

REVISIONS

Letter	ECO No.	Description	Checked	Approved	Date
A	36-101	INITIAL RELEASE	G. G.	EAB	8/2/94
B	36-102	INCORPORATE VENDOR COMMENTS	G.G.	KT	8/11/94
C	36-105	INCORPORATE VENDOR COMMENTS	G.G.	KT	8/22/94
D	36-113	ADD PACKAGE DETAIL INFORMATION TO FIGURE 2	EAB	KT	11/16/94
E	36-195	MODIFIED TABLE 1 TO FACILITATE TESTING	GG	DS	4/18/95

NAME	DATE	MASSACHUSETTS INSTITUTE OF TECHNOLOGY CENTER FOR SPACE RESEARCH			
Drawn: BRIAN KLATT	8/1/94	MICROCIRCUITS, LINEAR, CMOS 12-BIT A/D CONVERTER			
Checked: Gordon C. Gong	8/2/94				
Approved: Ed Boughan	8/2/94				
Released: K. Tibbetts	8/3/94				
		Size	Code Identification No.	Drawing No.	Rev.
		T	80230	36-02301	E
		Scale: NONE			Sheet: 1 of 7

1.0 SCOPE

- 1.1 Introduction This drawing describes device requirements for a self-calibrating 12 bit analog to digital (A to D) converter used in flight hardware for a space experiment on the AXAF CCD Imaging Spectrometer (ACIS) Instrument. The part described herein is a Crystal Semiconductor die, P/N CS5012A-YU, packaged in a 40 lead flat pack.
- 1.2 Part Number The complete MIT part number shall be 36-02301
- 1.3 Absolute maximum ratings Absolute maximum ratings are in accordance with paragraph 1.3 of SMD 5962-89679.
- 1.4 Recommended operating conditions Recommended operating conditions are in accordance with paragraph 1.4 of SMD 5962-89679.

2.0 APPLICABLE DRAWINGS

- 2.1 Government Specifications and Standards Unless otherwise specified, the following specifications and standards, of the latest released issue, form a part of this drawing, to the extent specified herein.

SPECIFICATIONS

MILITARY

5962-89679	Microcircuits, Linear, CMOS 12 BIT A/D Converter, Monolithic silicon
MIL-H-38534	Hybrid Microcircuits, General Specification for

STANDARDS

MIL-STD-883	Test Methods and Procedures for Microelectronics
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- 2.2 Order of precedence In the event of conflict between the text of this drawing and the references cited herein, the text of this drawing shall govern.

3.0 REQUIREMENTS

3.1 General Requirements

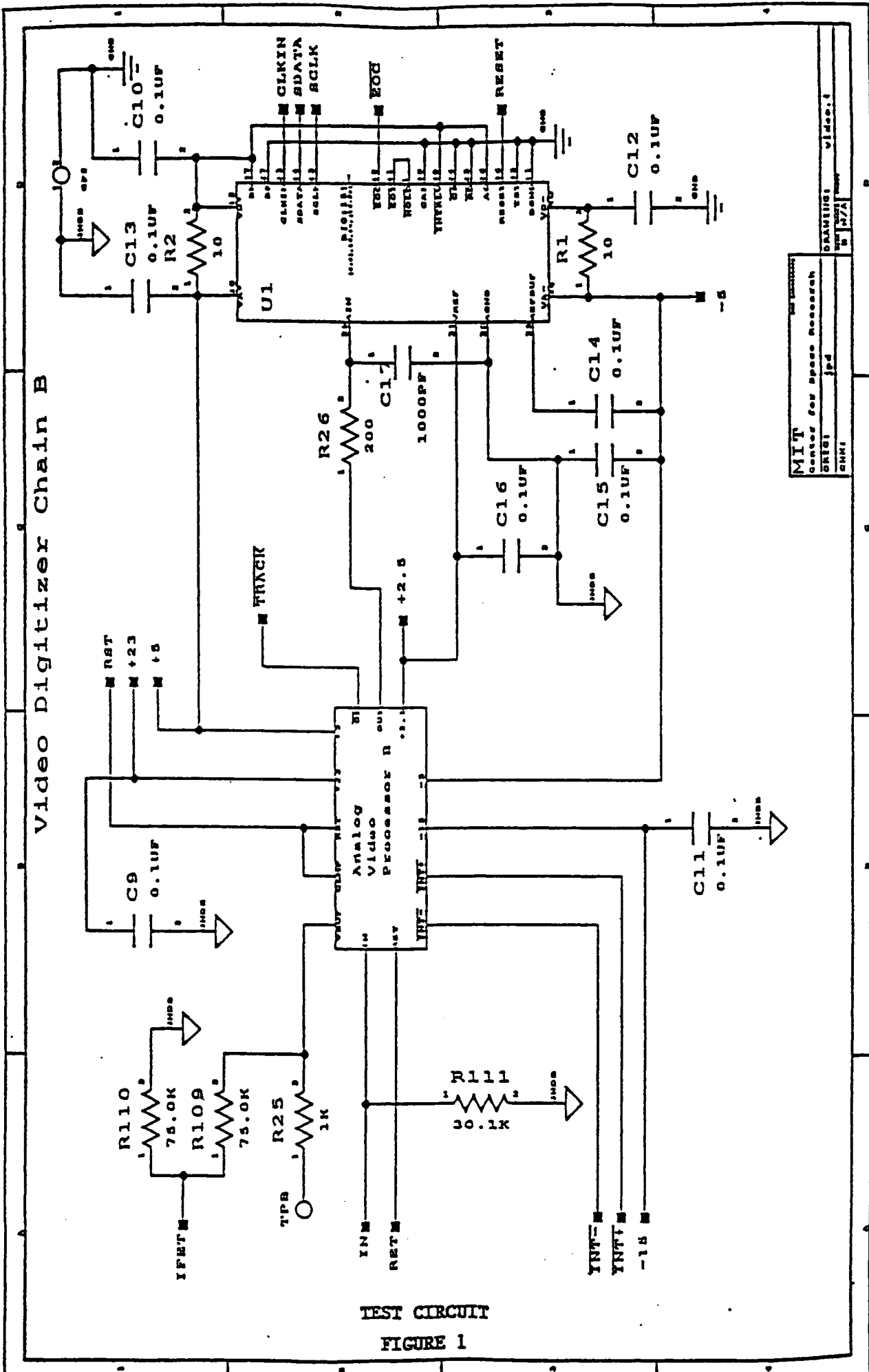
- 3.1.1 Item Requirements The microcircuits described herein shall, in all respects, meet the requirements of this specification for a class B microcircuit. These microcircuits shall be fabricated and tested using production and test facilities and a Reliability and Quality Assurance program adequate to assure successful compliance with this specification and 5962-89679, as modified herein.

Table 1
ELECTRICAL PERFORMANCE

TEST	Symbol	CONDITIONS -55°C ≤ T _A ≤ +125°C unless otherwise specified. Per figure 1 herein.	Group A Sub- groups	LIMITS		UNITS
				MIN	MAX	
Resolution for which no missing code is guaranteed	RES	<u>1</u> /	1,2	12		Bits
Integral linearity error	INL	<u>1</u> / <u>2</u> /	1,2		±0.5	LSB
Differential linearity error	DNL	<u>1</u> / <u>2</u> /	1,2		±0.5	LSB
Full scale error	FSE	<u>1</u> / <u>2</u> /	1 & 2 3		±0.5 ±1.5	LSB LSB
Bipolar negative full-scale error	BNFSE	<u>1</u> / <u>2</u> /	1,2		±0.5	LSB
Digital input current	I _{IN}	<u>5</u> / <u>6</u> /	1,2,3		±10	μA
High Impedance state output current	I _{OZ}	Pins D ₀ to D ₁₅ only <u>5</u> / <u>6</u> /	1,2,3		±10	μA
Throughput	t _{PUT}	<u>1</u> / <u>2</u> / <u>6</u> /	9, 10	100		kHz
Positive analog supply current	I _{A+}	<u>6</u> / <u>9</u> / +V _A , +V _D = +5.5V -V _A , -V _D = -5.5V	1,2,3		19.0	mA
Negative analog supply current	I _{A-}	<u>6</u> / <u>9</u> / +V _A , +V _D = +5.5V -V _A , -V _D = -5.5V	1,2,3		19.0	mA
Positive digital supply current	I _{D+}	<u>6</u> / <u>9</u> / +V _A , +V _D = +5.5V -V _A , -V _D = -5.5V	1,2,3		6.0	mA
Negative digital supply current	I _{D-}	<u>6</u> / <u>9</u> / +V _A , +V _D = +5.5V -V _A , -V _D = -5.5V	1,2,3		6.0	mA
<u> </u> HOLD pulse width *	t _{HPW}	<u>5</u> / <u>6</u> / <u>11</u> / (see figure 4)	N/A	1/f CLK +50	t _c	ns
<u> </u> EOC pulse width *	t _{EPW}	<u>5</u> / <u>6</u> / <u>11</u> / (see figure 4)	N/A	4/f CLK -20	t _c	ns

* These parameters are measured on the first article only
Figures and footnotes are in 5962-89679

Video Digitizer Chain B



TEST CIRCUIT
FIGURE 1

MIT
Center for Space Research
CRS-1
JPL
GMI

DRAWING: vidc01
DATE: 1/7/71

- 3.1.2 **Procuring Activity** For the purposes of this specification and documents referenced herein, the procuring activity is the Massachusetts Institute of Technology (MIT), Center for Space Research (CSR).
- 3.1.3 **Product Changes** The supplier(s) shall notify MIT of proposed changes to Microcircuits, including changes in design, materials, fabrication methods, or processes, and changes which may affect the quality or intended end use.
- 3.2 **Part marking** Microcircuit marking shall meet the intent of paragraph 3.4 of 5962-89679.
- 3.2.1 **Part Number** Microcircuits shall be marked with the MIT part number; 36-02301.
- 3.3 **Electrical performance characteristics** Unless otherwise specified, the electrical performance characteristics are as specified in table 1 herein, and apply over the full operating temperature range.
- 3.4 **Design and Construction Requirements**
- 3.4.1 **Package** The package shall be a 40-terminal square flat pack per figure 2 herein (Isotronics P/N KSF06250625-040-001 or equivalent). Leads shall be formed, after final electrical test, for surface mounting on a printed circuit board. Device hermeticity shall be tested after lead forming.
- 3.4.2. **Lead Finish** The lead finish shall be "A" per MIL-H-38510.
- 3.4.3 **Terminal connections** The terminal connections shall be per figure 1, for outline Q of 5962-89679.
- 4.0 QUALITY ASSURANCE PROVISIONS**
- 4.1 **Responsibility for Inspection** Unless otherwise specified herein, the assembly/packaging manufacturer is responsible for the performance of all examinations and tests as specified herein.
- 4.2 **Screening** All Microcircuits (100%) shall be subjected to and pass the screen tests and examinations defined in paragraph 4.5 of MIL-H-38534, class H.
- 4.2.1 **Xray** All Microcircuits (100%) shall be subjected to and pass radiographic examination per MIL-STD-883, method 2012.
- 4.2.2 **Particle Impact Noise Detection (PIND)** All Microcircuits (100%) shall be subjected to and pass PIND examination per MIL-STD-883, method 2020, condition B.
- 4.3 **Quality Conformance Inspection (QCI)** Quality conformance inspection shall be in accordance with paragraph 4.7 of MIL-H-38534, option 1.
- 4.4 **Destructive Physical Analysis (DPA)** An internal destructive examination shall be performed in accordance with paragraph 3.5, of MIL-STD-883, method 5009. Sample size shall be two (2).

4.5 Inspection and Test Records The supplier shall maintain inspection and test records for 36 months after hardware delivery to MIT. Test data for all electrical tests, screening, DPA, and QCI inspections shall be submitted to MIT with the delivery of flight parts.

4.6 Source Inspection

4.6.1 Government Source Inspection (GSI) The government has the right to inspect any or all of the work included in this order at the supplier's plant. In the event that Government Source Inspection (GSI) is imposed, the Government quality representative who has been delegated NASA quality assurance functions for this procurement shall be notified immediately upon receipt of this order. The Government representative shall also be notified 48 hours in advance of the time that parts are ready for inspection or test.

4.6.2 MIT Source Inspection MIT Performance Assurance will impose mandatory inspection points (MIPs) at wire bonding (precap visual examination) and final test, and must be notified 2 weeks before parts are ready for MIT Inspection. (call area code 617, phone 253-7555).

5.0 **PACKAGING**

5.1 Packaging requirements Packaging shall be in accordance with paragraph 5.1 of 5962-89679

6.0 **NOTES**

6.1 Approved Source of Supply

Semiconductor Element

Crystal Semiconductor
P. O. Box 17847
4210 South Industrial Drive
Austin, TX 78760

Assembly/Packaging

Interpoint Corporation
10301 Willows Road
Redmond, WA. 98073

Cage Code 50821

NOTES:
 1. MATERIAL
 BASE & LEADS - ASTM F-15 ALLOY (KOVAR)
 GLASS - 7032 OR EQUIV.

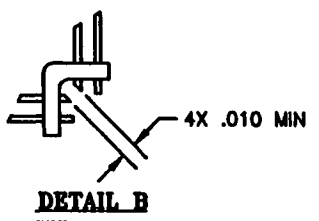
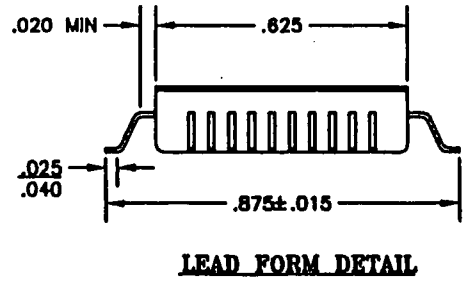
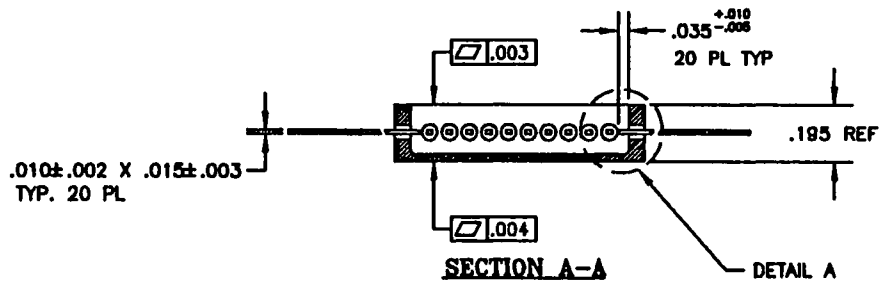
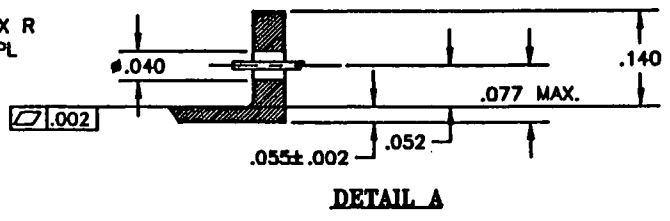
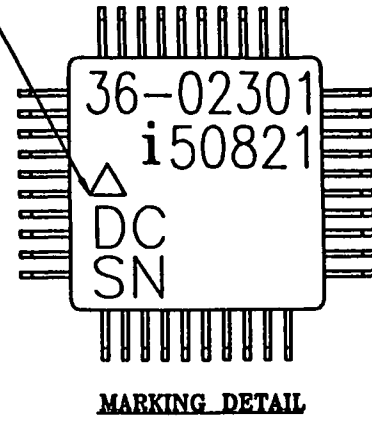
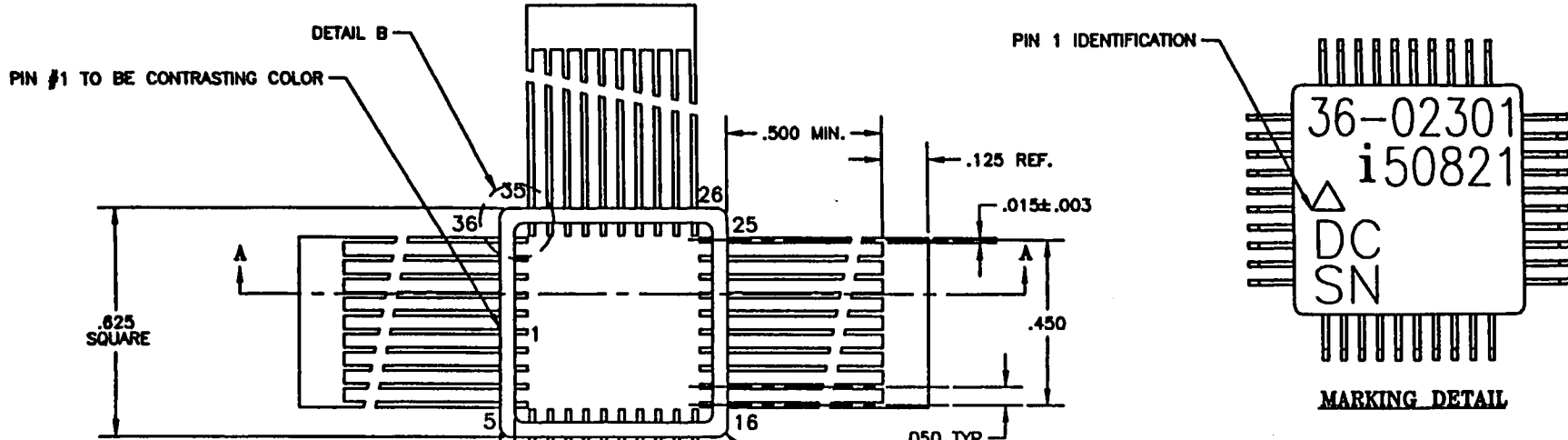


FIGURE 2
 PACKAGE

SCALE: NONE	SIZE: A	FSCM NO.: 80230	DWG. NO.: 36-02301	REV.: D
SHEET 7				