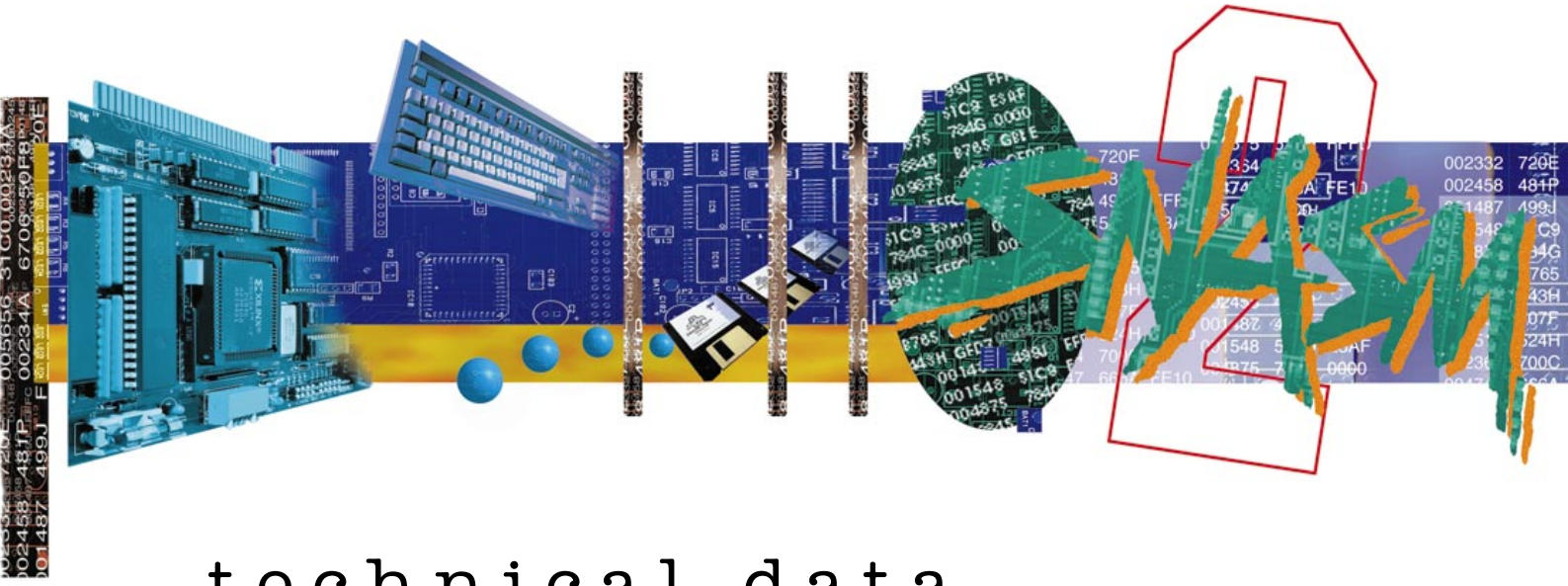

technical data

SATURN

Multi-Purpose Documented Interface Standard

The interface hardware we supply forms part of an open interface standard, so it supports other tools such as sound editors and artwork designers which are already available from Sega and third parties, with many more products planned for the future.

High Performance Interface

The interface hardware has its own RISC processor to avoid burdening the SH2s with communications tasks, and it uses a high-speed SCSI-2 interface so you get ultra-fast downloads and responsive debugging. The interface firmware is in flash memory so that any updates that may be required can be quickly and easily performed on-site without needing to return systems for upgrade.

Supports GNU C and Hitachi Mnemonics

You can rapidly port existing code, or samples, as we support GNU and Hitachi syntax in addition to our powerful SNASM2 code syntax. The system includes assemblers for SH2 and 68000 processors, a powerful multi-processor linker, GNU C compiler so you can work in any mixture of C or assembly language with full source-level debugging facilities being provided by our advanced SNASM2 remote debugger.

NMIs to all three processors

By adding shielded NMI cables between the Saturn target and the hardware interface, the debugging process is greatly improved. Rather than insisting that the program being debugged periodically checks to see if the PC wants to communicate, a separate Non-Maskable Interrupt is used for each processor. This means that the target is still available if the program being debugged should hang and that code can be debugged in its final production form.

All Systems Supplied V-CD Ready

Our debugging systems have been designed to work alongside the Saturn CD BIOS so you get full access to the CD features without having to jump through hoops. SNASM2 for Saturn can be used with a Programmer's Small Box, or we can supply a production Saturn which is modified to allow it to be used with a CD emulator such as the JVC V-CD or Mirage CD Emulator.

A Complete System

The SNASM2 Saturn development systems can be tailored to the developers specific requirements from low-cost options through to a comprehensive multi-purpose development environment and is supplied with all necessary hardware and software to begin development immediately.

SEGA

technical data

SATURN

The SNASM2 professional development environment consists of a core set of features and syntax which are common across all processors and all platforms. This means that you don't need to learn a new set of development tools or environment each time you change target, greatly reducing the learning curve of new platforms saving both time and money.

SNASM2 - Assembler/Linker

Fast and powerful assembler written specifically for the games industry. 32-bit 386 protected mode provides even more speed and supports larger projects.
Combined assembler and linker allows any combination of direct assembly and linking, and any combination of C and assembler code.

SNASM2 - Debugger

TRUE source level debugging automatically knows where source files are and which should be loaded when.
Source level debug C, assembler or mixed mode projects.
Debug multiple processors on a single screen.
Split-screen code window - view source and disassembly at the same time and trace in either.
32-bit 386 protected mode to provide unlimited windows, symbols, debug info, etc.
Configurable breakpoints to allow stopping on condition, logging without stopping, etc.
Session save to maintain windows, breakpoints etc. between debugging sessions.

SNASM2 - Data

Genuine download speed of 600k per second.
Output file types: COFF, Binary, S19.

SN320 - Saturn Development System Contains:

SNASM2 - Standard Software

SH2 Assembler/Linker
SH2 Source-level Debugger
Brief macros
Librarian
Make utility
GNU C Compiler for SH2
Test utility

SNASM2 - Standard Hardware

Adaptec SCSI card
SCSI cable
Enhanced Production Saturn targets
Cart Dev interface for Saturn

Detailed technical documentation.
12 months unlimited technical support and upgrades.
Access to dedicated BBS for upgrades.

SEGA

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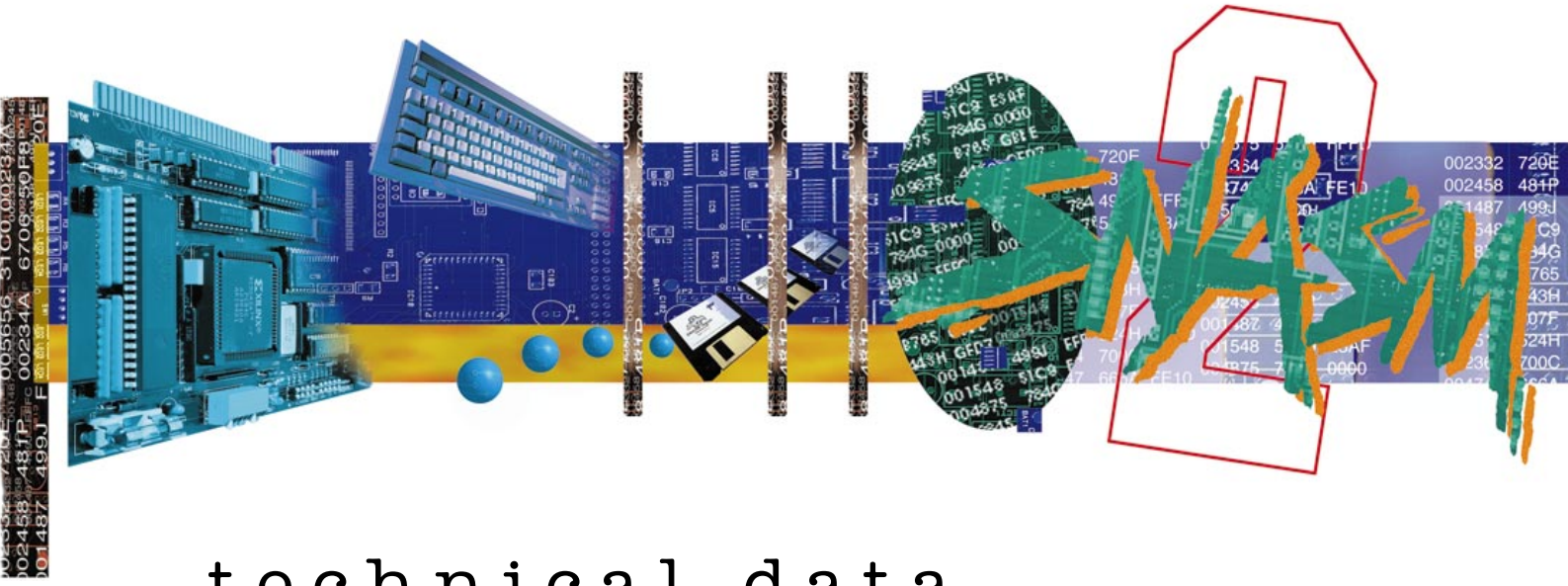
Internet: enquiry@crossprod.co.uk

Cross products ltd



technical data

32X

The SNASM2 professional development environment consists of a core set of features and syntax which are common across all processors and all platforms. This means that you don't need to learn a new set of development tools or environment each time you change target, greatly reducing the learning curve of new platforms saving both time and money.

Debug Final Form Code

This powerful development system provides debugging facilities for final code without Trap#0's or debugger polls, and simulated boot to guarantee your final ROM image will work on production machines.

Uses NMI's to all Three Processors

Uses Non-Maskable Interrupts (NMI) to all three processors so you remain in control without having to continually poll an invasive debugging monitor.

Supplied with Enhanced Targets

Uses enhanced production Genesis and 32X (which are included in the price!). The SDRAM of the 32X is doubled in size so that debugging code and monitors don't get in the way of your production code.

Dual Port RAM and NMI

No hole! Advanced design incorporating Dual Port RAM and NMI means that none of the available cartridge space is eaten up and neither do you have to set aside Genesis work RAM or SDRAM to the debugger.

Supplied with GNU C for SH2

For the 68000 we provide our fast and flexible SNASM68k tools which can be used with either GNU assembler code or Sierra C, and for the RISC processors you get SNASMSH2 which is compatible with both the GNU and Hitachi assembler syntax and mnemonics to allow rapid porting of existing code and code samples. The system comes complete with GNU C for the SH2 which can be linked into your project using the SNASM2 tools to enable mixed assembly/C development.

Simultaneous Multi-Processor Debugging

The SNASM2 debugger is specifically designed to support simultaneous display and debugging of multiple processors, eg. master & slave SH2 and 68000, all in one debugging session on one screen.

Banking Support

The debugger supports full access to all banked memory and knows which source code, data and symbols are in which bank.

High-Speed SCSI Interface

Uses fast bus-mastering SCSI-2 interface for reliable high speed communications between the PC and the 32X.

SEGA

technical data

32X

SNASM2 - Assembler/Linker

Fast and powerful assembler written specifically for the games industry. 32-bit 386 protected mode provides even more speed and supports larger projects.
Direct generation of ROM images. Combined assembler and linker allows any combination of direct assembly and linking, and any combination of C and assembler code.

SNASM2 - Debugger

TRUE source level debugging automatically knows where source files are and which should be loaded when.
Source level debug C, assembler or mixed mode projects.
Debug multiple processors on a single screen.
Split-screen code window - view source and disassembly at the same time and trace in either.
32-bit 386 protected mode to provide unlimited windows, symbols, debug info, etc.
Configurable breakpoints to allow stopping on condition, logging without stopping, etc.
Session save to maintain windows, breakpoints etc. between debugging sessions.

SNASM2 - Data

Genuine download speed of 600k per second.
Output file types: COFF, Binary, S19.

SN300 - 32x Development System Contains:

SNASM2 - Standard Software

68000 Assembler/Linker
SH2 Assembler/Linker
Combined 68000 and SH2 Debugger
Brief macros
Librarian
Make utility
GNU C Compiler for SH2
Test utility

SNASM2 - Standard Hardware

Adaptec SCSI card
SCSI cable
Enhanced Genesis +32X targets
Cart Dev interface with 32Mbit emulation RAM
Single power supply for Cart Dev/Genesis/32X*

Detailed technical documentation.
12 months unlimited technical support and upgrades.
Access to dedicated BBS for upgrades.

* Europe Only

SEGA

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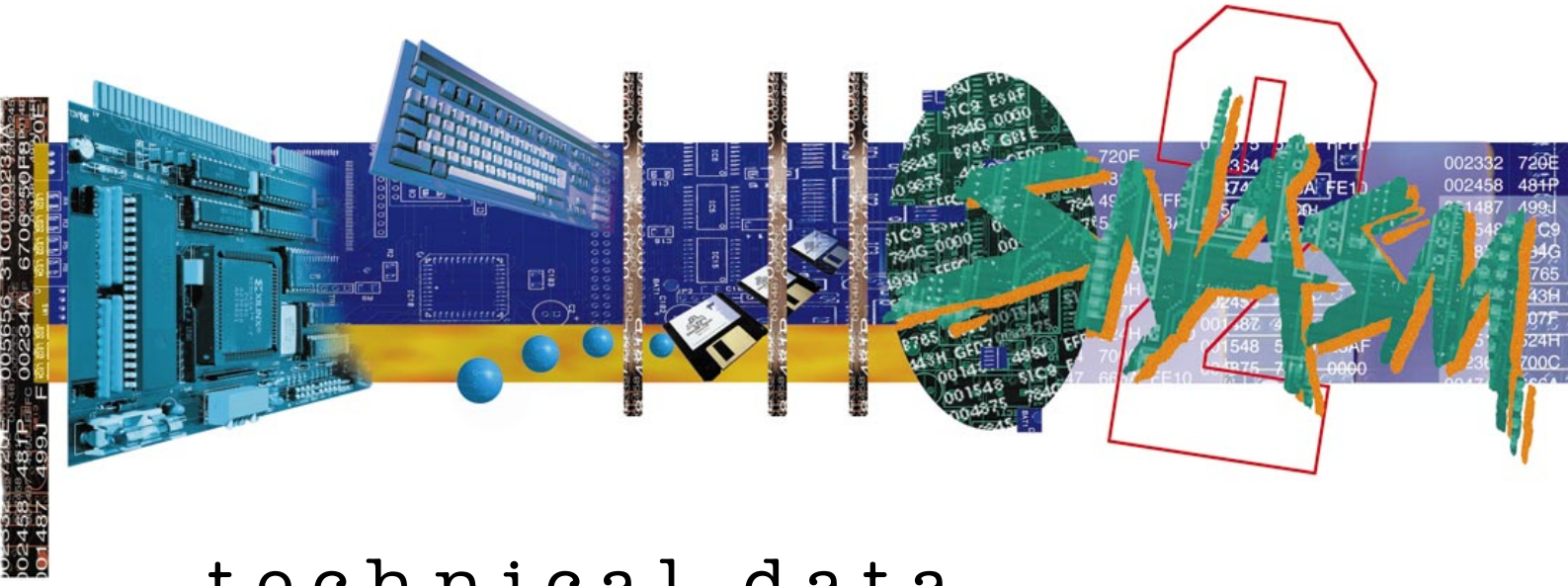

technical data

CD-i

The SNASM2 professional development environment consists of a core set of features and syntax which are common across all processors and all platforms. This means that you don't need to learn a new set of development tools or environment each time you change target, greatly reducing the learning curve of new platforms saving both time and money.

Suitable for business and pleasure

The SNASM2 CD-i system has been developed collaboratively by Philips and Cross Products to provide a remote development and debugging solution that can be used for any game or interactive multi-media title.

OS-9 Friendly

Even though the programmer isn't working on an OS-9 system all of the code written will be placed in OS-9 modules which are then sent to the CD-i player and loaded and run as usual. In fact, because the CD-i player doesn't need to run the development tools, the run-time environment can be almost identical to that on a production machine.

High Speed SCSI Interface

All communication between the CD-i and the PC, whether it's sending of modules or debugging a program, is performed using a high speed SCSI interface to keep the project build, test, debug cycle fast and rewarding.

Real Time Source-Level Debugging

Multi-windowed debugger allows user to configure the debugging environment to suite personal preferences.

PHILIPS

technical data

CD-i

SNASM2-Assembler/Linker

Fast and powerful assembler written specifically for the games industry.
32-bit 386 protected mode provides even more speed and supports large projects.
Able to send code directly to target allowing immediate testing.
Combined assembler and linker allows any combination of direct assembly and linking.

SNASM2 - Debugger

TRUE source level debugging automatically knows where to find files to step to.
Split-screen code window - view source and disassembly at the same time and trace in either.
32-bit 386 protected mode to provide unlimited windows, symbols, debug info, etc.
Configurable breakpoints to allow stopping on condition, logging without stopping, etc.
Full set-up save to maintain windows, breakpoints etc. between sessions.

SNASM2 - Data

Genuine download speed 140k per second.
Output file types: COFF, Binary, S19

SN290 - CD-i Development System Contains:

SNASM2 - Standard Software

68000 Assembler/Linker
68000 Debugger
Brief macros
Librarian
Make utility
Test utility

SNASM2 - Standard Hardware

PC Card with high-speed SCSI interface.
SCSI cable.

Detailed technical documentation.
12 months unlimited technical support and upgrades.
Access to dedicated BBS.

PHILIPS

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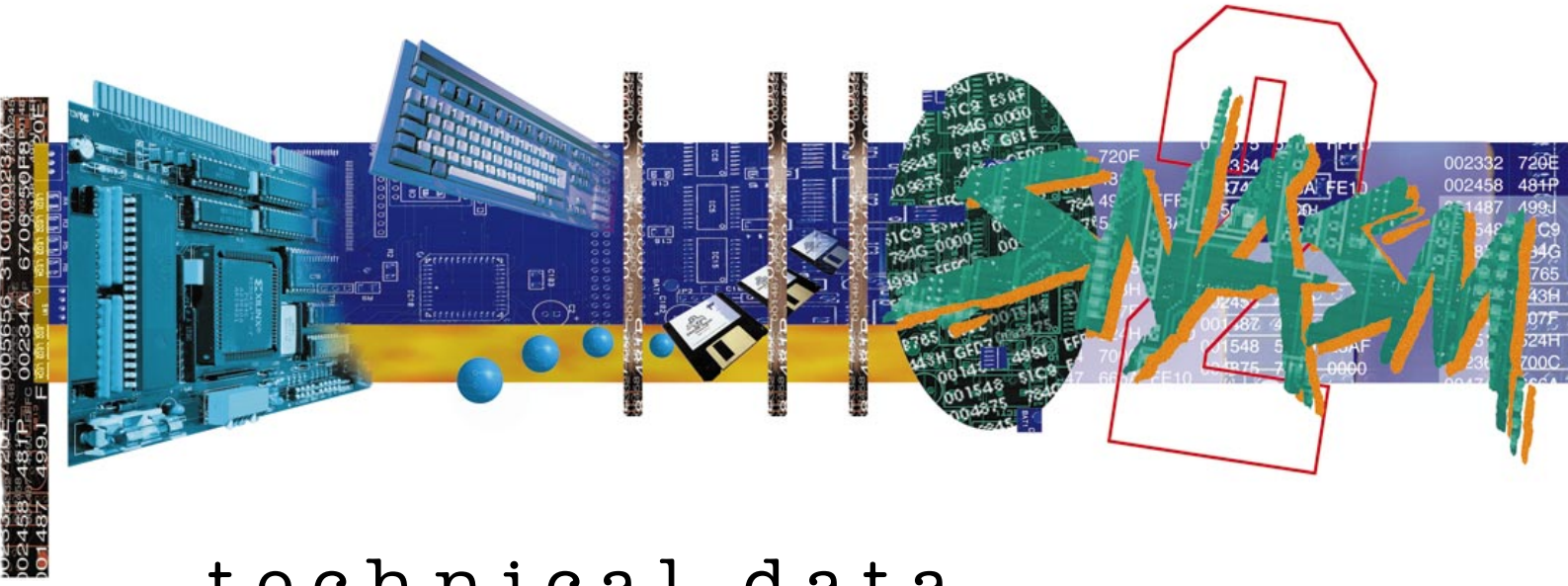
Cross products ltd



technical data

JAGUAR

The SNASM2 professional development environment consists of a core set of features and syntax which are common across all processors and all platforms. This means that you don't need to learn a new set of development tools or environment each time you change target, greatly reducing the learning curve of new platforms saving both time and money.

High Speed SCSI Interface

All communications with the target are by high-speed SCSI interface, utilising the standard SNASM2 PC card. Average download speed in excess of 300k/s.

'MADMAC' Emulation Macros

To enable the fast migration of projects into SNASM2 we provide MADMAC compatibility macros that allow the use of existing code with minimal changes.

Debugging of GPU & DSP

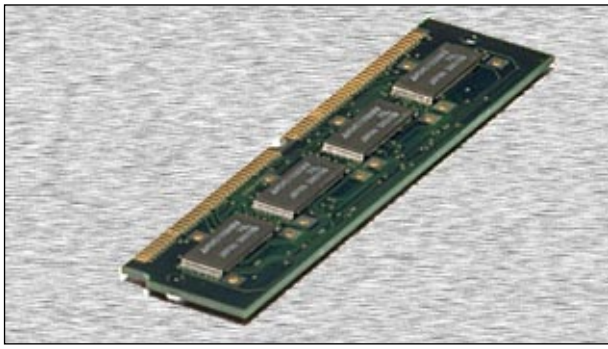
SNASM2 now has the ability to start/stop, single step and breakpoint the GPU and DSP processors, with display of all processor registers within the windowed debugger.

Up to 48 Mbit Cartridge Emulation

16 Mbit of RAM supplied as standard, can be quickly user-upgraded to 48 Mbit using non-volatile, low cost 8 Mbit SRAM SIMMs.

Break-out Switch

Allows the target to be stopped at anytime, especially useful when stuck in an infinite loop.



ATARI®

technical data

JAGUAR

SNASM2 - Assembler/Linker

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32-bit 386 protected mode provides even more speed and supports large projects.
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Direct generation of ROM images.
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Configurable breakpoints to allow stopping on condition, logging without stopping, etc.
Full set-up save to maintain windows, breakpoints etc. between sessions.

SNASM2 – Data

Genuine download speed 300k per second.
Unique design low profile low power 8 Mbit SRAM SIMMs.
Up to 48 Mbit cartridge emulation.
Output file types: COFF, Binary, S19

SN270 - Jaguar Development System Contains:

SNASM2 – Standard Software

68000 Assembler/Linker
DSP/GPU Assembler/Linker
Combined 68000 & DSP/GPU Debugger
Brief macros
Librarian
Make utility
Stand-alone file upload/download
Test utility
'MADMAC' Emulation macros

SNASM2 – Standard Hardware

PC Card with high-speed SCSI interface.
SCSI cable.
SNASM2 high-speed SCSI target interface supplied with 16 Mbit RAM as standard.

Detailed technical documentation.
12 months unlimited technical support and upgrades.
Access to dedicated BBS.

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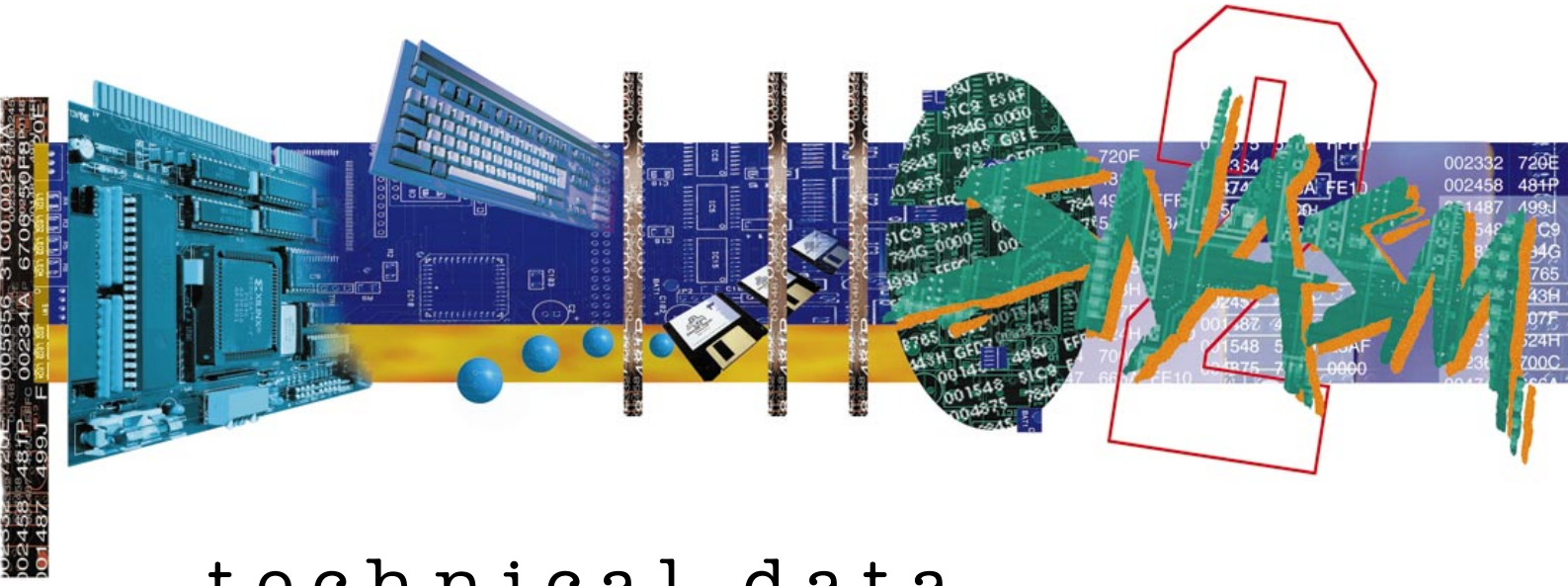

technical data

GENESIS

The SNASM2 professional development environment consists of a core set of features and syntax which are common across all processors and all platforms. This means that you don't need to learn a new set of development tools or environment each time you change target, greatly reducing the learning curve of new platforms saving both time and money. With huge advances in the technology used for SNASM2 development systems we are no longer offering just a software development tool, we're re-defining the funcionality of software tools and blurring the dividing line between these and expensive ICE equipment. We have incorporated in the GENerator many important useful features previously available only in very expensive hardware development tools.

Plugs into the Cartridge Socket and Provides more Features

The GENerator uses the cartridge socket rather than the 68000 socket but we haven't compromised on features, nor do you loose the cartridge socket as it has its own cartridge connector which accepts either RAMCarts or a standard Genesis game cartridge. When a game cartridge is plugged in you now have the ability to be able to check and trace code in the cartridge.

Vector Steal Available on any Selection of CPU exceptions

This allows selective trapping of exception vectors enabling the GENerator firmware to gain control when an exception occurs so you can debug a program without the need to change any of the vectors in the binary. An exception can be either completely trapped, which would be necessary for things such as Bus Error, or you can chain down to the user routine allowing the GENerator to gain control after a VBL without needing to insert a TRAP. No changes are required to binary for final cartridge.

VDP Access Tracking to allow non-intrusive VDP memory access.

The GENerator continuously monitors VDP access so it can keep track of the VDP access mode, access address and the value of AutoInc. This allows the SNASM2 firmware to read and write VDP memory without disturbing any VDP access that may be in progress. View and edit any video areas at will.

Latest Technology allows Hardware to be upgraded with no downtime

The GENerator holds its firmware in flash memory which is non-volatile but which can be quickly reprogrammed via the SCSI interface so the latest features can always be available. The GENerator has most of its hardware logic held in a Xilinx device which is programmed as the unit boots via the firmware so the hardware of the unit can be upgraded to allow for different types of cartridges, new versions of the Genesis or to add new debugging features.

Removeable Battery Backed RAMCart

16 Mbit of RAM supplied as standard in removable battery backed RAMCart, can be quickly user-upgraded to 32 Mbit using low cost 8 Mbit SRAM SIMMs. Detachable emulation RAM fully testable at all times. Plugs directly into standard Genesis for testing/demonstrations.

Available soon - Daughter board to plug into GENerator providing; hardware breakpointing, history buffer tracing and address checking.

SEGA

technical data

GENESIS

SNASM2 - Assembler/Linker

Fast and powerful assembler written specifically for the games industry.
32-bit 386 protected mode provides even more speed and supports large projects.
Able to send code directly to target allowing immediate testing.
Direct generation of ROM images.
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Debug multiple processors on a single screen.
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32-bit 386 protected mode to provide unlimited windows, symbols, debug info, etc.
Configurable breakpoints to allow stopping on condition, logging without stopping, etc.
Full set-up save to maintain windows, breakpoints etc. between sessions.

SNASM2 - New Features

Vector Steal capability.
Totally transparent VDP accessing.
Removeable battery-backed RAMCart.
Low cost 8 Mbit SRAM SIMMs.
Fully compatible with all types of DMA.
Plug-in cartridge interface will allow standard game cartridge to be connected.

SNASM2 - Data

Genuine download speed 300k per second.
RAMCart battery retains contents for 1 month.
Unique design low profile low power 8 Mbit SRAM SIMMs.
RAMCart capacity up to 32 Mbit.
Output file types: COFF, Binary, S19.

SN220 - Genesis Development System Contains:

SNASM2 - Standard Software

68000 Assembler/Linker
68000 Debugger
Brief macros
Librarian
Make utility
Stand-alone file upload/download.
Test utility

SNASM2 - Standard Hardware

PC Card with high-speed SCSI interface.
SCSI cable
GENerator cartridge interface.
Battery backed RAMCart fitted with 16 Mbit of SRAM SIMMs.

Detailed technical documentation.
12 months unlimited technical support and upgrades.
Access to dedicated BBS.

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SEGA