ANYWAVE
COMMUNICATION TECHNOLOGIES

MHPTV User Manual

June 25, 2019 - Version 2.6

MEDIUM-HIGH POWER TV TRANSMITTERS

Copyright Notice

FCC Compliance

This equipment complies with relevant portions of Parts 2, 73, & 74 of the FCC rules governing LPTV operation.

Disclaimer

Information provided by Anywave Communication Technologies is believed to be accurate and complete; however, no liability can be assumed for its use.

The manufacturer makes no representations or warranties, either expressed or implied, by or with respect to anything in this manual, and shall not be liable for any implied warranties of fitness for a particular purpose or for any indirect, special, or consequential damages. Information in this document is subject to change without notice and does not represent a commitment on the part of the manufacturer.

USE OF THIS PRODUCT IN A MANNER OTHER THAN DESCRIBED IN THIS MANUAL MAY RESULT IN DAMAGE TO THE EQUIPMENT AND/OR PERSONAL INJURY.

PLEASE READ THIS MANUAL IN ITS ENTIRETY BEFORE ATTEMPTING TO OPERATE THE EQUIPMENT. CONTACT ANYWAVE WITH ANY QUESTIONS OR CONCERNS YOU MAY HAVE.

Anywave Communication Technologies Inc.
300 Knightsbridge Parkway, Suite 150, Lincolnshire, IL 60069
Tel: (847) 415-2258
Fax: (847) 415-2112
http://www.anywavecom.net/

Unpacking

Carefully unpack the equipment and perform a visual inspection to determine if any apparent damage has occurred during shipment. Please notify the delivery carrier and Anywave immediately if shipment damage has occurred. Retain all original shipping materials.

Please locate and reference the Packing Check List to verify you have received all components of your system. Retain the Packing Check List for future reference.

Also, please identify and remove all packing materials and supports (foam pads, etc.) prior to the initial turn-on of the equipment.

Returns and Exchanges

Written approval and a Return Material Authorization number (RMA) are required from Anywave for all equipment returns. Please direct all return inquiries to the Anywave Service Department at support_us@anywavecom.com, providing the Sales Order number and Serial Number(s) of the equipment. Complete details regarding the nature and circumstances of your return must be included in your RMA request. Proper handling and return shipping instructions will be provided with an approved RMA number.

Technical Support

Technical support and troubleshooting assistance for Anywave Transmitters are available through the Anywave Technical Support Department during normal business hours (9:00 AM - 5:00 PM Eastern Time) at (847) 415-2258 (option 2). After hour Emergency Support is available at (847) 415-2258 (option 3). Email questions anytime to support_us@anywavecom.com and a Technical Support Engineer will respond as soon as possible.

Note: For all service and support requests, you will need to provide the Serial Number of the equipment with your Sales Order number. For future reference, please record that information here:

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WARNING

THE VOLTAGES, CURRENTS, AND RF ENERGY IN THIS EQUIPMENT ARE DANGEROUS. PERSONNEL MUST AT ALL TIMES OBSERVE ALL SAFETY WARNINGS, INSTRUCTIONS, AND REGULATIONS.

IN THE CASE OF EMERGENCY, ENSURE THAT ALL POWER HAS BEEN DISCONNECTED.

ALWAYS DISCONNECT POWER BEFORE REMOVING COVERS, ENCLOSURES, OR SHIELDS. DO NOT PERFORM SERVICE ON THE EQUIPMENT WHEN ALONE OR FATIGUED. KNOW YOUR EQUIPMENT AND DO NOT TAKE RISKS.

This manual is provided as a general guide for trained and qualified personnel well aware of the dangers inherent in handling potentially hazardous electrical transmission equipment.

The installation, operation, maintenance and service of this equipment involves risks both to personnel and equipment and must ONLY be performed by qualified personnel exercising due care. Anywave Communication Technologies, Inc. shall not be responsible for injury or damage resulting from improper handling or from the use of improperly trained or inexperienced personnel performing such tasks.

All local building and electrical codes, as well as fire protection standards, must be observed in the installation and operation of the equipment.

Contents

1. Introduction

This User Manual contains operational instructions for the Anywave MHPTV Transmitter fitted with 1, 2, 3, 4, 5, 6, or 8 PA drawers, delivering output powers as shown below (after the BPF). Please note that trained and qualified personnel are required to operate, install, maintain, and service this transmission equipment.

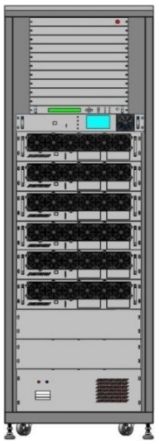
1100W ATSC
1000W COFDM

2200W ATSC
2000W COFDM

3300W ATSC
3000W COFDM

4400W ATSC
4000W COFDM

5500W ATSC
5000W COFDM



6600W ATSC
6000W COFDM

8800W ATSC
8000W COFDM

1.1 TX System Configuration

The operation of the MHPTV Transmitter is essentially the same independent of the Exciter modulation standard implemented - DTV (ATSC, ATSC 3.0, DVBT/T2, ISDBT, DTMB, etc. The differences are in the Exciter setup and configuration (please reference your specific Exciter user manual for details).

MHPTV Transmitters are fitted with Doherty (Hi-Efficiency) PAs. Please contact Anywave technical support for assistance if you wish to operate on a frequency other than your specified channel.

The table below highlights the MHPTV output power levels (ATSC and COFDM), cabinet dimensions, and power consumptions for the 1, 2, 3, 4, 5, 6, and 8 PA systems.

MHPTV Series - UHF							
Number of Amplifiers	1	2	3	4	5	6	8
Output Power (RMS) ATSC (1)	1300	2600	3800	5000	6000	7500	10000
Output Power (rms) ATSC (2)	1100	2200	3300	4400	5500	6600	8800
Output Power (RMS) COFDM (1)	1150	2300	3500	4500	5700	6800	9100
Output Power (rms) COFDM (2)	1000	2000	3000	4000	5000	6000	8000
Output Connector	1 5/8”					3 1/8”	
Height (inches / mm)	53.5 / 1358		70.6 / 1794			81.2 / 2063	
Width (inches / mm)	28.5 / 725		28.5 / 725			28.5 / 725	
Depth (inches / mm)	33.5 / 850		43.5 / 1100			43.5 / 1100	
AC Input Voltage (3)	240VAC Single φ (1, 2 or 3PA) or 208VAC Three φ						
AC Input Frequency	50 / 60 Hz						
Consumption - Max. - KW	3.3	6.5	9.7	12.8	15.9	19.2	25.6
Consumption - Typical. - KW	3.1	6.2	9.3	12.4	15.6	18.7	24.9
Current Rating Per φ typ – (1φ/ 3φ) (3)	13.0 / 8.7	25.9 / 17.3	38.9 / 26.0	34.6	43.2	51.9	69.2

(1) Power measured before Band Pass Filler

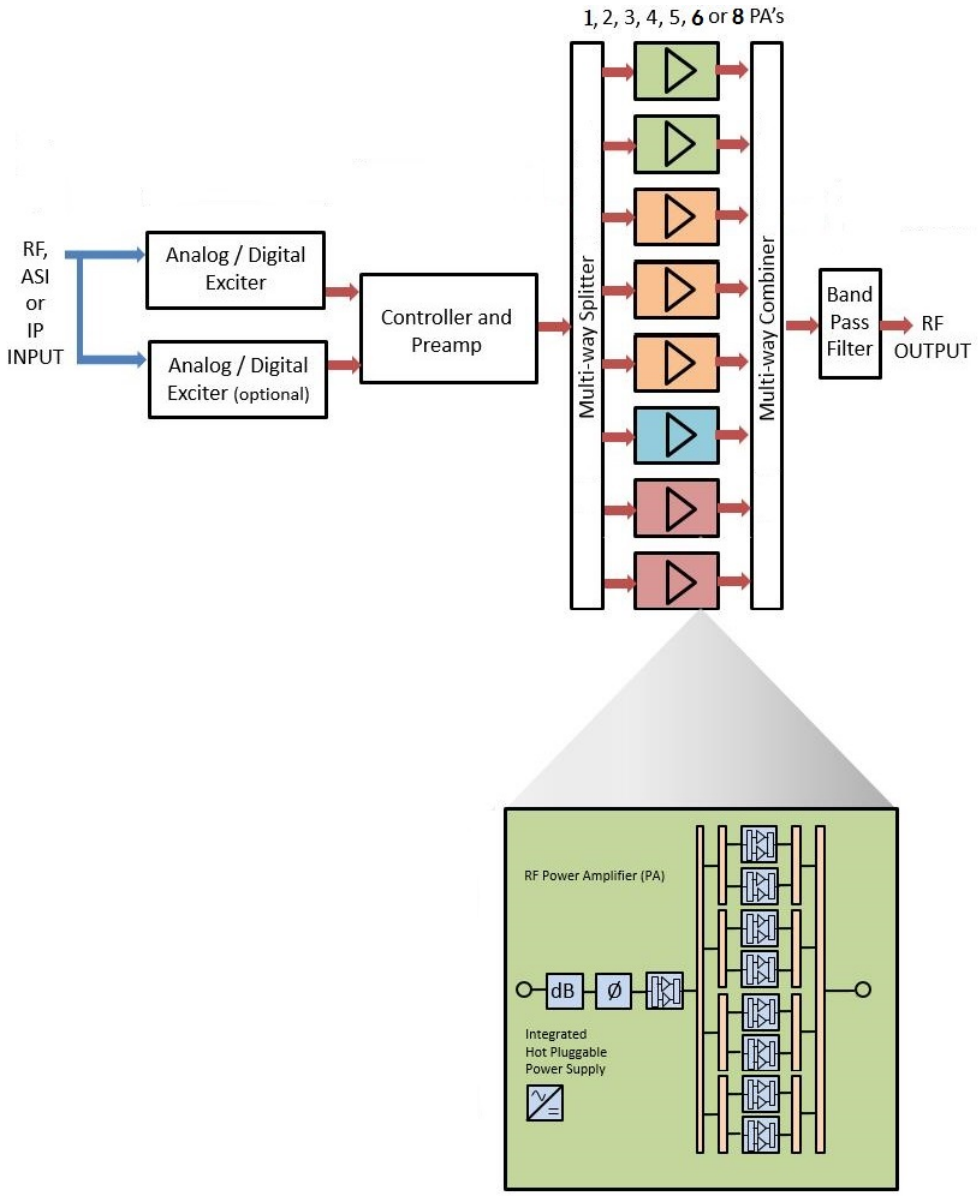
(2) Power measured after Band Pass Filler

(3) 4, 5, 6, 8 PA Current Rating is for 208V 3 ϕ

1.2 TX Overview

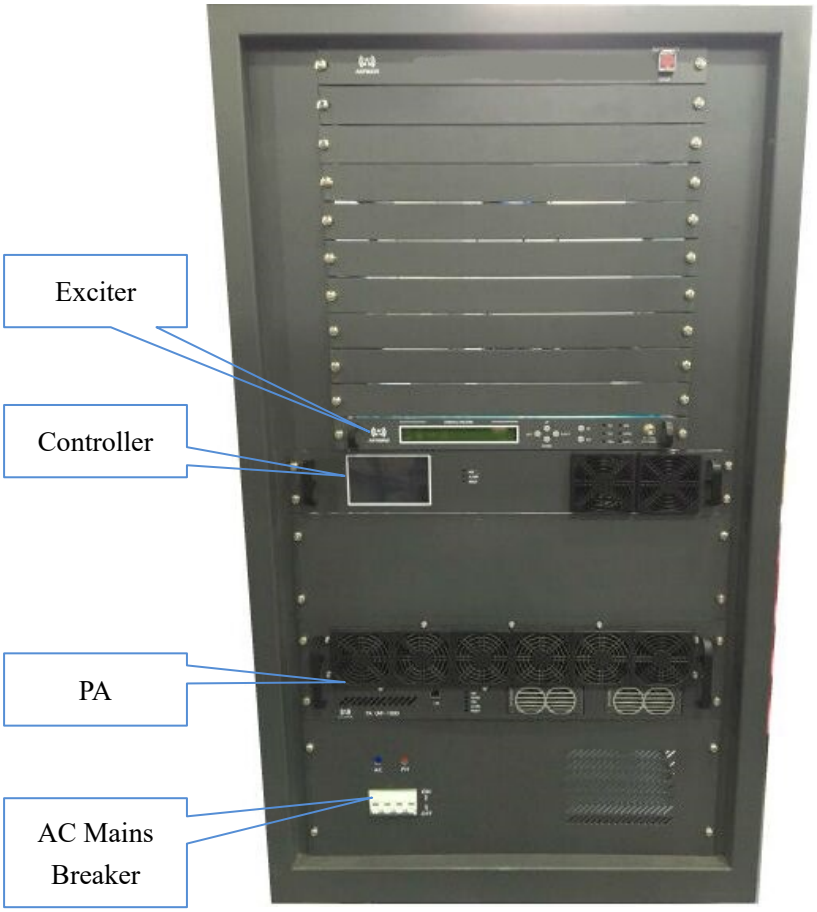
1.2.1 System Block Diagram

A hi-level System Block Diagram of the MHPTV TX is shown below. The MHPTV system essentially consists of an Exciter, a Controller (with built-in preamp), 1,2,3,4,5,6, or 8 Power Amplifiers with corresponding input Splitter and output Combiner, and a Band Pass (mask) Filter.

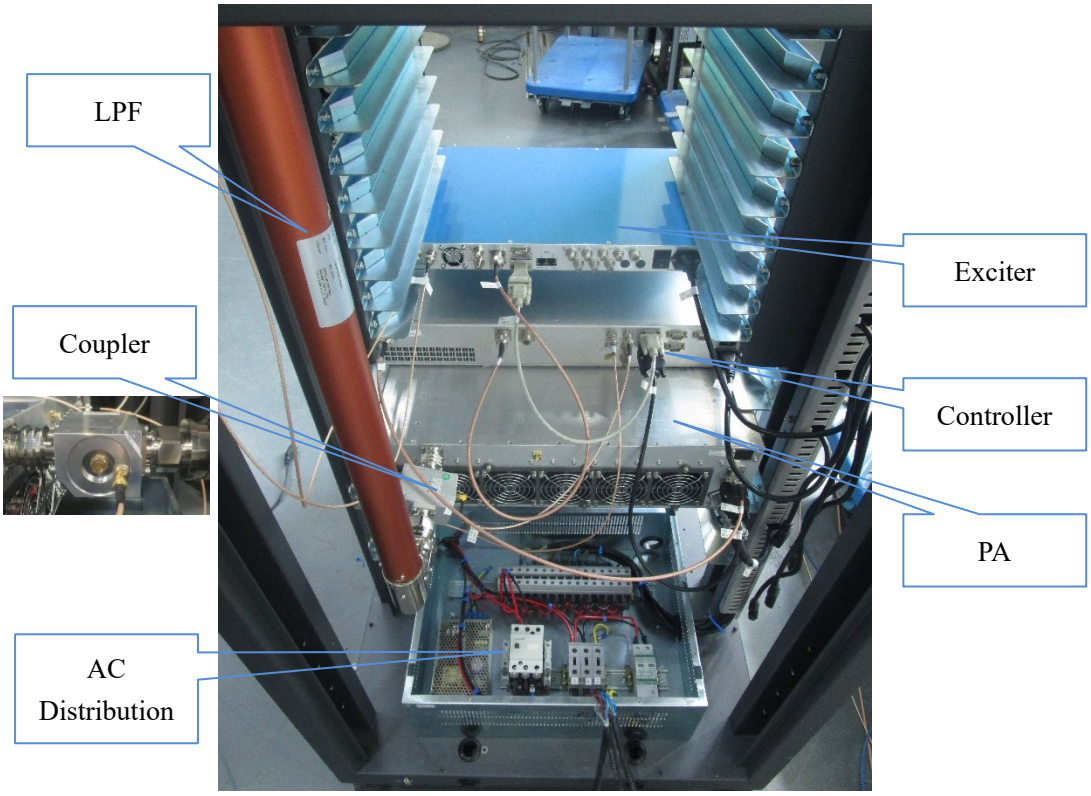


1.2.2 1-PA TX

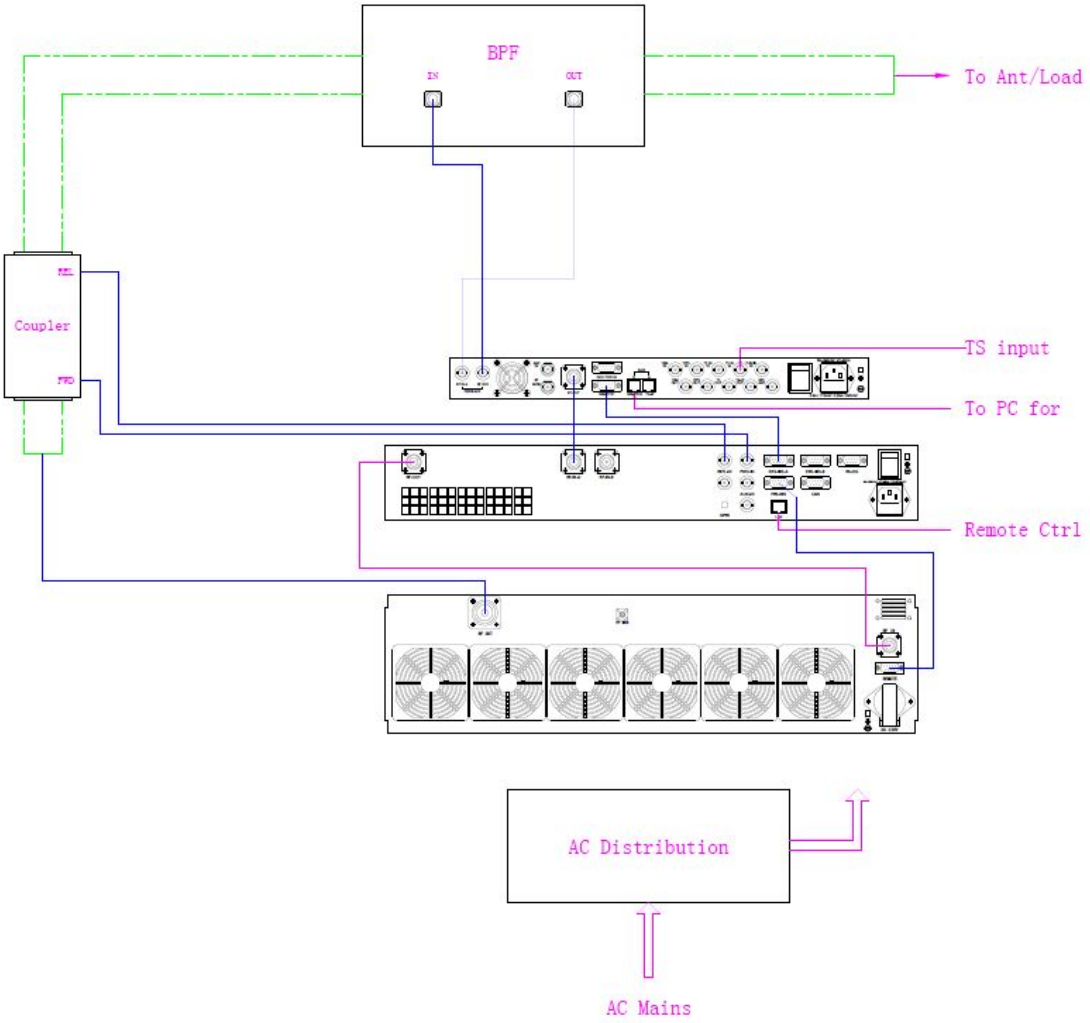
The Anywave 1-PA MHPTV Transmitter comes in single and dual exciter configurations. Photos of a single exciter system are shown below. The main subsystems (as seen from the front) include one or two Exciter(s), one Controller (with a touchscreen LCD, and built-in preamp), one PA-8D-C-FA power amplifiers (8-power transistors per PA), and one AC Mains Breaker.



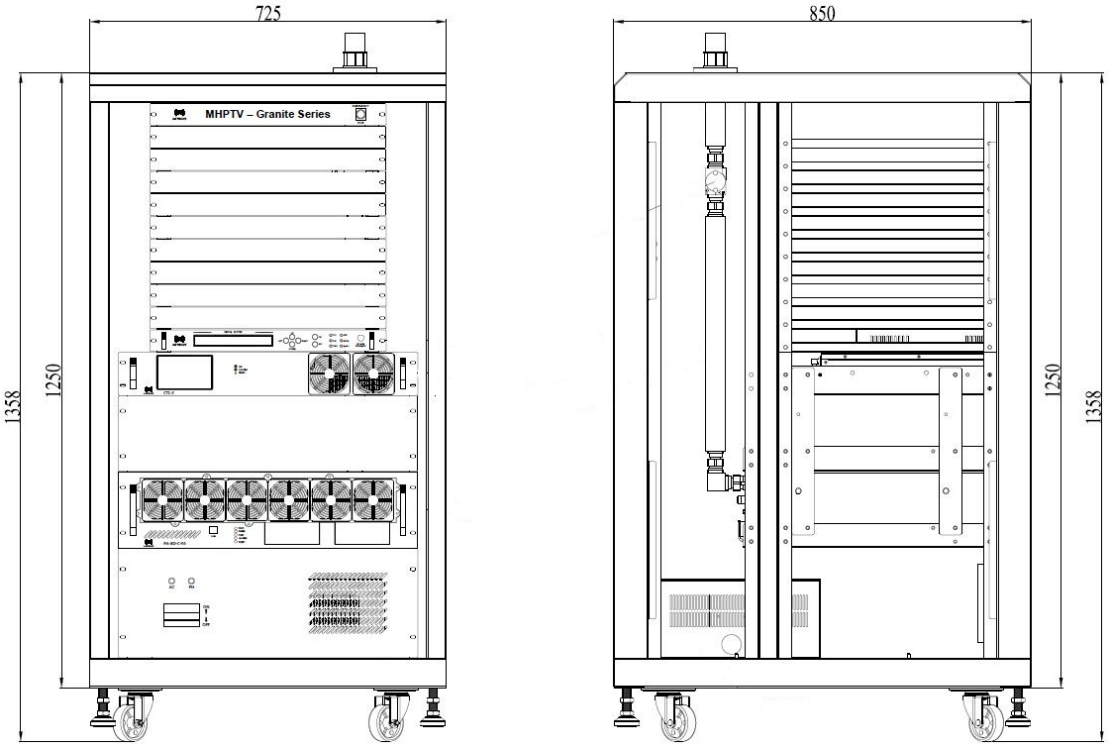
From the rear view of the TX cabinet, several other main components can be seen which include one AC Distribution System, one 2-port directional coupler and one Low Pass Filter (installed in the cabinet).



The diagram below shows the overall system interconnect between the various modules in the 1-PA MHPTV system.

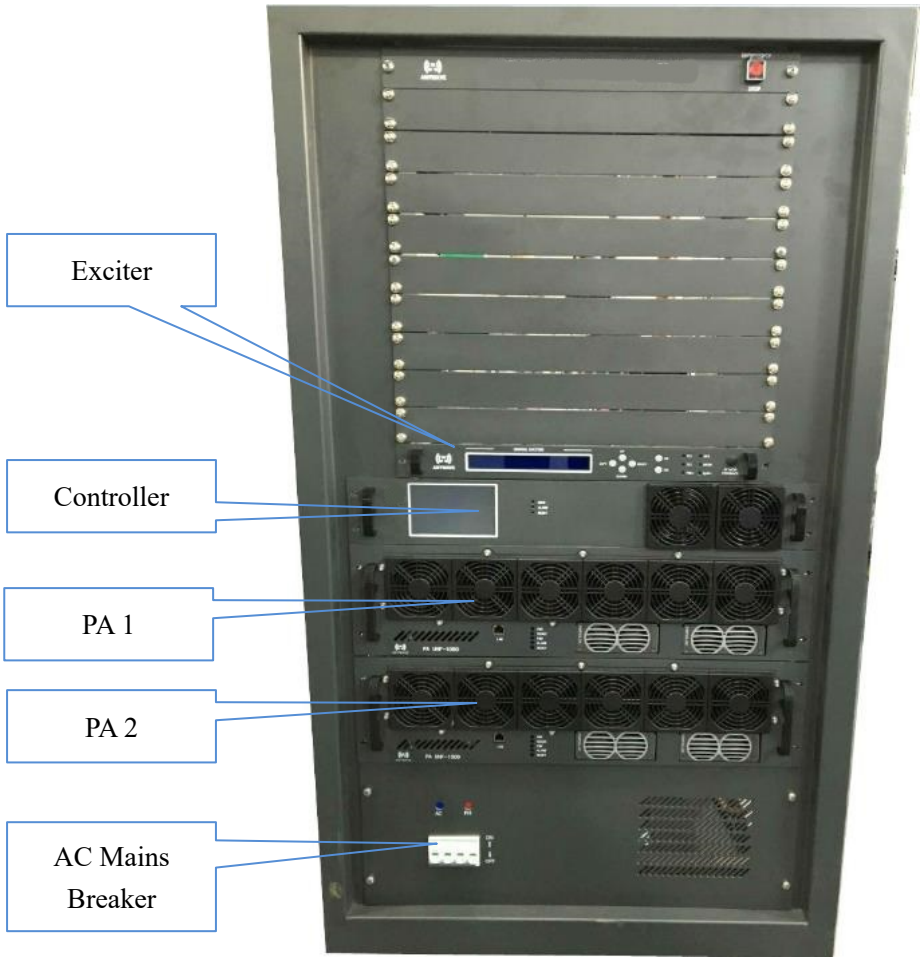


The 1-PA MHPTV system Cabinet dimensions are shown below. Please note: if the BPF (not shown) is mounted on top of the TX cabinet – and the additional height of the BPF must be considered in the overall system height.

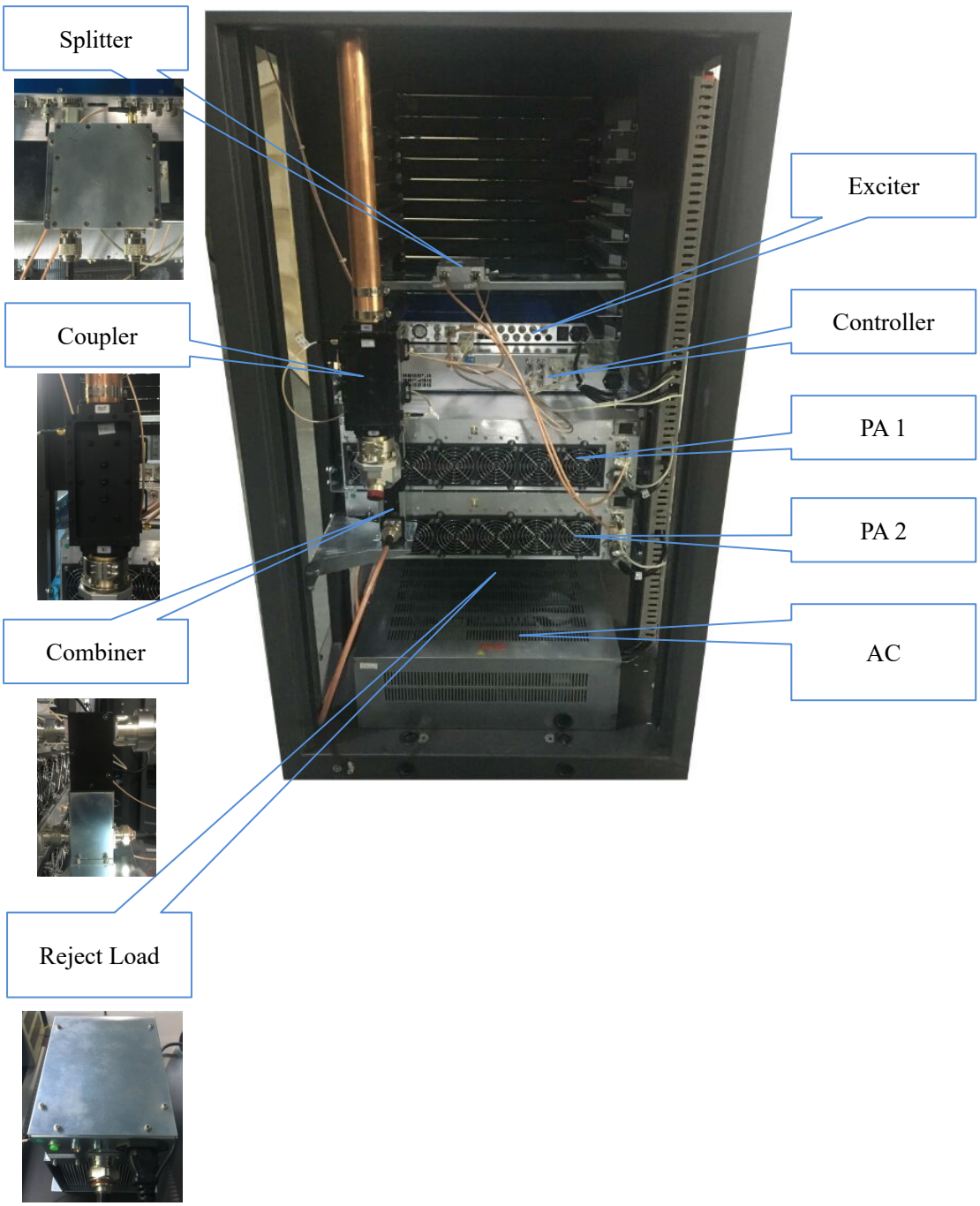


1.2.3 2-PA TX

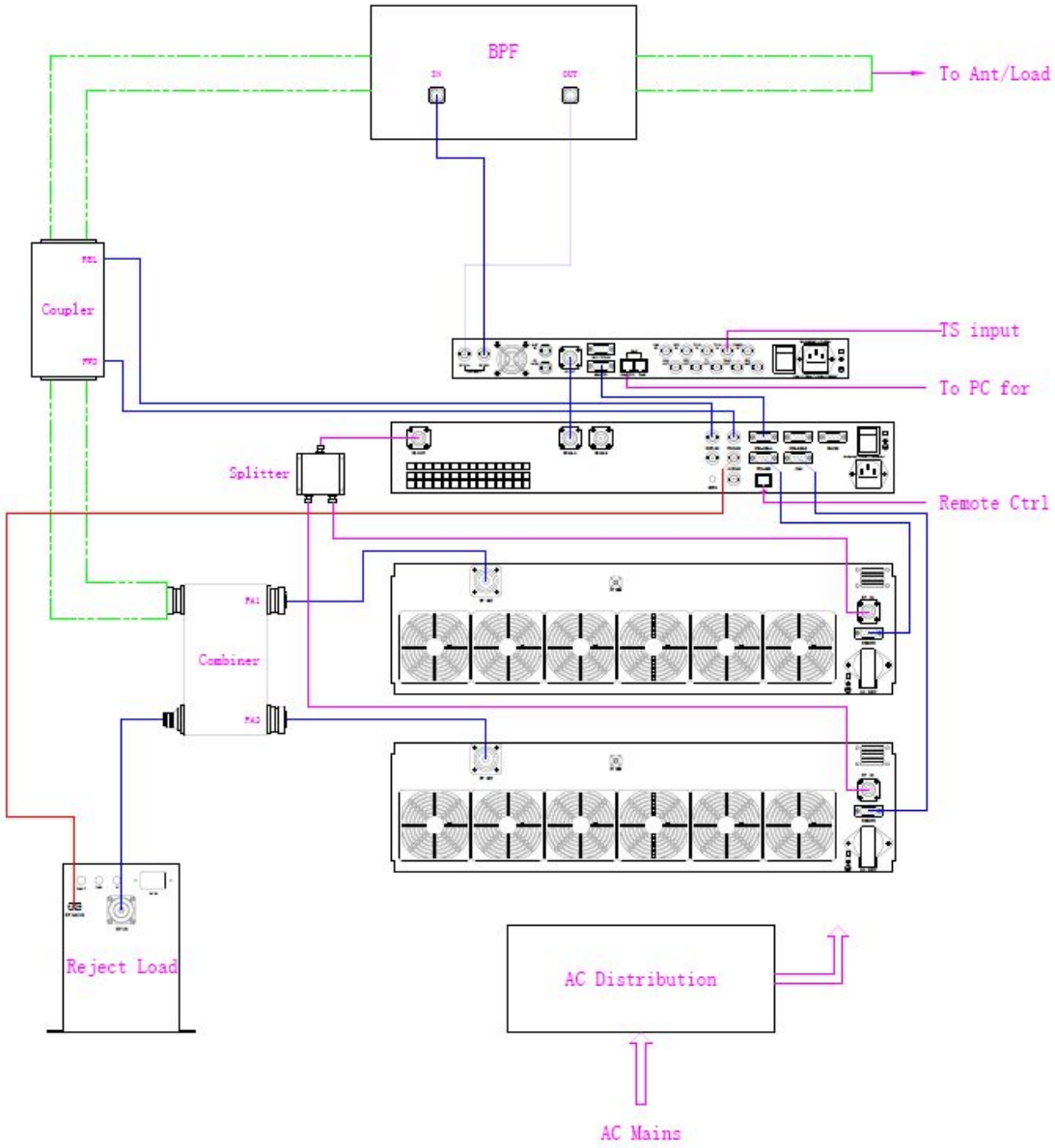
The Anywave 2-PA MHPTV Transmitter comes in single and dual exciter configurations. Photos of a single exciter system are shown below. The main subsystems (as seen from the front) include one or two Exciter(s), one Controller (with a touchscreen LCD, and built-in preamp), two PA-8D-C-FA power amplifiers (8-power transistors per PA), one AC Mains Breaker, one Low Pass Filter –installed external to the cabinet), and a channel mask Band Pass Filter (BPF) – optional –installed on the floor next to the cabinet rack (by default).



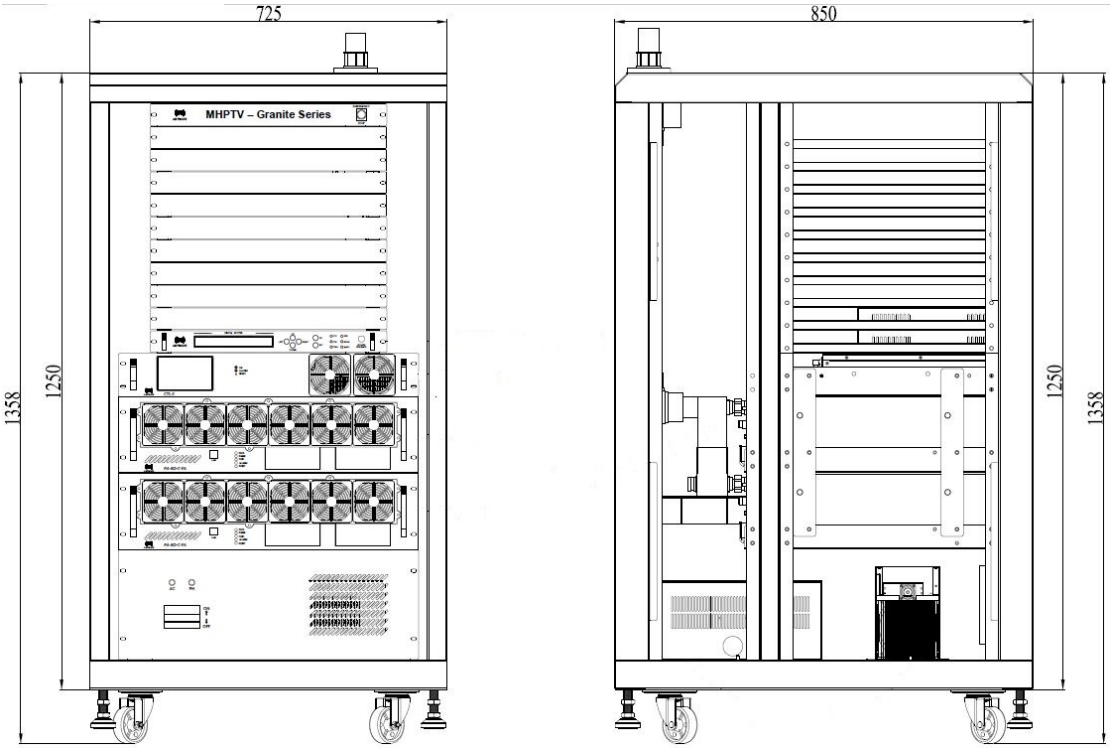
From the rear view of the TX cabinet, several other main components can be seen which include an AC Distribution System, one 2-way Splitter and Combiner, one 2-port Directional Coupler, and one Reject Load.



The diagram below shows the overall system interconnect between the various modules in the 2-PA MHPTV system.

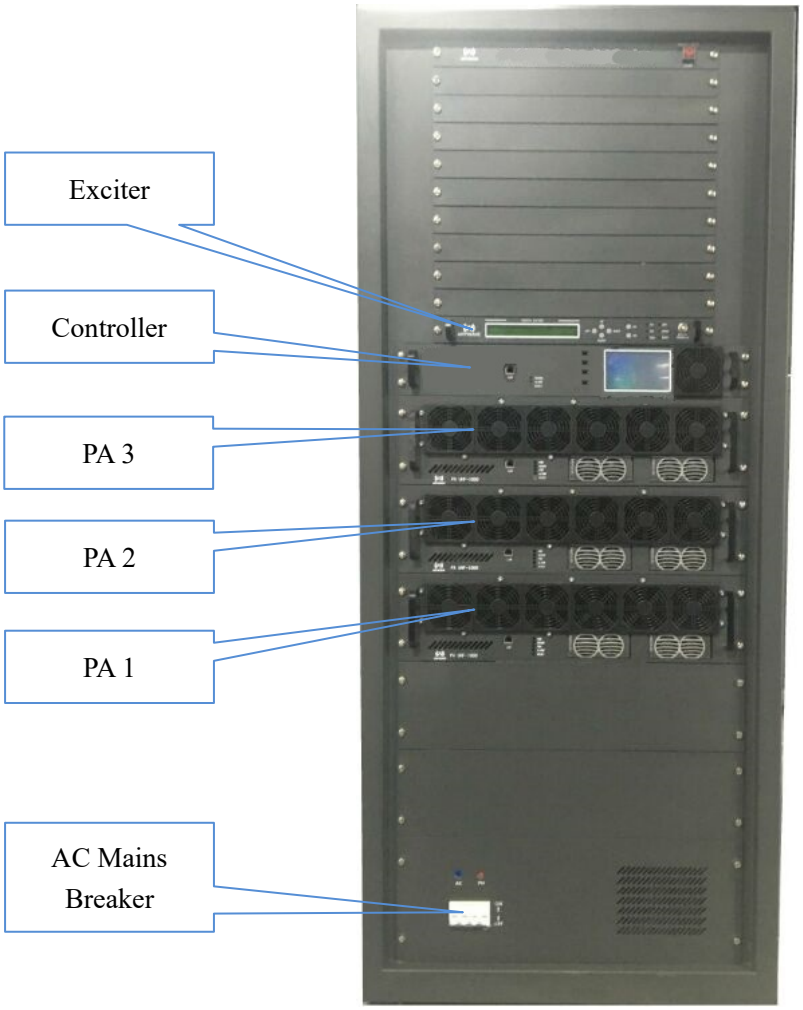


The 2-PA MHPTV system Cabinet dimensions are shown below.

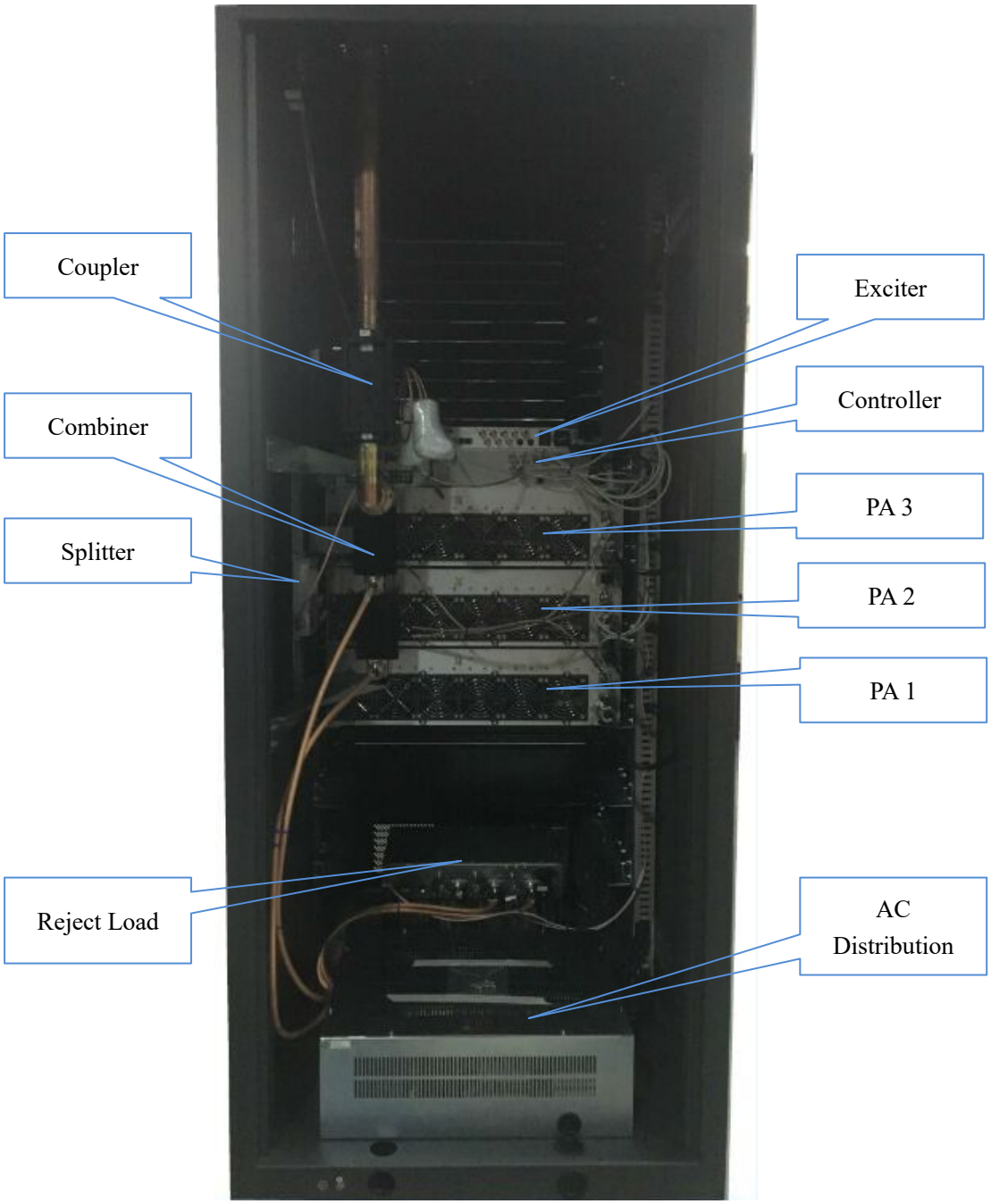


1.2.4 3-PA TX

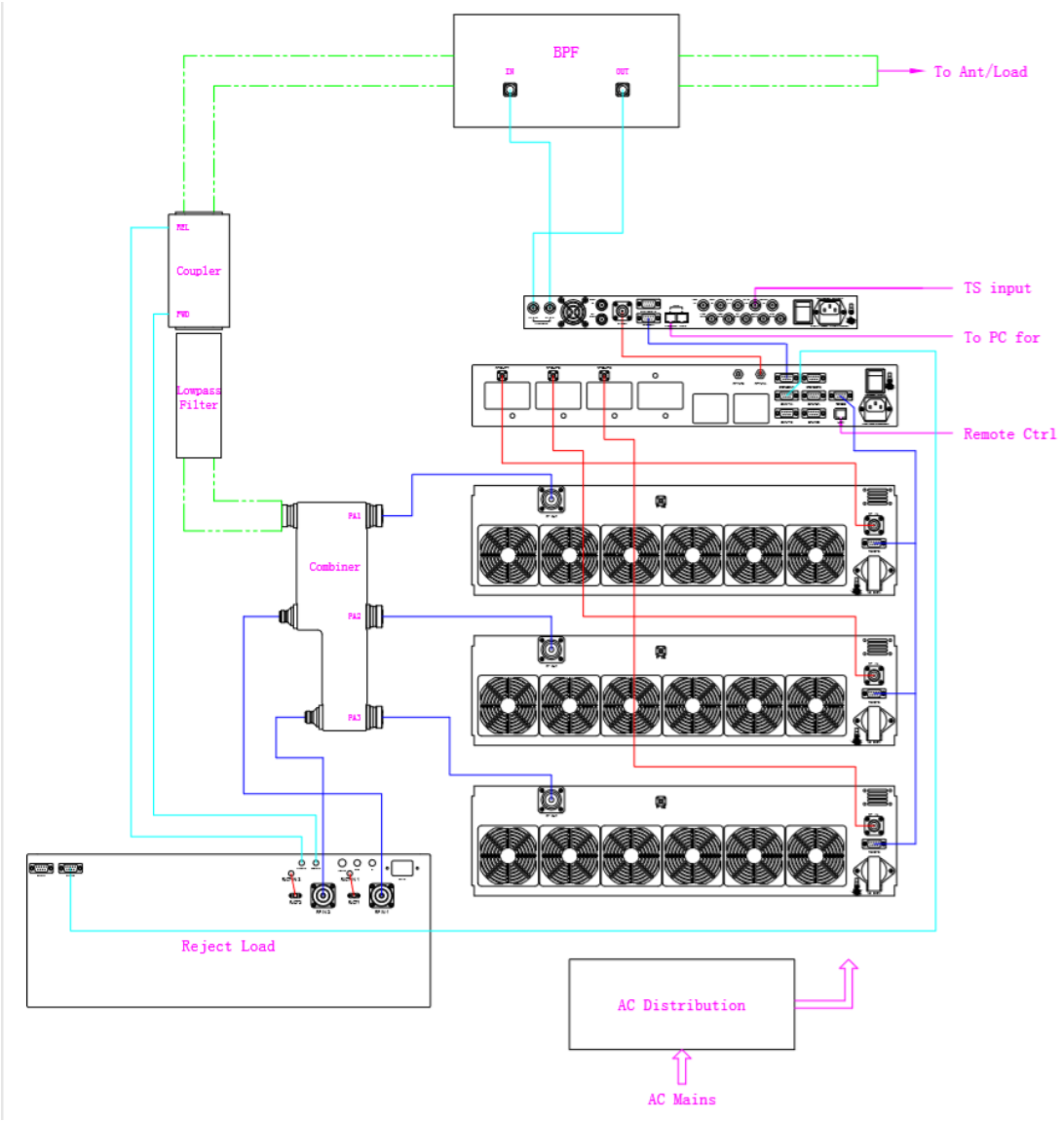
The Anywave 3-PA MHPTV Transmitter comes in single and dual exciter configurations. Photos of a single exciter system are shown below. The main subsystems (as seen from the front) include one or two Exciter(s), one Controller (with a touchscreen LCD, and built-in preamp), three PA-8D-C-FA power amplifiers (8-power transistors per PA), one AC Mains Breaker, one Low Pass Filter–installed external to the cabinet, and a channel mask Band Pass Filter (BPF) – optional –installed on the floor next to the cabinet rack (by default).



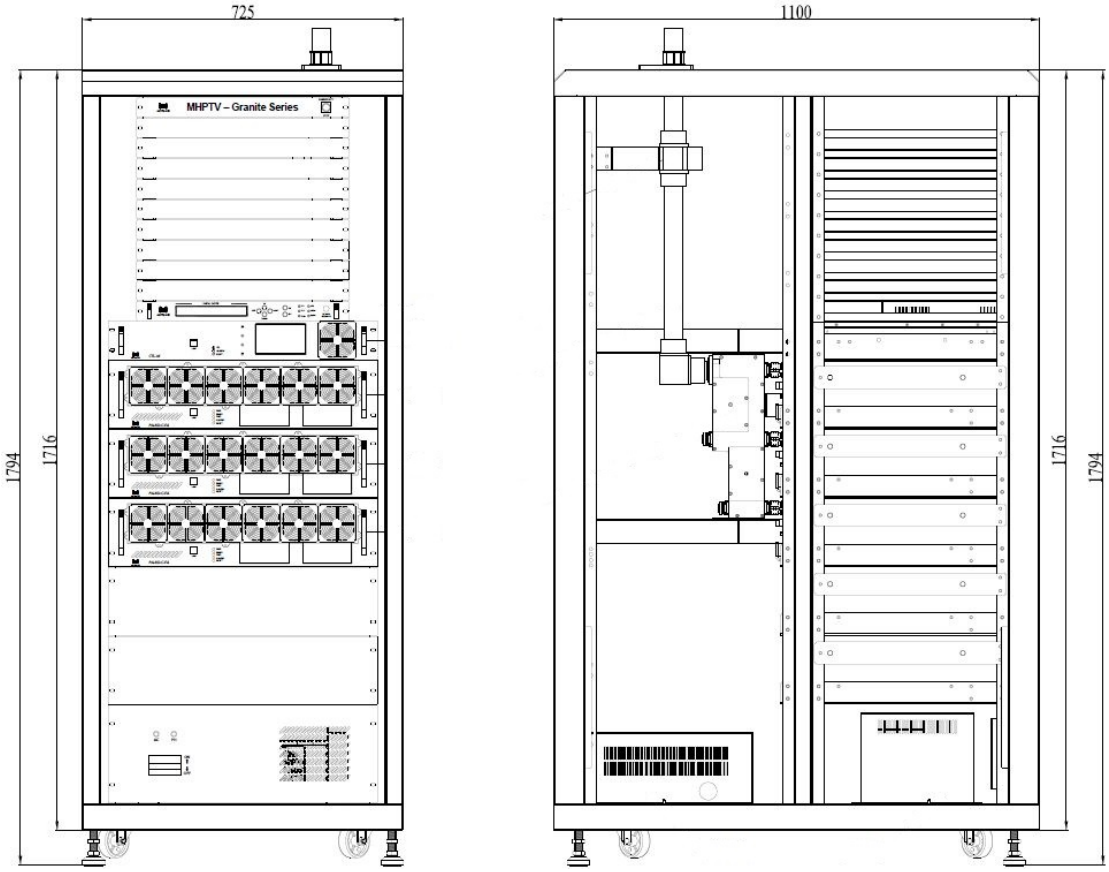
From the rear view of the TX cabinet, several other main components can be seen which include one AC Distribution System, one 3-way Splitter and Combiner, one 2-port Directional coupler, and one Reject Load.



The diagram below shows the overall system interconnect between the various modules in the 3-PA MHPTV system.

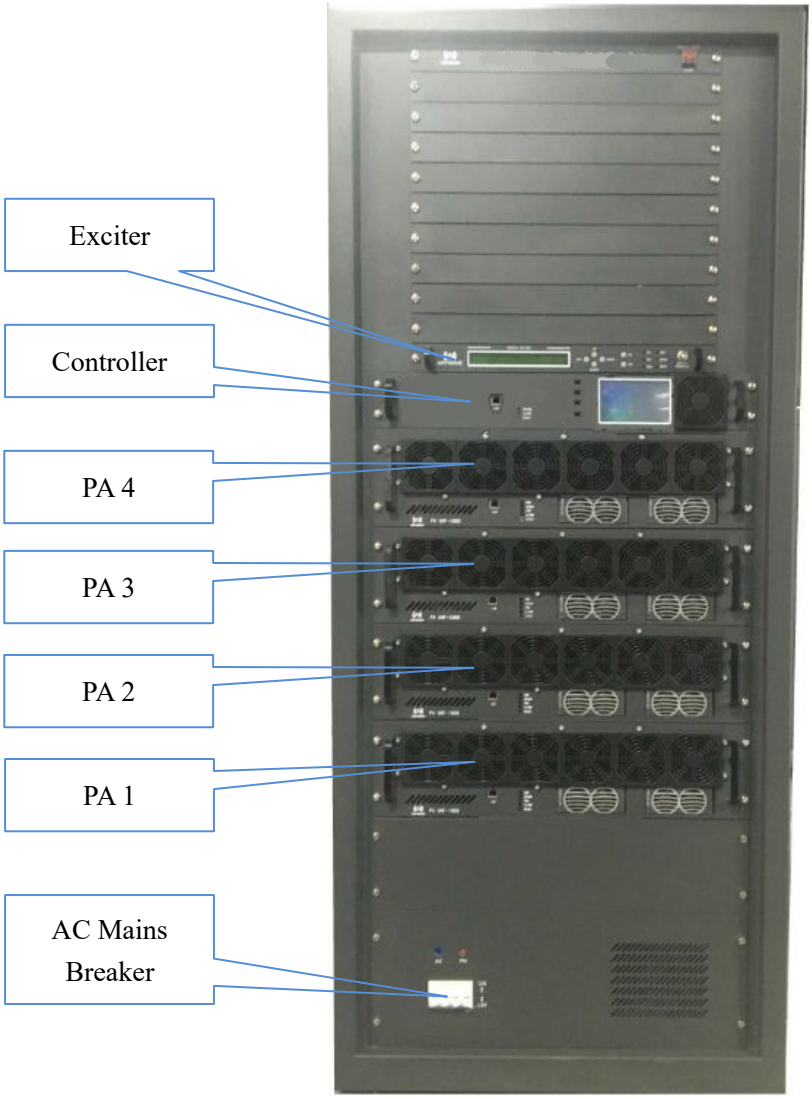


The 3-PA MHPTV system Cabinet dimensions are shown below.

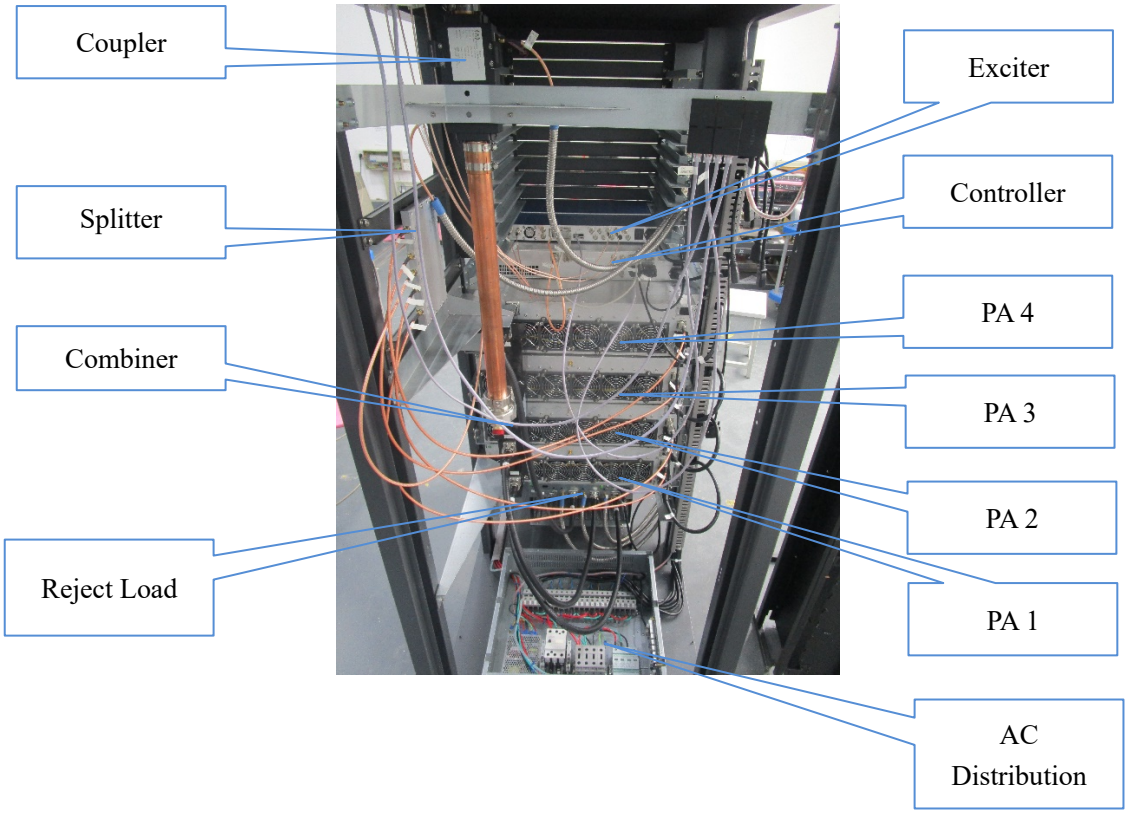


1.2.5 4-PA TX

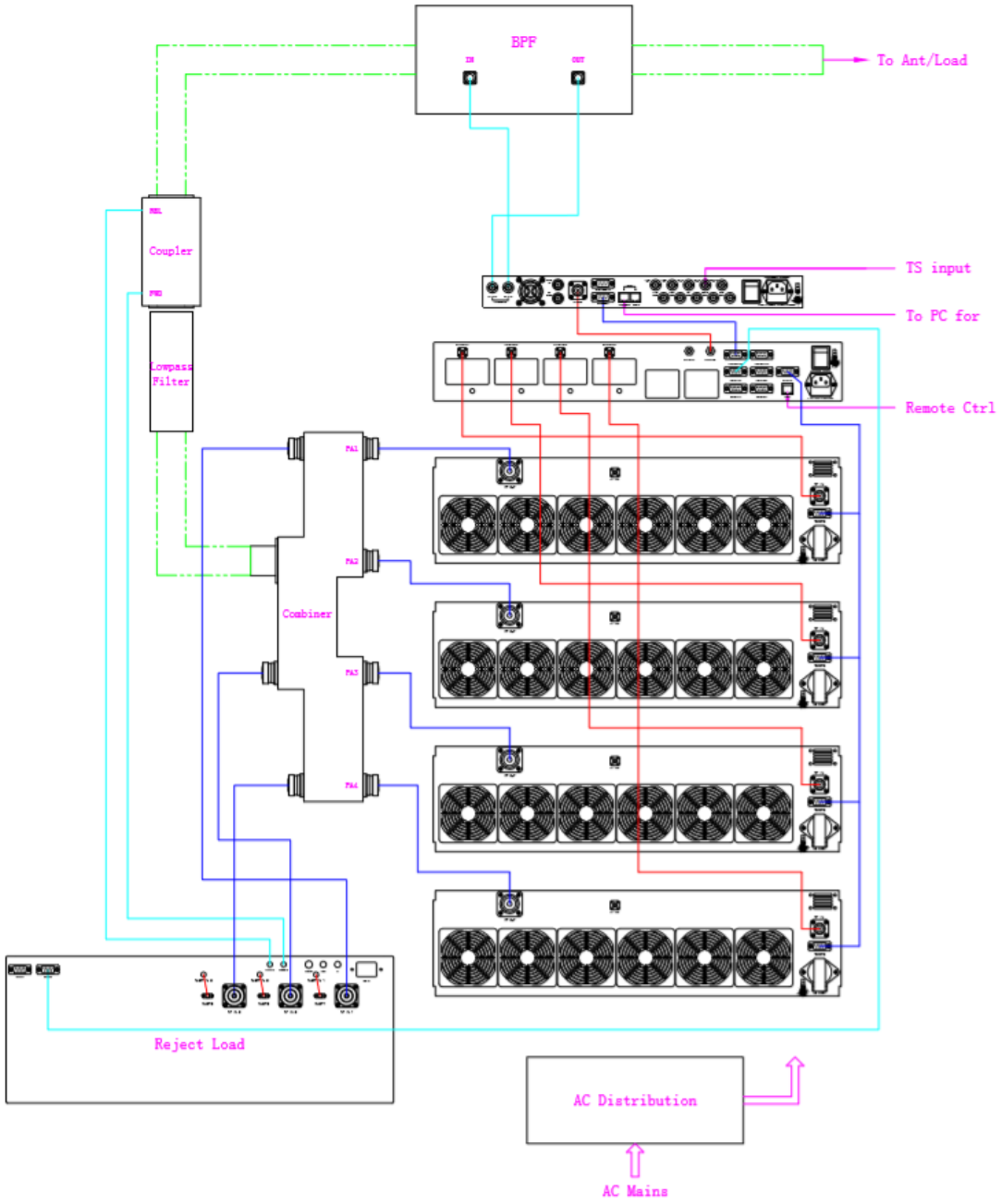
The Anywave 4-PA MHPTV Transmitter comes in single and dual exciter configurations. Photos of a single exciter system are shown below. The main subsystems (as seen from the front) include one or two Exciter(s), one Controller (with a touchscreen LCD, and built-in preamp), four PA-8D-C-FA power amplifiers (8-power transistors per PA), one AC Mains Breaker, one Low Pass Filter –installed external to the cabinet, and one channel mask Band Pass Filter (BPF) – optional –installed on the floor next to the cabinet rack (by default).



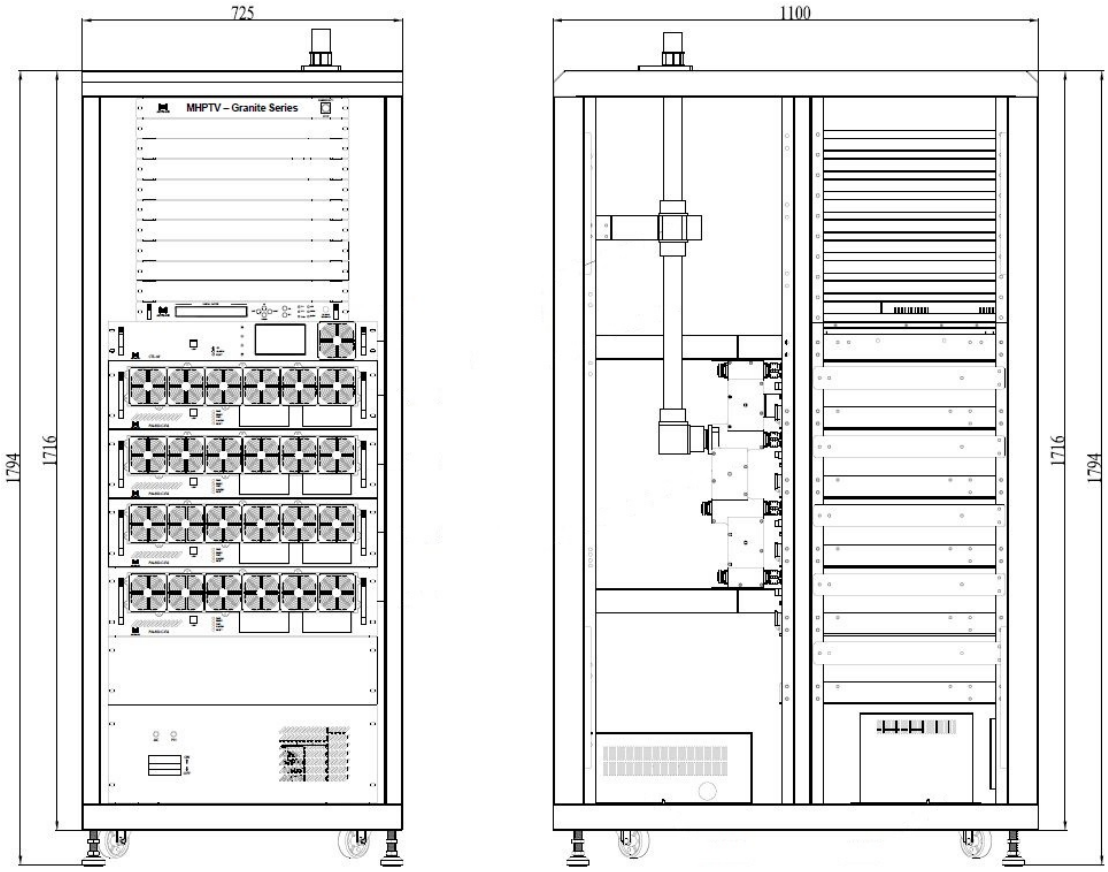
From the rear view of the TX cabinet, several other main components can be seen which include one AC Distribution System, one Combiner, one 2-port Directional coupler, and one Reject Load.



The diagram below shows the overall system interconnect between the various modules in the 4-PA MHPTV system.

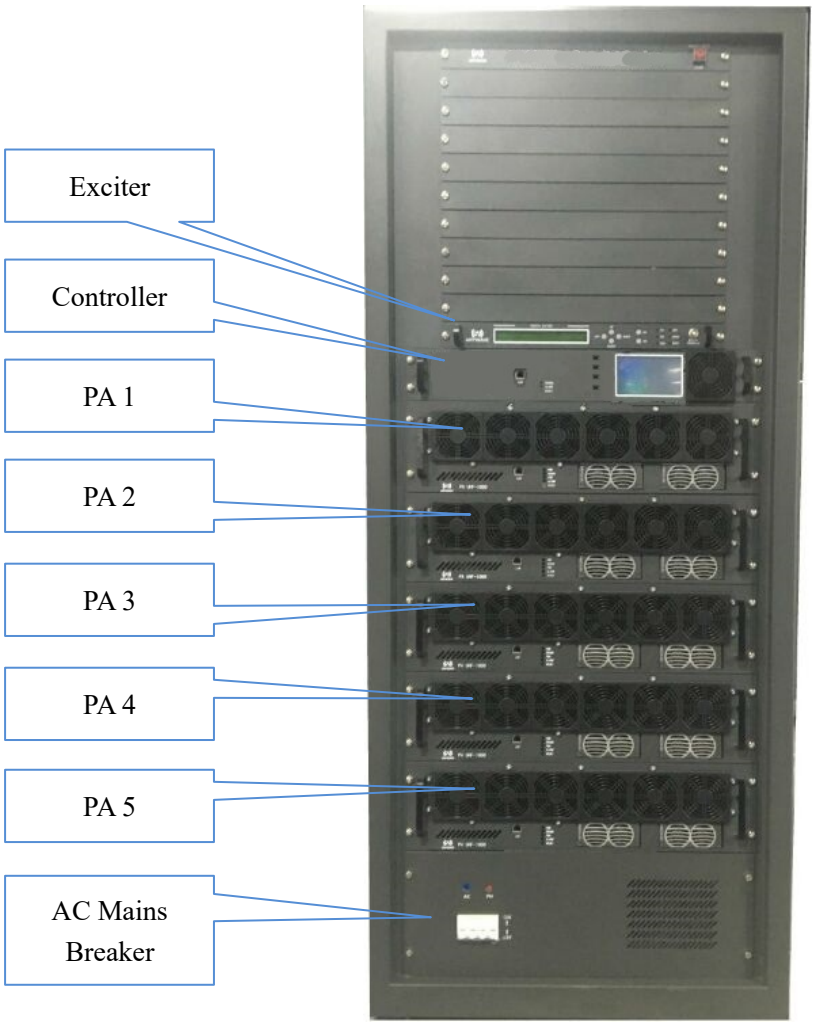


The 4-PA MHPTV system Cabinet dimensions are shown below.

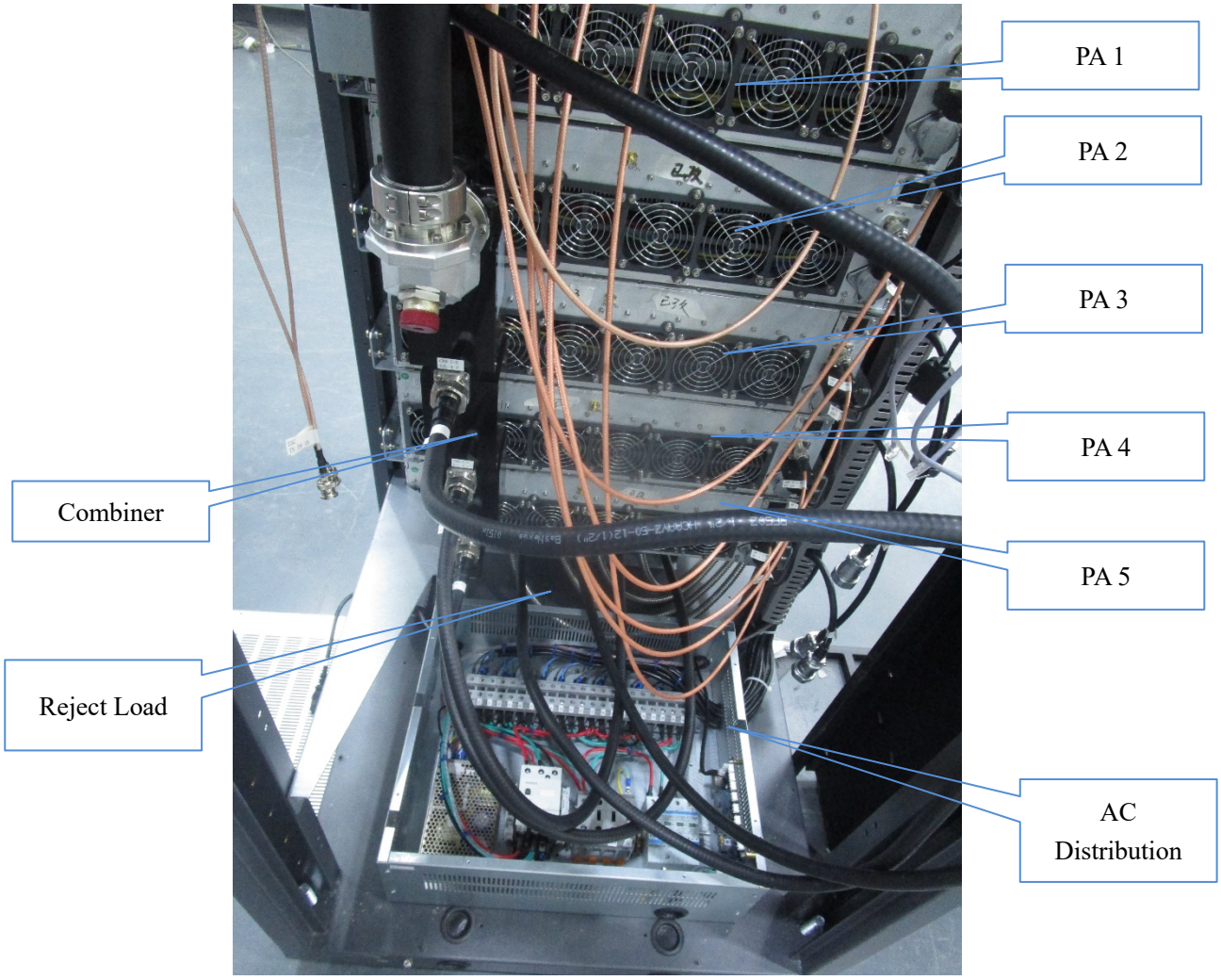


1.2.6 5-PA TX

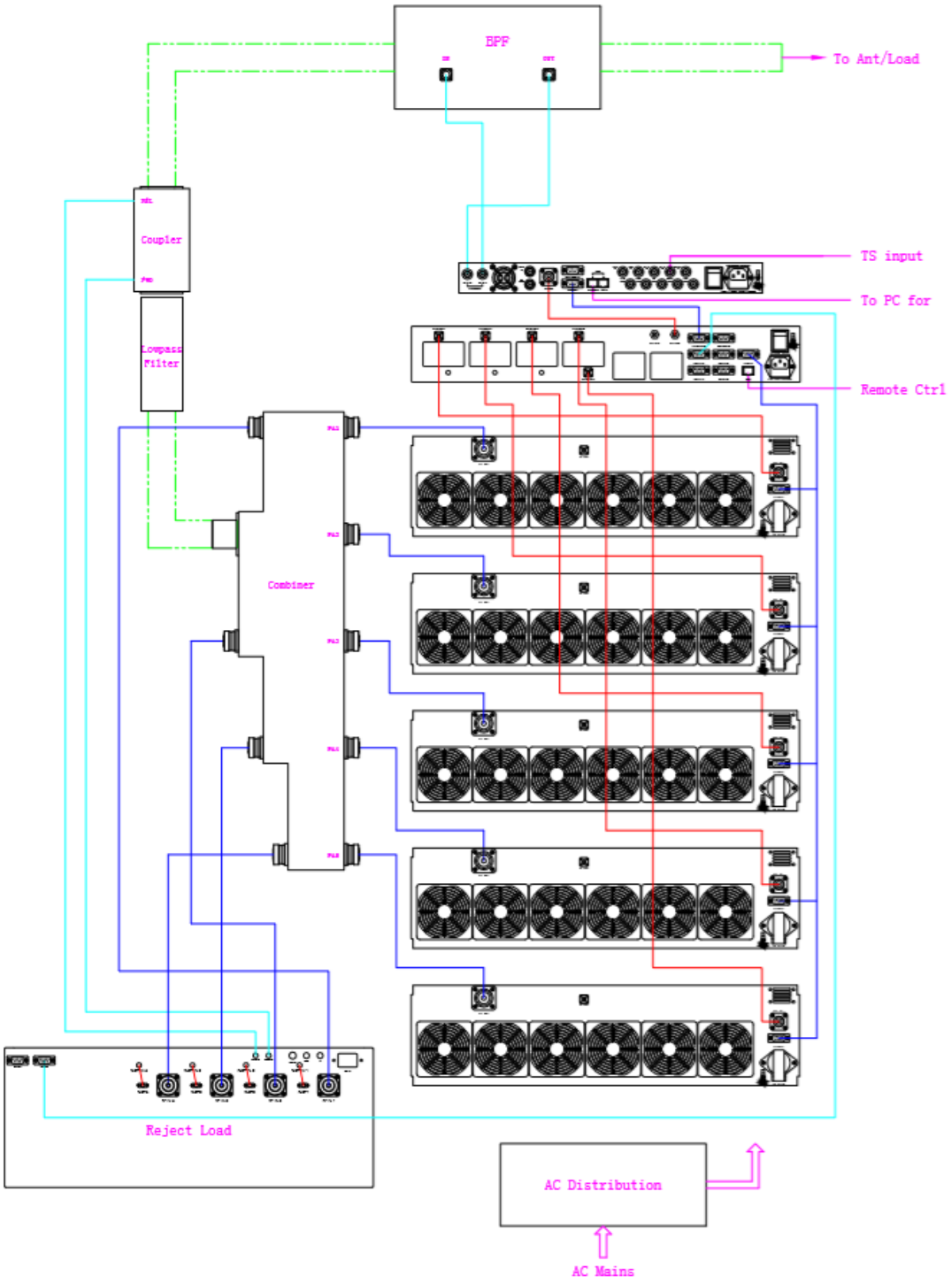
The Anywave 5-PA MHPTV Transmitter comes in single and dual exciter configurations. Photos of a single exciter system are shown below. The main subsystems (as seen from the front) include one or two Exciter(s), one Controller (with a touchscreen LCD, built-in preamp), five PA-8D-C-FA power amplifiers (8-power transistors per PA), one AC Mains Breaker, one Low Pass Filter –installed external to the cabinet, and one channel mask Band Pass Filter (BPF) – optional – installed on the floor next to the cabinet rack (by default).



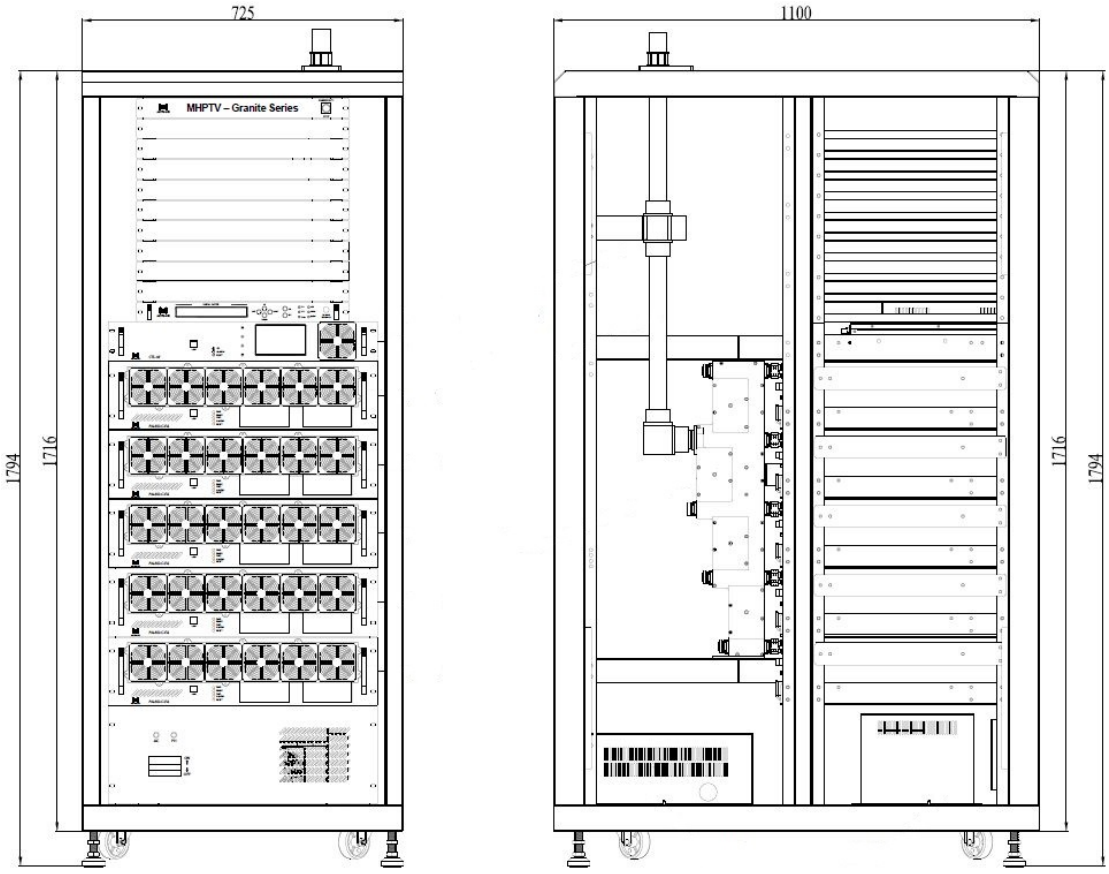
From the rear view of the TX cabinet, several other main components can be seen which include one AC Distribution System, one Combiner, one 2-port Directional coupler, and one Reject Load.



The diagram below shows the overall system interconnect between the various modules in the 5-PA MHPTV system.

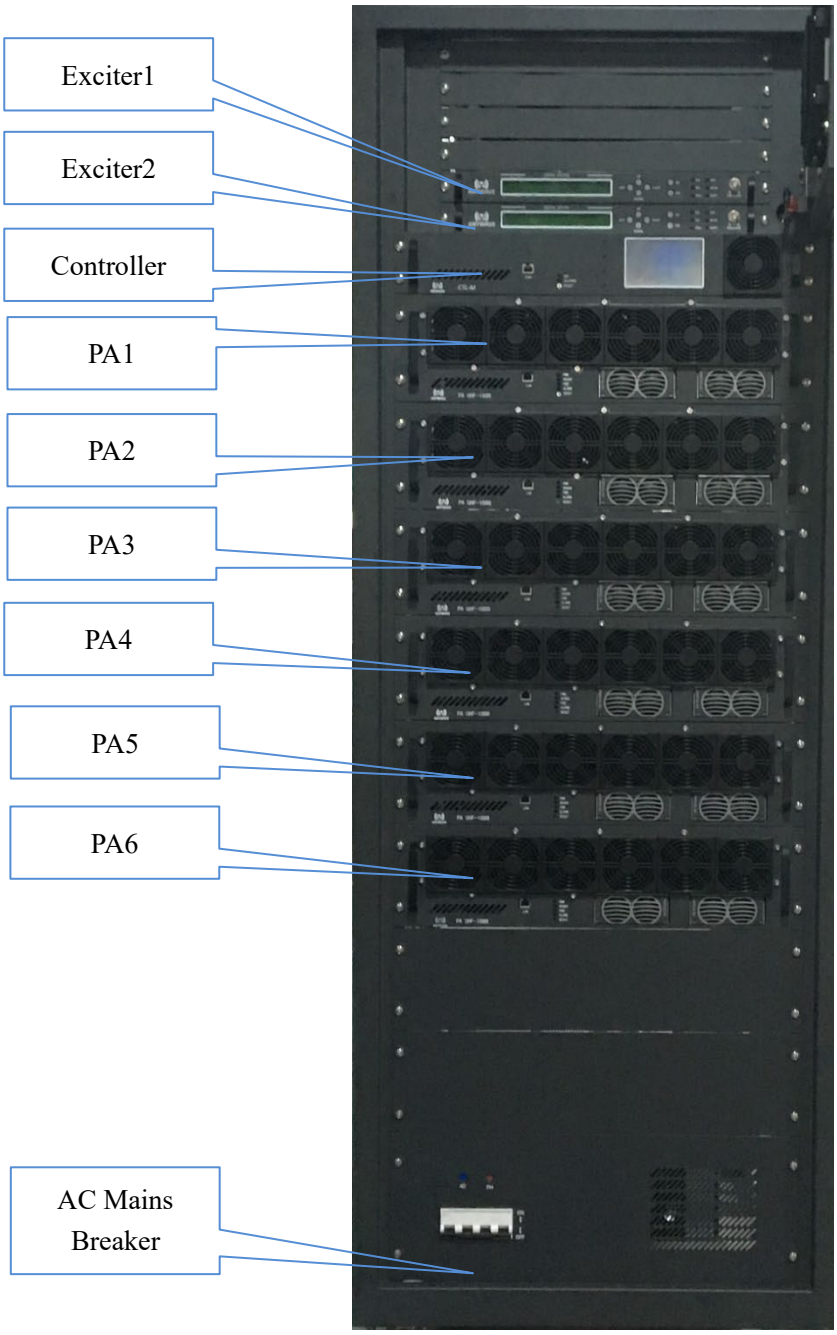


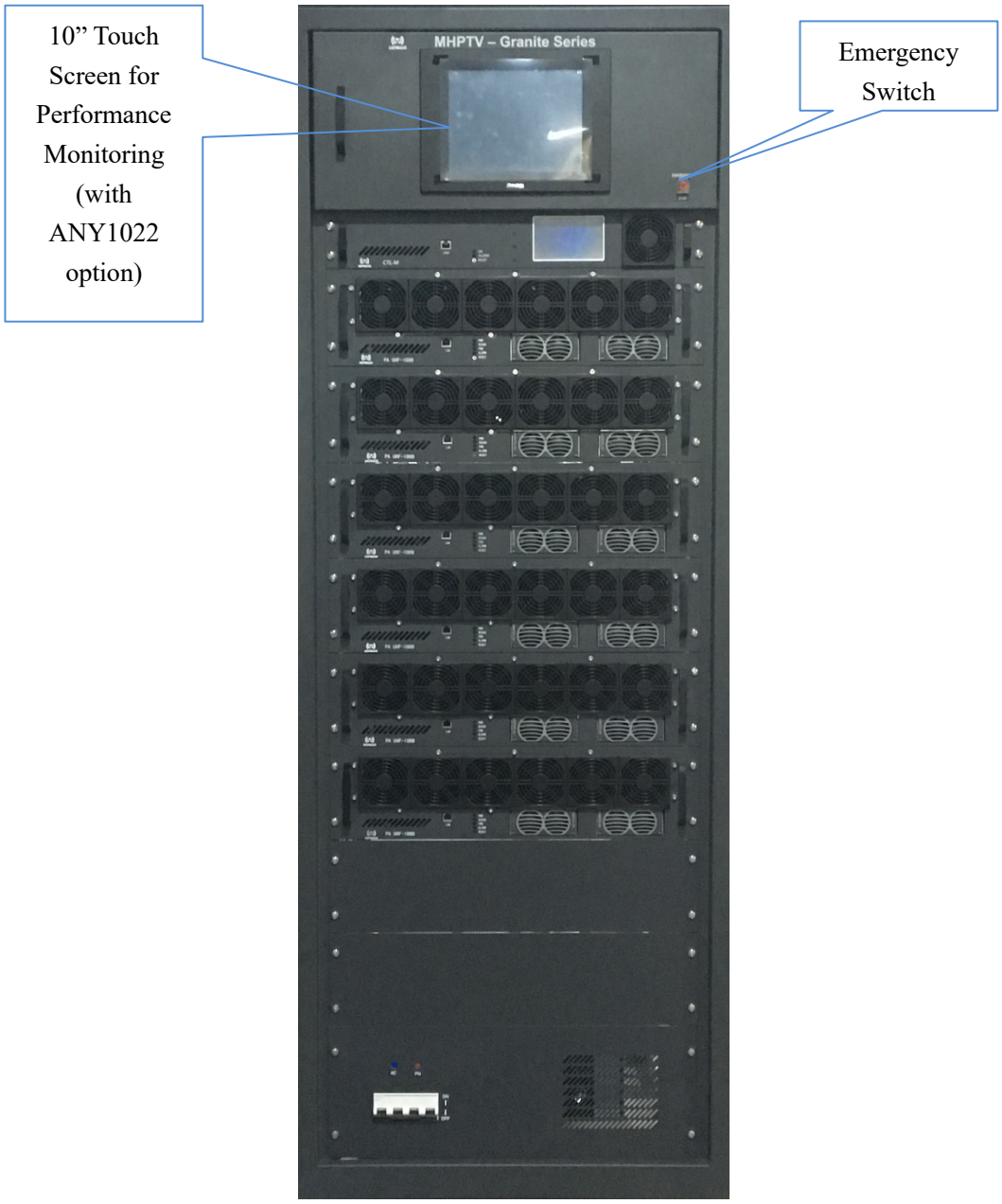
The 5-PA MHPTV system Cabinet dimensions are shown below.



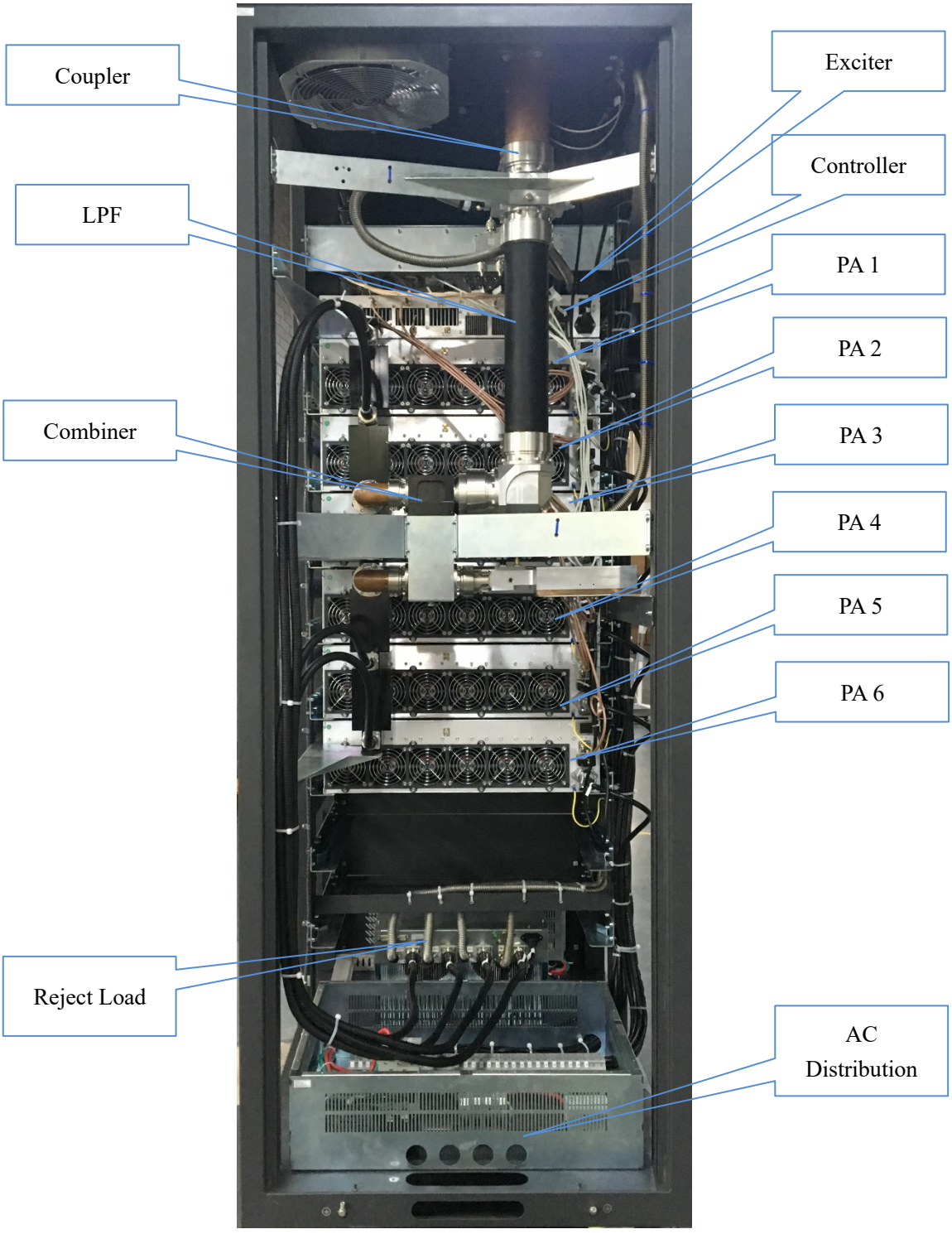
1.2.7 6-PA TX

The Anywave 6-PA MHPTV Transmitter comes in single and dual exciter configurations. Photos of a single exciter system are shown below. The main subsystems (as seen from the front) include one or two Exciter(s), one ANY1022 with 10” touch screen display(option), one Controller (with a touchscreen LCD, built-in preamp), six PA-8D-C-FA power amplifiers (8-power transistors per PA), one AC Mains Breaker, and one channel mask Band Pass Filter (BPF) – optional –installed on the floor next to the cabinet rack (by default).

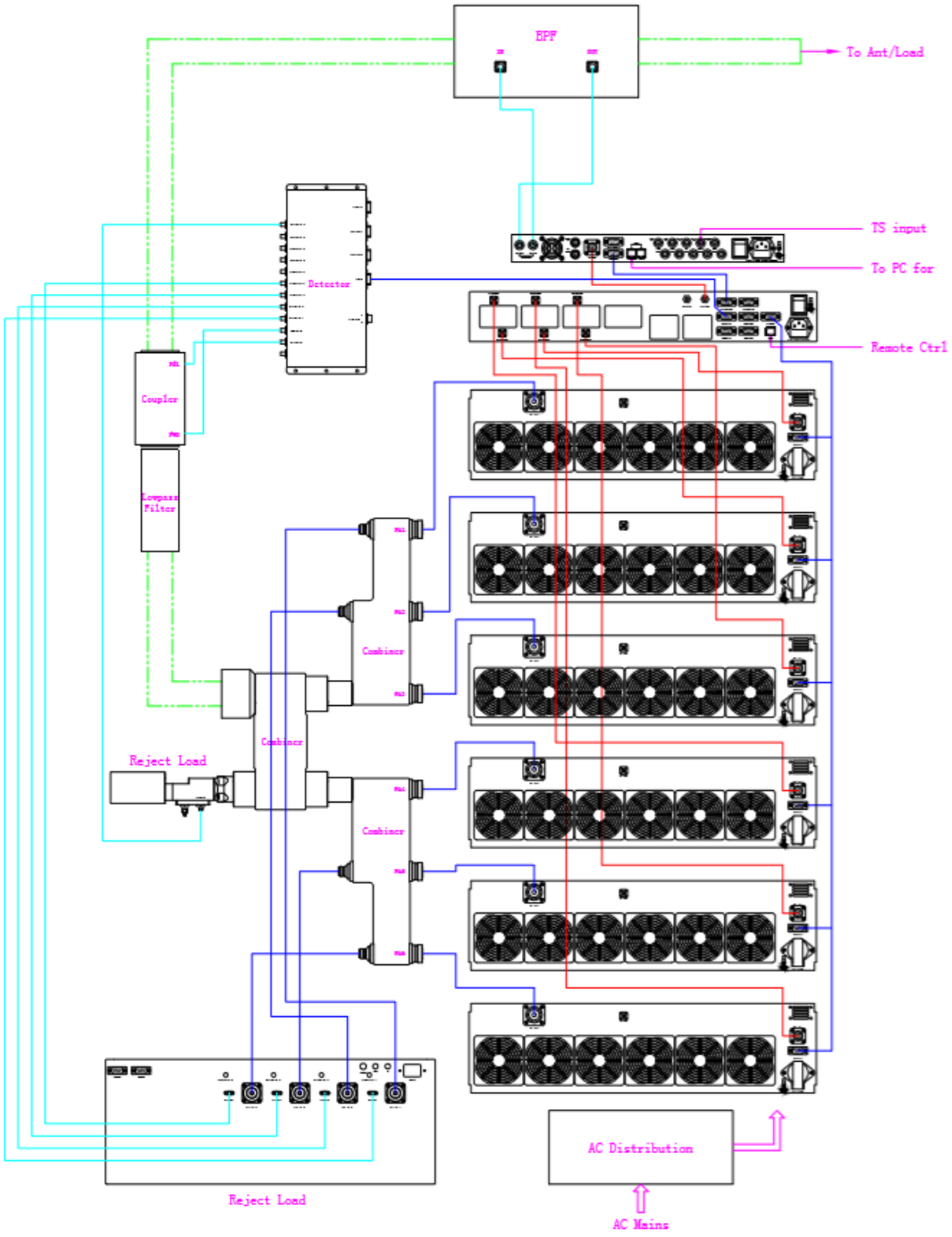



10” Touch Screen for Performance Monitoring (with ANY1022 option)
MHPTV – Granite Series
Emergency Switch

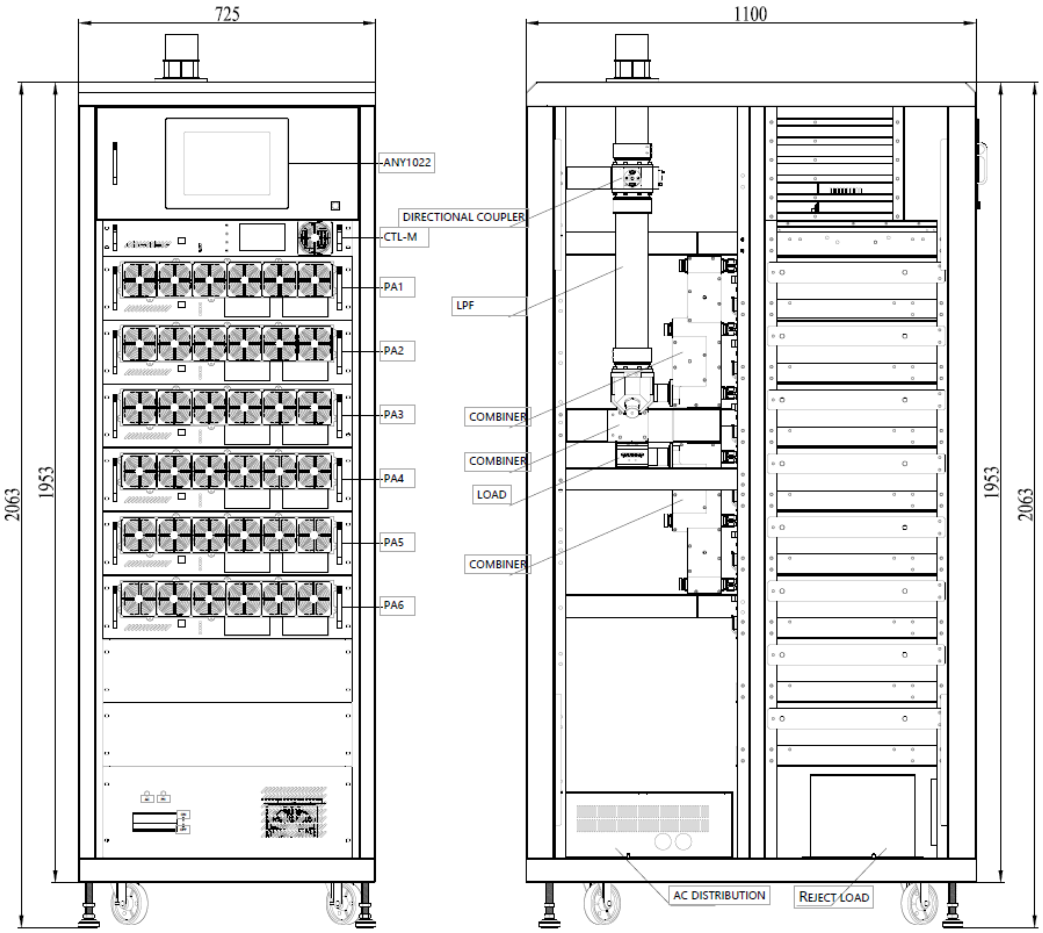
From the rear view of the TX cabinet, several other main components can be seen which include one AC Distribution System, one Combiner, one 2-port Directional coupler, one Low Pass Filter, and one Reject Load.



The diagram below shows the overall system interconnect between the various modules in the 6-PA MHPTV system.

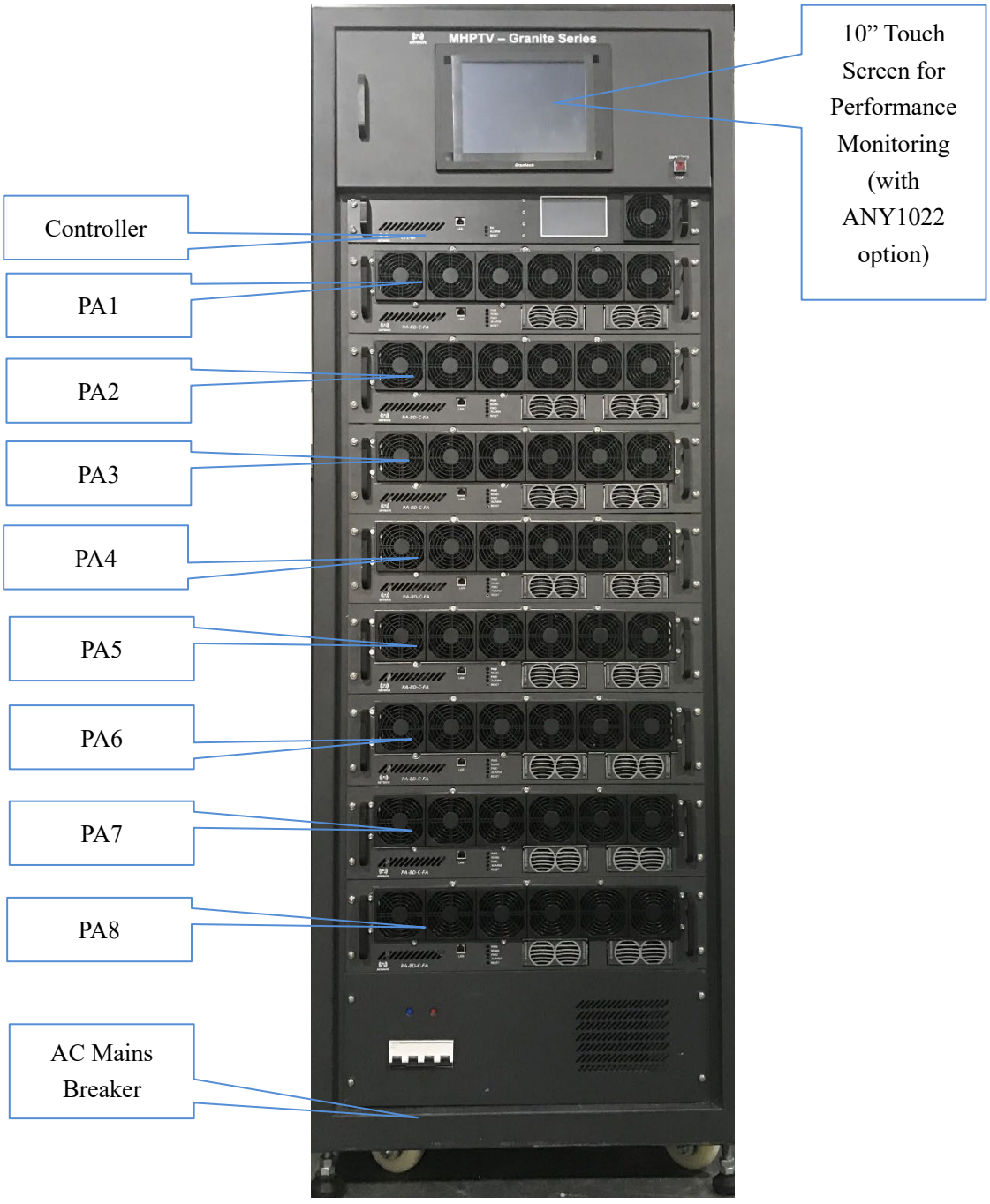


The 6-PA MHPTV system Cabinet dimensions are shown below.

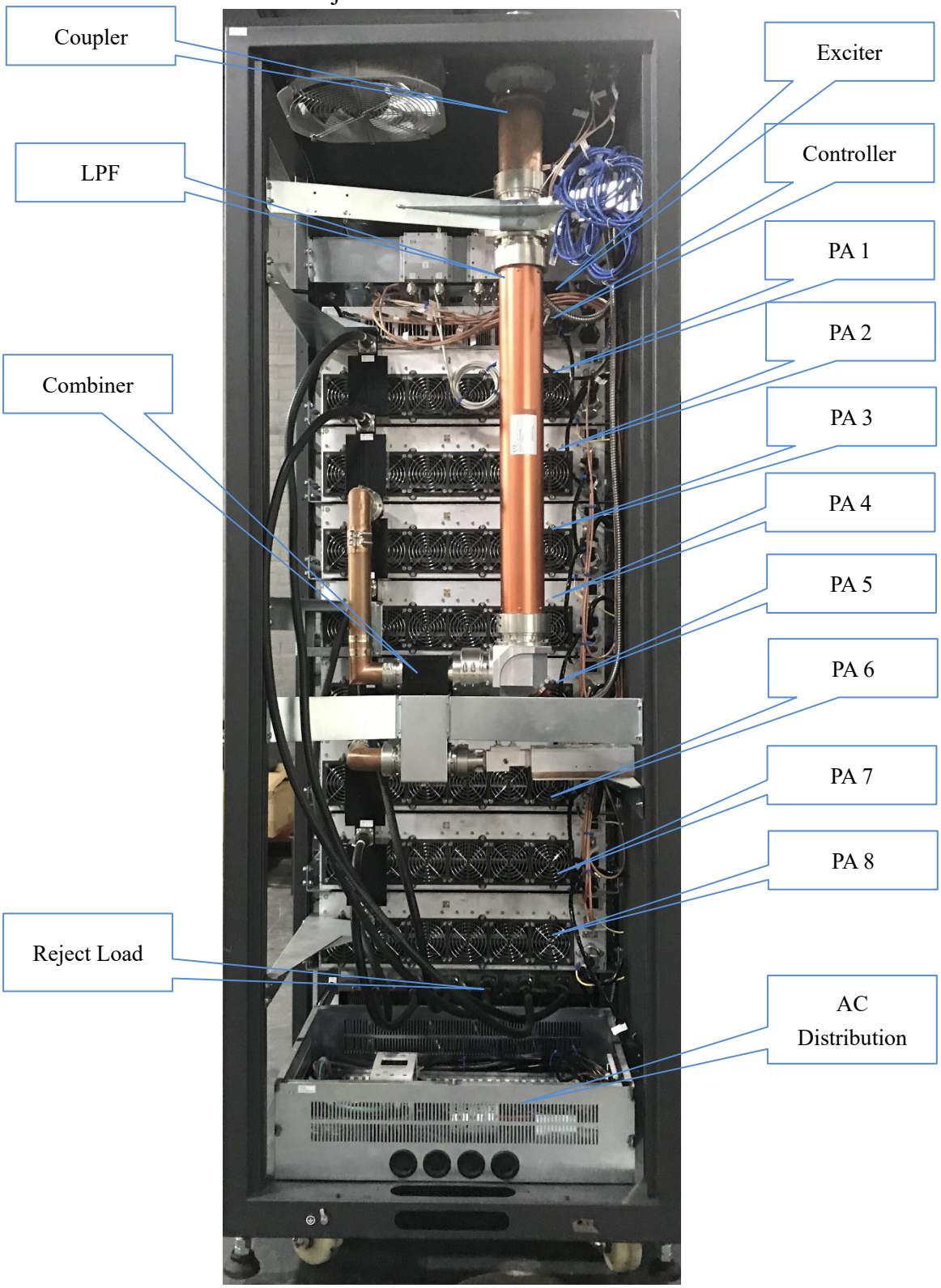


1.2.8 8-PA TX

The Anywave 8-PA MHPTV Transmitter comes in single and dual exciter configurations. Photos of a single exciter system are shown below. The main subsystems (as seen from the front) include one or two Exciter(s), one ANY1022 with 10” touch screen display(option), one Controller (with a touchscreen LCD, built-in preamp), eight PA-8D-C-FA power amplifiers (8-power transistors per PA), one AC Mains Breaker, and one channel mask Band Pass Filter (BPF) – optional –installed on the floor next to the cabinet rack (by default).



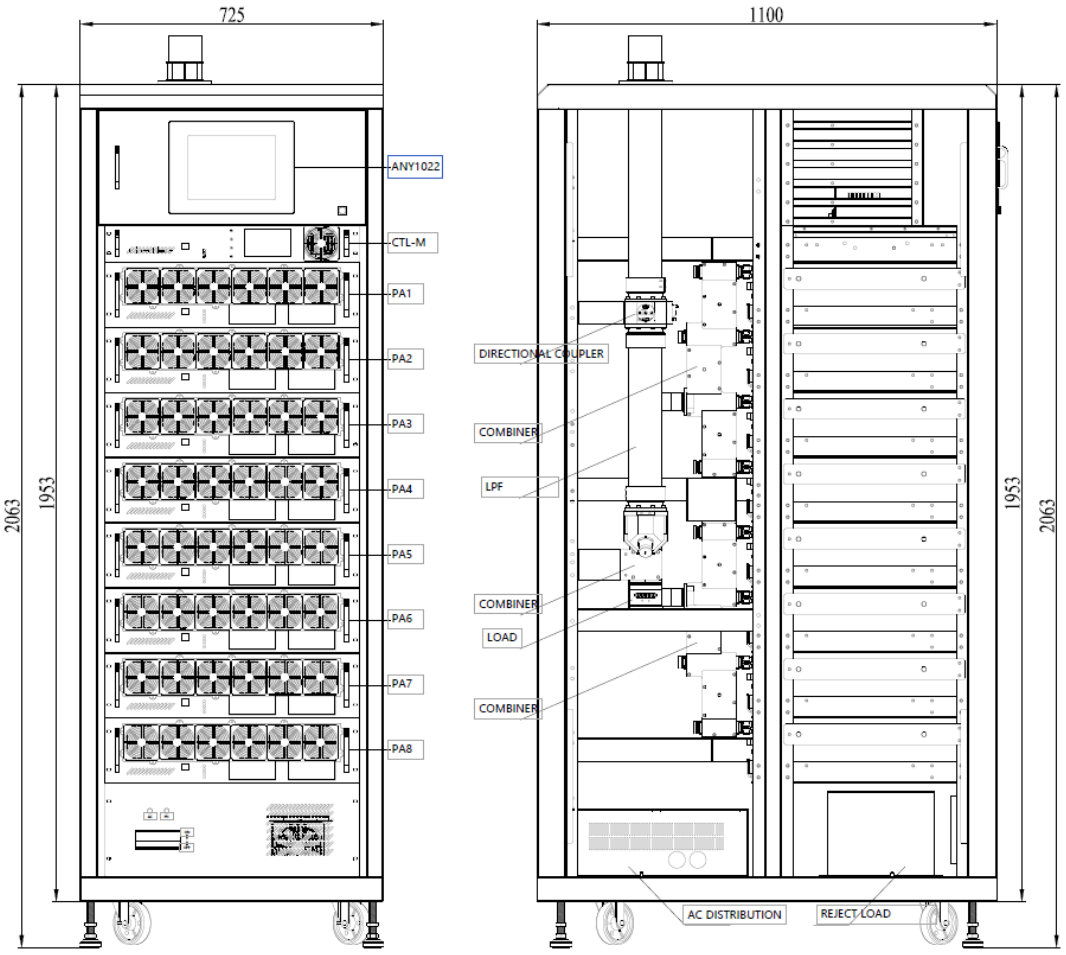
From the rear view of the TX cabinet, several other main components can be seen which include one AC Distribution System, Combiners, one 2-port Directional coupler, one Low Pass Filter and one Reject Load.



The diagram below shows the overall system interconnect between the various modules in the 8-PA MHPTV system.

(Insert Diagram here)

The 8-PA MHPTV system Cabinet dimensions are shown below.



1.3 TX Specifications

- RF Output
  - Connector: 1 5/8” (1, 2, 3, 4 or 5 PA), 3 1/8” (6 or 8 PA), 50 Ω
  - Frequency: 470~610 MHz, in steps of 1 Hz
  - Rated Power (after BPF): 1.1, 2.2, 3.3, 4.4, 5.5, 6.6, 8.8 kW (rms) (ATSC)
  - Level Stability: < ±0.2 dB
  - MER: > 35 dB
  - Amplitude Flatness: < ±0.5 dB
  - Shoulder Level: < - 50 dB (after correction)
  - Return Loss: > 16 dB
- Environment
  - Operation Temperature: 0 ℃ ~ +40 ℃
  - Operation Humidity: < 95 % (non-condensing)
  - Atmospheric Pressure: 86 kPa ~ 106 kPa
- Power Supply
  - Voltage: 240 VAC 1-phase, 208VAC 3-phase
  - Frequency: 50/60 Hz

Note

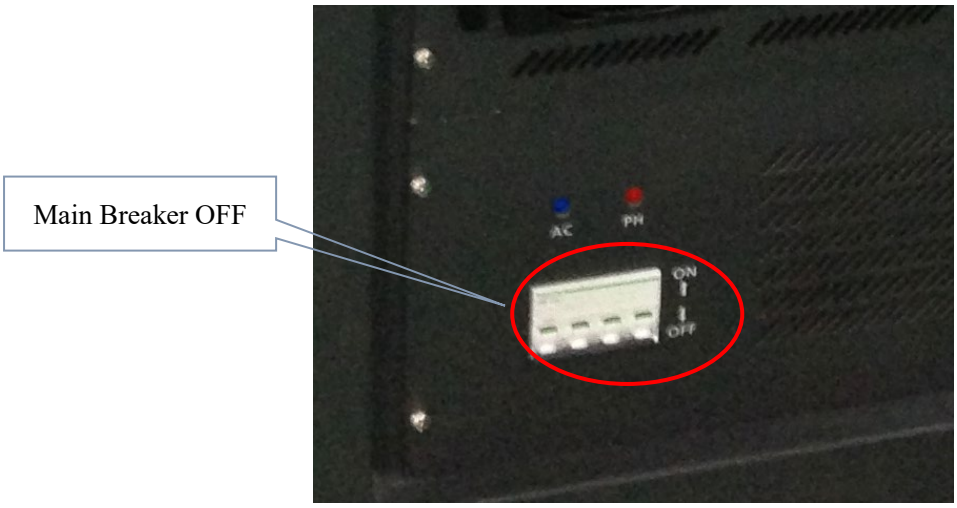
1. The electrical interface characteristics are measured under normal conditions. Values may vary.
2. Operating in abnormal conditions may result in damage to the equipment. Long operating hours in severe environments may reduce the reliability of the entire system, which may cause permanent damage to equipment. Make sure all electrical interface characteristics and environmental parameters are within the defined range listed above before operating this equipment.

1.4 AC Power Requirements

Please review the safety WARNINGS on page 4 of this manual before proceeding with any electrical work.

A licensed Electrician is required to properly and safely connect the AC mains power cable from your station's electrical panel to the terminal block located inside the TX AC Mains Distribution compartment in compliance with local electrical and building codes. Please note: a power cable is not provided with the Transmitter system and should be obtained via your local Electrician.

Be sure the Main Breaker on the lower left front of the TX is turned OFF before performing any electrical work on the TX (as shown below).



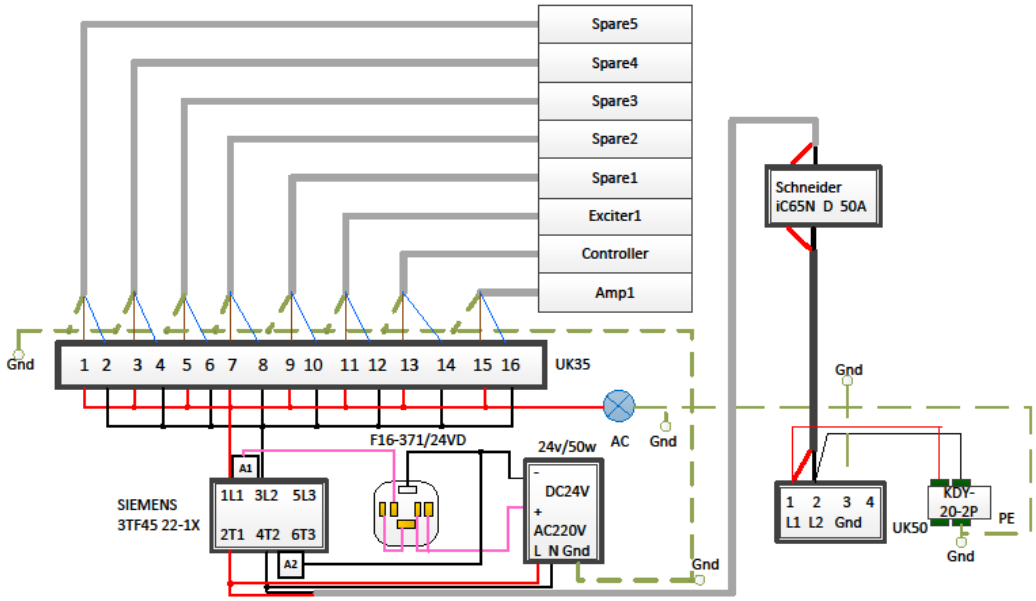
The MHPTV TX AC distribution compartment may be wired for 240VAC single-phase (3-wire, L1, L2, GND) or 208VAC three-phase (4-wire, L1, L2, L3, GND) power to be sourced from a proper breaker sized according to the charts below. Also, please note the recommended cable gauge to make the connection between the TX AC Mains Distribution terminal block and the circuit breaker installed in the facility electrical panel. Please note: this cable is not provided with your Transmitter equipment and should be obtained from your local Electrician.

Important: The transmitter cabinet MUST be properly bonded to the building lightning protective ground and have a good RF ground. This is typically done with a 2” to 4” copper strap that is connected to the cabinet ground, found at the bottom rear of the TX cabinet, making sure all equipment inside the rack is tied to this ground. Any damage caused by not having proper grounding may void your warranty.

MHPTV – (Granite) Doherty AC Power Requirements

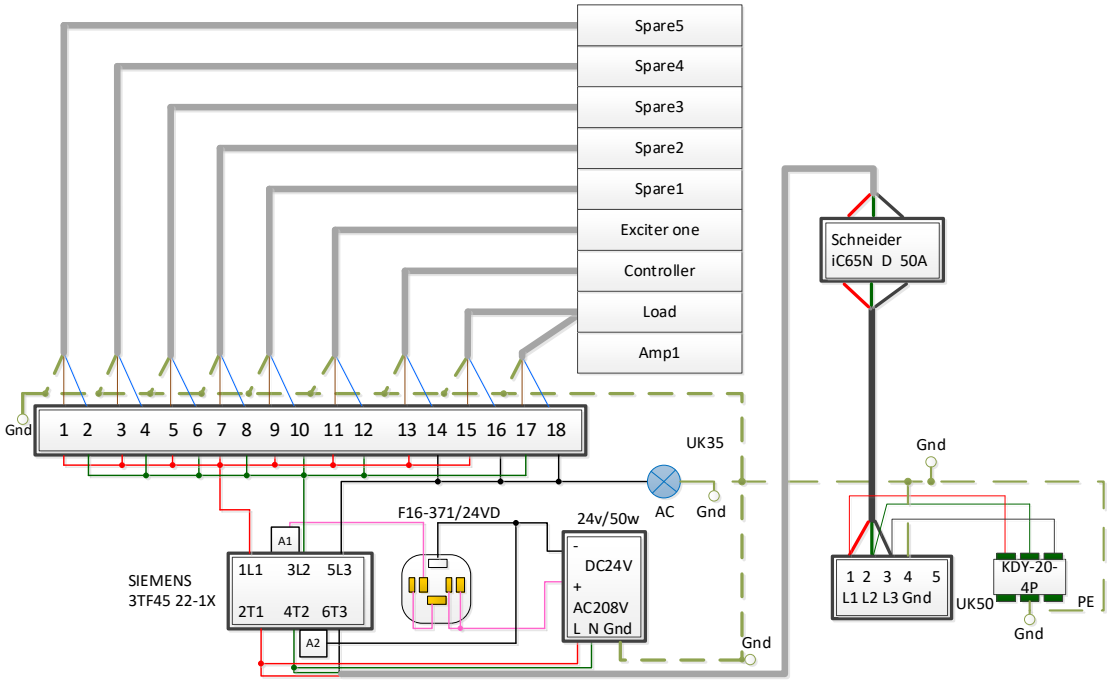
MHPTV- (Granite) Doherty (888E) -AC Power Requirements, Dimensions, and Weights			
After BPF(W)	**240VAC** **Single-phase (L1, L2, GND)**	**208VAC** **Three-phase (L1, L2, L3, GND)** **Delta**	Net Weight (lbs.) Dimensions (mm)
1100(ATSC), 1PA	3110W consumption	3110W consumption	Weight: 400 lbs.
	20A, 2pole breaker, gauge 12 wire	15A, 3pole breaker, gauge 14 wire	1358H x 850D x 725W (mm)
	13.0A/phase-current draw	8.7A/phase-current draw	
2200(ATSC), 2PA	6220W consumption	6220W consumption	Weight: 520 lbs.
	40A, 2pole breaker, gauge 8 wire	30A, 3pole breaker, gauge 10 wire	1358H x 850D x 725W (mm)
	25.9A/phase-current draw	17.3A/phase-current draw	
3300(ATSC), 3PA	9330W consumption	9330W consumption	Weight: 700 lbs.
	50A, 2pole breaker, gauge 6 wire	40A, 3pole breaker, gauge 8 wire	1794H x 1100D x 725W (mm)
	38.9A/phase-current draw	26.0A/phase-current draw	
4400(ATSC), 4PA	N/A	12440W consumption	Weight: 810 lbs.
	N/A	50A, 3pole breaker, gauge 6 wire	1794H x 1100D x 725W (mm)
	N/A	34.6A/phase-current draw	
5500(ATSC), 5PA	N/A	15560W consumption	Weight: 920 lbs.
	N/A	60A, 3pole breaker, gauge 6 wire	1794H x 1100D x 725W (mm)
	N/A	43.2A/phase-current draw	
6600(ATSC), 6PA	N/A	18670W consumption	Weight: 1060 lbs.
	N/A	70A, 3pole breaker, gauge 4 wire	2063H x 1100D x 725W (mm)
	N/A	51.9A/phase-current draw	
8800(ATSC), 8PA	N/A	24890W consumption	Weight: 1280 lbs.
	N/A	100A, 3pole breaker, gauge 2 wire	2063H x 1100D x 725W (mm)
	N/A	69.2A/phase-current draw	

1-PA 240VAC, Single-Phase AC Distribution Wiring



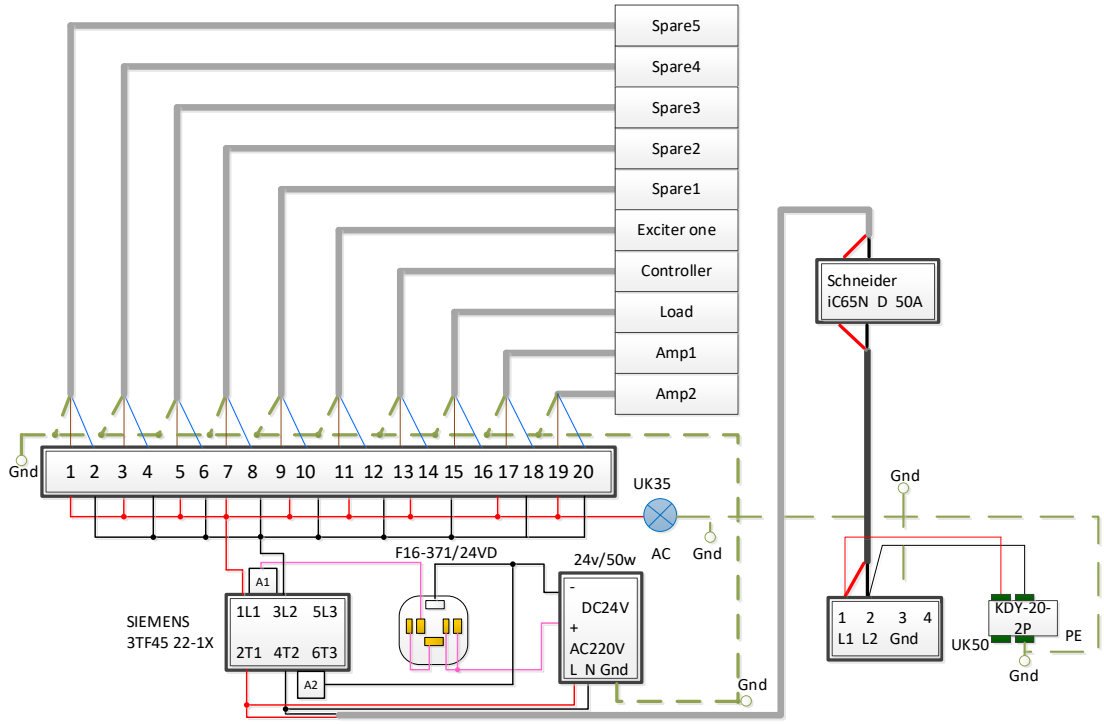
Properly connect the three wires to the terminal block as shown in the above diagram, taking care to notice which terminal is connected to the chassis Ground in your system. Be sure to connect the GND terminal properly and other two connections as L1 and L2.

1-PA 208VAC, Three-Phase AC Distribution Wiring



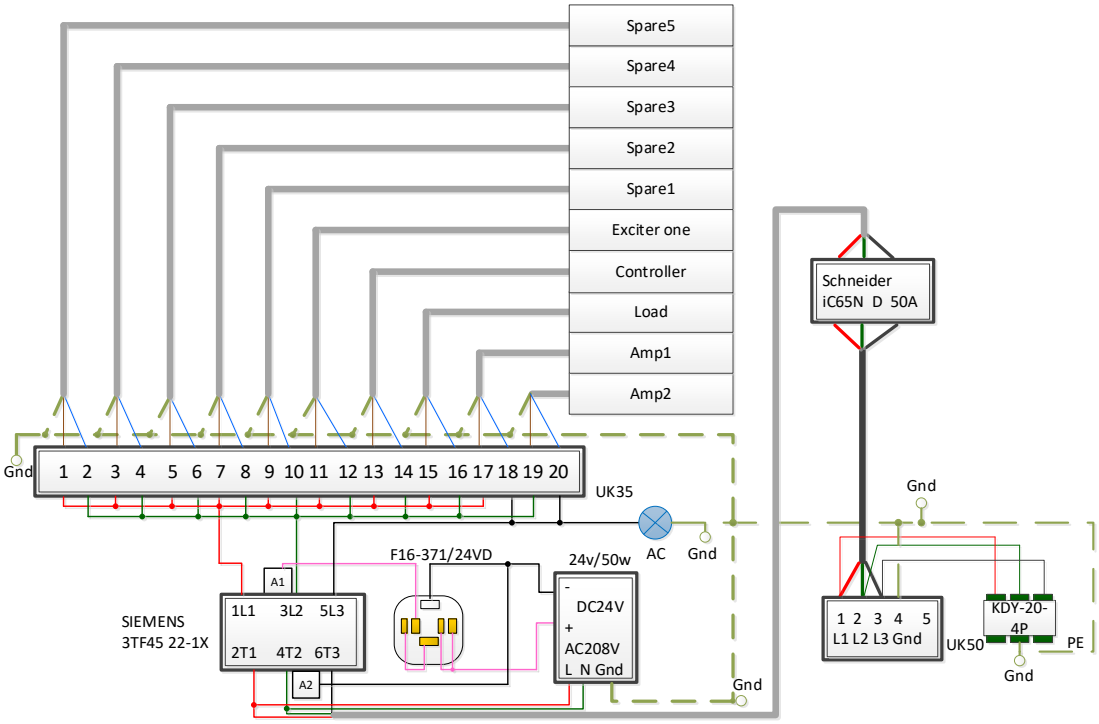
Properly connect the four wires to the terminal block as shown in the above diagram, taking care to notice which terminal is connected to the chassis Ground in your system. Be sure to connect the GND terminal properly and other three connections as L1, L2, and L3.

2-PA 240VAC, Single-Phase AC Distribution Wiring



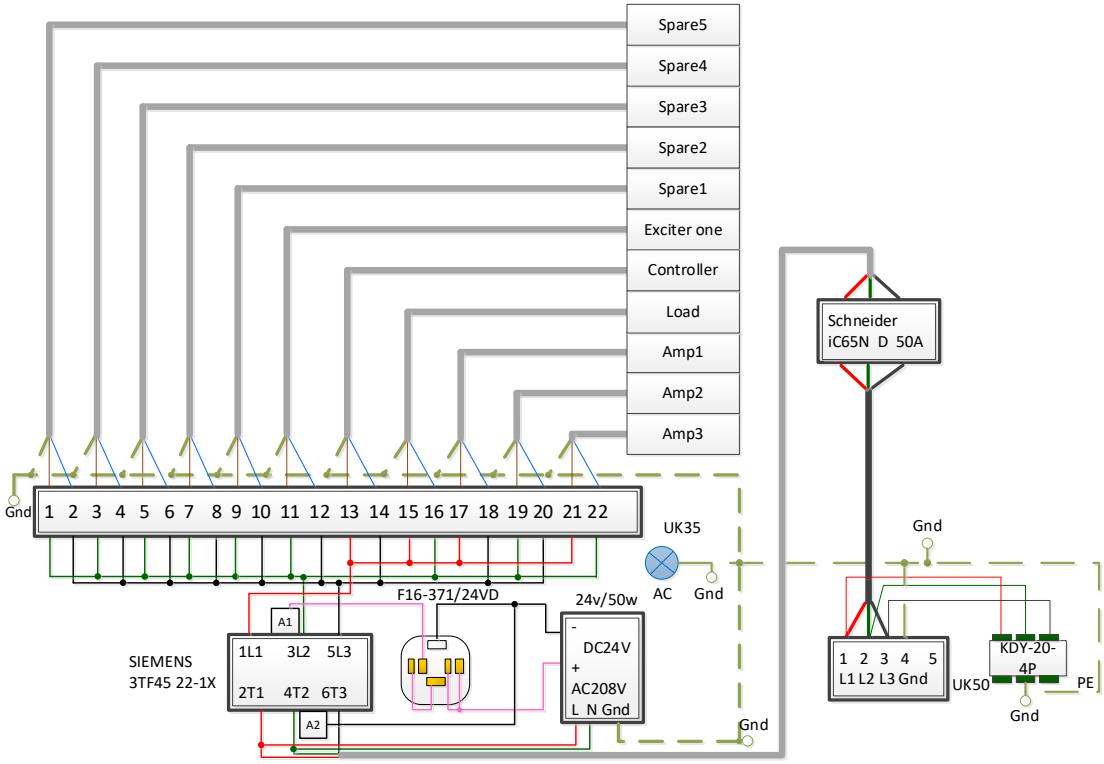
Properly connect the three wires to the terminal block as shown in the above diagram, taking care to notice which terminal is connected to the chassis Ground in your system. Be sure to connect the GND terminal properly and other two connections as L1 and L2.

2-PA 208VAC, Three-Phase AC Distribution Wiring



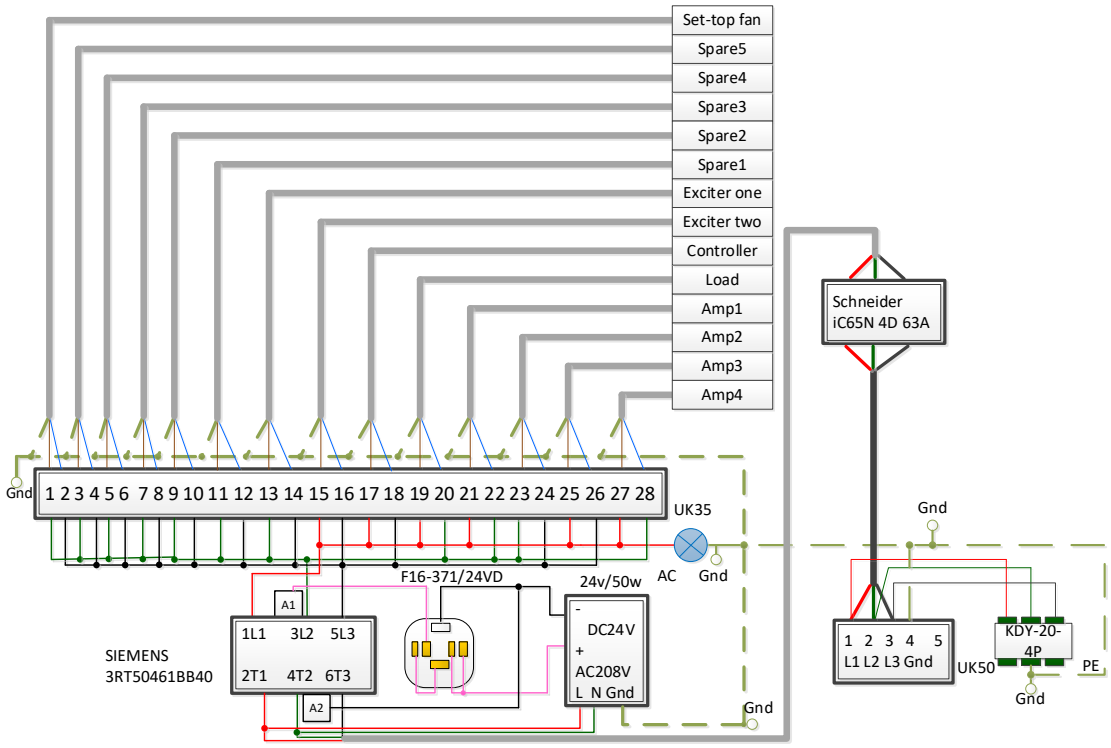
Properly connect the four wires to the terminal block as shown in the above diagram, taking care to notice which terminal is connected to the chassis Ground in your system. Be sure to connect the GND terminal properly and other three connections as L1, L2, and L3.

3-PA 208VAC, Three-Phase AC Distribution Wiring



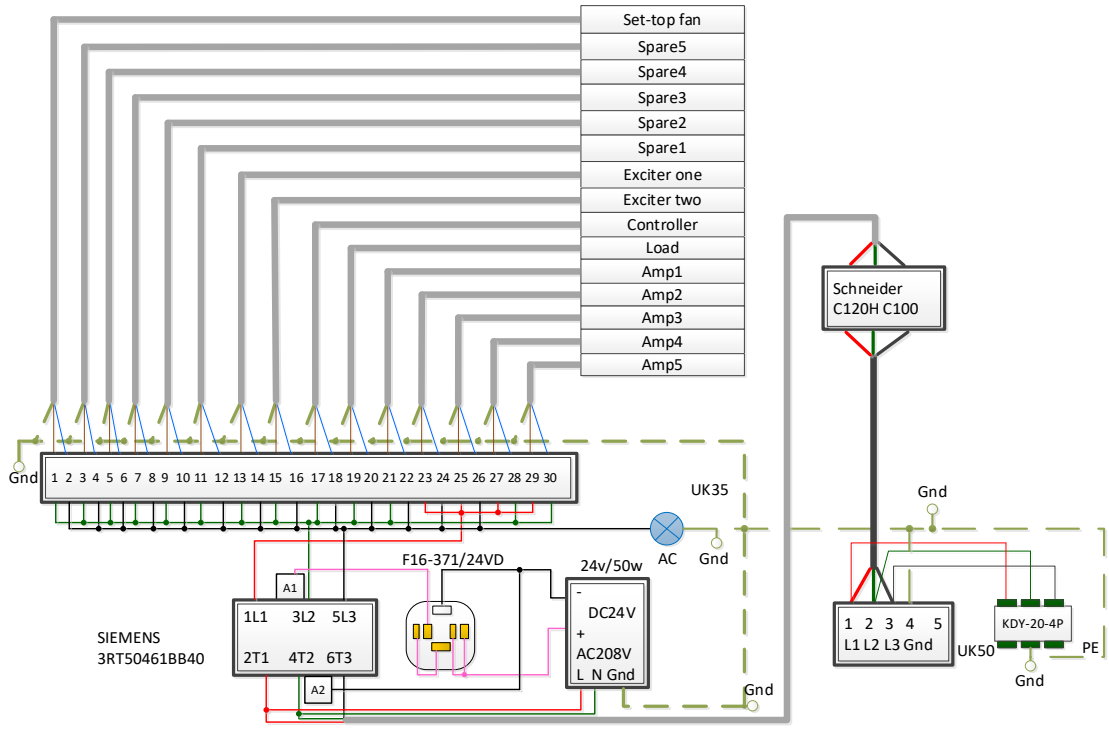
Properly connect the four wires to the terminal block as shown in the above diagram, taking care to notice which terminal is connected to the chassis Ground in your system. Be sure to connect the GND terminal properly and other three connections as L1, L2, and L3.

4-PA 208VAC, Three-Phase AC Distribution Wiring



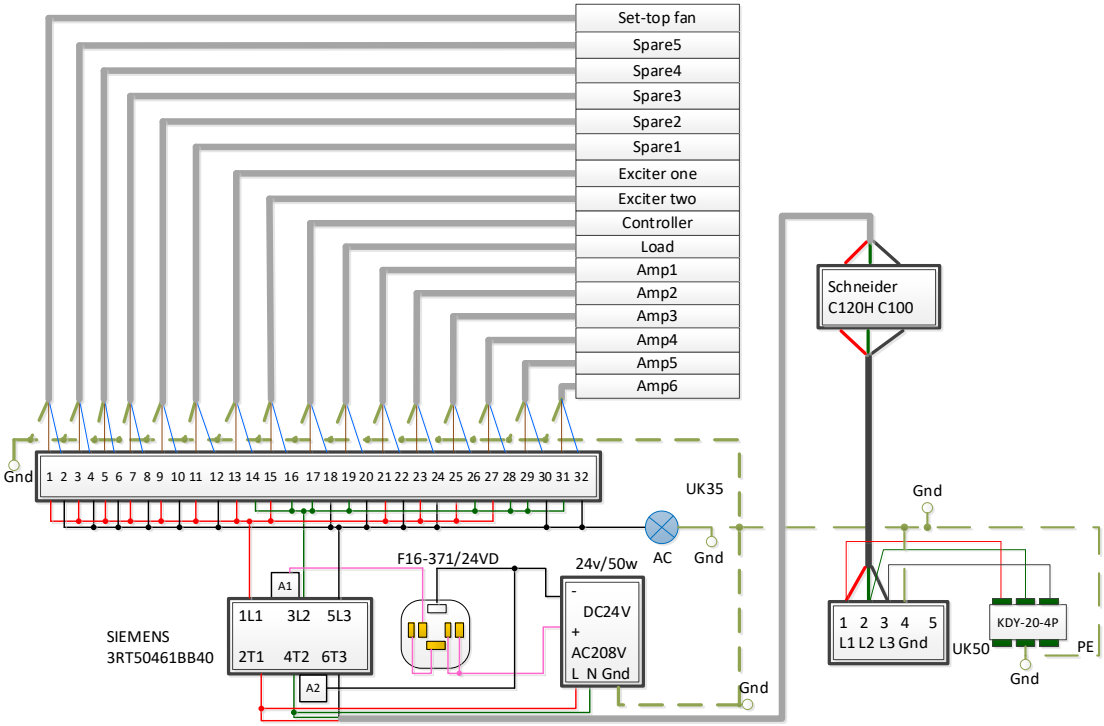
Properly connect the four wires to the terminal block as shown in the above diagram, taking care to notice which terminal is connected to the chassis Ground in your system. Be sure to connect the GND terminal properly and other three connections as L1, L2, and L3.

5-PA 208VAC, Three-Phase AC Distribution Wiring



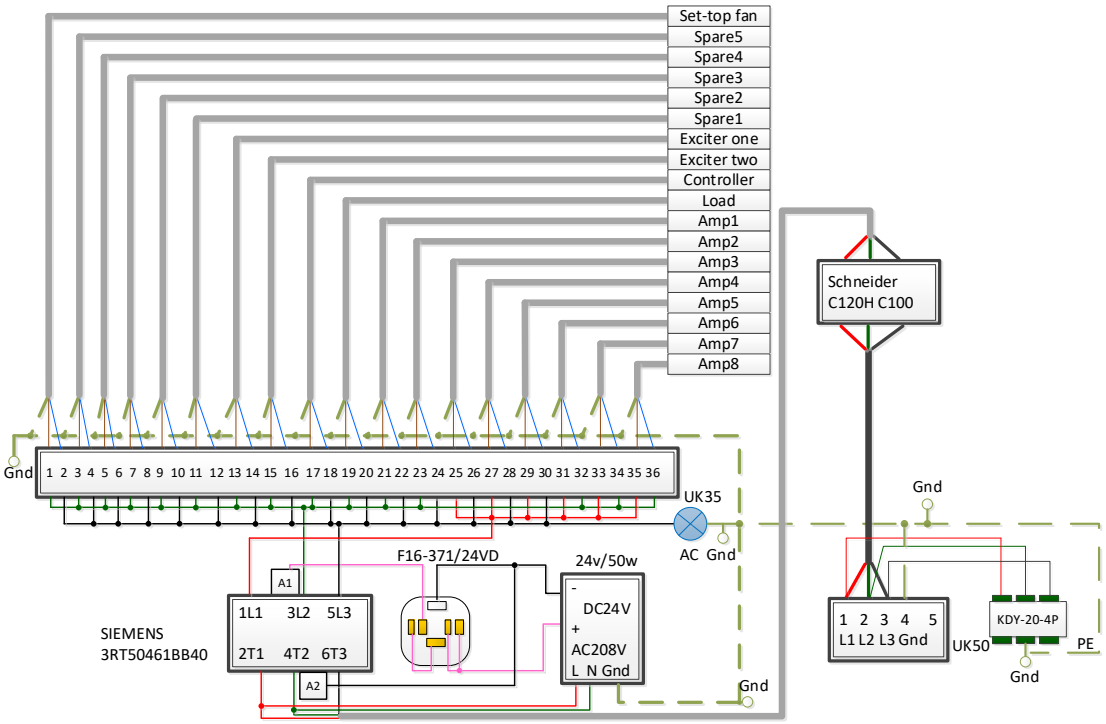
Properly connect the four wires to the terminal block as shown in the above diagram, taking care to notice which terminal is connected to the chassis Ground in your system. Be sure to connect the GND terminal properly and other three connections as L1, L2, and L3.

6-PA 208VAC, Three-Phase AC Distribution Wiring



Properly connect the four wires to the terminal block as shown in the above diagram, taking care to notice which terminal is connected to the chassis Ground in your system. Be sure to connect the GND terminal properly and other three connections as L1, L2, and L3.

8-PA 208VAC, Three-Phase AC Distribution Wiring

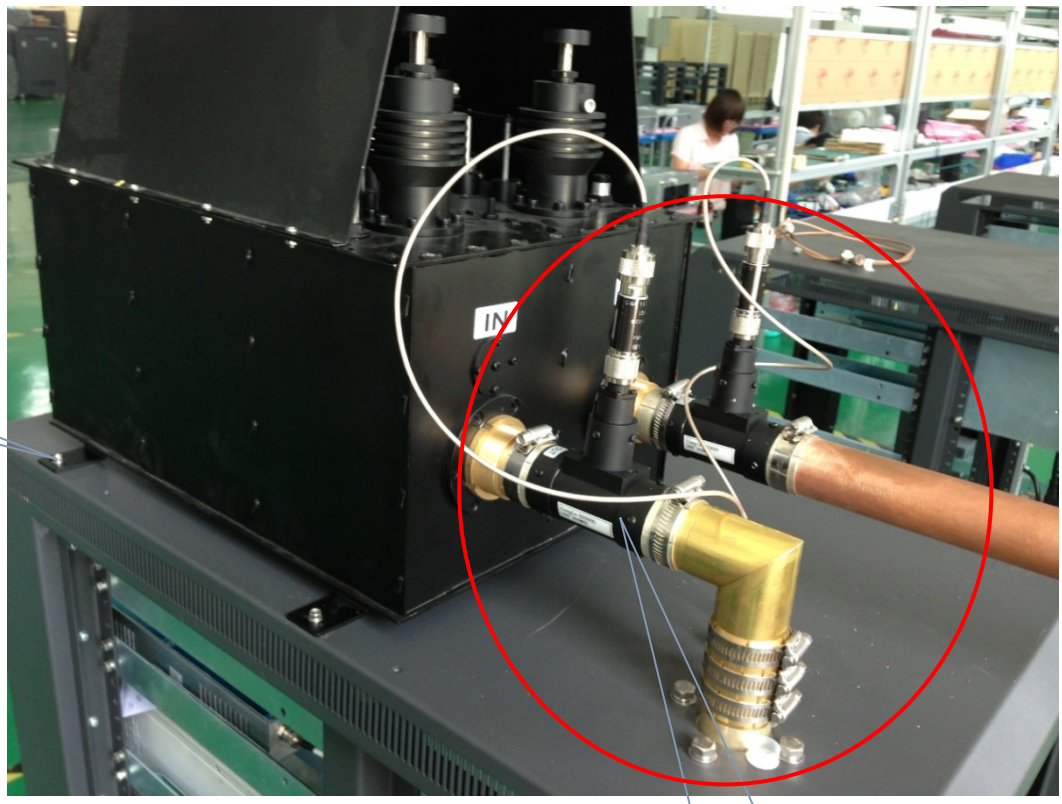


Properly connect the four wires to the terminal block as shown in the above diagram, taking care to notice which terminal is connected to the chassis Ground in your system. Be sure to connect the GND terminal properly and other three connections as L1, L2, and L3.

1.5 RF System Connections

If you purchased an Anywave BPF, Anywave will design to install the BPF either on top of the TX cabinet (as shown below) or standing on the floor, according to the transmitter and the BPF's dimension, unless it is specified with order. If it is installed on top of the TX cabinet, four metal stand-offs "feet" with mounting hardware are supplied with the BPF to allow it to be fastened and secured to four holes located in the top panel of the cabinet. Please reference Section 3 "Installation/Initial Turn-On" for step-by-step instructions on setting up and connecting your RF System components.

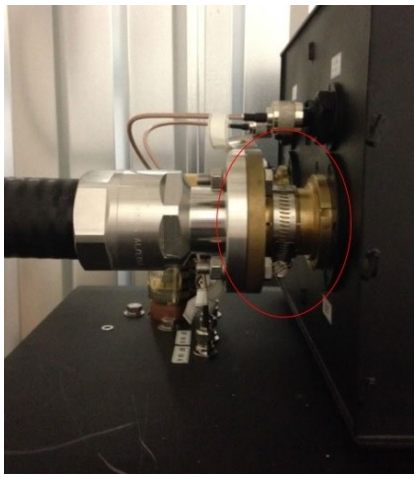
BPF on top of the TX cabinet:



Mount BPF

Connect Elbow, Directional Couplers, Attenuators and Exciter feedback cables

BPF standing on the floor next to the TX cabinet:



Please note: The 1.1kw~5.5kw MHPTV comes standard with a 1 5/8 EIA Flanged output connector, and the 6.6kw~8.8kw MHPTV comes standard with a 3 1/8 EIA Flanged output connector. If your Antenna feed is other than the standard connector (as shown on left), you will need to provide whatever adapter hardware is necessary to facilitate this connection to your Antenna feed).

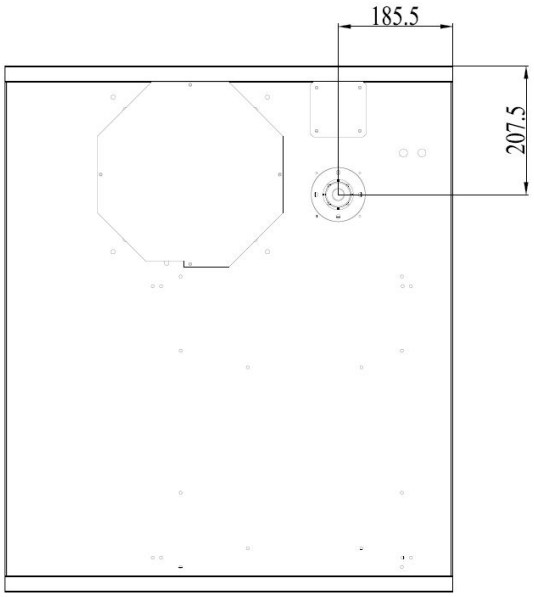
Before and After BPF Directional Coupler installation

Please be sure to install the Before and After BPF Directional Couplers in the correct positions and orientation. Incorrect operation of the TX system may result if these directional couplers are not installed in the proper locations with the proper orientation as labeled.

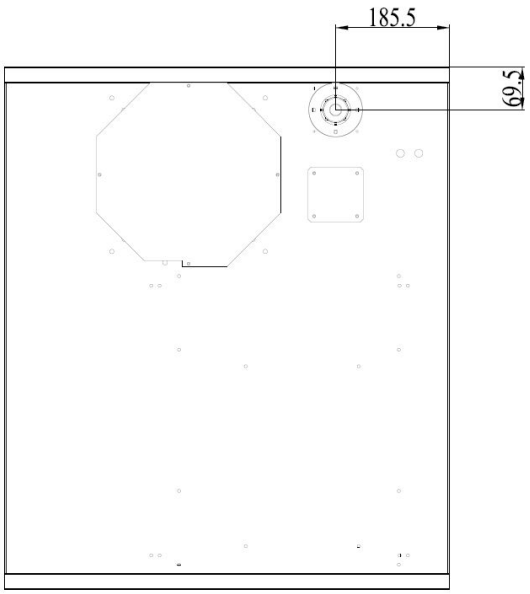
1.6 TX Ventilation

MHPTV PA cooling is from front to rear. In a standard installation, warm air is vented out perforations in the cabinet rear door and into the room. A proper air-conditioned, dust-free environment is required to operate the TX equipment.

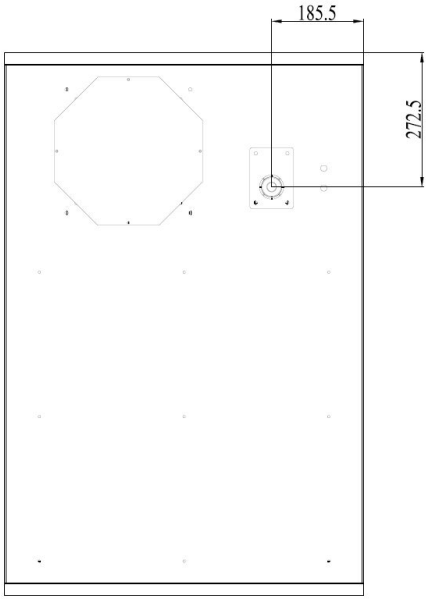
There is an option to exhaust heat out the top of the cabinet. The top-down cabinet drawings below show the provision for the top panel ventilation hole (11 inches). Please specify cabinet ventilation when ordering. If you specify top ventilation, the TX will be delivered with a solid rear panel door (instead of the standard perforated rear door). All TXs are provisioned with a single ventilation hole at the top of the cabinet.



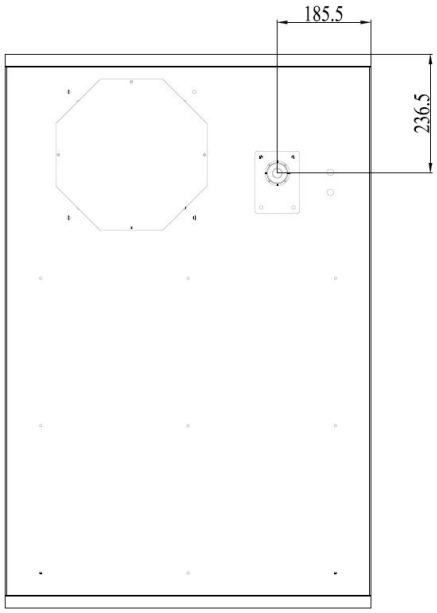
1 PA



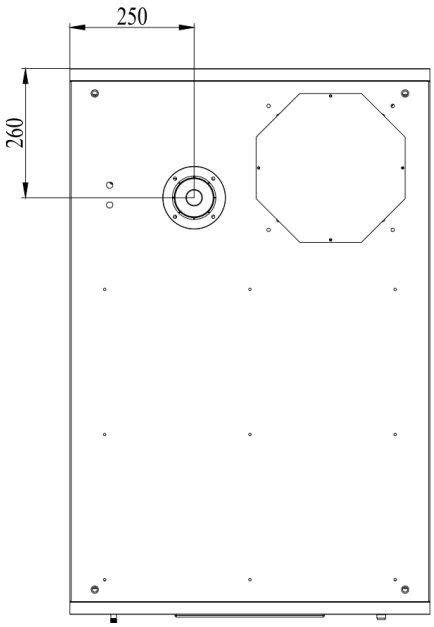
2 PA



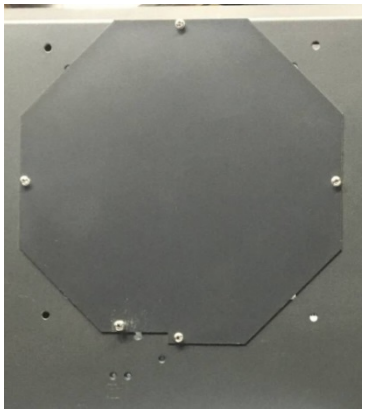
3 & 4 PA



5 PA



6 & 8 PA



2. Theory of Operation

The MHPTV transmitter is conceptually simple to understand and easy to operate.

The Transmitter operates on either 240VAC single-phase (3-wire) or 208VAC three-phase (4-wire) AC Mains service. An AC Mains Distribution compartment is located on the back-rear floor of the TX. This compartment is shielded for personnel safety and provides the distribution of appropriate AC power to the various modules inside the TX cabinet.

A standard ASI input stream is provided to one of the BNC connectors located on the rear panel of the Exciter. The Exciter (different platforms) supports options for DVB-ASI and SMPTE310M (ATSC 9x exciter only) stream formats as well as an RF off-air input via a built-in tuner and TSoIP support via an RJ-45 input. The Exciter performs the appropriate modulation to produce an RF output at the desired channel frequency. Exciter configurations may vary – for DTV (ATSC, ATSC 3.0, DVBT/T2, ISDBT, DTMB, etc.).

The TX supports both Single and Dual Drive (DD) Exciter configurations and manages the automatic and manual switchover between Exciters in a DD configuration. The modulated RF output signal from the Exciter(s) is (are) fed into the Control module which contains a preamp driver stage and built-in N-ways splitter (for multiple PA configurations). The N-ways outputs of the Controller preamp are then to feed the RF inputs of each of the PA modules.

The PA modules contain 8 x BLF888E Doherty devices that amplify the RF signal to produce 1300W of output power per PA. The amplified output signals are fed into an N-way Hybrid Combiner (for 2/3/4/5/6/8 PAs configuration) and then into a Directional Coupler (for 2/3/4/5/6/8 PAs configuration) and finally out the top of the cabinet via a section of 1 5/8 or 3 1/8 transmission line.

The 1 5/8 or 3 1/8 output stack of the Transmitter is then fed into an inline 1 5/8 or 3 1/8 Harmonic Filter (if required) before entering a Before-Filter directional coupler and the input to the channel mask BPF mounted on top of the cabinet. The output of the BPF connects through an After-Filter directional coupler into the Antenna feed to radiate the DTV signal on-air.

The Exciter receives the two feedback signals from the Before-Filter and After-Filter directional couplers located at the input and output of the BPF. These before and

after BPF feedback signals are used by the Exciter to provide automatic Linear and Non-Linear pre-correction of the forward path signal.

Additional feedback signals are provided to the Control module, which monitors these samples to implement protective protocols including forward power reduction and shutting down the TX in the event of high reflected power or other unsafe operating conditions. System FWD and REV power samples are provided to the Control module from the Directional Coupler located directly after the N-way power combiner (for 2/3/4/5/6/8 PAs configuration). The Control module also receives feedback samples from the System Reject Load(s) (for 2/3/4/5/6/8 PAs configuration), enabling it to control the variable fan speed of the reject load(s).

The Control module is in constant communication with the Exciter and PA modules via an RS-485 serial bus. Each module has a unique ID on the bus, and the Control module is continually talking with the Exciter and PA modules to provide monitoring and control capabilities via its front panel touchscreen and built-in web user interfaces. Both the Control module and the Exciter provide RJ-45 Ethernet connections through which the user may remotely monitor and control the TX via their respective built-in web interfaces.

2.1 Control Unit

2.1.1 Control Unit（CTL-S）

For 1, 2 and 3 PA configurations, the TX Control Unit CTL-S consists of a pre-amp and a powerful control system. It receives the RF input(s) from the exciter(s), performs the pre-amplification, and sends RF output to a PA or an external N-way splitter to feed up to 3 PAs. The CTL-S communicates over an RS-485 serial bus to the PAs and Exciter(s) installed in the system and monitors system Forward, Reflected, and Reject load power.

Front panel

The front panel of the Control Unit is shown below.

- Color touch screen
- LED_OK
  - If the green light is ON, then the transmitter is working in OK mode.
- LED_ALARM
  - If there is an alarm, the red light is ON, and the transmitter will shut down its output. The most common alarms include Over-drive/over-current of PA modules or Preamp, high reflected power of PA modules or Preamp, high absorbed power, over temperature of PA modules or Preamp, etc. Please refer to Status Bar and LOG from the touch screen of Control Unit for details.
  - RESET (reserved)

Rear Panel

The rear panel of the Control Unit is shown below:

- RF_OUT
  - Connector: N
  - Impedance: 50 Ω
  - Note: Sends pre-amplified RF signal to the inputs of PA modules
- RF_IN_A/RF_IN_B
  - Connector: N
  - Impedance: 50 Ω
  - Note: To receive the RF_OUT signal from Exciter_A / Exciter_B
- REFL_IN (TX Reflected Power)
  - Connector: BNC
  - Impedance: 50 Ω
  - Note: To receive feedback signal from Directional Coupler for Reflected Power detection and monitoring.
- FWD_IN (TX Forward Power)
  - Connector: BNC
  - Impedance: 50 Ω
  - Note: To receive feedback signal from Directional Coupler for Forward Power detection and monitoring.
- AUX_IN (TX Load Reject Power)
  - Connector: BNC
  - Impedance: 50 Ω
  - Note: To receive a feedback signal from RJCT1 of reject Load for Absorbed Power detection and monitoring
- GPRS (reserved)
- ERS485-A/ERS485-B: To be connected to REMOTE of Exciter_A/Exciter_B for internal communication between exciters and Control Unit.
- PRS485: To be connected to the RS485 of PA#1 for internal communication between the PA module and Control Unit.
- CAN: To be connected to the RS485 of PA#2 for internal communication between the PA module and Control Unit.
- RS-232: Reserved.
- LAN: 10M/100M Ethernet port for web-based remote control (IP address: 192.168.1.210)
- AC INPUT/FUSE: 100-240 VAC
- Power Switch: ON/OFF

2.1.2 Control Unit（CTL-M）

For 4 to 8 PA configurations, the TX Control Unit CTL-M consists of a pre-amp, an N-way splitter with “Optitune” (phase/gain adjustment) circuit, and a powerful control system. It receives the RF input(s) from the exciter(s), performs the pre-amplification, and sends RF output to an N-way splitter with phase/gain adjustment circuit, finally to feed 4, 5, 6 or 8 PAs. The CTL-M communicates over an RS-485 serial bus to the PAs and Exciter(s) installed in the system and monitors system Forward, Reflected, and Reject load power.

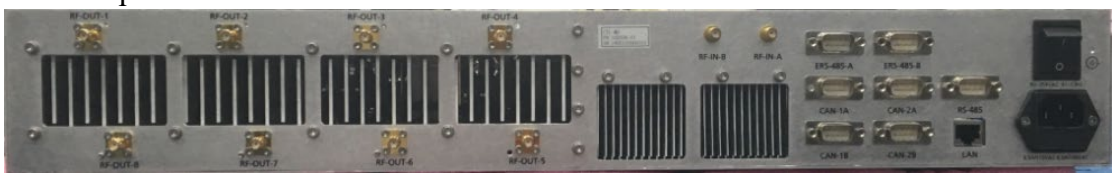
Front panel

The front panel of the Control Unit is shown below.

- Color touch screen
- LED_OK
  - If the green light is ON, then the transmitter is working in OK mode.
- LED_ALARM
  - If there is an alarm, the red light is ON, and the transmitter will shut down its output. The most common alarms include Over-drive/over-current of PA modules or Preamp, high reflected power of PA modules or Preamp, high absorbed power, over temperature of PA modules or Preamp, etc. Please refer to Status Bar and LOG from the touch screen of Control Unit for details.
  - RESET (reserved)

Rear Panel

The rear panel of Control Unit is shown below:



- RF_OUT-1/…/RF_OUT-8
  - Connector: SMA
  - Impedance: 50 Ω
  - Note: Sends pre-amplified RF signal to the inputs of PA modules
- RF_IN_A/RF_IN_B
  - Connector: SMA
  - Impedance: 50 Ω
  - Note: To receive the RF_OUT signal from Exciter_A / Exciter_B
- ERS485-A/ERS485-B: To be connected to REMOTE of Exciter_A/Exciter_B for internal communication between exciters and Control Unit.
- CAN-1A: To be connected to CAN port of the power detection board.
- CAN-1B/2A/2B: Reserved.
- RS-485: To be connected in series with RS485 ports of all PA modules.
- LAN: 10M/100M Ethernet port for web-based remote control (IP address: 192.168.1.210)
- AC INPUT/FUSE: 90-240 VAC
- Power Switch: ON/OFF

2.2 Digital Exciter

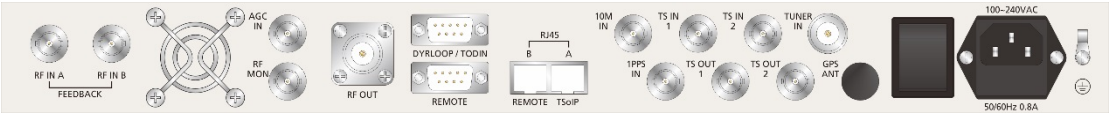
Front Panel

- LCD:
  40×2 LCD with power-saving backlight
- 6 Buttons:
  Left, Right, Up, Down, OK, ESC
- 6 LEDs:
  When in Exciter mode:
  - LED_TS1: Green light on indicates TS1 is selected and the input TS signal is OK
  - LED_TS2: Green light on indicates TS2 is selected and the input TS signal is OK
  - LED_TSErr: Red light on indicates the selected input signal has an error

  When in Translator mode:
  - LED_ TS1: Green light on indicates the synchronization of the input RF signal is OK
  - LED_TS2: Green light on indicates the equalization of the input RF signal is OK
  - LED_TSErr: Red light on indicates there is synchronization error or equalization error

  In both Exciter and Translator mode:
  - LED_ GPS: Green light on indicates GPS connected and locked
  - LED_ RFON: Green light on indicates system ready and RF on
  - LED_ SysErr: A flashing red LED indicates the presence of a system error
    A solid red LED indicates the unit is in "Local (LCL)" control mode, and when this LED is off, this indicates that the unit is in "Remote (RMT)" control mode
- 1 BNC connector:
  - RFMON: Reserved

Rear Panel



- RF_IN_A: Feedback signal, sampled after the band-pass filter (-5 to -15dBm)
- RF_IN_B: Feedback signal, sampled before the band-pass filter (-5 to -15dBm)
- AGC_IN: Feedback DC voltage for AGC control (0-5VDC)
- RF_MON: Loop out of RF_OUT for monitoring (-25 dB below RF_OUT)
- RF_OUT: Main RF signal output of exciter, to be connected to RF_IN_A/RF_IN_B of Control Unit (nominal 0 dBm output)
- DRY LOOP: Dry loop for remote control
- REMOTE: To be connected to ERS485-A/ERS485-B of Control Unit for internal communication between exciters and Control Unit
- REMOTE (RJ45-B): 10M/100M Ethernet for remote control (IP address: 192.168.1.143)
- TSoIP (RJ45-A): Input for IP based streams.
- 10M_IN: 10 MHz input from external GPS receiver
- 1PPS_IN: 1 PPS input from external GPS receiver
- TS_IN_1: The first port of TS inputs, DVB-ASI only
- TS_OUT_1: Loop out of [TS_IN_1] for monitoring
- TS_IN_2: The second port of TS inputs, DVB-ASI only
- TS_OUT_2: Loop out of [TS_IN_2] for monitoring
- TUNER_IN: Received RF signal input

Note: Please refer to the ACT-5X+/ACT9x Exciter User Manual for more details.

2.3 ANY1022 (option)

ANY1022's Front Panel

- PWR: The green light ON indicates ANY1022 is powered ON.
- STATUS: The red light ON indicates ANY1022 has detected an internal hardware error.
- ALARM: The red light on indicates ANY1022 has at least one active alarm.

ANY1022's Rear Panel

- REMOTE: To be connected to the 10" touch screen (industrial PC)'s LAN1.
- 10M IN: To be connected to exciter's 10M OUT
- 1PPS IN: To be connected to exciter's 1PPS OUT
- RF IN: To be connected to the transmitter's feedback samples.
- RELAY PORT: See the manual for more details.
- 12V DC: Reserved.
- Power Switch: ON/OFF
- AC INPUT/FUSE:88-264VAC

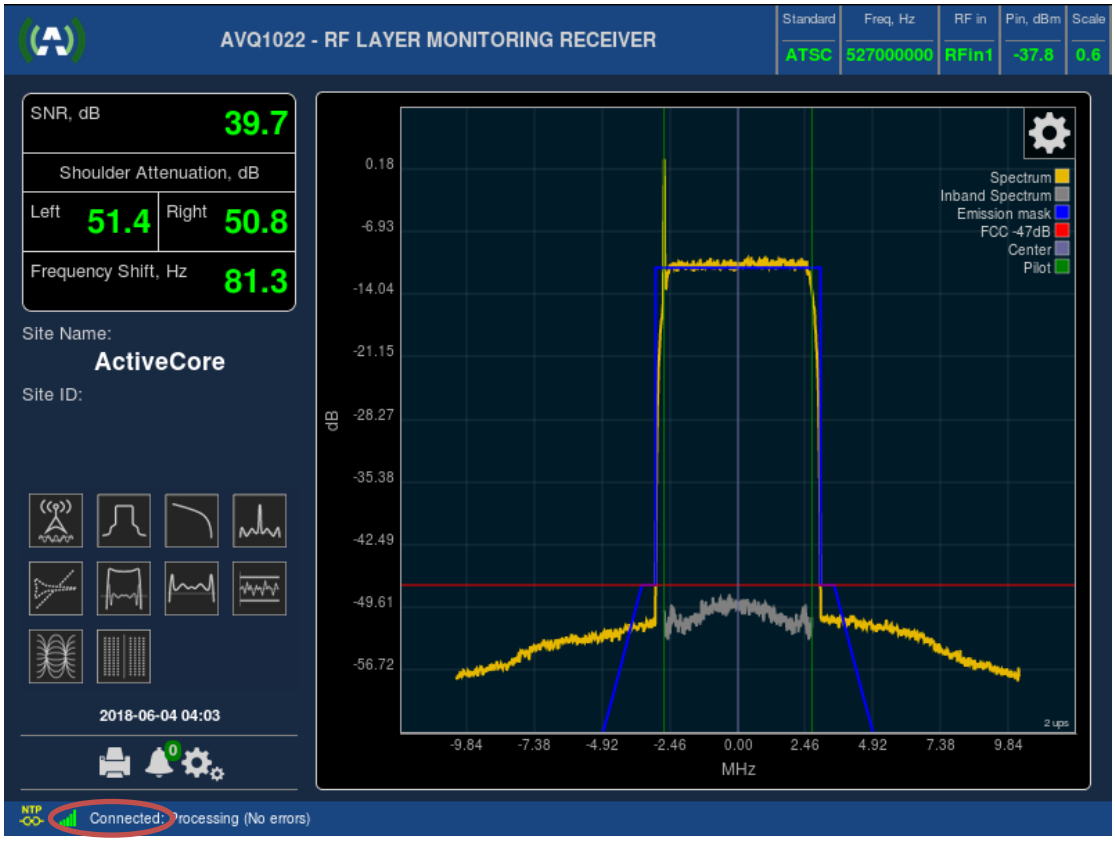
10" Touchscreen (Industrial PC) Rear panel (option)

- WIFI: Reserved.
- POWER: Power switch on/off.
- COM2/3/4: Serial port
- COM1: Serial port
- LAN2: To access to Ethernet.
- LAN1: To be connected to ANY1022 REMOTE(RJ-45).
- USB: two USB ports
- VGA
- HDMI
- DC9-24V: 24VDC voltage input.

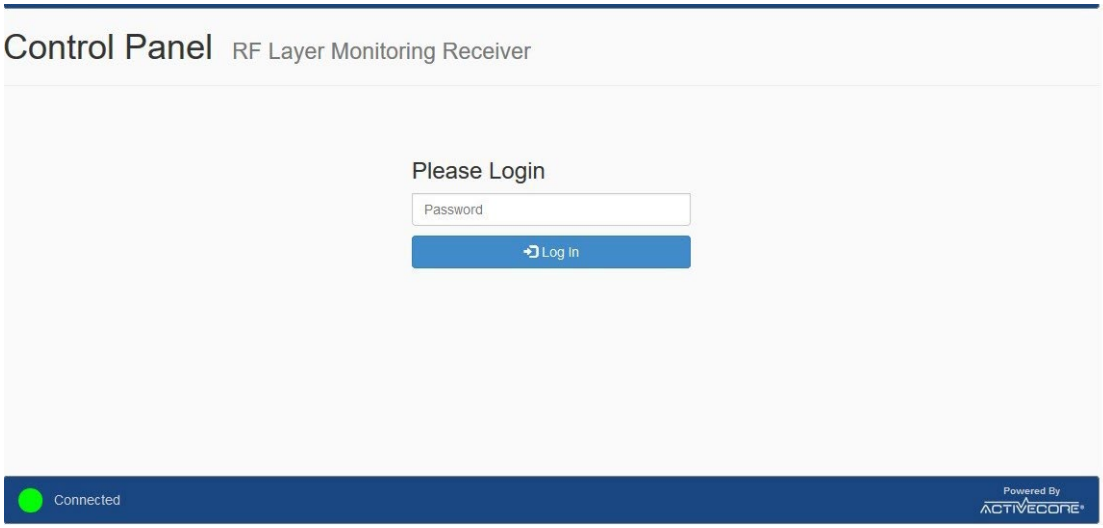
The default IP Address of the ANY1022 is 192.168.254.254. In order to communicate with the device through a web browser, configure the industrial PC (with 10" touchscreen) to be on the same subnet as ANY1022. This will allow you to have access to the ANY1022 Control Panel to tune network settings according to the required by your network parameters.

After setting network parameters of the computer/device running a WEB browser (Host) the following steps are recommended:

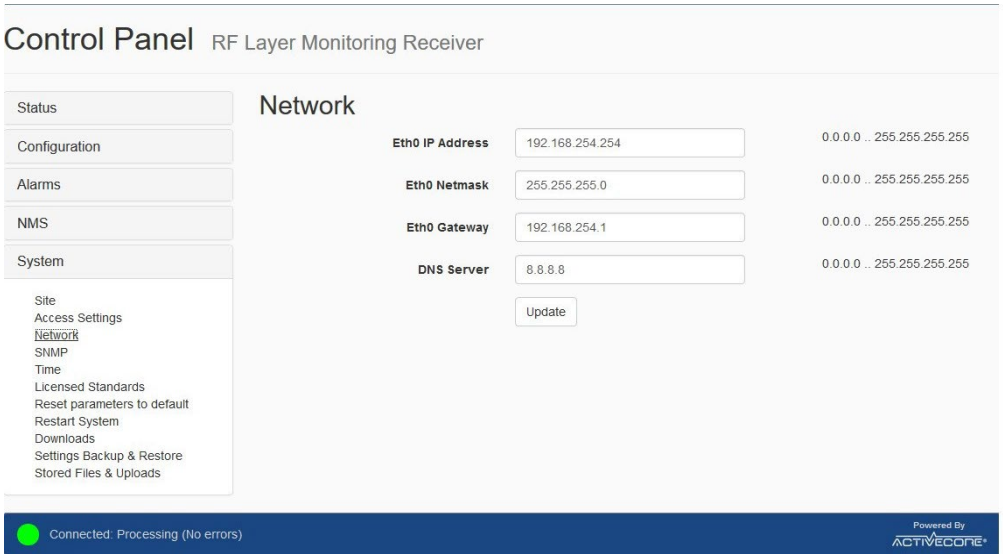
- Verify basic communication between the PC and ANY1022; you should be able to connect to the ANY1022 using the WEB browser by entering the ANY1022's IP address and see its WEB UI main page. Please refer to Figure below;
- Make sure that the "Connection" bar is green and "Connected" status is present;



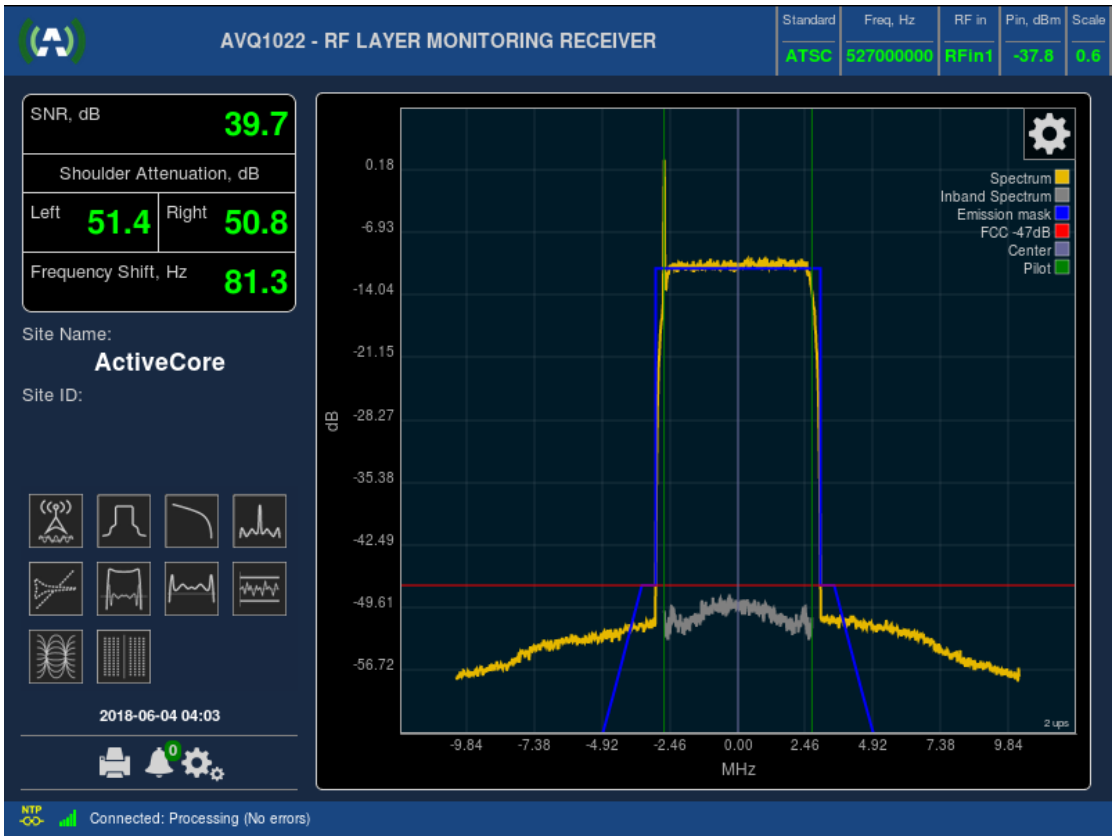
➢ By pressing “Control Panel” switch to the Receiver Control Panel Log-in page and enter a password for Administrator level of access. The default password is “admin”;



➢ Once logged in, navigate to Control Panel->System->Network and adjust the Receiver Network interface settings.

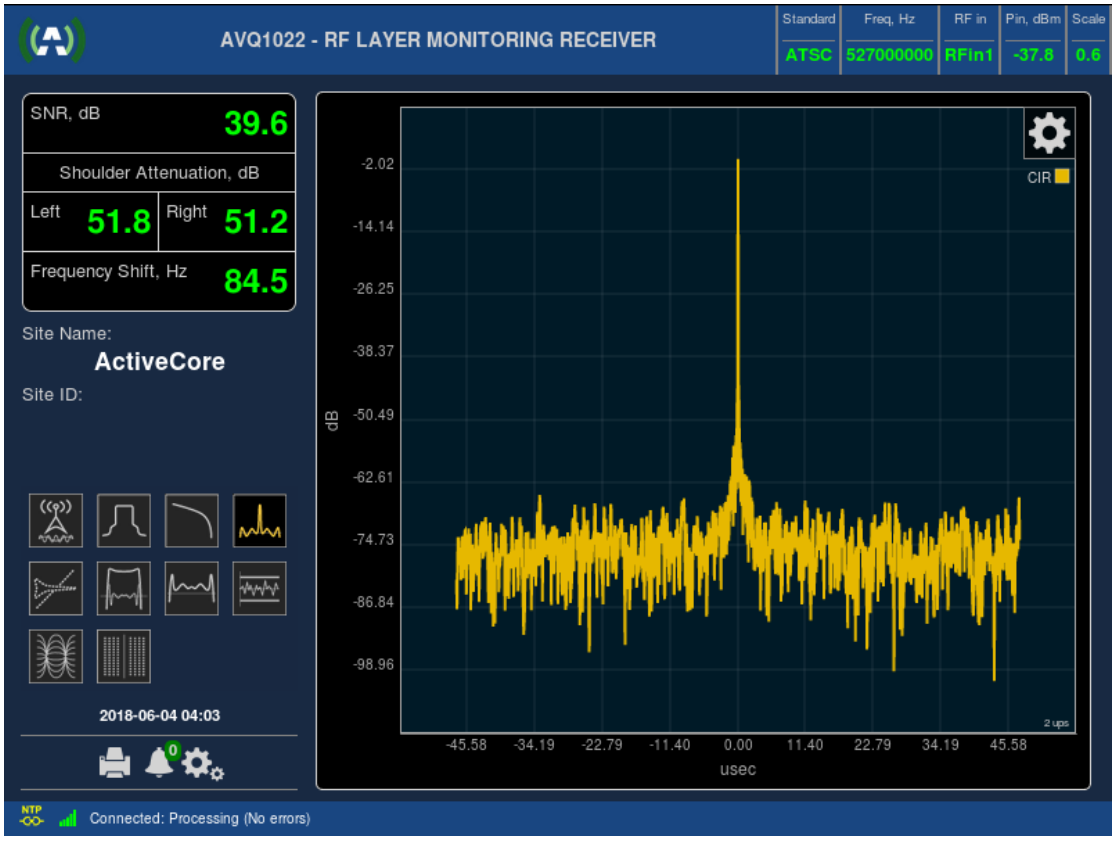


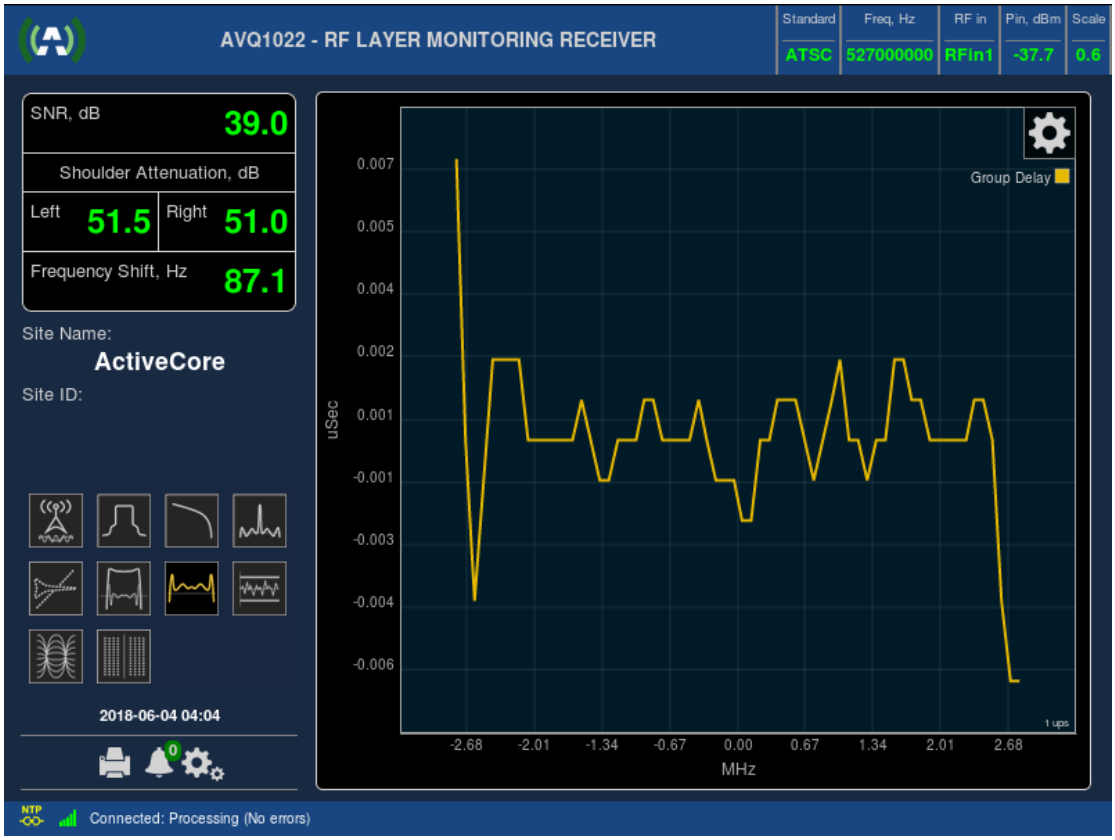
Below are a few screenshots of ANY1022 displayed on the 10” touchscreen.

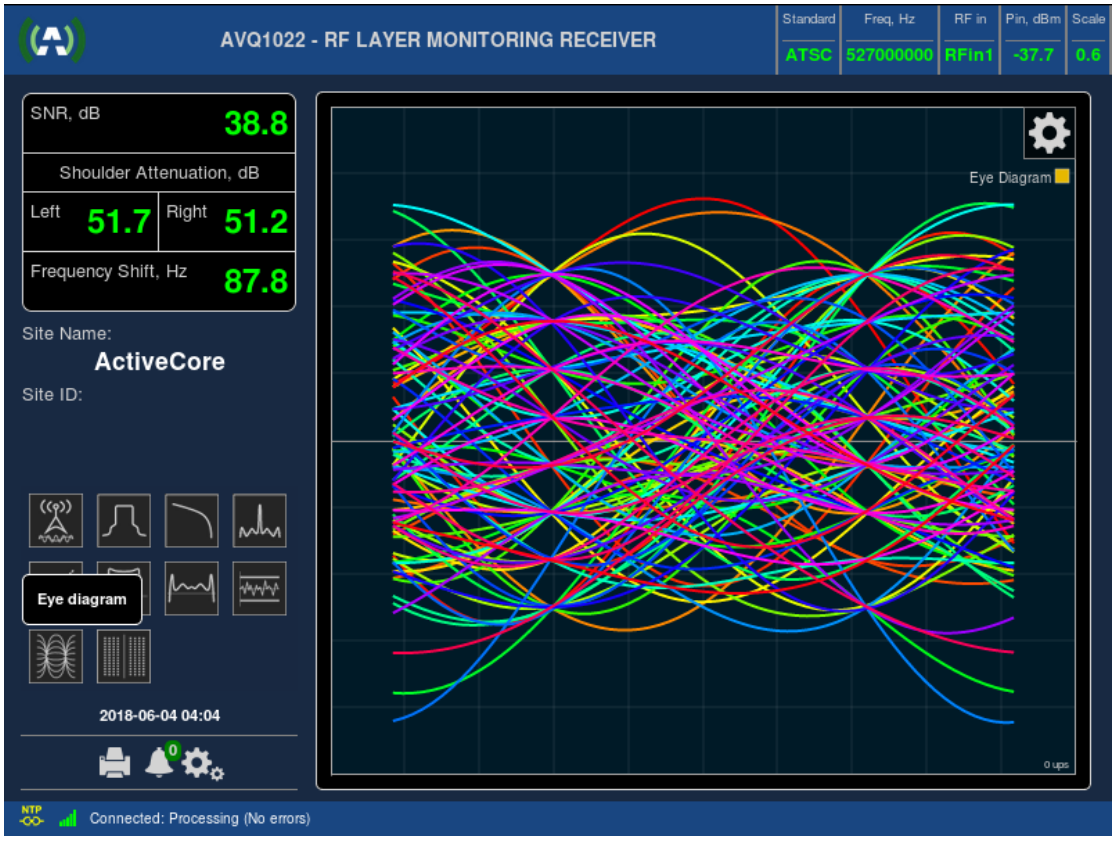


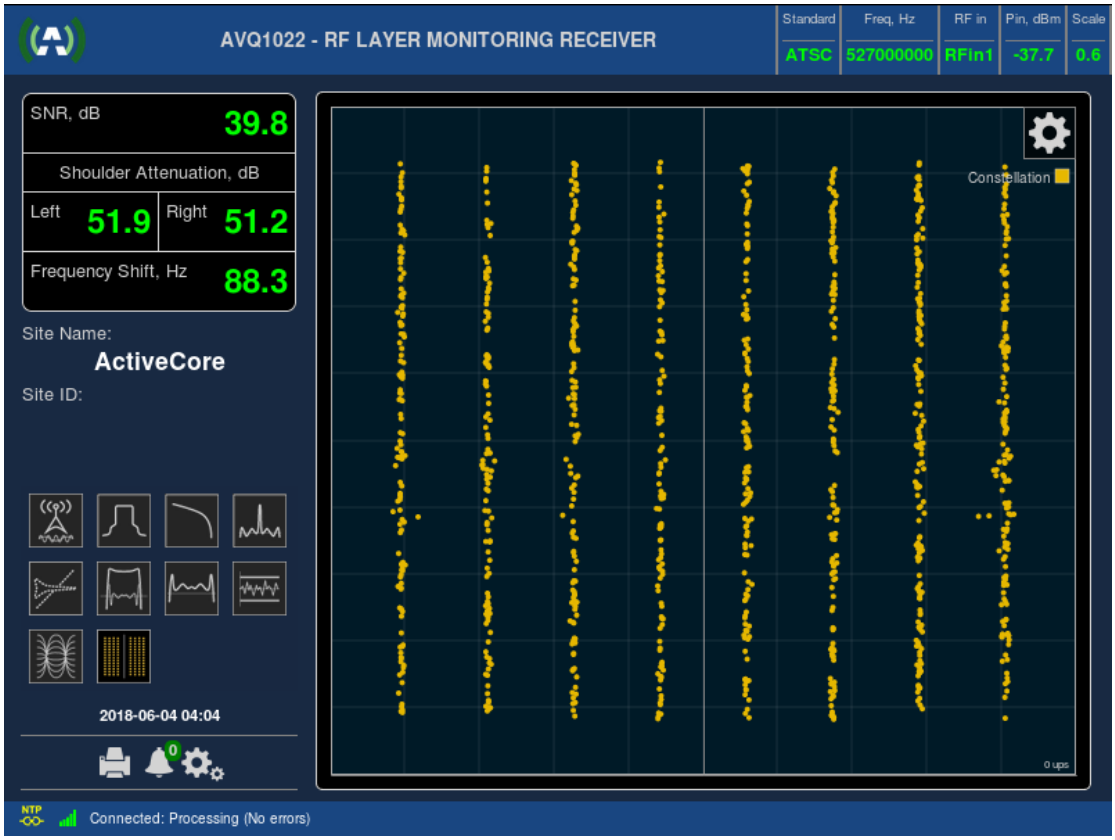

AVQ1022 - RF LAYER MONITORING RECEIVER
Standard
ATSC
Freq, Hz
527000000
RF in
RFin1
Pin, dBm
-37.6
Scale
0.6
SNR, dB
39.5
Shoulder Attenuation, dB
Left
51.5
Right
51.0
Frequency Shift, Hz
81.7
Site Name:
ActiveCore
Site ID:
2018-06-04 04:03
Statistics
General
Input RF power (dBm) -37.63
RMS 4095.81
PAPR (dB) 5.96
Signal Scale 0.61
Equalizer Off
Channel Filter Off
Standard Specific
Mode Tx Output
Bandwidth (MHz) 6
Spectrum Inversion Not inverted
Frequency Shift (Hz) 81.69
Sample Rate Shift (Hz) -1.58
MER (dB) 39.81
SNR (dB) 39.5
EVM (%) 0.69
Residual GD (usec) 0.011
Amplitude Error (dB) 1.78
Phase Error (degree) 2.8
Pilot Ampl Error (dB) -0.02
Pilot Phase Error (degree) -0.209
Right Shoulder (dB) 51
Left Shoulder (dB) 51.53
Emission
Spectral output
Offset, MHz Power L, dBm Power R, dBm
3 -51.53 -51
3.5 -52.04 -51.05
4 -52.45 -51.15
4.5 -52.79 -51.75
6 -53.56 -52.53
9 -56.65 -56.48
Connected: Processing (No errors)


AVQ1022 - RF LAYER MONITORING RECEIVER
Standard
ATSC
Freq, Hz
527000000
RF in
RFin1
Pin, dBm
-37.6
Scale
0.6
SNR, dB
40.0
Shoulder Attenuation, dB
Left
51.6
Right
50.9
Frequency Shift, Hz
82.5
Site Name:
ActiveCore
Site ID:
2018-06-04 04:03
Emission
Spectral output
Offset, MHz Power L, dBm Power R, dBm
3 -51.6 -50.86
3.5 -52.11 -51
4 -52.62 -51.21
4.5 -52.89 -51.52
6 -53.37 -52.36
9 -56.7 -56.49
Emission Mask Points
Offset, MHz
Power, dBm
Add new
3 -11 Delete
3 -47 Delete
3.5 -47 Delete
4 -53 Delete
4.5 -59 Delete
6 -76 Delete
9 -110 Delete
Defaults
Connected: Processing (No errors)


AVQ1022 - RF LAYER MONITORING RECEIVER
Standard
ATSC
Freq, Hz
527000000
RF in
RFin1
Pin, dBm
-37.8
Scale
0.6
SNR, dB
39.6
Shoulder Attenuation, dB
Left
51.8
Right
51.2
Frequency Shift, Hz
84.5
Site Name:
ActiveCore
Site ID:
2018-06-04 04:03
CIR
-2.02
-14.14
-26.25
-38.37
-50.49
-62.61
-74.73
-86.84
-98.96
dB
-45.58
-34.19
-22.79
-11.40
0.00
11.40
22.79
34.19
45.58
usec
2 ups
Connected: Processing (No errors)


AVQ1022 - RF LAYER MONITORING RECEIVER
Standard
ATSC
Freq, Hz
527000000
RF in
RFin1
Pin, dBm
-37.7
Scale
0.6
SNR, dB
39.0
Shoulder Attenuation, dB
Left
51.5
Right
51.0
Frequency Shift, Hz
87.1
Site Name:
ActiveCore
Site ID:
2018-06-04 04:04
Group Delay
0.007
0.005
0.004
0.002
0.001
-0.001
-0.003
-0.004
-0.006
uSec
-2.68
-2.01
-1.34
-0.67
0.00
0.67
1.34
2.01
2.68
MHz
1 ups
Connected: Processing (No errors)


AVQ1022 - RF LAYER MONITORING RECEIVER
Standard
ATSC
Freq, Hz
527000000
RF in
RFin1
Pin, dBm
-37.7
Scale
0.6
SNR, dB
38.8
Shoulder Attenuation, dB
Left
51.7
Right
51.2
Frequency Shift, Hz
87.8
Site Name:
ActiveCore
Site ID:
Eye diagram
2018-06-04 04:04
Eye Diagram
0 ups
Connected: Processing (No errors)


AVQ1022 - RF LAYER MONITORING RECEIVER
Standard
ATSC
Freq, Hz
527000000
RF in
RFin1
Pin, dBm
-37.7
Scale
0.6
SNR, dB
39.8
Shoulder Attenuation, dB
Left
51.9
Right
51.2
Frequency Shift, Hz
88.3
Site Name:
ActiveCore
Site ID:
2018-06-04 04:04
Constellation
0 ups
Connected: Processing (No errors)

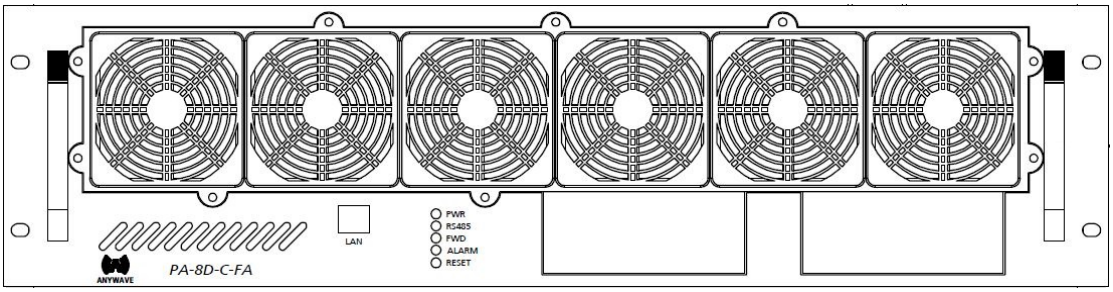
Note: Please refer to the ANY1022 User Manual for more details.

2.4 Power Amplifier – PA-8D-C-FA

The MHPTV TX may be fitted with 1, 2, 3, 4, 5, 6, or 8 PA-8D-C-FA PA modules. Each module consists of a total of 8 BLF888E (Doherty) devices per PA drawer. Each PA is also fitted with two pluggable 50V power supplies.

Front Panel

The front panel of PA is shown as below. The LED indicators and ports are listed below.

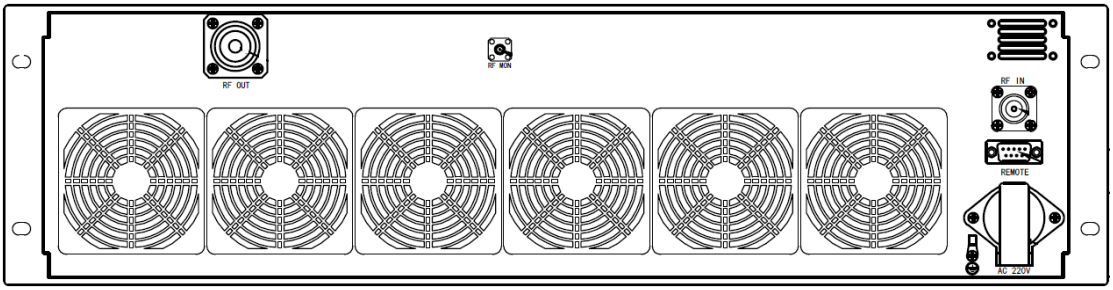


- LAN: 10M/100M Ethernet port for web-based remote control (IP address: 192.168.1.200)
- LED_PWR
  - The green light will be on when the DC voltage of the internal power supply is within the normal range (48 VDC ~ 52 VDC).
  - The green light will flash when the DC voltage of the internal power supply is out of the normal range (48 VDC ~ 52 VDC).
  - The green light will be off when the external power supply is turned off, or the internal power supply module does not work.
- LED_RS485
  - The green light will flash once per second when internal communication is normal.
  - The green light will stay constantly on or off when internal communication is abnormal.
- LED_FWD
  - The blue light will be on when the TX power level is stable and higher than 10 W.
  - The blue light will flash once per second during the ramp-up process and the TX power level is higher than 10 W.
  - The blue light will be off when the TX power level is less than 10 W, or it's turned off by configuration or for protection. There are several situations which will result in auto-protection mode, such as the input power is too high, the reflected power is too high, or the temperature is too high. When the transmitter reboots, the default setting of TX status is OFF.

- LED_ALARM
  - The red light will be on if there is any alarm
  - The red light will be off if there is no alarm
- RESET: To reset the IP to default (192.168.1.200).

Rear Panel

The rear panel of PA is shown below with ports described as follows.



- RF_OUT
  - Connector: 7/16 DIN
  - Impedance: 50 Ω
  - Note: To send out RF signal to the input of Power Combiner (attached to the cabinet). It must always be connected to a load.
- RFMON
  - Connector: SMA
  - Impedance: 50 Ω
  - Note: Loop out of RF_OUT for monitoring.
- RF_IN
  - Connector: N
  - Impedance: 50 Ω
  - Note: To receive RF signal from RFOUT1/RFOUT2 of Control Unit.
- REMOTE
  - Connector: DB9-M
  - Note: To be connected to PRS485-1/ PRS485-2 of Control Unit for internal communication between PA and Control Unit.
- AC220V input: To be connected with Power Supply System.

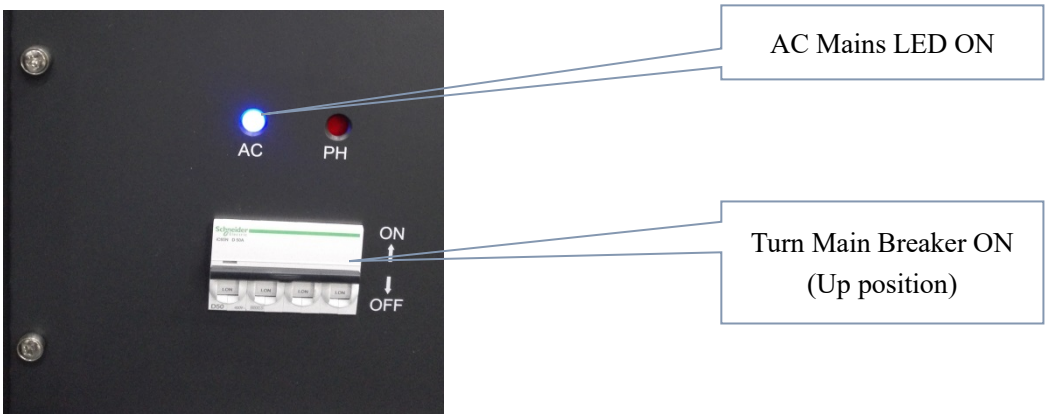
3. Installation/Initial Turn-On

Once the RF connections have been properly made into your antenna feed or suitable station load, and the Transmitter has been properly wired to the station electrical panel (as outlined in Chapter 1) you are now ready to turn on the system.

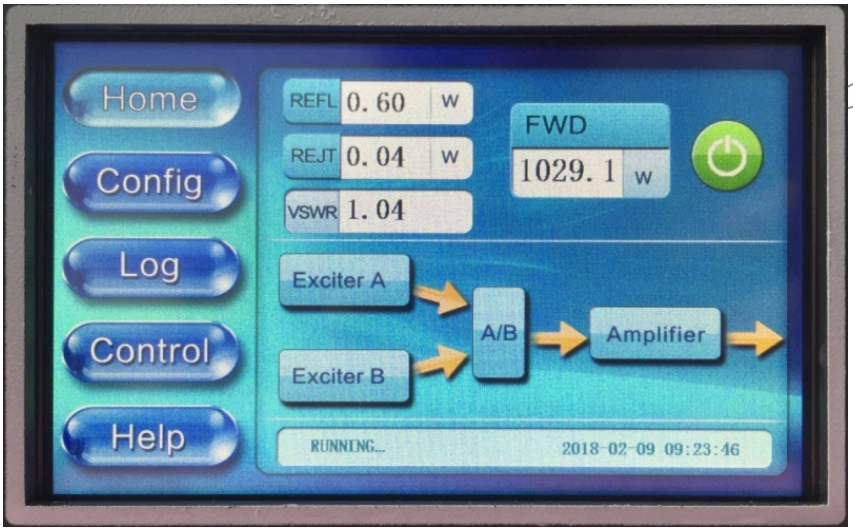
Please locate and have handy for reference a copy of your MHPTV TX Factory Test Report, and Exciter User Manuals.

Please follow the steps outlined below to safely turn on and bring your TX system up to power.

1. Apply power to the Transmitter by turning ON the AC Main Breaker located in the lower left front of the TX and ensure that the AC Mains indication is illuminated. You will hear the PA fans rev up to full speed for a few seconds and then ramp down.

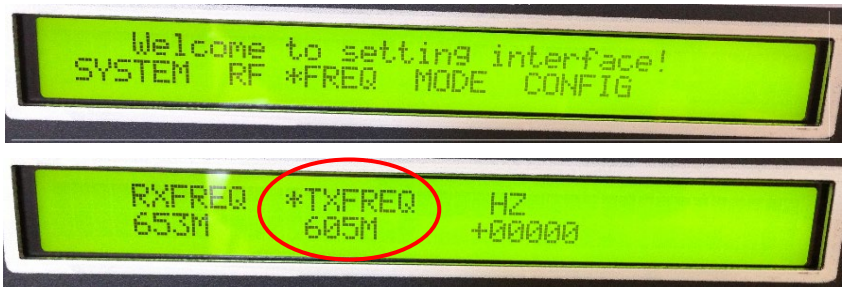


It takes a few seconds for the Controller to power up and to display the HOME screen (shown below). Please note that the values will be different as the TX initially turns ON at a reduced power level.

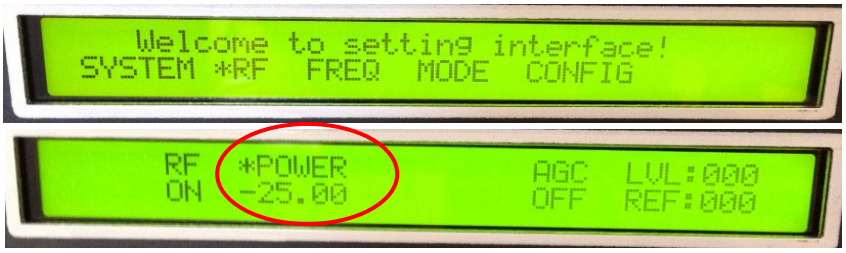


The Controller HOME touchscreen display will indicate System Forward (FWD), Reflected (REFL), and Reject Load (REJT) output power in Watts in real-time.

2. Check Exciter settings. Check the operating Frequency of the Exciter by navigating to the Exciter FREQ submenu (simultaneously press Left and Right buttons)

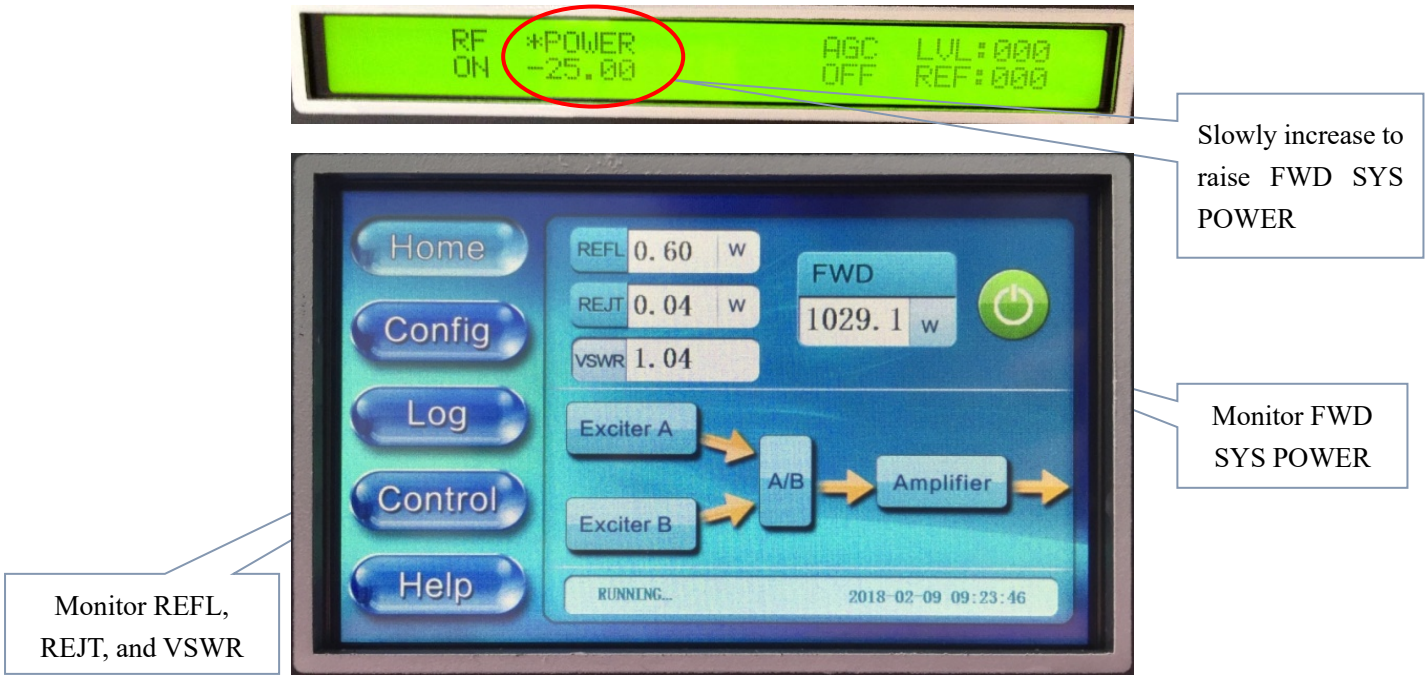


Check the Exciter drive level is set to -25dBm by navigating to the Exciter RF submenu (from above, press ESC button then enter the RF submenu).



3. You are now ready to bring the TX up to power. To accomplish this, slowly increase the drive level out of the Exciter by increasing the POWER setting in the Exciter RF submenu while watching the Sys FWD power increase accordingly on the Controller touchscreen.

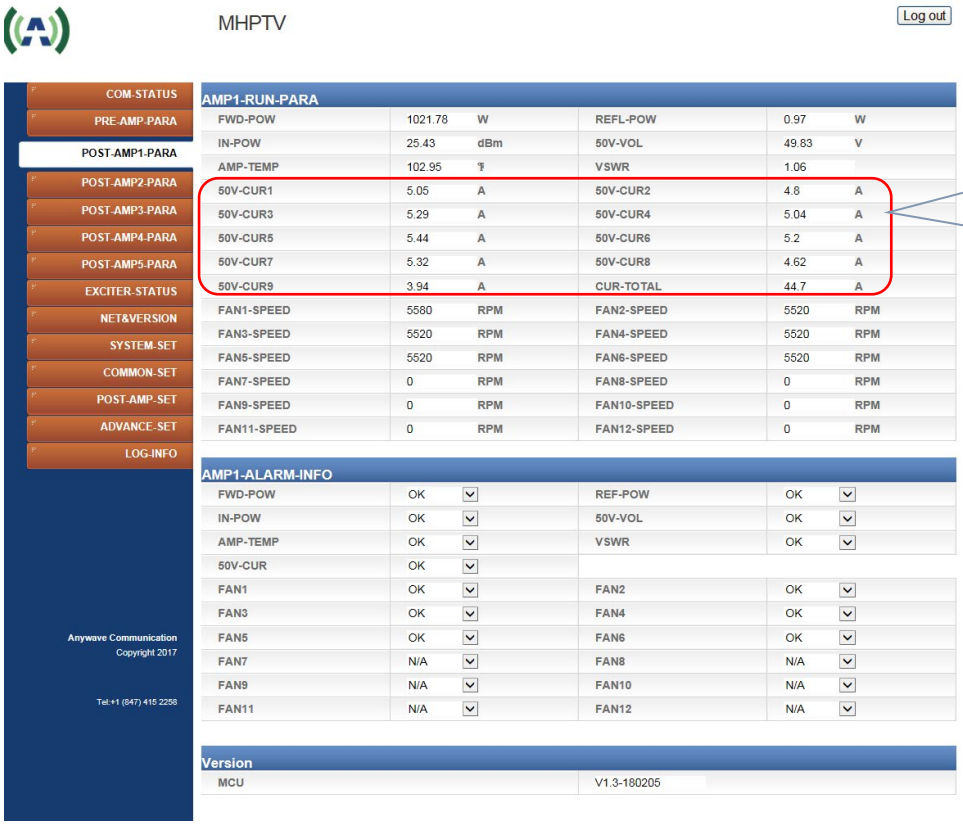
Begin to slowly raise the FWD System power by using the UP button on the Exciter, while monitoring the FWD system power meter on the Controller HOME screen as shown below.



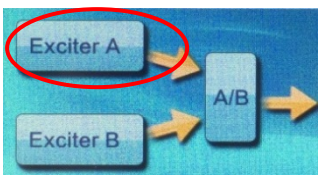
4. Slowly bring the FWD power to ~ half-power and notice the power meter values of REFL, REJCT, and VSWR to be sure these look reasonable (less than the values of the TX operating at full rated power (please reference your Factory Test Report for these values).

Check to be sure that the lower-left corner of the HOME screen shows the status as “RUNNING OK!” and there are no alarm messages. If you do see an alarm message, please reference the Troubleshooting section of your transmitter User Manual to understand what the error means and suggested steps to correct it. (For example, when initially turning on a system, the error message AMP_VSWR_ERR (accompanied by high REFL power readings) may be witnessed - indicating a connection problem somewhere in the external RF System – a mismatch sending hi reflected energy back to the REFL sample on the output directional coupler inside the TX cabinet.)

5. Continue to slowly raise the FWD power until you reach the max power rating of the TX or your lower desired TPO. Check to be sure that the PA device currents do not exceed the full power operating currents as shown in your Factory Test Report. Also, be careful to make small increases in the value of Exciter POWER as you approach the desired TPO.



6. Check the SNR and Shoulder (LIMD and UIMD) RF performance of your system by pressing the Exciter A icon on the Controller HOME screen or by checking the Exciter hi-level LCD or web interface as shown below.



Linear and Non-Linear corrections were performed and optimized at the TX rated TPO in the factory and so the stored correction coefficients should produce good results if you are operating at or close to the TX max output power.

If you are operating at a TPO less than the max rated TX power or wish to rerun corrections, please reference the “Running Corrections” section of your transmitter User Manual.

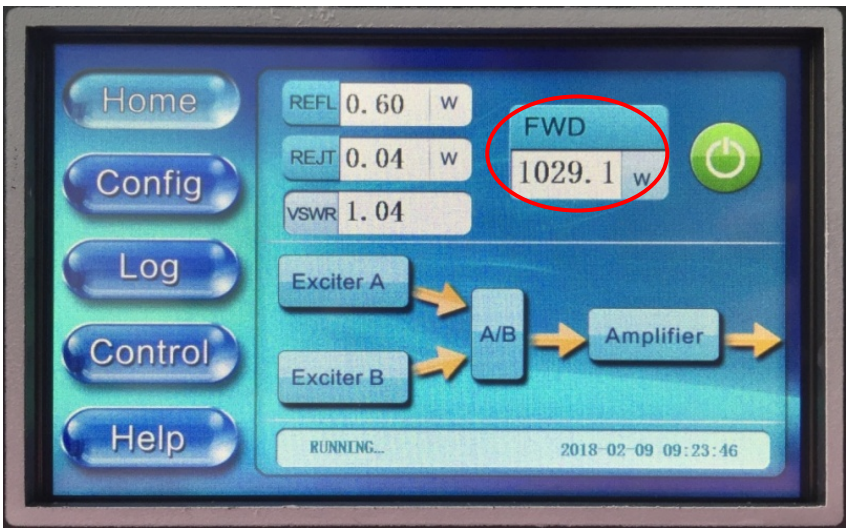
7. With your TX operating at your desired output power and with good RF performance, the next step is to engage the TX AGC.

Navigate to the AGC screen on the Controller (by pressing the CONFIG button and then the AGC button). Be sure the AGC Target FWD power is set your desired TPO but no higher than the TX max rated output power, and then press the unlit AGC button to engage the TX AGC and turn this button Green.

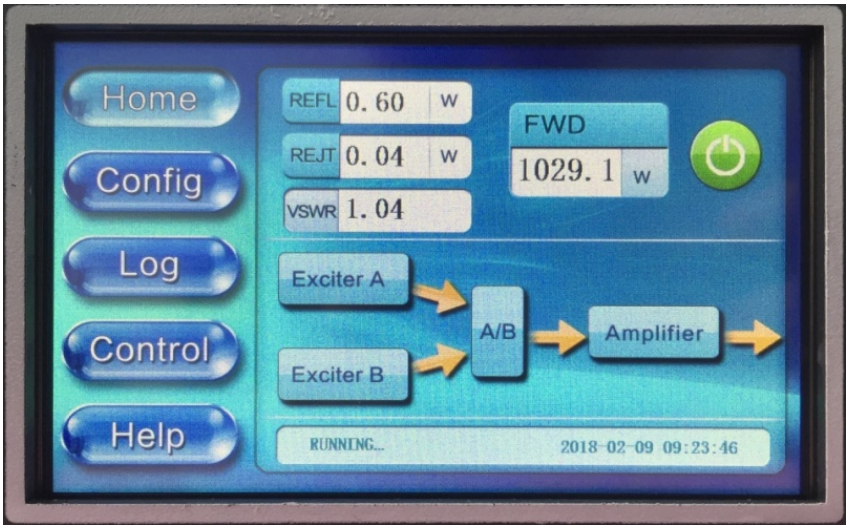
Set Target AGC Power to desired TPO

Press AGC button to turn AGC ON (will illuminate Green)

8. Press the HOME button to return to the HOME screen to monitor FWD power With the AGC engaged, the FWD power metering may vary up to +/- 5%, so for a 1500W TPO, meter variations from 1425W to 1575W may be experienced.



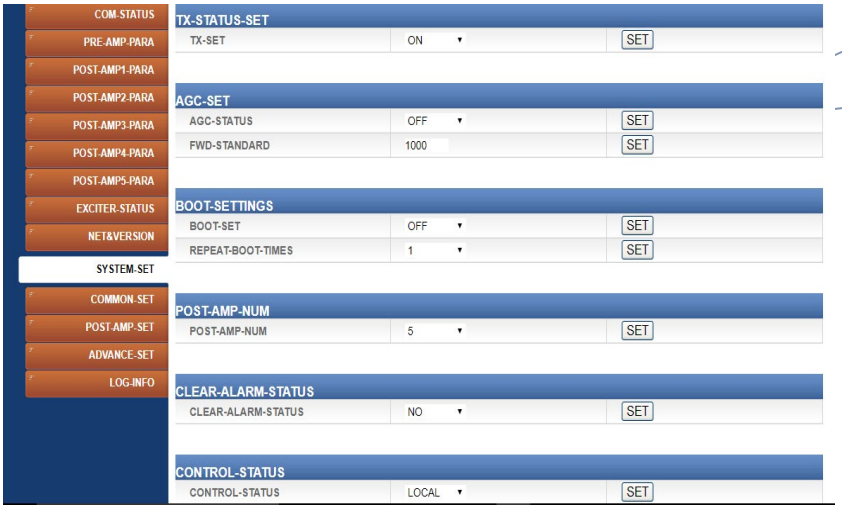
9. For Dual Exciter TX configurations, test the Exciter switchover behavior by pressing the A/B icon on the Controller touchscreen and initiating an Exciter Changeover by selecting EXCITER B, and confirming the changeover when asked. The power will drop and the exciter changeover will initiate. Once again, allow 45 to 60 seconds for the transmitter to reach operating power. Make the same performance checks as just outlined for Exciter A.



10. Your TX should now be up and running properly into your load or on-air antenna. Continue to monitor system parameters as you allow the transmitter to warm up to temperature and stabilize at full output power for another 30 minutes.

11. To turn the TX On/Off, please use the TX On/Off button located on the HOME screen of the Control module or via the TX built-in web interface. When turning the TX OFF and ON again, monitor the FWD power wattage on the HOME screen as FWD power ramps up to the AGC target level (45-60 seconds).

12. To Raise or Lower the TX output power level, please adjust the AGC target power setting under the Controller Config →AGC button. An alternative to this would be to disable the Controller AGC (set AGC-Status = Off) and raise/lower the Exciter output drive.



Set Target AGC to desired System Forward Power, Turn AGC ON/OFF

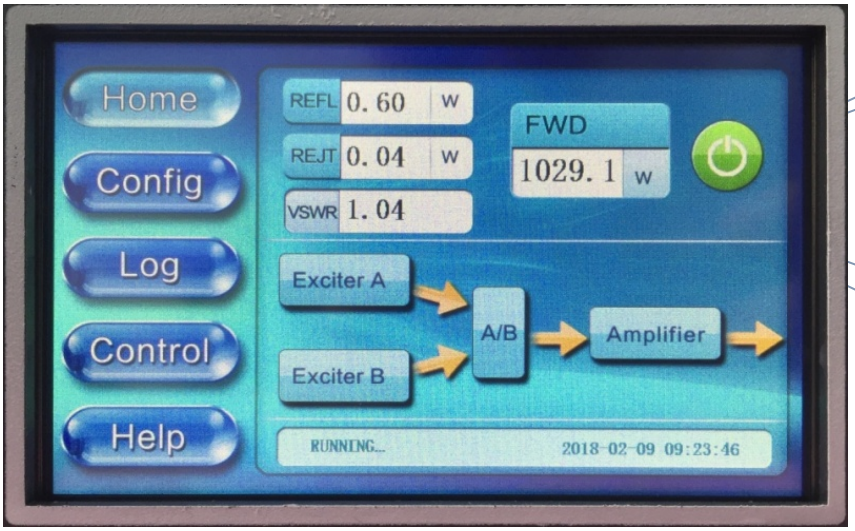
13. You may network your Transmitter Control Module (rear LAN connector, default IP address 192.168.1.210) and your Exciter (REMOTE RJ-45 rear panel connection at 192.168.1.143), and your PA drawers (front LAN port 192.168.1.200 – note – you will need to change some of the PA IP address (via the PA built-in web interface) to avoid network conflicts if putting all PAs on your network for remote monitor/control. All equipment IP addresses are user-configurable via their respective user interfaces, so they may be configured to match the TX sites specific IP addressing scheme.

If you desire to have remote monitoring and control, before leaving the station, please be sure to set the Transmitter to REMOTE mode via the Controller CONTROL button setting and set the Exciter to REMOTE mode under the SYSTEM submenu by setting CTL=RMT. This will enable remote monitoring and control of the TX via its built-in web interfaces (refer to the 1KW TX and Exciter user manuals for details).

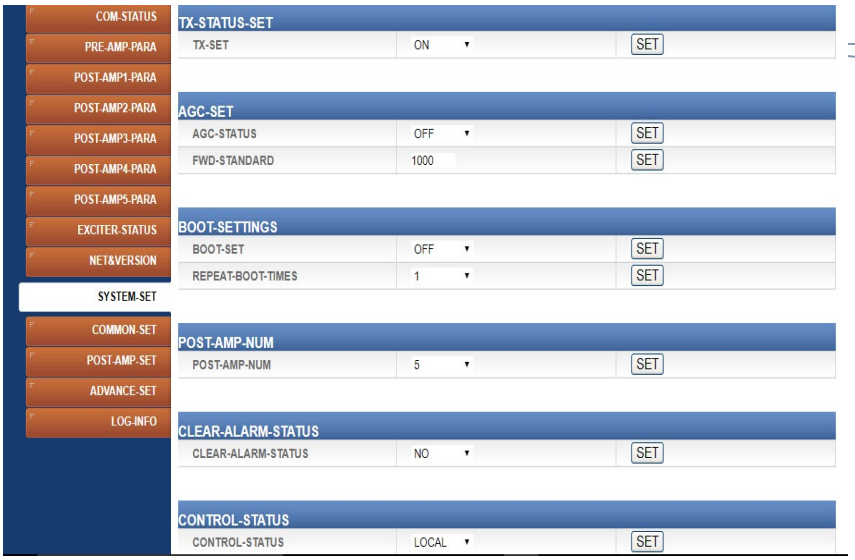
4. Operational Basics

4.1 TX ON/OFF

Local Control: To turn the TX On/Off, please use the TX On/Off button located on the HOME screen of the Control module. The Button will light Green when the TX is ON and RED when the TX is off. When turning the TX ON, please monitor the FWD power wattage on the HOME screen as FWD power ramps up to the AGC target level (which takes roughly 45-60 seconds).



Remote Control: To Turn the TX On/Off from the Controller Web Interface, please select ON or OFF for TX_SET on the SYSTEM-SET tab and press the SET button to the right (network to the Controller module via rear panel RJ-45 LAN connection, default IP address 192.168.1.210).

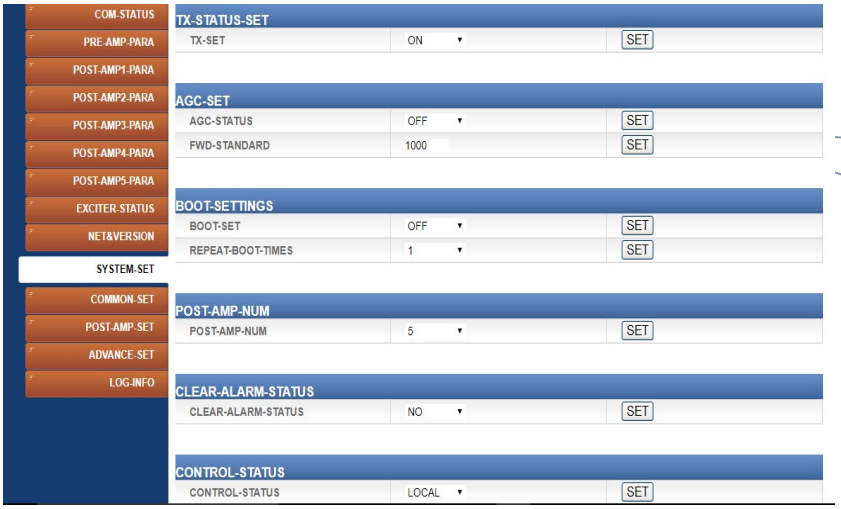


4.2 RAISE/LOWER POWER

Local Control: To raise or lower the TX system forward power, please adjust the target AGC power setting on the Controller AGC screen. Monitor the change in power via the Home screen FWD Power meter (which may take up to 60 seconds). Please note, as an alternative, you could disable the Controller AGC (Turn AGC Off) and raise/lower the Exciter output drive.

Set Target AGC to desired System Forward Power

Remote Control: To raise or lower the TX system forward power from the Controller Web Interface, please adjust the target AGC power setting and press the SET button to the right (network to the Controller module via rear panel RJ-45 LAN connection, default IP address 192.168.1.210). Please note, as an alternative, you could disable the Controller AGC (AGC-Status = Off) and raise/lower the Exciter output drive.



Set Target AGC to desired System Forward Power

4.3 RUNNING CORRECTIONS

Local Control:

This section guides you through the process of running Linear and Nonlinear Precorrection (You may also reference the Exciter User Manual for additional details and instructions on running corrections). If you are operating at reduced power you may wish to rerun corrections to achieve better RF performance.

Normal operation for the MHPTV TX is to run with the Transmitter AGC enabled to compensate for slight variations in output power due to changes in temperature, AC mains, etc. It is not recommended to run corrections with AGC enabled, as the correction process can at times produce slight changes in output power.

1. Please navigate to the Controller AGC screen (by pressing the CONFIG button and then AGC button) and disable AGC by pressing the Green button (as shown below), so that the button then becomes transparent (blue). This indicates that AGC is OFF.

Press AGC button to turn AGC OFF (button becomes transparent = blue)

2. Adjust the Exciter POWER setting under the RF submenu to achieve the desired Forward System Power (1000W for example) as monitored on the Controller Home screen.

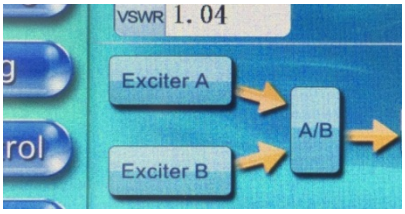
3. Before running corrections, it is important to verify proper feedback signal levels. There are two feedback signal samples used to compute corrections. “RF IN A” (After BPF) is used to calculate Linear correction coefficients while “RF IN B” (Before BPF) is used to compute the Non-Linear correction coefficients.

4. Navigate to the Exciter “DPD” submenu in the Advanced User menu (simultaneously press Left and Right buttons, then simultaneously press Up and Down buttons). Be sure the value of the Feedback Sample Signal Input (FSSI) for both A (after) and B (before) reads somewhere between 35% and 75% - which roughly corresponds to a value of -15 to -5 dBm as measured on a power meter (note: the FSSI indicator toggles between A and B and will “flash” when the signal level is out of range, too high or too low). Optimal FSSI level is typical ~ 50%. Add or remove the appropriate attenuator padding to achieve feedback signal levels in the desired range.

5. Check and set the value of PDT (correct time) (set to 5) and CFR (Crest Factor Reduction) (set to F) in the DPD Advanced Menu (above) (Note: CFR=F means NO CFR, CFR=0, means maximum CFR)

6. Navigate to the Exciter “SYSTEM” submenu and select UPDATE under ADPC then press the OK button to run corrections. The exciter will then proceed through 4 stages of correction, automatically computing Linear and Non-Linear corrections, and saving the coefficients into non-volatile memory upon completion. The correction process typically takes from 8-10 minutes to complete while real-time performance metrics of SNR and Shoulder performance are displayed on the Exciter LCD.

7. Check the SNR and Shoulder (LIMD and UIMD) RF performance on the front panel screen of the exciter or by pressing the Exciter Icon on the Controller HOME screen. (Change the value of CFR or rerun correction if necessary, to obtain optimal performance).



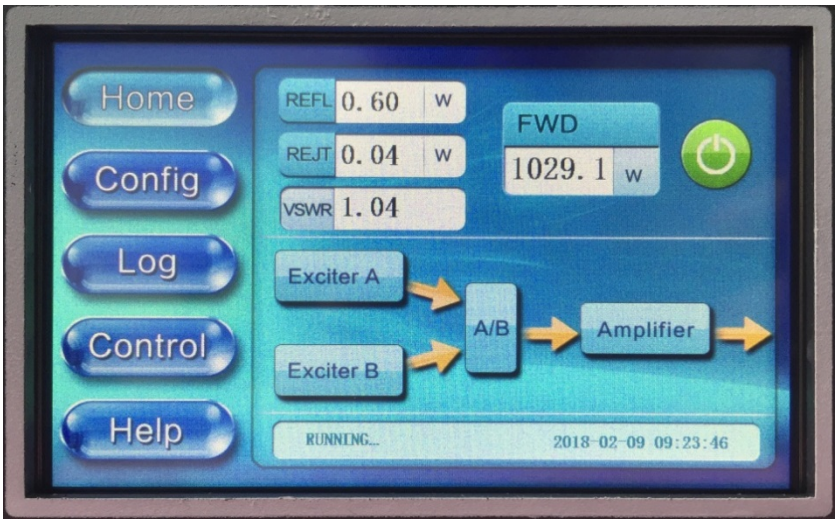
8. With your TX operating at your desired output power and with good RF performance, the next step is to set up and re-engage the TX AGC. To accomplish this, be sure the TX system forward power is at, or just slightly higher than, the desired system TPO.

9. Navigate to the AGC screen on the Controller (by pressing the CONFIG button and then the AGC button). Be sure the AGC Target FWD power is set to desired TPO and then press the unlit AGC button to engage the TX AGC and turn this button Green.

Set Target AGC Power to desired TPO

Press AGC button to turn AGC ON (will illuminate Green)

10. Press the HOME button to return to the HOME screen to monitor FWD power. With the AGC engaged, the FWD power metering may vary up to +/- 5%, so for a 1000W TPO, meter variations from 950W to 1050W may be experienced.



11. On the Exciter, navigate to the CAL setting under the AD3 Advanced submenu and select CAL then press OK to calibrate the FWD PWR meter on the Exciter front panel to ~ 100%.

Please note that the Exciter FWD PWR meter reading is based on the RF_IN_A BNC feedback sample on the rear panel of the Exciter and is only available when this sample is connected and in the proper signal level range (35% < FSSI A < 75%).

12. You have completed running Linear and Non-Linear corrections on your TX.

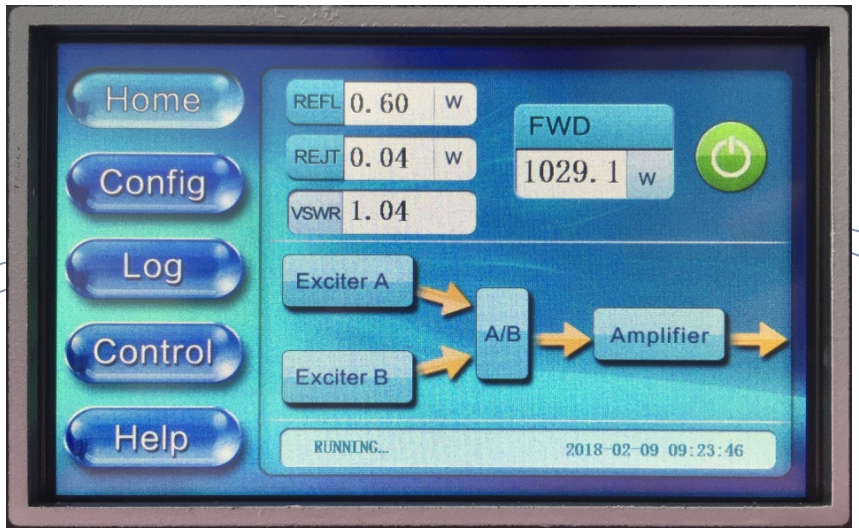
4.4 CALIBRATE EXCITER FWD POWER METER

On the Exciter, navigate to the CAL setting under the AD3 Advanced submenu and select CAL then press OK to calibrate the FWD PWR meter on the Exciter front panel to ~ 100%.

Please note that the Exciter FWD PWR meter reading is based on the RF_IN_A BNC feedback sample on the rear panel of the Exciter and is only available when this sample is connected and in the proper signal level range (35% < FSSI A < 75%).

4.5 CALIBRATE TX SYSTEM POWER METERS

Local Control: There are three TX system power meters located on the Controller HOME screen, Forward (FWD), Reflected (REFL), and Reject Load (REJT). These power meters were calibrated at the factory to provide accurate power readings when testing the TX at its full rated output power. These meters may be recalibrated if desired via the Controller calibration screens as outlined below.



System Reflected and Reject Load power meters

System FWD power meter

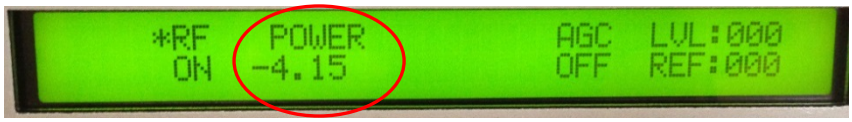
You will require a power meter to independently measure power at the Controller input samples in order to properly calibrate the built-in system FWD, REFL, and REJT power meters. Please reference the TX System Interconnect Diagrams in section 3 of this manual for connection details.

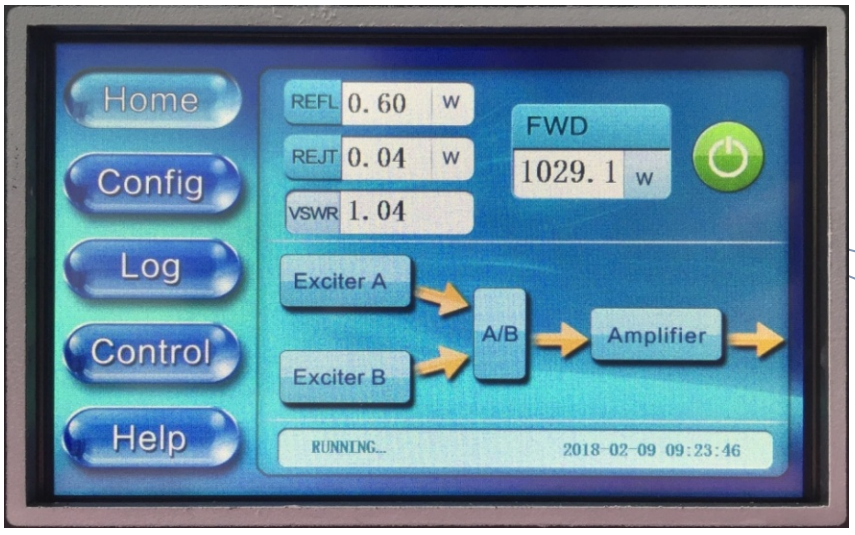
Normal operation for the MHPTV TX is to run with the Transmitter AGC enabled to compensate for slight variations in output power due to changes in temperature, AC mains, etc. It is not recommended to perform power meter calibration with AGC enabled.

1. Please navigate to the Controller AGC screen (by pressing the CONFIG button and then AGC button) and disable AGC by pressing the Green button (as shown below), so that the button then becomes transparent (blue). This indicates that AGC is OFF.

Press AGC button to turn AGC OFF (button becomes transparent = blue)

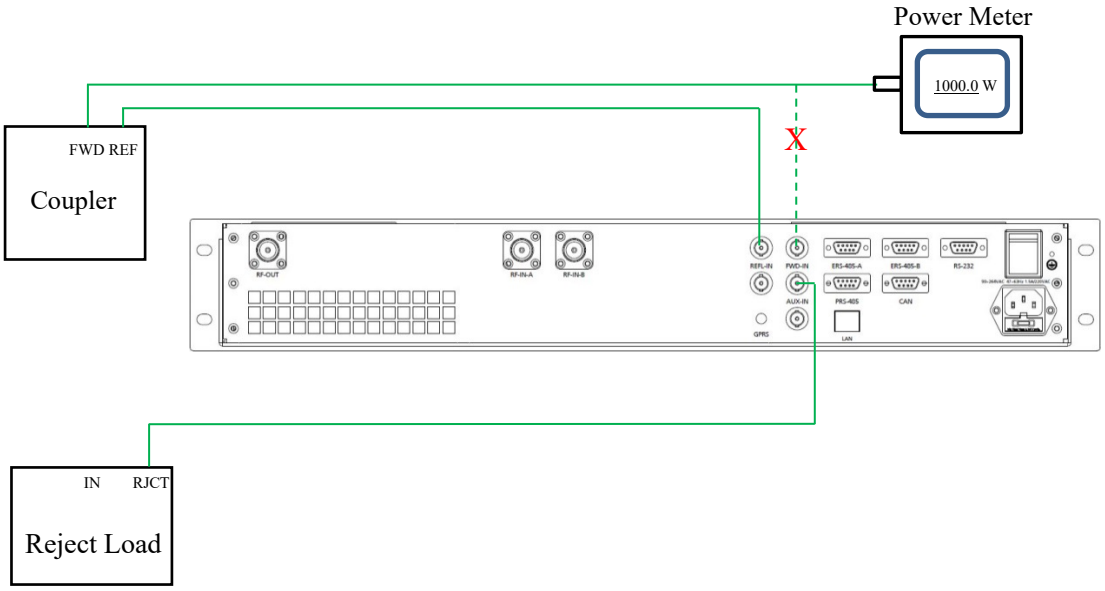
2. Adjust the Exciter POWER setting under the RF submenu to achieve the desired Forward System Power (1000W for example) as monitored on the Controller Home screen.





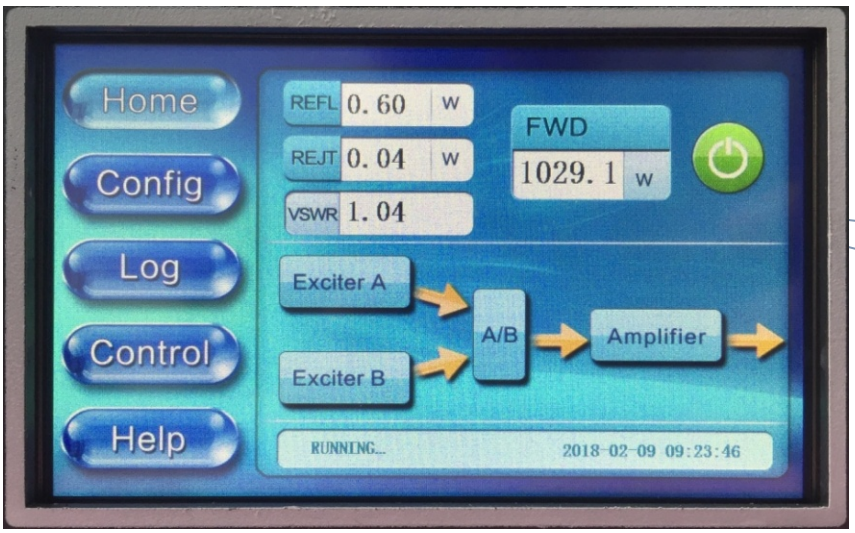
System FWD power meter

3. Disconnect the FWD IN sample from the rear panel of the Controller and connect this to your power meter. This sample comes from the TX output directional coupler and has a coupling value of 50dB (offset for your power meter). Measure and record the real Forward system power.

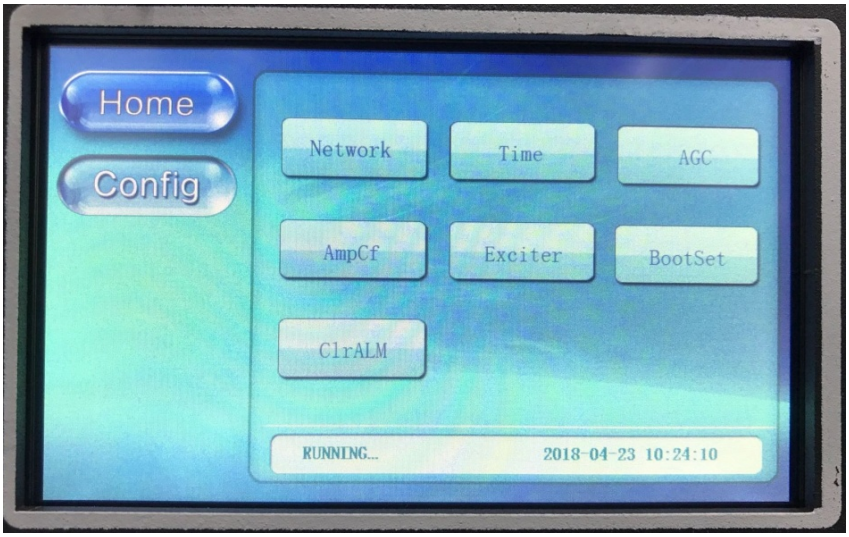


4. Disconnect the FWD sample from your power meter and reconnect it to the FWD IN port on the rear panel of the Controller.

5. Monitor the FWD power meter on the Controller HOME screen and notice if it reads higher or lower than your recorded power meter reading.



6. Navigate to the TX meter Calibration screen on the Controller by pressing the CONFIG button and then selecting AmpCF (Amplifier Configuration)



The AmpCF screen is used to configure advanced settings of the TX System and PAs and is locked with a password. When pressing the "AmpCf" button in the Config Menu, a pop-up window requiring a password will appear. Please enter the "AmpCf" password "27654" and then press "OK".

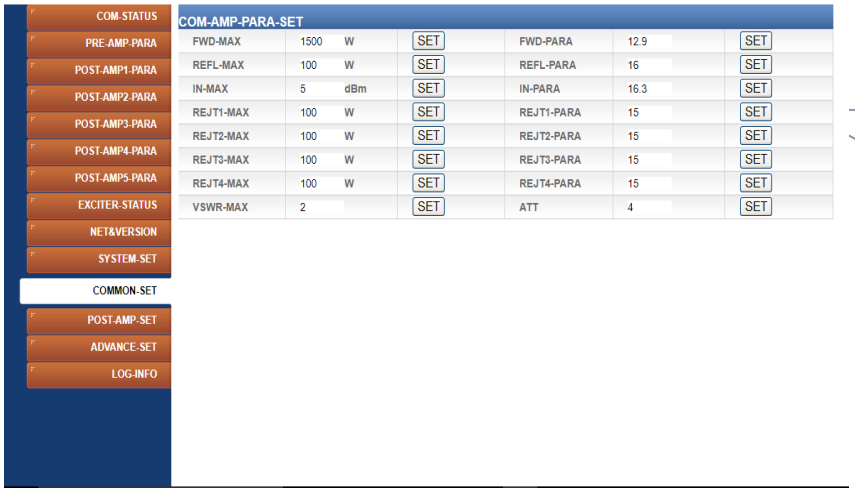
With the password properly entered, the AmpCf configuration screen will appear, as shown below. Press the ComCF button.

The ComCF screen is used to configure the TX maximum operating thresholds to engage safety and protective power reduction and shutdown mechanisms. Press the NextPage button to reach the FWD, REFL, and REJT power calibration screen below.

7. Press the word FwdPara to slightly adjust this value up or down (in small increments 0.1, 0.2, etc.) until the FWD power meter reading on the Controller HOME screen (also available via the Controller Web interface: RJ-45 LAN default IPaddress 192.168.1.210) agrees with the value of forward power you recorded from your power meter measurement.

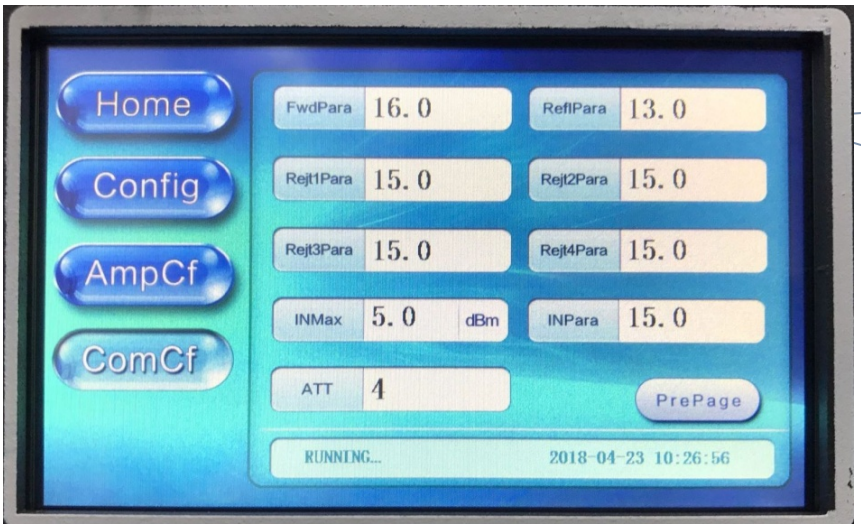
Calibration for FWD power meter (FwdPara)

8. Please note: the above FWD power meter calibration (and below Reflected and Reject meter readings) may alternatively be adjusted and calibrated via the Controller Web interface (192.168.1.210) Common-Set Tab instead of the Controller front panel touchscreen – as shown below.



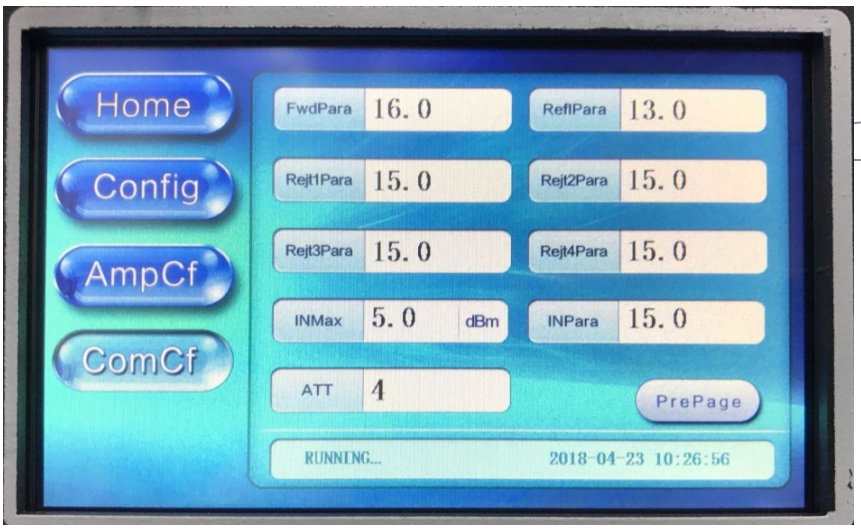
Calibration for FWD power meter (FWD-Para)

9. Repeat steps 3 through 7 above, this time removing, measuring, and returning the REFL IN sample to calibrate the Reflected system power meter by adjusting the value of RefPara below.



Calibration for REFL power meter

10. Repeat steps 3 through 7 above, this time removing, measuring, and returning the RJCT IN sample to calibrate the Reject Load system power meter by adjusting the value of Rejt1 below.



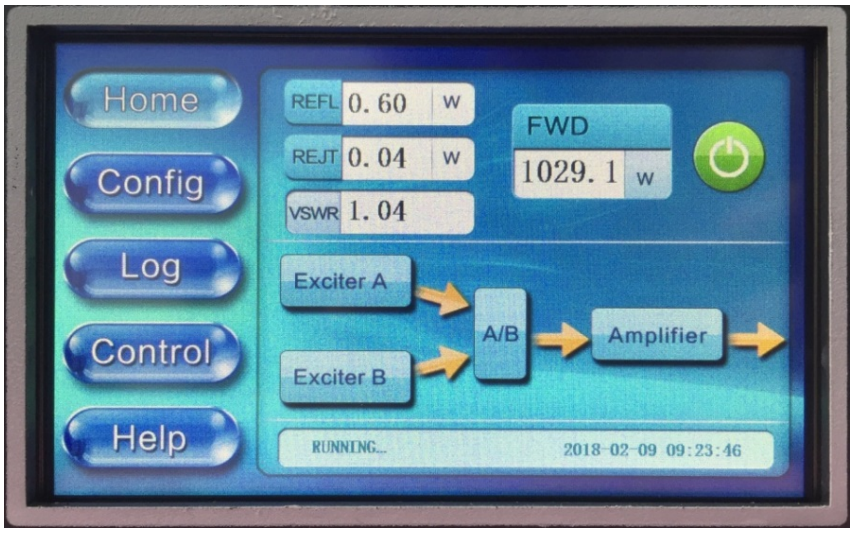
Calibration for RJCT power meter

11. With your TX operating at your desired output power and with accurately calibrated system power metering, the next step is to set up and re-engage the TX AGC. To accomplish this, slightly adjust (if necessary) the value of POWER in the Exciter RF submenu to desired TPO.

12. Navigate to the AGC screen on the Controller (by pressing the CONFIG button and then the AGC button). Be sure the AGC Target FWD power is set to desired

TPO level and then press the unlit AGC button to engage the TX AGC and turn this button Green.

13. Press the HOME button to return to the HOME screen to monitor FWD power With the AGC engaged, the FWD power metering may vary up to +/- 5%, so for a 1000W TX, meter variations from 950W to 1050W may be experienced.



4.6 OPTITUNE (Available in CTL-M)

Optitune is Anywave's unique feature, which can do self-calibrating, automatic, adaptive phase and gain matching of all PA modules. It automatically balances the entire system in gain and phase within 10 minutes to achieve maximum output power (minimizes combiner losses) and optimal operating efficiency (minimizes operating costs). Optitune is only available in the model of CTL-M controller.

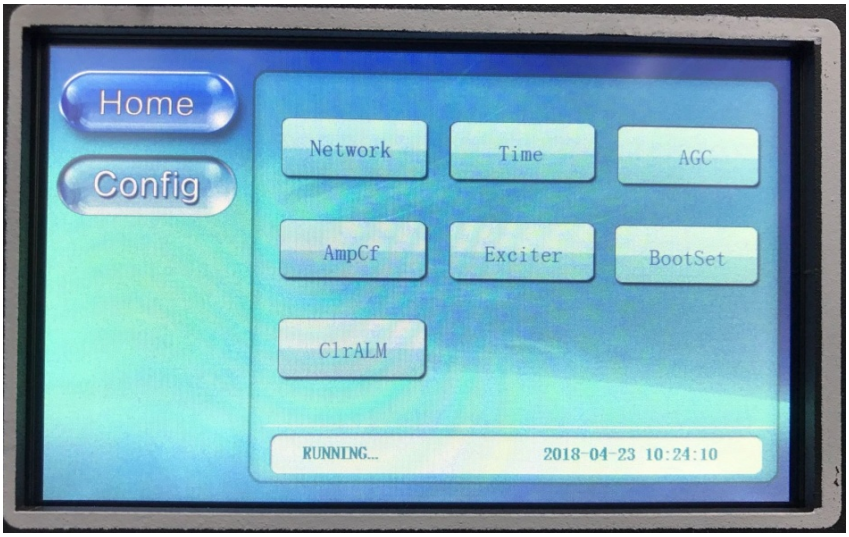
You can run Optitune locally via the touch screen or remotely from the web

interface.

Important: Never run Optitune in full power, otherwise it may cause damage to the transmitter and void the warranty. It is required only running Optitune with the guidance from the manufacturer.

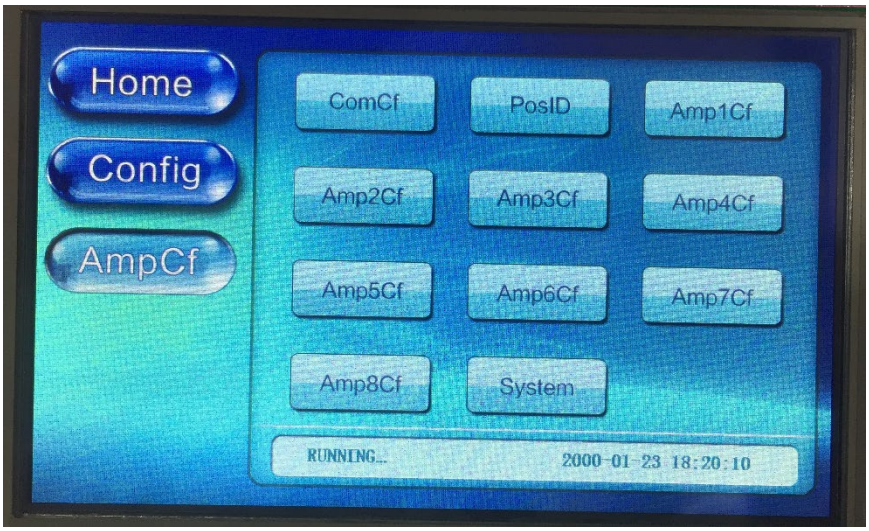
Local Control:

1. Make sure AGC is turned OFF, then lower the overall transmitter forward power level to 1kw.
2. Navigate to the System screen on the Controller by pressing the CONFIG button and then selecting AmpCF (Amplifier Configuration)



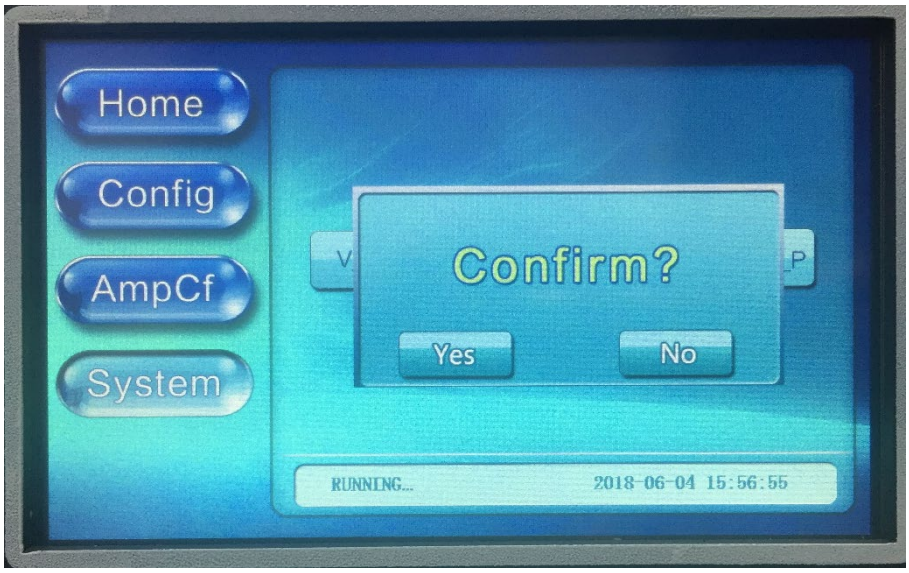
The AmpCF screen is used to configure advanced settings of the TX System and PAs and is locked with a password. When pressing the “AmpCf” button in the Config Menu, a pop-up window requiring a password will appear. Please enter the “AmpCf” password “27654” and then press “OK”.

3. With the password properly entered, the AmpCf configuration screen will appear, as shown below. Press the System button.



The System screen is used to run Optitune (AUTO_G_P) and One-Button Adjusting PSU output voltage (see section 4.7).

4. Press the word AUTO_G_P to run automatic, adaptive phase/gain matching between all PA modules in the system. A window pops up asking the user to confirm. Press Yes to start Optitune. It takes about 3 minutes to complete.



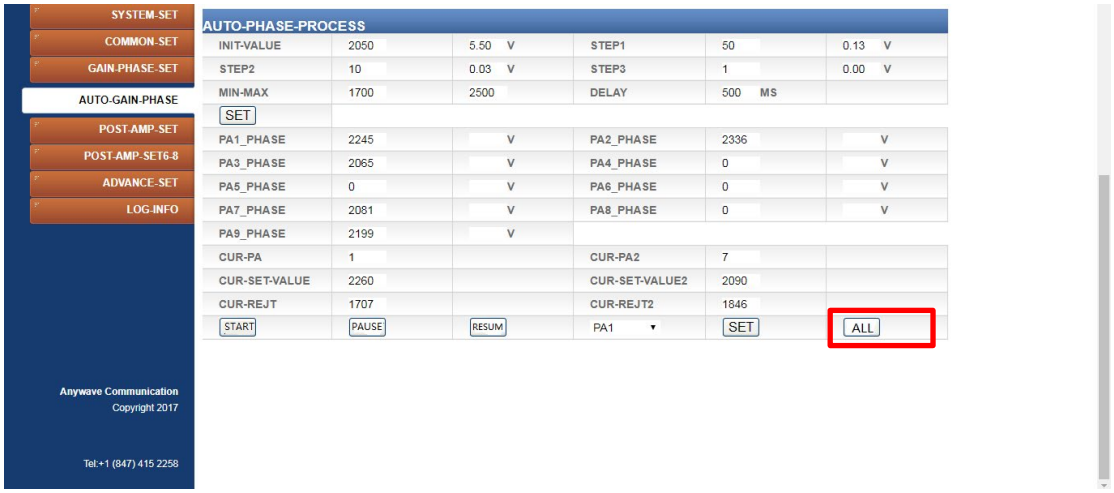
5. After Optitune is done, check all rejected power to see if they are within the desired range. If not, you can rerun Optitune again for optimization.
6. Raise the transmitter power level back to your desired level.

Remote Control:

The procedure of running Optitune via remote control is similar to the local control.

1. Make sure AGC is turned OFF, then lower the overall transmitter forward power level to 1kw.
2. Log in the Controller Web Interface.

3. Click to AUTO-GAIN-PHASE section on the left. Then on the right lower corner, click ALL to run.
4. After Optitune is done, check all rejected power to see if they are within the desired range. If not, you can rerun Optitune again for optimization.
5. Raise the transmitter power level back to your desired level.



Note: On the web interface it shows more readings/settings in the AUTO-GAIN-PHASE section. They are for manufacturer used. Please leave them untouched, or it may affect the Optitune performance.

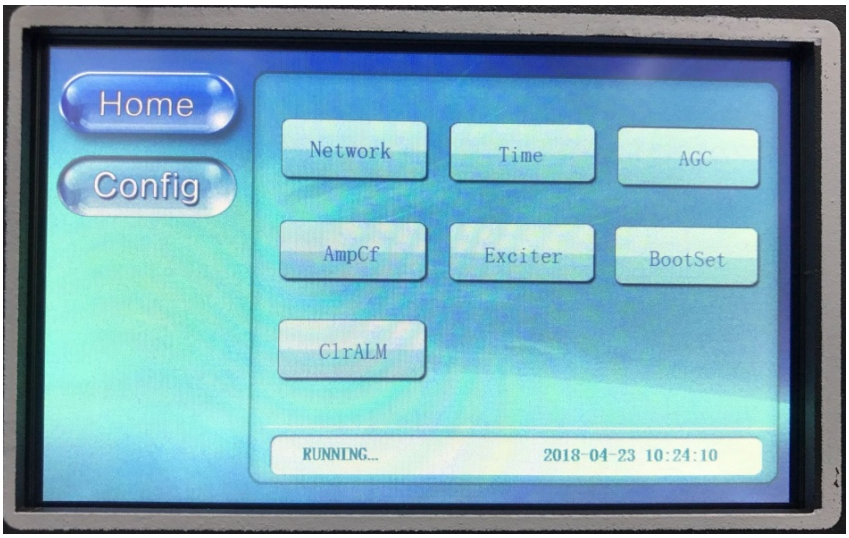
4.7 VOLTAGE ADJUSTMENTS (Available in CTL-M)

When the transmitter is not running at its rated power, it may have headroom in power level. So that reducing the output DC voltage of PSUs will help improve the system efficiency. Optitune is only available in the model of CTL-M controller.

We provide a One-Button feature reducing all PSUs voltage to 46V for those users who need it. Also, a One-Button feature bringing PSUs voltage back to the regular 50V.

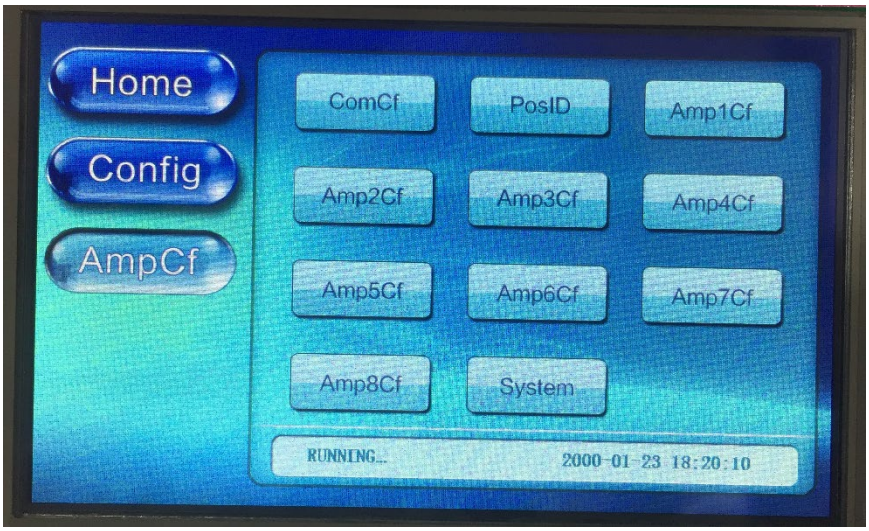
Local Control:

1. Navigate to the System screen on the Controller by pressing the CONFIG button and then selecting AmpCF (Amplifier Configuration)



The AmpCF screen is used to configure advanced settings of the TX System and PAs and is locked with a password. When pressing the “AmpCf” button in the Config Menu, a pop-up window requiring a password will appear. Please enter the “AmpCf” password “27654” and then press “OK”.

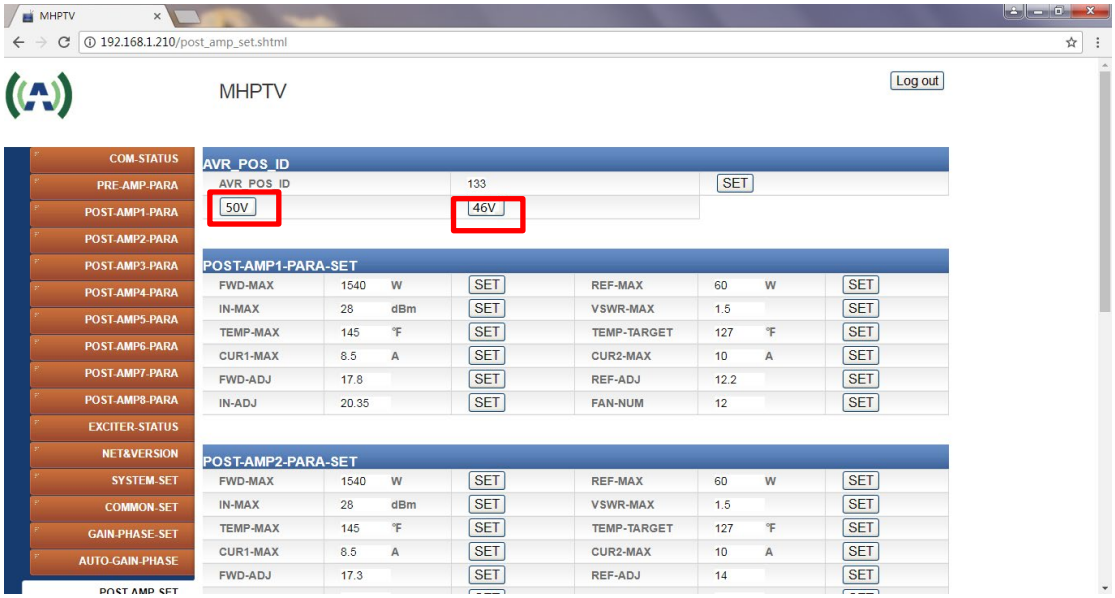
2. With the password properly entered, the AmpCf configuration screen will appear, as shown below. Press the System button.



3. The System screen is used to run Optitune (AUTO_G_P, see section 4.6) and One-Button Reducing/Resuming PSUs output voltage.
4. Press the V_Down button to One-Button reducing all PSUs' output DC voltage to 46VDC. If the transmitter is running at reducing power, reducing PSU output voltage will help improving system efficiency while performance still guaranteed.
5. Likewise, press the V_Resume button to One-Button bringing all PSUs' output DC voltage back to the regular 50VDC.

Remote Control:

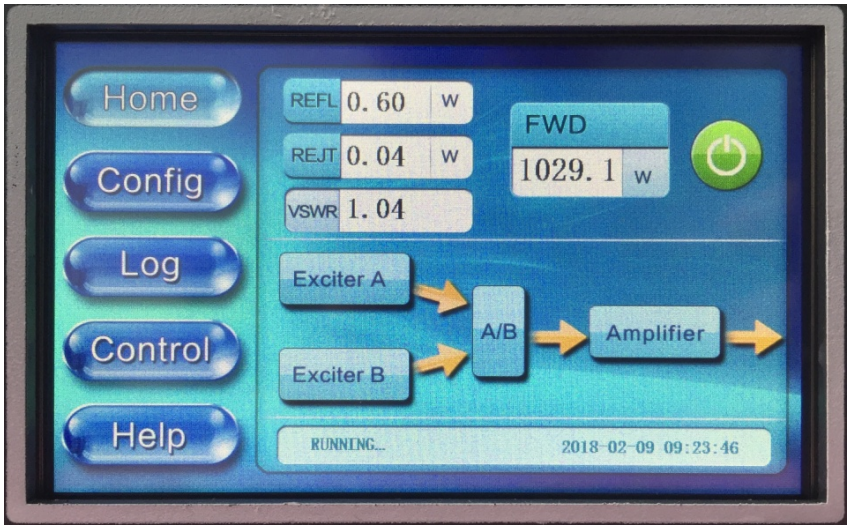
1. Log in the Controller Web Interface.
2. Click to POST-AMP-SET section on the left.
3. Near the top, there are two buttons, one is “50V”, which is the One-Button bringing all PSUs’ output DC voltage back to the regular 50VDC. The other is “46V”, which is the One-Button reducing all PSUs’ output DC voltage to 46VDC.



5. Local (Touch Screen) User Interface

5.1 HOME SCREEN

Turn on the power supply and the TX enters the initialization process, and after 5 seconds, the TX enters the home screen (as shown below).



The home screen is divided into 4 parts: Title Bar (left column), Power Metering (upper right), Block Diagram (middle right) and Status Bar (lower right), as shown below.

- **Title Bar**: Shown in the picture above, the "Home" button is highlighted, indicating the Home screen is now displayed. This TX Control Unit screen is a touch screen. You may navigate to the other screens (Config, Log, Control, Help) by simply touching the corresponding button in the Title Bar.

- **Power Metering**
  - ON/OFF (Green) Button: Provides TX ON/OFF control. When GREEN (as shown above), this indicates the TX is ON. When RED, this indicates the TX is OFF.
    Note: When there is an alarm, this button is always RED.
  - FWD: Forward Power Meter. Touching the white display box of FWD will toggle its display units between "dBm" and "W".
  - REFL: Reflected Power Meter. REJT" in the "Home" screen shows the value of rejected power. Press the white box beside the "REJT" button, to enter a screen showing all rejected power values. 1-PA TX has no reject load. 2-PA TX has 1 reject load. 3-PA system has 2 reject loads. 4-PA TX has 3 reject loads. 5-PA TX has 4 reject loads. If there is more than one "REJT" value, the

"REJT" value in the HOME screen will show the highest one (the one which is the closest to the preset threshold).

- VSWR: Voltage Standing Wave Ratio
- REJT: This is the system Reject Load Power Meter, derived from the REJT Load feedback sample. Displayed in units of "W" and cannot be changed.

- **Status Bar**: During normal operation, the default status is "RUNNING OK". If there is an alarm, the alarm will show up in the Status Bar of each screen.

- **Block Diagram**: Press the "Exc A/B" graphic to navigate to the Dual Exciters Switching screen (shown below). This screen shows which exciter is currently on-air (highlighted GREEN) and allows the user to manually change the on-air exciter.

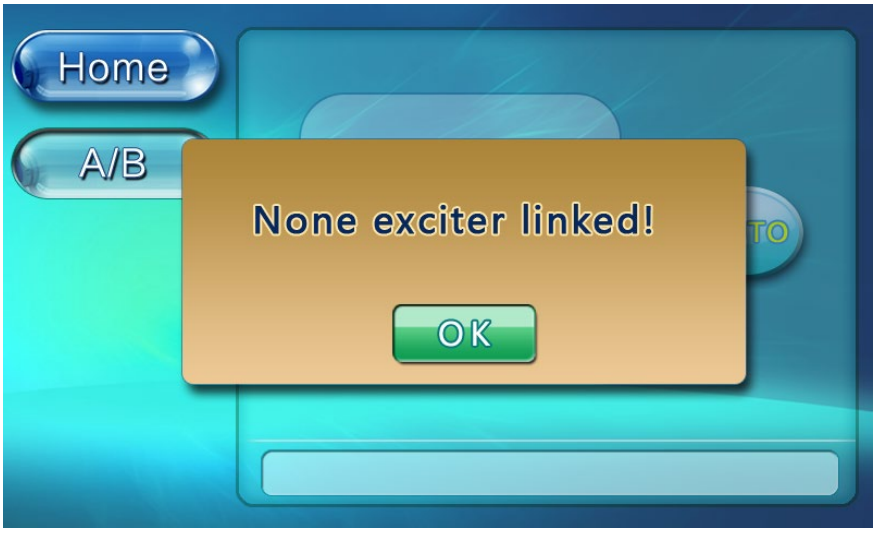
5.2 A/B EXCITER ICON SCREEN

Dual Exciters - Switching Screen: As mentioned above, pressing the "Exc A/B" icon will bring you to the Dual Exciters Switching Screen, a shown below.

Manual Exciter Switchover: Exciter A is the default on-air exciter. The on-air exciter's status will be "GREEN", as shown in the screen above, indicating that Exciter B is the current on-air exciter. Pressing the "Exciter A" or "Exciter B" button on this screen will cause a manual switch between exciters, that is if the Controller is "linked" to both exciters. (Note: In a dual exciter configuration, both exciters are on at the same time, producing an RF output signal the same time, and the Controller is considered "linked" with an exciter when the Controller detects an RF output present from the exciter as monitored inside the controller).

- Auto Exciter Switchover: In a Dual Drive configuration, the TX is set to automatically switch to the standby exciter in the event a problem occurs with the on-air exciter. The TX will not automatically switch back to the original Exciter as long as the standby Exciter is operating properly. However, the TX will automatically switch back to the original Exciter in the event of a problem with the on-air (standby) exciter. So the TX will continue to automatically switch to the standby exciter in the event of a problem with the on-air exciter.

If neither of the exciters can be linked successfully (i.e. the Controller does not detect a valid RF output present from either exciter), a window will pop up, indicating "No Exciter Linked", as shown below.



- If the manual switching is successful, a window will pop up indicating "Change succeed!", as shown below.

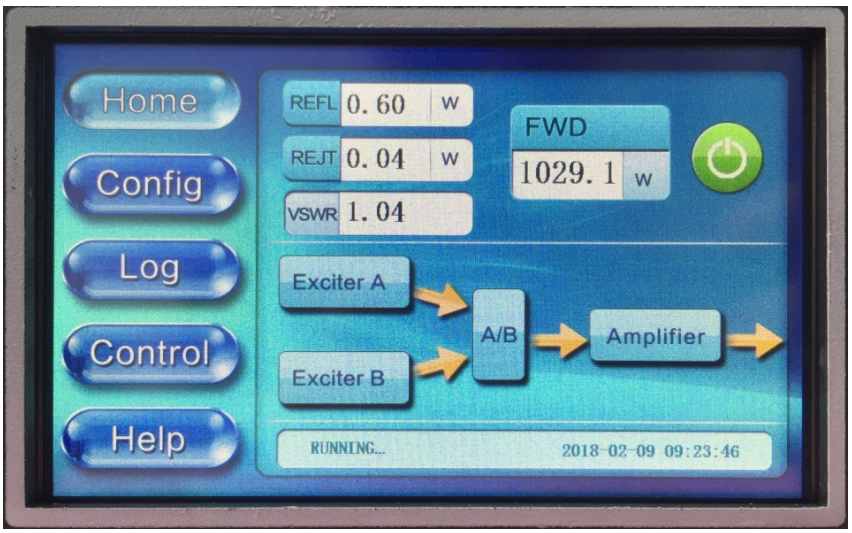
- If the manual switching is not successful, a window will pop up indicating "Change failed!", as shown below.

Please note that the Exciter(s) communicates via an RS-485 bus to the Transmitter Control module. In a single drive TX, the Exciter will be configured with an RS-485 address ID of 80H (as found under the Exciter CONFIG submenu) corresponding with Exciter A. In a dual-drive TX, Exciter B will be configured with an RS-485 ID of 81H.

Pressing the Exciter A or Exciter B button will bring up a window displaying the Exciter Channel Frequency and well as the TX System SNR and Upper and Lower Shoulder metrics. Please note: only the on-air exciter has valid readings.

5.3 AMPLIFIER ICON SCREEN

Amplifier Status Screens: As mentioned above, pressing the "Amplifier" icon on the Home page, will navigate to the Amplifier Status Screens.



- Title Bar: includes "PreAmp", "Amp1", "Amp2", ("Amp3 and more buttons are for higher power transmitters in the MHPTV product line).

- PreAmp Status Screen

  - IN: Input Power reading of the current preamp
  - Cur1~Cur6: Currents of the current preamp

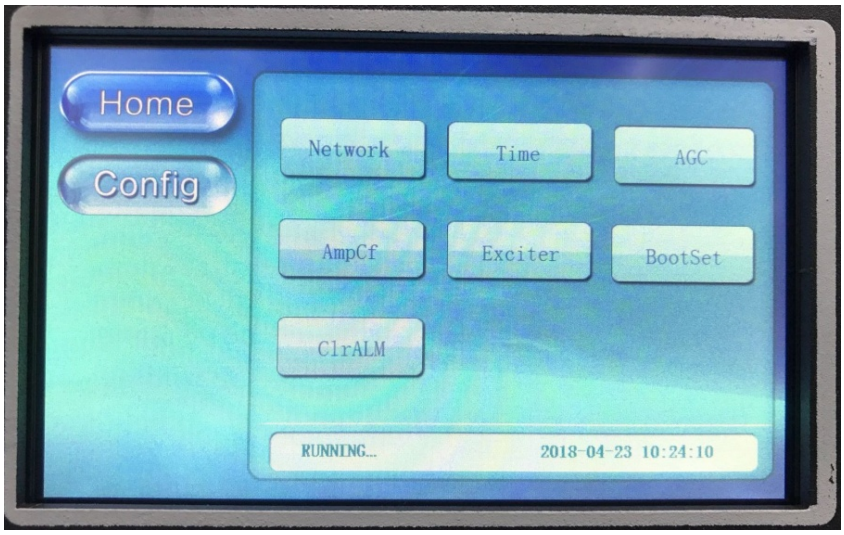
- Amp1 Status Screen

- Fwd: Forward Power reading of the current amplifier
- Refl: Reflected Power reading of the current amplifier
- IN: Input Power reading of the current amplifier
- VSWR: Voltage Standing Wave Ratio
- Temp: Temperature of the current amplifier
- V50: Reading of 50 V power supply of the current amplifier
- Fan1~Fan12: Fans' RPM of the current amplifier
- Cur1~Cur9: Currents of the current amplifier

Please note that the PAs communicate via an RS-485 bus to the Transmitter Control module. In a 2-PA TX, PA1 is configured with an RS-485 address ID of 130 and PA2 is set to 131 (in higher power TXs, PA3 is set to 132, PA4 to 133, PA5 to 134, PA6 is set to 135, PA7 to 136, PA8 to 137).

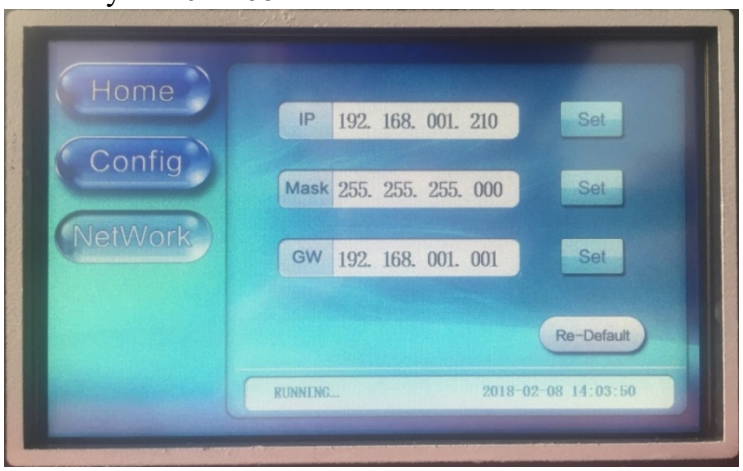
5.4 CONFIG SCREEN

Touching the Config button on the Title Bar of the Home Screen will navigate to the Config Screen, as shown below. The Config Screen has seven functional sections on the right. Press any of these buttons to navigate to that config screen. The Network screen is used to configure all the TX networking parameters including IP, Mask, and Gateway. The Time screen is used to set the current time. The AGC screen is used to turn the Controller AGC On/Off and to change the target AGC output power level. The AmpCf screen is for configuring the PA settings, including FWD and REFL fault threshold settings, and power meter calibrations. The Exciter screen provides Dual or Single Drive Exciter selection. The BootSet screen establishes how many times the TX attempts to reboot itself on power loss or fault conditions. The ClrALM screen allows the user to clear any previous alarms. Please Note: Modifying factory default configurations of certain parameters may lead to potential damage of the transmitter.



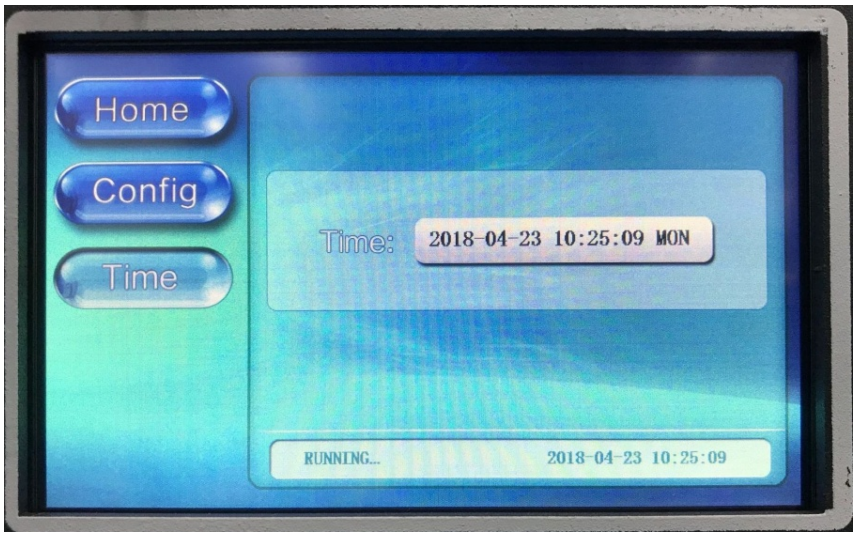
Network Screen: The User can check and set all the Controller network information in this screen.

- Re-Defualt: Reset Default settings - This button is used to set all the network settings to the default values, as show below:
  IP: 192.168.1.210
  MASK: 255.255.255.0
  GateWay: 192.168.1.1



- Set: There is a Set button for each bar on this screen. Pressing the Set button will lead to the corresponding configuration screen of IP or Mask or GateWay accordingly. Using the IP setting as an example, Press any part of the white bar on the IP Setting Screen and the keyboard (shown below) will be enabled, turning from grey to yellow. The user can only set 3-digits of one bar at a time. When the configuration is finished, press OK to confirm. If the keyboard is enabled by mistake, press Cancel to exit the setting mode. Don't press Ok without entering a valid number, otherwise, the system will fill it with all zeros instead.

Time Screen: This screen is used to check and adjust the current time settings. It's similar to the Network Settings.



AGC Screen: This screen is used to set the AGC Reference output power of the TX and to turn the Controller AGC ON/OFF. Press the AGC button to turn AGC ON (button will turn green).

AmpCf Screen: This screen is used to configure advanced settings of the TX PAs. The AmpCf screen is locked with a password. When pressing the "AmpCf" button in the Config Menu, a pop-up window requiring a password will appear. The password for "AmpCf" access is "27654".

With the password properly entered, the AmpCf configuration screen will appear, as shown below.

ComCf Screen: This screen is used to configure the TX maximum operating thresholds to engage safety and protective power reduction and shutdown mechanisms.

- FwdMax: Max TX Forward Power fault threshold
- ReflMax: Max TX Reverse Power fault threshold
- Rejt1-7Max: Max TX Reject Load fault threshold
- VSWRMax: Max TX VSWR fault threshold

(Note: Press the word FwdMax, ReflMax, etc. to see a pop-up screen to modify these settings. Warning – changing these settings may cause improper TX operation, damage, and shutdown of the Transmitter System).

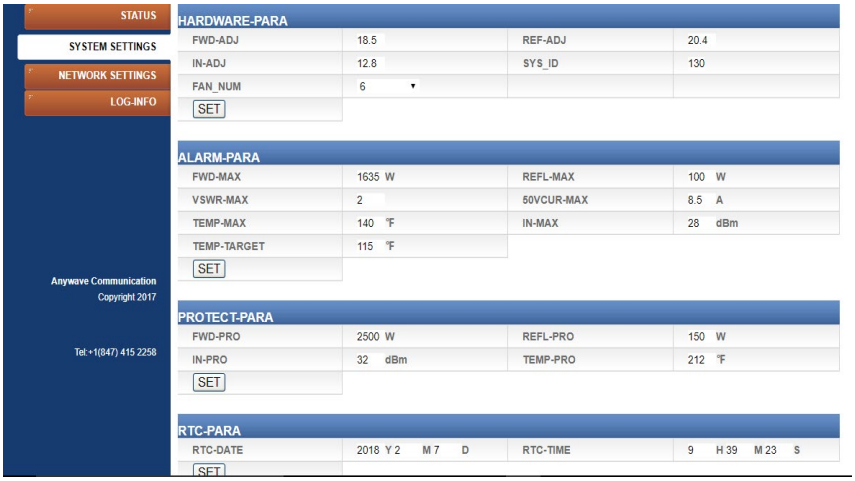
- FwdPara: Adjust to calibrate the main screen FWD Power Metering
- ReflPara: Adjust to calibrate the main screen Refl Power Metering

- Rejt1-7Para: Adjust to calibrate the Rejt 1-7 Power Metering

(Note: Press the word FwdMax, ReflMax, etc. to see a pop-up screen to modify these settings. Warning – changing these settings may cause improper TX operation, damage, and shutdown of the Transmitter System).

PosID Screen: This screen is used to configure and/or test the RS-485 communications between the Control module and each of the PA modules. **With the TX Turned OFF** and with a single PA connected (PA AC mains switched on and 485 serial connection established between the PA and Controller), PosID can be used to verify proper communications between each PA and the Control Module. With only PA#1 physically connected to the Control Module, pressing the Query button should return a value of 130. With only PA#2 physically connected, pressing the Query button should return a value of 131.

PosID Screen: Note: The PosID of each PA can be accessed and modified via the PA built-in LAN interface (192.168.1.200). Networking directly to the PA and pressing the System Set tab will bring up the following information. Here you can view and change the SYS_ID for the PA (Note: SYS_ID for PA1=130, PA2=131, PA3=132, PA4=133, PA5=134, PA6=135, PA7=136, PA8=137).



AmpxCf Screens: These screens are used to configure the Maximum PA operating thresholds to engage safety and protective power reduction and shutdown mechanisms.

Exciter Screen: This screen is used to configure the TX for single or dual exciters.

Bootset Screen: This screen is used to configure the number of attempts that the TX takes to successfully reboot on a shutdown condition, after which it gives up and remains off-air.

ClrALM: This is the Clear Alarm screen which is used to clear all alarms.

In LOCAL MODE, press the ClrALM button and a window pops out as below. Press Yes to clear all the alarms and restore the rated power. Alarms will not clear if they are currently active.

System:

The System screen is used to run Optitune (AUTO_G_P) and One-Button Adjusting PSU output voltage.

In LOCAL MODE, press the V_Down button to One-Button reducing all PSUs' output DC voltage to 46VDC. If the transmitter is running at reducing power, reducing PSU output voltage will help improving system efficiency while performance still guaranteed.

Likewise, press the V_Resume button to One-Button bringing all PSUs' output DC voltage back to the regular 50VDC.

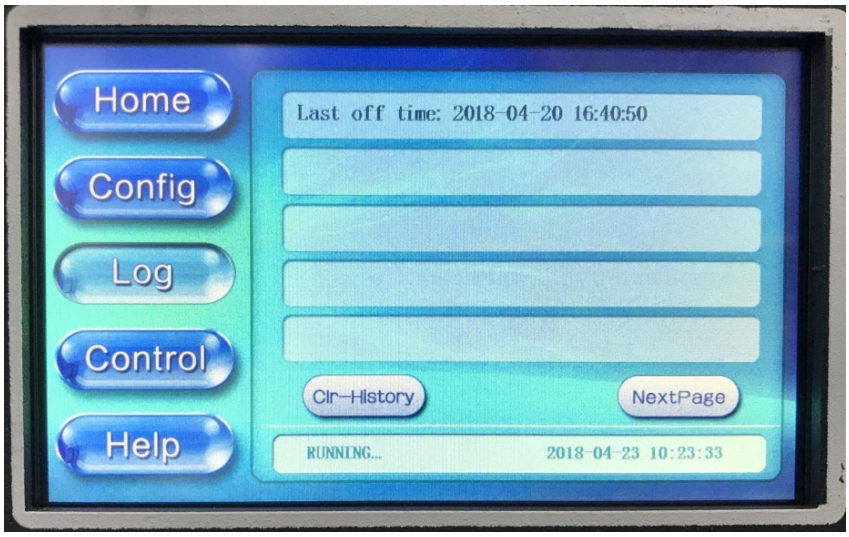
Press AUTO_G_P to run automatic, adaptive phase/gain matching between all PA modules in the system. It takes about 3 minutes to complete.


Home
Config
AmpCf
System
V_Down
V_Resume
AUTO_G_P
RUNNING...
2018-06-04 15:56:46

5.5 LOG SCREEN

Pressing the Log button on Title Bar in the Home Screen will navigate to the Log Screen, as shown below. There are two pages of current alarm information as well as history alarms. Each page can show up to 5 alarm messages. The user can use the NextPage/PrePage button to switch between pages.

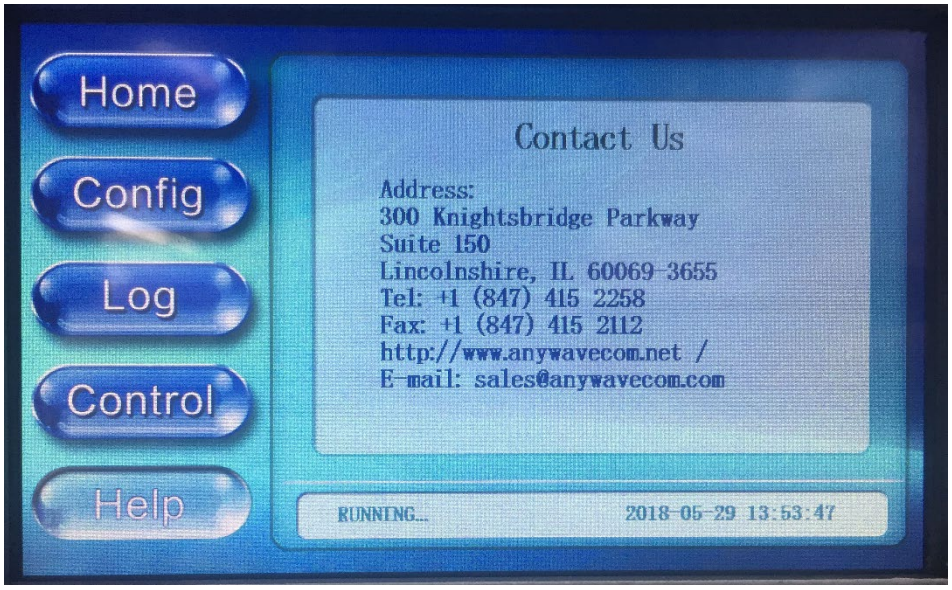
Please note: The Del-History button is used only to clear the status history of alarms. It will not clear any current active alarms which may require user intervention.



5.6 CONTROL SCREEN

Pressing the Control button on Title Bar in the Home Screen will navigate to the Control Screen, as shown below. The Control screen allows the user to switch between Local and Remote Control of the TX. In Local, the TX processes commands from the front panel touchscreen and ignores commands via the Controller web interface. In Remote mode, the TX processes command from the Controller Remote Web interface. Note: Be sure to switch the TX into Remote mode before leaving the TX site if Remote control of the TX is desired.

5.7 HELP SCREEN



6. Web Interface

6.1 TX WEB INTERFACE

The TX Control module provides a built-in web interface (192.168.1.210) that enables remote monitoring and control of the TX. This Control Module interface may be used for a variety of things, including turning the TX On/Off, manually switching between exciters (in a DD configuration), monitoring the voltages and currents of the PAs, calibrating the system and PA power meters, etc. Each Pa also has its own built-in web interface (PA web interface: 192.168.1.200).

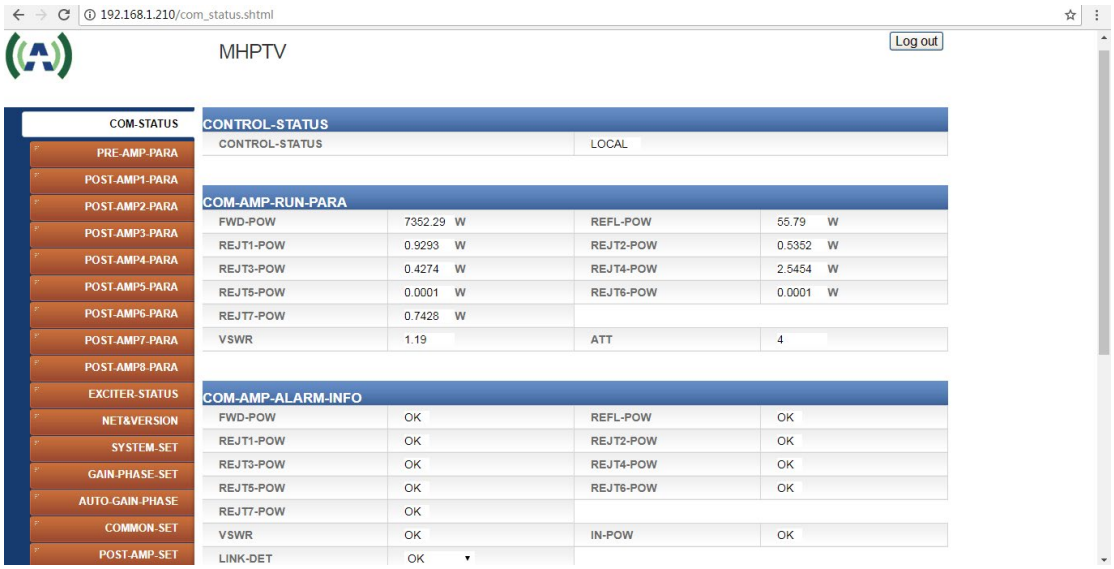
A built-in web interface also exists in the Exciter that may be used for such things as adjusting the TX output power, performing corrections, etc. (please reference the separate Exciter User Manual for a detailed description of the Exciter web interface). The Control Module communicates with the Exciter(s) and PAs inside the TX via an RS-485 bus network.

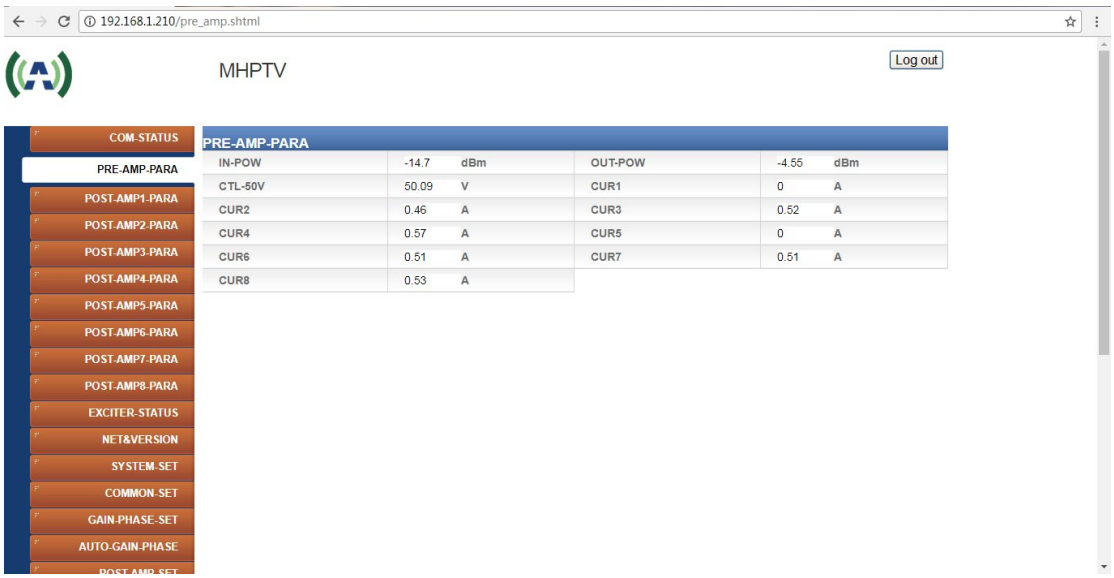
The Control Module built-in web interface is accessible via the rear panel LAN RJ-45 connection, once networked to your PC, the Controller web interface may be accessed via a web browser (such as Internet Explorer or Firefox, etc.) by entering the IP address of the Controller (default 192.168.1.210, note: you can navigate to the Network setting under the Config menu to view and change the Controller IP address).

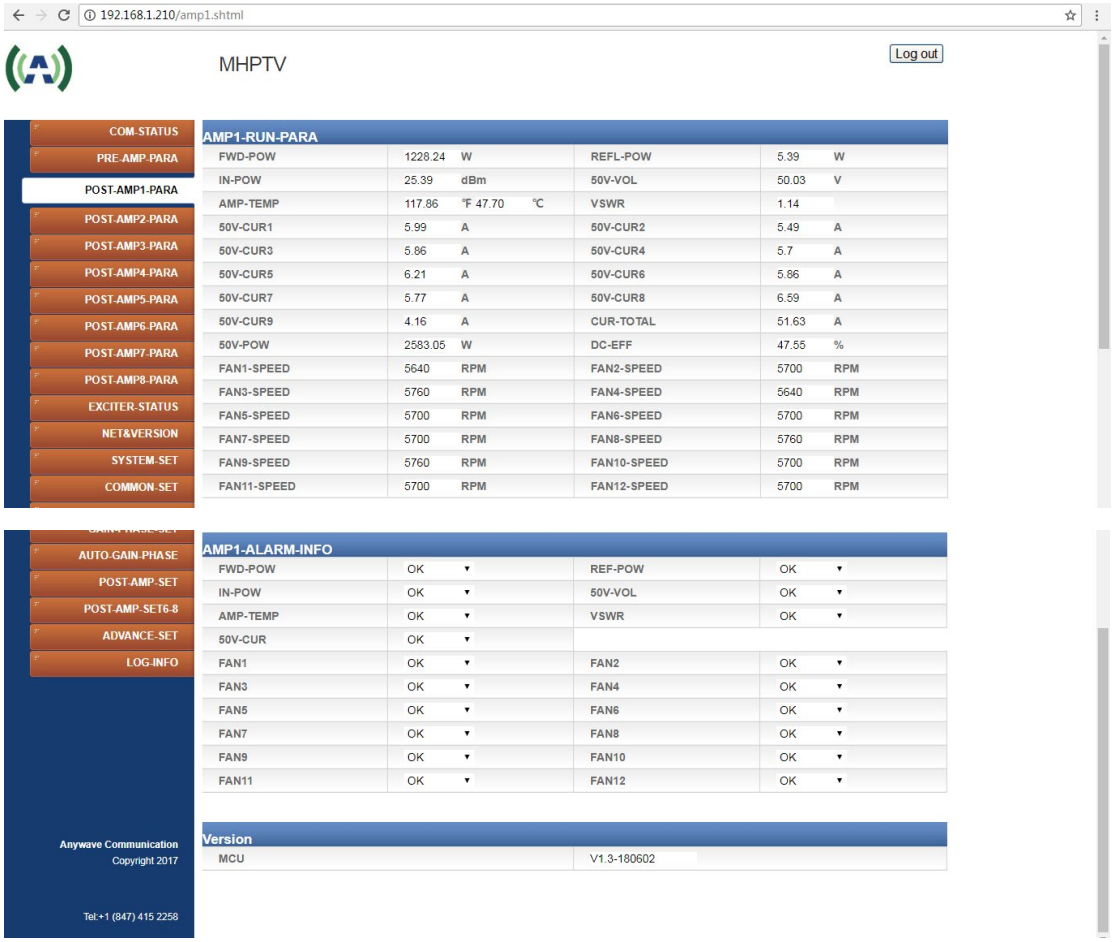
Launching a web browser and entering the Controller IP address (192.168.1.210) will bring up the following login window.

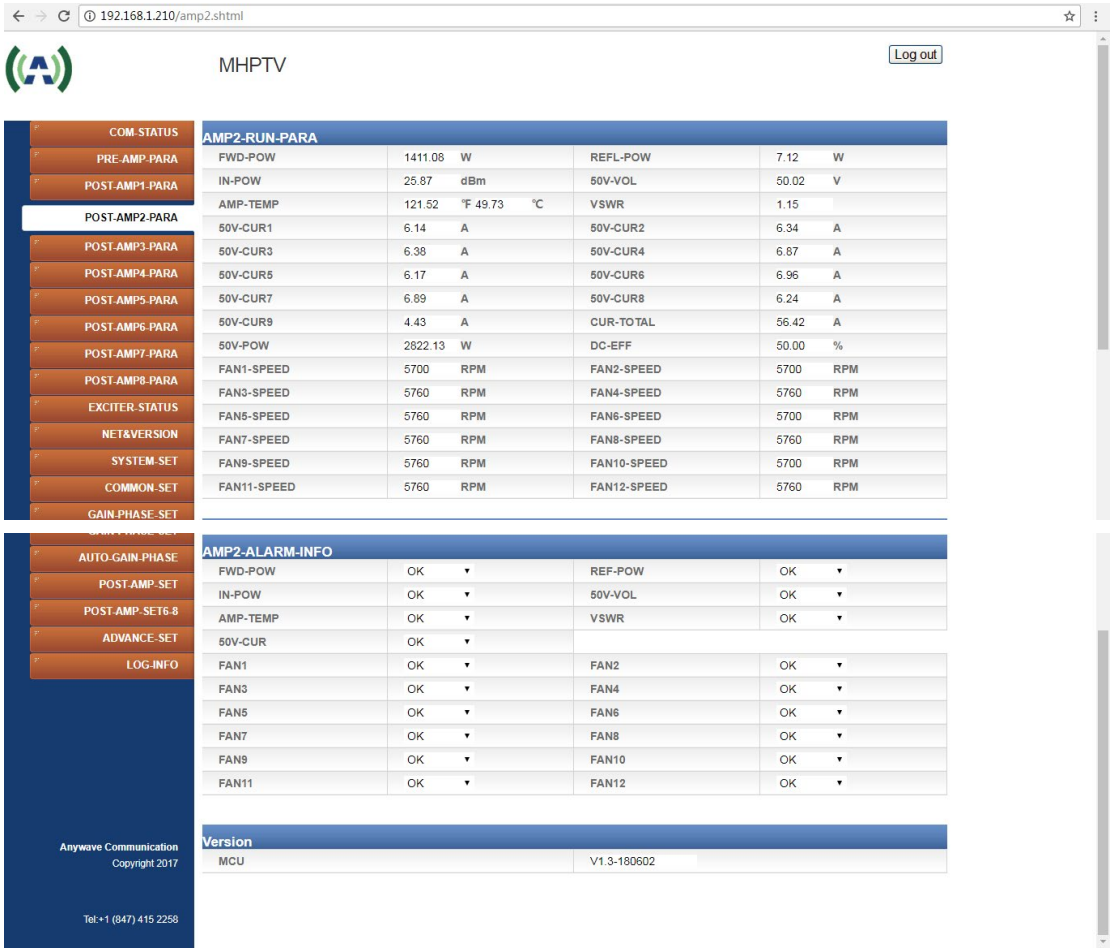
The “admin” tier provides full status and control of the Controller and is accessed with a username and password of "anywavecom" and "anywavecom" (case sensitive).

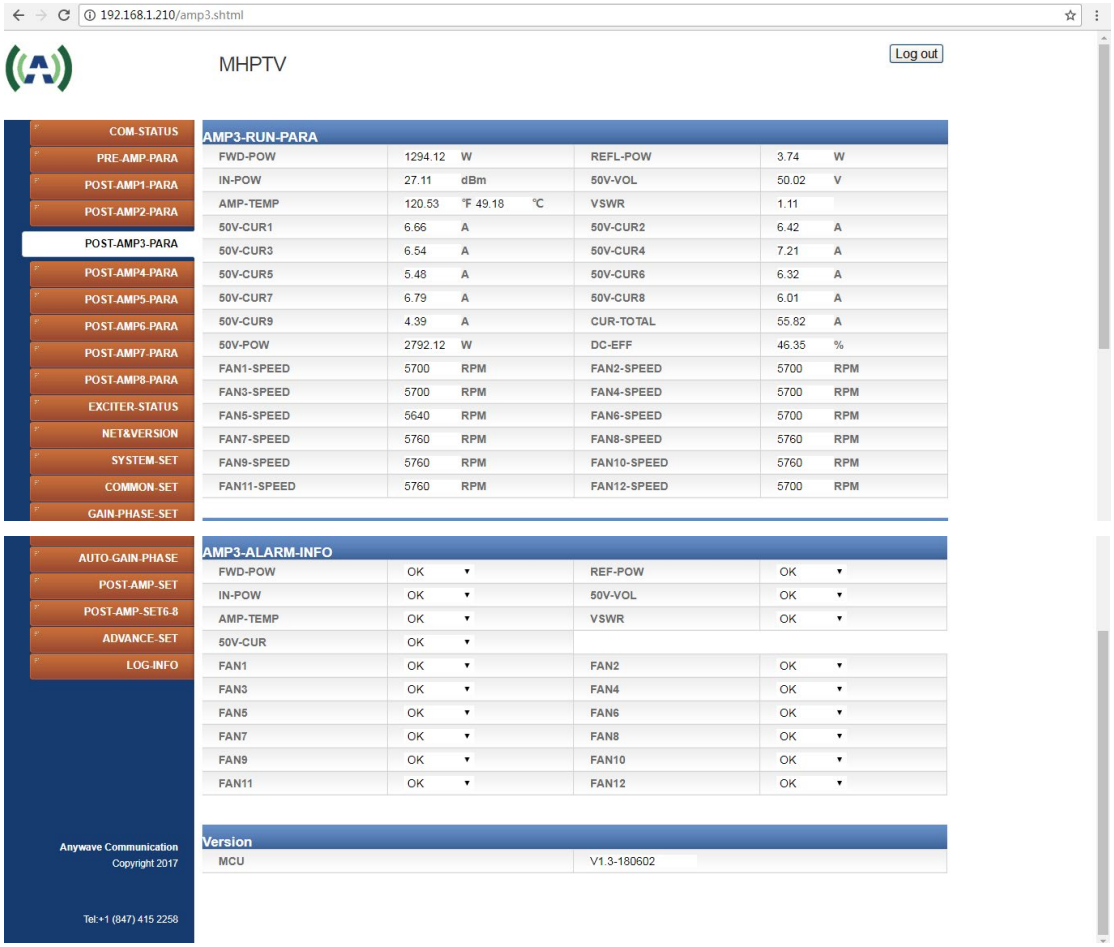
The screenshots below highlight the status and control available via the CTL-M Controller web interface for a 6-PA Doherty TX operating at 6.6KW.

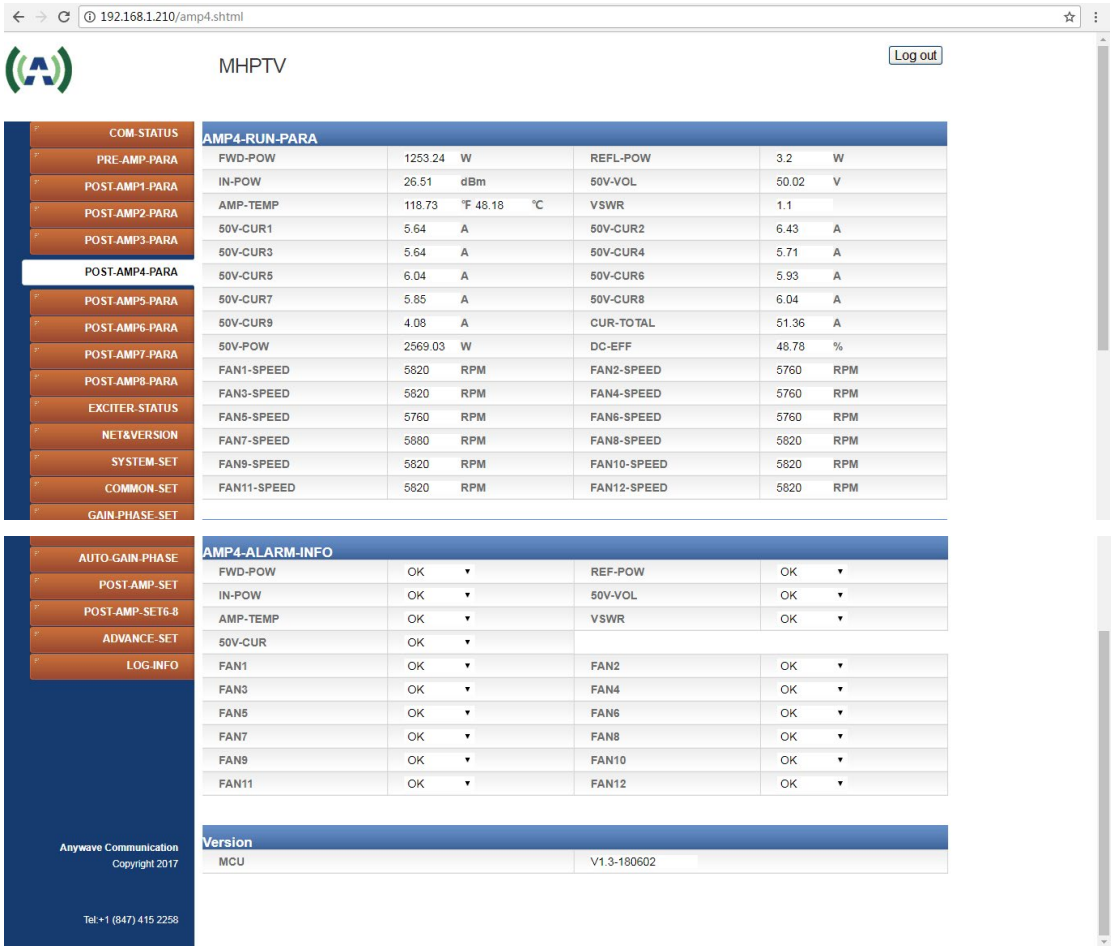



192.168.1.210/pre_amp.shtml
MHPTV
Log out
COM-STATUS
PRE-AMP-PARA
POST-AMP1-PARA
POST-AMP2-PARA
POST-AMP3-PARA
POST-AMP4-PARA
POST-AMP5-PARA
POST-AMP6-PARA
POST-AMP7-PARA
POST-AMP8-PARA
EXCITER-STATUS
NET&VERSION
SYSTEM-SET
COMMON-SET
GAIN-PHASE-SET
AUTO-GAIN-PHASE
PRE-AMP-PARA
IN-POW -14.7 dBm OUT-POW -4.55 dBm
CTL-50V 50.09 V CUR1 0 A
CUR2 0.46 A CUR3 0.52 A
CUR4 0.57 A CUR5 0 A
CUR6 0.51 A CUR7 0.51 A
CUR8 0.53 A


192.168.1.210/amp1.shtml
MHPTV
Log out
COM-STATUS
PRE-AMP-PARA
POST-AMP1-PARA
POST-AMP2-PARA
POST-AMP3-PARA
POST-AMP4-PARA
POST-AMP5-PARA
POST-AMP6-PARA
POST-AMP7-PARA
POST-AMP8-PARA
EXCITER-STATUS
NET&VERSION
SYSTEM-SET
COMMON-SET
AUTO-GAIN-PHASE
POST-AMP-SET
POST-AMP-SET6-8
ADVANCE-SET
LOG-INFO
Anywave Communication
Copyright 2017
Tel:+1 (847) 415 2258
AMP1-RUN-PARA
FWD-POW 1228.24 W
REFL-POW 5.39 W
IN-POW 25.39 dBm
50V-VOL 50.03 V
AMP-TEMP 117.86 °F 47.70 °C
VSWR 1.14
50V-CUR1 5.99 A
50V-CUR2 5.49 A
50V-CUR3 5.86 A
50V-CUR4 5.7 A
50V-CUR5 6.21 A
50V-CUR6 5.86 A
50V-CUR7 5.77 A
50V-CUR8 6.59 A
50V-CUR9 4.16 A
CUR-TOTAL 51.63 A
50V-POW 2583.05 W
DC-EFF 47.55 %
FAN1-SPEED 5640 RPM
FAN2-SPEED 5700 RPM
FAN3-SPEED 5760 RPM
FAN4-SPEED 5640 RPM
FAN5-SPEED 5700 RPM
FAN6-SPEED 5700 RPM
FAN7-SPEED 5700 RPM
FAN8-SPEED 5760 RPM
FAN9-SPEED 5760 RPM
FAN10-SPEED 5700 RPM
FAN11-SPEED 5700 RPM
FAN12-SPEED 5700 RPM
AMP1-ALARM-INFO
FWD-POW OK
REF-POW OK
IN-POW OK
50V-VOL OK
AMP-TEMP OK
VSWR OK
50V-CUR OK
FAN1 OK
FAN2 OK
FAN3 OK
FAN4 OK
FAN5 OK
FAN6 OK
FAN7 OK
FAN8 OK
FAN9 OK
FAN10 OK
FAN11 OK
FAN12 OK
Version
MCU V1.3-180602


192.168.1.210/amp2.shtml
MHPTV
Log out
COM-STATUS
PRE-AMP-PARA
POST-AMP1-PARA
POST-AMP2-PARA
POST-AMP3-PARA
POST-AMP4-PARA
POST-AMP5-PARA
POST-AMP6-PARA
POST-AMP7-PARA
POST-AMP8-PARA
EXCITER-STATUS
NET&VERSION
SYSTEM-SET
COMMON-SET
GAIN-PHASE-SET
AUTO-GAIN-PHASE
POST-AMP-SET
POST-AMP-SET6-8
ADVANCE-SET
LOG-INFO
Anywave Communication
Copyright 2017
Tel:+1 (847) 415 2258
AMP2-RUN-PARA
FWD-POW 1411.08 W
REFL-POW 7.12 W
IN-POW 25.87 dBm
50V-VOL 50.02 V
AMP-TEMP 121.52 °F 49.73 °C
VSWR 1.15
50V-CUR1 6.14 A
50V-CUR2 6.34 A
50V-CUR3 6.38 A
50V-CUR4 6.87 A
50V-CUR5 6.17 A
50V-CUR6 6.96 A
50V-CUR7 6.89 A
50V-CUR8 6.24 A
50V-CUR9 4.43 A
CUR-TOTAL 56.42 A
50V-POW 2822.13 W
DC-EFF 50.00 %
FAN1-SPEED 5700 RPM
FAN2-SPEED 5700 RPM
FAN3-SPEED 5760 RPM
FAN4-SPEED 5760 RPM
FAN5-SPEED 5760 RPM
FAN6-SPEED 5700 RPM
FAN7-SPEED 5760 RPM
FAN8-SPEED 5760 RPM
FAN9-SPEED 5760 RPM
FAN10-SPEED 5700 RPM
FAN11-SPEED 5760 RPM
FAN12-SPEED 5760 RPM
AMP2-ALARM-INFO
FWD-POW OK
REF-POW OK
IN-POW OK
50V-VOL OK
AMP-TEMP OK
VSWR OK
50V-CUR OK
FAN1 OK
FAN2 OK
FAN3 OK
FAN4 OK
FAN5 OK
FAN6 OK
FAN7 OK
FAN8 OK
FAN9 OK
FAN10 OK
FAN11 OK
FAN12 OK
Version
MCU V1.3-180602


192.168.1.210/amp3.shtml
MHPTV
Log out
COM-STATUS
PRE-AMP-PARA
POST-AMP1-PARA
POST-AMP2-PARA
POST-AMP3-PARA
POST-AMP4-PARA
POST-AMP5-PARA
POST-AMP6-PARA
POST-AMP7-PARA
POST-AMP8-PARA
EXCITER-STATUS
NET&VERSION
SYSTEM-SET
COMMON-SET
GAIN-PHASE-SET
AUTO-GAIN-PHASE
POST-AMP-SET
POST-AMP-SET6-8
ADVANCE-SET
LOG-INFO
Anywave Communication
Copyright 2017
Tel:+1 (847) 415 2258
AMP3-RUN-PARA
FWD-POW 1294.12 W
REFL-POW 3.74 W
IN-POW 27.11 dBm
50V-VOL 50.02 V
AMP-TEMP 120.53 °F 49.18 °C
VSWR 1.11
50V-CUR1 6.66 A
50V-CUR2 6.42 A
50V-CUR3 6.54 A
50V-CUR4 7.21 A
50V-CUR5 5.48 A
50V-CUR6 6.32 A
50V-CUR7 6.79 A
50V-CUR8 6.01 A
50V-CUR9 4.39 A
CUR-TOTAL 55.82 A
50V-POW 2792.12 W
DC-EFF 46.35 %
FAN1-SPEED 5700 RPM
FAN2-SPEED 5700 RPM
FAN3-SPEED 5700 RPM
FAN4-SPEED 5700 RPM
FAN5-SPEED 5640 RPM
FAN6-SPEED 5700 RPM
FAN7-SPEED 5760 RPM
FAN8-SPEED 5760 RPM
FAN9-SPEED 5760 RPM
FAN10-SPEED 5760 RPM
FAN11-SPEED 5760 RPM
FAN12-SPEED 5700 RPM
AMP3-ALARM-INFO
FWD-POW OK
REF-POW OK
IN-POW OK
50V-VOL OK
AMP-TEMP OK
VSWR OK
50V-CUR OK
FAN1 OK
FAN2 OK
FAN3 OK
FAN4 OK
FAN5 OK
FAN6 OK
FAN7 OK
FAN8 OK
FAN9 OK
FAN10 OK
FAN11 OK
FAN12 OK
Version
MCU V1.3-180602


192.168.1.210/amp4.shtml
MHPTV
Log out
COM-STATUS
PRE-AMP-PARA
POST-AMP1-PARA
POST-AMP2-PARA
POST-AMP3-PARA
POST-AMP4-PARA
POST-AMP5-PARA
POST-AMP6-PARA
POST-AMP7-PARA
POST-AMP8-PARA
EXCITER-STATUS
NET&VERSION
SYSTEM-SET
COMMON-SET
GAIN-PHASE-SET
AMP4-RUN-PARA
FWD-POW 1253.24 W
REFL-POW 3.2 W
IN-POW 26.51 dBm
50V-VOL 50.02 V
AMP-TEMP 118.73 °F 48.18 °C
VSWR 1.1
50V-CUR1 5.64 A
50V-CUR2 6.43 A
50V-CUR3 5.64 A
50V-CUR4 5.71 A
50V-CUR5 6.04 A
50V-CUR6 5.93 A
50V-CUR7 5.85 A
50V-CUR8 6.04 A
50V-CUR9 4.08 A
CUR-TOTAL 51.36 A
50V-POW 2569.03 W
DC-EFF 48.78 %
FAN1-SPEED 5820 RPM
FAN2-SPEED 5760 RPM
FAN3-SPEED 5820 RPM
FAN4-SPEED 5760 RPM
FAN5-SPEED 5760 RPM
FAN6-SPEED 5760 RPM
FAN7-SPEED 5880 RPM
FAN8-SPEED 5820 RPM
FAN9-SPEED 5820 RPM
FAN10-SPEED 5820 RPM
FAN11-SPEED 5820 RPM
FAN12-SPEED 5820 RPM
AUTO-GAIN-PHASE
POST-AMP-SET
POST-AMP-SET6-8
ADVANCE-SET
LOG-INFO
AMP4-ALARM-INFO
FWD-POW OK
REF-POW OK
IN-POW OK
50V-VOL OK
AMP-TEMP OK
VSWR OK
50V-CUR OK
FAN1 OK
FAN2 OK
FAN3 OK
FAN4 OK
FAN5 OK
FAN6 OK
FAN7 OK
FAN8 OK
FAN9 OK
FAN10 OK
FAN11 OK
FAN12 OK
Version
MCU V1.3-180602
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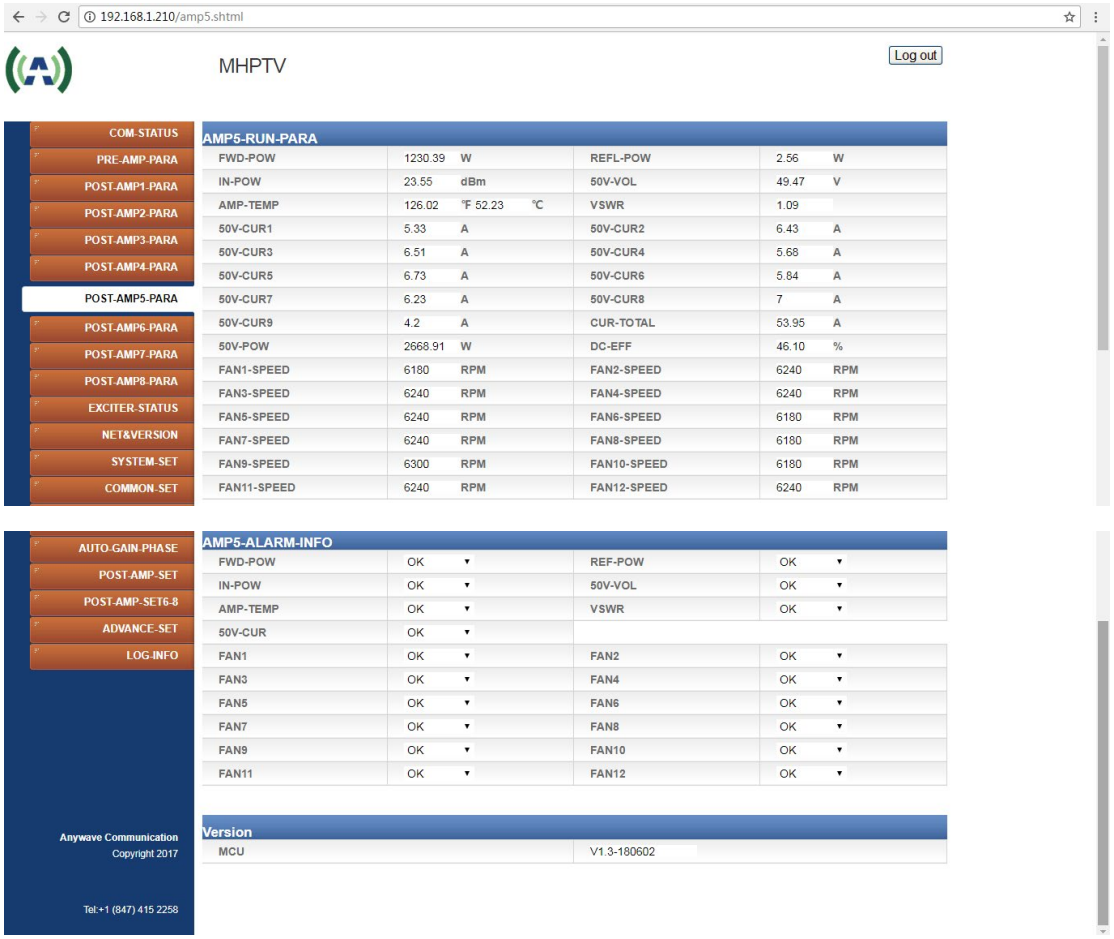


AMP5-RUN-PARA

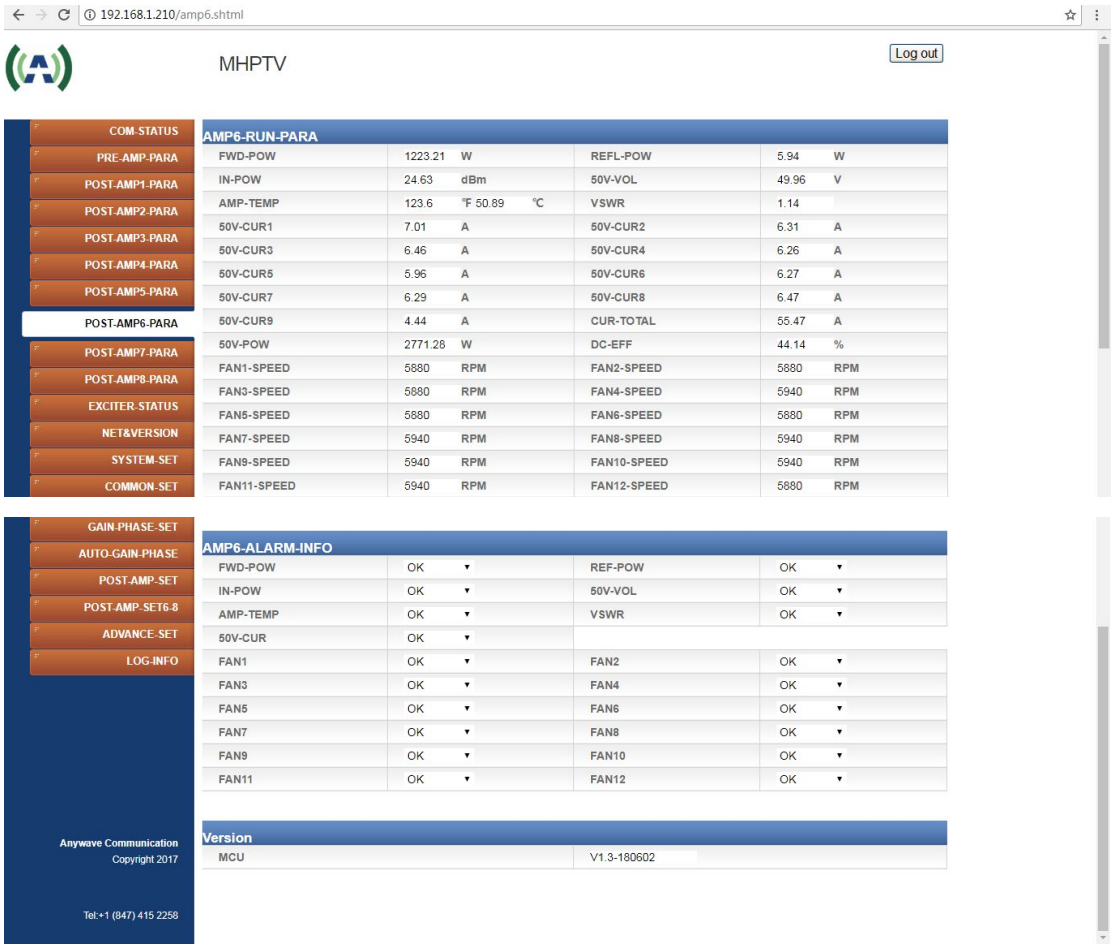
FWD-POW	1230.39	W	REFL-POW	2.56	W
IN-POW	23.55	dBm	50V-VOL	49.47	V
AMP-TEMP	126.02	°F 52.23 °C	VSWR	1.09	
50V-CUR1	5.33	A	50V-CUR2	6.43	A
50V-CUR3	6.51	A	50V-CUR4	5.68	A
50V-CUR5	6.73	A	50V-CUR6	5.84	A
50V-CUR7	6.23	A	50V-CUR8	7	A
50V-CUR9	4.2	A	CUR-TOTAL	53.95	A
50V-POW	2668.91	W	DC-EFF	46.10	%
FAN1-SPEED	6180	RPM	FAN2-SPEED	6240	RPM
FAN3-SPEED	6240	RPM	FAN4-SPEED	6240	RPM
FAN5-SPEED	6240	RPM	FAN6-SPEED	6180	RPM
FAN7-SPEED	6240	RPM	FAN8-SPEED	6180	RPM
FAN9-SPEED	6300	RPM	FAN10-SPEED	6180	RPM
FAN11-SPEED	6240	RPM	FAN12-SPEED	6240	RPM

AMP5-ALARM-INFO

FWD-POW	OK	REF-POW	OK
IN-POW	OK	50V-VOL	OK
AMP-TEMP	OK	VSWR	OK
50V-CUR	OK		
FAN1	OK	FAN2	OK
FAN3	OK	FAN4	OK
FAN5	OK	FAN6	OK
FAN7	OK	FAN8	OK
FAN9	OK	FAN10	OK
FAN11	OK	FAN12	OK

Version

MCU	V1.3-180602


192.168.1.210/amp6.shtml
MHPTV
Log out
COM-STATUS
PRE-AMP-PARA
POST-AMP1-PARA
POST-AMP2-PARA
POST-AMP3-PARA
POST-AMP4-PARA
POST-AMP5-PARA
POST-AMP6-PARA
POST-AMP7-PARA
POST-AMP8-PARA
EXCITER-STATUS
NET&VERSION
SYSTEM-SET
COMMON-SET
AMP6-RUN-PARA
FWD-POW 1223.21 W REFL-POW 5.94 W
IN-POW 24.63 dBm 50V-VOL 49.96 V
AMP-TEMP 123.6 °F 50.89 °C VSWR 1.14
50V-CUR1 7.01 A 50V-CUR2 6.31 A
50V-CUR3 6.46 A 50V-CUR4 6.26 A
50V-CUR5 5.96 A 50V-CUR6 6.27 A
50V-CUR7 6.29 A 50V-CUR8 6.47 A
50V-CUR9 4.44 A CUR-TOTAL 55.47 A
50V-POW 2771.28 W DC-EFF 44.14 %
FAN1-SPEED 5880 RPM FAN2-SPEED 5880 RPM
FAN3-SPEED 5880 RPM FAN4-SPEED 5940 RPM
FAN5-SPEED 5880 RPM FAN6-SPEED 5880 RPM
FAN7-SPEED 5940 RPM FAN8-SPEED 5940 RPM
FAN9-SPEED 5940 RPM FAN10-SPEED 5940 RPM
FAN11-SPEED 5940 RPM FAN12-SPEED 5880 RPM
GAIN-PHASE-SET
AUTO-GAIN-PHASE
POST-AMP-SET
POST-AMP-SET6-8
ADVANCE-SET
LOG-INFO
AMP6-ALARM-INFO
FWD-POW OK REF-POW OK
IN-POW OK 50V-VOL OK
AMP-TEMP OK VSWR OK
50V-CUR OK
FAN1 OK FAN2 OK
FAN3 OK FAN4 OK
FAN5 OK FAN6 OK
FAN7 OK FAN8 OK
FAN9 OK FAN10 OK
FAN11 OK FAN12 OK
Version
MCU V1.3-180602
Anywave Communication
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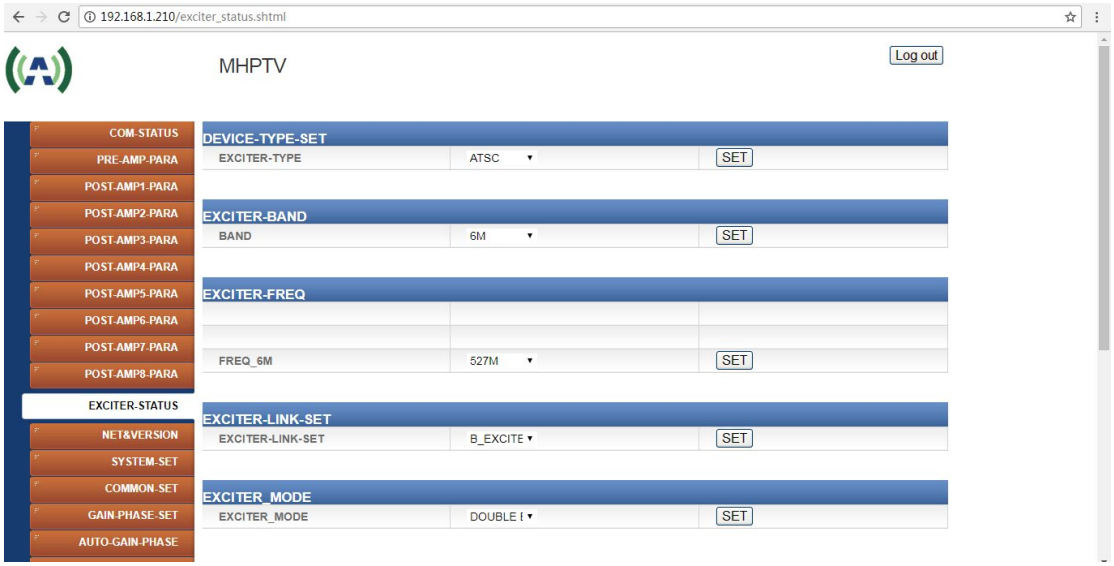
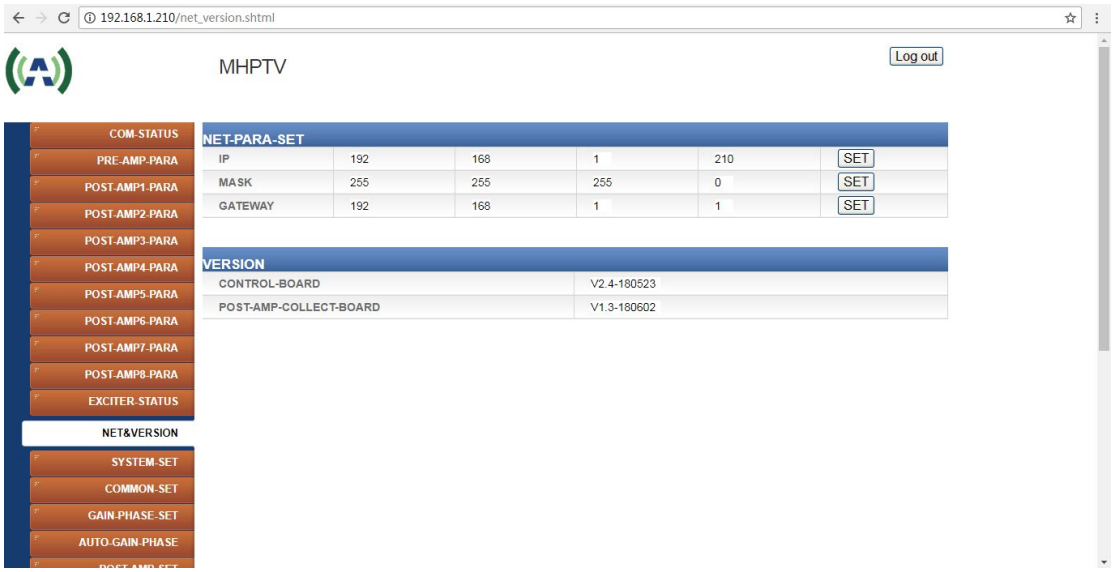

192.168.1.210/exciter_status.shtml
MHPTV
Log out
COM-STATUS
PRE-AMP-PARA
POST-AMP1-PARA
POST-AMP2-PARA
POST-AMP3-PARA
POST-AMP4-PARA
POST-AMP5-PARA
POST-AMP6-PARA
POST-AMP7-PARA
POST-AMP8-PARA
EXCITER-STATUS
NET&VERSION
SYSTEM-SET
COMMON-SET
GAIN-PHASE-SET
AUTO-GAIN-PHASE
DEVICE-TYPE-SET
EXCITER-TYPE
ATSC
SET
EXCITER-BAND
BAND
6M
SET
EXCITER-FREQ
FREQ_6M
527M
SET
EXCITER-LINK-SET
EXCITER-LINK-SET
B_EXCITE
SET
EXCITER_MODE
EXCITER_MODE
DOUBLE
SET


192.168.1.210/net_version.shtml
MHPTV
Log out
COM-STATUS
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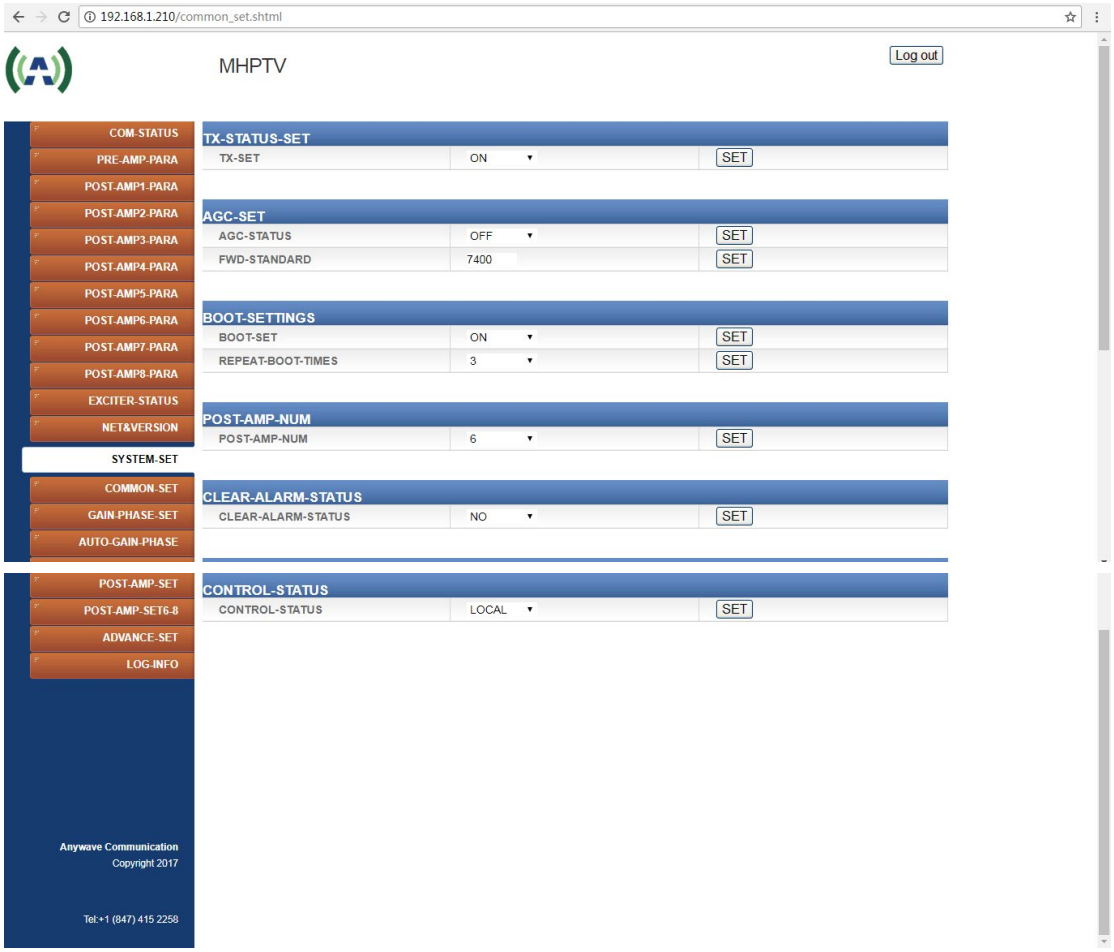
POST-AMP1-PARA
POST-AMP2-PARA
POST-AMP3-PARA
POST-AMP4-PARA
POST-AMP5-PARA
POST-AMP6-PARA
POST-AMP7-PARA
POST-AMP8-PARA
EXCITER-STATUS
NET&VERSION
SYSTEM-SET
COMMON-SET
GAIN-PHASE-SET
AUTO-GAIN-PHASE
NET-PARA-SET
IP
192
168
1
210
SET
MASK
255
255
255
0
SET
GATEWAY
192
168
1
1
SET
VERSION
CONTROL-BOARD
V2.4-180523
POST-AMP-COLLECT-BOARD
V1.3-180602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POST-AMP4-PARA
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POST-AMP6-PARA
POST-AMP7-PARA
POST-AMP8-PARA
EXCITER-STATUS
NET&VERSION
SYSTEM-SET
COMMON-SET
GAIN-PHASE-SET
AUTO-GAIN-PHASE
POST-AMP-SET
POST-AMP-SET6-8
ADVANCE-SET
LOG-INFO
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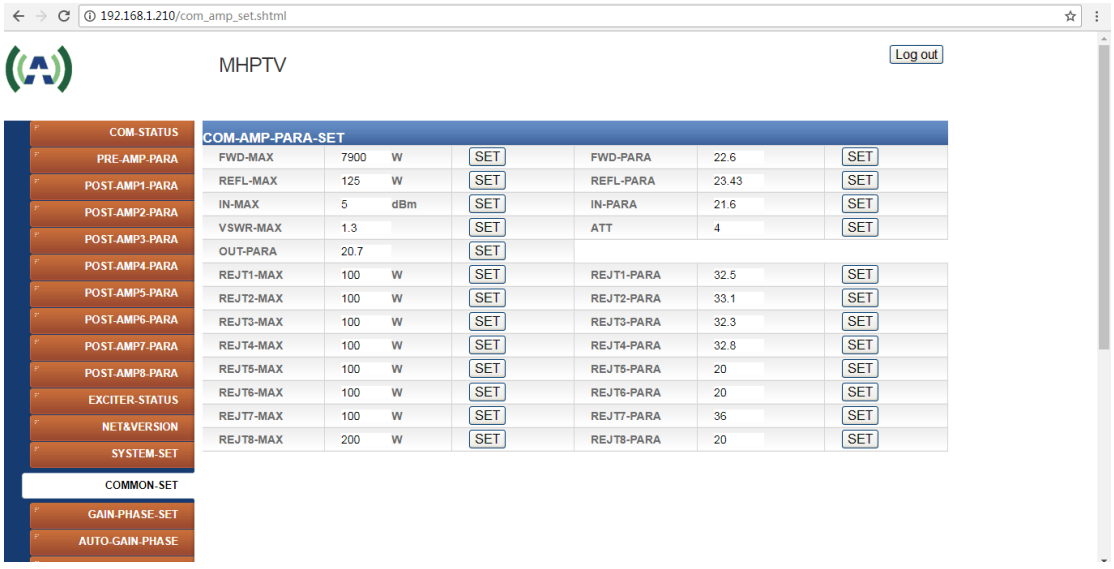
TX-STATUS-SET
TX-SET ON SET
AGC-SET
AGC-STATUS OFF SET
FWD-STANDARD 7400 SET
BOOT-SETTINGS
BOOT-SET ON SET
REPEAT-BOOT-TIMES 3 SET
POST-AMP-NUM
POST-AMP-NUM 6 SET
CLEAR-ALARM-STATUS
CLEAR-ALARM-STATUS NO SET
CONTROL-STATUS
CONTROL-STATUS LOCAL SET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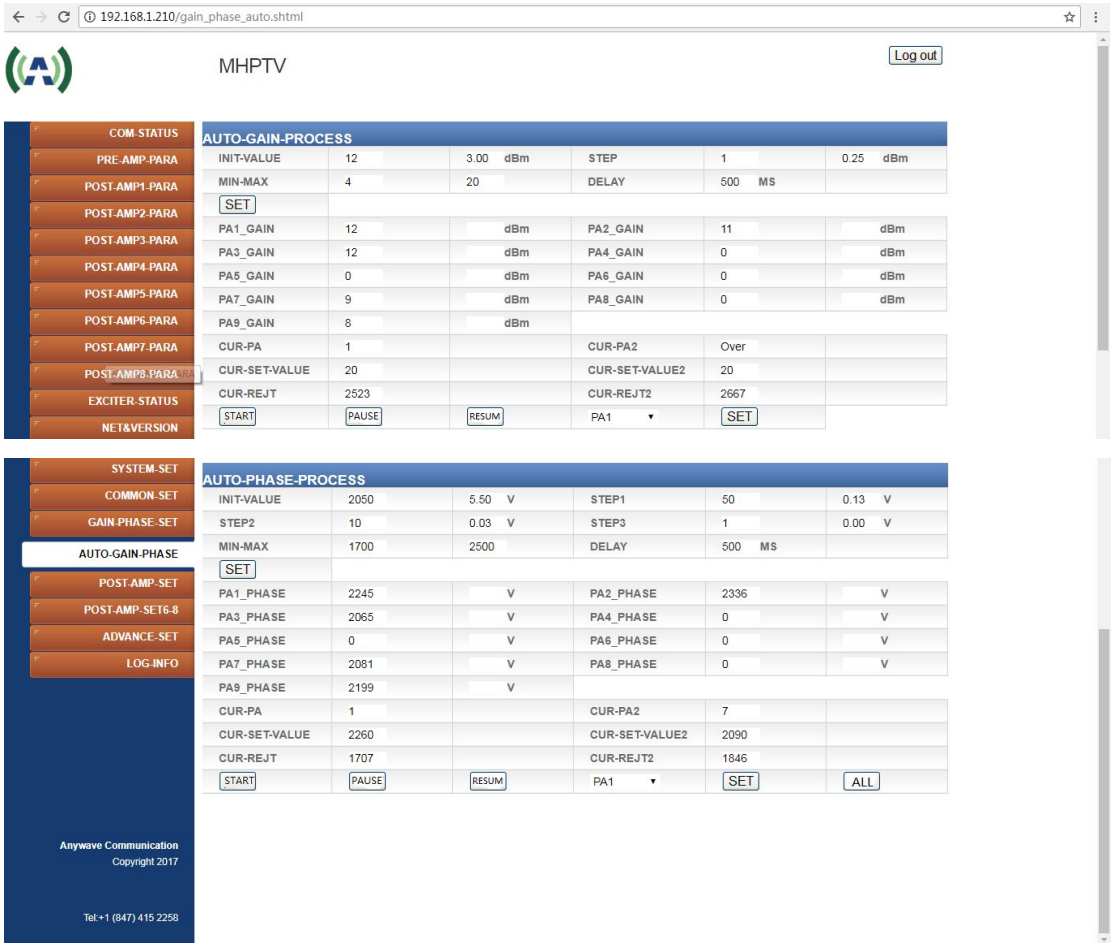
POST-AMP1-PARA
POST-AMP2-PARA
POST-AMP3-PARA
POST-AMP4-PARA
POST-AMP5-PARA
POST-AMP6-PARA
POST-AMP7-PARA
POST-AMP8-PARA
EXCITER-STATUS
NET&VERSION
SYSTEM-SET
COMMON-SET
GAIN-PHASE-SET
AUTO-GAIN-PHASE
COM-AMP-PARA-SET
FWD-MAX 7900 W SET FWD-PARA 22.6 SET
REFL-MAX 125 W SET REFL-PARA 23.43 SET
IN-MAX 5 dBm SET IN-PARA 21.6 SET
VSWR-MAX 1.3 SET ATT 4 SET
OUT-PARA 20.7 SET
REJT1-MAX 100 W SET REJT1-PARA 32.5 SET
REJT2-MAX 100 W SET REJT2-PARA 33.1 SET
REJT3-MAX 100 W SET REJT3-PARA 32.3 SET
REJT4-MAX 100 W SET REJT4-PARA 32.8 SET
REJT5-MAX 100 W SET REJT5-PARA 20 SET
REJT6-MAX 100 W SET REJT6-PARA 20 SET
REJT7-MAX 100 W SET REJT7-PARA 36 SET
REJT8-MAX 200 W SET REJT8-PARA 20 SET


192.168.1.210/gain_phase.shtml
MHPTV
Log out
COM-STATUS
PRE-AMP-PARA
POST-AMP1-PARA
POST-AMP2-PARA
POST-AMP3-PARA
POST-AMP4-PARA
POST-AMP5-PARA
POST-AMP6-PARA
POST-AMP7-PARA
POST-AMP8-PARA
EXCITER-STATUS
NET&VERSION
SYSTEM-SET
COMMON-SET
GAIN-PHASE-SET
AUTO-GAIN-PHASE
CAB#1 GAIN-PHASE-SET
PA1-GAIN 12 3.00 dBm PA1-PHASE 2245 6.03 V
PA2-GAIN 11 2.75 dBm PA2-PHASE 2336 6.27 V
PA3-GAIN 12 3.00 dBm PA3-PHASE 2065 5.55 V
PA4-GAIN 12 3.00 dBm PA4-PHASE 2050 5.51 V
PA5-GAIN 12 3.00 dBm PA5-PHASE 2050 5.51 V
SET
PA6-GAIN 12 3.00 dBm PA6-PHASE 2050 5.51 V
PA7-GAIN 9 2.25 dBm PA7-PHASE 2081 5.59 V
PA8-GAIN 12 3.00 dBm PA8-PHASE 2050 5.51 V
PA9-GAIN 8 2.00 dBm PA9-PHASE 2199 5.91 V
PA10-GAIN 12 3.00 dBm PA10-PHASE 2050 5.51 V
SET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MHPTV
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POST-AMP1-PARA
POST-AMP2-PARA
POST-AMP3-PARA
POST-AMP4-PARA
POST-AMP5-PARA
POST-AMP6-PARA
POST-AMP7-PARA
POST-AMP8-PARA
EXCITER-STATUS
NET&VERSION
AUTO-GAIN-PROCESS
INIT-VALUE 12 3.00 dBm STEP 1 0.25 dBm
MIN-MAX 4 20 DELAY 500 MS
SET
PA1_GAIN 12 dBm PA2_GAIN 11 dBm
PA3_GAIN 12 dBm PA4_GAIN 0 dBm
PA5_GAIN 0 dBm PA6_GAIN 0 dBm
PA7_GAIN 9 dBm PA8_GAIN 0 dBm
PA9_GAIN 8 dBm
CUR-PA 1 CUR-PA2 Over
CUR-SET-VALUE 20 CUR-SET-VALUE2 20
CUR-REJT 2523 CUR-REJT2 2667
START PAUSE RESUM PA1 SET
SYSTEM-SET
COMMON-SET
GAIN-PHASE-SET
AUTO-GAIN-PHASE
POST-AMP-SET
POST-AMP-SET6-8
ADVANCE-SET
LOG-INFO
AUTO-PHASE-PROCESS
INIT-VALUE 2050 5.50 V STEP1 50 0.13 V
STEP2 10 0.03 V STEP3 1 0.00 V
MIN-MAX 1700 2500 DELAY 500 MS
SET
PA1_PHASE 2245 V PA2_PHASE 2336 V
PA3_PHASE 2065 V PA4_PHASE 0 V
PA5_PHASE 0 V PA6_PHASE 0 V
PA7_PHASE 2081 V PA8_PHASE 0 V
PA9_PHASE 2199 V
CUR-PA 1 CUR-PA2 7
CUR-SET-VALUE 2260 CUR-SET-VALUE2 2090
CUR-REJT 1707 CUR-REJT2 1846
START PAUSE RESUM PA1 SET ALL
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192.168.1.210/post_amp_set.shtml
MHPTV
Log out
COM-STATUS
PRE-AMP-PARA
POST-AMP1-PARA
POST-AMP2-PARA
POST-AMP3-PARA
POST-AMP4-PARA
POST-AMP5-PARA
POST-AMP6-PARA
POST-AMP7-PARA
POST-AMP8-PARA
EXCITER-STATUS
NET&VERSION
SYSTEM-SET
COMMON-SET
GAIN-PHASE-SET
AUTO-GAIN-PHASE
AVR_POS_ID
AVR_POS_ID 133 SET
50V 46V
POST-AMP1-PARA-SET
FWD-MAX 1540 W SET REF-MAX 60 W SET
IN-MAX 28 dBm SET VSWR-MAX 1.5 SET
TEMP-MAX 145 °F SET TEMP-TARGET 127 °F SET
CUR1-MAX 8.5 A SET CUR2-MAX 10 A SET
FWD-ADJ 17.8 SET REF-ADJ 12.2 SET
IN-ADJ 20.35 SET FAN-NUM 12 SET
POST-AMP2-PARA-SET
FWD-MAX 1540 W SET REF-MAX 60 W SET
IN-MAX 28 dBm SET VSWR-MAX 1.5 SET
TEMP-MAX 145 °F SET TEMP-TARGET 127 °F SET
CUR1-MAX 8.5 A SET CUR2-MAX 10 A SET
FWD-ADJ 17.3 SET REF-ADJ 14 SET
POST-AMP-SET
POST-AMP-SET6-8
ADVANCE-SET
LOG-INFO
IN-ADJ 19.7 SET FAN-NUM 12 SET
POST-AMP3-PARA-SET
FWD-MAX 1540 W SET REF-MAX 60 W SET
IN-MAX 28 dBm SET VSWR-MAX 1.5 SET
TEMP-MAX 145 °F SET TEMP-TARGET 127 °F SET
CUR1-MAX 8.5 A SET CUR2-MAX 10 A SET
FWD-ADJ 18 SET REF-ADJ 14.3 SET
IN-ADJ 19.05 SET FAN-NUM 12 SET
POST-AMP4-PARA-SET
FWD-MAX 1540 W SET REF-MAX 60 W SET
IN-MAX 28 dBm SET VSWR-MAX 1.5 SET
TEMP-MAX 145 °F SET TEMP-TARGET 127 °F SET
CUR1-MAX 8.5 A SET CUR2-MAX 10 A SET
FWD-ADJ 17 SET REF-ADJ 10.1 SET
IN-ADJ 23 SET FAN-NUM 12 SET
POST-AMP5-PARA-SET
FWD-MAX 1540 W SET REF-MAX 60 W SET
IN-MAX 28 dBm SET VSWR-MAX 1.5 SET
TEMP-MAX 145 °F SET TEMP-TARGET 127 °F SET
CUR1-MAX 8.5 A SET CUR2-MAX 10 A SET
FWD-ADJ 17.7 SET REF-ADJ 11.4 SET
IN-ADJ 18.75 SET FAN-NUM 12 SET
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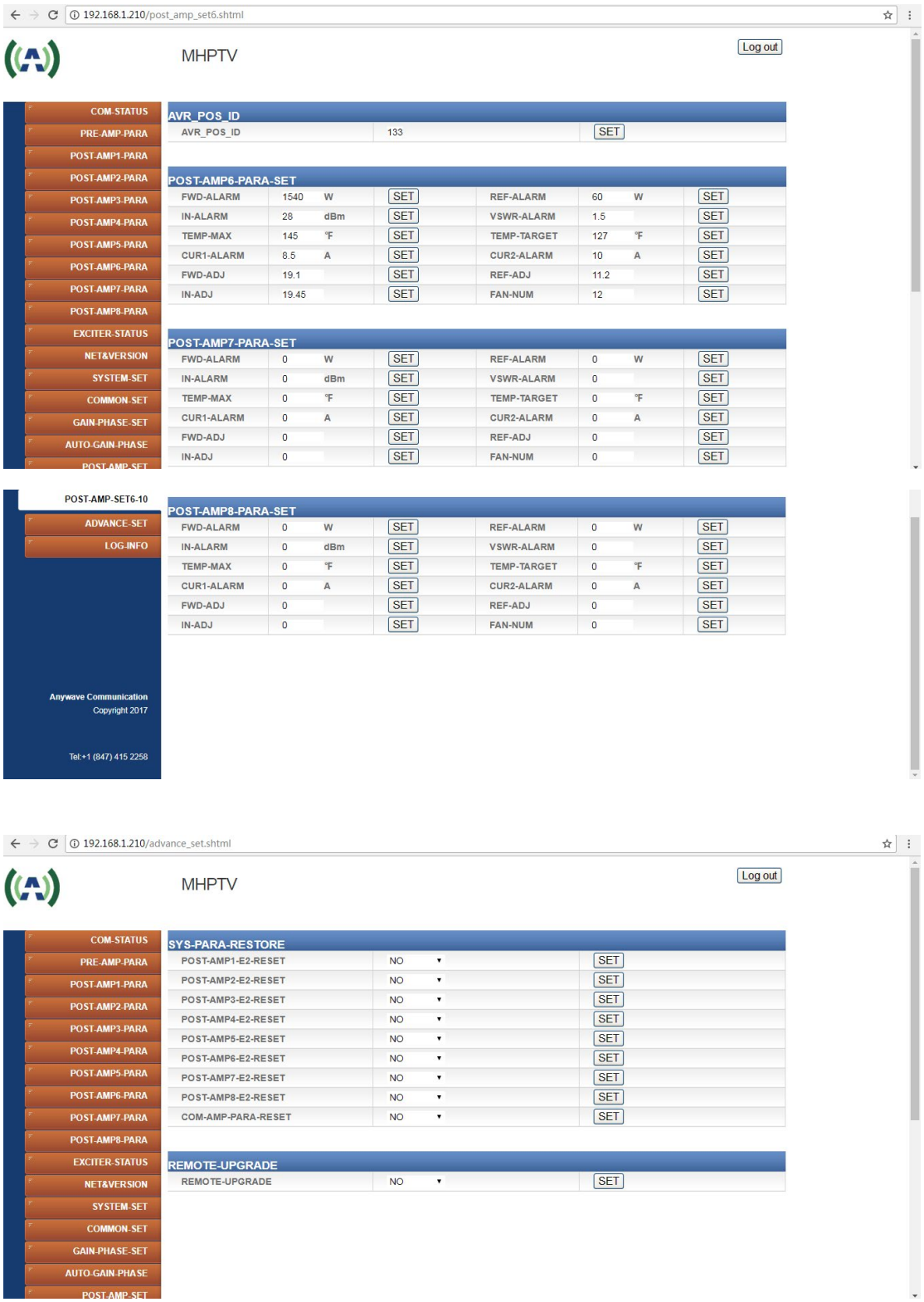
192.168.1.210/post_amp_set6.shtml
MHPTV
Log out
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POST-AMP2-PARA
POST-AMP3-PARA
POST-AMP4-PARA
POST-AMP5-PARA
POST-AMP6-PARA
POST-AMP7-PARA
POST-AMP8-PARA
EXCITER-STATUS
NET&VERSION
SYSTEM-SET
COMMON-SET
GAIN-PHASE-SET
AUTO-GAIN-PHASE
POST-AMP-SET
AVR_POS_ID
AVR_POS_ID 133 SET
POST-AMP6-PARA-SET
FWD-ALARM 1540 W SET
REF-ALARM 60 W SET
IN-ALARM 28 dBm SET
VSWR-ALARM 1.5 SET
TEMP-MAX 145 °F SET
TEMP-TARGET 127 °F SET
CUR1-ALARM 8.5 A SET
CUR2-ALARM 10 A SET
FWD-ADJ 19.1 SET
REF-ADJ 11.2 SET
IN-ADJ 19.45 SET
FAN-NUM 12 SET
POST-AMP7-PARA-SET
FWD-ALARM 0 W SET
REF-ALARM 0 W SET
IN-ALARM 0 dBm SET
VSWR-ALARM 0 SET
TEMP-MAX 0 °F SET
TEMP-TARGET 0 °F SET
CUR1-ALARM 0 A SET
CUR2-ALARM 0 A SET
FWD-ADJ 0 SET
REF-ADJ 0 SET
IN-ADJ 0 SET
FAN-NUM 0 SET
POST-AMP-SET6-10
ADVANCE-SET
LOG-INFO
POST-AMP8-PARA-SET
FWD-ALARM 0 W SET
REF-ALARM 0 W SET
IN-ALARM 0 dBm SET
VSWR-ALARM 0 SET
TEMP-MAX 0 °F SET
TEMP-TARGET 0 °F SET
CUR1-ALARM 0 A SET
CUR2-ALARM 0 A SET
FWD-ADJ 0 SET
REF-ADJ 0 SET
IN-ADJ 0 SET
FAN-NUM 0 SET
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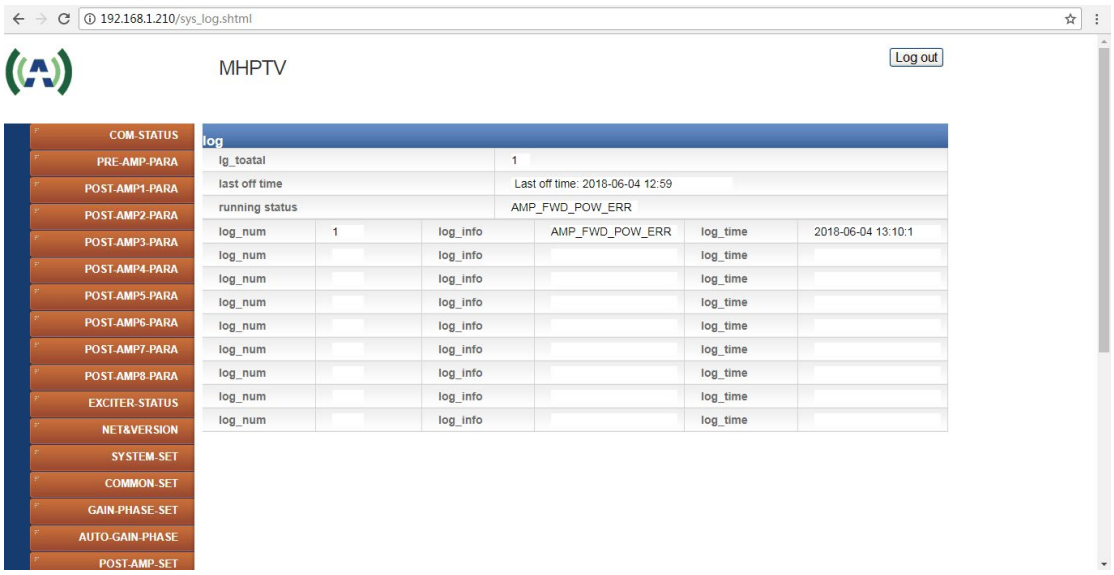
192.168.1.210/advance_set.shtml
MHPTV
Log out
COM-STATUS
PRE-AMP-PARA
POST-AMP1-PARA
POST-AMP2-PARA
POST-AMP3-PARA
POST-AMP4-PARA
POST-AMP5-PARA
POST-AMP6-PARA
POST-AMP7-PARA
POST-AMP8-PARA
EXCITER-STATUS
NET&VERSION
SYSTEM-SET
COMMON-SET
GAIN-PHASE-SET
AUTO-GAIN-PHASE
POST-AMP-SET
SYS-PARA-RESTORE
POST-AMP1-E2-RESET NO SET
POST-AMP2-E2-RESET NO SET
POST-AMP3-E2-RESET NO SET
POST-AMP4-E2-RESET NO SET
POST-AMP5-E2-RESET NO SET
POST-AMP6-E2-RESET NO SET
POST-AMP7-E2-RESET NO SET
POST-AMP8-E2-RESET NO SET
COM-AMP-PARA-RESET NO SET
REMOTE-UPGRADE
REMOTE-UPGRADE NO SET

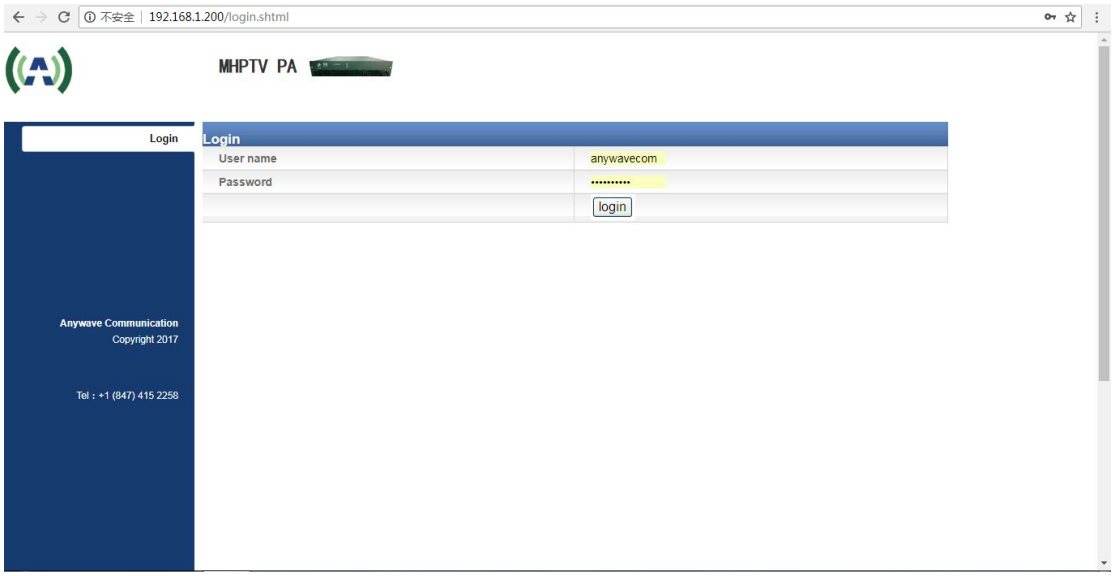

192.168.1.210/sys_log.shtml
MHPTV
Log out
COM-STATUS
PRE-AMP-PARA
POST-AMP1-PARA
POST-AMP2-PARA
POST-AMP3-PARA
POST-AMP4-PARA
POST-AMP5-PARA
POST-AMP6-PARA
POST-AMP7-PARA
POST-AMP8-PARA
EXCITER-STATUS
NET&VERSION
SYSTEM-SET
COMMON-SET
GAIN-PHASE-SET
AUTO-GAIN-PHASE
POST-AMP-SET
log
lg_toatal 1
last off time Last off time: 2018-06-04 12:59
running status AMP_FWD_POW_ERR
log_num 1 log_info AMP_FWD_POW_ERR log_time 2018-06-04 13:10:1
log_num log_info log_time
log_num log_info log_time
log_num log_info log_time
log_num log_info log_time
log_num log_info log_time
log_num log_info log_time
log_num log_info log_time
log_num log_info log_time
log_num log_info log_time

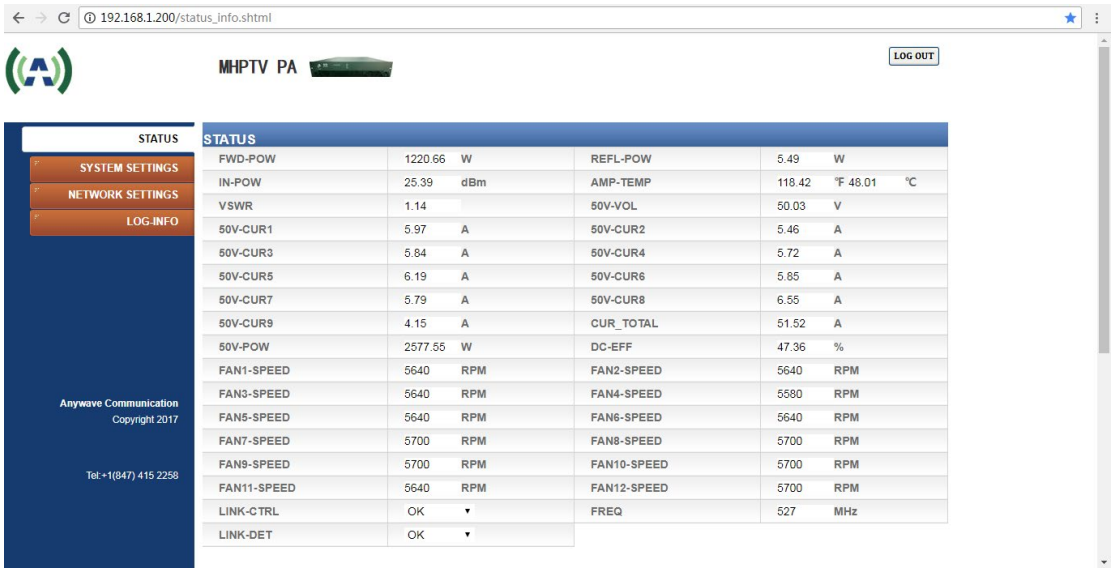
6.2 PA Web Interface

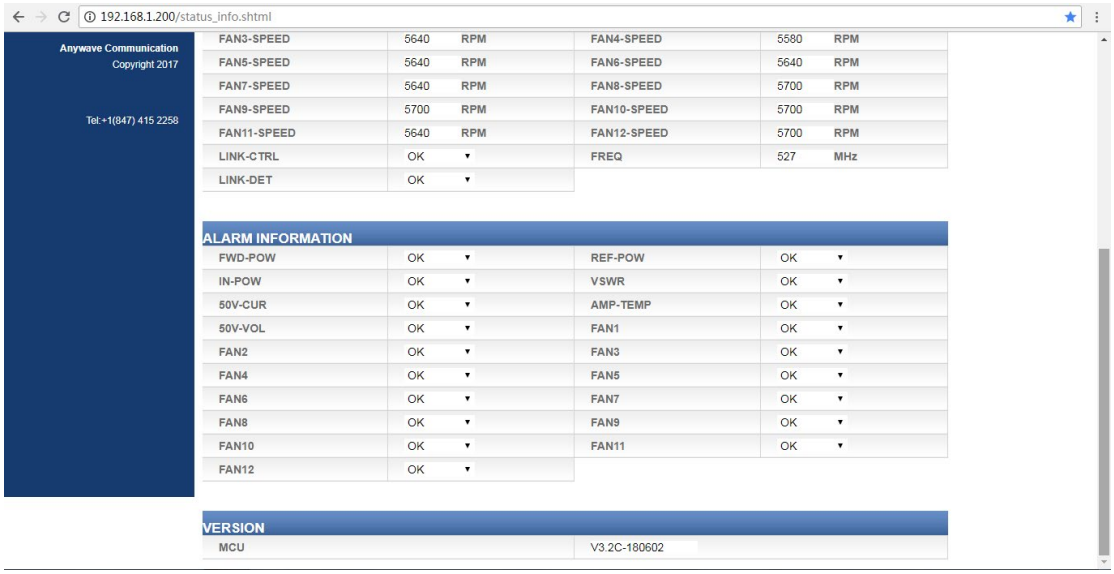
Each PA drawer installed in an MHPTV TX has its own built-in web interface accessible via the front panel LAN port (192.168.1.200).

The web interface allows the user to remotely monitor PA power levels, voltage, and device currents as well as view and modify PA network settings, max operating parameters, meter calibrations, RS-485 network ID, etc. (username and password of "anywavecom" and "anywavecom", both case sensitive).

The PA has four web pages as shown below.






192.168.1.200/status_info.shtml
Anywave Communication
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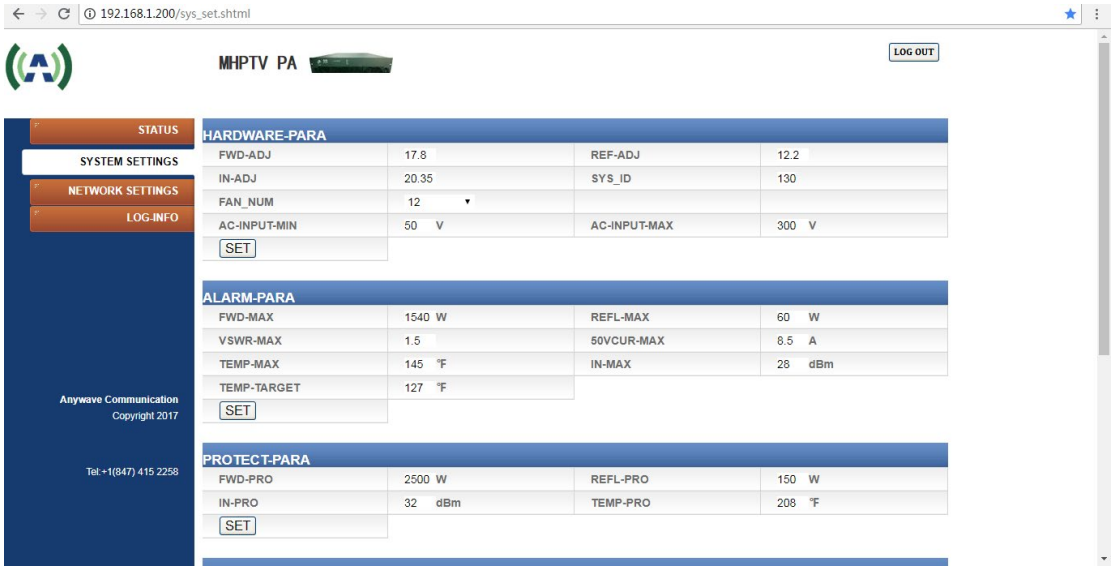
FAN3-SPEED 5640 RPM
FAN4-SPEED 5580 RPM
FAN5-SPEED 5640 RPM
FAN6-SPEED 5640 RPM
FAN7-SPEED 5640 RPM
FAN8-SPEED 5700 RPM
FAN9-SPEED 5700 RPM
FAN10-SPEED 5700 RPM
FAN11-SPEED 5640 RPM
FAN12-SPEED 5700 RPM
LINK-CTRL OK
FREQ 527 MHz
LINK-DET OK
ALARM INFORMATION
FWD-POW OK
REF-POW OK
IN-POW OK
VSWR OK
50V-CUR OK
AMP-TEMP OK
50V-VOL OK
FAN1 OK
FAN2 OK
FAN3 OK
FAN4 OK
FAN5 OK
FAN6 OK
FAN7 OK
FAN8 OK
FAN9 OK
FAN10 OK
FAN11 OK
FAN12 OK
VERSION
MCU V3.2C-180602


192.168.1.200/sys_set.shtml
MHPTV PA
LOG OUT
STATUS
SYSTEM SETTINGS
NETWORK SETTINGS
LOG-INFO
HARDWARE-PARA
FWD-ADJ 17.8
REF-ADJ 12.2
IN-ADJ 20.35
SYS_ID 130
FAN_NUM 12
AC-INPUT-MIN 50 V
AC-INPUT-MAX 300 V
SET
ALARM-PARA
FWD-MAX 1540 W
REFL-MAX 60 W
VSWR-MAX 1.5
50VCUR-MAX 8.5 A
TEMP-MAX 145 °F
IN-MAX 28 dBm
TEMP-TARGET 127 °F
SET
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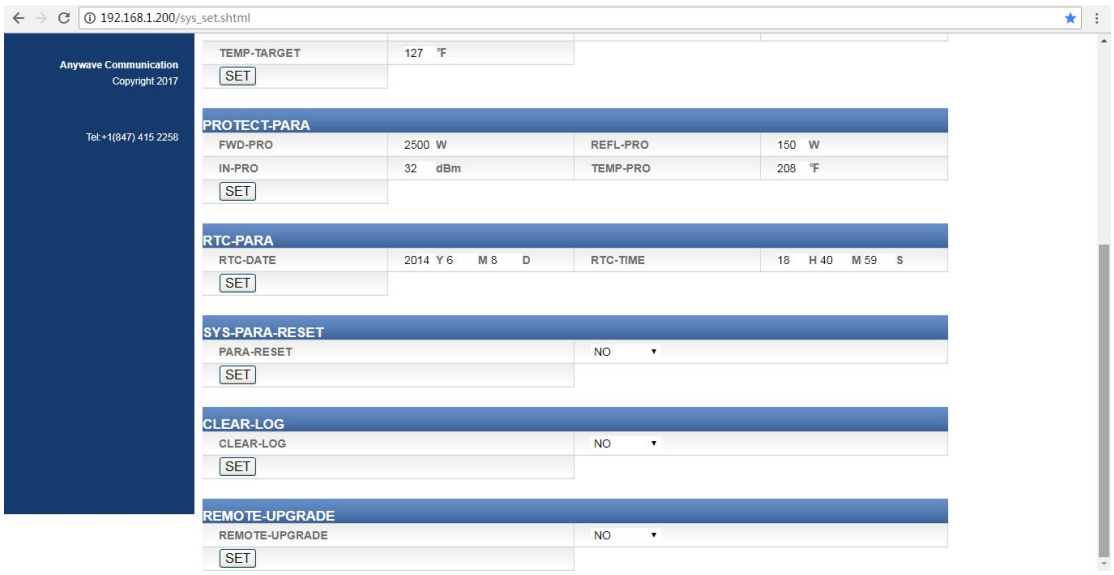
PROTECT-PARA
FWD-PRO 2500 W
REFL-PRO 150 W
IN-PRO 32 dBm
TEMP-PRO 208 °F
SET


192.168.1.200/sys_set.shtml
Anywave Communication
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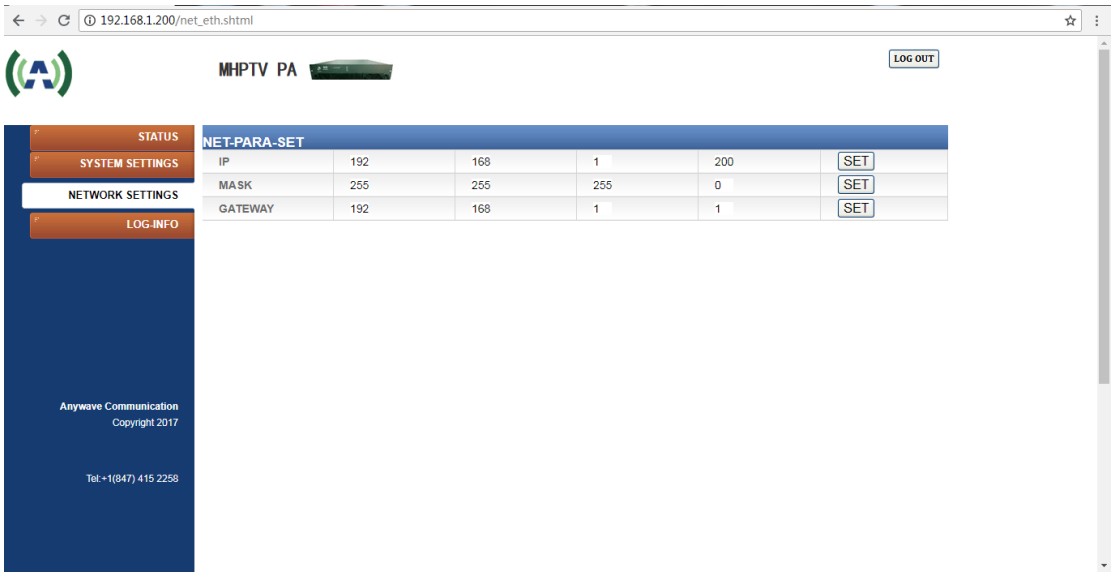
TEMP-TARGET
127 ℉
SET
PROTECT-PARA
FWD-PRO
2500 W
REFL-PRO
150 W
IN-PRO
32 dBm
TEMP-PRO
208 ℉
SET
RTC-PARA
RTC-DATE
2014 Y 6 M 8 D
RTC-TIME
18 H 40 M 59 S
SET
SYS-PARA-RESET
PARA-RESET
NO
SET
CLEAR-LOG
CLEAR-LOG
NO
SET
REMOTE-UPGRADE
REMOTE-UPGRADE
NO
SET


192.168.1.200/net_eth.shtml
MHPTV PA
LOG OUT
STATUS
SYSTEM SETTINGS
NETWORK SETTINGS
LOG-INFO
NET-PARA-SET
IP
192
168
1
200
SET
MASK
255
255
255
0
SET
GATEWAY
192
168
1
1
SET
Anywave Communication
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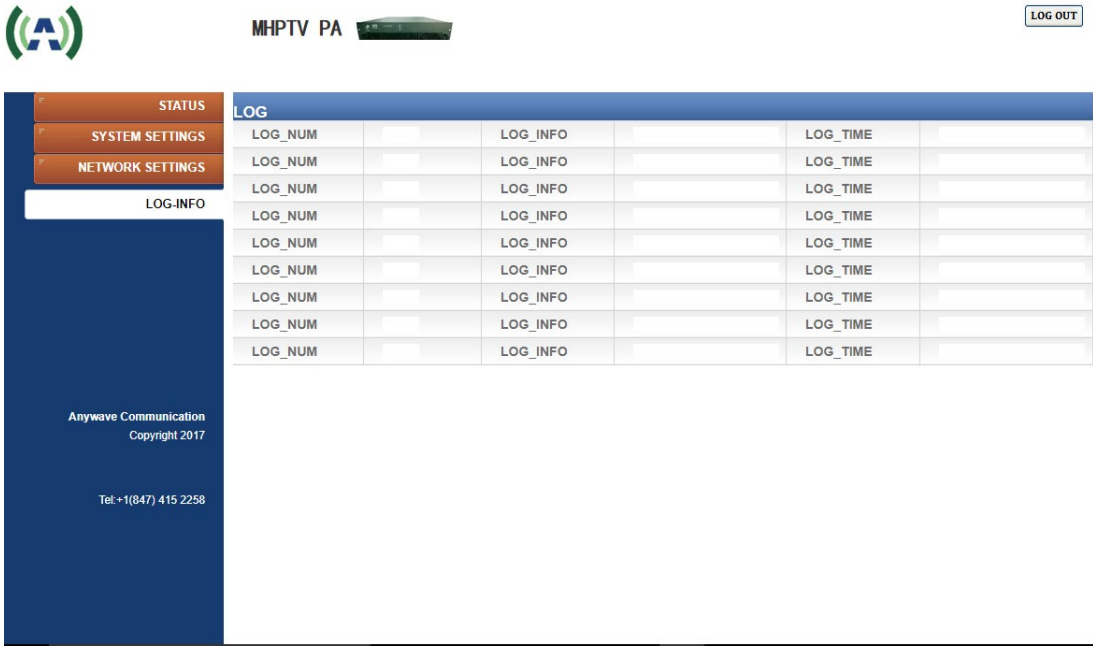
MHPTV PA
LOG OUT
STATUS
SYSTEM SETTINGS
NETWORK SETTINGS
LOG-INFO
LOG
LOG_NUM
LOG_INFO
LOG_TIME
Anywave Communication
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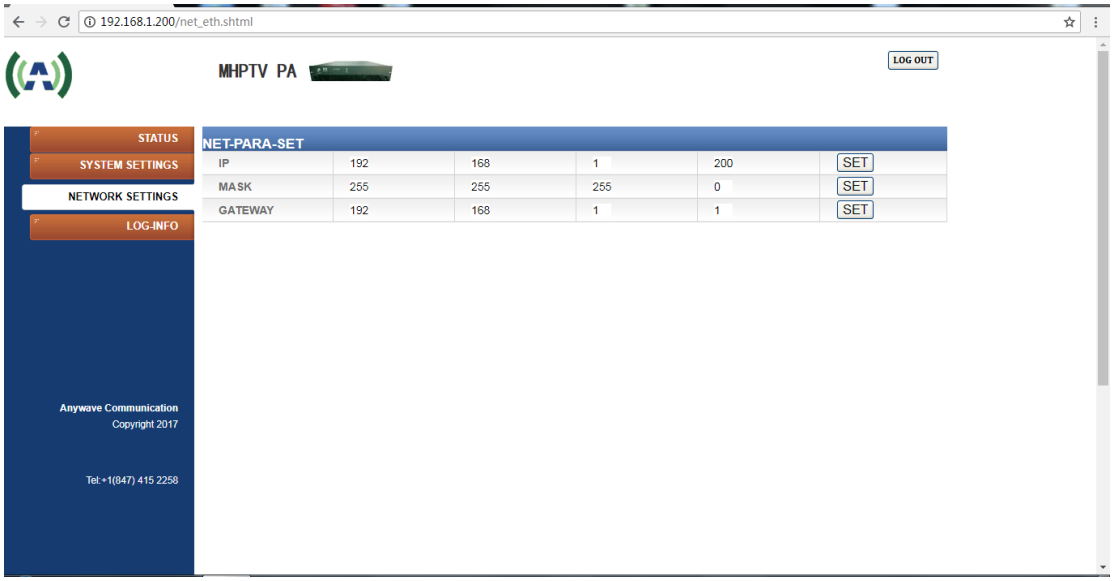
192.168.1.200/net_eth.shtml
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LOG OUT
STATUS
SYSTEM SETTINGS
NETWORK SETTINGS
LOG-INFO
NET-PARA-SET
IP 192 168 1 200 SET
MASK 255 255 255 0 SET
GATEWAY 192 168 1 1 SET
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