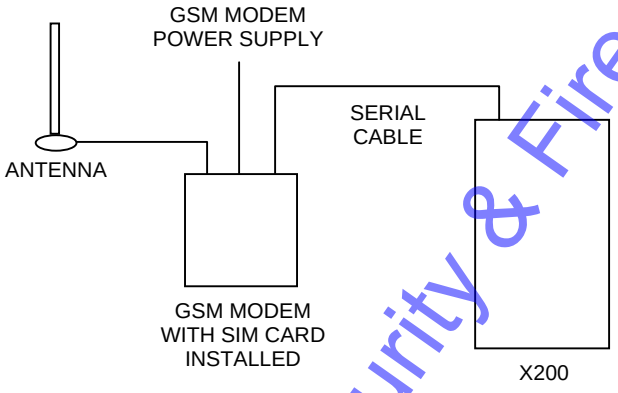
Sending an SMS message from the X200 in order to keep the SIM card from expiring will be a chargeable event. Please ensure that there is sufficient credit on the SIM to send an SMS message at the determined intervals.

2 Insert SIM card into GSM modem

Press in the little button on the side of the SIM tray using a pen. This pushes the SIM tray out. Remove the SIM from the mobile phone and place it into the SIM tray and slide the tray back into the GSM modem.

3 Connect modem equipment

Connect the modem equipment as shown in the diagram below:



The X200 system can now be switched on. It is ready for dial up.

5 Install RemoteLink V1.2 onto PC

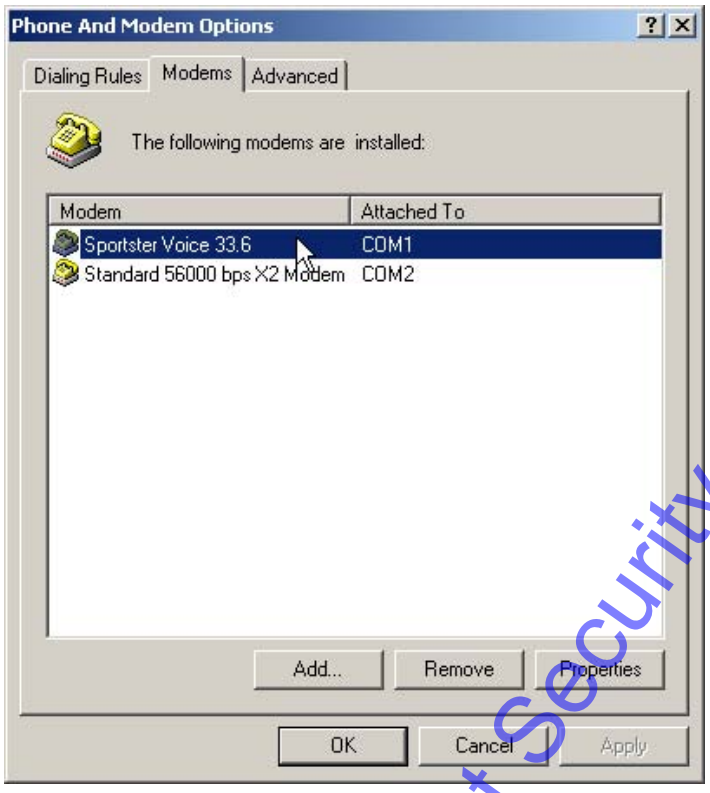
RemoteLink PC software is included in the PCLink200 installation V1.2.0 or later.

Running RemoteLink

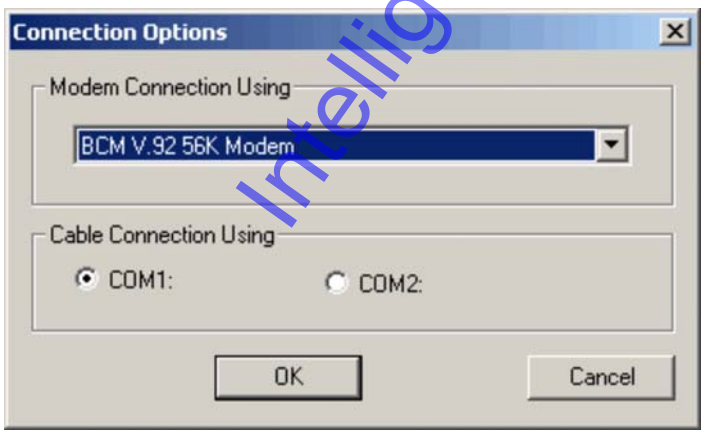
The RemoteLink main screen is a facsimile of the X201 Reviewer that it emulates, complete with screen, buttons and LEDs. All reviewer functions can be performed including the access and control of menus, live video display and recorded footage playback.

Selecting a modem

Before you can dial up any remote you units, you must first select the modem to use. This must be a modem that Windows recognises as one that it can use. It may be an internal or external version, but you must have installed the drivers that came with it and it must be visible in the list of installed modems. To check this list, open the Start menu and choose Settings>Control Panel. From the Control Panel list choose “Modems” or “Phone And Modem Options”



In RemoteLink, choose Tools>Options… from the main menu. The following dialogue will appear:



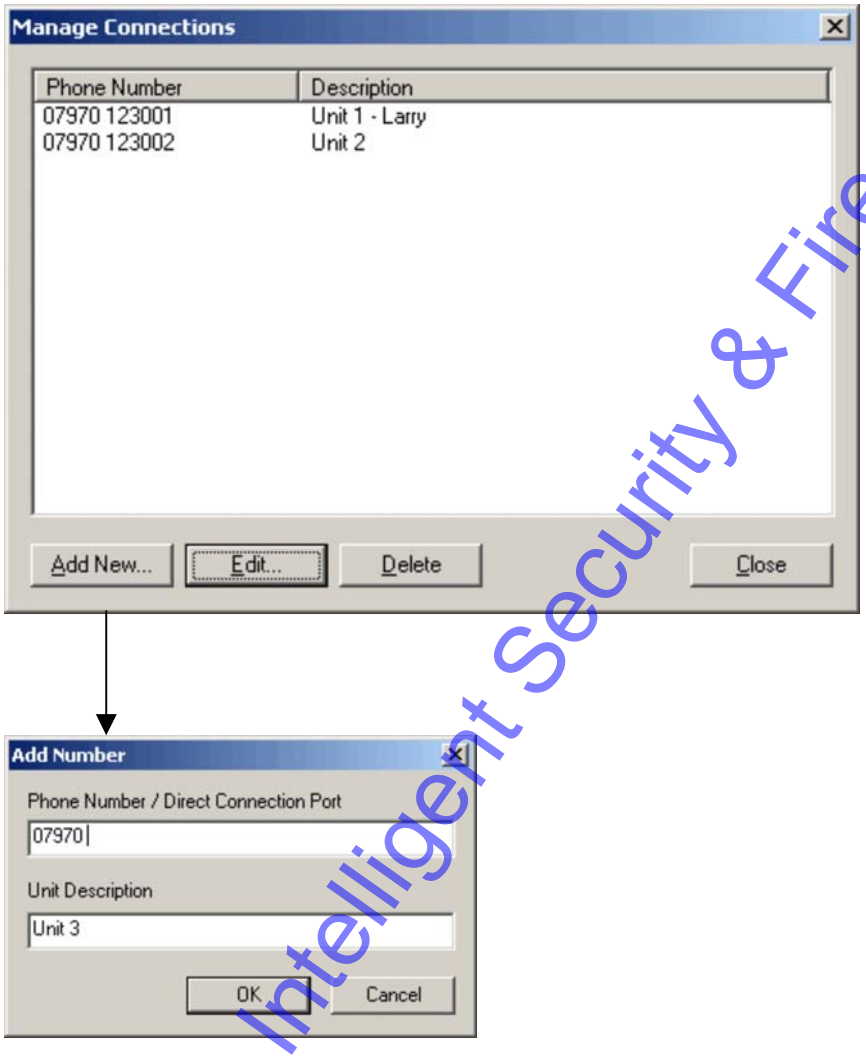
Click on the list box to see the available modems, and choose one. The highlighted modem will be used from now on. Click on OK to confirm you selection.

If you do try to connect to a remote unit without first selecting a modem in this way, RemoteLink will not be able to place the call, and will remind you to select a modem.

Entering / managing phone numbers

RemoteLink maintains a list of phone numbers of your remote units. When you contact a remote unit, you choose one of these numbers from a list. This avoids mistyping a number.

To Add numbers to the system, choose Tools>Manage Connections… from the main menu. This will open the Manage Connections Dialogue. If you click on the Add New… button, the Add Number dialogue will open and you can enter the new number and a description of that unit.



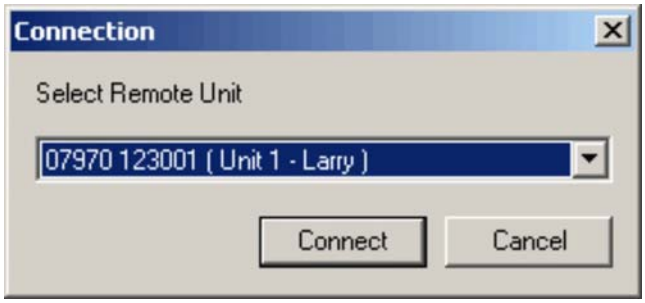
Any phone number you enter must only contain digits and optionally spaces. The unit description should be kept concise and will be used to show the user which unit is being accessed. Click OK to confirm the new number or Cancel to abort.

To edit and existing number, select it in the Manage Connections dialogue, and click on the Edit.
You may edit the existing phone number and unit name. The same rules apply as for adding a new number. Click OK to confirm the changes, or Cancel to abandon the editing.

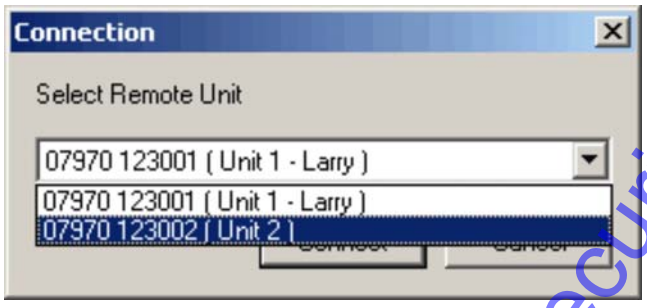
To delete a phone number, select it from the list and click on Delete. You will be asked for confirmation of this action.

Contacting a remote unit

Once a modem has been selected and there is at least one phone number stored in the system, RemoteLink will be able to dial a remote unit. To do this choose File>Connect using Modem… from the main menu. This will open the Connection dialogue:

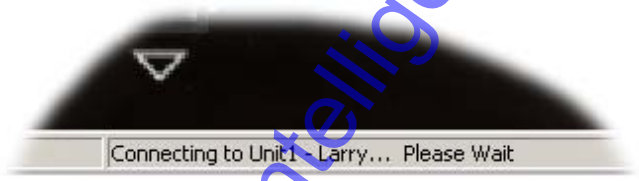


To select the number to dial, click on the down-arrow on the Phone Number drop-down box. This will show you all the numbers available.

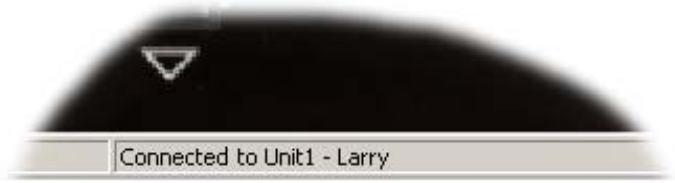


Click on the desired number and the drop-down box will close with that number selected. Click on the Connect button to start dialling.

The status bar at the bottom of the RemoteLink window shows that it is attempting to connect to the remote unit as shown:



Upon successful connection the status changes to Connected, along with the unit name:



To close the connection choose File>Disconnect from the main menu. The call may take a second to close down, at which point the status change to Not Connected.

Operation

Once a connection has been successfully made to a remote unit, the keyboard, LEDs and screen will be active, as if you are using an X201 Reviewer attached to the unit. Live video and stored footage can be viewed on the screen, all menus edited and parameters set. There is a noticeable delay when video is being transferred - please wait for any video to be uploaded. Key presses are registered with the X200 after video upload.

Important Note.
It is recommended that PABX extensions should not generally be used for modem connections as common in office environments, as they are known to be incompatible. Some PABX lines may be configured for use with PC modems, but if this is not available then always use a dedicated external line for modems.

SPECIFICATIONS

X200 DIGITAL RECORDER

Video Recording

Max Rate	25ips PAL, 30ips NTSC, shared; selectable by camera
Resolution	Low, Medium, High, V.High
TVL	540
Pixels	720 x 288 PAL; 720 x 240 NTSC
Format	MPEG2 - full image update or optional conditional refresh
Input Signal	4 or 16 inputs; composite video 1V p/p; colour/mono; PAL/NTSC auto switching
Simultaneous Functions	Record, Playback, Live views, Ethernet
Recording Medium	2.5" IDE PC-compatible hard disk in customised cartridge
Recording Modes	Normal, timer, alarm, single/multi shot, loop or single pass
Alarm recordings	Post-trigger recording; show alarmed cameras live on video switcher
Timer recording	Weekly timer (7 day programmable) or interval timer, or both
Embedded Text	Camera number, date and time plus 12 user characters for each camera; GPS* speed and position

Audio recording

Type	Optional 2 line inputs, 2 line outputs;
Sampling Rate	16kHz
Sampling Res.	16 bits
Max Level	Selectable: 0.12V to 2V RMS (0.35V to 5.6V pk-pk)

Configuration

Entry	Menu system with help screens; accessed [with password] by X201 Reviewer
Password	4 user-definable levels
Language Options	English
Date Options	dd/mm/yy; mm/dd/yy
Summertime Correction	UK; Europe; USA; Off

File System

File Type	Proprietary ".xba", convertible [with password] to AVI
File Name	Optional file text plus date/time, for example:"Bus0034 2004 month 08 day 16 12_30_00. .xba"
File Size	10 min or 1 hour
File Protection	Write-protection via file menu; optional automatic write - protection of alarm recordings

Playback

Functions	Rewind, Replay, Stop, Play, Fast Forward, Jog mode
Image Search	Time/date or by file

Remote Operation*

Systems	Ethernet [LAN/WLAN*], GSM*
Functions	File transfer to PC (LAN/WLAN), system configuration (GSM)

GPS*

Embedded Text	Position (coordinates) and speed (kph or mph)
GPS Data	Files contain GPS position/speed/time for mapping
Clock Lock	Locks X200 clock to world GPS clock

* Additional hardware required - not supplied by Timespace Technology

Connections/Controls

Connector Type	Cable harness (X200-16) Individual connectors (X200-04)
Video Inputs	16 on 25-way "D" connectors (X200-16) 4 x BNC (X200-04)
Video Out	1 on 25-way "D" connector (X200-16) 1 x BNC (X200-04)
Switcher Out	1 on 25-way "D" connector (X200-16)
Audio In	2 line on 25-way "D" connector (X200-16) 2 line on DIN 5 way audio socket (X200-04)
Audio Out	2 line on 25-way "D" connector (X200-16) 2 line on DIN 5 way audio socket (X200-04)
Alarm Inputs	4 on screw terminals
Alarm Output	1 on screw terminals
Power Inputs	2.5mm DC socket for PSU 1 x pair screw terminals, 12V
Modem and/or GPS	9-way "D" connector [RS232 serial]
LAN/WLAN	RJ45
Reviewer [X201]	RJ45
Record On/Off	Push button [menu disable]
Indicators LED	Power, Recording, Service, Fail
LED Out	2 x screw terminals for Recording LED and Service/Fail combined LED

General

Security	Proprietary files; password protection; fragile watermark every image [MD5+DES]; embedded camera text
Power [DC]	12V DC nominal (8V-13V DC max range);
External Supply	Input: 100V-240V AC 50-60Hz Output: 12DC Regulated, 2A (continuous) 3A (peak)
Power Recording	0.60A, 12V (7.2W)
Power Not Recording	0.48A, 12V (5.8W)
Peak Current	2.8A peak start-up current @ 12V (X201 connected)
Power on until Recording	< 5 seconds
Clock	TCXO [+/- 4 min/year]; optional GPS locked clock*
Case	Mild steel, grey painted
Dimensions [mm]	210 x 112 x 47 (case)
Dimensions [mm]	220 x 116 x 52 (overall)
Weight	965g (without cartridge)
Environment	Indoor use
Operating Temp. Range	+5C to + 40C, 20% to 80% RHStorage Temp. Range -40C to +65C
Mounting	Free-standing or screw-mounted
Supplied Accessory	Instruction manual; PSU
Warranty	36 months

REMOVABLE HARD DISK CARTRIDGE

Access	X201 Reviewer; LAN/WLAN while in X200; PC using USB Interface Kit (see below)
Hard Disk	2.5" IDE
Power Requirement	5V 1A (PSU supplied with USB Interface Kit)
Dimensions [mm max.]	143 x 84 x 23
Weight	~ 200g depending on type
Warranty	30 months

X201 REVIEWER

Functions	Program menus, check camera views, review live or recorded images
Operation	22 tactile keys with LED indicators
Power	Powered by X200
Power Consumption	0.35A, 12V (4.2W)
Display	3" LCD monitor, TFT, 960[H]x234[V] pixels
Format	PAL/NTSC
Audio	Single channel via built-in speaker
Connectors	X200 interface: 8-way RJ45 [serial data; video; audio; DC supply]; headphone jack
Case	Aluminium, grey painted
Dimensions [mm]	218 x 148 x 52
Supplied Accessory	Data link cable (X200 to X201)
Warranty	36 months (monitor 12 months)

PCLINK200 REVIEWING/ARCHIVING SOFTWARE

Availability	Supplied in USB Interface Kits; software freely available to law enforcement agencies
Compatibility	Recordings made on X200 cartridges
Access	Cartridge or recordings on CD/DVD, PC hard disk (copied or LAN/WLAN uploaded files)
Operating Systems	Windows 98, ME, 2000, XP
Hardware Requirements	2GHz Pentium, 256MByte RAM, USB2 for optimum playback speed
Security	Optional password on PCLink200 software and on export video to AVI function
Language Options	English
Playback Controls	Rewind, jog back, stop, play and fast forward, jump to time, rapid shuttle via timeline.
Playback Speed	Varispeed x0.1, x0.2, x0.5, x1, x2, x3, x4, x6, x8, x10 real-time for rapid playback.
Functions	Real-time playback with audio Review archive files on single or multi screen display Copy 10 min or 1 hour files from cartridge to PC Copy images into Microsoft Word or other package Activate and verify watermarks Export video to AVI file

OTHER ACCESSORIES

USB INTERFACE KIT
For access to X200 recordings via USB1 or USB2 socket of PC; includes software, cables, instructions, PCLink200 reading software.

ANTI-VIBRATION KIT
Shock and vibration protection in mobile and portable applications.

TROUBLESHOOTING

Text Messages

The following messages may be displayed on the X200 reviewer under the circumstances described:

```
      MANUAL OVERRIDE ENABLED

You have chosen to override ALARM
recording and turn recording off.

To disable this manual override,
press the record key again, after
leaving this screen.



     PRESS ANY KEY TO CONTINUE
```

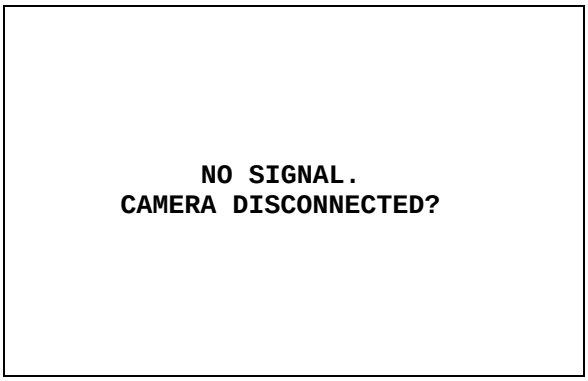
The above is displayed when the unit is configured for alarm recording and the record button is pressed which will override the configured mode. Press any key on the reviewer to clear the message.

```
      MANUAL OVERRIDE ENABLED

You have chosen to override TIMER
recording and turn recording off.

To disable this manual override,
press the record key again, after
leaving this screen.



     PRESS ANY KEY TO CONTINUE
```

The above is displayed when the unit is configured for timer recording and the record button is pressed which will override the configured mode. Press any key on the reviewer to clear the message.

```
     MANUAL OVERRIDE DISABLED

Manual override is now OFF.









     PRESS ANY KEY TO CONTINUE
```

The above is displayed when manual override has been enabled and then subsequently disabled again. Press any key on the reviewer to clear the message.



The above message is embedded within the recording file when the X200 video recorder detects that there is no video signal on an input selected for recording. Check that the camera is working and properly connected to the X200 should this message be seen unexpectedly in recordings.

Fail LED

Illuminated when the X200 video recorder is unable to make recordings. Check that the hard drive cartridge is properly inserted and locked in.

Service LED

Not currently used.

FAQ's

X200

"Does not record on power up"	Enter menu system; go to OTHER MENU, ADVANCED MENU; set to "RECORD AT POWER UP".
"Recording at varying times"	Check that the TIMER RECORDING MENU settings are correct or Timer Recording is disabled.
"The recorded picture is grainy"	Improve the light level to the camera, or increase the exposure level; use a camera which works to a lower lux level.
"X200 has all front panel LED's illuminated and fails to operate"	Ensure cartridge is pushed home and switched on.
"Cameras connected but no live views"	Press "Auto" on the X201 Reviewer.
"No picture on X201 monitor"	Ensure that correct power supply to X200 (12V +/- 1.2V, 2A (continuous) 3A (peak).
"PC can't see disk but recordings viewable on X200"	The hard disk boot / partition / FAT sectors may have become corrupted. Go to OTHER MENU, FILE SYTEM, FILE SYSTEM CHECK MENU and select PERFORM CHECK AND CORRECT NOW. This checks and rewrites the boot, partition and FAT sectors of the hard disk and removes any corrupted recording files. **Please also check the shock and vibration damping of the X200 as shock and vibration reduce disk life and can also lead to corruptions on the hard disk.**

USB Interface Kit

"PC fails to start if USB Interface Kit and cartridge is attached but switched off during start up"

On some PC's Windows may not start correctly if an X200 cartridge is left attached to the PC via the USB Interface Kit during start up. This may be the case even if the cartridge is switched off.

"Hard Disk Cartridge appears to be full When trying to save X200 software from a PC Running Windows 98"

If the hard disk cartridge has V1.51 of the X100 operating system installed on it then although it may have enough free space available to save the X200 .xos file Windows 98 shows the disk as full.

- Connect the cartridge to the PC via the USB Interface Kit.
- Go to My Computer and right click on the Cartridges drive letter.
- Select 'Properties'.
- Select 'Tools'.
- Select error-checking status 'check now'.
- Select type of test as 'Standard'.
- Select 'Start'.
  The scan disk process will detect the following errors: - 'System_b' and 'System' with the option to 'repair the error'
- Select 'OK'
  The scandisk will then detect that the information on the disk can be damaged with the option to repair the error.
- Select 'OK'
  Scandisk will then show the results from scanning the cartridge.
- Select 'Close'

The cartridge will now allow the user to transfer X200 software onto the cartridge.

USB Interface Kit compatibility with Windows XP

Early versions of Windows XP may have some compatibility problems when used with USB2 interfaces such as the USB Interface Kit supplied to connect an X200 Hard Disk Cartridge to a PC. This situation has been resolved with the issue of service pack 1 for Windows XP.

If you are having trouble installing and using the USB Interface Kit with Windows XP then check to see if service pack 1 has been installed (My Computer > View System Information > General Tab). If it is not listed under the System heading, then it may not have been installed and can be downloaded from Microsoft.