



ANYWAVE
ATSC 1KW DTV Transmitter
Operational Description
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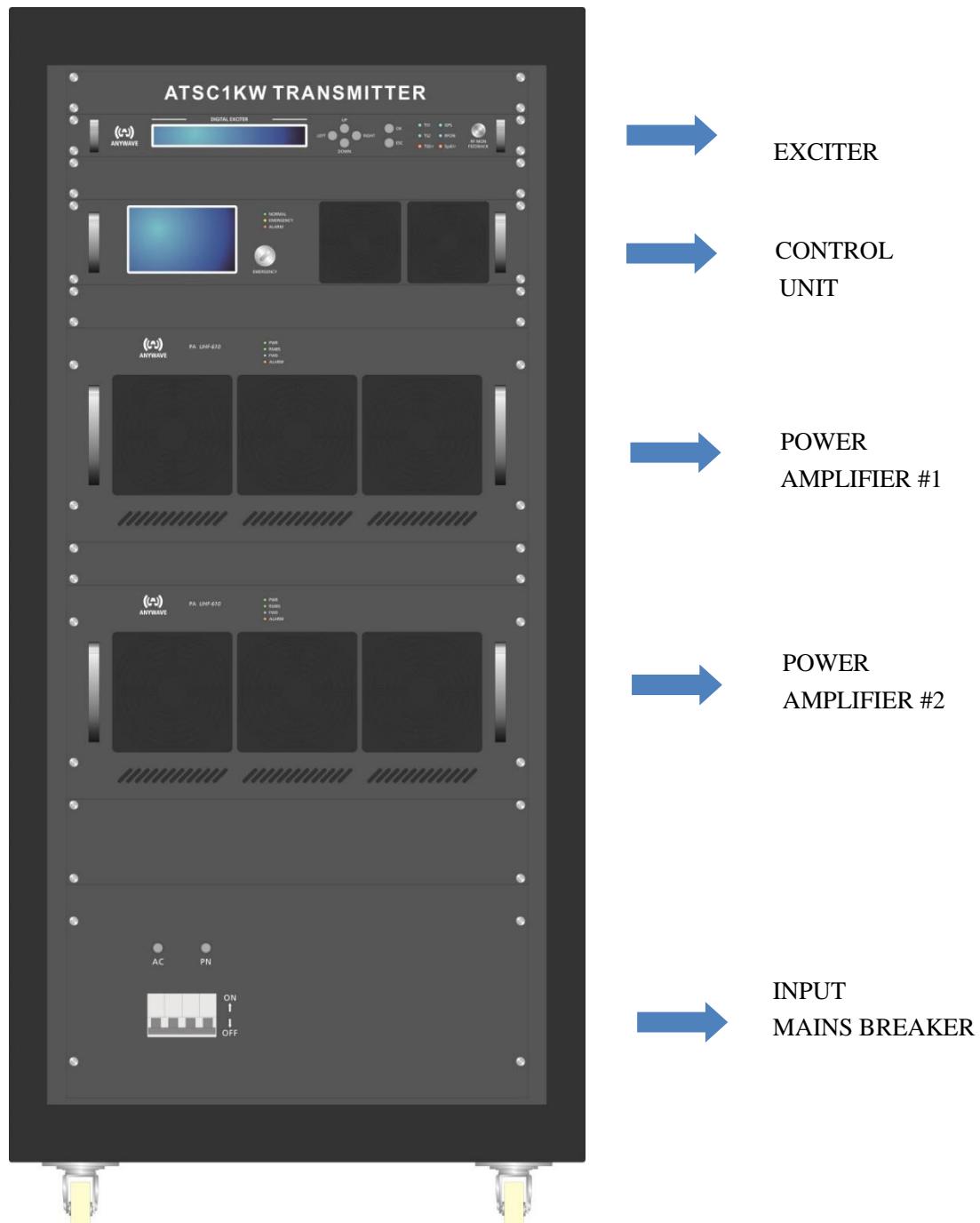
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1 Overview

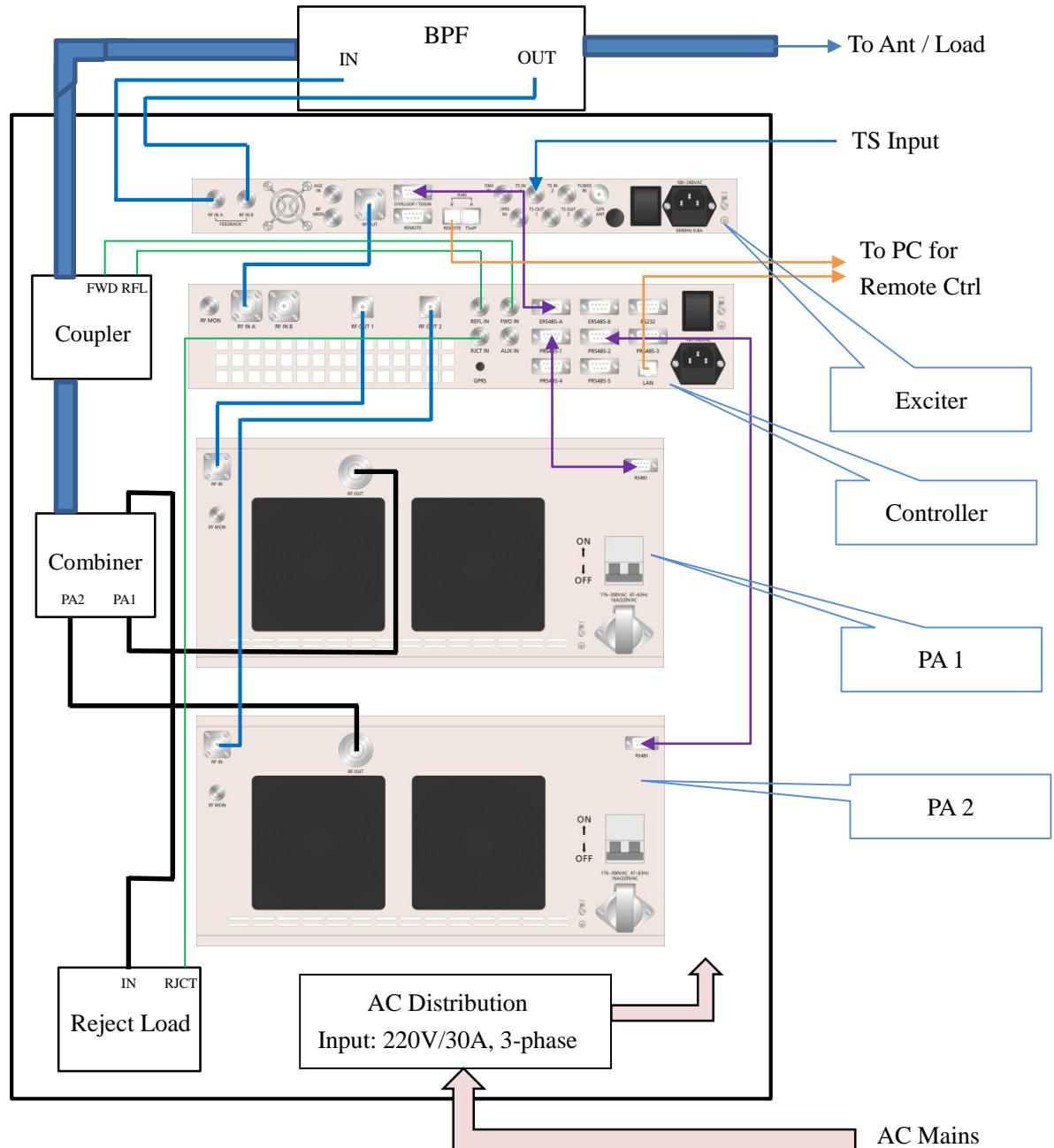
The ATSC 1000W DTV transmitter comes in single and dual exciter configurations, providing a control unit (with a front panel LCD and built-in preamp), two power amplifiers, a power splitter and combiner, and a power supply system.





2 TX System Schematic

The ATSC 1KW DTV transmitter is modular in its design. The diagram below shows the overall system schematic and signal flow existing between the various modules.





3 Theory of Operation

The ATSC 1000W DTV transmitter is conceptually simple to understand and easy to operate.

The Transmitter operates on 3-phase 220V, 30A AC Mains service. An AC Mains Distribution compartment is located in 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 ATSC ASI input stream is provided to one of the BNC connectors located on the rear panel of the Exciter. The Exciter supports options for DVB-ASI and SMPTE310M 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 FEC and Signal Processing to modulate a standard 19.39 Mbps ATSC TS to produce an RF output at the desired channel frequency. Supported ATSC modulation standards include A/53 (Legacy), A/153 (MH), and A110:20011 (SFN).

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 50W preamp driver (1xBLF571 device driving 2xBLF881 transistors in parallel). The output of the Controller preamp is then split and fed to the RF inputs of each of the PA modules.

The PA modules contain 4x BLF888A devices that amplify the RF signal to produce 600W of output power per PA. The amplified output signals of the two PAs are fed into a 2-way Hybrid Combiner and then into a Directional Coupler and finally out the top of the cabinet via a section of 1 5/8 transmission line.

The 1 5/8 output stack of the Transmitter is then fed into an inline 1 5/8 Harmonic Filter (LPF), if required, before entering a channel mask BPF. The output of the BPF connects to the Antenna feed to radiate the DTV signal on-air.

The Exciter receives two feedback signals from FWD and REV couplers located on 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 ideal 8-VSB forward path signal.

Additional feedback signals are provided to the Control module, which monitors these samples to implement protective protocols including forward power reduction or 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 2-way power combiner. The Control module also receives a feedback sample from the Reject Load, enabling it to control the variable fan speed on the load.



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.