Link

Lava I/O News

Parallel I/O IEEE 1284

Who knows more about parallel ports than Lava? The parallel port as it exists on PCs today has a long history. Lava, founded in 1984, has been there all the way. The Lava Parallel Bi-Directional, still a strong seller, has been a Lava product for 17 years. In that time, it has gone through relatively few design changes. Other than gaining an 8-bit bi-directional mode, it is functionally identical to the original Lava Parallel. In the fast-moving world of computer hardware, that might be some sort of a record. And yes, the Lava Lifetime Warranty still applies!
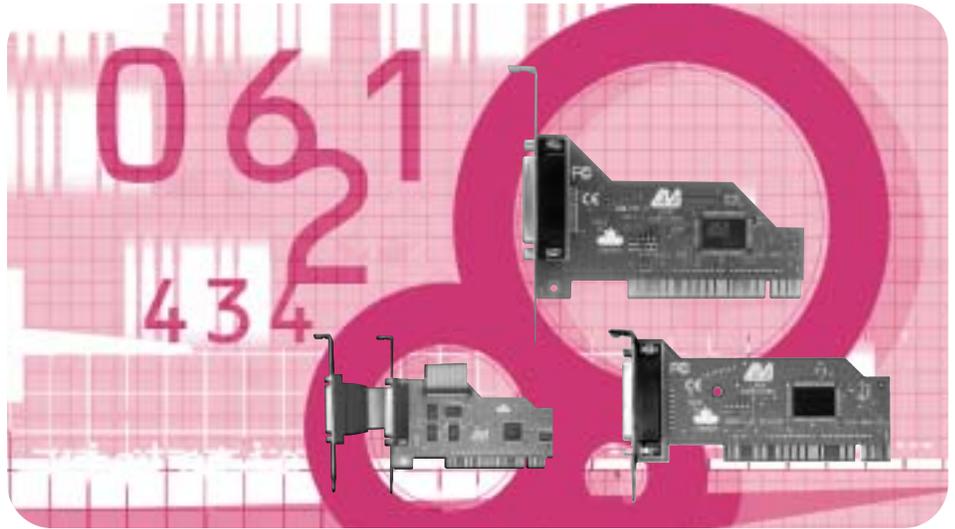
Parallel Bi-Directional

Since the introduction of the Lava Parallel, Lava has continued to lead in parallel port products. The Lava Parallel-PCI, featured in this issue of Link, is a good example. It embodies the principles of ease of use and reliable design. In addition, Lava has a complete range of other parallel ports for the needs of any PC user.

A Closer Look: Lava's Parallel-PCI

Here is a great card. The Lava Parallel-PCI epitomizes what Lava products are all about: filling a need with the most simple-to-use and reliable product that can be built. Lava's Parallel-PCI, when it came to market, was the first PCI-bus parallel port card in the world. It is fully PCI compliant and takes advantage of the speed and easy configuration of the PCI bus. On its arrival, it almost tripled the speed benchmarks of ISA-bus parallel port cards. It also offered greater flexibility of configuration. Users were no longer restricted to the three standard parallel port addresses: the Parallel-PCI would automatically select a free address and IRQ during installation, virtually eliminating user error and resource conflicts.

Lava didn't stop there. More recent versions of the Parallel-PCI incorporate the Moko S-1 ASIC (application-specific integrated circuit). This is Lava's own integrated circuit, specifically designed for the Parallel-PCI and other Lava products. The Moko S-1 is unique to Lava, and consolidates a number of separate components into one chip. This adds efficiency in manufacture, and more importantly, virtually eliminates any possibility of component failure — another reason Lava confidently offers the Lava Lifetime Warranty.

The popularity of the Lava Parallel-PCI has led to another Lava first: the first low-profile parallel PCI card. Functionally the same as the Parallel-PCI, the Parallel-PCI/LP (Low Profile) makes the advantages of the Lava Parallel-PCI available to users with systems in slimline or low-profile (Flex-ATX motherboard format) cases.

A Brief History of Parallel Ports

The history of the PC's parallel port has been one of increasing speeds. This is a good thing, because the parallel port originally used on PCs was intended exclusively as a printer port. It worked well for sending data to the typical printers of the time. That data, usually ASCII text, didn't place great demands on throughput: printers were neither fast nor sophisticated. Eventually, however, the parallel port had to evolve. Printers needed more control, faster speeds, more advanced font handling, and increased graphical capability.

To meet these needs, new modes of parallel port operation were added. Each increased the speed and capability of the parallel port. These modes are now specified in a document of the Institute of Electrical and Electronic Engineers (IEEE) called IEEE-1284, which defines most of the essentials of parallel ports as we have them today. The modes are each a type of parallel port data transfer as well as a handshaking protocol for that transfer. The more sophisticated modes include other features as well.

The IEEE 1284 parallel port modes are called Compatibility, Nibble, Byte, Enhanced Parallel Port (EPP), and Extended Capabilities Port (ECP) modes. Every PC parallel port uses at least a couple of these modes, and some of these modes encompass others.

Compatibility mode is a "forward channel" mode, or a mode that moves data from the PC to the peripheral. This mode moves bytes (8 bit chunks of data) one at a time to a peripheral, and is the default mode of parallel port operation. To be termed "IEEE 1284 Compatible" a port must be at least capable of this type of operation.

Nibble mode is a "reverse channel" mode, or one that moves data from the peripheral to the PC. This mode moves data one "nibble" (4 bits) at a time to the PC. Once the nibbles arrive they must be reassembled into bytes, an operation that slows the overall rate at which data can be transmitted. "IEEE Compliant" parallel ports must include at least compatibility and nibble modes, and an approved mechanism for negotiating transfers.

Byte mode is another reverse channel mode. This mode improves on nibble mode by enabling data to move to the PC one full byte at a time.

EPP mode works in both forward and reverse directions, moving full bytes each way. The primary advantage of EPP mode over compatibility, nibble, and byte modes is its speed. It can read or write one byte in a single ISA bus cycle, including the time required for protocol handshaking. Earlier modes required four cycles to transfer a byte. The EPP mode can also very quickly switch its direction of data movement, making it a good choice of mode for parallel storage devices. EPP mode includes within it compatibility, nibble, and byte modes that can be used if needed.

ECP mode adds another layer of sophistication to parallel data transfer. Like EPP mode, ECP moves full bytes on both forward and reverse channels. Again, each byte is moved in one ISA clock cycle. Additionally, ECP ports have data buffering, DMA support (the ability to write data directly to the system's memory without placing demands on the system's CPU), and data compression for more efficient data transfers. ECP mode includes the other modes within it.

Byte, EPP, and ECP modes all require supporting hardware and software, and so are not always as easily implemented as the more basic modes. On the other hand, the advantage of the advanced modes is speed!

Now it's time to tie these modes to products.

The original PC parallel printer port operated in compatibility and nibble modes. The next version of the parallel port arrived with the IBM PS/2. It added byte mode, and is generally called a "Simple Bi-directional" or "PS/2-type" port. Lava's Parallel Bi-Directional card is an example of this type of parallel port.

Lava's ECP port card, the Lava Parallel-ECP/EPP, is a sophisticated parallel port card for the ISA bus.

Finally, Lava's Parallel-PCI, Parallel-PCI/LP, and Dual Parallel-PCI cards are all EPP ports. They set the standard for ease of use among parallel ports. As PCI cards, they are Plug and Play devices that install easily and provide unrivaled flexibility and speed.

Parallel Port Speeds: Theoretical Maximums

Bi-Directional: 150 kbps

EPP: 1.5 Mbps

ECP: 2.5 Mbps

Lava Parallel-PCI EPP: 4.5 Mbps
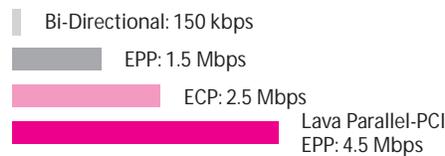
The Lava Parallel-PCI in the chart above shows that overall port speed depends on more than mode alone. The speed of the PCI bus, and its effective use by the Lava ASIC, give the Lava Parallel-PCI its speed. Other more general factors affecting parallel port throughput include the speed and architecture of a system's CPU, and peripheral support for EPP or ECP. Software factors include the type of code and the operating system. For example, DOS is usually faster than Windows.

Lava: Where Parallels Converge

Lava has a range of products with parallel ports: five parallel-only cards, four parallel/serial combo cards, and the Lava SPH-USB 1.1 hub.

Parallel Bi-Directional	(1 bi-directional; ISA)
Parallel-ECP/EPP	(1 ECP/EPP; ISA)
Parallel-PCI	(1 EPP; PCI)
Parallel-PCI/LP	(1 EPP; PCI)
Dual Parallel-PCI	(2 EPP; PCI)
2SP-550	(1 bi-directional + 2 16550 serial; ISA)
SP-PCI	(1 bi-directional + 1 16550 serial; PCI)
2SP-PCI	(1 EPP + 2 16550 serial; PCI)
LavaPort-Plus	(1 EPP + 2 16650 serial; PCI)
SPH-USB 1.1 Hub	(1 bi-directional + 1 16550 serial + 3 USB 1.1; USB upstream)

"Well done! Our researches have evidently been running on parallel lines, and when we unite our results I expect we shall have a fairly full knowledge of the case."

Sherlock Holmes,
The Hound of the Baskervilles

Lava's 8255-PIO

For the technically oriented, Lava has its 8255-PIO (Programmable Peripheral Interface I/O) board. The Lava 8255-PIO offers three 8-bit I/O ports and an 8-bit data bus. It is ideal for interfacing a microcontroller or other device to a PC, and its ports can be configured as inputs or outputs. Also, one of its ports can operate as a bi-directional port. The 8255 chip on the Lava 8255-PIO has enough port bits to interface with a parallel port's 17 signals (with seven left over), and can generate handshaking signals that are compatible with the handshaking used by parallel port Compatibility, Byte, and EPP modes. This is a card worth investigating if you need customizable interfacing using a PC's PCI bus.

Lava's 8255-PIO
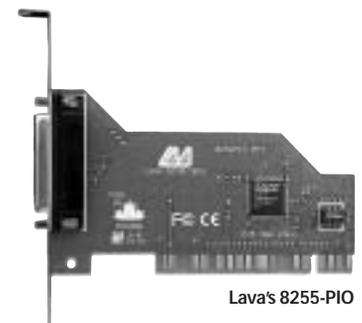
Win a Lava Parallel-PCI!

Please take a moment to fill out the survey. Tell us a little about yourself so we can serve you better!

By filling out this survey and faxing it to 416.674.8262, you might win Lava's best-selling Parallel-PCI!

NAME

_____

COMPANY

_____

TEL

_____

FAX

_____

E-MAIL

_____

Your business is a:

❍ Dealership
❍ Retail outlet
❍ On-line e-tailer
❍ Value Added Reseller
❍ System builder
❍ White box manufacturer
❍ National distributor
❍ Regional distributor
❍ Repair center
❍ Mail order supplier
❍ Other

_____

On average, how many I/O cards do you use/resell each month?

_____

Which technologies are you currently selling?

❍ Cables
❍ Ethernet/Fast Ethernet
❍ External storage
❍ FireWire/1394
❍ Macintosh
❍ Parallel
❍ Serial
❍ USB 1.1
❍ USB 2.0
❍ Other

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Where do you get your information about I/O boards?

❍ Advice from your tech
  support department
❍ Distributor
❍ Manufacturer
❍ Industry magazines
❍ Internet search engines
❍ Trade shows
❍ Other

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How did you originally find out about Lava I/O devices?

❍ Direct mail piece
❍ Distributor catalog
❍ Internet search engines
❍ Fax
❍ Trade show
❍ Phone call
❍ Referral
❍ Other

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Please rank each peripheral according to customer demand:

	No Demand	Moderate Demand	High Demand
Digital cameras (IEEE 1394)			
Digital cameras (USB)			
External modems			
Removable storage drives			
External hard drives			
External tape drives			
Internet cameras			
Printer (USB)			
Printer (parallel)			
Scanner (parallel)			
Scanner (USB)			

Profile

Tomauri Inc. was founded in 1987. Located in Richmond Hill, Ontario, Canada, Tomauri is a national distributor of high-quality computer cables and accessories. Tomauri has been buying Lava products for four years, and is one of Lava's key distributors in Canada.

Tomauri's wide range of products is supported by a team of trained service professionals who provide top-level service and product knowledge to their computer dealers. Tomauri prides itself on distributing its products through computer resellers, and does not sell direct to end-users. In business for over 14 years, Tomauri offers dealer support through innovative store merchandising programs, and industry-leading marketing programs.

Tomauri adapts to rapidly changing technology through its consistent research of new industry trends and standards which enables them to provide their resellers with state-of-the-art products — like Lava cards — to help them best serve their own customers.

Tomauri Inc.
88 Fulton Way
Richmond Hill, Ontario L4B 1J5
TEL: 905.886.8122
FAX: 905.886.6452
TOLL FREE: 877.4.Tomauri
www.tomauri.com

Win!

PRODUCT SUMMARY

Serial Cards

PCI	SSerial-PCI	Single 9-pin serial, 16550 UART
	SSerial-PCI/LP	Single 25-pin serial, 16550 UART, low profile
	DSerial-PCI	Dual 9-pin serial, 16550 UARTs
	DSerial-PCI/LP	Dual 9-pin serial, 16550 UARTs, low profile
	Quattro-PCI	Four-port 9-pin serial, 16550 UARTs, IRQ sharing
	Octopus-550	Eight-port 9-pin serial, 16550 UARTs, IRQ sharing
	LavaPort-650	Single 9-pin serial, 16650 UART
	LavaPort-PCI	Dual 9-pin serial, 16650 UARTs
	LavaPort-Quad	Four-port 9-pin serial, 16650 UARTs, IRQ sharing
ISA	SSerial-550	Single 25-pin serial, Com 1-4, 16550 UART, IRQ 3/4/5/7
	DSerial-550	Dual 9-pin serial, Com 1-4, 16550 UARTs, IRQ 2/3/4/5/7/10/11/12/15
	RS422-550	Dual 9-pin serial, 16550 UARTs, RS422 pinout
	LavaPort-ISA	Single 9-pin serial, Com 1-4 16650 UART, IRQ 2/3/4/5/10/11/12/15
	LavaPort-PnP	Single 9-pin serial, 16650 UART, plug & play

Parallel Cards

PCI	Parallel-PCI	Single EPP parallel
	Parallel-PCI/LP	Single EPP parallel, low profile
	Dual Parallel-PCI	Dual EPP parallel
ISA	Parallel Bi-Directional	Single bi-directional parallel port, LPT 1/2/3, IRQ 5/7
	Parallel-ECP/EPP	Single ECP/EPP parallel, LPT 1-6, IRQ 2/3/4/5/7/10/11/12

Combo Cards

PCI	SP-PCI	Single 9-pin serial, 16550 UART + single bi-directional parallel
	2SP-PCI	Dual serial (9 & 25-pin), 16550 UARTs + single EPP parallel
	LavaPort-Plus	Dual serial (9 & 25 pin), 16650 UARTs + single EPP parallel
ISA	2SP-550	Dual 9-pin serial, Com 1-4, 16550 UARTs + single bi-dir. parallel, LPT 1-2

USB 2.0 and 1.1 Devices

USB 2.0 Host Adapter	Dual USB 2.0 ports, 480 Mbps, fits in PCI slot
Kazan	Hard drive enclosure with USB 2.0-to-IDE interface
USB 1.1 Host Adapter	Dual USB 1.1 ports, 12 Mbps, fits in PCI slot
SPH-USB 1.1 Hub	Three powered USB ports, parallel port, serial port, connects to USB

IEEE 1394 (FireWire®) Devices

IEEE 1394 FireHost	Dual IEEE 1394 ports, 400 Mbps, fits in PCI slot
FireDrive®	Hard drive enclosure with FireWire®-to-IDE interface
IEEE 1394/IDE Controller	FireWire®-to-IDE hard drive interface

Specialty Cards

8255-PIO	8255 PIO interface card

Lava Computer MFG Inc.
2 Vulcan Street
Toronto, ON
Canada M9W 1L2

TEL: 416.674.5942
FAX: 416.674.8262
www.lavalink.com

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