1.0 General Description

The AMIS-710317-A6 (PI317MC-A6) is a contact imaging sensor (CIS) module, which is composed of 13 AMIS-720321 (PI3021) sensor chips. The AMIS-720321 is a 300 dots per inch (dpi) solid-state line imaging array, also a product of AMI Semiconductor. This imaging device is fabricated using MOS imaging sensor technology for high-speed performance and high sensitivity. The AMIS-710317-A6 is suitable for scanning A6 size (104mm) documents with 11.8 dots per millimeter (dpm) resolution. Applications include ticket, check and card scanners, a variety of mark readers and other automation equipment.

2.0 Key Features

- Light source, lens and sensor are integrated into a single module
- 11.8dpm resolution, 104mm scanning length
- Up to 250μsec/line scanning speed, with 5MHz pixel rate
- Wide dynamic range
- Analog output
- Yellow-Green LED light source
- Compact size ≅ 14mm x 19mm x 120mm
- Low power
- Light weight

3.0 Functional Description

The AMIS-710317-A6 imaging array consists of 13 sensors that are cascaded to provide 1248 photo-detectors with their associated multiplex switches and a digital shift register that controls its sequential readout. Mounted in the module is a one-to-one graded indexed micro lens array that focuses the scanned documents to image onto its sensing plane. The on-board amplifier processes the video signal to produce a sequential stream of video at the video output pin of the AMIS-710317-A6 module.

Illumination is accomplished by means of an integrated LED light source. All components are housed in a small plastic housing which has a cover glass that acts as the focal point for the object being scanned and protects the imaging array, micro lens assembly and LED light source from dust. I/O to the module is the 10-pin connector located on one end of the module. The cross section of the AMIS-710317-A6 is shown in Figure 1 and the block diagram in Figure 2.

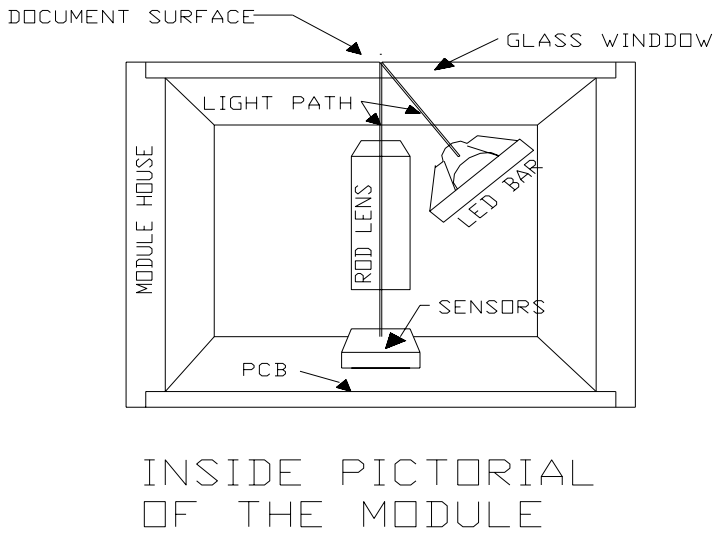

Figure 1: Inside Pictorial of the Module

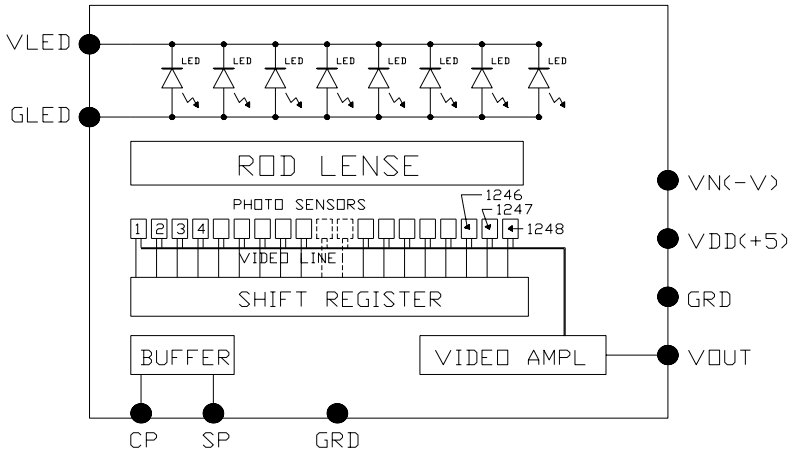

Figure 2: AMIS-710317-A6 Module Block Diagram (see Table 1)

Table 1: Pin Configuration

Pin Number	Symbol	Names and Functions
1	Vout	Analog video output
2	Gnd	Ground; 0V
3	Vdd (+5V)	Positive power supply
4	Vn (-5V to -12V)	Negative power supply
5	Gnd	Ground; 0V
6	SP	Shift register start pulse
7	Gnd	Ground; 0V
8	CP	Sampling clock pulse
9	GLED	Ground for the light source; 0V
10	VLED	Supply for the light source

Table 2: Absolute Maximum Rating

Parameter	Symbols	Maximum Rating	Units
Power supply voltage	Vdd	10	V
	Idd	50	ma
	Vn	-15	V
	In	10	ma
	VLED	5.5	V
	ILED	500	ma
Input clock pulse (high level)	Vih	Vdd - 0.5	V
Input clock pulse (low level)	Vil	-0.6	V

Table 3: Operating Environment

Parameter	Symbols	Maximum Rating	Units
Operating temperature	Top	0 to 50	˚C
Operating humidity	Hop	10 to 85	%
Storage temperature	Tstg	-25 to +75	˚C
Storage humidity	Hstg	5 to 95	%

4.0 Electro-Optical Characteristics at 25˚C

Table 4: Electro-Optical Characteristics at 25°C

Parameter	Symbol	Parameter	Units	Note
Number of photo detectors		1248	Elements	
Pixel-to-pixel spacing		84.7	µm	
Line scanning rate	Tint(1)	250	µsec	@ 5.0MHz clock frequency
Clock frequency(2)	f	5.0	MHz	
Bright output voltage(3)	Video output	1.0 +/-0.1	V	
Bright output non-uniformity(4)	Up	<+/-30	%	
Adjacent pixel non-uniformity(5)	Uadj	<25	%	
Dark non-uniformity(6)	Ud	<100	mV	
Dark output voltage	Vd	<450	mV	
Modulation transfer function(7)	MTF	>40	%	

Notes:

(1) Tint: Line scanning rate or integration time. Tint is determined by the interval of two SP.
(2) f: main clock frequency
(3) Vpavg = ∑ Vp(n)/1248; where n=1, 2, 3....,1248
(4) Up = [(Vpmax - Vpavg) / Vpavg] x 100% or [(Vpavg - Vpmin) / Vpavg] x 100% where Vpmax = the maximum V(n) and Vpmin = the minimum V(n)
(5) Upadj = MAX[| (Vp(n) - Vp(n+l) | / Vp(n)] x 100%
Upadj is the non-uniformity percentage pixel to pixel
(6) Ud = Vdmax – Vdmin
Vdmin is the minimum output voltage, LED off.
Vdmax is the maximum output voltage, LED off.
(7) MTF = [(Vpmax - Vpmin) / (Vpmax + Vpmin)] x 100 [%]; tested on a 75 lp/inch target.
Vpmax: maximum output voltage
Vpmin: minimum output voltage
lp/inch: line-pair/inch

Table 5: Recommended Operating Conditions (25°C)

Item	Symbol	Min.	Mean	Max.	Units
Power supply	Vdd	4.5	5.0	5.5	V
	Vn.	-4.5	-5	-12	V
	VLED		5		V
	Idd		47	55	ma
	Ivn		6.0	10.0	ma
	ILED		450	500	ma
Input voltage at digital high	Vih	Vdd-1.0	Vdd-0.5	Vdd	V
Input voltage at digital low	Vil	0		0.8	V
Clock frequency	f			5.0	MHz
Clock pulse high duty cycle		25			%
Clock pulse high duration		50			ns
Integration time	Tint	0.25		5.0	ms
Operating temperature	Top		25	50	˚C

* Tint (Min.) is the lowest line integration time available with a 5.0MHz clock rate.

5.0 Switching Characteristics (25°C)

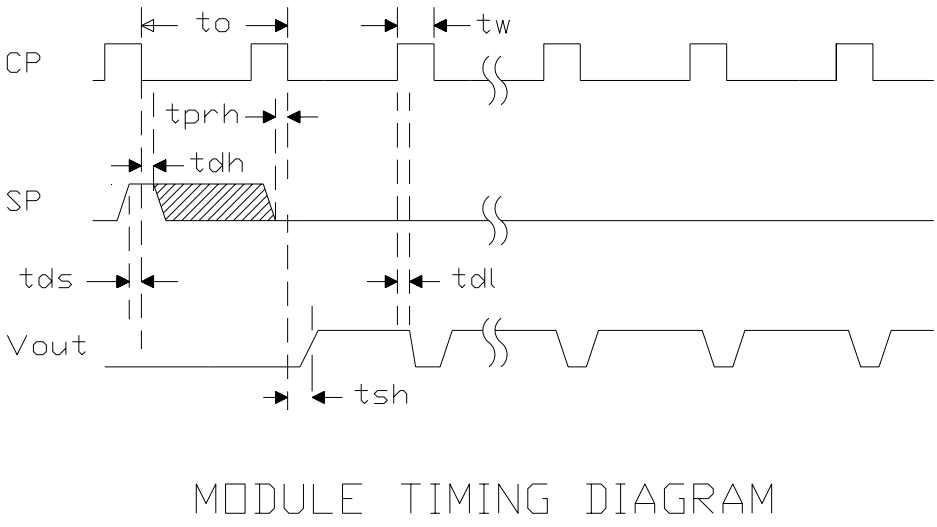

Figure 3: Module Timing Diagram

The switching characteristics for the I/O clocks are shown in Figure 3. See the timing symbol definitions in Table 6.

Table 6: Symbol Definitions for the Above Timing Diagram

Item	Symbol	Min.	Typ.	Max.	Units
Clock cycle time	to	0.20		4.0	µs
Clock pulse width	tw	50			ns
Clock duty cycle		25		75	%
Prohibit crossing time of SP	tprh	15			ns
Data setup time	tds	20			ns
Data hold time	tdh	20			ns
Signal delay time	tdl	50			ns
Signal settling time	tsh	120			ns

6.0 AMIS-710317-A6 Module and its Mechanical Dimensions

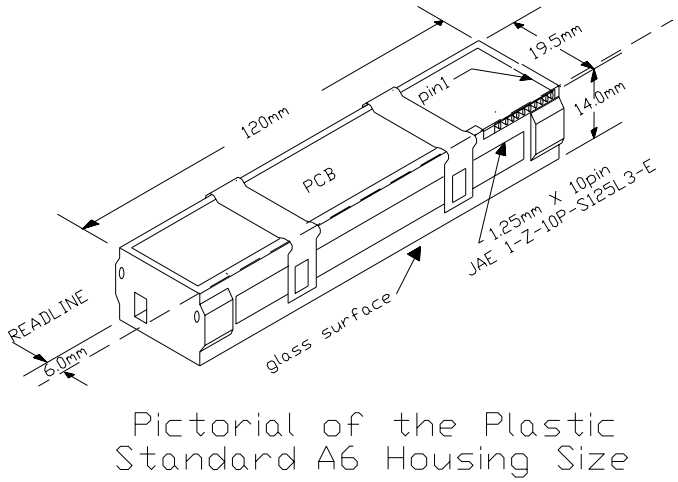

Figure 4: Pictorial of the Plastic Standard A6 Housing Size

The sketch of this module is to provide a pictorial of the module size and structure. A detailed drawing is available upon request.

7.0 Company or Product Inquiries

For more information about AMI Semiconductor, our technology and our product, visit our Web site at: http://www.amis.com

North America
Tel: +1.208.233.4690
Fax: +1.208.234.6795

Europe
Tel: +32 (0) 55.33.22.11
Fax: +32 (0) 55.31.81.12