

**FTM1010D/15  
Digital Camera Module**

**Narragansett Imaging**  
[www.nimaging.com](http://www.nimaging.com)

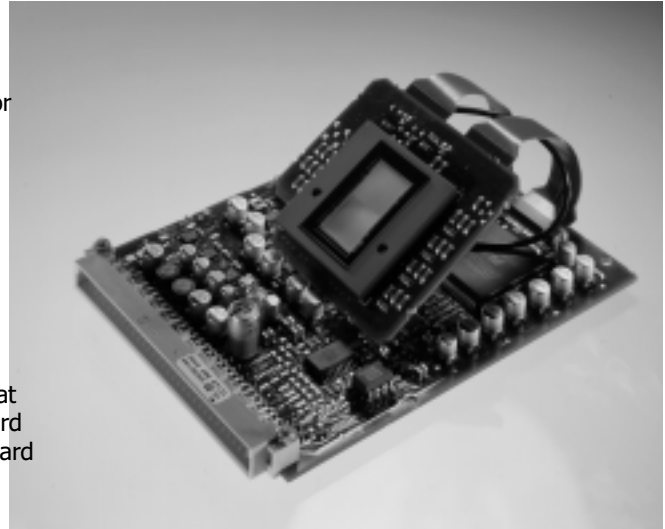
**Applications**

The **FTM1010D/15** camera module is specifically suited for applications in:

- **Medical imaging**
- **Scientific imaging**
- **Machine vision**
- **General purpose digital imaging**

**Description**

The **FTM1010D/15** is a 1K x 1K digital camera module that is designed for OEM applications. It consists of a sensor board containing a **1K x 1K** frame transfer image sensor and a board that contains the circuitry required to drive the sensor. The boards are connected by two flat flex cables, allowing **maximum configuration capability in the camera system.**



**Features**

The **FTM1010** has:

- A **1K x 1K progressive scan CCD**
- True **12 bit 1K x 1K images at 15 frames per second**
- Support for **vertical binning at 1024 x 512 30 frames per second**
- **Continuous or triggered integration control readout modes**
- **Data and sync outputs that can be tri-stated**
- **Oscillator shutdown mode**
- **Flexible mechanical design**

**Camera Target Performance Summary**

**(20MHz) System performance @10°...45°C**

<b>AD conversion .....</b>	<b>12 bit</b>
<b>Total RMS dark noise .....</b>	<b>&lt;2DN</b>
<b>Qmax (10% linearity) .....</b>	<b>200 kel</b>
<b>Gain .....</b>	<b>≈50el/DN (Qmax= full scale on ADC)</b>
<b>Black level adjusted to .....</b>	<b>50DN ± 5DN</b>
<b>Black level stability .....</b>	<b>&lt; ± 40DN</b>
<b>Pixel separation .....</b>	<b>&gt;90%</b>
<b>Operating temperature range .....</b>	<b>10°... 45°C</b>
<b>Power requirements .....</b>	<b>±6V DC +15V DC</b>

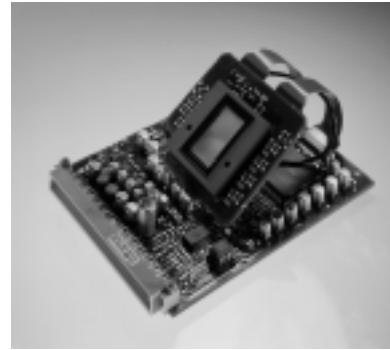
**Narragansett Imaging**

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## Sensor

The CCD is a one inch lens format, 1024 x 1024 pixel frame transfer image sensor that supports demanding professional imaging applications, offering **high resolution, high dynamic range, high speed, and low dark current**. The **built-in vertical anti-blooming mechanism** of the sensor allows the camera to experience a **high degree of overexposure without producing any visible blooming artifacts**.

Figure 1. shows the structure of the sensor in the FTM1010 module. Data is extracted from output W.

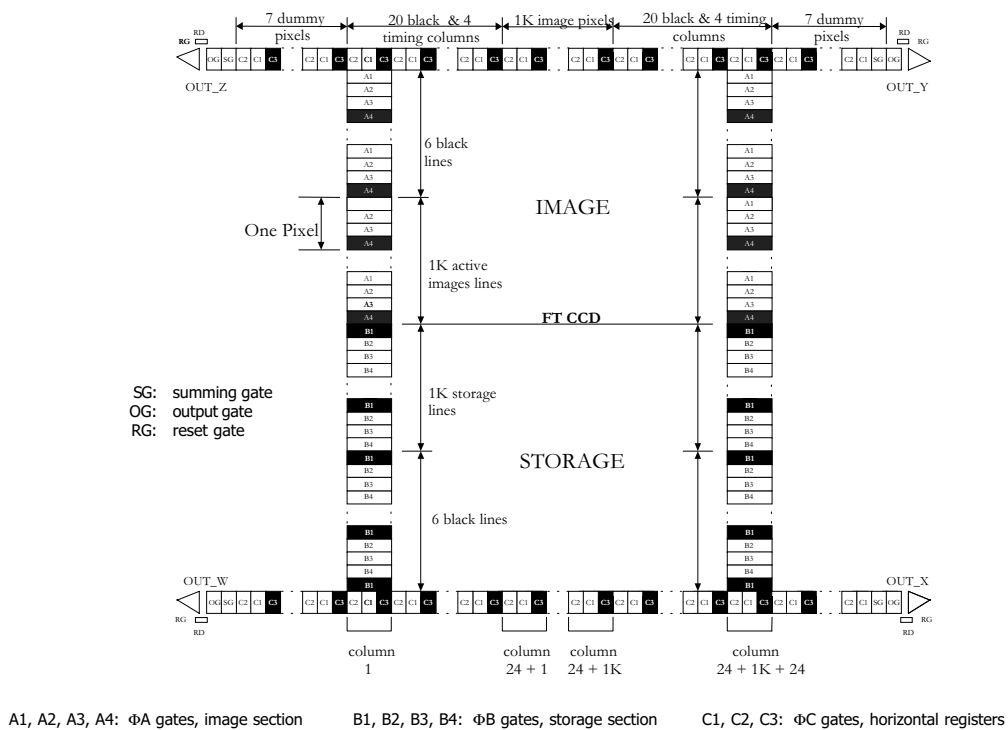


Figure 1. Detailed internal structure

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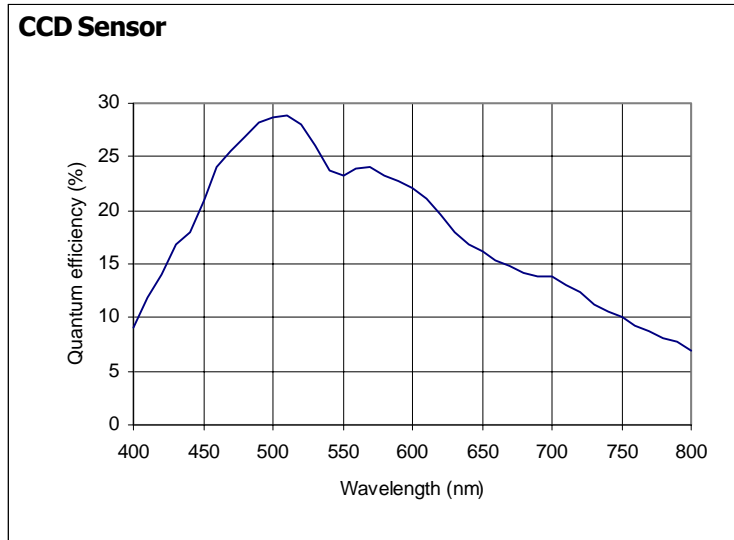
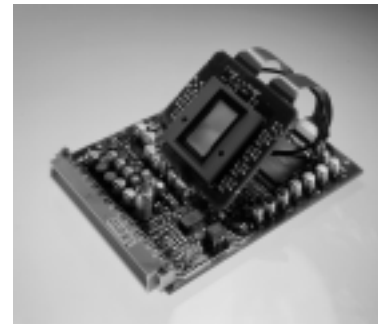


Figure 2. *Quantum efficiency*

**Table 1. Blemish specification (max. number of blemishes permitted)**

Monochrome

	<b><i>ECONOMY GRADE</i></b>	<b><i>INDUSTRIAL GRADE</i></b>	<b><i>HIGH GRADE</i></b>
COLUMNS	2	0	0
CLUSTERS	5	3	0
PIXELS	20	16	12

**Test conditions:**

Temperature	—	35° C
Integration time	—	10 ms

**Definition of blemishes**

- Pixel defect:
  1. A pixel whose signal, at nominal light (illumination at 50% of the linear range), deviates more than  $\pm 30\%$  from its neighboring pixels.
  2. A pixel whose signal, in dark, deviates more than 6mV from its neighboring pixels.
- Cluster defect:
 

The presence of at most four pixel defects around one pixel defect, within a subarea of 3 x 3 pixels.
- Column or row defect:
 

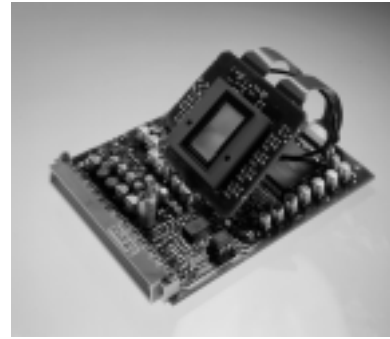
A column or row which has more than 12 pixel defects.

  1. Column defects are horizontally separated by no less than 3 columns
  2. Row defects are not allowed.

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### Connector Pin Out Definition

Input / Output Connector:

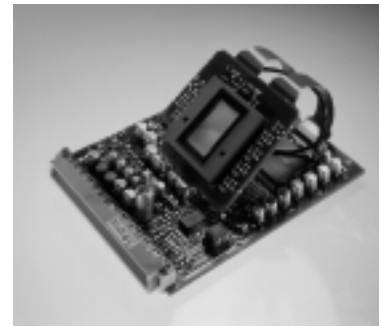
DIN 41612 / Male / 2 x 32 pins / 90° angle / Manufacturer: Harting (part # 09021646921)

Pin	Row A	Function	Type	Row B	Function	Type
1.	DNC	Do Not Connect	———	DNC	Do Not Connect	———
2.	DNC	Do Not Connect	———	DNC	Do Not Connect	———
3.	PXLCLK	Pixel Clock Out	CMOS	GND	Ground	———
4.	H-DRIVE	Horizontal Drive Out	CMOS	GND	Ground	———
5.	V-DRIVE	Vertical Drive Out	CMOS	GND	Ground	———
6.	DNC	Do Not Connect	———	GND	Ground	———
7.	D2	Video Data Bit 2	CMOS	GND	Ground	———
8.	D3	Video Data Bit 3	CMOS	GND	Ground	———
9.	D4	Video Data Bit 4	CMOS	GND	Ground	———
10.	D5	Video Data Bit 5	CMOS	GND	Ground	———
11.	D6	Video Data Bit 6	CMOS	GND	Ground	———
12.	D7	Video Data Bit 7	CMOS	GND	Ground	———
13.	D8	Video Data Bit 8	CMOS	GND	Ground	———
14.	D9	Video Data Bit 9	CMOS	GND	Ground	———
15.	D10	Video Data Bit 10	CMOS	GND	Ground	———
16.	D11	Video Data Bit 11 (MSB)	CMOS	GND	Ground	———
17.	GND	Ground	———	GND	Ground	———
18.	Spare	———	———	Spare	———	———
19.	IT-CONTROL	Integration Control	TTL/CMOS	GND	Ground	———
20.	OE-NOT	Output Enable Clock Data	TTL/CMOS	XTAL-EN	Enable Oscillator	TTL/CMOS
21.	BINNING-NOT	V-Binning on/off	TTL/CMOS	Free-Run-Not	Freerunning/IT control mode	TTL/ CMOS
22.	GND	Ground	———	GND	Ground	———
23.	D1	Video Data Bit 1	CMOS	+15 PWR	+15 V Supply	DC
24.	DNC	Do Not Connect	———	DNC	Do Not Connect	———
25.	DNC	Do Not Connect	———	DNC	Do Not Connect	———
26.	-6 PWR	-6V Supply	DC	-6 PWR	-6V Supply	DC
27.	D0	Video Data Bit 0 (LSB)	CMOS	Spare	———	———
28.	GND	Ground	———	GND	Ground	———
29.	+6 PWR	+6V Supply	DC	+6 PWR	+6V Supply	DC
30.	GND	Ground	———	GND	Ground	———
31.	DNC	Do Not Connect	———	DNC	Do Not Connect	———
32.	DNC	Do Not Connect	———	DNC	Do Not Connect	———

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**Table 2. Ordering Information**

Module	D/A	Frame Rate (FPS)	Sensor Grade*	Other
FTM1010	Digital (D)	15 frames/sec.	High grade (HG)	Monochrome (M)
			Industrial grade (IG)	With removable coverglass (WC) -can be ordered w/ any configuration that includes a sensor
			Economy grade (EG)	Without Sensor(WoS)**

**Table 3. Ordering information**  
**Module configurations**

<b>Ordering code</b>	<b>Definition</b>
1. FTM1010 D/15/HG/M	Digital 15 FPS High grade, Monochrome
2. FTM1010 D/15/HG/MWC	Digital 15 FPS High grade, Monochrome, With removable coverglass
3. FTM1010 D/15/IG/M	Digital 15 FPS Industrial grade, Monochrome
4. FTM1010 D/15/IG/MWC	Digital 15 FPS Industrial grade, Monochrome, With removable coverglass
5. FTM1010 D/15/EG/M	Digital 15 FPS Economy grade, Monochrome
6. FTM1010 D/15/EG/MWC	Digital 15 FPS Economy grade, Monochrome, With removable coverglass
7. FTM1010 D/15/WoS	Digital 15 FPS Without Sensor

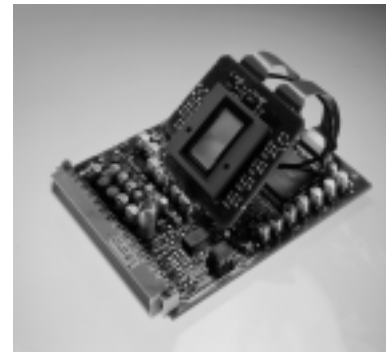
\* See Table 1, for determination of sensor grades.

\*\* If ordering Without Sensor (WoS), disregard column headed "Sensor Grade".

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## Deliverables

1. **FTM1010** camera module
2. **FTM1010** user manual

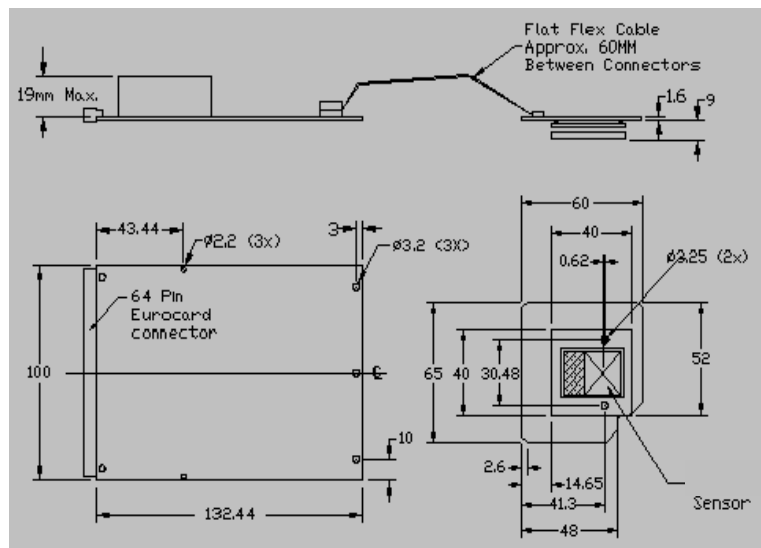
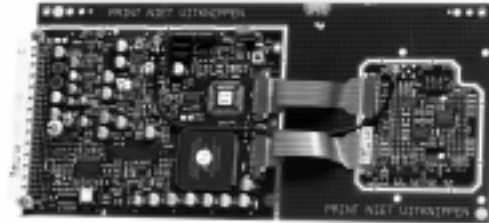
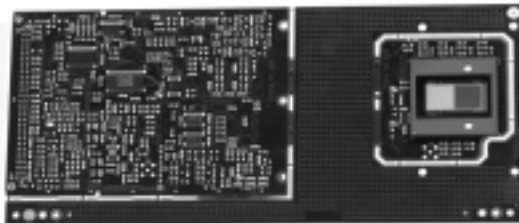
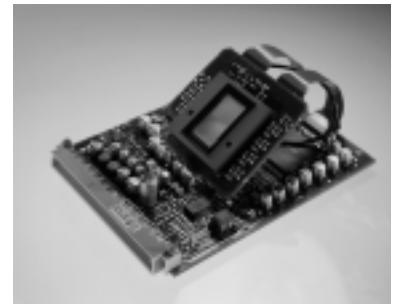


Figure 3. Mechanical Dimensions

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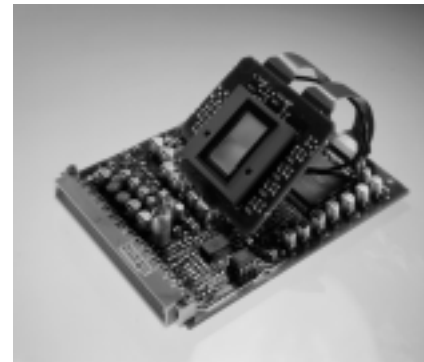


## NOTES

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