

# instructions for making JTAG & timing cables for SCROD revB

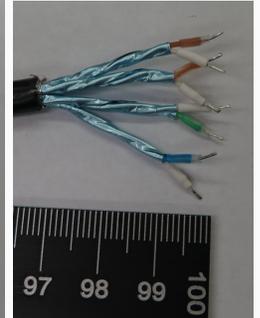
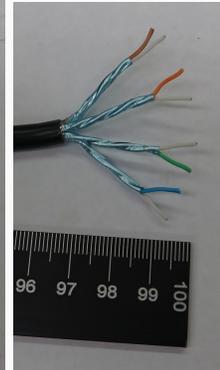
**tools required:**

- ruler (mm)
- utility knife
- wire cutters
- wire strippers (for 26 AWG wire)
- soldering iron set to 600 F
- tip for lead-free work
- PCB holder
- heat shrink tubing label printer



**materials required:**

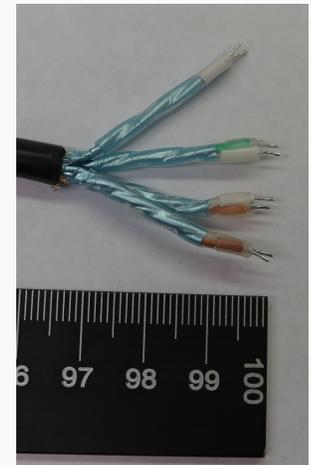
- 1 mm diameter lead-free solder
- 8 mm OD black heat shrink tubing
- 4 mm OD clear heat shrink tubing
- 2 mm OD white heat shrink tubing
- 2 mm OD clear heat shrink tubing
- 11 mm OD heat shrink tubing label
- 3/4" wide hook-and-loop fastener



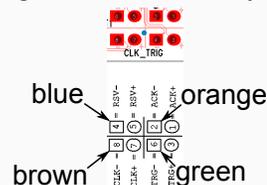
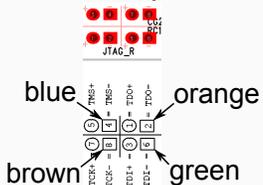
- prepare the following:
- 40 mm cut two lengths of 8 mm OD black heat shrink tubing
  - 6 mm cut four lengths of 2 mm OD white heat shrink tubing
  - 6 mm cut four lengths of 2 mm OD clear heat shrink tubing
  - 27 mm cut four lengths of 4 mm OD clear shrink tubing
  - 60 mm hook-and-loop fastener
  - 100 mm cut cat7 cable so you have two equal length halves (measured from end of connector to cut location)
- print out an 11 mm OD heat shrink tubing label that says, "JTAG" and another that says, "CLK\_TRG"

**perform the following steps:**

- slip the "CLK\_TRG" label on to one cable and the "JTAG" label on the other
- slip the black heat shrink over the end of each cable after the printed labels
- 30 mm cut and peel back plastic insulation, cut shield braid; nick shield aluminum and tear off
- 10 mm nick aluminum shield around each pair and tear shielding off
- 3 mm strip insulation off each wire in each pair
- tin the end of each wire with lead-free solder, ensuring not to leave any blob of solder bigger than will fit in the hole in the board
- the plastic insulation will recede when heated, so short lengths of heat shrink tubing will be needed (see next step)
- place the 2 mm OD clear heat shrink tubing over the insulation of each solid color wire
- place the 2 mm OD white heat shrink tubing over the insulation of each white/striped wire
- keeping the lengths of exposed wire equal for all wires, use heat gun on "low" setting to shrink in place
- add a length of 4 mm OD clear shrink tubing to each twisted pair, trying to keep the existing twist and shielding in place
- use the heat gun on "high" to shrink this together; this will make the soldering step easier
- tie the hook-and-loop fastener around the cable to keep it coiled during the soldering step (do the same for the power cable if applicable)
- put PCB in PCB holder and lock in place



- for each cable (JTAG on the left and CLK\_TRG on the right, as seen from the side of the board with the FPGA), perform the following steps:
- push one of the pairs of wires through the board in the appropriate holes (see map on this sheet for what color pairs go where for the cable you have)
  - using a clean soldering tip, tack the two wires in place with some lead-free solder
  - while reheating each connection, ensure the twisted pair is fully seated and no exposed metal is visible below the PCB
  - repeat for the other three twisted pairs
  - trim any solder/wire from the board in excess of 1 mm, being careful to discard any cuttings (so they do not cause shorts on the PCB when in operation)



wiring diagrams are for ANTEK E244650

the solid color wire goes in the rectangular pad;  
the companion striped or white wire goes in the round pad

the end result should look something like this:

