With 5150 pixels and scanning clock of 40MHz

Digital Line Sensor

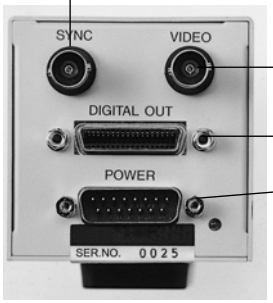
TL-5150UFD

(Lens optional.)

Outline

- This camera is a high-resolution and digital-output type of line sensor that has a linear image sensor.
- Its video signal output is in 2 systems; 10-bit digital signal, and analog signal.
- It's a CCD line sensor camera with 5150 pixels and scanning clock of 40MHz.
- External input also is available as for driving clock and line transfer pulse. (RS-644).

I/O connectors



SYNC connector
A connector for monitoring internal SNYC. This can be monitored with oscilloscope.

VIDEO connector (BNC)
This outputs analog video signals.

Digital output connector

POWER connector (15 pins)
- ○ Power supply (DC12V) input
- ○ Synchronous input/output
- ○ Clock input/output

Features

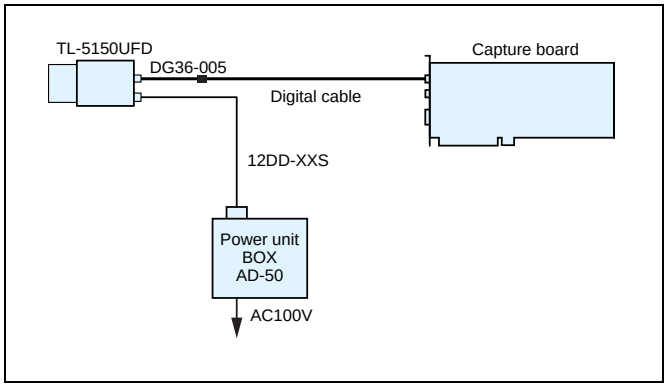
- It matches well to most of capture boards from other manufacturers, which makes it possible to construct high definition image processing systems.
- It is operated with a single power source of DC12V.
- Output waveform can be monitored with analog signal output.
- As it has a wide dynamic range, it is suited for image processing equipment.

Uses

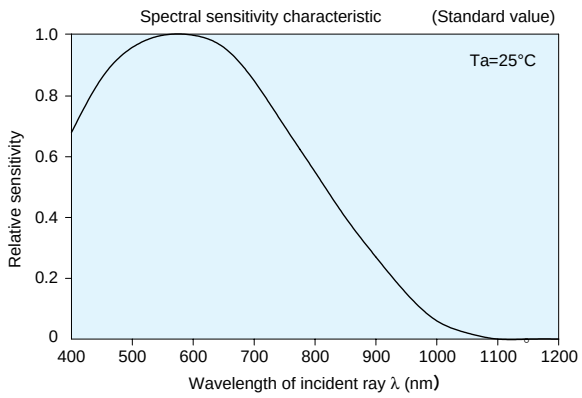
- Image processing equipment
- Appearance inspection equipment
- Pattern inspection equipment
- Dimension measuring instrument
- Sheet materials inspection equipment
- Width measuring equipment
- Tube-bore measuring equipment
- Length measuring equipment
- Position control equipment
- Various types of selectors

Example of uses

By connecting TL-5150UFD with capture board in PC, it is possible to use it for both development and field line operation of image processing equipment.

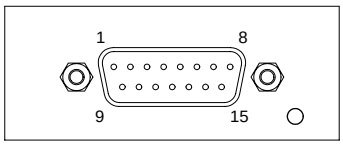


Sensitivity wavelength



● Power connector

The association between pin number of 15-pin D-sub connector and Input/Output is as per the table below:



(A view from connecting surface)

Pin No.	Signal name	Pin No.	Signal name
1	SHIELD	9	NC
2	+12V	10	GND
3	GND	11	NC
4	NC	12	SYNC– IN
5	SYNC+ IN	13	CLOCK– IN
6	CLOCK+ IN	14	SYNC– OUT
7	SYNC+ OUT	15	CLOCK– OUT
8	CLOCK+ OUT		

Outline of operation

Photo diodes, the light-receiving element, are to output starting from No.1 to n in consecutive order. Therefore, when there is an object like shown in the figure below, output voltage responding to the light/shade of the object can be obtained, as shown in the waveform figure, regarding output waveform of analog video signals.

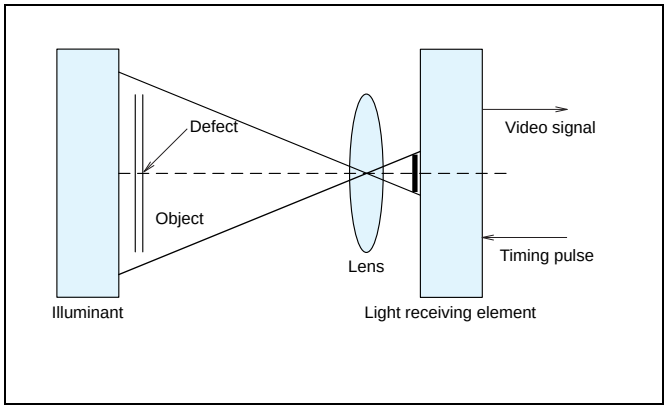
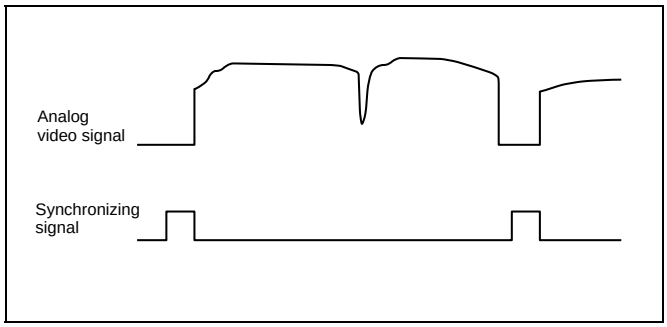


Image pickup principle diagram



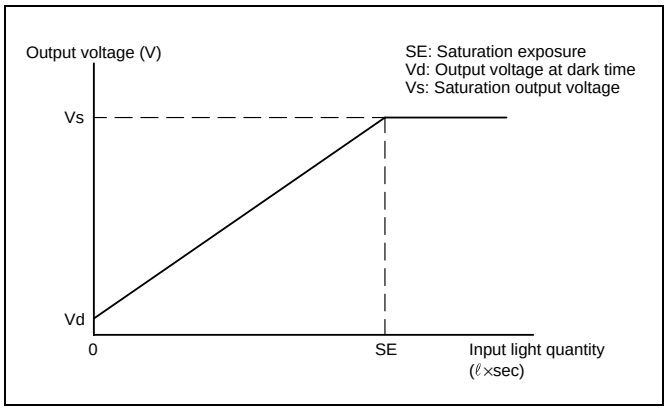
Video signal output

Photoelectric transfer characteristics

Image of the object is formed on the photo diode array, the light-receiving element, through a lens. The line sensor consists of multiple photo diodes, and each photo diode outputs electric signals in proportion to the light quantity received.
Photoelectric transfer characteristics is expressed by the equation of $y=ax^{\gamma}+b$.

Here, y : Output voltage
x: Input light quantity
a: Sensitivity
b: Output voltage at dark time
γ: 1

Output voltage at dark time gets doubled every time the temperature increases by around 8°C. (Around 20mv at 25°C)

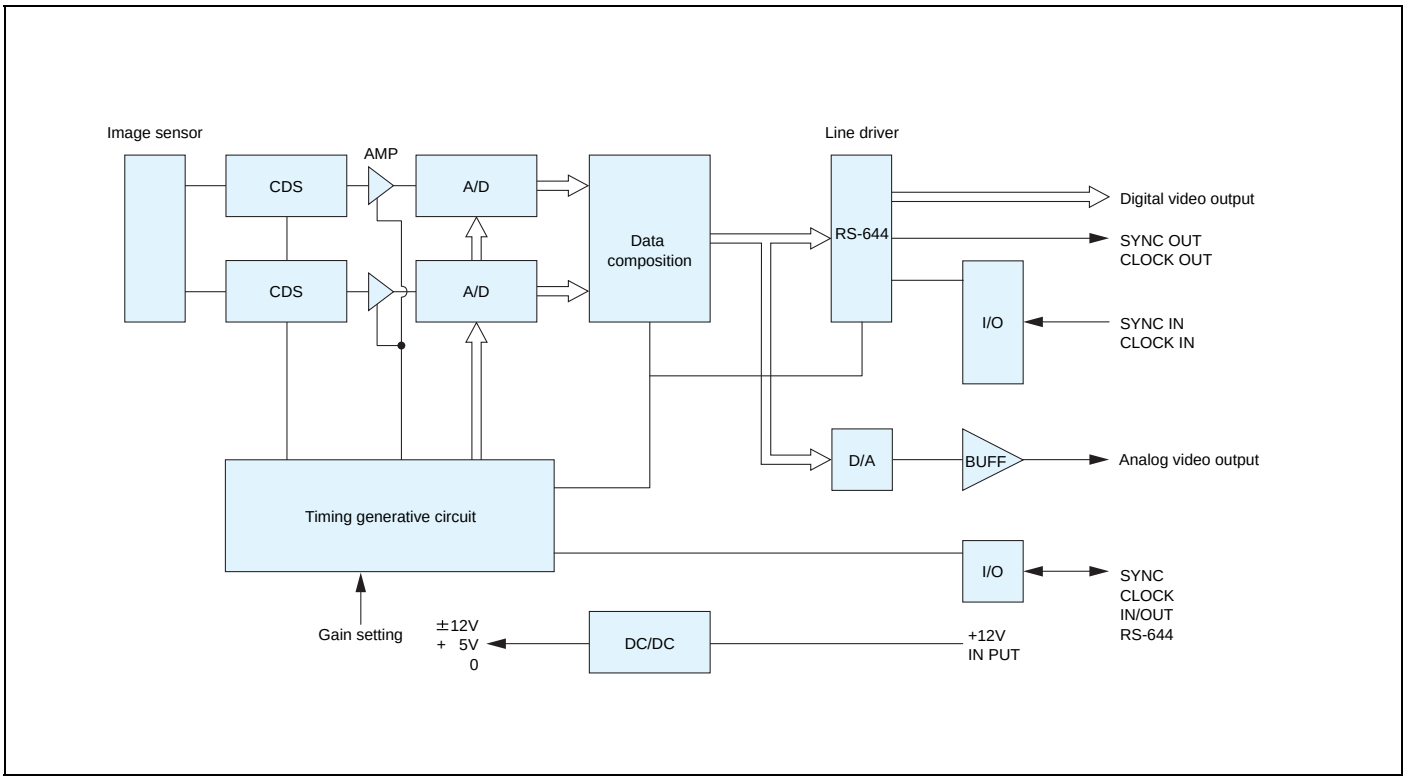


Photoelectric transfer characteristics

External synchronization

- EX CLK and EX SYNC shift to external operation mode automatically at the time of external input.
- At the time of no external input, the operation is in internal CLK mode and internal SYNC mode.
- When either one of CLK or SYNC is input externally, an external operation mode dominates in each case accordingly.

Block diagram



Digital output connector

HRS DX10A-36S manufactured by Hirose Electric is used.

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	CLK+	Out	2	CLK–	Out
3	SYNC+	Out	4	SYNC–	Out
5	–	–	6	–	–
7	GND		8	GND	
9	EX CLK+	In	10	EX CLK–	In
11	EX SYNC+	In	12	EX SYNC–	In
13	–	–	14	–	–
15	DO_0+	Out	16	DO_0–	Out
17	DO_1+	Out	18	DO_1–	Out
19	DO_2+	Out	20	DO_2–	Out
21	DO_3+	Out	22	DO_3–	Out
23	DO_4+	Out	24	DO_4–	Out
25	DO_5+	Out	26	DO_5–	Out
27	DO_6+	Out	28	DO_6–	Out
29	DO_7+	Out	30	DO_7–	Out
31	DO_8+	Out	32	DO_8–	Out
33	DO_9+	Out	34	DO_9–	Out
35	GND		36	GND	

CLK ·····Pixel clock
SYNC ·····Synchronizing signal
DOS_0~DO_9 ·····Digital video output

TAKEX

Specifications

Number of pixels	5150
Pixel pitch x aperture	7μm×7μm
Length of the Light-receiving element	36.05mm
Video rate	10~40MHz
Scanning rate (scan/sec)	MAX. 100-7540 times
Clock-to-video ratio	1 : 1
Driving clock input	10~40MHz, RS644 100Ω terminal built in
Data clock output	10~40MHz, RS644
Line transfer pulse input	0.133~10msec, RS644, 100Ω terminal built in
Line transfer pulse output	0.133~10msec, RS644
Video output (Analog output) (Digital output)	0~2.5V 75Ω at terminal Digital video (D0~D9+, D0~D9–) RS644 standard based
Sensitivity	50
Saturation exposure lx.sec (Element)	0.125
Dynamic range (Element)	5000 (Standard)
Output ununiformity (Element)	MAX 10% At 50% of saturation output
Power capacity	+12V±0.2V (450mA digital output at no load)
Operation temperature range	0~40°C
Operation humidity range	85%MAX
Storage temperature range	–10°C~65°C
Weight	450g
Dimensional outline	64×64×148mm (excl. protrusion)
Lens mount	Asahi K mount (Standard) Nikon mount (Optional)

Cables Optional

The following special cables are available.

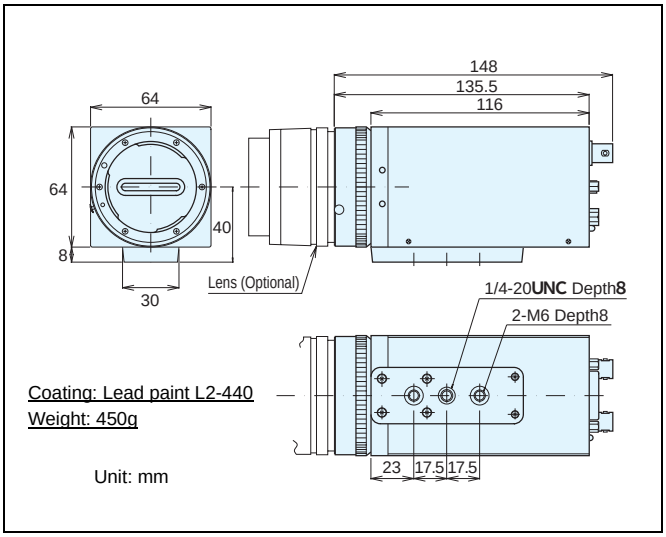
Digital cable
Model: DG36-005

This is a digital cable with 37-pin D-sub connector, which makes connection with various types of capture board easier. This is to be used by connecting with cable for capture board.

Camera cable
Model: 12DD- XXS
XX to show cable length (m)

This is a cable to connect line sensor with power unit. It has D-sub connectors on both ends.

Dimension outline



●Specifications are subject to change without notice because of improvement.

URL.http://www.takenaka-systm.com/

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