ProLINE-RoadRunner XLF
Just-In-Time Programming for Automotive Applications

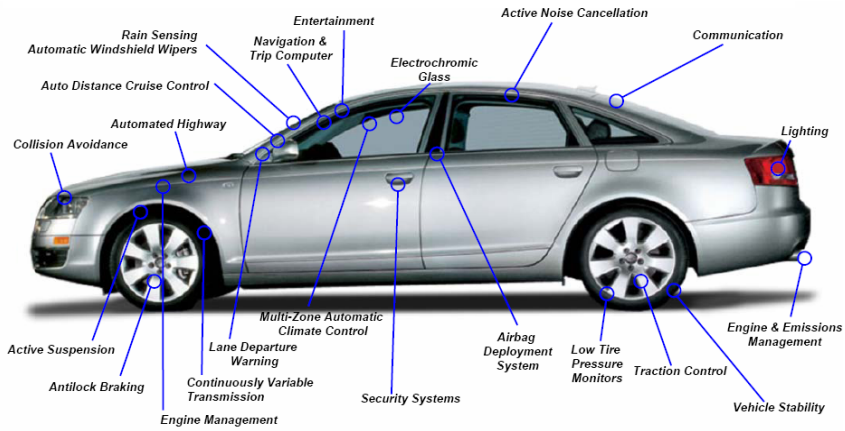
ProLINE RoadRunner XLF

ProLINE-RoadRunner XLF

1. Removes programmable devices from carrier tape
2. Places devices into sockets and programs them with your data
3. Places the program/verified devices onto a conveyor belt
4. Delivers them to the pick-point of the placement machine

- World's only JIT programming solution
- Optimized for lean mfg. environments
- Only 100% program/verified parts get placed
- Eliminate preprogrammed inventory
- Reduce board scrap costs
- Optimize floor space
- No individual device marking necessary
- Reduce number of testers
- Optimize test (Expand Coverage)
- Balance the production line
- High throughput and lower costs
- Process control software for managing Jobs
- Increase manufacturing profits
- Reduce manufacturing expenses
- Compliment test functions

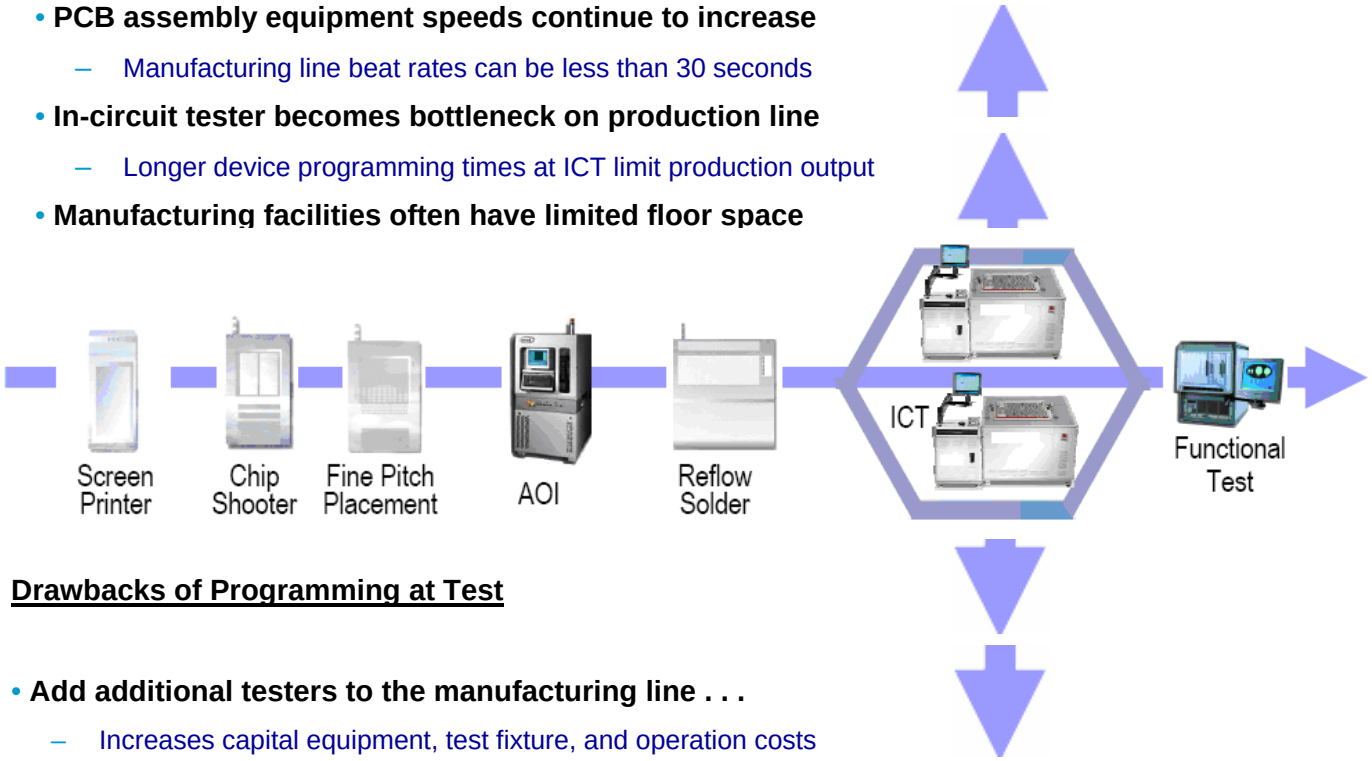
Automotive Applications



Challenges and Disadvantages… of Programming at Test

Challenges for High Volume Manufacturers

- **PCB assembly equipment speeds continue to increase**
  - Manufacturing line beat rates can be less than 30 seconds
- **In-circuit tester becomes bottleneck on production line**
  - Longer device programming times at ICT limit production output
- **Manufacturing facilities often have limited floor space**

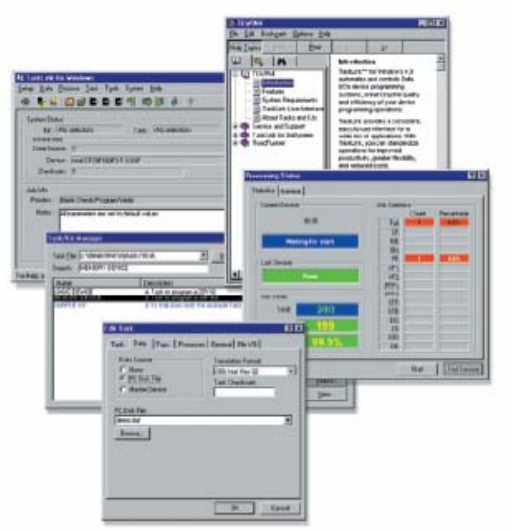


Drawbacks of Programming at Test

- **Add additional testers to the manufacturing line . . .**
  - Increases capital equipment, test fixture, and operation costs
  - Requires additional manufacturing floor space and test cells
  - More fixture storage space may be required
- **or, Remove tests to support longer programming times**
  - Reduced fault coverage
  - Extra program maintenance
  - Underutilize tester
  - Increased chance of shipping defective products with reduced test coverage
- **Special requirements**
  - Design for test may require special circuitry on the PCB to enable the ATE to program Flash memory without causing signal conflicts or bus contention
  - Project costs may increase due to additional hardware
  - Requires an in-house algorithm developer
  - PCBs with limited space may not accommodate test contact pads
- **Facts**
  - Production line cycle time (beat rate) will increase by programming time
  - Programming and fixture costs are the largest part of the total cost of ownership
  - Growing files sizes increase programming times and total test time

Process Control and FlashCORE II with Boost Technology

- **Process Control Software** (TaskLink™)
  - Installed off-line on a secured PC
  - Create and secure programming Jobs
  - Save Jobs to a network location or PCMCIA card
  - Select and run the Job using the keypad display



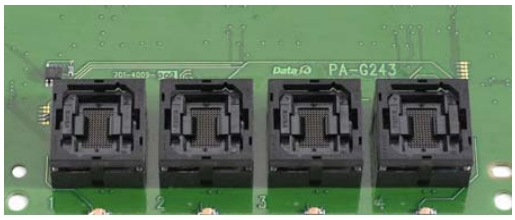
- **Built-in Diagnostics and Job Statistics**
  - RoadRunner writes these files to the PCMCIA card at the end of the production run
  - Statistics can be used by TaskLink to analyzing performance results which assist in optimizing production yields and throughput

- **FlashCORE II (FC II) with Boost Technology**
  - Supports the latest in memory (NAND/NOR) and microcontroller devices
  - Boost technology (a FC II extension for NAND) delivers up to 300%+ gains in program / verify times for 8-bit and 16-bit NAND devices
  - Data I/O supports more than 400 NAND devices

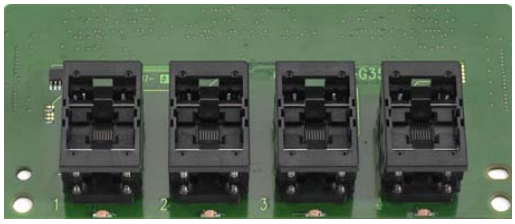
	With FlashCORE Boost		Without FlashCORE Boost		%
Device Name	Program Time	Verify Time	Program Time	Verify Time	Improvement
Samsung, K9F5608R0D-J, FBGA-63	15.4	4.3	38	33.5	**363%**
Toshiba, TY9000A410AMBF, FBGA-149	85.87	20.43	147.81	138.81	**270%**
Toshiba, TY80009000CMGF, FBGA-149	27.52	9.61	60.11	77.97	**372%**
STMicro, NAND99R3M0A-ZBA-E, TFBGA-149	35.15	8.86	69.07	72.15	**321%**
Hynix, HYG0SEG0MF1-P, FBGA-149	27.25	8.6	56.83	67.37	**346%**
STMicro, NAND01GW3M2B, TFBGA-137	60	18.6	128	148	**351%**

ProLINE-RoadRunner XLF Delivers High-Yield Performance

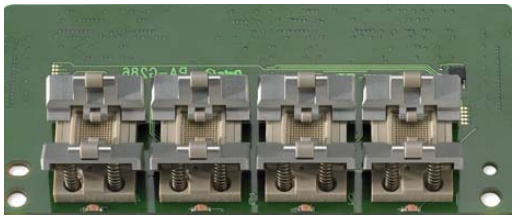
- **Standard Sockets**
  - Warranted for 5,000 insertions per socket
  - Typical yields are 97%
  - Requires regular maintenance over life of socket
  - Designed for ‘burn in’ applications



- **High Performance Socket (HPS)**
  - Warranted for 30,000 insertions per socket
  - Typical yields are 98% - 99%
  - BGA packages only
  - Spring pin contacts to solder ball
  - Exclusive Data I/O technology
  - Individual replacement sockets (screw mounted to PCB)
  - Top inner ‘IC Guide’ is easily machined for different BGA footprints

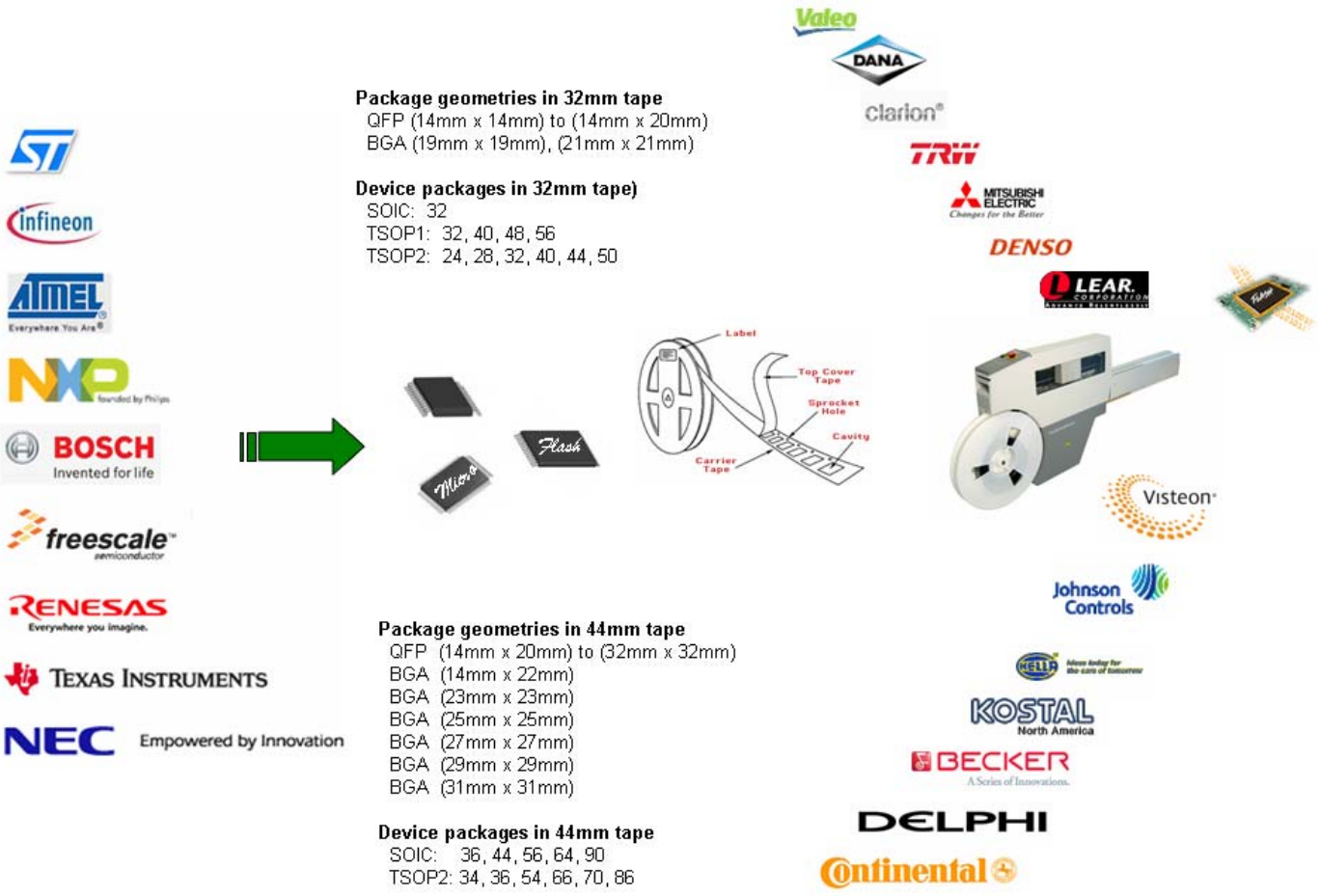


- **High Insertion Count Socket (HIC)**
  - Warranted for 250,000 insertions per socket
  - Typical yields are 99.8% - 99.9%
  - Pogo pin contact to solder balls
  - Heavy spring clamp for long life
  - Exclusive Data I/O technology
  - Supports BGA, QFP and TSOP packages



- **Replaceable Sockets**
  - *BGA pad, socket guide and screw holes allow replacement of HPS and HIC sockets*

ProLINE-RoadRunner XLF for Automotive Applications



- **Tape-In Configurations**
  - *32/44 mm Adjustable Tape-In (ships standard)*
  - *optional 16/24/32 mm Adjustable Tape-In*

- **Package Support**
  - *Geometries up to 32 mm x 32 mm*

- **Siemens Platform Support**
  - *80F4, 80F5, HF, S-series*
  - *D-series – using S-type feeder table*

- **Probe Operation**
  - Auto detects socket configuration to operate in 2 or 4 probe operation