

REV.	DESCRIPTION	DRAWN	DATE
	**SEE NEXT TO TITLE BLOCK	APPD.	DATE

REV.	DESCRIPTION	DRAWN	DATE
G	INNER & OUTER PU ELECTRODE LABELS SWAPPED	G.A. JOHNSON	7/20/94
H	2-4 GHZ CORE SYSTEM SWITCH ADDITIONS, REDRAWN ON MINI-CAD	WJM	3/29/95
J	ADDITION, A-S43SB2, 3 SPLITTERS, AND CABLING TO SEND STDP ML SIGNALS TO AP10	WJM	11/9/95
K	ADDED AMP AFTER S43SB2 STDP SWITCH	WJM	12/7/95
L	ADDED CV LASER LINK SIGNALS, CHANGED A-S6A106 TO 8-THROW (A-SR8T08) FOR TRI & SCH. TRO ON A-S6A101	WJM	6/20/97
M	MAJOR SYSTEM CHANGES/UPGRADE - REDRAWN	WJM	12/15/97

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
PARTS LIST			
UNLESS OTHERWISE SPECIFIED: ORIGINATOR R. J. PASQUINELLI			
FRACTIONS	DECIMALS	ANGLES	DRAWN WESLEY MUELLER
++	++	++	CHECKED
1. BREAK ALL SHARP EDGES 1:64 MAX			
2. DO NOT SCALE DRAWING			
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5 STD'S			
MAX. ALL MACHINED SURFACES			
MATERIAL-			
FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY			
ANTI-PROTON SOURCE NETWORK/SPECTRUM ANALYZER SWITCH MULTIPLEXER			
SCALE	FILMED	DRAWING NUMBER	REV.
		8000-ED-170256	M

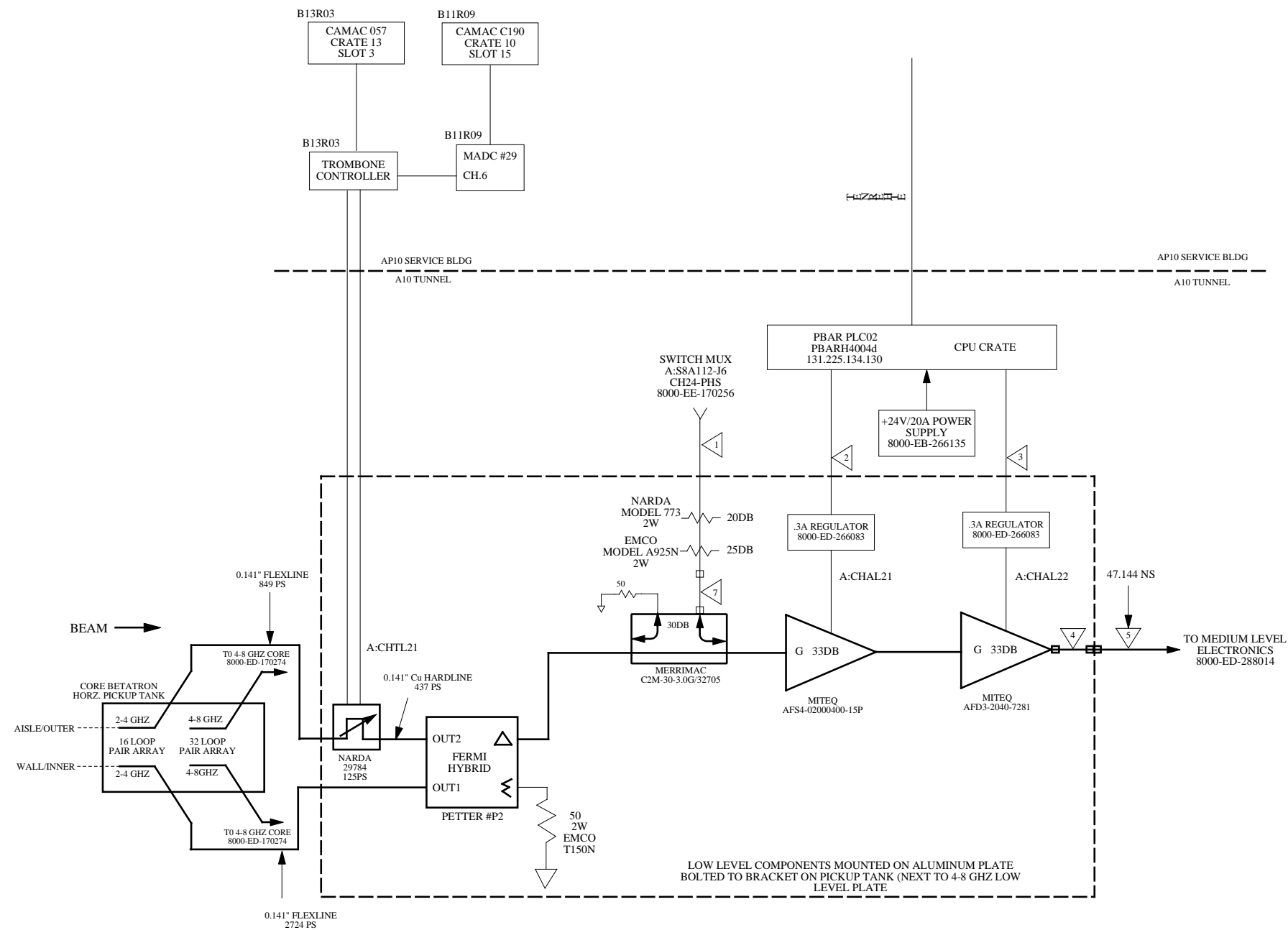
*NOTES:
 1) SYSTEM DESIGNATIONS ARE AS FOLLOWS:
 'C' REPRESENTS CORE SYSTEMS
 'D' REPRESENTS DEBUNCHER SYSTEMS
 'S' REPRESENTS STACKTAIL SYSTEMS
 'P' REPRESENTS MOMENTUM SYSTEMS
 'H' REPRESENTS A HORIZONTAL SYSTEM
 'V' REPRESENTS A VERTICAL SYSTEM
 'FB' REPRESENTS FANBACK
 'TRI' REPRESENTS TRANSFER SWITCH IN
 'TRO' REPRESENTS TRANSFER SWITCH OUT
 'SCH' REPRESENTS SCHOTTKY SCAN SIGNAL
 'PF' REPRESENTS PASSIVE FILTER
 'PU' REPRESENTS PICKUP TEST INPUT
 'PHS' REPRESENTS PHASING INPUT

4) SWITCH TYPE AND IDENTIFICATION:
 SYSTEM - ACCUMULATOR (A) OR DEBUNCHER (D)
 # OF THROWS _____
 LOCATION _____
 SWITCH # AT THAT LOCATION _____

SP2T BY TELEDYNE MICROWAVE, CS32N6E
 SP4T BY DYNATECH, #04-113E29-1 OR BY WAVECOM #043-B237-D10-3B1
 SP6T BY DYNATECH, #06-113E29-1 OR BY WAVECOM #063-B237-D10-3B1
 SP8T BY DYNATECH, #L8-113E29-1

1/27/00

REV.	DESCRIPTION	DRAWN	DATE
		APPD.	DATE
A	NAME/CONTROL CHANGES	WES MUELLER	8/14/98
B			
C			



- NOTES:
1. AMPLIFIER GAINS ARE NOMINAL.
 2. AMP REGULATOR BUS HAS ON/OFF CONTROL, HIGH/LOW VOLTAGE STATUS, AND HIGH/LOW CURRENT STATUS.

CABLE SCHEDULE			
NO.	CABLE NAME	CABLE NO.	SIZE
1	MUX SWITCH TO BRACKET	2-4CBH FWD INJ	1/2" Heliax
2	AMP REGULATOR TO PLC	A:CHAL21	10C/22GA
3	AMP REGULATOR TO PLC	A:CHAL22	10C/22GA
4	AMP OUT TO TRUNK		N/SMA adapter w/elbow
5	2-4 CBV LL TRUNK		1/2" HELIAX
6	+24V RAW SUPPLY TO PLC		4C/6GA
7	CBH INJ BRACKET TO COUPLER		0.141" Cu Hardline
8	TROMBONE READBACK	A:CHTL21 RDBK	4TPS/22Ga
9	TROMBONE CONTROL	A:CHTL21 PWR	2TPS/16Ga
10			

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
PARTS LIST			
UNLESS OTHERWISE SPECIFIED		ORIGINATOR	R.J. PASQUINELLI
FRACTIONS	DECIMALS	ANGLES	DRAWN
+/-	+/-	+/-	WESLEY MUELLER
		CHECKED	2/22/95
1. BREAK ALL SHARP EDGES 1/64 MAX.		APPROVED	
2. DO NOT SCALE DRAWING		USED ON	
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5 STD'S		MATERIAL-	
✓ MAX. ALL MACHINED SURFACES			

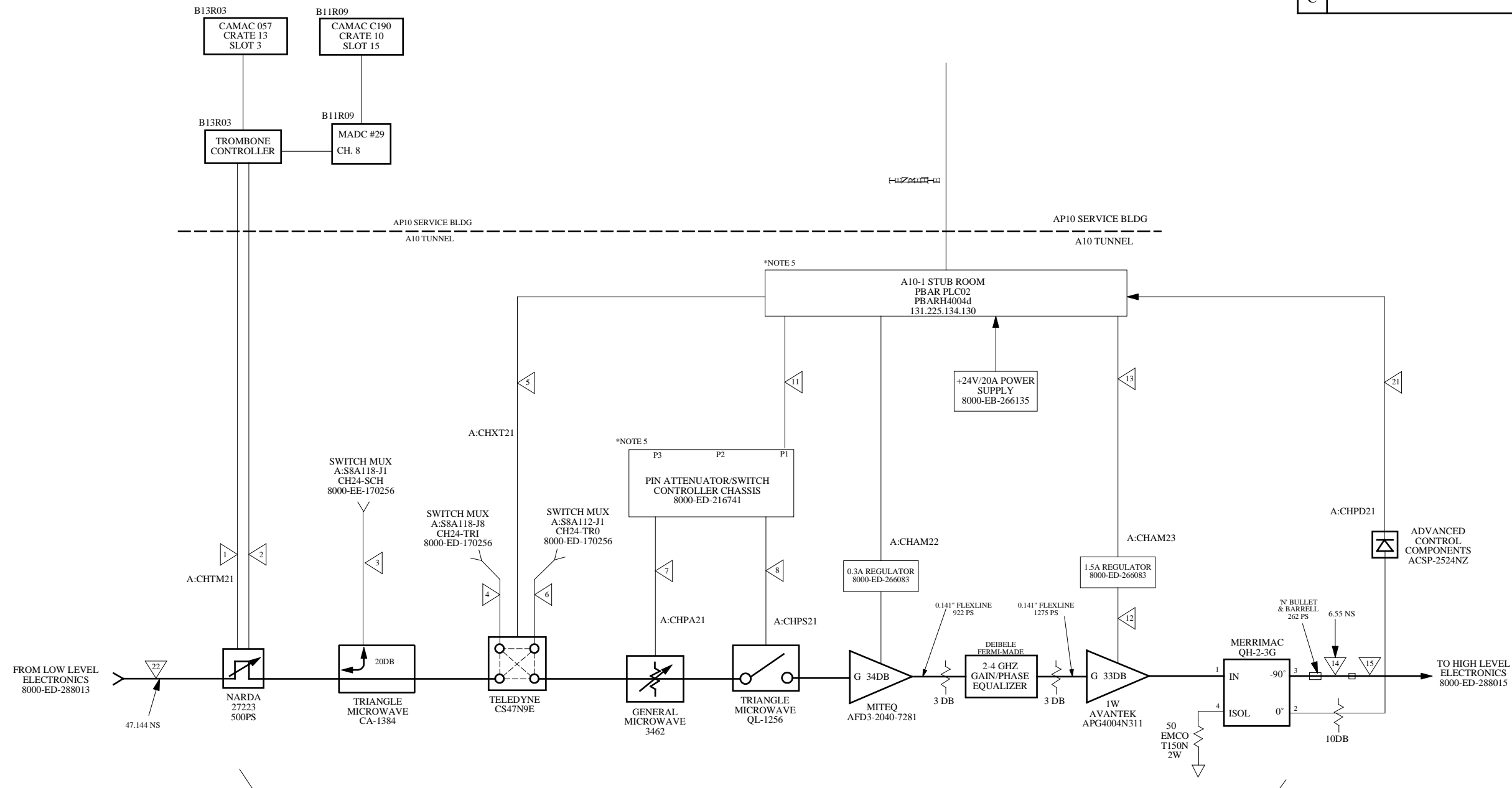
4/6/00

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

ANTI-PROTON SOURCE
CORE BETATRON HORIZONTAL (2-4 GHZ)
LOW LEVEL ELECTRONICS

SCALE	FILMED	DRAWING NUMBER	REV.
		8000-ED-288013	A

REV.	DESCRIPTION	DRAWN	DATE
		APPD.	DATE
A	GAIN/PHASE EQUALIZER ADDED	W.J. MUELLER	4/25/95
		W.J. MUELLER	4/25/95
B	NAME/CONTROL CHANGES	W.J. MUELLER	8/14/98
		W.J. MUELLER	
C			




COMPONENTS MOUNTED ON ALUMINUM PLATE
IN RELAY RACK IN 10-1 STUB ROOM
*PLATE COMMON WITH CORE VERTICAL

CABLE SCHEDULE			
NO.	CABLE NAME	CABLE NO.	SIZE
1	TROMBONE MOTOR - CH24	A:CHTM21 - PWR	2 TPS/16 AWG
2	TROMBONE READBACK - CH24	A:CHTM21 - RDBK	4 TPS/22 AWG
3	CH24 SCHOTTKY	CH24-SCH.S8A118-J1	1/4" HELIAX
4	A:CHXT21 TO SWITCH MUX	CH24-TRI.S8A118-J8	1/4" HELIAX
5	A:CHXT21 TO FROM PLC	A:CHXT21	6C/22AWG
6	A:CHXT21 FROM SWITCH MUX	CH24-TRO.S8A112-J1	1/4" HELIAX
7	A:CHPA21 TO FROM CHASSIS	A:CHPA21	15C RIBBON
8	A:CHPS21 TO FROM CHASSIS	A:CHPS21	6C/22AWG
9			15 TPS/22AWG
10			20C/22AWG
11	CHASSIS (P1) TO PLC	PLC TO ATT CHASSIS	48C/20AWG
12	AMP REG. TO A:CHAM23		RG108
13	AMP REG. TO FROM PLC	A:CHAM23	10C/22AWG
14	CH24 ML TRUNK JUMPER		1/2' SUPERFLEX
15	CH24 MED. TO HI TRUNK		7/8' HELIAX
16	RAW 24V TO TUNNEL PLC	24V TO 10-1 PLC	4C/12 AWG
17	CTL CRATE TO FROM PLC		48C/20AWG
18			
19			
20			
21	CH24 DIODE TO PLC	CH24 DIODE	RG58
22	CH24 LL TO ML TRUNK	LL TO ML TRUNK	1/2' SUPERFLEX
23			
24			
25			
26			

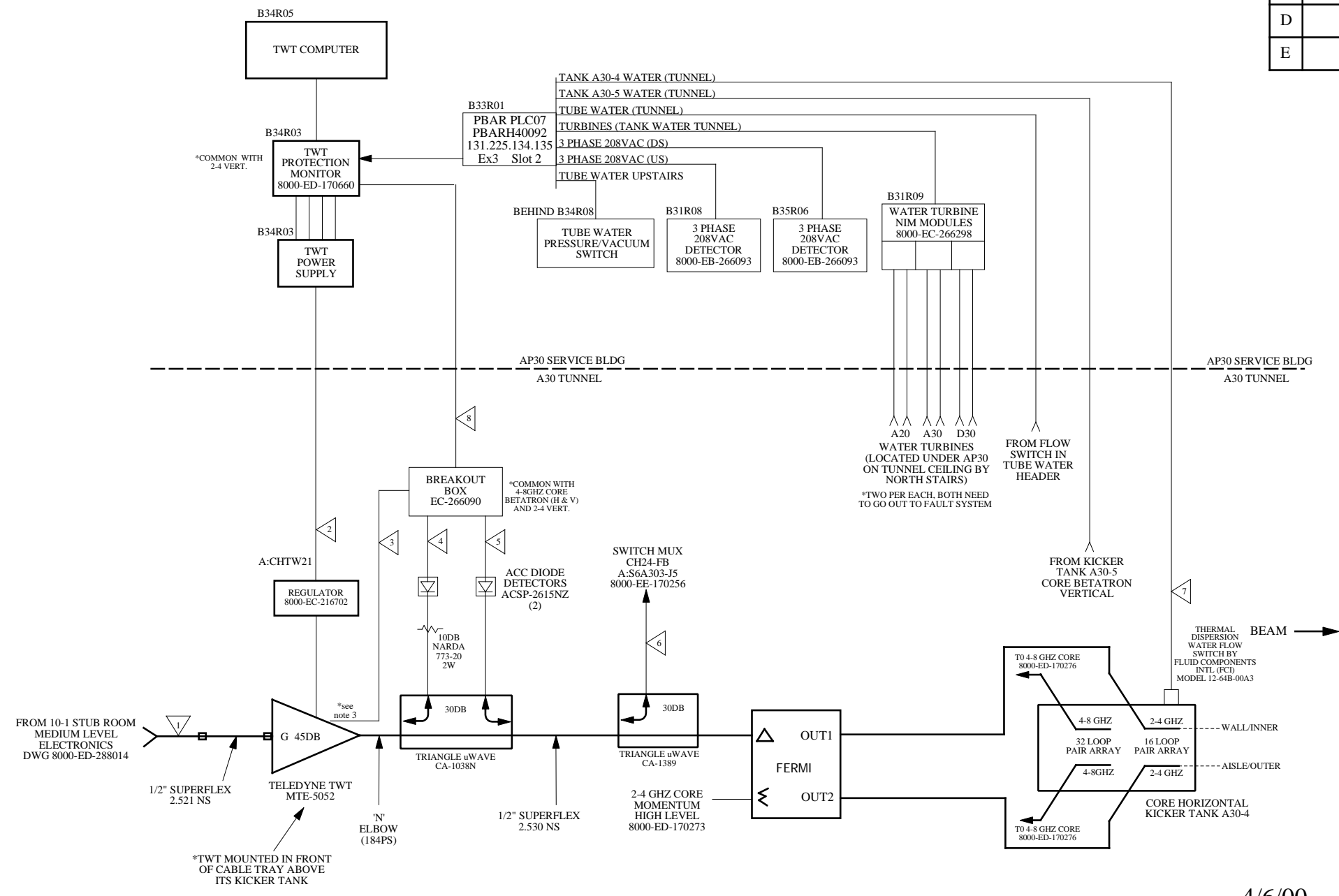
NOTES:

- AMPLIFIER GAINS ARE NOMINAL.
- AMP REGULATOR BUS HAS ON/OFF CONTROL, HIGH/LOW VOLTAGE STATUS, AND HIGH/LOW CURRENT STATUS.
- PIN ATTENUATOR BUS CONSISTS OF 8-BIT TTL DRIVER AND 8-BIT TTL READBACK.
- PIN SWITCH HAS ONE TTL ON/OFF BIT AND ONE TTL READBACK.
- COMMON WITH 2-4GHZ CORE VERTICAL.
-

9/26/00

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
PARTS LIST			
UNLESS OTHERWISE SPECIFIED		ORIGINATOR	R.J. PASQUINELLI
FRACTIONS	DECIMALS	ANGLES	DRAWN
+/-	+/-	+/-	WESLEY MUELLER
		CHECKED	
1. BREAK ALL SHARP EDGES 1/64 MAX.		APPROVED	
2. DO NOT SCALE DRAWING		USED ON	
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5 STD'S		MATERIAL-	
✓ MAX. ALL MACHINED SURFACES			
 FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY			
ANTI-PROTON SOURCE CORE BETATRON HORIZONTAL (2-4 GHZ) MEDIUM LEVEL ELECTRONICS			
SCALE	FILMED	DRAWING NUMBER	REV.
		8000-ED-288014	B

REV.	DESCRIPTION	DRAWN	DATE
		APPD.	DATE
A	FLIPPED KICKER HYBRID TO TANK	W.J. MUELLER	4/25/95
B	FLIPPED KICKER HYBRID TO TANK	W.J. MUELLER	4/25/95
C	REPLACED KICKER HYBRID WITH FERMI-MADE HYBRID	W.J. MUELLER	1/19/96
D	NAME/CONTROL CHANGES	W.J. MUELLER	8/2/96
E		W.J. MUELLER	8/14/98



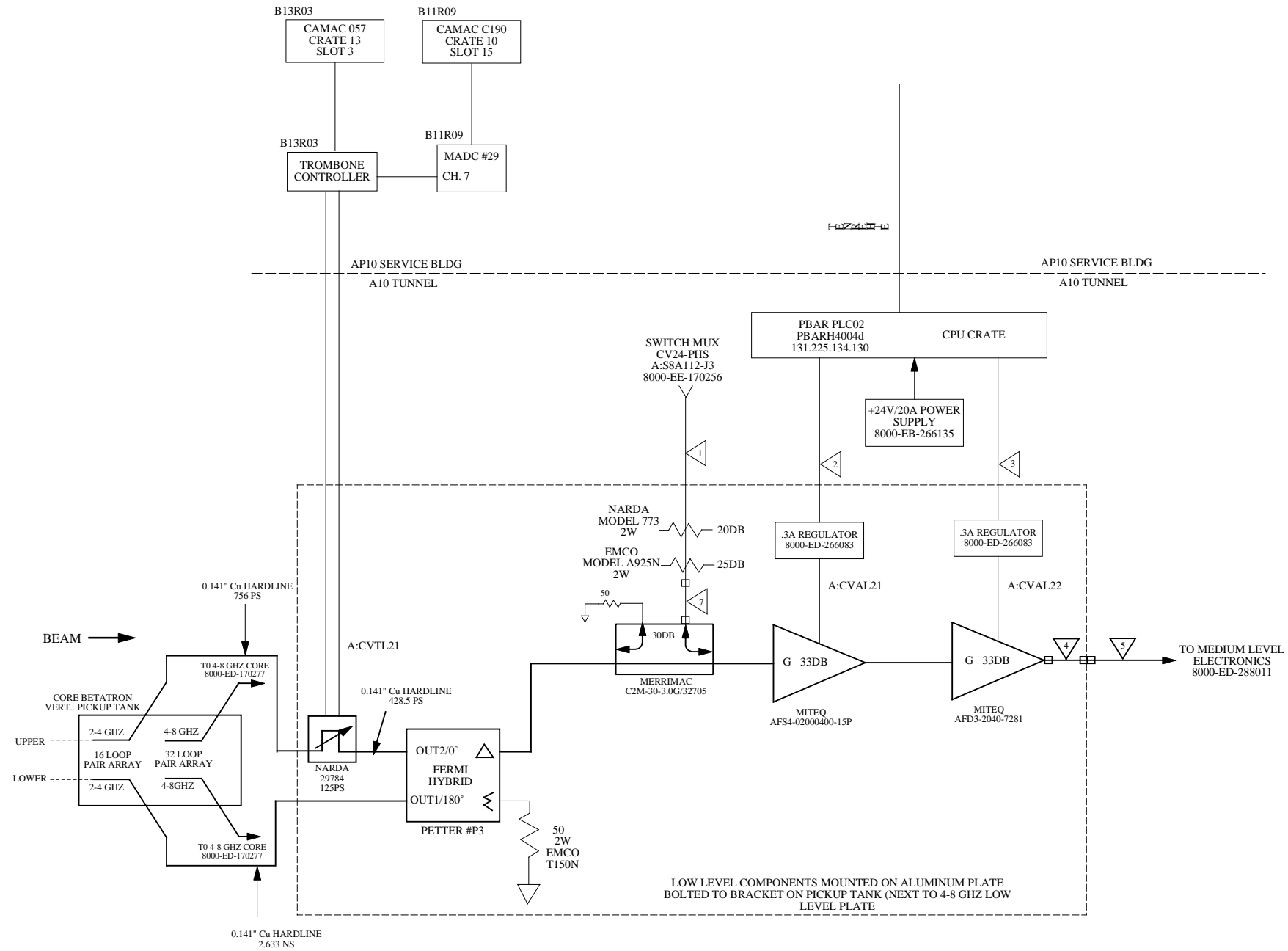
- NOTES:
1. AMPLIFIER GAINS ARE NOMINAL.
 2. AMP REGULATOR BUS HAS ON/OFF CONTROL, HIGH/LOW VOLTAGE STATUS, AND HIGH/LOW CURRENT STATUS.
 3. KLIXON MOUNTED ON TWT NEAR ITS OUTPUT. IT IS A NORMALLY CLOSED TEMPERATURE SWITCH SET TO OPEN AT 194° F. ELMWOOD SENSORS MODEL #3100-56-87L194.

CABLE SCHEDULE			
NO.	CABLE NAME	CABLE NO.	SIZE
1	2-4 GHZ CORE HORZ. TRUNK	CBH24 TRUNK	7/8" HELIAX
2	TWT PWR/RDBK CABLE	A-CHTW02	FERMI MADE ZIPPED
3	TWT KLIXON CABLE	A-CHTW02 TEMP	RG108 (TWINAX)
4	FORWARD DIODE CABLE	A-CHTW02 FWD	RG58
5	REVERSE DIODE CABLE	A-CHTW02 REV	RG58
6	FANBACK CABLE	CH24 FBS	STRIPLEX
7	A30-4 TANK FLOW SWITCH	WF A30-4	6 TPS/22Ga
8	DIODE BOX TO TWTPM	CB24 DIODES	
9			
10			

4/6/00

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
PARTS LIST			
UNLESS OTHERWISE SPECIFIED		ORIGINATOR	R.J. PASQUINELLI
FRACTIONS	DECIMALS	ANGLES	DRAWN
+/-	+/-	+/-	WESLEY MUELLER
		CHECKED	2/27/95
1. BREAK ALL SHARP EDGES 1/64 MAX.		APPROVED	
2. DO NOT SCALE DRAWING		USED ON	
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5 STD'S		MATERIAL-	
✓ MAX. ALL MACHINED SURFACES			
FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY			
ANTI-PROTON SOURCE CORE BETATRON HORIZONTAL (2-4 GHZ) HIGH LEVEL ELECTRONICS			
SCALE	FILMED	DRAWING NUMBER	REV.
		8000-ED-288015	D

REV.	DESCRIPTION	DRAWN	DATE
		APPD.	DATE
A	NAME/ CONTROL CHANGES	WES MUELLER	8/14/98
B		WES MUELLER	
C			



- NOTES:**
- AMPLIFIER GAINS ARE NOMINAL.
 - AMP REGULATOR BUS HAS ON/OFF CONTROL, HIGH/LOW VOLTAGE STATUS, AND HIGH/LOW CURRENT STATUS.

CABLE SCHEDULE			
NO.	CABLE NAME	CABLE NO.	SIZE
1	MUX SWITCH TO BRACKET	2-4CBV FWD INJ	1/2" Heliax
2	AMP REGULATOR TO PLC	A:CVAL21	10C/22GA
3	AMP REGULATOR TO PLC	A:CVAL22	10C/22GA
4	AMP OUT TO TRUNK		N/SMA adapter w/elbow
5	2-4 CBV I.L. TRUNK		12" Heliax
6	+24V RAW SUPPLY TO PLC		4C/6GA
7	24CBV INJ bracket to coupler		0.141" Cu Hardline
8	TROMBONE READBACK	A:CVTL21 RDBK	4TPS/22Ga
9	TROMBONE CONTROL	A:CVTL21 PWR	2TPS/16Ga
10			

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
PARTS LIST			
UNLESS OTHERWISE SPECIFIED		ORIGINATOR	R.J. PASQUINELLI
FRACTIONS	DECIMALS	ANGLES	DRAWN
+/-	+/-	+/-	WESLEY MUELLER
		CHECKED	2/22/95
1. BREAK ALL SHARP EDGES 1/64 MAX.		APPROVED	
2. DO NOT SCALE DRAWING		USED ON	
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5 STD'S		MATERIAL-	
✓ MAX. ALL MACHINED SURFACES			

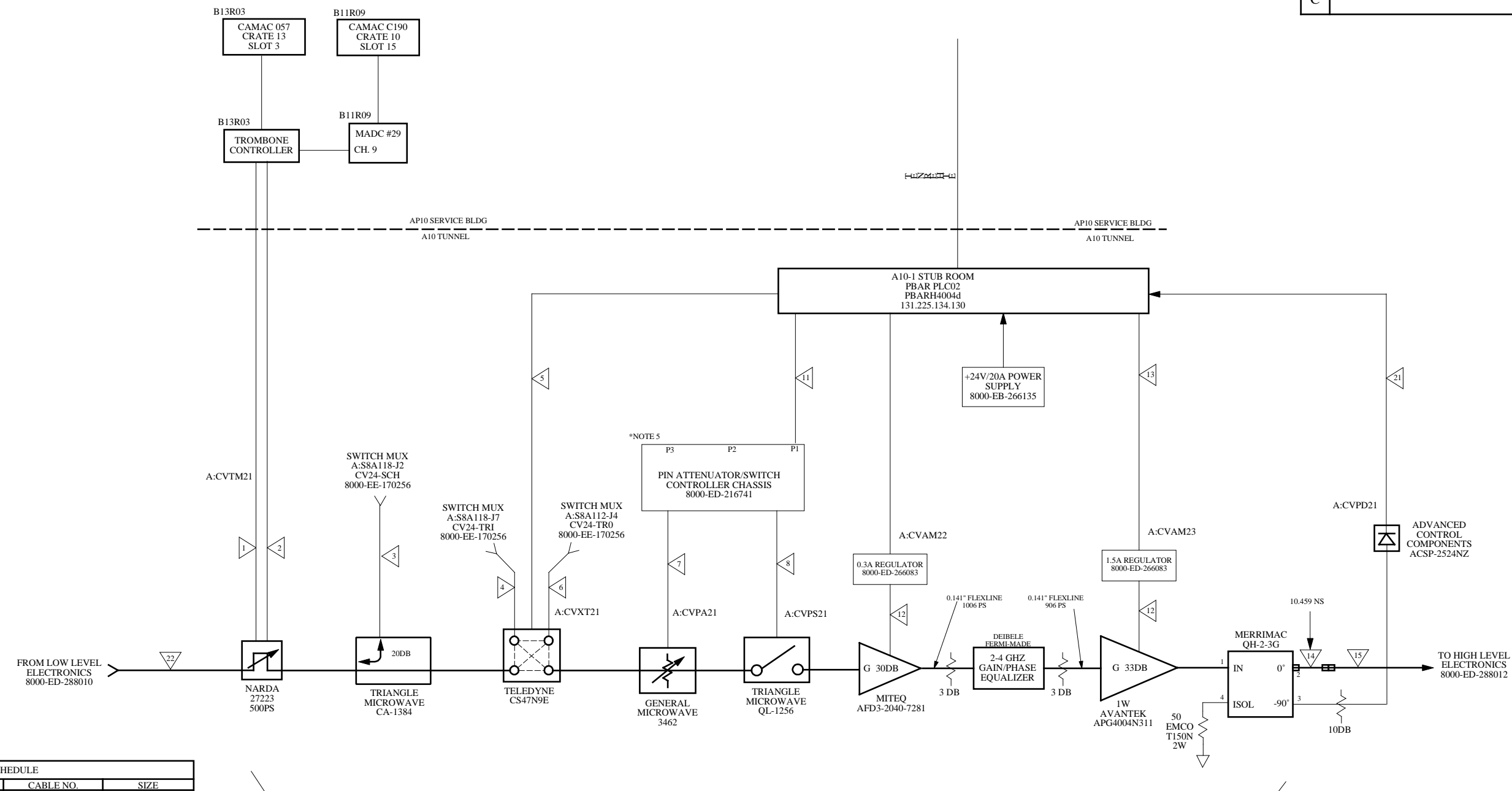
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

ANTI-PROTON SOURCE
CORE BETATRON VERTICAL (2-4 GHZ)
LOW LEVEL ELECTRONICS

SCALE	FILMED	DRAWING NUMBER	REV.
		8000-ED-288010	A

4/6/00

REV.	DESCRIPTION	DRAWN	DATE
		APPD.	DATE
A	GAIN/PHASE EQUALIZER ADDED	W.J. MUELLER	4/25/95
B	NAME/CONTROL CHANGES	W.J. MUELLER	8/14/98
C		W.J. MUELLER	



CABLE SCHEDULE			
NO.	CABLE NAME	CABLE NO.	SIZE
1	TROMBONE MOTOR - CV24	A:CVTM21 - PWR	2 TPS/16 AWG
2	TROMBONE READBACK - CV24	A:CVTM21 - RDBK	4 TPS/22 AWG
3	CV24 SCHOTTKY	CV24-SCH,S8A118-J2	1/4" HELIAX
4	A:CVXT21 TO SWITCH MUX	CV24-TRI,S8A118-J7	1/4" HELIAX
5	A:CVXT21 TO FROM PLC	A:CVXT21	6C/22AWG
6	A:CVXT21 FROM SWITCH MUX	CV2-TRO,S8A112-J4	1/4" HELIAX
7	A:CVPA21 TO FROM CHASSIS	A:CVPA21	15C RIBBON
8	A:CVPS21 TO FROM CHASSIS	A:CVPS21	6C/22AWG
9			15 TPS/22AWG
10			20C/22AWG
11	CHASSIS (P1) TO PLC	CB2 CTL-P1	48C/20AWG
12	AMP REG. TO A:CVAM23		RG108
13	AMP REG. TO FROM PLC	A:CVAM23	10C/22AWG
14	CV24 ML TRUNK JUMPER		1/2" SUPERFLEX
15	CV24 MED. TO HI TRUNK		7/8" HELIAX
16	RAW 24V TO TUNNEL PLC	24V TO 10-1 PLC	4C/12 AWG
17			
18	B13R02 PANEL TO MADC B14R03	A:CVPD21	RG108
19	B13R02 PANEL TO MADC B14R03	A:CVPL21	RG108
20	B13R02 PANEL TO CAMAC 053	CV24 DAC	10C/22AWG
21	CV24 ML DIODE TO PIN CHASSIS	CV24 DIODE	RG58
22	CV24 LL TO ML TRUNK	CV24 LL-ML TRUNK	1/2" SUPERFLEX
23			
24			
25			
26			

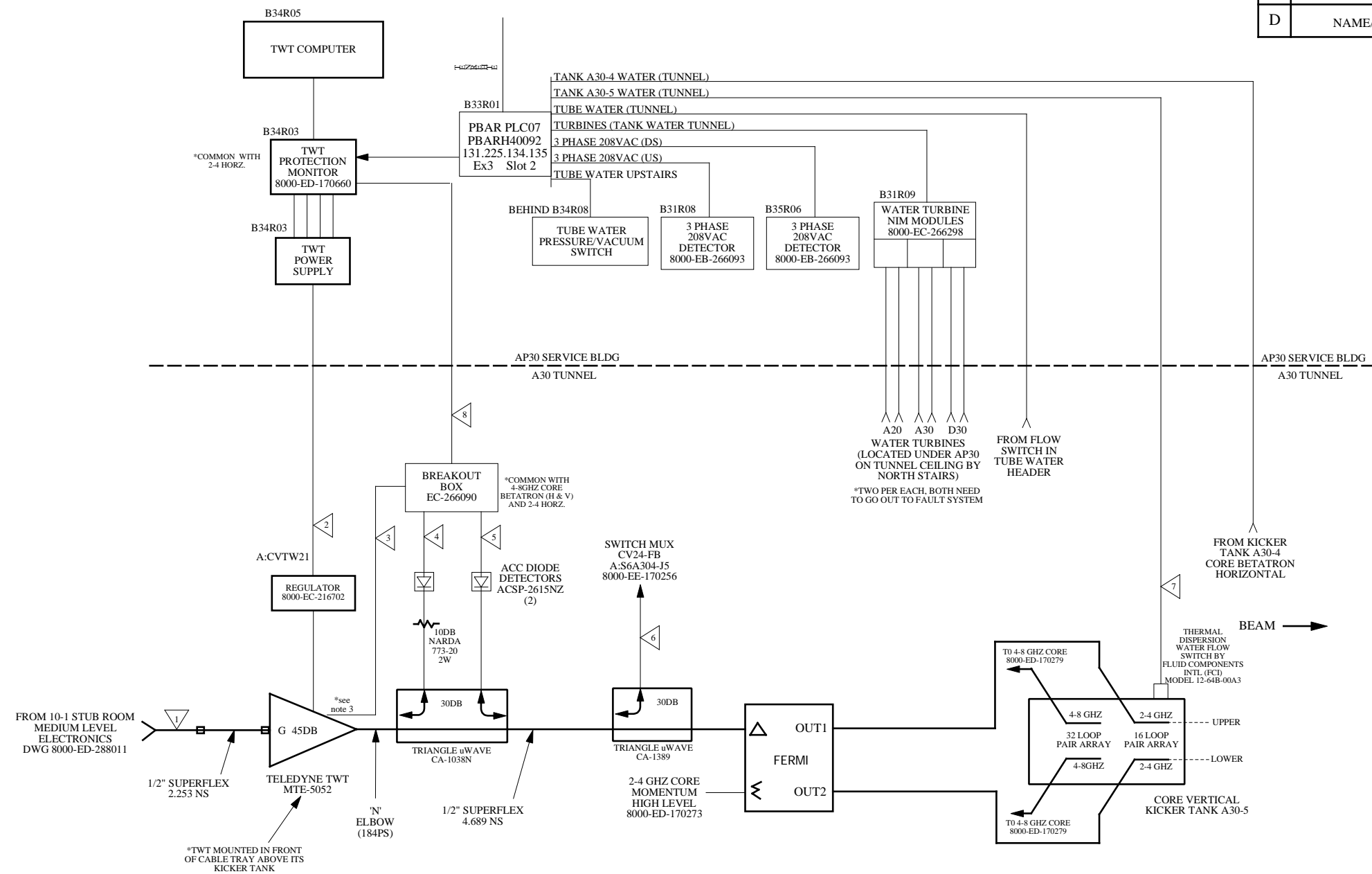
COMPONENTS MOUNTED ON ALUMINUM PLATE
IN RELAY RACK IN 10-1 STUB ROOM
*PLATE COMMON WITH CORE HORIZONTAL

- NOTES:
- AMPLIFIER GAINS ARE NOMINAL.
 - AMP REGULATOR BUS HAS ON/OFF CONTROL, HIGH/LOW VOLTAGE STATUS, AND HIGH/LOW CURRENT STATUS.
 - PIN ATTENUATOR BUS CONSISTS OF 8-BIT TTL DRIVER AND 8-BIT TTL READBACK.
 - PIN SWITCH HAS ONE TTL ON/OFF BIT AND ONE TTL READBACK.
 - COMMON WITH 2-4GHZ CORE VERTICAL.
 -

9/26/00

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
PARTS LIST			
UNLESS OTHERWISE SPECIFIED		ORIGINATOR	R.J. PASQUINELLI
FRACTIONS	DECIMALS	ANGLES	DRAWN
+/-	+/-	+/-	WESLEY MUELLER
			CHECKED
1. BREAK ALL SHARP EDGES 1/64 MAX.		APPROVED	
2. DO NOT SCALE DRAWING		USED ON	
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5 STD'S		MATERIAL-	
✓ MAX. ALL MACHINED SURFACES			
 FERMIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY			
ANTI-PROTON SOURCE CORE BETATRON VERTICAL (2-4 GHz) MEDIUM LEVEL ELECTRONICS			
SCALE	FILMED	DRAWING NUMBER	REV.
		8000-ED-288011	B

REV.	DESCRIPTION	DRAWN	DATE
		APPD.	DATE
A	FLIPPED KICKER HYBRID TO TANK	W.J. MUELLER	4/25/95
B	FLIPPED KICKER HYBRID TO TANK	W.J. MUELLER	4/25/95
		W.J. MUELLER	1/19/96
C	REPLACED KICKER HYBRID WITH FERMI-MADE HYBRID	W.J. MUELLER	1/19/96
		W.J. MUELLER	8/2/96
D	NAME/CONTROL CHANGES	W.J. MUELLER	8/14/98
		W.J. MUELLER	



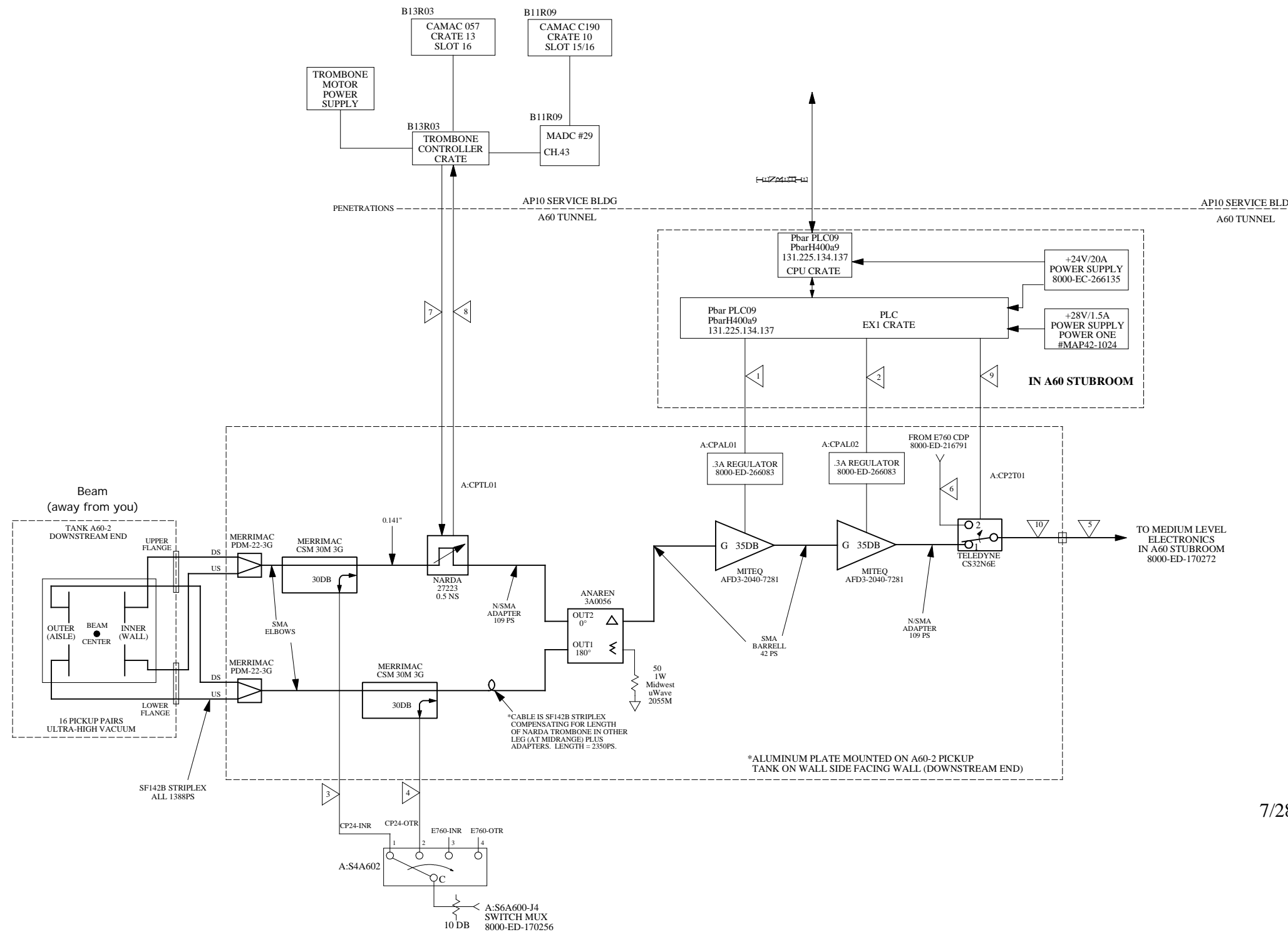
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- NOTES:**
- AMPLIFIER GAINS ARE NOMINAL.
 - AMP REGULATOR BUS HAS ON/OFF CONTROL, HIGH/LOW VOLTAGE STATUS, AND HIGH/LOW CURRENT STATUS.
 - KLIXON MOUNTED ON TWT NEAR ITS OUTPUT. IT IS A NORMALLY CLOSED TEMPERATURE SWITCH SET TO OPEN AT 194° F. ELMWOOD SENSORS MODEL #3100-56-87L194.

CABLE SCHEDULE			
NO.	CABLE NAME	CABLE NO.	SIZE
1	2-4 GHZ CORE VERT. TRUNK	CBV24 TRUNK	7/8" HELIAX
2	TWT PWR/RDBK CABLE	A-CVPE21	FERMI MADE ZIPPED
3	TWT KLIXON CABLE	A-CVPE21 TEMP	RG108 (TWINAX)
4	FORWARD DIODE CABLE	A-CVPE21 FWD	RG58
5	REVERSE DIODE CABLE	A-CVPE21 REV	RG58
6	FANBACK CABLE	CV24 FBS	STRIPLEX
7	A30-5 TANK FLOW SWITCH	WF A30-4	RG58
8	DIODE BOX TO TWTPM	CB24 DIODES	6 TPS/22Ga
9			
10			

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
PARTS LIST			
UNLESS OTHERWISE SPECIFIED		ORIGINATOR	R.J. PASQUINELLI
FRACTIONS	DECIMALS	ANGLES	DRAWN
+/-	+/-	+/-	WESLEY MUELLER
			3/10/95
		CHECKED	
		APPROVED	
		USED ON	
		MATERIAL-	
1. BREAK ALL SHARP EDGES 1/64 MAX. 2. DO NOT SCALE DRAWING 3. DIMENSIONING IN ACCORD WITH ANSI Y14.5 STD'S <input checked="" type="checkbox"/> MAX. ALL MACHINED SURFACES			
FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY			
ANTI-PROTON SOURCE CORE BETATRON VERTICAL (2-4 GHZ) HIGH LEVEL ELECTRONICS			
SCALE	FILMED	DRAWING NUMBER	REV.
		8000-ED-288012	D

REV.	DESCRIPTION	DRAWN	DATE
		APPD.	DATE
A	REDRAWN AND REVISED	G.A. JOHNSON W.J. MUELLER	11/13/90 11/28/90
B	ADDED PIN SYNC CHASSIS	G.A. JOHNSON W.J. MUELLER	3/21/91 3/25/91
C	REMOVED FWD INJ. MANUAL TROMBONES & CORRECTED MUX SWITCH POSITIONS	G.A. JOHNSON W.J. MUELLER	7/20/94 7/25/94
D	NAME & CONTROL CHANGES	W.J. MUELLER W.J. MUELLER	
E			



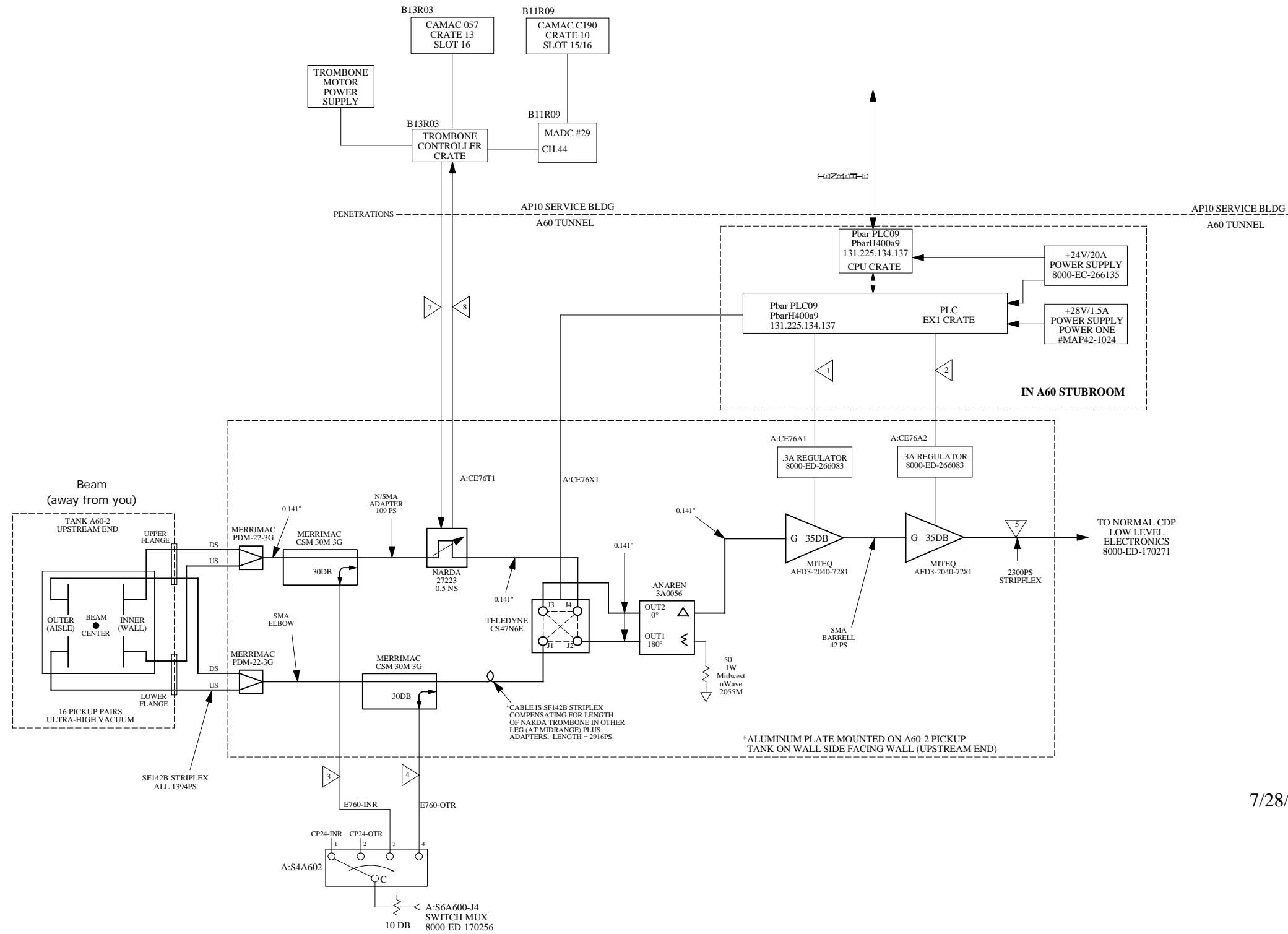
- NOTES:
1. AMPLIFIER GAINS ARE NOMINAL.
 2. AMP REGULATOR BUS HAS ON/OFF CONTROL, HIGH/LOW VOLTAGE STATUS, AND HIGH/LOW CURRENT STATUS.
 3. BOLD LINES INDICATE MAIN SIGNAL PATH
 - 4.

CABLE SCHEDULE			
NO.	CABLE NAME	CABLE NO.	SIZE
1	PLC TO REGULATOR	CPAL01	22GA/10C
2	PLC TO REGULATOR	CPAL02	22GA/10C
3	PHASE FWD (UPSTREAM)	S4A602-1	STRIPLEX, 2989PS
4	PHASE FWD (DOWNSTREAM)	S4A602-2	STRIPLEX, 2989PS
5	LL TO ML, TO STUBROOM	CPLMRF	1/2" HELIAX
6	E760 LL OUT TO NORMAL CP LL	E760 LL TO SWITCH	SF142B STRIPLEX
7	TROMBONE DRIVE	CPTL01 PWR	16GA/2 TPS
8	TROMBONE READBACK	CPTL01 RDBK	22GA/4 TPS
9	2 THROW SWITCH TO PLC	CP2T01	22GA/6C
10	SW TO PLATE OUT CON. FLANGE		0.141" Cu HARDLINE
11			
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19			
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7/28/99

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
PARTS LIST			
UNLESS OTHERWISE SPECIFIED		ORIGINATOR	R.J. PASQUINELLI 7/29/90
FRACTIONS	DECIMALS	ANGLES	DRAWN WESLEY MUELLER 9/26/96
+/-	+/-	+/-	CHECKED
1. BREAK ALL SHARP EDGES 1/64 MAX.		APPROVED	
2. DO NOT SCALE DRAWING		USED ON	
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5 STD'S		MATERIAL-	
✓ MAX. ALL MACHINED SURFACES			
FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY			
ANTI-PROTON SOURCE CORE MOMENTUM SYSTEM (2-4 GHZ) LOW LEVEL ELECTRONICS			
SCALE	FILMED	DRAWING NUMBER	REV.
		8000-ED-170271	D

REV.	DESCRIPTION	DRAWN	DATE
		APPD.	DATE
A	REDRAWN AND REVISED	G.A. JOHNSON W.J. MUELLER	11/12/90 11/28/90
B	ADDED PIN SYNC CHASSIS	G.A. JOHNSON W.J. MUELLER	3/21/91 3/25/91
C	REMOVALS/CHANGES	W.J. MUELLER	
D	LINE CHANGES/CORRECTIONS	W.J. MUELLER W.J. MUELLER	4/2/99
E			



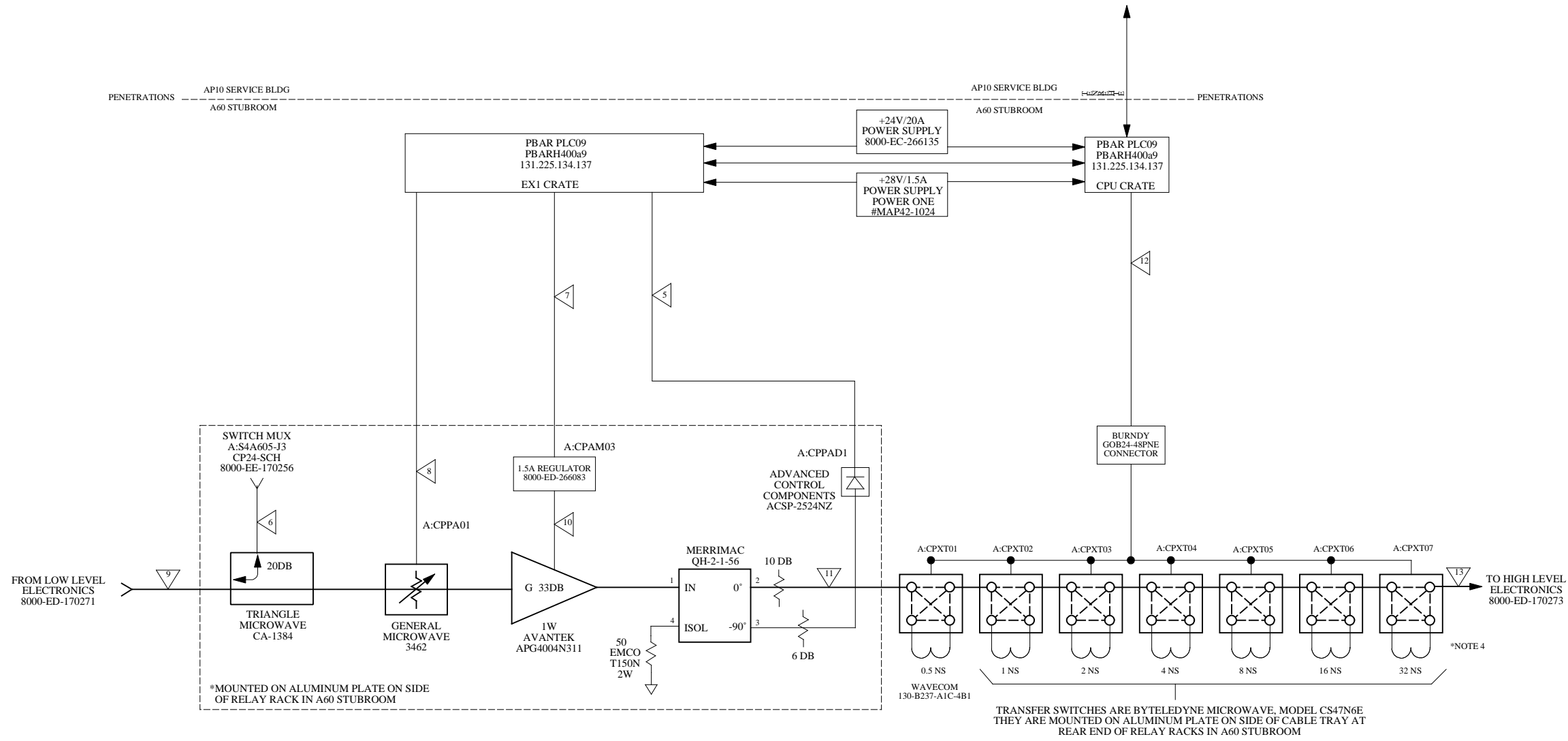
- NOTES:
1. AMPLIFIER GAINS ARE NOMINAL.
 2. AMP REGULATOR BUS HAS ON/OFF CONTROL, HIGH/LOW VOLTAGE STATUS, AND HIGH/LOW CURRENT STATUS.
 3. BOLD LINES INDICATE MAIN SIGNAL PATH
 - 4.

CABLE SCHEDULE			
NO.	CABLE NAME	CABLE NO.	SIZE
1	PLC TO REGULATOR	CE76A1	22GA/10C
2	PLC TO REGULATOR	CE76A2	22GA/10C
3	PHASE FWD (UPSTREAM)	S4A602-3	STRIPFLEX, 5276PS
4	PHASE FWD (DOWNSTREAM)	S4A602-4	STRIPFLEX, 5333PS
5	E760 LL TO NORMAL CDP LL	CP2T01-J2	STRIPFLEX, 2300PS
6			
7	TROMBONE DRIVE	CE76T1 PWR	16GA/2 TPS
8	TROMBONE READBCK	CE76T1 RDBK	22GA/4 TPS
9			
10			
11			
12			
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14			
15			
16			
17			
18			
19			
20			

7/28/99

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
PARTS LIST			
UNLESS OTHERWISE SPECIFIED		ORIGINATOR	R.J. PASQUINELLI
		DATE	7/29/90
FRACTIONS	DECIMALS	ANGLES	DRAWN
+/-	+/-	+/-	WESLEY MUELLER
		CHECKED	
1. BREAK ALL SHARP EDGES 1/64 MAX.		APPROVED	
2. DO NOT SCALE DRAWING		USED ON	
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5 STD'S		MATERIAL-	
✓ MAX. ALL MACHINED SURFACES			
FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY			
ANTI-PROTON SOURCE E760 CORE MOMENTUM SYSTEM (2-4 GHZ) LOW LEVEL ELECTRONICS			
SCALE	FILMED	DRAWING NUMBER	REV.
		8000-ED-216791	D

REV.	DESCRIPTION	DRAWN	DATE
		APPD.	DATE
B	REDRAWN, 24V RAW SUPPLY MOVED UPSTAIRS, NEW AMP. REG. DWG. #	G.A. JOHNSON	11/08/90
		W.J. MUELLER	11/28/90
C	PIN SYNC CHASSIS ADDED	T.P.S.	3/15/91
		W.J. MUELLER	3/22/91
D	PIN ATT. LIMIT & DIODE ADDITIONS	G.A. JOHNSON	11/5/92
		W.J. MUELLER	
E	NAME & CONTROL CHANGES	W.J. MUELLER	
F	DIODE PAD REDUCED FROM 10DB TO 6 DB	W.J. MUELLER	4/27/00



NOTES:

- AMPLIFIER GAINS ARE NOMINAL.
- AMP REGULATOR BUS HAS ON/OFF CONTROL, HIGH/LOW VOLTAGE STATUS, AND HIGH/LOW CURRENT STATUS.
- PIN ATTENUATOR BUS CONSISTS OF 8-BIT TTL DRIVER AND 8-BIT TTL READBACK.
- 1 NS, 2 NS, 4 NS, AND 8 NS DELAY CABLES ON TRANSFER SWITCHES ARE SF142B STRIPLEX. 16 NS, 32 NS, AND 64 NS CABLES ARE 1/2" HELIAX.
- BOLD LINES INDICATE MAIN RF SIGNAL PATH
-

CABLE SCHEDULE			
NO.	CABLE NAME	CABLE NO.	SIZE
1			
2			
3			
4			
5	DETECTOR TO PLC	CPDET1	RG58
6	SCHOTTKY SCAN	S4A605-J3	SF142B STRIPLEX
7	AMP REGULATOR TO PLC	CPAW01 REG.	22GA/10C
8	PIN ATT. TO PLC	CPPA1	25C RIBBON
9	LOW TO MEDIUM TRUNK	CP TRUNK	7/8" FOAM HELIAX
10	AMP REGULATOR TO AMP	CPAW01 AMP.	RG108
11	HYBRID TO DELAY SW. PLATE	HYB-SW TRUNK	1/2" FOAM HELIAX
12	DELAY SWITCHES TO PLC	DELAY SWITCHES	20GA/48C
13	MEDIUM TO HIGH LEVEL TRUNK	CP LO-MED TRNK	1/2" HELIAX
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
PARTS LIST			
UNLESS OTHERWISE SPECIFIED		ORIGINATOR	R.J. PASQUINELLI
FRACTIONS	DECIMALS	ANGLES	DRAWN
+/-	+/-	+/-	WESLEY MUELLER
		CHECKED	
1. BREAK ALL SHARP EDGES 1/64 MAX.		APPROVED	
2. DO NOT SCALE DRAWING		USED ON	
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5 STD'S		MATERIAL-	
✓ MAX. ALL MACHINED SURFACES			

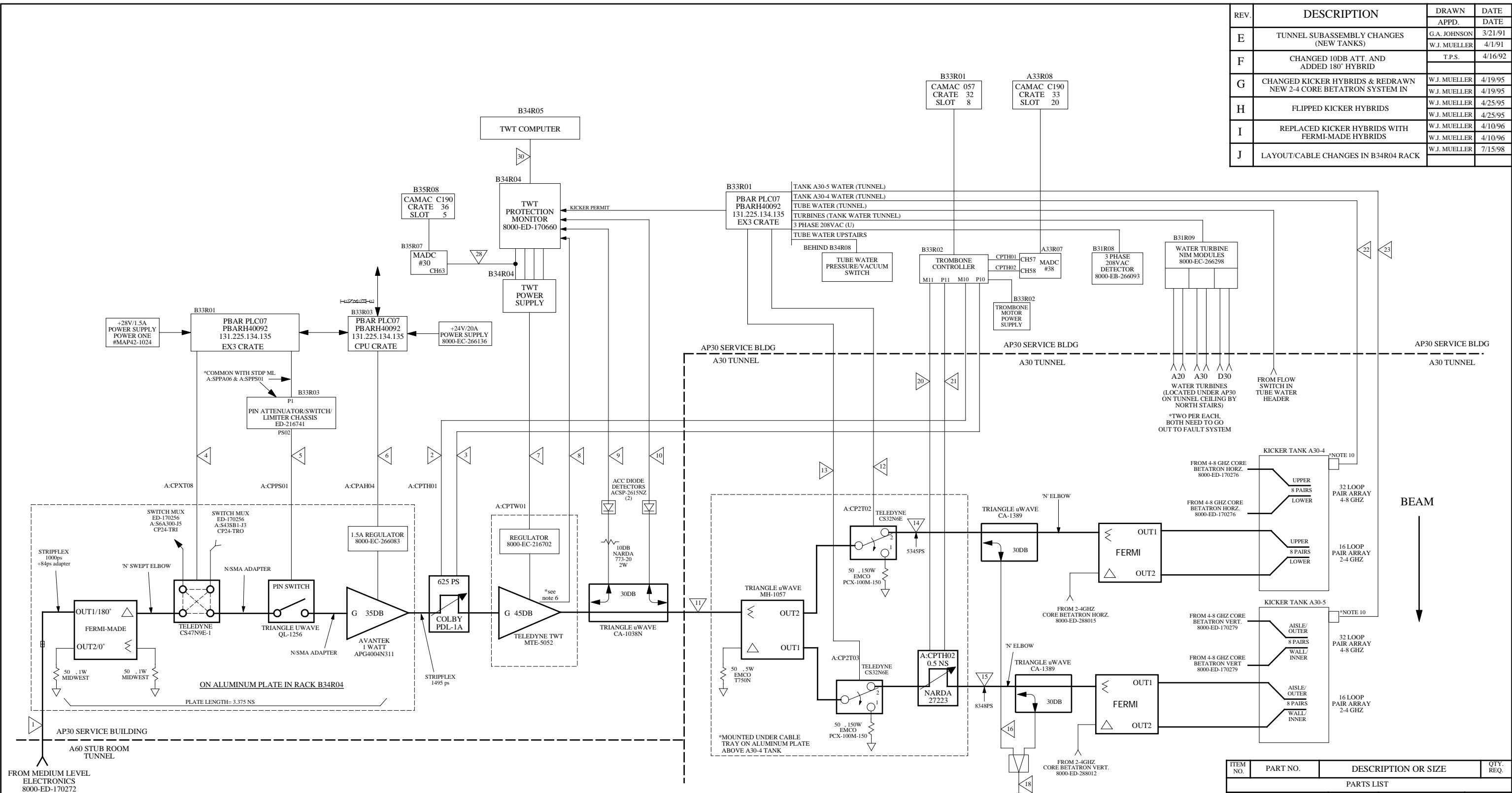
4/27/00

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

**ANTI-PROTON SOURCE
CORE MOMENTUM SYSTEM (2-4 GHz)
MEDIUM LEVEL ELECTRONICS**

SCALE	FILMED	DRAWING NUMBER	REV.
		8000-ED-170272	F

REV.	DESCRIPTION	DRAWN	DATE
		APPD.	DATE
E	TUNNEL SUBASSEMBLY CHANGES (NEW TANKS)	G.A. JOHNSON	3/21/91
		W.J. MUELLER	4/1/91
F	CHANGED 10DB ATT. AND ADDED 180° HYBRID	T.P.S.	4/16/92
G	CHANGED KICKER HYBRIDS & REDRAWN NEW 2-4 CORE BETATRON SYSTEM IN	W.J. MUELLER	4/19/95
		W.J. MUELLER	4/19/95
H	FLIPPED KICKER HYBRIDS	W.J. MUELLER	4/25/95
		W.J. MUELLER	4/25/95
I	REPLACED KICKER HYBRIDS WITH FERMI-MADE HYBRIDS	W.J. MUELLER	4/10/96
		W.J. MUELLER	4/10/96
J	LAYOUT/CABLE CHANGES IN B34R04 RACK	W.J. MUELLER	7/15/98



NO.	CABLE NAME	CABLE NO.	SIZE
1	CORE MOM. TRUNK ML-HL	CORE MOM. TRUNK	7/8" HELIAX
2	CPTH01 TROMBONE CONTROL	A:CPTH01 PWR	16 GA/2TPS
3	CPTH01 TROMBONE READBACK	A:CPTH01 RDBK	22 GA/4TPS
4	TRANSFER SW. CNTL/STATUS	A:CPXT08	22 GA/6C
5	PIN SWITCH CNTL/STATUS	A:CPPS01	22 GA/6C
6	1W AMP CNTL/STATUS	A:CPAH04	22 GA/10C
7	TWT CONTROL/STATUS	A:CPTW01	ZIP TUBE/12C
8	TWT KLIXON	A:CPTW01 TEMP	RG108
9	TWT FORWARD DIODE	A:CPTW01 FWD	RG58
10	TWT REVERSE DIODE	A:CPTW01 REV	RG58
11	CORE MOM. TRUNK SB-TUNNEL	CORE TWT FO	7/8" HELIAX
12	SPDT TO TANK 4	A:CP2T02	22 GA/6C
13	FANOUT TO TANK 4	A:CP2T02	22 GA/6C
14	FANOUT TO TANK 5	A30-4B FO (HORZ)	1/2" HELIAX
15	FANOUT TO TANK 5	A30-5B FO (VERT)	1/2" HELIAX
16	FANBACK FROM TANK 4	A30-4B FB (HORZ)	1/4" HELIAX
17	FANBACK FROM TANK 4	A30-4B FB (HORZ)	1/4" HELIAX
18	FANBACK SUM TO SW. MUX	CORE MOM FBS	1/4" HELIAX
19			
20	CPTH01 TROMBONE CONTROL	A:CPTH02 PWR	16 GA/2 TPS
21	CPTH01 TROMBONE READBACK	A:CPTH02 RDBK	22 GA/4 TPS
22	A30-4 TANK FLOW TO PERMIT	FLOW A30-4	22 GA/6C

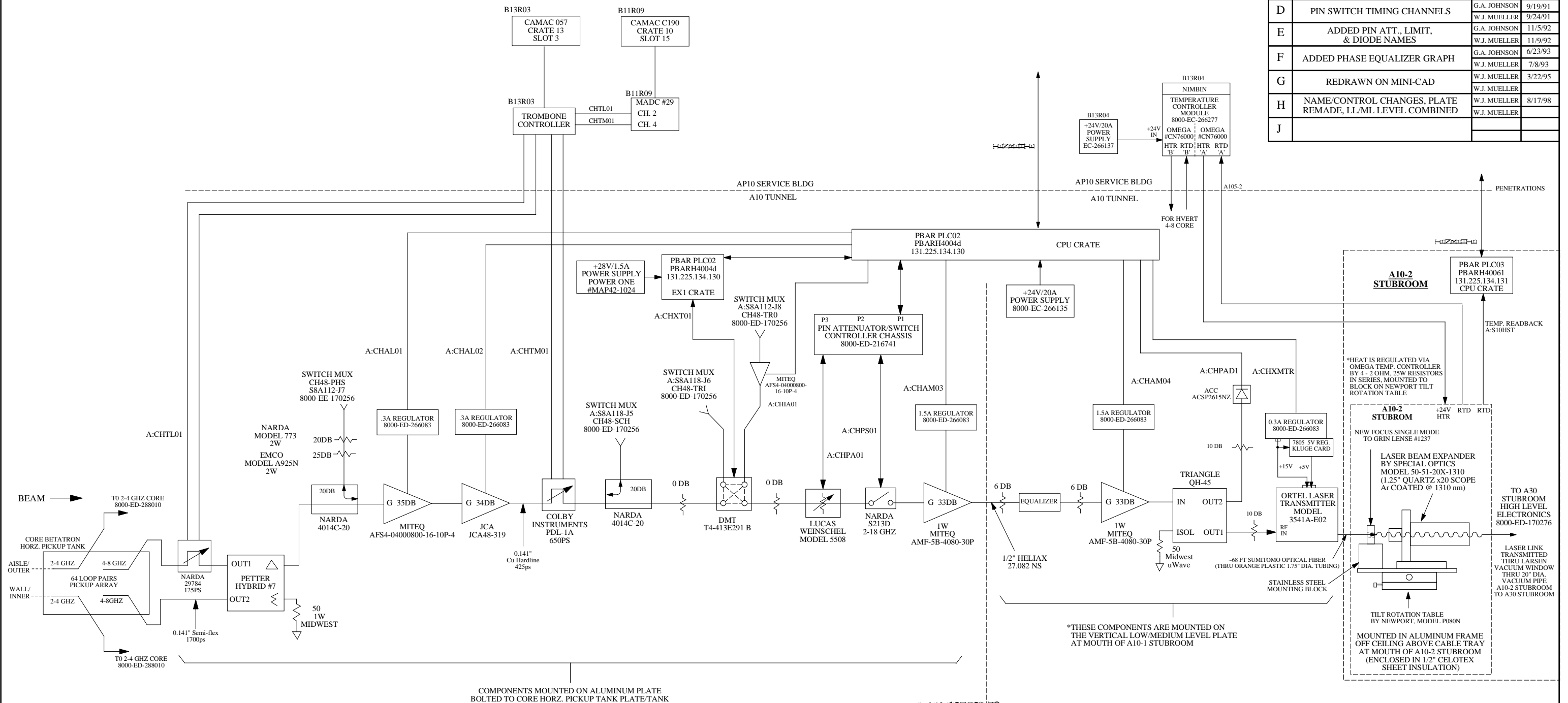
NO.	CABLE NAME	CABLE NO.	SIZE
23	A30-5 TANK FLOW TO PERMIT	FLOW A30-5	22 GA/4C
24			
25			
26	24V RAW SUPPLY TO PLC	VSA30SB	10 GA/2C
27			
28	TWT HELIX MON. TO MADC #30	A:CPTW01 HV	RG58
29			
30	TPM TO PROTECTION MONITOR	CPUPPMO1	30 PAIR RIBBON
31			
32			
33			
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42			
43			
44			

- NOTES:**
- AMPLIFIER GAINS ARE NOMINAL.
 - AMP REGULATOR BUS HAS ON/OFF CONTROL, HIGH/LOW VOLTAGE STATUS, AND HIGH/LOW CURRENT STATUS.
 - PIN SWITCH BUS HAS: ONE TTL ON/OFF BIT AND ONE TTL STATUS BIT.
 - TROMBONE LINE BUS HAS: MOTOR CONTROL LINES, LIMIT SWITCH LINES, AND POSITION READBACK LINES.
 - BOLD LINES INDICATE MAIN RF SIGNAL PATH.
 - KLIXON MOUNTED ON TWT NEAR ITS OUTPUT. IT IS A NORMALLY CLOSED TEMPERATURE SWITCH SET TO OPEN AT 194° F. ELMWOOD SENSORS MODEL #3100-56-87L194.
 - TWT POWER SUPPLY TO PROTECTION MONITOR BUS HAS: 9 STATUS SIGNALS FROM POWER SUPPLY TO MONITOR AND 3 CONTROL SIGNALS FROM MONITOR TO POWER SUPPLY.
 - SEE DRAWING 8000-EC-216369 FOR TROMBONE WIRING.
 - SCHOTTKY DIODE DETECTORS ARE BY ADVANCED CONTROL COMPONENTS MODEL ACSP-2524NZ.
 - THERMAL DISPERSION WATER FLOW SWITCHES BY FLUID COMPONENTS INTL. (FCI), MODEL 12-64B-00A3.
 -

10/11/99

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
PARTS LIST			
UNLESS OTHERWISE SPECIFIED		ORIGINATOR	R.J. PASQUINELLI
FRACTIONS	DECIMALS	ANGLES	DRAWN
+/-	+/-	+/-	WESLEY MUELLER
			4/19/95
1. BREAK ALL SHARP EDGES 1/64 MAX.		APPROVED	
2. DO NOT SCALE DRAWING		USED ON	
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5 STD'S			
✓ MAX. ALL MACHINED SURFACES		MATERIAL-	
FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY			
ANTI-PROTON SOURCE CORE MOMENTUM SYSTEM (2-4 GHz) HIGH LEVEL ELECTRONICS			
SCALE	FILMED	DRAWING NUMBER	REV.
		8000-ED-170273	J

REV.	DESCRIPTION	DRAWN	DATE
		APPD.	DATE
B	REDRAWN AND UPGRADED TO 4-8 GHZ	G.A. JOHNSON	8/1/90
		W.J. MUELLER	10/9/90
C	ADDED PIN SYNC CHASSIS	G.A. JOHNSON	3/21/91
		W.J. MUELLER	3/25/91
D	PIN SWITCH TIMING CHANNELS	G.A. JOHNSON	9/19/91
		W.J. MUELLER	9/24/91
E	ADDED PIN ATT., LIMIT, & DIODE NAMES	G.A. JOHNSON	11/5/92
		W.J. MUELLER	11/9/92
F	ADDED PHASE EQUALIZER GRAPH	G.A. JOHNSON	6/23/93
		W.J. MUELLER	7/8/93
G	REDRAWN ON MINI-CAD	W.J. MUELLER	3/22/95
		W.J. MUELLER	
H	NAME/CONTROL CHANGES, PLATE REMADE, LL/ML LEVEL COMBINED	W.J. MUELLER	8/17/98
J			

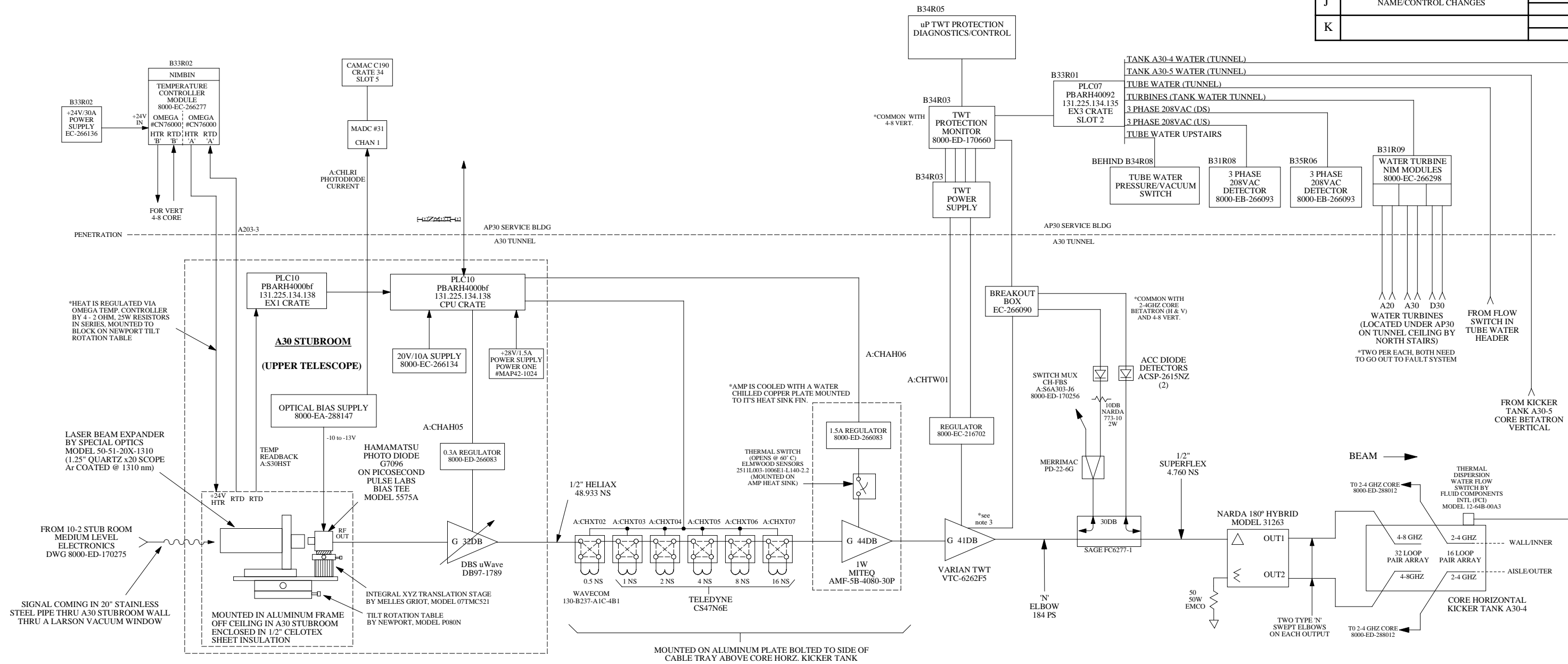


- NOTES:
- AMPLIFIER GAINS ARE NOMINAL.
 - AMP REGULATOR BUS HAS ON/OFF CONTROL, HIGH/LOW VOLTAGE STATUS, AND HIGH/LOW CURRENT STATUS.
 - PIN ATTENUATOR BUS CONSISTS OF 8-BIT TTL DRIVER AND 8-BIT TTL READBACK.
 - PIN SWITCH HAS ONE TTL ON/OFF BIT AND ONE TTL READBACK.
 - COMMON WITH 4-8GHZ CORE VERT. & HORZ.
 - CABLES TO PIN ATT. & PIN SWITCH ARE 'TEED' OFF OF ORIGINAL CORE VERT. SYSTEM SO SAME DATABASE NAMES ARE USED. BOTH ARE AFFECTED BUT ONLY THE SYSTEM THAT IS SWITCHED IN IS USED.

3/12/00

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
PARTS LIST			
UNLESS OTHERWISE SPECIFIED		ORIGINATOR	R.J. PASQUINELLI
FRACTIONS	DECIMALS	ANGLES	DRAWN
+/-	+/-	+/-	WESLEY MUELLER
			CHECKED
			APPROVED
			USED ON
			MATERIAL-
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 FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY			
ANTI-PROTON SOURCE CORE BETATRON HORIZONTAL (4-8 GHZ) LOW/MEDIUM LEVEL ELECTRONICS			
SCALE	FILMED	DRAWING NUMBER	REV.
		8000-ED-170275	H

REV.	DESCRIPTION	DRAWN	DATE
		APPD.	DATE
A	DWG. REDRAWN AND UPGRADED TO 4-8GHZ	G.A. JOHNSON WES MUELLER	8/2/90 10/9/90
F	NEW KICKER HYBRID	G.A. JOHNSON WES MUELLER	9/22/92 9/25/92
G	REDRAWN ON MINI-CAD, KICKER TANK CHANGES	WES MUELLER	3/13/95
H	2-THROW SWITCH ADDED TO CHOOSE BTWN NORMAL OR OPTICAL MEDIUM LEVEL	WES MUELLER	5/27/97
J	NAME/CONTROL CHANGES	WES MUELLER	8/14/98
K			



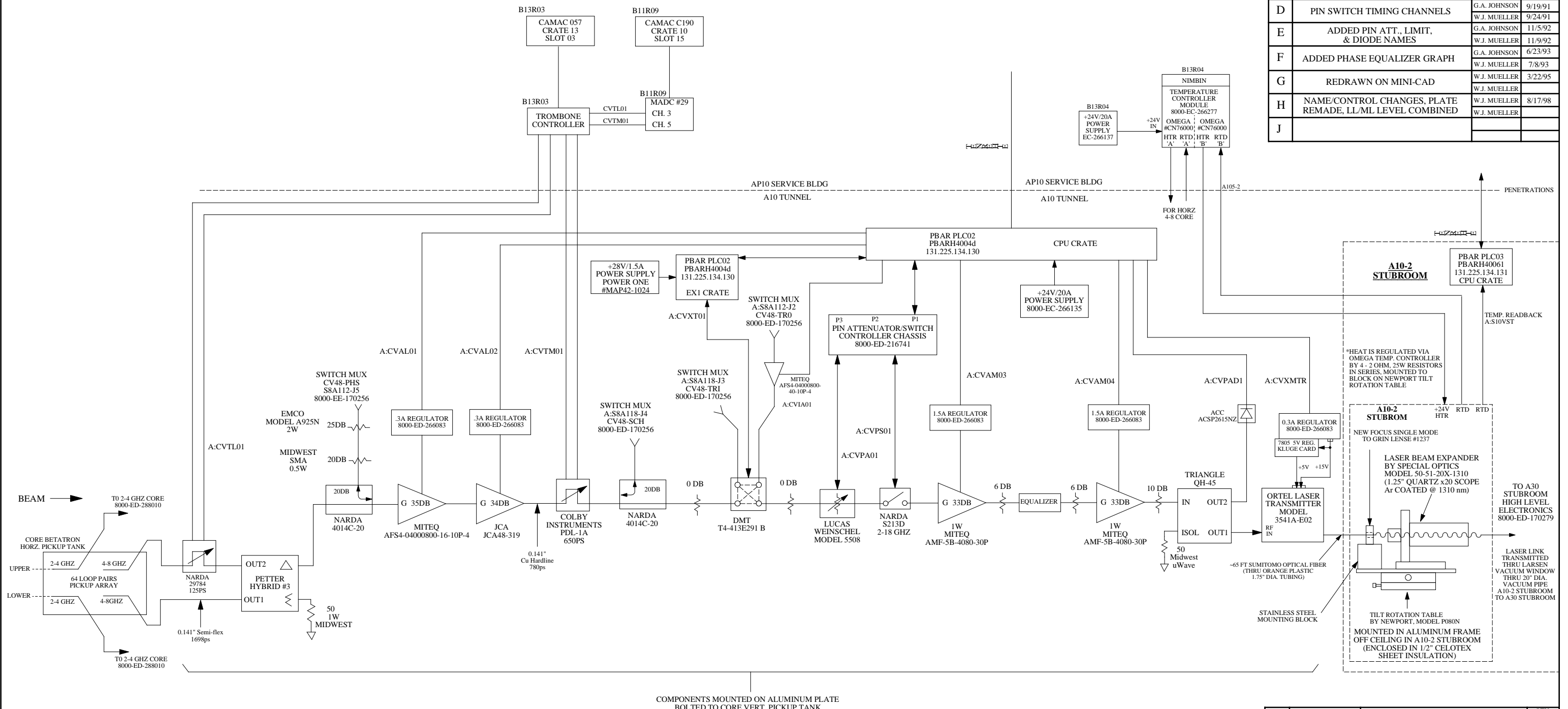
- NOTES:
1. AMPLIFIER GAINS ARE NOMINAL.
 2. AMP REGULATOR BUS HAS ON/OFF CONTROL, HIGH/LOW VOLTAGE STATUS, AND HIGH/LOW CURRENT STATUS.
 3. AN EXTERNAL TEMPERATURE KLIXON IS ATTACHED TO THE HOT (COLLECTOR) END OF TWT. KLIXON BY ELMWOOD SENSORS, MODEL 3100-56-162L250. NORMALLY CLOSED, SET TO OPEN AT 250°F ±9°F

CABLE SCHEDULE			
NO.	CABLE NAME	CABLE NO.	SIZE
1	4-8 CV TRUNK ML TO HL	4-8 CV TRUNK	1/2" HELIAX
2	AMP REG TO PLC	A:CVAH04	10C/22AWG
3	AMP KLIXON TO AMP		
4	TWT HV CABLE	A:CVPF01 HV	6C/16AWG.15KV
5	TWT LV CABLE	A:CVPF01 LV	6C/18AWG.600V
6	TWT TEMP KLIXON CABLE	A:CVPF01 TEMP	RG108.TWINAX
7	CV FANBACK TO SWITCH MUX	CV48-FB.A:S6A304-6	Stripflex
8	TWT FWD DIODE TO CHASSIS		RG58
9	TWT REV DIODE TO CHASSIS		RG58
10	TWTPM TO TPM	CV TWT TPM	50C RIBBON
11	TWT SUPPLY TO TWTPM	INTERFACE	RG58
12	TWT SUPPLY TO TWTPM	MODULATION	RG58
13	TWT SUPPLY TO TWTPM	HELIX MON.	RG58
14	TWT SUPPLY TO TWTPM	REMOTE CONTROL	2-10C/22AWG
15	4-8 CV OPTIC. ML TO HL	CVB OPTIC ML-HL	1/2" HELIAX
16			
17			
18			

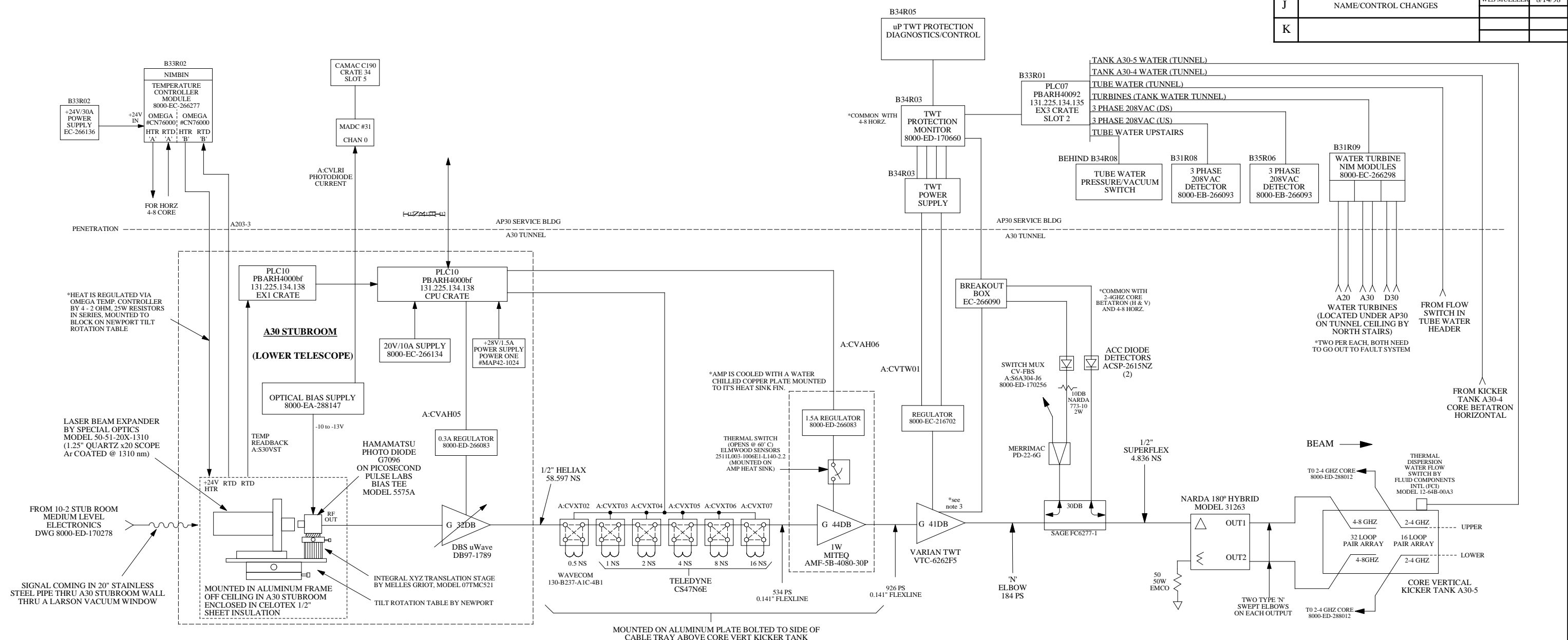
3/12/00

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
PARTS LIST			
UNLESS OTHERWISE SPECIFIED		ORIGINATOR	R.J. PASQUINELLI
FRACTIONS	DECIMALS	ANGLES	DRAWN
+/-	+/-	+/-	WESLEY MUELLER
		CHECKED	
1. BREAK ALL SHARP EDGES 1/64 MAX.		APPROVED	
2. DO NOT SCALE DRAWING		USED ON	
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5 STD'S		MATERIAL-	
✓ MAX. ALL MACHINED SURFACES			
 FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY			
ANTI-PROTON SOURCE CORE BETATRON HORIZONTAL (4-8 GHZ) HIGH LEVEL ELECTRONICS			
SCALE	FILMED	DRAWING NUMBER	REV.
		8000-ED-170276	J

REV.	DESCRIPTION	DRAWN	DATE
		APPD.	DATE
B	REDRAWN AND UPGRADED TO 4-8 GHZ	G.A. JOHNSON	8/1/90
C	ADDED PIN SYNC CHASSIS	G.A. JOHNSON	3/21/91
D	PIN SWITCH TIMING CHANNELS	G.A. JOHNSON	9/19/91
E	ADDED PIN ATT., LIMIT, & DIODE NAMES	G.A. JOHNSON	11/5/92
F	ADDED PHASE EQUALIZER GRAPH	G.A. JOHNSON	6/23/93
G	REDRAWN ON MINI-CAD	W.J. MUELLER	3/22/95
H	NAME/CONTROL CHANGES, PLATE REMADE, LL/ML LEVEL COMBINED	W.J. MUELLER	8/17/98
J			



REV.	DESCRIPTION	DRAWN	DATE
		APPD.	DATE
A	DWG. REDRAWN AND UPGRADED TO 4-8GHZ	G.A. JOHNSON	8/2/90
		WES MUELLER	10/9/90
F	NEW KICKER HYBRID	G.A. JOHNSON	9/22/92
		WES MUELLER	9/25/92
G	REDRAWN ON MINI-CAD, KICKER TANK CHANGES	WES MUELLER	3/13/95
H	2-THROW SWITCH ADDED TO CHOOSE BTWN NORMAL OR OPTICAL MEDIUM LEVEL	WES MUELLER	5/27/97
J	NAME/CONTROL CHANGES	WES MUELLER	8/14/98
K			



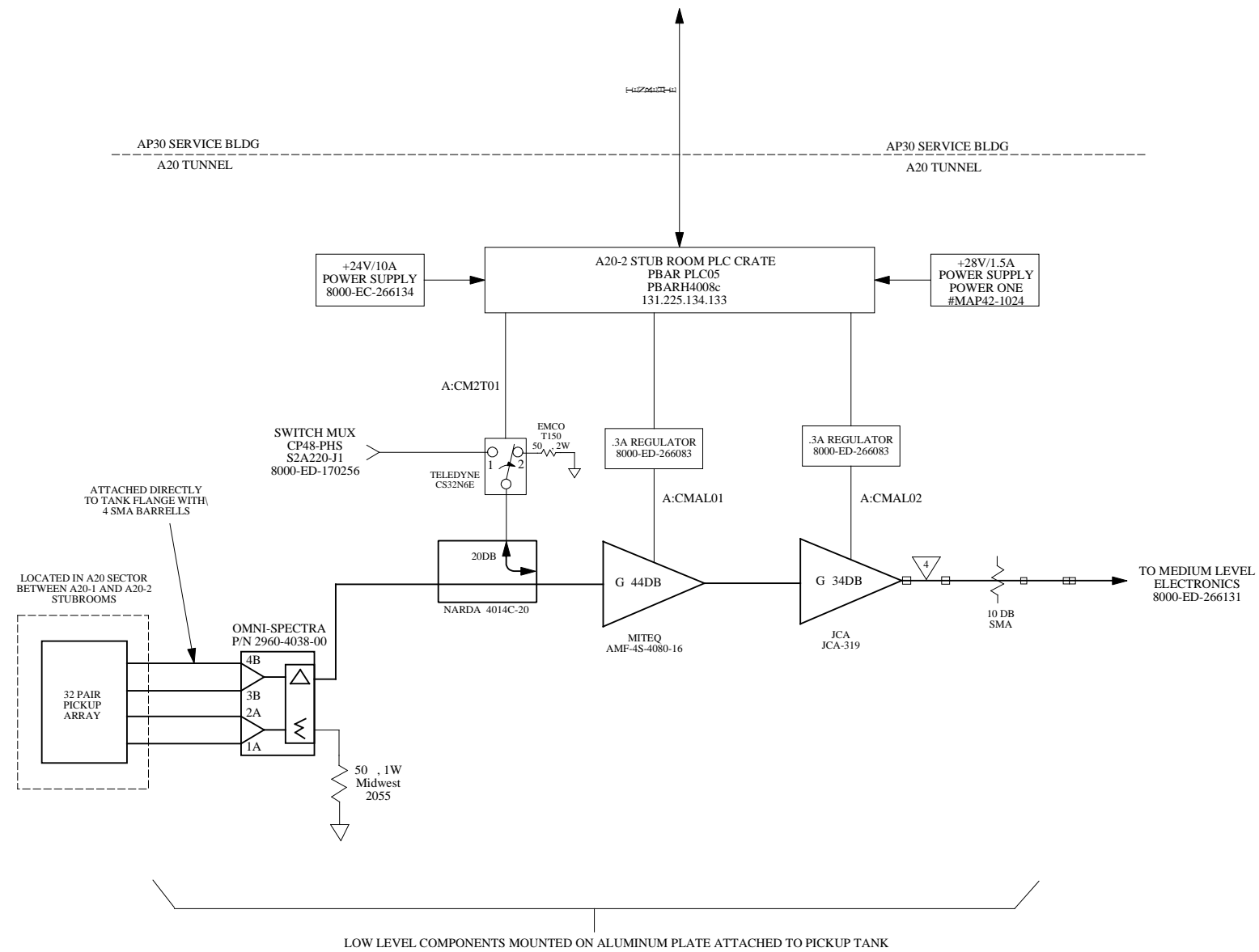
- NOTES:**
- AMPLIFIER GAINS ARE NOMINAL.
 - AMP REGULATOR BUS HAS ON/OFF CONTROL, HIGH/LOW VOLTAGE STATUS, AND HIGH/LOW CURRENT STATUS.
 - AN EXTERNAL TEMPERATURE KLIXON IS ATTACHED TO THE HOT (COLLECTOR) END OF TWT. KLIXON BY ELMWOOD SENSORS, MODEL 3100-56-162L250. NORMALLY CLOSED, SET TO OPEN AT 250°F ±9°F

CABLE SCHEDULE			
NO.	CABLE NAME	CABLE NO.	SIZE
1	4-8 CV TRUNK ML TO HL	4-8 CV TRUNK	1/2" HELIAX
2	AMP REG TO PLC	A:CVAH04	10C/22AWG
3	AMP KLIXON TO AMP		
4	TWT HV CABLE	A:CVPF01 HV	6C/16AWG,15KV
5	TWT LV CABLE	A:CVPF01 LV	6C/18AWG,600V
6	TWT TEMP KLIXON CABLE	A:CVPF01 TEMP	RG108,TWINAX
7	CV FANBACK TO SWITCH MUX	CV48-FB,A:S6A304-6	Striplex
8	TWT FWD DIODE TO CHASSIS		RG58
9	TWT REV DIODE TO CHASSIS		RG58
10	TWTPM TO TPM	CV TWT TPM	50C RIBBON
11	TWT SUPPLY TO TWTPM	INTERFACE	RG58
12	TWT SUPPLY TO TWTPM	MODULATION	RG58
13	TWT SUPPLY TO TWTPM	HELIX MON.	RG58
14	TWT SUPPLY TO TWTPM	REMOTE CONTROL	2-10C/22AWG
15	4-8 CV OPTIC. ML TO HL	CVB OPTIC ML-HL	1/2" HELIAX
16			
17			
18			

3/12/00


ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
PARTS LIST			
UNLESS OTHERWISE SPECIFIED		ORIGINATOR	R.J. PASQUINELLI
FRACTIONS	DECIMALS	ANGLES	DRAWN
+/-	+/-	+/-	WESLEY MUELLER
			CHECKED
			APPROVED
1. BREAK ALL SHARP EDGES 1/64 MAX.			
2. DO NOT SCALE DRAWING			
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5 STD'S			
MATERIAL-			
✓ MAX. ALL MACHINED SURFACES			
 FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY			
ANTI-PROTON SOURCE CORE BETATRON VERTICAL (4-8 GHz) HIGH LEVEL ELECTRONICS			
SCALE	FILMED	DRAWING NUMBER	REV.
		8000-ED-170279	J

REV.	DESCRIPTION	DRAWN	DATE
		APPD.	DATE
A	ADDED A:CM2T01 SWITCH TO INJ. COUPLER	G.A. JOHNSON	2/14/91
		WES MUELLER	2/15/91
B	ADDED MUX A:CMF101 AMP	G.A. JOHNSON	2/8/93
		WES MUELLER	2/11/93
C	10 DB PAD ADDED AFTER AMP	G.A. JOHNSON	4/21/93
		WES MUELLER	4/27/93
D	REDRAWN ON MINI-CAD, NAME/CONTROL CHANGES	WES MUELLER	8/14/98
		WES MUELLER	

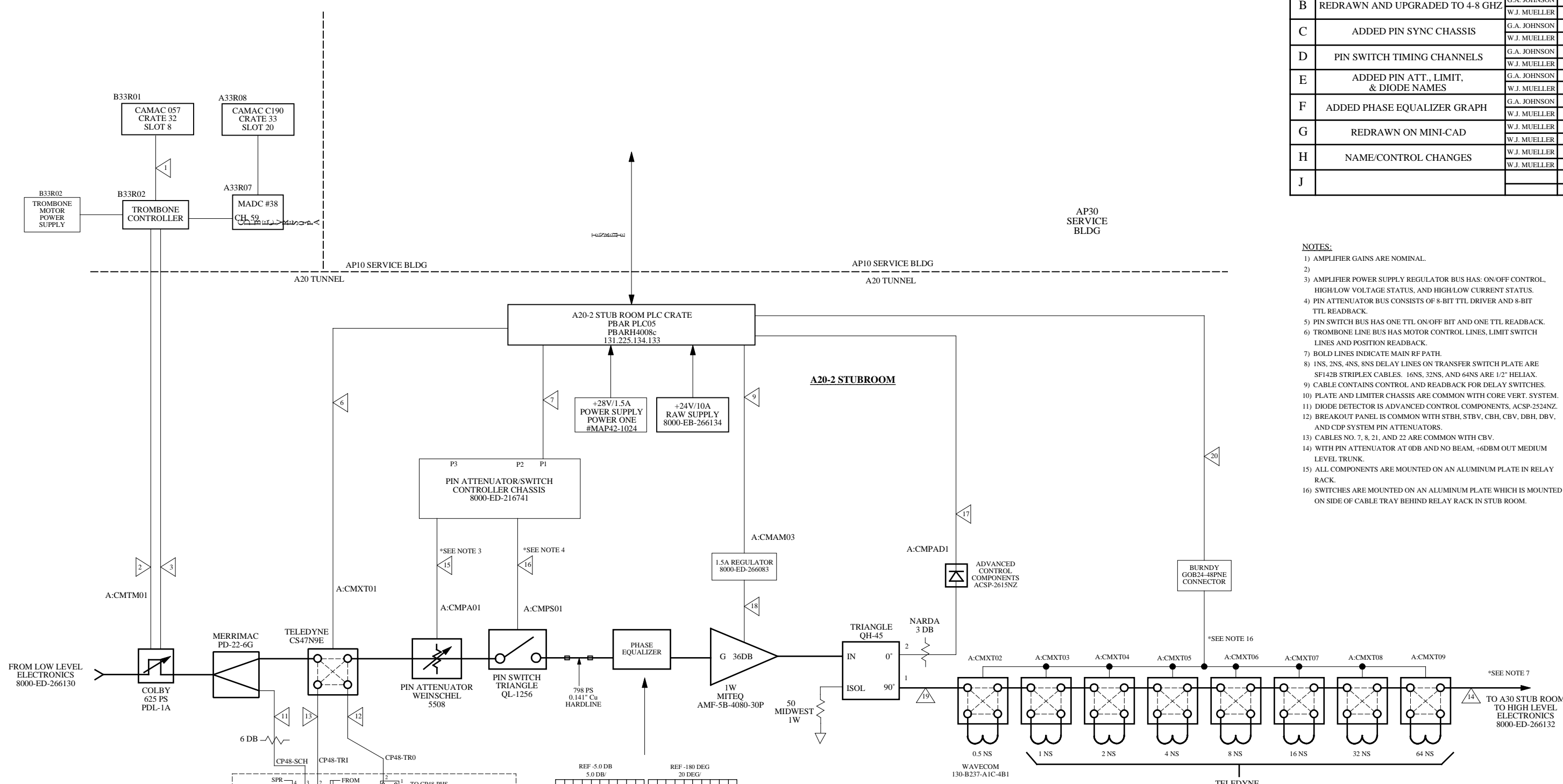


- NOTES:**
1. AMPLIFIER GAINS ARE NOMINAL.
 2. AMP REGULATOR BUS HAS ON/OFF CONTROL, HIGH/LOW VOLTAGE STATUS, AND HIGH/LOW CURRENT STATUS.

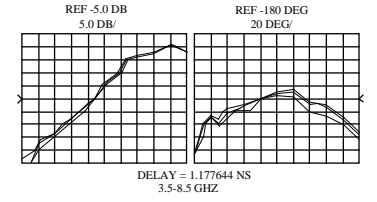
7/26/99

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
PARTS LIST			
UNLESS OTHERWISE SPECIFIED		ORIGINATOR	R.J. PASQUINELLI
FRACTIONS	DECIMALS	ANGLES	DRAWN
+/-	+/-	+/-	WESLEY MUELLER
		CHECKED	8/14/98
1. BREAK ALL SHARP EDGES 1/64 MAX.		APPROVED	
2. DO NOT SCALE DRAWING		USED ON	
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5 STD'S		MATERIAL-	
✓ MAX. ALL MACHINED SURFACES			
 FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY			
ANTI-PROTON SOURCE CORE MOMENTUM (4-8 GHZ) LOW LEVEL ELECTRONICS			
SCALE	FILMED	DRAWING NUMBER	REV.
		8000-ED-266130	D

REV.	DESCRIPTION	DRAWN	DATE
		APPD.	DATE
B	REDRAWN AND UPGRADED TO 4-8 GHZ	G.A. JOHNSON	8/1/90
		W.J. MUELLER	10/9/90
C	ADDED PIN SYNC CHASSIS	G.A. JOHNSON	3/21/91
		W.J. MUELLER	3/25/91
D	PIN SWITCH TIMING CHANNELS	G.A. JOHNSON	9/19/91
		W.J. MUELLER	9/24/91
E	ADDED PIN ATT., LIMIT, & DIODE NAMES	G.A. JOHNSON	11/5/92
		W.J. MUELLER	11/9/92
F	ADDED PHASE EQUALIZER GRAPH	G.A. JOHNSON	6/23/93
		W.J. MUELLER	7/8/93
G	REDRAWN ON MINI-CAD	W.J. MUELLER	3/22/95
		W.J. MUELLER	
H	NAME/CONTROL CHANGES	W.J. MUELLER	8/14/98
		W.J. MUELLER	
J			



- NOTES:**
- 1) AMPLIFIER GAINS ARE NOMINAL.
 - 2) AMPLIFIER POWER SUPPLY REGULATOR BUS HAS: ON/OFF CONTROL, HIGH/LOW VOLTAGE STATUS, AND HIGH/LOW CURRENT STATUS.
 - 3) PIN ATTENUATOR BUS CONSISTS OF 8-BIT TTL DRIVER AND 8-BIT TTL READBACK.
 - 4) PIN SWITCH BUS HAS ONE TTL ON/OFF BIT AND ONE TTL READBACK.
 - 5) TROMBONE LINE BUS HAS MOTOR CONTROL LINES, LIMIT SWITCH LINES AND POSITION READBACK.
 - 6) BOLD LINES INDICATE MAIN RF PATH.
 - 7) 1NS, 2NS, 4NS, 8NS DELAY LINES ON TRANSFER SWITCH PLATE ARE SFI42B STRIPLEX CABLES. 16NS, 32NS, AND 64NS ARE 1/2" HELIAX.
 - 8) CABLE CONTAINS CONTROL AND READBACK FOR DELAY SWITCHES.
 - 9) PLATE AND LIMITER CHASSIS ARE COMMON WITH CORE VERT. SYSTEM.
 - 10) DIODE DETECTOR IS ADVANCED CONTROL COMPONENTS, ACSP-2524NZ.
 - 11) BREAKOUT PANEL IS COMMON WITH STBL, STBV, CBH, CBV, DBH, DBV, AND CDP SYSTEM PIN ATTENUATORS.
 - 12) CABLES NO. 7, 8, 21, AND 22 ARE COMMON WITH CBV.
 - 13) WITH PIN ATTENUATOR AT 0DB AND NO BEAM, +6DBM OUT MEDIUM LEVEL TRUNK.
 - 14) ALL COMPONENTS ARE MOUNTED ON AN ALUMINUM PLATE IN RELAY RACK.
 - 15) SWITCHES ARE MOUNTED ON AN ALUMINUM PLATE WHICH IS MOUNTED ON SIDE OF CABLE TRAY BEHIND RELAY RACK IN STUB ROOM.



NO.	CABLE NAME	CABLE NO.	SIZE
1	CAMAC TO DRIVER	CDSB10	22Ga/37C & 22Ga/27C
2	CMTM01 DRIVE	CMTM01 CTL	16GA/2 TPS
3	CMTM01 READBACK	CMTM01 RDBK	22GA/4 TPS
4	CAMAC TO CONTROL	CCSB10	22Ga/37C & 22Ga/27C
5	CONTROL TO PLC		20GA/48C
6	XFER SW. TO PLC	CMXT01	22GA/6C
7	CHASSIS TO PLC		20GA/48C
8			
9	AMP. REG. TO PLC	CMAM03 REG.	22GA/10C
10	+24V TO PLC		12GA/2C
11	SCHOTTKY SCAN	CPLR/S4A221-J3	1/2" HELIAX
12	NA OUT	CMXT01/S2A220-J2	1/2" HELIAX
13	NA IN	CMXT01/S4A221-J2	1/2" HELIAX
14	CM ML TRUNK LINE OUT	CM TRUNK	1/2" HELIAX
15	PIN ATT. TO CHASSIS	CMPA01	25C RIBBON
16	PIN SW. TO CHASSIS	CMPS01	22GA/6C
17	DIODE DET. TO PLC	CMDET1	RG58
18	REG. TO AMP	CMAM03 AMP	RG108
19	HYBRID TO SWITCH PLATE	SW. DELAY IN	1/2" SUPERFLEX
20	DELAY PLATE CONTROL	PPSP1101	20GA/48C
21		CBP3	20GA/15 TPS
22			20GA/4 TPS
23		CMPAD1-CH18	RG108
24		CMPAL1-CH19	RG108
25	CMLL TO ML TRUNK	CMLL TRUNK	1/2" SUPERFLEX STRIPLEX
26	ML IN TRUNK JUMPER		

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
PARTS LIST			
UNLESS OTHERWISE SPECIFIED		ORIGINATOR	R.J. PASQUINELLI
FRACTIONS	DECIMALS	ANGLES	DRAWN
+	+	+	G.A. JOHNSON
+	+	+	CHECKED
+	+	+	WESLEY MUELLER
+	+	+	10/9/90
1. BREAK ALL SHARP EDGES 1/64 MAX.		APPROVED	
2. DO NOT SCALE DRAWING		USED ON	
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5 STD'S		MATERIAL-	
✓ MAX. ALL MACHINED SURFACES			

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

**ANTI-PROTON SOURCE
CORE MOMENTUM (4-8 GHZ)
MEDIUM LEVEL ELECTRONICS**

SCALE	FILMED	DRAWING NUMBER	REV.
		8000-ED-266131	H

4/27/00

REV.	DESCRIPTION	DRAWN	DATE
		APPD.	DATE
A	ADDED TWT HELIX VOLTAGE MADC	T.P.S.	2/11/91
		WES MUELLER	2/15/91
B	TWT TIMING	G.A. JOHNSON	9/19/91
		WES MUELLER	9/24/91
C	TURBINES ADDED IN CHILLED LCW	G.A. JOHNSON	7/20/94
		WES MUELLER	7/25/94
D	ADDED WATER FLOW MADC CHANNELS AND REDRAWN ON MINI-CAD	WES MUELLER	9/11/96
		WES MUELLER	9/11/96
E	NAME/CONTROL CHANGES	WES MUELLER	8/14/98
		WES MUELLER	
F			

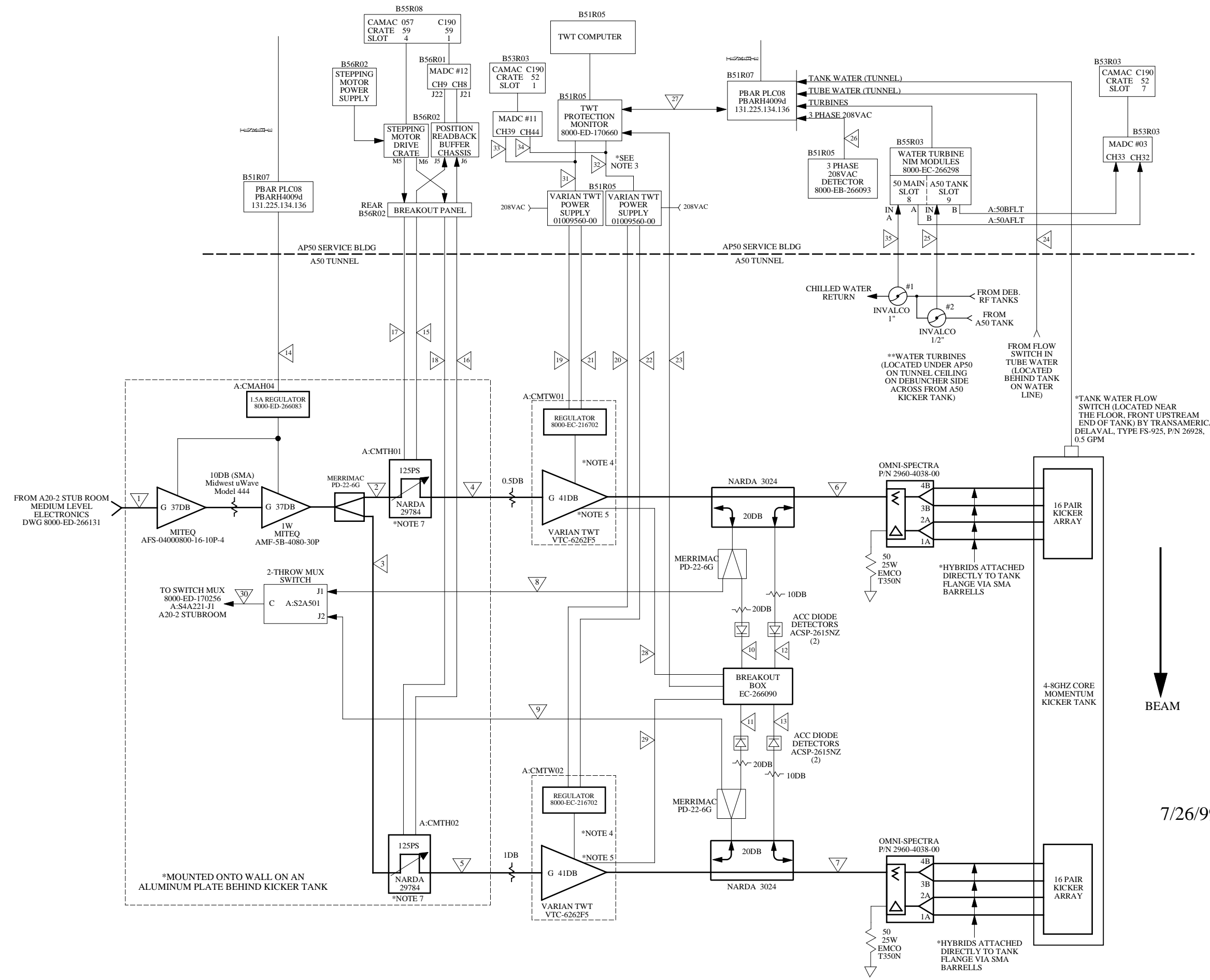
NOTES:

- AMPLIFIER GAINS ARE NOMINAL.
- AMP REGULATOR BUS HAS ON/OFF CONTROL, HIGH/LOW VOLTAGE STATUS, AND HIGH/LOW CURRENT STATUS.
- THERE ARE ACTUALLY 4 CABLES BETWEEN TWT SUPPLY AND THE TPMPM. THREE ARE RG58 FOR HELIX MON., HELIX MODULATION, AND REMOTE FAULT. THE FOURTH IS TWO 10C/22GA CABLES TY-RAPPED TOGETHER FOR REMOTE CONTROL AND STATUS.
- TWT AND REGULATOR ARE MOUNTED ON A WATER COOLED COPPER CHILL PLATE (DWG. #8000-MC-266077) WHICH IS BOLTED TO TANK THRU TWO ALUMINUM BLOCKS.
- KLIXONS ARE BY ELMWOODS SENSORS, MODEL #3100-56-87L250. THEY ARE NORMALLY CLOSED SWITCHES SET TO OPEN AT 250°F, +/- 9°F SWITCHES ARE MOUNTED AT OUTPUT END OF TWT UNDER SHROUD.
- ATTENUATORS ARE TYPE 'N' BY NARDA, MODEL 773, UNLESS NOTED OTHERWISE.
- WIRES IN TROMBONE READBACK CABLE, TO PINS 7 & 9 ONLY, ARE REVERSED FROM ALL OTHER TROMBONES FOR THE 4-8GHZ NARDA TROMBONES MODEL 29784. AS THEIR LINEAR POT INSIDE IS REVERSED FROM ALL THE OTHERS. REVERSAL IS DONE ON THE TROMBONE END ONLY (TUNNEL SIDE).

CABLE SCHEDULE			
NO.	CABLE NAME	CABLE NO.	SIZE
1	CM TRUNK, MEDIUM TO HIGH	A20-2 TO A50	1/2" HELIAX
2	CM HI LVL, UPSTREAM SPLIT	SPLITTER TO CMTW01	0.141" Cu HARDLINE
3	CM HI LVL, DOWNSTREAM SPLIT	SPLITTER TO CMTW02	0.141" Cu HARDLINE
4	TROMBONE TO TWT	CMTH01 TO CMTW01	1/2" SUPERFLEX
5	TROMBONE TO TWT	CMTH02 TO CMTW02	1/2" SUPERFLEX
6	CMPP01 COUPLER TO HYBRID	CMTW01 TO U.S. HYBRID	1/2" SUPERFLEX
7	CMPP02 COUPLER TO HYBRID	CMTW02 TO D.S. HYBRID	1/2" SUPERFLEX
8	CMPP01 MUX MON.	CMTW01 TO S2A501-J1	1/2" SUPERFLEX
9	CMPP02 MUX MON.	CMTW02 TO S2A501-J2	1/2" SUPERFLEX
10	FWD DIODE TO BREAKOUT BOX	CMTW01 FWD 'A'	RG58
11	FWD DIODE TO BREAKOUT BOX	CMTW02 FWD 'B'	RG58
12	REV DIODE TO BREAKOUT BOX	CMTW01 REV 'A'	RG58
13	REV DIODE TO BREAKOUT BOX	CMTW02 REV 'B'	RG58
14	CONTROL TO REGULATOR	CMAH04	10C/22GA
15	TROMBONE TO BREAKOUT	CMTH01 READBACK	4 TPS/22GA
16	TROMBONE TO BREAKOUT	CMTH02 READBACK	4 TPS/22GA
17	TROMBONE TO BREAKOUT	CMTH01 CONTROL	2 TPS/16GA
18	TROMBONE TO BREAKOUT	CMTH02 CONTROL	2 TPS/16GA
19	TWT HI VOLTAGE CABLE	CMTW01 HV	6C/16GA (15KV)
20	TWT HI VOLTAGE CABLE	CMTW02 HV	6C/16GA (15KV)
21	TWT LOW VOLTAGE CABLE	CMTW01 LV	6C/22GA (600V)
22	TWT LOW VOLTAGE CABLE	CMTW02 LV	6C/22GA (600V)
23	BREAKOUT BOX TO TWTPM	CM DIODES CHILLS	6 TPS/22GA
24	KICKER PERMIT TO FLOW SWITCH	CM TUBE FLOW	RG108
25	KICKER PERMIT TO FLOW SWITCH	CM TUBE FLOW	RG108
26	KICKER PERMIT TO 3 PHASE DET.	CM 208VAC 3PHS	RG58
27	KICKER PERMIT TO TWTMPM	CM 208VAC 3PHS	RG108
28	BREAKOUT BOX TO TWT	CMTW01 CHILL 'A'	RG108
29	BREAKOUT BOX TO TWT	CMTW02 CHILL 'B'	RG108
30	CM MUX MEDIUM TO HIGH LVL	S4A221 TO S2A501	1/2" HELIAX
31	TWT SUPPLY TO TWTMPM	CMTW01	(3) RG58 & (2) 10C/22GA
32	TWT SUPPLY TO TWTMPM	CMTW02	(3) RG58 & (2) 10C/22GA
33	TWT HELIX TO MADC #11	CMHVM1	RG58
34	TWT HELIX TO MADC #11	CMHVM2	RG58
35	KICK PERMIT TO MAIN FLOW SW.		RG108
36			
37			

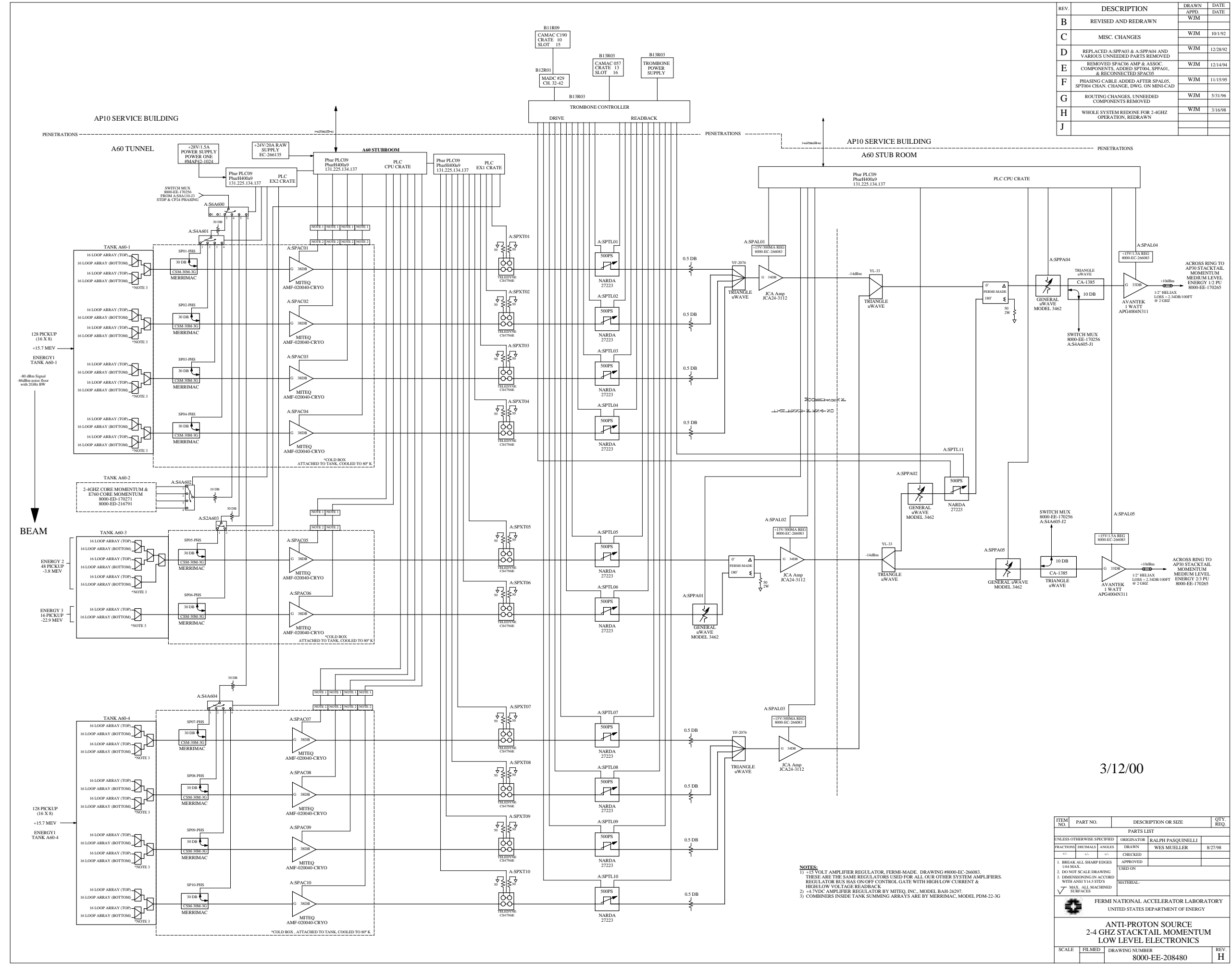
BEAM

7/26/99



ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
PARTS LIST			
UNLESS OTHERWISE SPECIFIED		ORIGINATOR	R.J. PASQUINELLI
FRACTIONS	DECIMALS	ANGLES	DRAWN
+/-	+/-	+/-	WESLEY MUELLER
		CHECKED	9/24/96
1. BREAK ALL SHARP EDGES 1/64 MAX.		APPROVED	
2. DO NOT SCALE DRAWING		USED ON	
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5 STD'S			
✓ MAX. ALL MACHINED SURFACES		MATERIAL-	
FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY			
ANTI-PROTON SOURCE CORE MOMENTUM (4-8 GHZ) HIGH LEVEL ELECTRONICS			
SCALE	FILMED	DRAWING NUMBER	REV.
		8000-ED-266132	E

REV.	DESCRIPTION	DRAWN	DATE
B	REVISED AND REDRAWN	WJM	
C	MISC. CHANGES	WJM	10/1/92
D	REPLACED A-SPPA03 & A-SPPA04 AND VARIOUS UNNEEDED PARTS REMOVED	WJM	12/28/92
E	REMOVED SPAC06 AMP & ASSOC COMPONENTS, ADDED SPT004, SPPA01, & RECONNECTED SPAC05	WJM	12/14/94
F	PHASING CABLE ADDED AFTER SPAL05, SPT004 CHAIN CHANGE, DWG. ON MINI-CAD	WJM	11/15/95
G	ROUTING CHANGES, UNNEEDED COMPONENTS REMOVED	WJM	5/31/96
H	WHOLE SYSTEM REDONE FOR 2-4GHZ OPERATION, REDRAWN	WJM	3/16/98
J			



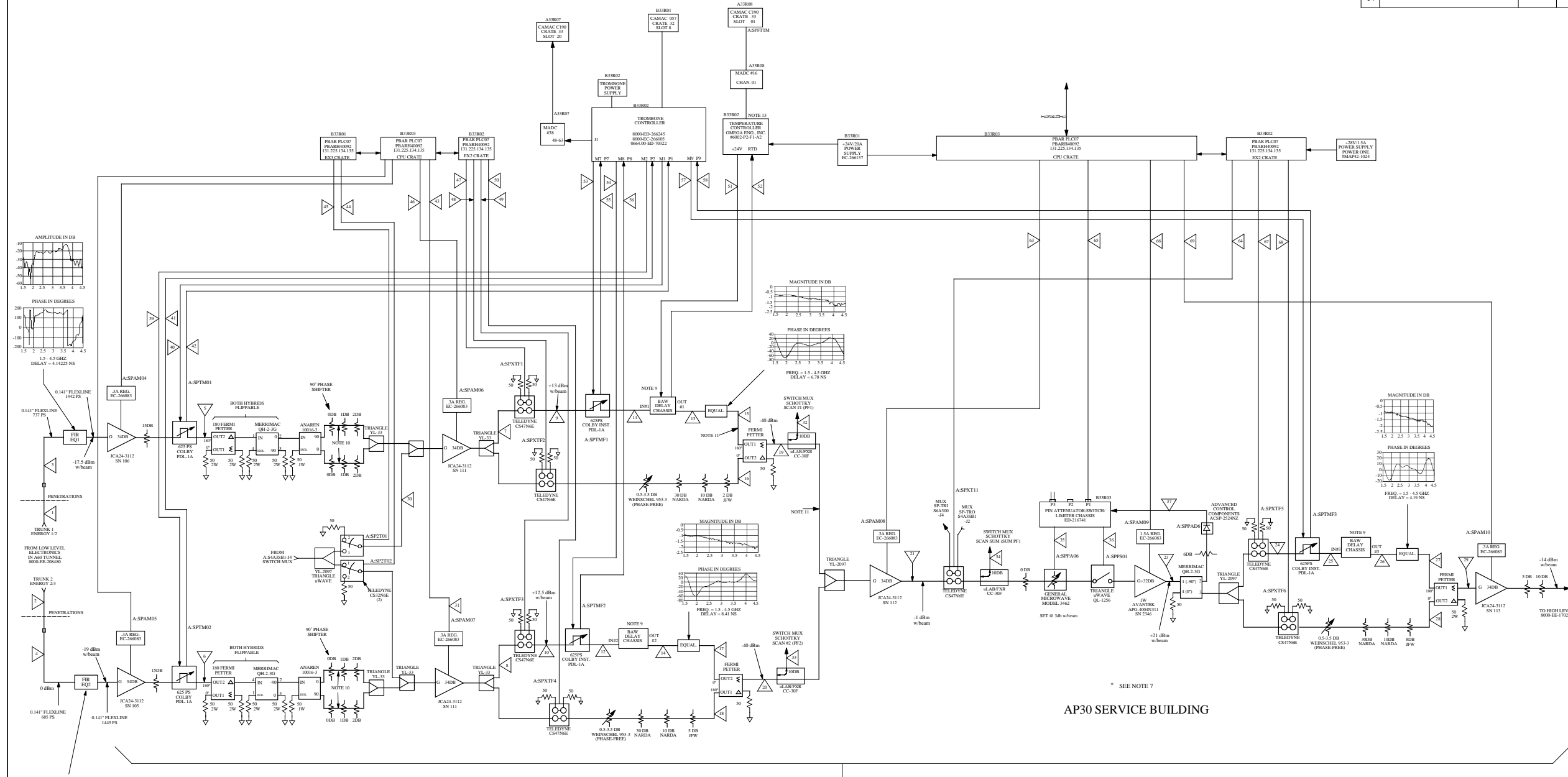
NOTES:
 1) -15VOLT AMPLIFIER REGULATOR, FERMI-MADE, DRAWING #8000-EC-2660R3. THESE ARE THE SAME REGULATORS USED FOR ALL OUR OTHER SYSTEM AMPLIFIERS. REGULATOR BUS HAS ON/OFF CONTROL GATE WITH HIGH/LOW CURRENT & HIGH/LOW VOLTAGE READBACK.
 2) -4.7VDC AMPLIFIER REGULATOR BY MITEQ, INC. MODEL BAH-26297.
 3) COMBINERS INSIDE TANK SUMMING ARRAYS ARE BY MERRIMAC, MODEL PDM-22-3G

3/12/00

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY.
PARTS LIST			
UNLESS OTHERWISE SPECIFIED		ORIGINATOR	RALPH PASQUINELLI
FRACTIONS	DECIMALS	DRAWN	WES MUELLER
ANGLES	DEG.	CHECKED	
1. BREAK ALL SHARP EDGES 1/64 MAX.		APPROVED	
2. DO NOT SCALE DRAWING		USED ON	
3. DIMENSIONS IN ACCORD WITH ANSI Y14.5 STD'S		MATERIAL	
✓ MAX. ALL MACHINED SURFACES			
FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY			
ANTI-PROTON SOURCE 2-4 GHZ STACKTAIL MOMENTUM LOW LEVEL ELECTRONICS			
SCALE	FILMED	DRAWING NUMBER	REV
		8000-EE-208480	H

AP30 SERVICE BUILDING

REV.	DESCRIPTION	DRAWN	DATE
F	PIN ATT. LIMIT & DIODE NAMES ADDED	WJM	10/92
G	REPLACED A-SPAM05 AND PHASE SHIFTER PAD CHANGES	WJM	12/92
H	ADDITION OF THE FOUR FILTER CHARACTERISTIC GRAPHS	WJM	5/93
J	CORRECTION OF SCHIFFMAN EQUALIZER GRAPHS	WJM	2/94
K	FLIPPED FILTER 2 (-1 MEV) 180 DEGREE HYBRID	WJM	9/94
L	ADDED 6DB PAD AFTER PIN ATT.	WJM	11/95
M	COMPLETE SYSTEM CHANGE TO 2-4 GHZ. REDRAWN	WJM	11/95
N			



*ALL COMPONENTS MOUNTED ON ALUMINUM PLATE WHICH IS BOLTED OVERHEAD ONTO RACKTOPS BETWEEN RACK B3300 & B3307

- NOTES:
- 1) AMPLIFIER REGULATOR BUS HAS ON/OFF CONTROL, HIGH/LOW VOLTAGE STATUS, AND HIGH/LOW CURRENT STATUS.
 - 2) TROMBONE POWER BUS HAS MOTOR CONTROL, REAR/BUS HAS LIMIT SWITCH AND POSITION STATUS.
 - 3) AMPLIFIER GAINS ARE NOMINAL.
 - 4) ATTENUATORS ARE SMA TYPE, MODEL 292 OR 444, BY MIDWEST MICROWAVE, OR N TYPE, MODEL 775 BY NARDA w/AWAVE, OR MODEL 50HF BY JFW.
 - 5) PIN ATTENUATOR BUS CONSISTS OF 8-BIT TTL DRIVER AND 8-BIT TTL REAR/BUS.
 - 6) PIN SWITCH BUS HAS ONE TTL ON/OFF BIT AND ONE TTL REAR/BUS BIT.
 - 7) ALL COMPONENTS ARE MOUNTED ON AN ALUMINUM PLATE SPANNING THE DISTANCE FROM TOP OF RACK B3303 TO TOP OF RACK B3307. TROMBONES A-SPAT11 & A-SPAT10 LAY ON TOP OF RACK B3303 FACING ALUM. PLATE.
 - 8) BOLD LINES ARE MAIN RF PATHS.
 - 9) BAW DEVICE OVEN CHASSIS MOUNTED ON UNDERSIDE OF ALUMINUM PLATE. SEE DWG. 8000-EE-2660-50. ALL THREE DELAY DEVICES ARE IN THIS ONE CHASSIS.
 - 10) 0105" COPPER SEMI-RIGID COAX
 - 11) 0.141" COPPER SEMI-RIGID COAX
 - 12) ALL TERMINATIONS ARE 17 OR 1 WATT FOR SMA PADS AND 2 WATT FOR TYPE N, UNLESS NOTED OTHERWISE.
 - 13) TEMPERATURE CONTROLLER SETTINGS AS FOLLOWS: RATE (RT) @ 00, HEAT GAIN (HG) @ 250, HEAT CYCLING (HC) @ 00, COOLING GAIN (CG) @ 100, COOLING CYCLING (CC) @ 50.

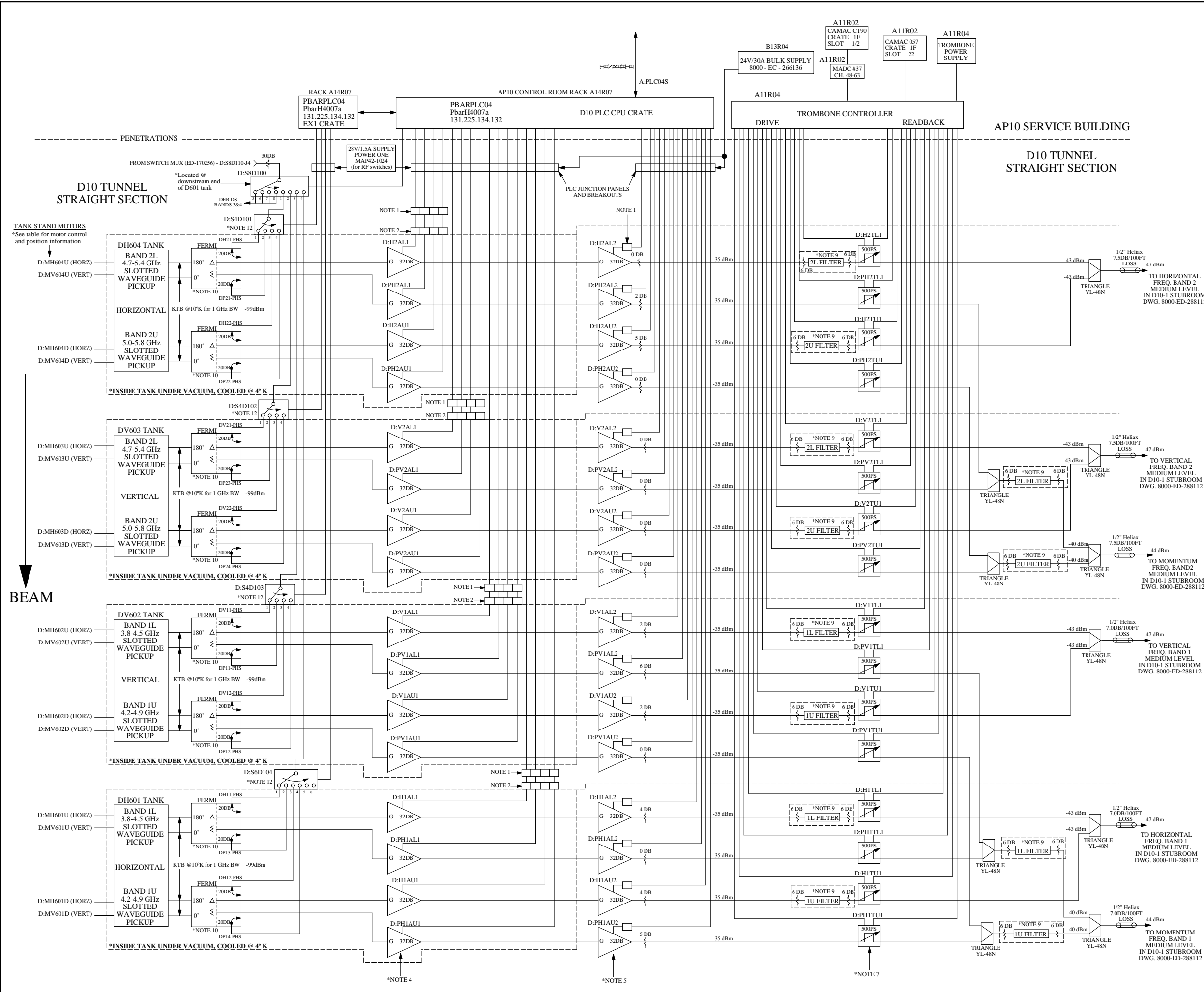
NO.	CABLE NAME	CABLE NO.	SIZE
1	125000-17 TRUNK FROM BUSNELL	17	HELIAX
2	125000-17 TRUNK FROM BUSNELL	17	HELIAX
3	125000-17 TRUNK FROM BUSNELL	17	HELIAX
4	125000-17 TRUNK FROM BUSNELL	17	HELIAX
5	125000-17 TRUNK FROM BUSNELL	17	HELIAX
6	125000-17 TRUNK FROM BUSNELL	17	HELIAX
7	125000-17 TRUNK FROM BUSNELL	17	HELIAX
8	125000-17 TRUNK FROM BUSNELL	17	HELIAX
9	125000-17 TRUNK FROM BUSNELL	17	HELIAX
10	125000-17 TRUNK FROM BUSNELL	17	HELIAX
11	125000-17 TRUNK FROM BUSNELL	17	HELIAX
12	125000-17 TRUNK FROM BUSNELL	17	HELIAX
13	125000-17 TRUNK FROM BUSNELL	17	HELIAX
14	125000-17 TRUNK FROM BUSNELL	17	HELIAX
15	125000-17 TRUNK FROM BUSNELL	17	HELIAX
16	125000-17 TRUNK FROM BUSNELL	17	HELIAX
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19	125000-17 TRUNK FROM BUSNELL	17	HELIAX
20	125000-17 TRUNK FROM BUSNELL	17	HELIAX
21	125000-17 TRUNK FROM BUSNELL	17	HELIAX
22	125000-17 TRUNK FROM BUSNELL	17	HELIAX
23	125000-17 TRUNK FROM BUSNELL	17	HELIAX
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25	125000-17 TRUNK FROM BUSNELL	17	HELIAX
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45	125000-17 TRUNK FROM BUSNELL	17	HELIAX
46	125000-17 TRUNK FROM BUSNELL	17	HELIAX
47	125000-17 TRUNK FROM BUSNELL	17	HELIAX
48	125000-17 TRUNK FROM BUSNELL	17	HELIAX
49	125000-17 TRUNK FROM BUSNELL	17	HELIAX
50	125000-17 TRUNK FROM BUSNELL	17	HELIAX

NO.	CABLE NAME	CABLE NO.	SIZE
1	125000-17 TRUNK FROM BUSNELL	17	HELIAX
2	125000-17 TRUNK FROM BUSNELL	17	HELIAX
3	125000-17 TRUNK FROM BUSNELL	17	HELIAX
4	125000-17 TRUNK FROM BUSNELL	17	HELIAX
5	125000-17 TRUNK FROM BUSNELL	17	HELIAX
6	125000-17 TRUNK FROM BUSNELL	17	HELIAX
7	125000-17 TRUNK FROM BUSNELL	17	HELIAX
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13	125000-17 TRUNK FROM BUSNELL	17	HELIAX
14	125000-17 TRUNK FROM BUSNELL	17	HELIAX
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41	125000-17 TRUNK FROM BUSNELL	17	HELIAX
42	125000-17 TRUNK FROM BUSNELL	17	HELIAX
43	125000-17 TRUNK FROM BUSNELL	17	HELIAX
44	125000-17 TRUNK FROM BUSNELL	17	HELIAX
45	125000-17 TRUNK FROM BUSNELL	17	HELIAX
46	125000-17 TRUNK FROM BUSNELL	17	HELIAX
47	125000-17 TRUNK FROM BUSNELL	17	HELIAX
48	125000-17 TRUNK FROM BUSNELL	17	HELIAX
49	125000-17 TRUNK FROM BUSNELL	17	HELIAX
50	125000-17 TRUNK FROM BUSNELL	17	HELIAX

11/3/00

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY.	REQ.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED		ORIGINATOR	R. J. PASQUINELLI	
DRAWINGS		DRAWN	WES MUELLER	
CHECKED		APPROVED		
1. BREAK ALL SHARP EDGES		USED ON		
2. DO NOT SCALE DRAWING		MATERIAL		
3. DIMENSIONS IN ACCORD WITH ANSI Y14.5 STD'S				
4. MAX. ALL MACHINED SURFACES				
FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY				
PBAR SOURCE STACKTAIL MOMENTUM MEDIUM LEVEL ELECTRONICS				
SCALE	FILMED	DRAWING NUMBER	8000 - EE - 170265	REV
				M

REV.	DESCRIPTION	DRAWN	DATE
		APPD.	DATE
A			




MOTOR CONTROLLER IN RACK A11R05

MOTOR	NAME	MADC CHAN
1	D:MH604U	16
2	D:MH604U	17
3	D:MH603U	18
4	D:MH603U	19
5	D:MH602U	20
6	D:MH602U	21
7	D:MH601U	22
8	D:MH601U	23
9	D:MH604D	24
10	D:MH604D	25
11	D:MH603D	26
12	D:MH603D	27
13	D:MH602D	28
14	D:MH602D	29
15	D:MH601D	30
16	D:MH601D	31

- NOTES:
- 1) AMPLIFIER +15V REGULATORS, FERMI-MADE, 300MA. SEE DWG 8000-EC-266083. REGULATORS PROVIDE ON/OFF CONTROL STATUS, HIGH/LOW VOLTAGE, AND HIGH/LOW CURRENT STATUS.
 - 2) AMPLIFIER +3.0V REGULATORS, BY MITEQ, MODEL BAH-26297.
 - 3) ATTENUATORS ARE SMA TYPE BY MIDWEST MICROWAVE, MODEL 444 OR 292, 86PS LENGTH
 - 4) CRYOGENIC AMPS BY MITEQ, INC. MODEL AMF-3F-040052-25K-CRYO FOR BAND 1 AND MODEL AMF-3F-047060-25K-CRYO FOR BAND 2.
 - 5) LOW LEVEL AMPLIFIERS BY DBS uWAVE, MODEL DB97-1787.
 - 6)
 - 7) PHASE SHIFTERS ARE BY NARDA uWAVE, MODEL 27223, 500PS RANGE CONTROL CABLES PROVIDES MOTOR DIRECTIONAL POWER ON/OFF, READBACK CABLES PROVIDES LOW/HIGH LIMIT AND POSITION.
 - 8) AMP REGULATORS, SWITCHES, AND ALL RF COMPONENTS PAST COLD BOX, ARE MOUNTED SOMEWHERE ON OR NEAR EACH OF THEIR RESPECTIVE PICKUP TANKS.
 - 9) FERMI-MADE TRANSVERSAL BANDPASS FILTER, LOSS 8DB MAX.
 - 10) FERMI-MADE CUSTOM NARROW BAND 180° RING HYBRID W/SHORTING STUB.
 - 11) ATTENUATORS ARE TYPE 'N' 5W, MODEL A956S BY EMCO.
 - 12) COAXIAL SWITCHES ARE EITHER BY NARDA (WAVECOM) OR DYNATECH. FOUR POSITION MODEL 04-113E291 (Dynatech) OR 043-B237-D1D-3B1 (Narda). SIX POSITION MODEL 06-113E291 (Dynatech) OR 063-B237-D1D-3B1.

1/23/01

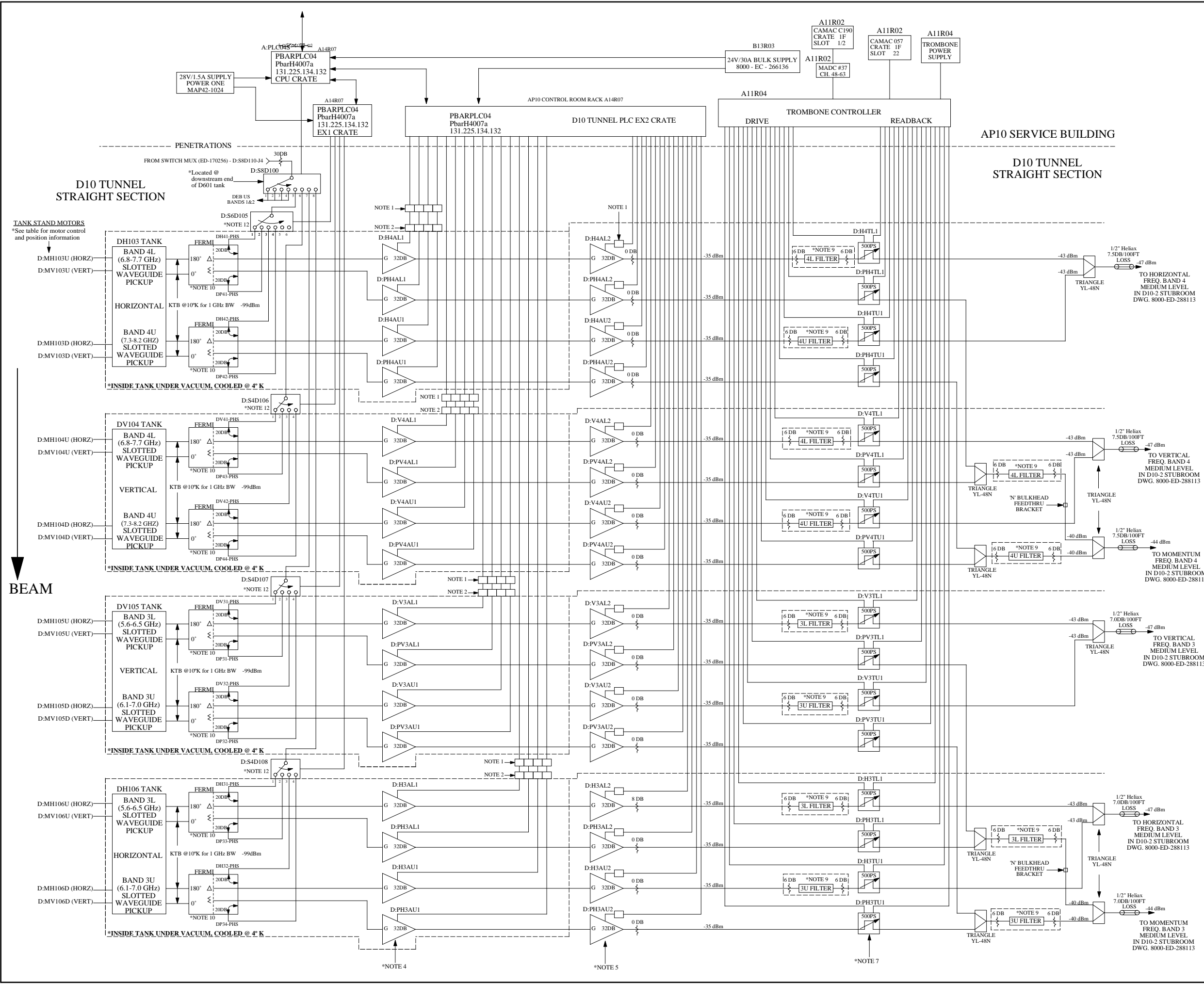
ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
PARTS LIST			
UNLESS OTHERWISE SPECIFIED		ORIGINATOR	RALPH PASQUINELLI
FRACTIONS	DECIMALS	ANGLES	DRAWN
+/-	+/-	+/-	WESLEY J. MUELLER
1. BREAK ALL SHARP EDGES 1/64 MAX.		CHECKED	3/17/98
2. DO NOT SCALE DRAWING		APPROVED	
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5 STD'S		USED ON	
✓ MAX. ALL MACHINED SURFACES		MATERIAL-	


FERMI NATIONAL ACCELERATOR LABORATORY
 UNITED STATES DEPARTMENT OF ENERGY

ANTI-PROTON SOURCE
DEBUNCHER LOW LEVEL
UPSTREAM ELECTRONICS

SCALE	FILMED	DRAWING NUMBER	REV.
		8000 - ED - 288110	

REV.	DESCRIPTION	DRAWN	DATE
A		APPD.	DATE



MOTOR CONTROLLER IN RACK A16R05

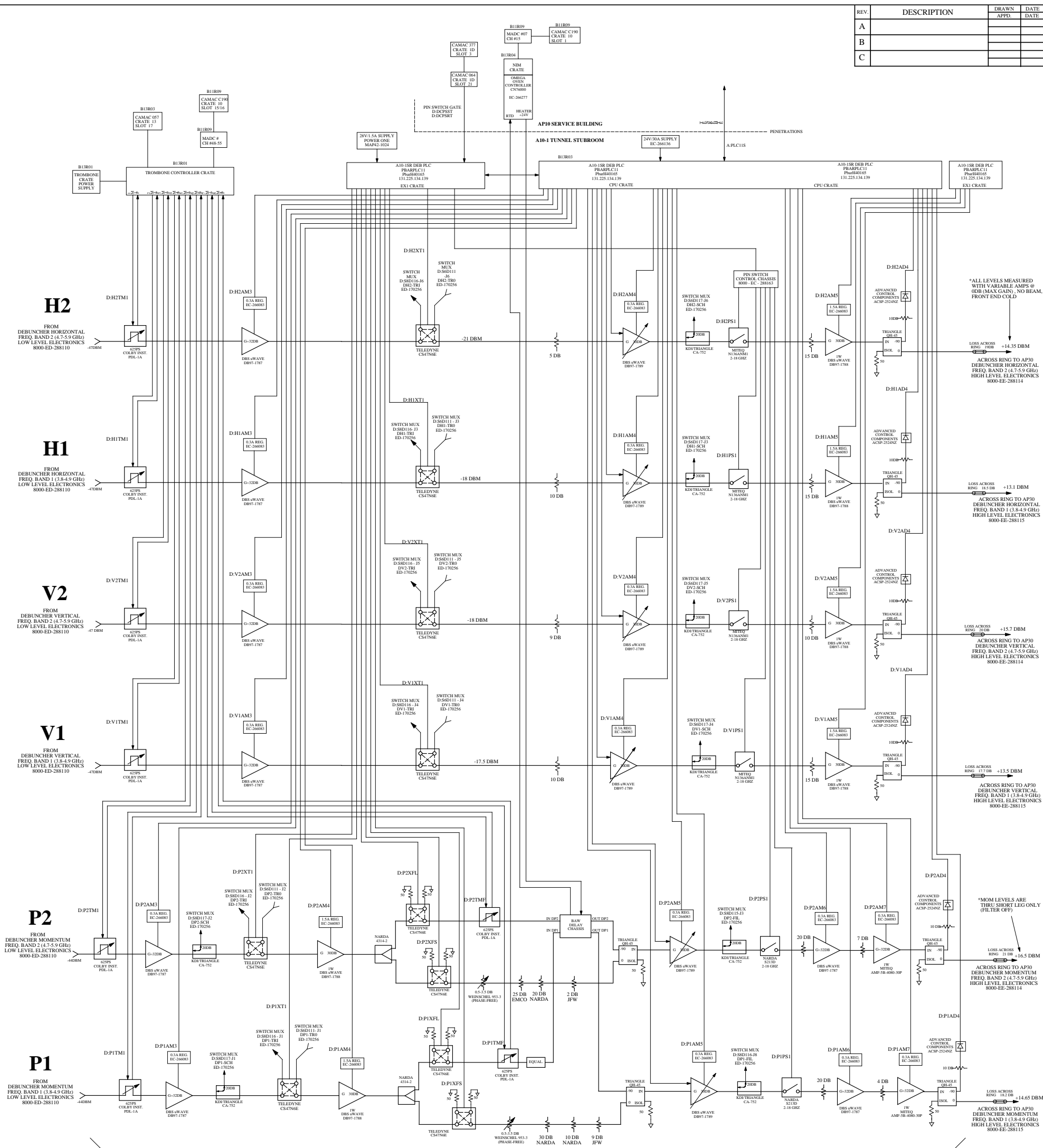
MOTOR	NAME	MADC CHAN
1	D-MH103U	48
2	D-MV103U	49
3	D-MH104U	50
4	D-MV104U	51
5	D-MH105U	52
6	D-MV105U	53
7	D-MH106U	54
8	D-MV106U	55
9	D-MH103D	56
10	D-MV103D	57
11	D-MH104D	58
12	D-MV104D	59
13	D-MH105D	60
14	D-MV105D	61
15	D-MH106D	62
16	D-MV106D	63

- NOTES:
- AMPLIFIER +15V REGULATORS, FERMI-MADE, 300MA. SEE DWG 8000-EC-266083. REGULATORS PROVIDE ON/OFF CONTROL STATUS, HIGH/LOW VOLTAGE, AND HIGH/LOW CURRENT STATUS.
 - AMPLIFIER +6.0V REGULATORS, BY MITEQ, MODEL BAH-26297.
 -
 - CRYOGENIC AMPS BY MITEQ, INC., MODEL AMF-3F-054070-25K-CRYO FOR BAND 3 AND MODEL AMF-3F-063080-25K-CRYO FOR BAND 4.
 - LOW LEVEL AMPLIFIERS BY DBS uWAVE, MODEL DB97-1787.
 -
 - PHASE SHIFTERS ARE BY NARDA uWAVE, MODEL 27223, 500PS RANGE
 - CONTROL CABLES PROVIDES MOTOR DIRECTIONAL POWER ON/OFF.
 - READBACK CABLES PROVIDES LOW/HIGH LIMIT AND POSITION. AMP REGULATORS, SWITCHES, AND ALL RF COMPONENTS FAST COLD BOX, ARE MOUNTED SOMEWHERE ON OR NEAR EACH OF THEIR RESPECTIVE PICKUP TANKS.
 - FERMI-MADE TRANSVERSAL BANDPASS FILTER, LOSS 8DB MAX.
 - FERMI-MADE CUSTOM NARROW BAND 180° RING HYBRID W/SHORTING STUB.
 - ATTENUATORS ARE TYPE 'N' 5W, MODEL A956S BY EMCO.
 - COAXIAL SWITCHES ARE EITHER BY NARDA (WAVECOM) OR DYNATECH. FOUR POSITION MODEL O4-113E291 (Dynatech) OR 043-B237-D1D-3B1 (Narda). SIX POSITION MODEL O6-113E291 (Dynatech) OR 063-B237-D1D-3B1.

1/9/01

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
PARTS LIST			
UNLESS OTHERWISE SPECIFIED		ORIGINATOR	RALPH PASQUINELLI
FRACTIONS	DECIMALS	ANGLES	DRAWN
+/-	+/-	+/-	WESLEY J. MUELLER
1. BREAK ALL SHARP EDGES 1/64 MAX.		CHECKED	3/17/98
2. DO NOT SCALE DRAWING		APPROVED	
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5 STD'S		USED ON	
✓ MAX. ALL MACHINED SURFACES		MATERIAL-	
FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY			
ANTI-PROTON SOURCE DEBUNCHER LOW LEVEL DOWNSTREAM ELECTRONICS			
SCALE	FILMED	DRAWING NUMBER	REV.
		8000 - ED - 288111	

REV.	DESCRIPTION	DRAWN	DATE
A			
B			
C			



- NOTES:
- 1) AMPLIFIER +15V REGULATORS, FERM-MADE, 300MA, SEE DWG 8000-EE-266083. REGULATORS PROVIDE ON/OFF CONTROL STATUS, HIGH LOW VOLTAGE, AND HIGH LOW CURRENT STATUS.
 - 2) PHASE SHIFTERS ARE BY COLBY INSTRUMENTS, MODEL PDL-1A, 625PS RANGE. CONTROL CABLES PROVIDES MOTOR DIRECTIONAL POWER ON/OFF. REARBACK CABLES PROVIDES LOW HIGH LIMIT AND POSITION.
 - 3) DEB EQUALIZERS ARE CUSTOM DESIGNED BY FERMI LAB, 1.8SS 8 DB MAX.
 - 4)

*ALL COMPONENTS MOUNTED ON ALUMINUM PLATE IN DOUBLE DEPTH RELAY RACKS IN A10-2 STUBROOM
 2 MOMENTUM SYSTEMS ARE ON LOWER PLATE INSIDE RACK AND 4 BETATRON SYSTEMS ARE ON UPPER PLATE ON TOP OF RACK

1/23/01

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY.
PARTS LIST			
UNLESS OTHERWISE SPECIFIED	ORIGINATOR	RALPH RASQUINELLI	
FRACTIONS	DECIMALS	ANGLES	3/11/98
APPROVED	CHECKED	WESLEY MUELLER	
1. BREAK ALL SHARP EDGES 1/64 MAX.	APPROVED	USED ON	
2. DO NOT SCALE DRAWING			
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5 STD'S			
4. MAX. ALL MACHINED SURFACES			
FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY			
ANTI-PROTON SOURCE DEBUNCHER MEDIUM LEVEL UPSTREAM ELECTRONICS			
SCALE	FILMED	DRAWING NUMBER	REV.
		8000 - EE - 288112	

*ALL LEVELS MEASURED WITH VARIABLE AMPS @ DBS (MAX GAIN). NO BEAM, FRONT END COLD

ACROSS RING TO AP30 DEBUNCHER HORIZONTAL FREQ. BAND 2 (4.7-5.9 GHz) HIGH LEVEL ELECTRONICS 8000-EE-288114

ACROSS RING TO AP30 DEBUNCHER HORIZONTAL FREQ. BAND 1 (3.8-4.9 GHz) HIGH LEVEL ELECTRONICS 8000-EE-288115

ACROSS RING TO AP30 DEBUNCHER VERTICAL FREQ. BAND 2 (4.7-5.9 GHz) HIGH LEVEL ELECTRONICS 8000-EE-288115

ACROSS RING TO AP30 DEBUNCHER VERTICAL FREQ. BAND 1 (3.8-4.9 GHz) HIGH LEVEL ELECTRONICS 8000-EE-288115

ACROSS RING TO AP30 DEBUNCHER HORIZONTAL FREQ. BAND 2 (4.7-5.9 GHz) HIGH LEVEL ELECTRONICS 8000-EE-288114

ACROSS RING TO AP30 DEBUNCHER HORIZONTAL FREQ. BAND 1 (3.8-4.9 GHz) HIGH LEVEL ELECTRONICS 8000-EE-288115

ACROSS RING TO AP30 DEBUNCHER VERTICAL FREQ. BAND 2 (4.7-5.9 GHz) HIGH LEVEL ELECTRONICS 8000-EE-288115

ACROSS RING TO AP30 DEBUNCHER VERTICAL FREQ. BAND 1 (3.8-4.9 GHz) HIGH LEVEL ELECTRONICS 8000-EE-288115

*MOM LEVELS ARE TRU SHORT LEG ONLY (FILTER OFF)

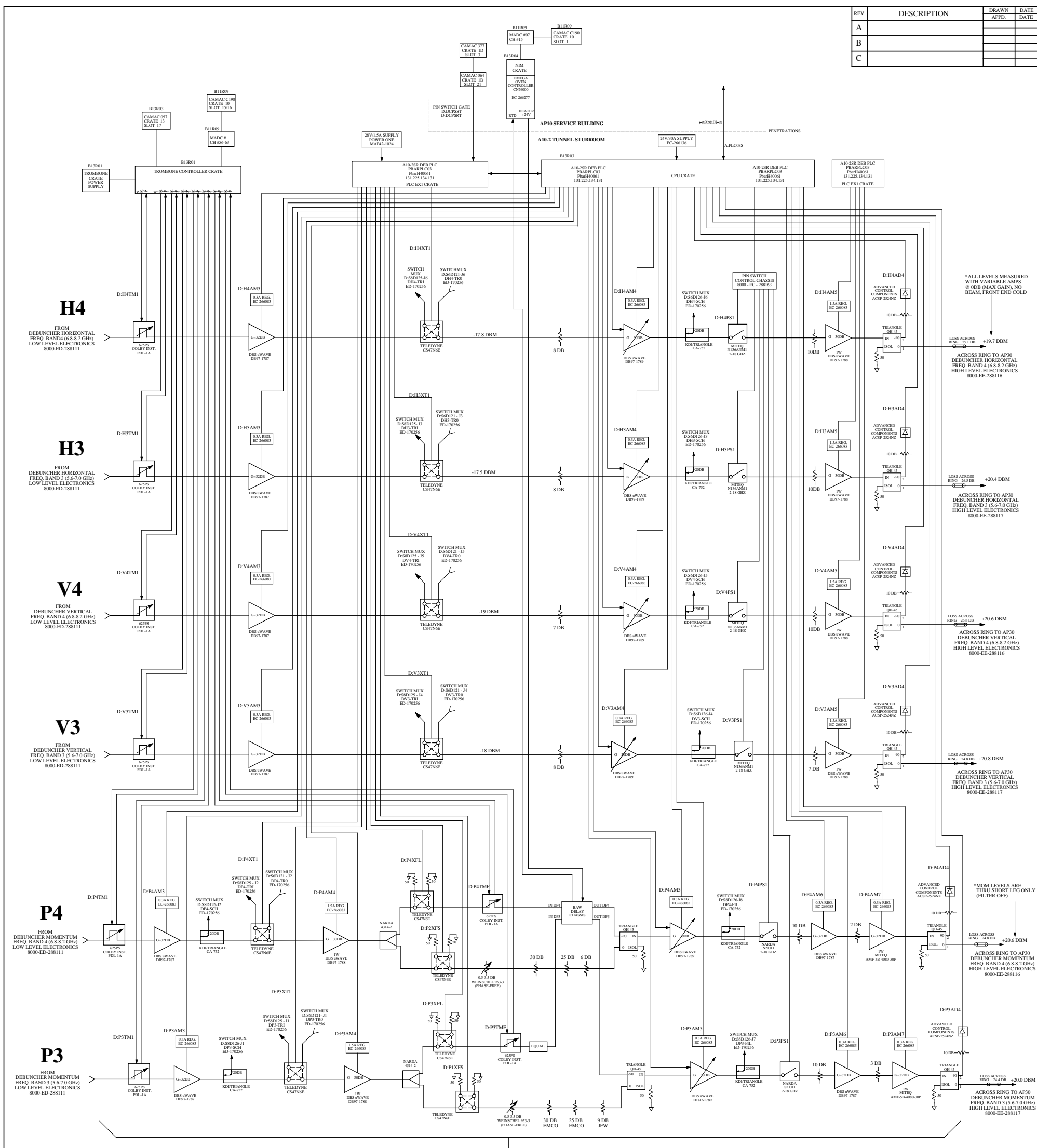
ACROSS RING TO AP30 DEBUNCHER HORIZONTAL FREQ. BAND 2 (4.7-5.9 GHz) HIGH LEVEL ELECTRONICS 8000-EE-288114

ACROSS RING TO AP30 DEBUNCHER HORIZONTAL FREQ. BAND 1 (3.8-4.9 GHz) HIGH LEVEL ELECTRONICS 8000-EE-288115

ACROSS RING TO AP30 DEBUNCHER VERTICAL FREQ. BAND 2 (4.7-5.9 GHz) HIGH LEVEL ELECTRONICS 8000-EE-288115

ACROSS RING TO AP30 DEBUNCHER VERTICAL FREQ. BAND 1 (3.8-4.9 GHz) HIGH LEVEL ELECTRONICS 8000-EE-288115

REV.	DESCRIPTION	DRAWN	DATE
A			
B			
C			

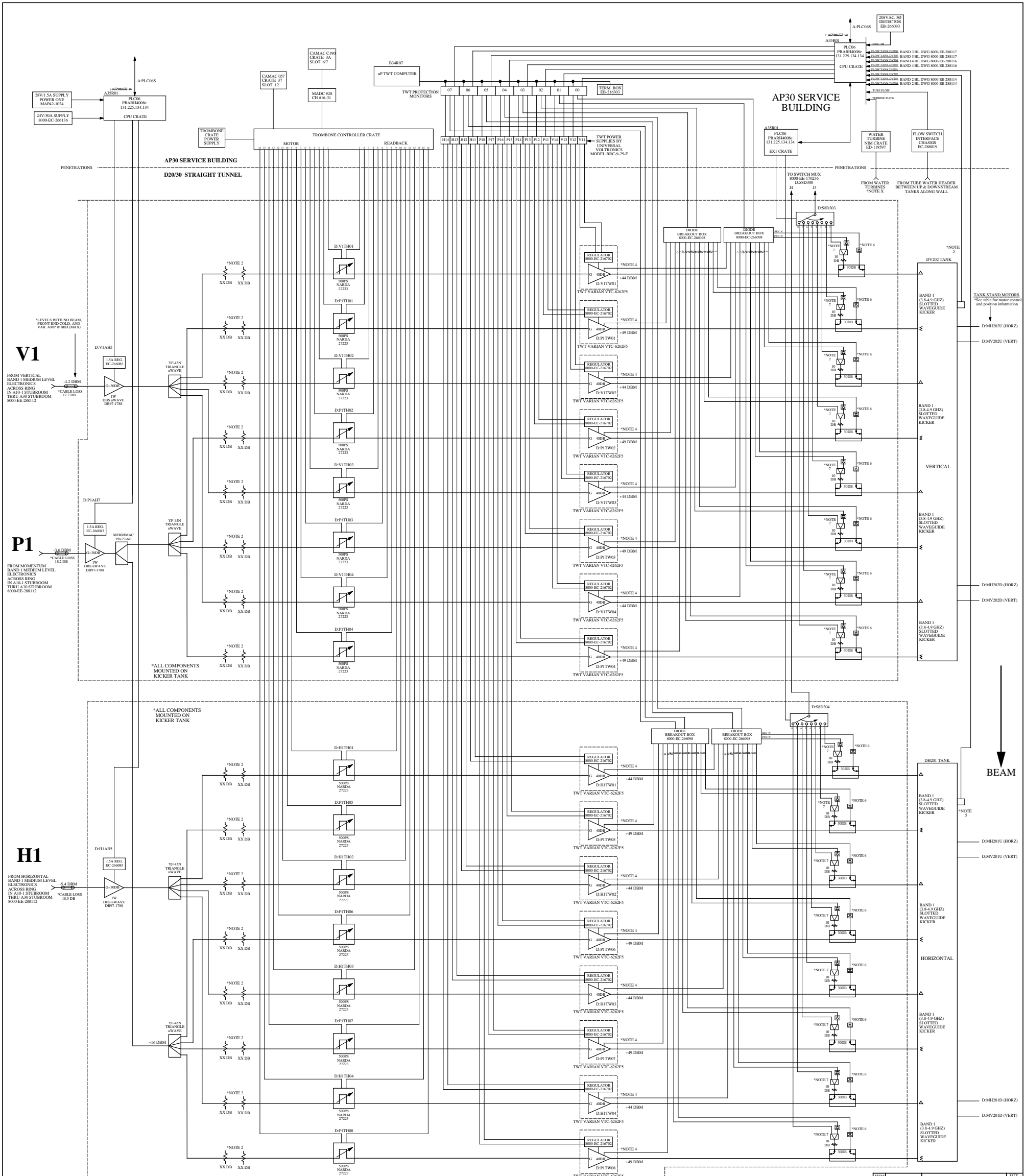


- NOTES:
- 1) AMPLIFIER +15V REGULATORS, FERM-MADE, 300MA, SEE DWG 8000-EE-266083. REGULATORS PROVIDE ON-OFF CONTROL STATUS, HIGH LOW VOLTAGE, AND HIGH LOW CURRENT STATUS.
 - 2) PHASE SHIFTERS ARE BY COLBY INSTRUMENTS, MODEL PDL-1A, 62PS RANGE. CONTROL CABLES PROVIDES MOTOR DIRECTIONAL POWER ON/OFF. REARBACK CABLES PROVIDES LOW HIGH LIMIT AND POSITION.
 - 3) DB EQUALIZERS ARE CUSTOM DESIGNED BY FERMI LAB, LOSS 8 DB MAX.
 - 4)

*ALL COMPONENTS MOUNTED ON ALUMINUM PLATE IN DOUBLE DEPTH RELAY RACKS IN A10-2 STUBROOM
 2 MOMENTUM SYSTEMS ARE ON LOWER PLATE INSIDE RACK AND 4 BETATRON SYSTEMS ARE ON UPPER PLATE ON TOP OF RACK

1/23/01

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY.
UNLESS OTHERWISE SPECIFIED			
FRACTIONS		DECIMALS	
ANGLES		DEGREES	
CHECKED		APPROVED	
1. BREAK ALL SHARP EDGES 1/64 MAX.		USED ON	
2. DO NOT SCALE DRAWING		MATERIAL	
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5 STD'S			
4. MAX. ALL MACHINED SURFACES			
 FERMIONATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY			
ANTI-PROTON SOURCE DEBUNCHER MEDIUM LEVEL DOWNSTREAM ELECTRONICS			
SCALE	FILMED	DRAWING NUMBER	REV.
		8000-EE-288113	



V1

P1

H1

BEAM

- NOTES:**
- 1) AMPERAGE REGULATOR CABLES HAVE ON/OFF CONTROL AND HIGH/LOW VOLTAGE AND HIGH/LOW CURRENT STATUS.
 - 2) LEVEL BALANCING ATTENUATORS CONSIST OF ONE NARDA (200P LENGTH), MODEL 771 AND ONE FW (600P LENGTH), MODEL 58H. BOTH ARE TYPE 'N'.
 - 3) TROMBONE CABLES CONSIST OF ONE MOTOR (POWER) CABLE WITH ON/OFF DIRECTIONAL CONTROL, AND ONE READBACK CABLE WITH UPPER LIMIT, LOWER LIMIT, AND POSITION STATUS.
 - 4) AN EXTERNAL TIMBER-TUBE KILNOR IS ATTACHED TO THE HOT COLLECTOR END OF TWT. KILNOR BY ELWOOD SENSORS, MODEL 3100-56-162-250, NORMALLY CLOSED, SET TO OPEN AT 290° ±0.5°.
 - 5) WATER FLOW SWITCHES BY FLEED COMPONENTS (FV), MODEL FV-1050A AND (FV)B0000. THEY ARE MOUNTED NEAR CEILING ABOVE THEIR ASSOCIATED TANK.
 - 6) DIODE DETECTORS BY ADVANCED CONTROL COMPONENTS (ACC), MODEL ACSP261SNZ.
 - 7) SPLITTERS ON TWT COOLERS ARE BY ANARIN, MODEL 40256. THESE ARE NORMALLY 2-GHZ SPLITTERS, THEY HAVE BEEN CHECKED AND VERIFIED TO WORK WELL 3.8 - 4.9 GHz. USED IN BAND 1 ONLY.
 - 8)

MOTOR CONTROLLER IN RACK AS2803

MOTOR	NAME	MADE#	CHAN
1	DMH204U		0
2	DMV204U		1
3	DMH202U		2
4	DMV202U		3
5	DMH202U		4
6	DMV202U		5
7	DMH201U		6
8	DMV201U		7
9	DMH204D		8
10	DMV204D		9
11	DMH202D		10
12	DMV202D		11
13	DMH202D		12
14	DMV202D		13
15	DMH201D		14
16	DMV201D		15

1/23/01

REV.	DESCRIPTION	APPD.	DATE	DRWN.	DATE	ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY.	REQ.
A										
B										
C										
D										
E										
F										

REVISED BY	DATE	DESCRIPTION
WESLEY MULLER	3/16/98	APPROVED

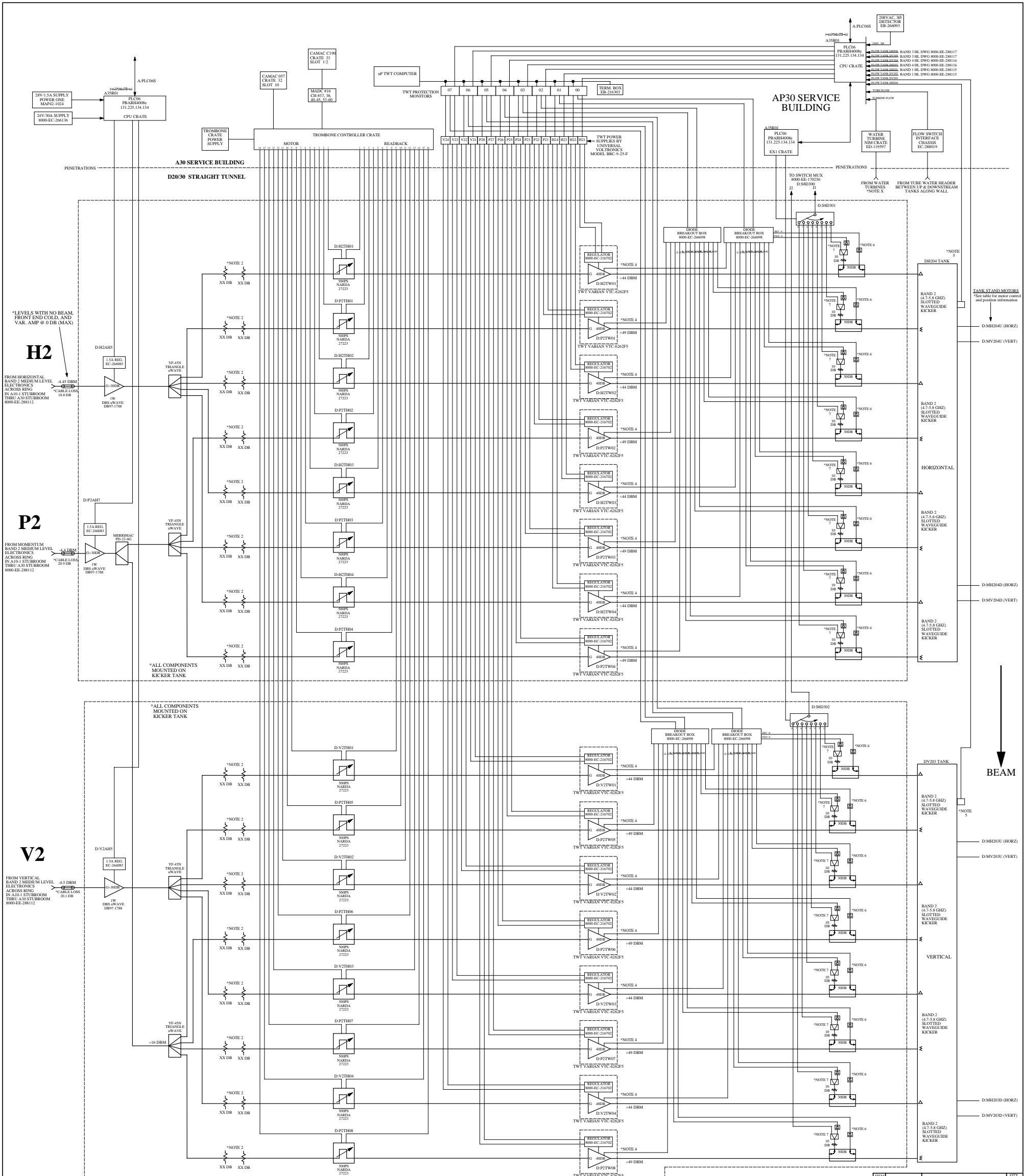
ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY.	REQ.
1	104-MA	BREAK ALL SHARP EDGES		
2		DO NOT SCALE DRAWING		
3		FORWARDING IN ACCORD WITH ANSI Y14.5 STD.		
4		MAX. ALL MACHINED SURFACES		

DESIGNER	DRAWN	CHECKED	APPROVED
WESLEY MULLER	WESLEY MULLER	WESLEY MULLER	WESLEY MULLER

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

**ANTI-PROTON SOURCE
DEBUNCHER BAND 1 (3.8-4.9 GHz)
HIGH LEVEL ELECTRONICS**

SCALE: 1/8"=1'-0" DRAWING NUMBER: 8000-EE-288115



H2

P2

V2

BEAM

- NOTES:**
- 1) AMPEX REGULATOR CABLES HAVE ON/OFF CONTROL AND HIGH/LOW VOLTAGE AND HIGH/LOW CURRENT STATUS.
 - 2) LEVEL BALANCING ATTENUATORS CONSIST OF ONE NARDA (COPIES LENGTH), MODEL 771 AND ONE FW (60FPS LENGTH), MODEL 58H. BOTH ARE TYPE 'N'.
 - 3) TROMBONE CABLES CONSIST OF ONE MOTOR (POWER) CABLE WITH ON/OFF DIRECTIONAL CONTROL, AND ONE READBACK CABLE WITH UPPER LIMIT, LOWER LIMIT, AND POSITION STATUS.
 - 4) AN EXTERNAL TEMPERATURE KILN IS ATTACHED TO THE HOT COLLECTOR END OF TWT. KILN BY ELWOOD SENSORS, MODEL 3100-56-162-250, NORMALLY CLOSED, SET TO OPEN AT 290°F ±0.5°F.
 - 5) WATER FLOW SWITCHES BY FLUID COMPONENTS INTL. (FCI), MODEL FLD-350A/10C/18B/0000. THEY ARE MOUNTED NEAR CEILING ABOVE THEIR ASSOCIATED TANK.
 - 6) DIODE DETECTORS BY ADVANCED CONTROL COMPONENTS (ACC), MODEL ACS261SNZ.
 - 7) SPLITTERS ON TWT COUPLERS ARE KDI/TRIANGLE MODEL VFL-48N.
 - 8)

MOTOR	NAME	MANUFACTURER
1	D-MH20H1	0
2	D-MV20H1	1
3	D-MH20H2	2
4	D-MV20H2	3
5	D-MH20H3	4
6	D-MV20H3	5
7	D-MH20H4	6
8	D-MV20H4	7
9	D-MH20H5	8
10	D-MV20H5	9
11	D-MH20H6	10
12	D-MV20H6	11
13	D-MH20H7	12
14	D-MV20H7	13
15	D-MH20H8	14
16	D-MV20H8	15

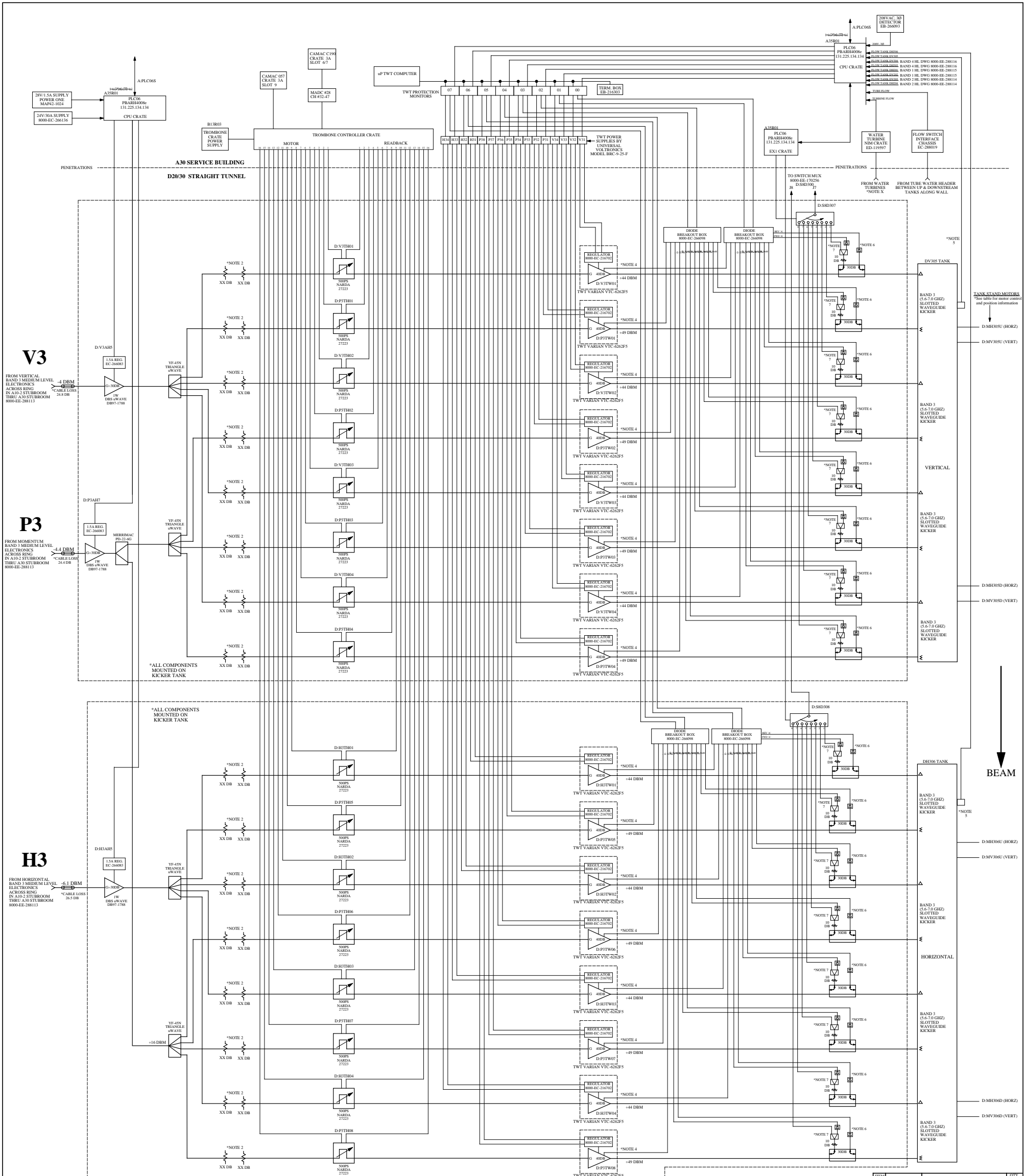
1/23/01

REV.	DESCRIPTION	DRAWN	DATE	APPROVED	DATE
A					
B					
C					
D					
E					
F					

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY.
1	D-MH20H1	REGULATOR	1
2	D-MV20H1	ATTENUATOR	1
3	D-MH20H2	REGULATOR	1
4	D-MV20H2	ATTENUATOR	1
5	D-MH20H3	REGULATOR	1
6	D-MV20H3	ATTENUATOR	1
7	D-MH20H4	REGULATOR	1
8	D-MV20H4	ATTENUATOR	1
9	D-MH20H5	REGULATOR	1
10	D-MV20H5	ATTENUATOR	1
11	D-MH20H6	REGULATOR	1
12	D-MV20H6	ATTENUATOR	1
13	D-MH20H7	REGULATOR	1
14	D-MV20H7	ATTENUATOR	1
15	D-MH20H8	REGULATOR	1
16	D-MV20H8	ATTENUATOR	1

FERMI NATIONAL ACCELERATOR LABORATORY
 UNITED STATES DEPARTMENT OF ENERGY
ANTI-PROTON SOURCE
DEBUNCHER BAND 2 (4.7-5.8 GHZ)
HIGH LEVEL ELECTRONICS

SCALE: 1/8"=1'-0"
 DRAWING NUMBER: 8000-EE-288114



V3
FROM VERTICAL BAND 3 MEDIUM LEVEL ELECTRONICS ACROSS RING IN A10.2 STUBROOM THRU A30 STUBROOM 8000-EE-288113

P3
FROM MOMENTUM BAND 3 MEDIUM LEVEL ELECTRONICS ACROSS RING IN A10.2 STUBROOM THRU A30 STUBROOM 8000-EE-288113

H3
FROM HORIZONTAL BAND 3 MEDIUM LEVEL ELECTRONICS ACROSS RING IN A10.2 STUBROOM THRU A30 STUBROOM 8000-EE-288113

- NOTES:**
- 1) AMPERAGE REGULATOR CABLES HAVE ON/OFF CONTROL AND HIGH/LOW VOLTAGE AND HIGH/LOW CURRENT STATUS.
 - 2) LEVEL BALANCING ATTENUATORS CONSIST OF ONE NARDA (200PS LENGTH, MODEL 77) AND ONE FW (600PS LENGTH), MODEL 58H. BOTH ARE TYPE 'N'.
 - 3) TROMBONE CABLES CONSIST OF ONE MOTOR (POWER) CABLE WITH ON/OFF DIRECTIONAL CONTROL, AND ONE READBACK CABLE WITH UPPER LIMIT, LOWER LIMIT, AND POSITION STATUS.
 - 4) AN EXTERNAL TIMBER-TUBE KILNON IS ATTACHED TO THE HOT COLLECTOR END OF TWT. KILNON BY ELMWOOD SENSORS, MODEL 3100-56-162-250, NORMALLY CLOSED, SET TO OPEN AT -200V +/-5%.
 - 5) WATER FLOW SWITCHES BY FLEED COMPONENTS (INTL. PART, MODEL FLE7030MAA10C18B0000). THEY ARE MOUNTED NEAR CEILING ABOVE THEIR ASSOCIATED TANK.
 - 6) DIODE DETECTORS BY ADVANCED CONTROL COMPONENTS (ACC, MODEL ACS261SNZ).
 - 7) SPLITTERS ON TWT COUPLERS ARE KDI/TRIANGLE MODEL YF-45N.
 - 8)

MOTOR CONTROLLER IN RACK A300

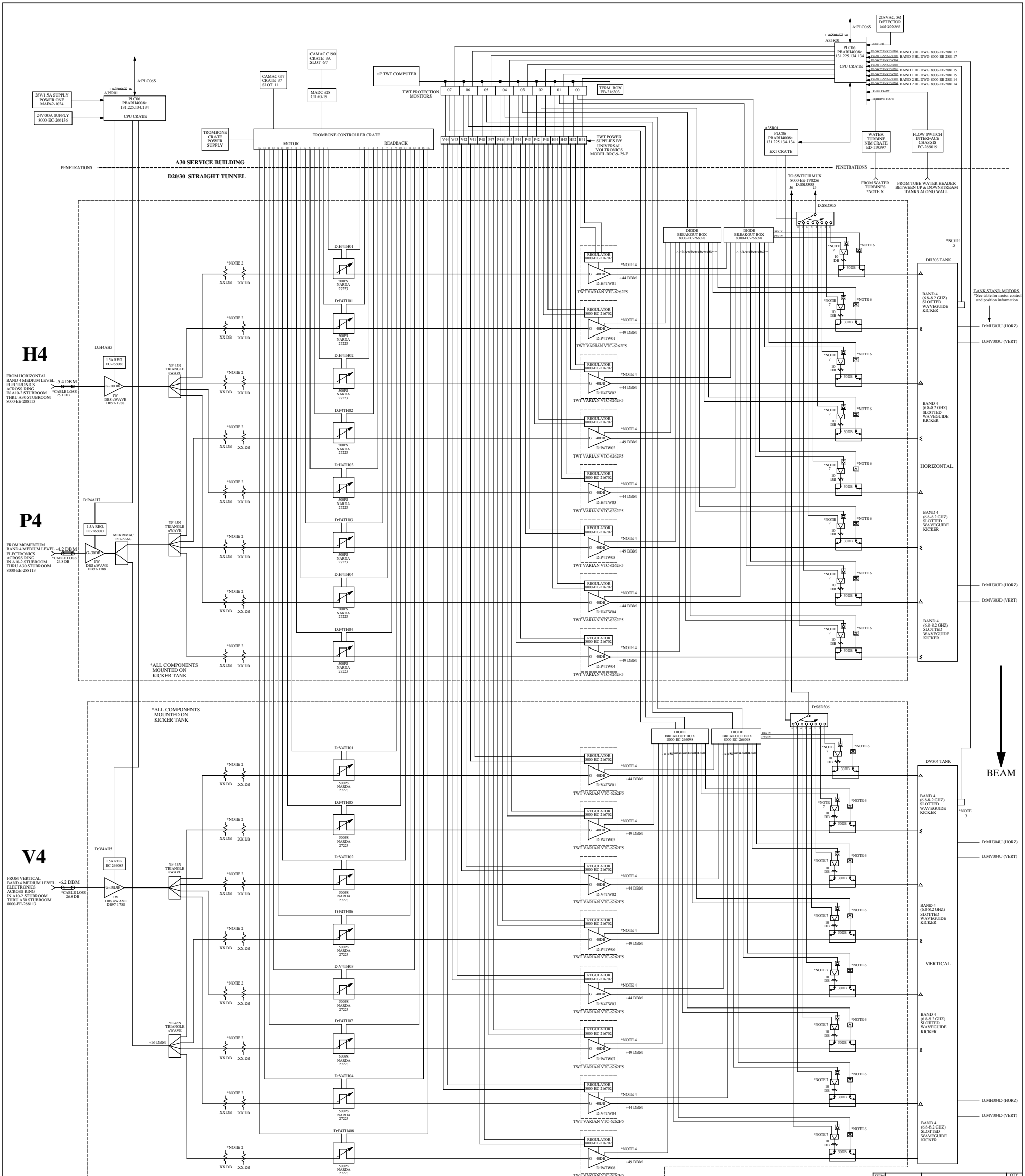
MOTOR	NAME	MALC CHAN
1	D-MH30U	16
2	D-MV30U	17
3	D-MH30L	18
4	D-MV30L	19
5	D-MH30U	20
6	D-MV30U	21
7	D-MH30L	22
8	D-MV30L	23
9	D-MH30U	24
10	D-MV30U	25
11	D-MH30L	26
12	D-MV30L	27
13	D-MH30U	28
14	D-MV30U	29
15	D-MH30L	30
16	D-MV30L	31

1/23/01

REV.	DESCRIPTION	DRAWN	DATE	APPROVED	DATE
A					
B					
C					
D					
E					
F					

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY.	REQ.
1	REGULATOR	REGULATOR 800-EC-216702		
2	ATTENUATOR	ATTENUATOR 800-EC-216702		
3	REGULATOR	REGULATOR 800-EC-216702		
4	ATTENUATOR	ATTENUATOR 800-EC-216702		
5	REGULATOR	REGULATOR 800-EC-216702		
6	ATTENUATOR	ATTENUATOR 800-EC-216702		
7	REGULATOR	REGULATOR 800-EC-216702		
8	ATTENUATOR	ATTENUATOR 800-EC-216702		
9	REGULATOR	REGULATOR 800-EC-216702		
10	ATTENUATOR	ATTENUATOR 800-EC-216702		
11	REGULATOR	REGULATOR 800-EC-216702		
12	ATTENUATOR	ATTENUATOR 800-EC-216702		
13	REGULATOR	REGULATOR 800-EC-216702		
14	ATTENUATOR	ATTENUATOR 800-EC-216702		
15	REGULATOR	REGULATOR 800-EC-216702		
16	ATTENUATOR	ATTENUATOR 800-EC-216702		

ANTI-PROTON SOURCE
DEBUNCHER BAND 3 (5.6-7.0 GHZ)
HIGH LEVEL ELECTRONICS
DRAWING NUMBER: 8000-EE-288117



H4

P4

V4

BEAM

- NOTES:**
- 1) AMPLIFIER REGULATOR CABLES HAVE ON/OFF CONTROL AND HIGH/LOW VOLTAGE AND HIGH/LOW CURRENT STATUS.
 - 2) LEVEL BALANCING ATTENUATORS CONSIST OF ONE NARDA (200P LENGTH, MODEL 77) AND ONE 1W (600P LENGTH), MODEL 58H, BOTH ARE TYPE 'N'.
 - 3) TROMBONE CABLES CONSIST OF ONE MOTOR (POWER) CABLE WITH ON/OFF DIRECTIONAL CONTROL, AND ONE READBACK CABLE WITH UPPER LIMIT, LOWER LIMIT, AND POSITION STATUS.
 - 4) AN EXTERNAL TIMBER-TUBE KILNIXON IS ATTACHED TO THE HOT COLLECTOR END OF TWT. KILNIXON BY ELWOOD SENSORS, MODEL 3100-56-162-250, NORMALLY CLOSED, SET TO OPEN AT 290°F .
 - 5) WATER FLOW SWITCHES BY FLEED COMPONENTS (FLEED, MODEL FL7030MA10C10B0000), THEY ARE MOUNTED NEAR CEILING ABOVE THEIR ASSOCIATED TANK.
 - 6) DIODE DETECTORS BY ADVANCED CONTROL COMPONENTS (ACC, MODEL ACS261SNZ).
 - 7) SPLITTERS ON TWT COUPLERS ARE KDI/TRIANGLE MODEL VL-48N.
 - 8)

MOTOR CONTROLLER IN RACK AS803

MOTOR	NAME	MADC	CHAN
1	DMEH0U	16	
2	DMV0U	17	
3	DMEH0L	18	
4	DMV0L	19	
5	DMEH0R	20	
6	DMV0R	21	
7	DMEH0D	22	
8	DMV0D	23	
9	DMEH0V	24	
10	DMV0V	25	
11	DMEH0S	26	
12	DMV0S	27	
13	DMEH0D	28	
14	DMV0D	29	
15	DMEH0D	30	
16	DMV0D	31	

1/23/01

REV.	DESCRIPTION	DRAWN	DATE	APPR.	DATE
A					
B					
C					
D					
E					
F					

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY.	REQ.
1		BREAK ALL SHARP EDGES TO 1/16" MAX.		
2		DO NOT SCALE DRAWING		
3		ENGINEERING IN CHARGE WITH ANSI Y14.5 TOLERANCES		
4		IF MAX. ALL MACHINED SURFACES		

REVISIONS	DESIGNED	DRAWN	CHECKED	DATE
1	ANTHONY PASQUINELLI	ANTHONY PASQUINELLI	WESLEY MULLER	3/16/98

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

**ANTI-PROTON SOURCE
DEBUNCHER BAND 4 (6.8-8.2 GHz)
HIGH LEVEL ELECTRONICS**

SCALE: 1/1"=1'-0" DRAWING NUMBER: 8000-EE-288116 REV: F