Flexible Printed Circuit Termination Services

CUSTOM TERMINATIONS for

* FLEXIBLE PRINTED CIRCUITS
* MEMBRANE SWITCHES
Flexible Printed Circuit and Membrane Switch Termination Services

Many designers in the electronics industry are choosing to use flexible printed circuits in their designs to address a multitude of issues, including:

1. Solve packaging problems.
   - Flexible circuits allow unique designs which solve interconnection problems.
   - The formability of a flexible circuit enables a package size reduction.
   - A Flexible circuit makes installation and repair practical and cost effective.

2. Reduce assembly costs.
   - Flex circuits can be tested prior to assembly of components.
   - Elimination of connectors and solder joints reduce costs.

3. Replace circuit boards and wires.
   - Flex circuits simplify system design.
   - Flex circuits reduce the number of levels of interconnection required in an electronic package.
   - Flexible circuits eliminate human error common in wire assemblies as routing is determined by artwork and repeatability is guaranteed.

4. Reduce weight and space.
   - Considerable weight reduction is a benefit over traditional round-wire harnesses. Thickness can be as thin as .004 inches (.10mm) in total.

5. Dynamic Flexing.
   - The thinness of the material makes flex circuits the best candidate for flexible applications up to millions of flexures.

6. Thermal management/high temperature applications.
   - Flex circuits dissipate heat at a better rate than any other dielectric materials while providing the added benefits of vastly improved flexibility.

7. Aesthetics.
   - Flexible circuits improve the internal appearance of an electronic package, which can have an influence on the decision making process of prospective users of the product.

Gopher Electronics has the tooling, products and expertise required to properly terminate flexible printed circuits.
CUSTOM TERMINATION SERVICES

* Flexible Circuit Terminations
  * Insulation Materials
    - Kapton®
    - Mylar
    - Teflon®
  * Pitches
    - .100" [2.54mm]
    - .075" [1.905mm]
    - .050" [1.27mm]
  * Terminations (see pages 5 and 7 for termination details)
    - .100" Centerline
      - Solder Tabs
      - Receptacles (with or without housings)
      - Pins (with or without housings)
    - .075" Centerline
      - Solder Tabs (long or short)
      - Receptacles (without housings only)
    - .050" Centerline
      - Solder Tabs (long or short)
      - Receptacles (with or without housings)
  * All terminations are compliant with Tyco Electronics' AMP Application Specifications 114-16008 (pg 19) and 114-16015.

* Membrane Switch Terminations
  * Insulation Materials
    - Kapton®
    - Mylar
    - Teflon®
  * Terminations (see pages 5 and 7 for termination details)
    - .100" Centerline
      - Solder Tabs
      - Receptacles (with or without housings)
      - Pins (with or without housings)
    - .050" Centerline
      - Solder Tabs (long or short)
      - Receptacles (with or without housings)
  * Test and Compliance Certifications are available on request.
3.3. Cable Selection and Preparation

See Figure 3 for cable construction recommended for AMP Flexible Flat Cable Contacts.

**CAUTION 1**
There must be a straight conductor length of 5.59 [.220] minimum for all terminations. A straight cable length of 41.15 [1.620] minimum is required for semi-automatic tools.

**CAUTION 2**
The optimum conductor width is 0.66 ± 0.05 [.026 ± .002]. The contacts can be used to terminate wider conductors; however, the lines may shave off some of the conductor and create slivers of metal that could cause electrical shorts. If slivers are suspect, brush the tine crimp area. Visually check that there are no slivers bridging from one contact to another, then apply a thin coat of fast-drying sealant over the tine crimp area. For additional information concerning cable requirements, contact AMP Engineering through the Technical Assistance Center phone number at the top of page 1.

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**CABLE**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>REFERENCE COMMERCIAL SPECIFICATION</th>
<th>CONDUCTOR</th>
<th>INSULATION</th>
<th>CRIMP AREA THICKNESS</th>
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<tr>
<td></td>
<td></td>
<td>WIDTH</td>
<td>THICKNESS</td>
<td>BASE</td>
</tr>
<tr>
<td>FFC</td>
<td>IPC–FC–220, CLASS 4</td>
<td></td>
<td>0.05–0.08</td>
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<tr>
<td>FEC/FPW</td>
<td>IPC–FC–250, CLASS 1, 2, OR 3</td>
<td>0.61–0.71</td>
<td>0.05–0.08</td>
<td>[.024–.028]</td>
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<tr>
<td>COND INK</td>
<td>None</td>
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<td>0.008–0.025</td>
<td>[.0003–.0010]</td>
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</table>

**NOTE**
For FEC using polyimide, there shall be no polyimide coverlay on the top side of the cable as terminated for a minimum distance of 5.59 [.220] from the end of the cable for proper termination. If there is an environmental concern, copper tracks should be plated or a conformal coating should be applied to the exposed copper before or after termination.

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Figure 3

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For Additional Information or Assistance, Please Call Gopher Electronics at 800-592-9519 or 651-490-4900

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3.5. FFC Selection and Preparation

Cable construction recommended for AMP Flexible Flat Cable Contacts is provided in Figure 5.

**CAUTION**

There must be a straight conductor length of 6.35 [250] minimum for all terminations. A straight cable length of 40.64 [1.600] minimum is required for semi-automatic machines.

**CAUTION**

The optimum conductor width is 1.27 ± 0.08 [0.050 ± 0.003]. The contacts can be used to terminate wider conductors; however, the lines may shave off some of the conductor and create slivers of metal that could cause electrical shorts. If slivers are suspect, brush the line crimp area. Visually check that there are no slivers bridging from one contact to another, then apply a thin coat of fast-drying sealant over the line crimp area. For additional information concerning cable requirements, contact AMP Engineering through the Tooling Assistance Center number at the bottom of page 1.

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**Figure 5**

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**CABLE**

<table>
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<tr>
<th>TYPE</th>
<th>COMMERCIAL SPECIFICATION</th>
<th>WIDTH</th>
<th>THICKNESS</th>
<th>BASE</th>
<th>COVERLAY</th>
<th>CRIMP AREA THICKNESS</th>
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<tr>
<td>FFC</td>
<td>IPC-FC–220, CLASS 4</td>
<td>1.27±0.08 [0.500±0.003]</td>
<td>0.05 – 0.13±0.008 [0.002 – 0.005±0.003]</td>
<td>0.08 – 0.31 [0.003 – 0.12]</td>
<td>0. – 0.23 [0.000 – 0.009]</td>
<td>0.38 [0.015] (Max)</td>
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<tr>
<td>FEC/FPW</td>
<td>IPC-FC–250, CLASS 1, 2, or 3</td>
<td>1.27±0.08 [0.500±0.003]</td>
<td>0.05 – 0.13±0.008 [0.002 – 0.005±0.003]</td>
<td>0.08 – 0.31 [0.003 – 0.12]</td>
<td>0. – 0.23 [0.000 – 0.009]</td>
<td></td>
</tr>
<tr>
<td>COND INK</td>
<td>None</td>
<td>1.27±0.08 [0.500±0.003]</td>
<td>0.008 – 0.030 [0.0003 – 0.010]</td>
<td>0.08 – 0.36 [0.003 – 0.014]</td>
<td>0. – 0.28 [0.000 – 0.011]</td>
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