

# **XL1000Pro**

## **Retrofit Instructions**

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### **PREPARATORY MEASUREMENTS AND ADJUSTMENTS:**

**The following adjustments are recommended to insure that the transmitter is working properly before any changes are made.**

1. Apply video signal composed of blanking level with sync and color burst to the modulator and connect the output of the driver to a separate watt meter and 50 ohm load. Measure the output power of the driver. It should be about 3.0 to 4.0 watts. The front panel Power adjustment knob should vary the power by +1 to -4 dB. If the output power is capable of greater than +1 dB power increase, adjust the variable resistor (see the XL1000 instruction Manual) to ensure a limit of 5.5 watts is maintained. This is important to protect the power amplifier from damage by overdrive. Overdrive damage to the XL1000-PRO is not covered by warranty.
2. Connect a directional coupler in the main RF path before the wattmeter and load. Connect the forward sample port to a spectrum analyzer, after ensuring the RF level at the sample port is less than the maximum input level for the spectrum analyzer. Using the modulator controls, adjust the aural/visual ratio to -13 dB (5%) as measured on the spectrum analyzer. This is a typical setting for most applications, however, the power amplifier can be used at higher levels if necessary with only minor degradation in performance.
3. Measure the purity of the driver output signal on the spectrum analyzer. This measurement is made to ensure that the mixing products are at least -45dBc or better. The solid state power amplifier that will be installed later is broadband and will amplify these unwanted signals making filtering necessary if they are out of specs to start with. If the mixing products are not -45 dBc relative to the visual carrier, consult the instruction manual or equipment supplier to achieve this.

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**\*\*\*WARNING\*\*\***

**BEFORE REMOVING ANY PARTS OR WIRE, THE TRANSMITTER OR TRANSPOSER MUST BE TURNED OFF AND DISCONNECTED FROM THE PRIMARY AC POWER SOURCE. ALL OTHER EXTERNAL CONNECTIONS INCLUDING ANTENNA MUST BE DISCONNECTED. USE A GROUNDING ROD TO DISCHARGE ANY RESIDUAL CHARGES FROM THE HIGH VOLTAGE SUPPLY, CAVITY ECT. MOVE THE EQUIPMENT AWAY FROM OTHER EQUIPMENT SO THAT THERE WILL BE PLENTY OF ROOM TO WORK ON THE FRONT AND REAR OF THE EQUIPMENT TO BE MODIFIED.**

**\*\*\*WARNING\*\*\***

1. Turn off the transmitter using the front circuit breaker on the front on the High Voltage Power Supply. Unplug the transmitter from the power source and then ground any excess power which may still be remaining in the transmitter, thus ensuring a safe environment to work in.
2. Move transmitter to a place where all four sides are accessible and you can work freely without any obstructions. Take off the back door of the transmitter by pulling the pins out of the hinge. Next take off side panels by first pushing the panels up and then pulling them away from the rack.
3. Inspect the transmitter for any loose wires or any other modifications which may have been done previously.
4. Disconnect and remove the tube from Tube and Cavity apparatus. Put tube in its tube carton or in a protected environment so it does not break.
5. Mark all the cables and their connectors with a to/from format. Disconnect coax cables from the transmitter and remove. Place aside for use later. Because of the volume of cables and wires it is better to be organized in the beginning. It will help you during the assembly phase. Disconnect the remaining cables and wires from their mating connectors and put aside for later use. You will have to cut some cable harnesses and ties to ensure all cables are removed.
6. Disconnect the main air hose from the Tube and Cavity apparatus. Disconnect the main air hose from the blower and remove. Make sure the blower motor power cord is disconnected from the junction box and any other wires have been removed from the blower assembly. Unbolt and remove the blower from the transmitter. Set aside out of the way of your workspace.
7. Disconnect main vent hose "Smoke Stack" from the Tube and Cavity apparatus, disconnect and remove main vent hose from the Airflow Switch Connector Temperature Sensor and ventilation bracket located above the tube and cavity on the top of the cabinet. Disconnect the Output Directional Coupler from the main output line connector. Disconnect the output filters from the Tube and Cavity apparatus. Remove both the Output Filters and Output Directional Coupler. Disconnect the Output Directional Coupler and Output Filters from each other. Set both aside out of the way of your workspace.

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8. Inspect Tube and Cavity apparatus to ensure there are no wires or cables attached to it. This includes all coax cables. Carefully unbolt the housing from the braces. When all the bolts are removed, carefully lift the tube and cavity off the braces. Lower the tube and cavity 2-3 inches, then tip the top of the Tube and Cavity apparatus toward the back of the transmitter. When the top of the Tube and Cavity has passed through the opening in the back of the transmitter then pull the Tube and Cavity apparatus out of the transmitter. Set it aside out of workspace area. Unbolt and remove brace bars the Tube and Cavity apparatus rested on.

9. **CAUTION: THE HIGH VOLTAGE POWER SUPPLY ASSEMBLY IS VERY HEAVY AND SHOULD BE REMOVED WITH ASSISTANCE.** The High Voltage Power Supply is hard wired to the junction box, so make sure you unfasten the wires from the junction box prior to removing. Disconnect the High Voltage Power Supply power cord from the junction box located in the rear of the transmitter. Make sure all wires and cables have been disconnected from the High Voltage Power Supply. From the front of the transmitter unscrew the anchor screws that hold the High Voltage Power Supply drawer. Pull the High Voltage Power Supply Drawer out as far as it will go. When the High Voltage Power Supply has reached the safety clips at the end of the rail press the safety clips, (located on the outside of each rail) in with a screwdriver disengaging the safety catch. After the safety clips are disengaged, continue to pull the High Voltage Power Supply Drawer out of the transmitter making sure it is free of all obstructions until it is completely free of the transmitter. Set it aside out of the way of your workspace.

10. Making sure all cables are disconnected from the modulator, from the front of the transmitter remove anchor screws holding the modulator in place. Carefully remove the modulator from the transmitter. Set it aside out of the way of your workspace.

11. From the rear of the transmitter locate the Driver Output Isolator, Driver Output Directional Coupler, and Input Bandpass Filter. Make sure all cables are disconnected from Isolator, Filter and Directional Coupler. Disconnect the Isolator from the Input Filter. From the side of the transmitter remove the screws that hold the Directional Coupler to the mounting plate. Carefully remove the Directional Coupler. Set it aside out of the way of your workspace. Carefully remove the Bandpass filter. Set it aside out of the way of your workspace. Carefully Remove the Input Isolator. Set aside out of the way of your workspace. Each of these will be used later during the re-assembly process.

12. Locate and remove the Filament Bypass Resistor. Set it aside out of the way of your workspace.

13. From the rear of the transmitter check to see the wires and cables have been removed from the Output Combiner and Splitter and LED Panel PC Board on the front panel. From the front of the transmitter unscrew the front panel anchor screw and remove the front panel from the transmitter. Set aside out of the way of your workspace.

14. From the front of the transmitter unscrew the anchor screws that hold the Bias/Fil/Screen Assembly to the front of the rack. Pull the Bias/Fil/Screen Assembly out as far as it will go. When the Bias/Fil/Screen Assembly has reached the safety clips at the end of the rail, press the safety clips, (located on the outside of each rail), in with a screwdriver disengaging the safety catch. After the safety clips are disengaged, continue to pull the Bias/Fil/Screen Assembly out of the transmitter making sure it is free of all obstructions until it is completely free of the transmitter. Put Bias/Fil/Screen Assembly in a place you are comfortable working on it. Unfasten fasten the top of the Bias/Fil/Screen Assembly and place it aside. Cut the red wire in the twist lock and seal it with a wire nut, so no future contact can be made. Find and cut the black wire running from the power terminal strip to the Transformer marked T202 and seal it with a wire nut. Replace the top cover and fasten it down. Set this assembly aside out of the way of your workspace.

15. At this time the only original part remaining of the XL1000 should be the output metering panel and all wires and cables should have been unhooked and removed from the panel. If there are any cables or wires connected to the metering panel at this time mark them and remove and set them aside for later use.

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16. Disassembly of the XL1000 is complete with the exception of the crossbars running from the front of the rack to the back of the rack. Remove all cross bars, swing doors, and support panels on the sides of the rack. At this time the rack should be free of all obstructions on all sides of the rack.

## **ASSEMBLING THE XL1000Pro**

1. Unpack all boxes and make sure you have received everything on the parts list. If you are missing any part of the XL1000Pro retrofit kit then please call Pineapple Technology, Inc. at 916-663-1016
2. Starting at the back of the transmitter open the junction box. Locate the knock out in the side facing the front of the transmitter. Punch out the 1 inch knock out. NOTE: In some junction boxes there are no knockouts, as an alternative drill a 1 inch hole to accommodate the main power supply cable. Feed the PS130-28 power cable through the hole made by the knock out.
3. From the front of the transmitter place the circuit breaker cables #1 & #2 through the rack and secure the breaker panel to front of transmitter.
4. From the back of the transmitter run the breaker cables along the side of the rack and secure them with a tie wraps as required. Then run the breaker cables along the bottom left side of the rack. Secure breaker cable to the back left side of the transmitter ensuring the cable has a straight path to the junction box.
5. Insert breaker cables into the junction box, using the hole closest to the front of the transmitter, on the side of the junction box. Place the main power cable through the bottom of the rack and feed it through the hole located on the side of the junction box towards the back.
6. With a wire nut connect the red wire from the main power cable to the red wire coming from breaker wire #1. In turn connect the black wire from the main power cable to the black wire coming from the breaker cable #1.
7. From the Main Power Cable secure the Ground (green) wire to the left side of the terminal strip in socket #1. Then secure the Neutral (white) wire to the left side of the terminal block in socket #2.
8. From the Breaker Power Cable #2 secure the red wire to the left side of the terminal strip in socket #3. Then secure the black wire to the left side of the terminal block in socket #4.
9. Connect the Ground (green) wire from the PS130-28 Power Cable atop the other wire into the left side of the terminal strip in socket #1. Insert the 2 Ground (green) wires from the 110VAC plugs into the right side of the terminal strip socket #1.
10. Place both the white wires from the PS 130-82 Power Cable and the 110VAC plug into the right side of the terminal strip socket #2
11. Place the red wire from the PS130-28 power cable into the right side of the terminal strip Socket #3.
12. Place both the black wire from the PS130-28 Power Cable and the black wire coming from the 110VAC fuse box into the right side of the terminal strip in socket #4. This should conclude the wiring for the junction box. Make sure that each wire is secure. Fasten the top back on the junction box.

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13. Align the bottom of the Bias/Fil/Screen Assembly with the top of the breaker panel. Align rails up with the rack marking the screw holes. Attach the rail sleeves to the rack where the markings are using the hardware saved during disassembly. Make sure the rails are level from back to the front and from side to side of the transmitter.
14. After the rail sleeves have been secured then slide the Bias/Fil/Screen Assembly into place fastening the face plate to the front of the rack.
15. At the top of the of the Bias/Fil/Screen Assembly mark the hole just above the top panel. From the Right side of the rack align brace with marked hold and fasten brace on from the side making sure it is level. Repeat on Left side of transmitter.
16. Making sure the braces are secure slide the main power supply PS130-28 onto the braces. Fasten Faceplate to the front of the rack.
17. From the front of the transmitter align the bottom of the Driver Box up with the main power supply. Align rails up with the rack marking the screw holes. Attach the rail sleeves to the rack at the markings are using the hardware saved during disassembly. Make sure the rails are level from back to the front and from side to side of the transmitter.
18. Slide the driver box into the support rails previously mounted in the transmitter rack. Screw in the faceplate to the front of the rack.
19. Screw the larger 4" faceplate provided, (Part Number MF9177) into the front of the transmitter just above the driver box.
20. At the top of the faceplate mark the hole just above the top of the panel. From the right side of the rack, align brace with marked hole and fasten brace from the side making sure it is level. Repeat on left side of transmitter.
21. Making sure the braces are secure slide the MFA1KW onto the braces. Fasten faceplate to the front of the rack.
22. From the front of the transmitter slide the filter into the space between the MFA1KW and the original TTC metering panel. Screw in the face of the filter to the rack.
23. Insert the 3/4" smaller faceplate provided, (Part Number MF9178) into the space between the original TTC metering panel and filter. Screw in the faceplate.
24. From the back of the transmitter insert one of the U600LD amplifiers into the back right side of the MFA1KW making sure it is inserted correctly. Screw the U600LD into the back of the MFA1KW using the six screws provided.
25. From the back of the transmitter insert the other U600LD amplifier into the back left side of the MFA1KW making sure it is inserted correctly. Screw the U600LD into the back of the MFA1KW using the six screws provided.
26. From the top of the transmitter, install the exhaust fan assembly (Part Number 1A0021) to the top of the transmitter using the existing bolt patterns and the screws saved from disassembly. Secure the AC cable on the outside of the rack supports and rails on the left side of the transmitter using tywraps as necessary to ensure the AC cord will fit between the rack supports and the outer cover. Secure AC cord to the bottom of the rack with tywraps making sure there is enough cord to plug in to the junction box. Plug AC cord into junction box 110VAC socket.

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27. Attach the Output Directional Coupler to the Filter output making sure the directional coupler sample ports are pointing inward toward the center of the transmitter.
28. Using the marks made at time of disassembly, connect the directional coupler forward and reflected port cables to the corresponding power meter ports on the rear of the metering panel.
29. Attach the Combiner brace Part Number MF9189 to the back of the transmitter just behind the filter approximately a third of the way down from the top of the transmitter with the hardware provided.
30. Locate the Driver Directional Coupler, Driver Isolator, and Bandpass Filter removed from the transmitter during disassembly. In a chain like fashion attach the directional coupler and the isolator together using one of the type N male to male adapter provided. Make sure they are securely fastened together.
31. To the directional coupler and isolator combination fasten the Input Bandpass Filter making sure the adjustment screws of the Bandpass Filter point to the rear of the transmitter. Again make sure there is a secure connection between the isolator and the Bandpass Filter.
32. Locate the US200 RF splitter provided as part of the retrofit kit. Using the second type N male to male adapter fasten the input of the US200 to the output of the bandpass filter. At this time you should have the Splitter Chain assembled, the assembly includes the Driver Directional Coupler, Driver Isolator, the Driver Bandpass Filter and the US200.
33. Mount the splitter chain on the splitter chain mounting bracket (Part Number MF9174) using screws provided.
34. From the rear of the transmitter on the left side, attach the splitter chain and mounting bracket to the transmitter about half way up using the screws provided.
35. Find the appropriately keyed rainbow cable that connected to the metering panel saved during disassembly. Connect that rainbow cable to the socket labeled P410 on the meter panel. Run the rainbow cable on the outside of the support bars on the left side of the transmitter securing it with tywraps along the back left of the transmitter. Plug the other end of the Rainbow cable to the Bias/Fil/Screen assembly socket labeled P302.
36. Find the second keyed Rainbow cable that connects the Bias/Fil/Screen Assembly to the driver unit. One end of the cable should have a twistlok socket. Plug in the twistlok to the driver unit. There will be three wires protruding from the twistlok connector; Brown, Orange, Green. Attach the Brown wire to the socket labeled TB101-1, attach the Orange wire to socket labeled TB101-2, and attach the Green wire to socket labeled TB101-3. Plug in the other end of this rainbow cable to the Bias/Fil/Screen Assembly in socket labeled P301. Route the cable and secure it with tywraps as needed.
37. Find the Bias/Fil/Screen Twistlok cable and connector. Plug in the Bias/Fil/Screen Assembly twistlok cable into the 110V socket in the junction box. Then insert the twistlok into the Bias/Fil/Screen Assembly.
38. Insert the PS130-28 power cable twistlok male plug into the back of the PS130-28 power supply.
39. Plug the DC power cord with the single Andersen Connector to the PS130-28 power supply, then plug the other ends of the cable into each U600LD.
40. Attach one end of the coax cable with type N connectors removed during disassembly to the driver assembly. Attach the other end to the directional coupler.

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41. Find the coax cables which originally ran from the Driver Directional Coupler to the forward and reverse sample connectors on the driver. Using the marks from the disassembly process, connect the forward sample cable from the coupler forward port and the reflected sample of the coupler reflected port to the corresponding connectors on the driver.
42. Attach the 75 ohm RF input cable from the driver input connector to the NBC connector on the top of the cabinet.
43. Install the Phase Matched Cables to their respective ports on the splitter and then securely fasten Cable #1 to Splitter port #1. Next attach cable #1 to PA #1 (the U600LD on the left side). Repeat the same process for Splitter port #2.
44. At the output of PA #1, attach the phase matched cable from it to the input port #1 of the Combiner. Repeat the same process for the output cable from PA #2. When this has been completed, place the Combiner on the MFA1KW for later use.
45. Attach the transmitter output cable (Part Number CA5711) to the bracket holes on the fan assembly. Attach the other end of the transmitter output cable to the output directional coupler.
46. Attach the Combiner to the Combiner Brace (Part Number MF9189).
47. Attach one end of the Combiner to Filter Cable (Part Number CA5710) to the filter. Attach the opposite end of the cable to the Combiner.
48. Review all cable connections to ensure they are correct according to the RF signal flow diagram and make sure they are securely fastened.
49. Replace the sides of the transmitter housing.
50. Replace the rear door to the transmitter. Install the FCC label according to the drawing provided.
51. Making sure the breaker located on the front of the transmitter is in the off position. Plug in the transmitter to a power source.

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**In order to test the equipment before actual usage, please do the following.**

1. Attach a dummy load with an in-line sample port and watt meter to the RF output connector of the transmitter.
2. Turn the power output control fully counter clockwise minimum setting.
3. Connect the output from a TV modulated source with a visual carrier output frequency of 45.75 MHz to the cabinet input RF connector.
4. Turn the transmitter "ON" using the circuit breaker at the bottom of the front panel.
5. Set the Meter Selector to +9 and +30 Voltages and verify that +9 volts and +30 volts are present. Apply a video signal to the modulated source and set video to blanking level plus sync. **This is very important, do not use any other input signal.**
6. Turn on the power supply circuit breaker to the "ON" position. This will energize the power supply and the solid state RF amplifiers.
7. Increase Power Output control to achieve a reading of 100% on the front of the panel meter or whenever the watt meter reads 600 watts whichever occurs first. If the wattmeter reads close to 600 watts, adjust the power output control so the wattmeter reads 600 watts and refer to the XL100 instruction manual for the correct power meter calibration procedure.
8. Connect the sample port to a spectrum analyzer ensuring the RF amplitude at the output of the sample point will not damage the spectrum analyzer and observe the -4.5 and +9 MHz intermodulation products. These signals should be -60 dB or lower compared to the visual carrier peak of sync power. In some cases, it may necessary to add additional filtering to comply with FCC requirements. A list of filter suppliers can be obtained from PTI.

After completing the procedure outlined above, the transmitter is ready to go on line. Turn off the transmitter using the circuit breaker at the bottom of the transmitter and remove the dummy load and watt meter. Connect the antenna to the transmitter and re-energize the transmitter. Check the reflected power by switching the meter panel selector to the reflected power position.. The reflected power should be about the same as that recorded before the XL1000-PRO installation. Check the aural power output by switching the meter panel selector to the aural power position. The aural power should be the same as before the modification.