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# Wire bonding a barrel module

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This note describes the procedure of wire bonding the detectors to the fan-ins and detectors to detectors on an ATLAS SCT barrel detector module

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## 1. Introduction

The following procedure is used to equip an ATLAS SCT barrel module with all wire bonds connecting detector plate to detector plate as well as connecting the detector plate to the fan-in on the electronics hybrid.

## 2. Procedure

### 2.1 TOP FACE

These steps are made in manual mode:

**Step 1.** Place the frame with the module on the work holder in the bonding machine.

**Step 2.** Align the module in the bonding machine.

**Step 3.** If necessary, adjust the height of the work holder to get focus on the hybrid's fan-in.

**Step 4.** Change to floppy mode and put the desired floppy (#21 Fan-in to detector short, #18 fan-in to detector long, #17 detector to detector short, #19 detector to detector long) in the floppy station.

**Step 5.** Press play button on the bonding machine (bonding machine is monitoring the floppy disc number on the display).

**Step 6.** Press accept button (machine is loading the program).

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## PROCEDURE

**Step 7.** Set power to 3.9 on 1st bond and 3.6 on 2nd bond (when bonding fan-in to detector) and 3.4 on 1st and 3.8 on 2nd (when bonding detector to detector).

**Step 8.** Press semi-auto mode button.

### **These steps are made in semi-auto mode:**

**Step 9.** Set hair cross to the lower left corner of the fan-in's 1st bond pad (when bonding fan-in to detector) set hair cross lower left corner of the detector's 1st bond pad (when bonding detector to detector)

**Step 10.** Press enter button, the program's X and Y is now set to zero.

**Step 11.** Press enter button 4 more times to accept the 2 outer and the 2 die points.

**Step 12.** The hair cross is now on the 1st bond press enter button and the hair cross is on the 2nd bond.

**Step 13.** Press enter button (the machine bonds a wire) repeat 3 times and have a look in the microscope and on the monitor to see if it's all O.K. If so proceed to the steps in auto mode.

### **These steps are made in auto mode:**

**Step 14.** Press auto. (The machine bonds 128 wires between fan-in and detector)

**Step 15.** Press preset button and then semi-auto button.

**Step 16.** Repeat step 4 to step 15 two more times along the fan-in to complete 328 wires.

**Step 17.** Start with program #21 then continue with #18, #17 and #19.

### **These steps are made in manual mode:**

**Step 18.** Set loop height to 97 and power on 1st bond to 3.9 and 2nd bond to 3.6.

**Step 19.** Set the hair cross on bias front pad to the left on the fan-in and bond two wires to the bias front pad on the detector.

**Step 20.** Set the hair cross on bias front pad to the right on the fan-in and bond two wires to the bias front pad on the detector.

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## PROCEDURE

**Step 21.** Set the hair cross on the 769th bond pad to the right on the fan-in and bond one wire to the pad on the detector.

**Step 22.** Set loop height to 115.

**Step 23.** Set the hair cross on the 770h bond pad on the fan-in and bond one wire to the pad on the detector.

**Step 24.** Set loop height to 75 and power on 1st bond to 3.4 and 2nd bond to 3.8.

**Step 25.** Set the hair cross on bias front pad to the left on the detector and bond one wire to the bias front pad on the opposite detector.

**Step 26.** Set the hair cross on bias front pad to the right on the detector and bond one wire to the bias front pad on the opposite detector.

**Step 27.** Set the hair cross on the 769th bond pad to the right on the detector and bond one wire to the pad on the opposite detector.

**Step 28.** Set loop height to 110.

**Step 29.** Set the hair cross on bias front pad to the left on the detector and bond one wire to the bias front pad on the opposite detector.

**Step 30.** Set the hair cross on 770th bond pad to the right on the detector and bond one wire to the pad on the opposite detector.

**Step 31.** Set the hair cross on bias front pad to the right on the detector and bond one wire to the bias front pad on the opposite detector.

**Step 32.** Set loop height to 100 and power on 1st bond to 3.1 and 2nd bond to 7.

**Step 33.** Set the hair cross on bias HT pad to the right on the hybrid and bond three wires to the back bias pad on the baseboard.

**Step 34.** Set the hair cross on bias HT pad to the left on the hybrid and bond three wires to the back bias pad on the baseboard.

## 2.2 BOTTOM FACE

**Step 35.** Press emergency stop button and release the bonding jig from the work holder.

**Step 36.** Unscrew the four screws holding the module frame and turn the frame bottom side up, put back the four screws holding the frame to the jig and slide the jig back into the work holder.

**Step 37.** Repeat step 1 to 31 to wire bond the bottom face of the module.