

GPC225-24 MTBF STUDY
WITH OUT POWER FAIL

7/15/96

Ambient Temperature

25 Deg. C

Total Supply Failure Rate per million hours

7.78 Faults

Total Supply MTBF

121325 Hours

- * ENTER POWER STRESS (.1 TO 1)
- ** ENTER ITEM BY 2'S FROM 25 TO 175 DEGREES C
- ***ENTER CapPACITENCE IN MICROFARADS

Part TYPE	Conn	Value		Temp Rise	TFR
		(Power)	(Capacitence)		
		*	***	**	
Input Block					
T2	INDUCTOR, GP225-24'S	2		20	0.0066
T1	XFMR, EMI INPUT, GPC225'S	2		20	0.0066
C3	Cap DK R ACY 250V 4700F	2	0.0047	0	0.0060
C4	Cap DK R ACY 250V 4700F	2	0.0047	0	0.0060
C2	Cap FI R ACX 250V 0.220MF	2	0.22	0	0.0060
C1	Cap FI R ACX 250V 1.000MF	2	1	0	0.0060
CR1	Rect BRIDGE 600V 4A	4	0.3	50	0.0089
M1	Varistor 300VAC 80J	2	0.1	0	0.0020
R1	Res F CF 1/2W 5% 220.0K Ohm	2	0.1	20	0.0119
R61	Res F F 1W 5% 22.0 Ohm	2	0.2	20	0.0140
RT1	Thermistor NTC 10.0 Ohm 5.0A	2	0.35	10	0.0135
W9	Wire jumper Ins 22GA 0.600"	2		20	N/A
W1	Wire jumper Ins 22GA 0.600"	2		20	N/A
W2	Wire jumper Ins 22GA 0.600"	2		20	N/A
W20	Wire jumper Ins 22GA 1.50"	2		20	N/A
J1	HEADER-3 OS, 312 CENTERS	3		0	N/A
F1	Fuse 5X20 U/C F 4A 250V	2		0	0.0143
	Total Connections	37			0.0518
	Total Failure Rate				0.1534235
	Block MTBF				6517906

DC Bus

L4	INDUCTOR,OUTUT 2A	2		20	0.0066
L5	INDUCTOR,OUTUT 2A	2		20	0.0066
C7	Cap AL R SME 8 25V 68.00MF	2	68	10	0.0828
C6	Cap DK R Z5U 1000V 20000F	2	0.02	20	0.0060
C5	Cap AL R KMH 1 400V 220.00MF	2	220	20	0.0828
C51	Cap AL R KMH 1 400V 220.00MF	2	220	20	0.0828
Q3	Tstr N 100V 1.0A MJE172	3	0.1	40	0.0500
CR2	Rect FR 1000V 1.0A BYV96E	2	0.45	30	0.0082
CR8	Rect FR 100V 1.0A 1N4934	2	0.2	20	0.0040
CR3	Rect UFR 150V 4.0A MUR415	2	0.2	30	0.0048
R56	Res F CF 1/8W 5% 4.7 Ohm	2	0.10	20	0.0119
R2	Res F MO 2W 5% 100.00K Ohm	2	0.2	10	0.0122
R57	Res F MO 2W 5% 22.00 Ohm	2	0.3	20	0.0165
R3	Res F MO 2W 5% 27.00K Ohm	2	0.45	20	0.0195

R6	Res F MO 1W 5% 750.00K Ohm	2	0.2	20	0.0140
W40	Wire jumper Ins 22GA .50"	2		20	N/A
W23	Wire jumper Ins 22GA 1.0"	2		20	N/A
W20	Wire jumper Ins 22GA 1.50"	2		20	N/A
	Total Connections	27			0.0378
	Total Failure Rate				0.43316
	Block MTBF				2308616

PWM

C12	Cap FI R MF 100V 0.0470MF 5%	2	0.047	0	0.0060
C14	Cap DK R Z5F 1000V 470F	2	0.00047	0	0.0060
C13	Cap MO R Z5U 50V 0.3300MF 20%	2	0.33	0	0.0060
C10	Cap MO R Z5U 50V 0.100MF 20%	2	0.1	0	0.0060
C11	Cap FI R MM 50V 0.0010MF 5%	2	0.2	0	0.0105
U1	IC 3844	8		50	1.45E-07
R11	Res F F 1/4W 5% 22.0 Ohm	2	0.5	20	0.0240
R12	Res F F 1/4W 5% 22.0 Ohm	2	0.5	20	0.0240
R14	Res F CF 1/4W 5% 750.0 Ohm	2	0.3	20	0.0165
R9	Res F CF 1/4W 5% 1.5K Ohm	2	0.2	20	0.0140
R8	Res F CF 1/4W 5% 15K Ohm	2	0.2	20	0.0140
R58	Res F CF 1/4W 5% 47 Ohm	2	0.4	20	0.0195
R10	Res F MF 1/4W 1% 13.70K Ohm	2	0.2	20	0.0140
R7	Res V CC 1/4w V-Adj 10K Ohm	2	0.05	10	0.0100
W15	Wire jumper Ins 22GA 0.200"	2		0	N/A
W24	Wire jumper Ins 22GA 0.200"	2		0	N/A
W10	Wire jumper Ins 22GA 0.300"	2		0	N/A
W25	Wire jumper Ins 22GA 0.300"	2		0	N/A
W18	Wire jumper Ins 22GA 0.400"	2		0	N/A
W19	Wire jumper Ins 22GA 0.400"	2		0	N/A
	Wire jumper Ins 22GA 0.500"	2		0	N/A
	Total Connections	48			0.0672
	Total Failure Rate				0.237550145
	Block MTBF				4209638

Power Block

T3	XFMR, POWER, GP225-24	12		20	0.0066
C9	Cap DK R Z5F 1000V 220F	2	0.00022	20	0.0060
Q1	Tstr FET N 600V 6.0A MT6N60	3	0.1	40	1.2928
Q2	Tstr FET N 600V 6.0A MT6N60	3	0.1	40	1.2928
CR9	Diode ZNR 1.0W 5% 3.3V	2		20	0.0074
CR4	Diode ZNR 1.0W 5% 18.0V	2		20	0.0074
R17	Res F MO 2W 5% 0.22 Ohm	2	0.68	20	0.0285
R41	Res F MO 2W 5% 0.22 Ohm	2	0.68	20	0.0285
R16	Res F MO 2W 5% 330.00 Ohm	2	0.4	20	0.0195
	Total Connections	82			0.1148
	Total Failure Rate				2.80430375
	Block MTBF				356595

Reg.

C47	Cap MO R Z5U 50V 0.3300MF 20%	2	0.33	20	0.0060
C46	Cap MO R Z5U 50V 0.3300MF 20%	2	0.33	20	0.0060
C48	Cap AL R KME 1 63V 10.00MF	2	10	20	0.0249
U6	IC VR ADJ SHUNT TL431 TO-92	3		20	0.0788

U2	Oto-Couler TSTR 4N35	6		20	0.0788
R49	Res F CF 1/4W 5% 100.0 Ohm	2	0.2	20	0.0140
R50	Res F CF 1/4W 5% 2.2K Ohm	2	0.2	20	0.0140
R50	Res F CF 1/4W 5% 6.8K Ohm	2	0.2	20	0.0140
R51	Res F CF 1/4W 5% 220.0 Ohm	2	0.2	20	0.0140
R36	Res F MF 1/4W 1% 1.50K Ohm	2	0.2	20	0.0140
R36	Res F MF 1/4W 1% 1.50K Ohm	2	0.2	20	0.0140
R53	Res V CE 1/4W V-Adj 500 Ohm	2	0.2	20	0.0030
W29	Wire jumper Ins 22GA 0.30"	2		0	N/A
W14	Wire jumper Ins 22GA 0.800"	2		0	N/A
	Total Connections	33			0.0462
	Total Failure Rate				0.3273998
	Block MTBF				3054370

NEG. 12 @ 1.2A

L7	CHOKE,OUTUT,2.0A	2		20	0.0066
C14	Cap DK R Z5F 1000V 470F	2	0.00047	0	0.0060
C34	Cap MO R Z5U 50V 0.3300MF 20%	2	0.33	20	0.0060
C43	Cap AL R KME 1 50V 220.00MF	2	220	20	0.0828
C44	Cap AL R KME 1 25V 100.00MF	2	100	20	0.0828
C25	Cap AL R KME 1 63V 47.00MF	2	47	20	0.0580
CR19	Rect STD 100V 1.0A 1N4002	2	0.2	20	0.0040
CR20	Rect STD 100V 1.0A 1N4002	2	0.2	20	0.0040
CR17	Rect UFR 150V 4.0A MUR415	2	0.2	30	0.0048
U5	IC VR -12V 2% 1.0A 7912 TO-220	3		20	1.00E-07
R40	Res F CF 1/4W 5% 160 Ohm	2	0.6	20	0.0285
R39	Res F MO 2W 5% 1.2K Ohm	2	0.5	20	0.0240
R59	Res F MO 2W 5% 10.00 Ohm	2	0.437	20	0.0195
W7	Wire jumper Ins 22GA 0.20"	2		0	N/A
W8	Wire jumper Ins 22GA 0.20"	2		0	N/A
W28	Wire jumper Ins 22GA 0.20"	2		0	N/A
W36	Wire jumper Ins 22GA 0.60"	2		0	N/A
W35	Wire jumper Ins 22GA 0.20"	2		0	N/A
W34	Wire jumper Ins 22GA 0.20"	2		0	N/A
	Total Connections	37			0.0518
	Total Failure Rate				0.372235725
	Block MTBF				2686470

NEG. 5 @ 1.2A

L6	CHOKE,OUTUT,2.0A	2		20	0.0066
C41	Cap DK R Z5F 1000V 470F	2	0.00047	0	0.0060
C38	Cap AL R KME 1 50V 220.00MF	2	220	20	0.0828
C26	Cap AL R KME 1 25V 100.00MF	2	100	20	0.0828
C33	Cap AL R KME 1 63V 47.00MF	2	47	20	0.0580
CR7	Rect STD 100V 1.0A 1N4002	2	0.2	20	0.0040
CR16	Rect STD 100V 1.0A 1N4002	2	0.2	20	0.0040
CR18	Rect UFR 150V 4.0A MUR415	2	0.2	30	0.0048
U4	IC VR -5V 2% 1.0A 7912 TO-220	3		20	1.00E-07
R33	Res F CF 1/4W 5% 22 Ohm	2	0.5	20	0.0240
R35	Res F MO 2W 5% 470 Ohm	2	0.5	20	0.0240

R59	Res F MO 2W 5% 10.00 Ohm	2	0.5	20	0.0240
W27	Wire jumper Ins 22GA 0.80"	2		0	N/A
R29	Wire jumper Ins 22GA 0.40"	2		0	N/A
W26	Wire jumper Ins 22GA 0.80"	2		0	N/A
	Total Connections	29			0.0406
	Total Failure Rate				0.355035725
	Block MTBF				2816618

+5Volt

L3	CHOKE,OUTUT,12.0A	2		20	0.0066
C27	Cap FI R MF 100V 0.01MF 10%	2	0.01	20	0.0060
C36	Cap DK R Z5U 1000V 1.0uF	2	1	20	0.0060
C49	Cap AL R KME 1 25V 10.00MF	2	10	20	0.0277
C52	Cap AL R KME 1 25V 100.00MF	2	100	20	0.0396
C28	Cap AL R SXF 1 25V 2200.00MF	2	2200	20	0.0634
C29	Cap AL R SXF 1 25V 2200.00MF	2	2200	20	0.0634
C30	Cap AL R SXF 1 25V 2200.00MF	2	2200	20	0.0634
C31	Cap AL R SXF 1 25V 2200.00MF	2	2200	20	0.0634
C32	Cap AL R SXF 1 25V 2200.00MF	2	2200	20	0.0634
C35	Cap AL R SXF 1 25V 2200.00MF	2	2200	20	0.0634
C42	Cap AL R SXF 1 25V 2200.00MF	2	2200	20	0.0634
CR11	Rect 2xSCH 45V 30A MBR3045	2	0.52	30	0.0106
CR13	Rect STD 100V 1.0A 1N4002	2	0.2	20	0.0040
CR12	Diode ZNR 0.5W +1-3% 5.6V	2	0.2	20	0.0040
SCR1	SCR 50V 25.0A TO-220 MCR69-2	3	0.2	20	0.0040
R27	Res F CF 1/8W 5% 47.0 Ohm	2	0.2	20	0.0140
R30	Res F CF 1/4W 5% 4.7 Ohm	2	0.2	20	0.0140
R37	Res F CF 1/4W 5% 4.7 Ohm	2	0.2	20	0.0140
R23	Res F MO 2W 5% 680.00 Ohm	2	0.2	20	0.0140
W11	Wire jumper Ins 18GA 0.40"	2		0	N/A
W12	Wire jumper Ins 18GA 0.40"	2		0	N/A
W13	Wire jumper Ins 18GA 1.500"	2		0	N/A
W37	Wire jumper Ins 18GA 0.300"	2		0	N/A
W39	Wire jumper Ins 18GA 0.800"	2		0	N/A
J3	CONN.,CB LCK,MTA-156,16 CIRTS	16		0	N/A
	Total Connections	67			0.0938
	Total Failure Rate				0.70172
	Block MTBF				1425070

MAG AMP

L1	CHOKE,MAGAMP GPX130	2		20	0.0066
L2	CHOKE,OUTUT,12.0A	2		20	0.0066
C15	Cap MO R X7R 50V 0.0470MF 5%	2	0.047	0	0.0060
C17	Cap FI R MF 100V 0.0220MF 5%	2	0.022	0	0.0060
C16	Cap DK R Z5F 1000V 470F	2	0.00047	0	0.0060
C20	Cap MO R Z5U 50V 0.3300MF 20%	2	0.33	20	0.0060
C19	Cap AL R KME 1 35V 390.00MF	2	390	20	0.0000
C50	Cap AL R KME 1 35V 390.00MF	2	390	20	0.0000
C18	Cap AL R SXF 1 35V 2200.00MF	2	2200	20	0.1094
Q3	Tstr N 100V 1.0A TI32C	3	0.2	40	0.6000
CR5	Rect 1xUFR 100V 15A MUR1510	2	0.2	30	0.4371
CR6	Rect FR 100V 1.0A 1N4934	2	0.1	30	0.4016
CR21	Rect FR 100V 1.0A 1N4934	2	0.1	30	0.4016

U3	IC VR ADJ SHUNT TL431 TO-92	3		20	0.0788
R18	Res F CF 1/4W 5% 22K Ohm	2	0.2	20	0.0140
R5	Res F CF 1/4W 5% 470 Ohm	2	0.2	20	0.0140
R20	Res F MF 1/4W 1% 10.00K Ohm	2	0.2	20	0.0140
R22	Res F MF 1/4W 1% 2.21K Ohm	2	0.2	20	0.0140
R4	Res F MO 2W 5% 22.00 Ohm	2	0.2	20	0.0140
R21	Res V CE 1/4W V-Adj 1K Ohm	2	0.2	20	0.1141
W42	Wire jumper Ins 22GA 0.300"	2		0	N/A
W43	Wire jumper Ins 22GA 0.500"	2		0	N/A
W46	Wire jumper Ins 18GA 0.60"	2		0	N/A
W22	Wire jumper Ins 18GA 1.300"	2		0	N/A
	Total Connections	48			0.0672
	Total Failure Rate				2.3101625
	Block MTBF				432870