Flexible Film Cables
(Flexible Flat Conductor Cables)

- HIGH FLEX LIFE
- SUPERIOR HEAT DISSIPATION
- LIGHT WEIGHT
- LOW PROFILE
- RUGGED
- CAN BE SHIELDED
- CAN BE FOLDED TO REQUIRED SHAPES
- MULTIPLE TERMINATION OPTIONS

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FLEXIBLE FILM CABLE

Also known as flexible flat conductor cable, this product is lightweight, low profile, small outline cable designed to satisfy high density cabling applications. It excels in applications that cause the cable to be flexed repeatedly. FFC Cable can be folded into shapes as needed. It is designed for high-cycle-life applications as well as for board-to-board jumpers. The cables are available in a variety of pitches to fit a broad spectrum of applications.

Features:
- Copper conductors rolled flat for high flex life.
- Available as blunt-cut, stripped-and-tinned for zif connector use, or terminated with solder tabs, pins, or receptacles.
- Choice of conductor pitches accommodates a variety of PCB hole patterns.
- Insulation is polyester that is permanently laminated to the conductors.
- Cable assemblies may be "connectorized" to mate with industry-standard headers.
- EMI/RFI shielding is available either in the form of a jacket placed around the cable or of conductive ink printed directly on the cable's insulation.

Advantages Include:
- Weight Savings: Considerably lighter than round wire harness methods.
- Space Savings: As much as 50% over round wire.
- Flexibility: Multi-million cycles may be achieved.
- Heat Dissipation: More efficient heat dissipation than round wire due to a larger surface area-to-volume ratio.
- Ruggedness: Flat plane provides a collective strength for tensile loads and contact retention.

Small Outline + Low Profile = High Density

Today's commercial electronics demand lightweight, high density packaging -- a natural home for a product that is almost paper thin. FFC Cables provide the low profile interconnect that designers look for when developing new laptop computers, notebook/PDAs, cellular telecommunications gear and medical equipment.

High Flex Life

Unlike other flat cables that utilize round conductors, FFC Cable is made with flat ribbon wire that is engineered for high flex-life application. The life cycle of an FFC Cable may extend to more than 10 million flexures at a radius of 22.0 mm. Board-to-board jumpers are the perfect application solution for print heads, plotters, copiers, automatic insertion equipment and other robotics. FFC Cables can be folded into shapes to ease routing.
FLEXIBLE FILM CABLE SPECIFICATIONS

Gopher Electronics uses Parlex and Miraco cable and Tyco/AMP contacts and housings. The cables are terminated using Tyco/AMP machines to AMP specifications. Cirrus cable testers are used to perform "opens" and "shorts" on tests on 100% of the assemblies.

Gopher Electronics is UL Recognized for Flexible Film Cable assembly and Flexible Printed Circuit termination under File Number E121321.

.100" [2.54mm] Centerline Cable

Materials:
Conductors Unplated copper, 27AWG equivalent
Insulation Flame Retardant Polyester Film
Thickness .011" Max.

Performance:
Current Rating 2 Amps
Voltage Rating 300VAC
Temperature Rating -55°C to +105°C

Typical Electrical Values:
Insulation Resistance 20Megaohms
Dielectric Strength 2500 Volts / Mil
Flammability Rating VW-1

UL Recognized

.050" [1.27mm] Centerline Cable

Materials:
Conductors Unplated copper, 30AWG equivalent
Insulation Flame Retardant Polyester Film
Thickness .011" Max.

Performance:
Current Rating 1.5 Amps
Voltage Rating 300VAC
Temperature Rating -55°C to +105°C

Typical Electrical Values:
Insulation Resistance 20Megaohms
Dielectric Strength 2500 Volts / Mil
Flammability Rating VW-1

UL Recognized
Multiple-Crimp Contact Design
(.100" [2.54mm] Centerline Shown)

AMP contacts are designed so that the primary electrical contact is made on the tips of the 4 tines when they bend around, pierce the insulation, and are crimped to the top of the conductor. *The tines do not pierce the conductor and rely on the contact between the new holes and piercing tines for electrical contact.* Although conductor piercing is an accepted technique, it can result in less than ideal electrical paths when the cables or jumpers get moved or bent or are subjected to repeated temperature cycling. Rather, *the AMP tines are designed to slightly penetrate the top surface of the conductor — without actually piercing it — and tightly grip the conductor.* This creates a highly reliable and robust gas-tight interface. The multiple-crimp design is featured on all .050" [1.27mm] and .100" [2.54mm] centerline flexible film contacts.
1. Flexible Flat Conductor Cable Base
2. Contact - Pin
3. Contact - Receptacle
4. Single Row Slim-Line Receptacle Housing - Plain
5. Single Row Slim-Line Receptacle Housing - Latch
7. Single Row Pin Housing, Polarized Detent Without Ears
8. Single Row Receptacle Housing, Polarized Detent Without Ears
9. Double Row Pin Housing, Polarized Detent With Ears
10. Double Row Pin Housing, Polarized Detent Without Ears
11. Double Row Receptacle Housing, Polarized Detent With Ears
12. Double Row Receptacle Housing, Polarized Detent Without Ears
13. Double Row Receptacle Housing with Center Polarization
14. Trio-Mate Connector - Vertical Entry
15. Trio-Mate Connector - Horizontal Entry
16. FFC Cable with Tin-Plated Prepared Ends
17. Round Wire Pin Contacts
18. Round Wire Receptacle Contacts
19. Header - Unshrouded Single Row Straight
20. Header - Unshrouded Single Row Right Angle
21. Header - Shrouded Single Row Straight
22. Header - Shrouded Double Row Right Angle
23. Header - Shrouded Double Row Right Angle Latch
24. Header - Shrouded Single Row Right Angle Latch
25. Header - Ejection Style Right Angle
26. Header - Ejection Style Straight
27. Contact - Solder Tab

For Additional Information or Assistance, Please Call Gopher Electronics at 800-592-9519 or 651-490-4900
.100" [2.54mm] Centerline Termination Options

Contact Plating Options
1. Duplex plated .000015 gold on mating area, .000100 min. bright tin-lead in crimp area, with entire contact underplated .000050 min. nickel.
2. Duplex plated .000030 gold on mating area, .000100 min. bright tin-lead in crimp area, with entire contact underplated .000050 min. nickel.
3. Plated .000100 min. bright tin-lead over .000050 min. nickel on entire contact.
4. Duplex plated .000050 gold on mating area, .000100 min. bright tin-lead in crimp area, with entire contact underplated .000050 min. nickel.

Options Available
- Pin (for use in housing) 1, 2, 3, 4
- Receptacle (Standard Pressure) 1, 2, 3, 4
- Receptacle (High Pressure) * 1, 2, 3
- Pin (for use without housing) 2, 3
- Solder Tab ** 1, 3

* High pressure receptacle contacts are recommended for a maximum connector size of 15 positions.
** Recommended hole size for solder tabs is .031 -.035 diameter.
.050" (1.27mm) Centerline Products

1. Flexible Flat Conductor Cable Base
2. Receptacle Contact
3. Solder Tab Contact
4. Single Row Receptacle Housing - Plain
5. Single Row Receptacle Housing - Latch
6. Double Row Receptacle Housing - Plain
7. Double Row Receptacle Housing - Latch
8. ZIF-Line Connector
9. FFC Cable with Tin-Plated Prepared Ends
10. Header - Shrouded Single Row Right Angle
11. Header - Shrouded Single Row Vertical
12. Header - Shrouded Double Row Right Angle
13. Header - Shrouded Double Row Vertical Thru-Hole
14. Header - Unshrouded Single Row Right Angle
15. Header - Unshrouded Single Row Vertical
16. Header - Unshrouded Double Row Right Angle
17. Header - Unshrouded Double Row Vertical
.050" [1.27mm] Centerline Termination Options

1. Duplex plated .000030 gold on mating area, .000100 min. bright tin-lead in crimp area, with entire contact underplated .000050 min. nickel.
2. Plated .000100 min. bright tin-lead over .000050 min. nickel on entire contact.
3. Duplex plated .000015 gold on solder tab end, .000100 min. bright tin-lead in crimp area, with entire contact underplated .000050 min. nickel.

Options Available

<table>
<thead>
<tr>
<th>Receptacle</th>
<th>1</th>
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<tbody>
<tr>
<td>Solder Tab (Long)</td>
<td>2, 3</td>
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<tr>
<td>Solder Tab (Short)</td>
<td>2</td>
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### Dimensions Table

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<tr>
<th>DIMENSION</th>
<th>.100&quot; CL S/R</th>
<th>.100&quot; CL D/R</th>
<th>.100&quot; CL PH</th>
<th>.050&quot; CL</th>
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<tbody>
<tr>
<td>A</td>
<td>0.330 IN</td>
<td>0.350 IN</td>
<td>0.500 IN</td>
<td>0.350 IN</td>
</tr>
<tr>
<td>B</td>
<td>0.220 IN</td>
<td>0.250 IN</td>
<td>0.300 IN</td>
<td>0.230 IN</td>
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<tr>
<td>C</td>
<td>0.185 IN</td>
<td>N/A</td>
<td>N/A</td>
<td>0.285 IN</td>
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</tbody>
</table>

= LONG

|   |   |   |   |   |   |
|---|---|---|---|---|
|   |   |   |   |   |

S/R = SINGLE ROW RECEPTACLE HOUSING
D/R = DOUBLE ROW RECEPTACLE HOUSING
PH = PIN HOUSING

For Additional Information or Assistance, Please Call Gopher Electronics at 800-592-9519 or 651-490-4900
GOPHER ELECTRONICS
FFC ASSEMBLY
PART NUMBERING SYSTEM

Example: FFC15X1.3RHU-RHU5

<table>
<thead>
<tr>
<th>FFC</th>
<th>15</th>
<th>X</th>
<th>1.3</th>
<th>RH</th>
<th>U</th>
<th>-</th>
<th>RH</th>
<th>U</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td>FFC=FLEXIBLE FILM CABLE</td>
<td>NUMBER OF COND.</td>
<td>CUT LENGTH IN INCHES</td>
<td>LEFT TERMINATION TYPE</td>
<td>LEFT ORIENTATION</td>
<td>RIGHT TERMINATION TYPE</td>
<td>RIGHT ORIENTATION</td>
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<td></td>
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<tr>
<td>DRFFC=DOUBLE ROW FLEXIBLE FILM CABLE</td>
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</tbody>
</table>

**TERMINATION TYPE**

T = SOLDER TAB
TA = TAB, RIGHT ANGLE - SHOULDER EXTENDS .05" BEYOND CABLE
TZ = TAB, STAGGERED STRAIGHT (.050" ONLY)
TS = TAB, STAGGERED RIGHT ANGLE (.050" ONLY)
R = RECEPTACLE CONTACT ONLY
RH = RECEPTACLE WITH HOUSING
P = PIN, .025" SQ., CONTACT ONLY
PH = PIN, .025" SQ., WITH HOUSING

**ORIENTATION**

U = LATCH UP OR CRIMP FINGERS UP IN THE CASE OF SOLDER TABS
D = LATCH DOWN (NORMAL ORIENTATION FOR SOLDER TABS IS CRIMP FINGERS DOWN. LETTER DESIGNATION IS NOT REQUIRED).

ASSEMBLY IS VIEWED WITH THE LENGTH ON THE HORIZONTAL AXIS AND THE "PIN 1" STRIPE ON THE BOTTOM EDGE AND VISIBLE.

IF THE ASSEMBLY IS "DOUBLE ROW", ADD THE PREFIX "DR" AND USE THE LENGTH AND CONDUCTOR COUNT FOR ONE OF THE TWO ROWS ONLY.

THE MINIMUM CUT LENGTH THAT CAN BE TERMINATED IS 3/4".
The MINIMUM CUT LENGTH IS 1/4".

For the following cable pitches, please contact a Gopher Electronics representative at:
Phone (toll free): 800-592-9519
Phone: 651-490-4900
Fax: 651-490-4911
Email: info@gopherelectronics.com

A "Cable Builder" page is also available on the Gopher Electronics website at www.gopherelectronics.com