

HRTL-One
Digital Video Recorder

User Guide

**HRTL-One Digital Video Recorder
User Guide**

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About This Document

This document introduces the HRTL-One Digital Video Recorder and describes how to install the hard drive in the recorder, and then install the recorder and operate it.

The HRTL-One Digital Video Recorder is referred to as the HRTL-One throughout this document.

Overview of Contents

This document contains the following chapters and appendixes:

- *Chapter 1, Overview*, introduces the HRTL-One and its features and functions.
- *Chapter 2, Installation*, shows the front and rear panel connections. It also describes how to install the HRTL-One and connect it to peripheral equipment.
- *Chapter 3, System Setup*, describes how to set the overall system level configuration.
- *Chapter 4, Operation*, shows how the HRTL-One front panel operates and describes typical daily operating tasks.
- *Appendix A, Solutions*, lists typical technical issues and describes how to solve them.
- *Appendix B, Compatible Hard Drives*, lists compatible hard drive brands.
- *Appendix C, Specifications*, lists the specifications for the HRTL-One.
- *Appendix D, Warranty*, provides product warranty information.

Important Safeguards and Warnings

Caution Please read all the safeguards and warnings before operating the HRTL-One.

Improper operation may cause permanent, irreparable damage to the HRTL-One digital video recorder.

Caution The installation of this equipment should be made only by qualified technicians and should conform to all local codes.

Safety Cautions

Environment

- Please lift and place this equipment gently.
- Do not expose this equipment under straight sunlight.
- Do not use this equipment near or in contact with water.

Operation

- Operate this equipment only with the power source provided.
- Operate this equipment only from the type of power source indicated on the manufacturer's label.
- Do not switch the power on and off within a short period (within three seconds).

Proper Care and Maintenance

- Do not spill liquid of any kind on the equipment.
- Do not unplug the power connector before turning the power off.

Service

Unauthorized repair or parts substitutions may result in fire, electric shock or other hazards.



Regulatory Compliance

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CE

The CE mark on the product indicates that the system has been tested to and conforms with the provisions noted within the EN 55024 Class A Electromagnetic Compatibility Directive.

Warranty and Service

Subject to the terms and conditions listed on the Product Warranty (see [Appendix D](#)), during the warranty period Honeywell will repair or replace, at its sole option, free of charge, any defective products returned prepaid.

In the event you have a problem with any Honeywell product, please call Customer Service for assistance or to request a Return Authorization (RA) number.

Call 1.800.796.CCTV.

Be sure to have the model number, serial number, and the nature of the problem outlined for the technical service representative.

Prior authorization must be obtained for all returns, exchanges, or credits. Items shipped to Honeywell without a clearly identified Return Authorization (RA) number may be refused.

Typographical Conventions

This document uses the following typographical conventions:

Font	What it represents	Example
Lucida	Values of editable fields that are mentioned in the body text of the document for reference purposes, but do not need to be entered as part of a procedure	The Time field can be set to Hours:Minutes:Seconds.
	Text strings displayed on the screen	The message Password Updated displays .
Lucida Bold	Words or characters that you must type. The word “enter” is used if you must type text and then press the Enter or Return key.	Enter the password: 1234
	Values of editable fields that appear in tables (on first mention)	The Background Recording field can be set to one of the following values: Enabled Disabled
Gill Sans bold	Menu titles and other items you select	Select the Setup menu.
	Buttons you click to perform actions	Click Exit to close the program.
<i>Italic</i> (any font)	Placeholders: words that vary depending on the situation	Enter the <i>basic parameters</i>
	Cross-reference to external source	Refer to the <i>manual</i> that came with your hard drive.
	Cross-reference within document	See <i>Overview</i> .

Overview

The HRTL-One Digital Video Recorder converts analog NTSC or PAL video to digital images and records them on a removable hard disk drive.

Digitally recorded video has several advantages over analog video recorded on tape, including:

- There is no need to adjust tracking
- You can index digital video by time schedule or events
- You can instantly view video after selecting the time or event
- You can freeze frames, fast-forward, fast-reverse, slow-forward, and slow-reverse without image streaking or tearing
- The HRTL-One Digital Video Recorder can be used as a replacement for a time-lapse VCR in a security installation

Features

- Replaces a traditional timelapse VCR
- Compatible with most multiplexer and quad processors
- Compatible with NTSC and PAL
- Supports hard drive installation and upgrade in the field, up to 120 GB hard drive. HRTL-One recorders with a serial number of 0405xxxxx and later support up to 250 GB hard drive
- Record speed options:
 - NTSC: 1 image per second to 60 images per second
 - PAL: 1 image per second to 50 images per second
- Offers a range of recording video compression settings to maximize usage of the hard drive capacity
Recording video quality selection includes best, high, normal, and basic
- Quick search modes
Search video by time, event, or alarm list
- Variable viewing speeds

Fast forward or reverse from 2X to 32X

Slow forward or reverse from 1/2X to 1/32X

- Time display format
- Password protection
- Alarm input enable record mode

One alarm input to activate recording

Auto detection for video loss

- One alarm input
- One alarm output
- Time scheduled recording
- Power loss protection

Fault tolerance design provides quick, reliable recovery from power loss

- RS232C control port

The HRTL-One can be linked to external equipment through the RS-232C interface.

- The HRTL-One automatically stops recording when the hard drive disk is full or continues recording when the overwrite feature is selected.

Installation

This chapter describes how to:

- Install a hard drive in the HRTL-One.
- Install the HRTL-One in a 19 inch (482.6 mm) rack.
- Connect the HRTL-One to peripheral equipment. Depending on your requirements, you can connect the HRTL-One to a variety of equipment, including camera(s), a monitor, multiplexer, alarm input or remote PC or laptop.

Before You Begin

Check that the items received match those listed on the packing slip. The HRTL-One packing box should include, in addition to this User Guide:

- One single channel HRTL-One Digital Video Recorder
- One hard drive cartridge and a key for the cartridge (key located inside cartridge)
- One power converter and power cord
- One DB-15 plug
- One rack mounting kit
- 80 GB Hard Drive (included with HRTL-One-80 DVR, not included with HRTL-One DVR)

If any parts are missing or damaged, please contact the dealer you purchased the HRTL-One from, or call Honeywell Customer Service. See *Warranty and Service*, page *xiii*.

Installing the Hard Drive

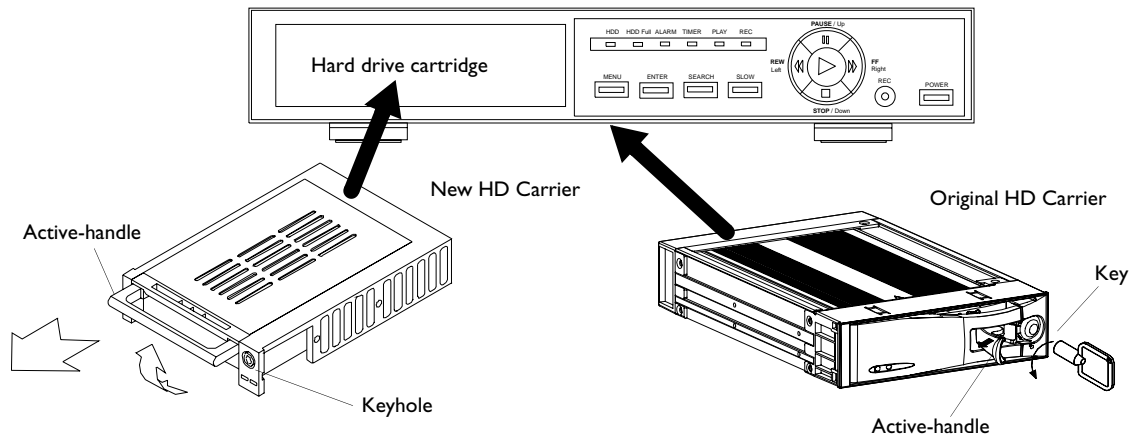
Caution The HRTL-One must be powered **off** before installing a new hard disk drive or removing an existing hard disk drive.

Do not remove the hard drive until after the HRTL-One has been powered down for at least 60 seconds. This will protect the hard drive from possible damage.

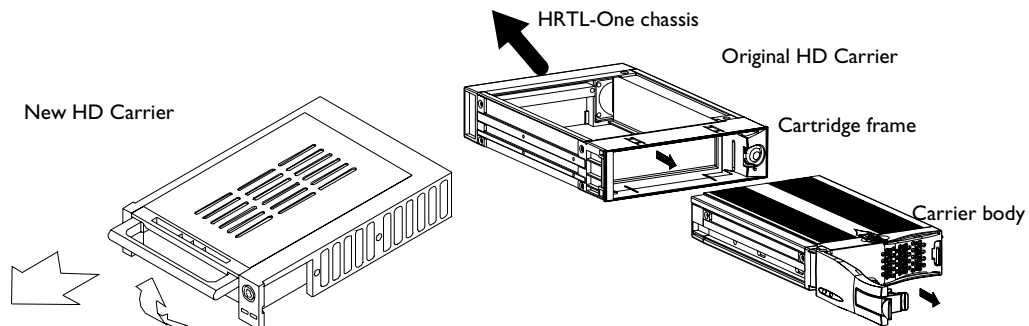
The hard drive must be installed before the HRTL-One can record video. For a list of compatible hard drives, see [Appendix B](#).

To install the hard drive:

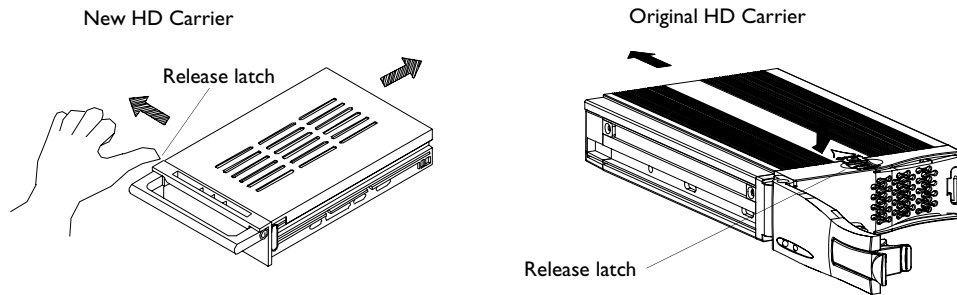
1. Pull the active-handle outwards, then insert the miniature key (supplied in the hard drive cartridge) into the key hole, turning the key counter-clockwise to the “power off” (unlocked) position.



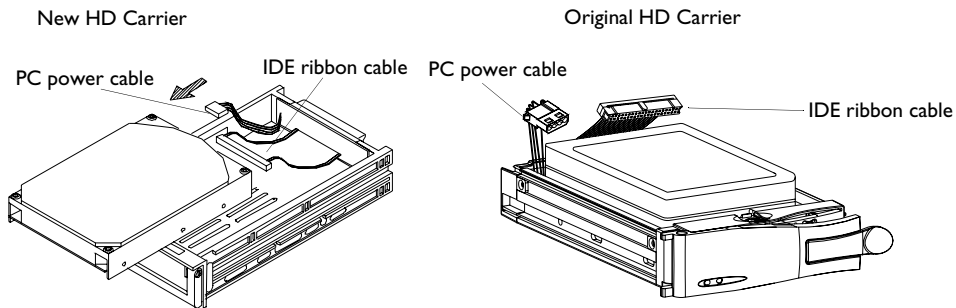
2. Pull the handle towards you to remove the carrier body away from the HRTL-One chassis.



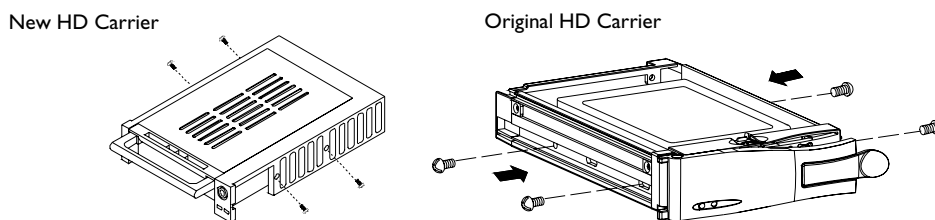
3. Push the black release latch on top of the carrier body (original carrier) or push the side release latch with the word OPEN printed beside it (new carrier) to slide the top cover backwards until it is completely removed.



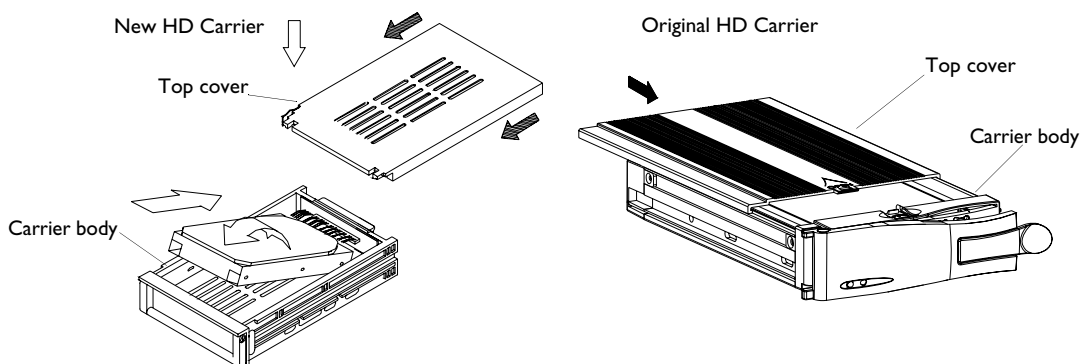
4. Ensure that the hard drive is configured as Master. Refer to the documentation supplied with the hard drive for the jumper settings.
5. Plug the PC power cable and IDE ribbon cable into the hard drive cartridge.



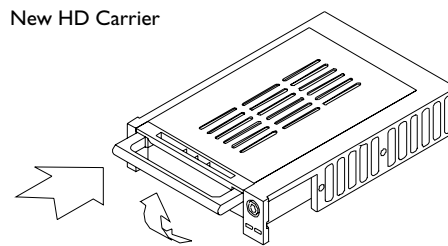
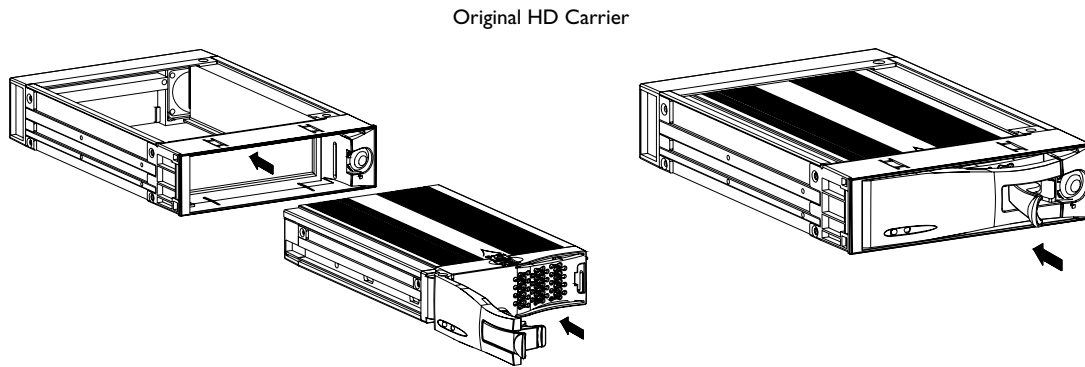
6. Position the hard drive cartridge into the carrier body. Secure the hard drive using the four #6-32 screws supplied.



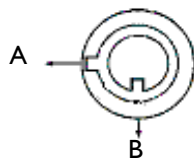
7. Slide the top cover back on the carrier body by sliding it forward. The silver tab (original carrier) or the side latch (new carrier) clicks over the black release latch to secure the cover in place.



- Slide the carrier body back into the cartridge frame until it is fully inserted.



- Push the handle towards the key lock (original carrier). Push the handle down to secure the carrier in place (new carrier).
- To ensure that the hard drive functions properly, turn the key lock clockwise to the **A** position before powering the hard drive on.



Status segment	Power status	Security status
A	ON	Locked (hard drive cannot be removed)
B	OFF	Unlocked (removable)

Hard Drive Front Panel Functions

Figure 2-1 shows the front panel of the hard drive and lists the functions of the various components.

Figure 2-1 Hard Drive Front Panel (Original Carrier)

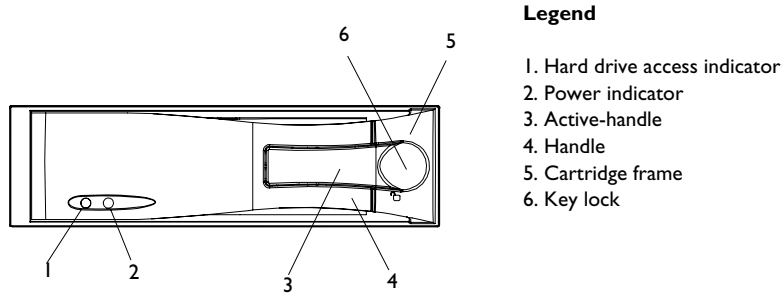
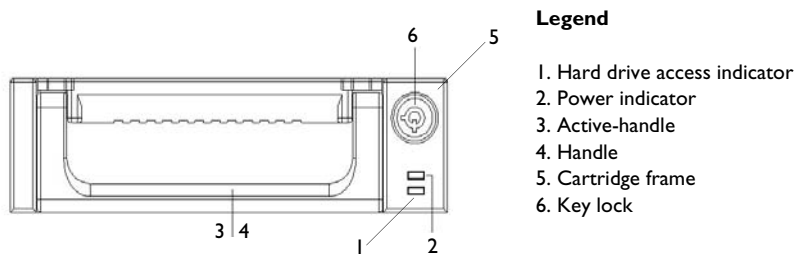


Figure 2-2 Hard Drive Front Panel (New Carrier)



Indicators

When the hard drive is powered up, the indicators display as follows:

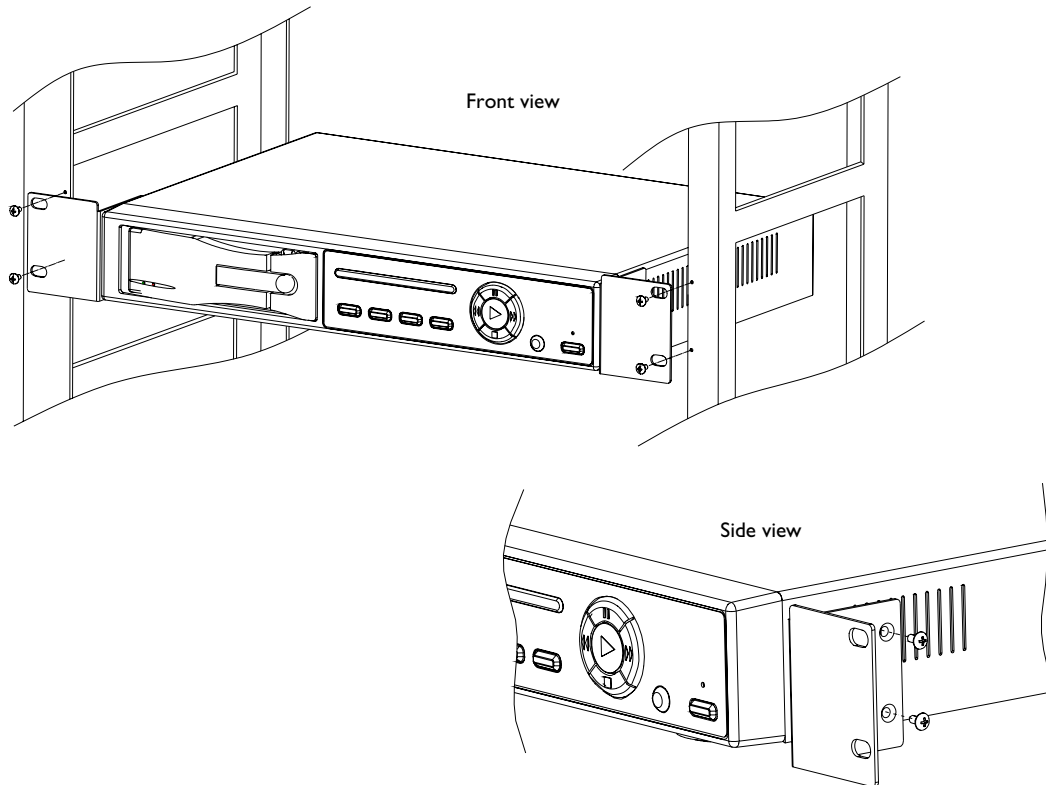
Table 2-1 Hard Drive Front Panel Indicators

Indicator	Color
Hard drive access indicator	Amber
Power indicator	Green

Installing the HRTL-One in the Rack Mount

Follow [Figure 2-3](#) to mount the HRTL-One in the rack mount.

Figure 2-3 Rack Mount Installation



Connecting the HRTL-One to Peripheral Equipment

The HRTL-One is designed to work with a variety of other equipment, including:

- Video camera(s). You can connect:
 - A single video camera
 - An external multiplexer that is connected to up to 16 cameras.
- Monitor
- Alarm sensor or Personal Computer (PC)

[Figure 2-4](#) and [Figure 2-5](#) show typical single camera and multiplexer installations.

Figure 2-4 Single Camera Installation

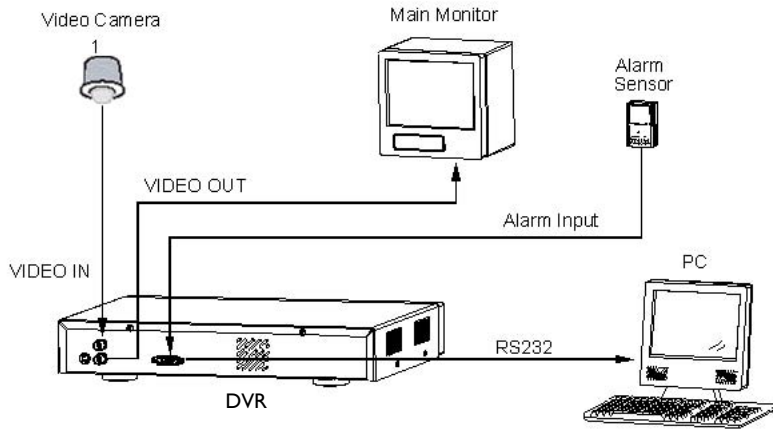
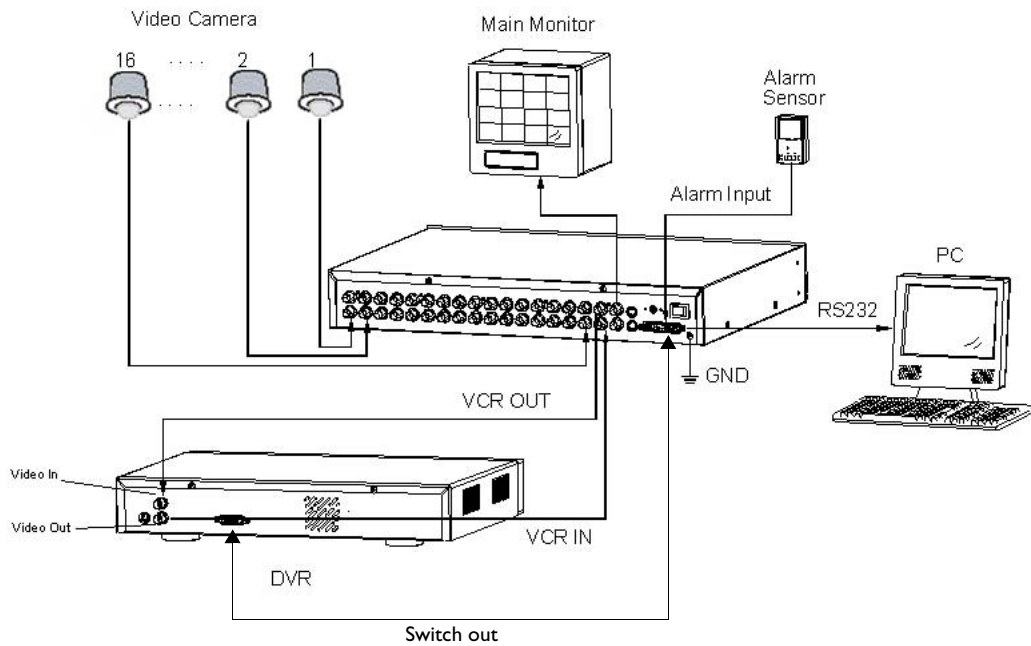


Figure 2-5 Multiple Cameras and Multiplexer Installation



Rear Panel Connections

Figure 2-6 shows the rear panel connections and Table 2-2 describes the connections.

Figure 2-6 Rear Panel Connections

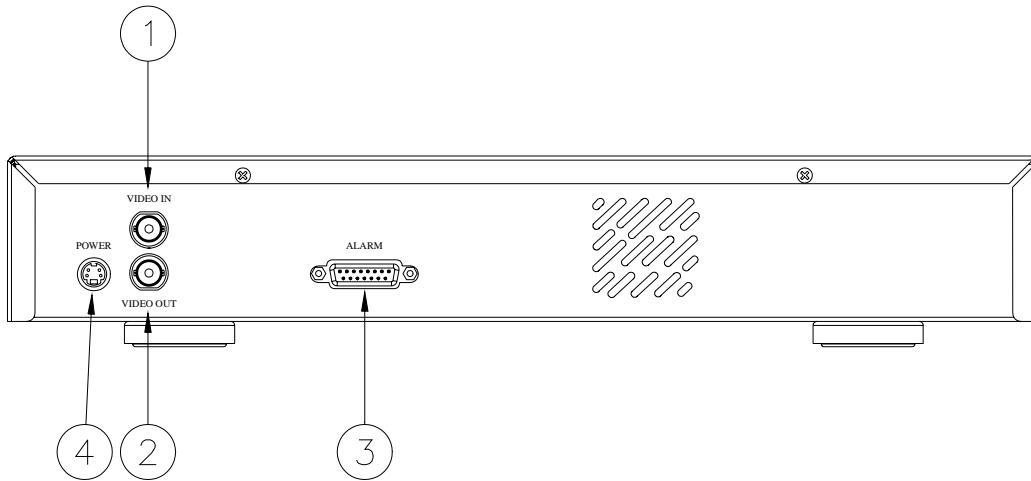


Table 2-2 Rear Panel Connections to Peripheral Equipment

Connection	Description
1. Video In	Connect to video source (for example, a quad, multiplexer, or camera).
2. Video Out	Connect to a monitor if there is no quad or multiplexer in your system (see <i>Figure 2-4</i>). Connect to the video input of a quad or multiplexer, as shown in <i>Figure 2-5</i> .
3. External I/O	<ul style="list-style-type: none"> • RS-232 / RS-485 front panel command line interface Controlled remotely by an external device or control system (see <i>Figure 2-4</i>). • Multiplexer synchronization • Disk full indication • Record enable/disable • Video loss indication • Alarm input/output
4. Power	Connect to power cable.

Alarm I/O Port

Figure 2-7 shows the 15-pin COM port pinouts on the rear panel of the HRTL-One for a typical HRTL-One PC to DVR interface (RS-232 communication via DB9 connector).

Figure 2-8 shows the 15-pin COM port pinouts on the rear panel of the HRTL-One and typical interface for RS-232 communication via DB25 connector. Table 2-3 describes the 9-pin pinouts.

Figure 2-7 9-Pin COM Port Pinout

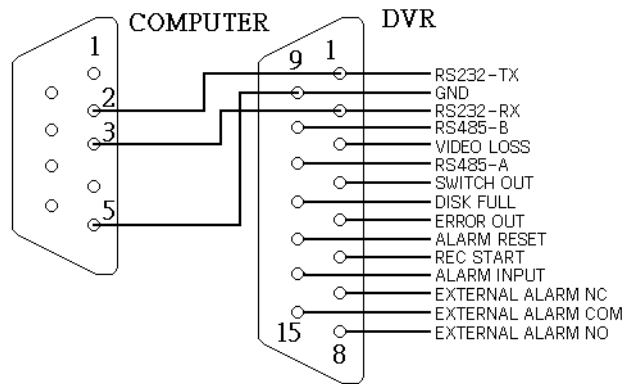


Figure 2-8 25-Pin COM Port Pinout on External Device

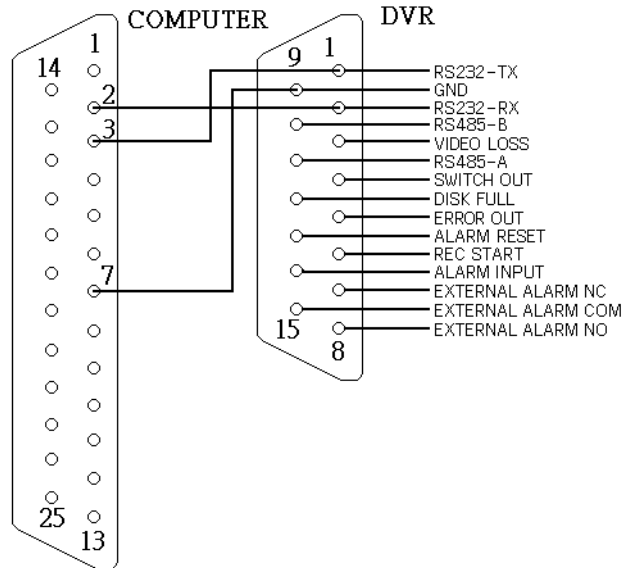


Table 2-3 9-Pin COM Port Pinouts

Pin	Type	Function
1	RS232-TX: RS232	The HRTL-One can be controlled remotely by an external device or control system (for example, a control keyboard), using RS-232 serial communications signals. See <i>RS-232/RS-485 Remote Protocol</i> , page 30.
2	RS232-RX: RS232	The HRTL-One can be controlled remotely by an external device or control system (for example, a control keyboard), using RS-232 serial communications signal.
3	Video loss	If video loss occurs, the system sends a signal to trigger another accessory. This pin output becomes Low when video loss occurs, and remains High under normal operation.
4	Switch out	Connect to the VCR trigger recording terminal of the multiplexer to synchronize recording signals. The default mode is falling (negative) edge.
5	Error out	This pin becomes Low when hard drive errors occur and remains High under normal operation.
6	Rec start	This pin can accept the external trigger signal to activate record mode from an external device. Options are: Low: (default) When the external signal turns to Low it triggers the HRTL-One record mode. High: When the external signal turns back to High the HRTL-One stops recording.
7	External alarm NC	Under normal operation, COM (pin 15) connects with NC and disconnects with NO (pin 8). When an alarm is triggered, COM disconnects with NC and connects with NO.
8	External alarm NO	Under normal operation, COM (pin 15) connects with NC and disconnects with NO (pin 7). When an alarm is triggered, COM disconnects with NC and connects with NO.
9	GND	Ground
10	RS-485-B	The HRTL-One can be controlled remotely by an external device or control system (for example, a control keyboard) using RS-485 serial communication signals.
11	RS-485-A	The HRTL-One can be controlled remotely by an external device or control system (for example, a control keyboard) using RS-485 serial communication signals.
12	Disk full	Under normal operation the state remains High. When the disk is full, the HRTL-One sends a Low state. Example: When the hard drive is full and you have installed another HRTL-One recorder, a signal can be sent to the next HRTL-One to activate recording.

Table 2-3 9-Pin COM Port Pinouts

Pin	Type	Function
13	Alarm reset	<p>When the wire from the Alarm reset (pin 13) is connected to Ground (pin 9) connector, it can disable the HRTL-One alarm notification (buzzer and flashing LED).</p> <p>An external signal to Alarm reset (pin 13) can be used to reset both the Alarm output signal and the internal buzzer on the HRTL-One. When an alarm has been triggered, the signal becomes Low and all alarm activities are stopped.</p> <p>Under normal operation the signal remains High.</p>
14	Alarm input	<p>When the wire from Alarm input (pin 14) is connected to ground (pin 9) connector, the HRTL-One starts recording and the buzzer will be on.</p> <p>Under normal operation, the signal remains High.</p>
15	COM	<p>Under normal operation, COM connects with NC (pin 7) and disconnects with NO (pin 8).</p> <p>When an alarm is triggered, COM disconnects with NC and connects with NO.</p>

System Setup

This chapter describes the front panel controls and how to use them to configure your system and perform daily routine operations.

Figure 3-1 Front Panel Controls

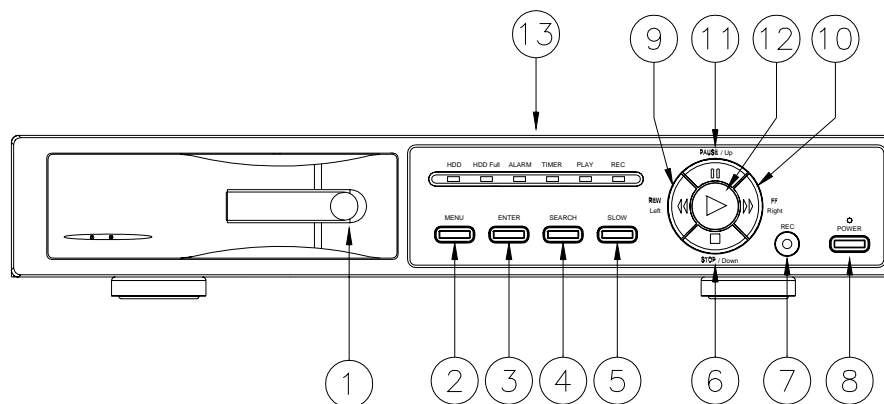


Table 3-1 Front Panel Controls

Control	Function
1. Hard drive	The HRTL-One comes with a removable hard drive disk tray. Before powering up the HRTL-One you must first install the hard drive and turn the key lock to the A position. See <i>Installing the Hard Drive</i> , page 4.
2. MENU	Press to enter Program mode and enter the Administrator password (default is 0000) to access the Main Menu. Press to navigate up the menu structure: <ul style="list-style-type: none"> • Through the fields on the menus • From the sub-menus back to the Main Menu
3. ENTER	Press to accept changes that you make in Program mode.
4. SEARCH	Press to search for previously recorded video.
5. SLOW	Press to slow down the speed of Play mode.
6. STOP	Press to stop recording or playing.

Table 3-1 Front Panel Controls

Control	Function (cont'd)
7. REC	Press to start recording.
8. POWER	Press to power up the HRTL-One. Press again to power off the HRTL-One.
9. REW (Left)	Press once to play video backward at high speed. Press again to adjust the speed (1, 2, 4, 8, 16, 32 times, depending on the number of times you press this button).
10. FF (Right)	Press once to play video forward at high speed. Press again to adjust the speed (1, 2, 4, 8, 16, 32 times, depending on the number of times you press this button).
11. PAUSE	Press to pause the video at the currently displayed image.
12. PLAY	Press to play recorded video.
13. LEDs	Under the following conditions, the red light is ON: <ul style="list-style-type: none"> • HDD = The hard drive is activated. • HDD FULL = The hard drive is full. • ALARM = When alarm enable is set to Yes and an alarm is triggered, the LED flashes red. • TIMER = When the recording timer is set for operation. • PLAY = The HRTL-One is in Play mode. • REC = The HRTL-One is in Record mode.

Recording Times

The record time depends on the record speed and record quality settings (see *Recording Setup*, page 26). *Table 3-2* provides typical NTSC recording times and *Table 3-3* provides typical PAL recording times for a 120 GB hard drive. *Table 3-4* provides typical NTSC recording times and *Table 3-5* provides typical PAL recording times for a 250 GB hard drive.

Note *Table 3-2* and *Table 3-3* are based on a 120 GB hard drive, *Table 3-4* and *Table 3-5* are based on a 250 GB hard drive.

The data in these tables was obtained by recording a normal TV program and is provided for reference only.

Table 3-2 NTSC Typical Recording Times (120 GB)

Record quality	IPS						
	60	30	15	8	4	2	1
Best	12 hr	24 hr	48 hr	90 hr	180 hr	360 hr	720 hr
High	15 hr	30 hr	60 hr	112.5 hr	225 hr	450 hr	900 hr
Normal	24 hr	48 hr	96 hr	180 hr	360 hr	720 hr	1440 hr
Basic	40 hr	80 hr	160 hr	300 hr	600 hr	1200 hr	2400 hr

Table 3-3 PAL Typical Recording Times (120 GB)

Record quality	IPS						
	50	25	12	6	3	2	1
Best	12 hr	24 hr	50 hr	101 hr	203 hr	304 hr	608 hr
High	15 hr	30 hr	63 hr	127 hr	253 hr	380 hr	760 hr
Normal	24 hr	49 hr	101 hr	203 hr	405 hr	608 hr	1220 hr
Basic	41 hr	81 hr	168 hr	338 hr	675 hr	1013 hr	2025 hr

Table 3-4 NTSC Typical Recording Times (250 GB)

Record quality	IPS						
	60	30	15	8	4	2	1
Best	25 hr	50 hr	100 hr	187.5 hr	375 hr	750 hr	1500 hr
High	31.3 hr	62.5 hr	125 hr	234.4 hr	468.8 hr	937.5 hr	1875 hr
Normal	50 hr	100 hr	200 hr	375 hr	750 hr	1500 hr	3000 hr
Basic	83.3 hr	166.7 hr	333.3 hr	625 hr	1250 hr	2500 hr	5000 hr

Table 3-5 PAL Typical Recording Times (250 GB)

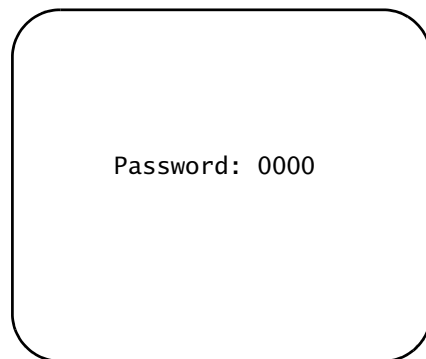
Record quality	IPS						
	50	25	12	6	3	2	1
Best	25 hr	50 hr	104.2 hr	210.4 hr	422.9 hr	633.3 hr	1266.7 hr
High	31.3 hr	62.5 hr	131.3 hr	264.6 hr	527.1 hr	791.7 hr	1583.3 hr
Normal	50 hr	102.1 hr	210.4 hr	422.9 hr	843.8 hr	1266.7 hr	2541.7 hr
Basic	85.4 hr	168.8 hr	350 hr	704.2 hr	1406.3 hr	2110.4 hr	4218.8 hr

Accessing the Menu Setup

After you have powered on the HRTL-One, access the menu setup as follows:

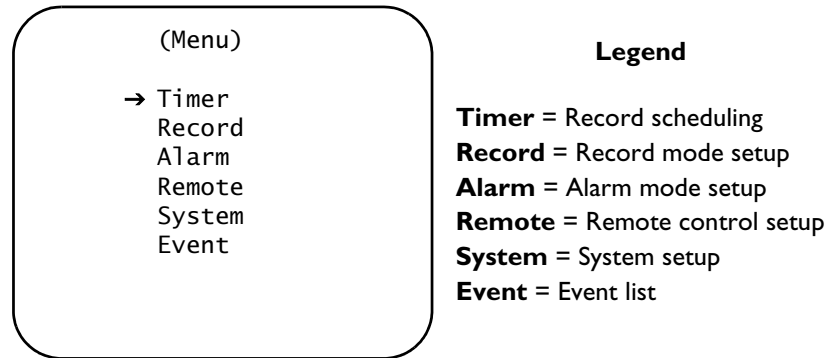
1. Press **MENU** on the front panel of the HRTL-One.
2. You are prompted to enter a password. Press ◀ or ▶ to move to the next digit and ▲ or ▼ to select the number. Press **Enter** to confirm the password.

Note The default password is 0000.



3. The Main menu displays, indicating you have entered the correct password.

Figure 3-2 Main Menu



4. Press ▲ or ▼ to navigate through the menu items. For example, to select the system setup, move to **System**, then press **Enter**.

Exiting the Menu Setup

To exit menu setup:

- From the Main menu, press the **Menu** button.
- From the submenus, press the **Menu** button to navigate back to the Main menu, then press **Menu** again to exit menu setup.

The HRTL-One automatically exits menu setup after 60 seconds of inactivity.

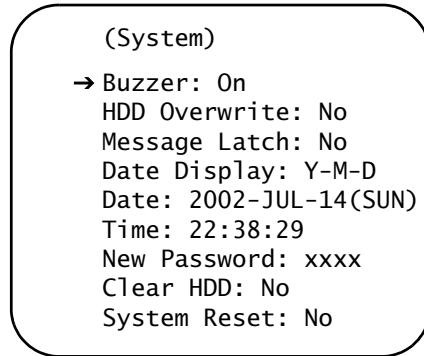
Setting Overall System Configuration

Use the System screen to set system-level configurations, including:

- Set the internal alarm buzzer
- Set the system clock
- Change password
- Clear the data on the hard drive
- Reset the system to the factory default settings

From the Main Menu, select **System**, then press **Enter**. *Figure 3-3* displays.

Figure 3-3 System Setup Menu



Setting the Internal Alarm Buzzer

To enable or disable the internal alarm buzzer:

1. On the **System** screen (**Main Menu** ► **System**), press ▲ or ▼ to select **Buzzer**, then press **Enter**.
2. Press ▲ or ▼ to enable or disable the internal alarm buzzer. Options are:
 - ON** = Buzzer is on. When the HRTL-One detects an alarm trigger (for example, when the hard drive is full) a buzzer sounds to alert the user.
 - OFF** = Buzzer is off.
3. Press **Menu** to confirm your change.
4. Press ▲ or ▼ to move to another field on the System screen or press **Menu** to exit this screen and confirm the current operation.
5. If you have completed all your system configuration changes, press **Menu** again to exit and close menu setup.

Setting the Hard Drive Override

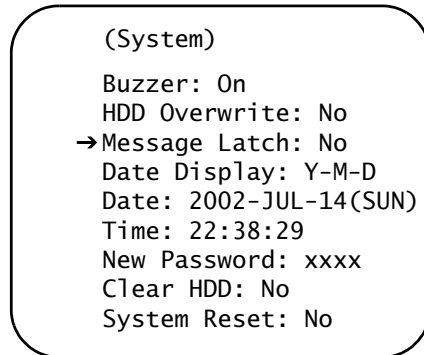
When the hard drive is full you can either:

- Have the HRTL-One overwrite the hard drive, OR
 - Have the HRTL-One stop recording
1. On the **System** screen (**Main Menu** ► **System**), press ▲ or ▼ to select **HDD Overwrite**, then press **Enter**.
 2. Press ▲ or ▼ to enable or disable the hard drive overwrite option. Options are:
 - YES** = The HRTL-One overwrites the data on the hard drive when the drive is full.
 - NO** = Turns auto reverse off. The HRTL-One stops recording when the drive is full.
 3. Press **Menu** to confirm your change.

4. Press ▲ or ▼ to move to another field on the System screen or press **Menu** to exit this screen and confirm the current operation.
5. If you have completed all your system configuration changes, press **Menu** again to exit and close menu setup.

Message Latch Setup

This feature is used to select whether the HDD Full message will disappear after 10 seconds or remain on the screen. No is the default setting.



When you set up the message latch to be On (Yes), once the hard drive fills up, and HDD Overwrite is not enabled, the message HDD Full will be displayed on the screen until you disable the message latch.

When you set up the message latch to be Off (No), the HDD Full message will appear for only 10 seconds.

Setting the Clock

You can set the system date and time and how the date displays on the Display Date screen.

On-screen Display

1. On the **System** screen (**Main Menu ► System**), press ▲ or ▼ to select **Date Display**, then press **Enter**.
2. Press ▲ or ▼ to choose a display format. Options are:
Y-M-D = Year - Month - Day
M-D-Y = Month - Day - Year
D-M-Y = Day-Month-Year

Off = The date and time will not show on the screen.

3. Press **Menu** to confirm your change.
4. Press **▲** or **▼** to move to another field on the System screen or press **Menu** to exit this screen and confirm the current operation.

System Date

1. On the **System** screen (**Main Menu** ► **System**), press **▲** or **▼** to select **System Date**, then press **Enter**.
2. Press **▲** or **▼** to choose a number, then press **◀** or **▶** to move to the next digit:
2002-JUL-14(SUN), YY-MM-DD(Day)
3. Press **Menu** to confirm your change.
4. Press **▲** or **▼** to move to another field on the System screen or press **Menu** to exit this screen and confirm the current operation.

System Time

1. On the **System** screen (**Main Menu** ► **System**), press **▲** or **▼** to select **Time**, then press **Enter**.
2. Press **▲** or **▼** to choose a number, then press **◀** or **▶** to move to the next digit:
Time: 22:38:29 HH:MM:SS; Hour, Minute, Second
3. Press **Menu** to confirm your change.
4. Press **▲** or **▼** to move to another field on the System screen or press **Menu** to exit this screen and confirm the current operation.
5. If you have completed all your system configuration changes, press **Menu** again to exit and close menu setup.

Changing Your Password

To change your password:

1. On the **System** screen (**Main Menu** ► **System**), press **▲** or **▼** to select **New Password**, then press **Enter**.
2. Press **▲** or **▼** to choose a number, then press **◀** or **▶** to move to the next digit:
xxxx
3. Press **Menu** to confirm your change.
4. Press **▲** or **▼** to move to another field on the System screen or press **Menu** to exit this screen and confirm the current operation.

5. If you have completed all your system configuration changes, press **Menu** again to exit and close menu setup.

Clearing the Data on the Hard Drive

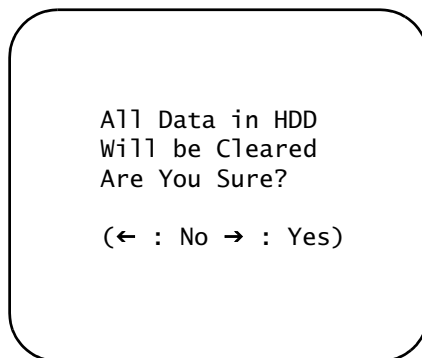
Caution Clearing the data on the hard drive results in permanent, irreversible loss of all video and other information currently stored on the hard drive.

To remove all the data from the hard drive:

1. On the **System** screen (**Main Menu** ► **System**), press ▲ or ▼ to select **Clear HDD**, then press **Enter**.
2. Press ▲ or ▼ to choose:
Yes = Clear the hard drive.
No = Do not clear the hard drive at this time.

When you select Yes, the following screen displays:

Figure 3-4 Clear Hard Drive Screen



3. Press ► to clear the hard drive or ◀ to abort the clear process.
4. Press **Menu** to exit this screen and confirm the current operation.
5. If you have completed all your system configuration changes, press **Menu** again to exit and close menu setup.

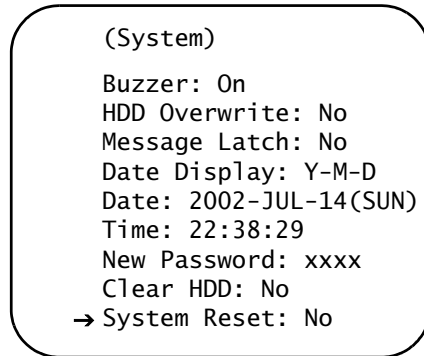
Resetting to System Defaults

To reset the system to the factory default settings:

1. On the **System** screen (**Main Menu** ► **System**), press ▲ or ▼ to select **System Reset**, then press **Enter**.

2. Press ▲ or ▼ to choose:
Yes = Confirm the system reset and load the default settings.
No = Do not reset the system at this time.
When you select Yes, the following screen displays:

Figure 3-5 System Reset Screen



3. Press **Menu** to exit this screen and confirm the current operation.
4. If you have completed all your system configuration changes, press **Menu** again to exit and close menu setup.

Note Resetting the system will not change the date, time, and password settings.

Timer Recording Setup

Use the Timer screen to set timed daily recording and holiday scheduling.

1. On the **Main** Menu screen, press ▲ or ▼ to select **Timer**, then press **Enter**. The following screen appears:

Yes = Timed recording is activated.

No = Timed recording is not activated.

9. Press **Menu** to confirm your change.
10. If you have completed all your system configuration changes, press **Menu** again to exit and close menu setup.

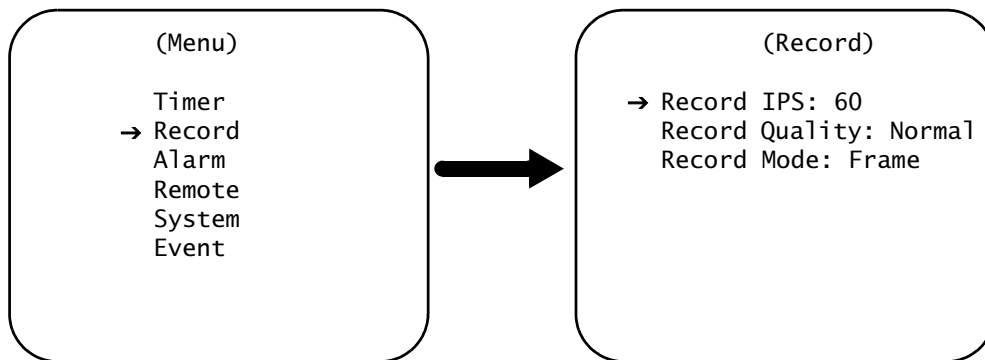
Note Do not overlap timers. If timers overlap, the HRTL-One stops recording at the end of the first timer interval.

Recording Setup

Use the Record screen to set:

- Image per second (IPS) ratio
 - Record quality
 - Recording format
1. On the **Main Menu** screen, press **▲** or **▼** to select **Record**, then press **Enter**. The following screen appears:

Figure 3-7 Record Screen



2. Press **▲** or **▼** to select the **Record IPS** (images per second) field, then press **Enter**.

Press **▲** or **▼** to choose from the following options:

NTSC = 1, 2, 4, 8, 15, 30, 60

OR

PAL = 1, 2, 3, 6, 12, 25, 50

Press **Menu** to confirm your changes.

3. Press **▲** or **▼** to select the **Record Quality** field, then press **Enter**.

Press **▲** or **▼** to choose from the following options:

See [Table 3-2](#) (NTSC) or [Table 3-3](#) (PAL) as a guide to determine the record duration vs. the quality selected.

Press **Menu** to confirm your changes.

4. Press **▲** or **▼** to select the **Record Mode** field, then press **Enter**.

Press **▲** or **▼** to choose from the following options:

Fields, Frames

Press **Menu** to confirm your changes.

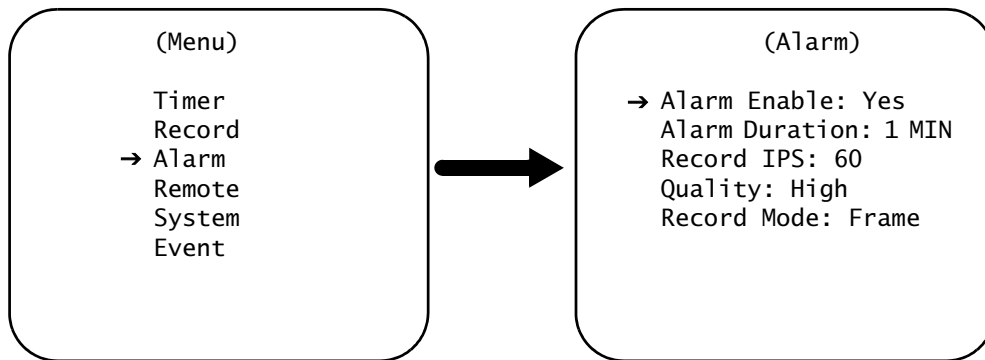
5. Press **Menu** to exit this screen and confirm the current operations.
6. If you have completed all your system configuration changes, press **Menu** again to exit and close menu setup.

Alarm Mode Setup

Use the Alarm screen to set how the system responds to an alarm event (for example, video loss, power failure, full hard drive).

1. On the **Main Menu** screen, press **▲** or **▼** to select **Alarm**, then press **Enter**. The following screen appears:

Figure 3-8 Alarm Screen



2. Press **▲** or **▼** to select the **Alarm Enable** field, then press **Enter**.

Press **▲** or **▼** to choose from the following options:

Yes = Turns on the alarm and activates a steady alarm LED on the front panel. When the HRTL-One detects an alarm condition, the appropriate LED on the front panel flashes to alert the user.

If the buzzer is enabled (see *Setting the Internal Alarm Buzzer*, page 20), the HRTL-One also buzzes to alert the user.

No = The alarm is not turned on. The system will not respond when it detects an alarm condition.

Press **Menu** to confirm your changes.

3. Press **▲** or **▼** to select the **Alarm Duration** field, then press **Enter**.

Press **▲** or **▼** to choose from the following options:

10 Sec, 15 Sec, 20 Sec, 30 Sec, 1 Min, 2 Min, 3 Min, 5 Min, 10 Min, 15 Min, 30 Min,

Always = Until the alarm condition is reset (pin 13 of the COM port)

Press **Menu** to confirm your changes.

4. Press **▲** or **▼** to select the **Record IPS** (images per second) field, then press **Enter**.

Press **▲** or **▼** to choose from the following options:

NTSC = 1, 2, 4, 8, 15, 30, 60

OR

PAL = 1, 2, 3, 6, 12, 25, 50

Press **Menu** to confirm your changes.

5. Press **▲** or **▼** to select the **Record Quality** field, then press **Enter**.

Press **▲** or **▼** to choose from the following options:

Best, High, Normal, Basic

Press **Menu** to confirm your changes.

6. Press **▲** or **▼** to select the **Record Mode** field, then press **Enter**.

Press **▲** or **▼** to choose from the following options:

Fields, Frames

Press **Menu** to confirm your changes.

7. Press **Menu** to exit this screen and confirm the current operations.

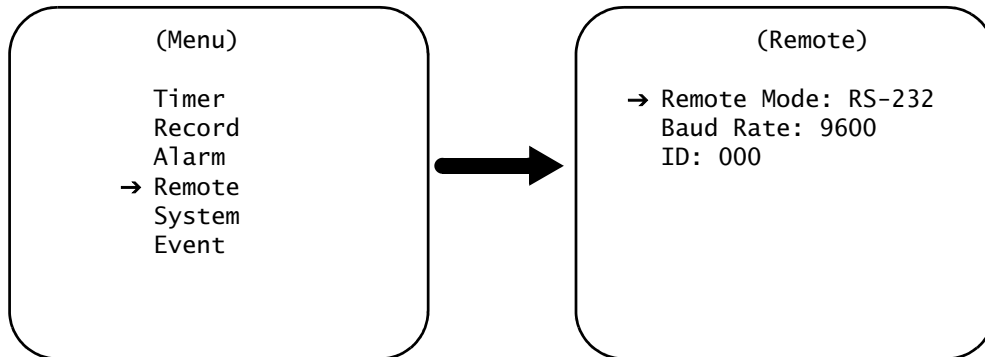
8. If you have completed all your system configuration changes, press **Menu** again to exit and close menu setup.

Remote Protocol Setup

You can control the HRTL-One remotely using commands specified in [Table 3-6](#). On the Remote screen you configure:

- Remote protocol interface
 - Transmission baudrate
 - Remote protocol ID
1. On the **Main Menu** screen, press **▲** or **▼** to select **Remote**, then press **Enter**. The following screen appears:

Figure 3-9 Remote Screen



2. Press **▲** or **▼** to select the **Remote Mode** field, then press **Enter**.
Press **▲** or **▼** to choose from the following options:
RS-232 = RS-232 interface
RS-485 = RS-485 interface
Press **Menu** to confirm your changes.
3. Press **▲** or **▼** to select the **Baud Rate** field, then press **Enter**.
Press **▲** or **▼** to choose from the following options:
115200, 57600, 19200, 9600, 4800, 3600, 2400, 1200
Press **Menu** to confirm your changes.
4. Press **▲** or **▼** to select the **ID** field, then press **Enter**.
Press **▲** or **▼** to set the numerical number and press **◀** or **▶** to move to the next digit (3 digits).
Press **Menu** to confirm your changes.
5. Press **Menu** to exit this screen and confirm the current operations.
6. If you have completed all your system configuration changes, press **Menu** again to exit and close menu setup.

RS-232/RS-485 Remote Protocol

You can use the PC keyboard to simulate a DVR keypad.

Figure 3-10 PC Keyboard / DVR Keypad

DATA: Remote protocol using 8 bit data, 1 start bit, 1 stop bit.

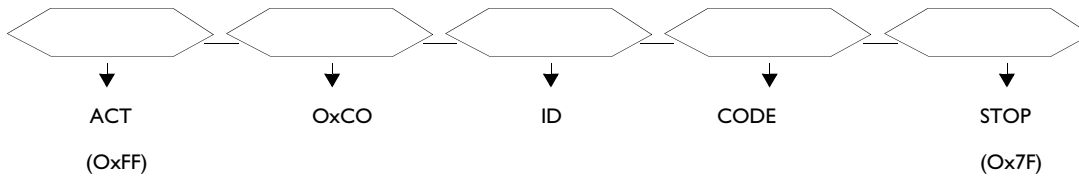


Table 3-6 describes the keypad functions.

Table 3-6 Keypad Functions

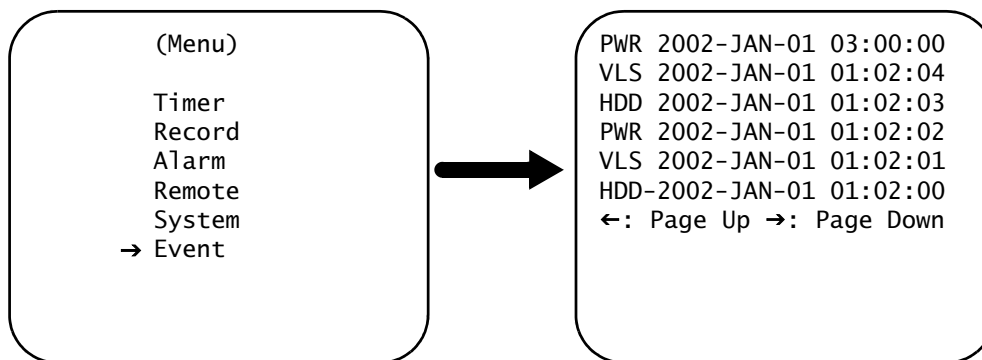
Function	Code	ASCII
Menu	0x4D	M
Enter	0x0D	Enter
Search	0x48	H
Slow	0x53	S
Up / Pause	0x55	U
Down / Stop	0x4E	N
Left / Fast forward	0x4C	L
Right / Fast reverse	0x52	R
Play	0x50	P
Record	0x72	r

Event Reporting Setup

Events affecting service are logged and reported using the Event screen. Use the Event screen to view a log of recorded events.

1. On the **Main Menu** screen, press **▲** or **▼** to select **Event**, then press **Enter** to confirm a full list. The following screen appears:

Figure 3-11 Event Screen



2. Press **▲** or **▼** to select a recorded event clip.

Note Only eight events appear on the screen at one time. Press **◀** or **▶** to scroll down the list.

PWR = Recovery time after the power shut down. For example, if the power shut down at 01:00 and power was recovered at 03:00, the event displays as 03:00:00, indicating that power was lost before 03:00.

HDD = Hard drive error time

VLS = Video loss time

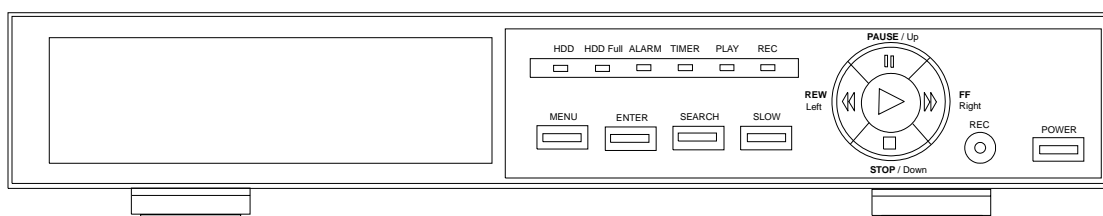
3. Press **Enter** to play the selected recorded video.

Operation

After you set up your system, you are ready for day-to-day operation. This chapter describes how to use the HRTL-One DVR to:

- Record video
- Play video clips
- Search for video clips

Figure 4-1 Front Panel Controls



Control	Function
MENU	Press to enter menu setup and enter the Administrator password (default is 0000) to access the Main Menu.
ENTER	Press to accept changes that you make in menu setup.
SEARCH	Press to search for previously recorded video.
SLOW	Press to slow down the speed of Play mode.
STOP	Press to stop recording or playing.
REC	Press to start recording. Note Pressing REC will put the system in manual recording mode, overriding any timed recording configured in the menu setup.
POWER	Press to power up the HRTL-One. Press again to power off the HRTL-One.
REW (Left)	Press once to play video backward at high speed. Press again to adjust the speed (1X, 2X, 4X, 8X, 16X, 32X, depending on the number of times you press this button).
FF (Right)	Press once to play video forward at high speed. Press again to adjust the speed (1X, 2X, 4X, 8X, 16X, 32X, depending on the number of times you press this button).
PAUSE	Press to pause the video at the currently displayed image.
PLAY	Press to play recorded video.

Front Panel LEDs

Under the following conditions, the red light is ON:

- HDD = The hard drive is activated.
- HDD FULL = The hard drive is full.
- ALARM = When alarm enable is set to **Yes** and an alarm is triggered, the LED flashes red.
- TIMER = When timer enable is **Yes**
- PLAY = The HRTL-One is in Play mode.
- REC = The HRTL-One is in Record mode.

Powering Up the HRTL-One

Before you power up the HRTL-One, make sure the hard drive is locked (key lock is in A position) and the POWER LED (above the POWER button) is red.

Press the POWER button. You will notice:

The POWER LED turns orange, then all the other LEDs turn red, except the HDD LED.

The On-screen Display (OSD) shows the message HDD Detecting.

The powering up process takes approximately five to 15 seconds. During power up, if the HDD is set as Master, the message on the OSD is HDD Master Connect. If the HDD is set as Slave, the message on the OSD is HDD Slave Connect.

Note If the hard drive is set as Slave, change the jumper settings so that the hard drive is set to Master.

When the powering up is complete, the POWER LED turns green.

Recording Video

Your HRTL-One DVR offers a variety of flexible recording modes. You can configure it to:

- Record all the time
- Record for scheduled time periods
- Record upon alarm activation

You can also configure record speed and resolution (quality).

The desired recording parameters are configured using the menu setup screens (see [Chapter 3](#)). During normal (recording) operation, if power stops accidentally, after the HRTL-One recovers power, it will continue to record after booting up.

Note You can also record manually by pressing the **REC** button on the front panel. Manual recording overrides timed recording.

System Status Reporting

System operational status is reported on the On-Screen Display (OSD).

The HRTL-One automatically detects:

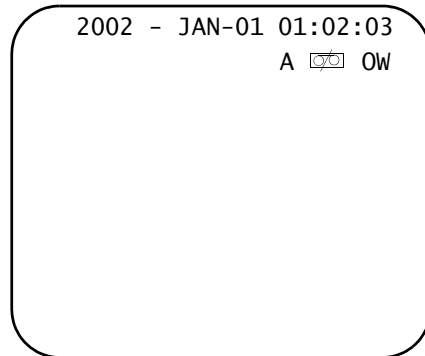
- The remaining hard drive capacity
- A full hard drive
- A system error
- Loss of video signal from connected camera(s)

There are four record modes:


- Alarm Record
- External Trigger Record
- Scheduling Timer Record
- Manual Record

An alarm trigger causes the HRTL-One to immediately start recording at the recording speed and quality configured for Alarm mode setup (see [Alarm Mode Setup](#), page 27).

The OSD looks similar to the following:



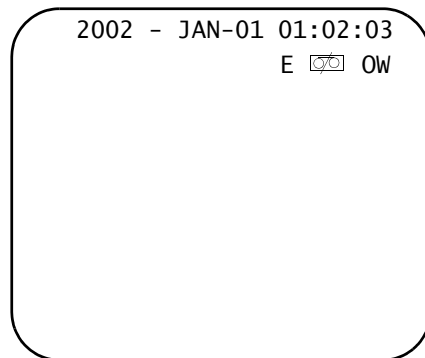
Legend

- A** = Alarm trigger
-  = Recording
- OW** = HDD overwrite
= **32GB**. If the OW shows 32GB, it means that the hard drive has 32 GB capacity left for storing recorded video.


Recording Video Triggered by an External Device

You can program the HRTL-One to record from an external device (see Pin 6 on [Table 2-2](#)). This external device trigger causes the HRTL-One to immediately start recording, at the recording speed and video quality configured for Record mode (see [Recording Setup](#), page 26).

The OSD looks similar to the following:



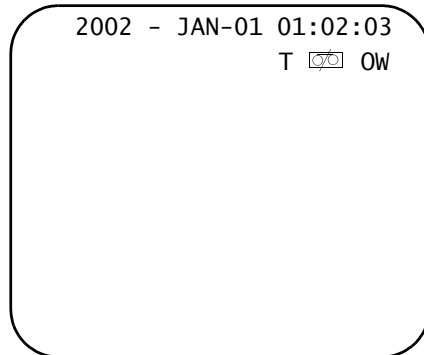
Legend

- E** = External trigger record
-  = Recording
- OW** = HDD overwrite
= **32GB**. If the OW shows 32GB, it means that the hard drive has 32 GB capacity left for storing recorded video.

Recording Timer Scheduled Video

When you set up recording schedules on the Timer screen, the HRTL-One records video automatically during the set time periods at the recording speed and video quality configured for Timer Recording mode setup (see *Timer Recording Setup*, page 24).

The OSD looks similar to the following:



Legend

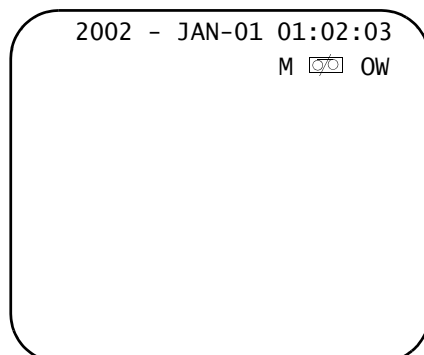
- T** = Timer record
- [Recording Icon] = Recording
- OW** = HDD overwrite
= **32GB**. If the OW shows 32GB, it means that the hard drive has 32 GB capacity left for storing recorded video.

Recording Video Manually

Press **REC** on the front panel to start recording immediately. The HRTL-One records video at the recording speed and video quality configured for Record mode setup (see *Recording Setup*, page 26).

Note Manual recording overrides timed recording configured in the menu setup.

The OSD looks similar to the following:



Legend

- M** = Manual record
- [Recording Icon] = Recording
- OW** = HDD overwrite
= **32GB**. If the OW shows 32GB, it means that the hard drive has 32 GB capacity left for storing recorded video.

Playing Back Video

To play back the most recent video clip recorded, press **PLAY** (▶) on the front panel. The HRTL-One displays the last recorded video clip.

Table 4-1 Play Speeds

Play back speeds	Use these controls
Fast forward	<p>Press PLAY (▶) on the front panel, then press ▶▶ to open the fast forward search screen.</p> <p>Press ▶▶ once to increase the speed to 2X, twice to increase the speed to 4X, and so on. The maximum fast forward speed is 32X.</p>
Fast reverse	<p>Press PLAY (▶) on the front panel, then press ◀◀ to open the fast reverse search screen.</p> <p>Press ◀◀ once to increase the reverse speed to 2X, twice to increase the reverse speed to 4X, and so on. The maximum fast rewind speed is 32X.</p>
Slow forward	<p>Press PLAY (▶) on the front panel, then press SLOW for slow play.</p> <p>Press ▶▶ to play images at slow speed (1/2X). Press ▶▶ again to slow the speed to 1/4X. Continue to press ▶▶ to slow down the speed. The minimum slow speed is 1/32X.</p>
Slow reverse	<p>Press PLAY (▶) on the front panel, then press SLOW for slow forward.</p> <p>Press ◀◀ to play images slowly forward (1/2X). Press ◀◀ again to slow the speed to 1/4X. Continue to press ◀◀ to slow down the speed. The minimum slow forward speed is 1/32X.</p>
Pause	<p>Press PLAY (▶) on the front panel, then press PAUSE to lock the current image on the screen.</p>
Stop	<p>Press STOP (■) on the front panel whenever you want to return the HRTL-One to live monitoring mode.</p>

Playing Back Single Images

Use the image jog dial to play back single images.

1. Press **PLAY** (▶) on the front panel, then press **PAUSE** to lock the current image on the screen.
2. Press ▶▶ to select single image play. Each time you press ▶▶ the next image will display. Continuing to press ▶▶ will result in forward image by image playback.

OR

Press ◀◀ to select single image play, from the first recorded image. Continuing to press ◀◀ will result in reverse image by image playback.

Searching for Video Clips to Play Back

To search for images:

1. Press **SEARCH** on the front panel. A screen similar to the following displays.

Figure 4-2 Search Menu



Legend

Last Record = The last recorded video.

Full List = A complete list of recorded video, sorted by time.

Alarm List = A list of recorded alarms, sorted by time.

Time Search = Allows you to search for video by entering time parameters.

2. Press ▲ or ▼ to navigate through the menu items.

Last Recorded Video

1. Press **SEARCH** on the front panel, then select **Last Record**.
2. Press **Enter** to play the last recorded video clip.

Search Through Full List

1. Press **SEARCH** on the front panel, then select **Full List**.
2. Press **Enter**. A screen similar to the following displays.

```
→ M 2002-JAN-01 01:02:03
M 2002-JAN-01 01:02:03
A 2002-JAN-01 01:02:03
T 2002-JAN-01 01:02:03
E 2002-JAN-01 01:02:03
M 2002-JAN-01 01:02:03
← : Page Up → : Page Down
```

Legend

M = Manual record time
A = Alarm record time
T = Timer record time
E = External record time

3. Press **▲** or **▼** to select the recorded event you wish to view.

Note Only eight events are displayed at one time on the screen. Press **◀** or **▶** to scroll through the complete list.

Press **Enter** to play the selected recorded video.

Search Through Alarm Events

1. Press **SEARCH** on the front panel, then select **Alarm List**.
2. Press **Enter**. A screen similar to the following displays.

```
→ A 2002-JAN-01 01:02:03
A 2002-JAN-01 01:02:03
A 2002-JAN-01 01:02:03
A 2002-JAN-01 01:02:03
A 2002-JAN-01 01:02:03
A 2002-JAN-01 01:02:03
A 2002-JAN-01 01:02:03
← : Page Up → : Page Down
```

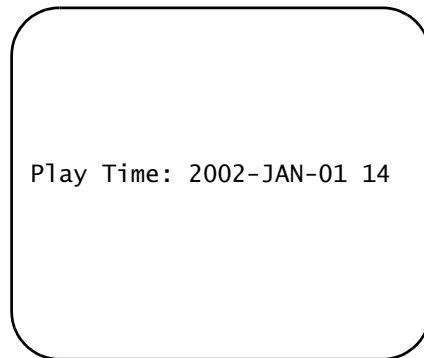
3. Press **▲** or **▼** to select the recorded alarm event you wish to view.

Note Only eight events are displayed at one time on the screen. Press ◀ or ▶ to scroll through the complete list.

Press **Enter** to play the selected recorded video.

Using Time Search

1. Press **SEARCH** on the front panel, then select **Time Search**.
2. Press **Enter**. A screen similar to the following displays.



Format for time search is:
Year-Month-Day Hour

3. Press ▲ or ▼ to select the desired date and hour for the recorded event. Press ◀ or ▶ to scroll between the clips.
4. Press **Enter** to play the selected recorded video.

Note If the system cannot find a record matching your search parameters in the database, the screen displays the message Time Not Found.

Video Loss

If the OSD screen displays the message Video Loss, check the video input connection.

Key Lock

To select the Key Lock function, press the front panel **MENU** and **ENTER** buttons at the same time.

To cancel the Key Lock function, press the front panel **MENU** and **ENTER** buttons at the same time.

A

Solutions

This appendix describes some system malfunctions that may occur from time to time and provides possible solutions.

If this happens ...	Try this ...
The front panel POWER LED is not lit.	<ul style="list-style-type: none">• Check the power source cable connections.• Confirm there is power at the outlet.
The HRTL-One does not work when I press any button.	<ul style="list-style-type: none">• Check the Key Lock mode (press MENU and ENTER at the same time).
The HRTL-One is not recording video.	Check that the hard drive has been properly installed. For more information, see <i>Installing the Hard Drive</i> , page 4.
You see the message HDD Not Found. Please Insert HDD and Press Any Key.	Check that the hard drive has been properly installed.
The Record Enable is not working.	Check that the Record Enable is set to Yes .
There is no live video.	<ul style="list-style-type: none">• Check the camera video cable and connections.• Check the monitor video cable and connections.• Confirm that the camera has power.• Check the camera lens setting.
The REC LED is on but the HRTL-One is not recording.	When the HRTL-One is in Timer mode, it will only record during the assigned times. For more information, see <i>Recording Timer Scheduled Video</i> , page 37.

B

Compatible Hard Drives

This appendix lists the hard drive models that have been tested and found to be compatible with the HRTL-One. Other IDE drives not on the list may also work but we recommend that you use the hard drives specified on the list below.

Manufacturer	Model	Storage capacity	Rotation
Hitachi®	Deskstar 180 GXP	120 GB	7200 RPM
Hitachi	Deskstar 7K250, HDS722516VLAT20	160 GB	7200 RPM
Hitachi	Deskstar 7K250, HDS722525VLAT80	250 GB	7200 RPM
IBM®	Deskstar 120GXP	80 GB	7200 RPM
IBM	Deskstar 120GXP	120 GB	7200 RPM
Maxtor®	DiamondMax 536DX, 4W0601H4	60 GB	5400 RPM
Maxtor	DiamondMax Plus 9	80 GB	7200 RPM
Maxtor	DiamondMax Plus 9, 6Y120L	120 GB	7200 RPM
Maxtor	DiamondMax Plus 9, 6Y160L0	160 GB	7200 RPM
Maxtor	MaxLine Plus II, 7Y250P0	250 GB	7200 RPM
Seagate®	Barracuda ATA IV, ST380021A	80 GB	7200 RPM
Seagate	Barracuda ATA V, ST3120023A	120 GB	7200 RPM
Seagate	Barracuda 7200.7 Plus, ST3160023A	160 GB	7200 RPM
Western Digital®	Caviar WD1200BB-00CAA1	120 GB	7200 RPM
Western Digital	Caviar WD2000BB-00DWA0	200 GB	7200 RPM
Western Digital	CaviarSE WD2500JB	250 GB	7200 RPM

Note Do not remove the hard drive until after the HRTL-One has been powered down for at least 60 seconds. This will protect the hard drive from damage.

Specifications

This appendix lists the HRTL-One specifications.

Specification	Description
Video format:	NTSC/EIA or PAL/DCIF
HDD storage:	IDE type, UTMA 66 above,
Record mode:	Manual, alarm, external, timer
Playback search options:	Date and time, event, alarm
RS-232 interface:	Yes
OSD (On-screen display):	Yes
Security:	Password protection
Video input:	1 video input, composite, 1 Vp-p, 75 ohms, BNC
Video output:	1 video output, composite, 1 Vp-p, 75 ohms, BNC
Video resolution:	720 x 576 (PAL) 720 x 486 (NTSC)
Video compression:	Wavelet
Display refresh rate:	60 IPS (NTSC), 50 IPS (PAL)
Record refresh rate:	60 IPS (NTSC), 50 IPS (PAL)
Alarm input:	TTL input, high (5V), low (GND)
Alarm output:	COM, NO
Video loss detection:	Yes
Time display format:	Yes
Power source:	AC 100~240V switching adapter
Power consumption:	< 27 W

Specifications

Specification	Description
Dimensions:	380 mm x 270 mm x 65 mm (W x L x H) 14.96 in. x 10.63 in. x 2.56 in.
Weight:	5.2 kg (11.46 lb.)
Operating temperature:	5° C to 40°C (41°F to 104°F)

Warranty

VERY IMPORTANT

PLEASE READ THIS WARRANTY CAREFULLY.

IF, AFTER READING THIS WARRANTY, YOU DISAGREE WITH ANY OF THE TERMS OR CONDITIONS, PLEASE RETURN THE PRODUCT TO THE POINT OF PURCHASE FOR A FULL REFUND.

IF YOU UNPACK THIS PRODUCT, IT IS DEEMED THAT YOU ACCEPT THE TERMS AND CONDITIONS OF THIS WARRANTY.

Honeywell Product Warranty

Honeywell warrants the components listed below against defects in workmanship and materials for the periods specified:

HRTL-One DVR 1 Year Parts and Labor

Repairs are warranted for 90 days if performed outside of the initial product warranty. If the product is within the initial warranty period then repairs are warranted for 90 days or the remainder of the warranty, whichever is greater.

Provisions for Canadian Customers

For those customers whose mailing address is in Canada, Honeywell's offer and any agreement of sale resulting therefrom shall be governed by and construed in accordance with the internal and domestic laws of the Province of BRITISH COLUMBIA without giving effect to the conflict of laws rules thereof. The courts of British Columbia shall have exclusive jurisdiction to entertain and determine all disputes and claims, whether for specific performance, injunction, declaration, or otherwise arising out of or in any way connected with the constructions, breach, or alleged, threatened or anticipated

breach of the contract resulting from this offer and shall have jurisdiction to hear and determine all questions as to the validity, existence, or enforceability thereof. The United Nations Convention On Contracts For The International Sale Of Goods shall not apply.

Provisions for American Customers

For those customers whose mailing address is in the United States, Honeywell's offer and any agreement of sale resulting therefrom shall be governed by and construed in accordance with the internal and domestic laws of the State of WASHINGTON without giving effect to the conflict of laws rules thereof. The Superior Court of Washington for Whatcom County and U.S. District Court for the Western District of Washington shall have exclusive jurisdiction to entertain and determine all disputes and claims, whether for specific performance, injunction, declaration, or otherwise arising out of or in any way connected with the construction, breach, or alleged, threatened, or anticipated breach of the contract resulting from this offer and shall have jurisdiction to hear and determine all questions as to the validity, existence, or enforceability thereof. Customer specifically consents to such Court's exercise of jurisdiction over it. The United Nations Convention On Contracts For The International Sale Of Goods shall not apply.

Returns and Repairs

Subject to the terms and conditions listed below, during the warranty period Honeywell International will repair or replace, at its sole option, free of charge any defective products returned prepaid. In the event you have a problem with any Honeywell product, please call and request a **RETURN AUTHORIZATION (RA) NUMBER** from the Service Department.

Call 1.800.796.CCTV; please ask for the Service Department. Be sure to have the model number, serial number, and the nature of the problem available for the customer service representative. Prior authorization **MUST** be obtained for all returns, exchanges, or credits. **ITEMS SHIPPED WITHOUT A CLEARLY IDENTIFIED RA NUMBER MAY BE REFUSED.**

Products returned will be tested to verify the defect. Upon verification of the defect, the product will be repaired, exchanged, or credited to the customer's account, at our sole discretion. As standard procedure, the product will be repaired or replaced. In the event of replacement, the returned product will be credited to the customer's account and a new invoice issued for the replacement item. Honeywell reserves the right to issue a credit only in lieu of replacement.

All merchandise returned for credit may be subject to a 20% restocking and refurbishing charge.

If the product is found to be in good working order or its inability to function properly is a result of user damage or abuse, the product will be returned in the same condition as received unless repair is possible and requested by the customer. Repairs of such nature will incur a charge for parts and labor and will proceed only by agreement with the customer to accept the charge.

Without limiting the generality of the following, this warranty shall not apply to defects resulting from unauthorized modification, misuse, vandalism, fire, floods, acts of nature, or alterations of serial numbers.

Disclaimer

This warranty is exclusive and in lieu of all other representations, warranties, guarantees, and conditions, express or implied, statutory or otherwise and without limiting the generality of the foregoing, Honeywell expressly disclaims and excludes any implied warranty of merchantability, durability, or fitness for purpose and any warranties or modified warranties arising from usage of trade or course of dealing.

Any description of the goods or services, whether in writing or made orally by Honeywell or our agents, specifications, samples, models, bulletins, drawings, diagrams, engineering sheets, or similar materials used in connection with customer's order are for the sole purpose of identifying the goods and/or services and shall not be construed as an express warranty. Any suggestions by Honeywell International or our agents regarding use, applications, or suitability of the goods and/or services shall not be construed as an express warranty unless confirmed to be such in writing by Honeywell International. You assume full responsibility for selecting products to achieve your intended purposes, for properly installing and using those products, and for verifying the results obtained therefrom.

Your exclusive remedy and Honeywell's entire liability arising from or in connection with your use of the products and/or this agreement shall be repair or replacement of defective products, as set forth above. Honeywell International shall not be subject to and disclaims: (A) Any other obligations or liabilities arising out of breach of contract or of warranty, (B) Any obligations whatsoever arising from tort claims (including negligence, and strict liability) or arising under other theories of law with respect to goods sold or services rendered by seller, or any undertakings, acts, or omissions relating thereto, and, (C) all consequential, incidental, special, and contingent damages whatsoever, even if Honeywell has been specifically advised of the possibility of such damages.

Without limiting the generality of the foregoing, Honeywell specifically disclaims any liability for property or personal injury damages, penalties, special or punitive damages, damages for lost profits or revenues, loss of use of goods or any associated equipment, cost of capital, cost of substitute goods, facilities or services, down-time, shut-down or

slow-down costs, or for any other types of economic loss, and for claims of customer's customers or any third party for any such damages. Some jurisdictions do not allow limitation or exclusion of incidental or consequential damages, so this limitation or exclusion may not apply to you. In no event shall Honeywell's total liability for any damages to you or any other person in connection with the products or this agreement exceed the lower of the suggested list price or the actual price paid for the products, regardless of whether such liability arises from contract, tort, warranty, or any other form of claim.

If any provision of this agreement is found to be void, invalid, or unenforceable, that finding shall not affect the remaining provisions, all of which shall be enforced to the full extent permitted by law. If any remedy hereunder is determined to have failed of its essential purpose, the limitations of liability and exclusion of damages set forth above shall remain in full force and effect. This agreement may be modified only by a writing signed by a duly authorized representative of Honeywell International.

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