



Full HD 1080P
Wide Screen Digital Video
MN90NV
Infrared Night Vision



MN90NV User Manual

About this Manual

Congratulations on purchasing the Minolta MN90NV 1080p HD Camcorder! The contents of this manual are subject to change without notice. Note that the example screens and product illustrations shown in this User's Guide may differ somewhat from the screens and configuration of the actual camera.

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FEDERAL COMMUNICATIONS COMMISSION INTERFERENCE STATEMENT

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CAUTION:

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. 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.

RF Exposure Warning

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment must be installed and operated in accordance with provided instructions and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must

be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

FCC: SAR standard Value: 1.6 W/Kg, Maximal Measure: 0.4 W/kg

CE Mark Warning

This is a Class B product, in a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

Safety and Handling Precautions

Camera Information

- Do not disassemble or attempt to service the camera yourself.
- Do not expose the camera to moisture, or extreme temperatures.
- Allow the camera to warm up when moving from cold to warm temperatures.
- Do not touch and put pressure on the camera lens.
- Do not expose the lens to direct sunlight for extended periods.
- Do not use abrasive chemicals, cleaning solvents or strong detergents to clean the product. Wipe the product with a slightly damp soft cloth.
- Do not use the flash or LED Light near a person's eyes to prevent possible eye injury.
- To prevent you from falling over or resulting in traffic accident, please do not use the camera while you are walking, driving or riding a vehicle.
- Please handle the camera strap with care, and never place the strap around the neck of an infant or child. Wrapping the strap around a neck may cause suffocation.
- Do not subject the LCD screen to impact.
- To prevent the risk of fire or electric shock, do not expose this appliance to rain or moisture.

Battery Information

- Turn off the camera before installing or removing the battery.
- Use only the provided batteries or type of battery and charger that came with your camera. Using other types of battery or charger may damage the device and invalidate the warranty.
- Inserting the battery upside down can cause damage to the product and possibly cause an explosion.
- When the camera is used for an extended period of time, it is normal for the camera body to feel warm.
- Download all pictures and remove the battery from the camera if you are going to store the camera for a long period of time.
- The type of battery and the battery power level may cause the lens to be stuck up. Ensure you use the correct battery type and use a fully charged battery.
- Risk of explosion if battery is replaced by an incorrect type. Dispose of used

batteries according to the instructions.

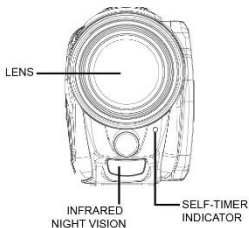
- Please keep the batteries out of the reach of children to prevent from swallowing batteries, which might cause poisoning.
- Once the battery's color changes or its shape is twisted, please stop using it.

USB adapter Information

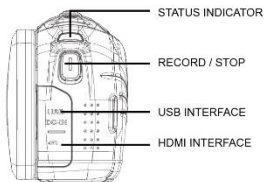
- Do not expose the adapter to high temperatures or moisture places. Otherwise, it may cause fire or electric shock.
- Do not attempt to repair, disassemble, change or transform the adapter.
- Avoid sudden changes in temperature, which may cause condensation on the adapter's internal surfaces. Please do not use it immediately in this situation.
- Do not touch the plug with wet hands. Otherwise, it may cause electric shock.
- Do not use the travel voltage converter or AC/DC power inverter. Otherwise, it may cause damage, overheating, malfunction or fire to the camera.

1.1 Camcorder Interface

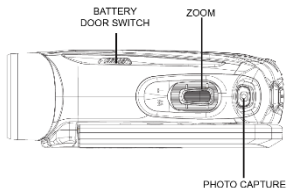
[front view]



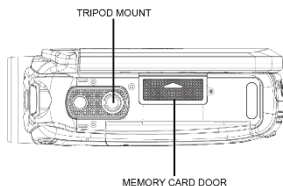
[rear view]



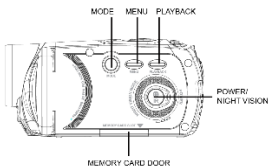
[top view]



[bottom view]



[side view]



1.2 Button Function Description

Function	Description
Power IR	Press for 3 seconds to power on or off. Tap once to enable or disable IR night vision.
Mode	Tap to cycle between Video, Photo and Setup modes.
Menu	Tap to access and exit all menus and submenus.
Zoom Up/Down	In Video or Photo: Press right to zoom-in. Press left to zoom-out. In menu: Press to select submenu In Playback: Press to scroll through media gallery. In Video Playback: Press to fast forward and rewind. Button used during menu navigation and playback use.
Photo OK	In Photo: Tap to capture a photo. OK button in menus. Tap to confirm a setting
Record	In Video: Tap to start/stop recording video.
Playback	In Photo: Tap to enter playback mode. In Video: Tap to enter playback mode.
Infrared Night Vision	Infrared LED to aid with vision and recording in darkness.
Tripod Mount	Mount port for attaching to a tripod nut.
Memory Card Door	Door to cover storage slot for inserting a memory card.
Battery Door	Door to cover the battery compartment.
Speaker	Built-in speaker output for playback of video files when audio recording is enabled.
Lens	Front capture device for all video and photo.

2. First Use

2.1 Inserting the Memory Card

Insert the included SD memory card to record and store your videos and photos. When the battery is low, media stored on the memory card will not be erased. Please insert the SD memory card by following the steps below:

1. Open the screen and open the memory card door on the bottom by pushing in the direction of the arrow.
2. Insert the memory card. Ensure that the metal contacts are inserted first. Push the memory card in until you hear an audible click.
The memory card can only be inserted in one way. Do not force the card in if it will not go in smoothly.
3. Close the memory card door by pushing it down and sliding it back into place.
4. To remove the memory card, simply push in and the card will eject back out.



1. Open the SD card door
2. Insert the memory card as shown

NOTE:

- Please format the memory card before using the camcorder (Caution, this will erase all data on the card).
- Do not remove or insert the memory card when recording. It may damage the card or cause data loss.
- Memory card rating must be Class 10 or above.

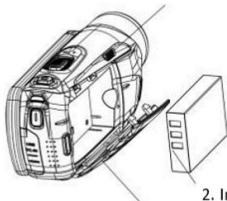
2.2 Installing the Battery

Insert the lithium-ion battery into the battery compartment with the metal contacts facing the back of the camcorder. The battery can only be inserted one way.

Attention!

Please insert the battery in the correct way.

1. Slide the battery door switch forward to open the battery door.



3. Close the battery door.

2. Insert the Li-ion battery into the battery compartment as shown.

2.3 Charging the Battery

Connect your camcorder to the included AC adaptor with the USB cable provided for charging. Insert the small end of the USB plug into the camcorder's port, and the larger end into the included AC adaptor.

2.4 Powering the Camcorder On/Off

Hold the POWER button for 3 seconds to power the camcorder on. To power the camcorder off, press and hold the POWER button for a further 3 seconds.

The camcorder will automatically power on and off when the screen is opened or closed. If the camcorder's battery is low, a "Low Power" message will display on the screen and it will automatically shut down within a few seconds to prevent memory corruption or loss.

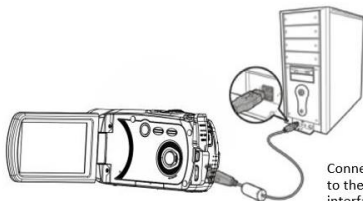
2.5 Switching Modes

Press the MODE button to cycle between Video, Photo and Setup Modes. The corresponding mode will be displayed in the top left corner

of the screen. You may also tap the corresponding mode icon in the top left corner of the touch screen to change modes.

2.6 Connecting to a Computer

Your camcorder can connect to a computer to transfer photo and video files for viewing and editing, as shown below. Once connected and powered on, the camcorder's screen will enter "Mass Storage" mode automatically.

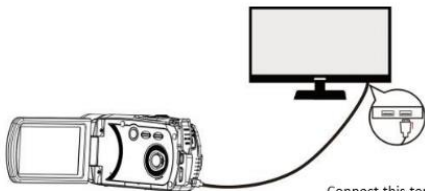


Connect this terminal to the standard USB interface of the camcorder.

Connect this terminal to the standard USB interface of the computer.

2.7 Connecting to a TV

The camcorder can also be connected to a TV. When connected, the camcorder screen will turn off and the camcorder will function normally. Use the TV as the camcorder monitor.



Connect this terminal to the standard HDMI interface of your camcorder.

Connect this terminal to the standard HDMI interface of the TV.

2.8 Video Mode

Press the MODE button to switch to Video Mode. The meaning of each icon within Video Mode is explained in the table below:

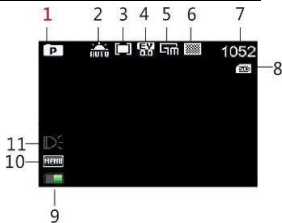
1) Video Mode	6) Recording Time
2) Video Quality Indicator	7) Memory Card Inserted
3) Exposure	8) Battery Level
4) Video Size (Resolution)	9) Menu Setup
5) Frame Rate	10) IR LED Light



2.9 Photo Mode

Press the MODE button to switch to Photo Mode. The meaning of each icon within Photo Mode is explained in the table below:

1) Photo Mode	5) Photo Size (Resolution)	9) Battery Level
2) White Balance	6) Photo Quality Indicator	10) Menu Setup
3) Metering	7) Remaining Image Space	11) IR LED Light
4) Exposure Value	8) Memory Card Inserted	



2.10 Using the Zoom Function

This camcorder has a digital zoom function. To operate the zoom function, slide the ZOOM button right to zoom in closer to the subject, and to the left to zoom away from the subject.

2.11 Using the IR Night Vision Mode

This camcorder has built-in infrared (IR) LEDs for night vision recording - giving you the ability to capture photos and videos in a dark environment.

In Photo or Video mode, short-press the POWER/IR button once to enable the IR LED light. When the IR LED light is enabled, the IR LED light indicator in the middle left of the screen will display in white.

To disable the IR light, short-press the POWER/IR button again. You will notice that the IR light indicator on the screen will now be grayed out.

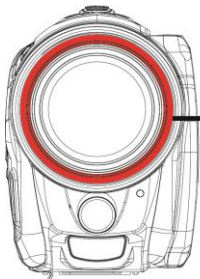
Note:

The photos and videos taken while the IR LED is enabled will be recorded in black and white.

The IR LED cannot be enabled or disabled during a recording.

2.12 Attaching External Accessories

This camcorder supports lens filters & attachments. Simply utilize the front lens diameter 34mm threading for any desired attachments.



34mm Diameter
Threading

3. Using the Camcorder

3.1 Video Recording

Power the camcorder on and it will be ready to record clips right away. You may press the MODE button or press the icon in the top left hand corner of the touch screen to switch to another mode. A camcorder icon will appear in the top left hand corner of the screen when you are in Video mode.

1. Line up your shot by looking at the LCD screen to see what is in view.
2. Hold the camcorder steady and press the RECORD button to begin recording.
3. When recording begins, a rolling timer will display in red in the top right hand corner of the screen. This indicates the recorded video time elapsed.
4. Press the PHOTO button to pause and resume recording. Press the RECORD button to stop recording.
5. The recorded video files will automatically save onto the inserted memory card.

3.1.1 Movie Size (Resolution)

Your camcorder has a number of preset resolutions and frames per second rates.

1. In Video Mode press the MENU button.
2. Select '*Movie Size*' using the ZOOM button and press the PHOTO button to enter the '*Movie Size*' submenu.
3. Press the ZOOM button to navigate the menu and press the PHOTO button to confirm your selected setting (1080P 30fps, 720P 60fps, 720P 30fps, 640x480P 60fps). A higher resolution and faster frames per second rate will produce a higher quality and larger video file.

3.1.2 Video Quality

The Video Quality function determines the level of compression the camcorder uses when saving videos to a memory card.

1. In Video Mode press the MENU button.
2. Select '*Video Quality*' using the ZOOM button and press the PHOTO button to enter the '*Video Quality*' submenu.
3. Press the ZOOM button to select the required quality option (Super Fine, Fine, Normal), and press the PHOTO button to confirm your selected image option. Fine uses the least amount of compression for saving, and as a result produces a higher video quality.

3.1.3 Loop Record

This function allows you to set a maximum duration for each video clip recorded.

1. In Video Mode press the MENU button.
2. Select '*Loop Record*' using the ZOOM button. Press the PHOTO button to

enter the 'Loop Record' submenu.

3. Press the ZOOM button to select the required loop duration option (Off, 1 Minute, 3 Minutes, 5 Minutes), and press the PHOTO button to confirm your selected option.

Once you select an option, your camcorder will record video clips in this interval only. Once this duration is reached, the camcorder will seamlessly end recording and begin recording a new video file.

3.1.4 White Balance

White Balance changes the color of light in your pictures, making it seem warmer or cooler depending on how the light you're shooting in affects the frame.

1. In Video Mode press the MENU button.
2. Select 'White Balance' using the ZOOM button and press the PHOTO button to enter the 'White Balance' submenu.
3. Press the ZOOM button to navigate the menu, and press the PHOTO button to confirm your selected setting (Auto, Daylight, Cloudy, Incandescent, Fluorescent, Fluorescent L).

3.1.5 Exposure

This function adjusts the frame brightness in your video.

1. In Video Mode press the MENU button.
2. Select 'Exposure' using the ZOOM button and press the PHOTO button to enter the 'Exposure' submenu.
3. Press the ZOOM button to navigate the menu, and press the PHOTO button to confirm your selected exposure mode (-2.0, -1.7, -1.3, -1.0, -0.7, 0.0, +0.3, +0.7, +1.0, +1.3, +1.7, +2.0).

3.1.6 Stabilizer

This function enables photo capture in high speed and low-light by electronically minimizing motion blur and reducing camera shake.

1. In Photo Mode press the MENU button.
2. Select 'Stabilizer' using the ZOOM button and press the PHOTO button to enter the 'Stabilizer' submenu.
3. Press the ZOOM button to navigate the menu, and press the PHOTO button to confirm your selected option (Off, On).

3.1.7 Metering

Metering mode refers to the way in which a camera determines the appropriate exposure (quantity of light reaching the camcorder lens). Spot metering will only base the exposure setting on a very small area of the scene. Center-Weighted metering will use the light from the center of the LCD and the Multi

setting measures the light at several points on the screen.

1. In Video Mode press the MENU button.
2. Select '*Metering*' using the ZOOM button and press the PHOTO button to enter the '*Metering*' submenu.
3. Press the ZOOM button to select the required Metering option (Center, Multi, Spot), and press the PHOTO button to confirm your selected option.

3.1.8 Video Effect

This function sets the color filter effect of a video.

1. In Video Mode press the MENU button.
2. Select '*Effect*' using the ZOOM button and press the PHOTO button to enter the '*Effect*' submenu.
3. Press the ZOOM button to navigate the menu, and press the PHOTO button to confirm your selected filter (Normal, Black & White, Sepia, Negative).

3.1.9 Slow Motion

This function sets the frame rate of the recorded video to a much slower 10 frames per second.

1. In Video Mode press the MENU button.
2. Select '*Slow Motion*' using the ZOOM button and press the PHOTO button to enter the '*Slow Motion*' submenu.
3. Press the ZOOM button to navigate the menu, and press the PHOTO button to confirm your selected setting (Off, On).

3.1.10 Time-Lapse

This feature allows you to capture long sequences of events in a much shorter time period.

1. In Video Mode press the MENU button.
2. Select '*Time Lapse*' using the ZOOM button and press the PHOTO button to enter the '*Time Lapse*' submenu.
3. Press the ZOOM button to navigate the menu, and press the PHOTO button to confirm your selected setting (Off, Interval of 3 Seconds, 5 Seconds, 10 Seconds, 30 Seconds, 1 Minute).

NOTE: By selecting '*10 Sec*' the camera will capture a photo every 10 seconds and create a time-lapse video. To disable Time-Lapse recording, select '*Off*' in this submenu.

3.1.11 Time Lapse Duration

The duration for the time lapse setting is determined in the menu. The option chosen here will record for the chosen duration.

1. In Video Mode press the MENU button.
2. Select 'Time Lapse Duration' using the ZOOM button and press the PHOTO button to enter the 'Time Lapse Duration' submenu.
3. Press the ZOOM button to navigate the menu, and press the PHOTO button to confirm your selected option (Unlimited, 5 Minutes, 10 Minutes, 15 Minutes, 20 Minutes, 30 Minutes, 60 Minutes).

For example, by selecting 15Min the camera will record for 15 minutes of real time. **If 10 Sec is selected in the previous menu, the camera will capture a photo every 10 seconds for 15 minutes.**

Alternatively, your camcorder's menus can be navigated via the touch screen. Press the 'MENU' icon in the bottom left hand corner of the touch screen to change chosen settings.

3.2 Photo Shooting

Power the camcorder on and press the MODE button or press the icon in the top left hand corner of the touch screen to switch to Photo mode.

1. Line up your shot by looking at the LCD screen to see what is in the shot.
2. Hold the camera steady and press the PHOTO button to capture a photo.
3. The number of photos that can be captured at a particular resolution will be displayed in the top right corner of the screen.
4. A “no card” message will be displayed on the screen if there is no SD card inserted in the camcorder’s memory card slot. A “storage card full” message will be shown on the screen when the SD card is full.
5. The number of remaining photos is determined by the selected photo resolution. The higher the photo resolution, the lower the number of photos you are able to be save to the memory card. Before capturing any photos, you can select a preferred photo resolution.

3.2.1 Resolution (Photo Size)

This function sets the photo resolution. The higher the resolution, the greater the photo quality and the larger the file size of the photo.

1. In Photo Mode press the MENU button.
2. Select ‘Resolution’ using the ZOOM button and press the PHOTO button to enter the ‘Resolution’ submenu.
3. Press the ZOOM button to select a resolution, and press the PHOTO button to confirm the selected photo resolution (24MP, 20MP, 16MP, 12MP, 10MP, 8MP, 7MP, 5MP, 3MP, 2MP).

3.2.2 Quality

The Photo Quality function determines the level of compression the camcorder uses when saving photos to a memory card.

1. In Photo Mode press the MENU button.
2. Select ‘Quality’ using the ZOOM button and press the PHOTO button to enter the ‘Quality’ submenu.
3. Press the ZOOM button to select the required quality option (Super Fine, Fine, Normal), and press the PHOTO button to confirm your selected image option. Super Fine uses the least amount of compression for saving, and as a result produces a higher photo quality.

3.2.3 Metering

Metering mode refers to the way in which a camera determines the appropriate exposure (quantity of light reaching the camcorder lens). Spot metering will only base the exposure setting on a very small area of the scene. Center-Weighted metering will use the light from the center of the LCD and the Multi

setting measures the light at several points on the screen.

1. In Photo Mode press the MENU button.
2. Select '*Metering*' using the ZOOM button and press the PHOTO button to enter the '*Metering*' submenu.
3. Press the ZOOM button to select the required Metering option (Center, Multi, Spot), and press the PHOTO button to confirm your selected option.

3.2.4 White Balance

White Balance changes the color of light in your pictures, making it seem warmer or cooler depending on how the light you're shooting in affects the frame.

1. In Photo Mode press the MENU button.
2. Select 'White Balance' using the ZOOM button and press the PHOTO button to enter the 'White Balance' submenu.
3. Press the ZOOM button to navigate the menu, and press the PHOTO button to confirm your selected setting (Auto, Daylight, Cloudy, Incandescent, Fluorescent, Fluorescent L).

3.2.5 ISO

This function adjusts the light sensitivity in your photograph.

1. In Photo Mode press the MENU button.
2. Select '*ISO*' using the ZOOM button and press the PHOTO button to enter the '*ISO*' submenu.
3. Press the ZOOM buttons to navigate the menu, and press the PHOTO button to confirm your selected ISO (Auto, 50, 100, 200, 400).

3.2.6 Exposure

This function adjusts the frame brightness in your photograph.

1. In Photo Mode press the MENU button.
2. Select '*Exposure*' using the ZOOM button and press the PHOTO button to enter the '*Exposure*' submenu.
3. Press the ZOOM button to navigate the menu, and press the PHOTO button to confirm your selected exposure mode (-2.0, -1.7, -1.3, -1.0, -0.7, -0.3, 0.0, +0.3, +0.7, +1.0, +1.3, +1.7, +2.0).

3.2.7 Self-Timer

This function determines the time delay before a photograph is captured. This setting can be used by photographers to take photographs of themselves.

1. In Photo Mode press the MENU button.
2. Select '*Self Timer*' using the ZOOM button and press the PHOTO button

to enter the 'Self Timer' submenu.

3. Press the ZOOM button to navigate the menu, and press the PHOTO button to confirm your selected option (Off, 2 Seconds, 10 Seconds, Double).

3.2.8 Photo Burst

This function allows to you capture consecutive photos with one click of the PHOTO button.

1. In Photo Mode press the MENU button.
2. Select 'Photo Burst' using the ZOOM button and press the PHOTO button to enter the 'Photo Burst' submenu.
3. Press the ZOOM button to navigate the menu, and press the PHOTO button to confirm your selected setting (Off, 3, 5, 10).

3.2.9 Sharpness

This function adjusts the visible detail of a photograph.

1. In Photo Mode, press the MENU button.
2. Select 'Sharpness' using the ZOOM button and press the PHOTO button to enter the 'Sharpness' submenu.
3. Press the ZOOM button to navigate the menu, and press the PHOTO button to confirm how sharp you would like your photograph to be (Hard, Normal, Soft).

3.2.10 Effect

This function sets the color filter effect of a photograph.

1. In Photo Mode press the MENU button.
2. Select 'Effect' using the UP or DOWN buttons and press the PHOTO button to enter the 'Color Filter' submenu.
3. Press the ZOOM button to navigate the menu, and press the PHOTO button to confirm your selected filter (Normal, B&W, Sepia, Negative, Red, Green, Blue).

3.2.11 Date/Time Stamp

This function adds a date/time stamp to your photographs.

1. In Photo Mode press the MENU button.
2. Select 'Date Stamp' using the ZOOM button and press the PHOTO button to enter the 'Date Stamp' submenu.
3. Press the ZOOM button to navigate the menu and the PHOTO button for your selected setting (Off, Date, Date and Time). Section 3.3.4 explains how to set the time & date on your camcorder.

Note that once a date/time stamp is captured on a photograph, it cannot be removed.

3.2.12 Photo Stabilization

This function enables photo capture in high speed and low-light by electronically minimizing motion blur and reducing camera shake.

1. In Photo Mode press the MENU button.
2. Select '*Stabilizer*' using the ZOOM button and press the PHOTO button to enter the '*Stabilizer*' submenu.
3. Press the ZOOM button to navigate the menu, and press the PHOTO button to confirm your selected option (Off, On).

3.2.13 Scene Modes

This function adjusts the camera's settings to predetermined values that will produce the best image for that selected scene.

1. In Photo Mode press the MENU button.
2. Select '*Scene Modes*' using the ZOOM button and press the PHOTO button to enter the '*Scene Modes*' submenu.
3. Press the ZOOM button to navigate the menu, and press the PHOTO button to confirm your selected option (Auto, Landscape, Portrait, Sport, Flower, Beach, Aquarium, Snow, Sunset, Night Scene, Fireworks).

3.2.14 Face Detection

This function allows you to set your camera to detect faces in a scene and adjust your camera's setting for the most optimal picture. You can also enable your camera to capture a photo once a smile is detected on the faces in a scene.

1. In Photo Mode press the MENU button.
2. Select '*Face Detection*' using the ZOOM button and press the PHOTO button to enter the '*Face Detection*' submenu.
3. Press the ZOOM button to navigate the menu, and press the PHOTO button to confirm your selected option (Off, On, Smile Detect). The On setting will enable Face Detection. The Smile Detect setting will enable your camera to capture a photo once a smile is detected on the faces in a scene.

3.2.15 Time Lapse

This function allows you to capture a long sequence of events in a much shorter time period. This specific setting will determine how often an image is automatically captured.

1. In Photo Mode, press the MENU button.
2. Select '*Time Lapse*' using the ZOOM button and press the PHOTO button to enter the '*Time Lapse*' submenu.

3. Press the ZOOM button to navigate the menu, and press the PHOTO button to confirm your selected option (Off, 3 Seconds, 5 Seconds, 10 Seconds, 30 Seconds, 1 Minute). For example, by selecting 10 Sec the camera will capture a photo every 10 seconds for a determined time period as selected in the Time Lapse Duration setting (see next setting).

3.2.16 Time Lapse Duration

The duration for the time lapse setting is determined in the menu. The option chosen here will record for the chosen duration.

1. In Photo Mode press the MENU button.
2. Select 'Time Lapse Duration' using the ZOOM button and press the PHOTO button to enter the 'Time Lapse Duration' submenu.
3. Press the ZOOM button to navigate the menu, and press the PHOTO button to confirm your selected option (Unlimited, 5 Minutes, 10 Minutes, 15 Minutes, 20 Minutes, 30 Minutes, 60 Minutes).

For example, by selecting 15 Min, the camera will record for 15 minutes of real time. **If 10 Sec is selected in the previous menu, the camera will capture a photo every 10 seconds for 15 minutes.**

Alternatively, your camcorder's menus can be navigated via the touch screen. Press the 'MENU' icon in the bottom left hand corner of the touch screen to change chosen settings.

3.3 Setup Menu

Basic settings can be changed in the Setup menu. These include date & time, language and sound options. Power the camera on and press the MODE button, or press the icon in the top left hand corner of the touch screen to switch to setup mode. A menu will display on the screen.

3.3.1 Sounds

This function can set the sound volume on your camcorder.

1. In Setup Mode, use the ZOOM button to select '*Sounds*' and press the PHOTO button to enter the '*Sounds*' submenu.
2. Press the ZOOM button to switch between '*Shutter*', '*Beep*' and '*Volume*'. Press the RECORD button to change the setting of the '*Shutter*' option (the sound made when a photo is captured), the '*Beep*' option (the sound is made when the camcorder mode is cycled) and the '*Volume*' option (the volume level of the camera sounds).
3. Once you are happy with the sound settings press the PHOTO button confirm your setting and exit the submenu.

3.3.2 Frequency

This function sets the frequency of the camcorder from 50Hz to 60Hz. Please check the frequency of your location and set accordingly.

1. In Setup Mode use the ZOOM button to select '*Frequency*' and press the PHOTO button to enter the '*Frequency*' submenu.
2. Press the ZOOM button to select your desired frequency. Then press the PHOTO button to confirm your selection (50Hz, 60Hz). The default frequency for the United States is 60Hz.

3.3.3 Power Save

This function sets the duration of time in which the camcorder will wait with no user input before automatically powering off.

1. In Setup Mode use the ZOOM button to navigate and select '*Power Save*' and press the PHOTO button to enter the '*Power Save*' submenu.
2. Press the ZOOM button to navigate the menu and then press the PHOTO button to confirm your selected setting (Off, 1 Minute, 3 Minutes, 5 Minutes).

3.3.4 Date and Time

This function allows you to set the current Date and Time on your recorded video clips and captured photos.

1. In Setup Mode use the ZOOM button to select '*Date and Time*' and press the PHOTO button to enter the '*Date and Time*' submenu.
2. Press the RECORD button to switch between year, month, date, hours

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and minutes.

3. Once highlighted on your desired field, press the ZOOM button to cycle through numbers.
4. The date format can be changed to display in three formats; YY/MM/DD, DD/MM/YY or MM/DD/YY.
5. Once completed with all of the fields, press the OK button to confirm the changes.

3.3.5 Language

This function allows you to set the camcorder's interface language.

1. In Setup Mode use the ZOOM button to select '*Language*' and press the PHOTO button to enter the '*Language*' submenu.
2. Press the ZOOM button to select your desired language. Then press the PHOTO button to confirm your selection.

3.3.6 TV Output

This function allows you to set how you view your media on your television.

1. In Setup Mode use the ZOOM button to select '*TV Out*' and press the PHOTO button to enter the '*TV Out*' submenu.
2. Press the ZOOM button to select your desired setting (*NTSC* for US or Canada or *PAL* for Europe). Then press the PHOTO button to confirm your selection.

3.3.7 Format

The format setting erases all photos, videos and data stored on your memory card.

1. In Setup Mode use the ZOOM button to select '*Format...*' and press the PHOTO button to enter the submenu.
2. Press the ZOOM button to select your desired selection, press the PHOTO button for your selected setting (Cancel, OK).

NOTE: This will delete all of your media and cannot be undone.

3.3.8 Reset All

Factory default settings can be restored in this menu. This function will not delete the media stored on the memory card, and will only restore all of the menu's setting back to factory default settings.

1. In Setup Mode use the ZOOM button to select '*Reset All...*' and press the PHOTO button to enter the '*Reset All...*' submenu.
2. Press the ZOOM button to select your desired option, then press the PHOTO button to confirm your selection (Yes, No).

3.4 Playback Mode

Videos and photos captured on your camcorder can be easily played back.

1. Press the ZOOM button to cycle through the captured videos and photos stored on the memory card.
2. To enter into a video or photo, press the PHOTO button.
3. When viewing a photo push the ZOOM button to the right and it will zoom in on the picture on the screen. Use the touch screen to navigate while zoomed in.
4. Tap the right side of the screen to move right, the left to move left, the top to move up and the bottom to move down.

Power the camcorder on and press the PLAYBACK button to switch to Playback Mode. In Playback Mode the following options are available:

3.4.1 Protect

This function protects the photo/video file. The file will be protected from being deleted accidentally. Files must be unprotected to be deleted.

1. In Playback Mode press the MENU button, and use the ZOOM button to select '*Protect*' and press the PHOTO button to enter the '*Protect*' submenu.
2. Press the ZOOM button to navigate the menu and press the PHOTO button to confirm your selected setting (Single, Protect All, Unprotect All).
3. Press the MENU button to exit the menu without protecting any pictures or videos.

3.4.2 Delete

This function is used to delete photos and videos. Photos and videos can be deleted singly or all at once.

1. In Playback Mode press the MENU button, and use the ZOOM button to select '*Delete*'. Press the PHOTO button to enter the '*Delete*' submenu.
2. Press the ZOOM button to navigate the menu, and press the PHOTO button for your selected setting (Single, All).
3. Press the MENU button to exit the menu without deleting any pictures or videos.

3.4.3 Slideshow

Photographs can be viewed as a slideshow on the camcorder.

1. In Playback Mode press the MENU, and use the ZOOM button to select '*Slide Show...*' Press the PHOTO button to enter the '*Slide*

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Show... submenu.

2. Press the ZOOM buttons to navigate the menu.
3. To change the photo interval, select '*Interval*' and press the RECORD button to choose between 1 to 10 seconds.
4. To repeat the images, select '*Repeat*' and press the RECORD button to change from '*Off*' to '*On*'.
5. Once your desired settings are selected, use the ZOOM button to select '*Start*' then press the PHOTO button to start the slideshow.
6. To pause and restart the slide show press the PHOTO button, to cancel the slide show press the MENU button.
7. To exit the '*Slide Show...*' submenu, press the MENU button.

3.4.4 Video Playback

Videos can be played back and viewed on your camcorder.

1. In Playback Mode, press the ZOOM button to select the video file for playback.
2. Press the PHOTO button to start playing the video. Press the PHOTO button a second time to pause the video.
3. During playback, push the ZOOM button (left or right) to fast forward or rewind the playing video.
4. Your camera can support touch screen navigation in Playback Mode.
 - Tapping the "▶" icon will Play the video file.
 - Tapping the "■" icon will Stop the video file.
 - Tapping the "⏸" icon will Pause the video file.
 - Tapping the "◀◀" icon will rewind if a video is already playing. Tap the icon multiple times for different rewind speeds.
 - Tapping the "▶▶" icon will fast forward if a video is already playing. Tap the icon multiple times for different fast forward speeds.

Alternatively, your camcorder's menus can be navigated via the touch screen. Press the 'MENU' icon in the bottom left hand corner of the screen to change chosen setting.

4.1 Technical Specifications

Model Number	Minolta MN90NV
Lens	Fixed Focus • f=7.5mm • F/3.2 • 34mm Front Threading for Lens Accessory Attachments
Zoom	16X Digital Zoom
Image Sensor	1/3.2" IMX179 Sony CMOS; 3288x2512 Pixels
Shutter Speed	1/60 ~ 1/30 sec
Shutter	Electronic • Anti-Shake Image Stabilization
Pixels (photo)	JPEG: 24 MP • 20 MP • 16 MP • 12 MP • 10 MP • 8 MP • 7 MP • 5 MP • 3 MP • 2MP • 16:9 (7 MP) • 16:9 (2 MP)
Pixels (video)	MOV: 1080p30fps • 720p60fps • 720p30fps • VgAp60fps
ISO Sensitivity	Auto • 50 • 100 • 200 • 400
LCD Monitor	262k 3.0 Inch 16:9 Wide LCD Touch Screen
Assistive Light	Infrared LED (for shooting in dark scenery)
Power Saving Mode	OFF • 1 Minutes • 3 Minutes • 5 Minutes
White Balance Control	Auto • Daylight • Cloudy • Incandescent • Fluorescent H • Fluorescent L
Scene Modes	Auto • Landscape • Portrait • Sport • Flower • Beach • Aquarium • Snow • Sunset • Night • Fireworks
Special Features	Loop Recording • Slow Motion • Time-Lapse • Photo Burst
Recording Media	SD • SDHC; Maximum: 32GB
I/O Ports	5-pin Mini USB, USB 2.0 (high speed) • Mini HDMI C Type • Microphone (built-in MIC) • Speaker • Microphone Input (3.5mm) • Hot Shoe
Power	NP-120; 3.7v, 1000mAh
Dimensions	4.6 x 1.65 x 2.36 in. • 7.02 oz.



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