



FM10000
RF Transmitter Package

User's Manual

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Important Notices

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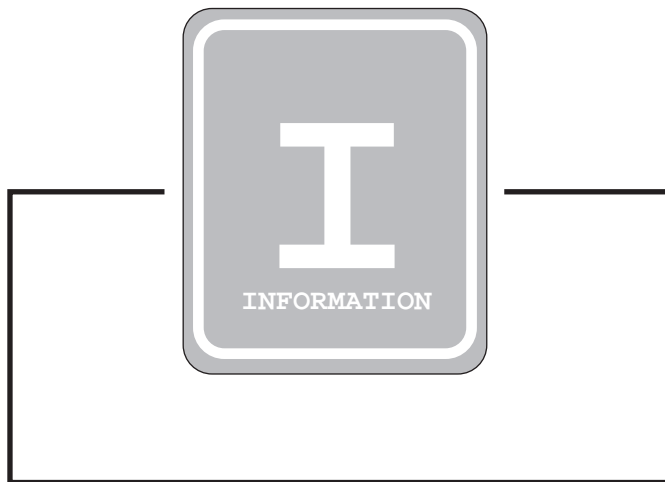
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Section 1—Getting Acquainted

This section provides a general description of the FM10000 transmitter system and introduces you to safety conventions used within this document. *Review this material before installing or operating the system.*



1.1 Your Transmitter Package

The FM10000 is a highly efficient transmitter package designed to set a new standard in FM transmitter design offering modularity, ease of use, and long-term reliability. The FM10000 package has five (5) PA2000-10K amplifiers, three (3) 5,600 watt power supplies, a transmitter controller, a low pass filter and an optional FM250.

The FM10000 transmitter package requires no tuning and typically provides 80% RF efficiency. The three (3) 5600W power supplies are power factor corrected and 90% efficient. Modern MOSFET technology ensures high AC to RF efficiency (better than 70% overall typical) and long-term reliability. The unmatched efficiency of this transmitter significantly improves your bottom line by providing cooler operation and lower power costs.

These modular units are uniquely designed to be compact for convenient shipping and simple installation with minimal floor space. Installation is easy with three connections; AC power in, Audio in, and antenna out. In addition, built in metering and status indicator capabilities enable intuitive operation to further augment the user-friendly design.

Economic long-term reliability is ensured through our carefully engineered solid-state design. Each PA2000 features four field-replaceable 500-watt power modules.

This transmitter delivers 2500 to over 10000 watts of RF power output. Use your existing exciter or purchase the FM10000T which includes our award-winning FM250 exciter for an unbeatable 10 kW transmitter package.

This transmitter also includes an internal grounding strap that can connect to your station ground providing quality protection for your transmitter. The transmitter also includes a high quality Line Voltage Surge Protector which properly installed will provide quality protection for your transmitter.

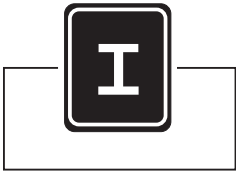


Illustration 1-1 FM10000 Transmitter Package

1.2 Transmitter Package Specifications

RF Power Output:	2500 to 11000 watts continuous with remote controlled power adjust
RF Drive Requirement:	250 watts for full output
RF Output Impedance:	50 ohms (unbalanced)
Maximum SWR:	2.0:1 (With power foldback at high SWR)
Frequency Range:	87–108 MHz
RF Harmonics/Spurious Products:	Better than –80 dB
Asynchronous AM S/N Ratio:	Meets FCC specifications (-50 dB) (typically > 60 dB)
Synchronous AM S/N Ratio:	Meets FCC specifications (-50 dB) (typically > 60 dB)
Operating Environment:	
Temperature Range:	0°–50°C at sea level
Humidity Range:	0–80% at 20°C (noncondensing)
AC Power:	240 Volts AC +10/-15%, 50–60 Hz with neutral
Power Consumption:	Less than 18000 watts at 11000 watts RF output typical
Power Factor:	.96 typical
Overall Efficiency:	70% typical
RF Output Connector:	1 5/8 " EIA flange
Cabinet dimentions :	7 x 17.25 x 23 inches (17.78 x 43.82 x 58.42 cm) exclusive of rack ears, but inclusive of connectors
Overall dimentions :	65 x 24 x 29 (cabinet only) 83 x 27 x 29 (including external filter)
Weight:	FM10K cabinet (950 lbs) FM10K shipping weight (997 lbs)

Note: System performance is specified using Crown Broadcast Model FM250 Exciter where applicable.



1.3 Safety Considerations

Crown Broadcast assumes the responsibility for providing you a safe product and safety guidelines during its use. “Safety” means protection to all individuals who install, operate, and service the transmitter as well as protection of the transmitter itself. To promote safety, we use standard hazard alert labeling on the product and in this manual. Follow the associated guidelines to avoid potential hazard.

1.3.1 Dangers

DANGER represents the most severe hazard alert. Extreme bodily harm or death will occur if **DANGER** guidelines are not followed.

1.3.2 Warnings

WARNING represents hazards which could result in severe injury or death.

1.3.3 Cautions

CAUTION indicates potential personal injury or equipment or property damage if the associated guidelines are not followed. Particular cautions in this text also indicate unauthorized radio-frequency operation.

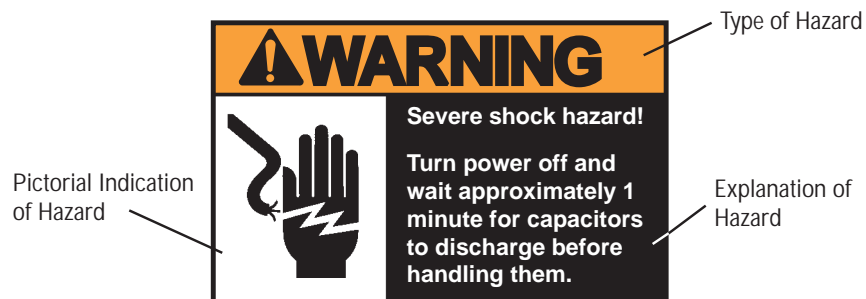
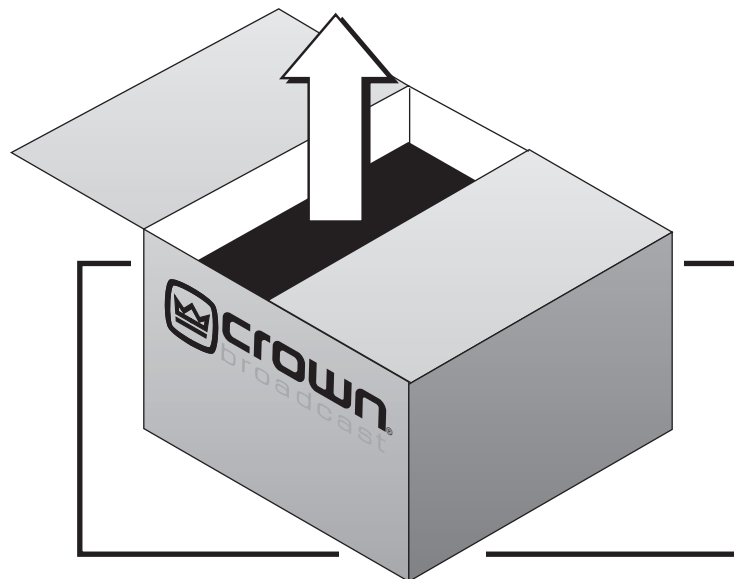
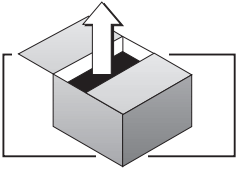


Illustration 1–2 Sample Hazard Alert



Section 2—Installation

This section provides important guidelines for installing your transmitter. Review this information carefully for proper installation.



2.1 Operating Environment

You can install the FM10000 transmitter on any flat surface which should be clean and well-ventilated as possible.

2.2 Tools Required

To install the FM10000, you will need the following tools:

- Medium phillips screwdriver
- Small flat-blade screwdriver
- 3/16 inch hex driver
- 1/2 inch wrench and/or nut driver
- ESD (Electrostatic Discharge) protection grounding strap and/or mat.

2.3 Unpacking

- 1) Remove outer crate.
- 2) At the bottom of the cabinet are retainer brackets holding the cabinet to the shipping platform. Use 1/2 inch wrench to remove these brackets.
- 3) Carefully move the cabinet off the shipping platform to the position of final installation using appropriate methods to ensure the cabinet doesn't tip over.
- 4) Cabinet is now ready for installation.

2.4 Installation

2.4.1 AC Power Input Block

! WARNING

Possible Electric *Shock* Hazard!

Do not connect AC source until all other connections are made and installation is complete.

Remove the 4 screws and the AC block cover as shown in Illustration 2-11 for □ access to the AC input block. Save these screws and cover for later re-installation.



Illustration 2-11 AC block access

Attach main AC feed to the appropriate points as labeled in Illustration 2-12. □

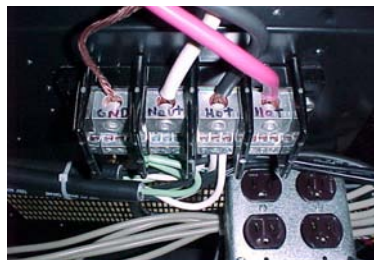


Illustration 2-12 AC block feed point definition

The AC mains feed-point requires 240 Volts single phase with neutral □ (which allows for 120 Volt supply). The following is the AC feed-point □ supply requirements : □

240 VAC single phase @ 100 Amps □

120 VAC single phase @ 15 Amps (Neutral wire) □

Provide the appropriate supply feed to match these requirements. □

Consult the National Electrical Code for your area for proper conductor □ size and color.

2.4.2 Voltage Surge Protection Device

Install the Voltage Surge Protection Device in accordance with the installation procedures provided with the device. Consult National Electrical Code for your area for proper conductor size and colors of wire.

2.4.3 Low Pass Filter and RF Output

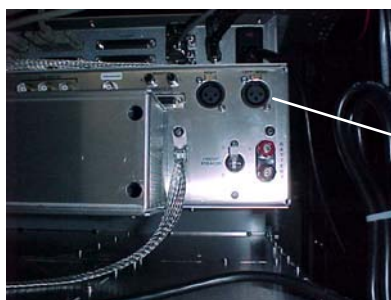
- 1) Remove Low Pass Filter from shipping container being careful not to drop or damage the filter during the process of removal.
- 2) Remove shipping cover from output connector at the bottom of the cabinet and save bolts for Low Pass Filter installation.
- 3) Install low pass filter onto the connector along with upper retaining clamp as shown in illustration 2-13. Use bolts from previous step to fasten down filter to connector. Connect "input" to connector on cabinet.
- 4) Tighten bolts onto connector and then tighten upper retaining clamp for a snug fit. Do not over tighten clamp enough to deform the shape of the low pass filter; the filter must remain perfectly round.



Illustration 2-13 Low Pass Filter and RF Output connections

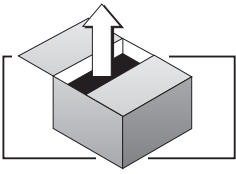
2.4.4 Audio Input Connection

The Audio input connection is an XLR Female on the back of the FM250 as shown below installed in the rack in illustration 2-14.



- Analog L and R :**
- XLR Left and Right**
- AES/EBU Input :**
- XLR Left only (with optional DP-3)**

Illustration 2-14 Audio Input connection



2.5 Remote I/O Connections

The I/O connections on the back of the controller consist of 3 main ports; Port A □ (DB-25 Female), Port B (DB-37 Female), and Port C (DB-37).□

Port A has the metering and control of the System as well as the metering for PA5 □ (bottom PA). Port B and Port C have the amplifier metering for PA1 (top) through □ PA4 (next to bottom). □

I/O port A is described in illustration 2-15, I/O port B is described in illustration □ 2-16, and I/O port C is described in illustration 2-17.

Port A	
Pin	Description
1	PA # 5 - # 8 current 1V = 2A of current
2	PA # 5 - # 7 current 1V = 2A of current
3	System Lock-Out Reset - Momentary to Ground to reset power control to normal
4	Remote RF Power RAISE - Momentary to Gnd to raise power 200 watts/second
5	Cabinet Temperature - 0.01 Volts/degrees Celsius reading of internal cabinet temp.
6	Ground
7	Remote High Voltage ON/OFF - Hold to ground to turn ON High Voltage
8	Fault Summary - TTL Logic HIGH (+5 VDC) when any fault light is ON
9	Ground
10	PA # 5 - ALC
11	PA # 5 - PA Temperature (Celcius) 1V = 20 degrees C
12	PA # 5 - SWR
13	PA # 5 - RF Output power 1V = 1000 Watts RF power
14	PA # 5 - In Ref.
15	Remote RF Power LOWER - Momentary to Gnd to lower power 20 watts/second
16	PA # 5 - # 6 current 1V = 2A of current
17	PA # 5 - # 5 current 1V = 2A of current
18	Remote RF Power, Forward - 1 VDC = 1000 Watts of Forward power
19	PA # 5 - # 4 current 1V = 2A of current
20	PA # 5 - # 3 current 1V = 2A of current
21	Remote RF Power, Reverse - 1 VDC = 1000 Watts of Reverse power
22	PA # 5 - # 2 current 1V = 2A of current
23	PA # 5 - # 1 current 1V = 2A of current
24	PA # 5 - PA Total Current 1V = 20 Amps
25	PA # 5 - PA Volts 1V = 10 Volts

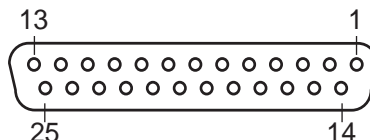


Illustration 2-15 Remote I/O Port A Female DB-25

Port B	
Pin	Description
1	(PA1) RF Power - 1V = 1000 Watts of power
2	(PA1) SWR - Calculated reading of SWR in VDC (1.00 VDC = 1.0 to 1.0 VSWR)
3	(PA1) PA Volts - 1V = 10 V on the PA
4	(PA1) PA Temperature - 1V = 20 degrees Celsius on the PA
5	Ground
6	(PA1) PA Total Current - 1V = 20 A on the PA
7	(PA1) PA#1 current - 1V = 2A of current
8	(PA1) PA#2 current - 1V = 2A of current
9	(PA1) PA#3 current - 1V = 2A of current
10	Ground
11	(PA1) PA#4 current - 1V = 2A of current
12	(PA1) PA#5 current - 1V = 2A of current
13	(PA1) PA#6 current - 1V = 2A of current
14	(PA1) PA#7 current - 1V = 2A of current
15	Ground
16	(PA1) PA#8 current - 1V = 2A of current
17	(PA1) ALC - A direct reading of the ALC voltage on the PA
18	(PA1) In Ref - A DC voltage reference representing RF input power to the PA
19	(PA2) RF Power - 1V = 1000 Watts of power
20	(PA2) SWR - Calculated reading of SWR in VDC (1.00 VDC = 1.0 to 1.0 VSWR)
21	Ground
22	(PA2) PA Volts - 1V = 10 V on the PA
23	(PA2) PA Temperature - 1V = 20 degrees Celsius on the PA
24	(PA2) PA Total Current - 1V = 20 A on the PA
25	(PA2) PA#1 current - 1V = 2A of current
26	Ground
27	(PA2) PA#2 current - 1V = 2A of current
28	(PA2) PA#3 current - 1V = 2A of current
29	(PA2) PA#4 current - 1V = 2A of current
30	(PA2) PA#5 current - 1V = 2A of current
31	Ground
32	(PA2) PA#6 current - 1V = 2A of current
33	(PA2) PA#7 current - 1V = 2A of current
34	(PA2) PA#8 current - 1V = 2A of current
35	(PA2) ALC - A direct reading of the ALC voltage on the PA
36	Ground
37	(PA2) In Ref - A DC voltage reference representing RF input power to the PA

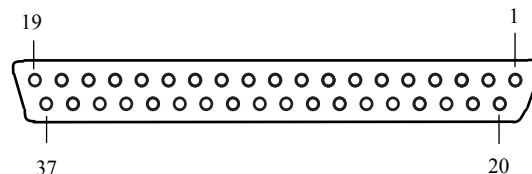


Illustration 2-16 Remote I/O Port B Female DB-37

Port C	
Pin	Description
1	PA # 3 - RF Power - 1V = 1000 Watts of power
2	PA # 3 - SWR
3	PA # 3 - PA Volts - 1V = 10 V
4	PA # 3 - PA Temperature - 1V = 20 degrees Celsius on the PA
5	Ground
6	PA # 3 - PA Total Current - 1V = 20 A on the PA
7	PA # 3 - PA#1 current - 1V = 2A of current
8	PA # 3 - PA#2 current - 1V = 2A of current
9	PA # 3 - PA#3 current - 1V = 2A of current
10	Ground
11	PA # 3 - PA#4 current - 1V = 2A of current
12	PA # 3 - PA#5 current - 1V = 2A of current
13	PA # 3 - PA#6 current - 1V = 2A of current
14	PA # 3 - PA#7 current - 1V = 2A of current
15	Ground
16	PA # 3 - PA#8 current - 1V = 2A of current
17	PA # 3 - ALC - A direct reading of the ALC voltage on the PA
18	PA # 3 - In Ref - A DC voltage reference representing RF input power to the PA
19	PA # 4 - RF Power - 1V = 1000 Watts of power
20	PA # 4 - SWR
21	Ground
22	PA # 4 - PA Volts - 1V = 10 V on the PA
23	PA # 4 - PA Temperature - 1V = 20 degrees Celsius on the PA
24	PA # 4 - PA Total Current - 1V = 20 A on the PA
25	PA # 4 - PA#1 current - 1V = 2A of current
26	Ground
27	PA # 4 - PA#2 current - 1V = 2A of current
28	PA # 4 - PA#3 current - 1V = 2A of current
29	PA # 4 - PA#4 current - 1V = 2A of current
30	PA # 4 - PA#5 current - 1V = 2A of current
31	Ground
32	PA # 4 - PA#6 current - 1V = 2A of current
33	PA # 4 - PA#7 current - 1V = 2A of current
34	PA # 4 - PA#8 current - 1V = 2A of current
35	PA # 4 - ALC - A direct reading of the ALC voltage on the PA
36	Ground
37	PA # 4 - In Ref - A DC voltage reference representing RF input power to the PA

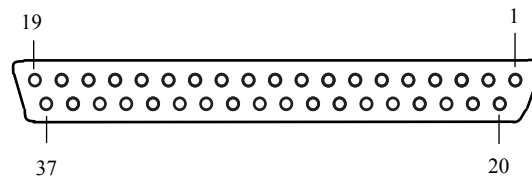
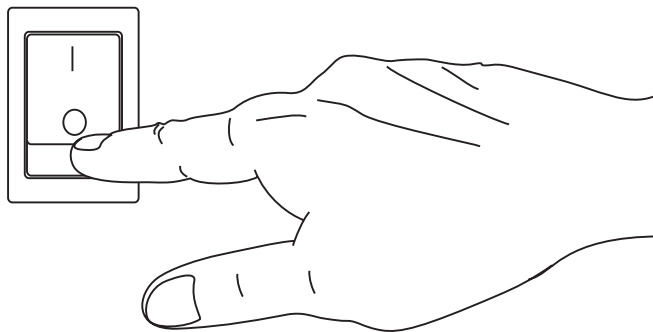
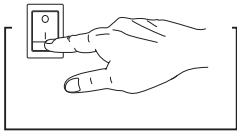


Illustration 2-17 Remote I/O Port C Female DB-37



Section 3—Operation

This section provides general operating parameters of your transmitter system and a detailed description of the front panel displays.



3.1 Initial Power-up Procedures

These steps summarize the operating procedures you should use for the initial operation of the power amplifier and power supply. More detailed information follows.

1. Ensure that the external remote control unit is properly connected to the transmitter controller port A (see illustration 2-15, Section 2.5, page 2-5 for proper pin configuration).
2. Connect Antenna feed-line to the output of the Low Pass Filter.

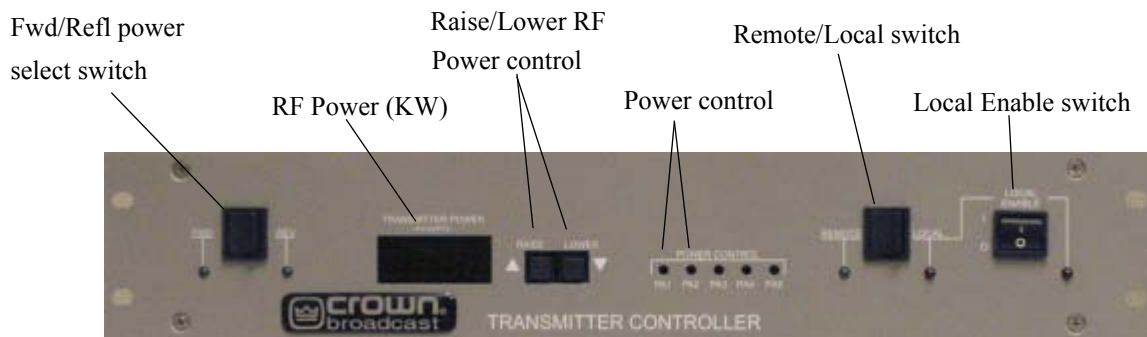


Illustration 3-1 Transmitter Controller Front Panel Controls

3. Locate the Remote/Local switch and select "Local". Verify the Local Enable switch is in the "0" position (indicating OFF) and that the enable LED is OFF.
 4. Locate the Exciter (Crown FM250) and be certain that the Power and Carrier switches are ON as well as the breaker on the back of the unit. Refer to Low Power Manual FM30 - FM500 for further instructions.
 5. Locate Fwd/Refl power select switch and verify it is in Fwd position. The Green LED will indicate the proper position once power is ON.
 6. Apply AC power to cabinet.
 7. Adjust the RF output power on the exciter (Crown FM250) for 250 - 275 watts.
- SPECIAL NOTE :** This system is not a drive dependent amplifier design; therefore drive level must remain constant regardless of main output level. Use remote control to raise and lower RF output power, not the RF output level of the driver.
- Note: The FM10000 is set for 10000 watts at 98MHz at the factory unless a specific frequency or power is specified at the time of order.
8. Enable the RF power by moving the "Local Enable" to the 'up' position. This should be indicated with a RED LED below the switch.

Note : If no RF power is achieved, check the DPM display for a flashing dot in the lower right corner of the display. If this is present, the system needs to be reset before power can be restored. Refer to illustration 2-15, section 2.5, Remote I/O connections pin 3 of Port A for further information.

-
- 9. Using the 'raise/lower RF power' buttons, raise or lower the RF power to the desired setting (unless the power was specified at time of order).
-
- 10. Use the 'Fwd/Rev' selector switch to check for reflected power on antenna feed-line if desired.
-
- 11. Use the PA1 through PA5 power controls to limit the amount of power output the transmitter can achieve. The FM10000 is set to limit at 11000 watts in the preset condition. For settings lower than this, adjust each PA control counter-clockwise in small equal increments to the desired level. For a more secure method, use the power set control located behind each front panel of each PA. The settings on the individual PA's are unconventional in that a lowering of power is achieved by adjusting the control clockwise.

□ The remainder of this section describes the controller and its functions.

□

3.2 AC Power Switch

The Transmitter Controller's AC power is controlled by a switch located on the AC input filter. The AC input range is 100-250 VAC. The fuse type and size are 3AGC at 1/2 amp slo-blo and there are 2 fuses. See illustration 3-2 for switch location.

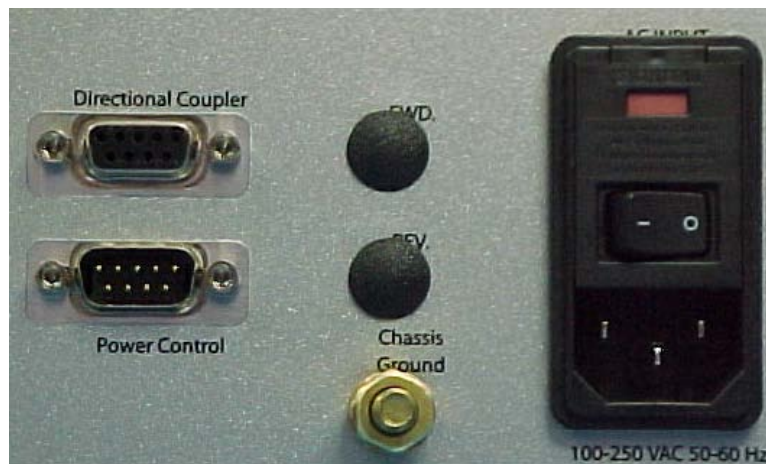
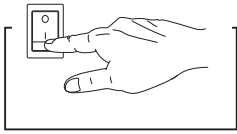


Illustration 3-2 AC Input Power □



3.3 Front Panel Controls and Display

Refer to illustration 3-1 for additional information when going through section 3.3.

3.3.1 Remote/Local Switch

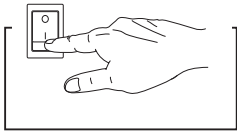
The Remote/Local switch is used to be able to 'break' the interlock line from the remote control unit to allow for local control of the High Voltage supply that feeds the PA's. It has a green LED which illuminates when the switch is in the remote position (allowing for control via remote control unit) and a red LED which will illuminate when the switch is in the local position (disabling the remote control from turning on the high voltage). See illustration 3-3.



Illustration 3-3 Remote/Local and Local Enable switches with indicators

3.3.2 Local Enable Switch

The Local Enable Switch is used to enable the high voltage supply for the PA's when the Transmitter Controller is in the 'Local' mode. The switch in the ON position (up, or 1) will enable the supplies and illuminate the red indicator LED. The switch in the OFF position (down, or 0) will disable the supplies and extinguish the red LED. See illustration 3-3.



3.3.3 Transmitter RF Power Control

The Transmitter Controller has the ability to internally set the maximum RF output power for the 10000 watt system using the power control setting for each PA. These controls are located behind the front panel and have an access hole in front of each control. A small flat blade screwdriver is needed to adjust each control. For maximum output level, these controls need to be set fully Clock-wise. Adjust the controls for each PA separately (PA1 thru PA5) in small steps (less than 300 watts difference) to prevent any unnecessary VSWR problems to the other amplifiers (the ones not being adjusted). These controls will effect the final RF output power that the remote control can adjust to. Whatever these are set for as a maximum level, that level is all the higher the remote control will be able to set the power to. See illustration 3-4 for location of these controls.



Illustration 3-4 Power Control Adjustment location

3.3.4 Raise/Lower RF Power Control

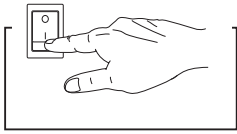
The Transmitter Controller has the ability to Raise or Lower the RF Power in small increments using the control switches on the front panel. Refer to illustration 3-4 for the location of these controls. To raise the power, depress the switch under the "Raise" label. Press and hold this switch to change the power in 200 watts/second increments. Pressing once should only change the power 20 - 30 watts. To lower the power, depress the switch under the "Lower" label. Press and hold this switch to change the power in 200 watts/second increments. Pressing this switch once will change the power 20 - 30 watts. Both switches are momentary contact type switches and parallel the remote control for Raising and Lowering power via Port A on the back of the unit. A remote control unit is not required for this operation. These controls will change the RF output power on all PA's simultaneously, reducing the need for separate controls for each PA.

3.3.5 RF power reading and selector switch

The Transmitter Controller has a digital panel meter which displays Forward RF Power and Reverse RF Power as detected by the RF power sampler built into the output combiner. The reading on the display is determined by the setting of the selector switch and accompanying green LED indicator. The readings are in Kilowatts and have an accuracy of better than 2% at the specified RF level and frequency at the time of order. However, it is recommended that an external watt meter be used for a more accurate reading. See illustration 3-5 for the location of the panel meter and selector switch with accompanying green LED indicators.



Illustration 3-5 RF Power Reading and Selector Switch



3.4 Rear Panel connections

The Transmitter Controller has several types of connections on the rear panel of the unit. The following will describe each type and what it is used for. See illustration 3-6 for location of each connector. Refer to Section 2.4.5 illustrations 2-15, 2-16 and 2-17 for detailed descriptions of each applicable remote control connector.

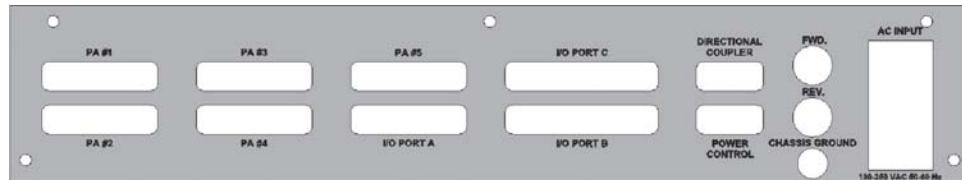


Illustration 3-6 Rear panel connections

3.4.1 DB-25

There are six (three, dual vertically stacked) DB-25 female connectors on the back of the Transmitter Controller. PA1 thru PA5 are what is used to connect to the DB-25 remote I/O on the back of each PA. These are pre-wired in the cabinet.

The connector labeled I/O Port A is used for the Remote Interface and has the final output metering information as well as the system controls for power control and high voltage control. It also contains information for PA5. See illustration 2-15 on page 2-5 for a detailed description of what each pin is used for.

3.4.2 DB-37

There are two (one, dual vertically stacked) DB-37 female connectors on the back of the Transmitter Controller. Port B is used for a remote monitor and has all the metering channels found on both PA1 and PA2 routed to this connector.

Port C has the information from PA3 and PA4. See illustration 2-16 and 2-17 on page 2-6 and 2-7 respectively, for a detailed description of what each pin is used for.

3.4.3 DB-9

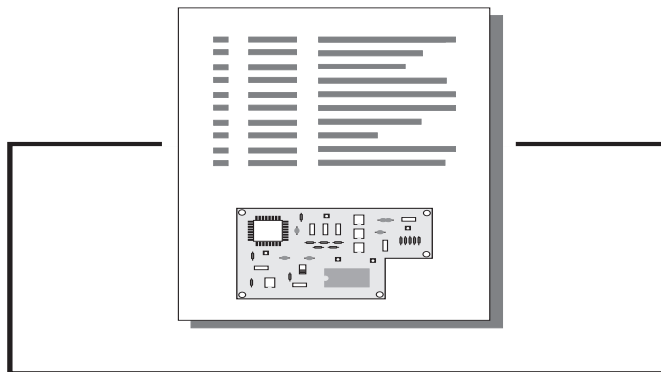
There is one DB-9 female connector and one DB-9 male connector (vertically stacked) on the back of the Transmitter Controller. The port labeled 'Directional Coupler' is used to provide a supply voltage to the temperature sensor located inside the connector shell attached to this port which in turn provides an internal cabinet temperature reading available on I/O port A. The port labeled 'Power control' is connected to the power supply located in the bottom of the cabinet. This port has the control signals necessary for the power supply to operate.

3.4.4 BNC Connectors

The Transmitter Controller has provisions for two BNC connectors on the back panel labeled Fwd and Rev. Both of these connectors are used in the FM10000 to receive DC voltage readings from the directional coupler located internal to the output combiner.

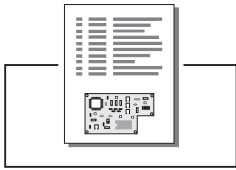
3.4.5 Chassis Ground

The Transmitter Controller has a provision to connect the chassis to the cabinet ground. A ground strap is pre-wired to the chassis ground.



Section 4—Reference Drawings

The illustrations in this section may be useful for making adjustments, taking measurements, troubleshooting, or understanding the circuitry of your RF power amplifier and power supply.



4.1 Views



Illustration 4-1 Transmitter Controller Front View

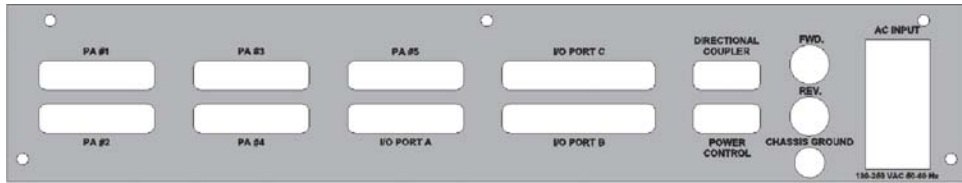


Illustration 4-2 Transmitter Controller Back View

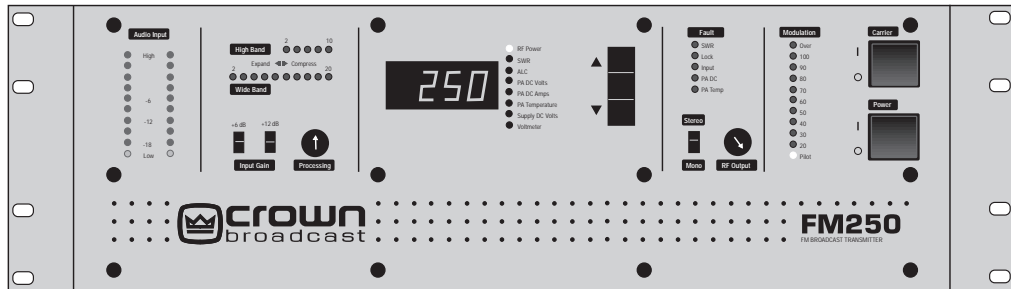


Illustration 4-3 Exciter/Driver Front View

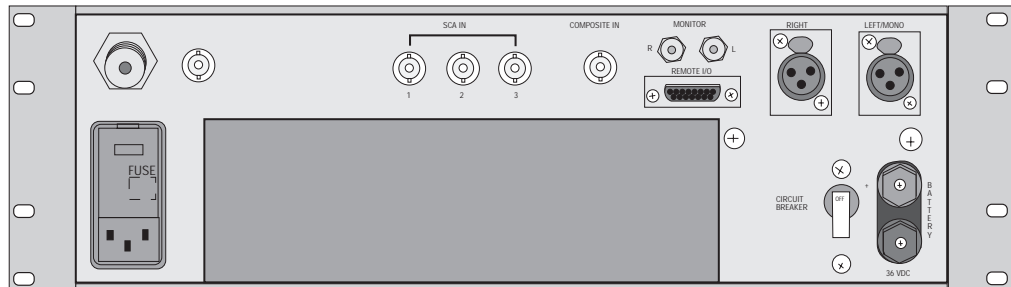


Illustration 4-4 Exciter/Driver Rear View

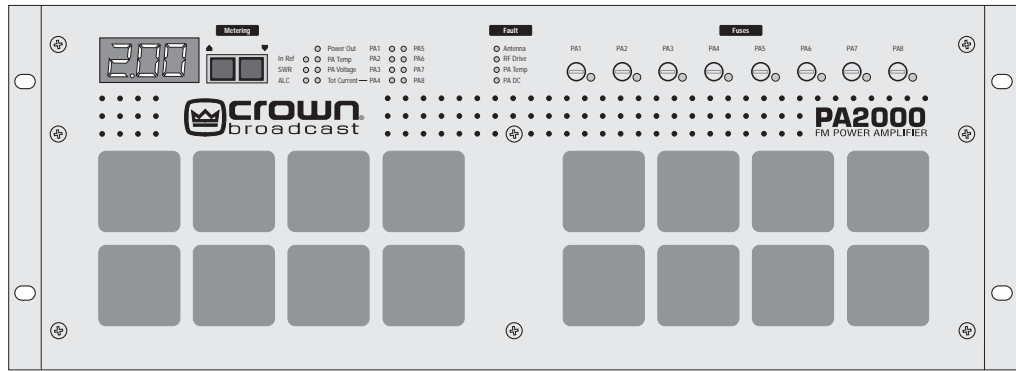
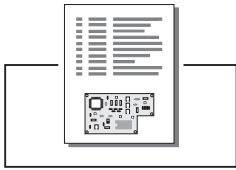


Illustration 4-4 Power Amplifier Front View

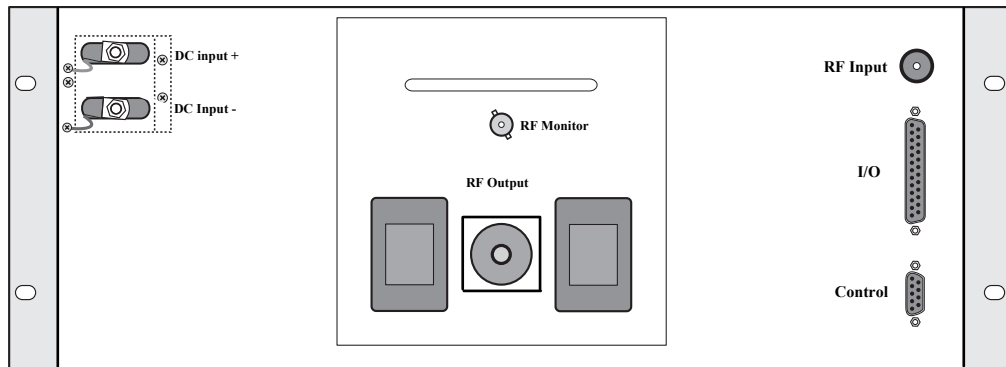


Illustration 4-5 Power Amplifier Rear View

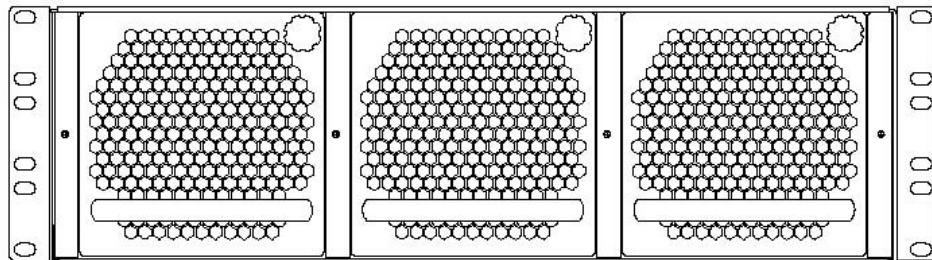


Illustration 4-6 Power supply Front View

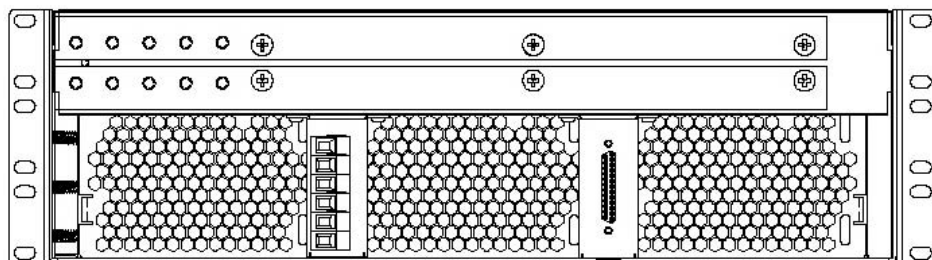
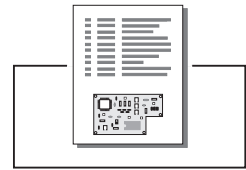
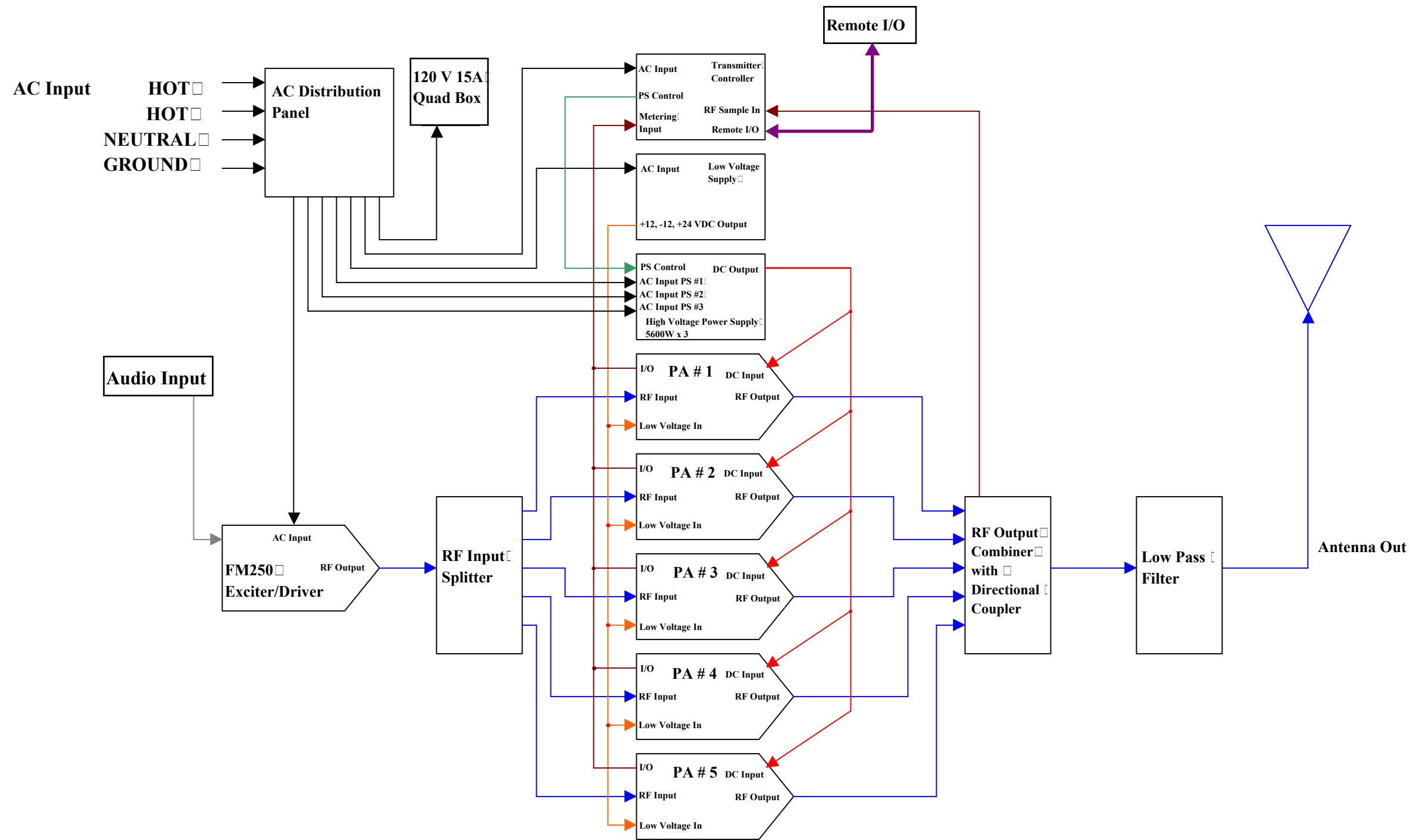


Illustration 4-7 Power Supply Rear View

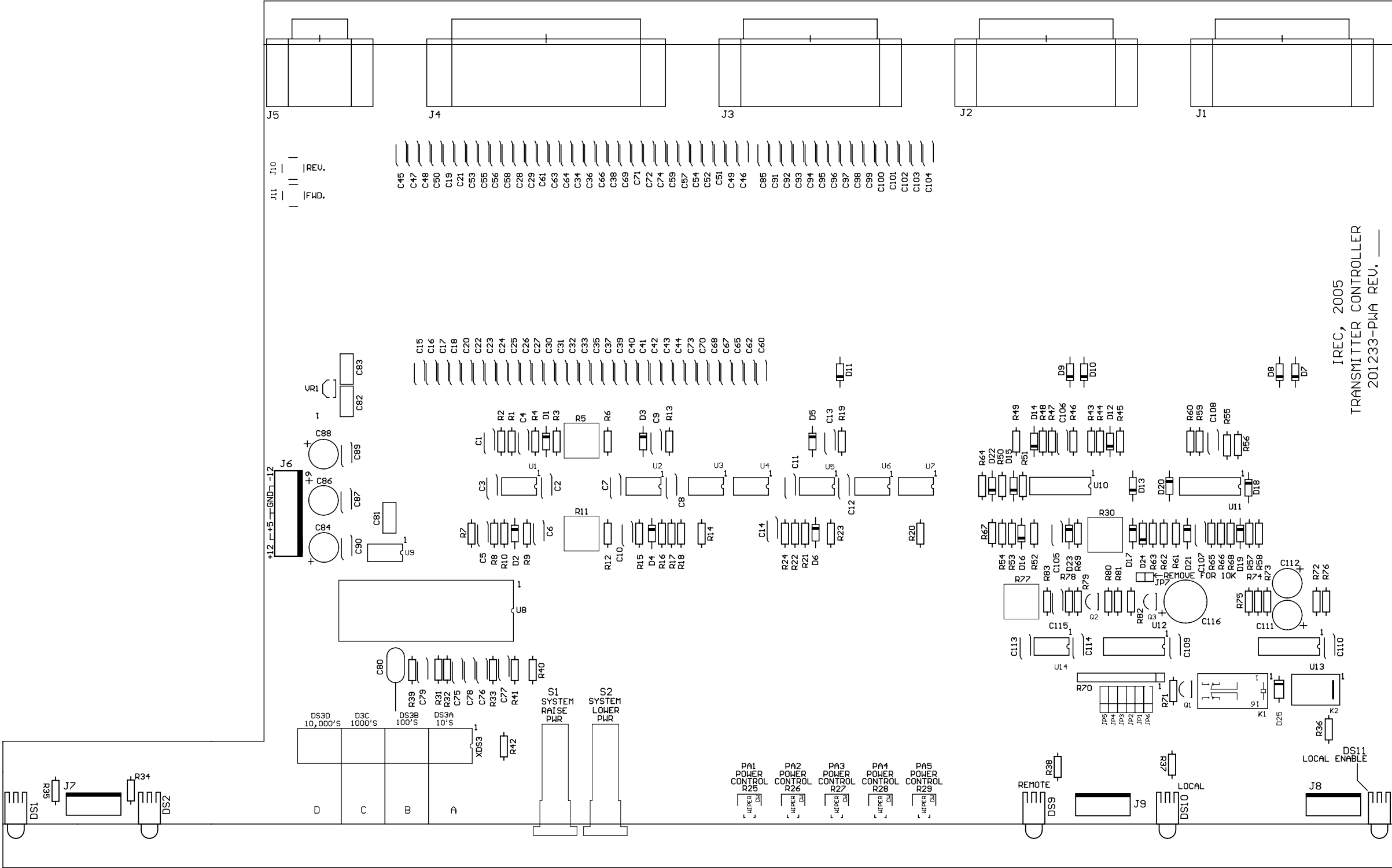


4.2 Block Diagram

FM10000 Transmitter System

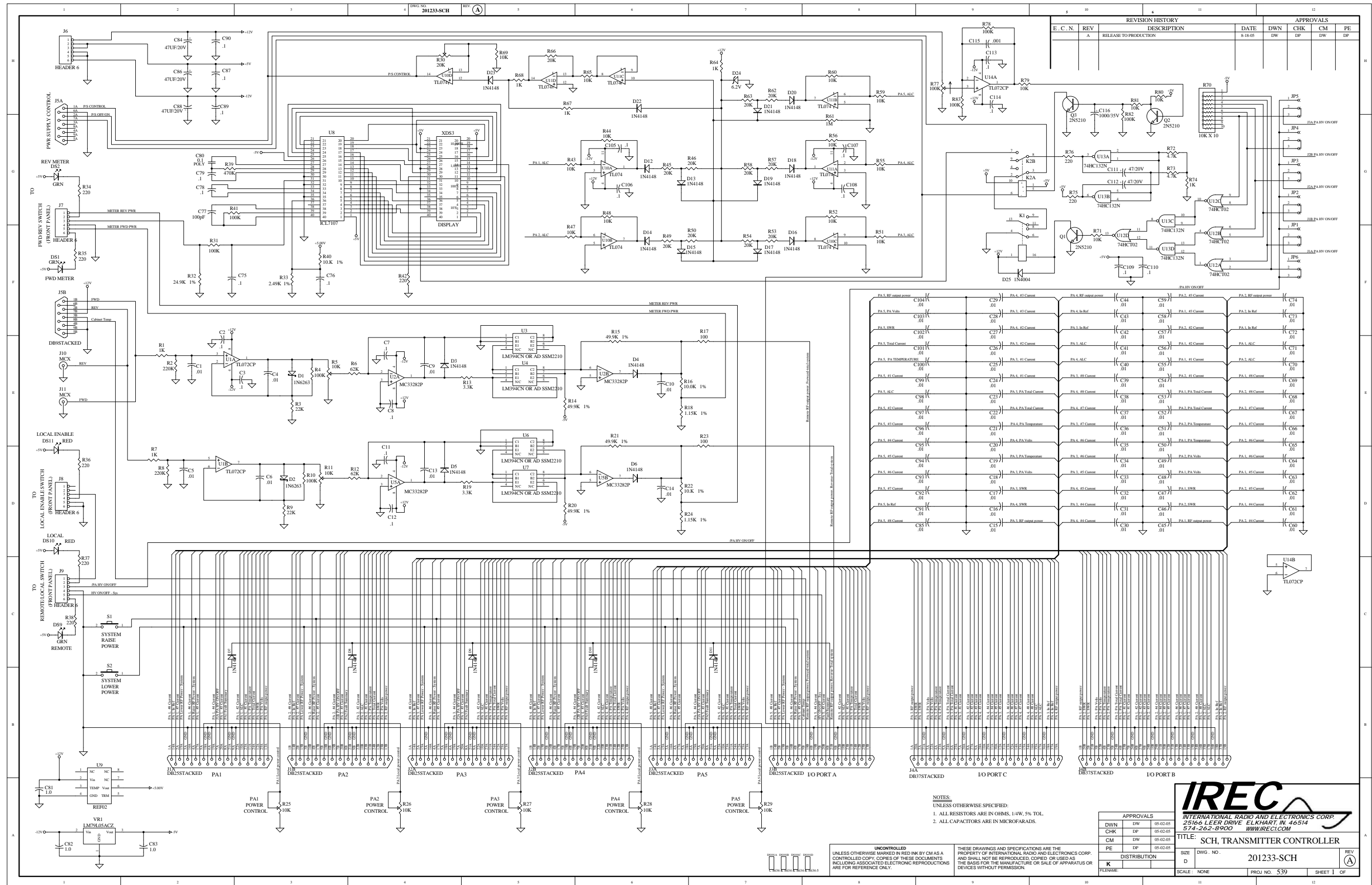


4.3 Transmitter Controller Board Component ID



IREC, 2005
 TRANSMITTER CONTROLLER
 201233-PWA REV. ____

4.4 Transmitter controller Board Schematic





Section 5—Service and Support

We understand that you may need various levels of support or that the product could require servicing at some point in time. This section provides information for both of these scenarios.



5.1 Service

The product warranty (see opposite page) outlines our responsibility for defective products. Before returning a product for repair or replacement (our choice), call our Customer Service department using the following telephone number:

(866) 262-8917

Our Customer Service Representative will give you further instructions regarding the return of your product. Use the original shipping carton or a new one obtained from Crown.

Please fill out the Factory Service Instructions sheet (page 5-4) and include it with your returned product.

5.2 24-Hour Support

In most instances, what you need to know about your product can be found in this manual. There are times when you may need more in-depth information or even emergency-type information. We provide 24-hour technical assistance on your product via a toll free telephone call.

For **emergency help** or **detailed technical assistance**, call

(866) 262-8917

You may be required to leave a message at this number but your call will be returned promptly from our on-call technician.

5.3 Spare Parts

To obtain spare parts, call **Crown Broadcast Service** at the following number :

(866) 262-8917

You may also write to the following address:

Service Manager

International Radio and Electronics Corp.

P.O. Box 2000

Elkhart, Indiana, U.S.A. 46515-2000

Crown Broadcast Three Year Limited Product Warranty

SUMMARY OF WARRANTY

Crown Broadcast, IREC warrants its broadcast products to the ORIGINAL PURCHASER of a NEW Crown Broadcast product, for a period of three (3) years after shipment from Crown Broadcast. All products are warranted to be free of defects in materials and workmanship and meet or exceed all specifications published by Crown Broadcast. Product nameplate with serial number must be intact and not altered in any way. This warranty is non-transferable. This warranty in its entirety is the only warranty offered by Crown Broadcast. No other warranties, expressed or implied, will be enforceable.

EXCLUSIONS

Crown Broadcast will not warranty the product due to misuse, accident, neglect and improper installation or operation. Proper installation included A/C line surge suppression, lightning protection and proper grounding of the entire transmitter, and any other recommendations designated in the Instruction manual. This warranty does not extend to any other products other than those designed and manufactured by Crown Broadcast. This warranty does not cover any damage to any accessory such as loads, transmission line or antennas resulting from the use or failure of a Crown Broadcast transmitter. Warranty does not cover any loss of revenue resulting from any failure of a Crown Broadcast product, act of God, or natural disaster.

Procedure for Obtaining Warranty Service

Crown Broadcast will repair or service, at our discretion, any product failure as a result of normal intended use. Warranty repair can only be performed at our plant facility in Elkhart, Indiana USA or at a factory authorized service depot. Expenses in remedying the defect will be borne by Crown Broadcast, including two-way ground transportation cost within the continental United States.

Prior to returning any product or component to Crown Broadcast for warranty work or repair, a Return Authorization (RA) number must be obtained from the Crown Broadcast Customer Service Department. Product must be returned in the original factory pack or equivalent. Original factory pack materials may be obtained at a nominal charge by contacting Crown Broadcast Customer Service. Resolution of the defective product will be made within a reasonable time from the date of receipt of the defective product.

Warranty Alterations

No person has the authority to enlarge, amend, or modify this warranty, in whole or in part. This warranty is not extended by the length of time for which the owner was deprived the use of the product. Repairs and replacement parts that are provided under the terms of this warranty shall carry only the unexpired portion of the warranty.

Product Design Changes

Crown Broadcast reserves the right to change the design and manufacture of any product at any time without notice and without obligation to make corresponding changes in products previously manufactured.

Legal Remedies of Purchaser

This written warranty is given in lieu of any oral or implied warranties not covered herein. Crown Broadcast disclaims all implied warranties including any warranties of merchantability or fitness for a particular purpose.

Crown Broadcast

25166 Leer Drive

Elkhart, Indiana 46514-5425

Phone 574-262-8900 Fax 574-262-5399 www.crownbroadcast.com

Factory Service Instructions

To obtain factory service, complete the bottom half of this page, include it with the unit, and ship to:

International Radio and Electronics Corp.
25166 Leer Drive
Elkhart, Indiana, U.S.A. 46514-5425

For units in warranty (within 3 years of purchase from any authorized Crown Dealer): We pay for ground UPS shipments from anywhere in the continental U.S. and Federal Express Second Day service from Hawaii and Alaska to the factory and back to you. Expedited service/shipment is available for an additional charge. You may ship freight collect (COD for cost of freight) or forward your receipt for shipping charges which we will reimburse. We do not cover any charges for shipping outside the U.S. or any of the expenses involved in clearing customs.

If you have any questions about your Crown Broadcast product, please contact Crown Broadcast Customer Service at:

Telephone: (866) 262-8917 or (574) 262-8900
Fax: (574) 262-5399

Name: _____ Company: _____

Shipping Address: _____

Phone Number: _____ Fax: _____

Model: _____ Serial Number: _____ Purchase Date: _____

Nature of the Problem

(Describe the conditions that existed when the problem occurred and what attempts were made to correct it.)

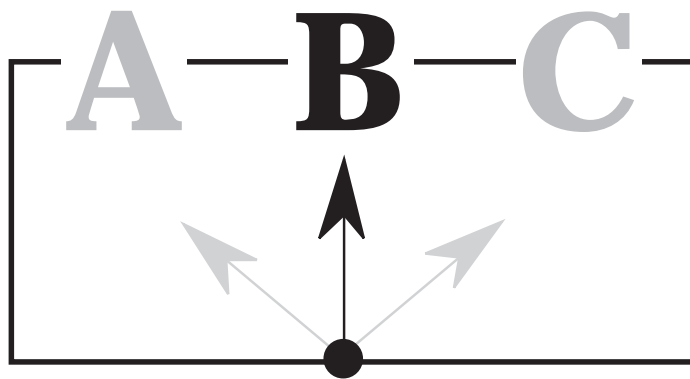
Other equipment in your system: _____

If warranty has expired, payment will be: Cash/Check VISA Mastercard COD
 Please Quote before servicing

Card Number: _____ Exp. Date: _____ Signature: _____

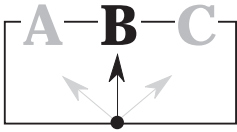
Return Shipment Preference if other than UPS Ground: Expedite Shipment Other _____

ENCLOSE WITH UNIT—DO NOT MAIL SEPARATELY



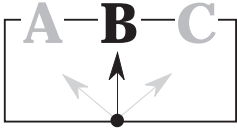
Glossary

The following pages define terms and abbreviations used throughout this and other Crown Broadcast manuals.



AF	Audio Frequency; the frequencies between 20 Hz and 20 kHz in the electromagnetic spectrum.
ALC	Automatic Level Control
AM	Amplitude Modulation; the process of impressing information on a radio-frequency signal by varying its amplitude.
bandwidth	The range of frequencies available for signalling.
BCD	Binary-Coded Decimal; a digital system that uses binary codes to represent decimal digits.
BFO	Beat Frequency Oscillator
BNC	A bayonet locking connector for miniature coax; said to be short for Bayonet-Neill-Concelman.
broadband	As used in the FM transmitter, refers to the entire audio spectrum as opposed to the spectrum influenced by the pre-emphasis; also called "Wideband."
carrier	A continuous signal which is modulated with a second, information-carrying signal.
crosstalk	In FM broadcasting, this term generally refers to the interaction between the main (L+R) and the subcarrier (L-R) signals as opposed to "separation" which generally refers to leakage between left (L) and right (R) channels.
density (program)	A high average of modulation over time.
deviation	The amount by which the carrier frequency changes either side of the center frequency.
DIP	Dual In-line Package; term used to describe an IC or socket that has two parallel rows of pins.
distortion	The unwanted changes in signal wave shape that occur during transmission between two points.
DPM	Digital Panel Meter
EPROM	Erasable Programmable Read Only Memory
ESD	Electrostatic Discharge; a discharge that is potentially destructive to sensitive electronic components.

exciter	(1) A circuit that supplies the initial oscillator used in the driver stage. (2) A transmitter configuration which excludes stereo generation and audio processing.
FET	Field-Effect Transistor
frequency synthesizer	A circuit that generates precise frequency signals by means of a single crystal oscillator in conjunction with frequency dividers and multipliers.
FM	Frequency Modulation; the process of impressing information on a radio signal by varying its frequency.
FSK	Frequency Shift Keying; an FM technique for shifting the frequency of the main carrier at a Morse code rate. Used in the on-air identification of frequencies.
gain reduction	The process of reducing the gain of a given amplifier.
harmonics	Undesirable energy at integral multiples of a desired, fundamental frequency.
HF	High Frequency; Frequencies in the 3.0 to 30.0 MHz range.
Highband	Frequencies affected by the pre-emphasis.
IC	Integrated Circuit
I/O	Input/Output
LED	Light-Emitting Diode
modulation	The process by which a carrier is varied to represent an information-carrying signal.
MOSFET	Metal Oxide Semiconductor Field Effect Transistor; a voltage-controlled device with high input impedance due to its electrically isolated gate.
nearcast	A transmission within a localized geographic area (ranging from a single room to a several kilometers).
PA	Power Amplifier



PAI	Power Amplifier Current
PAV	Power Amplifier Voltage
pilot	A 19-kHz signal used for stereo transmissions.
pre-emphasis	The deliberate accentuation of the higher audio frequencies; made possible by a high-pass filter.
processing	The procedure and/or circuits used to modify incoming audio (keeping its level around 75 kHz deviation) to make it suitable for transmission.
receiver	An option which adds incoming RF capability to an existing transmitter. See also "Translator."
RF	Radio Frequency; (1) A specific portion of the electromagnetic spectrum between audio-frequency and the infrared portion. (2) A frequency useful for radio transmission (roughly 10 kHz and 100,000 MHz).
SCA	Subsidiary Communications Authorization; see "subcarrier."
S/N	Signal to Noise
spurious products	Unintended signals present on the transmission output terminal.
stability	A tolerance or measure of how well a component, circuit, or system maintains constant operating conditions over a period of time.
stereo pilot	See "pilot."
stereo separation	The amount of left-channel information that bleeds into the right channel (or vice versa).
subcarrier	A carrier signal which operates at a lower frequency than the main carrier frequency and which modulates the main carrier.
suppression	The process used to hold back or stop certain frequencies.

SWR	Standing-Wave Ratio; on a transmission line, the ratio of the maximum voltage to the minimum voltage or maximum current to the minimum current; also the ratio of load impedance to intended (50 ohms) load impedance.
THD	Total Harmonic Distortion
translator	A transmitter designed to internally change an FM signal from one frequency to another for retransmission. Used in conjunction with terrestrial-fed networks.
satellator	A transmitter equipped with an FSK ID option for rebroadcasting a satellite-fed signal.
UHF	Ultra High Frequency; frequencies in the 300 to 3000 MHz range.
VCO	Voltage-Controlled Oscillator
VHF	Very High Frequency; frequencies in the 30 to 300 MHz range.
VSWR	Voltage Standing-Wave Ratio; see "SWR."
Wideband	See "broadband."