

## 3 Installation and Connections

**Note:** All the installation and operations here should conform to your local electric safety rules.

### 3.1 Check Unpacked DVR

When you receive the DVR from the forwarding agent, please check whether there is any visible damage. The protective materials used for the package of the DVR can protect most accidental clashes during transportation. Then you can open the box to check the accessories.

Please check the items in accordance with the list. Finally you can remove the protective film of the DVR.

**Note**

Remote control is not a standard accessory and it is not included in the accessory bag.

### 3.2 About Front Panel and Rear Panel

The model in the front panel is very important; please check according to your purchase order.

The label in the rear panel is very important too. Usually we need you to represent the serial number when we provide the service after sales.

### 3.3 HDD Installation

#### 3.3.1 HDD Calculation

Calculate total capacity needed by each DVR according to video recording (video recording type and video file storage time).

Step 1: According to Formula (1) to calculate storage capacity  $q_i$  that is the capacity of each channel needed for each hour, unit Mbyte.

$$q_i = d_i \div 8 \times 3600 \div 1024 \quad (1)$$

In the formula:  $d_i$  means the bit rate, unit Kbit/s

Step 2: After video time requirement is confirmed, according to Formula (2) to calculate the storage capacity  $m_i$ , which is storage of each channel needed unit Mbyte.

$$m_i = q_i \times h_i \times D_i \quad (2)$$

In the formula:

$h_i$  means the recording time for each day (hour)

$D_i$  means number of days for which the video shall be

kept

Step 3: According to Formula (3) to calculate total capacity (accumulation)  $q_T$  that is needed for all channels in the DVR during **scheduled video recording**.

$$q_T = \sum_{i=1}^c m_i \quad (3)$$

In the formula:  $c$  means total number of channels in one DVR

Step 4: According to Formula (4) to calculate total capacity (accumulation)  $q_T$  that is needed for all channels in DVR during **alarm video recording (including motion detection)**.

$$q_T = \sum_{i=1}^c m_i \times a\% \quad (4)$$

In the formula:  $a\%$  means alarm occurrence rate

You can refer to the following sheet for the file size in one hour per channel. (All the data listed below are for reference only.)

Bit stream size (max)	File size	Bit stream size (max)	File size
96K	42M	128K	56M
160K	70M	192K	84M
224K	98M	256K	112M
320K	140M	384K	168M
448K	196M	512K	225M
640K	281M	768K	337M
896K	393M	1024K	450M
1280K	562M	1536K	675M
1792K	787M	2048K	900M
3072Kbps	1350M	4096K	1800M
6144Kbps	2700M	8192Kbps	3600M

**Note**

- All information listed in the above sheet for reference only. We are not reliable for any damage or loss resulting from it.
- For the space marked by the HDD manufacturer, 1K=1000, while for the computer OS, 1K=1024. So, the space recognized by the computer system is less than the marked space on the HDD. Please pay attention to it.
- All HDD space marked by the HDD manufacturer is shown as below: 1T=1000G, 1G=1000M, 1M=1000K, 1K=1000.
- All HDD space marked by the HDD manufacturer shall become the computer OS space after the corresponding calculation. For example:  
 1T(marked by the HDD manufacturer)=1000G/(1.024\*1.024\*1.024)=931G(OS space),  
 500G=500G/ (1.024\*1.024\*1.024) =465G

**3.3.2 HDD Installation**



**Important**

- **Shut down the device and unplug the power cable before you install the HDD.**
- **Always use the HDD for the surveillance product recommended by the manufacturer.**
- **All figurers listed below for reference only. Slight difference may be found on the front or rear panel.**

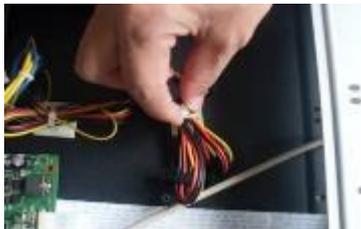
You can refer to the User's Manual for recommended HDD brand. Please follow the instructions below to install hard disk. This series DVR max supports 8 SATA HDDs. Please use HDD of 7200rpm or higher.

**3.3.2.1 1.5U series**

This series DVR max has four SATA HDDs.



- ① Loosen the screws of the upper cover.      ② Place the HDD in accordance with the four holes in the bottom.      ③ Use four screws to secure the HDD.



- ④ Unfasten the HDD power cable.      ⑤ Use special data cable to connect the HDD and the SATA port.      ⑥ Insert the HDD power cable and then put the cover back. Secure firmly.

**3.3.2.2 2U**



- ① Loosen the screws of the upper cover and then remove the cover.      ② Fix the HDD on the bracket. If you want to install the HDD on the bottom bracket, you need to remove the top bracket first.      ③ Connect one end of the HDD data cable to one HDD.



- ④ Connect the other end of the HDD data cable to the mainboard.      ⑤ Connect the power cable to the HDD.      ⑥ Put the cover back and then fix.

**Important:**

If the HDD amount is less than four, you do not need to install the HDD bracket. When there is a bracket, please make sure the installation direction of HDDs is the same.

3.3.2.3 3U series



- ① Remove the HDD box from the device.      ② Put the HDD to the box and then use the screws to secure.



- ③ Insert the HDD box to the device. Please make sure the HDD box handle is up in case it collides with the front panel.      ④ After you inserted the HDD box, put the handle back.

3.3.2.4 Removable Case



① Insert the key to the hole on the front panel.



② Open the front panel.



③ Insert the HDD to the clip and adjust the handle of the HDD to secure it.



④ Put the front panel back and then use the key to secure the front panel.

#### HDD Handle Installation



① Line up the one side of the handle to the HDD (The side of no port)



② Use screwdriver to fix the handle on the HDD.

### 3.4 Rack Installation

The DVR occupies 1.5U/2U rack units of vertical rack space.

- Use twelve screws to fix the unit
- Please make sure the indoor temperature is below 35°C (95°F).
- Please make sure there is 15cm (6 inches) space around the device to guarantee sound ventilation.
- Please install from the bottom to the top.
- If there are more accessories connected in the rack, please take precaution measures in case the rack power is overload.

## 3.5 Connecting Power Supply

Please check input voltage and device power button match or not.

We recommend you use UPS to guarantee steady operation, DVR life span, and other peripheral equipments operation such as cameras.

## 3.6 Connecting Video Input and Output Devices

### 3.6.1 Connecting Video Input

The video input interface is BNC. The input video format includes: PAL/NTSC BNC (1.0V<sub>P-P</sub>, 75Ω) .

The input video format: BNC (0.8VP-P, 75Ω) .

The video signal should comply with your national standards.

The input video signal shall have high SNR, low distortion; low interference, natural color and suitable lightness.

#### **Guarantee the stability and reliability of the camera signal:**

The camera shall be installed in a cool, dry place away from direct sunlight, inflammable, explosive substances and etc.

The camera and the DVR should have the same grounding to ensure the normal operation of the camera.

#### **Guarantee stability and reliability of the transmission line.**

Please use high quality, sound shielded BNC. Please select suitable BNC model according to the transmission distance.

If the distance is too long, you should use twisted pair cable, and you can add video compensation devices or use optical fiber to ensure video quality.

You should keep the video signal away from the strong electromagnetic interference, especially the high tension current.

#### **Keep connection lugs in well contact.**

The signal line and shielded wire should be fixed firmly and in well connection. Avoid dry joint, lap welding and oxidation.

### 3.6.2 Connecting Video Output

Video output includes a BNC(PAL/NTSC, 1.0VP- P, 75Ω) output, a VGA output and a HDMI output.

System supports BNC, VGA and HDMI output at the same time.

When you are using pc-type monitor to replace the monitor, please pay attention to the following points:

- To defer aging, do not allow the pc monitor to run for a long time.
- Regular demagnetization will keep device maintain proper status.
- Keep it away from strong electromagnetic interference devices.

Using TV as video output device is not a reliable substitution method. You also need to reduce the working hour and control the interference from power supply and other devices. The low quality TV may result in device damage.

## 3.7 Connecting Audio Input & Output, Bidirectional Audio

### 3.7.1 Audio Input

BNC port is adopted for audio input port.

Due to high impedance of audio input, please use active sound pick-up.

Audio transmission is similar to video transmission. Try to avoid interference, dry joint, loose contact and it shall be away from high tension current.

### 3.7.2 Audio Output

The audio output signal parameter is usually over 200mv 1K $\Omega$  (BNC). It can directly connect to low impedance earphone, active sound box or amplifier-drive audio output device.

If the sound box and the pick-up cannot be separated spatially, it is easy to arouse squeaking. In this case you can adopt the following measures:

- Use better sound pick-up with better directing property.
- Reduce the volume of the sound box.
- Using more sound-absorbing materials in decoration can reduce voice echo and improve acoustics environment.
- Adjust the layout to reduce happening of the squeaking.

## 3.8 Alarm Input and Output Connection

Please read the followings before connecting.

### 1. Alarm input

- a. Please make sure alarm input mode is grounding alarm input.
- b. Grounding signal is needed for alarm input.
- c. Alarm input needs the low level voltage signal.
- d. Alarm input mode can be either NC (normal Open) or NO (Normal Close)
- e. When you are connecting two DVRs or you are connecting one DVR and one other device, please use a relay to separate them,

### 2. Alarm output

The alarm output port should not be connected to high power load directly (It shall be less than 1A) to avoid high current which may result in relay damage. Please use the co contactor to realize the connection between the alarm output port and the load.

### 3. How to connect PTZ decoder

- a. Ensure the decoder has the same grounding with DVR, otherwise you may not control the PTZ. Shielded twisted wire is recommended and the shielded layer is used to connect to the grounding.
- b. Avoid high voltage. Ensure proper wiring and some thunder protection measures.
- c. For too long signal wires, 120 $\Omega$  should be parallel connected between A, B lines on the far end to reduce reflection and guarantee the signal quality.
- d. "485 A, B" of DVR cannot parallel connect with "485 port" of other device.

e. The voltage between of A,B lines of the decoder should be less than 5v.

**4. Please make sure the front-end device has soundly earthed.**

Improper grounding may result in chip damage.

**3.8.1 Alarm Input and Output Details**

**Important**

Please refer to the specifications for the alarm input and output channel amount. Do not merely count the alarm input and out channel amount according to the ports on the rear panel.

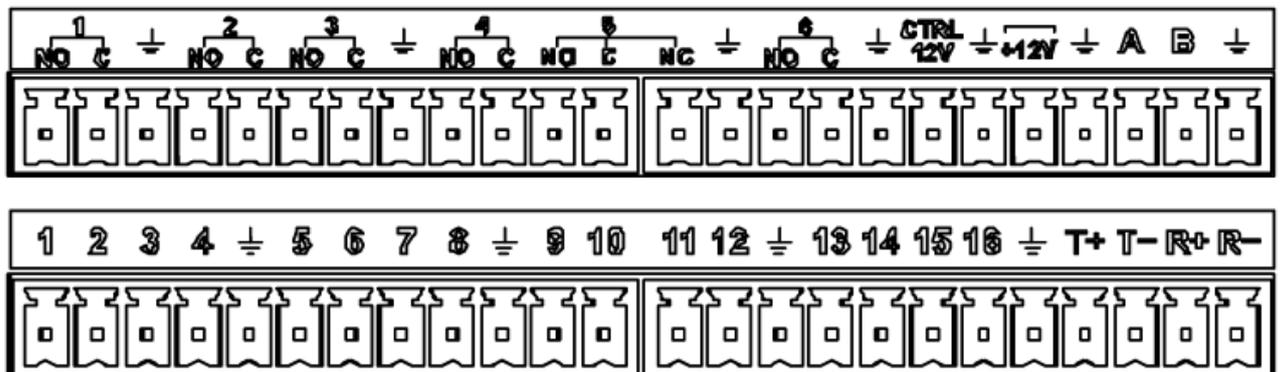


Figure 3-1

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	ALARM 1 to ALARM 16. The alarm becomes active in low voltage.
NO1 C1, NO2 C2, NO3 C3, NO4 C4, NO6 C6	The first four are four groups of normal open activation output (on/off button)
NO5 C5 NC5	NO5 C5 NC5 is a group of NO/NC activation output (on/off button)
CTRL 12V	Control power output. For external alarm, you need to close the device power to cancel the alarm.
+12V	It is external power input. Need the peripheral equipment to provide +12V power (below 1A).
	Earth cable.
A/B	485 communication port. They are used to control devices such as decoder.
T+,T-,R+,R-	They are four-wire double duplex RS485 port T+ T-: output wire R+ R-: input wire

**3.8.2 Alarm Input Port**

Please refer to the following sheet for more information.

- Grounding alarm inputs. Normal open or Normal close type)
- Please parallel connect COM end and GND end of the alarm detector (Provide external power to the alarm detector).
- Please parallel connect the Ground of the DVR and the ground of the alarm detector.
- Please connect the NC port of the alarm sensor to the DVR alarm input(ALARM)
- Use the same ground with that of DVR if you use external power to the alarm device.

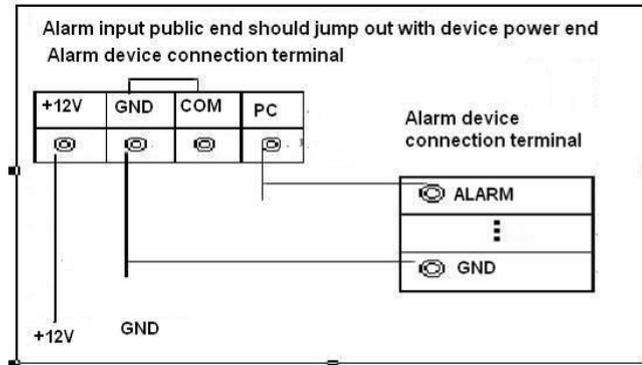


Figure 3-2

### 3.8.3 Alarm Output Port

- Provide external power to external alarm device.
- To avoid overloading, please read the following relay parameters sheet carefully.
- RS485 A/B cable is for the A/B cable of the PTZ decoder.
- T+,T-,R+,R- are four-wire double duplex RS485 port.  
T+ T-: output wire  
R+ R-: input wire

### Relay Specification

Model:		JRC-27F	
Material of the touch	Silver		
Rating (Resistance Load)	Rated switch capacity	30VDC 2A, 125VAC 1A	
	Maximum switch power	125VA 160W	
	Maximum switch voltage	250VAC, 220VDC	
	Maximum switch currency	1A	
Insulation	Between touches with same polarity	1000VAC 1minute	
	Between touches with different polarity	1000VAC 1minute	
	Between touch and winding	1000VAC 1minute	
Surge voltage	Between touches with same polarity	1500V (10×160us)	
Length of open time	3ms max		

Length of close time	3ms max	
Longevity	Mechanical	50×106 times (3Hz)
	Electrical	200×103 times (0.5Hz)
Temperature	-40°C ~+70°C	

### 3.9 RS485

When the DVR receives a camera control command, it transmits that command up the coaxial cable to the PTZ device. RS485 is a single-direction protocol; the PTZ device can't return any data to the unit. To enable the operation, connect the PTZ device to the RS485 (A,B) input on the DVR.

Since RS485 is disabled by default for each camera, you must enable the PTZ settings first. This series DVRs support multiple protocols such as Pelco-D, Pelco-P.

To connect PTZ devices to the DVR:

1. Connect RS485 A,B on the DVR rear panel.
2. Connect the other end of the cable to the proper pins in the connector on the camera.
3. Please follow the instructions to configure a camera to enable each PTZ device on the DVR.

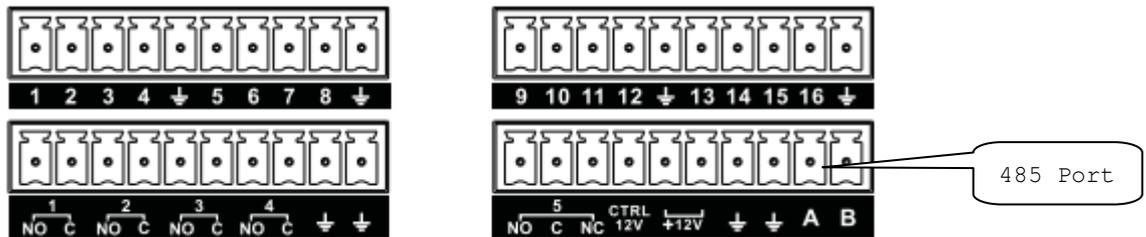


Figure 3-3

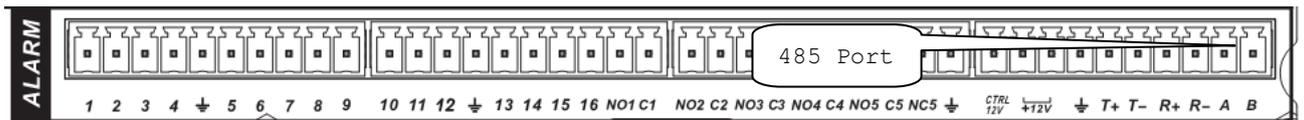


Figure 3-4

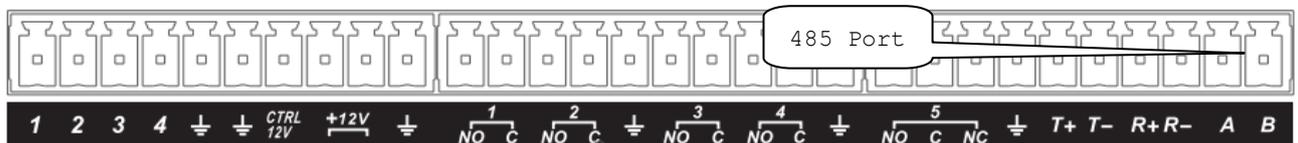


Figure 3-5

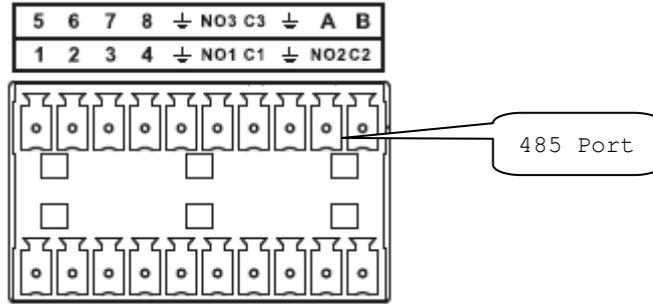


Figure 3-6

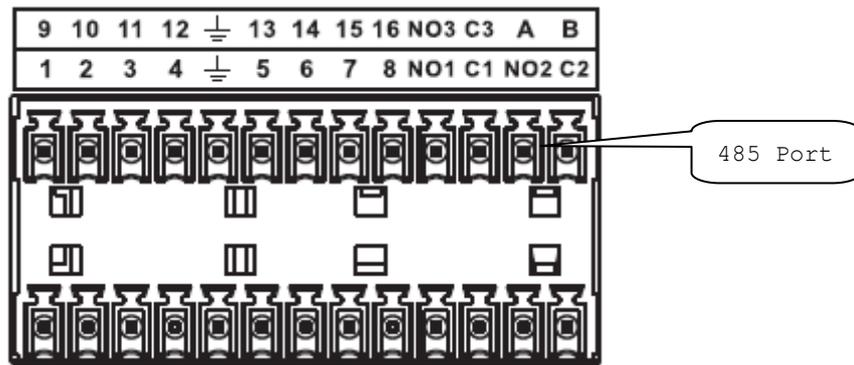


Figure 3-7

### 3.10 Other Interfaces

There are still other interfaces on the DVR, such as USB ports.