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INFRARED VIDICON CAMERA
C2741-03



(Lens is optional)

OUTLINE

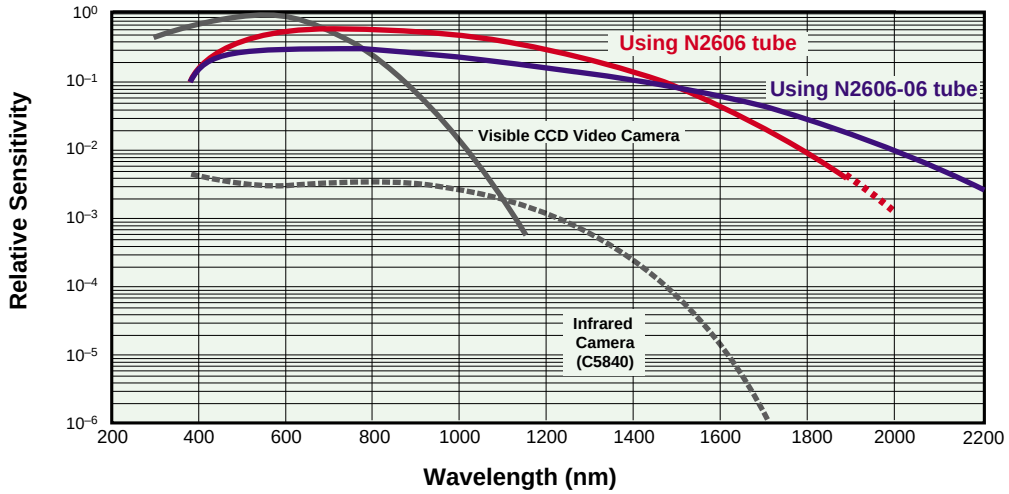
The C2741-03 is a high-performance video camera with various functions that have been developed for image processing and measurement purposes. The camera has sensitivity to 1800 (2200) nm from a visible wavelength region. Compared with conventional surveillance cameras, this camera excels in resolution, image distortion, stability, etc.

In addition, the camera can be connected to a real-time image processor and measurement system, and also to a personal computer for use with a video frame grabber board.

FEATURES

- **Sensitivity to 1800 (2200) nm from visible wavelength region**
- **Image processing and measurement**
- **Contrast enhancement function**

[Spectral Response Characteristics]



HAMAMATSU

APPLICATIONS

● Light intensity measurement in the infrared region

Light intensity measurement of infrared light sources, including infrared LEDs, transmission characteristic measurement of optical fibers, etc., and other applications, is possible. In addition, the light intensity distribution of an infrared light source can be measured with a real-time image processing system.

● Internal inspection

Internal inspection is possible with an infrared light source. The camera can be connected to a microscope to look for IC internal defects.

● Observation and surveillance

This camera can be connected to an infrared floodlight for surveillance under low illuminated conditions, in a darkroom, etc.

● Various image processing and measurement

The C2741-03 has been developed for image processing and measurement. By connecting it to the ARGUS-20 or a real-time image processing system, various measurements, such as light intensity measurement, width and area measurement, and position measurement can be performed.

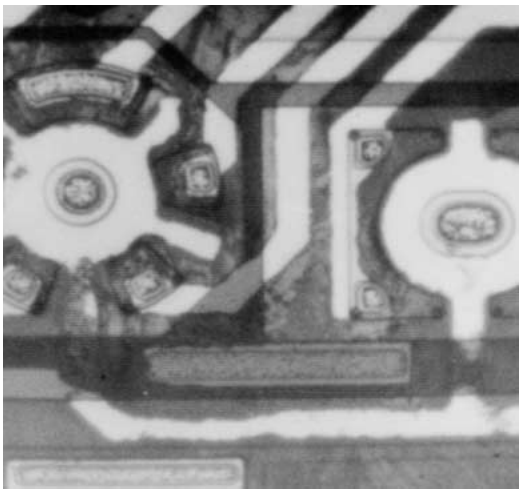
● IR Refrectography

The C2741-03 (N2606-06 tube) is suitable for observation and investigation of old art objects covered with soot and dust, since infrared light transmits through the soot and dust and refects from the true surface.

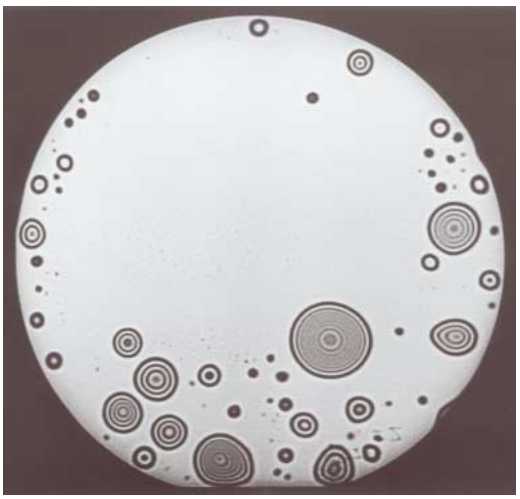


▲ Film photo ▲ IR Refrectrogram

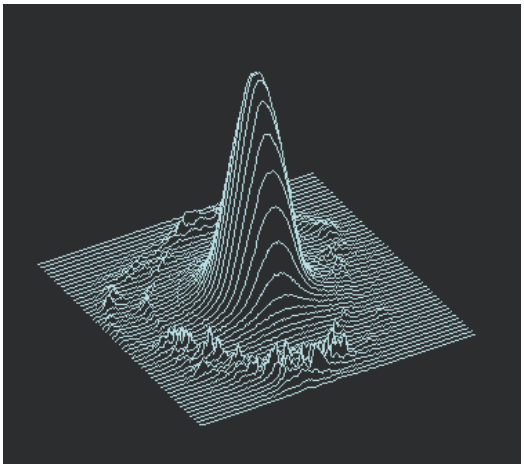
"The Holly Family and Saints", painted by Niccolo di Bartolomeo Pisano, photo courtesy of Worcester Art Museum, Worcestor, Massachusetts, USA. Paul Haner, Chief Conservator.



▲ Inspection of IC internal defects



▲ Void detection of bonded wafers



▲ Light intensity distribution of light spot

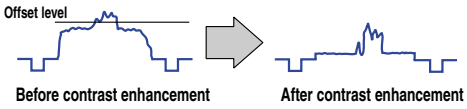
FUNCTIONS



▲ Front panel of camera controller

● Contrast Enhancement

The contrast enhancement function amplifies video signals that are above offset (threshold) level. Using this function, the low contrast image is enhanced and changed into a clear image.





▲ Before contrast enhancement



▲ After contrast enhancement

● Shading Corrector

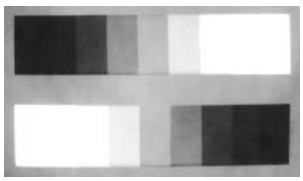
This corrects shading introduced by both the optics and the imaging tube to help utilize the contrast enhancement feature most effectively.

● Diagonal Shading Corrector

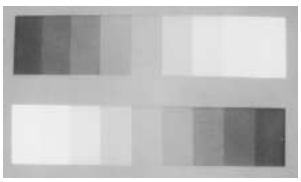
This corrects the direction of a diagonal.

● Video Booster

The video booster modifies the contrast in dark portions of the image revealing details which were lost due to their low intensity.



▲ Before processing



▲ After processing

● External Synchronization Control (Optional)

When utilizing external equipment, it may be necessary to synchronize the scanning of the camera via this optional control. This circuit automatically switches from the internal to external synchronization when external horizontal and vertical signals are provided.

● Automatic Gain Control: AGC

Excellent overall image contrast can be achieved automatically using this feature. This eliminates the need for manual adjustments in situations where light intensity fluctuates over time.

● Operational Video Output (Optional)

External processing of video signals is simplified by the operational video output. Operational video does not include synchronization signals so it can be used to display DC signals with black level as 0 volts.

● All Timing is Crystal Clock Controlled.

By using a crystal oscillator, synchronization is more stable and higher quality images can be produced . All control signals, including the deflection frequencies, are derived from a crystal oscillator.

● High Geometric Stability

It features high geometric (position and dimensional) stability. Also, highly uniform and accurate images are obtained.

● Level Indicator

Two LEDs, which monitor input light intensity, provide a unique and rapid method for the accurate determination of the illumination level required to produce optimal image quality. In addition, this feature provides a visual indication of potentially damaging extreme light levels.

● Video Tube Protection Circuit

A protection circuit has been incorporated to prevent damage to the imaging tube, should the horizontal or vertical synchronization signals be lost.

● Video Inverter

The video inverter produces a negative image by inverting the video intensity values. When used in conjunction with contrast enhancement, this feature is particularly valuable for improving detectability and image quality in low intensity regions.
In addition, it is very effective in facilitating the visual interpretation of high contrast images.

● White Clipper

The white clipper operates to suppress the level of the video signal when it exceeds a preset level, in order to maintain consistently high image quality on the TV monitor.

PERFORMANCE / SPECIFICATIONS

● Performance

Imaging tube		1- inch Infrared vidicon
Spectral response		400 to 1800 nm (N2606) , 2200 nm (N2606-06)
Horizontal center resolution		600 TV line (typical value)
Geometric distortion (within inscribed circles)		± 2.0 (maximum value)
Shading (within inscribed circles)		20 % (40 %) (maximum value)
Lag		60 % (typical value)
Gamma		0.6 (typical value)
S/N		46 dB (p-p/r.m.s.) (minimum value)
Functions	Standard	Contrast enhancement
		Shading corrector
		Diagonal shading corrector
		Video booster
		Video inverter
		Auto gain control (AGC)
		Level indicator
		Video tube protection
		White clipper
	Optional	External synchronization control
		Operational Video output

● Specifications

Video system		EIA	CCIR
Horizontal scanning frequency		15.734 kHz	15.625 kHz
Vertical scanning frequency		59.94 Hz	50.00 Hz
Total number of scanning lines		525	625
Effective number of scanning lines		485	509
Interlace ratio		2 : 1	
Aspect ratio		4 : 3 (horizontal/vertical)	
Synchronization system		Internal synchronazation	
Output signals	Video signal (composite)	1.0 Vp-p / 75 Ω Two output terminals. (The composite video signal is output only from VIDEO OUT 1. Operational video signal is output from VIDEO OUT 2.)	
	Horizontal vertical Synchronization signal	TTL level output, Negative polarity (External synchronization control(optional) uses this output terminal as input terminal. The horizontal vertical synchronization signal is not outputted.)	
Effective scanned area of tube		Approx. 12.7 (H) x 9.5 (V) mm	
Lens mount		1-inch C-mount	
Operating temperature		0 to +40 ˚C	
Storage temperature		-10 ˚C to +50 ˚C	
Operating/Storage humidity		90 % or less (non-condensation)	
Line voltage		AC 100/117/220/240 V ±10%, 50/60 Hz	
Power copmsumption		80 VA or less	

[Glossary of terms]

● Horizontal center resolution

This shows how far fine structure can be recognized, and it shows how many stripes TV book display can distinguish at the interval equivalent to the height (length) of the screen of video, and white or black is counted as one, respectively.

● Geometric distortion

This is the difference (distortion) between the subject and the image of the subject on the screen. It is expressed as a percentage to the vertical height of the screen.

● Shading

Non-uniformity of the video output signal when a video camera views a uniform source. It is expressed as the difference between the brightest and darkest signals divided by the brightest signal and multiplied by 100%. Shading is mainly caused by non-uniform sensitivity of an image tube surface.

● Lag

A phenomenon caused when some of the output signal lingers even after the incident light was interrupted. For video cameras, this means output signal delay in response to the change of incident light.

● Gamma characteristic

This is the relationship between the signal output and the incident light. On a logarithmic graph, the former is shown on the vertical axis and the latter on the horizontal axis; the gamma characteristic is the slope (tangent) of the resulting straight line.

● S/N ratio

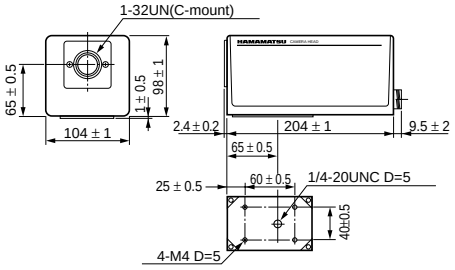
A comparison of the video signal component and the noise component that is mixed in. S/N ratio is usually shown in dB.

CONFIGURATIONS

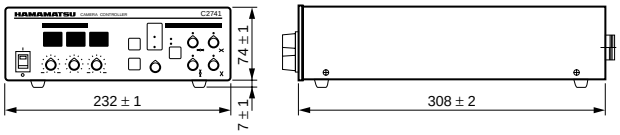
- **Camera Head**
- **Camera Controller**
- **Camera Cable (5 m)**
- **Video Monitor Cable (BNC-BNC, 3 m)**

DIMENSIONAL OUTLINE (UNIT: mm)

● Camera Head (approx. 2 kg)



● Camera Controller (approx. 5 kg)



TÜV CERT ISO 9001 Certificate: 09 105 79045

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