

GBT  
3mm Module 1 Front-End  
68-92 GHz

WIRING LIST

Unless noted all wire 22 AWG stranded

REF:           Bill of Materials:   A10310B001

Assembly Dwg:           D10310A005

Originated:  
September 19, 2005  
By: M. Stennes

DWG NO: A10310W001  
Sheet: 1 of 29  
Revision: -

Revision History:

Rev.	Date	Name	Revision Summary
-	9/19/05	M. Stennes	Originated

**ELCO 38-pin J2 DC Bias, M&C, to 300K Electronics**

Pin	Function	To	Color	Note
A	GND	Bus, J7-f	BUS	
B	+15 Volts	Bus	BUS	
C	-15 Volts	Bus	BUS	
D	+5 Volts	+5 Volts	3xx	
E	+28 Volts	Bus	8xx	
F				
H				
J				
K				
L				
M				
N				
P				
R	Cal 1 drive	S3-N	901	
S				
T				
U				
V				
W				
X				
Y				
Z				
AA				
BB				
CC				
DD				
EE	Phase switch 1S current drive	S1-14, phase switch 1S	91x	
FF	Phase switch 1D current drive	S1-15, phase switch 1D	93x	
HH	Phase switch 2S current drive	S1-16, phase switch 2S	92x	
JJ	Phase switch 2D current drive	S1-17, phase switch 2D	94x	
KK				
LL				
MM				
NN				
PP				
RR				
SS				
TT				

**ELCO 20-pin J6 AC Power to Dewar Feedthrough**

Pin	Function	To	Color	Note
A				
B				
C				
D				
E				
F				
H				
J				
K				
L				
M				
N				
P				
R				
S				
T				
U				
V				
W	AC 150 Volts	S9-W	0xx	
X	AC 150 Volts RTN	S9-19	9xx	

**ELCO 56-pin J7 Cryogenic LNA Bias, Beam 1**

Pin	Function	To	Color	Note
A	Gate 1 bias 1Sa	S10-H	91x	
B	Gate 2 bias 1Sa	S10-F	93x	
C	Gate 3 bias 1Sa	S10-E	92x	
D	Gate 4 bias 1Sa	S10-D	94x	
E	Gate 5,6 bias 1Sa	S10-S	9xx	
F	Gate 1 bias 1Sb	S11-H	901	
H	Gate 2 bias 1Sb	S11-F	902	
J	Gate 3 bias 1Sb	S11-E	903	
K	Gate 4 bias 1Sb	S11-D	904	
L	Gate 5,6 bias 1Sb	S11-S	9xx	
M	GND 1Sb	Ground bus	0xx	Ground near S11
N	Drain 1 bias 1Sb	S11-N	905	
P	Drain 2 bias 1Sb	S11-M	906	
R	Drain 3 bias 1Sb	S11-L	907	
S	Drain 4 bias 1Sb	S11-K	908	
T	Drain 5,6 bias 1Sb	S11-V	90x	
U	GND 1Sa	Ground bus	0xx	Ground near S10
V	Drain 1 bias 1Sa	S10-N	95x	
W	Drain 2 bias 1Sa	S10-M	96x	
X	Drain 3 bias 1Sa	S10-L	97x	
Y	Drain 4 bias 1Sa	S10-K	98x	
Z	Drain 5,6 bias 1Sa	S10-V	90x	
a	Gate 1 bias 1Da	S12-H	91x	
b	Gate 2 bias 1Da	S12-F	93x	
c	Gate 3 bias 1Da	S12-E	92x	
d	Gate 4 bias 1Da	S12-D	94x	
e	Gate 5,6 bias 1Da	S12-S	9xx	
f	GND 1Da	Ground bus	0xx	Ground near S12
h	Drain 1 bias 1Da	S12-N	95x	
j	Drain 2 bias 1Da	S12-M	96x	
k	Drain 3 bias 1Da	S12-L	97x	
l	Drain 4 bias 1Da	S12-K	98x	
m	Drain 5,6 bias 1Da	S12-V	90x	
n	GND 1Db	Ground bus	0xx	Ground near S13
p	Gate 1 bias 1Db	S13-H	901	
r	Gate 2 bias 1Db	S13-F	902	
s	Gate 3 bias 1Db	S13-E	903	
t	Gate 4 bias 1Db	S13-D	904	
u	Gate 5,6 bias 1Db	S13-S	9xx	
v	Drain 1 bias 1Db	S13-N	905	
w	Drain 2 bias 1Db	S13-M	906	
x	Drain 3 bias 1Db	S13-L	907	
y	Drain 4 bias 1Db	S13-K	908	
z	Drain 5,6 bias 1Db	S13-V	90x	
AA				
BB	LED bias 1Sa	S7-K	95x	
CC	LED bias 1Sb	S7-L	96x	
DD	LED bias 1Da	S7-R	97x	
EE	LED bias 1Db	S7-P	98x	
FF	LED Rtn	Ground bus	0xx	
HH	LED Rtn	Ground bus	0xx	
JJ				
KK				
LL				
MM				
NN				

**ELCO 56-pin J8 Cryogenic LNA Bias, Beam 2**

Pin	Function	To	Color	Note
A	Gate 1 bias 2Sa	S14-H	91x	
B	Gate 2 bias 2Sa	S14-F	93x	
C	Gate 3 bias 2Sa	S14-E	92x	
D	Gate 4 bias 2Sa	S14-D	94x	
E	Gate 5,6 bias 2Sa	S14-S	9xx	
F	Gate 1 bias 2Sb	S15-H	901	
H	Gate 2 bias 2Sb	S15-F	902	
J	Gate 3 bias 2Sb	S15-E	903	
K	Gate 4 bias 2Sb	S15-D	904	
L	Gate 5,6 bias 2Sb	S15-S	9xx	
M	GND 2Sb	Ground bus	0xx	Ground near S15
N	Drain 1 bias 2Sb	S15-N	905	
P	Drain 2 bias 2Sb	S15-M	906	
R	Drain 3 bias 2Sb	S15-L	907	
S	Drain 4 bias 2Sb	S15-K	908	
T	Drain 5,6 bias 2Sb	S15-V	90x	
U	GND 2Sa	Ground bus	0xx	Ground near S14
V	Drain 1 bias 2Sa	S14-N	95x	
W	Drain 2 bias 2Sa	S14-M	96x	
X	Drain 3 bias 2Sa	S14-L	97x	
Y	Drain 4 bias 2Sa	S14-K	98x	
Z	Drain 5,6 bias 2Sa	S14-V	90x	
a	Gate 1 bias 2Da	S16-H	91x	
b	Gate 2 bias 2Da	S16-F	93x	
c	Gate 3 bias 2Da	S16-E	92x	
d	Gate 4 bias 2Da	S16-D	94x	
e	Gate 5,6 bias 2Da	S16-S	9xx	
f	GND 2Da	Ground bus	0xx	Ground near S16
h	Drain 1 bias 2Da	S16-N	95x	
j	Drain 2 bias 2Da	S16-M	96x	
k	Drain 3 bias 2Da	S16-L	97x	
l	Drain 4 bias 2Da	S16-K	98x	
m	Drain 5,6 bias 2Da	S16-V	90x	
n	GND 2Db	Ground bus	0xx	Ground near S17
p	Gate 1 bias 2Db	S17-H	901	
r	Gate 2 bias 2Db	S17-F	902	
s	Gate 3 bias 2Db	S17-E	903	
t	Gate 4 bias 2Db	S17-D	904	
u	Gate 5,6 bias 2Db	S17-S	9xx	
v	Drain 1 bias 2Db	S17-N	905	
w	Drain 2 bias 2Db	S17-M	906	
x	Drain 3 bias 2Db	S17-L	907	
y	Drain 4 bias 2Db	S17-K	908	
z	Drain 5,6 bias 2Db	S17-V	90x	
AA				
BB	LED bias 2Sa	S7-H	95x	
CC	LED bias 2Sb	S7-J	96x	
DD	LED bias 2Da	S7-T	97x	
EE	LED bias 2Db	S7-S	98x	
FF	LED Rtn	Ground bus	0xx	
HH	LED Rtn	Ground bus	0xx	
JJ				
KK				
LL				
MM				
NN				



**ELCO 20-pin J9**

**CCB Switching Signals**

Pin	Function	To	Color	Note
A	CCB: 1S Phase Switch +	S1-R	2	
B	CCB: 1S Phase Switch -	S1-S	0	
C	CCB: 1D Phase Switch +	S1-T	2	
D	CCB: 1DPhase Switch -	S1-U	0	
E	CCB: 2S Phase Switch +	S1-V	2	
F	CCB: 2S Phase Switch -	S1-W	0	
H	CCB: 2D Phase Switch +	S1-X	2	
J	CCB: 2D Phase Switch -	S1-Y	0	
K				
L				
M				
N				
P				
R				
S				
T				
U				
V				
W	CCB: Cal 1 control +	S3-7	90x	
X	CCB: Cal 1 control -	S3-8	91x	

## 50-pin D-Connector, D-50S, MCB Analog Inputs, P10

PIN	FUNCTION	To	Color	Notes
1	LED voltage 1Sab	S7-M	91x	AIN 1A, RA 00
2	LED voltage 1Dab	S7-N	93x	AIN 2A, RA 01
3	LED voltage 2Sab	S7-F	92x	AIN 3A, RA 02
4	LED voltage 2Dab	S7-E	94x	AIN 4A, RA 03
5	15K temperature			AIN 5A, RA 04
6	50K temperature			AIN 6A, RA 05
7	300K temperature			AIN 7A, RA 06
8	Dewar vacuum			AIN 8A, RA 07
9	Pump vacuum			AIN 1B, RA 08
10	+15V supply mon	S7-V	902	AIN 2B, RA 09
11	-15V supply mon	S7-U	901	AIN 3B, RA 0A
12	+5V supply mon			AIN 4B, RA 0B
13	+28V supply mon	S3-F	98x	AIN 5B, RA 0C
14	Cryo LNA 1Sa, gate 5,6 voltage	S4-4	901	AIN 6B, RA 0D
15	Cryo LNA 1Sa, gate 2, 3, 4 voltage	S4-5	902	AIN 7B, RA 0E
16	Cryo LNA 1Sa, gate 1 voltage	S4-6	903	AIN 8B, RA 0F
17	Cryo LNA 1Sb, gate 5,6 voltage	S4-7	904	AIN 1C, RA 10
18	Cryo LNA 1Sb, gate 2, 3, 4 voltage	S4-8	905	AIN 2C, RA 11
19	Cryo LNA 1Sb, gate 1 voltage	S4-9	906	AIN 3C, RA 12
20	Cryo LNA 1Da, gate 5,6 voltage	S4-10	91x	AIN 4C, RA 13
21	Cryo LNA 1Da, gate 2, 3, 4 voltage	S4-11	92x	AIN 5C, RA 14
22	Cryo LNA 1Da, gate 1 voltage	S4-12	93x	AIN 6C, RA 15
23	Cryo LNA 1Db, gate 5,6 voltage	S4-13	94x	AIN 7C, RA 16
24	Cryo LNA 1Db, gate 2, 3, 4 voltage	S4-14	95x	AIN 8C, RA 17
25	Cryo LNA 1Db, gate 1 voltage	S4-15	97x	AIN 1D, RA 18
26	Cryo LNA 2Sa, gate 5,6 voltage	S4-16	905	AIN 2D, RA 19
27	Cryo LNA 2Sa, gate 2, 3, 4 voltage	S4-17	98x	AIN 3D, RA 1A
28	Cryo LNA 2Sa, gate 1 voltage	S4-18	95x	AIN 4D, RA 1B
29	Cryo LNA 2Sb, gate 5,6 voltage	S4-19	904	AIN 5D, RA 1C
30	Cryo LNA 2Sb, gate 2, 3, 4 voltage	S4-20	905	AIN 6D, RA 1D
31	Cryo LNA 2Sb, gate 1 voltage	S4-21	906	AIN 7D, RA 1E
32	Cryo LNA 2Da, gate 5,6 voltage	S5-4	901	AIN 8D, RA 1F
33	Cryo LNA 2Da, gate 2, 3, 4 voltage	S5-5	902	AIN 1E, RA 20
34	Cryo LNA 2Da, gate 1 voltage	S5-6	903	AIN 2E, RA 21
35	Cryo LNA 2Db, gate 5,6 voltage	S5-7	904	AIN 3E, RA 22
36	Cryo LNA 2Db, gate 2, 3, 4 voltage	S5-8	905	AIN 4E, RA 23
37	Cryo LNA 2Db, gate 1 voltage	S5-9	906	AIN 5E, RA 24
38				AIN 6E, RA 25
39				AIN 7E, RA 26
40				AIN 8E, RA 27
41	Cal 1 current	S3-T	902	AIN 1F, RA 28
42	Cal 1 voltage	S3-V	903	AIN 2F, RA 29
43	Phase switch, 1S, current	S1-5	903	AIN 3F, RA 2A
44	Phase switch, 1D, current	S1-6	904	AIN 4F, RA 2B
45	Phase switch, 2S, current	S1-7	905	AIN 5F, RA 2C
46	Phase switch, 2D, current	S1-8	906	AIN 6F, RA 2D
47	Phase switch, 3S, current			AIN 7F, RA 2E
48	Phase switch, 3D, current			AIN 8F, RA 2F
49	Phase switch, 4S, current			AIN 1G, RA 30
50	Phase switch, 4D, current			AIN 2G, RA 31



## 50-pin D-Connector, D-50S, MCB Analog Inputs and Outputs, P11

PIN	FUNCTION	To	Color	Notes
1	Noise source, current, module 1 68-92 GHz			AIN 3G, RA 32
2	Noise source, voltage, module 1 68-92 GHz			AIN 4G, RA 33
3	Noise source, current, module 2 90-115 GHz			AIN 5G, RA 34
4	Noise source, voltage, module 2 90-115 GHz			AIN 6G, RA 35
5	LO detector voltage, module 1 68-92 GHz			AIN 7G, RA 36
6	LO detector voltage, module 2 90-115 GHz			AIN 8G, RA 37
7				NOT USED
8				NOT USED
9				NOT USED
10				NOT USED
11				NOT USED
12				NOT USED
13				NOT USED
14				NOT USED
15	+5 VOLT SUPPLY	Bus	3xx	+5V
16	+5 VOLT SUPPLY	Bus	3xx	+5V
17	+5 VOLT SUPPLY	Bus	3xx	+5V
18	+5 VOLT SUPPLY	Bus	3xx	+5V
19	+5 VOLT SUPPLY	Bus	3xx	+5V
20	+5 VOLT SUPPLY	Bus	3xx	+5V
21	+5 VOLT SUPPLY	Bus	3xx	+5V
22	+15 VOLT SUPPLY	Bus	2xx	+15V
23	+15 VOLT SUPPLY	Bus	2xx	+15V
24	+15 VOLT SUPPLY	Bus	2xx	+15V
25	-15 VOLT SUPPLY	Bus	4xx	-15 V
26	-15 VOLT SUPPLY	Bus	4xx	-15 V
27	-15 VOLT SUPPLY	Bus	4xx	-15 V
28	CHASSIS GROUND, AND DC RETURNS	Bus	0xx	GND
29	CHASSIS GROUND, AND DC RETURNS	Bus	0xx	GND
30	CHASSIS GROUND, AND DC RETURNS	Bus	0xx	GND
31	CHASSIS GROUND, AND DC RETURNS	Bus	0xx	GND
32	CHASSIS GROUND, AND DC RETURNS	Bus	0xx	GND
33	CHASSIS GROUND, AND DC RETURNS	Bus	0xx	GND
34	CHASSIS GROUND, AND DC RETURNS	Bus	0xx	GND
35	Gain adjust, cryo LNA 1Sa	S10-Y	905	AOUT 3E, RA 40
36	Gain adjust, cryo LNA 1Sb	S11-Y	905	AOUT 4E, RA41
37	Gain adjust, cryo LNA 1Da	S12-Y	905	AOUT 5E, RA 42
38	Gain adjust, cryo LNA 1Db	S13-Y	905	AOUT 6E, RA 43
39	Gain adjust, cryo LNA 2Sa	S14-Y	905	AOUT 7E, RA 44
40	Gain adjust, cryo LNA 2Sb	S15-Y	905	AOUT 8E, RA 45
41	Gain adjust, cryo LNA 2Da	S16-Y	905	AOUT 1F, RA46
42	Gain adjust, cryo LNA 2Db	S17-Y	905	AOUT 2F, RA 47
43				NOT USED
44				NOT USED
45				NOT USED
46				NOT USED
47				NOT USED
48				NOT USED
49				NOT USED
50				NOT USED

## 50-pin D-Connector, D-50S, MCB Digital Monitor, P12

PIN	FUNCTION	To	Color	Notes
1	C			RA50-DM0
2	Not-H			RA50-DM1
3	X			RA50-DM2
4	Pump req.			RA50-DM3
5				RA50-DM4
6				RA50-DM5
7	CPU monitor			RA50-DM6
8	Manual/MCB control select			RA50-DM7
9	Bit 0 7-bit ID, ODD PARITY			RA51-DM0
10	Bit 1			RA51-DM1
11	2			RA51-DM2
12	3			RA51-DM3
13	4			RA51-DM4
14	5			RA51-DM5
15	6			RA51-DM6
16	Parity bit			RA51-DM7
17	Serial number, bit 0			RA51-DM8
18	Serial number, bit 1			RA51-DM9
19	Serial number, bit 2			RA51-DM10
20	Mod #, bit 0			RA51-DM11
21	Mod #, bit 1			RA51-DM12
22	Mod #, bit 2			RA51-DM13
23	CAL Control Select, bit 1			RA52-DM0
24	CAL Control Select, bit 0			RA52-DM1
25	Ext cal monitor	S3-M	92x	RA52-DM2
26	SIG/REF monitor`			RA52-DM3
27	Cal 1 monitor	S3-H	91x	RA52-DM4
28				RA52-DM5
29	CCB cal monitor beam 1			RA52-DM6
30	CCB cal monitor beam 2			RA52-DM7
31	Phase con stat mon b0	S1-E		RA53-DM0
32	Phase con stat mon b1	S1-F		RA53-DM1
33				RA53-DM2
34				RA53-DM3
35	1S phase sw state	S1-19	901	RA53-DM4
36	1D phase sw state	S1-20	902	RA53-DM5
37	2S phase sw state	S1-21	903	RA53-DM6
38	2S phase sw state	S1-22	904	RA53-DM7
39	3S phase sw state			RA54-DM0
40	3D phase sw state			RA54-DM1
41	4S phase sw state			RA54-DM2
42	4S phase sw state			RA54-DM3
43				RA54-DM4
44				RA54-DM5
45				RA54-DM6
46				RA54-DM7
47				RA55-DM0
48				RA55-DM1
49				RA55-DM2
50				RA55-DM3

## 50-pin D-Connector, D-50S, MCB Digital Control, P13

PIN	FUNCTION	To	Color	Notes
1	C			RA48-DM0
2	not-H			RA48-DM1
3	X			RA48-DM2
4				N.C.
5	Cal control select b0	S3-18	91x	RA49-DC0
6	Cal control select b1	S3-17	92x	RA49-DC1
7				RA49-DC2
8				RA49-DC3
9	MCB: cal 1 control	S3-K	5xx	RA49-DC4
10	MCB: cal 2 control			RA49-DC5
11				N.C.
12				N.C.
13	Ext cal select	S3-13	902	RA4A-DC0
14	Ext cal select	S3-14	903	RA4A-DC1
15				RA4A-DC2
16	MCB: 1S phase switch control	S1-J	92x	RA4A-DC3
17	MCB: 1D phase switch control	S1-K	94x	RA4A-DC4
18	MCB: 2S phase switch control	S1-L	95x	RA4A-DC5
19	MCB: 2D phase switch control	S1-M	96x	RA4A-DC6
20				RA4A-DC7
21	Cryo LNA 1Sa bias ON/OFF	S10-Z	91x	RA4B-DC0
22	Cryo LNA 1Sb bias ON/OFF	S11-Z	92x	RA4B-DC1
23	Cryo LNA 1Da bias ON/OFF	S12-Z	93x	RA4B-DC2
24	Cryo LNA 1Db bias ON/OFF	S13-Z	94x	RA4B-DC3
25	Cryo LNA 2Sa bias ON/OFF	S14-Z	901	RA4B-DC4
26	Cryo LNA 2Sb bias ON/OFF	S15-Z	902	RA4B-DC5
27	Cryo LNA 2Da bias ON/OFF	S16-Z	903	RA4B-DC6
28	Cryo LNA 2Db bias ON/OFF	S17-Z	904	RA4B-DC7
29				RA4C-DC0
30				RA4C-DC1
31				RA4C-DC2
32				RA4C-DC3
33	Phase switch control select b0	S1-F	91x	RA4D-DC0
34	Phase switch control select b1	S1-E	93x	RA4D-DC1
35				RA4D-DC2
36				RA4D-DC3
37				RA4D-DC4
38				RA4D-DC5
39				RA4D-DC6
40				RA4D-DC7
41	Cryo LNA 3Sa bias ON/OFF			RA4E-DC0
42	Cryo LNA 3Sb bias ON/OFF			RA4E-DC1
43	Cryo LNA 3Da bias ON/OFF			RA4E-DC2
44	Cryo LNA 3Da bias ON/OFF			RA4E-DC3
45	Cryo LNA 4Sa bias ON/OFF			RA4E-DC4
46	Cryo LNA 4Sa bias ON/OFF			RA4E-DC5
47	Cryo LNA 4Da bias ON/OFF			RA4E-DC6
48	Cryo LNA 4Da bias ON/OFF			RA4E-DC7
49	Not used			
50	Not used			

ELCO 56-pin J84 Local M&C Box

Pin	Function	To	Color	Note
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A	GND	Bus, J7-f	BUS	
B	+15 Volts	Bus	BUS	
C	-15 Volts	Bus	BUS	
D	+5 Volts	+5 Volts	3xx	
E	+28 Volts	Bus	8xx	
F	1S Phase Switch Manual Control	S1-9	91x	
H	1D Phase Switch Manual Control	S1-10	92x	
J	2S Phase Switch Manual Control	S1-11	93x	
K	2D Phase Switch Manual Control	S1-12	94x	
L	Cal 1 manual control	S3-Y	95x	
M	Manual/MCB select	S3-X	97x	
N				
P				
R				
S				
T				
U				
V				
W				
X				
Y				
Z				
a				
b				
c				
d				
e				
f				
h				
j				
k				
l				
m				
n				
p				
r				
s				
t				
u				
v				
w				
x				
y				
z				
AA				
BB				
CC				
DD				
EE				
FF				
HH				
JJ				
KK				
LL				
MM				
NN				

## Slot 1 Phase Switch Interface Card

Pin	Function	To	Color	Note
A	GND	Bus, J7-f	BUS	
B	+15 Volts	Bus	BUS	
C	-15 Volts	Bus	BUS	
D	+5 Volts	+5 Volts	3xx	See note 3
E	Phase switch control select b1	J12-31, J13-33	91x	
F	Phase switch control select b2	J12-32, J13-34	93x	
H	MCB/Local control bit	S7-7	97x	
J	MCB 1S Phase Switch	J13-16	92x	
K	MCB 1D Phase Switch	J13-17	94x	
L	MCB 2S Phase Switch	J13-18	95x	
M	MCB 2S Phase Switch	J13-19	96x	
N	S/R-EXT 1S Phase Switch	NC	905	
P	S/R-EXT 1D Phase Switch	NC	906	
R	CCB: 1S Phase Switch +	J9-A	2	
S	CCB: 1S Phase Switch -	J9-B	0	
T	CCB: 1D Phase Switch +	J9-C	2	
U	CCB: 1D Phase Switch -	J9-D	0	
V	CCB: 2S Phase Switch +	J9-E	2	
W	CCB: 2S Phase Switch -	J9-F	0	
X	CCB: 2D Phase Switch +	J9-H	2	
Y	CCB: 2D Phase Switch -	J9-J	0	
Z	S/R-EXT Phase Switch Rtn	NC	0xx	
1	GND	Bus	BUS	
2	+15 Volts	Bus	BUS	
3	-15 Volts	Bus	BUS	
4	+5 Volts	+5 Volts	jumper	See note 3
5	1S Phase Switch current sense	J10-43	903	
6	1D Phase Switch current sense	J10-44	904	
7	2S Phase Switch current sense	J10-45	905	
8	2D Phase Switch current sense	J10-46	906	
9	1S Phase Switch manual ctrl	J84-F	91x	
10	1D Phase Switch manual ctrl	J84-H	92x	
11	2S Phase Switch manual ctrl	J84-J	93x	
12	2D Phase Switch manual ctrl	J84-K	94x	
13	S/R-EXT 2S Phase Switch	NC	907	
14	1S Phase Switch current	J2-EE	91x	
15	1D Phase Switch current	J2-FF	93x	
16	2S Phase Switch current	J2-HH	92x	
17	2D Phase Switch current	J2-JJ	94x	
18	S/R-EXT 2D Phase Switch	NC	908	
19	1S Phase state	J12-35	901	
20	1D Phase state	J12-36	902	
21	2S Phase state	J12-37	903	
22	2D Phase state	J12-38	904	

### Slot 3 Cal Control Logic Card

Pin	Function	To	Color	Note
A	GND	Bus, J7-f	BUS	
B	+15 Volts	Bus	BUS	
C	-15 Volts	Bus	BUS	
D	+5 Volts	+5 Volts	3xx	See note 3
E	+28 Volts	Bus	8xx	See note 2
F	+28 V monitor	J10-13	98x	
H	Cal 1 monitor/indicator	J12-27	91x	
J	Cal 2 monitor/indicator	NC		
K	MCB: Cal 1 control	J13-9	5xx	
L	MCB: Cal 2 control	NC		
M	EXT Cal monitor	J12-23	92x	
N	Cal 1 drive output	J2-R	901	
P	Cal 2 drive output	NC		
R		NC		
S		NC		
T	Cal 1 current monitor	J10-41	902	
U	Cal 2 current monitor	NC		
V	Cal 1 voltage monitor	J10-42	903	
W	Cal 2 voltage monitor	NC		
X	Manual/MCB select	S7-7, J84-M	97x	
Y	Cal 1 manual control	J84-L	95x	
Z	Cal 2 manual control	NC		
1	GND	Bus	0xx	
2		NC		
3		NC		
4		NC		
5		NC		
6		NC		
7	CCB1+ control logic	J9-W	90x	
8	CCB1- control logic	J9-X	91x	
9	CCB2+ control logic	NC		
10	CCB2- control logic	NC		
11	EXT cal input	J3		BNC on card cage
12		NC		
13	EXT cal select B6	J13-13	902	
14	EXT cal select B7	J13-14	903	
15	CCB 1 cal monitor	NC		
16	CCB 2 cal monitor	NC		
17	Cal control select bit 1	J13-5	91x	
18	Cal control select bit 2	J13-6	92x	
19		NC		
20		NC		
21		NC		
22		NC		

## Slot 4 Half-Amp

Pin	Function	To	Color	Note
A	GND	Bus	BUS	
B	+15 Volts	Bus	BUS	
C	-15 Volts	Bus	BUS	
D	1Sa Gate 5,6 monitor in	S10-10	905	
E	1Sa Gate 2,3,4 monitor in	S10-4	98x	
F	1Sa Gate 1 monitor in	S10-7	95x	
H	1Sb Gate 5,6 monitor in	S11-10	905	
J	1Sb Gate 2,3,4 monitor in	S11-4	98x	
K	1Sb Gate 1 monitor in	S11-7	95x	
L	1Da Gate 5,6 monitor in	S12-10	905	
M	1Da Gate 2,3,4 monitor in	S12-4	98x	
N	1Da Gate 1 monitor in	S12-7	95x	
P	1Db Gate 5,6 monitor in	S13-10	905	
R	1Db Gate 2,3,4 monitor in	S13-4	98x	
S	1Db Gate 1 monitor in	S13-7	95x	
T	2Sa Gate 5,6 monitor in	S14-10	905	
U	2Sa Gate 2,3,4 monitor in	S14-4	98x	
V	2Sa Gate 1 monitor in	S14-7	95x	
W	2Sb Gate 5,6 monitor in	S15-10	905	
X	2Sb Gate 2,3,4 monitor in	S15-4	98x	
Y	2Sb Gate 1 monitor in	S15-7	95x	
Z	NC			
1	GND			
2	NC			
3	NC			
4	1Sa Gate 5,6 monitor out	P10-14	901	
5	1Sa Gate 2,3,4 monitor out	P10-15	902	
6	1Sa Gate 1 monitor out	P10-16	903	
7	1Sb Gate 5,6 monitor out	P10-17	904	
8	1Sb Gate 2,3,4 monitor out	P10-18	905	
9	1Sb Gate 1 monitor out	P10-19	906	
10	1Da Gate 5,6 monitor out	P10-20	91x	
11	1Da Gate 2,3,4 monitor out	P10-21	92x	
12	1Da Gate 1 monitor out	P10-22	93x	
13	1Db Gate 5,6 monitor out	P10-23	94x	
14	1Db Gate 2,3,4 monitor out	P10-24	95x	
15	1Db Gate 1 monitor out	P10-25	97x	
16	2Sa Gate 5,6 monitor out	P10-26	905	
17	2Sa Gate 2,3,4 monitor out	P10-27	98x	
18	2Sa Gate 1 monitor out	P10-28	95x	
19	2Sb Gate 5,6 monitor out	P10-29	904	
20	2Sb Gate 2,3,4 monitor out	P10-30	905	
21	2Sb Gate 1 monitor out	P10-31	906	
22	NC			

**Slot 5 Half-Amp**

Pin	Function	To	Color	Note
A	GND	Bus	BUS	
B	+15 Volts	Bus	BUS	
C	-15 Volts	Bus	BUS	
D	2Da Gate 5,6 monitor in	S16-9	905	
E	2Da Gate 2,3,4 monitor in	S16-4	98x	
F	2Da Gate 1 monitor in	S16-7	95x	
H	2Db Gate 5,6 monitor in	S17-9	905	
J	2Db Gate 2,3,4 monitor in	S17-4	98x	
K	2Db Gate 1 monitor in	S17-7	95x	
L				
M				
N				
P				
R				
S				
T				
U				
V				
W				
X				
Y				
Z				
1	GND			
2				
3				
4	2Da Gate 5,6 monitor out	P10-32	901	
5	2Da Gate 2,3,4 monitor out	P10-33	902	
6	2Da Gate 1 monitor out	P10-34	903	
7	2Db Gate 5,6 monitor out	P10-35	904	
8	2Db Gate 2,3,4 monitor out	P10-36	905	
9	2Db Gate 1 monitor out	P10-37	906	
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				



**Slot 6 Half-Amp**

<b>Pin</b>	<b>Function</b>	<b>To</b>	<b>Color</b>	<b>Note</b>
A	GND	Bus, J7-n	BUS	
B	+15 Volts	Bus	BUS	
C	-15 Volts	Bus	BUS	
D				
E				
F				
H				
J				
K				
L				
M				
N				
P				
R				
S				
T				
U				
V				
W				
X				
Y				
Z				
1	GND			
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

**Slot 7 ½ Amp/LED/Tswitch Control**

Pin	Function	To	Color	Note
A	GND	Bus, J7-f	BUS	
B	+15 Volts	Bus	BUS	
C	-15 Volts	Bus	BUS	
D	+5 Volts	+5 Volts	3xx	See note 3
E	LED 2Dab monitor	P10-4	94x	
F	LED 2Sab monitor	P10-3	92x	
H	LED bias 2Sa	J8-BB	95x	
J	LED bias 2Sb	J8-CC	96x	
K	LED bias 1Sa	J7-BB	95x	
L	LED bias 1Sb	J7-CC	96x	
M	LED 1Sab monitor	J10-1	91x	
N	LED 1Dab monitor	J10-2	93x	
P	LED bias 1Db	J7-EE	98x	
R	LED bias 1Da	J7-DD	97x	
S	LED bias 2Db	J8-EE	98x	
T	LED bias 2Da	J8-DD	97x	
U	-15 Volt monitor	P10-11	901	
V	+15 Volt monitor	P10-10	902	
W				
X				
Y				
Z				
1				
2				
3				
4				
5				
6				
7	MCB/Local control bit	S1-H, S3-X	97x	
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

**Slot 10 LNA bias 1Sa**

<b>Pin</b>	<b>Function</b>	<b>To</b>	<b>Color</b>	<b>Note</b>
A	GND	Bus, J7-U	BUS	Also to J7-U
B	+15 Volts	Bus	BUS	
C	-15 Volts	Bus	BUS	
D	Gate 4	J7-D	94x	
E	Gate 3	J7-C	92x	
F	Gate 2	J7-B	93x	
H	Gate 1	J7-A	91x	
J				
K	Drain 4	J7-Y	98x	
L	Drain 3	J7-X	97x	
M	Drain 2	J7-W	96x	
N	Drain 1	J7-V	95x	
P				
R				
S	Gate 5,6	J7-E		
T				
U				
V	Drain 5,6	J7-Z		
W				
X				
Y	Gain 5,6 adjust	P11-35	905	
Z	Bias ON/OFF Control	P13-21	91x	
1	GND	Bus	BUS	
2	+15 Volts	Bus	BUS	
3	-15 Volts	Bus	BUS	
4	1Sa Gate 2,3,4 monitor	S4-E, S10-5, S10-6	98x	
5	1Sa Gate 2,3,4 monitor	S10-4	Bus wire	
6	1Sa Gate 2,3,4 monitor	S10-4	Bus wire	
7	1Sa Gate 1 monitor	S4-F	95x	
8				
9				
10	1Sa Gate 5,6 monitor	S4-D	905	
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

**Slot 11 LNA bias 1Sb**

<b>Pin</b>	<b>Function</b>	<b>To</b>	<b>Color</b>	<b>Note</b>
A	GND	Bus, J7-M	BUS	Also to J7-M
B	+15 Volts	Bus	BUS	
C	-15 Volts	Bus	BUS	
D	Gate 4	J7-K	904	
E	Gate 3	J7-J	903	
F	Gate 2	J7-H	902	
H	Gate 1	J7-F	901	
J				
K	Drain 4	J7-S	908	
L	Drain 3	J7-R	907	
M	Drain 2	J7-P	906	
N	Drain 1	J7-N	905	
P				
R				
S	Gate 5,6	J7-L		
T				
U				
V	Drain 5,6	J7-T		
W				
X				
Y	Gain 5,6 adjust	P11-36	905	
Z	Bias ON/OFF Control	P13-22	92x	
1	GND	Bus	BUS	
2	+15 Volts	Bus	BUS	
3	-15 Volts	Bus	BUS	
4	1Sb Gate 2,3,4 monitor	S4-J, S11-5, S11-6	98x	
5	1Sb Gate 2,3,4 monitor	S11-4	Jumper	
6	1Sb Gate 2,3,4 monitor	S11-4	Jumper	
7	1Sb Gate 1 monitor	S4-K	95x	
8				
9				
10	1Sb Gate 5,6 monitor	S4-H	905	
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

**Slot 12 LNA bias 1Da**

<b>Pin</b>	<b>Function</b>	<b>To</b>	<b>Color</b>	<b>Note</b>
A	GND	Bus, J7-f	BUS	Also to J7-f
B	+15 Volts	Bus	BUS	
C	-15 Volts	Bus	BUS	
D	Gate 4	J7-d	94x	
E	Gate 3	J7-c	92x	
F	Gate 2	J7-b	93x	
H	Gate 1	J7-a	91x	
J				
K	Drain 4	J7-l	98x	
L	Drain 3	J7-k	97x	
M	Drain 2	J7-j	96x	
N	Drain 1	J7-h	95x	
P				
R				
S	Gate 5,6	J7-e		
T				
U				
V	Drain 5,6	J7-m		
W				
X				
Y	Gain 5,6 adjust	P11-37	905	
Z	Bias ON/OFF Control	P13-23	93x	
1	GND	Bus	BUS	
2	+15 Volts	Bus	BUS	
3	-15 Volts	Bus	BUS	
4	1Da Gate 2,3,4 monitor	S4-M, S12-5, S12-6	98x	
5	1Da Gate 2,3,4 monitor	S12-4	98x	
6	1Da Gate 2,3,4 monitor	S12-4	98x	
7	1Da Gate 1 monitor	S4-N	95x	
8				
9				
10	1Da Gate 5,6 monitor	S4-L	905	
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

**Slot 13 LNA bias 1Db**

<b>Pin</b>	<b>Function</b>	<b>To</b>	<b>Color</b>	<b>Note</b>
A	GND	Bus, J7-n	BUS	Also to J7-n
B	+15 Volts	Bus	BUS	
C	-15 Volts	Bus	BUS	
D	Gate 4	J7-t	904	
E	Gate 3	J7-s	903	
F	Gate 2	J7-r	902	
H	Gate 1	J7-p	901	
J				
K	Drain 4	J7-y	908	
L	Drain 3	J7-x	907	
M	Drain 2	J7-w	906	
N	Drain 1	J7-v	905	
P				
R				
S	Gate 5,6	J7-u		
T				
U				
V	Drain 5,6	J7-z		
W				
X				
Y	Gain 5,6 adjust	P11-38	905	
Z	Bias ON/OFF Control	P13-24	94x	
1	GND	Bus	BUS	
2	+15 Volts	Bus	BUS	
3	-15 Volts	Bus	BUS	
4	1Db Gate 2,3,4 monitor	S4-R, S13-5, S13-6	98x	
5	1Db Gate 2,3,4 monitor	S13-4	98x	
6	1Db Gate 2,3,4 monitor	S13-4	98x	
7	1Db Gate 1 monitor	S4-S	95x	
8				
9				
10	1Db Gate 5,6 monitor	S4-P	905	
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

**Slot 14 LNA bias 2Sa**

<b>Pin</b>	<b>Function</b>	<b>To</b>	<b>Color</b>	<b>Note</b>
A	GND	Bus, J8-U	BUS	Also to J8-U
B	+15 Volts	Bus	BUS	
C	-15 Volts	Bus	BUS	
D	Gate 4	J8-D	94x	
E	Gate 3	J8-C	92x	
F	Gate 2	J8-B	93x	
H	Gate 1	J8-A	91x	
J				
K	Drain 4	J8-Y	98x	
L	Drain 3	J8-X	97x	
M	Drain 2	J8-W	96x	
N	Drain 1	J8-V	95x	
P				
R				
S	Gate 5,6	J8-E	908	
T				
U				
V	Drain 5,6	J8-Z	905	
W				
X				
Y	Gain 5,6 adjust	P11-39	905	
Z	Bias ON/OFF Control	P13-25	901	
1	GND	Bus	BUS	
2	+15 Volts	Bus	BUS	
3	-15 Volts	Bus	BUS	
4	2Sa Gate 2,3,4 monitor	S4-U, S14-5, S14-6	98x	
5	2Sa Gate 2,3,4 monitor	S14-4	98x	
6	2Sa Gate 2,3,4 monitor	S14-4	98x	
7	2Sa Gate 1 monitor	S4-V	95x	
8				
9				
10	2Sa Gate 5,6 monitor	S4-T	905	
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

**Slot 15 LNA bias 2Sb**

<b>Pin</b>	<b>Function</b>	<b>To</b>	<b>Color</b>	<b>Note</b>
A	GND	Bus, J8-M	BUS	Also to J8-M
B	+15 Volts	Bus	BUS	
C	-15 Volts	Bus	BUS	
D	Gate 4	J8-K	904	
E	Gate 3	J8-J	903	
F	Gate 2	J8-H	902	
H	Gate 1	J8-F	901	
J				
K	Drain 4	J8-S	908	
L	Drain 3	J8-R	907	
M	Drain 2	J8-P	906	
N	Drain 1	J8-N	905	
P				
R				
S	Gate 5,6	J8-L	908	
T				
U				
V	Drain 5,6	J8-T	905	
W				
X				
Y	Gain 5,6 adjust	P11-40	905	
Z	Bias ON/OFF Control	P13-26	902	
1	GND	Bus	BUS	
2	+15 Volts	Bus	BUS	
3	-15 Volts	Bus	BUS	
4	2Sb Gate 2,3,4 monitor	S4-X, S15-5, S15-6	98x	
5	2Sb Gate 2,3,4 monitor	S15-4	98x	
6	2Sb Gate 2,3,4 monitor	S15-4	98x	
7	2Sb Gate 1 monitor	S4-Y	95x	
8				
9				
10	2Sb Gate 5,6 monitor	S4-W	905	
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				



**Slot 16 LNA bias 2Da**

<b>Pin</b>	<b>Function</b>	<b>To</b>	<b>Color</b>	<b>Note</b>
A	GND	Bus, J8-f	BUS	Also to J8-f
B	+15 Volts	Bus	BUS	
C	-15 Volts	Bus	BUS	
D	Gate 4	J8-d	94x	
E	Gate 3	J8-b	92x	
F	Gate 2	J8-b	93x	
H	Gate 1	J8-a	91x	
J				
K	Drain 4	J8-l	98x	
L	Drain 3	J8-k	97x	
M	Drain 2	J8-j	96x	
N	Drain 1	J8-h	95x	
P				
R				
S	Gate 5,6	J8-e	908	
T				
U				
V	Drain 5,6	J8-m	905	
W				
X				
Y	Gain 5,6 adjust	P11-41	905	
Z	Bias ON/OFF Control	P13-27	903	
1	GND	Bus	BUS	
2	+15 Volts	Bus	BUS	
3	-15 Volts	Bus	BUS	
4	2Da Gate 2,3,4 monitor	S5-E, S16-5, S16-6	98x	
5	2Da Gate 2,3,4 monitor	S16-4	98x	
6	2Da Gate 2,3,4 monitor	S16-4	98x	
7	2Da Gate 1 monitor	S5-F	95x	
8				
9				
10	2Da Gate 5,6 monitor	S5-D	905	
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

**Slot 17 LNA bias 2Db**

<b>Pin</b>	<b>Function</b>	<b>To</b>	<b>Color</b>	<b>Note</b>
A	GND	Bus, J8-n	BUS	Also to J8-n
B	+15 Volts	Bus	BUS	
C	-15 Volts	Bus	BUS	
D	Gate 4	J8-t	904	
E	Gate 3	J8-s	903	
F	Gate 2	J8-r	902	
H	Gate 1	J8-p	901	
J				
K	Drain 4	J8-y	908	
L	Drain 3	J8-x	907	
M	Drain 2	J8-w	906	
N	Drain 1	J8-v	905	
P				
R				
S	Gate 5,6	J8-u	908	
T				
U				
V	Drain 5,6	J8-z	905	
W				
X				
Y	Gain 5,6 adjust	P11-42	905	
Z	Bias ON/OFF Control	P13-28	904	
1	GND	Bus	BUS	
2	+15 Volts	Bus	BUS	
3	-15 Volts	Bus	BUS	
4	2Db Gate 2,3,4 monitor	S5-J, S17-5, S17-6	98x	
5	2Db Gate 2,3,4 monitor	S17-4	98x	
6	2Db Gate 2,3,4 monitor	S17-4	98x	
7	2Db Gate 1 monitor	S5-K	95x	
8				
9				
10	2Db Gate 5,6 monitor	S5-H	905	
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				