



TimelapseRobot
SETUP + RECOVERY

Hikvision to TimelapseRobot

Setup, operation and remote management of an FTP site camera



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CHAPTER 1

About this manual

This manual describes how a Hikvision IP camera captures images for a long-term timelapse and uploads them to TimelapseRobot on its own. It covers the complete path: from the first activation on the bench, through the FTP upload and the buffering during a network outage, to the remote management of an installation nobody visits on site any more.

The procedure described here is not theoretical. It was tested end to end on a real installation. Whatever was verified is marked as such in the text and evidenced individually in Appendix A. Whatever was not verified is listed there as well.

1.1 Scope

ITEM	TESTED CONFIGURATION
Camera	Hikvision DS-2CD2687G2HT-LIZS, 8 MP, 3840 × 2160
Camera firmware	V5.7.14 build 231028 , web version V4.0.1 build 231023
LTE gateway	Teltonika TRB140
Image intake	TimelapseRobot, FTP workflow for IP cameras
Remote management	Teltonika RMS with RMS Connect
Date of testing	3 September 2026

This manual covers the Hikvision model named above and nothing else. All menu paths and field names refer to that camera's web interface.

NOTE

Other FTP-capable IP cameras follow the same principle: the camera pushes its images outward and TimelapseRobot receives them. The menu paths, however, differ by manufacturer and model. For a different camera this manual is usable as a template, not as an instruction.

CAUTION

Menu paths and field names can shift between firmware versions. The version named above is the one that was tested. Record the firmware of your own devices in the site data sheet in Appendix D. If a menu item described here is missing, check the firmware first. You will find it under Configuration, System, System Settings, Basic Information.

1.2 Who this manual is for

The manual addresses people who set up, commission and operate such a camera. It assumes you can work with a browser, change the IP settings of a Windows PC, and reach a router or mobile gateway. No networking knowledge beyond DHCP is required.

1.3 How the manual is organised

The chapters follow the real sequence of an installation.

CHAPTER	CONTENT
2	How the system fits together and why it works without port forwarding
3 to 5	Activate the camera, set its clock, move it onto the network
6 to 8	Upload to TimelapseRobot, capture schedule, clean up the image
9 and 10	Behaviour during a network and a power failure
11 and 12	Operation over mobile network and remote management
13 to 15	Target configuration, commissioning, troubleshooting
Appendix	Test report, glossary, status, site data sheet

Chapter 4 deliberately comes before the network. The camera's clock decides where TimelapseRobot files an image. A wrongly set clock is noticed weeks later, when the timelapse already has gaps and jumps.

1.4 The markers used in this manual

Menu paths inside the device appear as a path, with the wording exactly as it appears in the web interface. Below it the same sequence is given for an interface set to German.

MENU PATH

Configuration ▶ Network ▶ Advanced Settings ▶ FTP

German interface: Konfiguration › Netzwerk › Erw. Einst. › FTP

Four boxes highlight content.

NOTE

Background that aids understanding but requires no action.

VERIFIED IN TESTING

Behaviour that was verified on the installation described here. The evidence is in Appendix A.

CAUTION

A point where a mistake is easily made or easily missed. These boxes carry the lessons that cost time during testing.

WARNING

A danger to people or equipment.

1.5 Language of the web interface

The camera's web interface can be set to different languages. In the documented installation it was set to German, while the underlying test record names the menu items in English.

This manual therefore gives the English wording for every menu path and the German wording below it. If your device runs in another language, follow the sequence of levels instead: that sequence is identical in every language version.

ENGLISH	GERMAN
Configuration	Konfiguration
System Settings	Systemeinstellungen
Time Settings	Zeiteinstellungen
Basic Settings	Grundeinstellungen
Advanced Settings	Erw. Einst.
Platform Access	Plattformzugriff
Schedule Settings	Zeitplaneinstellungen
Capture	Erfassen
Capture Parameters	Erfassungsparameter
Capture Schedule	Erfassungszeitplan
Storage Management	Speicherverwaltung
HDD Management	HDD-Verwaltung
Upload Picture	Bild hochladen
Enable Automatic Network Replenishment	Automatische Netzwerkgänzung aktivieren
Continuous	Durchgehend
Save	Speichern

1.6 Confidentiality

CAUTION

This manual deliberately contains no passwords, FTP credentials, account details, serial numbers or public IP addresses, and no camera images from customer projects. Every credential appears as a placeholder in angle brackets, for example `<TimelapseRobot-FTP-username>`.

Replace the placeholders with the values of your own installation and do not pass them on. Take the same care with screenshots: device pages show serial numbers and public IP addresses in unexpected places.

CHAPTER 2

System overview and architecture

The camera captures JPEG images on a fixed schedule and uploads every image to TimelapseRobot via FTP on its own. That is where the archive is built from which the timelapse is later rendered. If the internet connection fails, the camera stores the images on a built-in microSD card and uploads them once the connection returns. The installation is managed remotely, without opening any of the camera's ports to the public internet.

2.1 What each component does

COMPONENT	ROLE
Hikvision camera	Captures JPEG images on a schedule and opens the FTP connection outward
microSD in the camera	Buffers the captures while there is no connection
Teltonika TRB140	Provides the internet connection over mobile network where no line exists
TimelapseRobot	Receives the images via FTP, archives and sorts them, renders the video
Teltonika RMS	Opens the secured remote access for configuring the camera

2.2 Overall architecture

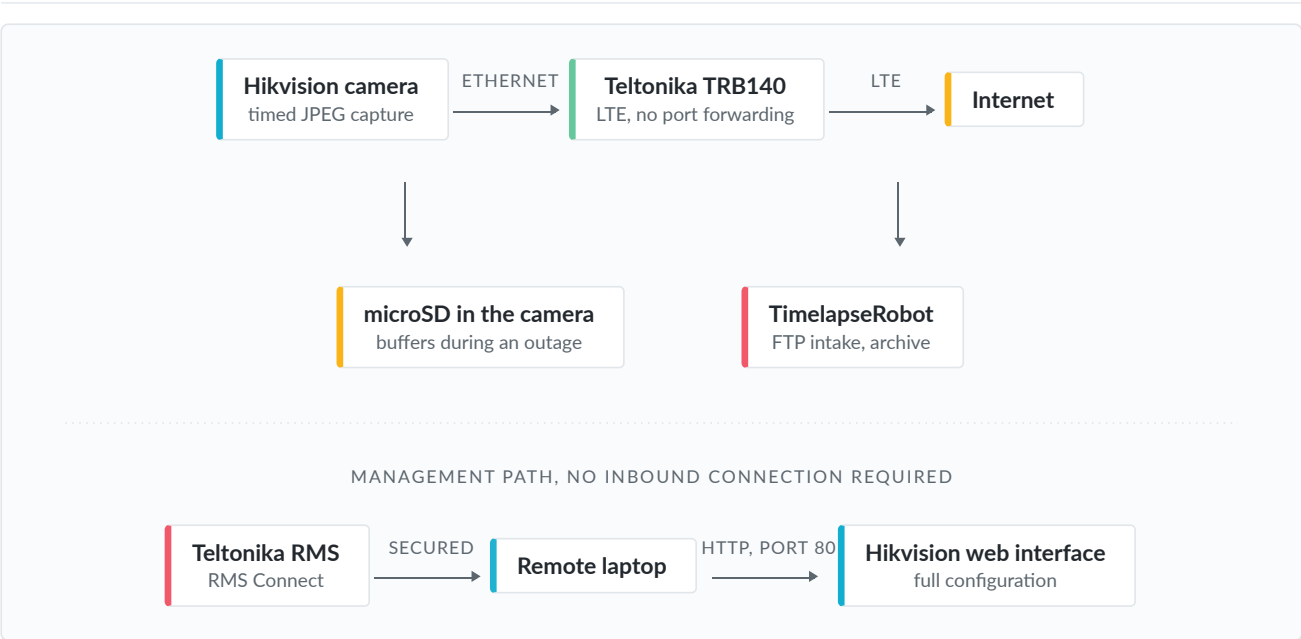


Figure 1: The image path runs outward from the camera to TimelapseRobot. The management path is separate from it and runs through Teltonika RMS.

2.3 Why no port forwarding is needed

The decisive property of this whole setup: **the camera opens the connection outward itself**. It pushes the images to TimelapseRobot via FTP. TimelapseRobot never connects towards the camera.

Three things follow from that:

- No inbound connection is required. Port forwarding and DDNS are unnecessary.
- TimelapseRobot does not need a static local IP address for the camera. For administration it remains useful all the same, see Chapter 5.
- A mobile connection behind CGNAT is unproblematic. Under CGNAT many customers share one public address, so inbound connections are impossible anyway. For this setup that makes no difference.

WARNING

Do not expose the camera's HTTP, RTSP and SDK ports directly to the public internet merely to gain remote configuration access. There is a secured route for that purpose through RMS Connect, described in Chapter 12.

2.4 What was verified on the installation

TESTED BEHAVIOUR	RESULT
Scheduled captures upload to TimelapseRobot automatically at full resolution	PASSED
The camera buffers images locally while internet or mobile connectivity is down	PASSED
Missing images are uploaded automatically once the connection returns	PASSED
Uploaded backlog keeps its original capture time and is filed correctly	PASSED
The local backlog survives a complete power cycle of the camera	PASSED
Mobile connection and upload recover on their own after a power failure	PASSED
The clock is corrected automatically over NTP after a restart	PASSED
Full remote configuration of the camera without exposing a port to the internet	PASSED

The individual evidence is in Appendix A.

CHAPTER 3

Commissioning the camera

The first setup happens on the bench, with a network cable running directly between the camera and a Windows PC. Only once the credentials and the clock are in place does the camera move onto the actual network.

3.1 Restoring factory settings

Perform a factory reset if you want to start from a clean state, for instance with a camera from an earlier project. On a new camera this is not necessary.

On this model the reset button sits behind the cover labelled:

RESET
microSD

CAUTION

After a factory reset the camera has to be activated again, and you set a new administrator password. Any existing password becomes invalid.

3.2 Powering the camera

The camera needs its own power supply. Use either

- a suitable 12 V DC power supply, or
- a matching PoE injector or PoE switch.

CAUTION

An ordinary Ethernet port on a computer does not normally supply PoE. If the camera stays dark on a directly connected PC, that is usually exactly what is missing.

NOTE

For fault finding and for offline tests the separate 12 V supply is particularly convenient. You can unplug the network cable while the camera keeps running and keeps capturing. That is precisely how the buffering was tested, see Chapter 9.

3.3 Connecting the camera directly to the Windows PC

For activation, connect the camera and the PC directly with a network cable.

The camera's factory address is:

192.168.1.64

For the PC to reach the camera it has to sit in the same address range for a while.

MENU PATH

Settings ▶ Network & Internet ▶ Ethernet ▶ IP assignment ▶ Edit

German interface: Einstellungen › Netzwerk und Internet › Ethernet › IP-Zuweisung › Bearbeiten

Set IPv4 to **Manual** and enter:

SETTING	VALUE
IP address of the PC	192.168.1.100
Subnet mask	255.255.255.0
Gateway	leave empty
DNS	leave empty

CAUTION

Do not use 192.168.1.64 for the PC. That address belongs to the camera. Two devices with the same address cannot find each other.

NOTE

On a direct connection Windows reports **Unidentified network** and **No Internet**. That is normal here and not a fault. In this setup there is no gateway and no route to the internet, only the two connected devices.

3.4 Activating the camera

Open in your browser:

http://192.168.1.64

During activation you set the administrator password. The administrator user name is **admin**.

Then sign in with:

SETTING	VALUE
User name	admin
Password	the administrator password set during activation

Check that the web interface opens properly before continuing. Every following chapter works inside this interface.

3.4.1 First setup in five steps

- 1 Power the camera and plug the network cable into the PC.
- 2 Set the PC's IPv4 address to 192.168.1.100.
- 3 Open http://192.168.1.64 and set the administrator password.
- 4 Sign in with **admin** and the new password.
- 5 Continue with the time configuration in Chapter 4.

CHAPTER 4

Time, NTP and daylight saving

The camera's clock is not a matter of tidiness. TimelapseRobot uses the capture time to place an image at the right position in the archive. A wrongly set camera produces a timelapse that jumps, and the mistake only surfaces weeks later, when the images have long been collected.

That is why this chapter comes before the network and before the upload.

4.1 Time zone and NTP

MENU PATH

Configuration ▶ System ▶ System Settings ▶ Time Settings

German interface: Konfiguration › System › Systemeinstellungen › Zeiteinstellungen

These values were used in the test:

FIELD IN THE INTERFACE	VALUE
Time zone	(GMT+01:00) Amsterdam, Berlin, Rome, Paris
NTP	enabled
Server address	time.windows.com
NTP port	123
Interval	1440 minutes

NOTE

123 is the standard network port for NTP. It is not a time offset. This is a common misreading of the field.

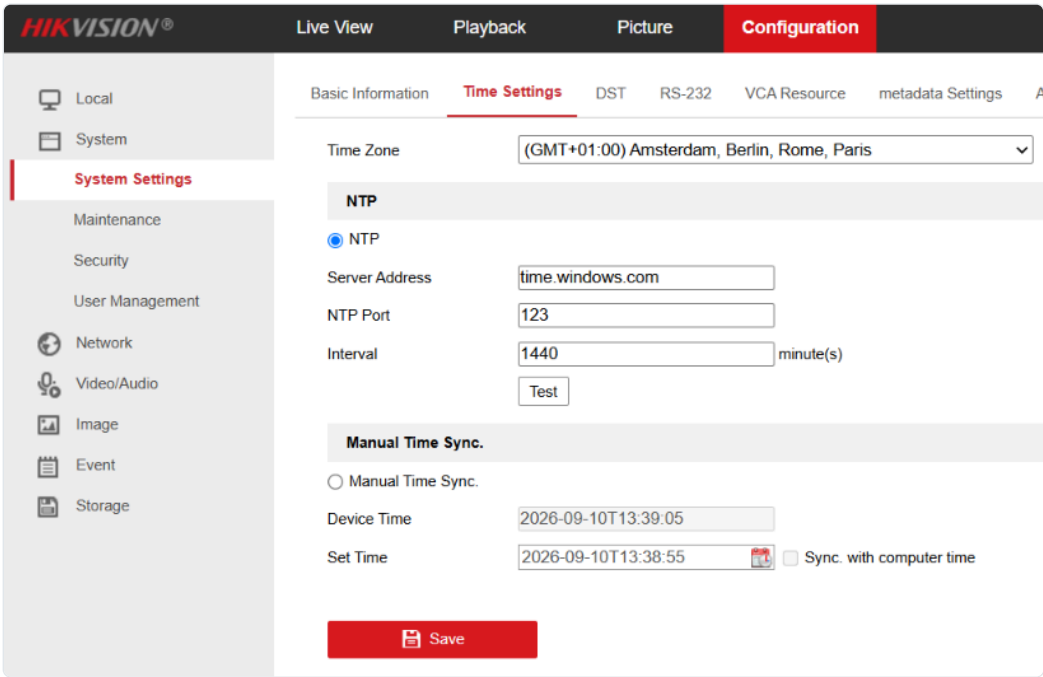


Figure 2: The Time Settings page in the correct state: Central European time zone, NTP enabled, synchronisation once per day.

A sync interval of 1440 minutes means one synchronisation per day. That is sufficient, because between synchronisations the camera drifts only by fractions of a second.

4.2 Daylight saving for Central Europe

Daylight saving is configured separately from the time zone.

MENU PATH

Configuration ▶ System ▶ System Settings ▶ DST

German interface: Konfiguration › System › Systemeinstellungen › DST

FIELD IN THE INTERFACE	VALUE
Enable DST	enabled
Start	March, last Sunday, 02:00
End	October, last Sunday, 03:00
DST bias	60 minutes

CAUTION

Check the DST bias carefully. The field is a drop-down and does not necessarily sit at 60 minutes. For Central Europe 60 is the correct value. A setting of 30 minutes would leave the clock permanently half an hour wrong through the summer months. That is exactly the value found in one of the test recordings.

VERIFIED IN TESTING

After a complete power failure the camera corrected its clock over NTP on its own. No manual intervention was needed. The evidence is in Chapter 10.

CHAPTER 5

Moving the camera onto the network

The camera now leaves the direct connection to the PC and joins the network over which it will later transfer its images. The order matters: enable DHCP first, then re-plug.

5.1 Enabling DHCP on the camera

Enable DHCP **before** you disconnect the direct link. While the camera is still reachable at its factory address, the setting is easy to make.

MENU PATH

Configuration ▶ Network ▶ Basic Settings ▶ TCP/IP

German interface: Konfiguration › Netzwerk › Grundeinstellungen › TCP/IP

Tick **DHCP** and click **Save**.

The screenshot shows the Hikvision web interface with the 'Configuration' tab selected. Under 'Configuration', the 'TCP/IP' sub-tab is active. The 'NIC Type' is set to 'Auto'. The 'DHCP' checkbox is checked. The 'IPv4 Address' field is empty, and the 'Test' button is visible. The 'IPv4 Subnet Mask' is set to '255.255.255.0'. The 'IPv4 Default Gateway' is empty. The 'IPv6 Mode' is set to 'Route Advertisement', and the 'View Route Advertisement' button is visible. The 'IPv6 Address', 'IPv6 Subnet Mask', and 'IPv6 Default Gateway' fields are empty. The 'Mac Address' field is empty. The 'MTU' is set to '1500'. The 'Enable Multicast Discovery' checkbox is checked. The 'DNS Server' section shows 'Preferred DNS Server' and 'Alternate DNS Server' fields, both empty. The 'Domain Name Settings' section shows 'Enable Dynamic Domain Name' checkbox (unchecked) and 'Register Domain Name' field (empty). A red 'Save' button is at the bottom.

Figure 3: The TCP/IP page with DHCP enabled. Address, gateway, MAC address and DNS server are covered in this figure because they are real values from the test network. In operation the camera fills these fields itself.

NOTE

TimelapseRobot does not require a fixed camera IP. The camera opens the FTP connection outward, so nobody has to find their way to it from outside.

For administration a **DHCP reservation** on the router is nevertheless preferable. The camera then keeps a predictable local address and you do not have to hunt for it every time. When running over a mobile network that reservation even becomes a precondition for remote management, see Chapter 11.

5.2 Connecting the camera to the router

- 1 Unplug the direct connection to the PC.
- 2 Connect the camera to the router or gateway with a network cable.
- 3 Set the PC's network adapter back to **Automatic (DHCP)**.

The camera's route to the internet always runs through the local infrastructure:

```
Hikvision camera
  |
  | Ethernet
  v
Router / gateway
  |
  v
Internet
```

CAUTION

The DS-2CD2687G2HT-LIZS has no built-in Wi-Fi. It always needs a network cable to the local infrastructure. Plan the cable route to the mounting position accordingly.

5.3 Finding the camera's new address

After the switch to DHCP the camera has a different address, assigned by the router.

NOTE

The camera no longer answering at `192.168.1.64` is expected behaviour, not a fault. The factory address only applies while DHCP is off.

Find the new address with the Hikvision tool **HiTools Delivery**.

MENU PATH IN HITOOLS DELIVERY

Device Management ▶ Search ▶ Current Subnet ▶ Refresh

Look for this entry in the list:

DS-2CD2687G2HT-LIZS

Note the assigned IPv4 address and open it in your browser:

`http://<local-IP-of-the-camera>`

Sign in with `admin` and the administrator password.

NOTE

Alternatively, the router's DHCP list shows the same information. When running through the TRB140 you will find the camera in its lease overview, see Chapter 11.

CHAPTER 6

Setting up TimelapseRobot and FTP

Now the route is built along which the images leave the device. TimelapseRobot provides an FTP account for this, and the camera transfers every captured image to it.

6.1 Creating the project and camera in TimelapseRobot

- 1 Create a project or open an existing one.
- 2 Add a camera.
- 3 Select the FTP / IP camera workflow.
- 4 Open the generated FTP connection details.

TimelapseRobot then supplies:

```
FTP server
FTP username
FTP password
FTP port
```

CAUTION

These credentials are confidential. Anyone holding them can write images into your project. Do not pass them on, and black them out in screenshots.

The endpoint used in the test was:

SETTING	VALUE
Server	ftp.timelapserobot.com
Port	21

Connect to FTP Server

Step 1: Configure FTP upload ⓘ

Parameter	Value	Copy
Server	ftp.timelapserobot.com	
Username		
Password		
Port	21	

Step 2: Wait for first image to be uploaded ⓘ

Refresh

Figure 4: The connection details in TimelapseRobot. User name and password are blacked out in this figure because they are the real credentials of the test project.

6.2 Configuring FTP on the camera

MENU PATH

Configuration ▶ Network ▶ Advanced Settings ▶ FTP

German interface: Konfiguration › Netzwerk › Erw. Einst. › FTP

FIELD IN THE INTERFACE	VALUE
FTP Protocol	FTP
Server Address	ftp.timelapserobot.com
Port	21
Username	<TimelapseRobot-FTP-username>
Password	<TimelapseRobot-FTP-password>
Confirm	the same password again
Anonymous	not enabled
Directory Structure	Save in the root directory
Picture Filing Interval	OFF Day(s), no additional daily folder required
Picture Name	Default
Upload Picture	enabled
Enable Automatic Network Replenishment	enabled, see Chapter 9

Click **Save**.

Figure 5: The FTP page of the camera with the settings from the table. The user name is covered because it is the real credential of the test project. **Enable Automatic Network Replenishment** is the switch that makes the catch-up after an outage possible.

NOTE

The setting for the file name is called **Default** in the English interface and **Standard** in the German one. Both mean the same thing: Hikvision's built-in naming rule.

CAUTION

The server address must include the `ftp.` subdomain. An entry without it, that is plain `timelapserobot.com`, is accepted by the field without complaint and even receives a green tick, but it does not reach the destination. This is exactly the mistake that occurred during the test.

6.3 The built-in FTP test is misleading

CAUTION

The **Test** button at the bottom of the FTP page reported a warning about missing write permissions **even though the actual upload of the scheduled captures worked perfectly.**

Do not rely on the result of this test, in either direction. It is neither evidence of a fault nor evidence of a working upload.

Only the practical check is valid:

- 1 Configure timed captures, see Chapter 7.
- 2 Wait for a scheduled capture.
- 3 Refresh the view in TimelapseRobot.
- 4 Check whether the image appears.

If the image appears, the upload works. That settles the question.

6.4 File name and timestamp

Leave **Picture Name** set to **Standard**. Hikvision's default naming rule assembles the file name from these parts:

- IP address
- channel number
- capture time
- event type

What matters is the **original capture time** contained in it. A custom naming rule was not needed in the tested workflow.

VERIFIED IN TESTING

This property proved its worth during the catch-up after a network outage: images that were transferred late were filed in TimelapseRobot at their **original capture time**, not at the later time of upload. The timelapse therefore stays chronologically correct. Details in Chapter 9.

CHAPTER 7

Snapshots and capture schedule

Two settings decide what the camera records: the capture parameters set the format, resolution and interval of the images, and the capture schedule sets the times at which anything is captured at all. Both have to be right, otherwise not a single image is produced.

7.1 Capture parameters

MENU PATH

Configuration ▶ Storage ▶ Schedule Settings ▶ Capture ▶ Capture Parameters

German interface: Konfiguration › Speicherung › Zeitplaneinstellungen › Erfassen › Erfassungsparameter

In the **Timing** section, tick **Enable Timing Snapshot**.

CAUTION

The page carries two sections with identical-looking fields: **Timing** for scheduled capture and **Event-Triggered** for event-driven capture. For a timelapse only the **Timing** section applies.

These values were used in the test:

FIELD IN THE INTERFACE	VALUE
Format	JPEG
Resolution	3840*2160
Quality	High

7.2 Capture interval

Set the interval between two captures in the **Interval** field on the same page. To the right of it you choose the unit.

NOTE

Watch the unit next to the number field. Ten minutes can be entered as **10** with the unit minutes, or as **600** with the unit seconds. The table below gives the values in seconds, the way they appear in the test record.

VALUE	MEANING
5	5 seconds, for stress and functional testing
60	1 minute
300	5 minutes
600	10 minutes, the planned production setting

Hikvision® Live View **Configuration**

Record Schedule **Capture**

Capture Schedule **Capture Parameters**

Timing

☒ Enable Timing Snapshot

Format: JPEG

Resolution: 3840*2160

Quality: High

Interval: 5 minute(s) ✓

Event-Triggered

☐ Enable Event-Triggered Snapshot

Format: JPEG

Resolution: 3840*2160

Quality: High

Interval: 1000 millisecond

Capture Number: 4

Save

Figure 6: The Capture Parameters page. The **Timing** section at the top governs the timelapse: enable the timing snapshot, then set format, resolution, quality and the interval with its unit. The figure shows a five-minute interval.

VERIFIED IN TESTING

Capture and upload ran successfully at 5 seconds and at 1 minute, in both cases at full resolution.

CAUTION

The planned production interval of 600 seconds was **not separately endurance-tested** in the test session. Because significantly faster intervals ran without fault, there is no indication of a technical problem. An indication, however, is not proof. Plan a check after a few days for the first installation running on a 10-minute interval.

7.3 Capture schedule

MENU PATH

Configuration ▶ Storage ▶ Schedule Settings ▶ Capture ▶ Capture Schedule

German interface: Konfiguration › Speicherung › Zeitplaneinstellungen › Erfassen › Erfassungszeitplan

Select **Continuous** and draw the active periods onto the weekly grid. Clicking a drawn bar opens the time fields in which you enter the start and end precisely.

For a continuous timelapse, all seven days apply:

Monday	00:00–24:00
Tuesday	00:00–24:00
Wednesday	00:00–24:00
Thursday	00:00–24:00
Friday	00:00–24:00
Saturday	00:00–24:00
Sunday	00:00–24:00

The drawn periods must appear as active blue bars. Then click **Save**.

CAUTION

An empty capture schedule is the most common reason for no image arriving despite correct FTP settings. The camera simply captures nothing. Check the blue bars, not only the saved confirmation message.

CAUTION

Do not confuse the two tabs. **Record Schedule** governs video recording, **Capture** governs the single images the timelapse is built from. A fully configured **Record Schedule** produces no timelapse images at all if **Capture Schedule** is left empty.

The screenshot shows the Hikvision Configuration web interface. The 'Configuration' tab is selected, and the 'Capture' sub-tab is active. On the left, a sidebar lists various settings categories: System, Network, Video/Audio, Image, Event, and Storage. Under 'Storage', 'Schedule Settings' is highlighted. The main area shows the 'Capture Schedule' configuration. At the top, there are buttons for 'Capture Schedule' (active), 'Capture Parameters', 'Continuous' (selected), 'Delete', and 'Delete All'. Below this is a weekly schedule grid. Each day of the week (Mon through Sun) has a horizontal bar representing the 24-hour period, which is entirely filled with a solid blue color, indicating 'Continuous' capture. A tooltip for Monday shows 'Continuous' and '00:05 - 24:00'. At the bottom right of the grid, a legend shows a blue square next to the word 'Continuous'. A red 'Save' button is located at the bottom center of the configuration area.

Figure 7: The Capture Schedule with all seven days set to continuous. Note the active tab: **Capture**, not **Record Schedule**.

7.4 Result on image size

An open question before the test was whether TimelapseRobot accepts the full 8 megapixels or whether the capture resolution has to be reduced.

VERIFIED IN TESTING

The complete JPEG captures at 3840 × 2160 were accepted and displayed by TimelapseRobot. No downscaling was required, and no image size limit was encountered at this resolution.

QUESTION	RESULT IN THE TEST
Downscaling required	no
Capture resolution	3840 × 2160
Format	JPEG

CHAPTER 8

Removing image overlays

Out of the box the camera burns the date, the time and the device name into the image. In a timelapse that overlay flickers in every frame and cannot be removed afterwards. Switch it off before the first capture.

MENU PATH

Configuration ▶ Image ▶ OSD Settings

German interface: Konfiguration › Bild

Switch off every overlay:

- Camera Name , the device name
- Display Date , date and time
- Display Week , the weekday
- Text Overlay 1 to Text Overlay 4 , four freely assignable lines of text

Then save.

CAUTION

The change only affects newly captured images. Images already transferred stay as they are and keep their overlay. Anyone who notices this only after two weeks has two weeks of material with a burnt-in date.

NOTE

If you want a time display in the finished video, generate it in TimelapseRobot from the capture timestamps. That stays editable, a burnt-in display does not.

CHAPTER 9

Offline buffering on microSD

This chapter answers the one question that was still open before the test and therefore mattered most:

NOTE

If the camera is disconnected from the network and keeps storing captures locally, does it upload the buffered images once the connection returns? And do those images end up at the right position in the archive with their original capture time, or do they get the time of the upload?

The answer is: they are uploaded, and they keep their original time. The evidence is at the end of this chapter.

9.1 Preparing the microSD card

A local microSD card is required for robust buffering.

MENU PATH

Configuration ▶ Storage ▶ Storage Management ▶ HDD Management

German interface: Konfiguration › Speicherung › Speicherverwaltung › HDD-Verwaltung

Confirm that the card is detected and writable. The card used in the test presented itself as follows:

COLUMN IN THE INTERFACE	VALUE IN THE TEST
Capacity	366.82GB
Free space	343.24GB
Status	Normal
Encryption Status	Unencrypted
Type	Local
Formatting Type	EXT4
Property	R/W

If necessary, initialise or format the card from the camera interface.

9.2 Storage quota

The camera divides the space between still images and video recording. The test configuration was:

FIELD IN THE QUOTA SECTION	VALUE IN THE TEST
Percentage of Picture	25 %
Percentage of Record	75 %
Max.Picture Capacity	86.25GB
Free Size for Picture	85.24GB

That provided far more space than the buffering of still images required. The quota can be adjusted to the requirements of the project.

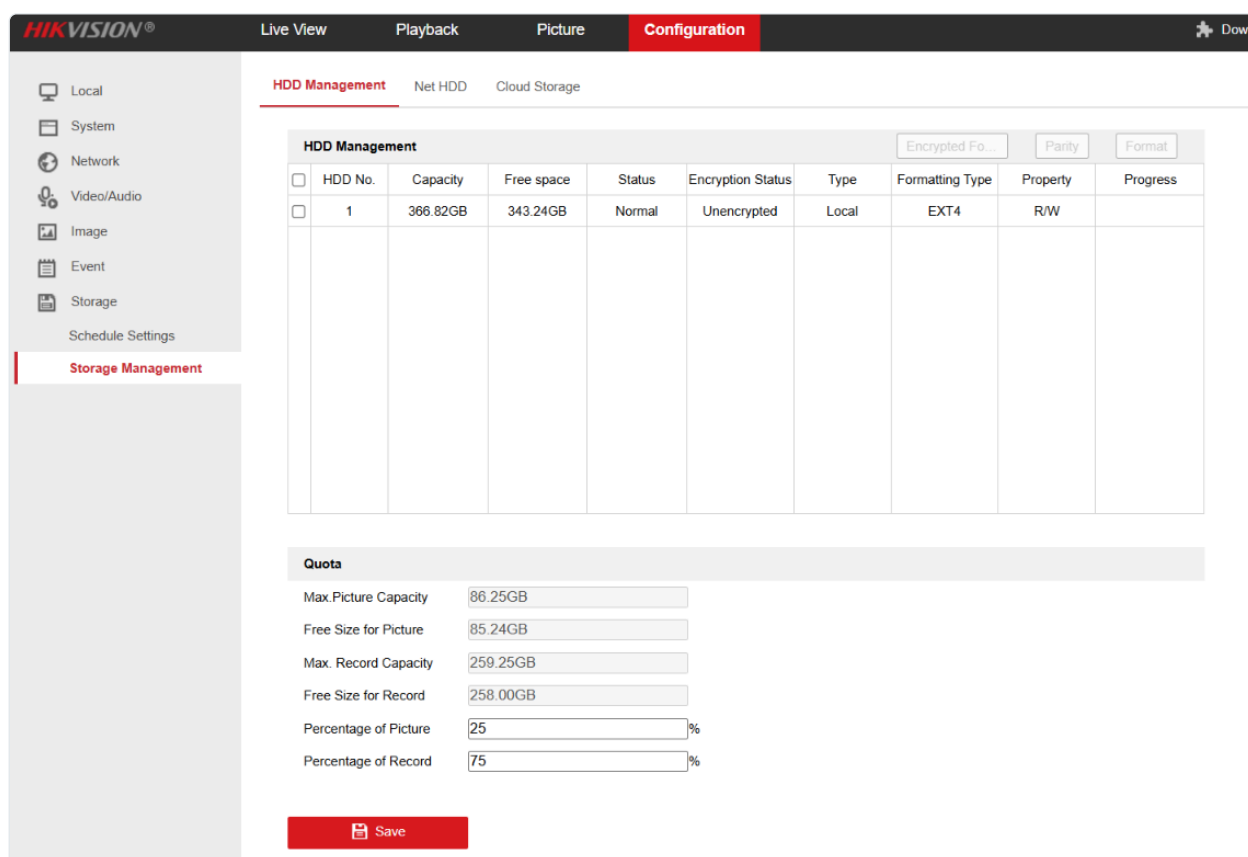


Figure 8: The HDD Management page with the card detected. The **Formatting Type** and **Property** columns are the decisive ones: only a writable card can buffer. The **Quota** section below shows how much of it is reserved for pictures.

9.2.1 Estimating how long an outage can be bridged

How long the card bridges an outage depends on three quantities: the free picture space, the average file size of one capture, and the capture interval.

$$\text{buffer time} = \text{free picture space} / (\text{file size per capture} / \text{capture interval})$$

CAUTION

The average file size of a capture depends on the project. It varies considerably with the subject, the daylight and the quality level: an image at night is much smaller than a detailed construction site in sunshine. Do not use an estimate from this manual, measure instead. After a day of operation, download a few images from TimelapseRobot and take the average. Record the result in the site data sheet in Appendix D.

Worked example using the picture space of around 85 GB available in the test, a capture interval of 10 minutes and an assumed average of 5 MB per capture: 6 captures per hour produce 30 MB per hour, so 85 GB last for roughly 2800 hours, that is about 118 days.

CAUTION

The 5 MB in this calculation are an assumption, not a measured value of this installation. The file size was not recorded during the test, so the result is an order of magnitude and not a commitment. The outage durations actually tested were a few minutes.

9.3 Enabling automatic catch-up

MENU PATH

Configuration ▶ Network ▶ Advanced Settings ▶ FTP

German interface: Konfiguration › Netzwerk › Erw. Einst. › FTP

Make sure **both** switches are on:

FIELD IN THE INTERFACE	VALUE
Upload Picture	enabled
Enable Automatic Network Replenishment	enabled

Click **Save**. The figure in Chapter 6 shows the page with both switches on.

CAUTION

Without **Enable Automatic Network Replenishment** no catch-up takes place. The images do sit on the card, but they never travel to TimelapseRobot. This setting is the precondition for everything described in this chapter, and it is not enabled out of the box.

9.4 The test and its result

9.4.1 Procedure

The camera stayed on its 12 V supply while the network connection was unplugged. During the outage:

- the camera kept capturing on schedule,
- the captures were stored locally,
- TimelapseRobot consequently received no new images.

After the network connection was plugged back in:

- the missing images were transferred automatically,
- the backlog was cleared without intervention,
- TimelapseRobot placed the delayed images at their original capture time.

9.4.2 Result

TESTED BEHAVIOUR	RESULT
Local buffering while the connection is down	PASSED
Automatic catch-up via FTP once the connection returns	PASSED
Original capture time preserved	PASSED
Correct chronological filing in TimelapseRobot	PASSED

VERIFIED IN TESTING

With the camera running, a network outage does not produce a gap in the timelapse. The images arrive late, but complete and in the right place.

How the installation behaves when the camera itself loses power as well is covered in Chapter 10.

CHAPTER 10

Behaviour during a power failure

The test in Chapter 9 kept the camera powered. On a construction site, however, a power failure takes everything down at once, the camera included. The decisive question then is: do the images that have not been transferred yet survive a restart of the camera?

10.1 How the test ran

The test ran with a capture interval of one minute.

- 1 Camera and LTE gateway were working normally.
- 2 The LTE gateway was switched off.
- 3 The camera kept running for about five minutes without a network connection.
- 4 Then the camera was switched off as well.
- 5 The LTE gateway was switched back on.
- 6 Once the LTE connection had returned, the camera was switched back on.
- 7 TimelapseRobot and RMS were observed for recovery.

This sequence therefore tests not only the recovery of the connection, but also whether buffered captures survive a complete power cycle of the camera before they have been transferred.

10.2 Result

The test passed. The captures made during the gateway outage

- remained on the microSD card,
- survived the subsequent power-off of the camera,
- were transferred after both devices had restarted,
- appeared in TimelapseRobot at their original capture time.

After the restart:

TESTED BEHAVIOUR	RESULT
Recovery after the network outage	PASSED
Images on microSD survive a restart of the camera	PASSED
Automatic catch-up of the backlog via FTP	PASSED
Chronological filing in TimelapseRobot	PASSED
Normal uploads resume on their own	PASSED
Clock synchronised over NTP after the restart	PASSED
Remote management access restored	PASSED

VERIFIED IN TESTING

The normal minute-interval uploads resumed on their own, the clock was correct, the LTE gateway reconnected by itself, and remote access through Teltonika RMS was available again. No intervention on site was required.

10.3 What this means in practice

A real power failure creates two distinct periods that must be told apart.

GATEWAY OFF, CAMERA RUNNING

The camera keeps capturing and stores the images on the microSD card. Once the connection returns it uploads the backlog on its own. The images appear at their original capture time. No gap.

CAMERA WITHOUT POWER

No images are captured during this period, so there is nothing to upload later. A genuine gap in the timelapse is to be expected. Not a fault of the installation.

NOTE

A gap in the timelapse is therefore not proof of a fault. Check first whether the camera had power at all during that period. Only the second case produces a genuine gap, and that one cannot be avoided with this installation.

CHAPTER 11

LTE operation with the Teltonika TRB140

A construction site rarely has an internet line. The camera can therefore be operated without a conventional router: a mobile gateway provides the connection. The test used a Teltonika TRB140.

11.1 The setup

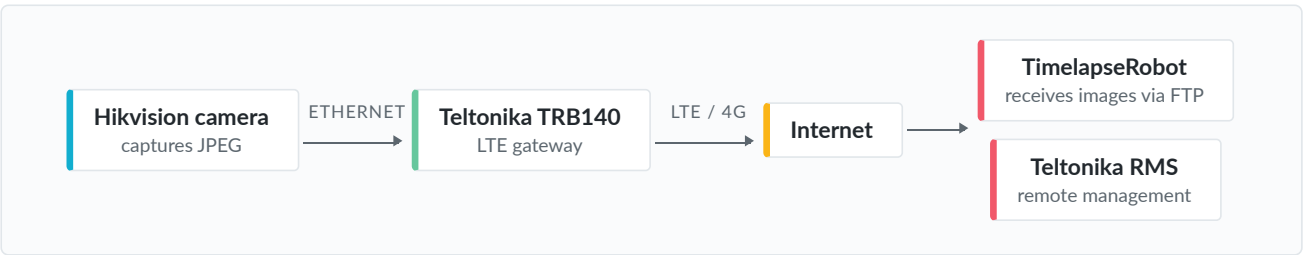


Figure 9: The camera stays on Ethernet. The TRB140 takes over the route to the internet and is at the same time the entry point for remote management.

The camera still uses a network cable; it has no mobile modem of its own.

11.2 Why port forwarding is not an option here

A mobile connection typically sits behind **CGNAT**. Several customers share one public address. Port forwarding with your own public IP address or via DDNS is therefore unavailable, and it would not be desirable either.

For this setup that is irrelevant: TimelapseRobot needs no inbound connections, because the camera pushes the images outward.

11.3 Preparing the TRB140

Set up the gateway before you connect the camera.

- 1 Insert and configure the SIM card.
- 2 Connect the LTE antennas.
- 3 Sign in to the TRB140 web interface.
- 4 Check three things.
 - ☐ The LTE data connection is up.
 - ☐ Internet access works.
 - ☐ The DHCP server on the LAN side is active.

The TRB140's local network used in the test:

SETTING	VALUE
Gateway	192.168.2.1/24

NOTE

The address assigned to the camera by DHCP may differ in your case. It depends on the range the TRB140's DHCP server hands out.

11.4 Connecting the camera

The camera stays on `DHCP: On`, as configured in Chapter 5.

- 1 Plug the camera's network cable into the TRB140's Ethernet port.
- 2 Wait until the camera receives an address from the TRB140's local network, for example `192.168.2.x`.
- 3 Check in TimelapseRobot that images are arriving over the mobile connection.

11.5 Reserving the camera's local address

In the TRB140 web interface open the overview of LAN or DHCP leases. Identify the camera by its MAC address and select:

Create static

The camera then always receives the same local address.

CAUTION

This reservation is strongly recommended for remote management. The RMS Connect entry points at the camera's local address. If that address changes, remote access leads nowhere. See Chapter 12.

NOTE

The camera may stay in DHCP mode throughout. The reservation is made in the TRB140, not in the camera, so nothing has to change in the camera's network settings.

CHAPTER 12

Remote management via Teltonika RMS

Nobody should have to visit a construction site camera just to change an interval. Teltonika RMS opens a secured route to the camera's web interface without exposing a port to the public internet.

12.1 Connecting the TRB140 to RMS

- 1 Enable RMS on the TRB140.
- 2 Register or add the gateway in the RMS portal.
- 3 First check whether the TRB140 itself can be opened remotely.

MENU PATH IN THE RMS PORTAL

Management ▶ Devices ▶ Device WebUI

If the TRB140 web interface opens through RMS, the management route over mobile network and RMS is working. Only then is it worth setting up access to the camera.

12.2 Setting up remote access to the camera

MENU PATH IN THE RMS PORTAL

RMS Connect ▶ Remote access

Create the endpoint for the camera manually. These values were used in the test:

SETTING	VALUE
Name	HIKVISION
Gateway	the TRB140
Destination IP	the reserved local address of the camera
Destination Port	80
Protocol	HTTP

Connect through RMS. The familiar Hikvision web interface opens remotely.

12.3 What is reachable remotely

This route gives you the same configuration pages as on site:

- FTP settings
- capture interval
- capture schedule
- storage and microSD
- image settings
- overlays (OSD)
- network settings
- NTP and daylight saving

- maintenance

Practically every change described in this manual can therefore be made remotely.

NOTE

The security benefit is that no camera port has to be opened directly to the public internet. Access runs over the secured RMS route.

12.4 Recovery after a power failure

VERIFIED IN TESTING

The power failure test confirmed the management route as well: the TRB140 restarted, the LTE connection came up on its own, RMS reconnected on its own, and remote access to the camera through RMS Connect worked again.

RMS is therefore suitable for the unattended management of a construction site installation. After a power failure the installation is reachable again without anyone driving out to it.

12.5 Hik-Connect as an option

MENU PATH

Configuration ▶ Network ▶ Advanced Settings ▶ Platform Access

German interface: Konfiguration › Netzwerk › Erw. Einst. › Plattformzugriff

Hik-Connect is useful for convenient remote viewing and simple device access.

For full management of the web interface, and particularly for changes to capture and FTP upload, RMS Connect was the better fit in the tested mobile setup.

WARNING

Do not expose the camera's HTTP, RTSP and SDK ports directly to the public internet merely to obtain remote configuration access. A camera reachable on the internet will be found and attacked. Use the RMS Connect route instead.

CHAPTER 13

Recommended production configuration

This overview collects every setting described in the preceding chapters. It serves as the target state for the commissioning check in Chapter 14, and as a reference when somebody inspects an installation later.

NOTE

The capture schedule and the picture quota depend on the project. All other values can be adopted unchanged.

13.1 Camera network

SETTING	VALUE
DHCP	enabled
DHCP reservation on the router	enabled
Port forwarding to the internet	not required

13.2 Time

SETTING	VALUE
Time zone	GMT+01, Central Europe
NTP	enabled
NTP server	time.windows.com
NTP port	123
NTP interval	1440 minutes
Daylight saving	enabled
DST bias	+60 minutes

13.3 Captures

SETTING	VALUE
Format	JPEG
Resolution	3840 × 2160
Quality	High or maximum
Timing Snapshot	enabled
Capture schedule	depends on the project
Production example	600 seconds, that is 10 minutes

13.4 FTP and TimelapseRobot

SETTING	VALUE
Server	ftp.timelapserobot.com
Port	21
Directory	root directory
Picture Name	Default
Upload Picture	enabled
Automatic Network Replenishment	enabled

13.5 Local storage

SETTING	VALUE
microSD	installed and initialised
Filesystem and state	writable, state normal
Picture quota	sufficient for the expected outage duration

13.6 Overlays

SETTING	VALUE
Device name	off, if a clean image is wanted
Date and time	off, if a clean image is wanted
Custom overlays	off, unless needed

13.7 Mobile network and remote management

SETTING	VALUE
Gateway	Teltonika TRB140
LTE	enabled
RMS	enabled
RMS Connect to the camera	configured
Destination port of the camera	80

CHAPTER 14

Commissioning check before handover

Work through every item on this list before the installation is left running unattended. A fault noticed here costs minutes. The same fault noticed after four weeks costs four weeks of material.

14.1 Checklist

- ☐ The camera boots normally.
- ☐ The correct local time is shown after boot.
- ☐ NTP is enabled.
- ☐ Daylight saving is configured correctly.
- ☐ The microSD card is detected and writable.
- ☐ The camera receives the local address reserved for it.
- ☐ TimelapseRobot receives a new, scheduled image.
- ☐ The full JPEG at `3840 × 2160` is accepted.
- ☐ The final capture interval is configured.
- ☐ The capture schedule is active, the bars are blue.
- ☐ The overlays are configured as required.
- ☐ `Upload Picture` is enabled.
- ☐ `Enable Automatic Network Replenishment` is enabled.
- ☐ The LTE gateway reconnects on its own after a power cycle.
- ☐ The camera resumes uploading on its own after a power cycle.
- ☐ Images buffered offline are transferred later.
- ☐ Delayed images appear at their original capture time.
- ☐ RMS can open the TRB140 remotely.
- ☐ RMS Connect can open the Hikvision web interface remotely.
- ☐ No unnecessary port forwarding to the public internet is active.

14.2 What to record

After the commissioning check, record what is needed for later remote support. Without these details an installation is hard to look after remotely, because nobody knows which state is the correct one. The form for this is the site data sheet in Appendix D.

DETAIL	WHY IT IS NEEDED LATER
Location and viewing direction	To judge whether a change in the image is a fault
Configured capture interval	To compare the expected and the actual number of images
Reserved local address of the camera	Target of the RMS Connect entry
Name of the RMS endpoint	To find the remote access again
Size and picture quota of the microSD	To estimate the outage duration that can be bridged
Date of the commissioning check	Reference point for the first inspection

CAUTION

Store these notes where the maintenance team will find them, not in the mailbox of the person who built the installation. Credentials do not belong in this note; they belong in a password manager.

CHAPTER 15

Troubleshooting

15.1 How to proceed

Almost every fault can be narrowed down remotely. Work through this order before anyone drives out to the installation.

- 1 Check in TimelapseRobot when the last image arrived.
- 2 Check in RMS whether the TRB140 is online and the LTE connection is up.
- 3 Open the camera's web interface remotely and check the schedule, FTP and storage.
- 4 Only if these steps do not help, plan a visit on site and take spare parts along.

NOTE

Before anything else, check whether the camera had power during the period in question. A gap without power is not a fault, see Chapter 10.

15.2 Symptoms and remedies

SYMPTOM	POSSIBLE CAUSE	REMEDY
Camera not reachable at <code>192.168.1.64</code>	No power, a cable fault, or the wrong IP setting on the PC	Check the power supply and the network cable. Set the PC to <code>192.168.1.100</code> with subnet mask <code>255.255.255.0</code> . Make sure the PC and the camera are connected directly.
Camera disappears after DHCP is switched on	Expected behaviour, the factory address no longer applies	Find the new address with HiTools Delivery: <code>Current Subnet</code> , then <code>Refresh</code> . Alternatively use the router's DHCP list.
The browser asks for a user name at sign-in	The user name is not filled in automatically	Enter <code>admin</code> together with the password set during activation.
The FTP test reports missing write permissions	The built-in test does not reflect the real workflow	Ignore the result and verify in practice: <code>Timing Snapshot</code> active, <code>capture schedule</code> active, <code>Upload Picture</code> active, wait for a scheduled capture, refresh TimelapseRobot.
TimelapseRobot receives no images	Wrong server name, wrong credentials, an inactive schedule or no connection	Check the server name including the <code>ftp.timelapserobot.com</code> subdomain, port <code>21</code> , the credentials, <code>Upload Picture</code> active, <code>capture schedule</code> active, <code>Timing Snapshot</code> enabled, gateway and DNS, internet connectivity.
Images are lost during a network outage	No card or a full card, or catch-up is switched off	Check that the microSD is installed and writable, check the free picture quota, <code>Upload Picture</code> active,

SYMPTOM	POSSIBLE CAUSE	REMEDY
		Enable Automatic Network Replenishment enabled. Then repeat the offline test with the camera running.
Remote access to the camera through RMS stops working	Gateway offline, changed camera address, or the wrong destination port	Check that the TRB140 is online in RMS, that the LTE connection is up, that the camera received its reserved address, that the RMS Connect entry points at that address, that the destination port is 80 , and that the camera has power.

15.3 The most common wrong turn

CAUTION

During the test, the built-in **Test** button on the camera's FTP page reported a warning about missing write permissions even though the upload of the scheduled captures worked perfectly.

Anyone who follows that message looks for the fault in the wrong place and ends up changing settings that were correct. The only valid check is whether a scheduled capture appears in TimelapseRobot.

APPENDIX A

Test report

This appendix is the evidence on which every statement marked as verified in this manual rests. The procedure described was carried out from beginning to end on a real installation.

CONDITION	STATE
Camera	Hikvision DS-2CD2687G2HT-LIZS, 8 MP, 3840 × 2160
Firmware version	V5.7.14 build 231028
Encoding version	V7.3 build 231027
Web version	V4.0.1 build 231023
Mobile gateway	Teltonika TRB140
Image intake	TimelapseRobot, FTP
Date of testing	3 September 2026

NOTE

The camera firmware above was recovered from the screen recordings of the test. No figure is available for the gateway. Record the versions of your own devices in the site data sheet in Appendix D. If your firmware differs and a menu item described here is missing, that is the most likely cause.

A.1 Fully verified procedure

TESTED BEHAVIOUR	RESULT
Reset the camera to factory settings and activate it	PASSED
Configure the camera from a Windows PC	PASSED
Move the camera to an ordinary router using DHCP	PASSED
Find the new camera address with HiTools Delivery	PASSED
Upload scheduled JPEG captures to TimelapseRobot via FTP	PASSED
Upload captures at the full resolution of 3840 × 2160	PASSED
Capture interval of 5 seconds for stress testing	PASSED
Capture interval of 1 minute as a production-like test	PASSED
Remove overlays for date, time and device name	PASSED
Store captures locally on microSD during a network outage	PASSED
Upload the missing captures once the connection returns	PASSED

TESTED BEHAVIOUR	RESULT
Preserve the original capture time of delayed images	PASSED
File delayed images in the correct chronological position	PASSED
Buffered captures survive a restart of the camera	PASSED
Camera operation through the Teltonika TRB140 LTE gateway	PASSED
Open the full Hikvision web interface remotely via RMS Connect	PASSED
Remote access despite CGNAT on the mobile network	PASSED
Automatic recovery of LTE, upload, NTP and remote access after a power failure	PASSED

A.2 Offline buffering test

The camera stayed on its 12 V supply; the network connection was unplugged and plugged back in later.

TESTED BEHAVIOUR	RESULT
Local buffering while the connection is down	PASSED
Automatic catch-up via FTP	PASSED
Original capture time preserved	PASSED
Correct chronological filing in TimelapseRobot	PASSED

Details in Chapter 9.

A.3 Complete power failure test

Capture interval one minute. The gateway was switched off first, the camera kept running for about five minutes without a network, then the camera was switched off as well. Afterwards both devices were put back into operation.

TESTED BEHAVIOUR	RESULT
Recovery after the network outage	PASSED
Images on microSD survive a restart of the camera	PASSED
Automatic catch-up of the backlog via FTP	PASSED
Chronological filing in TimelapseRobot	PASSED
Normal uploads resume on their own	PASSED
Clock synchronised over NTP after the restart	PASSED
Remote management access restored	PASSED

Details in Chapter 10.

A.4 Not verified

CAUTION

The endurance test of the planned production interval of 600 seconds was **not** carried out in this session. Only significantly faster intervals were tested. Because those ran without fault, there is no indication of a technical problem, but there is also no evidence over a longer period.

TESTED BEHAVIOUR	RESULT
Endurance test of the 10-minute interval over several days	OPEN
Average file size of a capture, the basis for the buffer time	OPEN
Outage durations beyond a few minutes	OPEN
Firmware version of the LTE gateway	OPEN

These points have to be established for your own installation. The calculation method for the buffer time is in Chapter 9, the fields for it in the site data sheet in Appendix D.

APPENDIX B

Glossary

TERM	MEANING
Automatic Network Replenishment	Setting on the Hikvision camera that automatically transfers the backlog of locally stored images after a connection failure. Without it no catch-up takes place. In the German interface <code>Automatische Netzwerkg��nzung aktivieren</code> .
CGNAT	Carrier-grade NAT. A method by which many customers of a provider share one public IP address. Inbound connections from outside are therefore impossible. Irrelevant for this setup, because the camera connects outward.
DHCP	The method by which a device receives its network address automatically from the router instead of having it configured statically.
DHCP reservation	A rule on the router that a particular device always receives the same address. The device stays in DHCP mode.
DST	Daylight Saving Time. Configured in the camera separately from the time zone, with a start, an end and a bias.
FTP	File Transfer Protocol. The camera uses it to transfer every captured image to TimelapseRobot.
Hik-Connect	Hikvision service for convenient remote viewing and simple device access. For full management of the web interface, RMS Connect was the better fit in the tested mobile setup.
HiTools Delivery	Hikvision Windows tool that finds cameras on the local network and shows their assigned IP address.
NTP	Network Time Protocol. The method by which a device synchronises its clock with a time server over the network. It uses network port 123.
OSD	On-screen display. Overlays that the camera burns into the image, such as date, time or device name. They cannot be removed afterwards.
PoE	Power over Ethernet. Power supplied over the network cable. It requires a PoE injector or a PoE switch; an ordinary computer port does not provide it.
RMS	Remote Management System by Teltonika. A portal for managing mobile gateways remotely.
RMS Connect	A function inside RMS that establishes secured access to a device on the gateway's local network, here to the camera's web interface.
Snapshot	A single image captured by the camera and stored as a JPEG. The basis of every timelapse in this setup.
Timelapse	A video made from single images captured at even intervals over a long period.
Timing Snapshot	Setting on the camera that captures single images at a fixed time interval, without an event triggering them. In the German interface <code>Timing-Schnappschuss aktivieren</code> .

APPENDIX C

Status and change history

C.1 What this manual covers

It describes the fully tested installation using the Hikvision DS-2CD2687G2HT-LIZS camera. Other camera models and other manufacturers are not covered by this manual, even though they work on the same principle.

C.2 What this manual is built from

Two sources, both from the same test.

SOURCE	WHAT COMES FROM IT
Test record of the installation	The procedure, the settings, the measured values and the results in Appendix A. The menu items are named in English there.
Screen recordings of the test	The German wording of the web interface, the firmware version, the characteristics of the microSD card, and the figures in this manual.

C.3 What remains open

Two points are deliberately left unanswered. Both appear again as a box at the relevant place in the text, so they are not missed while reading.

OPEN POINT	WHAT IT MEANS IN PRACTICE
Endurance test of the 10-minute interval	The planned production setting of 600 seconds was not run over several days. Only considerably faster intervals were tested, and those ran without fault. Check the first installation running this interval after a few days, see Chapter 7.
Outage duration that can be bridged	The average file size of a capture was not recorded, so there is no reference value for the buffer time of the microSD card. The calculation method and instructions for measuring it are in Chapter 9.

C.4 Figures

NOTE

The figures showing the camera web interface are being produced with the interface set to English and will be added in a following revision. The written procedure is complete and independent of them.

C.5 Change history

REVISION	CHANGE
First version of the setup guide	First setup, time, network migration, FTP configuration, capture schedule, removal of overlays, recommended settings, troubleshooting, security notes.
Second version, 3 September 2026	Extended with offline buffering on microSD including catch-up, the complete power failure test, operation through the Teltonika TRB140 LTE gateway, remote management via Teltonika RMS with RMS Connect, Hik-Connect as an option, the behaviour of file name and timestamp, and the commissioning checklist.
This manual, revision 1.0	Converted into a typeset manual: structure following the workflow, typeset architecture diagrams, a clear separation of verified statements and open points, a calculation method for the buffer time, the commissioning checklist, the site data sheet and the glossary.
English edition, revision 1.0	Translation of the German manual. Menu paths are given in English with the German wording below them, because the tested installation ran a German interface.

APPENDIX D

Site data sheet

Fill in this sheet during the commissioning check and store it where the maintenance team will find it. Without these details an installation is hard to look after remotely, because nobody knows which state is the correct one.

CAUTION

Do not write passwords or FTP credentials on this sheet. Those belong in a password manager. Only the details needed to judge the operation belong here.

D.1 Project and location

Project

name in TimelapseRobot

Location

address or building element

Viewing direction

what the camera shows, for judging changes in the image

Mounting

mast, wall, height

Date of commissioning**Commissioned by**

D.2 Devices

Camera model

the tested model was DS-2CD2687G2HT-LIZS

Camera firmware

matters because menu paths shift between versions

LTE gateway

the tested gateway was a Teltonika TRB140

Gateway firmware**Power supply**

12 V power supply or PoE

D.3 Network

Reserved local address of the camera

target of the RMS Connect entry

Gateway on the local network

Mobile operator and tariff

without credentials

Name of the RMS endpoint

to find the remote access again

D.4 Capture

Capture interval

value in seconds, as configured in chapter 7

Capture schedule

continuous or working hours

Resolution and quality

Expected images per day

for comparison with the actual number

D.5 Storage and buffer time

Size of the microSD card

Picture quota

share reserved for pictures in storage management

Measured file size per capture

determine from TimelapseRobot after a day of operation

Resulting buffer time

calculation method in chapter 9

D.6 Inspections

First inspection after commissioning

after a few days on a 10-minute interval

Result of the first inspection

Next maintenance

D.7 Notes

Particularities of the installation, faults encountered, deviations from this manual