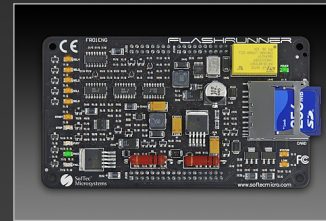


FlashRunner Series

Universal, Standalone In-System Programmers



Software Presentation

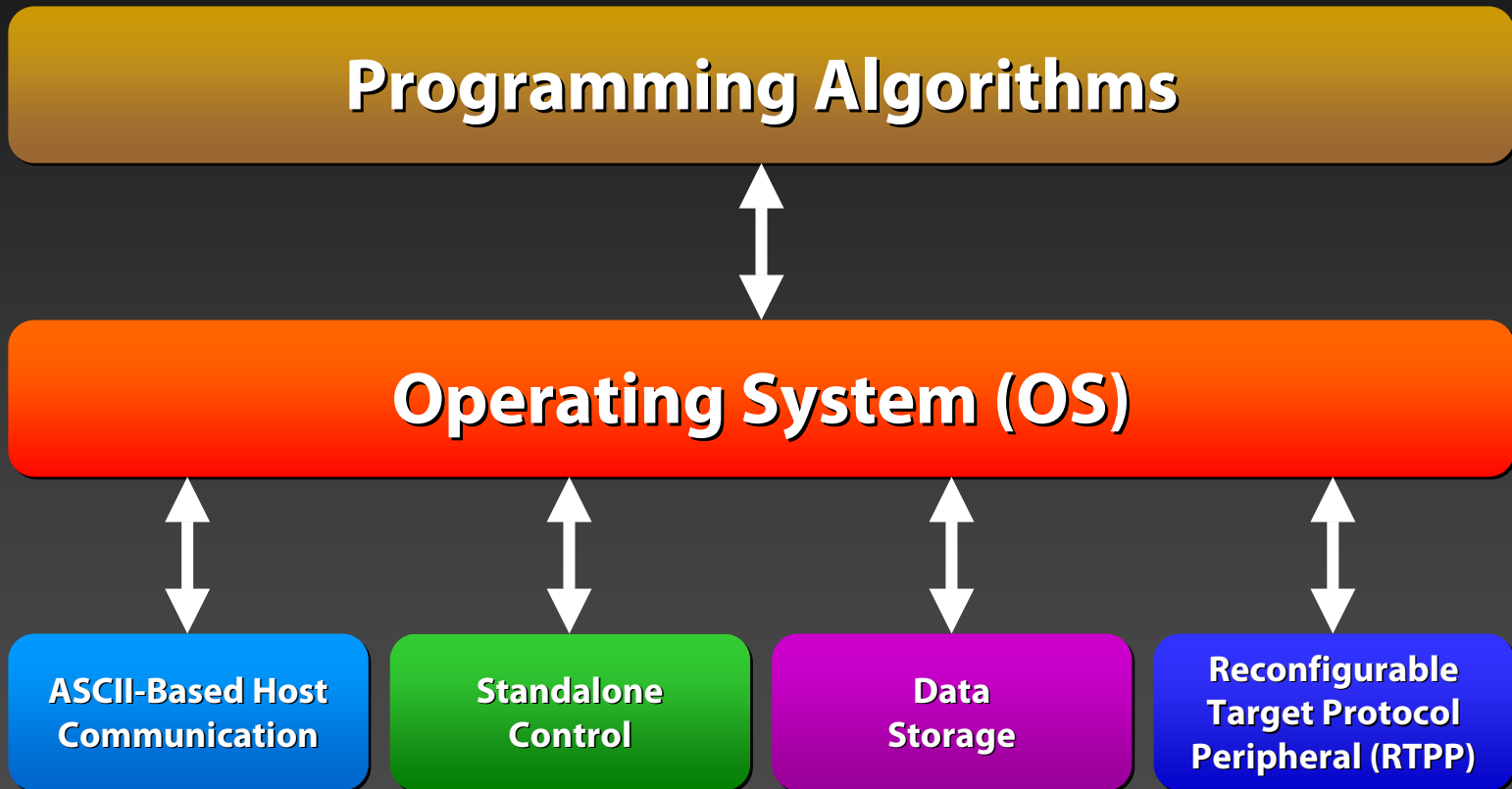
Rev. 2.0 – May 16th, 2007 – DC01340

Overview

FlashRunner series is the outcome of SofTec Microsystems' decennial experience on developing programming and debugging solutions for the most popular microcontrollers. FlashRunner has been carefully designed to be:

- **Intuitive**
- **Flexible and fully configurable**
- **Upgradable**
- **Safe (data integrity guaranteed)**

Software Block Diagram



Programming Algorithms

- **Programming algorithms are stored in files**
- **In order to program a specific device a specific license is required**
- **Upgrading a programming algorithm is as easy as replacing a single file**
- **Programming algorithms are constantly updated to reflect changes in device masks**

Operating System /1

This layer provides a software interface between the FlashRunner hardware and the programming algorithms. Main features:

- **Low-level hardware interface**
- **Programming command parser**
- **Script handling**
- **Logging system**
- **Programming algorithm management**
- **Data integrity checking system**
- **Hardware diagnostic**

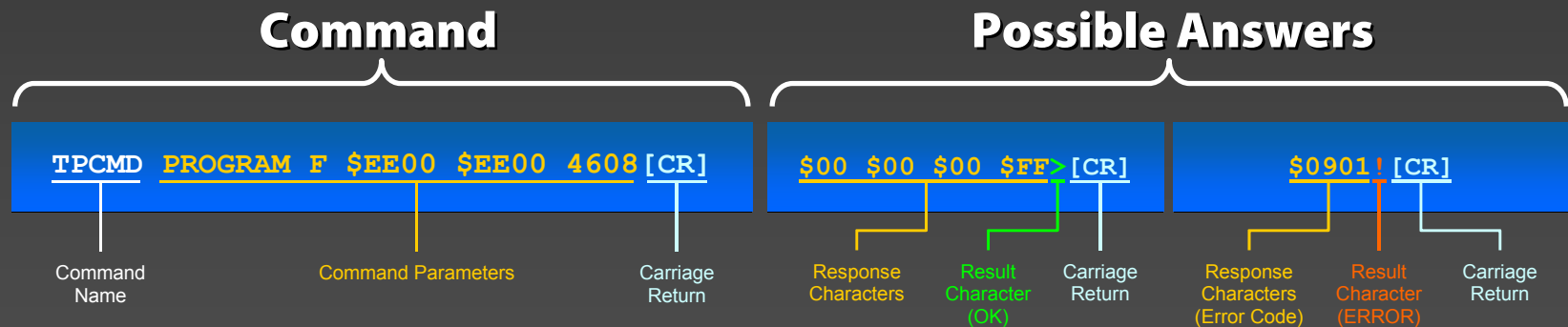
Operating System /2

The Operating System allows the programming algorithm to be independent from the other sub-layers and manages the programmer's main functionalities through a file-based data structure.

- **.alg** Programming algorithm files
- **.frs** ASCII-based scripts for standalone programming
- **.frb** Target memory image files
- **.lic** License files
- **.log** Log files
- **.sys** Swap memory system files

ASCII-Based Commands /1

- FlashRunner is set up and controlled by a simple ASCII-based serial protocol
- FlashRunner can receive and execute commands from a host or execute a command sequence stored in a script
- Below is an example of a FlashRunner command together with two possible responses:



ASCII-Based Commands /2

- **Can be used on any host system (Windows or Linux)**
- **Can be used with any terminal utility (e.g. HyperTerminal on Windows or minicom on Linux)**
- **Can be easily interfaced with any programming language (LabView, Visual C, Visual Basic, etc.)**

Standalone Mode: Scripts /1

- **Scripts are text files, stored in the SD card, which contain a sequence of commands**
- **Scripts are launched in standalone mode (through ATE control lines) or host mode (through the RUN command)**
- **An unlimited number of scripts can be stored in a SD card**
- **Easily customized to suit specific programming/testing needs**

Standalone Mode: Scripts /2

- Can contain unlimited number of commands
- No dedicated editing software required
- Derivative-specific script examples provided

Script Example

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

Data Storage /1

The Data Storage unit handles data transfer to/from the SD card.

- Data transfer is performed by a RISC core while a separated CISC core performs programming operations
- Optimized, pipelined SD data transfer results in minimum programming time overload
- The SD card contains the file-based data structure
- The SD data format is FAT16 compatible



Data Storage /2

Advantages of using a SD card + FAT16:

- **Windows reads FAT16 format**
- **Files can be copied to the card using any commercial memory reader**
- **Up to 2GB of memory**
- **Interchangeable: supports any commercial SD card in the market**
- **Easy data backup of your production files**
- **Data integrity guaranteed (CRC control during every transfer)**

Standalone Mode: Log Files

- **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**
- **The log file can be easily imported into Excel and analyzed**

```
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