Bus-Cam®

ESS4 Mobile Digital Recorder

User Manual

Before installing and using...
be sure to read this Manual for best performance.

ATTENTION

- This product is to be used within the vehicle interior. In order to prevent short-circuit or the risk of electrical shock, do not use this product within a wet environment.
- In the event of any foreign solid or liquid entering the DVR, please disconnect the power immediately, and have a qualified technician confirm safe operation.
- The product is high-tech equipment, with no user-serviceable parts. Please refer all service to qualified technical personnel.

Installation Environment

- Please ensure that the power supply to the DVR is in the range of 8-48V DC before turning on.
- If you will not be using the DVR for a long period, please disconnect the power.
- Please select an appropriate location for the installation of the DVR, and allow sufficient space for adequate air flow.
- Do not install the DVR in areas of high heat or extreme vibration and mechanical shock.

Packing List

Name	Quantity
ESS4-x Digital Video Recorder	1
Remote Control	1
Interface cable set	2

Note:
Due to continuing product improvements, specifications and features are subject to change without notice.

Contents

Product Overview

This four-channel embedded digital SD Card video recorder is designed for vehicle safety and surveillance. It uses an embedded processor and embedded operating system, combined with video/audio compression/decompression, vehicle recorder, and SD card storage technology to ensure high intelligence and high stability. Widely used for buses, cars, ships, trains, and other areas where mobile security is required.

Features

Operating System

- Embedded Linux operating system for stability.
- Simple Menu User-interface
- Graphical on-screen display.

Video Compression Standard

- H.264 Video format: Excellent images, with the most efficient bit stream.

Wide Operating Range

- The ESS4 can operate with a stable power supply of 8VDC to 36VDC.

Surveillance and Video Processing

- Surveillance: 4 channels D1 video (PAL: 720 * 576, NTSC: 720 * 480)
- Recorder: Total resources 100 PAL, 120 NTSC. 4 channels CIF (PAL: 352* 288, NTSC: 352 * 240), HD1 (PAL: 720* 288, NTSC: 720 * 240), D1. (PAL: 720* 576, NTSC: 720 * 480) video storage separately.
- Three record modes: Alarm record, Schedule record and Manual record. Supports 4 channels of video and 4 channels of audio recording simultaneously.
- Video quality: Eight levels, user-selectable.
- Specially designed video file system to prolong the life and improve the security of the SD card.
- The video & audio data of SD storage cannot be artificially modified, to preserve evidentiary value.

Playback and Search

- Playback is according to date & time.
- Supports 4 channel video and 4 channel audio playback simultaneously, or 1 channel video and audio playback (using our PC viewer software).
- If playback is from the DVR to an LCD monitor, then 1 channel video and 1 channel audio playback is supported.

SD Card and Backup

- Double SD card storage, supports max 64G each.
- Remove the SD card and create backups with our viewing software via your SD Card reader on your computer.
- Backup can be accomplished by using the USB connection on your computer (the USB port is equipped only upon customer's requirements；USB port backup of SD card when using SD2 is unavailable at this time).

Control

- Remote control.
- Dual MCU control, high reliability.

Designed to Prevent Vibration

- The circuit board and all electronic parts & components in the ESS4 are anti-vibration and consolidated for reliability.
- The entire system has anti-vibration construction.

Signal-loss Detection

- If a video signal is lost on any active channel, the ESS4 will activate the alarm output. NOTE: This function operates only when a channel is recording, and the ESS4 is not in full-screen display mode.

Alarm Pre-recording

- Whenever an alarm has been triggered, the ESS4 will prepend the previous 5 seconds of recorded video. This "early view" of events that led up to the alarm can aid in the reconstruction of incidents.

Malfunction Alarm

- If the ESS4 malfunctions, the alarm output will trigger for a period of 6 to 330 seconds (user-settable). The relay-contact output can be connected to a warning light or buzzer.

PTZ Camera Control

- The ESS4 can control PTZ (pan/tilt/zoom) cameras using standard protocols (RS-485, PELCO-D. PELCO) at 9600 baud, real-time for 4 channels

Networking

- With the ESS4 3G model, real-time video monitoring can be accomplished by using our CMS software

Authority, Encryption and Data Safety

- All Menu and Operational changes are password-protected (default is 6666). Recorded video is stored in a special encrypted format to prevent tampering, thereby preserving the evidentiary value.

Logging

- The ESS4 maintains a log that includes any alarm and malfunction events. This data is stored into the SD card, and can be reviewed in our viewing software.

Self-test and Self-recovery

- While the ESS4 is recording, the RUN indicator will continuously flash and the system will be continuously checked for any errors. In the unlikely event of a system disruption, the ESS4 will perform remedial action and recover within three minutes.

Others

- USB software upgrading，simple maintenance and upgrading.
- Password-protection to prevent data tampering.
- Prevents voltage surges, has low voltage supply protection.
- Time-lapse shut-down function (adjustable—default is 5 seconds).
- Real-time clock.
- Automatic Daylight Saving Time changeover can be enabled.

Technical Parameters

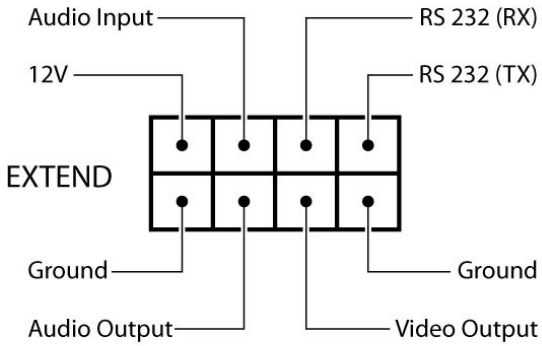
Items	Item Name	4 Channel Mobile DVR(HDD Storage)
	Item Number	ESS4-x
	Solutions	H.264 Main Profile
System	Operation Interface	Graphical Interfaces
	Password Control	User Password
Video	Video Input	4 ch Independent Input: 1.0Vp-p，75Ω.Both B&W and Color Cameras
	Video Output	1 Channel PAL/NTSC Output, 1.0Vp-p，75Ω，Composite Video Signal
	Video Display	1 Or 4 Screen Display
	Video Standard	PAL: 25 frames/Sec NTSC: 30 frames/Sec
	System Resources	PAL:100 Frames; NTSC:120 Frames
Audio	Audio Input	Four Channels Independent Input 600Ω
	Audio Output	1 Channel (Select any of 4 Channels)
	Basic Output Level	1.0—2.2V
	Distortion Plus Noise	≤-30dB
	Recording Mode	Sound And Image Synchronization
	Audio Compression	ADPCM
Digital Processing & Storage	Image Compression	H.264 Fixed Code Stream
	Image Format	4*CIF (352*288), or 4*HD1(720*288), or 4*D1(720*576)
	Video Stream	CIF: 8K-64Kb/s HD1 & D1: 32K-96Kb/s
	Video Usage of SD card	CIF: 28M-230Mb/hr/ch HD1 & D1: 115M-340Mb/hr/ch
	Resolution	Playback 1 Channel
	Video Streaming Standard	H.264 Main Profile
	Audio Bit Rate	4Kb / s /channel
	Audio Usage Of SD card	14Mb / hr /channel
	Internal Storage	Dual SD card storage, Max. 64 GB each
	Image Quality	User-selectable, eight Levels
Others	Power	DC8-48v 5%≤12W
	Working Temperature/humidity	-20℃～ +60℃/≤80%
	Clock	Built-In Clock, Calendar
Packaging	Product Size	6” (L) x 7.5” (W) x 2.05” (H)（with Bracket）
	Product Weight	1.2 lbs

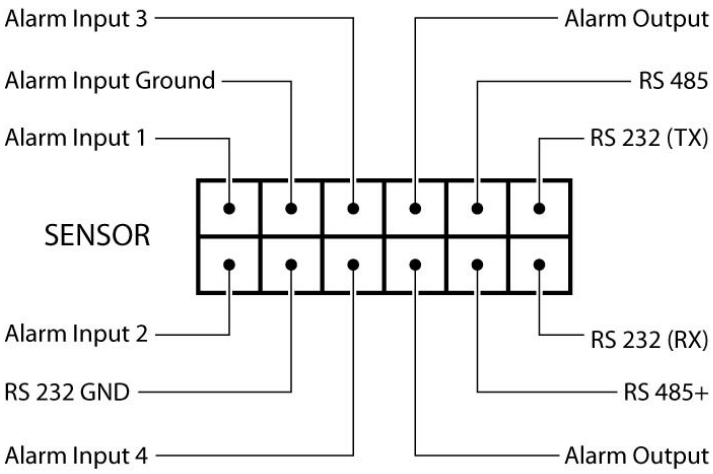
Optional Features

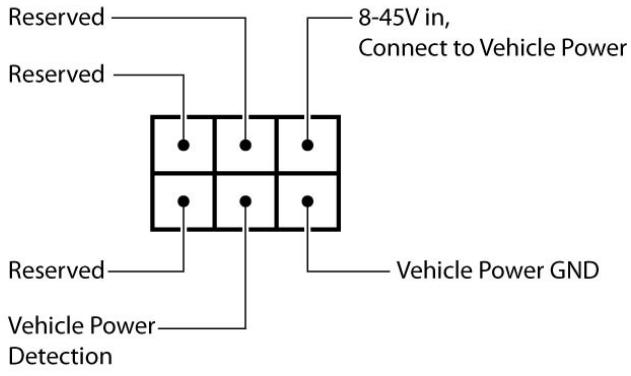
- GPS module
- 3G module
- Ports (one RS-232, one RS-485, cradle head control, PELCO-D, Baud rate 9600, address code 0x01)
- Intercom function

Installation Instructions

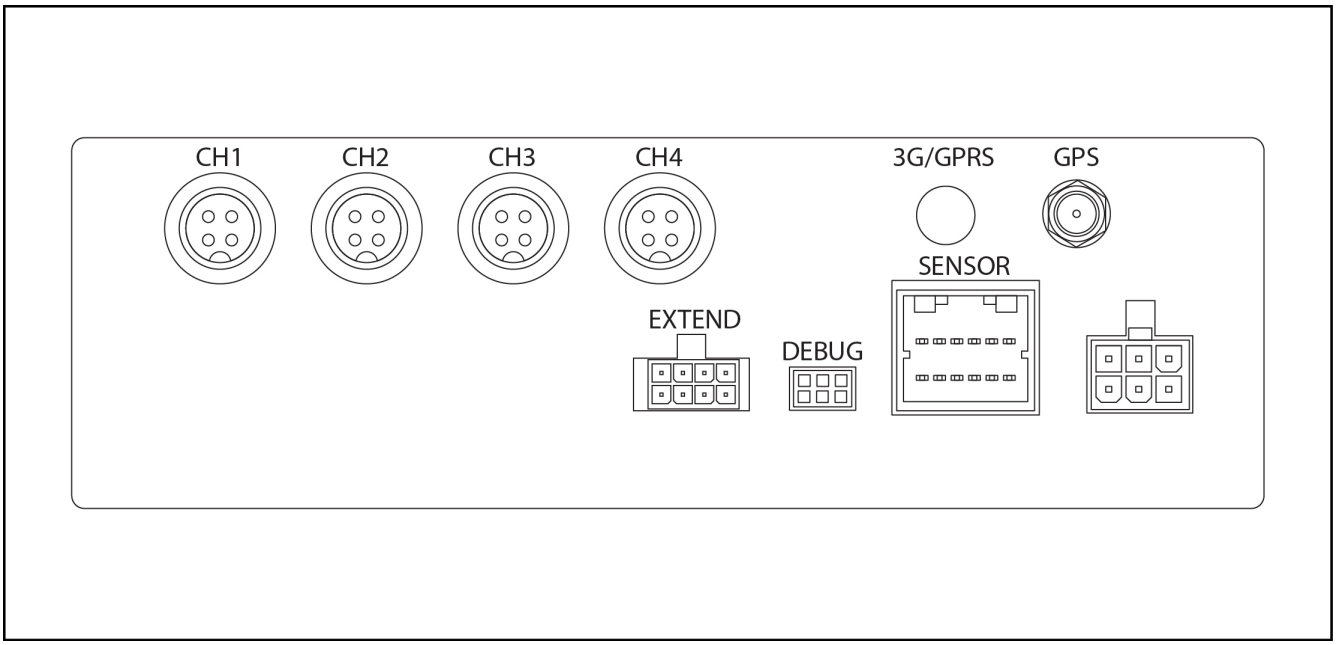
External Interface Wiring







4-pin Connector layout



Remarks:

- If the power supply is 12V, then the current of 12V output is limited to 1A. If there are more than 3 cameras, we suggest that customers get power for other cameras from the 12V vehicle power directly.
- RS485 and RS232 interfaces are optional.
- Ports:

DEBUG: Testing port
EXTEND: Intercom connection port
SENSOR: Alarm port

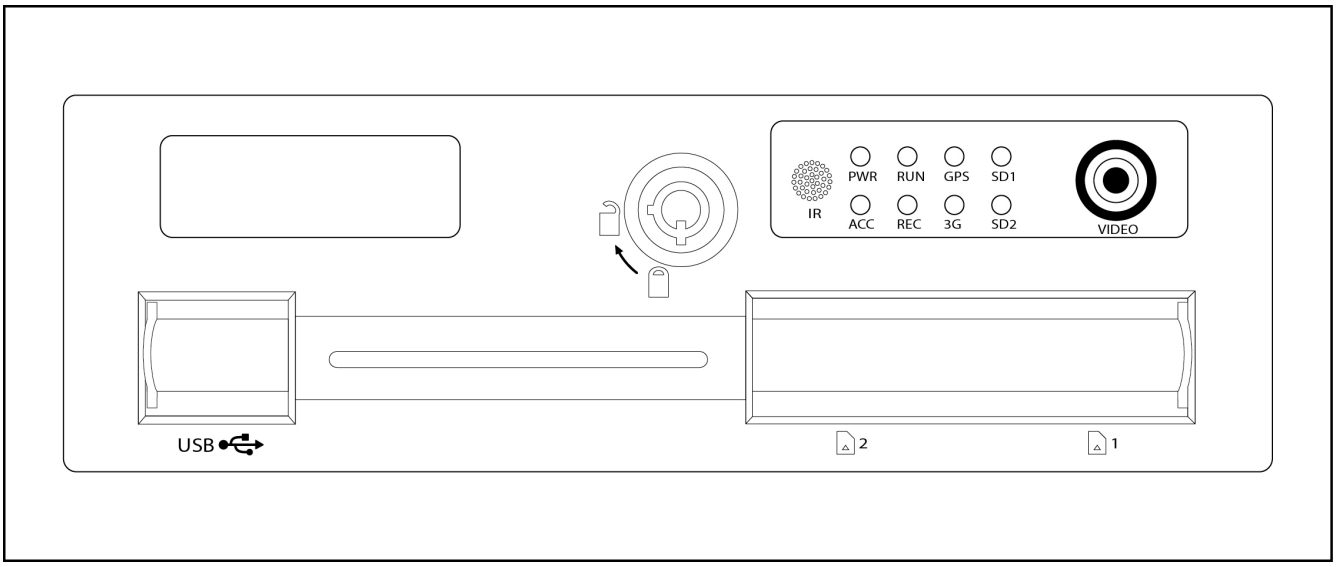
SD Card Installation

Unlock the unit with the key, making sure that the arrow points to he "**UNLOCK**" position.

Note: The lock also controls the power. When it is placed in the locked position, it also means that the DVR is powered and ready to use. Before turning on, please make sure all the cables in the system are well connected; otherwise, damage could occur.

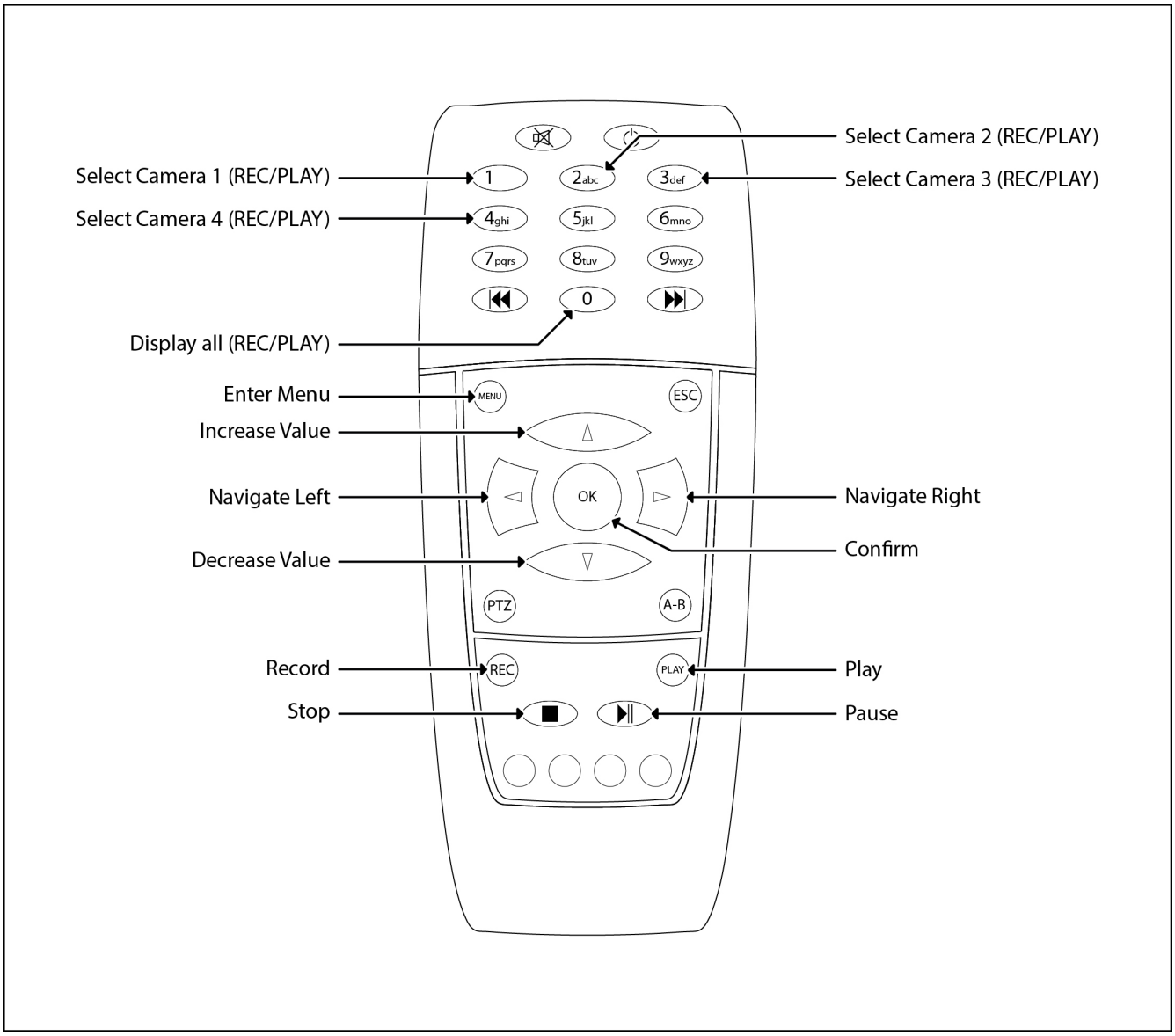
Using the DVR

Front Panel



LED

- ✓ **PWR LED**: Lit when system is active. Power LED on.
- ✓ **RUN LED**: LED flashes during normal operation.
- ✓ **SD LED**: Flashes when recording, playing back or backing up.
- ✓ **GPS LED:** GPS activity indicator.
- ✓ **3G LED**: 3G activity indicator.
- ✓ **ACC LED**: Vehicle started indicator
- ✓ **REC LED**: Recording indicator



Note: The numeric keys may be used when entering passwords.

Live (non-recording) mode, press **MENU,** then press the **DOWN ARROW** to display the password dialog**.** If this the first time entering the MENU, the system will display "ENTER THE PASSWORD" (The **default password** is **6666**). When finished, press **OK** to exit the MENU interface. In **Record** mode, please press **STOP** to stop recording, then press **MENU** to enter the MENU interface.

System Menu

Setup Sub-Menu

- **Date Fmt:** Choose format as y/m/d, m/d/y, d/m/y.
- **Daylight:** Enable/Disable Daylight Saving Time Changeover.
- **Date:** Sets the date.
- **Time:** Sets the time.
- **GPS Timing (for GPS equipped):** Set UTC time zone (UTC-6, etc.).
- **Language:** Select English, Portuguese, Chinese or Russian.
- **Video Mode：** Sets the video standard (NTSC or PAL). Takes effect upon restart of the DVR. Must restart unit after setting.
- **Delay Time：** Sets the post-trip delay recording function. Default time is 5 seconds. Can be set to 5, 30, 60, 120, 300, 600, 1200, 1800, 3600 or 7200. Takes effect upon restart of the DVR.
- **Speed Unit:** Mph (USA) or Km/h (Canada/Mexico).
- **Zoom in CH:** Channel to display on power-up (Default is NONE)
- **Password：** To change the password, enter the original password, then OK.
- **New Psw：** Sets the new password.

PTZ Sub-Menu

Unused for Mobile Applications.

Sys Info Sub-Menu

- **Device ID:** Internal electronic serial number (read-only).
- **Software Version:** Operating system version (read-only).
- **IMIE (3G models):** 3G SIM Card ID.
- **3G Signal (3G models):** Strength of signal and status.
- **GPS Signal (GPS models):** AA-BB(AA: GPS no. / BB: Strength—max 3).
- **Reset Cfg:** Restore all settings to factory default (use caution).

Vehicle Sub-Menu

- **Car ID:** License plate number.
- **Line Num:** Route number.
- **Driver ID:** Driver ID number;

G-Sensor Sub-Menu

- **GSensor X:** 0000mg (default. This will change according to x-direction g-force).
- **GSensor Y:** 0000mg (default. This will change according to y-direction g-force).
- **GSensor Z:** 0000mg (default. This will change according to z-direction g-force).

Log Sub-Menu

Historical listing of significant system activity (read-only). Includes Power status, record status, error events, etc.

Disk Menu

- **Disk Name:** Display the installed SD Card Name(s).
- **Total Size:** Display the total capacity of the SD Card(s).
- **Free Size:** Display the remaining free space of the SD Card(s).
- **Format:** Format the selected SD Card(s) (wipes the SD Data).

Record Menu

- **Channel:** Select the channel on which to control the following settings (or all).
- **Resolution:** (left-local storage / right-network streaming): CIF/HD1/D1
- **Frame:** (left-local storage / right-network streaming): 1-30 frames/sec.
- **Quality: Video Resolution** (left-local storage / right-network streaming) 8 Levels
- **Rec Mode:** Video / Audio+Video (A+V) / No Record (N)
- **File Len:** Length of created video files (300 to 3600 sec). Higher num = less fragments.
- **Save:** Saves setting changes (must restart DVR to take effect).

Playback Menu

- **Clip Listing by Date (select).**
- **Channel(s) to play back (ALL, 1-4).**
- **Play** Play selected clip to selected channel(s).
- **Copy** Backup selected clip to USB Disk

Network Menu

LAN Sub-Menu

- **Net Type:** LAN or 3G-WIFI Options (auto-switch, with WiFi first priority).
- **DHCP:** Set 'ON' to enable, to auto-obtain IP Address.
- **Static IP:** Set a static IP address in LAN mode.
- **Net Mask:** Set network subnet mask in LAN mode.
- **Gateway:** Set network gateway in LAN mode.
- **DNS:** DNS address (required for Dynamic DNS of 3G Server).
- **Server IP:** IP address of the 3G server or parked DDNS address of server.
- **Server Port:** 3G use (default is usually OK).

3G Network Sub-Menu

- **APN:** Data access address of 3G provider.
- **Dialup num:** Access number for 3G provider.
- **User Name:** User name for login.
- **Password:** Password for login.

WiFi Sub-Menu

- **SSID** Router key.
- **Password:** Password to access WiFi.
- **Certificate:** Select WPA or PSK.
- **Encryption:** Select CCMP and TKIP

Alarm Menu

- **Alarm REC:** Alarm-triggered video duration (30-330 sec)
- **GPS Interval (if equipped):** GPS data upload rate.
- **Alarm Out:** Alarm output duration (5-900 sec).
- **Over speed:** Sets the over-speed alarm value.
- **Motion Detect:** Enable/Disable motion detection. Disable for mobile use.
- **Det Area:** Not used in mobile application.

Video download

- Connect USB Flash Drive or USB HDD to USB interface in front of the DVR
- Shift to "Playback menu", select target video for download by Remote control, press "OK" to start copy.
- Repeat for each selection.

Video Data Capacity

Required capacity of video and video-related settings:

VIDEO QUALITY	Total Record Frames	Data Size Per Hour
HIGHEST	120 frames	1120 MB
HIGHER	120 frames	1012MB
HIGH（default）	120 frames	900 MB
BETTER	120 frames	780 MB
NORMAL	120 frames	675 MB
LOW	120 frames	560 MB
LOWER	120 frames	450 MB
LOWEST	120 frames	340 MB
Note: Calculate recording times based upon your settings.		