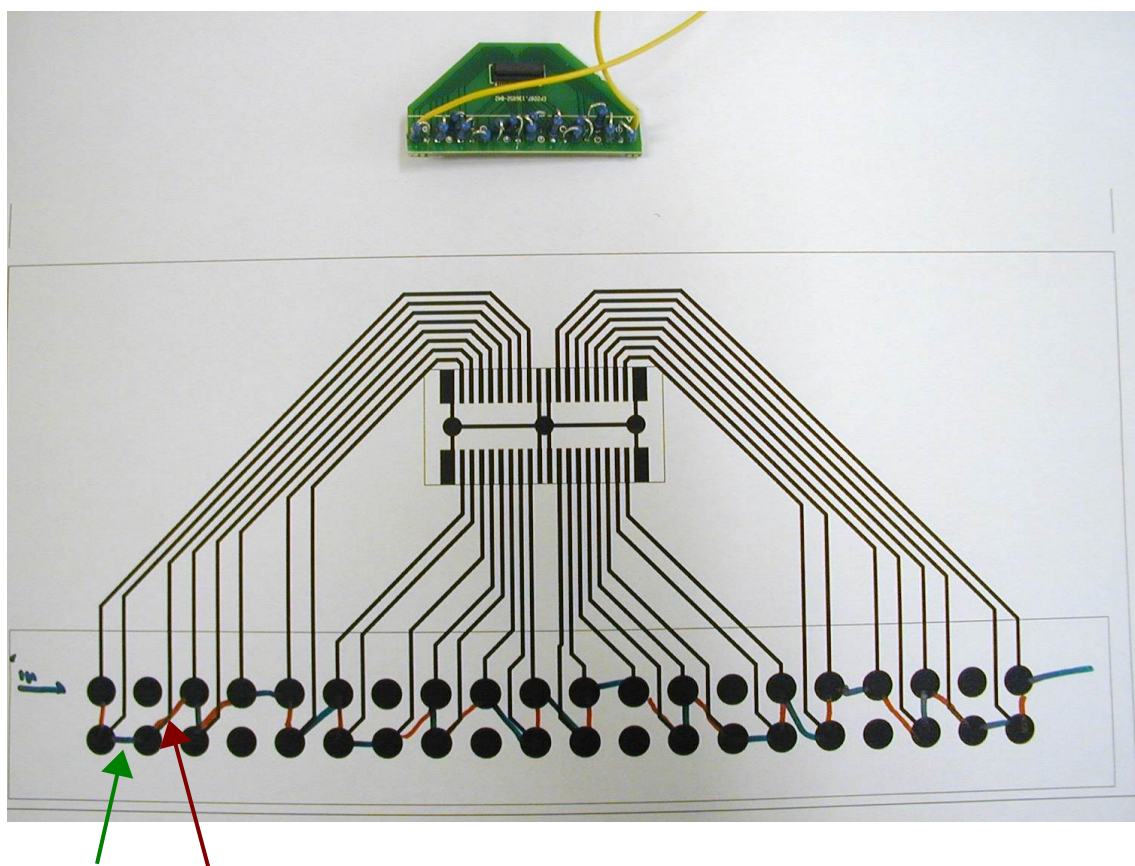


## Test of kapton flex cables for the ILC TPC setup

2010820

360 cables of the length 30 cm were tested for broken signal lines and short circuits between signal lines by a simple test setup. The signal lines were connected in a chain with 1kohm resistors. An unbroken and non short circuited chain should measure roughly 30.3 - 30.4 kohm, i.e. 30 1 kohm resistors in series. A broken chain will have an infinite resistance and a short circuit between signal lines will reduce the measured resistance with roughly 1 kohm.

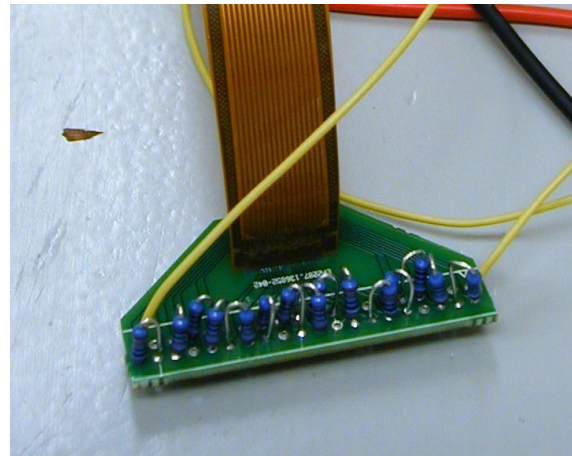
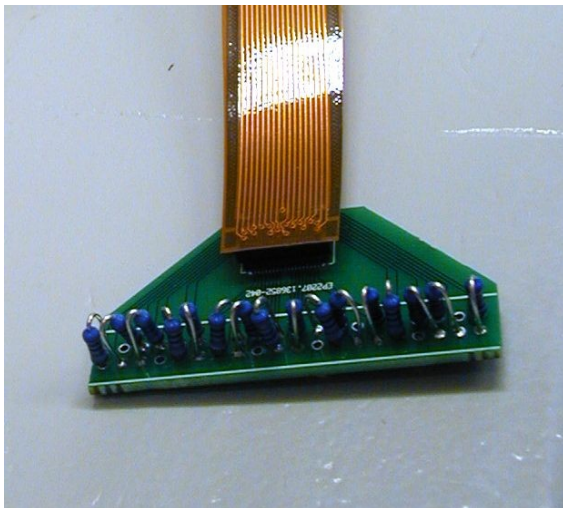
The resistors were soldered on special boards one for each end of the cable. The resistors are alternatively on either end of the cable to make a resistor chain. Figures below shows how the resistors were placed.



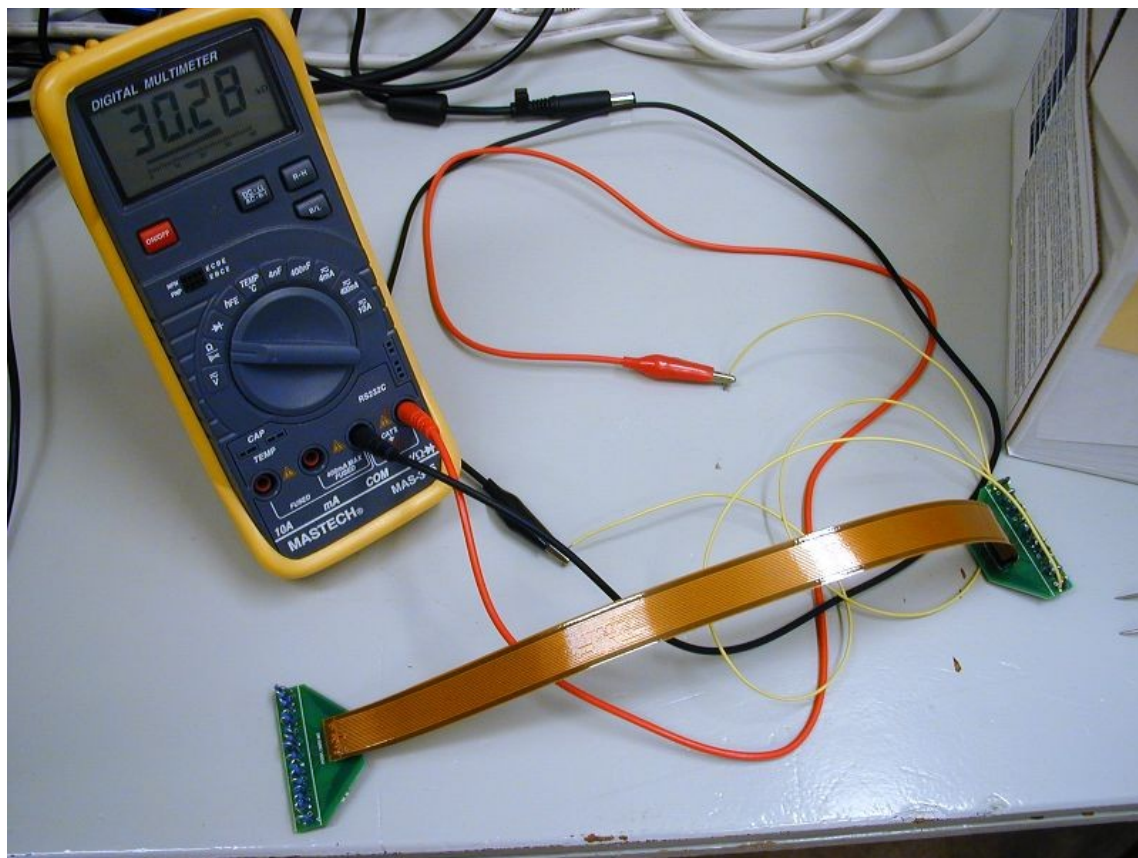
One end of cable

Other end of cable

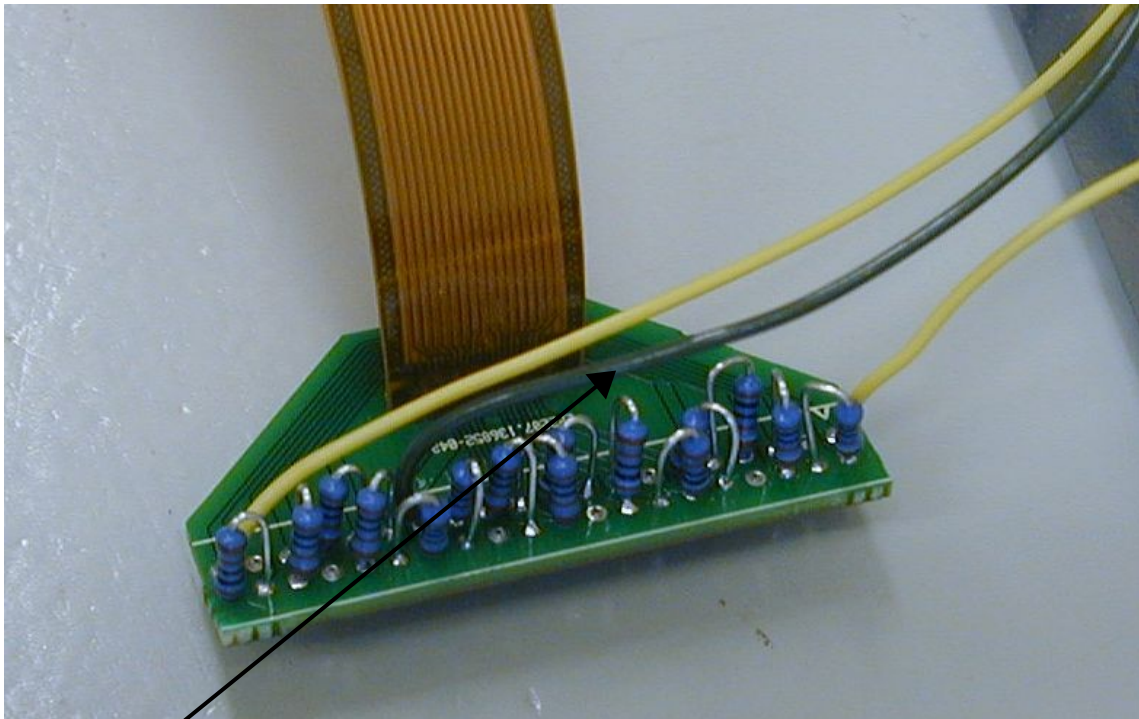
The connectors at the ends of the cable.



The overall setup:

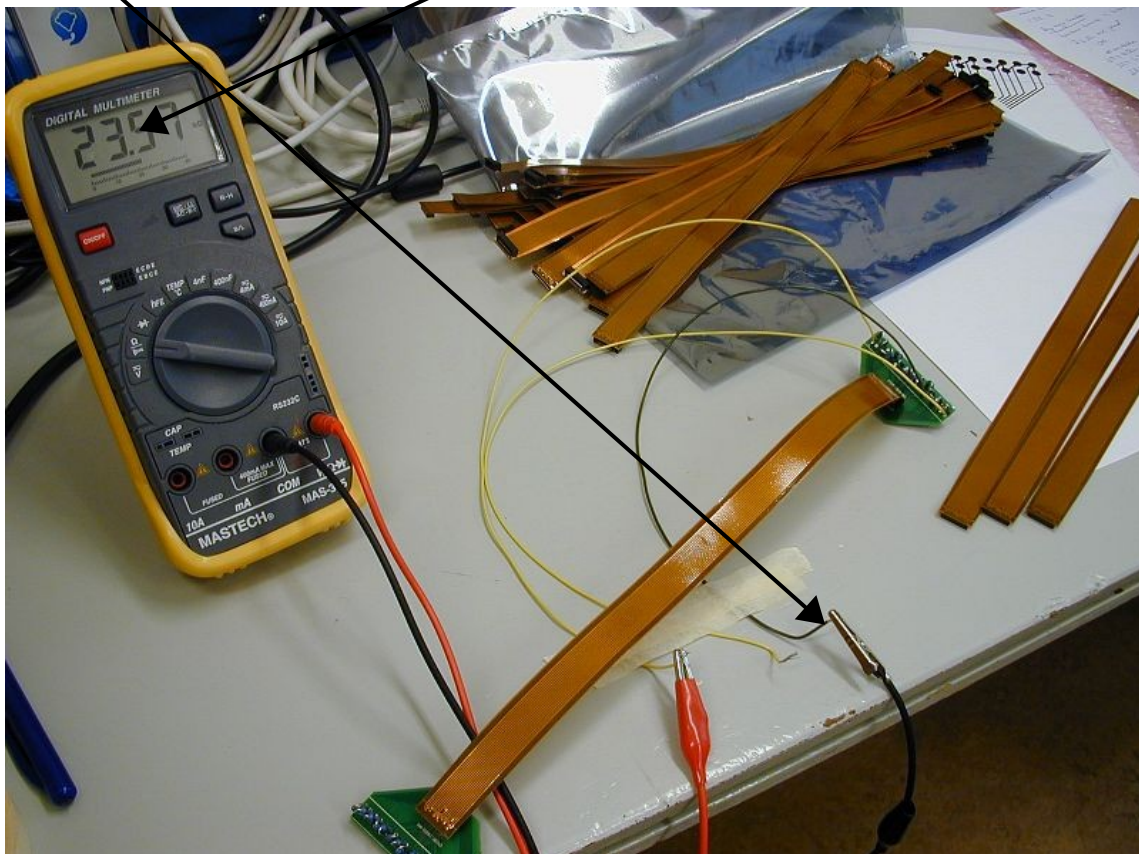


20100826 test of short to ground:



Ground wire

Measured resistance: a short since not infinite



## Test results

There are two sets of cables, cables labeled, and cables not labeled. Labeled cables are assumed to be used cables in a DESY test setup, the others not used. No effort was done to understand the faults, except checking that cables were properly inserted on the test boards.

|                      | used cables  | not used cables | in total     |                                    |
|----------------------|--------------|-----------------|--------------|------------------------------------|
| cables tested        | <b>237</b>   | <b>123</b>      | <b>360</b>   |                                    |
| failed:              |              |                 |              |                                    |
| infinite resistance  | 31           | 12              | 43           |                                    |
| changing resistance  | 6            | 1               | 7            | the measured resistance not stable |
| < 30.4 kohm          | 3            | 2               | 5            |                                    |
| short to ground      | 4            | 7               | 11           |                                    |
|                      | ---          | ---             | ---          |                                    |
| <b>total failed:</b> | <b>44</b>    | <b>22</b>       | <b>66</b>    |                                    |
|                      | <b>18.5%</b> | <b>17.9%</b>    | <b>18.3%</b> |                                    |

### 20100825

New cables of two lengths, 20cm and 40 cm, 99 + 100 of each, were tested. These were also tested for having a signal short to ground. The short was tested by measuring the resistance between one of the inputs (yellow cables in the pictures) to a ground line, and if this gave a finite resistance it is considered a short somewhere.

|                      | 20 cm        | 40 cm       | in total    |
|----------------------|--------------|-------------|-------------|
| cables tested        | <b>99</b>    | <b>100</b>  | <b>199</b>  |
| failed:              |              |             |             |
| infinite resistance  | 5            | 2           | 7           |
| < 30.4 kohm          | 3            | 3           | 6           |
| short to ground      | 4            | 1           | 5           |
| failed to solder     | 0            | 1           | 1           |
|                      | ---          | ---         | ---         |
| <b>total failed:</b> | <b>12</b>    | <b>7</b>    | <b>19</b>   |
|                      | <b>12.1%</b> | <b>7.0%</b> | <b>9.5%</b> |