# Parlex Flat Flexible Cables

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# Mega Trends our Customers are Facing

- Increased need for EMI/RFI protection as equipment becomes more complex with more integrated electronics and sensors
- Electronic PCB interconnects are getting smaller and smaller and PCB space is at a premium
  - Smaller space required to have board to board communication
  - 0.5mm pitch is becoming industry standard (smaller coming)
  - Miniaturization – more complexity, more value
- Long life expectancy for medical and industrial equipment

# Human and Business Values Served by Parlex FFC

- Human Values
  - Consistent and reliable performance
  - Ease-of-Use
  - High reliability
  - Smaller lighter package sizes
- Business Values
  - Reduced time to market
  - Custom problem solving provided where customer engineering resource is unable to do entire system design

# Why use Parlex Flat Flexible Cable Products?

- Safe Choice
  - Reliable method to interconnect 2 PCB's
  - RoHS, REACH compliant and UL rated
- Prototyping is easy
  - Dedicated Sales Applications Engineer support to assist with design goals
  - Custom samples often in < 2 weeks
- Fast time to Production
  - Lead time from concept to production can be < 1 month

# Applications & Markets

- Military
  - Hybrid technology – FFC, PCB, FPC, Connectors, etc….
    - Space savings and weight reductions
    - Parlex shielding
- Medical
  - Robotic dispensing applications
    - Light weight, space savings Parlex shielding especially for longer length FFC
    - Jumpers with FFC (High flex life)
- Hand Held Market – POS
  - Electronic designs where space is limited
    - Fine pitch custom ZIF FFC
      - Quick turn on samples and low cost in production
- Custom Display – LCD
  - Provide extension cables when needed to extend tails

# Parlex FFC Products - Advantages

## Technology Leadership

- State of the art manufacturing
- Unique shielding technology for EMI/RFI
- Complete interconnect options excludes no opportunities
- Lightweight and compact
- High Reliability

## The Safe Choice

- Industry leadership in FFC technology
- Proven support from concept to production
- Quick response and exceptional lead times

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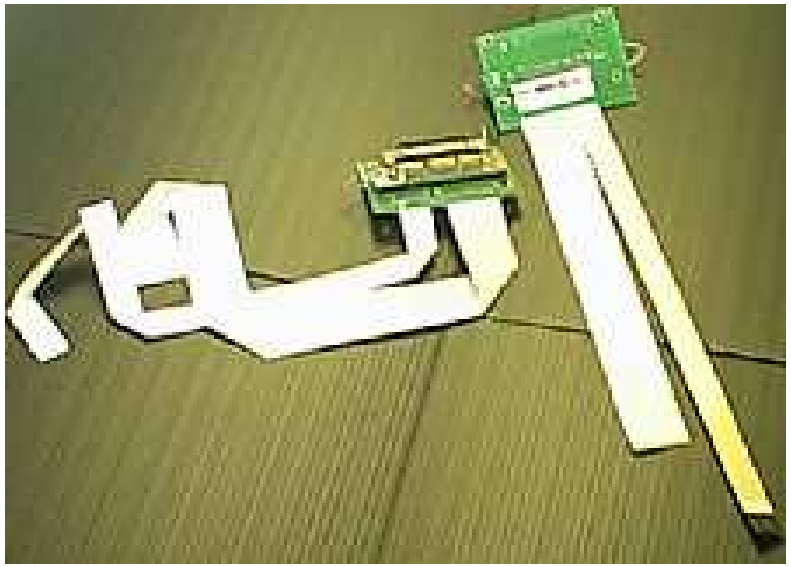
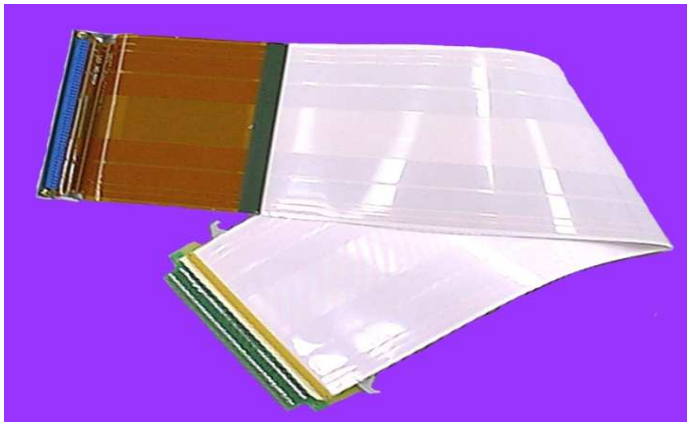
# FFC Technology Leadership Options

- Custom design solutions
  - Shielded – even with long length cables
  - Coved
  - ZIF
    - ALC ® – ZIF FFC “upgrade“/replacement (SMT)
  - Extremely long Jumpers to > 2 meters
  - PCB to FFC
  - FPC to FFC
  - PALStrip® – Tyco “Flexstrip” equivalent
  - Display – used on Sharp, NEC etc
  - Uflex ® – ZIF FFC “upgrade”/replacement (Thole)

# Custom FFC examples





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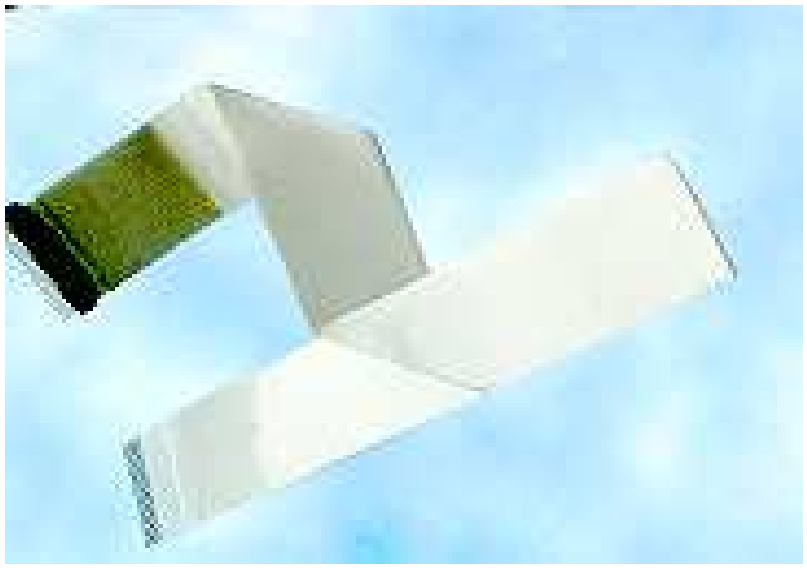
# FFC with EMI Flex (Shielding)



- Silver ink formula with conformal coating to prevent scratching
- Ultra thin, highly flexible shield vs foil
- EMI/RFI requirements
- Cable lengths can be greater than 2 meters

# FFC with EMI Flex (Shielding)

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**"Technology Leadership"**

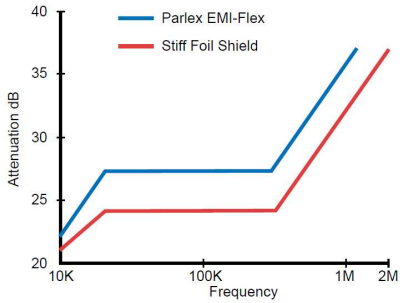
- EMI attenuation
- Flexible and conformable
- Lightweight and compact
- Conductive coating technology

**"The Safe Choice"**

- 360° shielding
- Reliable & durable
- Flex circuit industry leader
- Medical & Defense supplier

## Parlex EMI-Flex™ Shielded Flexible Circuits

PARLEX

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# Cambered / Coved FFC



- Cambered shape prevents drooping during cycling or need for channel
- Eliminates need for secondary support such as a channel
- Ideal for high flex life applications
- Multiple conductor options - unlimited conductor count

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# Coved FFC

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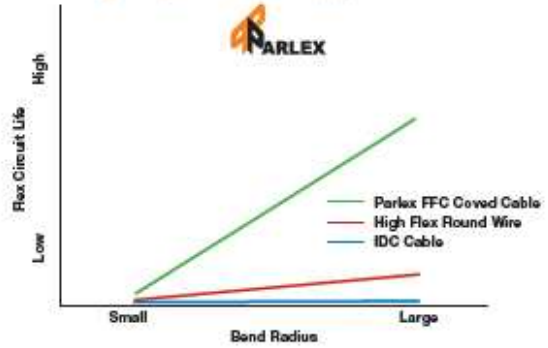
**"Technology Leadership"**

- Coved flex circuits for small spaces
- Cambered construction prevents drooping
- Ideal for long life cycling
- Multiple conductor options

**"The Safe Choice"**

- No secondary mechanical supports needed
- Maximum service life and reliability
- Long life for robotics, pick & place applications
- UL Approved/Rated

## Flexible Coved Circuits for High Cycle Rate Applications

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# Zero Insertion Force (ZIF)

- PET -55℃ to 105℃; White (FR), black, and clear
- Polyimide -55℃ to 125℃
- Pitches available 0.5, 0.8, 1.0, 1.25, 1.27, 2.54mm – any custom spacing

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# Zero Insertion Force (ZIF)

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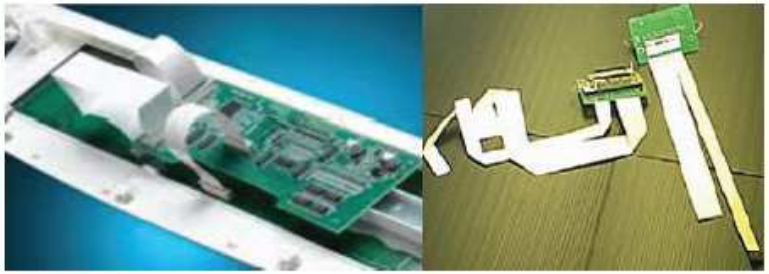
**"Technology Leadership"**

- Flat, flexible ZIF cables
- Industry-standard mating connectors
- Gold plated options for optimal performance
- Shielding for EMI/RFI protection

**"The Safe Choice"**

- Reliable connection method for multiple PCBs
- Proven medical and industrial expertise
- RoHS, REACH and UL approved
- Rapid prototyping



## Parlex Flexible Interconnects with Zero Insertion Force Connectors

Multiple spacing, conductor count and locking options

Folding, bending and creasing options

Ease of assembly

Blue foil for high frequency EMI/ RFI protection

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# Long FFC with EMI Shielding


- Shielded FFC to any length
- Competitors are limited by length using foil shielding
- Millions of cycles with minimum bend radius

# Long FFC with EMI Shielding

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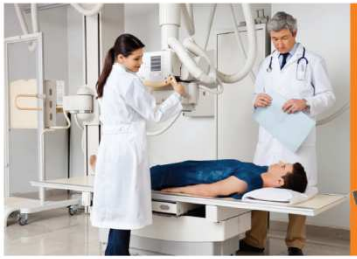
**"Technology Leadership"**

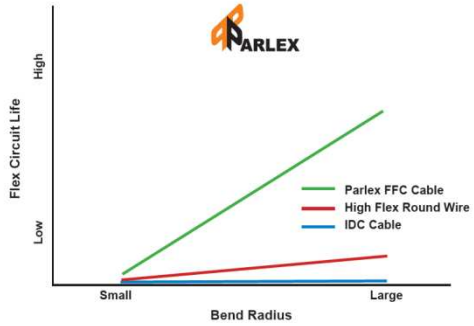
- Flat, flexible cables (FFC) — board-to-board connectors
- Lengths of 3 meters/10 feet or greater
- Many connector options — latch, plain or detent
- EMI/RFI shielding regardless of FFC length

**"The Safe Choice"**

- Reliable connection for dynamic flex applications
- Millions of flex cycles with minimum bend radius
- Multiple configurations for cutom design needs
- REACH, RoHS and UL approvals



## Long Life FFC Jumpers for Dynamic Flex Applications

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# Jumper FFC Female Receptacle Housings


- Crimped onto the end of the laminated FFC
- Black plastic female housing snapped in place
- Mated to a wide variety of pin headers
- Available in slim line, dual row and locking
- Available in Tyco, Molex & FCI Berg

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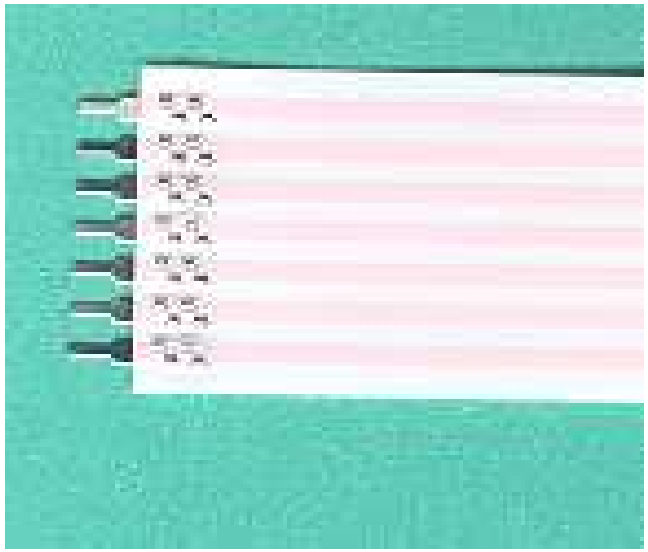
# Jumper FFC Male Solder Tabs



- 2.54 mm (.100”) or 1.27 mm (.050”) conductor pitch
- Crimp through insulation
- Through hole applications
- Straight, right angled or stagger formed

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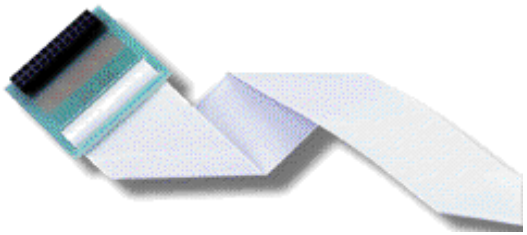
# Stamped FFC

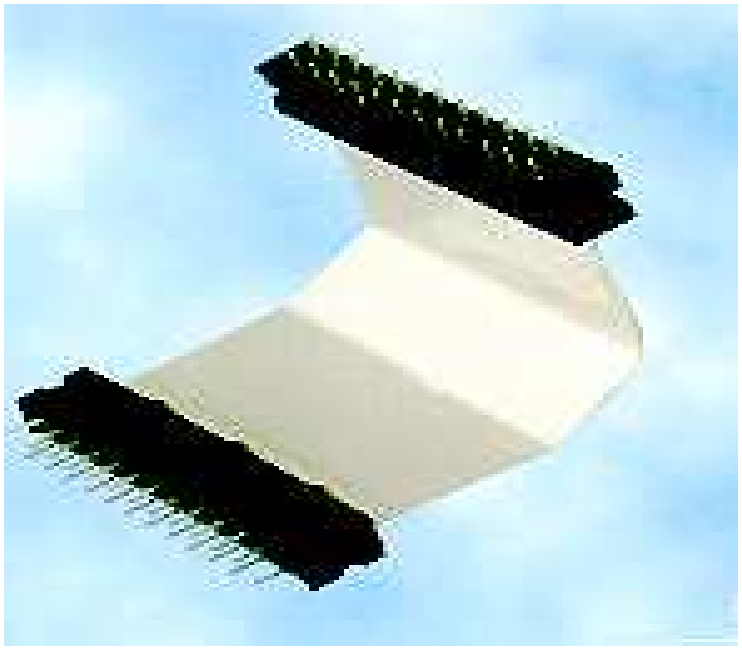

- Permanent Ink – (Limited chemical resistance)
- Up to 3 lines of text
- Individual stamping
- Bulk Stamping
- Polarity stripe

# Folded FFC

- FFC can be folded into any configuration where space constraints are a limiting design factor
- Folds can be created to limit stress induced by standard folding methods (if the FFC is not creased prior to folding the conductors could develop micro-cracks causing intermittent opens)
- We can supply FFC pre-creased to the customer and they can fold at assembly
- Any fold on 0.030” radius or greater is possible



# U-Flex FFC



- Eliminates connectors providing increased reliability
- Internal wire conductors formed into U shaped pin
- Injection molded to create a header
- Through hole applications

# FFC Lap Solder ends (ALC)

Auto Line (ALC)

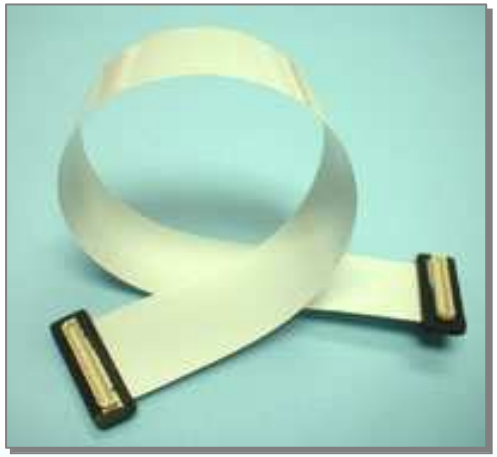
- Wire conductors exposed on both sides for hot bar soldering
- Multiple pitch patterns available
- Pre-assembled strain relief strip with push pins for easy mounting & accurate registration

# FFC Round to Flat PALStrip®

- FFC designed with round pin end to facilitate insertion in the board – PTH applications
- Meets UL and CSA requirement
- Straight, right angle, staggered, and Z-bend options available
- 2 - 40 pin

# FFC Hirose “DF9” Assemblies Display

- Connector soldered and molded to 0.5mm pitch FFC
- Used with LCD displays such as Sharp & NEC
- Molds are available in 31, 41 & 51 position connectors
- Provides a low profile and durable interconnection method



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# Parlex FFC

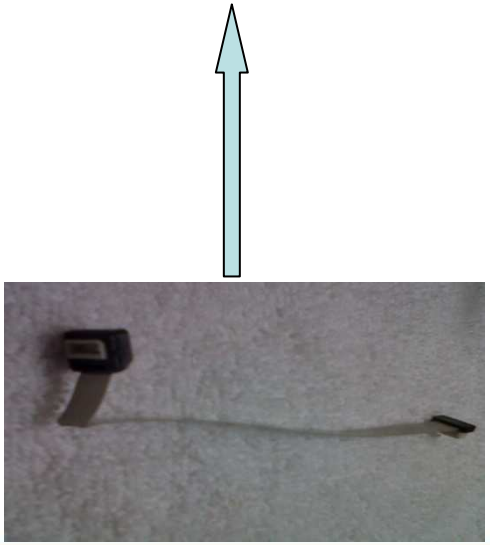
## Applications/Markets

# Markets/Product Examples

## Chemistry Systems

- Custom Assembly to > 1 meter in length
- Jumper FFC with Custom Double sided Shielding
- Non Foil Shielding adds more flexibility
- Long Flex life
- > 1M  million life cycles

# Markets/Product Examples



**Security Dome Camera**

- Custom engineered Hybrid Board to board connector and FFC with no EMI/RFI
- Shielded and folded
- PEMACS silver ink
- Total shielding yet flexible solution

# Markets/Product Examples


## Automated Defibrillator

- More dependable solution  in critical application - with ease of assembly
- Custom Design ZIF/Shielded Uflex
- Display FFC
- Double sided shielding (not foil) for more flexibility
- 100% reliability of connection

# Markets/Product Examples

**Chromatography**

- Custom Engineered Jumper Assembly
- Crimped Connectors
- Formed Coil FFC
- Tens of thousands of cycle life
- Economy of space

# Markets/Product Examples

## Medical Cell Sorter

- PCB Interconnect that would withstand many flex cycles
- Extended length Jumper FFC
- Mechanical connector assemblies
- Custom design for optimal flex life with strain relief
- > 1 Million cycle life without failure

# Markets/Product Examples

## Blood Analyzers

- Custom designed solution with optimal flex guidelines
- PCB Interconnect that would withstand many flex cycles
- Extended length Jumper FFC
- Mechanical connector assemblies
- > 1 Million life cycles

# Markets/Product Examples

## Clinical Chemistry equipment

- PCB custom shielded FFC assemblies
- PCB Interconnect to withstand many flex cycles
- EMI/RFI protection
- Double sided shielding (not foil) for more flexibility
- Grounding to specified conductors
- > 1 Million life cycles with customized connector options

# Markets/Product Examples

## Blood Analyzer

- Custom designed PCB Interconnect that would withstand many flex cycles
- Guidelines for optimal flex life
- EMI/RFI protection PCB shielded FFC
- Custom shielded FFC assemblies (16 per system)
- ZIF FFC technology
- Double sided shielding (not foil) for more flexibility

# Markets/Product Examples

## Portable Medical Analyzers

- PCB Interconnect that would withstand many flex cycles
- Extended length Jumper FFC
- Custom designed FFC > 0.5 meters
- > 1 Million life cycles
- Double sided shielding (not foil) for more flexibility
- Grounded to outer conductors for isolation
- Optimal flex guidelines for maximum life
- Custom assembly with AMP/Tyco double row mechanical connector

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# Markets/Product Examples

## Oncology Treatment Equipment

- Extended length FFC with no EMI/RFI interference
- Custom Mechanical shielded connector assemblies
- FFC > 1.5 Meters in length
- Blue foil shielding for stringent shielding needs
- Optimal flex guidelines provides millions of life cycles for reliable, long life connections