

ANODE

The image shows a vacuum tube assembly housed in a clear glass enclosure. The assembly consists of a glass bulb with a white ceramic base. Inside the bulb, there are three main components: a dome-shaped anode at the top, a cathode at the bottom, and a getter in the middle. The cathode is mounted on a white ceramic base. The getter is a small, cylindrical component with a metal cap. A white cable is connected to the getter. The entire assembly is mounted on a black base with a green indicator light and a dial.

GETTER

CATHODE

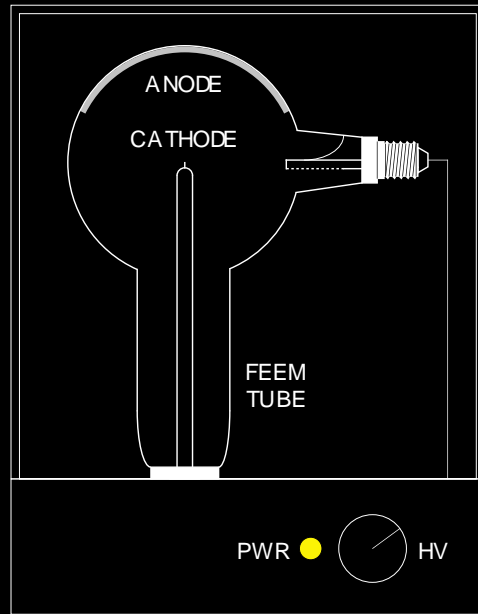
HV  
LIMIT

GAMMA HIGH VOLTAGE  
ORMOND BEACH, FL  
MODEL: MC100NM846  
INPUT: 12VDC  
OUTPUT: 10KV NEG  
S/N: 33-0802B-01

9V BATTERY



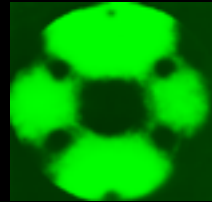
HV ADJUST



JAP 10/29/02

### Operating Instructions

Darken the room. Turn the HV control knob clockwise until it clicks. The power indicator should be illuminated. Continue to turn the knob until an image similar to the one shown below appears on the phosphor coated anode.

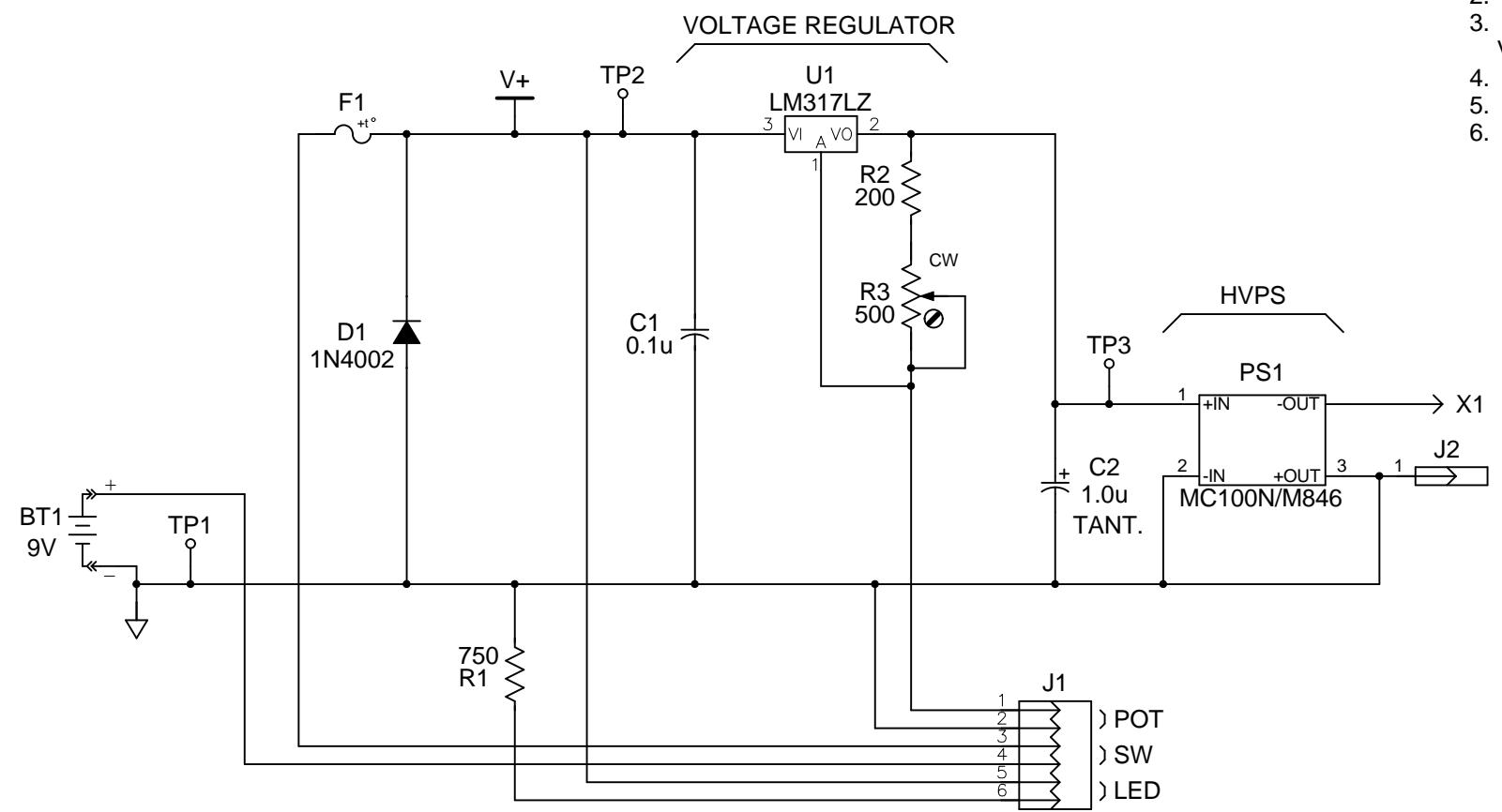


**Warning:** Turn the HV control knob to zero if the intensity of the image fluctuates or a bright spot suddenly appears. The tube can be damaged if this warning is ignored.

At the conclusion of the demonstration turn the HV control knob counterclockwise until it clicks. The power indicator should extinguish.

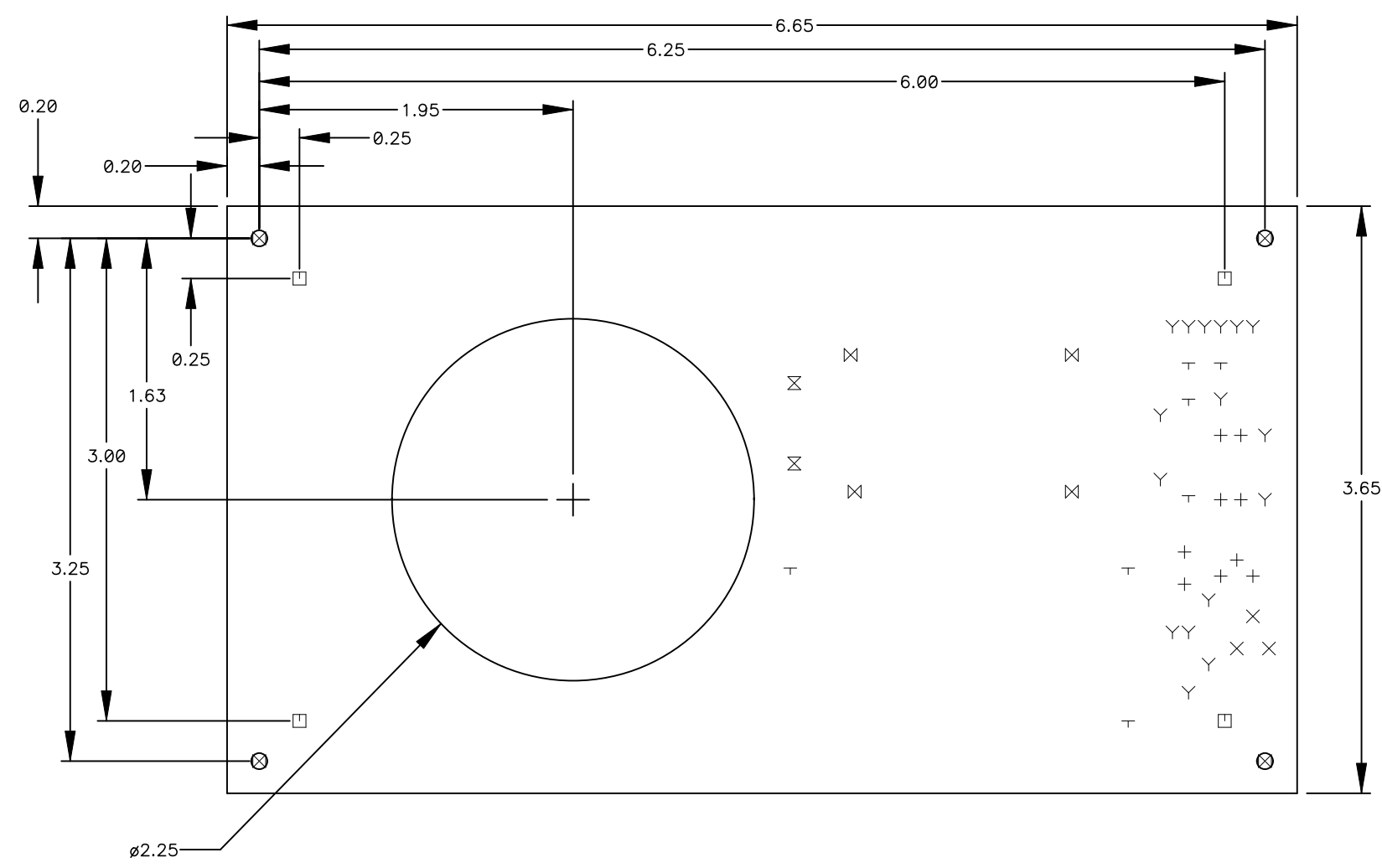
REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

- NOTES:  
 UNLESS OTHERWISE SPECIFIED:  
 1. ALL 5% RESISTORS ARE 1/4 W CARBON FILM WITH VALUES IN OHMS.  
 2. ALL 1% RESISTORS ARE 1/4 W METAL FILM WITH VALUES IN OHMS.  
 3. ALL POLARIZED CAPACITORS ARE TANTALUM ELECTROLYTIC WITH VALUES IN MICROFARADS.  
 4. FOR FABRICATION DETAILS SEE DRAWING 0024T0102.  
 5. FOR ARTWORK SEE DRAWING 0024T0103.  
 6. FOR ASSEMBLY SEE DRAWING 0024T0104.



CONTRACT NO.		UNIVERSITY OF NEW MEXICO DEPARTMENT OF PHYSICS AND ASTRONOMY ELECTRONICS SHOP ALBUQUERQUE, NEW MEXICO, USA 87131				
DRAWN	DATE				TITLE	
J. BEHRENDT	10/18/02				<b>FEEM DEMO II</b>	
DESIGNER	DATE					
APPROVED	DATE	SIZE	DWG NO	REV		
ENGINEER	DATE	<b>B</b>	<b>0024T0101</b>	-		
DWG FILENAME	SCALE	SHEET		1 OF 1		
0024t01.sch	NONE					

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED



- NOTES:
- BASE MATERIAL SHALL BE LAMINATED GLASS EPOXY FR-4.
  - FINISHED BOARD THICKNESS TO BE .063 +/- .007" EXCLUDING COPPER FOIL.
  - TRACE LAYER TO BE 1 OZ. COPPER.
  - MAINTAIN .010 MINIMUM BORDER BETWEEN COPPER FOIL AND EDGE OF BOARD.
  - SOLDERMASK OVER BARE COPPER, USING WET FILM, GREEN.
  - SILKSCREEN COMPONENT SIDE USING NON-CONDUCTIVE WHITE EPOXY INK.
  - CONSTRUCTION OF BOARD AS SHOWN IN DETAIL "A".
  - ALL HOLE SIZES SPECIFIED ARE UNPLATED.
  - FOR ARTWORK SEE DWG NO.0024T0103.

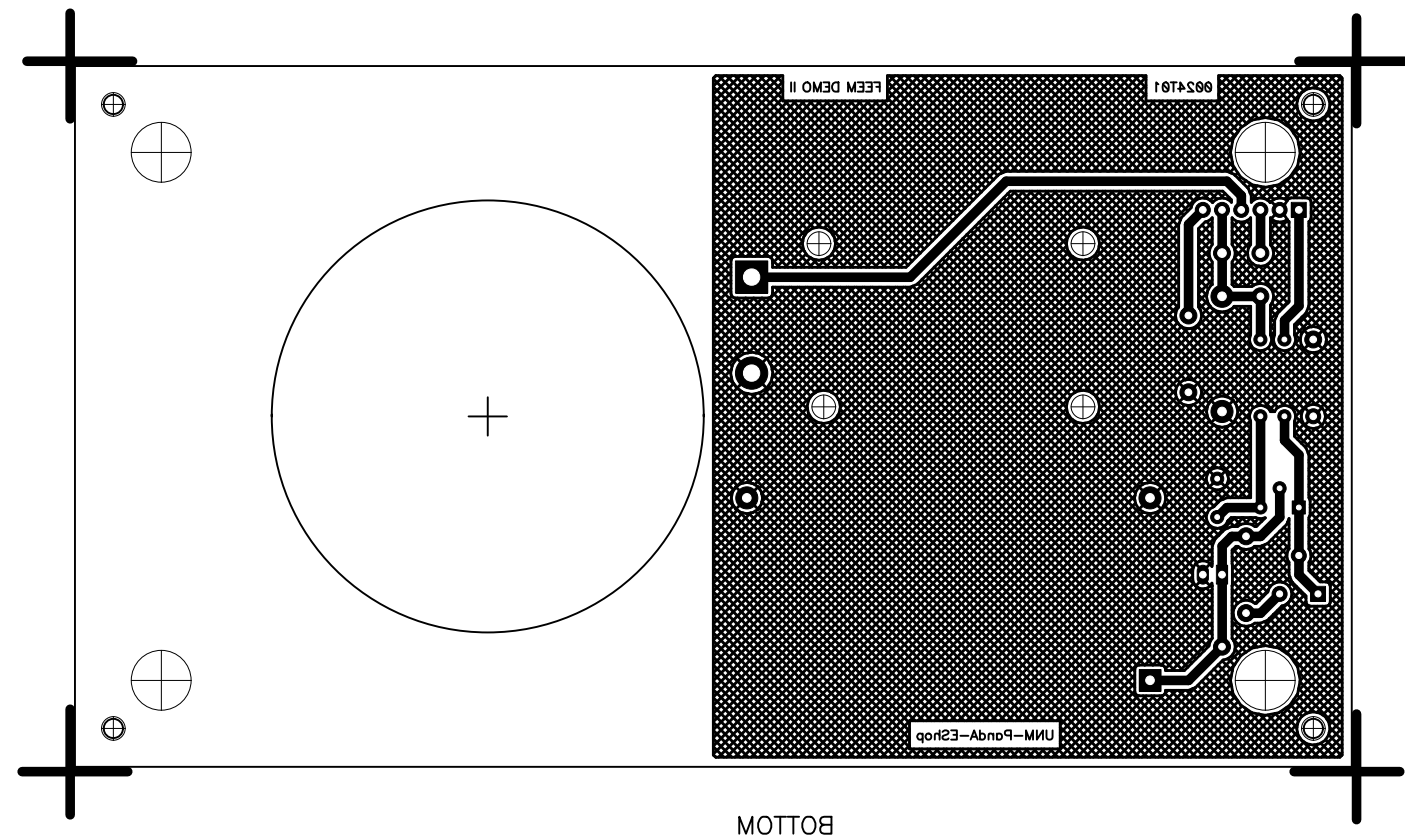
— SOLDER  
**DETAIL A**  
 SINGLE LAYER CONSTRUCTION  
 SCALE: NONE

Hole Dia (inch)	Symbol	Quantity	Plated
0.028	+	9	No
0.032	X	3	No
0.038	Y	16	No
0.046	T	7	No
0.086	⊗	2	No
0.125	⊗	8	No
0.312	□	4	No

UNLESS OTHERWISE SPECIFIED DIMENSIONS AND TOLERANCES ARE IN INCHES AND APPLY TO THE FINISHED PART	CONTRACT NO.	UNIVERSITY OF NEW MEXICO DEPARTMENT OF PHYSICS AND ASTRONOMY ELECTRONICS SHOP ALBUQUERQUE, NEW MEXICO, USA 87131	
	TOLERANCE ON: 2 PLACE DEC   3 PLACE DEC   ANGLES ±0.02   ±0.005   ±1/2°	DRAWN J. BEHRENDT	DATE 10/18/02
MATL	DESIGNER	TITLE <b>FEEM DEMO II FABRICATION DRAWING</b>	
FINISH	APPROVED	DATE	SIZE <b>B</b>
	ENGINEER	DATE	DWG NO <b>0024T0102</b>
			SCALE 1/1
			SHEET 1 OF 1

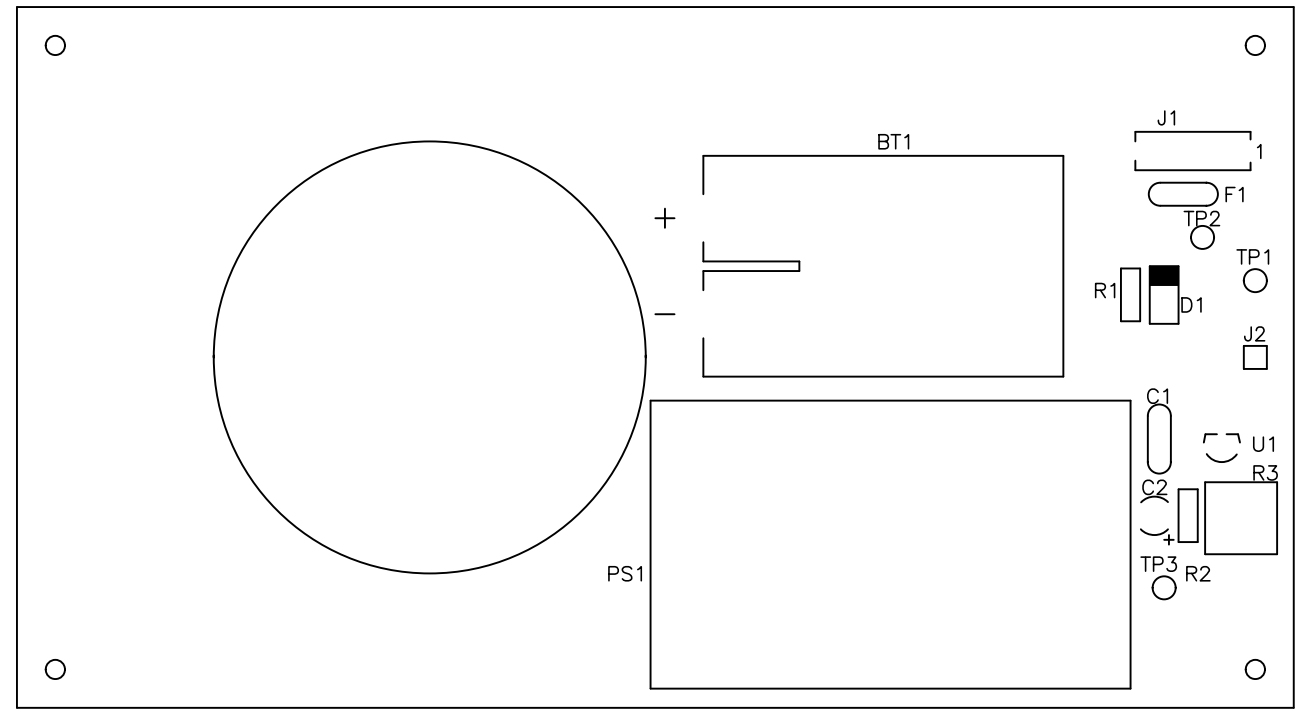
DWG FILENAME 0024t01.pcb  
 PLOTTED Tue Oct 29, 2002 14:48:20  
 CAD GENERATED DRAWING, MANUAL CHANGES NOT ALLOWED

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

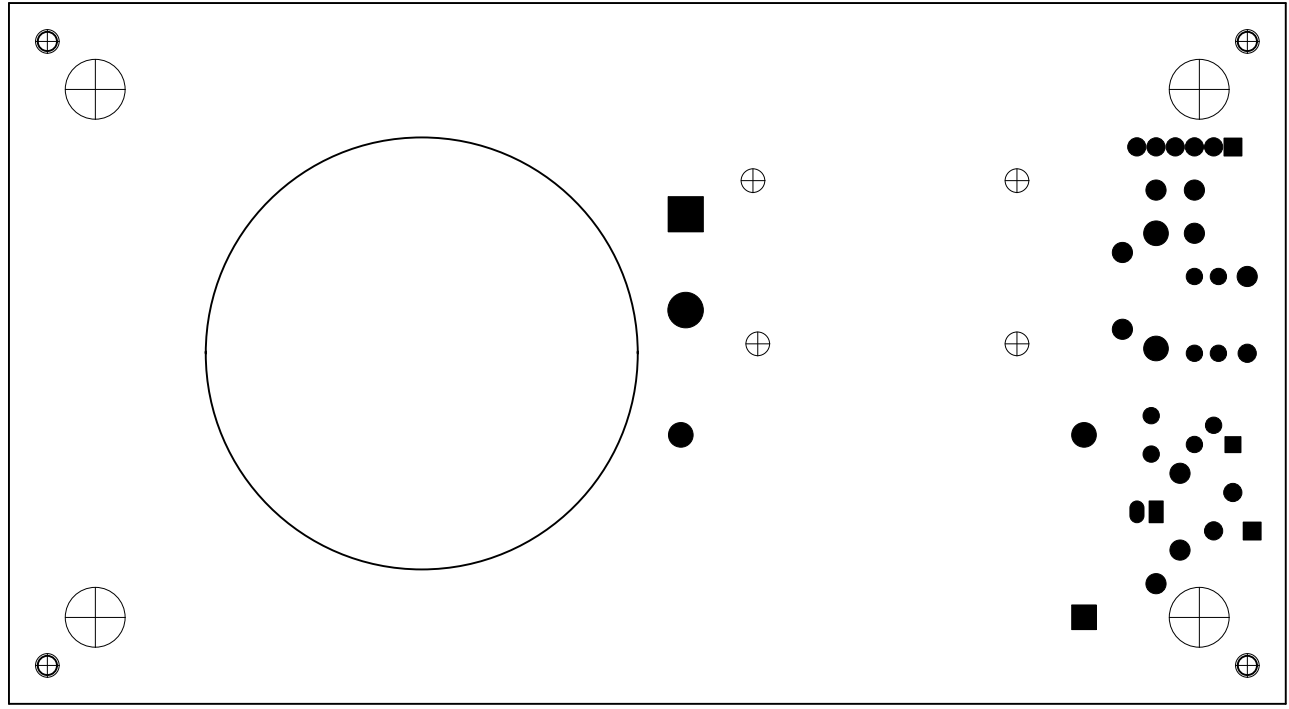


UNLESS OTHERWISE SPECIFIED DIMENSIONS AND TOLERANCES ARE IN INCHES AND APPLY TO THE FINISHED PART	CONTRACT NO.		UNIVERSITY OF NEW MEXICO DEPARTMENT OF PHYSICS AND ASTRONOMY ELECTRONICS SHOP ALBUQUERQUE, NEW MEXICO, USA 87131	
	TOLERANCE ON:			
2 PLACE DEC	3 PLACE DEC	ANGLES	DRAWN	DATE
±0.02	±0.005	±1/2°	J. BEHRENDT	10/18/02
MATL			DESIGNER	DATE
FINISH			APPROVED	DATE
		ENGINEER		DATE
		SIZE	DWG NO	REV
		<b>B</b>	<b>0024T0103</b>	-
		SCALE	SHEET 1 OF 3	
		1/1		

DWG FILENAME	0024t01.pcb
PLOTTED	Tue Oct 29, 2002 14:48:21
CAD GENERATED DRAWING, MANUAL CHANGES NOT ALLOWED	



TOP SILK

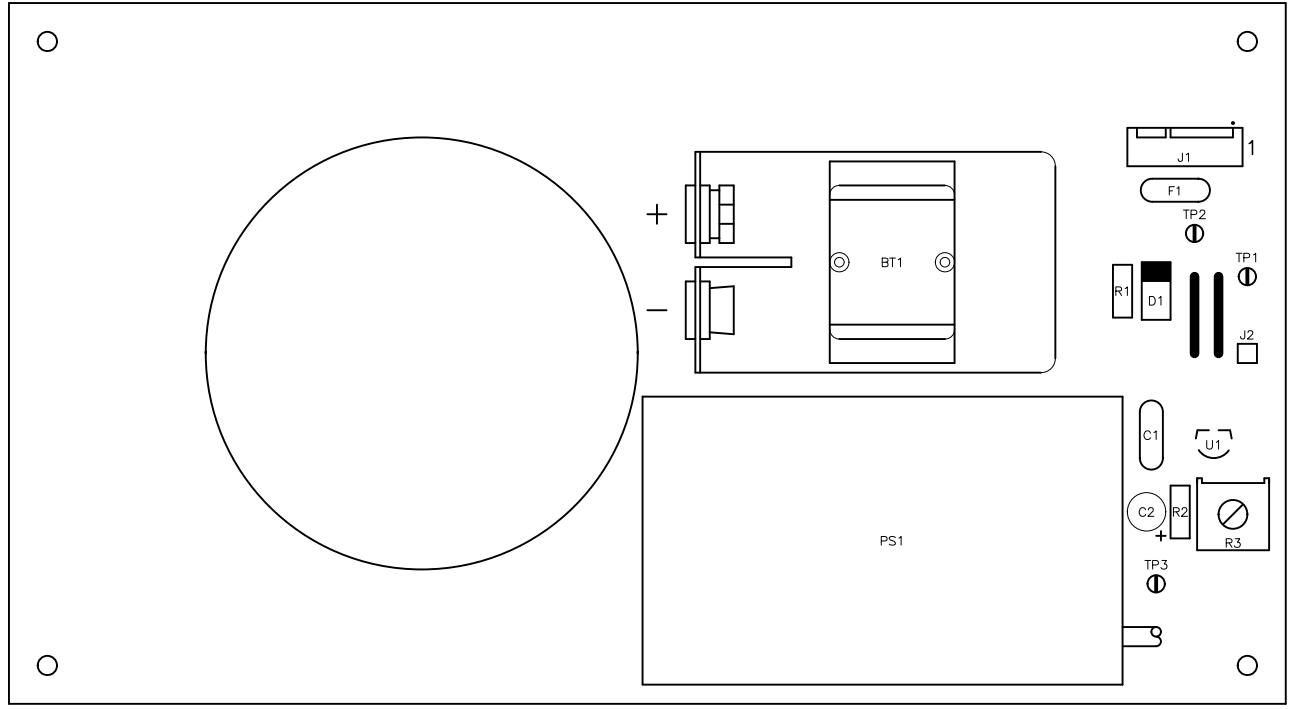


BOTTOM MASK



REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

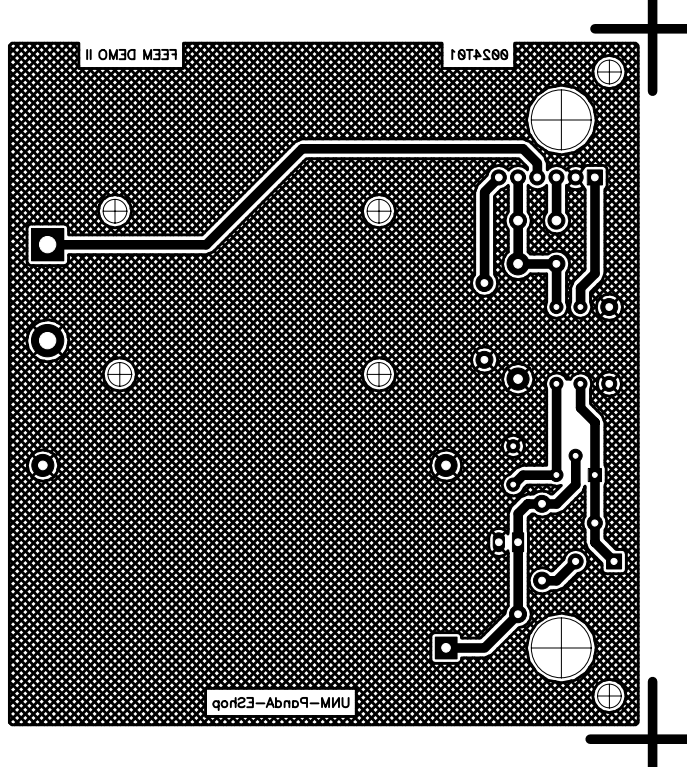
- NOTES:
1. REFERENCE ELECTRICAL SCHEMATIC DRAWING,0024T0201.
  2. FOR PARTS LIST SEE 0019T01BOM.
  3. ASSEMBLE AND SOLDER PER J-STD-001B.
  4. OBSERVE POLARITY OF CAPACITORS, DIODES, ETC..
  5. ELECTRICAL REFERENCE DESIGNATIONS ARE FOR REFERENCE ONLY AND NEED NOT APPEAR ON THE PARTS OR COMPONENTS UNLESS OTHERWISE SPECIFIED.



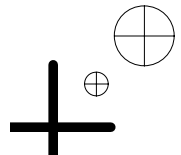
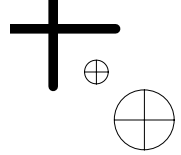
TOP ASSY      TOP

UNLESS OTHERWISE SPECIFIED DIMENSIONS AND TOLERANCES ARE IN INCHES AND APPLY TO THE FINISHED PART	CONTRACT NO.		UNIVERSITY OF NEW MEXICO DEPARTMENT OF PHYSICS AND ASTRONOMY ELECTRONICS SHOP ALBUQUERQUE, NEW MEXICO, USA 87131	
	TOLERANCE ON:		TITLE	
2 PLACE DEC $\pm 0.02$	3 PLACE DEC $\pm 0.005$	ANGLES $\pm 1/2^\circ$	FEEM DEMO II ASSEMBLY DRAWING	
MATL	DRAWN J. BEHRENDT DATE 10/18/02		SIZE <b>B</b>	DWG NO <b>0024T0104</b>
FINISH	DESIGNER		SCALE 1/1	REV -
	APPROVED		SHEET 1 OF 2	
	ENGINEER			

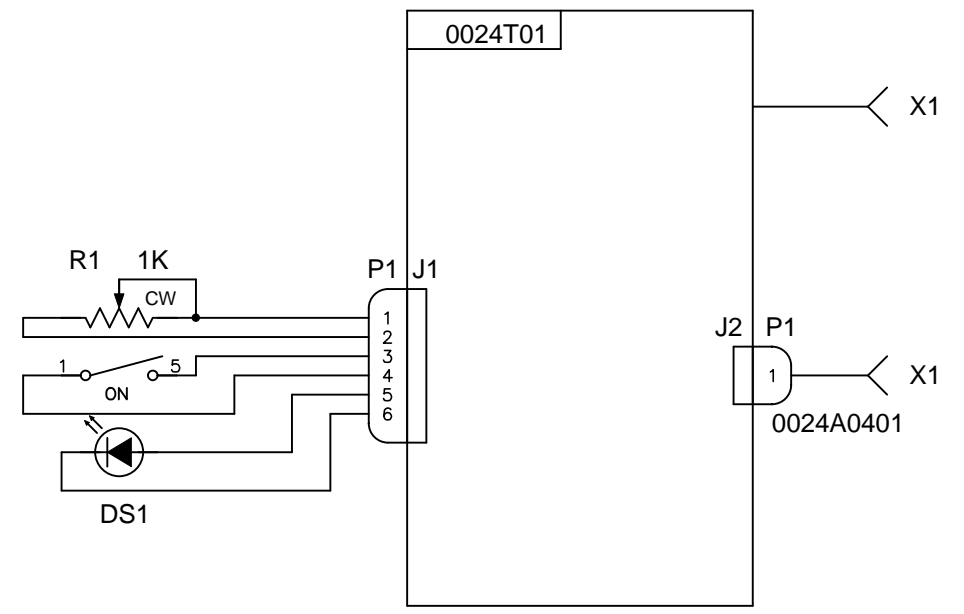
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CAD GENERATED DRAWING, MANUAL CHANGES NOT ALLOWED



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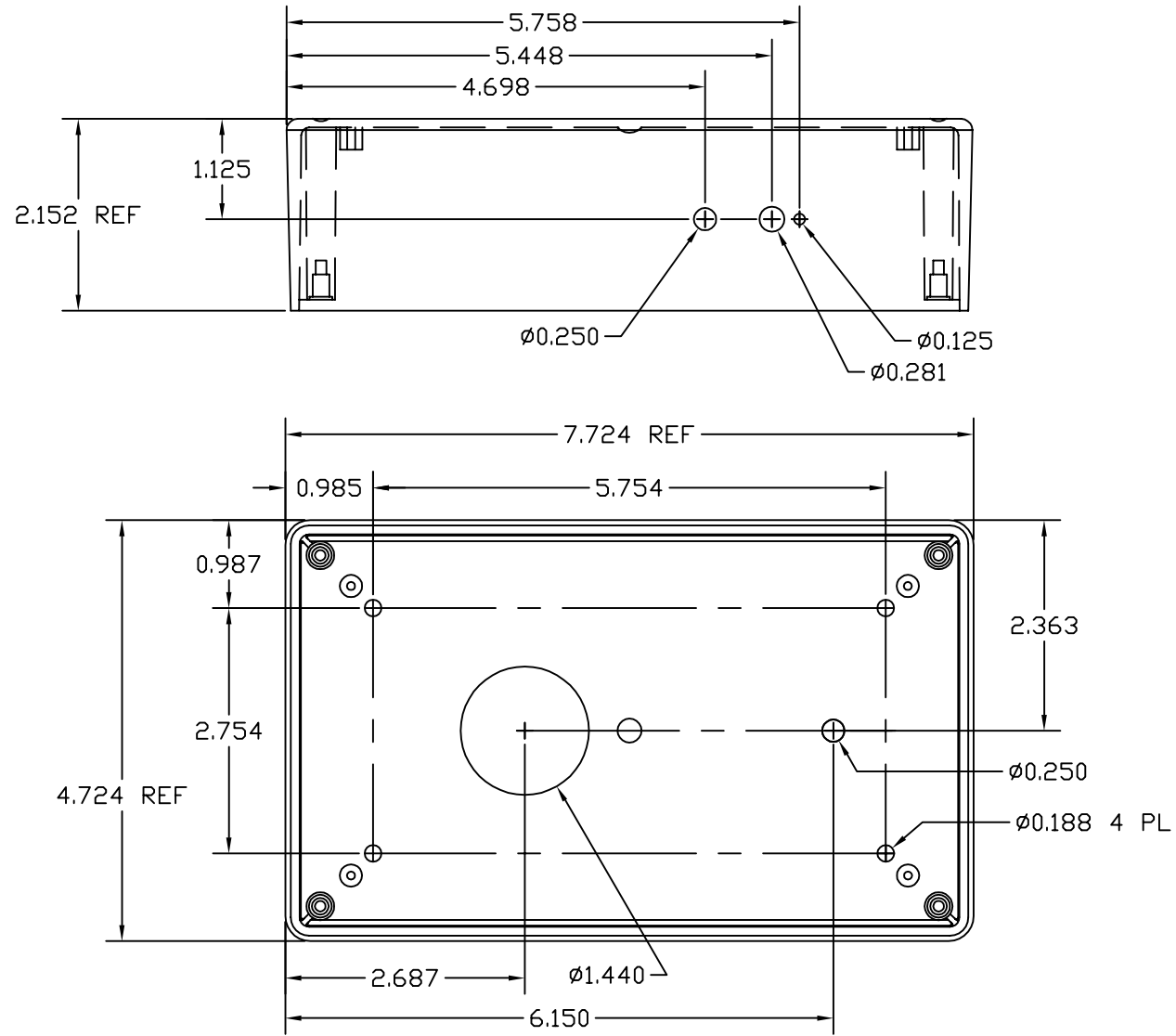


REVISIONS			
REV	DESCRIPTION	DATE	APPROVED



CONTRACT NO.		UNIVERSITY OF NEW MEXICO DEPARTMENT OF PHYSICS AND ASTRONOMY ELECTRONICS SHOP ALBUQUERQUE, NEW MEXICO, USA 87131		
DRAWN <b>J. BEHRENDT</b>	DATE <b>10/29/02</b>	TITLE  <b>FEEM DEMO II</b>		
DESIGNER	DATE			
APPROVED	DATE			
ENGINEER	DATE	SIZE <b>B</b>	DWG NO <b>0024T0201</b>	REV <b>-</b>
DWG FILENAME 0024t02.sch	SCALE NONE	SHEET 1 OF 1		

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	MOVED .25 HOLE	10/28/02	



NOTE: REMOVE BURRS AND SHARP EDGES

UNLESS OTHERWISE SPECIFIED DIMENSIONS AND TOLERANCES ARE IN INCHES AND APPLY TO THE FINISHED PART			UNIVERSITY OF NEW MEXICO DEPARTMENT OF PHYSICS AND ASTRONOMY ELECTRONICS SHOP ALBUQUERQUE, NEW MEXICO, USA 87131		
TOLERANCE ON:			TITLE		
2 PLACE DEC $\pm 0.02$	3 PLACE DEC $\pm 0.005$	ANGLES $\pm 1/2^\circ$	FEEM DEMO II ENCLOSURE		
MATL BUD CU-3284 ENCLOSURE			DRAWN J. BEHRENDT	DATE 10/1/02	SIZE <b>B</b>
FINISH			DESIGNER	DATE	DWG NO <b>0024A0101</b>
			APPROVED	DATE	REV <b>A</b>
			ENGINEER	DATE	SCALE 1/2
			SHEET 1 OF 1		

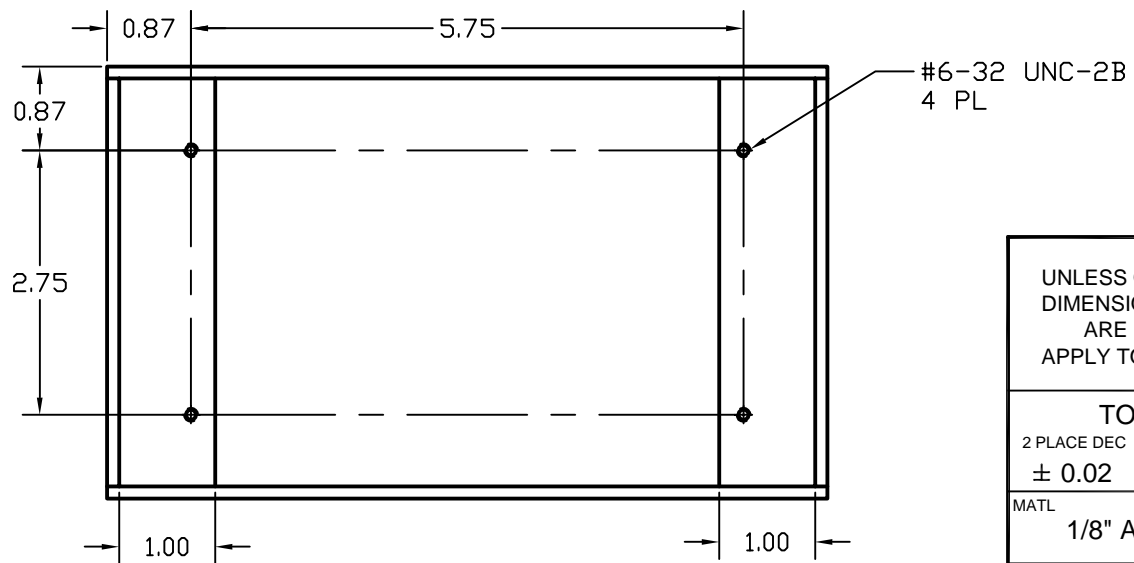
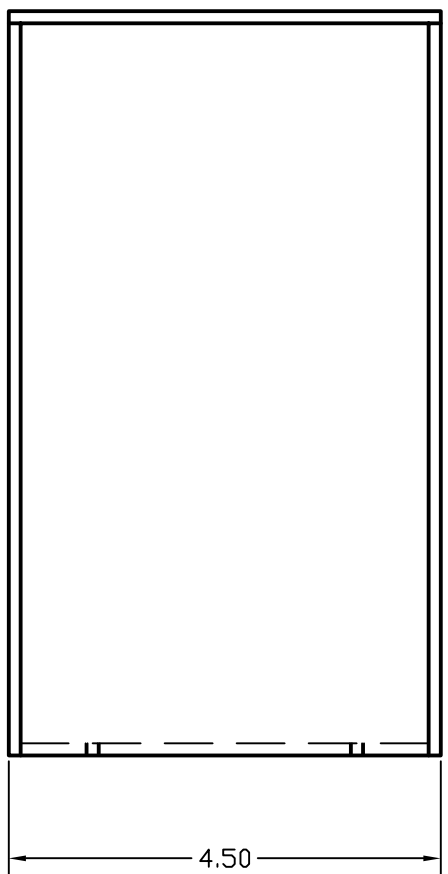
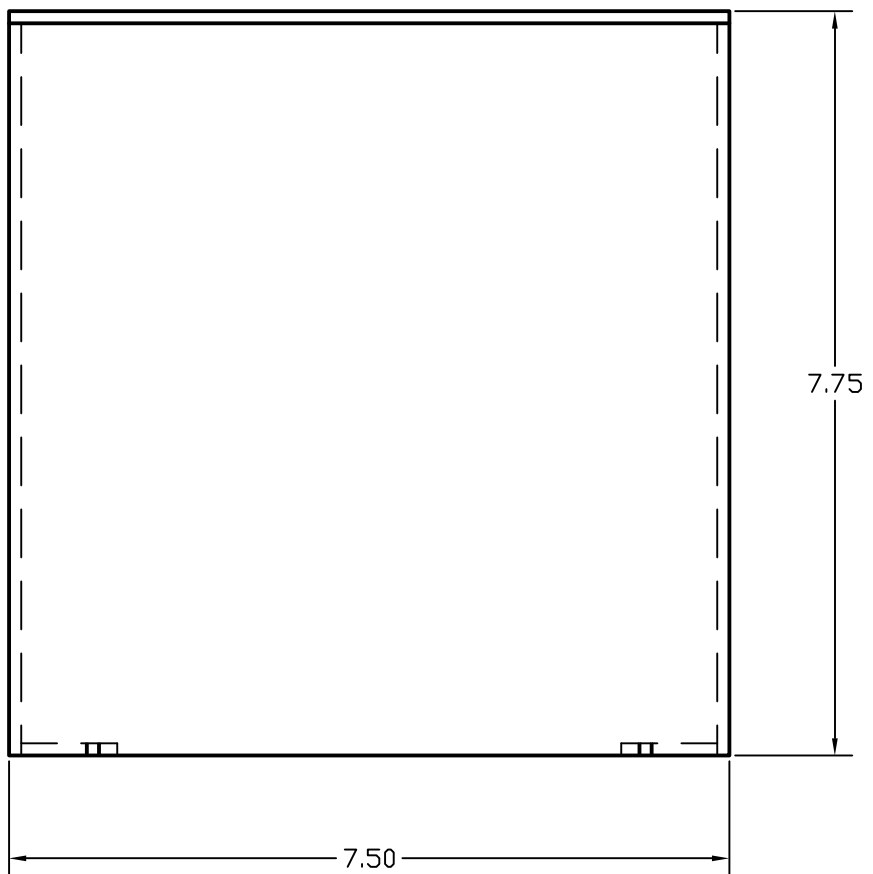
DWG FILENAME
CAD GENERATED DRAWING, MANUAL CHANGES NOT ALLOWED



DWG NO	<b>0024A0301</b>	SH 1 OF 1	REV -
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NOTE:  
CHAMFER ALL EDGES 45° X .030

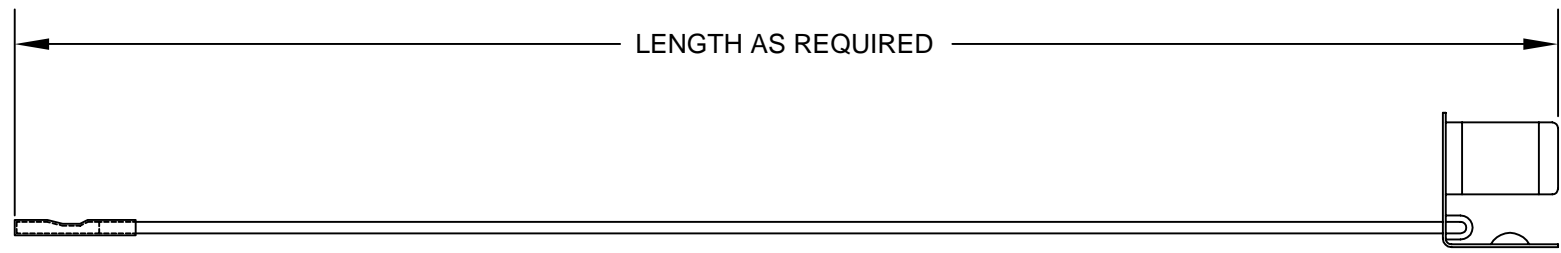
REVISIONS			
REV	DESCRIPTION	DATE	APPROVED



UNLESS OTHERWISE SPECIFIED DIMENSIONS AND TOLERANCES ARE IN INCHES AND APPLY TO THE FINISHED PART			UNIVERSITY OF NEW MEXICO DEPARTMENT OF PHYSICS AND ASTRONOMY ELECTRONICS SHOP ALBUQUERQUE, NEW MEXICO, USA 87131		
<b>TOLERANCE ON:</b> 2 PLACE DEC   3 PLACE DEC   ANGLES $\pm 0.02$   $\pm 0.005$   $\pm 1/2^\circ$			TITLE		
MATERIAL <b>1/8" ACRYLIC SHEET</b>			<b>FEEM DEMO II SHIELD</b>		
FINISH			DRAWN <b>J. BEHRENDT</b>	DATE <b>10/7/02</b>	SIZE <b>B</b>
			DESIGNER 	DATE 	DWG NO <b>0024A0301</b>
			APPROVED 	DATE 	REV <b>-</b>
			ENGINEER 	DATE 	SCALE 1/2
			SHEET 1 OF 1		



REVISIONS			
REV	DESCRIPTION	DATE	APPROVED



1	CONTACT, STANDARD, (26-22)	87667-3	AMP
1	BATTERY CLIP	92	KEYSTONE
	WIRE, 22 GA., TEFLON	2875	ALPHA
	TUBING, HEAT SHRINK, 3/32"	FIT221B	ALPHA

UNLESS OTHERWISE SPECIFIED DIMENSIONS AND TOLERANCES ARE IN INCHES AND APPLY TO THE FINISHED PART			UNIVERSITY OF NEW MEXICO DEPARTMENT OF PHYSICS AND ASTRONOMY ELECTRONICS SHOP ALBUQUERQUE, NEW MEXICO, USA 87131		
TOLERANCE ON:			TITLE		
2 PLACE DEC ± 0.02	3 PLACE DEC ± 0.005	ANGLES ± 1/2 °	<b>FEEM TUBE ANODE CABLE</b>		
DRAWN J. BEHRENDT			DATE 10/28/02		
DESIGNER			DATE		
APPROVED			DATE		
ENGINEER			DATE		
SIZE <b>B</b>		DWG NO <b>0024A0401</b>		REV -	
SCALE FULL		SHEET 1 OF 1			

10/30/02

FEEM DEMO II  
PARTS LIST

0024T01 BOM

COUNT	REFDES	DESCRIPTION	MPN	MFR
<b>PCB PARTS</b>				
1	BT1	BATTERY HOLDER, 9V	1291	KEYSTONE
1	C1	CAP., CERDISC	ECUS1H104KBB	PANASONIC
1	C2	CAP., TANTALUM ELEC., 1.0UF, 35V	ECS-F1VE105K	PANASONIC
1	D1	RECTIFIER, 1A, 200V	1N4002	
1	F1	FUSE, RESETTABLE, PTC, 5A	60R025	LITTLEFUSE
1	J2	PIN, 25 MIL SQ.	PTC36SAAN	SULLINS
1	J1	HEADER, STR., .100", 6 POS.	22-23-2061	MOLEX
1	PS1	MODULE, HV, 10KV	MC100N/M846	GAMMA HIGH VOLTAGE
1	R1	RESISTOR, CF, 1/4 W,5%, 750 OHM	CFR-25JB-750R	YAGEO
1	R2	RESISTOR, CF, 1/4 W,5%, 200 OHM	CFR-25JB-200R	YAGEO
1	R3	POTENTIOMETER, 500 OHM	3386F-501	BOURNS
1	TP1	TEST POINT, MINIATURE, BLACK	5001	KEYSTONE
1	TP2	TEST POINT, MINIATURE, RED	5000	KEYSTONE
1	TP3	TEST POINT, MINIATURE, YELLOW	5004	KEYSTONE
1	U1	I.C., VOLTAGE REGULATOR, TO-220	LM317T	NATIONAL

<b>ADDITIONAL PARTS</b>				
1	DS1	LED, PNL MT, YELLOW	5100H7	CML
1	R1	POTENTIOMETER, 1K W/SWITCH	313-1100-1K	XICON/ALPHA
1	X1	SOCKET, LAMP	8101	LEVITON
4		BUMPER, RECESSED, .50X.24	720	KEYSTONE
1		FEEM DEMO II SHIELD	0024A03	
1		FEEM TUBE ANODE CABLE	0024A02	
4		SCREW, MACH., 36-32X1/4	OBD	
4		SCREW, SHEET MET., #4X1/4	OBD	
4		SCREW, MACH., #4-40X1/2	OBD	
4		LOCK WASHER, #4, INT TOOTH	OBD	