

Action!#

Clinton Parker, OSS, 1983

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Background#

Action! is an Atari-specific programming language written by Clinton Parker and sold by Optimized Systems Software (OSS) in ROM cartridge form starting in August 1983. It is the only language other than [BASIC](#) and [assembler](#)) that had real popularity on the platform and saw any significant coverage in the Atari press; type-in programs and various technical articles were found in most magazines. In comparison, languages like [Forth](#) and [Logo](#) saw much less use and almost no press coverage.

Reviewers at the time gushed about the system. They noted that practically every aspect was superior to anything available at the time; compiling was almost instantaneous, the resulting code ran almost as fast as hand-coded assembler, the full-screen editor was universally loved, and the entire system took up only 8k due to clever memory management. The only complaint, also universal, was the poor quality of the original manual set.

Action! uses a greatly cut-down version of the ALGOL syntax, and thus bears strong similarities with [Pascal](#) and [C](#), which were also derived from ALGOL. Like those languages, Action! is procedural, with programs essentially consisting of a large collection of functions that call each other. It lacked encapsulation or data hiding, but that is not a serious concern in the limited program sizes available on an 8-bit machine. Syntactically it looks very similar to Pascal, with the exception that it uses ALGOL 68 DO/OD style bracketing rather than Pascal's BEGIN/END.

Action! included a number of features to allow it to run as fast as possible. Notably, its main data types were BYTE, INT and CARD, 8-bit and 16-bit signed and unsigned values, respectively. These map directly onto the basic 6502-types. The language also included a syntax to directly refer to these objects in memory so they could be mapped into hardware registers. For instance, one could set a variable to `BYTE RTCLOCK=20` which defined the 8-bit value at memory location 20 to be the value of the real-time clock. The user could then read or write to that register using the name `RTCLOCK`.

Action! had a number of limitations, none of them very serious. Variables were assigned to memory in procedures, not on a stack, so recursion was not supported internally. Curiously, Action! did not include support for floating point types, although such support is built into the machine's OS ROM (see [Atari BASIC](#) for details) and available to any programming language. This is a significant limitation in some roles, although perhaps not for its target market. It also lacked most string handling, but made up for this somewhat with a series of `PRINT` commands that made formatted output easy.

Generally, Action! programs had performance on-par with reasonable-quality [assembler](#), while being much easier to program. In one review, it ran Byte's Sieve of Eratosthenes 219 times faster than Atari BASIC, while its source was only a few lines longer. In comparison, the assembler version's source ran on for several pages. Such performance, combined with terse code and library functions to access much of the platform's hardware, made it suitable for action games while still having a simple source format suitable for type-in programs. It deserved to be much more popular, and may have been had it been released earlier, or by Atari itself.

Action! inspired several similar languages that differ largely in syntax and various features that they do or do not support. Examples include [PL65](#) and [Quick](#).

Examples#

```
; Hello world in Action! programming language for the Atari 8-Bit computers
PROC Hello()
    PrintE("Hello World!")
RETURN
```

The `;` is a comment marker, which was commonly used as the comment marker in assembler as well. The `PROC` is the start of a PROCedure, which ends (perhaps oddly) with `RETURN`. In Action!, the last `PROC` in the program is the one that runs first, in this case "Hello". This is something of a mix between Pascal where the "global code" defines the program entry point, and C, where the function called "Main" is the entry point. The only line of code in this example is `PrintE`, which simply prints a string, while the more common `PrintF` is a formatted print similar to `printf` in C.

Like assembler, it was common for variables to be specified at a particular address that mapped onto one of the Atari's "shadow registers" that were used to communicate between the hardware and user programs. Here is a simple variation on Hello World that demonstrates this concept, as well as a basic loop:

```
; Hello world in a loop
PROC Hello()
BYTE RTCLOCK=20,          ; decimal address of system timer
    CONSOL=$D01F          ; hex address of the key-pressed register
CARD TIME

    RTCLOCK=0 ; reset the clock
    WHILE CONSOL>6 ; did the user press a key?
    DO
        PRINTE("Hello World!")
    OD
```

```
TIME = RTCLOCK
PRINTF("Ran for %E %U jiffies",TIME)
RETURN
```

Note that the definitions of `RTCLOCK` and `CONSOL` are not setting the values, but stating that they are at those memory locations. The syntax changes when those variables are accessed; the `RTCLOCK=0` *does* set the value of that location. Also notice the syntax of loops, which work similarly to Pascal's `BEGIN/END` but use `DO/OD`.

There is a clever trick in this code. Note that `RTCLOCK` is defined as a `BYTE` but `TIME` is defined as a `CARD`, a 16-bit value. This is because the clock value is stored in three bytes, 18, 19 and 20. By defining `TIME` as a `CARD`, when that value is read it automatically reads two bytes, thereby getting a value from both 20 and 19. This solution ignores the third byte, but since the value is from 0 to 65535 jiffies, about 36 minutes, this can safely be ignored for a program that is likely to run for a few seconds. This solution avoids the need to read two bytes and manipulate them into a 16-bit value, something that is commonly found in BASIC programs.

ACTION! source code #

at that point AtariWiki must give the highest award possible:

- [ACTION! source code](#)

Thanks#

Thank you so much Mr. Parker, we can't thank you enough for what you have done for us.

Thank you so much Mr. Parker

Further thank you Alfred from AtariAge for preserving the source code for generations to come. We are deep in your debt.

Thank you Alfred

- [Action-Editor.asm](#) ; Source code for the ACTION! editor extracted out of the ACTION! source code. Mega-thanks to Alfred from AtariAge. :-)))

Blogs#

- [Learning Atari Action!](#)

Manuals and Docs#

- [Action manual 3rd-revised edition 2018 by GBXL](#) ; size: 991 KB ; 3rd revised and enlarged edition (p) 2018 by GBXL. There is no better version worldwide! Thank you so much GBXL. We are deep in your debt! :-)))
- [Action-Handbuch-komplett 2016 von GBXL.pdf](#) ; Das komplette, vollständige, restaurierte und überarbeitete Action!-Handbuch in deutsch! Der totale Hammer, inkl. Editor, Monitor, Language, Compiler, Library, Run Time, Toolkit. Vollständig überarbeitete Version von 2016 von GoodByteXL. So müssen PDF-Dateien aussehen, es gibt weltweit nichts vergleichbares. AtariWiki empfiehlt die PDF-Datei auf das Wärmste! Wer diese nicht lädt, ist selber schuld. Wir bedanken uns an dieser Stelle sehr, sehr herzlich bei GoodByteXL für seine lange andauernde und intensive Arbeit an diesem Werk, dass er hiermit der Atari-Gemeinschaft zur Verfügung

stellt. GoodByteXL mega-Danke für Deine Arbeit, die Gemeinschaft steht tief in Deiner Schuld. :-)))

- [Action manual 3rd-revised edition 2015 by GBXL.pdf](#) ;The complete Action! manual! Editor, Monitor, Language, Compiler, Library, Run Time, Toolkit. 3rd revised edition 2015 by GoodByteXL. Highly recommended by the AtariWiki! This is, without any(!) doubt, the very best edition worldwide available. Nobody does it better. Mega-thanks to GoodByteXL for this outstanding work and the many hours of work to the community. We are deep in your debt! Thank you so much. :-)))
- [ACTION! Reference Manual](#)
- [ACTION! Handbuch](#) (German ACTION! Manual)
- [The ACTION! Toolkit](#)
- [The ACTION! Run Time Package](#)
- [ACTION! Reference Card](#)
- [ACTION! error codes](#)
- [Action! and BBS Express! PRO Tutorial](#)
- [Larry's ACTION! Tutorial](#)
- [Aktion mit ACTION](#) - Report about the ACTION! Programming Language from the German Magazin "Happy Computer"
- [Step-by-Step Tutorial - How to create a stand-alone ACTION! Program](#)
- [How to setup an ACTION! Development Disk](#)
- [Action! Bugsheet #3](#)
- [Fix for the Bugs in divide in ACTION!](#)
- [Fix for Bug in PrintF](#)
- [Optimized Systems Software, Inc. - SOFTWARE LICENSE AGREEMENT](#) ; thanks to Atarimania

New ACTION! versions > 3.6#

- [Action! greater than version 3.6](#) ; thanks to JAC! for compiling and fixing the known bugs. Please go ahead with your outstanding work in this, we really appreciate your help and work very much.

CAR-Images#

- [ACTION Version 3.6 \(C\) 1983 ACS 034M.car](#)
- [ACTION Version 3.6 \(C\) 1983 ACS M091.car](#)

ROM-Images#

- [ACTION Version 3.6 \(C\) 1983 ACS 034M.rom](#)
- [ACTION Version 3.6 \(C\) 1983 ACS M091.rom](#)

Runtimes#

- [OSS ACTION Programmers Aid Disk 100.atr](#)
- [The ACTION! Toolkit.atr](#)
- [The Action RunTime Disk-Original.atr](#) protected image copy of the original disk from a good soul from AtariAge
- [The ACTION! RunTime Disk.atr](#) unprotected copy of the original disk from a good soul from AtariAge
- [Original ACTION! System Runtime Source](#)
- [Alternative ACTION! Runtime Source](#)
- [ACTION! Runtime von Jeff Reister](#)
- [OSS ACTION 3.6 and REAL files with DOS XL 2.30p Color.atr](#)
- [TURBO-DOS XE with ACTION Disk 1.atr](#)
- [TURBO-DOS XE with ACTION Disk 2.atr](#)

XEX-Files#

- [ACTION.XEX](#) ; Thanks goes to Peter Dell for making the XEX-file out of the above source code. Peter, we owe you so much, please go ahead! :-)
- [Action Editor-MADS.xex](#) ; If you rename the file to E.COM, you can even use it under SpartaDOS I for example with D1:E MYSRC.ACT to direct load the MYSRC.ACT file into the editor. Further, this editor can even be used for BASIC, PASCAL, FORTH etc... A Giga-thanks goes to Alfred from AtariAge for extracting the source code from Clinton Parker's original source code and JAC! from AtariAge for building the xex file from that very source code, while adapting to MADS. Great job, not only for Action! :-)))

Mini-LIBs (and/or independant Runtime Parts)#

- [_Intro](#) (Eine kleine Einführung zu den Mini-LIBs)
- [Simple PRINT Runtime](#) (Mini-LIB)
- [ZERO and SETBLOCK](#) (RT Part)

Functions#

- [Misc useful ACTION! Functions](#) - (DIVERS.ACT)
- [Chartest](#) - a group of routines which perform various functions and tests on characters.
- [Fast Screen IO](#)
- [Player Missile](#)
- [String Library PSC](#) - (STRING.ACT)

Code#

- [A pseudo Assembler in ACTION!](#)
- [ACTION! Logo ACS](#)
- [Atari Fuji Logo in ACTION!](#)
- [Atari ST Mouse Driver for ACTION!](#)
- [Backtrack in ACTION!](#)
- [BASIC USR Machine Language Call Simulation for ACTION!](#)
- [Big Symbol Table for ACTION! ACS](#)
- [Binary File Load in ACTION!](#)
- [Butterfly Demo](#)
- [C Style Strings](#)
- [Catch and Throw Error Handling ACS](#)
- [Catepill](#) unfinished Game with Level editor in ACTION!
- [COM File Segment Dump](#)
- [Compile to Disk ACS](#)
- [Data Entry Routines](#)
- [Date Routines](#) - Library of routines supporting the input, storage and manipulation of dates.
- [Delete EOL Char in Textfiles](#)
- [Displaylist in ACTION!](#)
- [DLI in ACTION!](#)
- [DOS Setup](#) - A small tool to copy some files from disk to ramdisk. can be configured by a textfile.
- [END Procedure](#) - Call procedure to leave ACTION! Program
- [ERROR](#) (Converts SpartaDOS, BeWeDOS and RealDOS error # to readable text)
- [Fast Graphics 15 Routines](#)
- [Fast Graphics 8 Routines](#)
- [File Compare](#)
- [File IO Routines](#)
- [File Select Box](#)

- [File Select Shell](#)
- [Game AMAZING in ACTION!](#)
- [Grep for Sparta DOS](#)
- [HexDump](#) - Dump - Print the contents of binary files in hexadecimal and ATASCII
- [Kermit in ACTION!](#)
- [Load APL Display-List Files](#)
- [Load Font Files in ACTION!](#)
- [Load Koala Pictures](#)
- [Multi Player Animation](#)
- [PERCOM Block Manipulation](#)
- [PERCOM Service](#) -- Disk Format Configuration
- [Printing Routine for Epson Printer](#)
- [Query Console Keys](#)
- [SIO CIO Routine](#)
- [VTEulator](#)
- [VT52 Terminal Emulator](#)
- [Windowing Routines](#)
- [OS Vectors](#)
- [use RAM under ROM on XL-XE machines](#)
- [Symbol table lister ACS](#)
- [XFD Disk Transfer tool](#) XFormer Filetransfere
- [XModem Filetransfer](#)
- [Starburst](#)
- [Atari Picture Mirror Tool](#)
- [ATARI Rainbow effect](#)
- [Access SpartaDOS commandline parameters](#)
- [Jump to DOS DUP](#)
- [Trackball](#)
- [Timer Programming](#)
- [MiniDOS](#)
- [SourceCodeDisk1](#) ; SpartaDOS X disk image with ACTION! source code

Tools#

- [Action Source Code Formatter](#)
- [Infoline](#) for ACTION! and BASIC
- [ACTION OBJECT CODE RELOCATION PROGRAM](#) ; Thank you so much Alfred from AtariAge, we all really appreciate your help here again.
- [Relocator](#) for ACTION!, relocates ACTION! code to run independent from the code location
- [acsterm.txt](#) ; ACSTERM is a terminal emulator for the Atari 800, 800XL, 1200XL and 130XE
- [How to find the revision number of ACTION](#)

Misc#

- [ACTION! Workshop 1](#) 24. October 2010 "Unperfekthaus" in Essen
- [ACTION! Workshop 2](#) October 2011 "Unperfekthaus" in Essen
- [ACTION! Workshop 3](#) 28. October 2012 "Unperfekthaus" in Essen

Still missing: Graphics Utilities Library and Shape Editor#

Now just these two are missing. Any hint, any help is welcome at any time. We would really appreciate your help in that case.

Graphics Utilities Library for ACTION! screen 1

Graphics Utilities Library for ACTION! screen 2

Shape Editor and Animator for ACTION!

Action Articles in Magzines#

Analog#

Title	Issue	Language	Comment
Review Action!	#16 (02/ 84)	en	review
An Introduction to ACTION!	#17 + #18 (03+ 04/ 84)	en	tutorial
Stars in 3D	#20 (07/ 84)	en	demo
Bounce in ACTION!	#20 (07/ 84)	en	game
Pulse in ACTION!	#26 (01/ 85)	en	demo
More Fun with Bounce!	#27 (02/ 85)	en	game
Demon Birds	#28 (03/ 85)	en	game
Roto	#31 (06/ 85)	en	game
Color the shapes	#32 (07/ 85)	en	game
Getting in on the Action! 1	#32 (07/ 85)	en	ON-LINE Action! Tutorial
Getting in on the Action! 2	#35 (10/ 85)	en	ON-LINE Action! Tutorial
Sneak attack	#36 (11/ 85)	en	game
Air hockey	#38 (01/ 86)	en	game
D-Check	#44 (07/ 86)	en	tool
Trails	#50 (01/ 87)	en	
ACTION! Zero Free	#54 (05/ 87)	en	tool

Antic#

Title	Issue	Language	Comment
Interrupts in ACTION!	Vol. 3 #3 (07/ 84)	en	
Demo Pretty	Vol. 3 #7 (11/ 84)	en	demo from Antic I/O-Board
SPLASH in ACTION!	Vol. 3 #12 (04/ 85)	en	demo
Game AMAZING in ACTION!	Vol. 4 #1 (05/ 85)	en	game
View 3D	Vol. 4 #2 (06/ 85)	en	tool
Dark Star	Vol. 4 #3 (07/ 85)	en	game:Zapping Aliens With Radioactive Waste
Display Master	Vol. 4 #4 (08/ 85)	en	
Eight Queens	Vol. 4 #5 (09/ 85)	en	92 chess solutions in 40 seconds
Video Stretch	Vol. 5 #6 (10/ 86)	en	tool
Killer Chess	Vol. 6 #10 (02/ 88)	en	game
Reardoor	Vol. 6 #10 (02/ 88)	en	game
Frog	Vol. 6 #10 (02/ 88)	en	game

ACTION! Toolbox	Vol. 7 #6 (10/ 88)	en	Lightning-fast command finder (Wordfind and Matchup)
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ATARImagazin**#**

Title	Issue	Language	Comment
Schnelle Vektoren in ACTION!	#1 (1-2/ 87)	ge	tutorial:Action!-Center Teil 1
Schnelle Umwege in ACTION!	#2 (3-4/ 87)	ge	tutorial:Action!-Center Teil 2
Interne Variablen	#3 (5-6/ 87)	ge	tutorial:Action!-Center Teil 3
Was ist dran an Action!?	#4 (7-8/ 87)	ge	tutorial:Action!-Center Teil 4

CK Computer Kontakt#

Title	Issue	Language	Comment
Musik in ACTION	#10/85	ge	tutorial
ACTION! noch schneller	#6-7/86	ge	tutorial

Atari Magazine#

Title	Issue	Language	Comment
ACTION! Deel		nl	A collection of ACTION! Articles