



LVmPC®

Leutron Vision's micro-PC for embedded vision applications

- Intel ultra low power Pentium III and Celeron versions
- 10/100 Mb Ethernet, IEEE1394a (FireWire), USB, VGA, COM1/2, Keyboard, Mouse, IDE-Harddisk and CompactFlash
- Windows 9x/NT/2000/XP, Linux, VxWorks supported
- Analog, Digital, IEEE1394a and Camera Link frame grabbers available
- Extensive choice of standard and non-standard cameras
- PC-Card interface available for add-on custom functionality
- Remote boot from LAN



**Leutron
Vision**



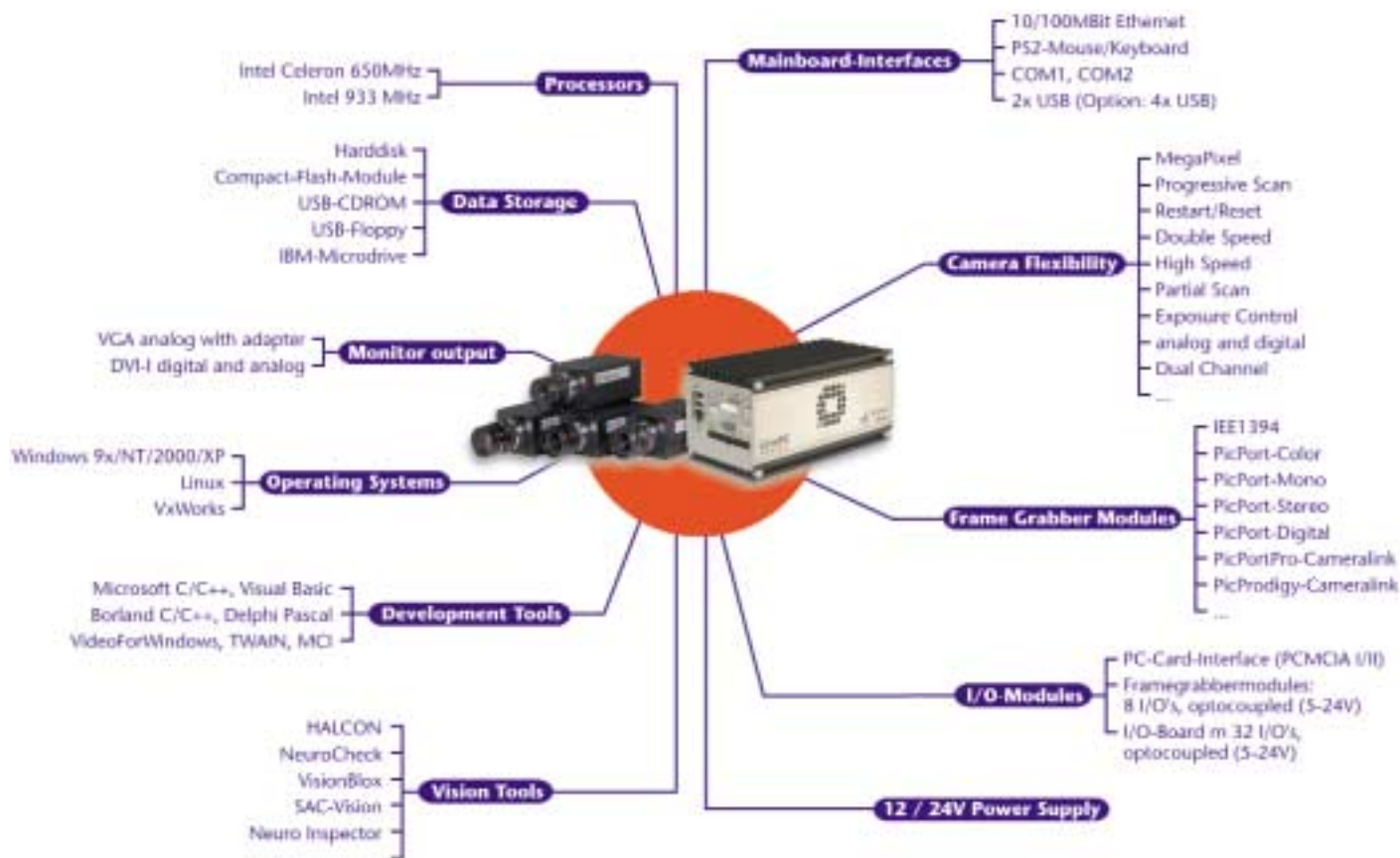
Architecture

The LVmPC series is a modular micro-PC with a small footprint of 91×92×182mm, suitable for medical, security and industrial machine vision applications. This PC family combines innovative notebook technology with modern frame grabber technology in a very small form factor. For vision applications, the popular operating systems Windows 9x/NT/2000/XP, Linux and VxWorks are available.

The LVmPC series represents a modular PC system based on notebook PentiumIII or Celeron CPU technology combined with a large choice of frame grabbers. With these frame grabbers, the LVmPC system offers image acquisition for standard and non-standard cameras with analog or digital interfaces, providing powerful processing capabilities. The user can utilise popular PC interfaces like 10/100 Mb Ethernet, IEEE1394a, USB, VGA, Mouse, Keyboard and COM1. The LVmPC series can be equipped with up to four Leutron Vision PMC modules such as PicPort® or PicProdigy® frame grabbers. OEMs may integrate third party PMC modules. An integrated DC/DC-Converter ensures that the external power requirement is reduced to a single voltage source of 12 or 24 volt. To

interface to external events, all PicPort® and PicProdigy® frame grabbers are equipped with 8 opto-isolated digital inputs and outputs capable of 5 to 24 volt signaling. An optional PC-Card interface enables the use of standard PCMCIA I/II cards like CANbus and Profibus, or for remote control and Modem or wireless LAN. The internal storage medium can be selected from standard notebook 2.5" harddisk, IBM Microdrive or Compact Flash memory. For OS boot or external transfer medium, USB floppy drives, USB-CD drives or IDE-Devices can be used over an externally accessible IDE Interface.

With the LVmPC series, the embedded target and development system are one and the same – just



connect the keyboard, mouse and monitor and start work. Not only does your development work get easier, but easy maintenance and field upgrades are additional benefits.

Clients who already use Leutron frame grabbers can take advantage of software compatibility with these

standard PCI grabbers and port their application to LVmPC very easily.

The LVmPC series is available in different flexible configurations. The standard system is the PC and comes with one frame grabber without camera. (The cabinet size of this version is 91 × 92 × 182 mm).



MainBoard

The LVmPC series is based on standard notebook components with the following specifications:

- MainBoard based on Intel 815E standard-chipset.
- Processor choice of Intel PIII 933MHz with 512K cache or Celeron 650MHz with 256K Cache, using advanced 0.13 micron process technology. As Ultra Low Power Processors, the power consumption and therefore the heat dissipation is extremely low. They belong to the Intel Embedded Roadmap and are long-term available. An OEM version with a 478-pin socket enables the use of other Low-Cost / High performance CPU's.
- 64-bit 512MB SDRAM as a single SO-DIMM, 144 Pin, 68 mm × 2,7 mm
- Integrated 3D graphics controller chipset with up to 1280×1024×24-bit resolution with DVI-I connector for standard digital TFT monitors, as well over an adapter plug for standard analog monitors.
- 2 × USB type A (for OEMs there is an option of 2 additional USB type A), COM1, COM2 (internal),

PS/2-keyboard, PS/2-Mouse, IDE, all with standard connectors accessible from outside the cabinet.

- 10/100 Mb Ethernet Controller
- IEEE1394 FireWire Interface for Digital cameras etc. (for OEMs there is an option of 1 additional IEEE1394a FireWire Interface)
- up to 4 PMC slots for PicPort® or PicProdigy® frame grabbers and other I/O modules from Leutron Vision (OEMs may integrate a third party PMC module supporting 3.3V PCIbus)
- State of the art standard BIOS, 100% compatibly with PC-Standard
- Boot from USB device or remote boot from LAN
- 2.5" IDE hard-disk with mounting size of 9.5mm thick
- 2 slots for Compact Flash Type I /II (50 Pin ATA-Interface) enable the use of up to 2GB of resident flash memory (as a replacement for the hard-disk)
- DC/DC converters enable the use of a single 12 or 24 VDC power supply

Frame Grabber Modules



To connect cameras for medical, security and industrial machine vision applications, LVmPC offers different PMC frame grabber modules as well as a IEEE1394a interface on the motherboard. Supported are analog standard cameras (CCIR, RS170) and non-standard video sources (high-resolution, high-speed, dual tap, etc) as well digital interfaces (CameraLink, RS-422, RS-644, IEEE1394a, etc). These frame grabbers offer many possible configurations for almost all image acquisition needs like simultaneous acquisition from several cameras, image processing and Bayer pattern decoding in realtime, or random reset control of cameras. Image data is transferred by DMA over the PCIbus direct into the CPU memory and/or into the graphics card memory. A hardware state-machine on each frame grabber guarantees the performance of realtime critical functions independent of the operating system.

PicPort-Color

- 3 CVBS + 1 S-Video input or 4 CVBS-Inputs
- PAL, NTSC, CCIR and RS170 video
- Brightness, Contrast, Hue and Saturation programmable
- Color conversion to RGB, YUV or monochrome with different pixel depths
- Down scalable in horizontal and/or vertical direction
- synchronous acquisition trigger

IEEE1394a

- Integrated on the motherboard of LVmPC series
- 400Mb data rate
- Optional for OEM second interface

PicPort-Mono

- 4 analog video inputs
- CCIR, RS170 and non-standard video timing
- Resolution up to 2048 × 2048 pixels programmable
- Up to 20 MHz @ 8-bit acquisition rate
- 256 × 8-bit Look-Up-Table
- asynchronous acquisition trigger
- Down scalable in horizontal and/or vertical directions

PicPort-Stereo

- same as PicPort-Mono
- additional second input channel for stereo acquisition from 2 synchronized cameras or 1 dual-channel camera

PicPort-Digital

- 2 Video inputs with 8-bit/40 MHz or 1 Video input with 16-bit/20 MHz
- RS-422, RS-644 and RS-644-TTL
- Resolution up to 2048 × 2048 Pixels programmable
- Asynchronous acquisition trigger
- Down scalable in horizontal and/or vertical directions

PicPortPro-CameraLink

- 1 Base connector
- Hirose 6-pin connector for camera power
- 32MB high speed DDR-SDRAM
- multi-tap cameras supported
- 16 DMA channels for PCIbus
- Bayer-Pattern decoder hardware function
- resolution up to 64k × 64k for area scan and 64k × ∞ for line scan cameras
- input frequency up to 85MHz

PicProdigy-CameraLink

- same as PicPort-Pro-CL
- additional configurable Logic processor for functions like, pixel gain/offset correction, convolution, etc.
- pipeline processing

Common features of all frame grabber modules

- over 500 editable camera definitions in Camera Editor available
- 8 trigger in/out (opto coupler) with input voltage range from 5 to 24 volt
- 12 V power output for cameras with resettable fuses.
- at least two DMA channels
- horizontal and/or vertical mirroring
- Hardware Overlay
- acquisition trigger
- Drivers for Windows 9x/NT/2000/XP, Linux and VxWorks
- 3rd-Party-Software: HALCON, ActiveTools, Neurocheck, Common Vision Blox.

For further details about Leutron Vision's extensive range of frame grabber boards, please consult the data sheets of the PicPort and PicProdigy, which are compatible.

Expansion Options



An optional PC-Card interface enables the use of standard PCMCIA I/II cards like CANbus, Profibus or for remote control using Modem or wireless LAN. In addition to the PC-Card interface there is an OEM option

to integrate third party PMC boards. In this way, existing drivers for a standard PCI computer can be used.



Software

Operating systems

As LVmPC is 100% compatible with standard PC technology, all popular OS's can be used. We support Windows 9x/NT4/2000/XP/embedded-NT, Linux and VxWorks ensuring full user compatibility with existing applications.

LV-SDS

Leutron Vision Software Development Suite, LV-SDS, is a software development package (Windows, Linux & VXWorks) that allows full control of all PicPort® and PicProdigy® products and contains extensive libraries and software tools.

The suite consists of Daisy - the basic software interface for PicPort®/PicProdigy® cards, Camera Editor - easy interactive setup of standard and non-standard cameras, DRAL - a library for handling specific time-critical tasks, and Orchid - high level library (DLL or OCX) for quick and easy design of PicPort®/PicProdigy® applications. The camera editor comes with more than 500 definition sets for the most popu-

lar cameras on the market. TWAIN Driver and Video for Windows - provide a simple interface between Leutron Vision hardware and other office and image manipulation programs (e.g. MS Office, CorelDRAW, etc.).

Demo programs and example source code

The software products come complete with a set of demo programs and additional examples with source code as a guide to the programmer in developing particular applications. To obtain more information, please download the LV-SDS manual from www.leutron.com/download.

3rd party software

Several well-known third party packages for real-time image processing and analysis are also supported. The packages include HALCON, Activ Vision Tools, Neurocheck and others. Please refer to our software brochure for more details.



Specifications

Bus	PMC IEEE 1386.1; PCI Rev. 2.1	Data storage	2.5" Harddrive, Compact FlashDisk, Microdrive
Supported operating systems	Windows ME Windows NT Windows Embedded NT Windows 2000 Windows XP Linux VxWorks	Frame grabber	IEEE1394a (on Motherboard) PicPort-Color PicPort-Mono PicPort-Stereo PicPort-Digital PicPortPro-CameraLink PicProdigy-CameraLink
Host Processor	intel PIII 933MHz 512K cache, Celeron 650MHz 256K cache, 0.13micron process technology (intel embedded roadmap)	Digital I/O	37pin DSUB with 8 opto-isolated I/O (on the frame grabber module) 32 opto-isolated I/O, 80pin SCSI- connector (option)
Memory	64 to 512 MB SDRAM, 3.3V, 144-Pin SO DIMM	Video Data Transfer	via Busmaster Burst DMA up to 132 MB/sec, realtime for all video transfer modes
BIOS	Phoenix Award BIOS. Boot from USB Floppy / USB-CDROM/ LAN	Expansion	PCMCIA-card type I/II over PC-card interface 1 PMC expansion slot for 3rd party- module (3.3 V PCI-Bus)
Mainboard- interfaces	10/100 Mb Ethernet, COM1, (COM2 intern), IEEE1394a, 2xUSB, PS/2 keyboard, PS/2 Mouse, IDE-Internal, second IDE externally accessible	Size	with 1 PMC-module 91x92x182 mm 2 PMC-modules 91x109x182 mm 3 PMC-modules 91x126x182 mm 4 PMC-modules 91x142x182 mm
Monitor-output	DVI-I digital monitor output, analog monitor over adapter plug possible	Power supply	12 or 24VDC, 60 Watt, depending the LVmPC configuration
Graphics	Intel 815E chipset with built in 24bit 230MHz RAMDAC with up to 1280x1024x24bit Color and 3-D HyperPipelined Architecture		

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