Ranger Micro | Mk II

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Ranger Mk II Quick Start Guide

Ranger Mk II is the world's most capable professional wireless video system, featuring our Emmy and Academy Award-winning zero-delay, 4K HDR technology. Ranger's best-in-class performance allows broadcasters, live production companies, churches, and government entities to implement real-time wireless workflows over licensed and unlicensed bands, from 4.9 GHz up to 6.4 GHz. And new for 2023, Ranger now includes 12 additional RF channels over 6 GHz (U-NII 5), providing access to wireless spectrum rarely used by other electronics.

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What's Included

- Ranger Mk II Transmitter and Receiver
- Lightstand Adapter 1/4-20in
- 2pin Conn. to PowerTap - 18in Cable
- Ultra Thin HDMI Male Type A (Full) - HDMI Male Type A (Full) 18in Cable
- SDI 12G BNC to BNC Cable Length: 18in / 46cm
- USB 2.0 Type A Male to USB Type B (Micro) Male - 1m Cable
- PSU 2pin Conn. to 30W AC Adapter (Int) - 6ft Cable
- **1x** N-Type Barrel H Antenna
- **1x** N-Type Barrel V Antenna
- **3x** 2dBi WIFI 2.4/5.8GHz Antennas
- **2x** 2dBi Flexible H Mushroom V4.9-7.3Ghz RP-SMA
- **5x** RP-SMA Female to RP-SMA Female 4in/10cm Cable

Physical Properties

Power and Connect

1. Attach the Ranger transmitter (male side) to the back of your camera.
2. Connect power to the Ranger transmitter and receiver with the included A/C adapter, or if both devices are equipped with battery plate accessories, attach a compatible battery (**Gold or V mount**).
3. Connect the output from your video source to either the SDI or HDMI input **(C or E)** on the Ranger transmitter. Connect either the SDI or HDMI output **(D or J)** from the Ranger receiver to the video input on your monitor. **NOTE: If mounting the receiver upright on a stand above the monitor, use a right-angle SDI adapter to relieve any strain caused by the weight of the cable, and to avoid damaging the SDI output's internal connectors.**
4. **Transmitter:** Attach the **H** and **V** barrel antennas to the type-N connectors on the transmitter. The **V** antenna attaches to the V-connector, and the **H** antenna attaches to the H-connector.
   Receiver: Attach the three 2dBi antennas to the receiver's center connectors and the two horizontal antennas to the left and right connectors.
5. Move the power switches on both the transmitter and receiver **(I)** to the ON position. Video appears within a few seconds.

Pairing/Unpairing

Ranger devices purchased as a set (TX and RX), are paired by default, requiring no additional configuration. Ranger devices purchased separately need to be paired using the device's front panel (OLED) menu, **Launchpad**, or the **Ranger App**. To pair your transmitter with multiple receivers, you will

need to use either Launchpad or the Launchpad App. **NOTE: Before starting either pairing process, ensure that both the transmitter and receiver have the same firmware version and have Bluetooth enabled.**

PAIRING/UNPAIRING VIA FRONT PANEL
To Piar:

1. Using the Menu Joystick, navigate to the **Pair** menu on both the transmitter and the receiver front panel.
2. Select **Pair** to begin the pairing process. The transmitter will begin scanning for a receiver within range and automatically pair to the receiver.
3. Once paired, the front panel will indicate whether or not Pairing is successful.

To Unpair:

1. Navigate to the **Unpair** menu on either the transmitter and the receiver.
2. Select the transmitter/receiver you want to unpair. If you have multiple devices paired, you can select **Unpair All**.

PAIRING TIPS
If you're having trouble getting units to pair, we recommend keeping the transmitter and receiver six feet apart when pairing. Keep all other RF devices nearby turned off or out of range to ensure the transmitter and receiver only detect each other. To eliminate any chance of interference, perform the Wired Pairing process via Launchpad.

WIRED PAIRING VIA LAUNCHPAD
To Pair:

1. Connect both the transmitter and receiver(s) to your computer (Windows/Mac) via USB.
2. Open Launchpad, select the **Pairing** tab, then tap the **Wired Pairing** button.
3. Select the devices you want to pair, then click the **Pair Devices** button. Launchpad will indicate whether or not Pairing is successful.

To Unpair:

1. Connect both the transmitter and receiver(s) to your computer (Windows/Mac) via USB.
2. Open Launchpad, select the **Pairing** tab, then tap the **Unpair All** button.

PAIRING VIA RANGER APP
To Pair:

1. Open the Ranger App from your iOS or Android device, then tap the **Pairing** button.
2. Select the transmitter you wish to pair, then tap the **Next** button.
3. Select the receiver(s) you wish to pair with the transmitter, then tap the **Pair!** button. The Launchpad App will indicate when the pairing process is complete.

To Unpair:

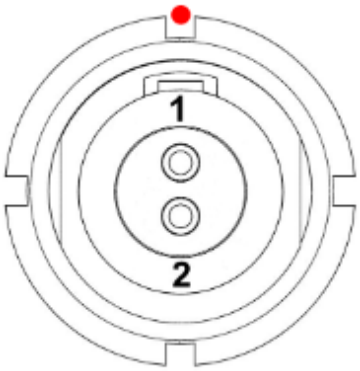
1. Open the Ranger App from your iOS or Android device, then tap the settings button (3 dots) on the top right corner of the screen.
2. Enter the **Pairing** menu, select the receiver(s) you wish to unpair, then tap the **Unpair** button.

Power Cables

2-Pin Power Connector
Ranger devices use a locking 2-pin power connector similar to the 0B 302 series LEMO connector.

2-Pin Power Connector Pin Out

Pin	Description
1*	GND
2	+DC



* Pin 1 is closest to the red dot on the connector.

Input Voltage: 7-28V DC (TX and RX)
Max Power Consumption: 19W (TX) and 15W (RX)

Custom/3rd Party Cables

- Test the power cable polarity with **ONLY** the power cable connected to Ranger. Do not connect video cables.
- Check the power cable for shorts and proper grounding.

12G-SDI Input/Output Cables
Ranger units require the use of 12G-SDI cables to reliably transport 12G video signals and are included as a standard item. Ensure that your cables are rated for compatibility with your camera's output.

CAUTION:

Using a reverse polarity or improperly-constructed power cable can damage the product and is not covered under warranty. To prevent the inputs from being damaged, best practice is to plug in the power cable first, THEN connect the video cable from the camera before powering on the TX unit.

Mounting

Ranger devices have a 1/4”-20 and 3/8"-16 threaded holes on the bottom for mounting the included light stand adapter or any other mounting accessories. Additionally, Ranger devices are equipped with a dual-mount battery plate that allows you to attach your device to either the back of a camera, monitor, or Array Antenna.

- Mount the transmitter onto the back of your camera keeping the antennas clear of any obstructions.
- Orient the transmitter and receiver antennas so they are parallel to each other.
- For best results, orient the transmitter antennas so each one has a clear line-of-sight to the receiver.

CAUTION: DO NOT OVERTIGHTEN SCREWS INSERTED INTO THE THREADED HOLES. Doing so can damage the device's chassis and internal components, voiding the warranty.

TX/RX Configuration Menus

Wireless Settings

Switch TX (RX Only) - Ranger receivers can pair with up to four transmitters simultaneously. Switch TX allows you to quickly switch from one paired transmitter's camera feed to another paired transmitter. This feature is handy in multi-camera situations when you need to switch to a different camera's view mid-shoot without having to perform the pairing process every time. **NOTE: The transmitter(s) must first be paired with the receiver**.

Band - Select either the 5GHz or 6GHz wireless frequency. The 5GHz frequency provides more channels, but is utilized by more devices, resulting in frequent interferences and video dropouts. The 6GHz frequency is less crowded than the 5GHz frequency, resulting in faster connections and less interference.

Enable Broadcast Mode (TX Only)- Broadcast Mode allows you to transmit to multiple receivers simultaneously (non-DFS frequencies only) while extending your Ranger's transmission range.

- **Broadcast Mode Disabled (**Standard Multicast Mode**)** - Transmitter and connected receiver(s) coordinate and maintain two-way communication to optimize frequency usage and video transmission.
- **Broadcast Mode Enabled** - Data uplink channel is disabled, allowing the transmitter to connect to an unlimited number of receivers, as long as they have already been paired. Attach the receiver to your Panel Antenna while in Broadcast Mode to achieve even better range performance.

Enable Fixed Frequency - Fixed Frequency Mode allows your transmitter to designate a specific non-DFS channel within the selected wireless region for use, providing a stronger connection under challenging environments. **NOTE: By default, Ranger will select the lowest available frequency from the Frequencies list if one has yet to be selected beforehand.**

Allow Licensed Channels - Enable or disable Licensed Channel selection within the **Frequencies** menu. Ranger supports an extended RF range of 4.91 GHz to 6.425 GHz, which includes both unlicensed and licensed channels. Selecting a specific licensed channel ensures no interference from other devices broadcasting within range. **NOTE: Fixed Frequency Mode must first be enabled to select a specific licensed channel. Otherwise, Ranger will automatically select a licensed channel (Auto Mode).**

Bandwidth - Choose between 20MHz and 40MHz bandwidth options

Frequencies - Select which frequency to use (determined by **Fixed Frequency Mode** selection).

Video Quality - The Video Quality menu lets you adjust the balance between your signal’s maximum range and quality according to the number of antennas that transmit fine information. Ranger has several picture quality levels that vary based on the lowest quality link or the furthest receiver.

- **Auto Mode** - (*Default*) Transmitter automatically determines how many fine antennas are needed based on the range and signal quality.
- **Longer Distance Mode** - (*One fine antenna*) Maintains the maximum range in situations where other sources of interference might be present but will slightly reduce your video signal's maximum quality.
- **Better Quality Mode** - (*Two fine antennas*) Maintains higher signal quality, but reduces the maximum range.
- **Best Quality Mode** - (*Three fine antennas*) Ideal for complex, high-contrast scenes that require the highest possible quality.
- **Low Power Mode** - (*One fine antenna with shorter range*) Reduces the transmitter's total power consumption by about 1.5W, and may reduce any unwanted interference in multi-system environments.

Video Settings

HDMI/SDI Output Format (RX only) - Select the video output format. You can match the video source's resolution (**Same As Input**) or choose from the resolutions listed. If using the receiver with a recorder or monitor sensitive to video signal changes, select **Continuous Output** to ensure the signal stays constant even if the link is interrupted. Note that this adds a small delay to the video output.

Video OSD Settings (RX Only) - Choose when to display the OSD.

- **Never show** - Disable OSD.
- **Show when operating** - Hide OSD until it is activated by the joystick.
- **Show when no video** - Display the OSD when there is no video feed; hide the OSD when video appears (default).
- **Always show** - Always display OSD unless temporarily deactivated by the joystick.

Display Settings - Use the Display Settings to control the OLED display operation. By default, the OLED display will invert every 30 minutes.

Tools

SDI Eye Pattern (TX only) - The SDI Eye Pattern provides a graphical display of the SDI signal coming from the camera to the transmitter, and is useful in determining the amount of interference present. The size of the "eye" displayed on the front panel indicates the quality of the SDI signal. The bigger the size of the eye pattern is, the better the SDI signal.

Signal Quality Graph (RX Only) - The Signal Quality Graph indicates the quality and reliability of the signal being received according to the amount of interference that is present between the RX and TX. Signal Quality is represented in percentages:

- Figures below 30% indicate **poor** signal quality
- Figures between 30% and 45% indicate **fair** signal quality
- Figures above 45% indicate **good** signal quality

Spectrum Analyzer (RX Only) - The built-in Spectrum Analyzer provides a visual indication of channel noise and saturation across the entire available frequency range. Move the Menu joystick left and right to select a frequency. Frequencies are represented by bars; the higher the bar, the more congested that frequency is.

Test Pattern (RX Only) - This menu allows you to select a video resolution format to output a test pattern over HDMI or SDI. Select a specific output resolution from the resolutions list.

Advanced/System Settings

Lock Keypad - The Lock Keypad feature prevents the menu joystick from being used to avoid any accidental or unauthorized configurations. There are two ways to lock the keypad:

- Navigate to **Advanced Settings** via the front panel and select **Lock Keypad**.
- Press and hold the menu joystick upward for 5 seconds.

To unlock, press and hold the menu joystick upwards for five seconds or until the display reads "**KEYPAD UNLOCKED**."

HDMI (RX only) - Ranger supports all HDMI output modes. You can select from one of the following options:

- Auto
- RGB 8bit
- RGB 10bit
- YCbCR 4:4:4 8bit
- YCbCR 4:4:4 10bit
- YCbCR 4:2:2 10bit
- YCbCR 4:2:0 8bit
- YCbCR 4:2:0 10bit

Audio (RX only) - Configure Ranger's Audio settings. If **Beep on REC** is activated, you will hear a short tone whenever the camera begins or stops recording. The **Mute Settings** allow you to completely mute the audio or only mute audio while recording.

Bluetooth - Use the Bluetooth menu to enable or disable Bluetooth communication. **NOTE: Bluetooth is enabled by default.**

- **Enable Bluetooth** - Allows transmitter and receiver to be paired and communicate with the Launchpad App.
- **Use Bluetooth PIN** - Enables the use of a PIN for authentication when using the Launchpad App.

- **Change PIN** - Press the Menu joystick towards the right to change the Bluetooth PIN

Background Color (RX only)- The Background Color feature allows you to select a screen color displayed on the monitor when no video is received from the transmitter. This valuable tool indicates to the crew that a signal has been dropped and the TX and RX need to be synced again.

Reset All Settings - Reset all configurable options to their factory settings.

Additional Information

Device Info - Displays the model and serial number of the device

Firmware Versions - Displays the current firmware versions for all device components.

Regulatory - Displays all compliance certifications and certification markings related to radio frequencies used by the TX and RX to communicate. For complete regulatory information and declarations of conformity, please visit the **Regulatory Information** section.

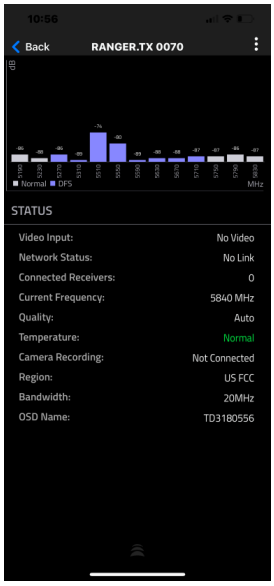
Ranger Manager

Use the Ranger App to remotely manage and monitor every parameter of Ranger, including pairing, frequency selection, and 3D LUTs.

CONNECT VIA BLUETOOTH

1. Download the Ranger App.
2. Enable Bluetooth on your iOS or Android device.
3. Navigate to the Bluetooth menu on both the transmitter and receiver, then select **Enable**.
4. Open the Ranger App from your iOS or Android device, then tap the **Status/Configuration** button.
5. Select the device(s) you want to pair or monitor.

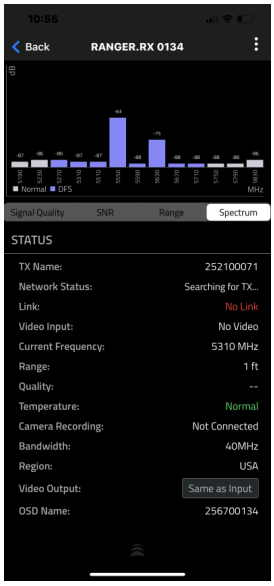
Transmitter Status Display



- **Settings** (Descriptions listed in **TX/RX Configuration Menus** section) - Tap the settings button on the top right corner of the screen to customize the transmitter's settings.
- **Status -** Displays the current status of:

  - Video Input
  - Network Status
  - Connected Receivers
  - Current Frequency
  - Quality
  - Temperature
  - Camera Recording
  - Region
  - Bandwidth
  - OSD name

Receiver Status Display



- **Settings** (Descriptions listed in **TX/RX Configuration Menus** section) - Tap the settings button on the top-right corner of the display to customize the receiver's various settings, such as the output format, audio, display, and OSD.
- **Signal Quality** - Determine the quality and reliability of the received signal.
- **SNR (Signal to Noise Ratio) -** Compare the signal power level to the noise power level from the antennas.
- **Range Analyzer -** Displays the transmission distance between the transmitter and receiver.
- **Spectrum Analyzer** - Visually indicates channel noise and saturation across the available frequency range.
- **Status** - Displays the current status of:

  - TX Name
  - Network Status
  - Link
  - Video Input
  - Current Frequency
  - Range
  - Quality
  - Temperature
  - Camera Recording
  - Bandwidth
  - Region
  - Video Output
  - OSD name

Other Resources

- **USER MANUAL: https://guide.teradek.com/m/112641**
- **FIRMWARE UPGRADE: https://teradek.com/pages/ranger**

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What's Included

- Ranger Micro Transmitter and Receiver
- Hot Shoe Adapter
- Lightstand Adapter 1/4-20in
- 2pin Conn. to PowerTap - 18in Cable
- **2x** Ultra Thin HDMI Male Type A (Full) - HDMI Male Type A (Full) 18in Cable
- **2x** SDI 12G BNC to BNC Cable Length: 18in / 46cm
- USB 2.0 Type A Male to USB Type C Male - 1m Cable
- **2x** PSU 2pin Conn. to 18W AC Adapter (Int) - 6ft Cable
- **3x** 2dBi Rigid V 4.9-7.3Ghz RP-SMAAntennas
- **3x** 2dBi Flexible H Mushroom V4.9-7.3Ghz RP-SMA Antennas
- **5x** RP-SMA Female to RP-SMA Female 4in/10cm Cable

Physical Properties

Power and Connect

1. Connect a power source to the transmitter and receiver using the included A/C adapter. If the receiver is equipped with battery plate accessories, attach a compatible battery (**Gold** or **V mount**).
2. Connect the output from your video source to either the SDI or HDMI input (**C** or **E**) on the transmitter.
3. Connect either the SDI or HDMI output (**D** or **J**) from the receiver to the video input on your monitor.
4. Turn the units on by moving the power switches on both the transmitter and receiver **(I)** to the ON position.
5. **NOTE: If mounting the receiver upright on a stand above the monitor, use a right-angle SDI adapter to relieve any strain caused by the weight of the cable, and to avoid damaging the SDI output's internal connectors.**
6. Attach two 2dBi antennas to the transmitter and five antennas to the receiver via the threaded RP-SMA connectors. **IF USING "H" (HORIZONTALLY POLARIZED) ANTENNAS:** Attach one "H" antenna to the connector in the back of the transmitter (closest to the rear connectors), and one 2dBi antenna to the opposite connector. Attach the three 2dBi antennas to the receiver's center connectors and the two "H" antennas to the left and right connectors
7. Move the power switches on both the transmitter and receiver **(I)** to the ON position. Video appears within a few seconds.

Pairing/Unpairing

Ranger devices purchased as a set (TX and RX), are paired by default, requiring no additional configuration. Ranger devices purchased separately need to be paired using the device's front panel (OLED) menu, **Launchpad**, or **Ranger Manager**. To pair your transmitter with multiple receivers, you will need to use either Launchpad or **Ranger Manager**. **NOTE: Before starting either pairing process, ensure that both the transmitter and receiver have the same firmware version and have Bluetooth enabled.**

PAIRING/UNPAIRING VIA FRONT PANEL
To Pair:

1. Using the Menu Joystick, navigate to the **Pair** menu on both the transmitter and the receiver front panel.
2. Select **Pair** to begin the pairing process. The transmitter will begin scanning for a receiver within range and automatically pair with the receiver.
3. Once paired, the front panel will indicate whether or not Pairing is successful.

To Unpair:

1. Navigate to the **Unpair** menu on either the transmitter or the receiver.
2. Select the transmitter/receiver you want to unpair. If you have multiple devices paired, you can select **Unpair All**.

PAIRING TIPS
If you're having trouble getting units to pair, we recommend keeping the transmitter and receiver six feet apart when pairing. Keep all other RF devices nearby turned off or out of range to ensure the transmitter and receiver only detect each other. To eliminate any chance of interference, perform the Wired Pairing process via Launchpad.

WIRED PAIRING VIA LAUNCHPAD
To Pair:

1. Connect both the transmitter and receiver(s) to your computer (Windows/Mac) via USB.
2. Open Launchpad, select the **Pairing** tab, then tap the **Wired Pairing** button.
3. Select the devices you want to pair, then click the **Pair Devices** button. Launchpad will indicate whether or not Pairing is successful.

To Unpair:

1. Connect both the transmitter and receiver(s) to your computer (Windows/Mac) via USB.
2. Open Launchpad, select the **Pairing** tab, then tap the **Unpair All** button.

PAIRING VIA RANGER MANAGER
To Pair:

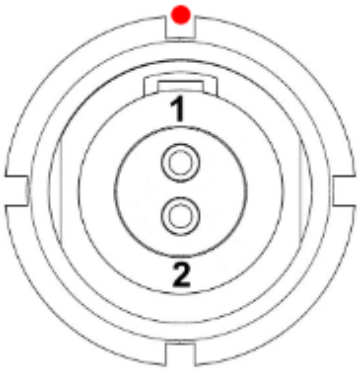
1. Open the Launchpad App from your iOS or Android device, then tap the **Pairing** button.
2. Select the transmitter you wish to pair, then tap the **Next** button.
3. Select the receiver(s) you wish to pair with the transmitter, then tap the **Pair!** button. The Launchpad App will indicate when the pairing process is complete.

To Unpair:

1. Open the Launchpad App from your iOS or Android device, then tap the settings button (3 dots) on the top right corner of the screen.
2. Enter the **Pairing** menu, select the receiver(s) you wish to unpair, then tap the **Unpair** button.

Power Cables

2-Pin Power Connector
Ranger devices use a locking 2-pin power connector similar to the 0B 302 series LEMO connector.

2-Pin Power Connector Pin Out		
Pin	**Description**	
1*	GND	
2	+DC	

* Pin 1 is closest to the red dot on the connector.

Input Voltage: 7-28V DC (TX and RX)
Max Power Consumption: 9W (TX) and 11W (RX)

Custom/3rd Party Cables

- Test the power cable polarity with **ONLY** the power cable connected to Ranger. Do not connect video cables.
- Check the power cable for shorts and proper grounding.

CAUTION:

Using a reverse polarity or improperly–constructed power cable can damage the product and is not covered under warranty. To prevent the inputs from being damaged, best practice is to plug in the power cable first, THEN connect the video cable from the camera before powering on the TX unit.

Mounting

Ranger devices have a 1/4”-20 and 3/8"-16 threaded holes on the bottom for mounting the included light stand adapter or any other mounting accessories. Additionally, Ranger devices are equipped with a dual-mount battery plate that allows you to attach your device to either the back of a camera, monitor, or Array Antenna.

- Mount the transmitter onto the back of your camera keeping the antennas clear of any obstructions.
- Orient the transmitter and receiver antennas so they are parallel to each other.
- For best results, orient the transmitter antennas so each one has a clear line-of-sight to the receiver.

CAUTION: DO NOT OVERTIGHTEN SCREWS INSERTED INTO THE THREADED HOLES. Doing so can damage the device's chassis and internal components, voiding the warranty.

TX/RX Configuration Menus

Wireless Settings

Switch TX (RX Only) - Ranger receivers can pair with up to four transmitters simultaneously. Switch TX allows you to quickly switch from one paired transmitter's camera feed to another paired transmitter. This feature is handy in multi-camera situations when you need to switch to a different camera's view mid-shoot without having to perform the pairing process every time. **NOTE: The transmitter(s) must first be paired with the receiver**.

Band - Select either the 5GHz or 6GHz wireless frequency. The 5GHz frequency provides more channels but is utilized by more devices, resulting in frequent interferences and video dropouts. The 6GHz frequency is less crowded than the 5GHz frequency, resulting in faster connections and less interference.

Enable Broadcast Mode (TX Only)- Broadcast Mode allows you to transmit to multiple receivers simultaneously (non-DFS frequencies only) while extending your Ranger's transmission range. (On supported models)

- **Broadcast Mode Disabled (**Standard Multicast Mode**)** - Transmitter and connected receiver(s) coordinate and maintain two-way communication to optimize frequency usage and video transmission.
- **Broadcast Mode Enabled** - Data uplink channel is disabled, allowing the transmitter to connect to an unlimited number of receivers, as long as they have already been paired. Attach the receiver to your Panel Antenna while in Broadcast Mode to achieve even better range performance.

Enable Fixed Frequency - Fixed Frequency Mode allows your transmitter to designate a specific non-DFS channel within the selected wireless region for use, providing a stronger connection under challenging environments. **NOTE: By default, Ranger will select the lowest available frequency from the Frequencies list if one has yet to be selected beforehand.**

Allow Licensed Channels - Enable or disable Licensed Channel selection within the **Frequencies** menu. Ranger supports an extended RF range of 4.9GHz to 6.0GHz, which includes both unlicensed and licensed channels. Selecting a specific licensed channel ensures no interference from other devices broadcasting within range. **NOTE: Fixed Frequency Mode must first be enabled to select a specific licensed channel. Otherwise, Ranger will automatically select a licensed channel (Auto Mode).**

Bandwidth - Choose between 20MHz and 40MHz bandwidth options

Frequencies - Select which frequency to use (determined by **Fixed Frequency Mode** selection).

Video Quality - The Video Quality menu lets you adjust the balance between your signal’s maximum range and quality according to the number of antennas that transmit fine information. Ranger has several picture quality levels that vary based on the lowest quality link or the furthest receiver.

- **Auto Mode** - (*Default*) Transmitter automatically determines how many fine antennas are needed based on the range and signal quality.
- **Longer Distance Mode** - (*One fine antenna*) Maintains the maximum range in situations where other sources of interference might be present but will slightly reduce your video signal's maximum quality.
- **Better Quality Mode** - (*Two fine antennas*) Maintains higher signal quality but reduces the maximum range.
- **Best Quality Mode** - (*Three fine antennas*) Ideal for complex, high-contrast scenes that require the highest possible quality.
- **Low Power Mode** - (*One fine antenna with shorter range*) Reduces the transmitter's total power consumption by about 1.5W and may reduce any unwanted interference in multi-system environments.

Video Settings

HDMI/SDI Output Format (RX only) - Select the video output format. You can match the video source's resolution (**Same As Input**) or choose from the resolutions listed. If using the receiver with a recorder or monitor sensitive to video signal changes, select **Continuous Output** to ensure the signal stays constant even if the link is interrupted. Note that this adds a small delay to the video output.

Video OSD Settings (RX Only) - Choose when to display the OSD.

- **Never show** - Disable OSD.
- **Show when operating** - Hide OSD until it is activated by the joystick.
- **Show when no video** - Display the OSD when there is no video feed; hide the OSD when video appears (default).
- **Always show** - Always display OSD unless temporarily deactivated by the joystick.

Display Settings - Use the Display Settings to control the OLED display operation. By default, the OLED display will invert every 30 minutes.

Tools

SDI Eye Pattern (TX only) - The SDI Eye Pattern provides a graphical display of the SDI signal coming from the camera to the transmitter and is useful in determining the amount of interference present. The size of the "eye" displayed on the front panel indicates the quality of the SDI signal. The bigger the size of the eye pattern is, the better the SDI signal.

Signal Quality Graph (RX Only) - The Signal Quality Graph indicates the quality and reliability of the signal being received according to the amount of interference that is present between the RX and TX. Signal Quality is represented in percentages:

- Figures below 30% indicate **poor** signal quality
- Figures between 30% and 45% indicate **fair** signal quality
- Figures above 45% indicate **good** signal quality

Spectrum Analyzer (RX Only) - The built-in Spectrum Analyzer provides a visual indication of channel noise and saturation across the entire available frequency range. Move the Menu joystick left and right to select a frequency. Frequencies are represented by bars; the higher the bar, the more congested that frequency is.

Test Pattern (RX Only) - This menu allows you to select a video resolution format to output a test pattern over HDMI or SDI. Select a specific output resolution from the resolutions list.

Advanced/System Settings

Lock Keypad - The Lock Keypad feature prevents the menu joystick from being used to avoid any accidental or unauthorized configurations. There are two ways to lock the keypad:

- Navigate to **Advanced Settings** via the front panel and select **Lock Keypad**.
- Press and hold the menu joystick upward for 5 seconds.

To unlock, press and hold the menu joystick upwards for five seconds or until the display reads "**KEYPAD UNLOCKED**."

HDMI (RX only) - Ranger supports all HDMI output modes. You can select from one of the following options:

- Auto
- RGB 8bit
- RGB 10bit
- YCbCR 4:4:4 8bit
- YCbCR 4:4:4 10bit
- YCbCR 4:2:2 10bit
- YCbCR 4:2:0 8bit
- YCbCR 4:2:0 10bit

Audio (RX only) - Configure Ranger's Audio settings. If **Beep on REC** is activated, you will hear a short tone whenever the camera begins or stops recording. The **Mute Settings** allow you to completely mute the audio or only mute audio while recording.

Bluetooth - Use the Bluetooth menu to enable or disable Bluetooth communication. **NOTE: Bluetooth is enabled by default.**

- **Enable Bluetooth** - Allows transmitter and receiver to be paired and communicate with the Launchpad App.
- **Use Bluetooth PIN** - Enables the use of a PIN for authentication when using the Launchpad App.

- **Change PIN** - Press the Menu joystick towards the right to change the Bluetooth PIN

Background Color (RX only)- The Background Color feature allows you to select a screen color displayed on the monitor when no video is received from the transmitter. This valuable tool indicates to the crew that a signal has been dropped and the TX and RX need to be synced again.

Reset All Settings - Reset all configurable options to their factory settings.

Additional Information

Device Info - Displays the model and serial number of the device

Firmware Versions - Displays the current firmware versions for all device components.

Regulatory - Displays all compliance certifications and certification markings related to radio frequencies used by the TX and RX to communicate. For complete regulatory information and declarations of conformity, please visit the **Regulatory Information** section.

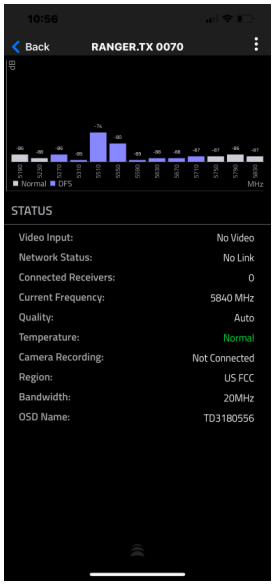
Ranger Manager

Use Ranger Manager to remotely manage and monitor every parameter of Ranger, including pairing, frequency selection, and 3D LUTs.

CONNECT VIA BLUETOOTH

1. Download Ranger Manager.
2. Enable Bluetooth on your iOS or Android device.
3. Navigate to the Bluetooth menu on both the transmitter and receiver, then select **Enable**.
4. Open Ranger Manager from your iOS or Android device, then tap the **Status/Configuration** button.
5. Select the device(s) you want to pair or monitor.

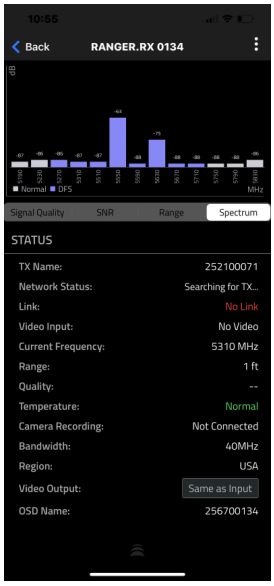
Transmitter Status Display



- **Settings** (Descriptions listed in **TX/RX Configuration Menus** section) - Tap the settings button on the top right corner of the screen to customize the transmitter's settings.
- **Status -** Displays the current status of:

  - Video Input
  - Network Status
  - Connected Receivers
  - Current Frequency
  - Quality
  - Temperature
  - Camera Recording
  - Region
  - Bandwidth
  - OSD name

Receiver Status Display



- **Settings** (Descriptions listed in **TX/RX Configuration Menus** section) - Tap the settings button on the top-right corner of the display to customize the receiver's various settings, such as the output format, audio, display, and OSD.
- **Signal Quality** - Determine the quality and reliability of the received signal.
- **SNR (Signal to Noise Ratio) -** Compare the signal power level to the noise power level from the antennas.
- **Range Analyzer -** Displays the transmission distance between the transmitter and receiver.
- **Spectrum Analyzer** - Visually indicates channel noise and saturation across the available frequency range.
- **Status** - Displays the current status of:

  - TX Name
  - Network Status
  - Link
  - Video Input
  - Current Frequency
  - Range
  - Quality
  - Temperature
  - Camera Recording
  - Bandwidth
  - Region
  - Video Output
  - OSD name

Other Resources

- **USER MANUAL: https://guide.teradek.com/m/112641**
- **FIRMWARE UPGRADE: https://teradek.com/pages/ranger**

Device Operation

- Keep the transmitter and receiver at close range for 60 seconds after powering on the devices. This allows them to scan for and select the best wireless frequency.
- For best results when using multiple Ranger systems in the same area, place the transmitters and receivers a few feet apart from each other.
- Operation of other wireless equipment may interfere with the Ranger. Try to separate other wireless transmitters and receivers as much as possible.

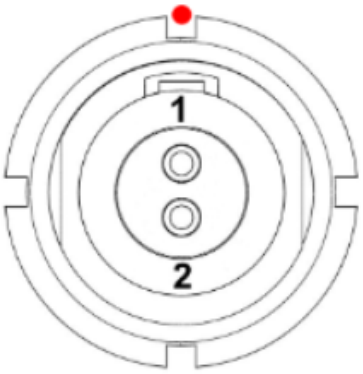
Power and Connect

1. Attach the Ranger transmitter to your camera. If your Ranger (Mk II) TX is equipped with battery plates, attach the unit to the back of your camera.
2. Connect power to the Ranger transmitter and receiver with the included A/C adapter, or if both devices are equipped with battery plate accessories, attach a compatible battery (**Gold or V mount**).
3. Connect the output from your video source to either the SDI or HDMI input **(C or E)** on the Ranger transmitter. Connect either the SDI or HDMI output **(D or J)** from the Ranger receiver to the video input on your monitor. **NOTE: If mounting the receiver upright on a stand above the monitor, use a right-angle SDI adapter to relieve any strain caused by the weight of the cable, and to avoid damaging the SDI output's internal connectors.**
4. **Ranger Mk II Transmitter:** Attach the **H** and **V** barrel antennas to the type-N connectors on the transmitter. The **V** antenna attaches to the V-connector, and the **H** antenna attaches to the H-connector.
   Ranger Micro Transmitter: Attach two 2dBi antennas to the connectors on the transmitter. If using an H+V antenna configuration, attach the H and V antennas to the connectors on the transmitter. The V antenna attaches to the V-connector, and the H antenna attaches to the H-connector.
   Ranger Mk II Receiver: Attach the three 2dBi antennas to the receiver's center connectors and the two horizontal antennas to the left and right connectors.
   Ranger Micro Receiver: Attach five 2dBi antennas to the connectors on the transmitter. If using an H+V antenna configuration, attach the three 2dBi antennas to the receiver's center connectors and the two horizontal antennas to the left and right connectors.
   If using a Panel Antenna with the receiver: Connect the receiver's three center connectors to the Array Antenna connections labeled "V," then connect the left and right connectors to the "H" connections using the RP-SMA connectors (see **MOUNTING**). **NOTE: Ensure that the 2dBi omnidirectional antenna (A) is attached at all times to the Panel Antenna when in use.**
5. Move the power switches on both the transmitter and receiver (**I**) to the **ON** position. Video appears within a few seconds.

Power Cables

2-Pin Power Connector

Ranger devices use a locking 2-pin power connector similar to the 0B 302 series LEMO connector.

2-Pin Power Connector Pin Out		
Pin	**Description**	
1*	GND	
2	+DC	

* Pin 1 is closest to the red dot on the connector.

Input Voltage: 7-28V DC
Max Power Consumption: 12W (TX) and 18W (RX)

Custom/3rd Party Cables

- Test the power cable polarity with **ONLY** the power cable connected to Ranger. Do not connect video cables.
- Check the power cable for shorts and proper grounding.

12G-SDI Input/Output Cables (Ranger Mk II only)
Ranger Mk II units require the use of 12G-SDI cables to reliably transport 12G video signals and are included as a standard item. Ensure that your cables are rated for compatibility with your camera's output.

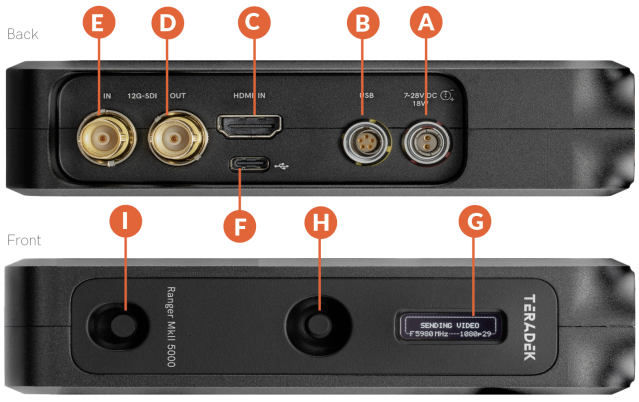
CAUTION:
Using a reverse polarity or improperly-constructed power cable can damage the product and is not covered under warranty. To prevent the inputs from being damaged, best practice is to

plug in the power cable first, THEN connect the video cable from the camera before powering on the TX unit.

Ranger Mk II

Ranger Mk II RX

Ranger Mk II TX



A: 7-28V DC power input

B: USB port

C: HDMI input

E: SDI input

F: USB-C port

G: OLED display

H: Menu joystick

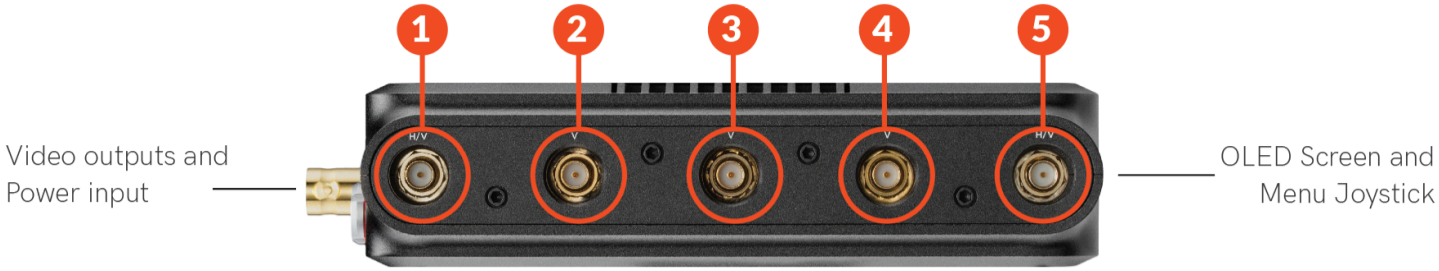
I: Power switch

J: HDMI output

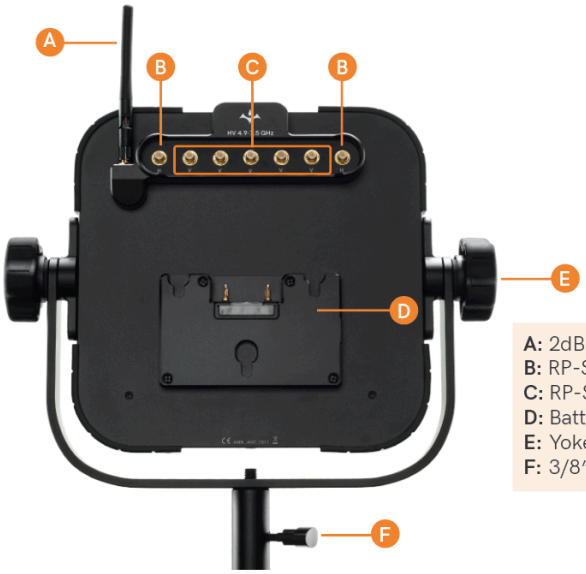
D: SDI output

Receiver Antennas

This image illustrates the order of the receiver's antennas. The numbers below correspond to the antenna numbers in the **Ranger App's** per-antenna SNR (Signal-to-noise ratio) graph, which can be used to troubleshoot signal quality issues. **Antenna 1** is closest to the video outputs, while **Antenna 5** is closest to the OLED screen.



Panel Antenna v.4



A: 2dBi Omnidirectional antenna
B: RP-SMA connectors (horizontal)
C: RP-SMA connectors (vertical)
D: Battery plate
E: Yoke assembly
F: 3/8″ Light stand adapter

OMNIDIRECTIONAL ANTENNA

The included omni-directional antenna **(A)** can receive a signal from your transmitter even when it's placed behind the Panel Antenna, and supports a wider spectrum (4.9-7.3 GHz).

ANTENNA CONFIGURATION

The Panel Antenna has both vertical **(C)** and horizontal **(B)** antenna connectors. The transmitter's antenna configuration will determine which Panel RP-SMA connectors you use with the receiver. For more information, go to **Vertical and Horizontal Antennas**.

Ranger Micro

Ranger Mk II RX

Ranger Mk II TX

A: 7-28V DC power input

B: 5-pin USB port

C: HDMI input

D: SDI output

E: SDI input

F: USB-C port

G: OLED display

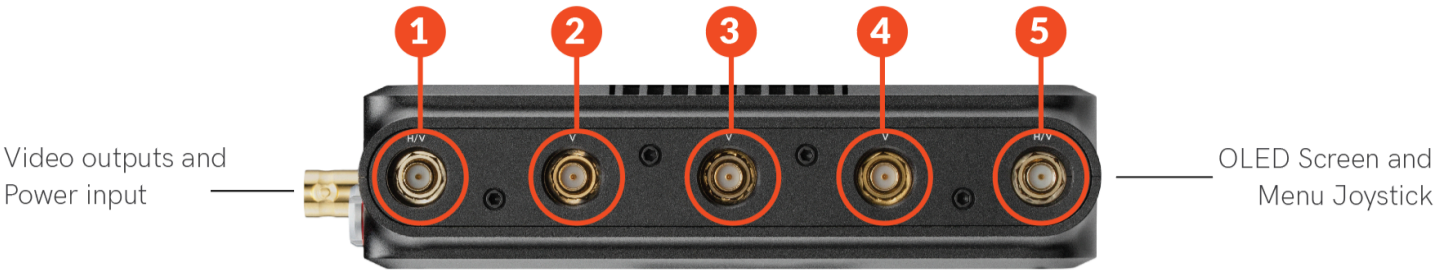
H: Menu joystick

I: Power switch

J: HDMI output

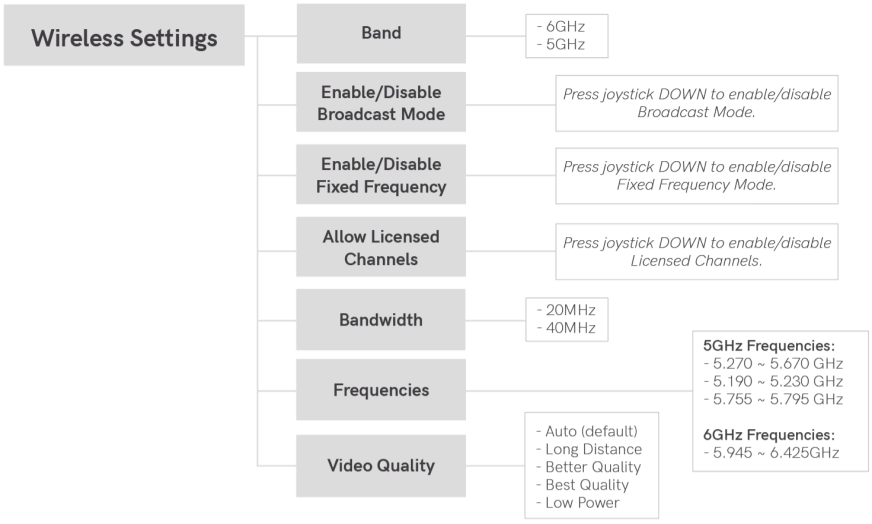
Receiver Antennas

This image illustrates the order of the receiver's antennas. The numbers below correspond to the antenna numbers in the **Ranger App's** per-antenna SNR (Signal-to-noise ratio) graph, which can be used to troubleshoot signal quality issues. **Antenna 1** is closest to the video outputs, while **Antenna 5** is closest to the OLED screen.



Wireless Configuration

Ranger contains several wireless configuration options that allow the system to work at its best in different environments. The system is designed to work adequately using its automatic default settings, but they may not be ideal for all situations. This section details all available wireless configuration options for the transmitter and receiver.



Wireless Settings

Band
The Band menu lets you select either **5GHz** or **6GHz,** frequency bands. The 5GHz frequency allows for higher total output power and backward compatibility with Ranger devices but is more likely to experience interference from other wireless devices (Wifi routers, cell phones, IoT devices, and other wireless video systems), resulting in frequent interference and video dropouts.

The 6GHz (U-NII-5) band is virtually vacant compared to the 5GHz band, and although the allowed output power is lower, it should offer better connection stability with fewer interruptions. 6GHz frequency is currently available in the US and Canada, with more countries opening the 6GHz frequency in 2023. For all available frequencies, refer to the **FREQUENCIES BY REGION** chart.

Enable Broadcast Mode (TX only)
Enabling Broadcast Mode improves the system's maximum transmission range by allowing Ranger systems to operate without any back-channel communication between the receiver and transmitter and reduces any interference.

- **Broadcast Mode Disabled (**Standard Multicast Mode**)** - Transmitter and connected receiver(s) coordinate and maintain two-way communication with each other to optimize frequency usage and video transmission.
- **Broadcast Mode Enabled** - This allows the transmitter to connect to an unlimited number of receivers, as long as they have already been paired. To achieve even better range performance, attach the receiver to your Panel Antenna while in Broadcast Mode.

Enable Fixed Frequency
Fixed Frequency Mode bypasses any automatic frequency switching logic, allowing your Ranger system to always attempt to connect on a specified frequency. Once a frequency is selected, the transmitter will only use that frequency. This allows the transmitter to link/reconnect to the receiver much faster. After enabling Fixed Frequency mode, navigate to **Frequencies** and select a frequency within the selected wireless region (non-DFS frequencies only). For best results, ensure that both the transmitter and receiver have **Fixed Frequency Mode** enabled, and use the **Spectrum Analyzer** (on the receiver's front panel or the Launchpad app) to search for the least congested frequency to use.

- **Fixed Frequency Mode Disabled** - Ranger scans all available frequencies and repeatedly switches from one frequency to the next during transmission.
- **Fixed Frequency Mode Enabled** - Ranger connects to one specific frequency.

NOTE: By default, Ranger will select the lowest available frequency from the Frequencies list if one has not been selected beforehand.

Allow Licensed Channels
Enable or disable Licensed Channel selection within the Frequencies menu. Ranger supports an extended RF range of 4.9GHz to 6.0GHz, which includes both unlicensed and licensed channels. Selecting a specific licensed channel ensures there is no interference from other devices broadcasting within range. This is especially useful during large events such as sports or news broadcasts where multiple cameras are operating simultaneously. For all available frequencies, refer to the **FREQUENCIES BY REGION** chart.

NOTE: Fixed Frequency Mode must first be enabled to select a specific licensed channel. Otherwise, Ranger will automatically select a licensed channel (Auto Mode).

Select Bandwidth
The Bandwidth menu lets you choose between 40MHz (default) and 20MHz operating modes. Ensure that both the transmitter and receiver are set to the same bandwidth with a resolution of up to 1080p60. For all available frequencies, refer to the **FREQUENCIES BY REGION** chart.

- **20MHz** - Reduces the amount of bandwidth by half, effectively doubling the number of usable frequencies while decreasing interference.
- **40MHz** - (*Default*) Increases the amount of bandwidth by bonding two 20MHz frequencies, allowing for faster transfer rates but increased interference.

NOTE: 20MHz mode supports HD/3G resolutions up to 1080p60. Resolutions up to 4k30 are also supported but downscaled to 1080p before transmission (4k50/59/60 is not supported).

Select Frequency
The Frequencies menu contains a list of all available frequencies. Ranger will automatically select an operating frequency when multiple values are selected. If both the transmitter and receiver have **Fixed Frequency Mode** enabled, you can only select one frequency for Ranger to use. Frequencies marked with (DFS) must be scanned for one minute before they can be used, but are typically less crowded. For all available frequencies, refer to the **FREQUENCIES BY REGION** chart.

Video Quality (TX only)
The Video Quality menu lets you adjust the balance between your signal's maximum range and quality according to the number of antennas used to transmit fine information. Ranger has three picture quality levels that vary based on the lowest quality link or the furthest receiver.

- **Auto Mode** - (*Default*) Transmitter automatically determines how many fine antennas are needed based on the range and signal quality.
- **Longer Distance Mode** - Maintains the maximum range in situations where other sources of interference might be present, but will slightly reduce your video signal's maximum quality.

- **Better Quality Mode** - Maintains higher signal quality but reduces the maximum range.

Wireless Configuration Recommendations

Ranger devices can be used in many different situations that require you to configure the wireless settings to provide the optimal video transmission quality possible. The following table (**TX Video Quality Descriptions**) describes the Video Quality modes available on the TX. The table below (**Recommended Wireless Configurations**) illustrates some of the most common scenarios encountered while using Ranger devices and recommended wireless settings that will provide you with the best video quality in those situations.

TX Video Quality Descriptions

VIDEO QUALITY MODES	DESCRIPTION
Auto Mode (Default)	In Auto Mode, the system will jump between the configurations listed below based on the range and signal quality - if you know your conditions won't change, you can set them manually.
Longer Distance Mode	Longer Distance Mode is best for outside use, especially in situations where other sources of interference might be present, but will slightly reduce your video signal’s maximum quality.
Better Quality Mode	This mode is best for inside use, especially when there are other WiFi networks in the vicinity. Better Quality Mode maintains higher signal quality but reduces the maximum range.
Best Quality Mode	Best Quality Mode is ideal for complex, high-contrast scenes that require the highest possible quality. This mode is also best for inside use, especially when there are other WiFi networks in the vicinity.
Low Power Mode	Low Power Mode provides the best connection possible at extremely short distances by reducing the transmitter's total power consumption and any unwanted interference in multi-system environments.

Recommended Wireless Configurations

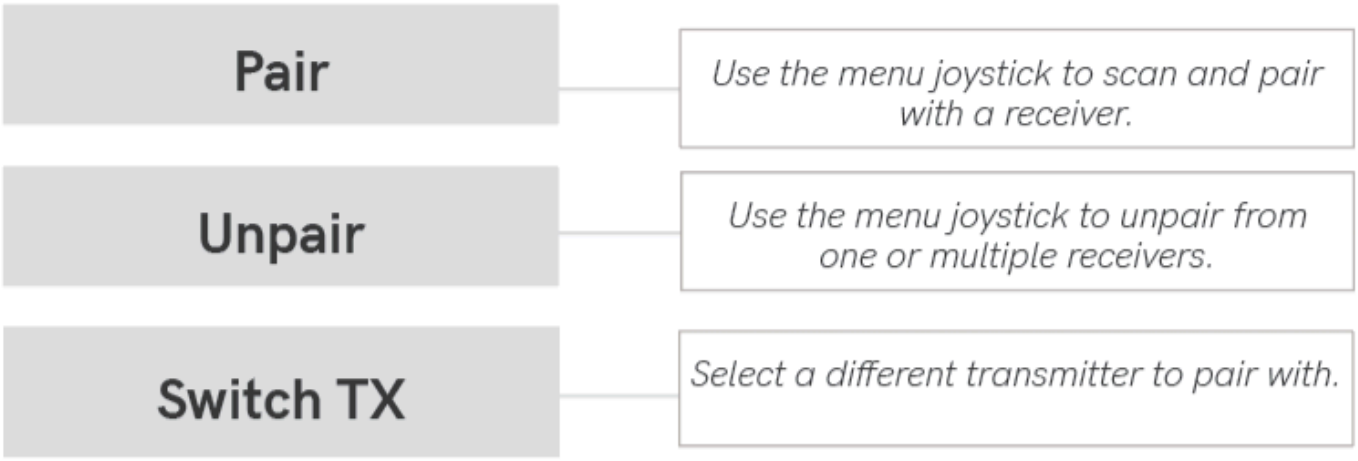
	WIRELESS SETTINGS				
USER SCENARIOS	Band	Broadcast Mode	Fixed Frequency	Bandwidth	Video Quality (TX)
Auto (Default)	5GHz	Disabled	Disabled	40MHz	Auto Mode

	WIRELESS SETTINGS				
USER SCENARIOS	**Band**	**Broadcast Mode**	**Fixed Frequency**	**Bandwidth**	**Video Quality (TX)**
Longest Range (No interference)	5GHz	Enabled w/ Panel Antenna	Optional	40MHz	Longer Distance Mode
Long Range (Busy RF)	6GHz	Enabled	Optional	40MHz	Longer Distance Mode
Short Range	6GHz	Optional	Enabled	40MHz	Auto or Best Quality Mode
Best Video Quality (4K)	6GHz	Disabled	Optional	40MHz	Auto or Best Quality Mode
Best Video Quality (HD)	6GHz	Disabled	Optional	40MHz	Auto or Best/Better Quality Mode
Multi-System* (Close Range)	6GHz	Disabled	Enabled	20MHz	Better Quality Mode
Multi-System* (Mid Range)	6GHz	Disabled	Enabled	20MHz	Longer Distance Mode
Multi-System* (Short Range)	6GHz	Optional	Optional	40MHz	Low Power Mode

* **Multi-System** scenarios refer to situations where multiple TX and RX paired systems are in use in the same vicinity as the system you are trying to configure.

Pairing and Unpairing

Ranger devices purchased as a set (TX and RX) are paired by default, requiring no additional configuration. Ranger devices purchased separately need to be paired using the device's front panel (OLED) menu, **Launchpad**, or the **Ranger App**. You will need to use either **Launchpad** or the **Ranger App** to pair your transmitter with multiple receivers.
NOTE: Before starting either pairing process, ensure that both the transmitter and receiver have the same firmware version and have Bluetooth enabled.



Pairing/Unpairing via the Front Panel

TO PAIR:

1. Using the Menu Joystick, navigate to the **Pair** menu on both the transmitter and the receiver.
2. Select Pair to begin the pairing process. The transmitter will begin scanning for a receiver within range and automatically pair to the receiver.
3. Once paired, the front panel will indicate whether or not Pairing is successful.

TO UNPAIR:

1. Navigate to the **Unpair** menu on either the transmitter and the receiver.
2. Select the transmitter/receiver you want to unpair. If you have multiple devices paired, you can select **Unpair All**.

PAIRING TIPS

If you're having trouble getting units to pair, we recommend keeping the transmitter and receiver six feet apart when pairing (if antennas are connected). Without antennas, they can be closer. Keep all other RF devices nearby turned off or out of range to ensure the transmitter and receiver are only detecting each other. To eliminate any chance of interference, perform the **Wired Pairing** process via Launchpad.

Pairing/Unpairing via the Ranger App

TO PAIR:

1. Open the Ranger App from your iOS or Android device, then tap the **Pairing** button.
2. Select the transmitter you wish to pair, then tap the **Next** button.
3. Select the receiver(s) you wish to pair with the transmitter, then tap the **Pair!** button. The Ranger App will indicate when the pairing process is complete.

TO UNPAIR:

1. Open the Ranger App from your iOS or Android device, then tap the settings button (3 dots) on the top right corner of the screen.
2. Enter the **Pairing** menu, select the receiver(s) you wish to unpair, then tap the **Unpair** button.

Wired Pairing via Launchpad

TO PAIR:

1. Connect both the transmitter and receiver(s) to your computer (Windows/Mac) via USB.
2. Open Launchpad, click the **Pairing** tab, then tap the **Wired Pairing** button.
3. Select the devices you want to pair, then click the **Pair Devices** button. Launchpad will indicate whether or not pairing is successful.

TO UNPAIR:

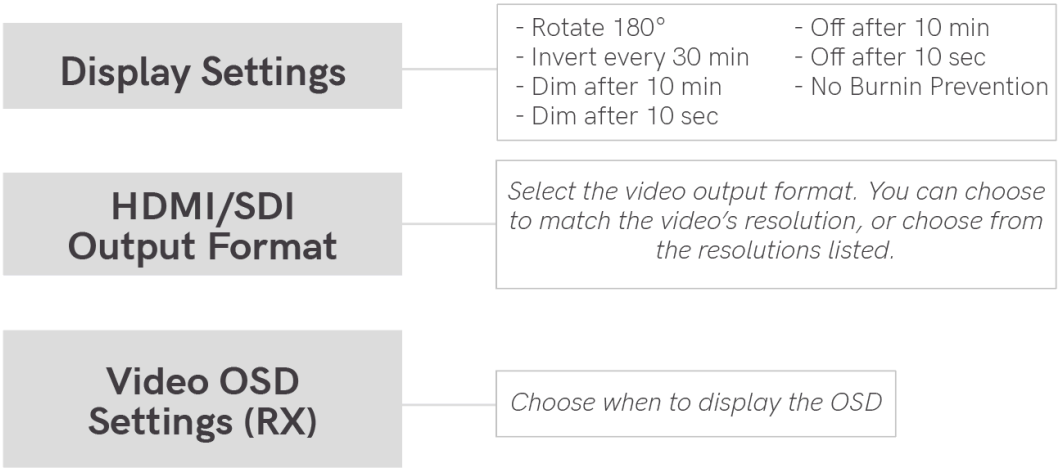
1. Connect both the transmitter and receiver(s) to your computer (Windows/Mac) via USB.
2. Open Launchpad, select the **Pairing** tab, then tap the **Unpair All** button.

Switch TX (RX only)

Ranger receivers can pair up to four transmitters simultaneously. **Switch TX** allows you to quickly switch from one paired transmitter's camera feed to another paired transmitter. This feature is especially useful

in multi-camera situations when you need to switch to a different camera's view mid-shoot, without having to perform the pairing process every time. The Switch TX feature can be found in the main menu. **NOTE: The transmitter(s) need to first be paired with the receiver**.

Video Settings Configuration



Display Settings

Use the Display Settings to control the OLED display operation. By default, the OLED display will invert every 30 minutes. You can set the display to invert every 30 minutes (lengthens the display life), or it can dim or turn off after either 10 minutes or 10 seconds.

- **Rotate 180°**
- **Invert every 30 min**
- **Dim every 10 min**
- **Dim after 10 sec**
- **Dim after 10 min**
- **Off after 10 sec**
- **No Burnin Prevention**

HDMI/SDI Output (Ranger Mk II RX only)

You can choose to match the video source's resolution (**Same As Input**) or choose from the resolutions list. If using the receiver with a recorder or monitor that is sensitive to video signal changes, select **Continuous Output** to ensure the signal stays constant even if the link is interrupted. Keep in mind that selecting Continuous Output adds a small delay to the video output. Selecting **SD**, **HD**, or **6G-UHD** matches the video source's frame rate while adjusting the resolution. This is useful for when you need to down-convert a 4K video to display on an HD monitor.

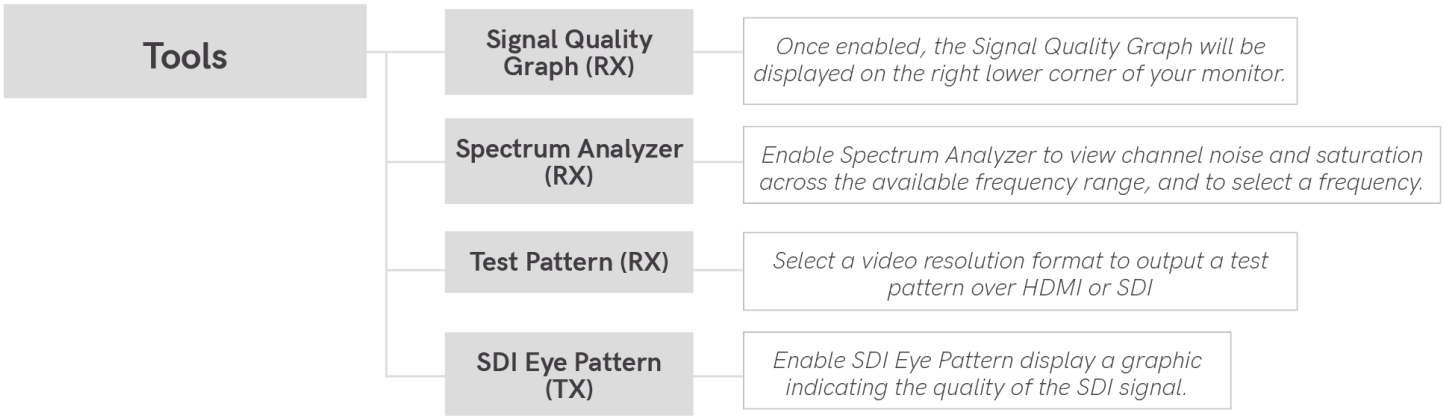
- **Continuous Output -** Video signal output stays constant when using a monitor or recorder that is sensitive to video signal changes.
- **Same as Input** - Matches the transmitter's video source resolution.
- **SD** - Matches the TX frame rate and outputs SD resolution.
- **HD** - Matches the TX frame rate and outputs 1920x1080p.
- **6G-UHD** - Matches the TX frame rate and outputs 3840x2160.
- **Resolutions List**- Select a specific output resolution:
  - 4K (DCI) - 23.98/24/25/29.97/30/50/59.94/60
  - 4K (UHD) - 23.98/24/25/29.97/30/50/59.94/60
  - 1080p - 23.98/24/25/29.97/30/50/59.94/60
  - 1080psf - 23.98/24/25/29.97/30
  - 1080i - 50/59.94/60
  - 720p - 50/59.94/60
  - 480p - 59.94/576p - 50 (via HDMI ports only)
  - 480i (NTSC)
  - 576i (PAL)

Video OSD Settings (RX)

Choose when to display the OSD.

- **Never show** - Disable OSD.
- **Show when operating** - Hide OSD until it is activated by the joystick.
- **Show when no video** - Display OSD when there is no video feed; hide OSD when video appears (default).
- **Always show** - Always display OSD unless temporarily deactivated by the joystick.

Tools



SDI EYE PATTERN (RANGER MKII TX ONLY)

The SDI Eye Pattern provides a graphical display of the SDI signal coming from the camera to the transmitter, and is useful in determining the amount of interference present, or if the SDI cable is damaged. The size of the "eye" displayed on the front panel indicates the quality of the SDI signal. The bigger the size of the eye pattern is, the better the SDI signal.

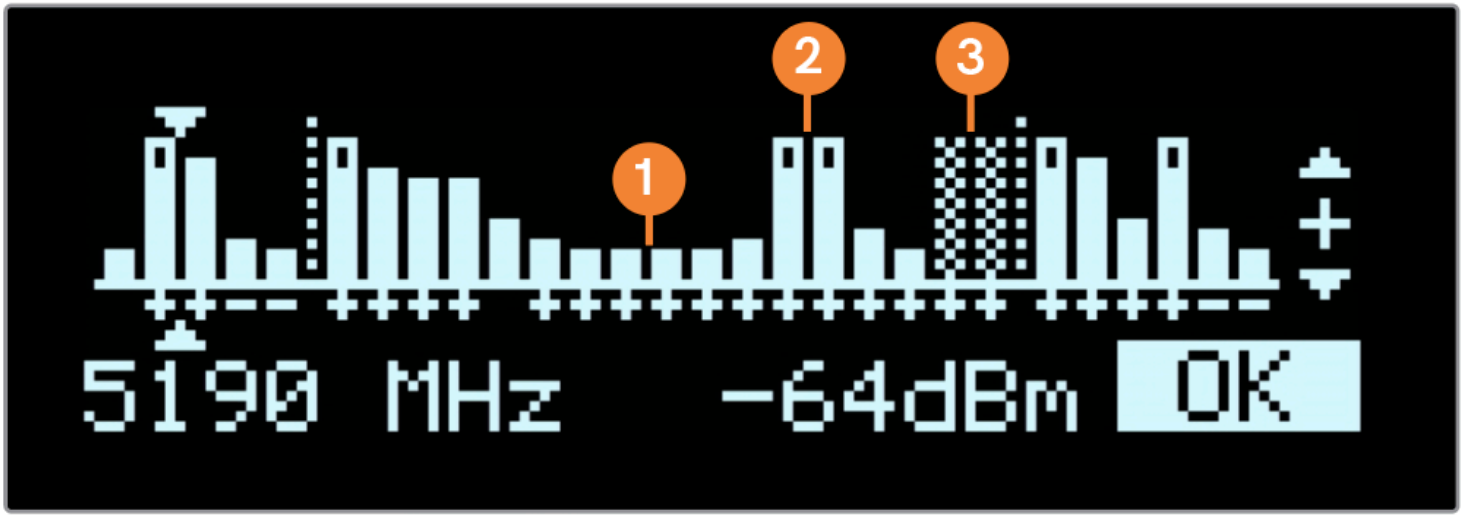
SIGNAL QUALITY GRAPH (RX)

The Signal Quality Graph indicates the quality and reliability of the signal being received according to the amount of interference that is present between the RX and TX. When enabled, the graph will be displayed on the right lower corner of your monitor. Signal Quality is represented in percentages:

- Figures below 30% indicate **poor** signal quality
- Figures between 30% and 45% indicate **fair** signal quality
- Figures above 45% indicate **good** signal quality

SPECTRUM ANALYZER (RX)

The built-in Spectrum Analyzer provides a visual indication of channel noise and saturation across the entire available frequency range. Move the Menu joystick left and right to select a frequency.



Frequencies are represented by bars; the higher the bar, the more congested that frequency is. Bars without a dot **(1)** indicate the frequency is not as saturated and can be used. Bars with a dot **(2)** indicate the frequency is too saturated to connect to. Faded bars **(3)** represent a frequency that is unavailable for use due to restrictions in particular regions.

TEST PATTERN

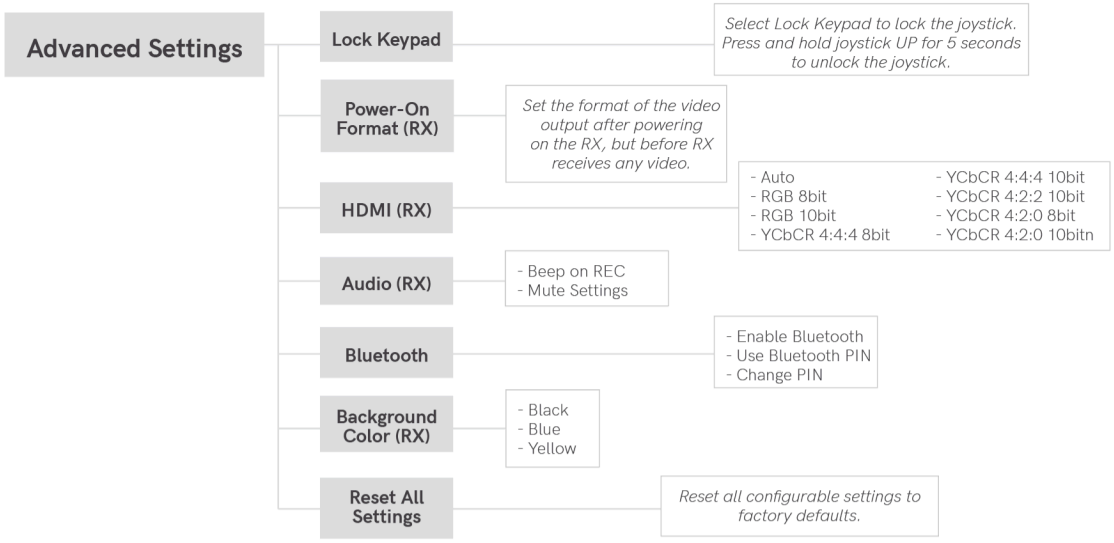
The Test Pattern menu allows you to select a video resolution format to output a test pattern over HDMI or SDI.

- **Resolutions List**- Select a specific output resolution:
  - **4K** - 23.98/24/25/29.97/30/50/59.94/60
  - **1080p** - 23.98/24/25/29.97/30/50/59.94/60
  - **1080psf** - 23.98/24/25/29.97/30
  - **1080i** - 50/59.94/60
  - **720p** - 50/59.94/60
  - **480p** - 59.94/576p - 50 (via HDMI ports only)
  - **480i** (NTSC)
  - **576i** (PAL)

ANTENNA TEST (RX only)

The Antenna Test option allows you to evaluate the performance and ability of the Ranger's antennas to receive and transmit signals efficiently. Before beginning the Antenna Test, ensure that there is a good link between the RX and TX and that all the antennas are attached correctly.

Advanced Settings



LOCK KEYPAD
Enabling the Lock Keypad feature prevents the menu joystick from being used to avoid any accidental or unauthorized configurations. There are two ways to lock the keypad:

- Navigate to **Advanced Settings** via the front panel and select **Lock Keypad**.
- Press and hold the menu joystick upward for 5 seconds.

To unlock, press and hold the menu joystick upwards for five seconds or until the display reads "**KEYPAD UNLOCKED**."

POWER-ON FORMAT (RX only)
Power-On Format sets the video output format after power-up and before RX receives any video. This allows your RX to maintain the same resolution that was applied before the unit is turned off.

ANAMORPHIC DESQUEEZE (Ranger Mk II RX only)
Anamorphic video is a technique where footage is squeezed horizontally during the recording process. Anamorphic Desqueeze restores footage to its native aspect ratio. Choose the amount to de-squeeze your input by.

- **1×**
- **1.33×** (this will stretch a 4×3 video back to 16×9)
- **1.5×**
- **1.66x**
- **1.79x**
- **2×**
- **Custom**

HDMI (RX only)
Ranger supports all HDMI output modes. You can select from one of the following options:

- **Auto**
- **RGB 8bit**
- **RGB 10bit**
- **YCbCr 4:4:4 8bit**
- **YCbCr 4:4:4 10bit**
- **YCbCr 4:2:2 10bit**
- **YCbCr 4:2:0 8bit**
- **YCbCr 4:2:0 10bit**

AUDIO (RX only)
Configure Ranger's Audio settings. If **Beep on REC** is activated, you will hear a short tone whenever the camera begins or stops recording. The **Mute Settings** allow you to completely mute the audio or only mute audio while recording.

- **Beep on REC** - Short tone when the camera begins or stops recording
- **Mute Settings**- Select an option:
  - Off
  - Mute while recording
  - On

BLUETOOTH
Use the Bluetooth menu to enable or disable Bluetooth communication.

- **Enable Bluetooth** - Allows transmitter and receiver to be paired and communicate with the Launchpad App.
- **Use Bluetooth PIN** - Enables the use of a PIN for authentication when using the Launchpad App.
- **Change PIN** - Press the Menu joystick towards the right to change the Bluetooth PIN

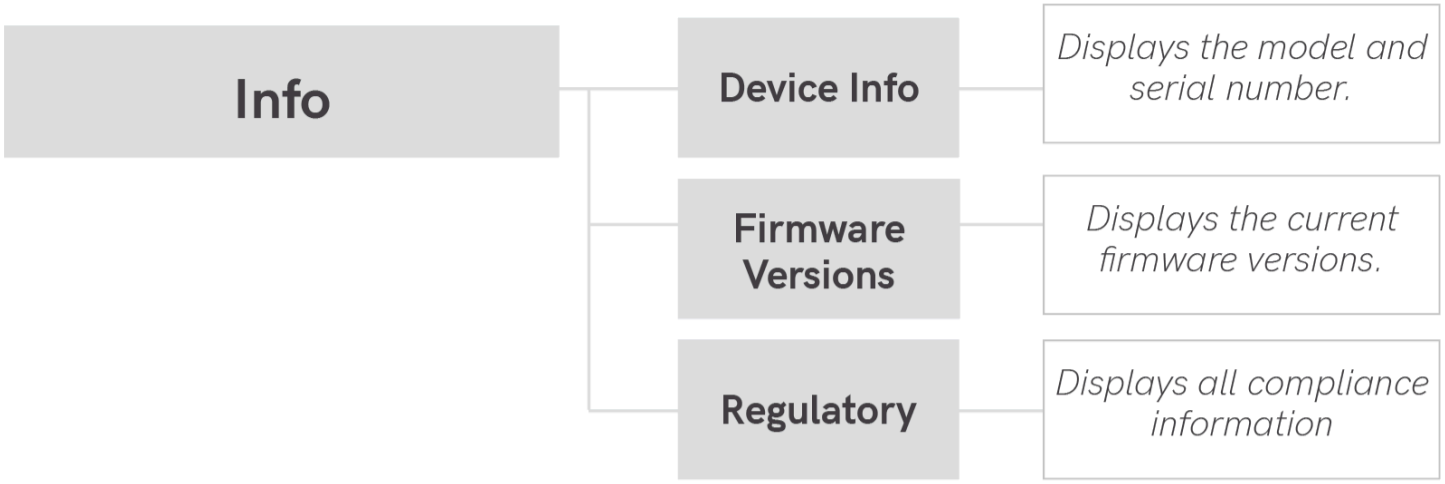
NOTE: Bluetooth is disabled by default. To configure your Ranger devices via the Launchpad App, you must first enable Bluetooth.

BACKGROUND COLOR (RX only)
The Background Color feature allows you to select a screen color to be displayed on the monitor when no video is received from the transmitter. This useful tool indicates to the crew that a signal has been dropped and the TX and RX need to be synced again.

RESET ALL SETTINGS

Reset all configurable options to their factory settings.

Info



DEVICE INFO
Reset all configurable options to their factory defaults.

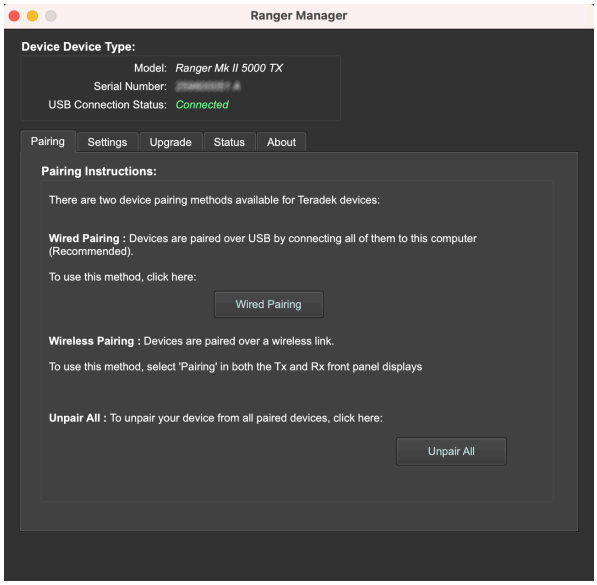
FIRMWARE VERSIONS
Displays the current firmware versions for all device components.

REGULATORY
Displays all compliance certifications relating to radio frequencies used by the TX and RX to communicate.
For complete regulatory information and declarations of conformity, please visit the **Regulatory Information** section.

Ranger Manager

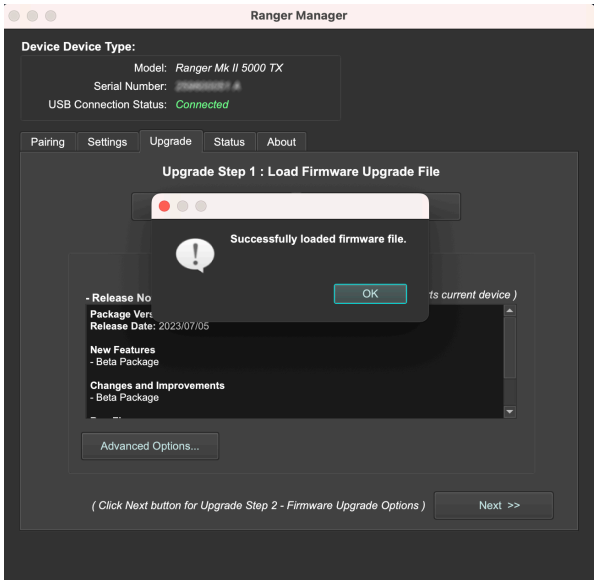
With Ranger Manager, you can configure all of your Ranger devices at once. Available as software for Windows and Mac, Ranger Manager allows you to pair multiple receivers to your transmitter, select frequencies, and perform firmware upgrades.

Configuration Options



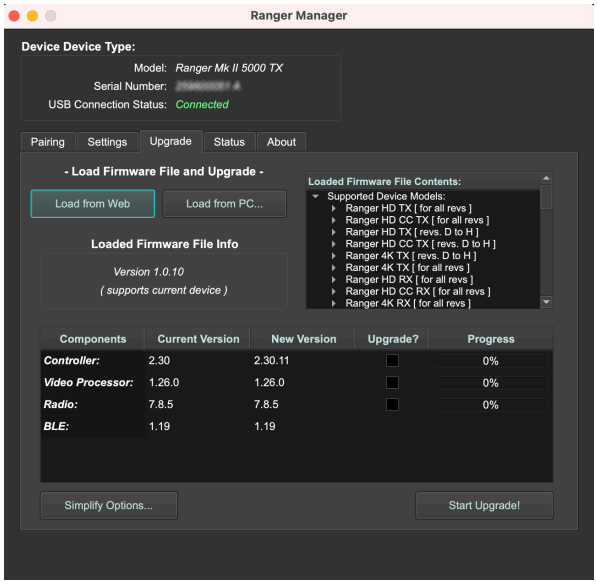
- **Pairing** - Pair or unpair your devices.
- **Settings -** Modify the RX/TX name.
- **Upgrade -** Update your devices with the latest firmware.
- **Status -** Displays detailed information about configuration and update statuses.
- **About -** Displays the software version and License Agreement.

Upgrade



Teradek releases firmware updates periodically that add new features, improve performance, and fix vulnerabilities. To update Ranger, you'll need to load a firmware package into Ranger Manager.

- **Load from Web -** If you have an Internet connection, click **Load from Web** to download the latest firmware package from Teradek's servers.
- **Load from PC -** Click **Load from PC** if you have already downloaded the firmware package you wish to use. For the latest firmware, visit: **https://teradek.com/pages/downloads#ranger**



Once the firmware is loaded, and information about the package is displayed, click **Next** to proceed with the upgrade. You will then be presented with a list of device components and whether or not they are scheduled to be updated, along with two options:

- **Start Upgrade -** Update your Ranger device(s) with the latest firmware version.
- **Advanced Options -** View detailed version information for each component and the firmware upgrade package components. The Advanced screen also allows users to select which components to upgrade.

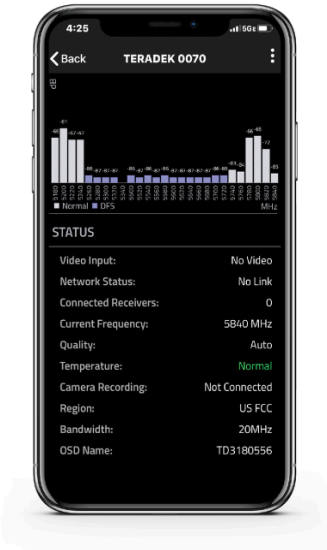
Ranger Manager

Use the Ranger App to remotely manage and monitor every parameter of Ranger including pairing, and frequency selection.

Connect via Bluetooth

1. Download the Ranger App.
2. Enable Bluetooth on your iOS or Android device.
3. Navigate to the Bluetooth menu on both the transmitter and receiver, then select **Enable**.
4. Open the Ranger App from your iOS or Android device, then tap the **Pairing** button.
5. Select the device(s) you want to pair or monitor.

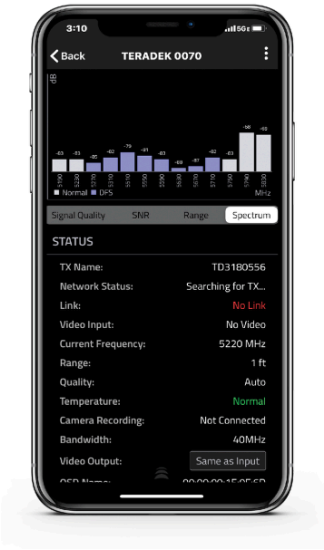
Transmitter Status Display



- **Settings** (Descriptions listed in the **Configuration** section) - Tap the settings button on the top right corner of the screen to customize the transmitter's various settings.

- **Spectrum Analyzer** - Detects congestion in the area and determines which frequencies are available to use. Each bar represents a frequency, and the height represents the amount of congestion in that frequency; the higher the bar, the more congested that frequency is. Make sure to always select the shortest, least congested bar.
- **Status -** Displays the current status of:
  - Video input
  - Temperature
  - Network
  - Camera Recording
  - Connected receivers
  - Region
  - Current frequency
  - Bandwidth
  - Quality
  - OSD name

Receiver Status Display



- **Settings** (Descriptions listed in the **Configuration** section) - Tap the settings button on the top-right corner of the display to customize the receiver's various settings such as the output format, audio, display, and OSD.
- **Signal Quality** - Determine the quality and reliability of the signal being received.
- **SNR (Signal to Noise Ratio) -** Compare the signal power level to the noise power level from the attached antennas.
- **Range Analyzer -** Displays the transmission distance between the transmitter and receiver.
- **Spectrum Analyzer** - Detects congestion in the area and determines which frequencies are available to use. Each bar represents a frequency, and the height represents the amount of congestion in that

frequency; the higher the bar, the more congested that frequency is. Make sure to always select the shortest, least congested bar.

- **Status** - Displays the current status of:
  - TX Name
  - Quality
  - Network
  - Temperature
  - Link
  - Camera Recording
  - Video input
  - Bandwidth
  - Current frequency
  - Video output
  - Range
  - OSD name

Antenna Orientation

Ranger units require the use of external antennas for basic operation. For Ranger, we recommend **ONLY** using a Horizontal + Vertical (H+V) antenna configuration.

VERTICAL AND HORIZONTAL ANTENNAS

Vertical (V) antennas are ideal for achieving diversity indoors and offer good performance in a wide variety of short-to-medium range situations when quick setup and flexibility are key. Once you move outdoors with the V antennas, the RF signals travel in a similar or identical manner toward the receiver, weakening diversity. **Horizontal (H) antennas** were designed for use with the V antennas. H antennas cause the RF signal from the transmitter to propagate perpendicularly compared to the vertical signal from the V antenna. The **H+V antenna configuration** helps to maintain the quality and performance of your video transmission, especially when your signal would otherwise begin to deteriorate due to noise and/or longer ranges.

NOTE: H+V antennas must be attached to both the transmitter and receiver.

Ranger system with H+V antenna configuration

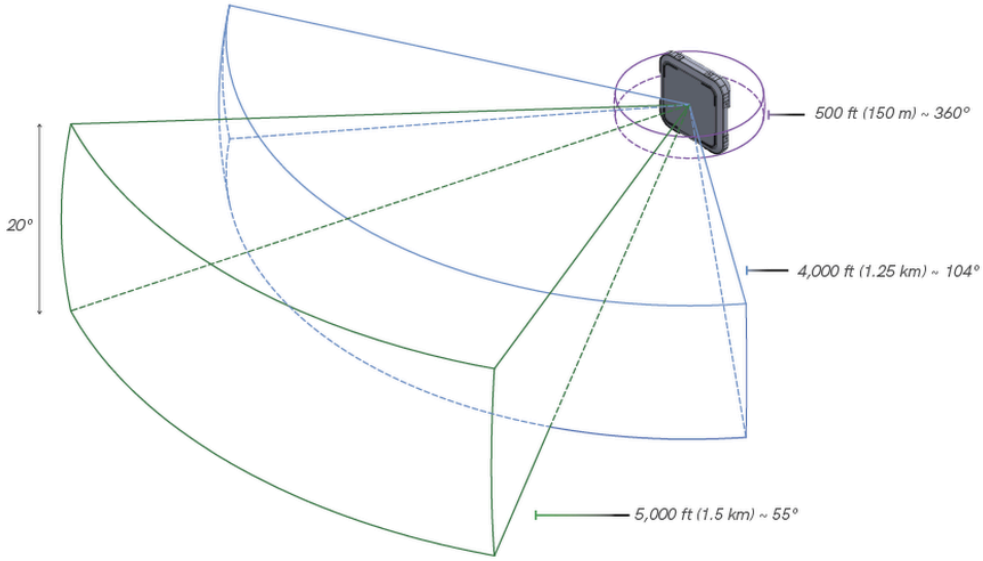
BOLT PANEL ANTENNA V.4

If using the **Bolt Panel Antenna V.4** with your Ranger receiver, you must connect the five RP-SMA connectors from the receiver to the back of the antenna (see below for connector placement) and position the antenna so that the front (with the Teradek logo) has a clear line of sight to the transmitter.

Ranger Transmitter and Bolt Panel Antenna with H+V antenna configuration

The Bolt Panel Antenna includes an omnidirectional antenna with a receive pattern that varies based on its distance from the transmitter. The horizontal receive angle measures 55° at 5,000 ft (1.5 km), 104° at 4,000 ft (1.25 km), and is effectively omni-directional at up to 500 ft (150 m). The vertical receive angle measures 20° at any distance. In order to maintain signal strength, you need to adjust the height of the

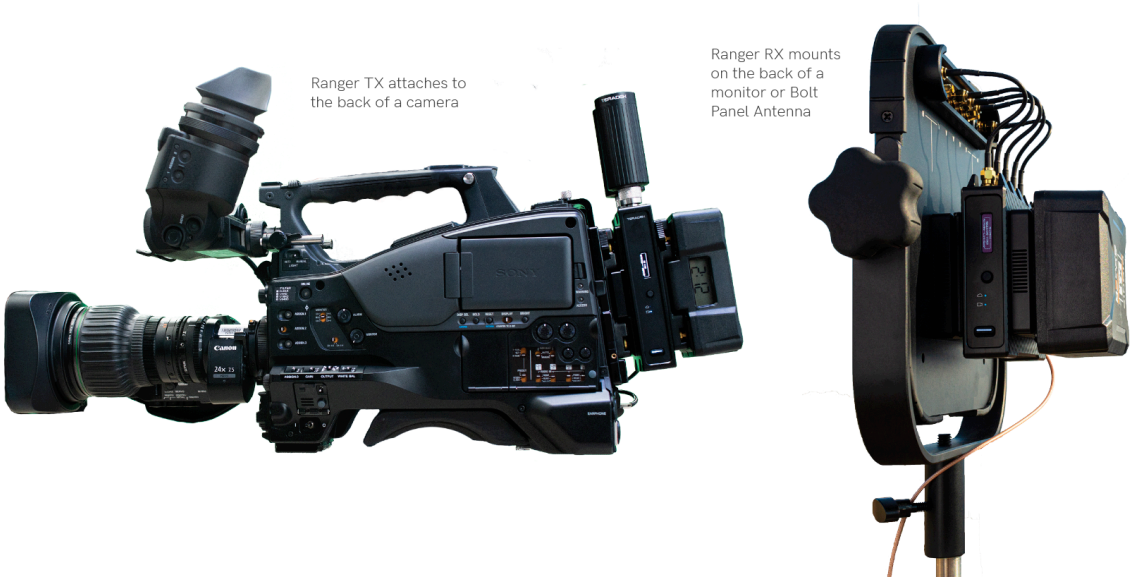
receiver and/or the height of the transmitter accordingly so that there is no more than 20% obstruction. For more information, please visit: https://support.teradek.com/hc/en-us/articles/4405667258007-Bolt-Panel-Antenna-v4-0-Best-Practices



For more information about the different antenna configurations for Ranger, please visit: https://teradek.com/blogs/articles/what-antennas-should-i-use-with-bolt4k_pos=1&_sid=cefeb7d2d&_ss=r

Device Placement

Ranger devices are equipped with a dual-mount battery plate that allows you to attach your device to either the back of a camera, monitor, or Bolt Panel Antenna.



Frequencies by Region

NOTE: Pairing the TX and RX is required after a different region is selected.

	Freq Range		US (FCC)		EU		Canada		Japan		Australia/New Zealand	
Bandwidth (MHz)	40	20	40	20	40	20	40	20	40	20	40	20
UNII1 (Non DFS)		5160		5160		5160						5160
	5190	5180	5190	5180	5190	5180	5190	5180	5190	5180	5190	5180
		5200		5200		5200		5200		5200		5200
	5230	5220	5230	5220	5230	5220	5230	5220	5230	5220	5230	5220
		5240		5240		5240		5240		5240		5240
UNII2 (DFS)	5270	5260	5270	5260	5270	5260	5270	5260	5270	5260	5270	5260
		5280		5280		5280		5280		5280		5280
	5310	5300	5310	5300	5310	5300	5310	5300	5310	5300	5310	5300
		5320		5320		5320		5320		5320		5320
		5340				5340						5340
	5510	5500	5510	5500	5510	5500	5510	5500	5510	5500	5510	5500
		5520		5520		5520		5520		5520		5520
	5550	5540	5550	5540	5550	5540	5550	5540	5550	5540	5550	5540
		5560		5560		5560		5560		5560		5560
	5590	5580	5590	5580	5590	5580		5580	5590	5580		5580
		5600		5600		5600				5600		
	5630	5620	5630	5620	5630	5620			5630	5620		
		5640		5640		5640				5640		
	5670/ 5690/ 5710	5660	5670	5660		5660	5670	5660	5670	5660		5660
		5680		5680	5690	5680		5680		5680	5690	5680
		5700	5710	5700		5700		5700		5700		5700
		5720		5720								
UNII3 (Non DFS)	5755	5745	5750	5740			5755	5745			5755	5745
		5765		5760				5765				5765
	5795	5785	5790	5780			5795	5785			5795	5785
		5805		5800				5805				5805
		5825	5830	5820								5825
				5840								

Ranger U-NII-5 (6GHz) support by region

Ranger Micro and Mk II radios are calibrated and tested to support operation in the U-NII-5 (5.925–6.425GHz) frequencies. Although the product and its internal radios support these additional frequencies vs. previous Ranger products, regulatory restrictions mean that U-NII-5 operation is allowed only in the regions where it has been cleared for use. As different regions approve U-NII-5 for unlicensed operation, Teradek will release firmware updates to enable the additional frequencies. Note that we sometimes refer to U-NII-5 frequencies as “6GHz” to make it simpler to understand.

Ranger Mk I (5GHz only) vs. Ranger Mk II and Micro operation (5GHz and 6GHz).

Background

Ranger operates on licensed and unlicensed frequencies within certain U-NII (Unlicensed National Information Infrastructure) frequency bands. Ranger Mk I works in U-NII-1, U-NII-2A, U-NII-2B, U-NII-2C, U-NII-3, and U-NII-4 bands. A majority of these frequencies are more commonly used in commercial wi-fi equipment. Ranger Micro and Mk II supports all of these, but adds support for U-NII-5 as a separate frequency range.

*Note that the following table represents the US (FCC) region, other regions may be more limited.

U-NII band	**Frequency range**	**Selectable Frequencies (40MHz)**	**Selectable Frequencies (20MHz)**	**Ranger Mk I Support**	**Micro | Mk II Support**
U-NII-1	5.150–5.250	2	5	?	?
U-NII-2A	5.250–5.350	2	4	?	?
U-NII-2B	5.350–5.470	3	6	?	?
U-NII-2C	5.470–5.725	6	12	?	?
U-NII-3	5.725-5.850	3	6	?	?
U-NII-4	5.850–5.925	1	3	?	?
U-NII-5	5.925–6.425	12	25	?	?
		Total selectable frequencies (40/20 MHz)		**19/45**	**33/70**

U-NII-5 (6GHz) support by region

Teradek products are built to comply with regulatory requirements for all markets in which they are sold. As such, we can only enable U-NII-5 support in the regions where it is approved for license-free use. Teradek will release firmware updates with additional regional support as they become available.

Region	U-NII-5 Approval	Firmware available	Expected availability
US (FCC)	Yes	Yes	Now
Europe	In Process	No	2023
Canada	Yes	Yes	Now
Japan (Indoors)	In Process	No	2023
Japan (Outdoors)	In Process	No	2023
South Korea	In Process	No	2023
Australia/New Zealand	TBD	No	2023

NOTE: additional region support TBD, will be added as regulation and certification allows

Configuration

By default, Ranger Mk I operates in the 5GHz range. This allows backwards compatibility with Ranger Mk II and Micro systems and in low interference environments will allow for the highest maximum range. Switching to U-NII-5 (6GHz) frequencies allows Ranger Mk II and Micro to operate with minimal interference as very few other products support these frequencies. To configure Ranger Mk II and Micro for 6GHz operation simply switch TX and RX units to the 6GHz band in the wireless settings menu. This can be done via the app or OLED display.

- **TX**: open menu, Wireless Settings, frequency range. Select 6GHz
- **RX**: open menu, Wireless Settings, frequency range. Select 6GHz

Associated menus for frequency selection will only show frequencies for the selected bands. Automatic frequency hopping works on either the 6GHz or 5GHz bands, but does not support scanning both. All systems must be set to 6GHz to work in the 6GHz range.

Regulatory Information

PRODUCT INFORMATION

This product is designed to be compliant with rules and regulations in the country it is sold to and therefore is marked as required. These markings signify the countries the device is approved in. Operating the product without regulatory approval is illegal. Any changes or modifications to the product not expressly approved by Teradek could void the user's authority to operate the equipment and its regulatory approvals. Please make sure you use the latest revision of this document which is available at **teradek.com.**

SAFETY INSTRUCTIONS

- Keep these instructions in a safe and accessible place for future use.
- When operating this equipment, read and follow all the instructions in this manual.
- Do not open the unit.
- Do not block the air ventilation openings, and provide proper ventilation for the units to allow them to cool down during operation.
- Use only accessories/batteries/chargers specified or recommended by Teradek.
- When devices are switched ON, keep away at least 20 cm (7.9 in) from your body.
- People with pacemakers should **ALWAYS** keep the device at the listed distance from their pacemaker when turned ON. Should you have any reason to suspect that interference is taking place, you should turn your device OFF.
- Do not expose to moisture, excessive heat, or fire.
- Keep away from water and other liquids.
- Clean with a dry cloth only.
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- To reduce the risk of fire or electric shock, refer servicing to qualified service personnel. Declared maximum operating temperature: +40°C
- Please avoid electrostatic discharge from the antenna ports for proper operation

WARNING

Ranger devices contain sensitive electronic components that can be damaged by electrostatic discharge (ESD). When handling, care must be taken so that the device is not damaged. Damage due to inappropriate handling is not covered by the warranty. For complete warranty information, please see the warranty card that arrived with the device, or visit **www.teradek.com/pages/warranty-information.**

USING THE AC POWER ADAPTOR

- All components must be dry before connecting to an external power source

- Use ONLY a UL/IEC 62368 or UL/IEC 60950-1 2nd revision approved AC/DC power adapter class LPS with an electrical output rating range of 6-28 V DC, 3A, with an ambient temperature range of 0°C to 40°C.
- Use of an alternative AC/DC power adapter will invalidate any approvals given to this unit and may be dangerous.

BATTERY

This device is not supplied with batteries. In case a battery is used, please adhere to the following general battery usage guidelines:

- Use batteries with the rated voltage and current characteristics as listed in the manual.
- Use IEC 62133-approved lithium batteries such as the **Anton Bauer Digital Battery (Dionic XT 150/ Dionic XT 90).**
- Verify battery temperature is within the range specified.
- Do not use incompatible/incorrect batteries. Use of an incompatible battery may present a risk of fire, explosion, leakage, or other hazards.
- Severe impact from dropping any battery-operated device on a hard surface could cause the battery to overheat.

RF MODULES

These devices contain the following approved radio modules:

Device	Description	IC	FCC ID
AMN41012	HD Video Transmitter	7680A-AMN41012	VQSAMN41012
AMN42012	HD Video Receiver	7680A-AMN41012	VQSAMN41012
2832	BT Module	4492A-2832	HSW2832

RF EXPOSURE

The product complies with internationally recognized standards covering human exposure to electromagnetic fields from radio devices. To satisfy local RF exposure regulation requirements, the transmitting product must operate with a minimum separation distance of 20 cm or more from a person’s body.

FCC RF EXPOSURE STATEMENT

This equipment complies with the FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

IC RADIATION EXPOSURE STATEMENT

Important Note: Radiation Exposure Statement

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator and your body.

Note Importante: Déclaration d'exposition aux radiations

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

Antenna Information

The radio transmitters **7680A-AMN41012 (HD Transmitter), 7680A-AMN42012 (HD Receiver), and 4492A-2832 (BT Module)** have been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device. Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Informations sur l'antenne

Les présent émetteur radios **7680A-AMN41012 (HD Transmitter), 7680A-AMN42012 (HD Receiver), and 4492A-2832 (BT Module)** ont été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur. Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Modules IC	Antenna	Max Permissable Gain	Location	Antenna Impedance
7680A-AMN41012	Dipole	2dBi Typical at 5GHz	External	50Ω
7680A-AMN41012	Dipole	5dBi Typical at 5GHz	External	50Ω

Modules IC	Antenna	Max Permissable Gain	Location	Antenna Impedance
7680A-AMN41012	Dipole	2dBi Typical at 5GHz	External	50Ω
7680A-AMN41012	Dipole	11dBi Typical at 5GHz	External	50Ω
4492A-2832	Internal Antenna		Internal	

UNINTENTIONAL RADIO INTERFERENCE

FCC COMPLIANCE STATEMENT
This equipment has been tested and found to comply with the limits for a Class A digital device, under 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 by 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 the receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or television technician for help

This equipment 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.

IC COMPLIANCE STATEMENT - CAN ICES-3 (A)/NMB-3 (A)
This device complies with the Innovation, Science and Economic Development Canada’s license-exempt RSS(s). 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.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:
1. L'appareil ne doit pas produire de brouillage, et
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

RADIO TRANSMITTER
FCC STATEMENT
Radio Transmitters (Part 15) – Class A Digital Devices
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.

IC STATEMENT
This device complies with RSS-247 of the Industry Canada Rules. Operation is subject to the following two conditions:
1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

Ce dispositif est conforme à la norme CNR-247 d'Industrie Canada applicable aux appareils radio exempts de licence. Son fonctionnement est sujet aux deux conditions suivantes:
1. Le dispositif ne doit pas produire de brouillage préjudiciable, et
2. Ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

IC STATEMENT - Operation at 5GHz Range
Caution:
1. The device for operation in the band 5150-5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;
2. Users should also be advised that high-power radars are allocated as primary users (i.e. priority users) of the bands 5250-5350 MHz and 5650-5850 MHz and that these radars could cause interference and/or damage to LE-LAN devices.
3. The maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall be such that the equipment still complies with the e.i.r.p. limit;

4. The maximum antenna gain permitted for devices in the band 5725-5850 MHz shall be such that the equipment still complies with the e.i.r.p. limits specified for point-to-point and non-point-to-point operation as appropriate.

Avertissement:
1. Les dispositifs fonctionnant dans la bande 5 150-5 250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux;
2. De plus, les utilisateurs devraient aussi être avisés que les utilisateurs de radars de haute puissance sont désignés utilisateurs principaux (c.-à-d., qu'ils ont la priorité) pour les bandes 5 250-5 350 MHz et 5 650-5 850 MHz et que ces radars pourraient causer du brouillage et/ou des dommages aux dispositifs LAN-EL.
3. Le gain d'antenne maximum autorisé pour les appareils fonctionnant sous les bandes de fréquences 5250-5350 MHz et 5470-5725 MHz doit être tel que l'équipement est toujours conforme à la limite PIRE;
4. Le gain d'antenne maximum autorisé pour les appareils fonctionnant sous les bandes de fréquences 5725-5850 MHz doit être tel que l'équipement est toujours conforme à la limite PIRE spécifiée pour un fonctionnement point à point et non point à point, le cas échéant.

EC DECLARATION OF CONFORMITY
This equipment may be operated in all EU countries with the following restrictions:

- 5.15-5.35GHz frequencies for indoor use only

Teradek hereby declares that this Radio Transmitter complies with the essential requirements and other relevant provisions of Directives 2014/53/EU and 2011/65/EU. The full text of the EU DoC is located at: **https://support.teradek.com/hc/en-us/articles/233429747-EC-Declaration-of-Conformity-for-CE-mark**

WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE)

English: Waste electrical and electronic equipment should not be disposed of with household waste. Please recycle where facilities exist. Check with your local authority or retailer for recycling advice.

Français: Déchets d'équipements électriques et électroniques ne doit pas être jeté avec les ordures ménagères. S'il vous plaît recycler où les installations existent. consultez auprès de votre autorité locale ou le détaillant pour obtenir des conseils de recyclage.

Deutsch: Elektro- und Elektronik-Altgeräte dürfen nicht mit dem Hausmüll entsorgt werden. Bitte recyceln, wo Anlage vorhanden sind. Beraten Sie sich bei Ihren lokale Behörde oder händler über Recycling information.

SUPPORT RESOURCES

In addition to this Reference Guide, you can find more information on Ranger devices' features and operation by visiting www.teradek.com. If you are unable to find what you need online, please contact Teradek's support staff.

E-mail: support@teradek.com | Phone: (888) 941-2111 ext. 2 (available M-F 7 am-6 pm PST)

DISCLAIMER

This manual is intended for user information only. Every effort has been made to ensure that the contents within are accurate at the time of printing and that updates are made promptly. Teradek cannot be held responsible for inaccuracies, typographical errors, or out-of-date information contained within this manual.

Troubleshooting/FAQ

For more Troubleshooting and FAQs please visit http://support.cs.inc

Can I down-convert from 4K to HD to display video on an HD Monitor?

Yes. Even if you feed the transmitter a 4K signal, you can output an HD signal from a paired receiver. Output settings are configured on the receiver (see **Configuration**) or the **Bolt App**.

Will Bolt 4K work with my current Bolt?

No. Previous generation Bolts cannot communicate with Bolt 4K. Bolt 4K uses a different RF system along with a unique chipset not found in any of the previous generation Bolts.

Does Bolt 4K support SDI Metadata/ancillary data passthrough?

Bolt 4K supports a limited subset of SDI ancillary data (metadata) from certain cameras. The following data can be passed wirelessly from the transmitter to the receiver:

- Start/stop record flags
- Time code
- File/clip name (RED and ARRI cameras)

- Full metadata except for LUTs (ARRI cameras)

The following cameras are capable of transmitting SDI ancillary data, although any camera with a time code embedded in the SDI signal should work:

- **RED Epic, Scarlet** - Supports time code, record start/stop, and file/clip name
- **ARRI** - Supports full metadata (except for LUTs)
- **Canon C300/C500/XF305/XF105** - Supports time code and record start/stop
- **Sony VENICE F3/F5/F55** - Supports time code and record start/stop
- **Panasonic** - Supports time code

The Bolt App does not display my Bolt 4K unit.

Ensure that both your Bolt 4K and cellular device have Bluetooth enabled (see **Bolt App**). By default, Bluetooth is disabled on your Bolt 4K device until you enable it.

Can I use any SDI or HDMI cable with my Bolt 4K units?

No. You should make sure that your SDI or HDMI cable is capable of handling **6G** or **12G** video. If using HDMI cables, it is recommended that you use an HDMI 2.0 compatible cable, and regularly check if your cables are still functional. HDMI cables are extremely delicate and repeated bending can damage the internal wiring to the point where it will no longer send a signal (especially a 4K signal).

How many receivers can I link to one Bolt 4K transmitter?

You can link up to six Bolt 4K receivers to any single Bolt 4K transmitter.

What are the A/C power requirements for Bolt 4K?
Bolt 4K devices require more power than any of our previous products. When powering Bolt 4K from an A/C outlet, use only the included A/C adapter. This A/C adapter has a higher voltage capacity that meets Bolt 4K's increased power requirements. Lower-rated A/C adapters are not supported, and using one will affect Bolt 4K's performance and capabilities. **NOTE: These requirements only apply if you are using an A/C outlet to power on Bolt 4K. Using a compatible battery and accessory cable as a power source will not affect Bolt 4K's performance.**

Supported A/C adapters:

- 9V 2.0A (18W)
- 12V 1.5A (18W)
- 12V 3.0A (included with Bolt 4K)
- 12V 2.5A (30W)
- 24V 2.5A (60W)

Not supported:

- 12V 1.25A (15W)

Can I install battery plates on my Bolt 4K units myself?
Yes. Recent changes to the device's chassis allows the user to assemble and install battery plates on either the receiver or transmitter. Earlier Bolt 4k units required battery plates to be installed only by a trained technician at a Certified Teradek Repair Center. Contact Teradek to verify if your device's metalwork is the latest.

Ranger Mk II System

	TRANSMITTER	RECEIVER
VIDEO		
Video Inputs	**1x** 12G-SDI SMPTE 2082-1 standard/ 75 Ω, **1x** HDMI 2.0 Type-A receptacle	N/A
Video Outputs	**1x** 12G-SDI SMPTE 2082-1 standard / 75 Ω (BNC x 1)	**2x** 12G-SDI SMPTE 2082-1 standard/75 Ω, **1x** HDMI 2.0 Type-A receptacle
Color Sampling	**SDI**: YCbCr 4:2:2, 10-bit **HDMI**: RGB / YCbCr 4:4:4, 8-bit | YCbCr 4:2:2 10-bit	**SDI**: YCbCr 4:2:2, 10-bit **HDMI**: RGB / YCbCr 4:4:4, 8-bit | YCbCr 4:2:2 10-bit
Delay (TX to RX)	<0.001sec (without format conversions)	<0.001sec (without format conversions)

Supported Resolutions	4Kp23.98/24/25/29.97/30/50/59.94/60 1080p23.98/24/25/29.97/30/50/59.94/60 1080psf23.98/24/25/29.97/30 1080i50/59.94/60 720p50/59.94/60 480p50 576p59.94/60 480p50 576p59.94 (HDMI only)	
Input Cross Conversion	Yes, HDMI to SDI	N/A
Output Video Scaling	N/A	Yes, Framerate and Resolution Scaling
VIDEO PROCESSING		
Video Compression	Uncompressed	Uncompressed
Test Pattern Generator	N/A	Yes
Video Format Conversion Support	Yes	Yes
Spectrum Analyzer	Yes (via Ranger Manager App)	Yes
AUDIO		
Audio Compression	48kHz 24-bit PCM	48kHz 24-bit PCM
Audio Input	Embedded SDI/HDMI Audio Input (2 channel)	N/A
Audio Output	N/A	Embedded SDI/HDMI Audio Input (2 channel)
PHYSICAL ATTRIBUTES		
Dimensions	3.7" x 6.1" x 1.3" (95mm x 157mm x 34mm)	4.5" x 5.3" x 1.3" (114.5mm x 137mm x 34mm)

Weight	22oz (624g)	20.6oz (584g)
Construction	Milled aluminum (chassis), regulation-compliant PCB	
INTERFACES		
Configuration Interface	OLED Screen with Menu Joystick Navigation	OLED Screen with Menu Joystick Navigation
Switches	On/Off Switch	On/Off Switch
Desktop App	Ranger Manager application for OSX & Windows	Ranger Manager application for OSX & Windows
Mobile App	Ranger Manager app (iOS and Android) configuration via Bluetooth	Ranger Manager app (iOS and Android) configuration via Bluetooth
USB Interface	Upgrade via USB-C	Upgrade via USB-C
Bluetooth	Bluetooth 5 LE	Bluetooth 5 LE
NETWORK		
Wireless	**Licensed Frequencies*:** 4.850 ~ 5.150 GHz 5.350 ~ 5.470 GHz 5.850 ~ 5.925 GHz **Unlicensed Frequencies**: 5.150 ~ 5.250 GHz (Non-DFS) 5.250 ~ 5.350 GHz (DFS) 5.470 ~ 5.725 GHz (DFS) 5.725 ~ 5.850 GHz (Non-DFS) 5.925 ~ 6.425 GHz ***By using this product in the licensed frequencies, you acknowledge and agree to comply with all applicable regulations and rules, and to only operate this system in compliance with the applicable license requirements.***	
RF Channel Selection	Auto, Manual (Manual available for non-DFS, DFS, and Licensed Frequencies)	Auto, Manual (Manual available for non-DFS, DFS, and Licensed Frequencies)
Encryption	AES-256, RSA-1024 key exchange	AES-256, RSA-1024 key exchange
RF Power	23 dBm EIRP (max power)	21 dBm EIRP (max power)

Antennas	**1x** Horizontal N-Type 2dbi antenna **1x** Vertical N-Type 2dbi antenna	**5x** Vertical 2dbi antennas
Range	Up to 5000ft [1524m] with Panel Antenna	
Noise Rejection	Can coexist with Wi-Fi and 5GHz cordless phones, and operate up to 6 sets in the same location	Can coexist with Wi-Fi and 5GHz cordless phones, and operate up to 6 sets in the same location
POWER		
Power Input	2-Pin locking connector 7-28 VDC	2-Pin locking connector 6-28 VDC
Battery	Gold or V-mount battery plate	Gold or V-mount battery plate
Nominal Power Consumption	12 Watts	18 Watts
Operating Temperature	0~40 deg-C	0~40 deg-C
GENERAL		
Mountability	Integrated Gold or V Battery Mount, and multiple mounting options with M3 and 1/4-20” holes	Integrated Gold or V Battery Mount, and multiple mounting options with 3/8”x16 and 1/4-20” holes

Ranger Micro System

	TRANSMITTER	RECEIVER
VIDEO		
Video Inputs	3G-SDI SMPTE 2082 standard / 75 Ω (BNC x 1) 1 x HDMI 1.4b Type-A receptacle	N/A
Video Outputs	3G-SDI SMPTE 2082 standard / 75 Ω (BNC x 1)	3G-SDI SMPTE 2082 standard / 75 Ω (BNC x 2) 1 x HDMI 1.4b Type-A receptacle
Color Sampling	**SDI:** YCbCr 4:2:2, 10-bit **HDMI:** RGB / YCbCr 4:4:4, 8-bit | YCbCr 4:2:2 10-bit	**SDI:** YCbCr 4:2:2, 10-bit **HDMI:** RGB / YCbCr 4:4:4, 8-bit | YCbCr 4:2:2 10-bit
Delay (TX to RX)	<0.001sec (without format conversions)	<0.001sec (without format conversions)
Supported Resolutions	1080p23.98/24/25/29.97/30/50/59.94/60 1080psf23.98/24/25/29.97/30 1080i50/59.94/60 720p50/59.94/60 576i/480i 480p50 576p59.94 (HDMI only)	
Input Cross Conversion	Yes, HDMI to SDI	N/A
Output Video Scaling	N/A	Yes, Auto scaling to 1080p
VIDEO PROCESSING		
Video Compression	Uncompressed	Uncompressed
Test Pattern Generator	N/A	Yes
Video Format Conversion	Yes	Yes

Support		
Spectrum Analyzer	Yes (via Launchpad App)	Yes
AUDIO		
Audio Compression	48kHz 24-bit PCM	48kHz 24-bit PCM
Audio Input	Embedded SDI/HDMI Audio Input (2 channel)	N/A
Audio Output	N/A	Embedded SDI/HDMI Audio Input (2 channel)
PHYSICAL ATTRIBUTES		
Dimensions	2.3” x 4.3” x 1.3” (59 x 108 x 32mm)	5.0” x 3.7” x 1.2” (126 x 93 x 31mm)
Weight	10.6oz (300g)	17.5oz (496g)
Construction	Milled aluminum (chassis), regulation-compliant PCB	
INTERFACES		
Configuration Interface	OSD Screen with Menu Joystick Navigation	OSD Screen with Menu Joystick Navigation
Switches	On/Off Switch	On/Off Switch
Desktop App	Launchpad (OSX and Windows)	Launchpad (OSX and Windows)
Mobile App	Launchpad App (iOS and Android)	Launchpad App (iOS and Android)
USB Interface	Upgrade via USB - C	Upgrade via USB - C
Bluetooth Compatibility	Bluetooth 5 LE	Bluetooth 5 LE
NETWORK		
Wireless		**Licensed Frequencies*:** 4.900 ~ 5.150 GHz

	5.350 ~ 5.470 GHz 5.850 ~ 5.925 GHz **Unlicensed Frequencies**: 5.150 ~ 5.250 GHz (Non-DFS) 5.250 ~ 5.350 GHz (DFS) 5.470 ~ 5.725 GHz (DFS) 5.725 ~ 5.850 GHz (Non-DFS) 5.925 ~ 6.425 GHz **By using this product in the licensed frequencies, you acknowledge and agree to comply with all applicable regulations and rules, and to only operate this system in compliance with the applicable license requirements.*	
RF Channel Selection	Auto, Manual Manual available for all Channels	Auto, Manual Manual available for all Channels
Encryption	AES-256, RSA-1024 key exchange	AES-256, RSA-1024 key exchange
RF Power	23 dBm EIRP (max power)	21 dBm EIRP (max power)
Antennas	**1x** Horizontal RP-SMA 2dBi antenna **1x** Vertical RP-SMA 2dBi antenna	**5x** Vertical 2dBi antennas
Range	Up to 5000 ft line of sight (using Panel Antenna)	
Noise Rejection	Can coexist with Wi-Fi and 5GHz cordless phones, and operate up to 6 sets in the same location	Can coexist with Wi-Fi and 5GHz cordless phones, and operate up to 6 sets in the same location
POWER		
Power Input	2-Pin locking connector 7-28 VDC	2-Pin locking connector 7-28 VDC
Battery	N/A	Gold or V-mount battery plate
Nominal Power Consumption	9 Watts	11 Watts
Operating Temperature	0~40 deg-C	0~40 deg-C
GENERAL		

Mounting Options	Multiple mounting options with M3, 3/8” and 1/4-20” holes	Integrated Gold or V Battery Mount, Multiple mounting options with M3, 3/8” and 1/4-20” holes

Ranger Panel Antenna v.4

WIRELESS	
Frequency Range	4.9 - 7.5 GHz
Gain	14 and 16dBi
Polarization	**2x** Horizontal, **5x** Vertical for polarization
Beam-width deg horizontal	75°
Beam-width deg vertical	35°
Impedance	50 ohm
PHYSICAL ATTRIBUTES	
Dimensions	13.78 x 13.78 x 1.25 in (35 x 35 x 3.18 cm)
Weight	39oz [1111.3g]
Construction	UV-protected plastic with aluminum alloy (construction-grade)
Connectors	RP-SMA
Operating Temperature	-40~176°F (-40°C to 80°C)