

TM-6701AN PROGRESSIVE SCAN FULL-FRAME SHUTTER CAMERA

IMAGING PRODUCTS



Product Features

- High resolution 1/2" progressive scanning interline transfer CCD imager 648(H) x 484(V)
- Double speed progressive scan (525 lines/60Hz), Two-row scan (120Hz), or Partial scan
- Full frame shutter1/60 to 1/32,000 sec.
- Asynchronous reset with ext. shutter control
- Full frame integration
- On chip micro-lens and low smear at fast shutter
- AGC on/off, gamma 1 or 0.45
- Small, lightweight, ruggedized design
- Single channel VGA analog output

General Description

The PULNiX TM-6701AN is a high resolution monochrome camera with three scanning modes, including non-interlace double speed scanning VGA format (60Hz), two-row scanning (120Hz), and partial scanning (100 and 200 lines) capability. Since the double speed mode is standard, images can be displayed on a standard VGA monitor. PULNiX PVM multi-sync monitors can display all functions including partial scanning. The shutter function works in all scanning modes.

The signal is analog progressive scanning (525 lines). The full frame electronic shutter with asynchronous reset permits shutter speeds to 1/32,000 sec. Square pixels provide excellent image definition in all orientations. Optional features include AGC enable, internal IR cut filter, gamma adjust to 0.45, and remoted imagers.

This camera is excellent in applications such as bar code reading, high speed on-line inspection, gauging, character reading, high definition graphics, intensified CCD cameras, and fast speed surveillance. For scientific applications, the Peltier cooling option provides 30°C of cooling for up to 20 minutes of integration.

Asynchronous Reset

The TM-6701AN's asynchronous reset is flexible and takes external horizontal drive (HD) for phase locking. When VINIT pulse is applied, it resets the camera's scanning and purges the CCD. Three modes control the asynchronous reset and shutter speed. With Async shutter mode and external VINIT high (5V), the async mode is automatically selected and the signal read-out is inhibited until the trigger starts. Without VINIT, the camera remains in the normal mode.

1. External VINIT with controlled pulse width. The duration between pulse edges controls the shutter speed externally.

2. Internal shutter speed with Fast mode. The video signal capturing has no delay from the reset timing if the falling edges of VINIT and external HD are the same. Otherwise, there is a 0-1 HD delay.

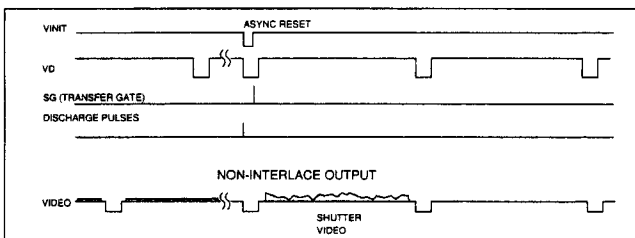
3. Internal shutter speed with Slow mode. The speed control can be selected from 1/250 to 1/2,000 sec. The camera will discharge at VINIT falling edge, if VINIT and external HD falling edges are the same, and start accumulating charges. The output will be delayed depending on the selected shutter speed.

Integration

The CCD imager of the TM-6701AN can be exposed longer than normal TV timing (1/60 sec.). This feature provides high sensitivity for dark environment applications. Integration is achieved by controlling the #11 pin of the 12-pin connector to Low (GND). The progressive scanning CCD chip in the TM-6701AN produces a full frame of resolution, using a frame grabber to capture the one frame of integrated image in non-interlace format.

Electronic Shutter

The TM-6701AN has a substrate drain type shutter mechanism which produces a superb picture at various speeds without smearing. The built-in manual shutter speed control selects the electronic shutter rate of 1/125, 1/250, 1/500, 1/1,000, 1/2,000, 1/4,000, 1/8,000, 1/16,000, or 1/32,000 sec. All shutter speeds are applied to double speed (60Hz), 120 Hz two-row scan, and partial scan, except slow speed at partial scanning. Progressive scanning allows a full 484 lines of vertical resolution per single shutter, unlike a conventional CCD camera at only 244 lines per shutter.



Double speed and partial scanning

By setting the speed switch on the back plate, the TM-6701AN can scan with normal double speed (525 lines per 60 Hz), two-row scanning (242 lines at 120Hz), and partial scanning of 100 and 200 lines (full resolution at narrower field of view and faster frame rate).

	Switch selection		
Normal mode:	N	O	60 Hz progressive scan, VGA
Double scan:	N	T	120 Hz two-row scan
100 line scan:	P	O	222 Hz progressive scan
200 line scan:	P	T	130 Hz progressive scan

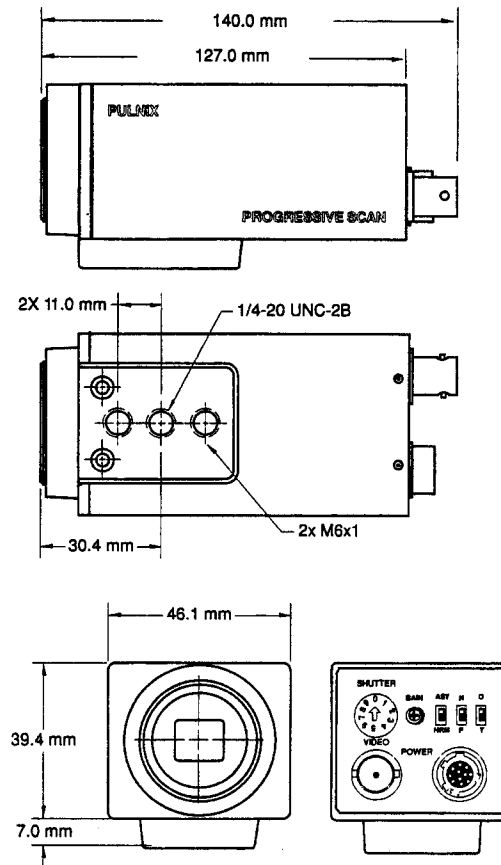
TM-6701AN

Specifications

Imager	1/2" progressive scanning interline transfer CCD
Pixel	648 (H) x 484 (V)
Cell size	9.0 μm x 9.0 μm square pixels
Scanning	60 Hz (double speed) non-interlace, 120 Hz two row scanning, Partial scanning (100 and 200 lines)
Sync	Internal/external auto switch HD= 31.468KHz ±5% Vertical async. reset or VD=60Hz
Asynchronous reset	Ext. Vinit with output inhibit Ext. shutter speed control pulse (pulse width control)
Pixel clock	25.49 MHz
TV resolution	500 (H) x 484 (V) lines
S/N ratio	50dB min. (AGC = off)
Min. illumination	2 lux at normal speed
Video output	1.0 Vp-p composite video, 75Ω non-interlace
AGC	OFF (AGC ON is a factory option)
Gamma	1.0 (Gamma 0.45 is a factory option)
Electronic shutter	Asynchronous electronic shutter Mode A: 1/32,000 Max. (controlled by 1 H, 2 H, 4 H, ...) Mode B: External speed control pulse input Full frame resolution per shutter
Lens mount	C-mount
Power req.	12V DC 400 mA
Operating temp.	-10°C to 50°C *
Vibration & shock	Vibration: 7G, Shock: 70G
Size (W x H x L)	46.1mm x 39.4mm x 140.0mm (1.78" x 1.52" x 5.41")
Weight	260 gr (9.2 oz)
Power cable	12P-02
Power supply	K25-12V or PD-12
Auto Iris connector	None
Functional options	See current price list.

* NOTE: Image degradation may occur at increased temperatures.

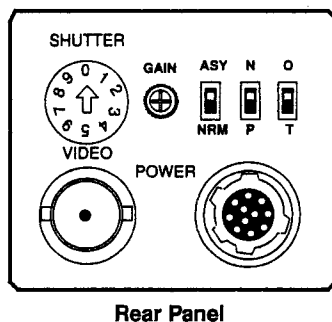
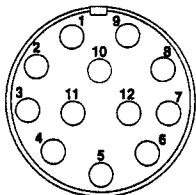
Dimensions (mm)



Pin Configuration

12-pin connector

1 GND	7 VD in
2 12V in	8 GND
3 GND	9 HD in
4 Video out	10 N/C
5 GND	11 Integ
6 Vinit	12 GND



Rear Panel

Manual Shutter Control

Manual Shutter	Async	Reset
0 no shutter	normal	1/60
1 1/125	1H	1/32,000
2 1/250	2H	1/16,000
3 1/500	4H	1/8,000
4 1/1,000	8H	1/4,000
5 1/2,000	16H	1/2,000
6 1/4,000	32H	1/1,000
7 1/8,000	64H	1/500
8 1/16,000	128H	1/250
9 1/32,000	Shutter determined by pulse width	

Async Reset Mode: Mode 0: normal mode; Mode 1-4: fast mode; Mode 5-8: slow mode; Mode 9: pulse width mode. At modes 1-9 the camera is at standby only, black video is output. One frame image will be output upon receiving an async reset pulse.

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