



CLARITY 4

High-Definition 720p Mobile DVR Installation and Operation Guide

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1.0 Introduction

Before installing and using, be sure to read this manual to properly install and use.

- This product is for vehicle interior use only.
- To prevent short-circuits, or the risk of electric shock, do not install or use in damp or wet areas.
- In the event of any liquid or foreign object entering the DVR, please disconnect the power immediately.
- This product is not user-servicable. Please refer to a qualified technician for service.
- Specifications and features are subject to change without notice.

1.1 Installation Environment

- Requires 8-36 VDC power supply. Please confirm the power source before powering.
- If the DVR will not be used for an extended period, please disconnect to conserve vehicle battery power.
- Select an appropriate location for installation: Dry, with adequate ventilation.
- Do not install near heat sources, or directly in sunlight. Avoid dusty or wet areas, and mount securely to avoid mechanical vibration or impact.

1.2 Packing List

Item	Quantity
Clarity 4 720p Dual SD Card Mobile DVR	1
User Manual	1
Remote Control (not including battery)	1
Connecting cables	3

1.3 Product Overview

This four-channel, high-definition Digital Video Recorder is designed for mobile video surveillance. It is totally solid-state for reliability—recording high-quality video to dual SD Cards, each with a capacity of up to 128 GB. Appropriate for all mobile environments, when installed as designated herein.

2.0 Basic Functions

2.1 Audio/Video Compression Formats

The CLARITY 4 adopts the latest ISO14496-10 (H.264) video compression technology, with a high compression rate to ensure optimal image quality, while consuming minimal storage space. The audio system uses G711 compression for low-distortion, quality audio.

2.2 Audio/Video Recording Mode

Compression Format	Special encrypted files for security and chain of custody.
Compression Stream	8 Levels, adjustable from 192kbps to 2.0Mbps/channel.
Storage	Dual 128GB SD Cards. One-time or recycle recording modes.

2.3 Image Quality/Rate

Resolution	720P, 1280*720/Channel in record/playback/monitoring.
Rate	Maximum of 30 fps/Channel, total 120 fps.
Monitoring	Greater than 270TVL/Channel.

2.4 Total Resources

Recording	Four channels @ 720p, 1280*720 each.
Playback	Four channels @ 720p, 1280*720 each.

2.5 Audio/Video Synchronous Recording

Records and plays Audio/Video/GPS data simultaneously. Clips and information can be reviewed on a PC with our free CMS software.

2.5 Access Detection

Although video-based motion detection is available, it is more appropriate for fixed locations, rather than mobile environments, where there can be constant background motion.

2.6 Signal Loss Detection and Alarm (3G/4G Equipped Models)

If the video signal is lost, the system will send an alarm signal via the internet (with 3G-equipped systems). Response time is less than 5 seconds, and includes system log information.

NOTE: This function will not work if a channel is not in record mode, or if a channel is displaying in full-screen mode.

2.7 Alarm Linkage

Supports 4-channel alarm inputs, requiring 4-36DC voltage to trigger. 1-channel alarm, using an open-contact, form-c relay (Maximum current 500ma in on-state). When an alarm has been triggered, recording will start automatically for an adjustable duration of 30-330 seconds. The relay will close for a duration of 5-900 seconds. Response time is less than 1s.

2.8 Alarm Pre-recording

In Alarm-video mode, the system will pre-record more than 5 seconds of Video/Audio/GPS data.

2.9 Full Duplex Operation

The system is capable of recording and playback simultaneously with no frame loss.

2.10 System Watchdog (Malfunction) Alarm

If recording is interrupted, the alarm relay will activate for a minimum of 6 minutes.

2.11 Self-test and Self-Recovery

When in operational status, the **RUN** indicator will constantly flash, to indicate that the system is self-analyzing. In the event of a problem, the system will auto-recover from the fault within a maximum of six minutes.

2.12 External Device Control

The CLARITY 4 can control PTZ cameras through built-in protocols (RS-485, PELCO-D or RS-232 @ 9600 Baud), 4-channels, real-time, switchable to monitoring mode.

2.13 Networking

If 3G-equipped, the CLARITY 4 can be monitored remotely (requires your SIM card and carrier. Their data rates may apply).

2.14 Data Backup

Use your computer with its SD Card reader and our free viewing software. The 4-channel files can be converted to single-channel AVI format to play in standard media players.

Download SD Card data remotely, through the network (if so equipped).

2.15 Security and Data Safety

The CLARITY 4 is password-protected, so that only authorized personnel can make changes to the operation parameters. Default password is **6666**. Data is stored in a special file system to ensure that it is encrypted and safe from tampering.

The SD Cards are protected from tampering behind a locking, sliding door on the front panel.

2.16 Logging System Activity

The CLARITY 4 maintains a history log file that includes any alarm or malfunction information. The log file is stored onto the SD Card, and can be reviewed with your computer.

3.0 Features

3.1 Operating System

- Embedded Linux operating system, for high stability and freedom from viruses.
- Graphical user menu interface.

3.2 Compression Format

H.264 Format, which provides a high frame-rate and quality image with minimal storage requirements.

3.3 Monitoring and Recording

Monitoring	4-channels @ 720p (1280*720).
Recording	4-channels @ 720p (1280*720).
Image Quality	8 levels, user-selectable.
Security	Encrypted data to ensure unalterable content.

3.4 Indexing and Playback

- Can Index and Playback according to time.
- Supports 4-channel audio, 1-channel video (any channel). Index and playback concurrently.
- Playback via our free DVR viewing software.

3.5 SD Card Storage and Data Backup

- Supports two SD Cards, each with 128GB maximum
- SD Card data can be backed up via our free DVR viewing software.

3.6 Control

- Dual MCU control ensures DVR operational stability.
- Uses included infrared Remote Control for user interaction.

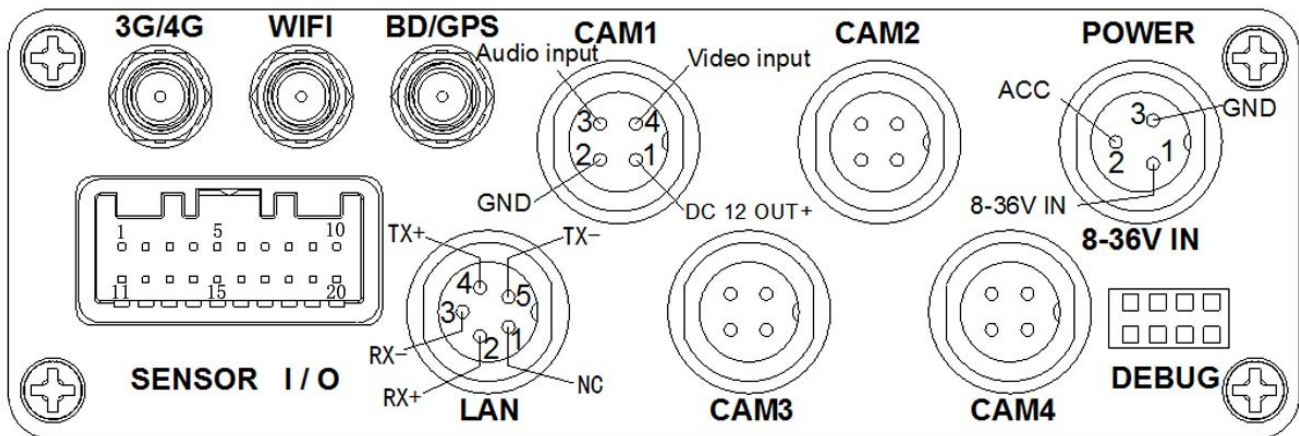
3.7 Other

- Can upgrade the system through the USB port or SD card for easy maintenance.
- Password protection to preserve data integrity.
- Delayed shutdown (Post-trip delay). User-settable, default is 5 seconds.
- Built-in power conditioning for voltage transients and brownouts.
- Watchdog function to avoid system crashes, perform auto-recovery.

4.0 Technical Specifications

Items	Device parameters	Performance index
Name	Product Name	CLARITY 4 4CH 720P Mini SD Mobile NVR
System	Operation System	Linux
	Operation Interface	Graphical Interface: English
	File System	Proprietary Format
Video	System Privileges	User Password
	Video Input	4ch Independent Input: 1.0Vp-p75Ω.Both B&W and Color Cameras
	Video Output	1 Channel PAL/NTSC Output, 1.0Vp-p75Ω Composite Video Signal
	Video Display	1 Or 4 Screen Display
	Video Standard	NTSC:30frames/Sec
	System Resources	NTSC:120 Frames
Audio	Audio Input	Four Channels Independent Input 600Ω
	Audio Output	1 Channel(4 Channels Can Be Converted Freely)
	Basic Output Level	1.0—2.2V
	Distortion Plus Noise	≤-30dB
	Recording Mode	Sound And Image Synchronization
	Audio Compression	G711A
igital Processing & Storage	Image Compression	H.264 Fixed Code Stream
	Image Format	NTSC:4*960H960*480 NTSC: 4*720P1280*720
	Video Stream	192Kbps-2.0Mbit/schannel
	Video Consumption	720P: 85MB-900 Mbyte/ hour SD Card usage
	Playback Resolution	NTSC: 1 or 4*960H(960*480) NTSC: 1 or 4*720P1280*720
	Audio Bitrate	4KByte / s / channel
	Audio Consumption	14MByte / hour / channel
	SD Storage	Double SD card storage, Support Max 2* 128GB
	Image Quality	Eight Grades to Choose
Alarm	Alarm in	4 Channels Independent Input. High Voltage Trigger
	Alarm out	1 Channels Independent output
	Motion Detect	Available (for non-mobile application)
Network Interface	Wire line Access	Can Expand One 6pin Ethernet Port
	WIFI	Can expand one Exterior WIFI Module, 802.11 B/G/N
	3G/4G	Can expand one FDD-LTE/TD-LTE/WCDMA/CDMA2000 Module Inside
GPS	GPS	Can expand one Interior GPS Module
Extend Interface	RS232	Extensible, interface with other vehicle equipment
	RS485	Extensible, interface with other vehicle equipment and PTZ Camera
	Intercom	Can Expand Intercom Module Inside
	G-Sensor	Can Expand G-Sensor Module Inside
	Canbus	not support, need to customize
Others	Power Consumption	DC8-36V 5% 8Wwithout SD
	Working Temperature	-20℃ ~ +85℃
	Clock	Built-In Clock, Calendar
Packaging	Product Size	132(L)*119(W)*40(H)mm
	Product Weight	0.6KG(without SD)

5.0 Rear Panel Layout



SENSOR I/O INTERFACE DEFINITION

1	VGA Red Out	8	Audio Out	15	Alarm Input 2
2	VGA Green Out	9	Composite Video Out	16	Alarm Input 3
3	VGA Blue Out	10	+12VDC Out	17	Alarm Input 4
4	RS-485 +	11	VGA VS	18	Switch Signal A
5	RS-485 -	12	VGA HS	19	Switch Signal B
6	RS-232 Tx	13	Ground	20	Ground
7	RS-232 Rx	14	Alarm Input 1		

6.0 SD Card Installation

Unlock the front panel with the provided key by switching to the "Unlock" position.

NOTE: The lock also controls the system power. When the unit is locked, it also means that the DVR is powered. Before locking (turning on), be sure that all the cables are properly connected, and at the proper voltage; otherwise, the system could be damaged.

Gently place the SD Cards into the slots, taking care not to slide the locking tab of the card into a "Locked" position as they enter the slot. Push the cards until they have snapped into a fully-inserted position, then slide the SD Card access panel closed, and lock.

The SD Card will not be able to record if the SD Card side-lock is in the locked position.



















7.0 Front Panel Layout






Status LED	Function
PWR	Lighted when system is powered.
GPS	Lighted when GPS is connected and active.
4G	Lighted when 3G/4G is connected and active.
SD1	SD Card 1: Flashing when recording, playing or backing up
SD2	SD Card 2: Flashing when recording, playing or backing up
WIFI	Flashing when WiFi is connected and active.

Feature	Function
IR	Infrared Remote control receiving window (keep unobstructed).
LOCK	Provides access to SD Cards. NEVER UNLOCK DURING RECORDING!
A/V OUT	5-Position Audio/Video Output, Voice Intercom Input.
Audio Jack	Under Status LEDs: MIC Input Jack.
SIM	SIM Card Slot for systems with 3G/4G Option.

8.0 Remote Control Operation

		Enters/Exits Menus to program settings
		Record
		Enter the sub-menu to set and confirm
		Playback recorded clips
		Stop during recording or playback. Delete
		Pause/Play during playback
		Fast-forward during playback. Successive presses change speed: 2x / 4x / 8x
		Fast Reverse during playback--each press equals 10 seconds
		For PTZ wiper (customized)
		Enter PTZ control mode
		Controls PTZ Zoom
		Controls PTZ focus
		Mute key--toggles audio output during playback.
		Exit from playback or backup. Exit from PTZ mode.
	UP for MENU selection. UP direction for PTZ control mode.	
	DOWN for MENU selection. DOWN direction for PTZ control mode.	
	LEFT for MENU selection or MENU setup. LEFT direction for PTZ control mode.	

		RIGHT for MENU selection or MENU setup. RIGHT direction for PTZ control mode.
		Displays first channel during standby, play or recording. Enter Password or set system Password number. Shortcut keys—First press for number 1, Second press for capital letters, Third press for lowercase letters. Use UP and DOWN keys to change values.
		4-channel display during standby, play or recording. Enter password or set system password.
	Other number buttons	Press 2,3,4 buttons to select CH2, CH3, CH4
	Other buttons	Not used

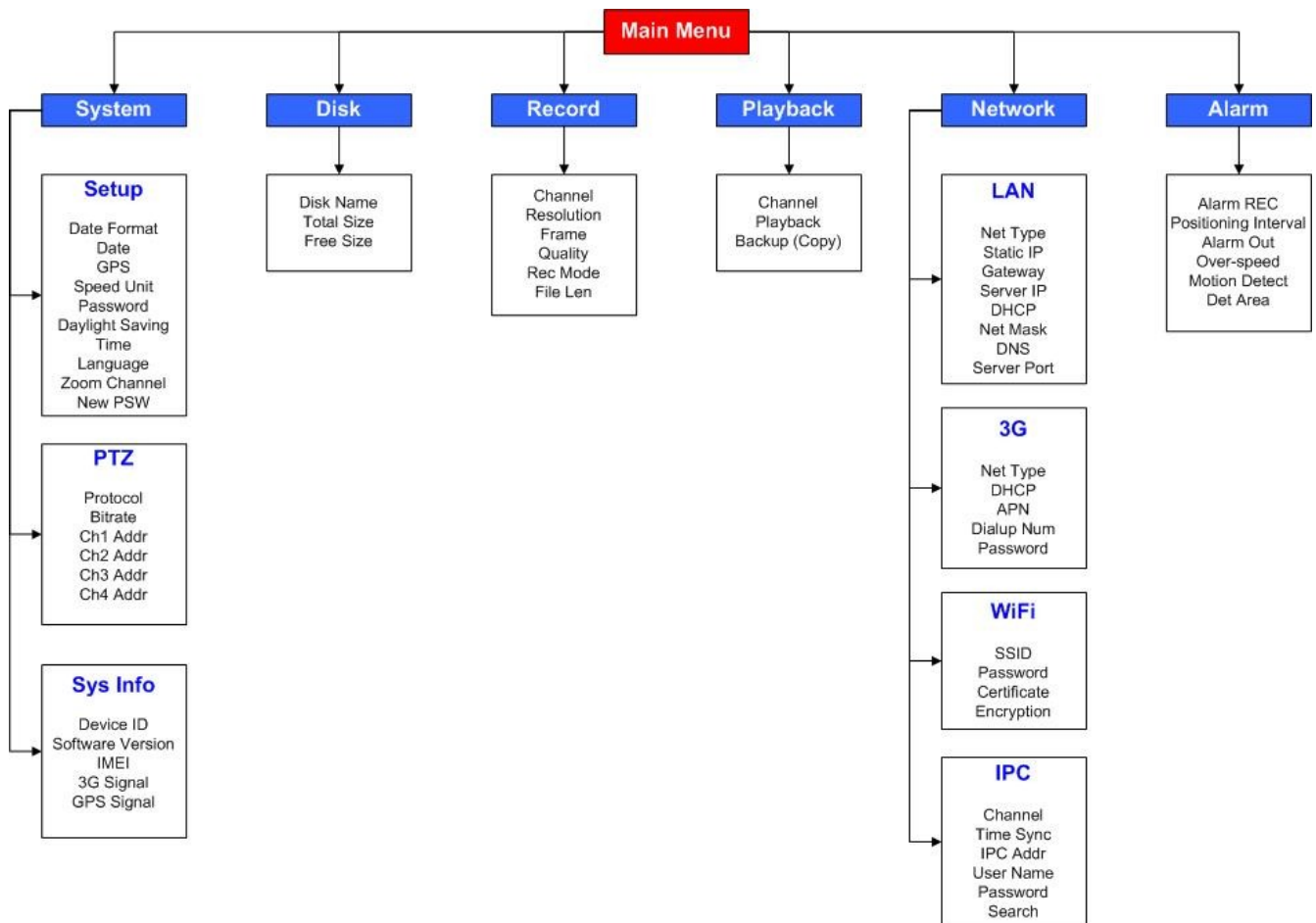
When the DVR is in an Alarm State, the Remote Control is inoperative.

10.0 Menu Settings

Use the Remote Control to enter the MENU as follows:

- Press the **MENU** Key
- Use the **▼** Key to highlight the Password Entry window
- Enter the Password. Factory Default is: **6666**.
- Press **OK** to enter the **MAIN MENU**.

Menu Structure



10.1 Menu Functions in Detail

System-Setup Menu	
Function	Description
Date Format	Select y/m/d or m/d/y or d/m/y
Daylight Saving Time	Enable or Disable, according to your requirement.
Date	Set the current date.
Time	Set the current time.
Time Zone	Set your time zone, using Universal Time (GMT). For example, Chicago is GMT-6
Language	Defaults to English. Other languages are available upon special order.
Video Mode	Set to NTSC (North America) or PAL (Europe & Far East). Default: NTSC.
Delay Time	Post Trip delay after ignition has been turned off—0 to 3600 seconds. User-settable--default is 5 seconds.
Speed Unit	Choose MPH (Miles per Hour) or KPH (Kilometers per Hour). Default is MPH.
Zoom Channel	Select the camera that will be automatically displayed when the DVR is powered.
Password	Enter the current password before changing to a new one. Note: You must enter the current password after pressing OK; otherwise, the DVR will remain in the current state, and the system will not recognize the updated password.
New Password	This is where you enter the new Password.

System-PTZ Menu	
Function	Description
Protocols	Select from PELCO-D (default), PELCO-P.
Bit Rate	For RS-485 Control: Select from 2400/4600/9600/38400/57600 bits/second.
Channel 1 Address	Assign Channel 1 Device Control Address.
Channel 2 Address	Assign Channel 2 Device Control Address.
Channel 3 Address	Assign Channel 3 Device Control Address.
Channel 4 Address	Assign Channel 4 Device Control Address.

System-Info Menu (Read-only)	
Function	Description
Device ID	Unique serial identifier for the DVR.
Software Version	Version of operating system software currently installed.
IMIE	If using 3G/4G, the unique ID number of the network or module.
3G Signal	Signal strength of the 3G/4G network.
GPS Signal	Signal strength of the GPS signal. AA=None / BB = strength (rmax 3).
Reset CFG	Resets all configuration settings to factory defaults (Clears all user settings).

System-Other Menu	
Function	Description
Vehicle ID	License plate number or Vehicle number (alpha-numeric).
Driver ID	Driver Identifier (alpha-numeric).
A-Person	Name
JPEG Time	
Phone Num	Contact phone number for 3G/4G.
Line Num	
VGA Output	VGA output resolution (default: 1280*720).
JPEG Channel	
Alm Phone	Contact phone number for 3G/4G.

System-G-Sensor Menu	
Function	Description
G-Sensor X	G-Force in the X-direction (0000mg at rest)
G-Sensor Y	G-Force in the Y-direction (0000mg at rest)
G-Sensor Z	G-Force in the Z-direction (0000mg at rest)

System-Log Information Menu (read-only)	
Function	Description
	History log of User actions, alarms, equipment status.

Disk (SD Card) Menu	
Function	Description
Disk Name	Displays the system-recognized name of the current SD Card.
Total Size	Total capacity of the installed storage media.
Free Size	Remaining capacity of the installed storage media.
Format (Button)	Press to format the current SD Card.

Record Menu	
Function	Description
Channel	Select the Channel for the current settings.
Resolution	Left: Select D1/720p for DVR Storage. Right: Select D1/720p for Network.
Frame Rate	Left: Select 1-30 fps for DVR Storage. Right: Select 1-30 fps for Network.
Quality	Left: Video Quality for DVR Storage. Right: Video Quality for Network.
Rec Mode	Video only / Audio+Video / None.
File Len	Record clips in packet lengths of: 300 seconds to 3600 seconds.
Save (Button)	Save changes (must reboot DVR to set changes permanently).

Playback Menu	
Function	Description
Channel (Selection)	Select the Channel(s) for playback (1-4 or ALL). Can record/play simultaneously.
Playback (Button)	Select one of the listed clips and pressed PLAY.
Copy (Button)	Select one of the listed clips to Copy (Backup).

LAN Menu	
Function	Description
Network Type	Select LAN for Wired, 3G or WiFi for Wireless (see WiFi Setting menu if using).
DHCP	Enabled: Get an IP address from the Network / Disabled: Use a static IP.
Static IP	Set the IP address to assign to this DVR.
Net Mask	Subnet Mask of Network.
Gateway	Gateway address of Network.
DNS	Not needed with a Static IP. Set if the Server IP is a DNS.
Dialup Number	Obtain from your telephone provider.
User Name	Fill in, if necessary.
Password	Fill in, if necessary.
NOTE: Please ensure that you select the proper SIM card for the 3G Module.	

LAN Menu	
Function	Description
Net Type	Select 3G or WiFi When Network Type is not LAN (See LAN Menu)
DHCP	Enabled: Get an IP address from the Network / Disabled: Use a static IP.
SSID	WiFi Router Identifier
Password	Network Password
Certificate	Select security certificate type: WPA-PSK or WPA2-PSK
Encryption	Select CCMP or TKIP
Check with your network administrator for the proper security settings.	

Alarm Menu	
Function	Description
Alarm REC	Alarm-triggered recording duration (30-sec to 330-sec, in 30 sec increments).
Positioning Interval	GPS Data upload interval.
Alarm Out	Set the Alarm-out hold time (5-sec to 900-sec).
Over-speed	Set the Over-speed alarm value.
Motion Detect	Not recommended for use in mobile applications.

11.0 Playing Back Video

The best way to play recorded clips is by using our free Viewing Software on your PC. However, sometimes it is helpful to review clips directly from the CLARITY 4. Here are the steps to do that:

Enter the MAIN MENU, then select **Search/Playback** and **Press OK**

Use the ▲ ▼ keys to select the desired clip, then press **OK** to select a channel and play it.

Use the ◀ ▶ to navigate among multiple pages.

12.0 Video Backup

There are two methods for backing up your recordings:

- Connect a USB drive (FAT32, Max 20GB) to the **CLARITY 4** USB Port.
- Use the remote control to navigate to the PLAYBACK menu and select the desired clip.
- Press **OK** to start the backup process.

OR

- Stop Recording.
- Unlock the SD Card door and remove the SD Card.
- Place the SD Card in your PC's SD Card slot.
- Start the RTI View software to navigate, select and play the desired clips.
- If desired, select clip start and end points, then save to your PC hard drive.
- Note: The clips can be saved as AVI files, one channel at a time.

13.0 PTZ Control

Use the **PTZ** menu to control the aiming of external cameras. If the system is 3G/4G enabled, then control can be achieved remotely from any location that has a 3G/4G connection, by using our free CMS software and a user-provided CMS platform service.