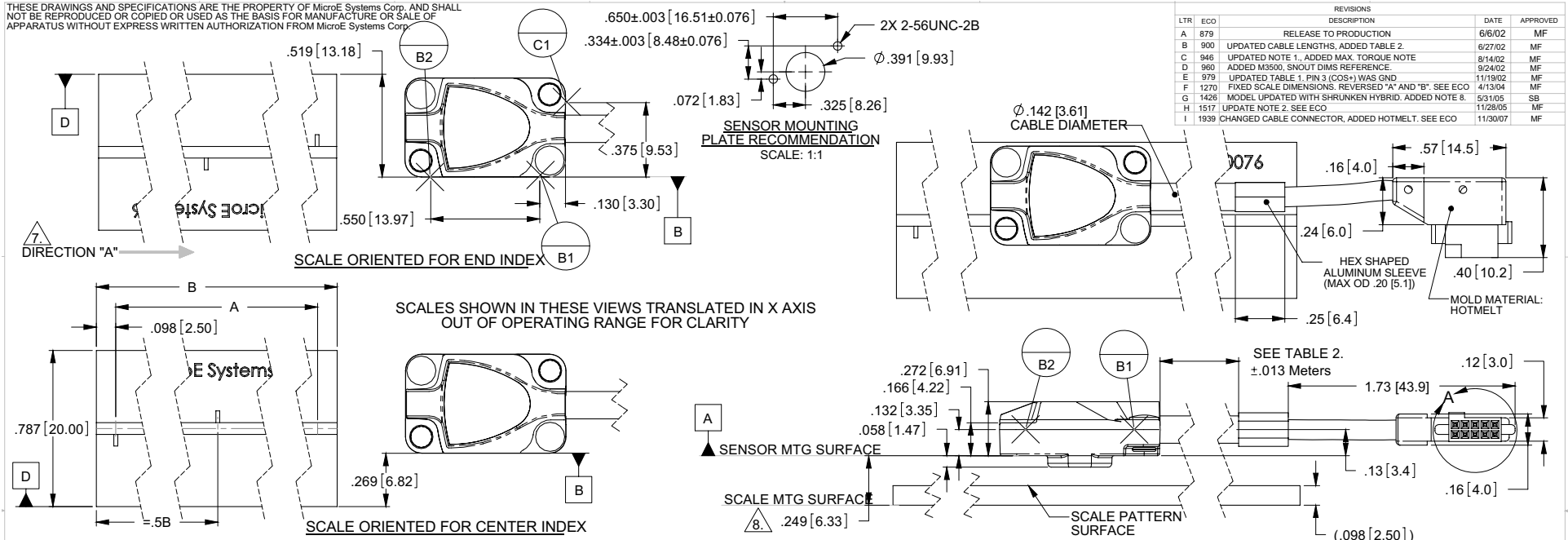




# Mercury 2000, 3000 & 3500 Encoder System Interface Drawing: Long Linear Scales

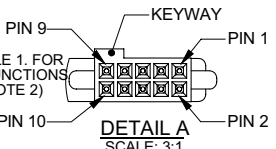
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- NOTES:**
- RECOMMENDED MOUNTING HARDWARE: 2-56 OR M2 SCREWS w/ 4 FLAT WASHERS (2 ON EACH SCREW) (OD OF WASHER NOT TO EXCEED .150 [3.81]). MAX. TORQUE: 3.3 in. lbs
  - FOR APPLICATIONS USING THE SMARTPRECISION ELECTRONICS THIS CONNECTOR (FCI p/n 87012-605 or SAMTEC p/n SFM-105-03-S-D) IS INSIDE THE ENCLOSURE (see interface drawings). ADDITIONAL STRAIN RELIEF MUST BE PROVIDED IF MICROE SUPPLIED ELECTRONICS IS NOT USED. RECOMMENDED MATING CONNECTOR: FCI p/n 87407-105/SAMTEC p/n TFM SERIES OR EQUIVALENT.
  - IF BENCHING PINS ARE TO BE USED, PINS MUST BE PLACED ALONG DATUM EDGES OF BOTH THE SENSOR AND THE SCALE FOR PROPER ALIGNMENT. SEE TABLE 1. FOR PINOUT FUNCTIONS (SEE NOTE 2)
  - HEIGHT OF SENSOR BENCHING PINS MUST BE A MINIMUM OF .170 [4.32] IN HEIGHT FROM DATUM A.
  - HEIGHT OF SCALE BENCHING PINS NOT TO EXCEED THE THICKNESS OF THE SCALE.
  - RECOMMENDED SENSOR MOUNTING PLATE THICKNESS: MINIMUM- 4 SCREW THREADS MAXIMUM- ALLOW CLEARANCE TO SCALE AND SCALE MOUNTING HARDWARE (BENCHING SURFACES, CLAMPS, HUBS, ETC.)

**TABLE 2.**

Cable Length	
(1500H)	(2000/3000/3500)
1 Meter	.5 Meter
2 Meter	1 Meter
5 Meter	2 Meter



**TABLE 1.**

5x2, .050" PITCH HEADER		
PIN	Function (2000/3000/3500)	Function (1500H)
1	SIN+	SIN+
2	INDEX WINDOW-	INDEX WINDOW-
3	SIN-	COS+
4	GND	GND
5	COS+	A+
6	INDEX WINDOW+	INDEX WINDOW+
7	COS-	A-
8	+5V	+5V
9	N/C	B+
10	N/C	B-

- WHEN SCALE MOVES IN DIRECTION "A" WITH RESPECT TO A STATIONARY READHEAD, OUTPUT SIGNAL COS+/B+ (PIN 5/PIN 9) LEADS OUTPUT SIGNAL SIN+/A+ (PIN 1/PIN 5).
- FOR SCALES ATTACHED W/ADHESIVE TAPE (LXX-T), THE SCALE MOUNTING SURFACE MUST BE .006" FURTHER AWAY FROM SENSOR MOUNTING SURFACE FOR NOMINAL Z HEIGHT. DIM = .255[6.48]

**SCALE IDENTIFICATION AND SIZE**

Scale Identification #	Dim A. Measured Length	Dim B. Scale Length
LXX	XXmm-5mm	XXmm
L155	155mm-5mm = 150mm	155mm
(max) L2025	2025mm-5mm = 2020mm	2025mm

THESE ARE EXAMPLES

UNLESS OTHERWISE SPECIFIED  
ALL DIMENSIONS ARE IN INCHES (millimeters)  
DIM. APPLY AFTER PROCESSING  
INTERPRET ALL GEOMETRIC TOLS.  
PER ANSI Y14.5M-1994

TOLERANCES ARE:  
DECIMALS: .XX [X]±.01 [25] ±30 MIN.  
XXX [X]±.005 [13]

APPROVALS

APPROVALS	DATE
DRAWN: S. BUTURLIA	4/18/01
CHECKED:	
ENGRG: DON GRIMES	6/5/02
MFG ENG: M. SKWIRA	6/6/02
QA: J. FARNAM	6/6/02

**UNITS: .in [mm]**

MicroE Systems  
Division of GSI

8 Erie Drive  
Natick, MA 01760

DESCRIPTION:  
**INTERFACE, ENCODER, 20um,  
LONG LINEAR, CABLE OUT, MERCURY  
1500H/2000/3000/3500 SENSOR**

SIZE: DWG. NO. **ID-00201** REV. **I**

SCALE: 2:1 CAD FILE: SHEET 1 OF 1

# Mercury 2000, 3000 & 3500 Encoder System Interface Drawing: Rotary Scales with Hub

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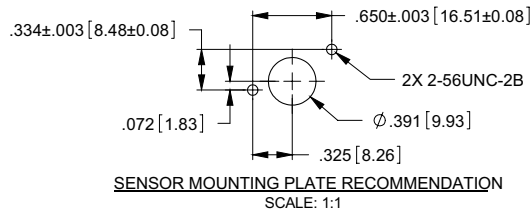
**NOTE:**

1. RECOMMENDED MOUNTING HARDWARE:  
2-56 OR M2 SCREWS w/ 4 FLAT WASHER (2 ON EACH SCREW)  
(OD OF WASHERS NOT TO EXCEED .150 [3.81]).  
MAX TORQUE: 3.3 in. lbs
2. FOR APPLICATIONS USING THE SMARTPRECISION ELECTRONICS THIS CONNECTOR (FCI p/n 87012-605 or SAMTEC p/n SFM-105-03-S-D) IS INSIDE THE ENCLOSURE (see Interface drawings). ADDITIONAL STRAIN RELIEF MUST BE PROVIDED IF MICROE SUPPLIED ELECTRONICS IS NOT USED. RECOMMENDED MATING CONNECTOR: FCI p/n 87407-105/SAMTEC p/n TFM SERIES OR EQUIVALENT.
3. IF BENCHING PINS ARE TO BE USED, PINS MUST BE PLACED ALONG DATUM EDGES OF SENSOR FOR PROPER ALIGNMENT. (REFERENCE DATUMS B1, B2 AND C1).
4. HEIGHT OF SENSOR BENCHING PINS MUST BE A MINIMUM OF .170 [4.32] IN HEIGHT FROM DATUM A.
5. RECOMMENDED SENSOR MOUNTING PLATE THICKNESS:  
MINIMUM- 4 SCREW THREADS  
MAXIMUM- ALLOW CLEARANCE TO SCALE AND SCALE MOUNTING HARDWARE (BENCHING SURFACES, CLAMPS, HUBS, ETC.)

6. WHEN SCALE MOVES IN DIRECTION "A" WITH RESPECT TO A STATIONARY READHEAD, OUTPUT SIGNAL COS+/B+ (PIN 5/PIN 9) LEADS OUTPUT SIGNAL SIN+/A+ (PIN 1/PIN 5).

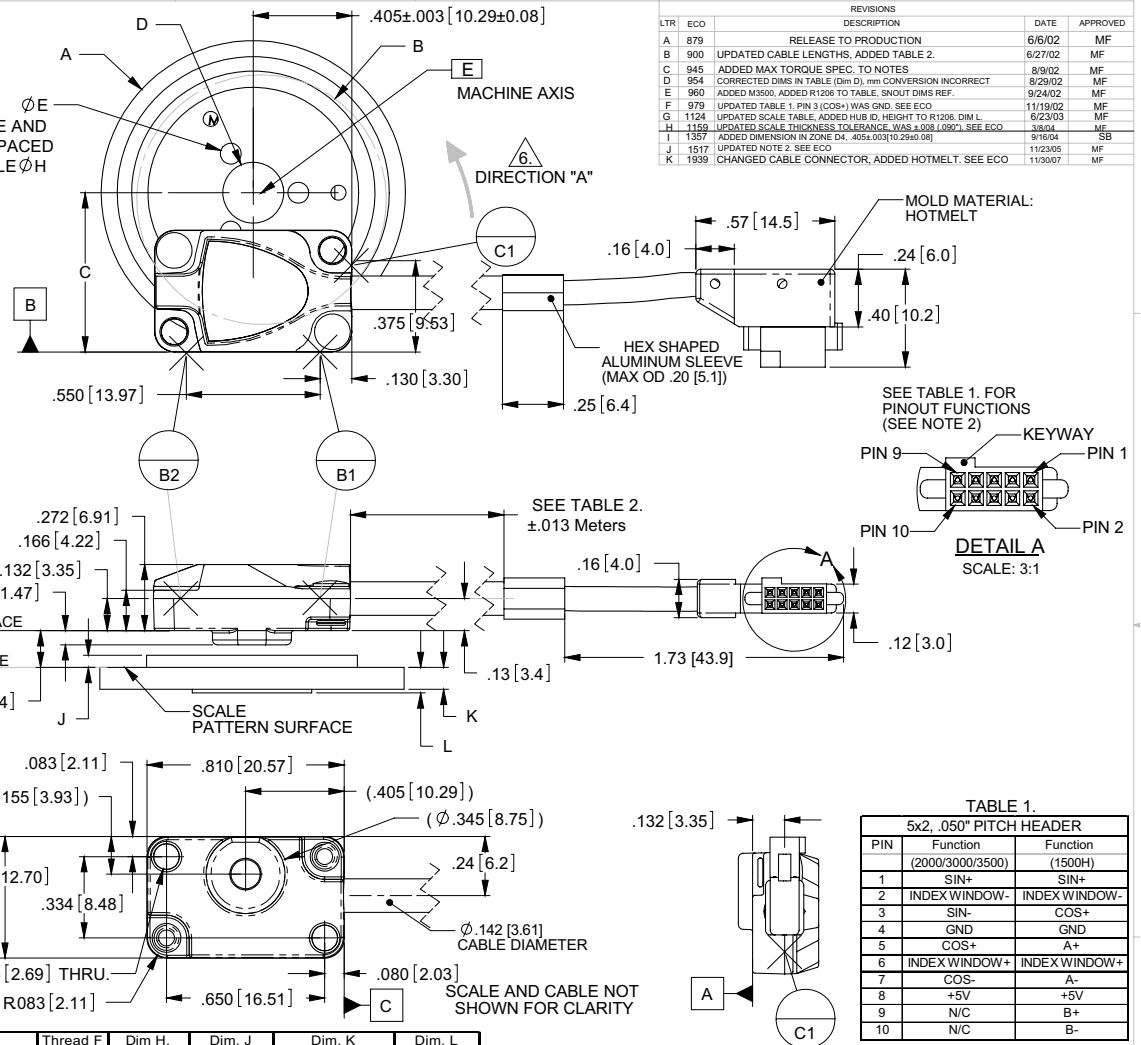
**TABLE 2.**  
Cable Length

(1500H)	(2000/3000/3500)
1 Meter	.5 Meter
2 Meter	1 Meter
5 Meter	2 Meter



SCALE IDENTIFICATION AND SIZE. DIMENSIONS IN INCHES [MILLIMETERS]

Scale Identification	Counts/Rev	Dim. A Scale O.D.	Scale I.D.	Dim. B Optical Dia.	Dim. C Mounting Dim.	Dim. D Hub I.D.	Dim. E Mounting Hole Dia.	Thread F	Dim. H Bolt Circle	Dim. J Hub Height	Dim. K Scale Thickness	Dim. L Hub Relief
R1206	1,650	0.472 [12.00]	.250+/- .005 [6.35+/- .13]	0.413 [10.50]	0.348+/- .002 [8.84+/- .05]	0.1253+ .0005/- .0000 [3.182+ .013/- .000]	N/A	N/A	N/A	0.040 [1.02]	.036+/- .002 [ .91+/- .05]	0.045 [1.14]
R1910	2,500	0.750 [19.05]	.375+/- .005 [9.53+/- .013]	0.627 [15.92]	0.454+/- .002 [11.53+/- .05]	0.1253+ .0005/- .0000 [3.182+ .013/- .000]	0.047 [1.19]	0-80 [6.35]	0.250 [6.35]	0.040 [1.02]	.090+/- .004 [2.29+/- .10]	0.105 [2.67]
R3213	4,096	1.250 [31.75]	.500+/- .005 [12.70+/- .013]	1.027 [26.08]	0.654+/- .002 [16.62+/- .05]	0.2503+ .0005/- .0000 [6.357+ .013/- .000]	0.070 [1.78]	2-56 [9.40]	0.370 [9.40]	0.050 [1.27]	.090+/- .004 [2.29+/- .10]	0.105 [2.67]
R5725	8,192	2.250 [57.15]	1.000+/- .005 [25.40+/- .013]	2.053 [52.15]	1.168+/- .002 [29.66+/- .05]	0.5003+ .0005/- .0000 [12.707+ .013/- .000]	0.136 [3.45]	8-32 [19.05]	0.750 [19.05]	0.060 [1.52]	.090+/- .004 [2.29+/- .10]	0.105 [2.67]
R10851	16,384	4.250 [107.95]	2.000+/- .005 [50.80+/- .013]	4.106 [104.30]	2.194+/- .002 [55.73+/- .05]	1.0003+ .0005/- .0000 [25.408+ .013/- .000]	0.136 [3.45]	8-32 [19.05]	1.375 [34.93]	0.080 [2.03]	.090+/- .004 [2.29+/- .10]	0.105 [2.67]



REVISIONS

LTR	ECO	DESCRIPTION	DATE	APPROVED
A	879	RELEASE TO PRODUCTION	6/6/02	MF
B	900	UPDATED CABLE LENGTHS, ADDED TABLE 2.	6/27/02	MF
C	945	ADDED MAX TORQUE SPEC. TO NOTES	8/9/02	MF
D	954	CORRECTED DIMS IN TABLE (Dim D), mm CONVERSION INCORRECT	8/29/02	MF
E	960	ADDED M3.00, ADDED R1206 TO TABLE, SNOT DIMS REF.	9/24/02	MF
F	979	UPDATED TABLE 1. PIN 3 (COS+) WAS GND. SEE ECO	11/19/02	MF
G	1124	UPDATED SCALE TABLE, ADDED HUB ID, HEIGHT TO R1206, DIM L	6/23/03	MF
H	1129	UPDATED SCALE THICKNESS TOLERANCE, WAS .088 (.090). SEE ECO	3/6/04	MF
I	1527	ADDED DIMENSION IN ZONE D4, .405 (.003 TO .250 (.08))	9/16/04	SB
J	1517	UPDATED NOTE 2. SEE ECO	11/23/05	MF
K	1939	CHANGED CABLE CONNECTOR, ADDED HOTMELT. SEE ECO	11/30/07	MF

**TABLE 1.**  
5x2, .050" PITCH HEADER

PIN	Function (2000/3000/3500)	Function (1500H)
1	SIN+	SIN+
2	INDEX WINDOW-	INDEX WINDOW-
3	SIN-	COS+
4	GND	GND
5	COS+	A+
6	INDEX WINDOW+	INDEX WINDOW+
7	COS-	A-
8	+5V	+5V
9	N/C	B+
10	N/C	B-

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES [MILLIMETERS]. DIM. APPLY AFTER PROCESSING. INTERPRET ALL GEOMETRIC TOLS. PER ANS Y14.5M-1994.

TOLERANCES ARE:  
DECIMALS: .XX [XX±.01 [25] XXX [XX±.005 [13]]  
ANGULAR: ±30 MIN.

APPROVALS: DRAWN: S.BUTURLIA, CHECKED: DON GRIMES, ENGR: M.SKWIRA, GA: J.FARNAM, DATE: 4/20/01, 6/5/02, 6/6/02, 6/6/02.

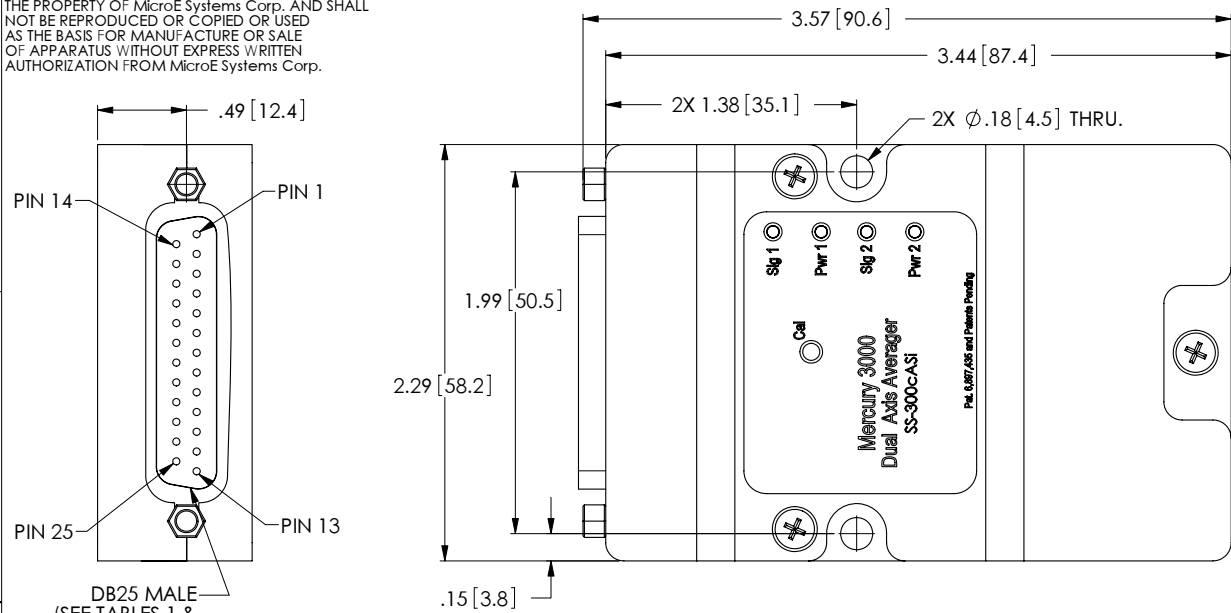
DESCRIPTION: INTERFACE, ENCODER, 20um, ROTARY w/HUB, CABLE OUT, MERCURY 1500H/2000/3000/3500 SENSOR

UNITS: .in [mm]  
MicroE Systems Division of GSI  
8 Erie Drive Natick, MA 01760

SIZE DWG. NO. B ID-00202  
SCALE: 2:1 CAD FILE: SHEET 1 OF 1

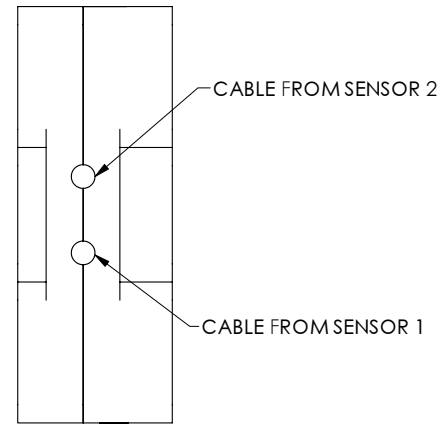
# Mercury 3000 Dual Axis Averager Interface Drawing: SmartPrecision Electronics Module (Interpolator)

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DB25 MALE  
(SEE TABLES 1 & 2 FOR PINOUTS)

USB MINI-B RECEPTACLE  
(SEE TABLE 3 FOR PINOUTS)



REVISIONS				
LTR	ECO	DESCRIPTION	DATE	APPD
S1		PRELIMINARY	3/29/04	
S2	1397	ADDED DIMENSIONS, NOTES, TABLES 1, 2 & 3 AND DETAILS FOR MOUNTING SCREWS AND THRU HOLES.	2/16/05	SB
A	1727	RELEASE TO PRODUCTION	11/13/06	SB
B	1847	COVER MODIFIED, CHANGED LENGTH OF JACK SCREWS, ADDED DIMENSIONS, LABEL RESIZED DUE TO COVER CHANGE.	4/3/08	VB

**TABLE 1**

SS-300cA DB25 PINOUTS			
1	A1+	14	A3-
2	A1-	15	B3+
3	B1+	16	B3-
4	B1-	17	I3+
5	I1+	18	I3-
6	I1-	19	N/C
7	A2+	20	N/C
8	A2-	21	TXD/D-
9	B2+	22	RXD/D+
10	B2-	23	ALARM
11	I2+	24	+5V
12	I2-	25	GND
13	A3+		

**TABLE 2**

SS-300cASi DB25 PINOUTS			
1	SD01+	14	SD03-
2	SD01-	15	CS3+
3	CS1+	16	CS3-
4	CS1-	17	SCLK3+
5	SCLK1+	18	SCLK3-
6	SCLK1-	19	FBCLK+
7	SD02+	20	FBCLK-
8	SD02-	21	TXD/D-
9	CS2+	22	RXD/D+
10	CS2-	23	ALARM
11	SCLK2+	24	+5V
12	SCLK2-	25	GND
13	SD03+		

**TABLE 3**

USB CONNECTOR PINOUTS			
1	VBUS	4	N/C
2	D-	5	GND
3	D+		

NOTES:

1. RECOMMENDED MOUNTING HARDWARE 8-32 UNC OR M4 SCREWS WITH FLAT WASHERS (OD OF WASHER NOT TO EXCEED .320[8.13])
2. THIS DRAWING APPLIES TO BOTH MODEL NUMBERS SS-300cA AND SS300-cASi.

UNLESS OTHERWISE SPECIFIED  
ALL DIMENSIONS ARE IN INCHES [millimeters]  
DIM. APPLY AFTER PROCESSING  
INTERPRET ALL GEOMETRIC TOLS.  
PER ANSI Y14.5M-1994

TOLERANCES ARE:  
DECIMALS: .XX[X] ±.01[.25]  
XXX[XX] ±.005[.13]

ANGULAR: ±30 MIN.

APPROVALS	DATE
DRAWN: PAUL DEVINE	1/19/04
CHECKED:	
ENGRG: CJ	11/13/06
MFG ENG: THOMAS GARCIA	11/13/06
CA: A. VILLARROEL	11/13/06

**GSI** MicroE Systems  
Division of GSI  
8 Erie Drive  
Natick, MA 01760

DESCRIPTION:  
**INTERFACE, INTERPOLATOR,  
DUAL AXIS AVERAGER**

SEE DWG. NO. ID-00283  
SCALE: 1:5 [CAD FILE]

REV. B  
SHEET 1 OF 1