AP520
Automated Programming System

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Automated IC Programmer for One-Piece-Flow Operation

Specifications

• Component Handler System •

▸ Throughput: 1200 UPH (Tray-LIM-Tray)
▸ Placement accuracy: ± 0.10 mm
▸ Placement repeatability: ± 0.03 mm
▸ Placement force: 95 grams
▸ Pick-and place method: Dual vacuum nozzles
▸ Component detection: Laser sensing and vacuum sensor
▸ Dimensions: 190(L) x 120(W) x 170(H) cm
  (74.8 x 47.2 x 66.9 inches)
▸ Shipping dimensions: 225 x 210 x 205 cm
  (88.6 x 82.7 x 80.7 inches)
▸ Net weight: 2030 kg (4466 lb)
▸ Shipping weight: 2470 kg (5434 lb)
▸ Safety: CE compliant

• Positioning System •

▸ X-Y drive system: Servo motor drive system
▸ X-axis resolution: 0.006 mm
▸ Y-axis resolution: 0.005 mm
▸ X-Y axes repeatability: 0.010 mm
▸ X-axis maximum velocity: 2.50 m/sec
▸ Y-axis maximum velocity: 1.60 m/sec
▸ Z-theta drive system: Servo motor
▸ Z-axis resolution: 0.001 mm
▸ Z-axis repeatability: 0.05 mm
▸ Z-axis maximum velocity: 0.334 m/sec
▸ Theta-axis resolution: 0.036^{o}
▸ Theta-axis repeatability: 0.072^{o}

• Positioning Recognition System •

▸ Laser alignment sensor: Component position recognition
  system for dimensions smaller than 3.0 x 3.0 cm
▸ Upward camera: Component position recognition
  system for dimensions larger than 3.0 x 3.0 cm (optional)
▸ Local fiducials: Socket position reference coordinate system

User's Manual

• Programming System •

▸ Programming sites: Up to 20 sites
▸ Type: H9600 high-speed universal programmer on each site
▸ Pin drivers: 112 standard, extendable to 448 per site
▸ Devices supported: EPROM, EEPROM, Flash,
  microcontroller, PLD, CPLD, antifuse, FPGA, and many others
▸ Packages supported: PLCC, TSOP, TSSOP, TQFP, PQFP, SOIC,
  SSOP, BGA, CSP, and many others
▸ File formats supported: Intel Hex, Microchip INHX, Tektronix
  Hex, Motorola S, Signetics Hex, Extended Tekhex, HP 64000
  Absolute, Spectrum, TI SDSMAC, ASCII Hex, ASCII Oct, ASCII
  Binary, Formatted Binary, Binary, JEDEC, POF, DIO, AFM,
  STAPL, and LOF
▸ RAM buffer: 128 Mbits standard, expandable up to 1024 Mbits
▸ Communication: RS-232 and USB
▸ Safety: CE compliant

• AP520 System Software •

▸ User interface: Windows-based HMI
▸ Operating system: Windows 98/2000/NT

• Operating Requirements •

▸ Input voltage: 220V, 3-phase, 4-wire
  (200V/220V/240V/380V/400V/415V/440V with optional transformer)
▸ Input line frequency: 50/60 Hz
▸ Power consumption: 2.5 kVA
▸ Air pressure: 75~95 PSI
▸ Air flow: 120 liters/min (4.2 CFM at peak)
▸ Operating temperature range: 15~30 ^{o}C
▸ Relative humidity: 35~90%

• Optional Subsystems •

▸ CO_2 laser marking
▸ Labeling
▸ Upward CCD camera
▸ Tape-and-Reel input/output media
▸ Tube input/output media

Up to 20 sites

Product Highlights

• Pick-and-place automated device programming system (up to 20 sites)
• Throughput up to 1200 UPH under zero programming time
• Automatic tray stacker (up to 20 JEDEC or non-JEDEC trays)
• Downward CCD camera for Teach
• On-the-Fly laser alignment system
• Dual pick-up heads with height sensors
• Interfaces with the H9600 high-speed universal programmer (up to 448 pin drivers)
• One-piece-flow operation
• Network-oriented Windows-based Job software
• USB interface
• Laser marking or labeling (optional)
• Upward CCD camera (optional)
• Lead inspection module (optional)
• I/O support for tape and tube devices (optional)

ISO 9001 SGS   CE

SYSTEM GENERAL

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Automated Programming Solution for One-Piece-Flow Operation

The AP520: Designed for your needs

- For years the industry has been using automated handlers for device programming. And for years customers have been waiting for better solutions. At System General, we believe that a better programmer has arrived: The AP520. The AP520 Automated Programming System is a reliable automated programmer that delivers record-breaking throughput while requiring minimal operator intervention.

H9600 Programming Module

One-Piece-Flow Operation

The AP520's design philosophy is to provide a one-piece-flow programming workstation capable of completing programming tasks with minimal human intervention. This handler comes standard with a tray-to-tray interface and an automatic tray stacker. Additional options available for the AP520 workstation include device laser marking, device labeling, a tape interface, and a tube interface.

The tray stacker on the AP520 is designed to transport light-weight trays with BGA, QFP, TSOP and other fine-pitched devices on them. It accommodates up to 20 trays, JEDEC or non-JEDEC. A user-friendly software program allows the tray interface to be easily customized.

Maximum Throughput

The gantry of the AP520 is designed to travel at high speeds in order to reach a throughput of 1200 UPH. The two pick-up heads on the gantry allow the system to complete the entire device removal/insertion routine in one trip during each programming cycle. With up to 20 programmer sites, the AP520 has a consistently high throughput, regardless of the target device size.

Dual pick-up heads

Configurable I / O Media and Integrated Processing

Tray	Programming / Testing	Lead Inspection	Laser Marking / Labeling	Tray
Tube				Tube
Tape				Tape

One-piece-flow operation

Interface with the Ultra High-Speed Model 9600 Programmer

System General introduced the High Speed Programming (HSP) solution in 1998. Since then, HSP has set the standard in the industry. System General is already building on its success with its next generation of programmer technology. The AP520 can be combined with the Model 9600 to create one of the fastest Universal Automated Programming Systems currently available on the market.

The new 9600 programmer supports virtually all the latest device technologies. Through a USB interface, it can download large memory files in seconds. The 9600's 1.2 Volt V_{CC} operating capability makes it fully compatible with the next generation of Green devices. With up to 448 pin drivers, the 9600 programmer can easily be upgraded to program 32/64 bit Flash memory devices. The current sensing capabilities of the Model 9600 are precise enough even to support Anti-Fuse devices.
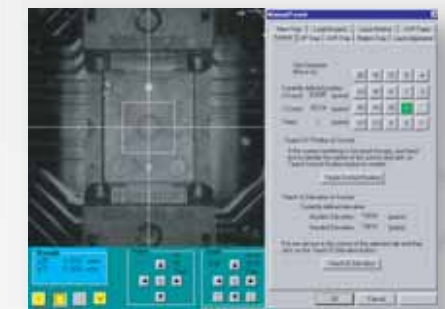
All times represented in seconds

Flash Device	Blank Check	Program	Verify
28F160B3TA	1	12	1
28F320B3TA	2	25	2
28F640W18	5	26*	NA *
28F128K3C	9	78**	NA **

 * Benchmark based on the Intel EFP algorithm. Verify has been included as a part of the program cycle.
 ** Benchmark based on the Intel BEFP algorithm. Verify has been included as a part of the program cycle.
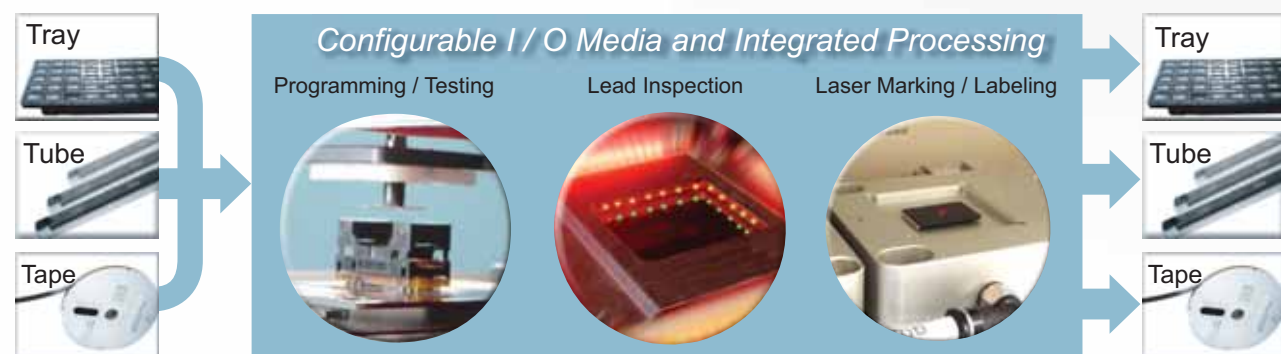
Accurate Vision Alignment and Minimum Teach Overhead

The AP520 is equipped with two vision cameras plus an on-the-fly laser system for accurate insertion alignment. Its efficient alignment mechanism helps reduce the Teach overhead associated with each programming task. For socket types with differing size profiles, a height sensor automatically defines the ideal height for device pick-up and insertion. On-the-fly laser correction adjusts for the pick-up head offset, even while the pick-up head is moving towards the socket.

The upward camera can align large devices having dimensions greater than 3.0 x 3.0 cm. Alternatively, the upward camera can be replaced with a lead-inspection camera for coplanarity checking.

Easy Teach