Broadcast Electronics
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STX LP Generation II
1 kW, 2 kW, 3 kW, 5 kW
FM Transmitters
Operation Manual

597-4102-200
Revision B
May 31, 2013

STX LP Generation II - 1 kW, 2 kW, 3 kW, 5 kW FM Transmitters
Operation Manual

Broadcast Electronics Product Warranty (Two-Year Limited)

BE hereby warrants all new products manufactured by BE against any defects in material or workmanship at the time of delivery thereof, or that develop under normal use within a period of two (2) years from the date of shipment.

BE reserves the right to repair equipment under warranty with new or refurbished equipment or parts. BE's sole responsibility with respect to any equipment or parts not conforming to this warranty is to replace or repair such equipment upon the return thereof F.O.B. to BE's factory in Quincy, Illinois, U.S.A. In the event of replacement pursuant to the foregoing warranty, only the unexpired portion of the warranty from the time of the original purchase will remain in effect for any such replacement.

This warranty shall exclude the following products, component parts and/or assemblies:

(a) Transmitter power output tubes shall only carry the original manufacturers' or suppliers' standard warranty in effect on their original shipment date.

(b) All computers, computer peripherals, cables, hard disk drives, etc., shall only carry the manufacturers' or suppliers' standard warranty in effect on their original shipment date.

(c) "Components", defined as separate and individual parts (e.g. transistors, integrated circuits, capacitors, resistors, inductors, fans, etc), resold by BE from another manufacturer or supplier, shall only carry a 90 day warranty, effective the date of shipment. Any such 'Components' being returned for warranty claim must be (1) returned in their original packaging and (2) must be in new, unused condition. BE is unable to process or resolve component defects or performance concerns on components that have been soldered, installed, wired or in any way altered from new their new condition.

(d) "Resale Equipment", defined as equipment purchased from another manufacturer or supplier, then resold by BE, shall only carry such manufacturer's or supplier's standard warranty in effect as of the original shipment date. All warranty claims against any and all 'resale equipment' sold by BE must be filed directly with the original equipment manufacturer. BE is unable to process or resolve equipment defects or performance concerns on products or services not manufactured by BE.

This warranty shall not extend to claims resulting from any acts of God, terrorism, war, defects or failures caused by Purchaser or user abuse or misuse, operator error, or unauthorized attempts to repair or alter the equipment in any way.

Under no circumstances shall BE be responsible for indirect, incidental or consequential damages, including, but not limited to transportation costs, non-authorized repair or service costs, downtime costs, costs for substituting equipment or loss of anticipated profits or revenue, incurred by Purchaser, whether based in contract, tort or for negligence or breach of statutory duty or otherwise. The terms of the foregoing warranty shall be null and void if the equipment has been altered or repaired without specific written authorization from BE, or if not installed according to BE's instruction manuals, including, but not limited to, the absence of proper grounding, surge (TVSS) protection on the AC circuit panel or proper lightning protection/grounding on all output circuits, or if equipment is operated under environmental conditions or circumstances other than those specifically described in BE's product literature or instruction manual which accompany the equipment. The warranty shall be voided if the product or subassembly is equipped with a tamper seal and that tamper seal is broken. BE shall not be liable for any expense of any nature whatsoever incurred by the original user without prior written consent of BE. The warranty provided herein shall terminate at the end of the period set forth above. This warranty extends only to the original Purchaser and is not transferable. There are no third party beneficiaries of any of the provisions of

this warranty. If the equipment is described as “used” equipment, it is sold as is and where is and no warranty applies unless authorized in writing. .

EXCEPT AS SET FORTH HEREIN, AS TO TITLE AND AS SPECIFICALLY REQUIRED BY LAW, THERE ARE NO OTHER WARRANTIES, OR ANY AFFIRMATIONS OF FACT OR PROMISES BY BE, WITH REFERENCE TO THE EQUIPMENT, OR TO MERCHANTABILITY, FITNESS FOR A PARTICULAR APPLICATION, SIGNAL COVERAGE, INFRINGEMENT, OR OTHERWISE, WHICH EXTEND BEYOND THE DESCRIPTION OF THE EQUIPMENT ON THE FACE HEREOF.

IMPORTANT INFORMATION

EQUIPMENT LOST OR DAMAGED IN TRANSIT

When delivering the equipment to you, the truck driver or carriers' agent will present a receipt for your signature. Do not sign it until you have:

1) Inspected the containers for visible signs of damage and 2) Counted the containers and compared with the amount shown on the shipping papers. If a shortage or evidence of damage is noted, insist that notation to that effect be made on the shipping papers before you sign them.

Further, after receiving the equipment, unpack it and inspect thoroughly for concealed damage. If concealed damage is discovered, immediately notify the carrier, confirming the notification in writing, and secure an inspection report. This item should be unpacked and inspected for damage WITHIN 15 DAYS after receipt. Claims for loss or damage will not be honored without proper notification of inspection by the carrier.

RF PRODUCT TECHNICAL ASSISTANCE, REPAIR SERVICE, PARTS -

Technical assistance is available from Broadcast Electronics by letter, prepaid telephone or E-mail. Equipment requiring repair or overhaul should be sent by common carrier, prepaid, insured, and well protected. If proper shipping materials are not available, contact the RF Technical Services Department for a shipping container. Do not mail the equipment. We can assume no liability for inbound damage, and necessary repairs become the obligation of the shipper. Prior arrangement is necessary. Contact the RF Technical Services Department for a Return Authorization.

Emergency and warranty replacement parts may be ordered from the following address. Be sure to include the equipment model number, serial number, part description, and part number. Non-emergency replacement parts may be ordered directly from the Broadcast Electronics stock room at the number shown below.

RF TECHNICAL SERVICES

Telephone: +1 (217) 224-9617
E-Mail: rfservice@bdcast.com
Fax: +1 (217) 224-6258

FACILITY CONTACTS

Broadcast Electronics, - Quincy Facility
4100 N. 24th St. P.O. BOX 3606
Quincy, Illinois 62305
Telephone: +1 (217) 224-9600
Fax: +1 (217) 224-6258
General E-Mail: bdcast@bdcast.com
Web Site: www.bdcast.com

PARTS

Telephone: +1 (217) 224-9617
E-Mail: parts@bdcast.com

RETURN, REPAIR, AND EXCHANGES

Do not return any merchandise without our written approval and Return Authorization. We will provide special shipping instructions and a code number that will assure proper handling and prompt issuance of credit. Please furnish complete details as to circumstances and reasons when requesting return of merchandise. All returned merchandise must be sent freight prepaid and properly insured by the customer.

MODIFICATIONS

Broadcast Electronics, reserves the right to modify the design and specifications of the equipment in this manual without notice. Any modifications shall not adversely affect performance of the equipment so modified.

SAFETY PRECAUTIONS

PLEASE READ AND OBSERVE ALL SAFETY PRECAUTIONS

ALL PERSONS WHO WORK WITH OR ARE EXPOSED TO POWER TUBES, POWER TRANSISTORS, OR EQUIPMENT WHICH UTILIZES SUCH DEVICES MUST TAKE PRECAUTIONS TO PROTECT THEMSELVES AGAINST POSSIBLE SERIOUS BODILY INJURY. EXERCISE EXTREME CARE AROUND SUCH PRODUCTS. UNINFORMED OR CARELESS OPERATION OF THESE DEVICES CAN RESULT IN POOR PERFORMANCE, DAMAGE TO THE DEVICE OR PROPERTY, SERIOUS BODILY INJURY, AND POSSIBLY DEATH.

DANGEROUS HAZARDS EXIST IN THE OPERATION OF POWER TUBES AND POWER TRANSISTORS

The operation of power tubes and power transistors involves one or more of the following hazards, any one of which, in the absence of safe operating practices and precautions, could result in serious harm to personnel.

A. HIGH VOLTAGE - Normal operating voltages can be deadly. Additional information follows.

B. RF RADIATION - Exposure to RF radiation may cause serious bodily injury possibly resulting in Blindness or death. Cardiac pacemakers may be affected. Additional information follows.

C. HOT SURFACES - Surfaces of air-cooled radiators and other parts of tubes can reach temperatures of several hundred degrees centigrade and cause serious burns if touched. Additional information follows.

D. RF BURNS - Circuit boards with RF power transistors contain high RF potentials. Do not operate an RF power module with the cover removed.

HIGH VOLTAGE

Many power circuits operate at voltages high enough to kill through electrocution. Personnel should always break the primary AC Power when accessing the inside of the transmitter.

RADIO FREQUENCY RADIATION

Exposure of personnel to RF radiation should be minimized, personnel should not be permitted in the vicinity of open energized RF generating circuits, or RF transmission systems (waveguides, cables, connectors, etc.), or energized antennas. It is generally accepted that exposure to "high levels" of radiation can result in severe bodily injury including blindness. Cardiac pacemakers may be affected.

The effect of prolonged exposure to "low level" RF radiation continues to be a subject of investigation and controversy. It is generally agreed that prolonged exposure of personnel to RF radiation should be limited to an absolute minimum. It is also generally agreed that exposure should be reduced in working areas where personnel heat load is above normal. A 10 mW/cm^2 per one tenth hour average level has been adopted by several U.S. Government agencies including the Occupational Safety and Health Administration (OSHA) as the standard protection guide for employee work environments. An even stricter standard is recommended by the American National Standards Institute which recommends a 1.0 mW/cm^2 per one tenth hour average level exposure between 30 Hz and 300 MHz as the standard employee protection guide (ANSI C95.1-1982).

RF energy must be contained properly by shielding and transmission lines. All input and output RF connections, such as cables, flanges and gaskets must be RF leak proof. Never operate a power tube without a properly matched RF energy absorbing load attached. Never look into or expose any part of the body to an antenna or open RF generating tube or circuit or RF transmission system while energized. Monitor the tube and RF system for RF radiation leakage at regular intervals and after servicing.

HOT SURFACES

The power components in the transmitter are cooled by forced-air and natural convection. When handling any components of the transmitter after it has been in operation, caution must always be taken to ensure that the component is cool enough to handle without injury.

Table of Contents

Figures

Tables

1 Overview

The STX LP FM transmitter series is designed to provide a low power cost effective solution for the FM broadcast market. The STX LP is available in 4 models providing power levels from 250 W to 5 kW.

Every STX LP transmitter is tested at the factory for quality and reliability. Technicians will use settings given to sales representatives at the time of purchase. In the absence of this information, the following default settings are used:

- RF Power - OFF
- Frequency – 98.5 MHz
- Operating Mode – FM Only
- Total Output Power – Nominal by model name (1 kW Model - 1000 W, etc.)
- Emergency Output Power – 0 W
- 100% Modulation – 75 kHz
- Pre-emphasis – 75 μs
- Pilot Injection – On, 10%
- Mono/Stereo Mode - Stereo
- Audio Input – AES
- AES Injection Level – 100% at -2dBfs
- Analog L/R Injection Level – 100% with 3.5 Vpp at 400 Hz each input
- Composite Injection Level – 100% with 3.5 Vpp at 400 Hz
- SCA1 Injection – Off, 10% with 3.5 Vpp at 67 kHz
- SCA2 Injection – Off, 10% with 3.5 Vpp at 92 kHz
- RDS Injection – Off, 10% with 3.5 Vpp at 53 kHz
- Real Time Clock – Central Standard Time. Note: The internal real time clock may stop keeping time and reset to 2000-01-01 00:00:00 if the system has no AC power for approximately two days. This is highly likely to occur when the transmitter is shipped.
- Ethernet
  - DHCP - Disabled
  - I.P. – 10.2.4.110
  - Subnet Mask – 255.255.0.0
  - Gateway – 10.2.1.1
- Passwords
  - Chief – 12345678
  - User – 22222222
  - Operator – 11111111

For installation instruction, please see the STX LP Generation II FM Transmitter Installation and Maintenance Application Guide, BE part number 597-4101-200. A copy can be found in the front of the binder containing this manual that is shipped with all transmitters. For electronic copies of this and any other technical documentation please visit http://www.bdcast.com/information-center/ and follow navigation on the left side of the page – authorized login is required for download of technical documents.

2 Main Assembly Front Panel Features

The main assembly front panel contains LED indicators for the system controller, internal exciter, internal power amplifier, and an LCD user interface.

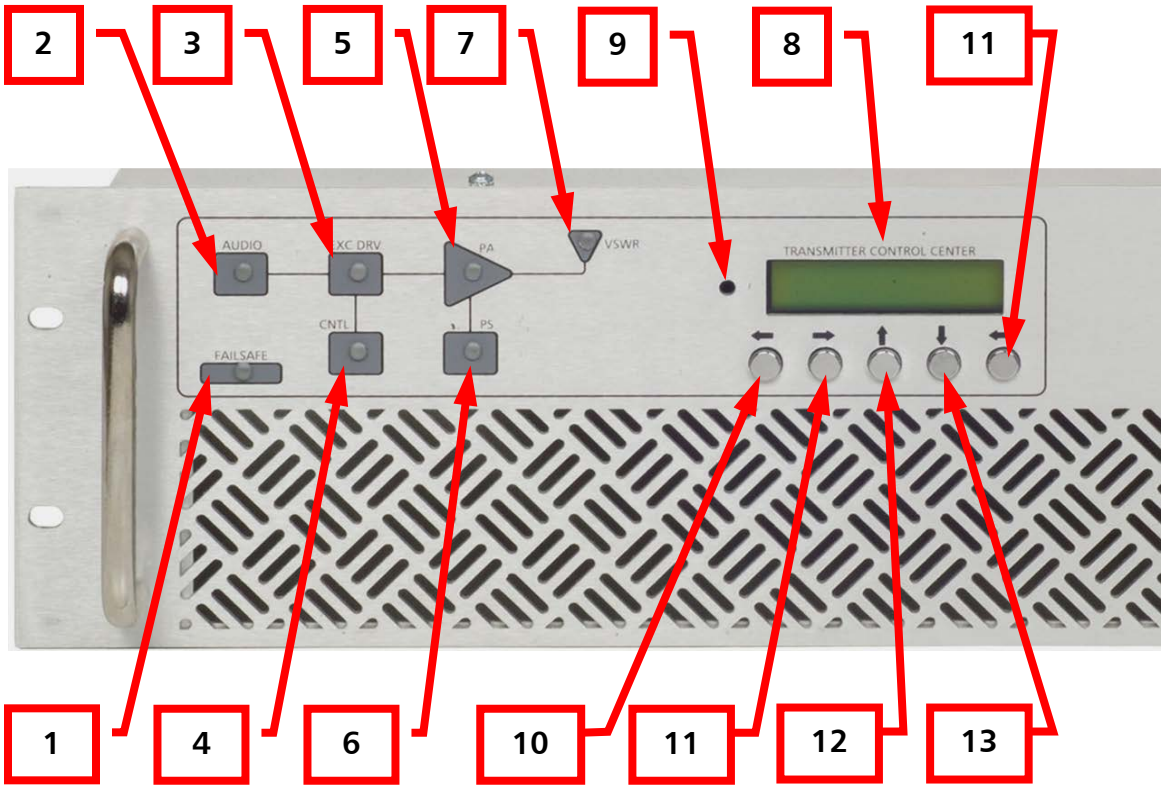


Figure 1 – Main Assembly Front Panel

2.1 FAILSAFE

The failsafe LED is coupled to the failsafe input on the back panel. Green indicates the failsafe is tied to ground for normal operation. If red the failsafe is open and exciter RF power is hardware disabled.

2.2 AUDIO

The audio LED indicates the status of the current primary audio source. If an audio peak silence condition is detected, this LED turns red. The LED remains green until a failure is detected. Check the exciter diagnostics for details on what alarms or faults may be active.

2.3 EXC DRV

The exciter drive LED indicates the status of any alarms or faults related to the exciter. Green indicates that the exciter has settled into normal operating conditions. Orange indicates an alarm condition. Red shows when the exciter has a fault condition. See Table 2 – Exciter Diagnostics Details in section 9.7 for more information.

Note that there is overlap between internal exciter and internal PA status for drive detection. An exciter drive alarm indication may originate from the PA. The exciter must also establish frequency lock as it powers up. These are intended to indicate conditions that prevent full operation whether the conditions are expected or not. Check the exciter and PA diagnostics for details on what alarms or faults may be active.

2.4 CNTL

The system control LED shows the status of the system controller. Green indicates normal control operation. Red indicates a loss of communication between the front panel and the system controller.

2.5 PA

The power amplifier LED shows status of the internal PA. Green indicates normal power control. Orange indicates an alarm condition. Red indicates a fault and PA shutdown condition. Check PA diagnostics for details on what alarms or faults may be active.

2.6 PS

The power supply LED shows the status of the RF power supply module. Green indicates normal operation. Orange indicates a self-reported alarm. Red indicates a determined fault. Check PA diagnostics for details on what alarms or faults may be active in the supply connected to the PA.

Note that these power supplies are on the same communications node as the PA they are connected to. A communication fault will illuminate red on both the PA and the PS LEDs.

2.7 VSWR

The voltage standing wave ratio LED shows the status of the internal PA output in terms of measured reflected power. Green indicates normal operation into an acceptable load. Orange indicates active foldback protection. Red indicates a fault and shutdown condition. Check PA diagnostics for details on what alarms or faults may be active in the PA.

2.8 TRANSMITTER CONTROL CENTER

This front panel LCD interface can be used for control and monitoring of all features in the system. Use the five buttons below the screen to navigate and make modifications. See section 5 - Transmitter Control Center for details on how to use this interface.

2.9 Contrast Control

A potentiometer tuning tool can be used to adjust the contrast on the LCD screen if desired. Turning the potentiometer clockwise reduces contrast, and turning it counter-clockwise increases contrast.

3 Add-on Assembly Front Panel Features

The add-on power amplifier assembly front panel contains LED indicators for the power amplifier.

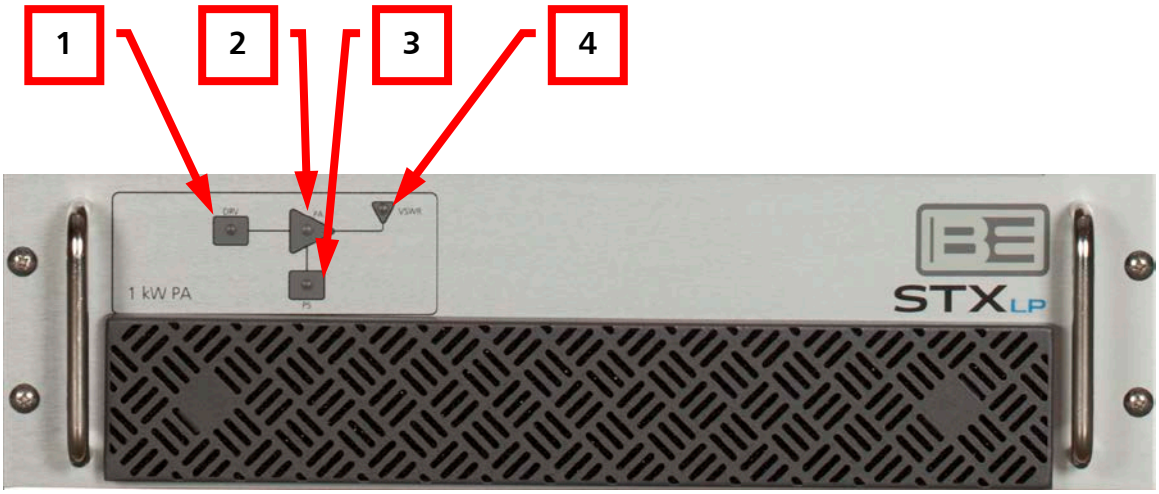


Figure 2 – Add-on PA Assembly Front Panel

3.1 DRV

The exciter drive LED shows the status of the RF input connected to PA RF IN. Green indicates normal operation levels. Red shows if an improper drive power level is detected.

3.2 PA

The power amplifier LED shows the status of PA hardware foldback protection. Green indicates normal operation. Red indicates an active hardware foldback. Check PA diagnostics for details on what alarms or faults may be active.

3.3 PS

The power supply LED shows the status of power to the front panel. Green shows when there is power, otherwise the LED is off. Check PA diagnostics for details on what alarms or faults may be active in the supply connected to the PA.

3.4 VSWR

The voltage standing wave ratio LED shows the status of the PA output in terms of measured reflected power. Green indicates normal operation into an acceptable load. Red indicates a fault and shutdown condition. Check PA diagnostics for details on what alarms or faults may be active in the PA.

4 Combiner Assembly Front Panel Features

The combiner assembly front panel contains LED indicators for the splitter and combiner.

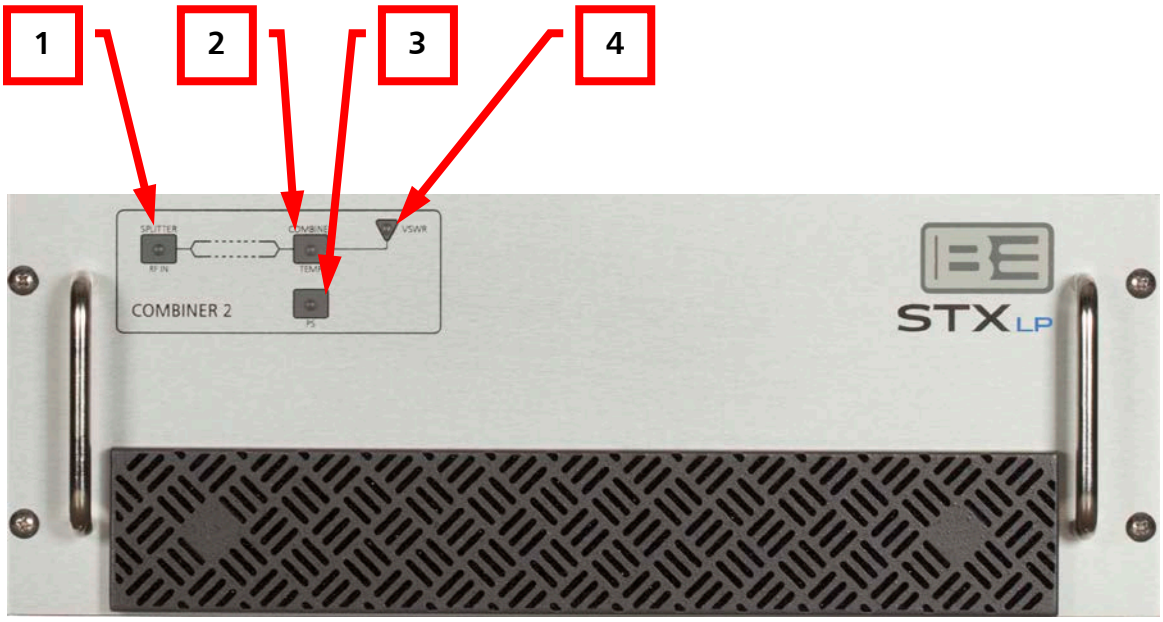


Figure 3 – Combiner Assembly Front Panel

4.1 RF IN

Splitter RF input LED. This LED indicates the general status of the RF splitter. Green indicates normal operation. Red indicates that the splitter output is turned off. There are a number of factors that can cause this to occur including invalid splitter input levels or detected problems in the combining system. Refer to the muted splitter output alarm in combiner diagnostics for details on what alarms or faults may be active causing this LED to turn red.

4.2 TEMP

Combiner temperature LED. This LED indicates the status of the internal temperature of the combiner. Green indicates normal operation with acceptable temperatures. Red indicates a fault due to excessively high temperatures.

4.3 PS

Power supply LED. This indicator shows the status of power to the combiner front panel. Green shows when there is power, otherwise the LED is off. Check combiner diagnostics for details on what alarms or faults may be active in the combiner.

4.4 VSWR

Voltage standing wave ratio LED. This shows the status of the system output in terms of measured reflected power. Green indicates normal operation into an acceptable load. Red indicates a fault and shutdown condition. Check combiner diagnostics for details on what alarms or faults may be active in the combiner.

5 Transmitter Control Center

Initial system setup after installation requires interfacing with the LCD display and buttons on the front of the main assembly, see section 2.8. Once initial setup is complete, almost all configurations accessible on this control center can be modified remotely via Ethernet interfaces.

5.1 ← Left Button

The context dependent left button performs two primary functions. When navigating between screens it allows a return to the main screen from any other navigation screen. When an editing screen is entered this button moves the cursor one space to the left.

5.2 → Right Button

The context dependent right button performs two primary functions. When navigating between screens it allows a return to the first screen of the submenu tree. When an editing screen is entered this button moves the cursor one space to the right.

5.3 ↑ Up Button

The context dependent up button performs various functions. When navigating between screens through the trunk it selects a new submenu tree. After entering a submenu screen it either selects different branches or cycles through options. When an editing screen is entered this button modifies the object located at the cursor.

5.4 ↓ Down Button

The context dependent down button performs various functions. When navigating between screens through the trunk it selects a new submenu tree (in the opposite direction as the up button). After entering a submenu screen it either selects different branches or cycles through options. When an editing screen is entered this button modifies the object located at the cursor.

5.5 ↵ Return Button

The context dependent down button performs two primary functions. When navigating between screens through the trunk it enters the next level in the menu. This can lead to submenu screens, options selection, or field editing. Once an editing function has been made this saves the field and returns to the first screen in the submenu tree.

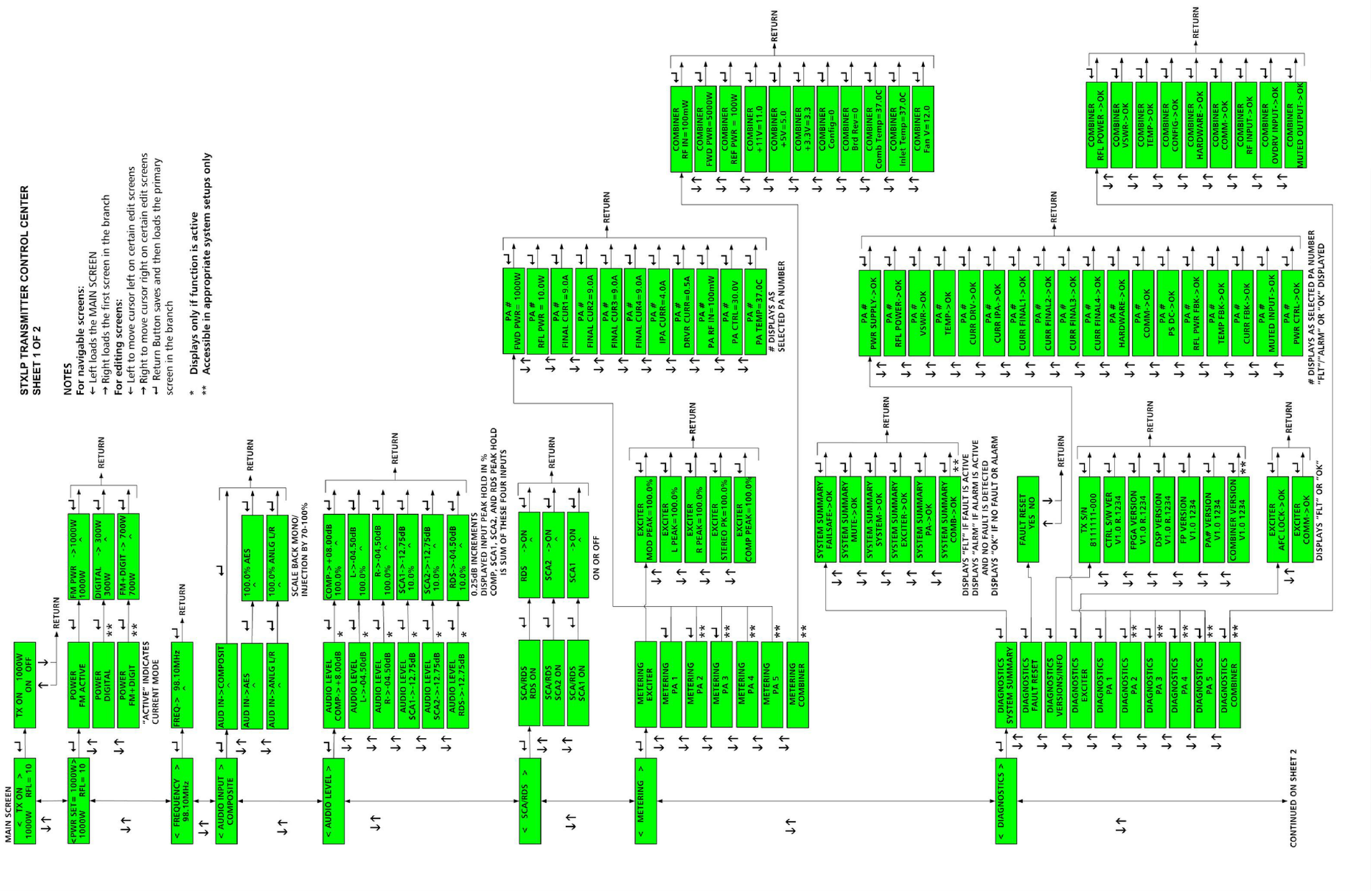


Figure 4 – Transmitter Control Center Menus Sheet 1

STXLP TRANSMITTER CONTROL CENTER
SHEET 2 OF 2

NOTES
For navigable screens:
← Left loads the MAIN SCREEN
→ Right loads the first screen in the branch
For editing screens:
← Left to move cursor left on certain edit screens
→ Right to move cursor right on certain edit screens
↵ Return Button saves and then loads the primary screen in the branch

* **Displays only if function is active**
** **Accessible in appropriate system setups only**

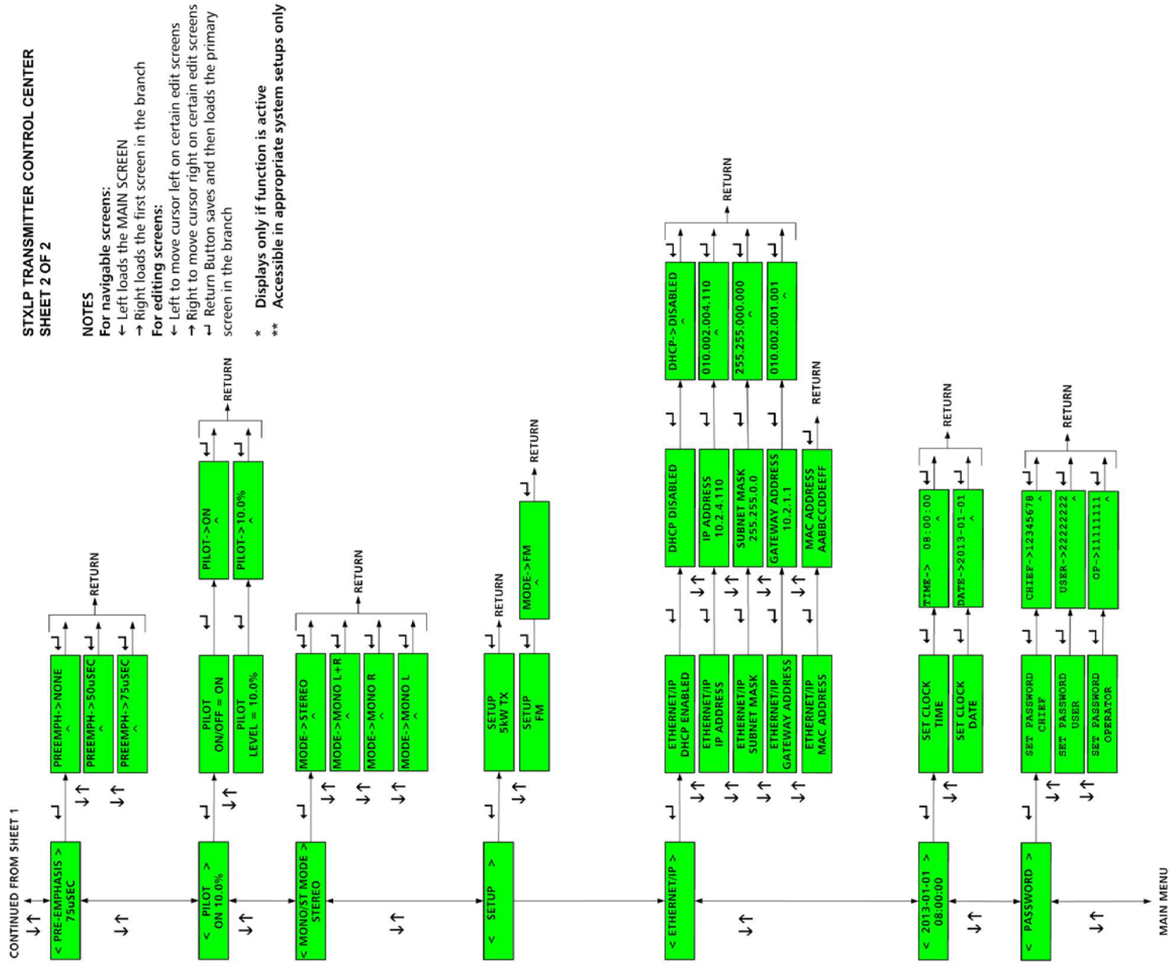


Figure 5 - Transmitter Control Center Menus Sheet 2

6 Web Page

The STX LP Generation II comes standard with a built in HTTP web server monitoring and control interface. To load this web page, simply direct a standard web browser to the IP assigned to the Ethernet port on the system.

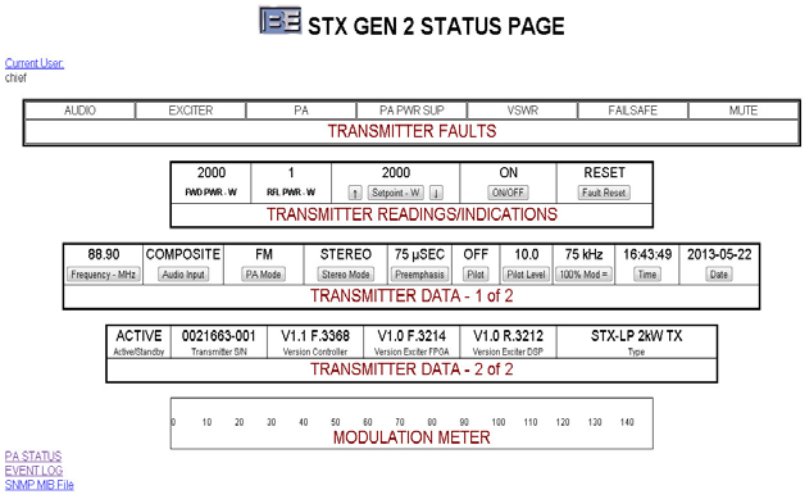


Figure 6 – Web Interface Main Page

The basic settings and monitoring fields in the system are shown above in Figure 6 – Web Interface. To cycle through the active user selection click the "Current User" link in the upper left. To access PA and Combiner monitoring information or the event log click on "PA STATUS" or "EVENT LOG" links respectively. These can be seen in Figure 8 and Figure 9.

Posting any settings to the transmitter requires an appropriate login. The graphic button objects are disabled for user types that do not have permission to modify transmitter settings. Once an adequate user selection is made, the buttons can be clicked to display any additional options. When the change is attempted a dialog box will pop up, which can be seen in Figure 9. Simply enter the active user type and the correct 8-digit numerical password that goes with it to save the setting. Note: password entry times out after 10 seconds and must be entered on the next new settings change attempt. Valid login is remembered for the active session.

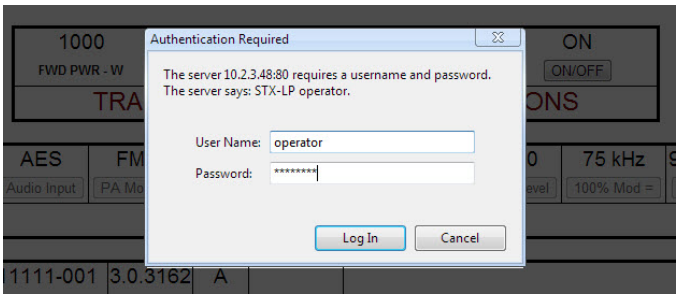


Figure 7 – Web Interface Authentication

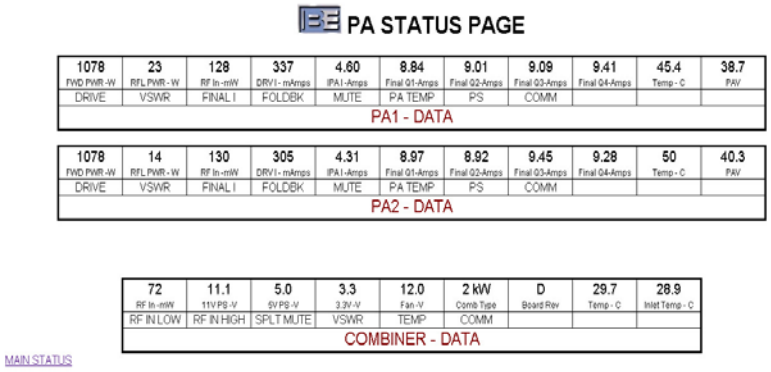


Figure 8 – Web Interface PA Page

EVENT LOG

MAIN STATUS

#	TIMESTAMP	EVENT	SOURCE	TYPE	PARAM	DESCRIPTION
10890	2013-05-22 11:48:24	4000	PA 2	Alarm Cleared	0	PA 2 PS DC Alarm Cleared
10889	2013-05-22 11:48:24	4000	PA 1	Alarm Cleared	0	PA 1 PS DC Alarm Cleared
10888	2013-05-22 11:48:24	4004	PA 1	Alarm Cleared	0	PA 1 Mute Alarm Cleared
10887	2013-05-22 11:48:24	4004	PA 2	Alarm Cleared	0	PA 2 Mute Alarm Cleared
10886	2013-05-22 11:48:24	4007	Combiner	Alarm Cleared	0	Combiner RF In Mute Alarm Cleared
10885	2013-05-22 11:48:24	4000	PA 2	Alarm Cleared	0	PA 2 PS DC Alarm Cleared
10884	2013-05-22 11:48:24	4000	PA 1	Alarm Cleared	0	PA 1 PS DC Alarm Cleared
10883	2013-05-22 11:48:24	6001	Controller	Event	0	Transmitter On
10882	2013-05-22 11:48:22	4007	Combiner	Alarm Asserted	0	Combiner RF In Mute Alarm Asserted
10881	2013-05-22 11:48:22	4000	PA 2	Alarm Asserted	0	PA 2 PS DC Alarm Asserted
10880	2013-05-22 11:48:22	4000	PA 1	Alarm Asserted	0	PA 1 PS DC Alarm Asserted
10879	2013-05-22 11:48:22	4004	PA 2	Alarm Asserted	0	PA 2 Mute Alarm Asserted
10878	2013-05-22 11:48:22	4004	PA 1	Alarm Asserted	0	PA 1 Mute Alarm Asserted
10877	2013-05-22 11:48:22	6002	Controller	Event	0	Transmitter Off
10876	2013-05-22 11:46:47	4000	PA 2	Alarm Cleared	0	PA 2 PS DC Alarm Cleared
10875	2013-05-22 11:46:47	4000	PA 1	Alarm Cleared	0	PA 1 PS DC Alarm Cleared
10874	2013-05-22 11:46:47	4004	PA 1	Alarm Cleared	0	PA 1 Mute Alarm Cleared
10873	2013-05-22 11:46:47	4004	PA 2	Alarm Cleared	0	PA 2 Mute Alarm Cleared
10872	2013-05-22 11:46:47	4007	Combiner	Alarm Cleared	0	Combiner RF In Mute Alarm Cleared
10871	2013-05-22 11:46:47	4000	PA 1	Alarm Cleared	0	PA 1 PS DC Alarm Cleared
10870	2013-05-22 11:46:47	4000	PA 2	Alarm Cleared	0	PA 2 PS DC Alarm Cleared
10869	2013-05-22 11:46:47	6001	Controller	Event	0	Transmitter On
10868	2013-05-22 11:46:40	4007	Combiner	Alarm Asserted	0	Combiner RF In Mute Alarm Asserted
10867	2013-05-22 11:46:40	4000	PA 2	Alarm Asserted	0	PA 2 PS DC Alarm Asserted
10866	2013-05-22 11:46:40	4000	PA 1	Alarm Asserted	0	PA 1 PS DC Alarm Asserted
10865	2013-05-22 11:46:40	4004	PA 2	Alarm Asserted	0	PA 2 Mute Alarm Asserted
10864	2013-05-22 11:46:40	4004	PA 1	Alarm Asserted	0	PA 1 Mute Alarm Asserted
10863	2013-05-22 11:46:40	6002	Controller	Event	0	Transmitter Off
10862	2013-05-22 11:23:48	6019	Controller	Event	0	Active
10861	2013-05-22 11:23:48	4000	PA 2	Alarm Cleared	0	PA 2 PS DC Alarm Cleared
10860	2013-05-22 11:23:48	4000	PA 1	Alarm Cleared	0	PA 1 PS DC Alarm Cleared
10859	2013-05-22 11:23:48	4004	PA 1	Alarm Cleared	0	PA 1 Mute Alarm Cleared

Figure 9 – Web Interface Events Page

To check the current web page version, simply point a web browser to [IP Address]/rev.html

7 SNMP

Simple Network Management Protocol is a member of the Internet Protocol standard communications suite. The STX LP Generation II comes with a built-in SNMP agent (SNMP version 2c) for handling all request types included in the protocol – GET, SET, GETNEXT, and GETBULK. The appropriate MIB for the version of SNMP agent installed on the transmitter must be downloaded from the transmitter itself. As with any MIB, this ASCII text file completely defines the data structure within the agent. The MIB also provides textual descriptions for every accessible object. To download the file access the web interface using a standard web browser. Right click on the "SNMP MIB File" link and click "Save link as…", refer to Figure 10. Save a local copy of the mib file wherever desired for use in an SNMP manager application. Alternatively, click the link and navigate to the file in the browser. Right click anywhere in the viewing space and click "Save as…" Simply remove the .txt extension (leaving only the .mib extension) and save at the desired location.

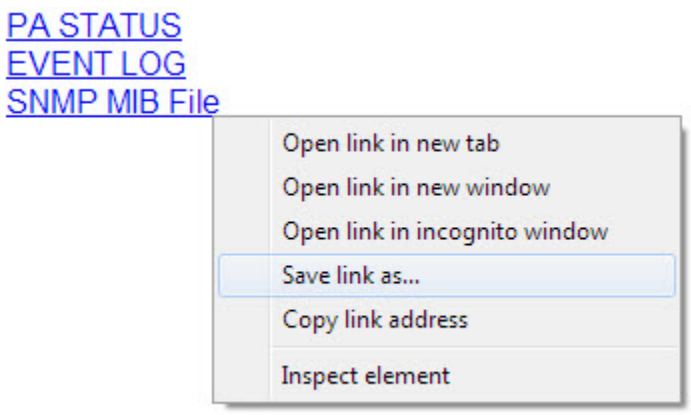


Figure 10 – MIB Download

An SNMP manager application must be utilized in order to access the interface. Integrating a manager into custom station automation programming provides countless possibilities. Alternatively, various third party MIB browser GUI applications are available for free download; however Broadcast Electronics does not endorse any specific application. Simply direct the manager to the Ethernet port for communication across a network.

7.1 Authentication

Data is accessible by using the correct community strings for the desired login level. The formula for these strings is a combination of the login type – chief, user, or operator –, a delimitating '+' character, and the 8 digit numerical password associated with that login type. For example, "chief+12345678" in both the read community and write community passes authentication and allows read and write to essentially every object in the MIB with the appropriate max-access type. User and Operator login types provide more strict control over what settings can be modified and commands issued in the system.

7.2 Objects

The SNMP interface utilizes tables wherever it makes sense to communicate data in an indexed fashion. Almost all PA data is structured as tables by using the PA number as the index. This works by appending ".#" to the object where # is the PA number. Note that a normal "leaf" node is accessed by appending ".0" as in …38118.2.2.2.0 for system forward power.

Table 1 – SNMP Object Access

Object ID	User Access	Operator Access	Chief Access
transmitterType	Read	Read	Read/Write
serialNumber	Read	Read	Read
activeStandby	Read	Read	Read
primarySecondary	Read	Read	Read
frequency	Read	Read	Read/Write
time	Read	Read	Read/Write
date	Read	Read	Read/Write
macAddress	Read	Read	Read
useDHCP	Read	Read	Read/Write
keyTypeSNMPv3	Read	Read	Read/Write
requireSNMPv3	Read	Read	Read/Write
requireHTTPDigestAuth	Read	Read	Read/Write
ipAddress	Read	Read	Read
subnetMask	Read	Read	Read
gatewayAddress	Read	Read	Read
staticIPAddress	Read	Read	Read/Write
staticSubnetMask	Read	Read	Read/Write
staticGatewayAddress	Read	Read	Read/Write
userPassword	Read/Write	Read/Write	Read/Write
operatorPassword	None	Read/Write	Read/Write
chiefPassword	None	None	Read/Write
transmitterIsOn	Read	Read	Read
systemForwardPower	Read	Read	Read
systemReflectedPower	Read	Read	Read
transmitterOnOff	Read	Read/Write	Read/Write
currentPowerMode	Read	Read	Read
autoPowerMode	Read	Read	Read
defaultPowerMode	Read	Read	Read/Write
setpointCurrent	Read	Read/Write	Read/Write
setpointFM	Read	Read/Write	Read/Write
setpointFmDigital	Read	Read/Write	Read/Write
setpointDigital	Read	Read/Write	Read/Write
setpointCurrentMin	Read	Read	Read
setpointFMMin	Read	Read	Read
setpointFmDigitalMin	Read	Read	Read
setpointDigitalMin	Read	Read	Read
setpointCurrentMax	Read	Read	Read
setpointFMMax	Read	Read	Read
setpointFmDigitalMax	Read	Read	Read
setpointDigitalMax	Read	Read	Read

Object ID	User Access	Operator Access	Chief Access
inputSelect	Read	Read	Read/Write
peakModulationDeviation	Read	Read	Read/Write
preemphasis	Read	Read	Read/Write
monoStereoMode	Read	Read	Read/Write
modulationPeakHold	Read	Read	Read
stereoGeneratorPeakHold	Read	Read	Read
compositeAdjust	Read	Read	Read/Write
compositeDB	Read	Read	Read
compositePeakHold	Read	Read	Read
analogLAdjust	Read	Read	Read/Write
analogLDB	Read	Read	Read
analogLPeakHold	Read	Read	Read
analogRAdjust	Read	Read	Read/Write
analogRDB	Read	Read	Read
analogRPeakHold	Read	Read	Read
sca1OnOff	Read	Read	Read/Write
sca1Adjust	Read	Read	Read/Write
sca1DB	Read	Read	Read
sca2OnOff	Read	Read	Read/Write
sca2Adjust	Read	Read	Read/Write
sca2DB	Read	Read	Read
rdsOnOff	Read	Read	Read/Write
rdsAdjust	Read	Read	Read/Write
rdsDB	Read	Read	Read
analogLRLevel	Read	Read	Read/Write
aesLevel	Read	Read	Read/Write
pilotOnOff	Read	Read	Read/Write
pilotLevel	Read	Read	Read/Write
clock10MhzStatus	Read	Read	Read
clock10MhzLock	Read	Read	Read
clock1PPS	Read	Read	Read
afcLock	Read	Read	Read
afcUnlock	Read	Read	Read
modulationSilence	Read	Read	Read
audioInputSilence	Read	Read	Read
audioSilenceThreshold	Read	Read	Read/Write
audioSilencePeriod	Read	Read	Read/Write
exciterCommunications	Read	Read	Read
paForwardPower	Read	Read	Read
paReflectedPower	Read	Read	Read
paPowerSetpoint	Read	Read	Read/Write
paRfInPower	Read	Read	Read
paAlarmStatus	Read	Read	Read
paAlarmPowerSupplyDC	Read	Read	Read
paAlarmFoldbackReflectedPower	Read	Read	Read
paAlarmFoldbackTemperature	Read	Read	Read
paAlarmFoldbackCurrent	Read	Read	Read
paAlarmMutedInput	Read	Read	Read
paAlarmRailed	Read	Read	Read

Object ID	User Access	Operator Access	Chief Access
paFaultStatus	Read	Read	Read
paFaultPowerSupply	Read	Read	Read
paFaultReflectedPower	Read	Read	Read
paFaultVSWR	Read	Read	Read
paFaultTemperature	Read	Read	Read
paFaultCurrentDriver	Read	Read	Read
paFaultCurrentIPA	Read	Read	Read
paFaultCurrentFinal1	Read	Read	Read
paFaultCurrentFinal2	Read	Read	Read
paFaultCurrentFinal3	Read	Read	Read
paFaultCurrentFinal4	Read	Read	Read
paFaultHardware	Read	Read	Read
paFaultCommunication	Read	Read	Read
paTemperature	Read	Read	Read
paPsVoltage	Read	Read	Read
paDriveCurrent	Read	Read	Read
paIPACurrent	Read	Read	Read
paFinal1Current	Read	Read	Read
paFinal2Current	Read	Read	Read
paFinal3Current	Read	Read	Read
paFinal4Current	Read	Read	Read
paTotalCurrent	Read	Read	Read
combinerForwardPower	Read	Read	Read
combinerReflectedPower	Read	Read	Read
splitterRFInputPower	Read	Read	Read
splitterConfigID	Read	Read	Read
splitterBoardRev	Read	Read	Read
splitterAlarmInputMute	Read	Read	Read
splitterAlarmInputOverdrive	Read	Read	Read
splitterAlarmOutputMuted	Read	Read	Read
combinerFaultReflectedPower	Read	Read	Read
combinerFaultVSWR	Read	Read	Read
combinerFaultTemperature	Read	Read	Read
combinerFaultConfig	Read	Read	Read
combinerFaultHardware	Read	Read	Read
combinerFaultCommunication	Read	Read	Read
splitterCombinerPs11V	Read	Read	Read
splitterCombinerPs5V	Read	Read	Read
splitterCombinerPs3_3V	Read	Read	Read
combinerFan	Read	Read	Read
combinerTemperatureInternal	Read	Read	Read
combinerTemperatureInlet	Read	Read	Read
failsafe	Read	Read	Read
muteInput	Read	Read	Read
fmMode	Read	Read	Read
fmDigitalMode	Read	Read	Read
digitalMode	Read	Read	Read
systemReflectedPowerOutput	Read	Read	Read
paTotalCurrentOutput	Read	Read	Read
paTemperatureOutput	Read	Read	Read

Object ID	User Access	Operator Access	Chief Access
systemFaultOutput	Read	Read	Read
vswrSystemOutput	Read	Read	Read
transmitterOnOutput	Read	Read	Read
transmitterOffOutput	Read	Read	Read
muteOutput	Read	Read	Read
afcLockOutput	Read	Read	Read
paPsFaultOutput	Read	Read	Read
paFaultOutput	Read	Read	Read
paForwardPowerOutput	Read	Read	Read
paReflectedPowerOutput	Read	Read	Read
systemForwardPowerOutput	Read	Read	Read
paVoltageOutput	Read	Read	Read
controllerSoftware	Read	Read	Read
controllerHardware	Read	Read	Read
splitterCombinerSoftware	Read	Read	Read
splitterCombinerHardware	Read	Read	Read
paSoftware	Read	Read	Read
paHardware	Read	Read	Read
frontPanelSoftware	Read	Read	Read
frontPanelHardware	Read	Read	Read
systemFaultReset	Read	Read/Write	Read/Write
failsafeStatus	Read	Read	Read
mute	Read	Read	Read
systemAlarm	Read	Read	Read
systemFault	Read	Read	Read
exciterAlarm	Read	Read	Read
exciterFault	Read	Read	Read
paAlarm	Read	Read	Read
paFault	Read	Read	Read
paPsFault	Read	Read	Read
splitterCombinerAlarm	Read	Read	Read
splitterCombinerFault	Read	Read	Read
vswrFault	Read	Read	Read
eventTimestamp	Read	Read	Read
eventType	Read	Read	Read
eventSource	Read	Read	Read
eventCode	Read	Read	Read
eventParam	Read	Read	Read
eventLogEntryOldest	Read	Read	Read
eventLogEntryNext	Read	Read	Read
eventLogClear	Read	Read	Read/Write

8 Backup Control Modes

STX Generation II systems come equipped with two backup control methods. Emergency control mode is integrated standard with all systems and simply allows the system to continue functioning in the event of a system controller failure. The backup system control and exciter feature utilizes an entire controller and exciter sub-system to also allow for full control interfacing and an identical standby exciter.

8.1 Emergency Control Mode

In the event of a loss in communications with the system controller, all sub-systems enter emergency control mode. Behavior when in this mode depends on user specified emergency power levels. This must be set to the desired emergency power level in order to enable the feature, which comes from the factory set at 0 W and is effectively disabled. The transmitter will continue to function in emergency mode as long as the exciter maintains drive to all power amplifiers.

8.2 Standby System Control and Exciter

For complete system control and exciter redundancy an FW LP1 exciter switcher kit can be acquired. These kits supply all required hardware for utilization of standby systems in STX LP Generation II systems. The exciter switcher occupies one rack unit. The standby controller/exciter is typically contained in a second main unit. 1kW systems utilize an additional two rack unit STXe chassis.

Detailed information including installation and operation of this optional configuration are contained in the FW LP1 Standby Exciter Application Guide, BE part number 597-4005. A copy is included in standard kits and/or inserted in the front of the binder containing this manual if shipped as part of the same order. For electronic copies of this and any other technical documentation please visit http://www.bdcast.com/information-center/ and follow navigation on the left side of the page – authorized login is required.

9 Troubleshooting

Some basic information and troubleshooting steps are included below. If problems persist, please contact RF Technical Services. Contact information is located on our website at www.bdcast.com and on page iii in the front of this manual.

A fault in any part of the system indicates a complete disruption in normal operation of at least one part of the transmitter system. A fault might simply indicate loss of one PA or may be as serious as a complete shutdown of the entire transmitter.

A fault reset command should always be issued through diagnostics in any user interface to correct fault conditions. If the reset is not successful or a condition that caused a fault still remains, the fault will re-assert.

An alarm typically indicates an abnormal condition that is expected or should resolve itself. Alarms in unexpected situations could indicate serious conditions. Alarms that persist for long periods of time or unexpectedly appear on a regular basis should not be ignored. To get a good feel for what alarms are expended under which conditions, see the alarm details in the sections that follow.

9.1 Event Log

The system event log can be accessed through the web interface log page or in its raw form through the eventLog tree in SNMP. An event is defined by its index starting with the first saved event at index 1, a timestamp from the system's internal real time clock, an event identification number, and the sub-system where the event triggered. Some events also have context-based parameters that are embedded in the description of the event.

9.2 Standby

The STX LP Generation II comes with built-in functionality for a standby controller and exciter – see section 8.2 Standby System Control and Exciter. A system that is in standby is muted and not actively controlling the transmitter. This mode is not intended in a setup that has a single system controller and exciter. Standby system control and exciter setups should also be able to have no more than one unit active at a time.

If a system is stuck in standby mode, this typically indicates a setup problem. Single system controller and exciter setups require a stub 949-4130 that activates the transmitter. This must be attached to the BE Interface jack, please see the appropriate section in the installation and maintenance guide. Dual system controller and exciter setups require a switcher that connects to both assemblies through this interface, and the switcher device must be operated to activate one controller/exciter.

9.3 Failsafe

An asserted failsafe input on the remote station interface is required for operation of the system. The intended usage of this input is to make a loop that passes through safety relays in all critical transmission system components. When any part of the transmission system becomes unsafe, the circuit should open and de-assert the failsafe on the transmitter. When a failsafe condition is active, check all systems that are wired into the failsafe circuit.

9.4 Mute

A mute refers to a lack of an RF source in some part of the system, and the affected part depends on the context of the notification. Mute indications can happen at various stages for different reasons, and details in system sections below should be considered.

Transmitter mute conditions typically refer to the FM exciter. In internal exciters this commonly occurs when:

- There is no power to the exciter
- The transmitter is turned off
- The mute input pin on the remote station interface is asserted
- Failsafe input is not asserted
- The BE Interface active input is not asserted

9.5 Internal Exciter Diagnostics

Table 2 – Exciter Diagnostics Details

Fault/Alarm	Description
AFC Unlock Alarm	Automatic frequency control system does not yet have lock.
Modulation Silence Alarm	This alarm activates when a silence condition is detected in exciter modulation.
Audio Input Silence Alarm	This alarm activates when a silence condition is detected at the exciter input.
Communication Fault	This fault occurs when communication between the system controller and the internal exciter is lost.

9.6 Power Amplifier Diagnostics

Table 3 – PA Diagnostics Details

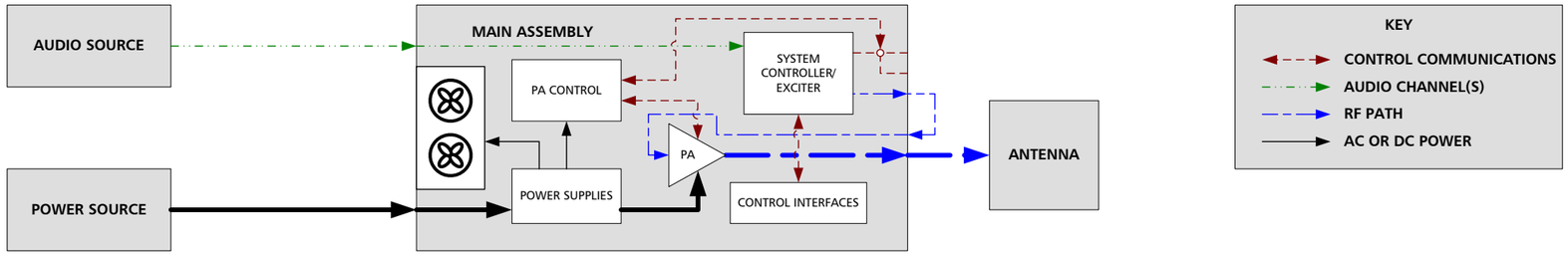
Fault/Alarm	Description
RF Power Supply Fault	This fault activates when a power supply failure is detected.
Reflected Power Fault	This fault activates when a sudden increase in reflected power is detected by hardware in the power amplifier. The threshold for this fault detection is 111W, which is 2.0:1 VSWR running at the rated power level.
VSWR Fault	This fault activates when the measured VSWR is greater than 2.0:1 at any power level
Temperature Fault	This fault actives when the measured internal heat sink temperature exceeds about 95 degrees C
Current Fault	There is current monitoring on the four final stage RF amplifiers. The PA shuts down when measured current on any of these solid state amplifiers exceeds about 20A DC.
Hardware Fault	This is an internal self-report of problems in PA controller hardware.
Communication Fault	This fault occurs when communication between the system controller and the PA is lost.
Power Supply DC Alarm	This is a direct connection to a self-reported DC level issue in the RF power supply. This asserts when the voltage is below the minimum threshold of about 6V. This is normal behavior when

Fault/Alarm	Description
	the PA is turned off for any reason.
Reflected Power Foldback Alarm	During FM only operation, the PA attempts to lower its output power when reflected power approaches dangerous levels. This keeps the transmitter running at reduced power in order to prevent a reflected power fault.
Temperature Foldback Alarm	During FM only operation, the PA attempts to lower its output power when the internal power sink temperature approaches dangerous levels. This keeps the transmitter running at reduced power in order to prevent a temperature fault.
Current Foldback Alarm	During FM only operation, the PA attempts to lower its output power when the worst case final transistor current approaches dangerous levels. This keeps the transmitter running at reduced power in order to prevent a current fault.
Muted Input Alarm	This alarm activates as a hardware failsafe mechanism when the measured exciter drive input is below the minimum threshold for safe operation. The threshold is based on operating mode: FM-only mutes below about 10 mW and digital modes mute below about 0.5 mW.
Railed Alarm	During FM only operation this indicates a condition where automatic power control has reached its highest or lowest possible control value.

9.7 Combiner Diagnostics

Table 4 – Combiner Diagnostics Details

Fault/Alarm	Description
Reflected Power Fault	This fault activates when a sudden increase in reflected power is detected by hardware in the combiner. The threshold for this fault detection is based on 2.0:1 VSWR running at the rated power level.
VSWR Fault	This fault activates when the measured VSWR is greater than 2.0:1 at any power level.
Temperature Fault	This fault actives when the measured internal heat sink temperature exceeds about 95 degrees C.
Config Fault	This fault activates when the system setup does not match the configuration of the combiner.
Hardware Fault	This is an internal self-report of problems in combiner controller hardware.
Communication Fault	This fault occurs when communication between the system controller and the combiner is lost.
Muted Splitter Input Alarm	This alarm does not activate. RF mute protection occurs at the PAs to ensure correct operation in both FM and digital modes.
Overdriven Splitter Input Alarm	This alarm activates when the exciter drive input to the splitter is above the maximum threshold for safe operation, about 24 dBm.
Muted Splitter Output Alarm	This alarm activates when the exciter drive outputs from the splitter are turned off by the combiner controller due to problems in the combiner module and its sub-systems. Reflected power fault, temperature fault, and overdriven splitter input alarm will disable the splitter output.



STX LP GENERATION II – 1kW BLOCK DIAGRAM

STX LP GENERATION II – 2kW BLOCK DIAGRAM

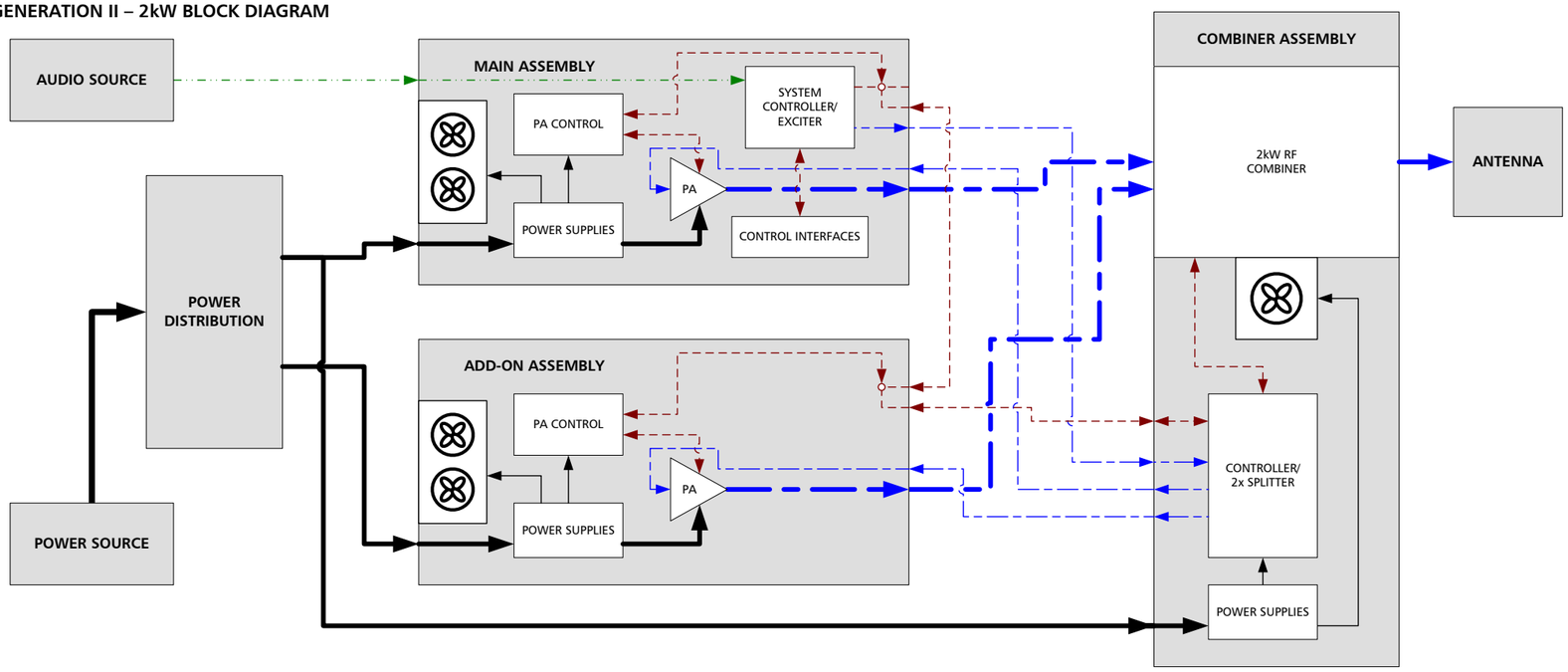


Figure 11 - STX LP Gen II 1kW and 2kW Block Diagrams

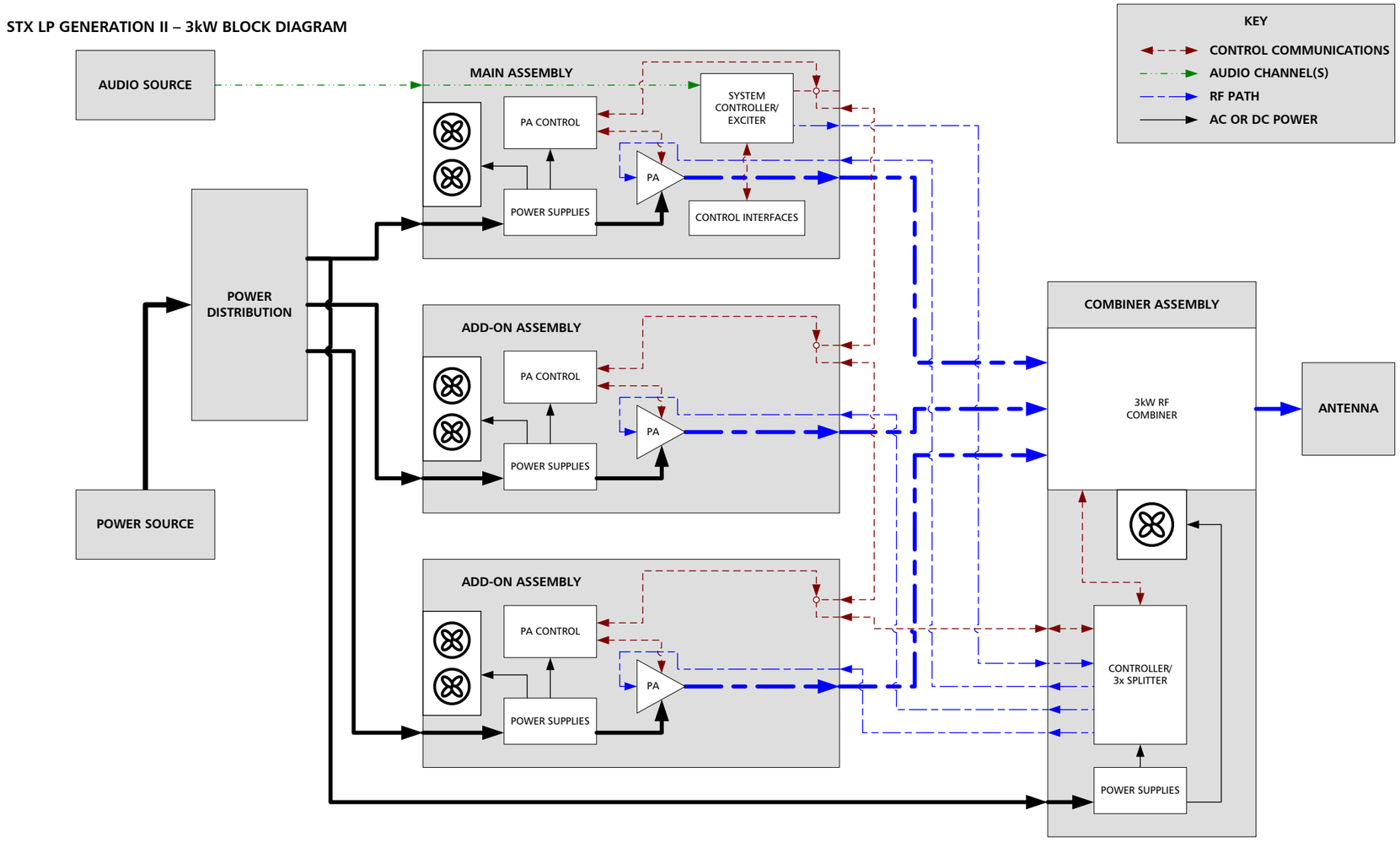


Figure 12 - STX LP Gen II 3kW Block Diagram

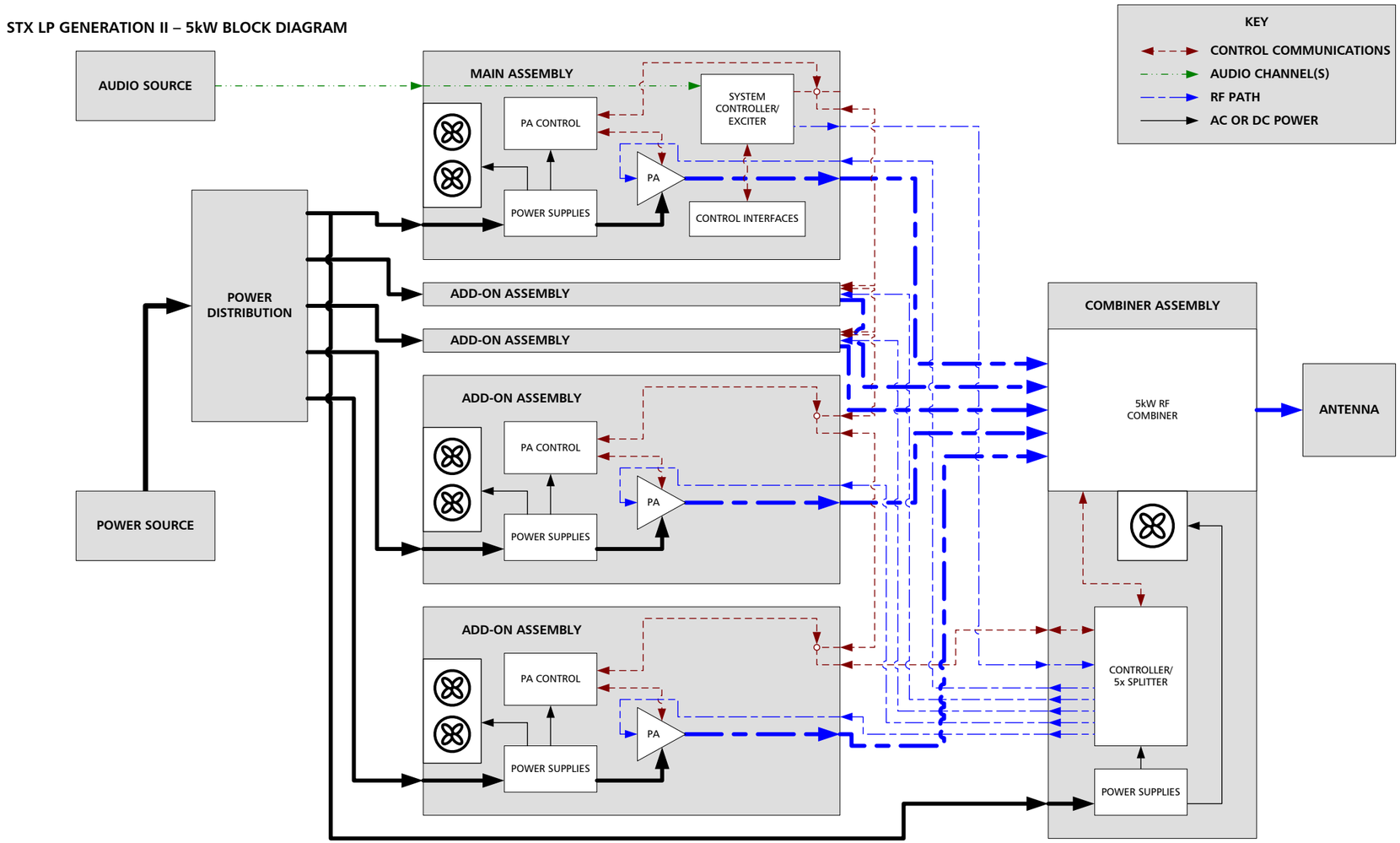


Figure 13 - STX LP Gen II 5kW Block Diagram