



### Product Features

- High resolution 1/2" blemish-free imager  
768 (H) x 494 (V) TM-7200 (EIA)  
752 (H) x 582 (V) TM-6200 (CCIR)
- Low light sensitivity (0.5 lux) with on-chip lenses
- Smearless shutter, 1/60 to 1/10,000 (or 1/31,500)
- Asynchronous reset with external shutter control
- Full frame integration
- Excellent S/N (50dB), with 8-bit digital output
- AGC on/off, gamma 1 or 0.45, Frame/Field mode

### General Description

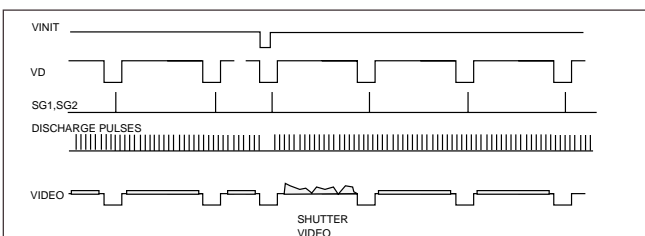
The PULNiX TM-7200/TM-6200 is a high resolution monochrome shutter camera with asynchronous reset capability and built-in video frame memory with 8-bit RS-422 digital output. Designed as a basic machine vision or automated inspection imaging sensor, the TM-7200 provides low cost image capture and storage functions right in the camera. The TM-7200/TM-6200 asynchronously resets upon external command, then holds and scans out a captured field image until the next reset signal is input. A convenient rotary selector switch on the rear of the camera is used to select one of eight different shutter modes up to 1/31,500 sec.

Full frame integration and continuous sync output during reset are available as options. Additional options include a remoted imager, AGC on, and an internal IR cut filter. The TM-7200/TM-6200 is excellent for applications such as on-line, high speed automated inspection, bar code and label reading, and process inspection.

### Asynchronous Reset

The TM-7200/TM-6200's asynchronous reset is flexible and takes external HD for phase locking. When VINIT pulse is applied, the camera's scanning resets and the CCD is purged. There are three modes to control the asynchronous reset and shutter speed:

- 1. External VINIT with pulse width control.** The duration between two pulses edges controls the shutter speed externally.
- 2. Internal shutter speed with Fast mode.** The video signal has no delay from the reset timing. The shutter speed range is 1/2,400 to 1/31,000 sec.
- 3. Internal shutter speed with Slow mode.** This varies the speed control from 1/120 to 1/950 sec. The video signal starts with internal V reset timing related to shutter speed.



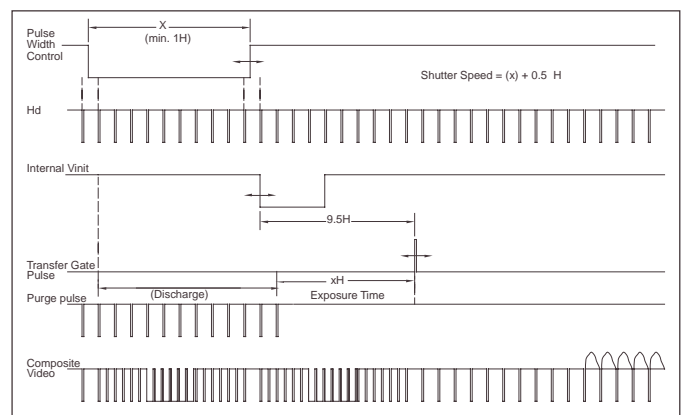
### Integration

The CCD imager of the TM-7200/TM-6200 can be exposed longer than normal TV timing (16.7 msec.), resulting in increased sensitivity for dark environment applications. Integration is achieved by controlling the #11 pin of the 12-pin connector to Low (GND). Because PULNiX uses an interline transfer chip in the TM-7200, a full frame of resolution is obtainable with the Frame mode option (not available in the Shutter mode). In integration, the signal processing keeps optical black levels as the reference black video to clamp video levels. This cancels out thermal noise during the integration period.

### Electronic Shutter

The TM-7200/TM-6200 has a substrate drain type shutter mechanism which provides a superb picture at various speeds without smearing. Optional manual shutter speed control selects the electronic shutter rate of 1/60, 1/125, 1/250, 1/500, 1/1,000, 1/2,000, 1/4,000, or 1/10,000 sec.

In the asynchronous reset mode, with VINIT high (5V), the CCD keeps discharging. With a negative going pulse to VINIT, the camera resets and purges the charge momentarily. Then it starts integrating for the period of shutter control set by either an external pulse width signal or internal shutter control.



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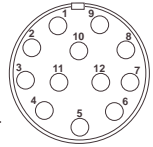
# Specifications

Model	TM-7200 (EIA)	TM-6200 (CCIR)
Imager	1/2" interline transfer CCD	
Pixel	768 (H) x 494 (V)	752 (H) x 582 (V)
Cell size	8.4 μm x 9.8 μm	8.4 μm x 8.2 μm
Scanning	525 lines 60 Hz, 2:1 interlace	625 lines 50 Hz, 2:1 interlace
Sync	Internal/external auto switch HD/VD, 4.0 Vp-p impedance 4.7KΩ VD=interlace/non-interlace	
Data clock	HD=15.734kHz±5%	HD=15.625kHz±5%
TV resolution	14.31818 MHz	
S/N ratio	570 (H) x 350 (V)	560 (H) x 420 (V)
Min. illumination	50dB min.	
Video output	0.5 lux f=1.4 without IR cut filter	
AGC	Analog: 1.0 Vp-p composite video, 75Ω, Digital: RS-422 8-bit	
Gamma	ON/OFF (OFF std.)	
Lens mount	C-mount std.	
Power req.	12V DC, 300 mA	
Operating temp.	-10°C to 50°C	
Vibration & shock	Vibration: 7G, Shock: 70G	
Size (W x H x L)	42mm x 32mm x 130mm 1.65" x 1.26" x 5.12"	
Weight	206 grams (6.65 oz.)	
Power cable	12P-02	
Power supply	K25-12V or PD-12	
Auto iris connector	None	
Functional options	1-2,3-1,3-2,4-1,7-2,10-1, 10-7,21,51,60,72, (refer to video price list)	
Accessories	30DG-02-7200 Digital Cable	

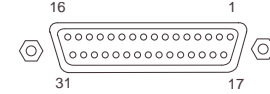
# Pin Configurations

## 12-Pin Connector

1	GND	7	VD in
2	+12V	8	GND
3	GND	9	HD in
4	Video	10	GND
5	GND	11	Int. cont.
6	VINIT	12	GND



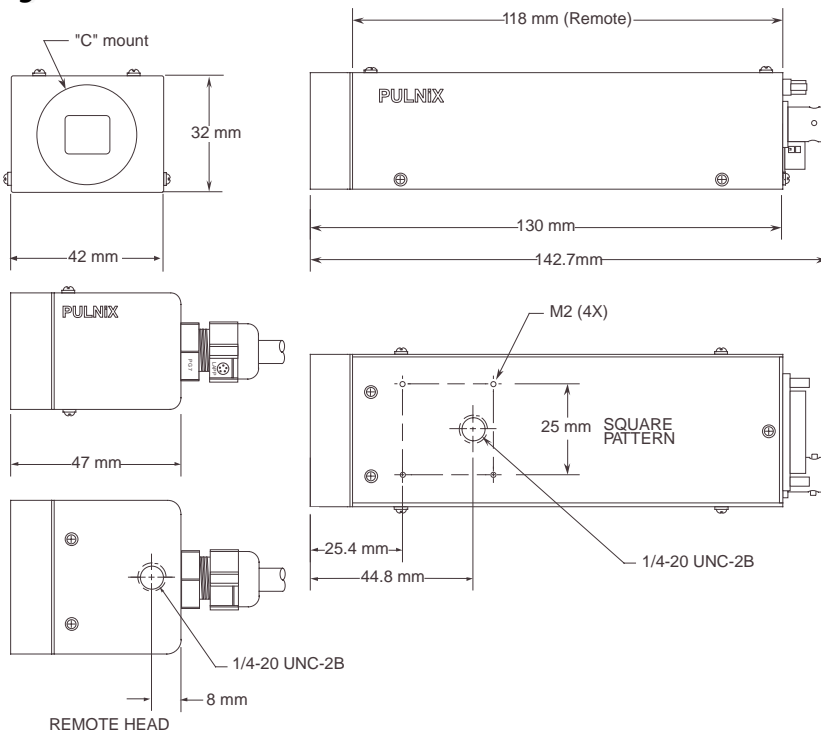
## 31-Pin Connector (MP211-031-113-4300)



Pin#	Description I/O	Pin#	Description I/O
1	CLK+ Out	17	CLK- Out
2	LDV+ Out	18	LDV- Out
3	FDV+ Out	19	FDV- Out
4	GND	20	VINIT In
5	FI+ Out	21	FI- Out
6	INTEG In	22	ENINT In
7	LPULSE Out	23	GND
8	D0+ Out	24	D0- Out
9	D1+ Out	25	D1- Out
10	D2+ Out	26	D2- Out
11	D3+ Out	27	D3- Out
12	D4+ Out	28	D4- Out
13	D5+ Out	29	D5- Out
14	D6+ Out	30	D6- Out
15	D7+ Out	31	D7- Out
16	GND		

**Note:** CLK: data clock, LDV: Line data valid, FDV: Frame or field data valid, ENINT: Integration enable, LPULSE: Last pulse, FI: odd or even field data valid

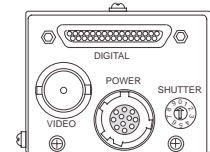
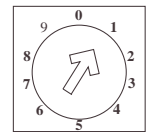
# Physical Dimensions



## Shutter Control

Manual Shutter Mode	Async Reset Mode	
	TM-7200	TM-6200
0	1/60 normal	1/60 normal
1	1/125 0.5H	1/31,000 1/31,000
2	1/250 1.5H	1/10,000 1/10,000
3	1/500 3.5H	1/4,500 1/4,500
4	1/1,000 6.5H	1/2,400 1/2,400
5	1/2,000 16.5H	1/950 1/950
6	1/4,000 32.5H	1/480 1/480
7	1/10,000 64.5H	1/245 1/245
8	N/C 128.5H	1/120 1/120
9	N/C	Pulse width control

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



Rear Panel



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