P0110 Output Jumper Cable Assembly
Drawing: # 25042
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Output Jumper Cable Assembly

Document Revision Record

Rev	Date	ECO#	Pages Affected	Description
-	1/30/98	NA	NA	New procedure

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Notes:

This assembly is not ESD sensitive.
Assembly should be carried out in the readout cleanroom.

Materials & Supplies

1. Shield output cable 0.050 OD X .010 wall tube, Phosphor Bronze (UNS C51000).
2. Plug Connector, 4 pin #65113-1C34317-101
3. Lemo Connector, 10-pin, Female #25047-101
4. 0.005 wire, Phosphor Bronze .001 Formvar insulation.
5. 0.005 wire, Phosphor Bronze .0005 SnPb Plating, .001 Formvar insulation.
6. Flange, Output cable, #25022-201
7. Cover, Output, #25048-201.
8. Screw, #2-56, #25054-104 .
9. Heat shrink tubing .049-.060 OD., Teflon, SMT-18-36.
10. Teflon sleeving #1933.
11. Chemoloy, high purity alloy activated rosin core #6421-1, 60/40 PbSn.
12. Sand paper 600 Grit.
13. Isopropyl Alcohol.
14. Acetone #9006-01
15. Texwipe small foam swab # TX751B
16. Norkorde solder paste.
17. Stycast epoxy #1266.
18. B-D 1cc syringes (tuberculin) #309602.
19. Sem-Flex needle Teflon tip lavender #232749.
20. Ultrajet 2000 airjet # ES1270
21. Jeweler Saw X-Acto #7043
22. 8 mil. Jeweler blade X-Acto #746.
23. Master Appliance Proheat heat gun model PH-1200 120V 60HZ 12A 1500w Max.
24. Hand Drill Makita #6012HD 1100/400 rpm.
25. Dremel tool (model #395, type 3 cutoff wheel #409).

26. Ceramic Blade #2
27. Bausch & Lomb Microscope #200 M range 0.7x-3.0x.
28. Branson B-220H ultrasonic cleaner.
29. Fluke 77 Multimeter.
30. Clean room wipes Durx #670.
31. Baxter clean room glove #G7300-26.
32. Squid Package #25017-201.
33. Nut, Output cable, #25641-101

Procedure

1. Shield cutting and Deburring

1.1 Cut the shield tubing to length according to the cable length table. Use the Dremel tool (model 395, type 3 cutoff wheel 409) or a jeweler saw X-Acto #7043 and a 8mil jeweler blade X-Acto #746.

1.2 Deburr the end of the shield tubing with the sharp-tip file. Use a fine jeweler file and fine grit #600 sandpaper to smooth the ends of the shield.

1.3 Make sure the shield is not blocked with residue. Use an airjet to free any obstacles. Clean the shield with alcohol and clean room wipes Durx #670.

1.4 Insert a piece of twisted pair wire through the shield. Run it back and forth to make sure the ends have been sanded smooth and are burr free. Repeat step 1.2-1.4 until no damage is found on the wire insulation.

1.5 Use Scotchbrite to clean the outside of the shield by wiping it down 2 to 3 times.

1.6 Use clean room wipes Durx #670 and isopropyl alcohol to wipe the shield until there is no residue on the wipe.

1.7 Run some acetone #9006-01 down the center of the shield. Use airjet to blow out any acetone inside the shield on a clean room wipe. The shield is clean inside when no residue is seen on the wipe.

2. Magnetic Screening

2.1 After cleaning, insert the shield tubing in clean plastic bags. Bags shall be labeled with permanent ink. I.D each set of shields with a serial number.

2.2 Fill out the magnetic test report form and send the shields to the magnetics lab.

3. Shield solder tinning operations

3.1 The following parts shall be tinned with activated rosin core solder 60/40.

1. Part # .050 OD x .010 wall tube shield, Phosphor Bronze

2. Part # 65113-1C34321-101, QB plug cable adapter
3. Part # 65113-1C34317-101, Readout 4 pin intermediate plug connector
4. Part # 25047-101, B-insert (10) pin Lemo connect

3.2 Visually inspect all shield surfaces carefully. Examine both insides and outsides of shield segments.
Look for any deep scratches or dents or other defects

3.3 Remove oxides from the outside ends of the phosphor bronze shields using fine grit sand paper or
Scotchbrite.

3.4 Clean shields with acetone & isopropyl alcohol

3.5 Apply Nokorode soldering paste to both ends of the phosphor bronze shield by brushing the flux on
the part with a Q-tip.

3.6 Tin one end of the shield to a length of 0.25”±0.03” with activated rosin core solder 60/40. Use a
small amount of solder and wipe off any excess.

3.7 Locate the position of the second end according to the cable length table. Tin the shield at the length
of 0.25”±0.03” with activated rosin core solder 60/40. Use a conservative amount of solder and wipe
off any excess.

3.8 Remove all residual flux from the phosphor bronze shields with acetone.

4. Solder tinning of readout plug cable adapter (#65113-1C34321-101).

4.1 Use solder 60/40 to tin the inside of the readout intermediate plug cable adapter at a distance of
0.165”±0.010” from the end of the adapter (where it will interface to the shield, inside of the 0.065”
diameter hole). Note that after tinning, the readout intermediate plug cable adapter must be able to slide freely over the tinned end of the shield.

4.2 Clean the adapters in isopropyl alcohol using the Ultrasonic cleaner for 10 minutes.

5. Solder readout plug cable adapter to shield

5.1 Slide the connector adapter over the end of the shield such that the small end of the connector
adapter is facing the end of the shield.

5.2 Position the intermediate plug cable adapter so that it overlaps the cable shield by 0.165”± 0.010”.

5.3 Reflow solder. Add solder if necessary to prevent voids in solder joint.

5.4 Insert heat shrink tubing (SMT-18-36) from other end over shield, use a heat gun to shrink sleeving
down to size over shield.

5.5 Slide the collet back nut (65113-1C34317-109) over the end of the appropriate shield such that the threaded portion of the collate is facing the end of the shield.

6. Solder the Screw flange to the Shield

6.1 Slide the flange cover #25048-201 and the nut #25641-101 over the second end of the shields. Make sure you have the collet back nut on as well.

6.2 Insert the second end of the shields in through the screw flange holes so that they are flush with the
flange. As to be aligned with each other. Reflow solder shield to the flange, add solder to prevent
Voids in solder joints.

6.3 Clean the assembly with alcohol. Use clean room wipes to wipe the shields. Flow some acetone down
the center of the shields to remove any flux residual. Use airjet to dry the inside of the shields.

7. Twisted pair wire preparation

7.1 Cut 4 pieces of wire (.005 wire, Phosphor Bronze .001 Formvar). The length should be 2 inch
longer than the final required length.

7.2 Make 2 twisted pairs out of these 4 wires using the hand drill for the Modulation and Bias cables.

7.4 Cut 4 pieces of wire (.005 wire, Phosphor Bronze .0005 SnPb Plating .001 Formvar insulation.)
make 2 twisted pairs out of these 4 wires for the 4 pin Signal cable.

7.5 Visually inspect all wires carefully. Use microscope to check if there is any deep scratches, breaks or
kinks in insulation.

7.6 Untwist one end of each twisted pair by approximately 0.250".

7.7 Strip 0.150" ± 0.03" of wire insulation from both wires. Use ceramic blade #2.

7.8 Tin the exposed wire on the stripped end of the twisted pairs with 60/40 solder. 0.150" of
the wire shall be tinned.

7.9 Verify end-to-end continuity of wires. Write down the resistance reading.

7.10 Wipe clean the wires with alcohol using cleanroom wipes.

8. Solder tinning of readout 4 pin Lemo connector

8.1 Tin the connector pin solder cups using solder 60/40.

8.2 Trim the end of the twisted pair as requested for soldering.

8.3 Use Teflon sleeving #1933 to cover the solder cups.

8.4 Attach the "bias" 4 pin Lemo connector. Solder one pair of the twisted wires to pin # 1 & 2 and solder the second pair of the twisted wires to pin # 3 & 4 solder cups. Refer to Drawing #25042-10n.

8.5 Attach the "modulation" 4 pin Lemo connector. Solder pins 1&2 to one twisted pair per Drawing #25042-10n.

8.6 Attach the "signal" 4 pin Lemo connector. Solder pins 1&2 to one twisted pair per Drawing #25042-10n.

8.6 Verify wire continuity from Lemo connector to the loose end. Write down the resistance readings.

9. Wire and shield integration

9.1 Inject isopropyl alcohol down the shield for lubrication prior to installing wires.

9.2 Push 2 twisted pairs wires through a cable shield for the 4 pin connector such that the tinned
ends of the twisted pair are at the end of the flange.

9.3 Make sure the shield is dry inside from alcohol before taking continuity measure. Blow a
little air into the shield to help it dry.

9.4 Verify continuity and insulation for all of the wires after installation. Write down resistance
readings.

9.5 Use a drop of Stycast 1266 epoxy at each end of the shield. To protect wire from moving and
to prevent damage to wire at each end of the shield.

9.6 Let Stycast 1266 cure over night or 24 hours.

9.7 Verify continuity and insulation of all wires again. Write down resistance readings.

10. Assemble connector outer shell

10.1 Slide the latch sleeve over insert and connector adapter until the key engages in latch sleeve.

10.2 Slide outer shell over latch sleeve.

10.3 Secure latch sleeve by threading collate back nut onto latch sleeve (finger tight).

11. Solder tinning of 10 pin Lemo Connector (25047-101).

11.1 Measure and leave 0.5" of wire from the end of the flange (25022-201).

11.2 Strip 0.150" $\pm$ 0.03" of wire insulation from ends of wires. Use ceramic blade #2. Tin the exposed end of wires with 60/40 solder. Verify continuity from end to end of wires from 4 pin Lemo connectors to the exposed wire. Trim ends needed to solder to the 10 pin Lemo connector.

11.3 Use Teflon sleeving #1933 to cover the solder cups. Note that the key position of the two ends should be opposite (one key up and another down). Solder the loose wires to the 10 pin Lemo connector per Drawing 25042-10n. Double check to make sure that the wires are connected to the right pins.

11.4 Take continuity and insulation measurement from the 4 pin Lemo connectors to the 10 pin Lemo connector of the cable shield. Write down resistance readings.

12. Connector Pin-Outs (Refer to drawing #25042, Sheet 2 of 2)

13. Assemble Connector Cover to Flange

13.1 Use a diamond pen to scribe a serial number on the output cable cover (25048-201). Slide the cover over the end of the flange (25022-201) so that the screw stud comes out of the hole in the cover. Slide the nut (25641-101) down to the screw stud and screw it down. The 10 pin Lemo connector should stick out of the cover about 0.050" and it should be loose, flexible.

13.2 Verify final continuity and insulation of all connector and shields. Write down the resistance reading.

14. Completion

P0110-Table 1 Continuity Measurement

	Continuity	Insulation
Step 7.9		

Step 8.6		
Step 9.4		
Step 9.7		
Step 11.4		
Step 13.2		

Completed by: _____

Date: _____

Meter: _____

Approval by: _____