

STANFORD PHOTONICS, INC.

ELECTRONIC IMAGING TECHNOLOGIES

XR/MICRO™ ICCD CAMERA

3/01-A

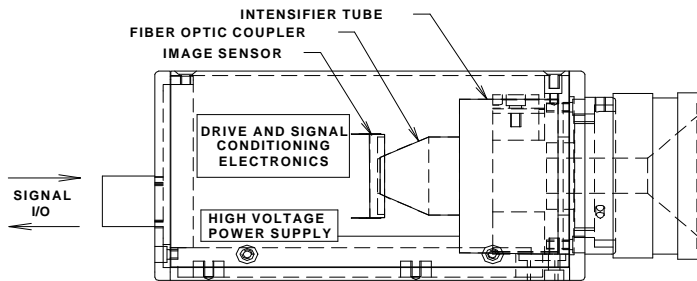
- *AUTOGATED DAY-NIGHT IMAGING IN COMPACT "MICRO" PACKAGE
- *SUPERIOR PHOTORESPONSE AND SIGNAL-TO-NOISE
- *STATE OF THE ART GEN III OMNI IV TECHNOLOGY*
- *LIGHT/IMAGE AMPLIFICATIONS OF 40,000+
- *TRUE NYQUIST LIMITED RESOLUTION

The XR/MICRO™ ICCD Camera System from Stanford Photonics is the smallest in its line of high performance, low-light imaging products incorporating GEN III Ultra/OMNI IV intensifier tube technology. The GEN III Ultra offers the highest resolution, the highest visible and near IR sensitivity and the best signal-to-noise specifications of any 18 MM input format device.* Stanford Photonics uses its own proprietary bonding process to couple these tubes via fiber-optic tapers directly to the CCD image sensor. Direct fiber-optic coupling results in a five to ten-fold increase in sensitivity and higher resolution and contrast in the final video image relative to ICCD cameras using relay optics between the intensifier and image sensor. Advances in power supply and Intensifier tube packaging along with miniaturized CCD drive electronics have resulted in a daylight to starlight camera weighing just over 8 ounces and small enough to fit in the palm of one's hand.



*All Stanford Photonics' products are available, subject to controls and conditions, with unfilmed photocathode GEN IV intensifier tubes.

An added benefit of fiber optic coupling is a reduction in package size: the XR/MICRO ICCD, complete with intensifier tube, power supply, camera and autogating drive electronics, has a standard envelope dimension of only 1.6W by 2.0H by 3.75L inches. This unique "micro" sized-package opens up many opportunities for covert surveillance, remote piloted aircraft and transports, robotics, submarines and machine vision, where volume and mass are critical to the application.



"MICRO" ENVELOPE: 1.60W X 2.00 H X 3.75 INCHES LONG
WEIGHT: 9 OZ.; SIGNAL I/O: RS-170 AND 12 VDC IN @ 250 MA TYP

The XR/MICRO uses a 768(H) by 494(V) pixel, 2/3-inch format interline transfer CCD backed by full-featured RS-170 drive electronics. The 2/3-inch sensor requires less image reduction (smaller taper ratio for 18mm to 2/3-inch format conversion) and therefore provides better sensitivity than coupling based on 1/2 inch devices. The final system resolution of the combined intensifier tube-taper-sensor-electronics assembly is 570 TVL(H): essentially limited by the CCD sensor/drive electronics. The superior low-light response of the XR/MICRO camera allows imaging and detection at levels below 10 (-6) Lux

The standard XR/MICRO is designed for automatic photocathode gating with fixed or remote iris'ed lensing, providing complete hands-off operation. Other functions and features available on a custom basis or in other product configurations offered by Stanford Photonics include:

- | | | |
|---------------------------|---------------------------|------------------|
| *HIGH QE SELECTION | *AUTO IRIS LENS CONTROL | *GEN IV FILMLESS |
| *72 LP/MM TUBE SELECTION | *"ZERO DEFECT" COSMETICS | *MANUAL GAIN |
| *120-240 HZ. FAST FRAMING | *CUSTOM AND OEM PACKAGING | *GEN II, GEN II+ |
| *750 TVL EXTENDED RES. | *EXTENDED BLUE RESPONSE | *DIGITAL CAMERAS |

This product is controlled by the Office of Munitions Control, U.S. Department of State and requires a Department of State export license if shipped or taken out of the United States.

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INTENSIFIER COMPONENTS/CONTROL AND SPECIFICATIONS

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IMAGE INTENSIFIER TUBE. GEN III ULTRA (UB/Ultra Blue/OMNI IV). 18mm input/output format. Minimum 64 lp/mm resolution with optional selection for 72 lp/mm. High quantum efficiency and photoresponse from 450 -900 nm. Extended response (minimum quantum efficiency of 38% at 546 nm) available on a limited basis. Luminous gain to 40,000 typ./80,000 max. Specifications:

<u>PARAMETER</u>	<u>SPECIFICATION</u>					
<u>PHOTOCATHODE SENSITIVITY</u>						
LUMINOUS: 2856 °K	1800 MICRO AMP/LUMEN, MIN.					
RADIANT: @ 830 NM.	190 MA/WATT, MIN.					
RADIANT: @ 880 NM.	75 MA/WATT, MIN.					
<u>LUMINOUS GAIN, FL/FC</u>	20,000-80,000					
<u>OUTPUT BRIGHTNESS, FL</u>	0.7-4.5					
<u>EBI (EQUIVALENT BACKGROUND INPUT)</u>	2.5 E-11 LUMENS.CM**2, MAX (0.25 µLUX)					
<u>SIGNAL-TO-NOISE RATIO</u>	21.0 MINIMUM OVER FULL GAIN RANGE					
<u>RESOLUTION</u>	64 LP/MM MIN; 72 LP/MM SELECT					
<u>MTF</u>						
@2.5 LP/MM	92% MIN.					
@7.5 LP/MM	80% MIN.					
@15 LP/MM	61% MIN.					
@25 LP/MM	38% MIN.					
<u>HALO</u>	1.25 MAX					
<u>PHOSPHOR</u>	P43					
<u>RELIABILITY (MIL-1-49428(CR))</u>	10,000					
<u>SPOTS/COSMETICS (STD. AND "S")</u>	Z1	Z2	Z3	Z1S	Z2S	73S
>0.15"	0	0	0	0	0	0
0.012"-0.015"	0	0	0	0	0	0
0.009"-0.012"	0	0	0	0	0	0
0.006"-0.009"	0	1	2	0	0	0
0.003"-0.006"	0	2	3	0	0	0

These specifications are derived from the manufacturer's most current published data and are subject to change without notice.

FIBER OPTIC COUPLING. 18mm:11mm fiber optic taper; 4.0 micron large end fiber; N.A. 1 with E.M.A. Direct adhesive bond to image sensor. Other mag ratios (2.2:1; 1.45:1 for 16mm input format; 1:1 straight through) available upon request.

INTENSIFIER POWER SUPPLY. Standard: steady state and/or gateable unit with autogating control electronics internal to camera Gate widths down to 100 ns with 50 ns (typ.) rise/fall times. Integral BSP and ABC protection circuitry. Gain control 0-5 VDC (2x gain increase for each 0.2 volt increment from 3-5 VDC; 1000:1 range; other range options available on request). Gain step response 20 dB (10x) with 2 ms. (nominal) settling. Auto gain/gate control provides for up to six decades of dynamic light level compensation.

SENSOR. SONY XX082 2/3" Hyper Had interline transfer. 768H by 493 pixels (11H micron by 13V micron).

VIDEO ELECTRONICS. Three part miniature surface mount. Frame mode integration.. 50 dB minimum S/N, 56 dB typical. "Point-and-shoot" configuration with minimal I/O connections standard: 12 VDC in; 1.0 V p-p composite video, 75 Ohm out. Other options include Gamma 0.45 (Gamma 1.0 standard), AGC, ext. H and V sync; field mode integration; CCIR sensor; remote auto/manual intensifier gate and gain; iris control out (these are all factory settings/modifications; additional backplate hardware required for extended I/O).

POWER. 12 VDC, 250 mA typical. On-camera receptacle: Tajima RB-2-F; Plug: Tajima PB-2-M

ENVIRONMENTAL. -10°C to 50°C operational. -20°C to 65°C storage. Vibration and shock TBD.

MECHANICAL. 1.6W by 2.0H by 3.75 inches long. 9 ounces. Powder coat and black anodized outside surfaces.