



Ironwood Established in 1986

Located in Eagan Minnesota





335

100,000 Sockets built 1M+ adapters bu<u>ilt</u>

#### United States

Ironwood Electronics (Headquarters) K2 Integrated Technologies

## Distributors

#### Asia – Pacific – Middle East

Migvan Technologies Qtec Technologies Pte. Ltd. K-Tokiwa & Co., Inc. JC Electronics Corporation Mirai Corporation BGA Socket Honpo 3H Corporation Ltd. Tekall Technologies Co., Ltd. YF Tech Co., Ltd. Suzhou YF Science Technology Co., Ltd. Long Summer Co., Ltd. Globetek Tula Solution Co., Ltd. Nautech

#### Europe

EMC (Electro Mechanical Components GMBH) PTS (Production Test Systems Ltd.) Manudax B.C.E. S.R.L.

### • MARKETS SERVED

- Semiconductor Manufactures
  - Memory
  - o RF
  - Digital / Analog
  - Microprocessors / Microcontrollers
- o OEM
- Military Aerospace
- Telecommunications
- Consumer Products



#### Company History & Milestones







Ironwood ATE PicoRaptor Cartridge flexibility & performance

- DROP INTO EXISTING FOOTPRINT
- SHORT WIPE
- X, Y & Z COMPATIBLE TO EXISTING TECHNOLOGIES
- ONE FRAME, FOR MULTIPLE PIN & PITCH DEVICES
- MULTIPLE CARTRIDGES INTO SINGLE FRAME



# PICORAPTOR RIGID ATE CARTRIDGE



MECHANICAL SPECIFICATIONS	PicoRaptor-1	PicoRaptor-2
Contact Pin Uncompressed Height (mm)	0.95	1.6
Contact Compliance (mm)	0.2	0.2
Contact Tip Coplanarity (mm)	±0.05*	±0.05
Gram Force per Contact (g)	30 ± 10	*20~40g
Wipe Length (mm)	0.09 ~ 0.12	*0.1
Number of Insertion - Laminated Housing	≥6M	≥6M
Number of Insertion - Pin (Mattte Tin.). Number of Insertion - Pin (NiPd)	200 - 300K *	300K ~ 500K*
Number of Insertion - Elastomer	~200K	*300K ~ 400K
Operating Temperature	-45 ~ 155 °C	-45 ~ 155 °C
Socket Frame	Torlon 5030 or Equivalent	Torlon 5030 or Equivalent
Contact Cartridge	Cirlex® Polyimic	de Cirlex® Polyimide
Pin Material	BeCu - NiAu	BeCu - NiAu

## PICO RAPTOR RIGID CONTACT



ELECTRICAL SPECIFICATION	PicoRaptor-1	PicoRaptor-2
Self Inductance (nH)	0.62	0.76**
Mutual Inductance (nH)	0.23	0.46**
Ground Capacitance (pF)	0.06	0.15**
Mutual Capacitance (pF)	0.085	0.11**
S21 (Insertion Loss/Bandwidth)	- 1db @ 35.4GHz++	-1db @ 18GHz**
S11 (Return Loss/Bandwidth)	- 20dB @ 7.8 GHz++	- 20dB @ 3GHz**
S41 (Crosstalk /Bandwidth)	- 20dB @ 15.8GHz ++	- 20dB @ 12GHz**
Contact DC Resistance (m $\Omega$ )	≤ 25	≤ 25
Curent Carrying Capacity (A) Duty Cycle 100% (20° rise)	6	9A**
Current Leakage (pA) @ 10V	≤]	≤1

PICO RAPTOR RIGID CONTACT







#### Feature #1 – No pin engagement to the back wall

- Sustainable specification & FPY can be achieved
- Longer housing lifespan; ≥6M insertion (≥200% longer lifespan than typical socket housing)
- It maximizes contact pin & elastomer lifespan









No Pin Engagement with Back-Stopper Benefit : No Wearing of housing wall



Progressive deterioration of the housing back-stopper









#### Feature #2 – Short Wipe Technology

PicoRaptor has 0.10mm wiping length compared to typical 0.17~0.22mm

#### <u>Benefit</u>

- Less debris generation leads to less cleaning
- Optimizes lifespan of pin's contact tip due to bigger contact area (≥60% longer lifespan than typical contact pin)
- Longer MTBA, MTBR and MTBF
- Ideal for chamfered corner pad, short pad and wettable
  flank pad/dimple pad
- Shorter wiping length retain more solderability area
- Ideal for multiple testing insertion









Wettable flank pad/ Dimple pad

Typical wiping length 0.17~0.22mm

Short chamfered corner pads

EZ wiping length 50~100% shorter length



#### SWS (Short Wiping Stroke) Technology Benefit : Slow Wearing PicoRaptor has 0.10mm wiping length compared to typical 0.17~0.22mm



#### PicoRaptor SWS technology

#### Typical wiping stroke



#### Feature #3 – AirTherm Air Flow

#### <u>Benefit</u>

- Enable temperature testing on DUTs with +/- 2°C
- Reduces device soaking time and conditions contacts to desired temperature



Feature #4 – P-Shaped Elastomer Benefit : Single and Multifunction Elastomer One elastomer for gripping and stress distribution

#### <u>Benefit</u>

- No dropping of the pin
- Generates high gram force
- Insurance of contact & consistent Cres
- Sustainable test performance
- Longer MTBA, MTBR & MTBF



#### Feature #5- ACF (Adv. Contact Finishing) Technology **Benefit : Slow Wearing**

Finer contact finishing has less cavity for debris accumulation at contact tip of DUT & less abrasive to loadboard

#### **Benefit**

- Loadboard friendly
- Less cleaning frequency •
- Less cost of loadboard repair •
- Longer MTBA, MTBR & MTBF •



Digging level stays at Level 0 – Gold after 1M cycles (Note: In house testing) **Customer Reference:-**

- Digging level 0 Gold
- Digging level 1 Nickel
- Digging level 2 Copper
- Digging level 3 FR4



**Competitor pin** 



lronwood

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Problem New boards with probe mark scrubs Analysis Notes Fook sem images at a 45 degree tilt Analysis Result Analyst1: Phone# Analyst2: Phone#





#### Feature Design Feature #6 XYZ Compatible with market platform Benefit: Minimal or zero hardware investment Plug & Play





Ironwood

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Interchangeable Cartridges can be utilized with different handlers





Both contact set with similar package size are interchangeable, as long as, outline and alignment holes are identical.



Key Features	ATE PicoRaptor Cartridge Benefits
Single Multifunctional Elastomer	Easy Installation, Inventory and Cost Reduction, Consistent / Controlled Contact Motion, Consistent Cres, Longer MTBA
Short Electrical Length	Superior Signal Performance
No Contact Pin Engagement with Back Wall of Socket Housing	No Wearing of the Socket Housing, Extended Lifespan
SWS (Short Wiping Stroke) Technology	Ideal for Short Pads, Chamfered Corner Pads, Wettable Flank, and Step Cut Styles
ACF (Advanced Contact Finishing) Technology	Loadboard Friendly, Minimizes Debris, Prolonged Cleaning
AirTherm Air Flow	Conditions Contact pins to desired temperature
ATE Cartridge Technology	Same Frame for Multiple Pin count & Multiple Pitch cartridges equates to cost & inventory reduction & Quick change to reduce downtime





## GROUND BLOCK OPTIONS

Bell Contact (BC)	Hinged Contact Insert (HCI)	PicoRaptor	Ground Block with/without Pin
≥ 2x2	≥ 3x3	≥ 5x5	≥ 2x2 (With BC) ≥ 3x3 (With HCl) ≥ 5x5 (With EZ)

### MANUAL ACTUATOR OPTIONS



#### Hinged Single latch ball bearing Z actuated

Double Latch ball bearing Z actuated







# COMING SOON!











#### Coming Soon!

### BENEFITS OF CANTILEVER VS SPRING PINS

- Disposable cartridge
- Rebuildable cartridge
- Spring Probe platform Compatible
- Configurable:
  - Non Kelvin
  - Kelvin
  - Selectable Kevin
- Same height as spring pin
- Wiping motion to remove oxides
- Single piece for consistent CRes & excellent for high current testing
- Longer lifespan then spring pins
- No board wear, bottom pin is locked into cartridge
- Optional AirTherm air flow



