

Automated Waveguide Align, Test & Attach System

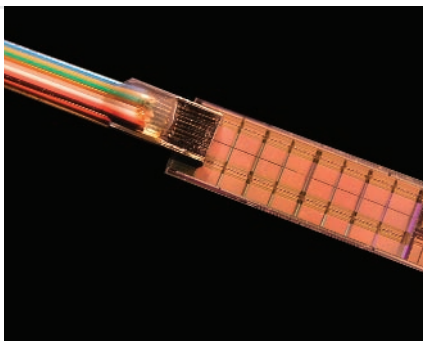
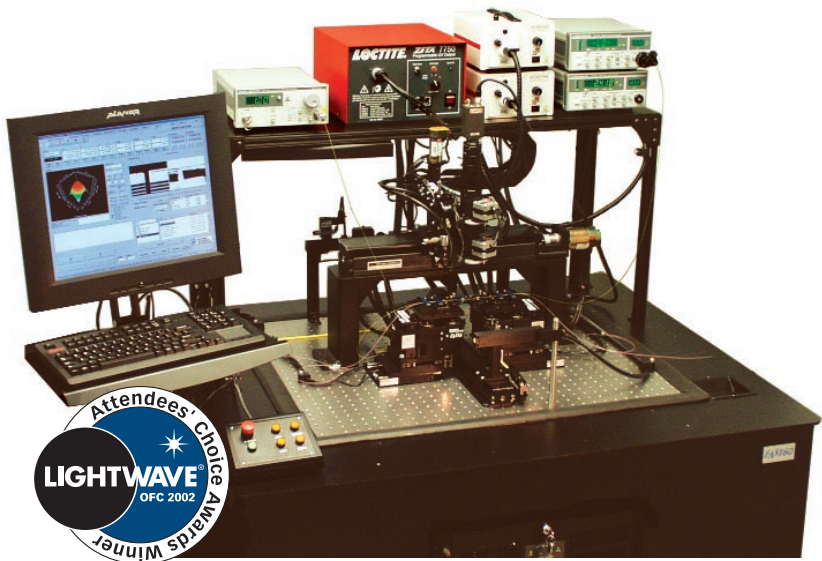
FAST 60

Automated Waveguide Alignment & Characterization

Palomar Technologies award-winning FAST™ 60 is an automated active align system for the test and fiber attach of single- and multi-sided planar waveguides.

KEY FEATURES

- ▶ **Direct drive alignment** stages result in superior optical repeatability through nanometer-level step sizes
- ▶ **Virtual pivotpoint** aligns about the true optical center for greater coupling efficiency
- ▶ **Optimized process control** aligns double-ended device in minutes including first light, fine alignment, and attach
- ▶ **Programming wizard** enables the automation of new devices through easy, parameter-based program tool
- ▶ **Machine vision** routines enable accurate, non-contact array-to-waveguide alignment for fast first light acquisition
- ▶ **Optical test equipment** is fully integrated for seamless alignment, test, and characterization



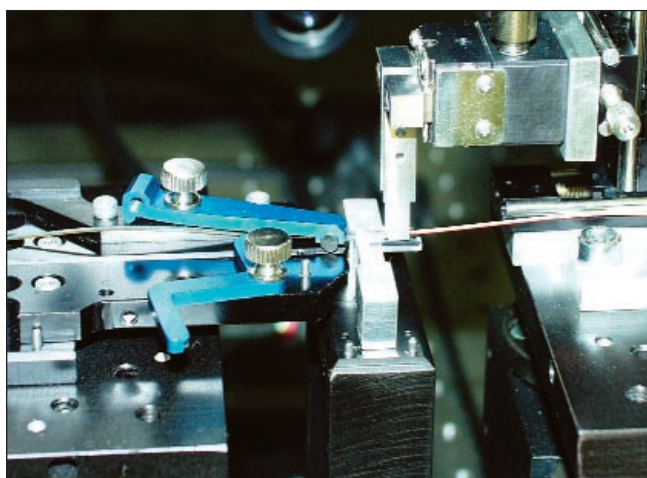
TYPICAL DEVICES

- ▶ AWGs
- ▶ VOA's
- ▶ Couplers
- ▶ Splitters
- ▶ MEMS Switches
- ▶ Modulators
- ▶ OADM's
- ▶ Single- and double-sided; 90° or 180°

Optimize Planar Waveguide Development and Production — Automation increases repeatability, throughput, yield

WHY CHOOSE THE PALOMAR TECHNOLOGIES FAST™ 60?

- ▶ The FAST 60 is the only standard planar device test and attach system based on direct drive/linear motor/voice coil nano-positioning technology
- ▶ Fine resolution in a long travel motion system enables load/unload and fine align in a single, compact stage
- ▶ Production-grade construction and non-contact drive system ensures long-term, reliable operation in lab or manufacturing environments
- ▶ Open-architecture PC bus-based control system is powerful and easy-to-use
- ▶ Turnkey solutions of proven, tested, standard processes bring manufacturing online quickly
- ▶ Comprehensive product line ranging from component solutions to full in-line automation specifically optimized for photonics applications
- ▶ Worldwide applications and service support.

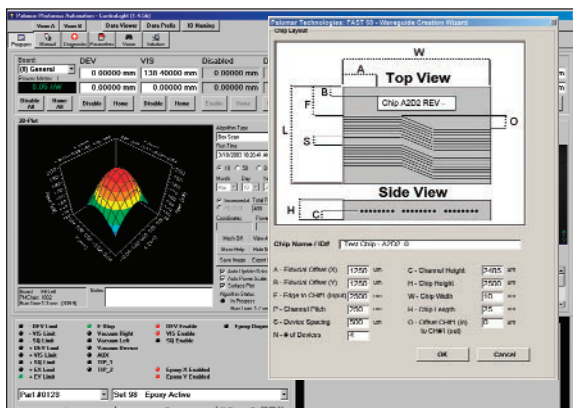


▲ **Flexibility:** Configurable hardware and software enable the FAST 60 to accommodate a wide range of devices and sizes.

AUTOMATED PROCESS CONTROL

Palomar's system software is designed for waveguide applications and incorporates all of the critical functionality into a single, user-friendly yet powerful front end.

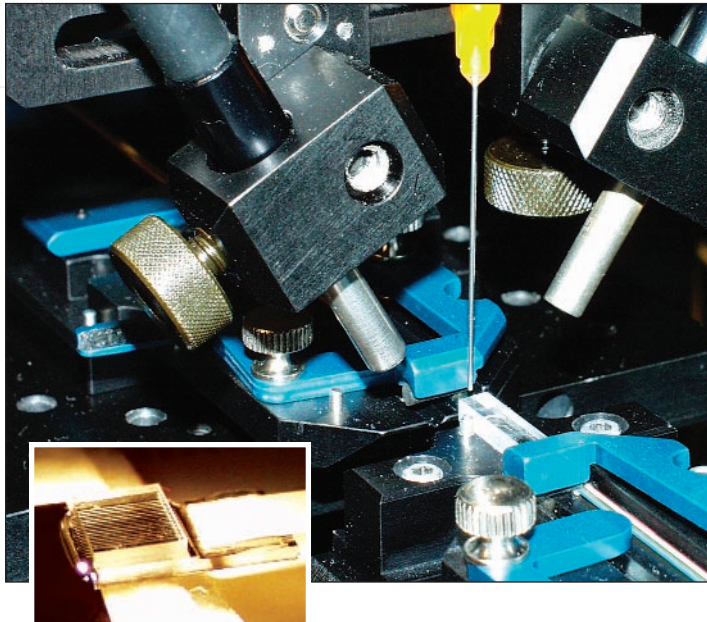
- ▶ Programmable device library allows users to select any of the pre-programmed chips
- ▶ Device wizard simplifies creation and programming of new devices
- ▶ Networkable database enables remote monitoring and data transfer to/from shop floor control.



▲ **'FAST' Programming:** The 'Waveguide Wizard' simplifies the programming of new devices.

EPOXY DISPENSE AND ATTACH

The FAST 60 incorporates a fully computer controlled epoxy dispense and attach system for packaging active and passive planar devices.



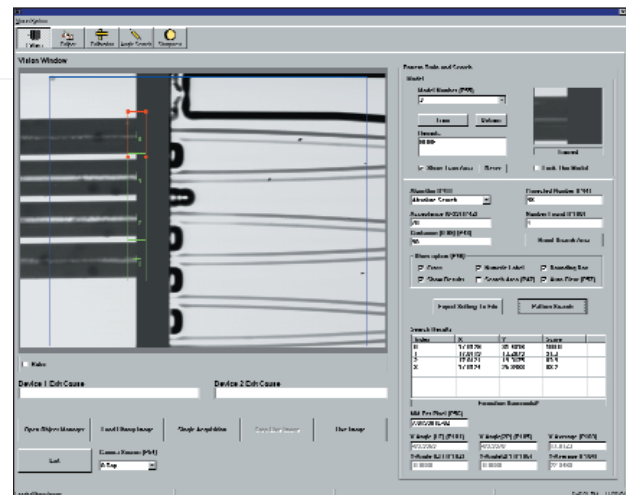
- ▶ Precision epoxy indexer provides accurate, consistent epoxy placement of dots or continuous bead
- ▶ Programmable UV-cure system can accommodate a range of curing schemes to match specific packaging requirements
- ▶ Multi-headed light pipes are capable of simultaneous curing for greater system throughput.

◀ **Epoxy Attach:** Automated epoxy dispense and cure yields higher quality parts through consistent dispense and cure. The inset shows a fiber array attached to a planar light circuit.

INTEGRATED MACHINE VISION AND TEST INSTRUMENTATION

Our total process solution seamlessly integrates all of the necessary components for a one-button test and assembly routine

- ▶ Automated vision zoom, focus, and indexing detects parts, computes offsets and commands adjustments for optimal first-light coupling
- ▶ Complete integration of meters, sources, analyzers, etc. allows users to specify or implement any test set necessary
- ▶ Programmable function calls simplify triggering and data transfer with existing analysis tools.



▶ **Machine Vision:** Advanced vision tools find first light quickly.

MACHINE SPECIFICATIONS

EQUIPMENT SPECIFICATIONS	Alignment Stages	Dual FAST™ 6
	Alignment Stage Travel	X=20mm, Y=5mm, Z=50mm, Pitch / Roll / Yaw up to 5°
	Motion Controller	32-axis, 150MHz DSP, PCI bus
	Motion Software	ControLight MMI and process development software
	Base	Steel weldment with levelers
	Mounting	Air-isolated optical breadboard (standard); granite (optional)
	Size	42" (depth) x 50" (width) x 58½" (height)
Weight	Approx. 1400 lbs.	

VISION	Framegrabber	Cognex® 8100 Series
	Cameras	CCD, 760 x 574 pixel
	Lens	Automated zoom & focus
	Positioning	Automated - programmable
	Lighting	Dynamic intensity control

INSTRUMENTATION	POWER METER	
	Channels	Dual meter (standard); additional meters or optical switch (optional)
	Wavelength	850-1650nm
	Power	-70 to +20 dBm
	LASER SOURCE	
	Wavelength	1310, 1550, ASE broadband or tunable
Power	Up to +13 dBm	

FIXTURING	Device	Vacuum with optional TEC
	Fiber	Pneumatic or manual v-groove clamp
	Array	Pneumatic or manual with strain relief
	Size	Up to 64 channel arrays

EPOXY ATTACH	DISPENSE	
	Control	Computer controlled dispense and positioning
	Output	Dot or bead, programmable size
	CURE	
	Control	Computer controlled triggering, intensity, and duration
	Type	Spot- or step-cure
Output	1-, 2-, or 3-leg light pipe	

COMPUTER	PC	1.5GHz, 512MB RAM, passive backplane (or better)
	Operating System	Windows 2000®
	Monitor	17" flat panel

FACILITY	Electrical	115VAC, 60Hz, 20A
	Air	60 psi clean / dry compressed air or nitrogen

PROCESS SPECS	Cycle Time	~200 sec (typical 16-channel device)
	<i>Includes: first light, align, dispense, and cure*</i>	
	Repeatability	0.01dB (SM-SM alignment)

* NOTE: Cycle times shown are approximate. Actual cycle times are dependent on device type; consult factory for detailed analysis.