



# FC-2500

Hand Held Controller



## Quick Reference Guide





# **FC-2500**

## **Quick Reference Guide**

Part Number 7010-0910

Rev A

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# Introduction

## The FC-2500 Digital Camera

The FC-2500 is not your everyday digital camera. The same CMOS imaging technology found in many digital cameras is present in this powerful and rugged computer (Figure 1-1).



Figure 1-1. The FC-2500 Hand-Held Computer

## Components of the FC-2500

The following are the components of the FC-2500 (Figure 1-2 on page 1-2):

- The FC-2500 is a 5 megapixel camera (4 megapixel processed).
- The FC-2500 has four illuminators that allows you to take pictures in low light conditions.
- The FC-2500 has two 635 nm red visible lasers that you can use to position objects and to align the FC-2500.

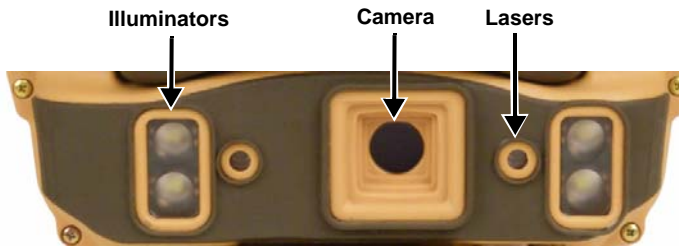


Figure 1-2. Components of the FC-2500 – Back View



Please refer to your *FC-2500 Operator's Manual* for a comprehensive glossary of photography and terms, and detailed instructions on how to change the settings mentioned in this companion guide.

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The key to taking great pictures with the FC-2500 digital camera is learning how to properly use it. Before warming up, take the time to know the FC-2500 to make consistently great quality pictures.



For a detailed description of all FC-2500 components (including indicators and interface connections) please refer to your *FC-2500 Operator's Manual*.

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## Positioning the FC-2500

The main difference between an off-the-shelf digital camera and the FC-2500 is how it is held. Whereas traditional cameras include a viewfinder and sometimes, an LCD display, the FC-2500's display **is** the viewfinder that operates on a horizontal plane. Instead of holding the FC-2500 up to your eye, you hold it in front of you, about waist high (or whatever is comfortable).



## Settings for the FC-2500

Some settings in the FC-2500 can be changed easily while others are more complex and should be left to the programmer. Depending on your application, things such as resolution, key controls, and options to save may already be set up for you (preprogrammed).

## Getting Started

Unlike conventional digital cameras, the FC-2500 does not have a menu system that allows users to directly change camera options, such as shutter speed and aperture. Because the FC-2500 is a computer capable of taking pictures, camera functionality is integrated into an application via eyeWARE.

eyeWARE is an API that enables an application to communicate with the FC-2500 to take and store pictures. One component of eyeWARE enables you to do the following:

- Store different camera settings (shutter speed, aperture, etc.)
- Picture storage information
- Key press functions in configuration files that you can load from your application to take a picture.

When you start eyeWARE, a configuration file is loaded. This activates the keys on the FC-2500 or you can use the buttons from your application to activate camera functions.

You don't have to write an application to take pictures just yet. Pre-programmed applications within eyeWARE Setup allow you to take pictures until you are ready to take your own.



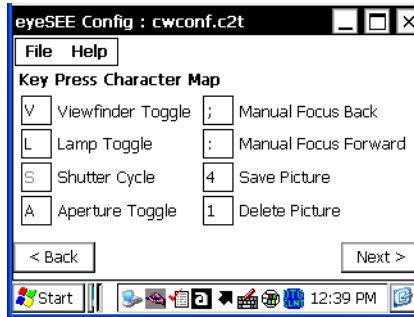
For complete instructions on how to change and save your settings, refer to the *FC-2500 Operator's Manual*.

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## Keypad Controls

When using eyeWARE with a standard 55-key joystick keypad, use the default control buttons on the **left** when taking pictures.??

Keypads on the FC-2500 can vary. Consequently, not all the functions listed in Figure 1-3 or in Table 1-1 on page 1-4 may work as described. In addition, functions listed on certain keypads may require you to write an application interface.



**Figure 1-3. Key Press Character Map**

Table 1-1 describes the buttons on the FC-2500 and their functions.

**Table 1-1. FC-2500 Button Functions**










Icon	Name	Function
	Camera	Takes a picture
	V	Viewfinder Toggle (Turns the viewfinder on and off)
	L	Lamp Toggle (Turns the lamp on and off)
	S	Shutter Toggle (Changes the shutter cycle)
	A	Aperture Toggle (Changes the aperture setting)

Table 1-1. FC-2500 Button Functions (Continued)

	Colon (:) (FUNC + O)	Manual Focus Forward (Changes the focus setting forward)
	Semicolon (;) (FUNC + P)	Manual Focus Back (Changes the focus setting backward)
	4	Saves the current picture
	1	Deletes the current picture



Create a custom keypad to work intuitively with your application.

## Camera Settings for the FC-2500

EyeSEE is the part of eyeWARE that allows you to create configuration files to change camera settings in your application and determine how eyeWARE works (Figure 1-4).



Figure 1-4. eyeSEE Configuration Screen

# EyeSetup Menu

To display the eyeSETUP menu, tap **Start ▶ Programs ▶ eyeWARE eyesee setup**. The *eyeSEE Config* screen displays. Table 1-2 on page 1-6 describes the menus on the *eyeSEE Config* screen (Figure 1-5, Figure 1-6 on page 1-7, and Figure 1-7 on page 1-7).

**Table 1-2. eyeSETUP Menu**

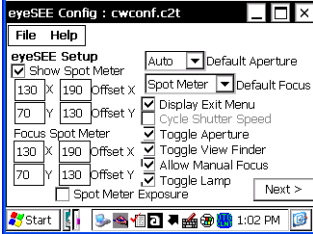
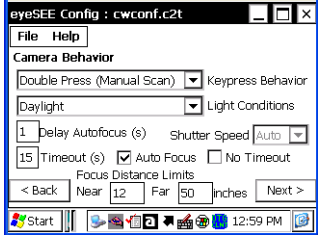
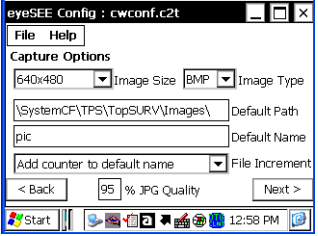
Menu Item	Menu Option/Description
	<p><b>Figure 1-5. eyeSEE Config Options Screen</b></p>
Aperture Settings	<p>FC-2500 has three aperture settings (Figure 1-5):</p> <ul style="list-style-type: none"> <li>• Auto</li> <li>• Large (F2.8)</li> <li>• Small (F8.0)</li> </ul> <p>The aperture diameter is expressed in f-stops. The lower the number, the larger the aperture and the more light that passes through to the sensor.</p>
Spot Meter	<p>The viewfinder consists of nine equal sections when you press the Camera button (Figure 1-5).</p> <p>The FC-2500 uses the center section to measure the amount of available light and to adjust the exposure accordingly (this process is known as Spot Meter Exposure).</p> <p>NOTE: Spot Meter can be enabled/disabled as required for different scenarios.</p>

Table 1-2. eyeSETUP Menu (Continued)

	
<b>Figure 1-6. Camera Behavior Options Screen</b>	
Light Conditions	<p>Enables you to configure the FC-2500 to compensate for different light conditions and environments (Figure 1-6). Select either Daylight, Cloudy, Tungsten, or Fluorescent.</p>
Shutter Speed	<p>The speed at which the shutter operates (Figure 1-6 on page 1-7).</p> <p>All resolutions, except QSXGA mode uses a preset video capture mode.</p> <p>If you are taking pictures of fast moving objects, a higher shutter speed is recommended to prevent a blurred image.</p>
	
<b>Figure 1-7. Capture Options Screen</b>	
Resolution	<p>The FC-2500 has four available resolutions (Figure 1-7):</p> <ul style="list-style-type: none"> <li>• 320x200 (HF)</li> <li>• 640x480 (VGA)</li> <li>• 1280x960 (SXVGA)</li> <li>• 2048x1944 (QSXGA)</li> </ul>

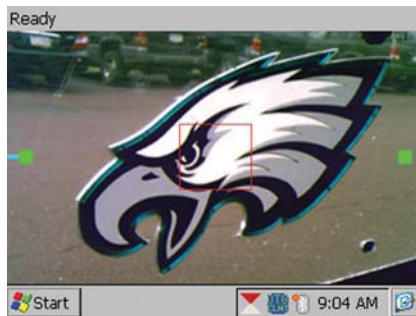
# The Viewfinder

Press the **Camera** button for eyeWARE to:

- Display the viewfinder screen
- Automatically put the camera in focus
- Calculate the exposure setting

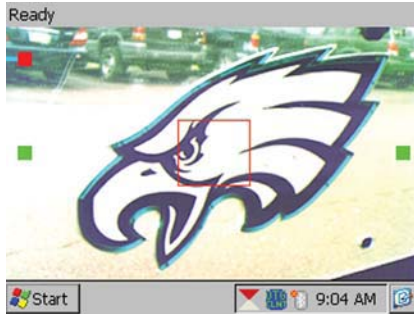
By default, a red square or Region of Interest (ROI) displays in the center of the viewfinder and a status bar displays at the top. A blue exposure bar displays on the left side of the viewfinder. As the exposure changes, the blue exposure bar moves up for a brighter exposure or down for a darker exposure. When the correct exposure has been reached, the bar remains still and a green box displays. To readjust the focus, place the center of the subject within the ROI and press **F4**. The viewfinder automatically closes if a picture is not taken within 15 seconds.??

When the focusing process completes, a green square displays on the right side of the viewfinder. When the exposure has stabilized, a green square displays on the left side of the viewfinder (Figure 1-8).



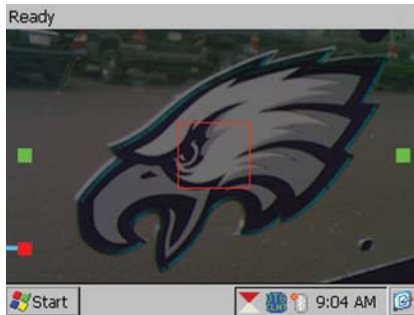
**Figure 1-8. The Focusing Process**

If the camera is overexposed, a red square displays in the top left section of the viewfinder. In this case, the mirror finish of the license plate causes a glare (Figure 1-9 on page 1-9).



**Figure 1-9. An Overexposed Picture**

If the camera has reached an underexposure limit, a red square appears in the top left section of the viewfinder. In this case, the mirror finish of the license plate is causing a glare (Figure 1-10).



**Figure 1-10. An Underexposed Picture**

# Taking a Photo Using the FC-2500

If the viewfinder is active and both green squares are visible, press the **Camera** button to take a picture.

If the viewfinder is not active, press the Camera button to activate the viewfinder, wait for two green squares to display, then press the **Camera** button again to take a picture. If you are successful in taking the picture, you can expect the following:

- the FC-2500 makes a beeping noise
- the picture displays in the viewfinder
- an update displays in the status bar

Press 4 to save the picture or 1 to delete the picture.



If you are not successful in taking a picture, the FC-2500 makes a buzzing noise.

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By default, the eyeWARE engine saves the pictures as JPEG files in the My Documents folder.

Hold the FC-2500 parallel to the ground to avoid a skewed perspective. The best way to hold the FC-2500 is in front of you, about waist high, with your arms comfortably bent (Figure 1-11 on page 1-10).



**Figure 1-11. The Correct Way to Hold the FC-2500**



Holding the FC-2500 out in front of you with one hand may cause your image to blur. Using a stationary object for support helps to reduce the blur (Figure 1-12).



Figure 1-12. Reduce Blur by Using a Stationary Support



Remember! The Beep is your friend! Don't move until you hear the Beep!

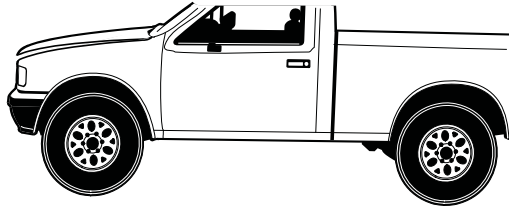
## Taking Good Photos with the FC-2500

There are four basic elements to consider to take good photos.

- Composition
- Focus
- Exposure
- Color Temperature

## Composition

Composition is how the subject is presented in the frame of the photograph. While basically artistic, composition is important because it affects the focus and exposure of the picture taken.

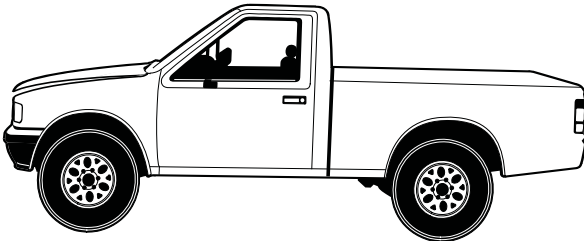


**Figure 1-13. Top Half and Part of Rear is Cut Off**

To avoid the frustration of realizing you have cropped out the important details of a picture (Figure 1-13), do the following:

- Be certain that your main subject is in the center of the viewfinder. There should be about 10% of white space around the subject.
- Use the ROI square as a guide.
- If your ROI square falls on a bright spot or a dark spot, move slightly to find a neutral zone.

Figure 1-14 shows an improved image of Figure 1-10 above.



**Figure 1-14. Full Image of Truck**



Some cropping will occur on the sides of your final image. Make sure that you capture your entire subject, then take a step back.

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## Focus

Focus is the sharpness of the photograph. Images that are out of focus lose detail and can appear blurry. Poor focus can be the result of one of the following:

- not waiting for the green focus indicator
- incorrect manual adjustment of the focus
- motion blur

The right focus determines whether your picture comes out blurry or crystal clear.



Things such as muscle fatigue, too much caffeine, and impatience can cause you to lose focus in your picture.

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To avoid blurry pictures do the following:

- Freeze! Do your best to stay completely still until you hear the BEEP!
- Use a tripod or brace your hands on a sturdy object like a table when photographing moving objects.

The photograph shown in Figure 1-15 is out of focus. Details are not visibly clear.

**Out of Focus**



**Figure 1-15. Example of an Out of Focus Picture**

The photograph shown in Figure 1-16 shows motion blur. Chances are that the FC-2500 was not held still while taking the photograph.

**Motion Blur**



**Figure 1-16. Example of Motion Blur**

The photograph in Figure 1-17 is in focus. The edges are sharp. To achieve an excellent photograph you must have a steady hand and stand as still as possible.

**In Focus**



**Figure 1-17. Example of a Photograph That is in Focus**

**Depth of Field** Depth of Field (DOF) is the distance wherein objects are in focus.

To have objects both close and far from you in focus (known as a great depth of field), you need to set up the FC-2500 to use the small aperture setting of F8.0. The focus is equally distributed between foreground and background (Figure 1-18).



**Figure 1-18. Great Depth of Field**

To have the subject in sharp focus while keeping the background out of focus (known as a shallow depth of field), you need to set up the FC-2500 to use the large aperture setting of F2.8. The focus is on the background (Figure 1-19 on page 1-16).



**Figure 1-19. Shallow Depth of Field**



If you have difficulty achieving the correct Depth of Field, move back from your subject and try again.

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## **Exposure**

Exposure controls the brightness of the photograph. Underexposure is a common problem indoors, and overexposure is a common problem outdoors. This section identifies and corrects any problems you may have with exposure.

As with all cameras, getting the right exposure can be tricky, especially when dealing with bright light sources or a mix of light sources and shadows. Once you become familiar with how the FC-2500 reacts to certain environments, you can fine tune your settings appropriately. Do the following to avoid underexposure or overexposure:

- The main reason for incorrect exposure is using the wrong settings.
- Centering your ROI square on a light bulb, the sun, or any other source of light causes a severe overexposure and in turn, an underexposure in the surrounding areas.
- Centering your ROI square on a very dark area causes the rest of the photo to be overexposed.

Table 1-3 describes what setting you should use depending upon the light conditions of your picture.

**Table 1-3. Light Condition Settings**

Light Condition Setting	Circumstance of Use
Daylight	Parking lots, on the water, extremely bright indoor locations
Cloudy	Overcast or rainy weather, in the woods, in the shade
Tungsten	Where regular household lamps are used, by candlelight.
Fluorescent	Public buildings where overhead lights are used.

**Indoor** When indoors, select either Tungsten or Fluorescent in your Light Condition setting:

- Bright light from a window can make your picture appear too dark. The quality of indoor pictures taken during daylight hours can be greatly improved by providing as much ambient light as possible.
- Placing your subject in front of a bright window will leave them silhouetted against the bright light. In most cases, the light often appears too bright and your subject appears too dark.
- Take advantage of indirect, ambient light from lamps, overhead lights, or candles instead.



**Figure 1-20. Underexposed with Insufficient Light to Show Details**



**Figure 1-21. Improved Image with Sufficient Light to Show Details**



Change your illumination settings in eyeSEE setup. Please refer to your *eye.WARE Users Guide* for instructions.

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**Outdoor** When taking pictures outdoors, select Daylight or Cloudy in the Light Condition setting.

- When working in bright sunlight, avoid taking pictures if glare appears on the viewfinder (such as taking pictures of windshields or windows) by slightly moving the FC-2500 up and down or side to side until you find a good angle that produces little or no glare.
- Pay attention to the sun! If the sun is shining from the side or in front of you, you may end up with extreme dark and light areas.
- Standing with the sun behind you may eliminate extreme light and dark, but could produce glare on shiny objects. Try different locations around your subject to find the ‘sweet spot’.
- In extremely bright sun, you may need to block the screen with your hand for better visibility.

The photograph in Figure 1-22 is overexposed. The detail in the wheel is lost and there are areas where the light is so bright that features are lost. Notice the seam of the door above the wheel. It seems to disappear.

When this picture was taken, the sun was behind the FC-2500.



**Figure 1-22.** Example of an Overexposed Photograph

Figure 1-23 shows a second example of an overexposed picture. The hood of the vehicle is overexposed and there are several bright spots hiding detail.

When this picture was taken, a red box displayed on the upper left of the viewfinder indicating overexposure. If you examine this photograph, you will see that the sun is in front of the FC-2500.



**Figure 1-23. The Hood is Overexposed**

The photograph in Figure 1-24 on page 1-21 is properly exposed. There is a small amount of glare in the tail light lens but the detail of the lens is visible. The wheel detail is visible.



Figure 1-24. Example of a Photograph with the Right Exposure



Angling the FC-2500 to avoid glare or bright spots may result in a skewed perspective.

## Color Temperature

Color temperature deals with the color characteristics of a light source. Not all sources of light are the same in this respect. A light source such as an ordinary light bulb has a low color temperature (more yellow/red light), while sunlight has a higher color temperature (more blue light). As a result, you must adjust the FC-2500 for indoor lighting versus daylight conditions.

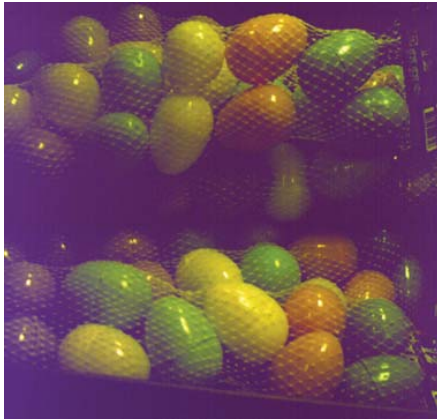
There are four color temperature settings to choose from:

- Daylight
- Cloudy
- Tungsten
- Fluorescent

If your photos look similar to the photographs that follow, you should change your current lighting conditions.

Daylight is usually the “whitest” light source. Fluorescent light typically produces a blue or green tint, while Tungsten lamps produce a red or orange tint.

This photograph was taken in fluorescent light with the FC-2500 set to Daylight (Figure 1-25). The highlights on the eggs have a greenish tint to them. Overall, the photograph has a greenish tint.



**Figure 1-25. Example of FC-2500 Set to Daylight**

The photograph in Figure 1-26 on page 1-23 is the opposite of the one shown above. It was taken in daylight with the FC-2500 set to Fluorescent. The result is an overall bluish tint.



**Figure 1-26. Example of FC-2500 Set to Fluorescent**

A surrealistic image resulted when taking a daylight photograph with the FC-2500 set to Tungsten in Figure 1-27.



**Figure 1-27. Example of FC-2500 Set to Tungsten**

The photograph in Figure 1-28 on page 1-24 was taken with the correct color temperature. Compare the chrome bumper on the vehicle with other photographs.



**Figure 1-28. Example of Photo Taken with the Correct Color Temperature**



Practice makes perfect. The more comfortable you are with the FC-2500, the better your photographs will be.

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