

Technical Service Bulletin 040704

IOX/DCX HPA Controller Backplane Replacement

The type 452101-01 HPA controller features a type 452125-01 backplane board, which acts a fiber optic receiver for telemetry from the high voltage compartment and features a non-volatile (NOVRAM) memory for permanent storage of transmitter configuration settings and meter calibration factors. On rare occasions, such as after a severe transient AC event or a lightning strike, the backplane board may suffer a failure of this non-volatile memory, resulting in the reporting of a “NOVRAM failure” to the controller LCD screen. If this NOVRAM failure does not clear upon recycling AC mains power to the controller, a complete replacement of the backplane board may be indicated. Another condition that may require a complete replacement of the backplane would be FO LOOP alarms that are not resolved by the replacement of the FBI supply and fiber optic cable(s).

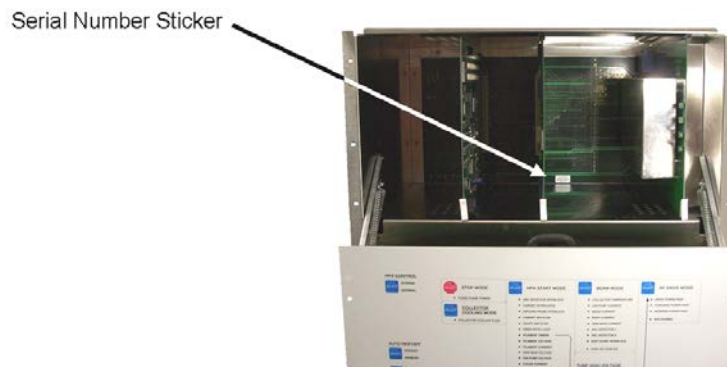
This service bulletin provides a procedure to install and initialize a replacement type 452125-01 controller backplane PCB. Replacement of the backplane should only be attempted as a last resort, as the complete recalibration of most HPA metering values is required.

Procedure 040704: IOX/DCX HPA Controller Backplane Replacement Procedure	
Applicability	IOX and DCX transmitters with type 452101-01 HPA controller.
Prerequisites	Transmitter in STOP mode.
Equipment Required	Phillips Screwdriver. Fluorescent worklight. Telephone. Copies of Service Bulletins 030524, 030525, 030607(NTSC only), 030608, 030609, 030610, 030611, 030612.
Comments	Requires special password from Comark Customer Service. Requires recalibration of most HPA meters.

NOTE: If a NOVRAM error is being reported on the LCD screen, it may be possible to perform a soft recovery of the backplane board without resorting to a complete replacement. Skip to step 15 and follow instructions on obtaining a temporary password from Comark. Request a password based on serial number 0000 along with a password based on the serial number on your backplane. If the password is accepted, then set the backplane ID to the actual serial number. Do steps 16 to 24, then exit out of setup, cycle the power to the controller to reboot. Return to step 16 and check to see if it needs the serial number-based password to get in and that it remembers the information just entered. If it needs the #0000 password again, the backplane will need to be replaced. Otherwise, proceed to set transmitter configuration and recalibrate all transmitter meters. The physical replacement of the backplane board is not required.

1. If HPA controller still nominally functional, record crowbars counts, filament hours, and HPA name from LCD screen home page.

2. **Millennium FBI supply only:** If HPA controller still nominally functional, record set point values for filament voltage, filament current, bias voltage, ion voltage by accessing set point menu pages on LCD screen: **Information Access > Adjustments > Filament, Bias, Ion > password = 55555 > (select appropriate parameter to check).**
3. Open Control Power circuit breaker on AC distribution panel to remove mains power to HPA controller.
4. Open and pull down front panel to HPA controller.
5. Carefully remove CPU, relay, and power supply PC boards from controller chassis.
6. Carefully remove all connectors from rear panel of controller. Record proper positions of fiber optic cable(s), coax cables, and connectors before disconnecting. Carefully inspect all connectors for any loose wires or wires partially crimped on their insulation. These factors can contribute to erratic controller operation.
7. Remove all screws from periphery of backplane board.
8. Remove backplane board from controller chassis.
9. Install new backplane board on controller chassis. Replace screws around periphery of PCB.
10. Carefully restore all connections to new backplane board.
11. Carefully reinstall CPU, relay, and power supply PC boards at front of controller chassis.
12. Note serial number of new backplane board. Serial number is recorded on a small white sticker on the front of the backplane PCB.



13. Close front panel of controller.
14. Close Control Power circuit breaker on AC distribution panel to restore mains power to controller.
15. Contact Comark Customer Service at 1-800-345-9295 to obtain a temporary factory password to access necessary backplane configuration menus. Be prepared to supply backplane serial number to Comark Customer Service.

NOTE: Comark factory password is date dependent and will work only on the date on which it was issued. It is therefore necessary to first set the correct time and date before attempting to access the backplane configuration menus. (The date and time are saved on the cpu board and may already be correct.)

CAUTION: Except as directed in the steps below, DO NOT turn on high voltage or RF until all steps are completed. DO NOT skip steps.

16. Clear HPA history by issuing commands: **Initialize CPU > Clear HPA History! > password = 55555 > Ok.**
17. Set date via the following commands on controller LCD screen: **Information access > Adjustments > Date & Time > password = 55555 > Date > (enter year) > Ok > (enter month) > Ok > (enter day) > Ok.**
18. Use similar procedure to set Time: **(Date & Time) > Time > (enter hours) > Ok > (enter minutes) > Ok > Previous menu > Previous menu > Exit.**
19. Access backplane configuration area of LCD screen menus by issuing commands: **Information Access > System Operations > Factory > password = (special password just obtained) > Set HPA IDs > Set HPA name.**
20. Follow instructions on LCD screen to change HPA name to match name of old backplane. e.g. "WXYZ_ONE" . Select **Ok** to save setting.
21. Select **Initial Settings > Set Crowbar Count** on LCD screen to change crowbar count setting. Press **Ok** to save setting.

NOTE: Never set crowbar count to zero. Crowbar counter may not function correctly if initially set to zero. (The counter may remain stuck at zero.)

22. Select **(Initial Settings) > Set Filament Hours** on LCD screen to change filament hours setting. Press **Ok > Previous Menu > Previous Menu** to save setting and return to top-level **Factory** menu.
23. Select **(Factory) > Set HPA Type** on LCD screen. Chose CIOX /DCX for most transmitters, CIOX2 for phase II transmitters (...*single cabinet with built-in exciter*). Press **Ok** to save setting.
24. Select **(Factory) > Set Configuration > Tubes > Set Tube Type** on LCD screen. Select correct tube model from menus. Press **Ok** to save setting.
25. Select **(Tubes) > Set Tube 100% Pwr** on LCD screen. Press **Ok** to save the default setting.

NOTE: Always use the default value. (It may lose the RF forward power meter calibration after power is removed from the controller if any other value is entered.)

26. Select **(Set Configuration) > Power Supplies > Filament, Bias, Ion** on LCD screen. Select either 405343-03 for original style FBI supply (...*fold open door*) or 46745360 for Millennium style FBI (...*four round nuts on front*). Press **Ok** to save setting.
27. Select **(Power Supplies) > HVPS** on LCD screen. Select **Linear** option unless a switching beam supply is being used (very rare). Press **Ok > Previous Menu** to save setting and return to **Set Configuration** menu.
28. Select **(Set Configuration) > Hardware > HV Isolate Relay** on LCD screen. Choose either select 605501 (self latching) or 606669-01 (electrically latched) option. Press **Ok** to save setting.

NOTE: Two varieties of HV isolation relay exist: type 605501-01 is mechanically self-latching, while type 606669-01 requires continuous voltage from the HPA controller to remain in the open position. The determination of which type is installed in an HPA cabinet may be made by opening the high voltage compartment and visually inspecting the relay: the self-latching 605501-01 has two solenoids, the non-latching 606669-01 has only one solenoid.

29. Select **(Hardware) > Meter Selection > Voltage > Beam Voltage** on LCD screen. Select 451162-05 (...*35kV full scale*) or 451162-27/-38 (...*40kV full scales*) option. Press **Ok > Previous Menu** to save setting and return to **Meter Selection** menu..
30. Select **(Meter Selection) > RF Power > Drive** on LCD screen. Select either 451162-23 or 451162-30/-34 option. See note immediately below to determine correct selection. Press **Ok** to save setting.

NOTE: For proper selection of forward, reverse, and drive meter types, observe the reverse power meter. If the reverse power meter has a 0-150% scale, chose the *upper* selection for meter type in each of the forward, reverse, and drive meter selection menus. If the reverse power meter has a 0-15% scales, chose the *lower* selection for meter type in each meter selection menu.

31. Perform similar operations for forward and reverse meters using **Forward** and **Reverse** menus in the **RF power** section.
32. Open and close Control Power circuit breaker on AC distribution panel to cycle mains power to HPA controller. Allow controller to power up.

CAUTION: All meter readings must be recalibrated before HPA cabinet may be safely operated. If transmitter log readings were scrupulously kept during period leading up to failure, it may be possible to roughly calibrate meters to last known good readings until a more thorough calibration is possible.

33. Calibrate and set filament voltage and current per Service Bulletin 030524.
34. Calibrate and set ion voltage per Service Bulletin 030609.
35. Calibrate grid metering per Service Bulletin 030608.
36. Calibrate focus voltage metering per Service Bulletin 030612.

37. Calibrate body current metering per Service Bulletin 030610.
38. Calibrate beam metering per Service Bulletin 030611.
39. Set bias voltage, idle current per Service Bulletin 030525.
40. Calibrate HPA power metering per Service Bulletin 030529 and 030607 (IOX) or 030616 (DCX).

NOTE: The default calibration factor for the drive meter is very sensitive. It may be necessary to temporarily install a 10 dB attenuator pad on the drive detector to allow initial re-calibration of drive power meter (e.g. 100W real = 10W indicated). After initial calibration is complete, remove the 10dB pad and perform final calibration.

41. Log all transmitter readings for future reference.
42. Procedure complete.

At Comark, we are constantly striving to improve the satisfaction of both our new and existing customers. Please do not hesitate to contact Comark Customer Service with any questions you may have concerning the contents of this service bulletin.

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