the enduring standard for through-hole automation
A 50-year history as the leading through-hole provider, coupled with an incremental upgrade path to protect our investment made Universal the obvious choice.

Through-hole technology remains vital in electronics manufacturing. Refined through decades of experience, Universal Instruments’ through-hole lineup continues to stay one step ahead of the growing demands of the industry.

The next step in Universal’s evolution is the Generation 88HT series, building off the highly successful Generation 88 series with improvements yielding higher throughput, improved reliability and increased capability. These enhancements are also available as an upgrade package to preserve Universal’s platform philosophy and provide the end user with the best-in-class investment protection. Universal continues to ensure its solutions will meet the needs of today and into the future.

Value-driven evolution
Easy to use and easy to maintain with higher throughput and reliability, today’s Generation 88HT family delivers real speed, stability and cost advantages on your shop floor.

**Throughput enhancements**
- X / Y Table speed increase – 445mm to 685mm/second
- 0.5 second improvement in board handling times
- Faster Auto-repair – up to 50% improvement over Generation 88
- Operator-free Missing Part Auto-repair

**Capability enhancements**
- Quad Span Radial offerings
- Tall Part Kits available for larger radial components
- Adjustable radial clinch height for sensitive component requirements

**Ease-of-use enhancements**
- Optional touch-screen interface
- Management data automatically exports to host system

The green machine
Generation 88HT through-hole machines are the most economical and environmentally friendly gear available today, continuing to lower operating costs.
- 5% less power consumption than Generation88
- 50% less electricity than alternative solutions
- 8% less pneumatic than alternative solutions
- True zero-slap jumper wire insertion on the Jumper Wire 88 inserter

A heritage of reliability
Robust equipment solutions that run with maximum performance and minimal down-time are critical in getting the most from your manufacturing resources. Generation 88HT was designed for rock-solid reliability to lower cost of ownership and ensure your time is spent building product and adding to your bottom line.
- RoHS wear-resistant tooling
- Axial feeder technology that eliminates the need for lubrication
- Radial feeder technology that eliminates jamming

Easy to use
Generation 88HT machines are simply the easiest to use, providing the best possible operator experience and lessening the learning curve. Simple setup and operation with intuitive controls minimizes operator training.
- Graphical user interface
- Standard PC accessories include network connectivity, USB ports and CD-ROM
- Optional offline programming software
- Optional touch-screen interface

Flexible performance
Choose from several machine configurations to exactly match your application requirements. From low-cost manual-load with zero board transfer time, to modular automatic board-handling options including an optional CE-compliant automatic-load machine.

**Radial tooling**
- Single Span 2.5mm for high-density applications
- Dual Span 2.5/5.0mm for optimal combination of density and capability
- Triple Span 2.5/5.0/7.5mm for high capability
- Quad Span 2.5/5.0/7.5/10mm for ultra-high capability

**Radial sequencers**
- Small 20-station sequencer – small applications, limited floor space
- Up to 100-station sequencers – large applications, quick changeovers

**Axial tooling**
- High-density 5mm tooling – wire diameters 0.45 to 0.8mm
- High-reliability 7.62mm tooling – wire diameters 0.45 to 0.8mm
- Large-lead 7.62mm tooling – wire diameters 0.6 to 1.0mm

**Axial sequencers**
- Small 20-station sequencer – small applications, limited floor space
- Up to 220-station sequencers – large applications, quick changeovers
the ideal solution for any market

LED Signage / LED Illumination
Radial 88HT
• 20k cph real throughput
• Highest-density dedicated 2.5mm Single Span tooling
• Inward / outward clinch choices
• V-groove inward clinch technology eliminates “tiling”, reduces LED twist
• Alternate Feeder enables non-stop operation
• Component replenishment without machine stoppage
• Manual board handling option allows up to 800mm x 800mm boards with park steps

Appliance (White Goods)
Radial 88HT
• 17k cph real throughput
• No derate for larger components
• Triple Span 2.5/5.0/7.5mm for high capability
• Quad Span 2.5/5.0/7.5/10mm for ultra-high capability
• 360-degree radial component placement
• Small-40 station sequencer – quick changeover, minimized floor space
• Alternate Feeder capability
• Component replenishment without machine stoppage
• Adjustable radial clinch height for sensitive component requirements – high-and-tight for typical components (tact switches, connectors, other radials), low-and-loose for sensitive components (LEDs and sensitive capacitors)

VCD 88HT Axial
• 22k cph real throughput
• Optional Jumper Wire dispenser
• High-density 5mm tooling
• High-power Large-lead 7.62mm tooling
• Small 20-station sequencer – duplicate feeder capacity, minimized floor space

Power Conversion
Radial 88HT
• 17k cph real throughput
• No derate for larger components
• Triple Span 2.5/5.0/7.5mm for high capability
• Quad Span 2.5/5.0/7.5/10mm for ultra-high capability
• Alternate component location on guide jaw for density improvement (Quad Span)
• Optional Tall Part Kit
• Alternate Feeder capability
• Component replenishment without machine stoppage
• 12.7 and 15mm tape inputs and single, dual, triple-pitch

VCD 88HT Axial
• 22k cph real throughput
• Optional Jumper Wire dispenser
• High-density 5mm tooling
• High-power Large-lead 7.62mm tooling
• Small 20-station sequencer – small applications, minimized floor space

Compact Fluorescents (CFLs) and Ballasts
Radial 88HT
• 17k cph real throughput
• No derate for larger components
• Triple Span 2.5/5.0/7.5mm for high capability
• Quad Span 2.5/5.0/7.5/10mm for ultra-high capability
• 360-degree radial component placement
• Small 20-station sequencer – quick changeover, minimized floor space
• Programmable clinch height by component – avoid bottom-side SMT
• Alternate Feeder enables non-stop operation
• Component replenishment without machine stoppage
• 12.7 and 15mm tape inputs and single, dual, triple-pitch

VCD 88HT Axial
• 22k cph real throughput
• Optional Jumper Wire dispenser
• High-density 5mm tooling
• High-power Large-lead 7.62mm tooling
• 140-station sequencer for a wide range of components addressing multiple products
• Component Verifier – measures each component, ensures accurate setup

High-mix Environment
Radial 88HT
• 15k cph real throughput
• 360-degree radial component placement
• Single configurations, multiple changeover options in under 5 minutes – Triple Span 2.5/5.0/7.5mm, Dual Span 2.5/5.0/7.5mm and Single Span 2.5mm
• 100-station sequencer for a wide range of components addressing multiple products
• Component Verifier – measures each component, ensures accurate setup

VCD 88HT Axial
• 20k cph real throughput
• Optional Jumper Wire dispenser
• High-density 5mm tooling
• High-power Large-lead 7.62mm tooling
• 140-station sequencer for a wide range of components addressing multiple products
• Component Verifier – measures each component, ensures accurate setup
Radial 88HT
Flexible Radial sequencer / inserter for high productivity

- 22,000 CPH
- Highest reliability in the industry (300 ppm)
- Component replenishment without machine stoppage
- Manual Load or Automatic PCB Load/Unload
- Configurable sequencer (In-Line or Straight-Back)
- Multiple clinch options
  - N (Standard, Long, Short-lead)
  - Inward (for high-density applications)
- Component Verifier
- Simple-to-use operator environment:
  - Graphical user interface
  - Network connectivity, USB ports and CD-ROM
  - Optional touch-screen interface
  - Optional offline programming software

NEW for Radial 88HT
- Higher throughput – faster X/Y table, operator-free Missing Part Auto-repair
- Bad Clip Bypass
- Adjustable radial clinch height for sensitive component requirements
- Tall Part Kits available for larger radial components
- Quad Span capability

Green Machine
The Radial 88HT is the most economical radial insertion machine available with the lowest utility costs for electrical and pneumatic requirements.
- 5% less power consumption than Generation88
- 50% less electricity and 8% less pneumatic than alternative solutions

Component Verifier
Allows for the online verification of value and polarity of the components to be inserted. This reduces the risk of inserting defective, out-of-sequence or incorrectly oriented components.

Component Feeding
Sequencer feeds components to machine from reels or ammo packs. Generation 88HT features new jam-resistant designs, alternate feeder capability and double-index feeders for higher speed and increased throughput.

Odd-form Component Capability
Automate non-traditional odd-form components in tape, including LEDs, terminals, connectors, fuse holders, power resistors and eyelets. Improve product quality and output per floor space, while reducing associated labor costs.

360° Insertion Angle
Insertion heads are servo-driven for precise and rapid component insertion. The insertion tooling may be rotated from 0° to 360° in 1° increments.

Sequencer Configuration Options
Available in-line or straight-back sequencer configurations to accommodate a variety of factory layouts. Expandable from 20 stations up to 100 stations in 20-station increments.

Component Specs
- Maximum Size (LxDxH) 13.0 x 13.0 x 23.0mm (0.512 x 0.512 x .906”)
- Tape Pitch 12.7mm (0.5”) and 15.0mm (0.6”)
- Component Replenishment Without stopping production
- Options
  - Board Handling: Manual or Automatic PCB load/unload
  - Component Verification: Component Verifier ensures operator accuracy of component loading
  - Networking: Ethernet, TCP/IP
  - Touch-screen Interface

PCB Specifications
- Automated Bd Handling
  - Length x Width (minimum) 102.0 x 80.0mm (4 x 3.1”)
  - Length x Width (maximum) 483 x 406mm (19 x 16”)
  - Insertable Area 483 x 406mm (19 x 16”)
  - PCB Transfer Time 2.5 seconds
- Manual Bd Handling
  - Length x Width (minimum) 51 x 51mm (2.0 x 2.0”)
  - Length x Width (maximum) 600 x 600mm (23.6 x 23.6”) with Park Step
  - Insertable Area 508 x 470mm (20 x 18.5”)
  - PCB Transfer Time 0 seconds (with 2-window board-holding fixture)

Cycle Rate
Max 22,000 cph (0.16 sec. per insertion)

Lead Spans
- Single Span 2.5mm
- Dual Span 2.5/5.0mm
- Triple Span 2.5/5.0/7.5mm
- Quad Span 2.5/5.0/7.5/10.0mm

Reliability
- Single/Dual Span 300 ppm or better
- Triple/Quad Span 400 ppm or better

Intrinsic Availability
95% Intrinsic Availability

Insertion Capability
360° in 1° increments

Component Types
- Standard and Odd Form
- Capacitors (electrolytic, ceramic, box, and film), transistors, hairpin resistors, diodes, SIPs, LEDs, connectors, tact switches, coils, potentiometers, fuse clips, lamps, fuses, terminals, connectors

Component Spec
- Maximum Size (LxDxH) 13.0 x 13.0 x 23.0mm (0.512 x 0.512 x .906”)

Tape Pitch
- 12.7mm (0.5”) and 15.0mm (0.6”)

Component Replenishment Without stopping production

Options
- Board Handling: Manual or Automatic PCB load/unload
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SERVO-DRIVEN AXIS
The Radial 88HT utilizes servo-driven axis to improve speed, accuracy and reliability, while reducing maintenance and setup requirements. The Radial 88HT increases table move speed 60% over Radial 88.

NEW for Radial 88HT
- Higher throughput – faster X/Y table, operator-free Missing Part Auto-repair
- Bad Clip Bypass
- Adjustable radial clinch height for sensitive component requirements
- Tall Part Kits available for larger radial components
- Quad Span capability

Component Verification
Component Verification ensures operator accuracy of component loading

Networking
Ethernet, TCP/IP

Touch-screen Interface

PCB Specifications
- Automated Bd Handling
  - Length x Width (minimum) 102.0 x 80.0mm (4 x 3.1”)
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  - Insertable Area 508 x 470mm (20 x 18.5”)
  - PCB Transfer Time 0 seconds (with 2-window board-holding fixture)
VCD 88HT
High-performance Axial sequencer / inserter for demanding production

- 26,000 CPH
- Highest “real” throughput Axial sequencer/inserter
- Highest reliability in the industry (200 ppm)
- Component replenishment without machine stoppage
- Expandable from 20 inputs up to 220 inputs
- Manual Load or Automatic PCB Load/Unload
- Component Verifier
- Simple-to-use operator environment:
  - Graphical user interface
  - Network connectivity, USB ports and CD-ROM
  - Optional touch-screen interface
  - Optional offline programming software

Expandable Sequencer
Expandable from 20 stations up to 220 stations in 20-station increments.

Board Handling Options
Machines are available with either manual load or automatic PCB handling configurations. Manual load delivers near-zero board transfer time for maximum throughput.

Component Feeding
Sequencer feeds components to machine from reels, ammo packs or jumper wire spools. Component replenishment without machine stoppage.

Axial Head Tooling Options
Tooling to accommodate a variety of applications – field reconfigurable:
- High-density 5mm
- High-reliability 7.62mm
- Large-lead 7.62mm

Component Verifier
Allows for the on-line verification of value and polarity of the components to be inserted. This reduces the risk of inserting defective, out-of-sequence or incorrectly oriented components.

Low-Maintenance Lead Screw on Head and Clinch
The Teflon-coated insertion head and clinch lead screws are virtually maintenance free, requiring very little attention over the machine life cycle.

Jumper Wire Station
The VCD/Sequencer allows for up to four jumper wire stations that utilize a continuous wire input spool. Dispensing jumper wire in this manner is more cost-effective than utilizing pre-packaged jumper wire reels.

VCD 88HT SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cycle Rate</td>
<td>26,000 cph (0.14 sec per insertion)</td>
</tr>
<tr>
<td>Reliability</td>
<td>200 ppm or better</td>
</tr>
<tr>
<td>Intrinsic Availability</td>
<td>99.5% intrinsic availability</td>
</tr>
<tr>
<td>Component Handling</td>
<td></td>
</tr>
<tr>
<td>Pitch</td>
<td>5.08mm (0.200&quot;) or 10.16mm (0.400&quot;)</td>
</tr>
<tr>
<td>Component Replenishment</td>
<td>Without stopping production</td>
</tr>
<tr>
<td>Tooling</td>
<td></td>
</tr>
<tr>
<td>High-reliability 7.62mm</td>
<td></td>
</tr>
<tr>
<td>Hole Span</td>
<td>7.62mm (0.300&quot;) min – 24.13mm (0.950&quot;) max</td>
</tr>
<tr>
<td>Lead Wire Diameter</td>
<td>Wire lead diameter (min) – 10.68mm (0.420&quot;) minus 2 times board thickness (max)</td>
</tr>
<tr>
<td>Large-lead 7.62mm</td>
<td></td>
</tr>
<tr>
<td>Hole Span</td>
<td>7.62mm (0.300&quot;) min – 24.13mm (0.950&quot;) max</td>
</tr>
<tr>
<td>Lead Wire Diameter</td>
<td>Wire lead diameter (min) – 11.68mm (0.460&quot;) minus 2 times board thickness (max) (At 5mm max component body diameter is 2.29mm (0.090&quot;) minus 2 times board thickness (max))</td>
</tr>
<tr>
<td>Options</td>
<td></td>
</tr>
<tr>
<td>Lead Wire Diameter</td>
<td>0.38mm (0.015&quot;) min – 0.81mm (0.032&quot;) max</td>
</tr>
<tr>
<td>Manual PCB Load/Unload</td>
<td></td>
</tr>
<tr>
<td>Insertion Tooling</td>
<td>Jumper Wire Dispenser System</td>
</tr>
<tr>
<td>Networking</td>
<td>Ethernet, TCP/IP</td>
</tr>
<tr>
<td>Touch-screen Interface</td>
<td></td>
</tr>
</tbody>
</table>

PCB Specifications

| Automated Bd Handling |                   |
|-----------------------|                   |
| Length x Width (minimum) | 102 x 80mm (4 x 3.1") |
| Length x Width (maximum) | 483 x 406mm (19 x 16") |
| Insertable Area        | 483 x 406mm (19 x 16") |
| PCB Transfer Time      | 2.5 seconds |
| Manual Bd Handling     |                   |
| Length x Width (minimum) | 51 x 51mm (2.0 x 2.0") |
| Length x Width (maximum) | 600 x 600mm (23.6 x 23.6") with Park Step |
| Insertable Area        | 508 x 470mm (20 x 18.5") |
| PCB Transfer Time      | 0 seconds (with 2-window board-holding fixture) |
Single-Head Jumper Wire 88
High-Reliability Jumper Wire inserter with zero waste

- 33,000 CPH
- Zero Scrap – zero scrap leads
- Highest reliability in the industry (75 ppm)
- Programmable clinch angles 25° to 75° from vertical
- Manual Load or Automatic PCB Load/Unload
- Simple-to-use operator environment
- 5 to 33mm spans

Zero Scrap
The Jumper Wire 88 utilizes a precise, servo-driven wire feed mechanism to feed the exact length of wire required for insertion and clinching in the board without any scrap leads.

Long Tool Life
Robust tooling endures an extensive life span of approximately 10M - 15M insertion cycles, depending on the material composition of the wire being utilized.

Jumper Wire 88 Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cycle Rate Max</td>
<td>33,000 cph (0.109 sec. per insertion)</td>
</tr>
<tr>
<td>Reliability</td>
<td>Zero-scan Jumper Wire leads</td>
</tr>
<tr>
<td>Intrinsic Availability</td>
<td>99.5% Intrinsic Availability</td>
</tr>
<tr>
<td>Component Specs</td>
<td></td>
</tr>
<tr>
<td>Input Wire Diameter</td>
<td>0.51mm (0.020”) to 0.81mm (0.032”) tin-coated copper wire [0.6mm (0.024”) is recommended]</td>
</tr>
<tr>
<td>Input Wire Packaging</td>
<td>Preferred package is a drum that measures up to 405mm (16”) high by 350mm (13.8”) diameter, which may be placed on the floor next to the machine.</td>
</tr>
<tr>
<td>Hole Span</td>
<td>5.00mm (0.197”) min to 33.00mm (1.300”) max</td>
</tr>
<tr>
<td>Options</td>
<td>Manual or Automatic PCB load/unload</td>
</tr>
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Universal’s platform philosophy helps you maintain your competitive advantage with incremental software, hardware and infrastructure upgrades that bring your insertion machines to highest level of performance and reliability at a fraction of the cost of purchasing new machines.

- Servo-Driven Wire Feeding
  The servo-driven wire feed delivers precise feed lengths into the insertion head to eliminate scrap.

- Wipe Clinch
  The wipe-only, servo-controlled clinch offers programmable clinch angles from 25° to 75° off the board.

- Low-Maintenance Lead Screw on Head and Clinch
  The Teflon-coated insertion head and clinch lead screws are virtually maintenance free, requiring very little attention over the machine life cycle.

- Servo-Driven Axis
  The SH JW 8HS utilizes servo-driven axes to improve sized, accuracy and reliability, while reducing maintenance and setup requirements.