

FM Series Power Amplifier Handbook

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Limited Warranty

PTEK (SELLER) warrants that products are free from defects in material and workmanship and meet performance specifications provided, however, that:

- (A) SELLER' liability under this Warranty is limited to repairing or replacing, at its option, any product delivered here under not conforming to this Warranty;
- (B) This Warranty is limited to a period of two years;
- (C) Minor deviations from specifications which do not affect performance are excluded from this Warranty; and
- (D) SELLER shall be liable under this Warranty only if:

- (1) It is promptly notified in writing by the Buyer upon discovery of the failure of any product to conform to this Warranty,
- (2) The product is returned to SELLER, transportation charges prepaid by the Buyer,
- (3) The product is received by SELLER not later than ten days after the last day of the two-year period of this Warranty, and
- (4) SELLER' examination of the Product discloses to SELLER'S reasonable satisfaction that such defects or failures as may exist have not been caused by misuse, neglect, improper installation, repair, alteration, accident or shipping.

The Buyer will prepay freight to and from SELLER on products serviced here under at SELLER' plant; but SELLER may, at its option, elect to perform any repairs here under at the Buyer's place of business. The foregoing constitutes SELLER'S entire Warranty expressed, implied and/or statutory, except as to title, and states the full extent of SELLER'S liability to the Buyer or to any other party for any breach of such Warranty and for damages, whether direct, special, incidental or consequential; and, other than as expressly provided in this document. No Warranties, expressed or implied, including any Warranty or merchant ability or of fitness for a particular purpose, are made. No employee, representative or agent of SELLER has any authority, expressed or implied, to alter or to supplement the terms of this Warranty.

Warranty Service

The Limited Warranty covers parts and labor to the original purchaser for two year. Damage caused by misuse or shipping is excluded from the warranty. Before returning units or material, contact the factory for a Returned Material Authorization (RMA) number. Ship all material prepaid. Defective material should be addressed to:

**PTEK
Customer Service Manager
1814 Schooldale Drive
San Jose, CA. 95124
(408) 448-3342**

Rev record

- A.....10/1/96
- B.....5/14/96
- C.....1/28/00
- D.....11/02/02
- E.....5/27/03
- F.....12/05/03

change in fuse spec. 5/26/09

Specifications

Parameter	Characteristics
<i>General</i>	
<i>Frequency range</i>	87.5 to 108MHz
<i>Input RF connector</i>	Type N
<i>Output RF connector</i>	Type N
<i>Harmonics</i>	-70dBc
<i>AM noise</i>	dependent on excitor used
<i>FCC Registration</i>	
<i>FM 500</i>	ML9FM 500
<i>Metering Ranges</i>	
<i>Forward power</i>	600W 10 percent
<i>Reverse power</i>	60W 10 percent
<i>Final current</i>	20A 5 percent
<i>Final voltage</i>	60V 5 percent
<i>Indicators</i>	REMOTE OFF RED OUTPUT OUT OF RANGE LO RED OUTPUT OUT OF RANGE HI RED
<i>Accessory connector</i>	25 way D connector
<i>Analog voltages</i>	0 to 8Vdc, 1k Ohm source resistance
<i>Active lines</i>	Refer to Table 7-13 for a description by function
<i>AC line connector</i>	
<i>Input</i>	IEC 320 male
<i>FM 500</i>	
<i>Drive power</i>	20W maximum
<i>Output power</i>	500W minimum
<i>Gain</i>	17.dB
<i>AC line</i>	105 to 125Vac 60Hz, single phase
<i>AC line power</i>	1000W
<i>Environmental</i>	
<i>Temperature</i>	-10 to 50 degrees C (14 to 122 degrees F)
<i>Elevation</i>	30.5km (10,000 ft) ASL maximum
<i>Cabinet</i>	
<i>Width</i>	48.3cm (19.0in), panel drilled to EIA RETMA hole spacing
<i>Height</i>	14.4cm (5.25in), three EIA RETMA units
<i>Depth</i>	61.0cm (24.0in), sides drilled for cabinet sliders
<i>Weight</i>	36.3kg (80lbs)
<i>Packaged</i>	61.0cm (24.0in) W x 30.5cm (12.0in) H x 76.3cm (30.0in) D

Safety

BEFORE APPL YING POWER

Verify that the line voltage is 115V

GROUND THE POWER AMPLIFIER.

To minimize shock hazard, the power amplifier chassis must be connected to an electrical ground. the power amplifier must be connected to the ac power mains through a three-conductor power cable, with the third wire firmly connected to an electrical ground (safety ground) at the power outlet. Any interruption of the protective (grounding) conductor or disconnection of the protective earth terminal will cause a potential shock hazard that could result in personal injury. If the power amplifier is to be energized by any other source be certain the that chassis is connected to a separate safety ground.

Fuses

Only fuses with the same required current, voltage rating, and specified type (normal blow, time delay, etc.) should be used. Do not use repaired fuses or short-circuited fuseholders. To do so could cause a shock or fire hazard.

DO NOT OPERA TE IN AN EXPLOSIVE ATMOSPHERE

Do not operate the power amplifier in the presence of flammable gases or fumes.

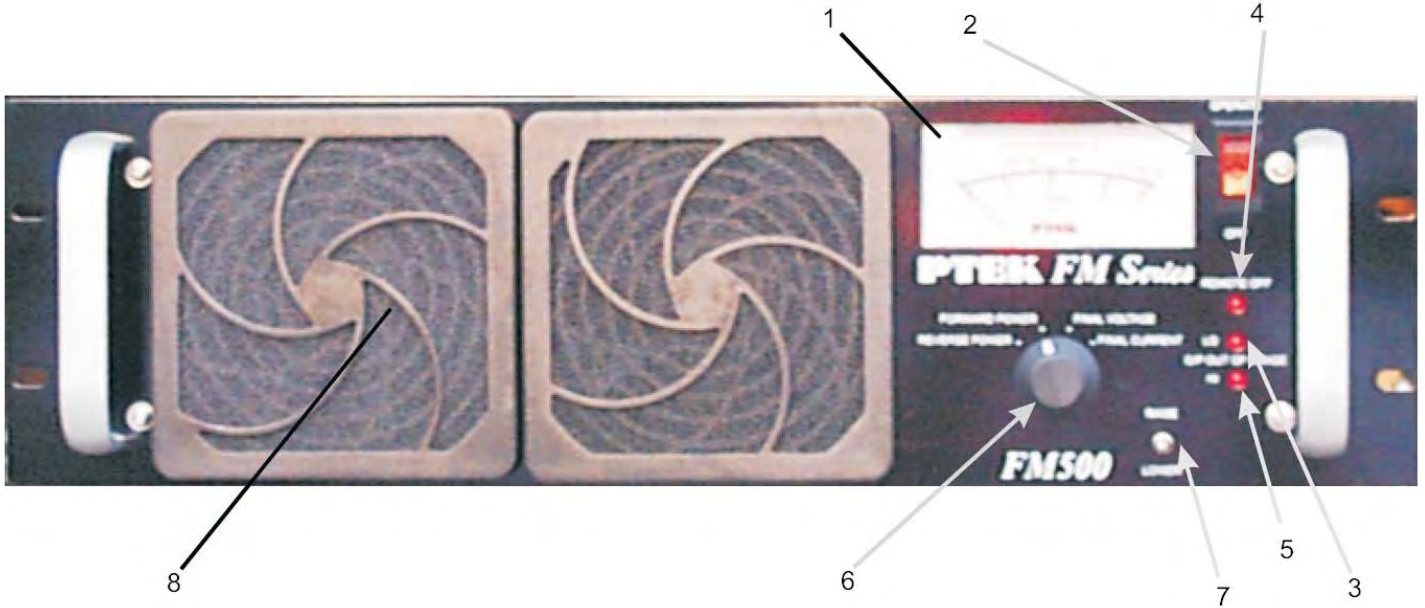
DO NOT REMOVE THE POWER AMPLIFIER COVER

Operating personnel must not remove the power amplifier cover. Component replacement and internal adjustments must be made only by qualified service personnel.

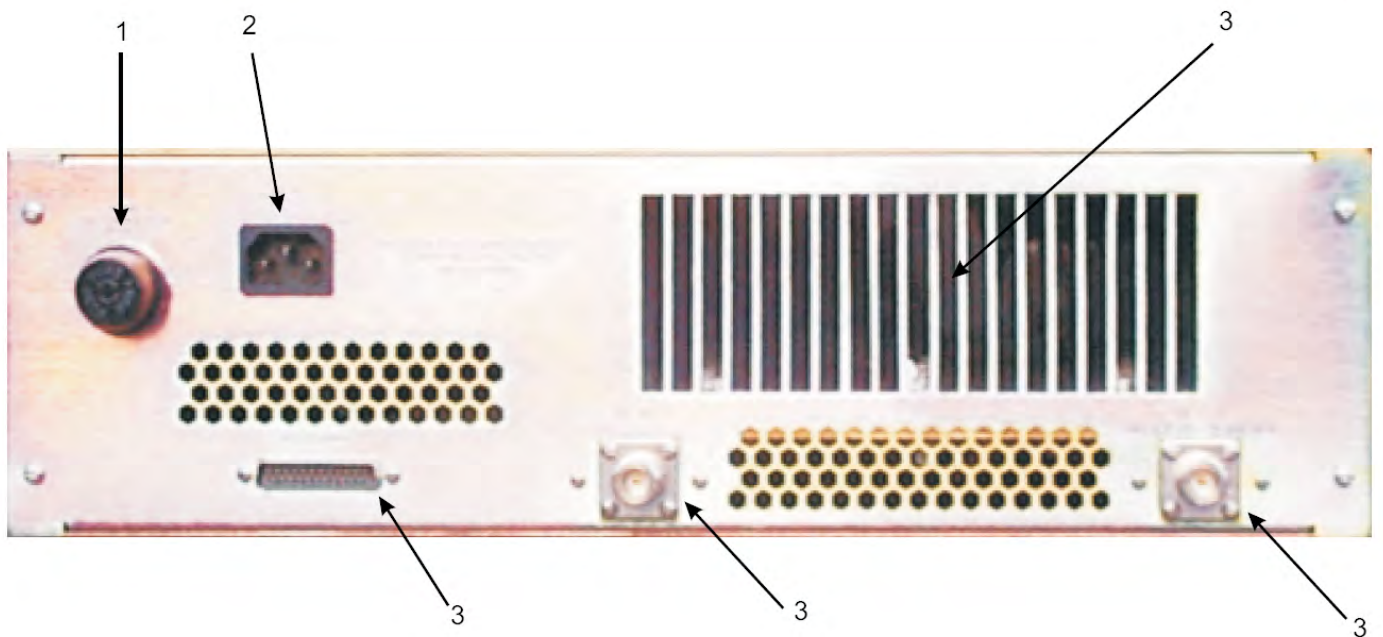
Output connector

The type N output connector carries dangerously high RF voltages which present a shock and burn hazard. NEVER operate this amplifier with out the out put connector properly terminated in either an adequately rated load or antenna.

Front panel layout



Rear panel layout



Key	Element	Description
1	METER	Indicates <i>Forward Power</i> , <i>Reverse Power</i> , <i>Final Voltage</i> and <i>Final Current</i>
2	OPERATE Switch and Indicator	This switch sets the <i>FM Broadcast Amplifier</i> to the <i>Operate Mode</i> ; <i>110 VAC</i> is applied to the line transformers and this amber indicator is lit.
3	REMOTE OFF Indicator	This red LED indicator is lit when the <i>FM Broadcast Amplifier</i> is in <i>remote off</i> mode.
3	OUTPUT OUT OF RANGE LO Indicator	This red LED indicator is lit when the <i>FM Broadcast Amplifier</i> can not make the power requested, because for example low drive power.
5	OUTPUT OUT OF RANGE HI Indicator	This red LED indicator is lit when the <i>FM Broadcast Amplifier</i> is in a fault condition. This can be for one or combination of the following:- <i>Over drive</i> , <i>High supply Voltage</i> , <i>High load VSWR</i> , <i>Over temperature</i> .
6	Meter Select Switch	This switch selects one of the following to be presented on the meter (1):- <i>Forward Power</i> , <i>Reverse Power</i> , <i>Final Voltage</i> and <i>Final Current</i>
7	RAISE LOWER control	This control adjust the output power from rated full power to less than <i>50%</i> .
8	<i>Ventilation Filter</i>	This provides for filtering the environmental air as it is drawn into the cabinet by the internal fan.

Key	Element	Description
1	FUSE	20A
2	AC IN	110 VAC input
3	Cooling air exhaust	
4	RF OUT	TYPE N <i>RF Output</i> Warning High <i>RF Voltages</i> are present under operating conditions.
5	RF IN	TYPE N <i>RF Input</i>
6	Accessory connector	Connections for; Remote off and DC indications of <i>Forward Power</i> , <i>Reverse Power</i> , <i>Final Voltage</i> and <i>Final Current</i>

Installation-Hardware

(For optional rack sides)

Refer to the figure left and tables below for the following description. The installer will need a normal set of shop tools to perform the installation procedure.

Step	Procedure
1	Install the right and left Stationary Section into the installation rack with the screws and hardware provided. The amplifier cabinet is 24 inches, it may be necessary to also use an extension to the Stationary Section depending on installation rack dimensions.
2	Install the right and left Chassis Section to the FM Broadcast Amplifier cabinet in the 8-32 holes using the screws provided. IMPORTANT: The amplifier weighs 36 kg (80 lbs) and will require two individuals to pick up and install the amplifier in the installation rack.
3	Install the amplifier cabinet into the Stationary Sliders.
4	Install four user provided #10 screws through the front panel holes into the installation rack.

Installation-Electrical

Refer to the Table below for the following description. The installer should assure the ac line voltage is turned OFF before performing this procedure. The electrical connections are installed at the FM Broadcast Amplifier rear panel.

Step	Procedure
1	Connect the exciter RF output line to RF IN connector.
2	Connect the load RF line to RF OUT connector.
3	Connect the ac line power to the ac line in connector.
4	Optional. Connect the remote site metering, to the rear 25W D-SUB

Turn-On Checkout

Refer to the table below for the following procedure. The RF source or exciter should be set to 10W and either mute the output or turn off the exciter.

Step	Action	Verification
1	Switch the RF out to a dummy load.	
2	Turn on the ac line power to the FM Broadcast Amplifier.	O/P OUT OF RANGE LO indicator is on. O/P OUT OF RANGE HI is out. REMOTE OFF indicator is out.
3	Enable the exciter	DRIVE LOW indicator goes out
4	Select Meter to read FORWARD POWER	
5	Adjust the RAISE LOWER switch to a reading of 500W.	
6	Select Meter to read FINAL VOLTAGE.	The Meter reads 40~50V. Note the exact value.
7	Select Meter to read FINAL CURRENT.	The The Meter reads 10~20A. Note the exact value.
8	Calculate the dc power input to the PA from the values of step 4 and 5.	$P=VI$ and note the exact value.
9	Select the Meter to read REVERSE POWER.	Check that there is no appreciable reading of reverse power
10	Calculate the PA efficiency.	Step 6 value divided by the value in step 7 or about 60 percent.
11	Adjust the RAISE LOWER switch to set the output to the required output power in the range 250~500W.	

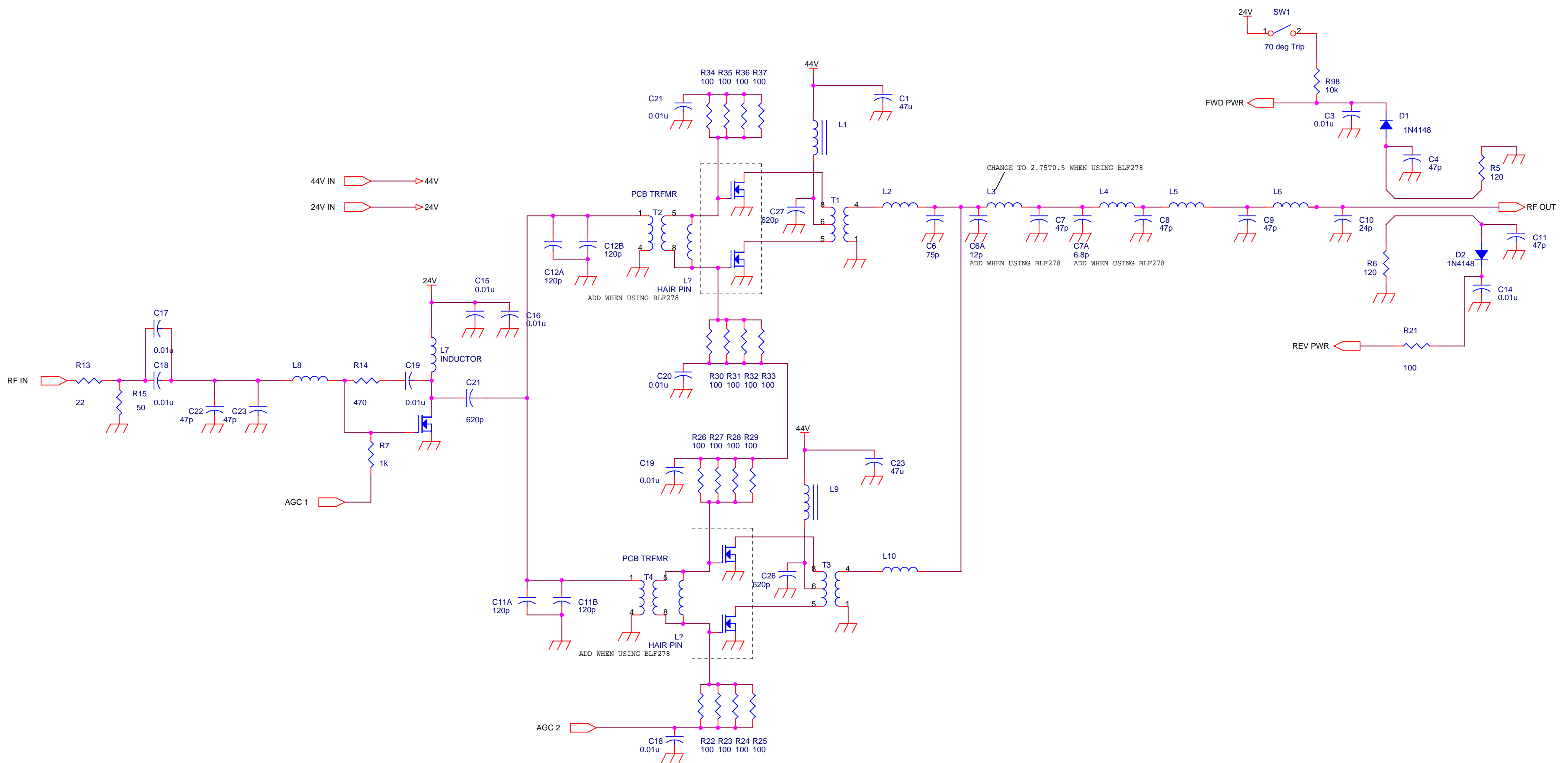
Accessory Connector

Pin Number(s)	Accessory Function
1	Forward Power DC Indication 2.4V=600W
2	Final Voltage DC Indication V=V/10
3	Output Power out of range Hi (10V)
8	Lower; Ground to lower the output power
10	Serial; Used when 2 or more amplifiers are combined
13	Remote Off
14	Reverse Power DC Indication 2.4V=600W
5,18,6,19	48V Output (Fan supply for combiners)
15	Output Power out of range Lo (10V)
20	Raise; Ground to raise the output power
21	Final Current DC Indication Full scale = 2.5V
22	Talk; Used when 2 or more amplifiers are combined
25	Remote on
11,12,23,24	Ground

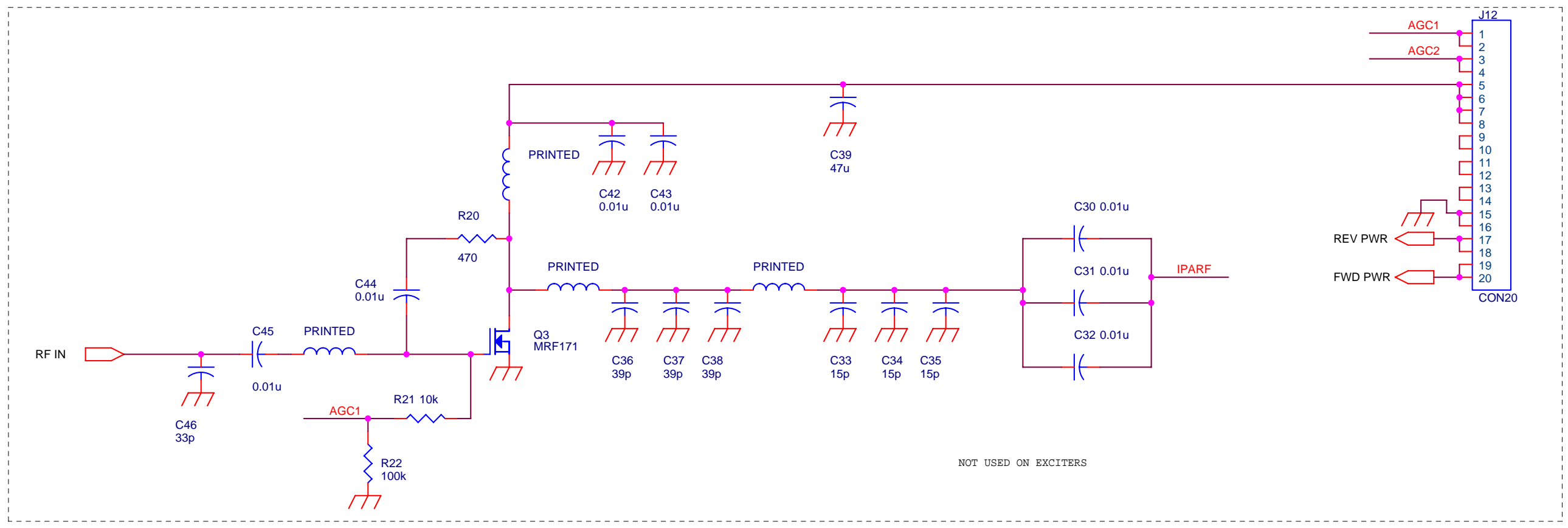
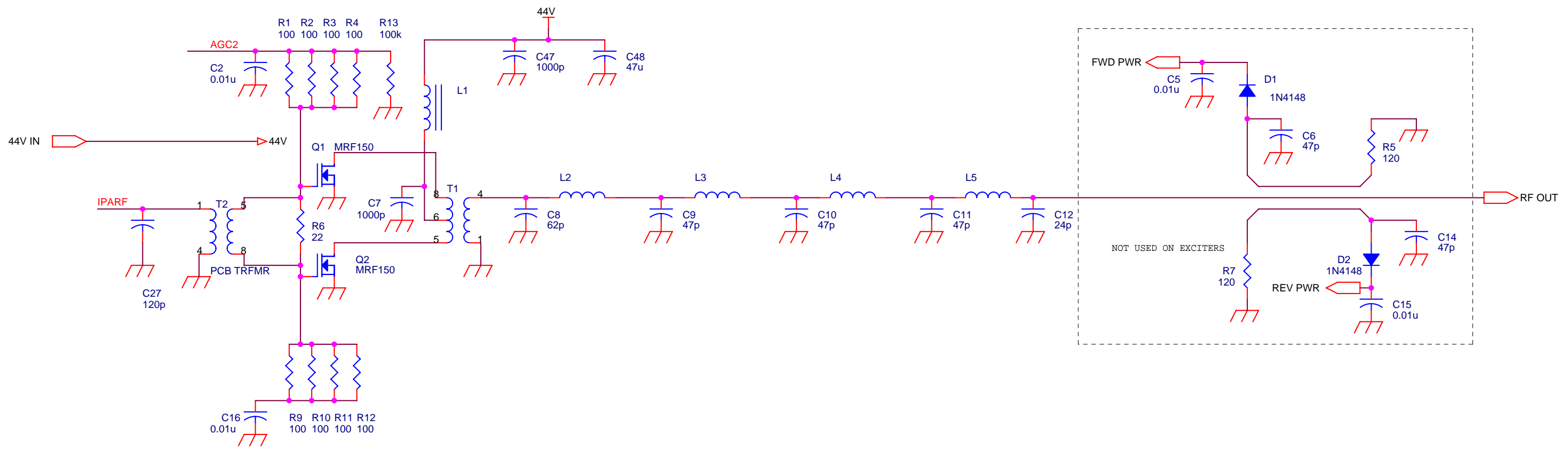
Efficiency Vs Output Power

FM500		FM300		FM250		FM150	
Power Output (Watts)	Efficiency (%)	Power Output (Watts)	Efficiency (%)	Power Output (Watts)	Efficiency (%)	Power Output (Watts)	Efficiency (%)
500	71	300	70	300	70	150	68
450	70	250	65	250	65	100	60
400	68	200	52	200	52	50	40
350	66	150	48	150	48		
300	64						
250	57						

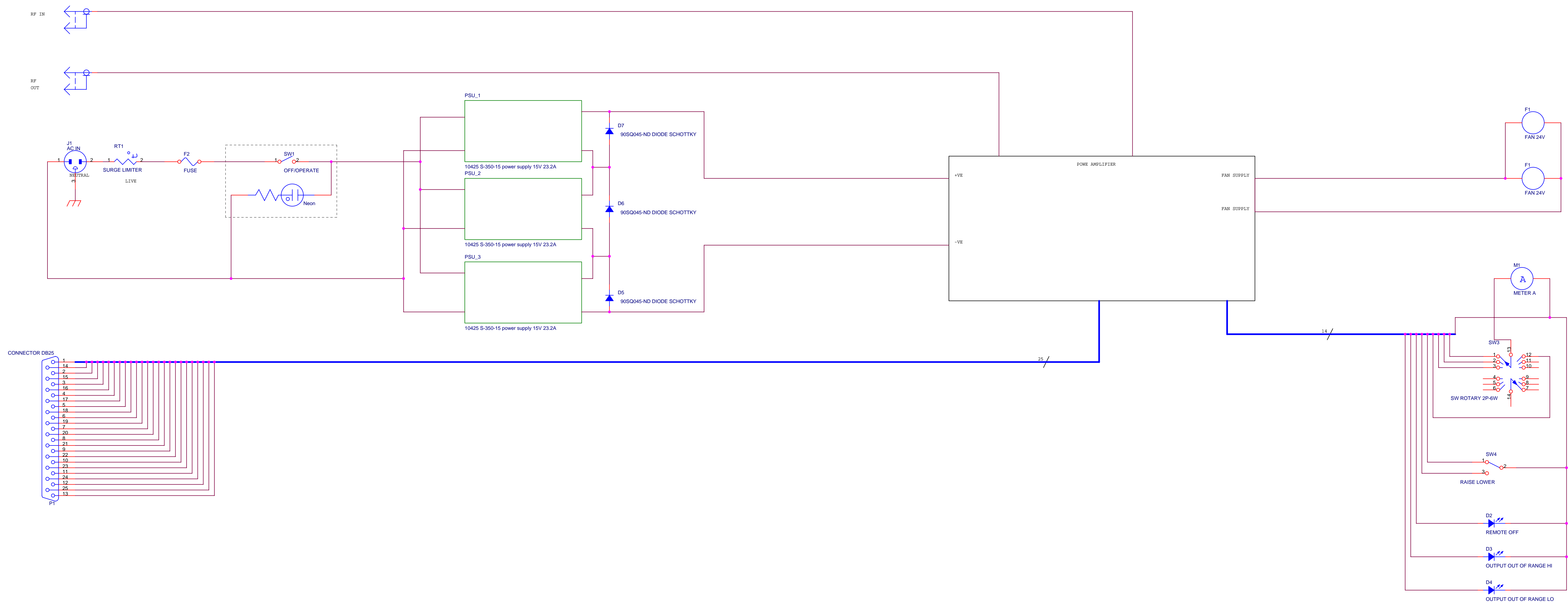
Reduce Efficiency by 4% when combining two FM500s. All data is +/- 10%

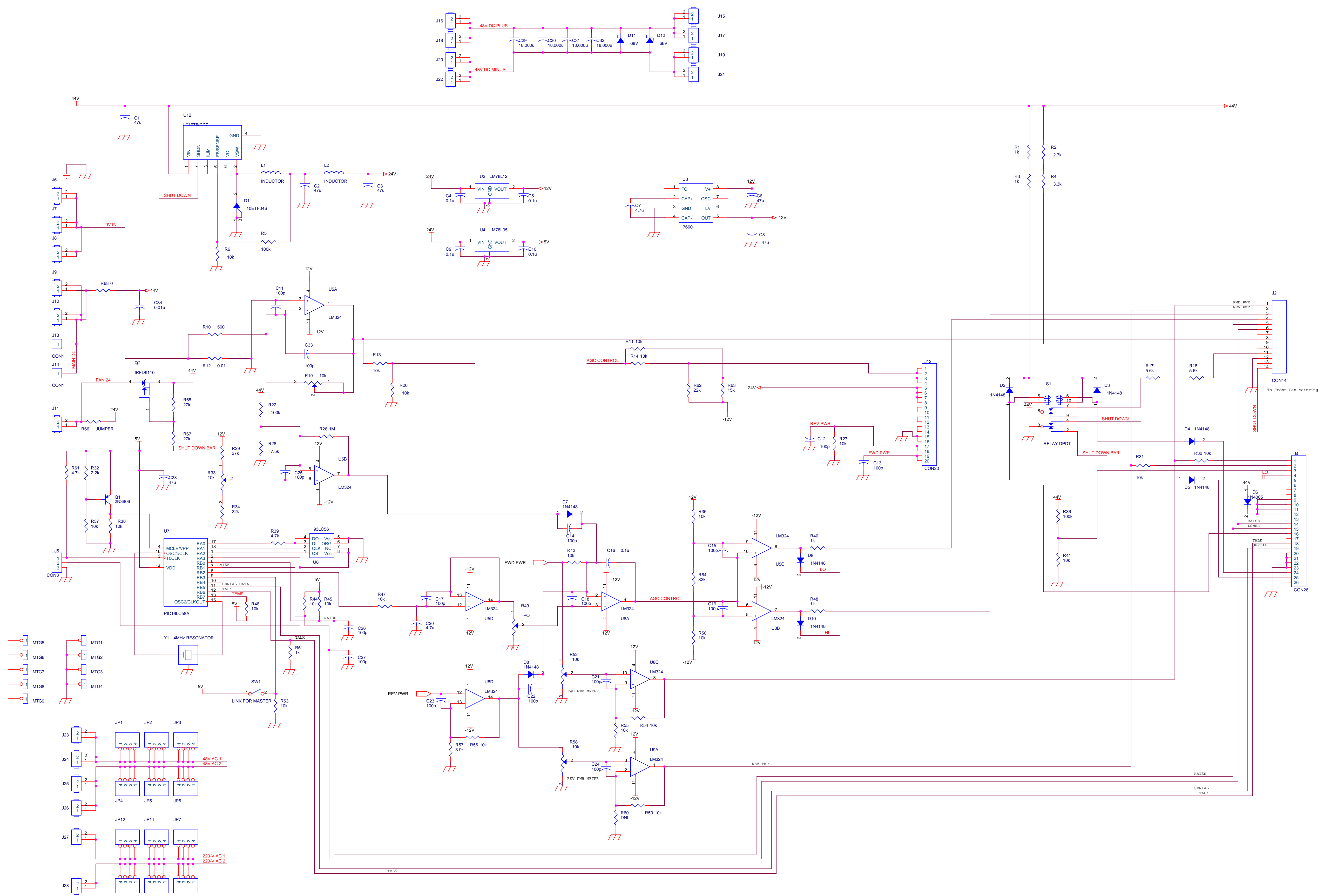


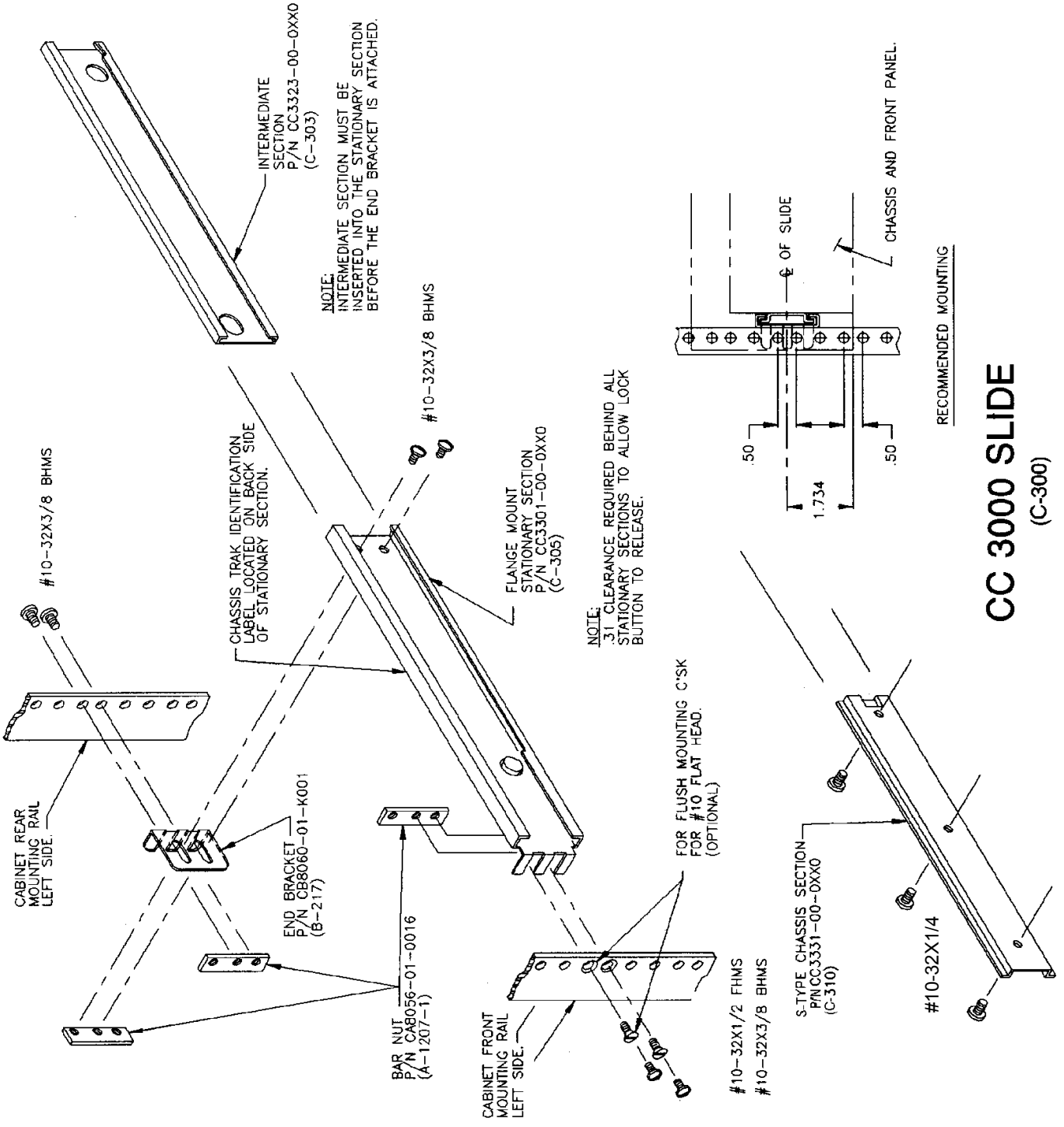
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Schematic PA 300W 88 to 108MHz		
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CC 3000 SLIDE

(C-300)