STD Bus Cards on the NuBus?

(You must be crazy!)

Crazy like a fox! Read on to find out more details on our latest generation of add-on boards for the Macintosh II. Hurdler™ II is shipping in August and will be demonstrated at the MacWorld Expo.

The *article on page two* of this issue is a more technical look at some of the Hurdler features and how it simplifies card access and development for the NuBus interface.

Also enclosed is a copy of the Hurdler Data Sheet that we hope you will use or pass along to an interested party within your organization. Request additional copies of this literature via the order form or by calling 1-800-367-8465 ext.787.

Mac II Tools to ship early September

Interested in optimizing the features of the new Macintosh II technology? We have added these features as an extension kit to the basic MacForth Plus product which has been running on the Macintosh SE and II since their introduction:

- color graphics
- new hierarchical menus
- 68881 co-processor support
- 68020 assembler

This toolkit includes documentation and will sell for an introductory price of $59 (list $79).

New Multi-Forth for the Amiga Released

For any Multi-Forth Amiga clients who may not have received our specific mailing in June the new release of Multi-Forth, version 1.21, is shipping now. It includes a complete set of INCLUDE files, local multi-tasking, sound drivers, new AmigaDos 1.2 calls, and an enhanced kernel. Upgrades for $30 (changes only) or $49 (entire new manual & disks).

Who's Your Pal?? (supplier)
New CSI PAL Mail Order Distribution System

Programmable Array Logic (PALs) parts are an integral part of board level development for the new Macintoshes. As a result of our experience in the manufacturing of PC boards for the Hurdler, we have an opportunity to sell PALs to other developers at low quantities and significantly below retail prices.

We currently have in stock blank 20 pin PALs by MMI and National for $2.50 each in quantities below 10. This includes but is not limited to PAL16L8, PAL16R8 PAL16R4 and PAL16R6. 24 pin blank PALs are also available, call for current pricing.

If you need a custom PAL give us a call. Please check the interest box on the order form to get on the mailing list for pricing and data sheets.

Orbital Mech:
A SpaceFlight Simulator
by Dale M. Greer using MacFORTH Plus.
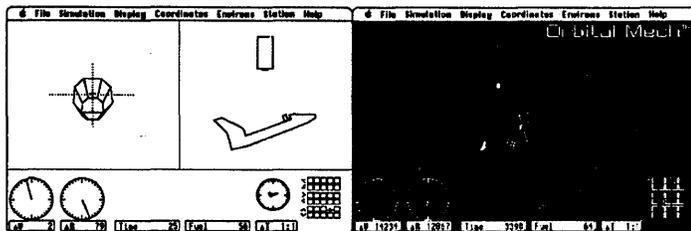
Orbital Mech is a real-time spaceflight simulator designed to be educational as well as entertaining.

As education, **Orbital Mech** gives the user an intuitive grasp of the vagaries of orbital mechanics and the subtleties of orbital maneuvering.

As entertainment, **Orbital Mech** runs the gamut from laid back kinetic video art, to curious amusement, to exciting challenge.

The microworld of **Orbital Mech** consists of a spaceship with rotational and translational thrusters activated via the mouse and/or the keyboard, one or two attractive bodies (gravitationally attractive, that is), and a space station for docking purposes.

Menus provide control over such things as the orbital environment, simulation parameters, the visual display, screen printing, file operations, etc. **Orbital Mech** automatically adjusts to large screens, runs on any Apple Macintosh computer with at least 512K of memory and one disk drive, and is not copy protected.

The source code for **Orbital Mech** is not provided, but the author will answer any questions you might have, either personally or through the **MacFORTH** users' group. The author's own **QFloat** package, available through the users' group, was developed concurrently with **Orbital Mech** so the necessary floating point calculations wouldn't bog down the action. The 3-D imagery was done with an enhanced version of CSI's 3-D package and smooth animation was accomplished with bitmaps.

Distributed by: Creative Solutions, Inc.
Suggested retail price: $34.95
Summer Special: $29.95!
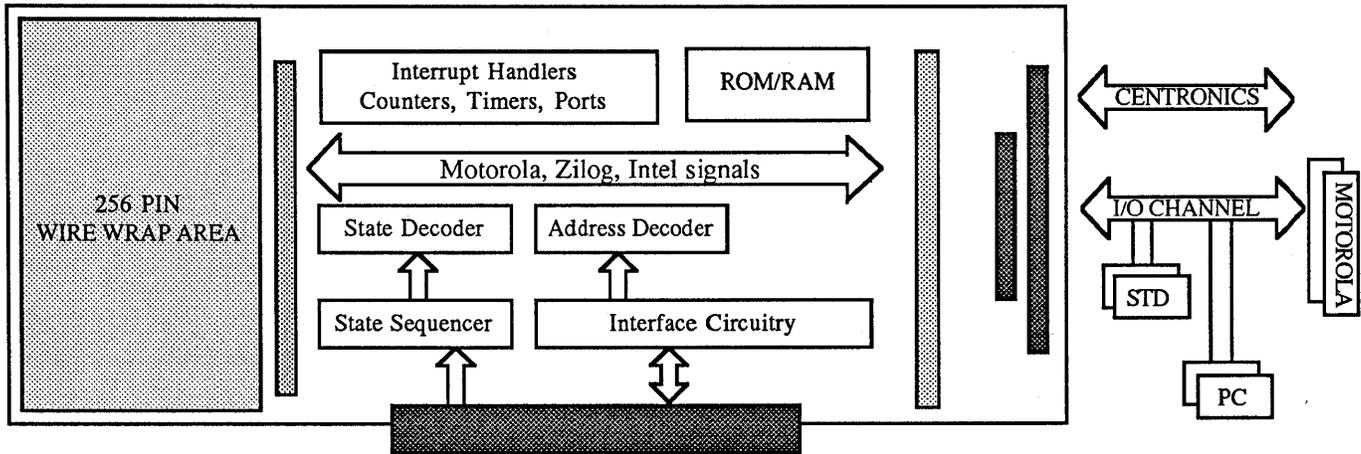
HURDLER BLOCK DIAGRAM

Shown above is a simplified block diagram of the HURDLER card. The interface circuitry is mainly responsible for latching address and data lines. The state sequencer and decoder extract useful signals from the NuBus and synthesize others needed by Motorola, Zilog or Intel peripheral chips. Together they will save developers hours of frustration.

An on-board Zilog Z8536A CIO is used to generate a 12-bit (8-bit data, 4-bit handshake) parallel interface that is brought out to a Centronics compatible connector. The CIO also provides 8 direct vectored interrupt request pins and 3 16-bit counters/timers. The interrupt response time (interrupt low to first chip select) is about 30 microseconds. Typical time to a vectored interrupt is under 40 µs.

The HURDLER comes with a "Slot Declaration ROM" that may be replaced with RAM during development. The large wire wrap area may be used to attach periperal chips of various sizes. Throughout the board, important signals are brought out to user accessable pads and headers. To attach a typical LSI peripheral chip requires less than 20 wire-wrap connections.

In addition to the NuBus connector, the HURDLER may be configured with either a 25 pin D-connector or a 50 pin ribbon connector (both are supplied). There is also a 64 pin header to which cables may be attached.
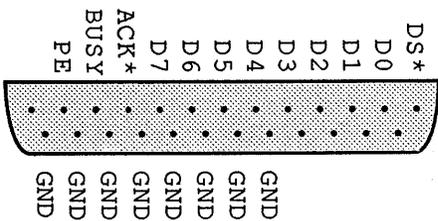
64 pin header	50 pin connector			
gnd	A1	C1	INT4*
gnd	A2	C2	INT3*
gnd	A3	C3	INT2*
gnd	A4	C4	INT1*
gnd	A5	C5	IORES*
gnd	A6	C6	XACK*
gnd	A7	C7	CLK
gnd	A8	C8	res
gnd	A9	C9	R D *
gnd	A10	C10	W R *
A11	A11	C11	gnd
A10	A12	C12	A9
A8	A13	C13	A7
A6	A14	C14	A5
A4	A15	C15	A3
A2	A16	C16	A1
gnd	A17	C17	A0
gnd	A18	C18	STB*
gnd	A19	C19	WRT*
D7	A20	C20	gnd
D6	A21	C21	D5
D4	A22	C22	D3
D2	A23	C23	D1
gnd	A24	C24	D0
gnd	A25	C25	gnd
-12vdc	A26	C26	-12vdc
res	A27	C27	res
+12vdc	A28	C28	+12vdc
+5vdc	A29	C29	+5vdc
+5vdc	A30	C30	+5vdc
gnd	A31	C31	gnd
gnd	A32	C32	gnd

HURDLER-II CONNECTORS

Parallel Port

Order Form Spring '87 ■■■■■■■■■■

Software:		Special Price	Quantity	Extended Amount
Mac II Tools Disk	(list $79 - 1 lb)	59.00	_____	_____
Orbital Mech	(list $34.95 - 1 lb)	29.95	_____	_____
Multi-Forth Amiga 1.21 Upgrade - Complete (2 lbs)		49.00	_____	_____
	Upgrade - Changes Only (1 lb)	30.00	_____	_____
MacForth Plus	(upgrade Level 2 users - 3 lbs))	49.00	_____	_____
	(upgrade Level 1 users - 3 lbs)	99.00	_____	_____
	(upgrade Level 3 users - 3 lbs)	35.00	_____	_____
MacForth Plus Tools Disk #1 (list $35 - 1 lb)		30.00	_____	_____
MacForth 3D Library (list $25 - 1 lb)		20.00	_____	_____
ForthTalk	(list $55 - 3 lbs)	49.00	_____	_____
MacForth: PFRU Book	(list $18.95 - 2 lbs)	15.00	_____	_____

Hardware:

		Special Price	Quantity	Extended Amount
Hurdler II	(list $279 - 2 lbs)	249.00	_____	_____
Hurdler II - CPI	(list $199 - 2 lbs)	179.00	_____	_____
Hurdler II - STD	(list $249 - 2 lbs)	229.00	_____	_____
Hurdler II - IOC	(list $249 - 2 lbs)	229.00	_____	_____
Hurdler II - PCB	(list $349 - 2 lbs)	349.00	_____	_____

Pals:

20 Pin PAL16 ___ (list - $3.00 - 2 oz) Qty 1-10 2.50 each
Qty 11-25 2.35 ea   Qty 26-25 2.20
Qty 51-100 2.00 ea   Qty 100 & up 1.80

Prices for PALs are for small quantities - call for quantity pricing. $5.00 minimum

Shipping Chart	
Weight	Amount
0-1 lb	$3.50
2 lbs	$4.00
3 lbs	$4.50
4 lbs	$5.00
5 lbs	$5.50
Add .50/pound for shipments exceeding 5 lbs.	

Subtotal _____
Shipping _____
Total _____

New products are in italics.

Add $10 air mail to Europe & South America. North America add $2 for air mail. Australia, Far East, Japan add $20 for air mail.
All prices good through September 30, 1987. Phone in orders to **1-800-367-8465**. Our standard shipping method for US is UPS. For overseas & North America we ship by mail. See weight chart.

Payment Method: COD/Check/Money Order _____
Visa/MC/Amex (circle one) Number: _____ Exp. Date _____
Signature: _____ Order Date:_____

MacForth Disk #: _____ **Multi-Forth Disk #:** _____

Name: _____

Company: _____

Address: _____

City/State/Zip: _____

Phone Number: _____
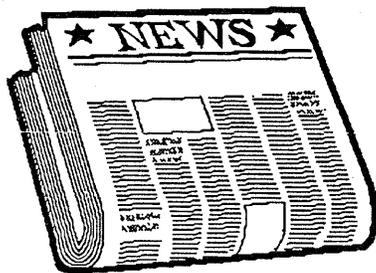
Inside this issue:

•Hurdler - The NuBus Connection - Boards for the Mac II

•Mac II Tools Disk

•PALs for Sale

•Orbital Mech: A SpaceFlight Simulator

TECHNICAL DATA SHEET

The NuBus HURDLER™

Macintosh II interfaces to 3 popular industrial busses: STD bus, Motorola I/O Channel & IBM PC bus

The NuBus is the new slot interface for the Macintosh II. It details a mechanical and electrical specification for all expansion cards. This presents an exciting opportunity for scientists, engineers and hobbyists to produce custom tailored interface cards for the Macintosh II.

Although selection of the NuBus by Apple will certainly prove to be a wonderful long term solution, it does impose two short-term barriers that are sure to impede development of interface cards.

First, the NuBus is a 10MHz multiplexed address and data, synchronous bus. Peripheral chips require that address and data lines be demultiplexed, and appropriately sequenced. Suitable control signals also must be synthesized. This is a lot more complicated than the conventional Intel-Zilog or Motorola peripheral chip bus interfaces with which most potential card developers are familiar.

Second, all NuBus slot cards, in order to be accepted by the Macintosh operating system, are required to contain a "Slot Declaration ROM". This ROM specifies critical interface parameters, and allows uniform logical access regardless of the actual physical implementation of the card. This may require a significant software engineering effort.

The NuBus Hurdler is intended to allow both personal and professional card developers to quickly leap over these barriers, and be productive in hours, rather than weeks. Anyone familiar with digital logic will easily be able to attach I/O cards, devices or LSI integrated circuits to create new and innovative hardware products.
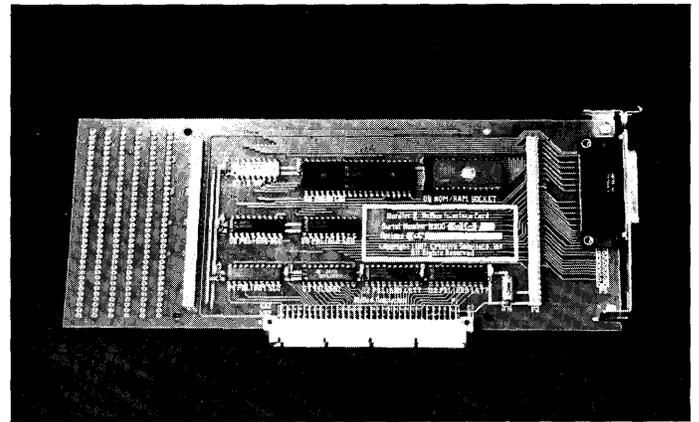
The "Hurdler" card features:

• Complete interrupt driven NuBus slave interface to conventional Motorola, Intel or Zilog type busses and peripheral devices.

• Motorola interface brought out to a 64-pin ribbon cable connector compatible with Motorola's Eurocard form factor I/O-Channel.

• Zilog/Intel interface suitable for connection to a remote STD Bus or IBM PC I/O expansion chassis.

• 3 16-bit counter/timers

• Separate 12 bit, bi-directional, parallel interface brought to a Centronics compatible connector

• Macintosh II interrupt response time about 35 microseconds

• EPROM/RAM socket with generic configuration ROM

• 256 pin wire-wrap area

• Software driver that provides high level interface to card, accessible from any development language

HURDLER-II-STD

NuBus STD BUS Interface

The STD BUS was developed by Pro-Log Corp. as a simple bus structure that standardizes the physical and electrical aspects of 8-bit microprocessor card systems. It is modular, rich in I/O functions, and can be configured for applications from simple control or data acquisition systems to powerful multiprocessor and multi-tasking computer systems. The STD bus is a well established bus standard used by over 10,000 companies and supported by over 100 manufacturers. The HURDLER-II-STD interface card makes available to your Macintosh II hundreds of low cost, off-the-shelf and highly reliable boards. A 50 conductor ribbon cable is used to connect the HURDLER-II-STD to an interface card (included) in a STD BUS chassis. Using your favorite programming language, (preferably a language suited to control applications such as MacForth) you can easily read from and write to registers, set up interrupt service routines and be well on your way to developing real data acquisition and process control systems.

HURDLER-II-CPI

NuBus Centronics Parallel Interface

The HURDLER-II-CPI parallel interface allows you to connect your Macintosh II to any of hundreds of printers that use Centronics type interfaces, including inexpensive laser printers. For years the Centronics port has been the standard interface to printers in the micro world. The 25 pin D-connector on the HURDLER-II-CPI is the same connector found on IBM PC and compatible printer interfaces. So you can use the same printer and cable you used on your IBM PC or compatible computer. Included with the HURDLER-II-CPI is an easy to install printer driver.

HURDLER-II-IOC

NuBus Motorola IO Channel Interface

The Motorola I/O Channel is an interfacing system that provides a high speed data path between I/O slave devices and the bus master. It provides a 12-bit address, an 8-bit bidirectional data bus, 4 interrupt lines, and a data transfer rate up to 2 megabytes per second. Most of Motorola's I/O modules are implemented using the single-high Eurocard format. The interface is brought out to a 64-pin ribbon cable connector compatible with the Eurocard format. Sufficient power is directly available at the connector to drive up to 4 interface cards. Signal drive is up to 50 feet, over ribbon cable. Mounting holes, standoffs, and cable assemblies are available to mount I/O Channel cards above the HURDLER-II-IOC, within the Macintosh II chassis. Among the cards available today are Analog to Digital and Digital to Analog converters, ac and dc optocoupled drivers and detectors, parallel and serial ports, and even a buffered interface to 9-track tape drive formatters. These cards are extremely durable and available, in stock, from Motorola distributors worldwide.

HURDLER-II-PCB

NuBus IBM PC Bus Interface

The HURDLER-II-PCB card allows you to connect your Macintosh II to IBM PC bus boards mounted on an expansion chassis. Your Macintosh II can now take advantage of the plethora of boards available for today's most popular bus. A 50 conductor ribbon cable is used to connect the HURDLER-II-PCB to an interface card which resides in the PC BUS chassis. Software that you develop on the Macintosh II can control all the boards addressed in "I/O Port" space on the PC bus. Included with the HURDLER-II-PCB are the interface board, ribbon cable and a ROM-resident driver.