DFW-SX910
DFW-X710

Progressive Scan

*1 1/2 Type CCD

*2 1/3 Type CCD

Square Pixels

C Lens Mount

*1 SXGA Output

*2 XGA Output

IEEE-1394 Digital Output

Long Exposure

Normal Shutter

External Trigger Shutter

CCD Iris

ATW White Balance

One-Push White Balance

Fixed White Balance

Manual White Balance

Partial Scan

Lead-Free Solder

*1 :DFW-SX910
*2 :DFW-X710

DFW digital   Ps   Digital output

Connection Diagram P92

Outline

The DFW-SX910 with its 1/2 type PS IT CCD, and the DFW-X710 with its 1/3 type PS IT CCD are high-resolution industrial-use digital video camera modules.
The IEEE1394-1995 digital interface realizes a transfer speed of 400 Mbps and outputs SXGA (1280 X 960)/YUV (4:2:2)/7.5 fps with the DFW-SX910, XGA (1024 X 768)/YUV (4:2:2)/15 fps with the DFW-X710.
In addition, the DFW-SX910/X710 also adopts a primary color filter CCD to realize good color reproducibility, as well as a square pixel CCD to eliminate the need for aspect ratio conversion in the image processor.

Features

■ High resolution video format
  DFW-SX910: SXGA 1280 (H) x 960 (V)
  DFW-X710: XGA 1024 (H) x 768 (V)
■ Frame rate
  DFW-SX910: 7.5/3.75/1.875 fps
  DFW-X710: 15/7.5/3.75/1.875 fps
■ C-mount lens
■ Digital camera protocol
  1394-based Digital Camera Specification (Ver. 1.30)
■ Partial scan function (256 zones)
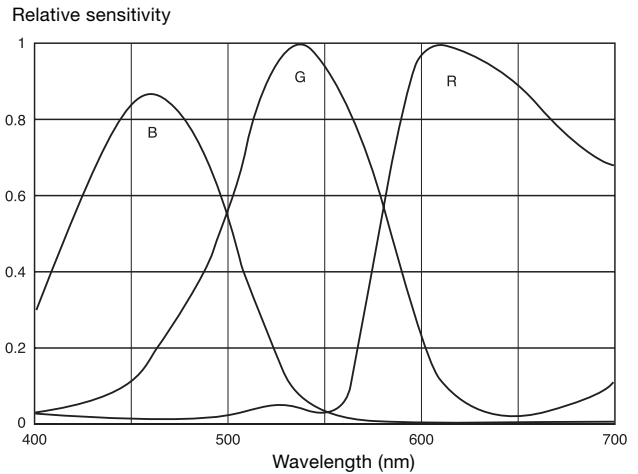■ External trigger shutter function
■ Lead-free solder

Dimensions

Camera body of all models

1"-32UNC
110
5
3.5
50
29.5
55
1
Digital Interface
TRIG IN
16.65
33.4
41
1/4"-20UNC
25
4-M3
13
56
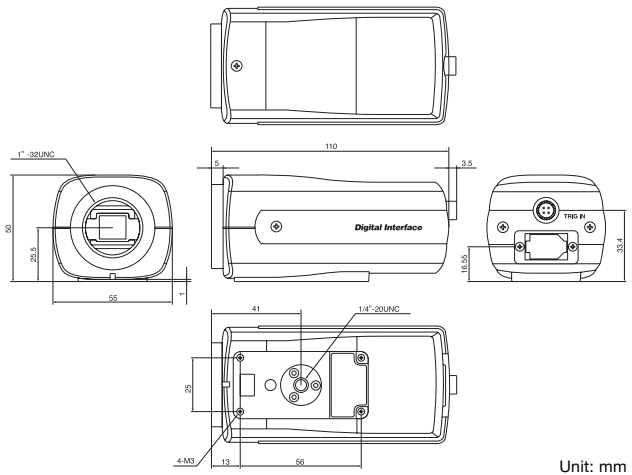
Unit: mm

Spectral Sensitivity Characteristics

Relative sensitivity

B   G   R

Wavelength (nm)

(Lens characteristics included, and light source characteristics excluded.)

Non-TV Format
B/W Model
TV Format
Color Model
Intelligent
Digital Interface IEEE1394
Camera Link compatible
Accessories
Color PTZ Model
Color Camara Block

Location and Function of Parts and Controls
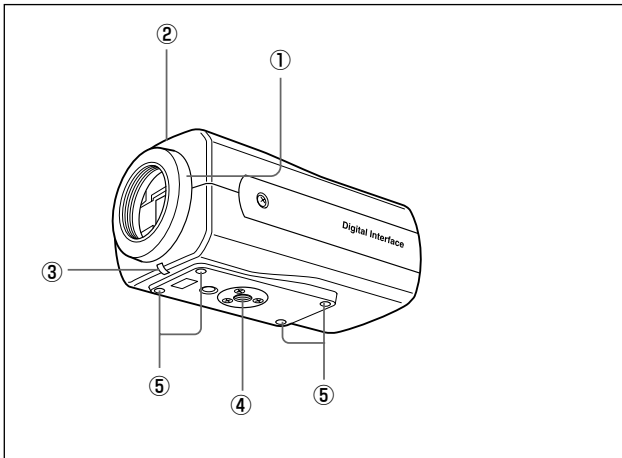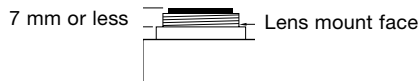

① **Lens mount (C-mount)**
Attach any C-mount lens or other optical equipment.
Note
The lens must not project more than 7 mm from the lens mount.

7 mm or less — Lens mount face

② **Flange back hole**
Adjust the flange back by adjusting the screw at the bottom of this hole.

③ **Pilot lamp**
This lamp indicates the camera module operation states:
OFF: Camera power OFF
Green: Camera power ON/Video signal output OFF
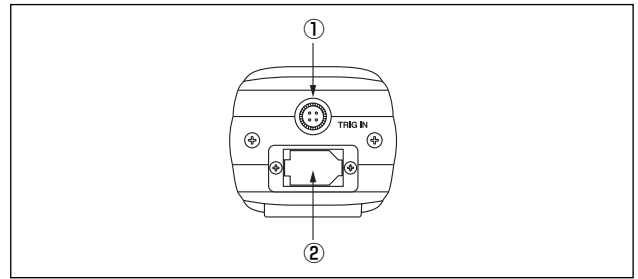Orange: Camera power ON/Video signal output ON

④ **Tripod hole**
Install a tripod into this hole.

⑤ **Reference holes (bottom)**
These precision screw holes are for locking the camera module.

Rear Panel

① **TRIG IN/Exposure OUT connector**
Connect the trigger signal generator (trigger output connector) to this connector. When trigger is OFF, or software trigger is ON, a signal that indicates the exposure time is output from pin 1 of the camera.
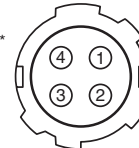
② **CAMERA connector**
Connect the IEEE1394 camera cable (supplied) to this connector.
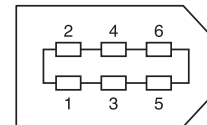
Connector Pin Assignments

● **TRIG IN**
1. Exposure Out*
2. GND
3. TRIG IN
4. NC

*When the hardware trigger feature is used, the signal above is not output. The output is the open-connector type.

● **CAMERA**
1. Power
2. Power (GND)
3. TPB–
4. TPB+
5. TPA–
6. TPA+

Specifications

	DFW-SX910	DFW-X710
Image device	1/2 type prigressive scan IT CCD	1/3 type prigressive scan IT CCD
Effective picture elements	1,392 (H) x 1,040 (V); 1,450,000 pixels	1,034 (H) x 779 (V); 800,000 pixels
Effective lines / Output image size	1,280 (H) x 960 (V)/SXGA	1,034 (H) x 768 (V)/XGA
Unit Cell size	4.65 µm (H) x 4.65 µm (V)	
Lens mount	C mount	
Minimum illumination	20 lx (F0.95, Gain+18 dB)	
Digital interface	IEEE 1394-1995	
Protocol	IIDC 1394-based Digital Camera Specification Version1.30	
Transfer rate	400 Mbs/200 Mbs	
Frame rate	7.5/3.75/1.875 fps	15/7.5/3.75/1.875 fps
Gain control	Auto/Manual (0 to 18 dB)	
Gamma	ON (2 type) / OFF	
Shutter speed	1/100,000 to 16 s (Absolute value control possible)	
External trigger shutter	Available (Trigger mode 0, 1)	
Partial scan function	256 zones (16 x 16)	
Power requirements	DC 8 to 30 V (from IEEE 1394 camera cable)	
Power consumption	3.5 W (12V)	
Dimensions	55 (W) x 50 (H) x 110 (D) mm	
Mass	250 g	
Operating temp. / humidity	-5 to +45 ˚C / 20 to 80 % (no condensation)	
Storage temp. / humidity	-30 to +60 ˚C / 20 to 80 % (no condensation)	
Performance guarantee temperature	0 to +40 ˚C	
Shock resistance	70 G	
MTBF	59,549 hrs. (approx. 6.8 years)	
Regulation	UL60950, FCC Class B Personal computers and peripherals, ICES-003 Class B Digital Device, CE (EN61326/97+A1/98), Australia EMC (AS4251.1 + AS4252.1)	
Supplied accessories	Lens mount cap (1), Operation instructions (1), Cable (1), Clamp filter (2)	

Non-TV Format

B/W Model   Color Model

TV Format

Intelligent

Digital Interface IEEE1394

Camera Link compatible

Accessories

Color PTZ Model

Color Camara Block

Shutter

This feature sets exposure time. Both manual and automatic settings are available.

When the automatic setting is selected, Shutter is adjusted automatically, based on the brightness of the subject.

At this time, the reference level (target point) of the brightness is set in the Auto Exposure register.

With manual setting, the camera uses relative control values indicated by a 12-bit integer and absolute control values indicated using a 32-bit floating point number.

Relative control values for Shutter

The relationship between the parameter and the exposure time is given by the following formulas.

Where

P = Parameter (003h to 47Eh)

E = Exposure time (s)

$P \geqq 3 \sim P \leqq 1000$

$$E = \frac{P^2}{1000000} + 0.000005 \quad\text{———} \quad ①$$

$P > 1000 \sim P \leqq 1150$

$$E = (P - 1000)*0.1 + 1.000005 \quad\text{———} \quad ②$$

Setting examples

3 (003h) :	14 µs	(1/100000)
32 (020h) :	1.005 ms	(1/1000)
100 (064h) :	10.005 ms	(1/100)
1000 (3E8h) :	1 s	
1010 (3F2h) :	2 s	
1150 (47Eh) :	16 s	

Absolute control values for Shutter

Control of exposure time using absolute values is possible. The values are indicated using a 32-bit floating point value. (Unit: sec.) The control steps are synchronized with the pixel clock, and as the pixel clock is 15.25 MHz, one step is approximately 65.6 ns. The range for these values extends from 10 microseconds to 17.5 seconds.

Gain

This feature adjusts the brightness of the picture. Both manual and automatic settings are available. The variable range extends from 0 to 18 dB.

When automatic setting is selected, Gain is adjusted automatically, based on the brightness of the subject. At this time, the reference level (target point) of the brightness is set in the Auto Exposure register.

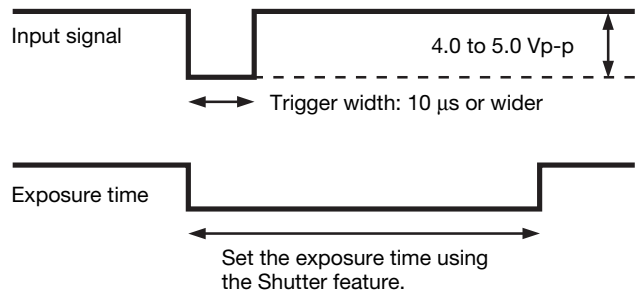For details on Auto Exposure, plaese see the usesr's guide.

Trigger Shutter

This feature allows you to control the exposure timing via a external signal input (Hardware Trigger) or via a command sent from application software (Software Trigger). There are two trigger modes:

–Trigger Mode 0 where the exposure time is controlled by the shutter parameter

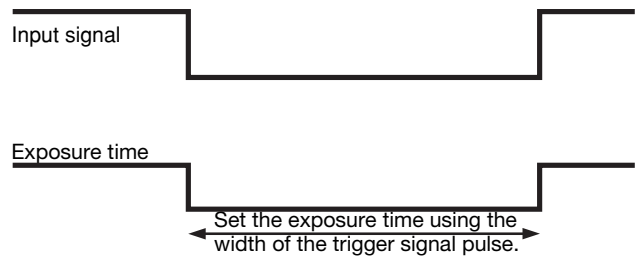–Trigger Mode 1 where the exposure time is controlled by the trigger pulse width.

In both modes, the leading edge of the hardware trigger starts the exposure. In Trigger Mode 0, the maximum exposure is limited by the shutter parameter. In Trigger Mode 1, there is no limit to the exposure time.

The Software Trigger is a function defined in IIDC Ver. 1.31.

Trigger Mode 0

Input signal

4.0 to 5.0 Vp-p

Trigger width: 10 µs or wider

Exposure time

Set the exposure time using the Shutter feature.

Trigger Mode 1

Input signal

Exposure time

Set the exposure time using the width of the trigger signal pulse.

• Input impedance: 10 kΩ

It is possible to trigger the cameras at full frame rate using hardware trigger. (This was not possible with the earlier DFW-SX900/X700 because the trigger in would not be accepted until after the previous images was output from the camera.) It is very important that the exposure not end before the previous image is out of the cameras. If the camera is trigger too fast or there is noise on the trigger line that will cause the exposure to end before previous image is output, you will get double exposure of the image.