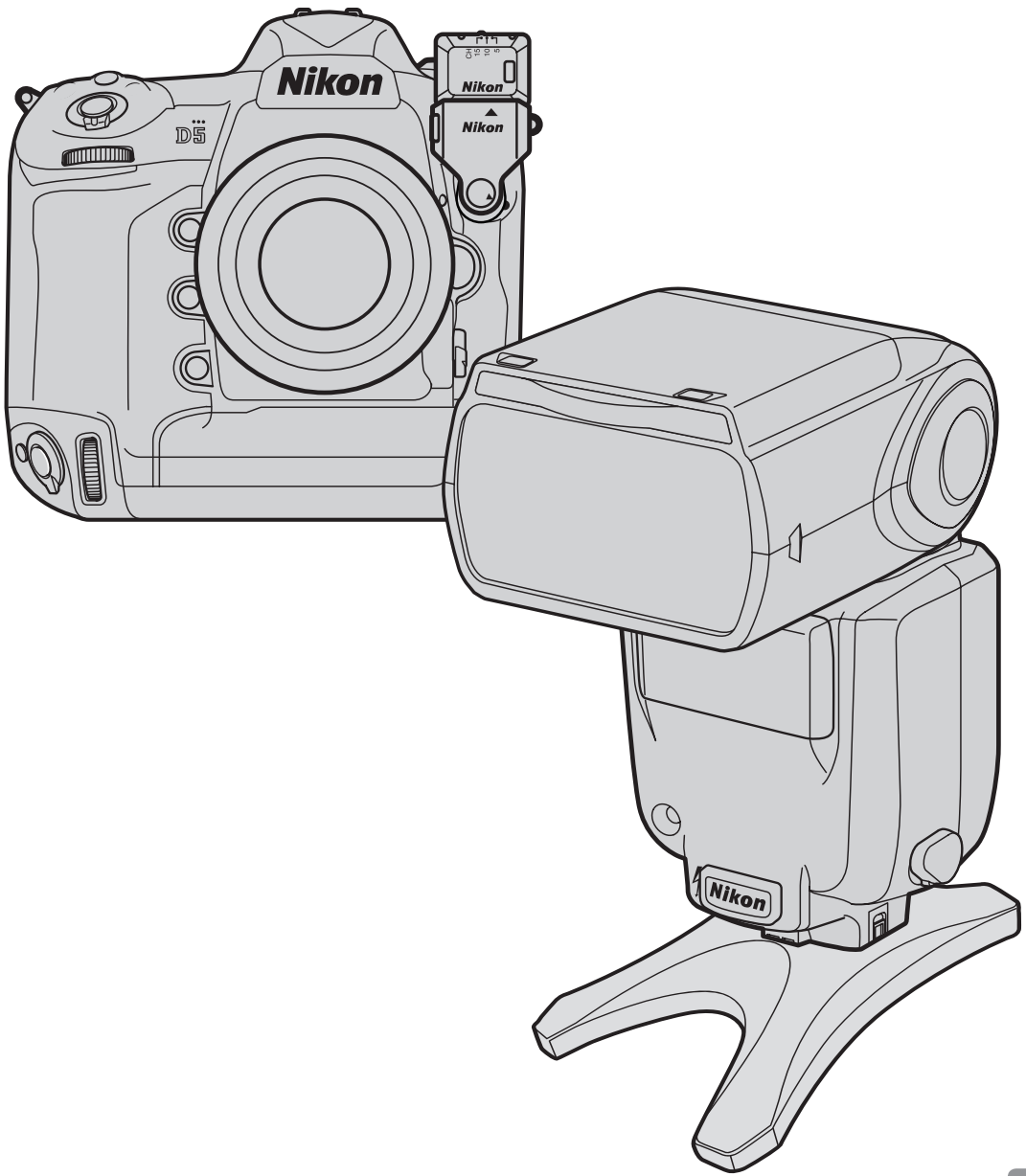
Nikon

Technical Guide
—for Radio-Controlled Advanced Wireless Lighting—



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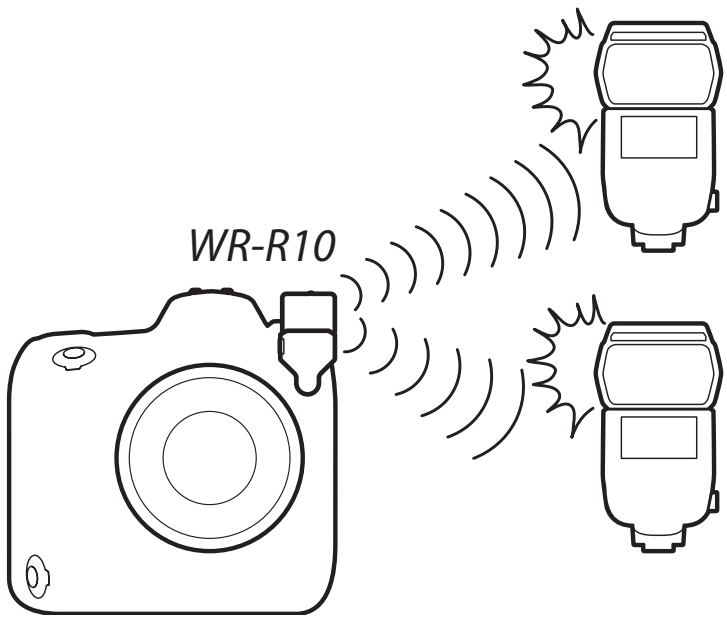
This manual uses the D5 for illustrative purposes. All photos are copyright © Soichi Hayashi.

An Introduction to Radio AWL

In radio-controlled Advanced Wireless Lighting ("radio AWL"), the camera controls remote flash units with radio signals transmitted via a WR-R10 wireless remote controller attached to the camera.



Camera that supports radio AWL

Equipment That Supports Radio AWL

As of March 2017, the following support radio AWL:

- **Cameras**: The D5 and D500
- **Flash units**: The SB-5000
- **Wireless remote controllers**: The WR-R10 * (firmware version 3.00 or later)

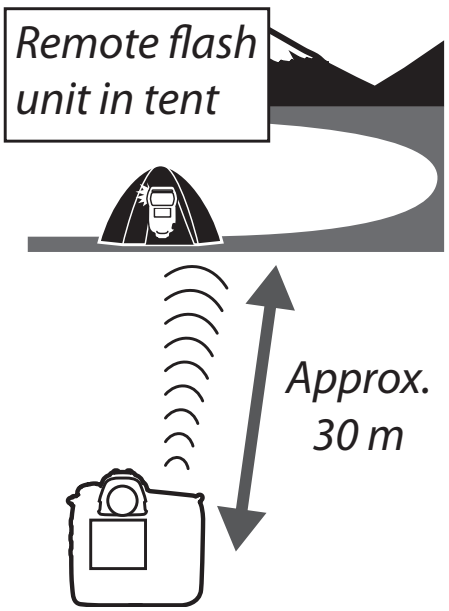
* WR-A10 WR adapter required with D5 or D500.

When to Use Radio AWL

Radio AWL can be used in situations not suited to optical flash control, such as the three listed below.

Distant Flash Units

Radio AWL can be used for reliable communication with flash units up to about 30 m (98 ft) from the camera.

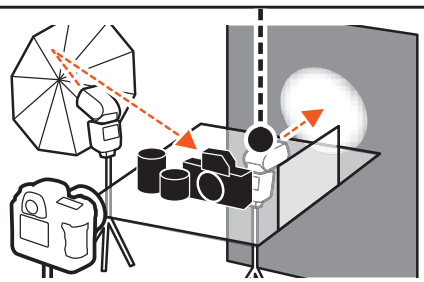


■ **Remote flash control**: Group flash (A: **M** ⅛)
■ **Lens**: AF-S NIKKOR 24–70mm f/2.8E ED VR ■ **Focal length**: 24 mm
■ **Exposure mode**: Manual ■ **Shutter speed**: 1805.5 s ■ **Aperture**: f/6.3
■ **ISO sensitivity**: ISO 100

Flash Units Out of Line of Sight

Radio flash control can be used with flash units that cannot be seen from the camera, giving you greater freedom in placing remote flash units.

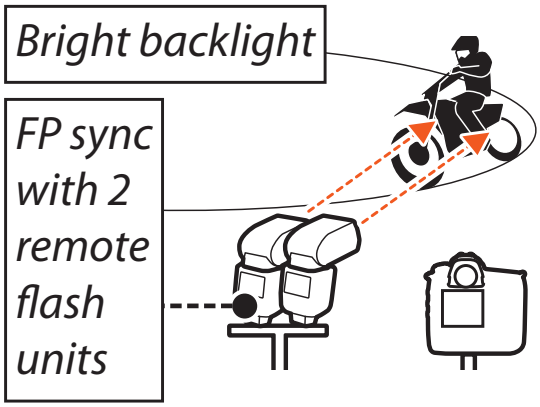
Group B: *Remote flash unit under table adds gradient to background*



■ **Remote flash control**: Group flash (A: **M** 1/1, B: **M** 1/8)
■ **Lens**: AF-S NIKKOR 85 mm f/1.8G ■ **Focal length**: 85 mm
■ **Exposure mode**: Manual ■ **Shutter speed**: 1/60 s ■ **Aperture**: f/16
■ **ISO sensitivity**: ISO 640

Bright Ambient Lighting

Bright ambient lighting interferes with the optical signals used for optical flash control. Radio AWL provides reliable flash control even in bright sunlight.



■ **Remote flash control**: Group flash (A: **M** ½, B: **M** ½)
■ **Lens**: AF-S NIKKOR 70–200mm f/2.8E FL ED VR
■ **Focal length**: 70 mm ■ **Exposure mode**: Manual
■ **Shutter speed**: 1/8000 s ■ **Aperture**: f/2.8 ■ **ISO sensitivity**: ISO 100

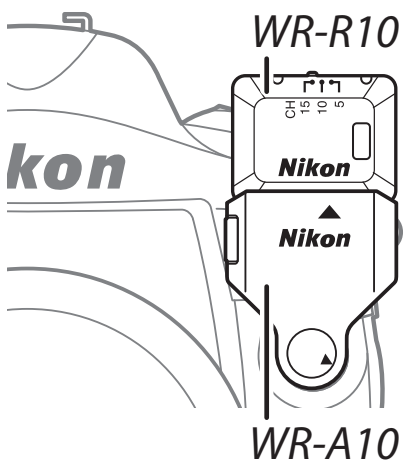
Benefits of Radio AWL

Among the benefits of radio AWL are:

- compact equipment (page 5);
- flexible lighting (page 6);
- real-time, two-way communication between the camera and remote flash units (page 7);
- a flash info display that can be used to view and change flash settings from the camera (page 8);
- remote standby (page 9); and
- the ability to combine radio and optical AWL (page 9).

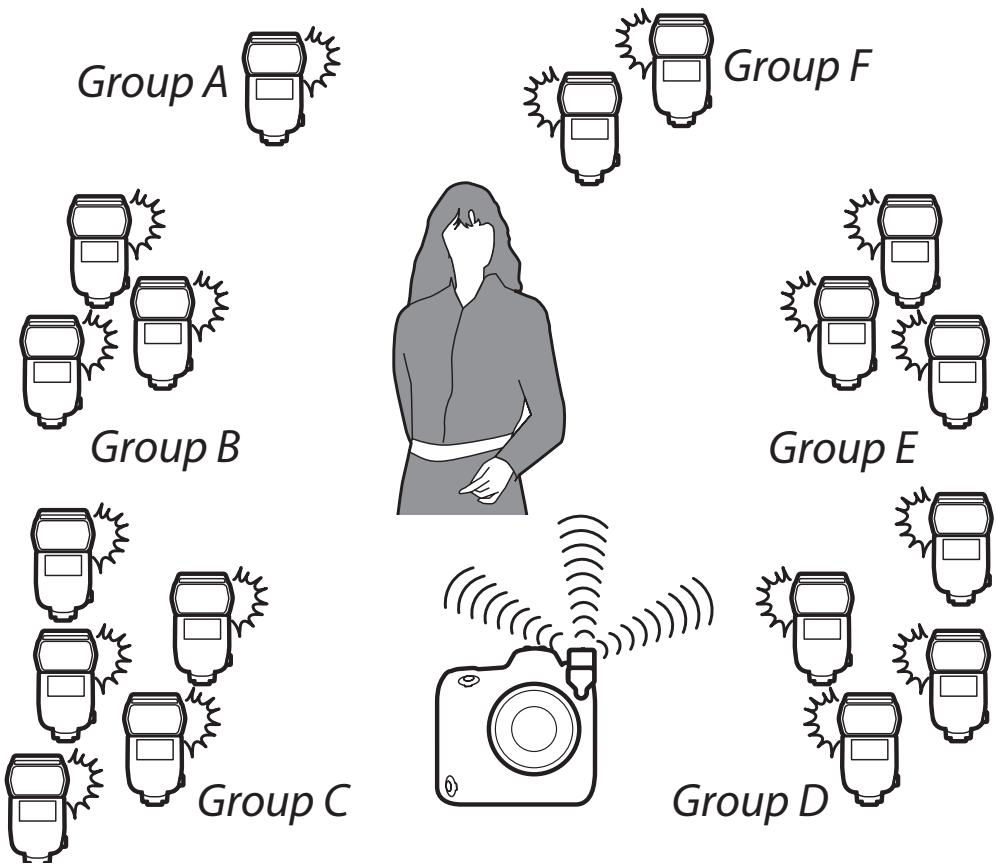
Compact Equipment

Remote flash units can be controlled using just a camera with a WR-R10 attached to the 10-pin terminal. There is no need for a master flash mounted on the camera accessory shoe: lighting can be provided by remote "off camera" flash units controlled via compact on-camera equipment.



Flexible Lighting

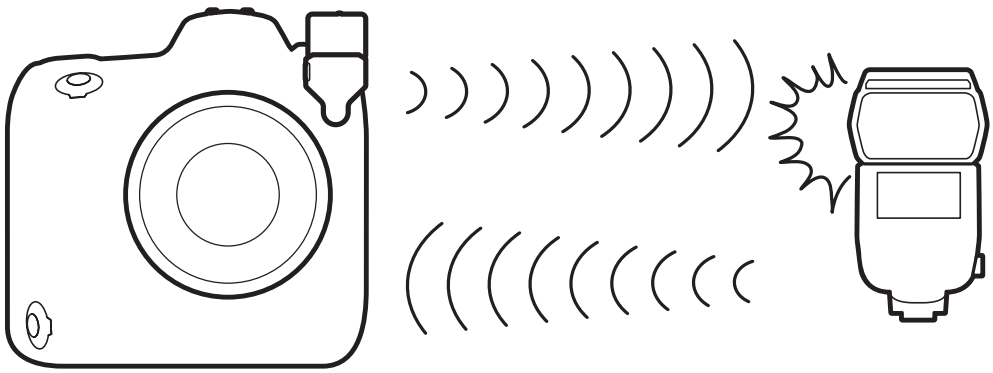
Radio AWL allows simultaneous control of up to 18 flash units arranged freely in up to 6 groups for flexible lighting capable of illuminating the scene from a variety of angles.



Real-Time, Two-Way Communication

The camera provides real-time updates on the status of remote flash units controlled via radio AWL (page 8).

Flash settings and flash control

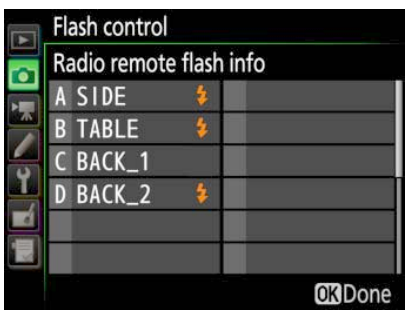


Name, status, color temperature, etc.*

* The camera can use color temperature data provided by remote flash units for auto white balance control.

Naming Flash Units

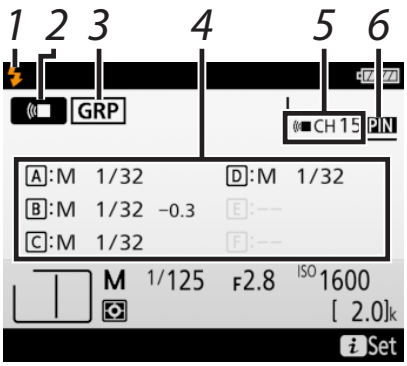
Assigning remote flash units unique, role-based identifiers (page 20) makes it easier for you to check flash status when configuring remote flash units (page 28).



The Flash Info Display

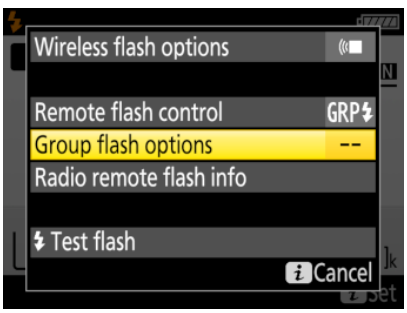
To view settings for remote flash units connected via radio AWL, press the info button in the camera information display. The following settings are listed:

1. *Flash ready indicator*
2. *Remote flash control*
3. *Remote flash control mode*
4. *Group flash control mode and flash level/flash compensation*
5. *Channel*
6. *Link mode*



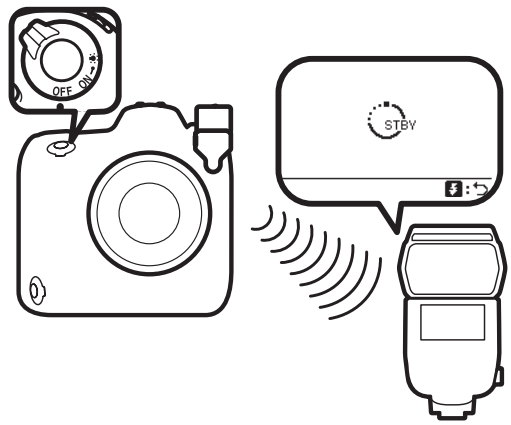
Changing Flash Settings

Flash settings can be changed from the camera by pressing the *i* button in the flash info display. The options available vary with the flash unit and the settings selected. You can also test-fire the flash.



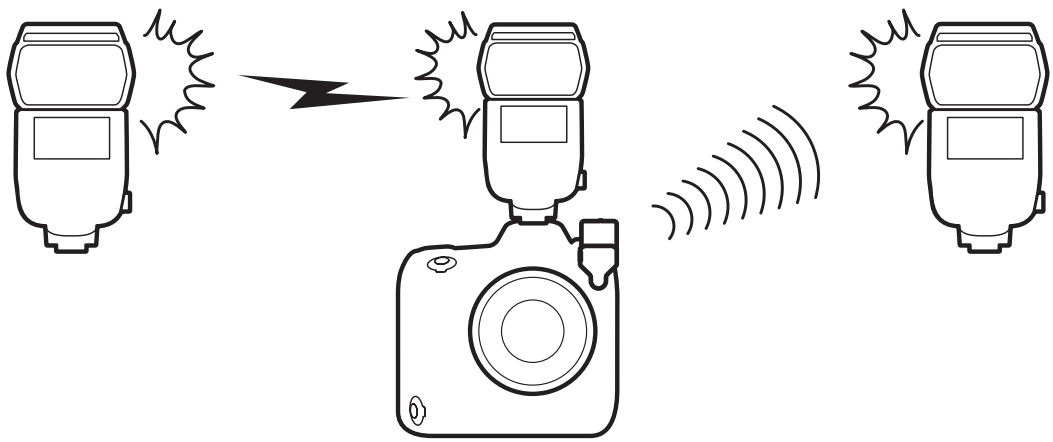
- **Remote Standby**

  Remote flash units controlled via radio AWL automatically enter standby when the camera is turned off, reducing the drain on the battery (the LINK indicators on the remote units will blink orange). Normal operation is restored when the camera is turned on.



- **Simultaneous Radio and Optical AWL**

  Radio-controlled remote flash units can be used simultaneously with units controlled via optical AWL. For more information, see "Combined Radio and Optical AWL" (page 40).

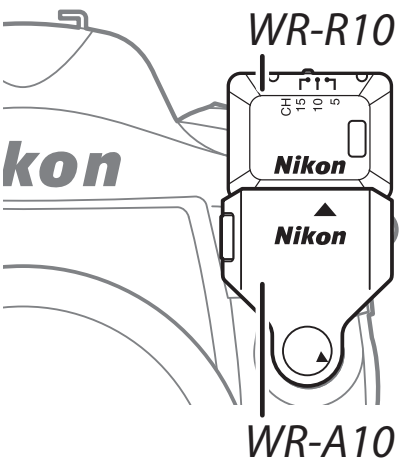


Follow the steps below to establish a wireless connection between the camera and remote flash units.

Adjusting Camera Settings

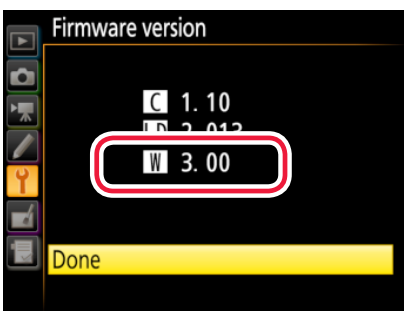
1 Connect a WR-R10.

Connect a WR-R10 to the camera ten-pin terminal. A WR-A10 WR adapter is required.



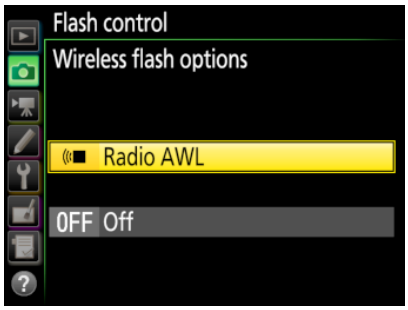
WR-R10 Firmware

After connecting the WR-R10, select **Firmware version** in the camera setup menu and confirm that the WR-R10 firmware is version 3.00 or later. Users of earlier versions will need to request an update from a Nikon-authorized service representative.



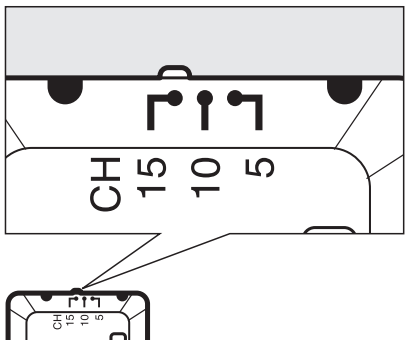
2 Enable radio AWL.

In the photo shooting menu, select **Radio AWL** for **Flash control** > **Wireless flash options**.



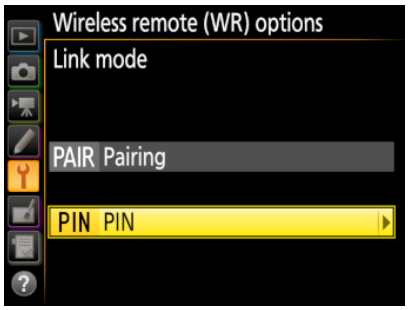
3 Set the WR-R10 to the desired channel.

Slide the channel selector to the desired channel (the illustration shows Channel 15 selected).



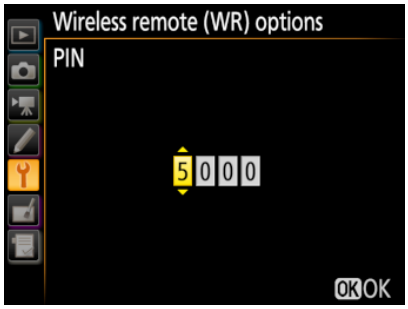
4 Choose PIN mode.

In the setup menu, select **PIN** for **Wireless remote (WR) options** > **Link mode** (for information on connecting using **Pairing**, see page 16).



5 Choose a PIN.

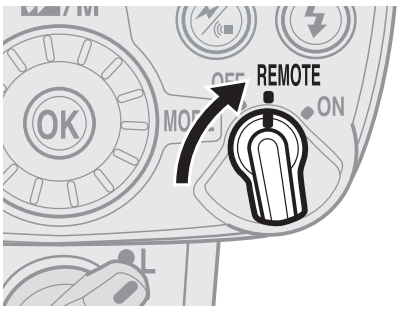
When prompted, enter a four-digit PIN of your choosing and press OK. There is no need to change the PIN if you have entered it already.



Adjusting Flash Unit Settings

1 Select remote mode.

Rotate the power switch to **REMOTE**.

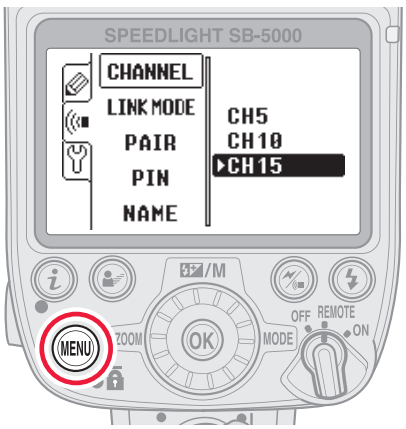


2 Select mode.

Press the wireless setting button to cycle through remote modes until (“radio control remote”) is displayed.

3 Choose the channel.

Press the **MENU** button, highlight **CHANNEL** in the “wireless item” tab, and press **OK**. Highlight the channel selected in Step 3 of “Adjusting Camera Settings” (page 11; the illustration shows Channel 15 highlighted) and press **OK**.



4 Choose PIN mode.

In the "wireless item" tab, highlight **LINK MODE**, press **OK**, and then highlight **PIN** and press **OK**.

5 Enter the camera PIN.

In the "wireless item" tab, highlight **PIN** and press **OK**. Use the rotary multi selector to enter the four-digit PIN selected in Step 5 of "Adjusting Camera Settings" (page 11), pressing ◀ or ▶ to highlight digits and ▲ or ▼ to change.

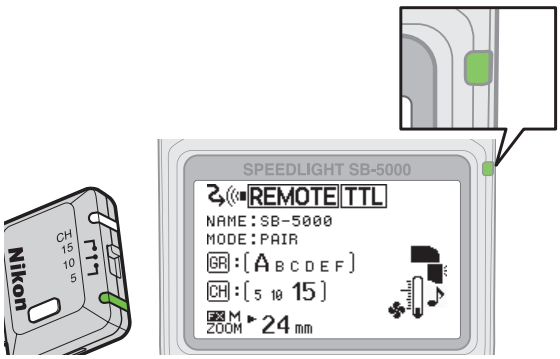
The camera and flash unit are now connected. For more information, see "Taking Photos with Radio AWL" (page 18).

Checking the Connection

Check the LEDs on the WR-R10 and flash unit to confirm that a connection has been established. Once a connection has been established, it will automatically resume when radio AWL is selected, unless settings such as the channel or link mode are changed.

Connection Established

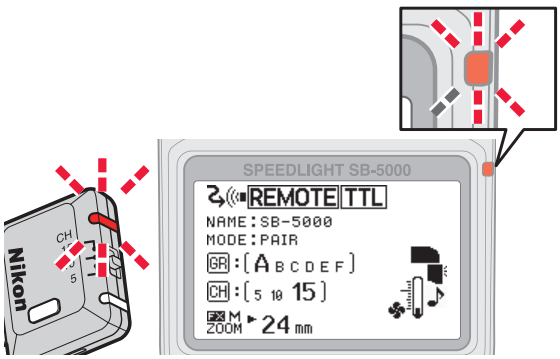
The LED on the WR-R10 and the LINK indicator on the flash unit will light green when a connection is established.



Lights green *Lights green*

Connection Failed

If the devices are unable to connect, the LED on the WR-R10 will blink red and the LINK indicator on the flash unit will blink orange. See page 51 for more information.



Blinks red *Blinks orange*

Link Mode

The "link mode" determines how the camera connects to the flash unit. There are two link modes—"pairing" and "PIN"—each with different features.

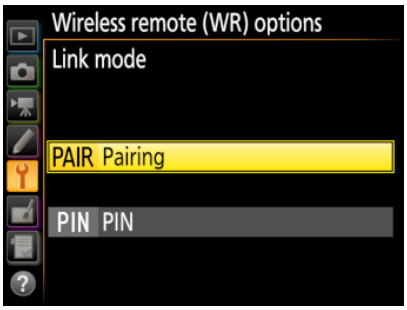
- **Pairing:** The camera connects only to devices with which it has previously been paired, preventing signal interference from other devices in the vicinity. Given that each device must be paired separately, **PIN** is recommended when connecting to a large number of devices. ***Recommended for*** photographers who use radio AWL exclusively with one or two specific flash units.
- **PIN:** Communication is shared among all devices with the same four-digit PIN, making this a good choice for photography featuring a large number of remote devices. If there are multiple cameras present that share the same PIN, the flash units will be under the sole control of the camera that connects first, preventing all other cameras from connecting (the LEDs on the WR-R10 units connected to the affected cameras will blink). ***Recommended for*** scenes that require large numbers of flash units or if different cameras, flash units, or WR-R10 units will be used on different occasions.

Connecting in Pairing Mode

Perform the following steps after completing Step 3 of both "Adjusting Camera Settings" and "Adjusting Flash Unit Settings".

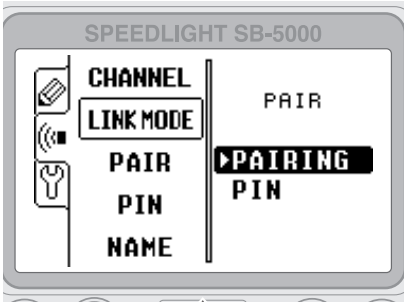
1 Select **Pairing** on the camera.

Select **Wireless remote (WR) options** > **Link mode** > **Pairing** in the camera setup menu.



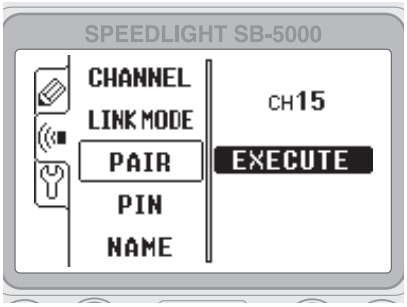
2 Select **PAIRING** on the flash unit.

Press the **MENU** button, go to the "wireless item" tab, select **LINK MODE**, and then highlight **PAIRING** and press **OK**.



3 Ready the flash unit for pairing.

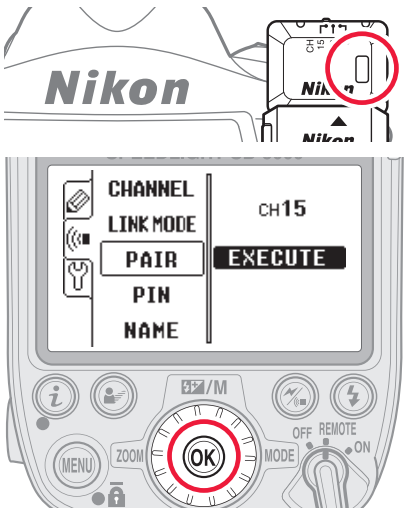
Highlight **PAIR** and press **OK**. **EXECUTE** will be highlighted in the display.



This step involves both the camera and the flash unit. Have them ready side-by-side before proceeding.

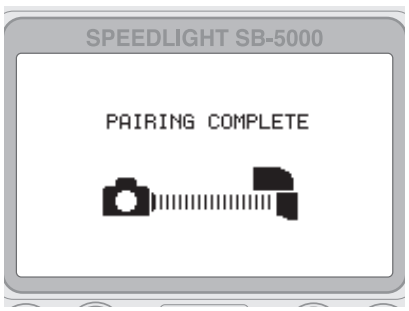
4 Pair the devices.

Press the **OK** button on the flash unit and then the pairing button on the WR-R10. Wait no longer than about a second between pressing the two buttons. The LINK indicator on the flash unit and the LED on the WR-R10 will blink alternately green and orange.

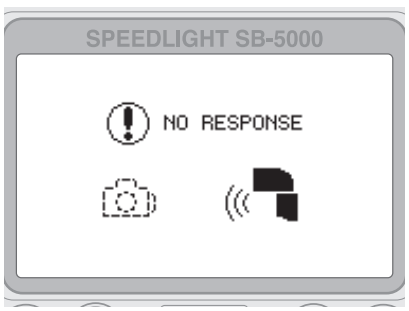


5 Confirm that pairing is complete.

Pairing is complete when the LINK indicator and LED turn green and the flash unit displays the message "PAIRING COMPLETE". You will not need to perform pairing again when connecting the devices in future.



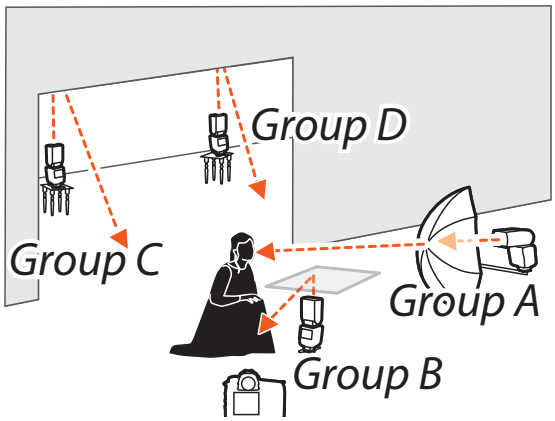
If you wait too long between pressing the buttons on the two devices, pairing will fail and the flash unit will display the message "NO RESPONSE". Return to Step 4.



Taking Photos with Radio AWL

Learn the techniques used to take the photo below.

The subject was lit by flash units placed under and beside the table at her feet. Two more units were used to light the room in the background.



■ **Remote flash control**: Group flash (A, C, D: **M** 1/32, B: **M** 1/32–0.3, SZ-4TN color filters on all units) ■ **Lens**: AF-S NIKKOR 70–200mm f/2.8E FL ED VR ■ **Focal length**: 95 mm ■ **Exposure mode**: Manual ■ **Shutter speed**: 1/125 s ■ **Aperture**: f/2.8 ■ **ISO sensitivity**: ISO 1600

The procedure for taking this photo is detailed below. Steps marked "Try Me" are recommended but optional. Before proceeding, establish a connection between the camera and remote flash unit as described in "Connecting to Remote Flash Units" (page 10).

Name the remote flash units (page 20). Try Me

↓

Step 1: Group the remote flash units (page 22).

↓

Step 2: Position the remote flash units (page 24).

↓

Test-fire the remote flash units (page 25). Try Me

↓

Step 3: Adjust flash settings (page 26).

↓

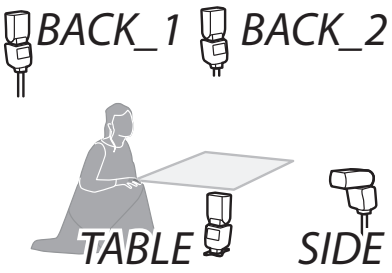
Step 4: Check flash status (page 28).

↓

Check modeling illumination (page 29). Try Me

Naming Remote Flash Units

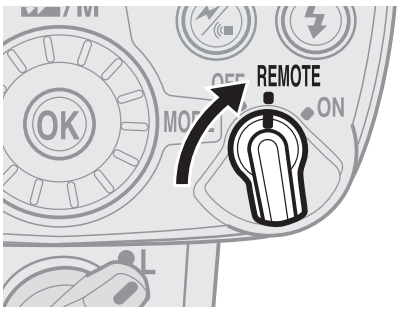
Try Me



SB-5000 flash units can be named, making it easier to check their status (page 28). Here we will name the units according to their positions: "SIDE" for the unit beside the subject, "TABLE" for the unit under the table, and "BACK_1" and "BACK_2" for units in the room behind the subject. Use the controls on each unit to enter its name as described below.

1 Select remote mode.

Rotate the power switch to **REMOTE**.



2 Select NAME.

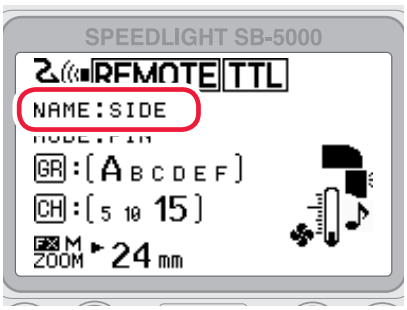
Press the **MENU** button, highlight **NAME** in the "wireless item" tab, and press **OK**. The current name will be highlighted; press **OK** to change the name.

3 Enter a name.

Highlight letters using the rotary multi selector and press **OK** to enter the highlighted character. Flash names can be up to 8 characters long. Highlight **OK** and press the **OK** button to exit when entry is complete.

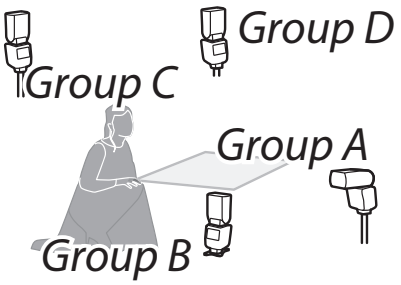
Viewing Flash Unit Names

The flash unit name is listed at the top of the flash display.



Step 1: Grouping Remote Flash Units

Use the controls on each flash unit to place it in a group as described below. This allows settings for each group, including flash mode and flash output, to be adjusted using camera controls.



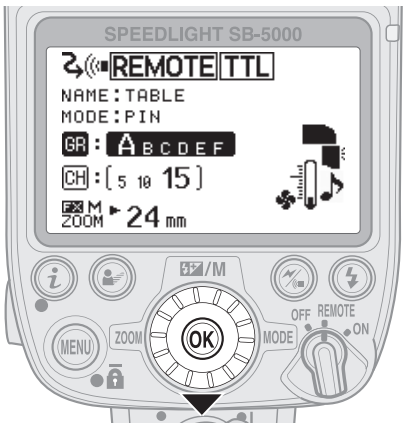
- **Group A**: SIDE
- **Group B**: TABLE
- **Group C**: BACK_1
- **Group D**: BACK_2

1 Select remote mode.

Rotate the power switch to **REMOTE**.

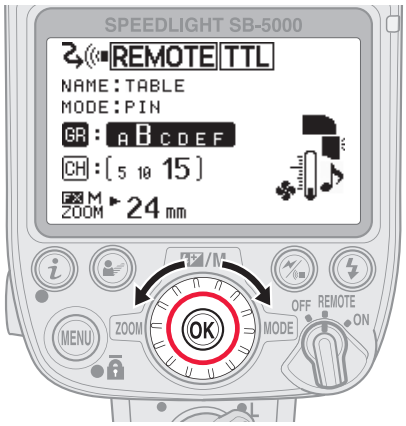
2 Highlight the group list.

Press the rotary multi selector ▼ to highlight the group list.



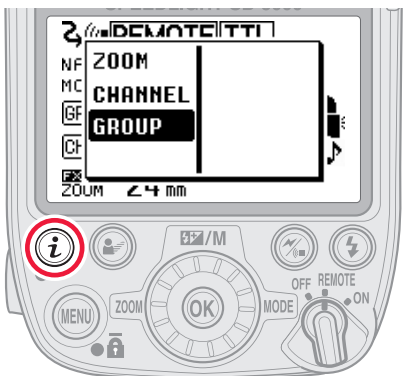
3 Choose a group.

Rotate the rotary multi selector to choose a group and press **OK**.



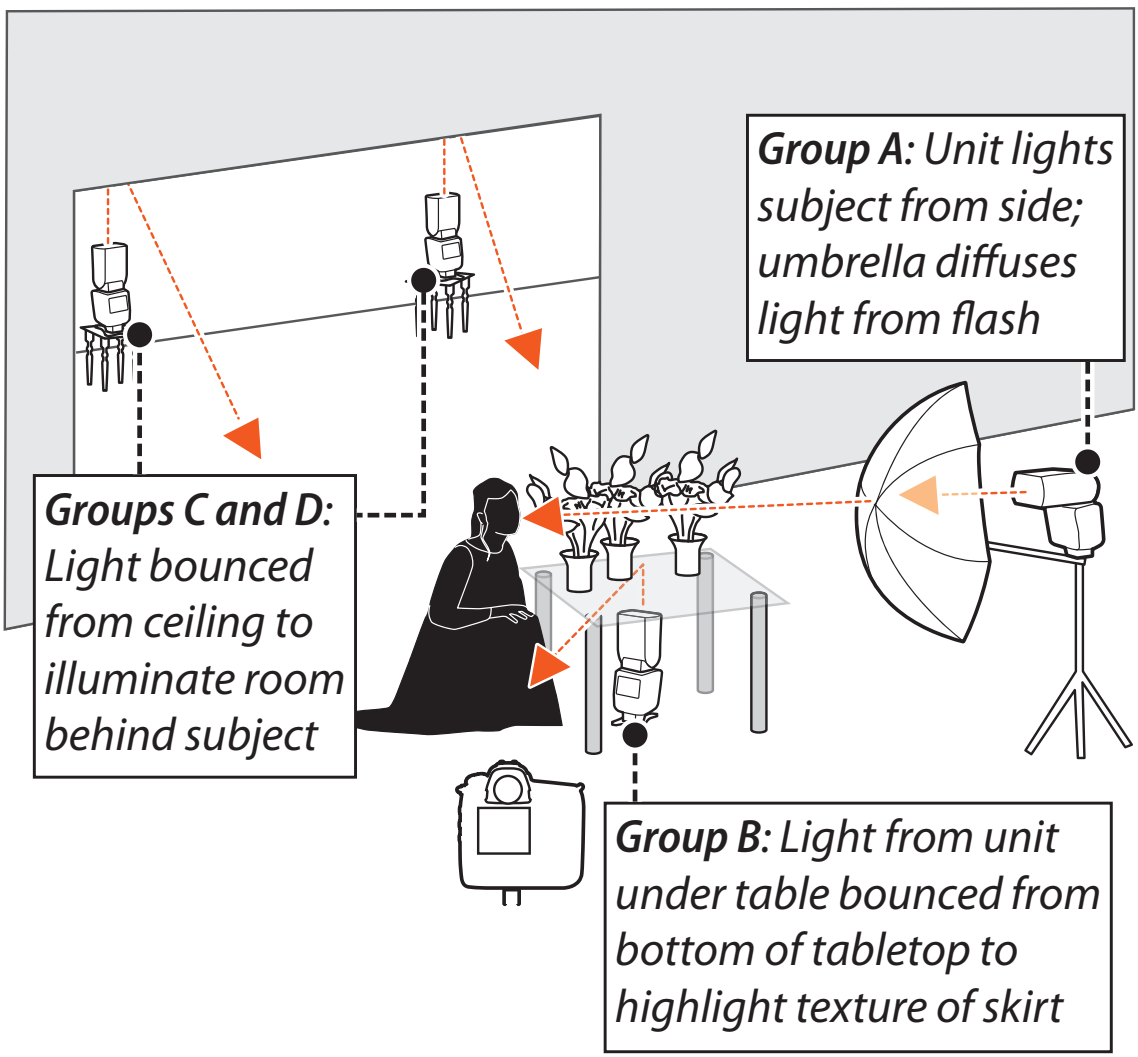
The *i*-Button Menu

Settings such as the group and channel can also be adjusted by pressing the *i* button and selecting the desired option in the *i*-button menu.



Step 2: Positioning Remote Flash Units

The flash units in this example were positioned as follows:



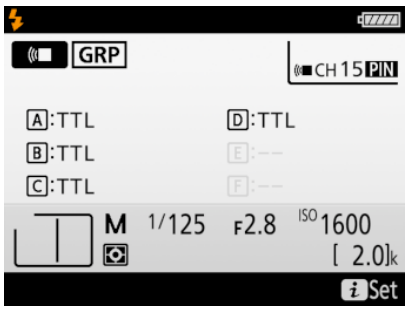
Test-Firing Remote Flash Units

Try Me

Test-fire the remote flash units to ensure that they are functioning correctly.

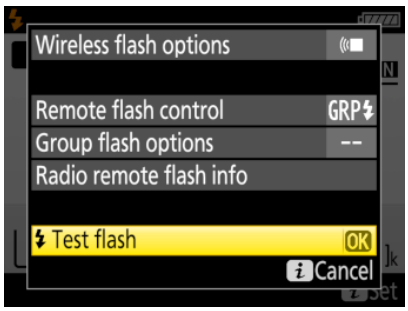
1 Display flash info.

Press the camera info button twice to display flash info (page 8).



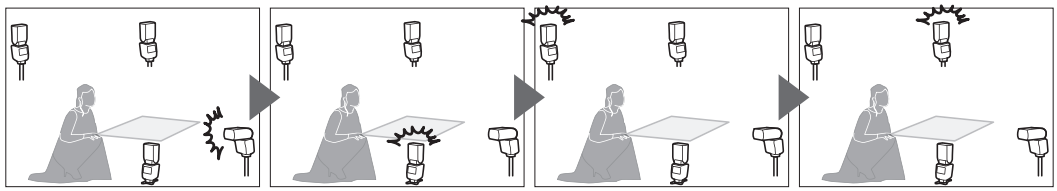
2 Highlight ϟ Test flash in the i-button menu.

Press the i button and highlight ϟ **Test flash**.



3 Test-fire the flash units.

Press OK to test-fire the flash units in order by group, starting from Group A. Units in groups that are disabled will also fire.

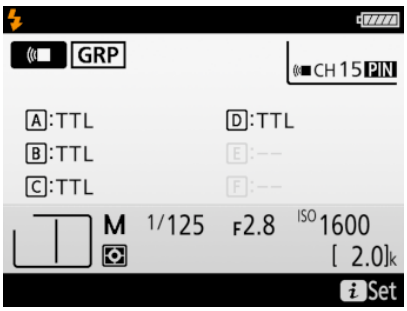


Step 3: Adjusting Flash Settings

Remote flash settings such as flash control mode and flash level are adjusted using camera controls, sparing you having to walk between units after placing them.

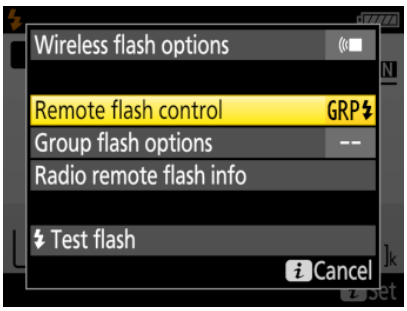
1 Display flash info.

Press the camera info button twice to display flash info (page 8).



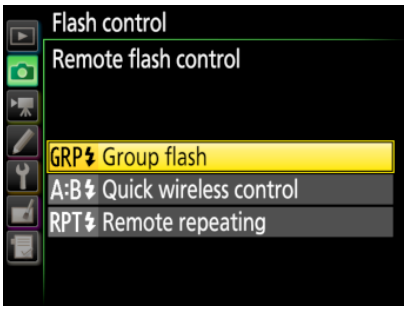
2 Select **Remote flash control** in the *i*-button menu.

Press the *i* button, highlight **Remote flash control**, and press OK.



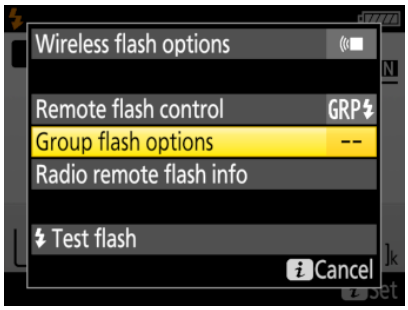
3 Select **Group flash.**

The photo in this example was taken using group flash control. Highlight **Group flash** and press OK to return to the *i*-button menu.



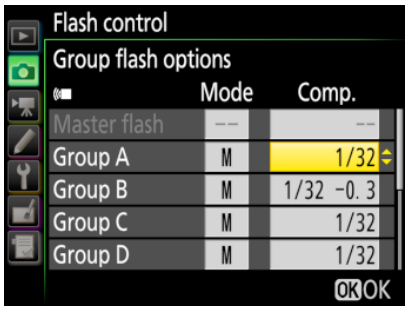
4 Select **Group flash options.**

Highlight **Group flash options** and press OK.



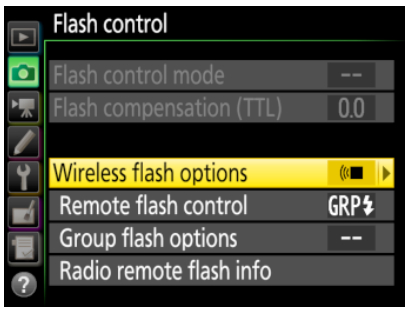
5 Adjust flash settings.

Use the multi selector to choose the flash control mode and flash level for the units in each group. Press ◀ or ▶ to highlight items and ▲ or ▼ to change, and then press OK when settings are complete. The settings used for the photo in the current example are shown in the illustration.



The Photo Shooting Menu

During live view or whenever you are unable to access the **i**-button menu, you can adjust flash settings using the **Flash control** option in the photo shooting menu. You can also add **Flash control** to My Menu for quick access (page 38).

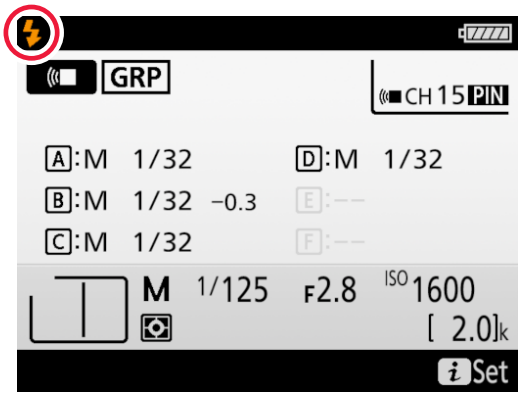


Step 4: Checking Flash Status

When the remote flash units are ready to fire, their flash-ready lights will turn on and flash-ready indicators will appear in the following camera displays:

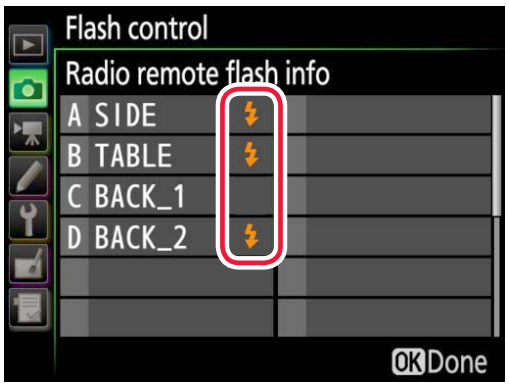
- **The viewfinder and flash info display:** A flash-ready indicator (ϟ) appears in the viewfinder and flash info display when all remote flash units are ready to fire. If the indicator is not displayed, one or more of the units may be unable to fire normally.

Viewfinder



Flash info display

- **The radio remote flash info display:** To list the status of each remote flash unit separately, select **Flash control** > **Radio remote flash info** in the photo shooting menu or the menu displayed by pressing the *i* button in the flash info display. Units not marked by a flash ready indicator may be unable to fire normally.



Modeling Illumination

Try Me

Use modeling illumination to test the effects of current flash placement and settings on light levels and shadows.

After confirming that all units are ready to fire, press the button to which **Preview** has been assigned using Custom Setting f1 (**Custom control assignment**). The remote flash units will light for about a second to show the light balance that would be achieved if they were fired at current settings. Adjust flash placement, output, and other settings until the desired results are achieved.

Modeling Illumination

Modeling illumination is not available during live view or if **Off** is selected for Custom Setting e5 (**Modeling flash**).

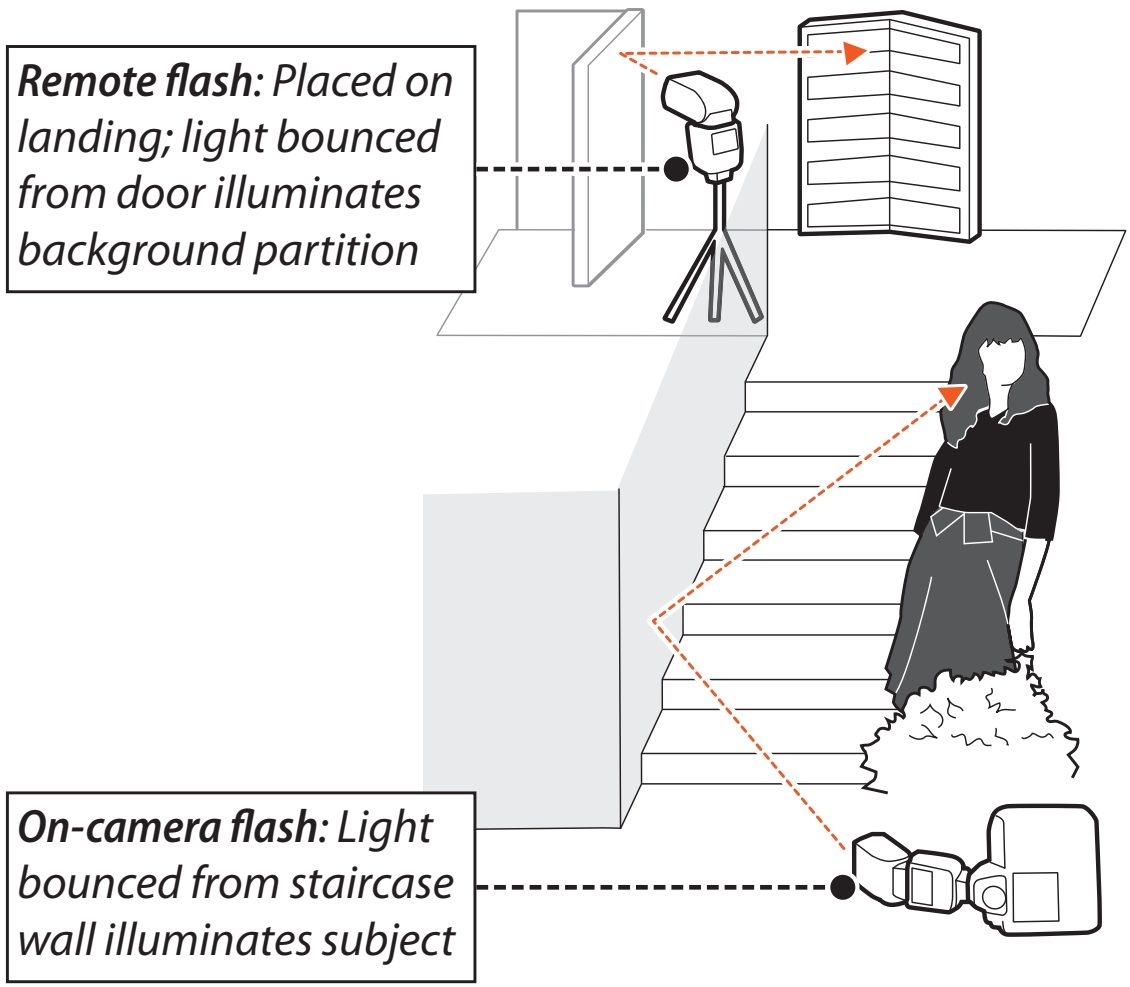
Read this section for some examples of how radio AWL can be used with remote flash units.

Adding an On-Camera Flash

You can light the main subject with a flash unit mounted on the camera accessory shoe while using remote radio-controlled units to light the background.

■ **Remote flash control**: Group flash (Master: **M** ¼, A: **M** ½ with SZ-4TN color filter) ■ **Lens**: AF-S NIKKOR 24–70mm f/2.8E ED VR ■ **Focal length**: 50 mm ■ **Exposure mode**: Manual ■ **Shutter speed**: 1/125 s ■ **Aperture**: f/3.5 ■ **ISO sensitivity**: ISO 400

Light from the flash on the camera accessory shoe is bounced from a wall to illuminate the main subject, while the partition in the background is lit with remote flash units. As radio control is unaffected by obstructions, the remote units need not be visible from the camera.



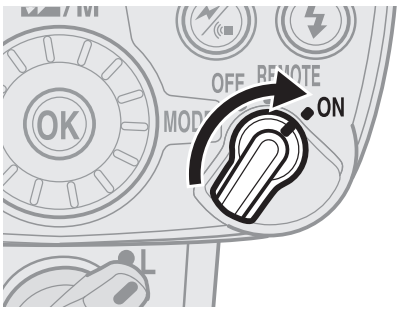
The Master Flash

How you will adjust settings for the unit mounted on the camera accessory shoe (the "master flash") depends on whether it supports unified flash control (page 49).

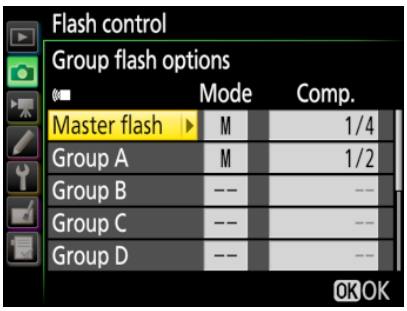
Units That Support Unified Flash Control

The SB-5000, SB-500, SB-400, and SB-300 support unified flash control, allowing settings to be adjusted using camera controls.

After attaching the unit to the camera accessory shoe, turn it on (the SB-5000 is shown; if you are using an SB-500, rotate the power switch to ϟ).



Use camera controls to adjust flash mode, flash level, and other settings for the master flash. You can also use an SB-5000 flash unit mounted on the camera accessory shoe to adjust settings for remote flash units (page 34).



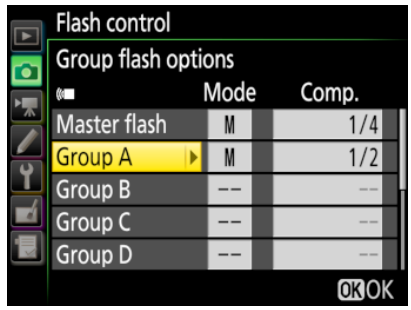
Other Flash Units

Flash units such as the SB-910, SB-900, SB-800, SB-700, and SB-600 do not support unified flash control, meaning that settings must be adjusted using the controls on the flash unit. Units that do not support the Nikon Creative Lighting System (CLS) can be used in non-TTL auto (A) or manual flash control mode.

After attaching the unit to the camera accessory shoe, turn it on and adjust flash mode, flash level, and other settings as you would for a stand-alone flash unit.

Remote Flash Units

After selecting **Wireless flash options** > **Radio AWL** and connecting to the remote flash units, adjust settings for the units in groups A through F.

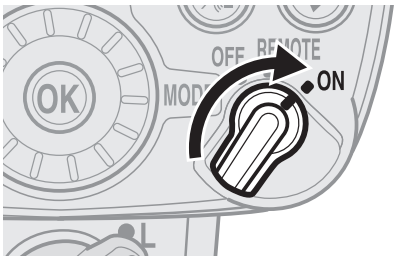


Using an SB-5000 to Control All Flash Units

When an SB-5000 is mounted on the camera accessory shoe, its controls can be used to adjust settings both for the master flash and for all remote units controlled via radio AWL.

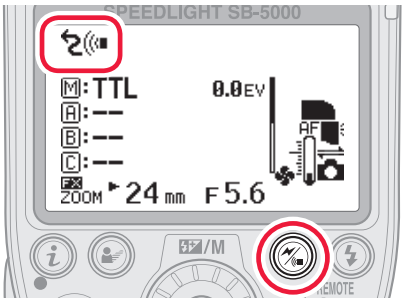
1 Turn on the SB-5000.

Rotate the power switch to **ON**.



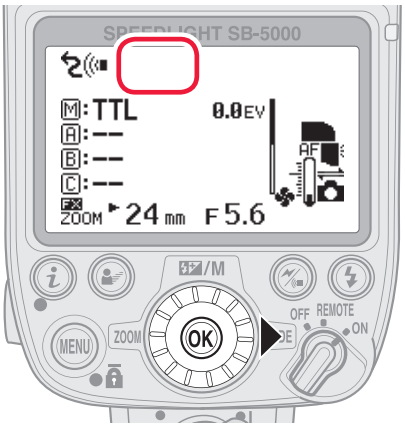
2 Select mode.

Press the wireless setting button to cycle through remote modes until (“radio control master”) is displayed.



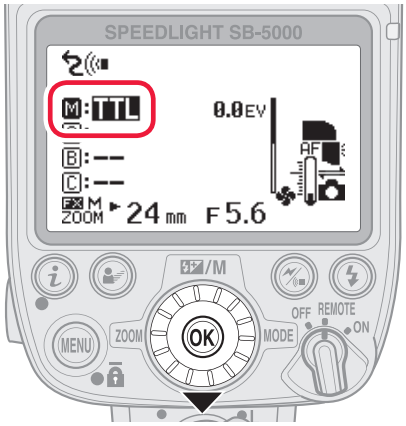
3 Choose a remote flash control mode.

Press the rotary multi selector ▶ and choose a remote flash control mode (if you select group flash, as in this example, no icon will be displayed).



4 Place the cursor in group settings.

Press the rotary multi selector ▼ to highlight master flash settings.



5 Adjust settings.

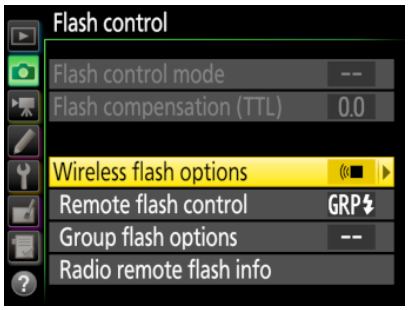
Use the rotary multi selector to adjust settings for each group. Press ▲ or ▼ to choose a group, press ◀ or ▶ to highlight items, and rotate the selector to choose settings.

Attaching an SB-5000

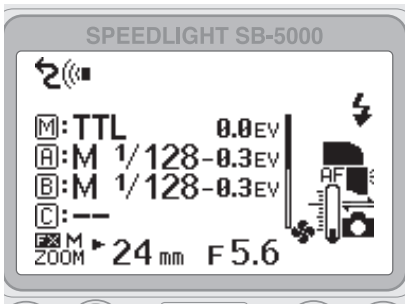
When an SB-5000 is attached and turned on, the settings in the camera **Flash control** menu will automatically be updated to reflect the settings previously selected with the flash unit. The original settings are not restored when the flash unit is removed (page 54).

Using Radio AWL in Live View

The information display, and by extension the flash info display (page 26), cannot be viewed by pressing the INFO button during live view. Master and remote flash settings can be adjusted using either of the following two methods:



- **The photo shooting menu:** Use **Flash control** > **Remote flash control** or **Group flash options** in the photo shooting menu to adjust the settings for each group. If desired, you can add **Group flash options** to My Menu for quick access (page 38).



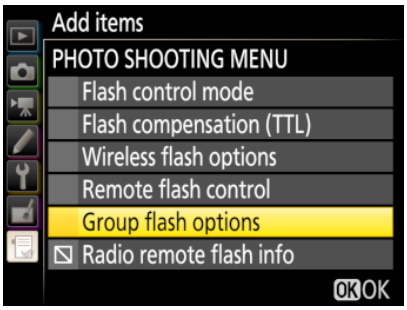
- **Flash unit controls:** Adjust settings using an SB-5000 mounted on the camera accessory shoe as described in "Using an SB-5000 to Control All Flash Units" (page 34).

Viewing Group Flash Options at the Touch of a Button

My Menu can be combined with custom controls to display the photo shooting menu **Flash control** > **Group flash options** item at the touch of a button, even during live view.

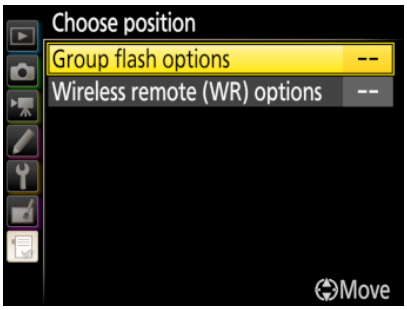
1 Add **Group flash options** to My Menu.

In My Menu, select **Add items** > **PHOTO SHOOTING MENU**, then highlight **Group flash options** under **Flash control** and press OK.



2 Move **Group flash options** to the top of My Menu.

Select **Choose position** and move **Group flash options** to the top (use **Rank items** to reorder the items as desired at any time).

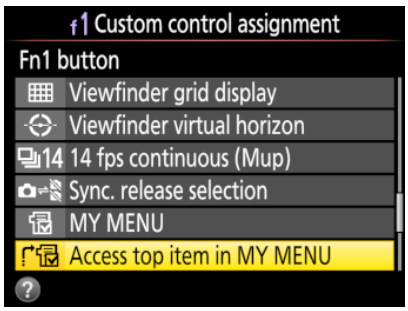


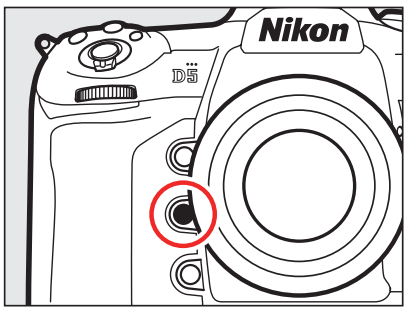
3 Choose a control.

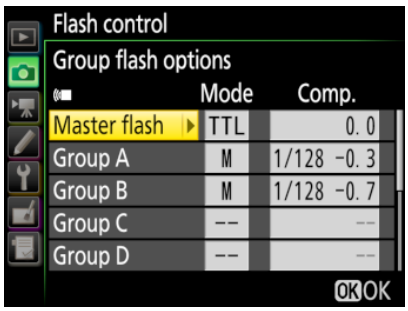
Select Custom Setting f1 (**Custom control assignment**) and choose the control that will be used to access the top item in My Menu (here the **Fn1** button is selected, but you could also choose the **Pv** or **Fn2** button, the **Fn** button for vertical shooting, or the center of the sub-selector).

4 Select **Access top item in MY MENU**.

You can now use the selected button to display **Group flash options** during viewfinder photography or live view.





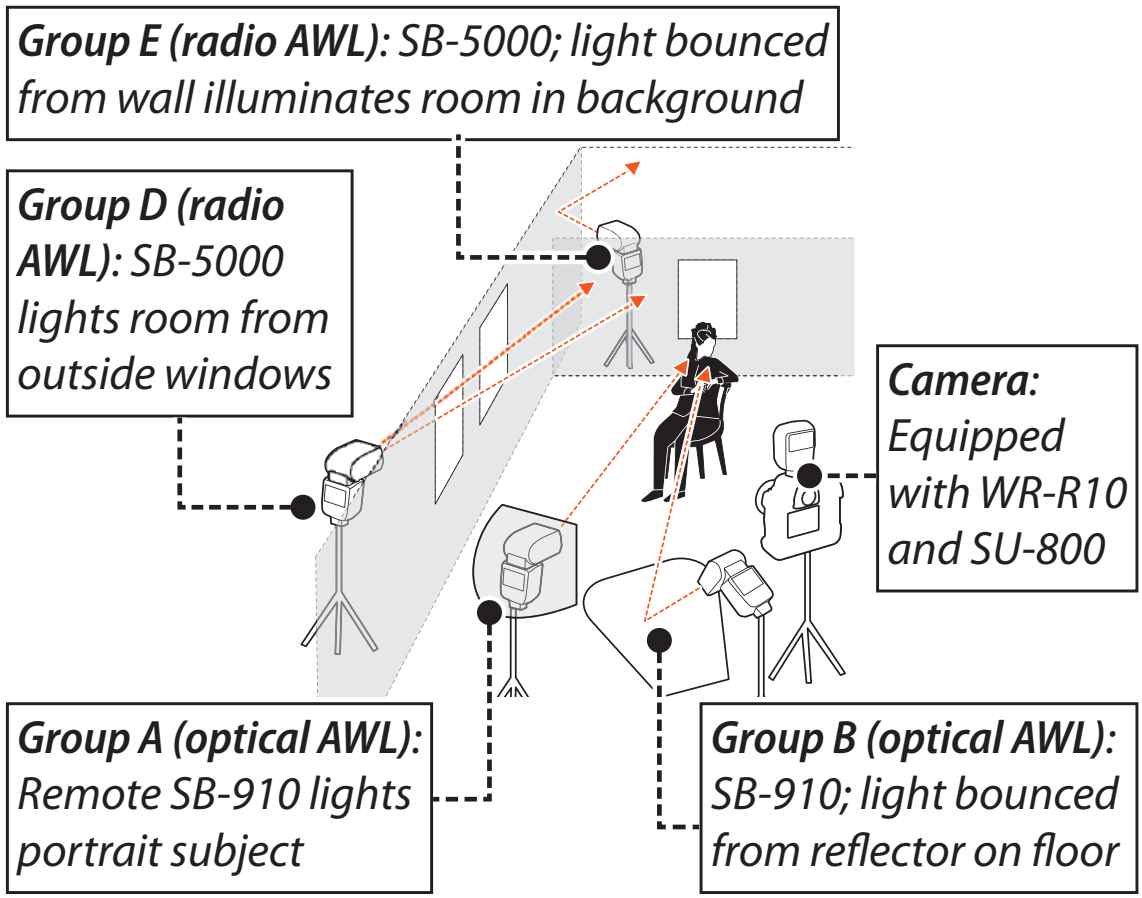


Combined Radio and Optical AWL

Radio AWL can be combined with optical AWL. For example, you could position a lone radio-controlled SB-5000 out of line of sight behind a wall or other object and use optical AWL with SB-910 or other units already in your collection serving as master and remote flashes.

■ **Remote flash control**: Group flash (A: **M** 1/64, B: **M** 1/128, D: **M** 1/32, E: **M** 1/16–0.7)
■ **Lens**: AF-S NIKKOR 24–70mm f/2.8E ED VR
■ **Focal length**: 34 mm ■ **Exposure mode**: Manual
■ **Shutter speed**: 1/125 s ■ **Aperture**: f/2.8 ■ **ISO sensitivity**: ISO 400

In this example, the portrait subject is lit using remote units in Groups A and B controlled via *optical AWL* by an SU-800 commander mounted on the camera accessory shoe, while background lighting is provided by units in Groups D and E placed where optical signals will not reach and controlled via *radio AWL*.



Optical AWL

Designate the unit on the camera accessory shoe as the master flash and use the controls on the master flash to adjust settings for the master and remote flash units (you will, however, need to use **Group flash options** in the camera menus to adjust settings if the master flash is an SB-500).

As of March 2017, optical AWL is available with an SB-910, SB-900, SB-800, SB-700, SB-500, or SU-800 mounted on the camera accessory shoe and serving as a master flash. The SB-5000 cannot be used as a master flash for combined optical and radio AWL.

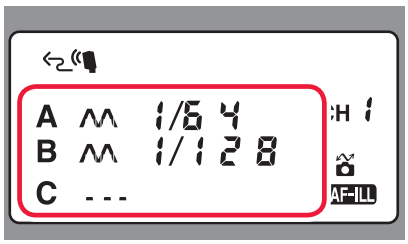
Radio AWL

After attaching a WR-R10 to the camera and establishing wireless connections to the remote flash units, adjust flash settings using **Group flash options** in the camera menus. If an SB-500 is mounted on the camera accessory shoe, choose **Optical/radio AWL** for **Flash control** > **Wireless flash options** (if any other type is mounted on the accessory shoe, this will be the only option available). The only option available for **Remote flash control** will be **Group flash**.

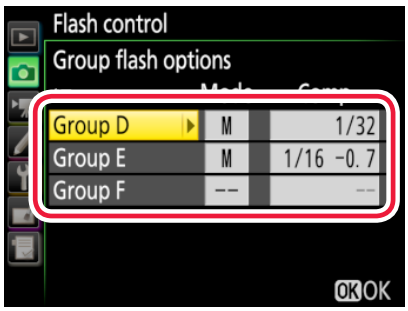
Important: Group Selection

When grouping flash units for combined optical and radio AWL:

- Place the optically-controlled units in Groups A through C.

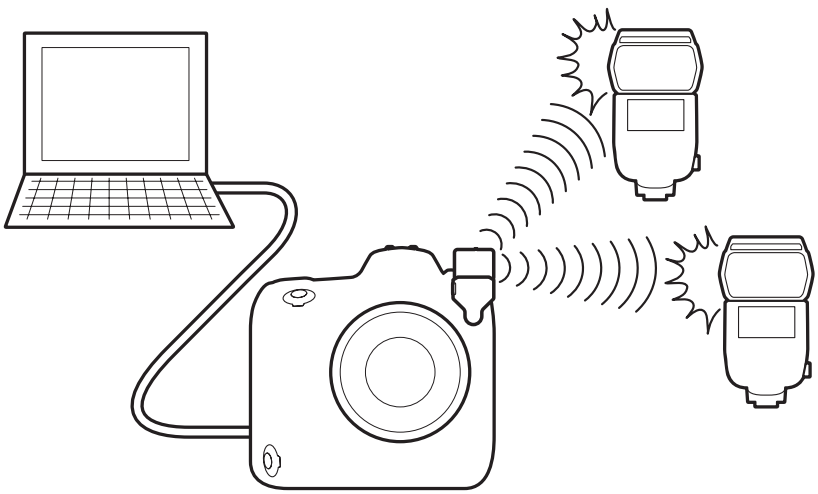


- Place the radio-controlled units in Groups D through F.

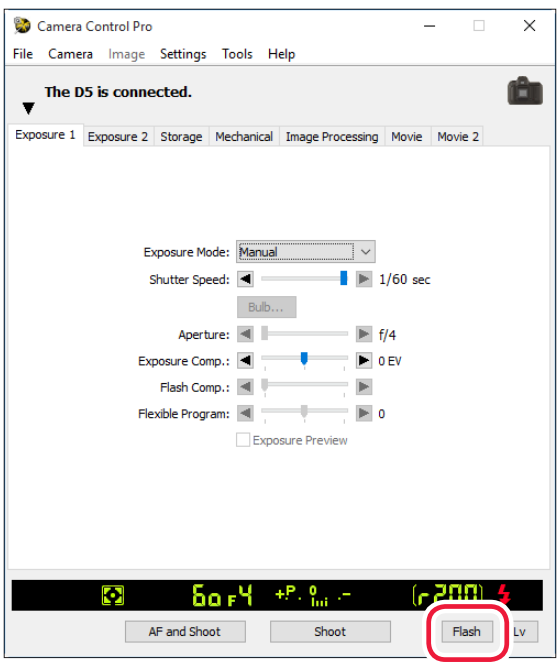


Adjusting Flash Settings from a Computer

Nikon's Camera Control Pro 2 software can be used to control cameras connected to the computer via USB, allowing pictures to be viewed on the computer as they are taken. The flash control options offered by Camera Control Pro 2 are similar to those in the camera **Flash control** menu.



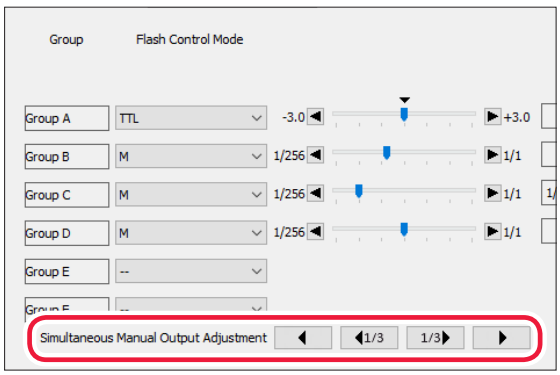
Click **Flash** to view flash control options. Use Camera Control Pro 2 version 2.23.0 or later and note that flash setting adjustment is available only with shoe-mounted SB-5000, SB-500, SB-400, and SB-300 flash units and flash units controlled via a WR-R10.



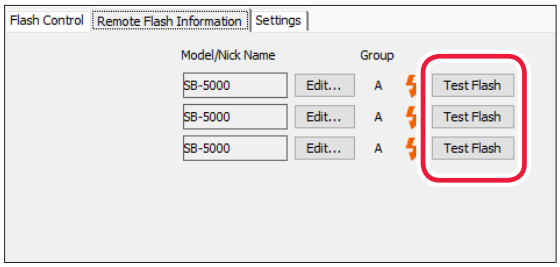
Camera Control Pro 2 offers the following options—some of which are otherwise only available from the camera and others only from remote flash units—giving you one-stop access to the full range of flash settings:

	Camera Control Pro 2	Camera	Remote flash units
Choose flash control mode and flash level	✔	✔	—
Apply flash compensation to all groups in manual mode[1]	✔	—	—
Name remote flash units	✔	—	✔
View remote flash info	✔	✔	—
Test-fire all remote units	✔	✔	—
Test-fire selected units[2]	✔	—	—
Save/load settings	✔	✔	—

1. Flash output can be raised or lowered across all groups in steps of ⅓ or 1 EV.

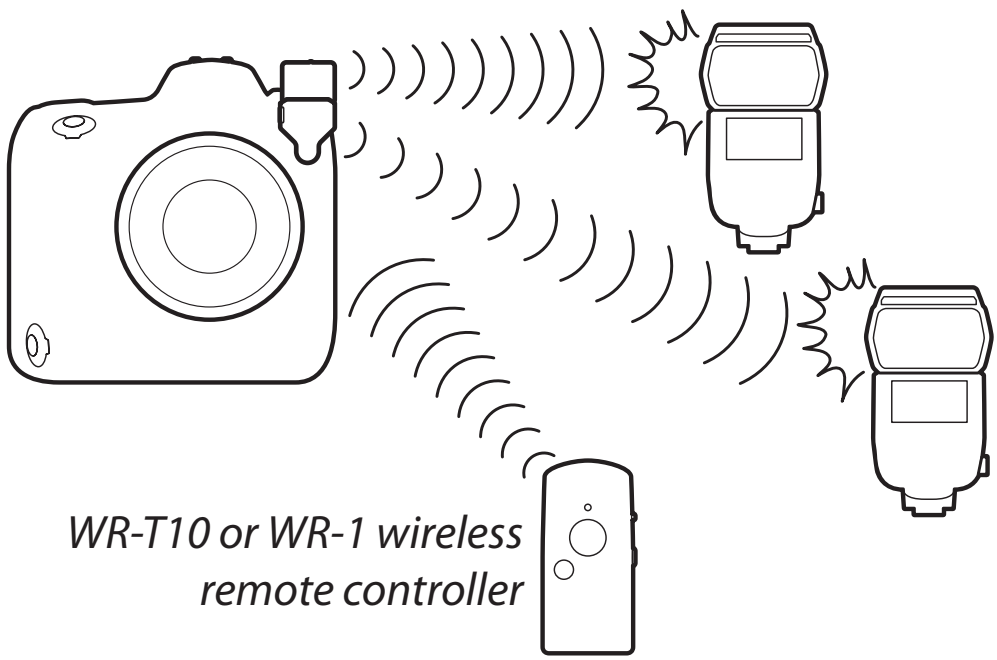


2. Test-fire selected units to check placement and flash control.



Using a Remote Control

The WR-R10 can also be used as a receiver for WR-T10 or WR-1 wireless remote controllers, letting you release the shutter at a distance from the camera. Using the WR-R10 for remote release does not interfere with radio AWL, meaning that remote release can be combined with flash photography using radio-controlled remote flash units.



WR-T10 or WR-1 wireless remote controller

Glossary

Advanced Wireless Lighting (AWL)	A form of wireless remote flash control compatible with the Nikon **C**reative **L**ighting **S**ystem (CLS).
channel	A radio band. Devices can communicate with others on the same channel and avoid interference from devices on other channels.
flash info	A camera display of flash information.
flash-ready indicator	A lamp or icon showing that the flash is ready to fire.
group	A collection of one or more remote flash units controlled as a unit.
group flash control	A remote flash control mode allowing group-by-group adjustments to flash mode and flash level for master and remote flash units.
link mode	The method (pairing or PIN) used to establish connections between devices for radio AWL.
master flash	In wireless flash control, the flash unit mounted on the camera.
modeling illumination	A lighting check in which the flash units that will be used in the final photograph light for about a second.
Nikon Creative Lighting System (CLS)	A lighting system unique to Nikon cameras and flash units.

off-camera lighting	Lighting provided by flash units not mounted on the camera. Subjects can be lit from a variety of angles, adding depth. The need for cables connecting the remote units to the camera can be eliminated by using wireless off-camera lighting for more flexible flash placement.
optical AWL	A form of **A**dvanced **W**ireless **L**ighting in which remote flash units are controlled by means of low-intensity light pulses emitted by a master flash. The remote units controlled via optical signals must be in line of sight of the master flash.
optical/radio AWL	A form of **A**dvanced **W**ireless **L**ighting in which some remote flash units are controlled via optical signals and others via radio signals.
pairing	A process used to link the WR-R10 with remote flash units for wireless communication.
pairing mode	A wireless mode in which the WR-R10 connects to remote flash units with which it has previously been paired.
PIN	A four-digit authentication code ("**p**ersonal **i**dentification **n**umber") used to identify devices in a wireless network.
PIN mode	A wireless mode in which the WR-R10 connects to remote flash units with the same PIN as the camera.

quick wireless control	A remote flash control mode in which the user controls the balance between Groups A and B while setting output for Group C manually.
radio AWL	A form of **A**dvanced **W**ireless **L**ighting in which remote flash units are controlled by means of radio signals.
remote flash	A flash commanded by the camera or a master flash during wireless flash photography.
remote repeating	A remote flash control mode in which the flash units fire repeatedly while the shutter is open, creating a multiple-exposure effect.
test-fire	To fire flash units to test their functioning.
unified flash control	A system for sharing flash unit settings, allowing flash settings to be viewed and adjusted from compatible cameras or Camera Control Pro 2.

Troubleshooting

If the camera or flash units fail to function as expected, check the list of common problems below before consulting your retailer or Nikon-authorized service representative.

The LED (WR-R10) or LINK indicator (SB-5000) blinks.

- The wireless connection has failed (page 14).
- The LED on the WR-R10 lights green when a connection is established, blinks red when there is no connection, flashes if another camera has already established a connection to remote flash units using the same PIN (PIN mode only), and blinks green when **Off** or **Optical AWL** is selected for **Wireless flash options** in the camera menus.
- The LINK indicator on the SB-5000 lights green when a connection is established and blinks orange when there is no connection or the unit is in standby mode.
- If you attempt to add flash units beyond the maximum of 18, the LINK indicators on the new units will blink orange to show they are unable to connect, but the LED on the WR-R10 will remain green to show that the existing connections are still in effect.

The camera is unable to connect with remote flash units via radio AWL.

- Confirm that:
  - **Radio AWL** or **Optical/radio AWL** is selected for **Wireless flash options** in the camera menus (page 10).
  - The remote flash units are in (“radio control remote”) mode (page 12).
  - The channel selected with the WR-R10 matches those on the remote flash units (page 10, 12).
  - The link mode and (in PIN mode) PIN selected with the camera match those on the remote flash units (page 10, 12).
  - Other cameras with the same PIN are off (PIN mode only). If several cameras with the same PIN are operating in the vicinity, the remote flash units will connect only to the first camera detected.
  - The remote flash units are paired with the WR-R10 (pairing mode only; page 16). Note that pairing will fail if:
    - the camera and flash units are more than about 30 cm (1 ft) apart, or
    - you wait longer than about a second between pressing the buttons on the flash units and WR-R10.
  - Radio-controlled flash units for **Optical/radio AWL** are in Groups D through F.
- If an SB-5000 is attached, camera **Flash control** settings will be overwritten by the settings current on the SB-5000 when the unit is turned on and will not be restored even when the unit is removed (page 36). In this case the original settings must be restored manually.

- If you are still unable to connect after confirming the points above, turn the camera and remote flash units off and then on again.

Radio control is unreliable.

- Confirm that the remote flash units are within range. The maximum range for radio control when the units are approximately 1.2 m (4 ft) off the ground is around 30 m (98 ft), but may be less depending on weather conditions, flash placement, signal strength, and the presence of obstructions.
  - Range generally increases with height.
  - Range decreases in grassy or marshy areas.
  - At heights of less than about 30 cm (1 ft), radio signals are absorbed by the ground and range falls off dramatically.
- Check for interference from other wireless devices operating in the vicinity.
  - Radio control may be unavailable in environments with high concentrations of wireless devices (such as cell phones and smartphones) or services (such as Wi-Fi access points or cell towers).
  - Radio AWL may only be affected by devices or services operating in the 2.4 GHz band.
  - You may be able to resolve the issue by changing the channel used for radio AWL.

The LED (WR-R10) and LINK indicator (SB-5000) light green but the flash units do not fire when the shutter-release button is pressed all the way down.

- The flash units will not fire when:
  - "Off" is selected for flash mode,
  - photographs are taken in movie mode (either in live view or during movie recording),
  - photographs are taken using HDR, or
  - **14 fps (mirror up)** is selected in continuous high-speed (**CH**) release mode.
- Confirm that a flash control mode is selected for the affected group in the camera **Flash control** menu or flash info display (page 26). You can also check the flash control mode in the display on the back of the flash unit, which will show "--" if no mode is selected.
- If you press the shutter-release button all the way down in a single motion after the standby timer has expired, a photo may be taken before the camera has had time to detect remote flash units and the flash units may not fire.
- Flash units may not fire if the connection is unreliable.

Flash info is not displayed.

Flash info will only be displayed if:

- the WR-R10 is connected and configured for radio AWL (page 10), and
- live view is off (page 37).

Auto white balance does not produce the desired results when used with radio AWL.

In some circumstances, the camera may be unable to obtain the color temperature and other data needed to adjust auto white balance. If this occurs, set white balance to **Preset manual** or **Flash**.

The options selected for Flash control in the camera menus change without notice.

If an SB-5000 is attached, camera **Flash control** settings will be overwritten by the settings current on the SB-5000 when the unit is turned on and will not be restored even when the unit is removed (page 36). In this case the original settings must be restored manually.