



ISP Advantages

- **Higher Manufacturing Quality**, by elimination of device manual handling
- **Shorter Time-to-Market**, software development overlaps manufacturing startup
- **Lower Cost of Stock**, no need for inventory of different versions of product
- **Higher Integration**, by programming integration into the PCB manufacturing and test flow
- **Higher PCB Testability**, by programming a test firmware prior to real product firmware



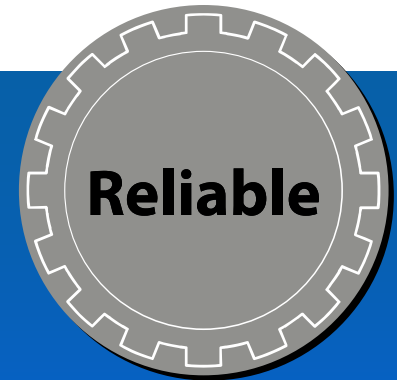
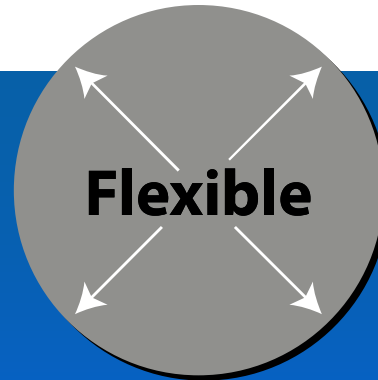
Today's ISP Market Offer

- Some programmers are not truly universal
- Some are slow
- Some don't allow for fault traceability
- Some don't easily integrate into ATE systems

**No single In-System Programmer
fits all Production needs**



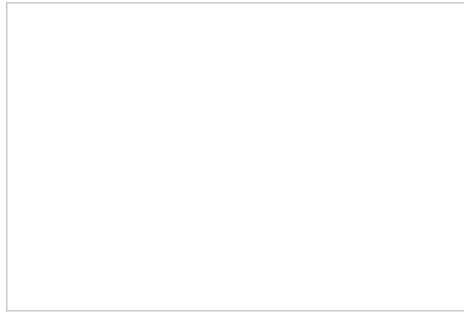
FlashRunner Overview



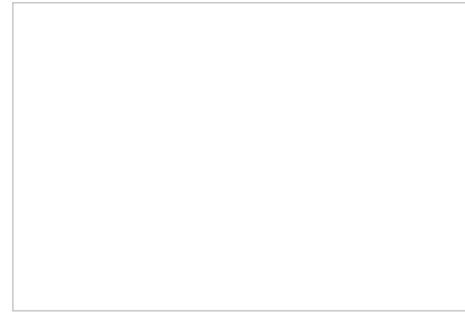
FlashRunner is the First **Complete**
Production In-System Programmer
specifically designed for
Manufacturing lines



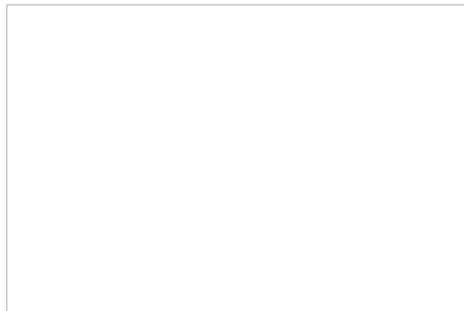
FlashRunner Models



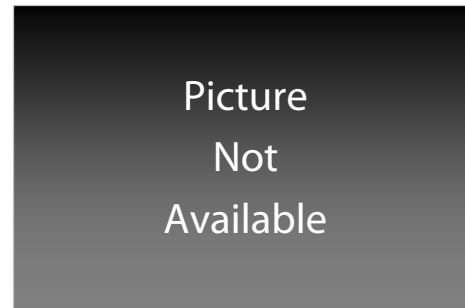
Piggyback Version
(code: FR01ENG)



Ethernet Version
(code: FR01LAN)



Rackmount Version
(code: FR01PRO)



3 Multiplexed Channels Version
(code: FR01M01)



Main Features

- **Universal In-System Programmer Engine**
Supports most popular microcontrollers and serial memories
- **Extremely Fast**
Optimized programming algorithms, as fast as target device's memory technology limit
- **Innovate Logging System**
For detailed error report and traceability
- **Easy ATE Integration**
Mechanical, hardware and software



Additional Features

- Standalone or host-controlled operations
- Supports most ISP protocols (SPI, JTAG, SCI, BDM, I2C, MON08, and other serial interfaces)
- Host protocol connections: Ethernet, RS-232
- Gangable through Ethernet or control lines
- Standard memory card to store projects, binary images, log files
- Robust mechanical design
- Fully-protected: optoisolated I/O lines and anti-shock protection
- Fully upgradable: designed to support new devices and customer-specific programming algorithms
- Rapid start-up documentation
- Prompt and knowledgeable technical support



Device Support

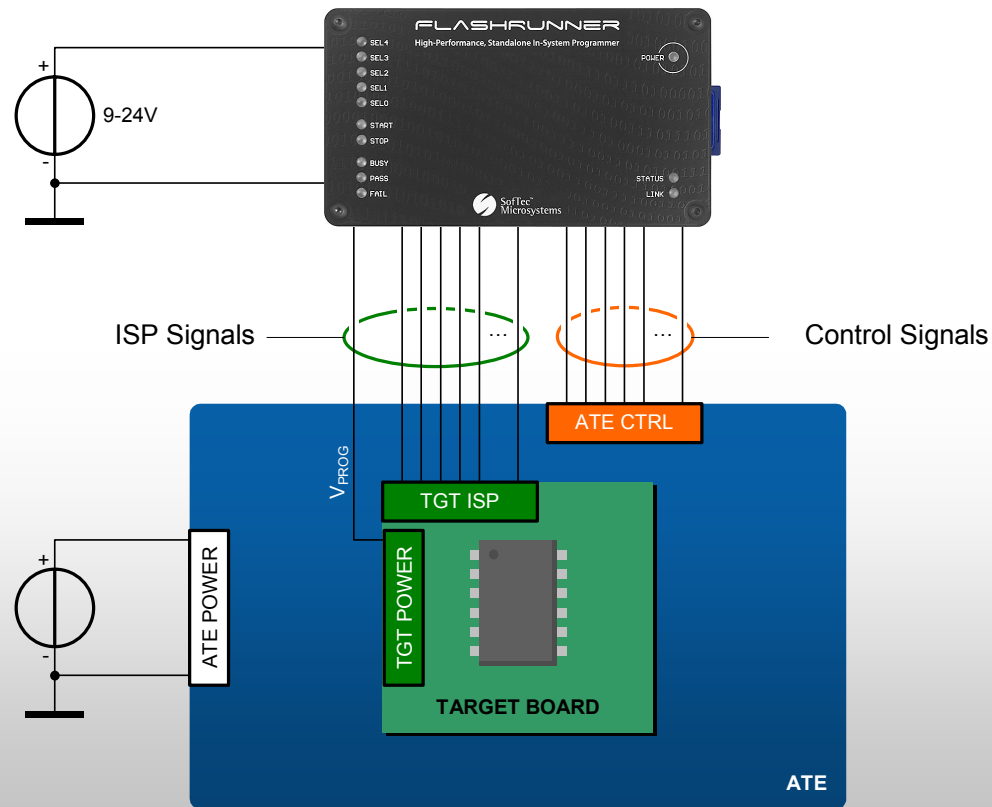




Easy ATE Integration

- Piggyback and Ethernet versions mount easily inside ATE and test fixtures
- Compatible with Agilent, Teradyne, Genrad, and any major in-circuit test system
- Fully autonomous,,a signal from the test system starts the programmer automatically
- No external hardware components required
- Independent from ATE control system
- Standalone or host-controlled operation
- Fully upgradable

Typical ATE Connections





Hardware Features

- Wide range input power supply (9 to 24V)
- Expanded ISP connection lines:
 - Two programmable output voltages
 - Five ISP digital I/O lines
 - Two digital I/O or analog output lines
 - One analog input line
 - One programmable clock output
- Communication and parallel control lines:
 - Optoisolated RS-232 or Ethernet
 - Optoisolated inputs for project selection
 - Two optoisolated command inputs (START, STOP)
 - Three optoisolated status outputs (FAIL, PASS, BUSY)
- 512 bytes on-board dynamic memory
- On-board timekeeper/calendar
- Fully protected against EOS and ESD

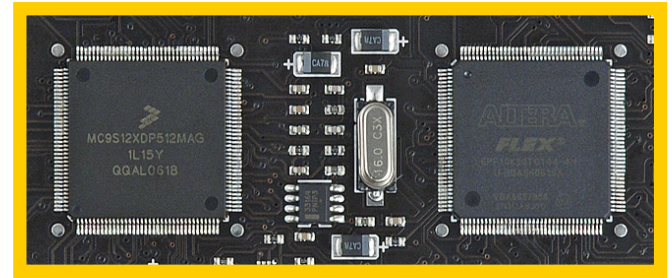


Software Features

- Controllable by any host system through a terminal utility and simple ASCII commands
- Project handling
(unlimited number of text-based projects)
- Integrated, full logging system
(thanks to the built-in real-time clock/calendar)
- Erase, blank check, program, read, verify, oscillator trimming, etc.
- Serial numbering
- Data integrity guaranteed
(every data transfer to/from the SD card is CRC tagged)
- Ready-to-use device-specific programming algorithms

In-Depth: Powerful Hardware

- FlashRunner is based on a dual-core processing engine paired with a field programmable logic
- FlashRunner hardware and firmware has been designed to be open and easily reconfigurable
- FlashRunner is therefore fully upgradable and ready to support new devices and customer-specific programming algorithms



In-Depth: Logging

- FlashRunner's built-in logging system timestamps all operations performed, together with their result
- Production problems can thus be traced back to the exact moment they happened, and the cause of the problem can be easily investigated
- Logs are stored in the SD card

```
01:000:06.07.06.15.21.00.00:START LOGGING
01:010:06.07.06.15.21.00.01:TCSETDEV FREESCALE MC68HC908EY16 HC08:>
01:011:06.07.06.15.21.02.15:TCSETPAR FOSC 16000000:>
01:012:06.07.06.15.21.02.20:TCSETPAR FDIV 4:>
01:013:06.07.06.15.21.02.25:TCSETPAR VDD 5000:>
01:014:06.07.06.15.21.02.30:TCSETPAR PWDOWN 10:>
01:017:06.07.06.15.21.02.35:TPSETSRC FILE TEST.FRB:>
01:020:06.07.06.15.21.02.40:TPSTART:>
01:023:06.07.06.15.21.02.41:TPCMD SETPSW CONST $FF $FF $FF $FF $FF $FF $FF $FF:>
01:026:06.07.06.15.21.02.42:TPCMD MASSERASE F:>
01:029:06.07.06.15.21.03.00:TPCMD BLANKCHECK F $C000 16384:>
01:032:06.07.06.15.21.05.32:TPCMD TRIM 4000000 $FF80:>
01:035:06.07.06.15.21.06.01:TPCMD PROGRAM F $C000 $C000 16384:>
01:038:06.07.06.15.21.08.54:TPCMD VERIFY F R $C000 $C000 16384:>
01:041:06.07.06.15.21.09.88:TPEND:>
01:000:06.07.06.15.21.09.89:END LOGGING:OK
```

Log Example

In-Depth: Easy Scripts

```
;
; FLASHRUNNER SCRIPT EXAMPLE FOR FREESCALE MC68HC908EY16
;
; Use this example as a starting point for your specific programming needs
;

#LOG_ON 2 ; Turns off logging
#HALT_ON FAIL ; Halt on errors

TCSETDEV FREESCALE MC68HC908EY16 HC08 ; Sets device
TCSETPAR FOSC 16000000 ; Oscillator frequency, Hz
TCSETPAR FDIV 4 ; Oscillator divisor
TCSETPAR VDD 5000 ; Target voltage, mV
TCSETPAR PWDOWN 10 ; Power-down time, ms
TCSETPAR PWUP 10 ; Power-up time, ms

TPSETSRC FILE TEST.FRB ; Image file to be programmed

TPSTART ; Starts programming block

TPCMD SETPSW CONST $FF $FF $FF $FF $FF $FF $FF $FF ; Security bytes
TPCMD MASSERASE F ; Mass erases Flash memory
TPCMD BLANKCHECK F $C000 16384 ; Blank checks Flash memory
TPCMD TRIM 4000000 $FF80 ; Trims internal oscillator
TPCMD PROGRAM F $C000 $C000 16384 ; Programs Flash memory
TPCMD VERIFY F R $C000 $C000 16384 ; Verifies Flash memory, read-out method

TPEND ; Ends programming block
```

This simple script it's all that is needed to mass erase, blank check, trim, program and verify a Freescale HC08 device. The script is stored on the FlashRunner SD card and is launched via either control lines or serial command.