



## Product Guide





**Worldwide more than 600 companies use MPL products on a daily basis. Maintaining a close customer partnership is our goal for each successful collaboration. We support and monitor our products for full life-cycle management.**

**MPL – The Company You Trust!**

### **Continuity**

Since 1985, MPL is the industry leader in developing and manufacturing rugged, fanless electronics and embedded systems for customers demanding best quality. MPL's commitment to design, high reliability, low power consumption, extended temperature and longevity products are the cornerstones of our success.

### **Reliable Partnership**

MPL offers its customers and business partners a long-term, cooperative engagement. Our financial strength and independence is important to sustain MPL's growth and future.

### **Innovation**

MPL Products differ clearly from any other products in the markets. Most other products are cost optimized but neglect the quality, life cycle management, low power consumption and MTBF optimization found in each MPL product. MPL maintains special agreements and relationships with the major chip suppliers that offer MPL early access to latest technology developments.

### **Closeness**

Our distributors are near you! To serve our customers the best: we maintain a global distributor network which will handle your local pre and post sales support.

### **MPLcare**

MPLcare is a system which is maintained by design engineers, management and the MPL administration team. MPLcare is provided to each customer free of charge. Technical support questions are answered within 24 hours by the product design engineer team.

**We embed the future.**



**High-Tech · Made in Switzerland**



**Our low power designs – increase MTBF**

We only design products and solutions that have the lowest possible power consumption in the industry. This generates less heat, less stress and therefore a higher MTBF value and better reliability rate.

**Unmatched Quality**

MPL products are designed from inception to meet or exceed a reliable operation in rugged and tough environments. A further development focus is to get produce a unmodified consistent, stable long available life-cycle product.

**Extended temperature range (-40°C up to +85°C)**

Each standard MPL product withstand operating temperatures of -20°C to +60°C. Products with the extended temperature option receive additional specific product tests and test cycles in our environmental chambers.

**Long-term available solutions**

Our main target is long-term availability as this is a major cost reduction factor for the customer. Wherever possible, MPL uses products out of the embedded road map of various suppliers. MPL maintains end-of-life stock to ensure longevity of supply and longevity of repair.

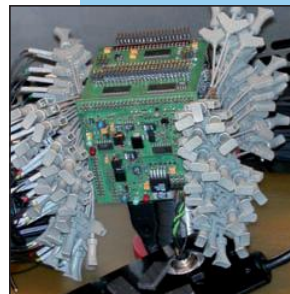
**High Ruggedization**

MPL products are specifically designed to withstand harsh environment operations. In numerous applications MPL standard and custom products prove their ability to withstand extreme temperatures, thermal cycling stress, high shock and vibration conditions.

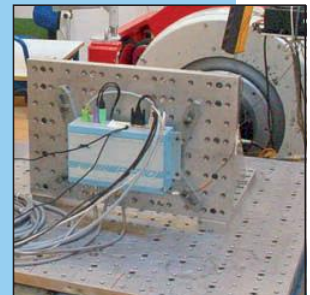
**High-Tech Made in Switzerland!**



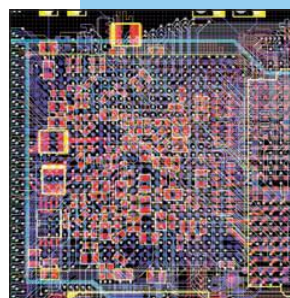
*MPL climate chamber test environment*



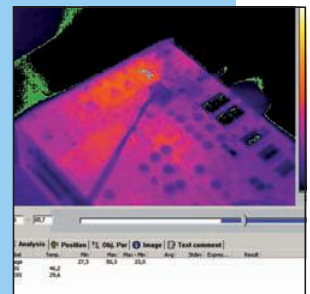
*Measuring test setup for design verification*



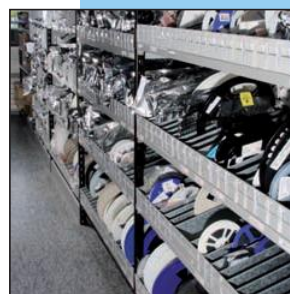
*PIP during shock and vibration test*



*Layout verification of multilayer PCB*

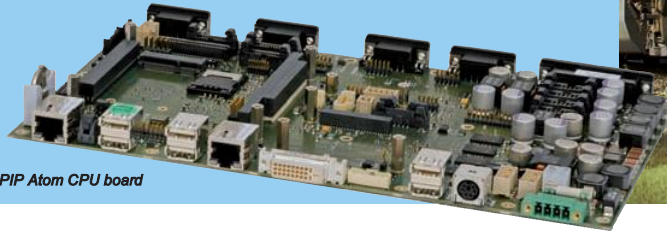


*Thermal analysis of PIP*



*MPL parts stock*

# MPL Embedded Computers



PIP Atom CPU board



## Why buy an MPL Embedded Computer?

MPL embedded computers are based around common PC technology without the known limitations of normal PC platforms. MPL computers have long life-cycle management, they are ruggedized by design, they have extended temperature capabilities and they are based on more than 25 years of MPL embedded design experience. MPL Embedded Computers represent the most unique and clever designs in the industry.

## Specialities

- low power consumption – less stress & higher MTBF
- fanless operation under all conditions
- operation temperature -40°C up to +75°C / +85°C
- long-term availability guarantee – with 7 to 10 years or longer
- easy expansion with PMC, PC/104 or PCI modules
- designed for rugged environments
- serviceability for 20 years or more

## Standards

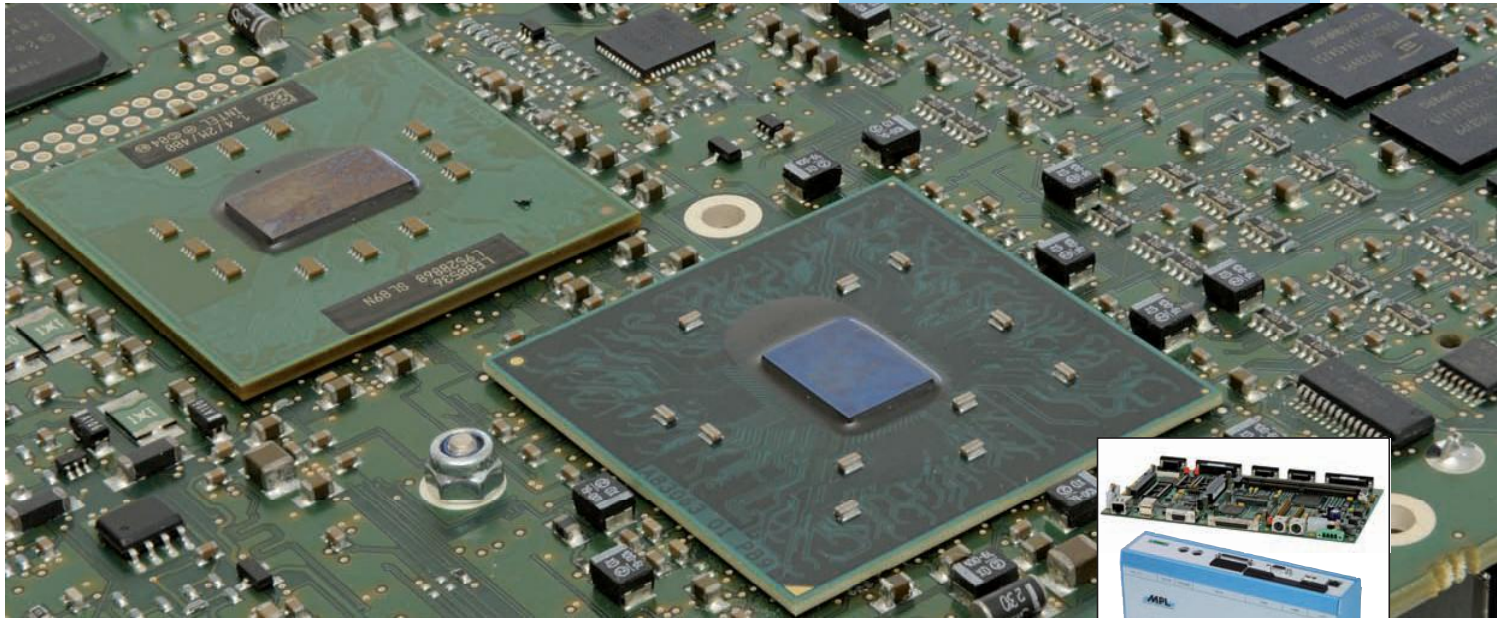
The MPL embedded computer are deployed in many applications as listed below. For many of these applications MPL products have been certified in various tests including: marine certification (EN 60945), railways certifications (EN 50155), defense certifications (MIL-810), EMI certification, UL, CE, FCC just to name a few. In each case MPL embedded computers have successfully passed all required tests.

## Applications

MPL embedded computers are successfully in operation since years in application areas such as

- Automotive
- Communication
- Maritime
- Traffic
- Avionics & Space
- Defense
- Railways
- Medical & Healthcare

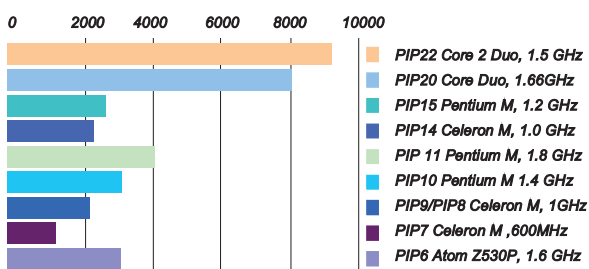
as well as in other areas where reliable long-term available computers are needed.



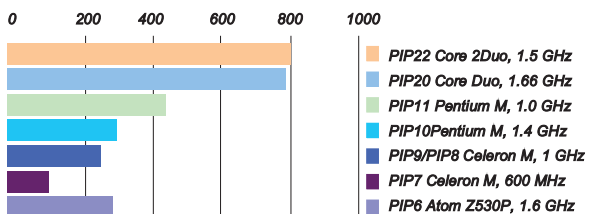
### MPL Embedded Computers - Characteristics

Since 1998 the MPL Embedded Computer family (PIP) offers:

- same foot print / same size
- graphics, ethernet, USB on board
- up to 4 serial lines on board
- a parallel port is on board
- wide input voltage range (8-28VDC)
- internal PC/104-Plus expansion bus (PCI- and ISA bus)
- use of standard connectors
- all connectors remain on the same side
- fanless design useable in extended temperature range



### Whetstone ISSE (2/3) MFLOPS



### Passmark CPU Mark



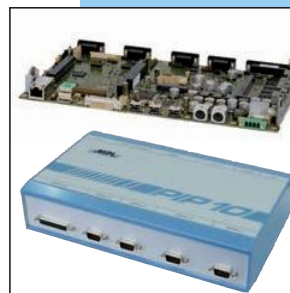
1998  
first introduction of PIP  
concept  
PIP 5 – 5x86 CPU



1999  
PIP 6 – Pentium MMX CPU



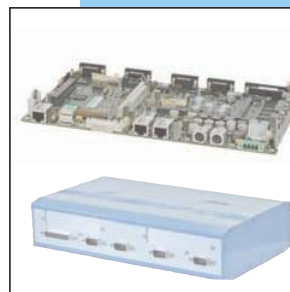
2001  
PIP 8 – Pentium III Product  
Family



2005  
PIP 10 – Pentium/Celeron M  
Product Family

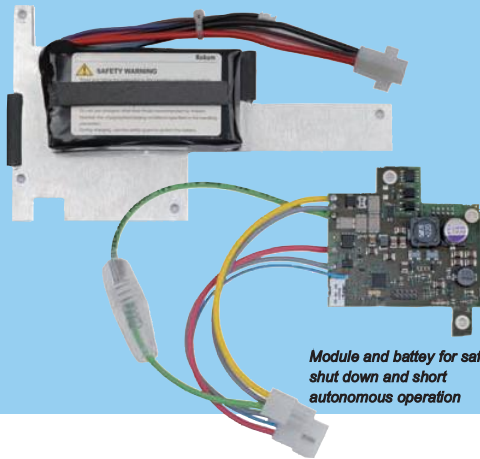


2008  
PIP 20 – Core Duo Product  
Family

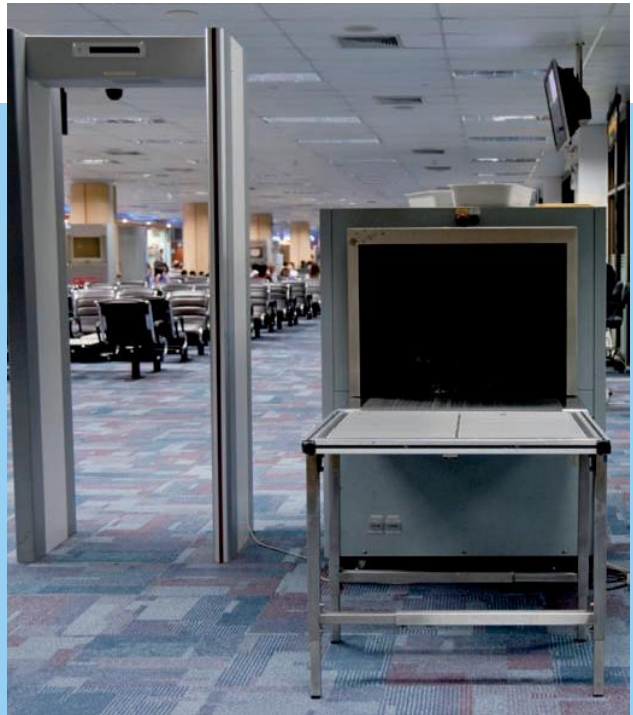


2011  
PIP 30 – future Product  
Family

# MPL Embedded Expansion Options



Module and battery for safe shut down and short autonomous operation



MPL embedded expansion options are specifically designed and produced to withstand the high quality expectation in MPL embedded computers. These option products are tested inside the complete system with all relevant drivers. For highest flexibility most options are offered in different versions for best possible fit.

The advantage of the MPL expansion products are the variety of options to meet the various requirements of the different applications (Industry, defense, railways, medicine...). MPL option products are designed to meet both the specific customer function as well as maintaining operations in extended temperature and shock/vibration environments.

The MPL expansion option list is constantly growing due to the requirements of our customers. If you have a need but are not yet able to find a solution therefore, please talk to MPL. We are open to develop and create your custom I/O option to meet your application needs.

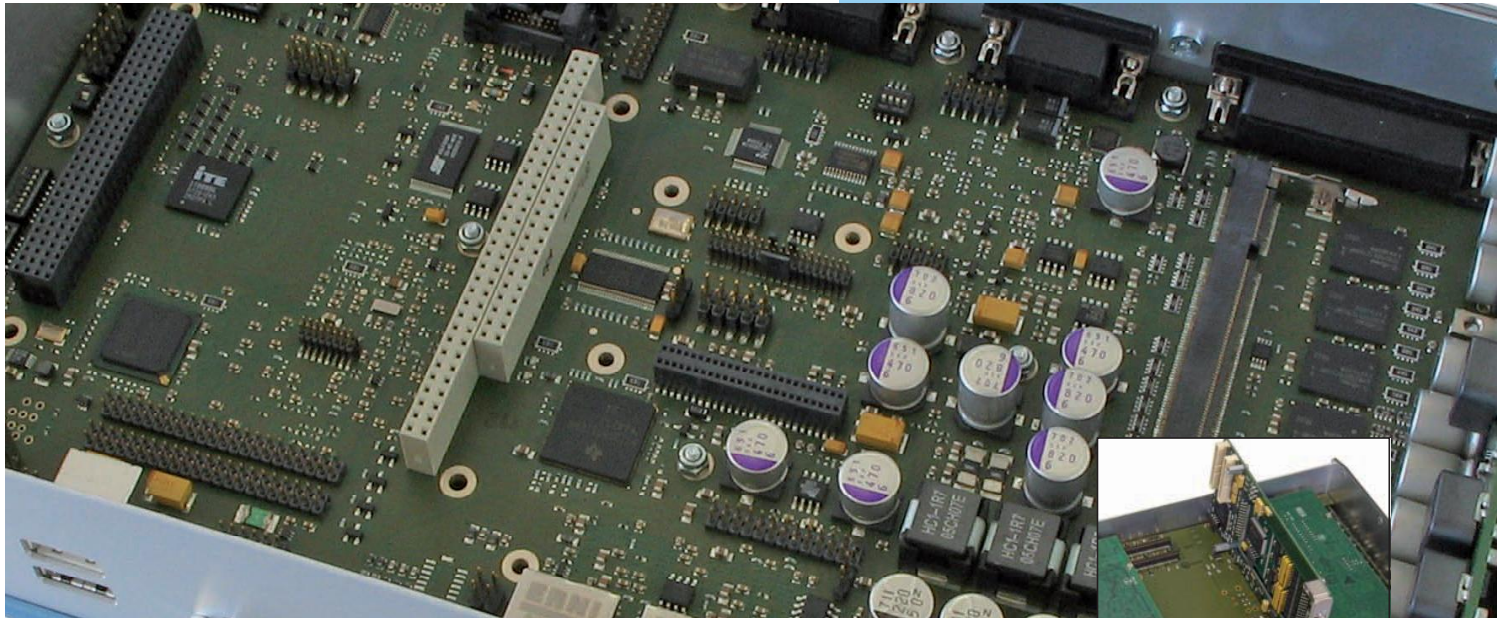
## Specialities

- Extended temperature
- Conformal coating

All of the offered MPL expansion options are available in extended temperature. These modules are installed in the ordered system and tested in MPL's climate chambers according to our test plans. All of our embedded expansion options can be provided with conformal coating if required.

## Applications

MPL embedded expansion options have been in use for many years across a wide array of applications and markets. Like our embedded computers, MPL expansion options maintain the same demand for long-term availability and ruggedness.



### Input Power options

BOLD	UPS functionality in case of unstable power
PIPVIN	Galvanic isolation of the input
PIPVIN	Wider input range than 8 -28VDC
PIPLD	Reverse voltage and load dump protection
PIPREL	Redundant input power solution

### Graphic options

DLD / SDLD	2nd DVI graphic output for dual monitoring
DOLL	24 bit LVDS expansion for Core Duo solutions

### Networking options

WLAN-1USB	WLAN module supporting 802.11 g/b/n
MAGBES	Integrated managed Gigabit Switch
TRIGET	Additional GigE ports
TX2FX / MAGBES	Fiber optical Ethernet port
TX2FX	Fiber optical converter

### Mass storage options

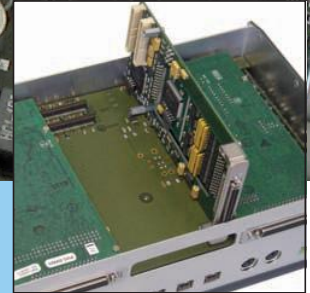
HDD-xEX / xEXS	Ext. temp. 24/7 hard disk's
SATA FL / IDE FL	Solid state disks with SATA or PATA interface
SATA-REMOVE	External removable HDD / SSD
IDE2CF	Compact Flash adapter for IDE port
HSRAID	Hot swap capable RAID solution

### Expansion options

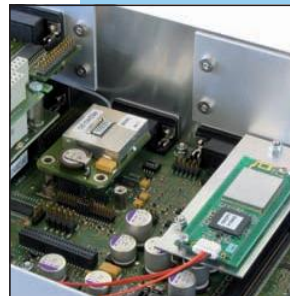
PC/104	ISA bus expansion on board of all PIPs
PC/104-Plus	ISA & PCI expansion on board of all PIPs
PCI-104	PCI expansion on board of all PIPs
PIPPCI	Expansion module for standard PCI slots
PIPPMC	Expansion module for standard PMC slots

### Various add-on

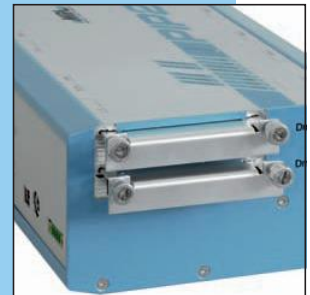
PIPCAN	CAN 2.0 field bus module
SePS	GPS module supporting TSIP, TAIP, NMEA
SOUNDPAN	AC97 sound expansion
TERM50	Screw terminal to access IO signals



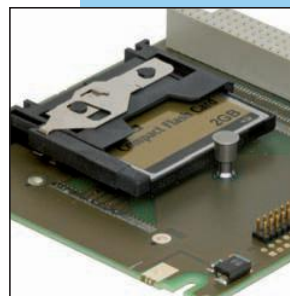
Expansion for standard PMC modules



Integrated WLAN and GPS



Integrated hot swap capable RAID1 solution



Lockable Compact Flash adapter



External removable disk drawer



Fiber optic converter

# MPL Embedded Computer Housings

Standard PIP 10 with flange mounting



MPL offers various rugged and flexible housing options for its embedded computers to give customers the best possible solution for their specific application. All housings can be adapted according to the customer requirements.

## The customer can choose between:

- Use MPL's standard industrial proven, rugged PIP housing either with DIN-rail or flange mount option. Various heights are offered to create the most compact system according to your I/O requirements. OEM versions are readily available with customer logo and colors.
- For the harshest environments use our fully IP67 protected military or outdoor housing. Feel free to select the required interface and external connectors according your requirements and standards. The housings can be adapted according to the customer requirements.
- Design your own housing/chassis and integrate our reliable MPL embedded computer board, that is delivered on an aluminum cooling plate which offers the best conductive cooling concept.

## Quality / Finish

All housings are chromated to provide best EMI protection. Each chassis is external powder coated to provide a more industrial and long lasting exterior finish.

## Colors

MPL offers as standard color for the PIP housing

- MPL blue (RAL 5024)
- Anthracite gray (RAL 7016)

In case of special needs any RAL color can be used for your OEM case. The MIL Outdoor housing is by default mat black (RAL 9005) but other RAL colors are possible as well.



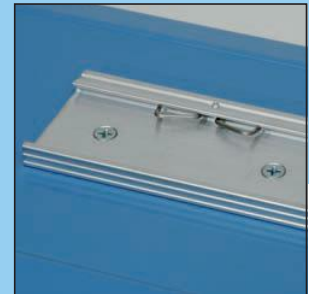


### PIP Standard housings

Version	Size mm	Case characteristics
DIN-Rail mount	270 x 162 footprint 62 / 83 / 120 height	highly flexible easy expandable compact, complete solution robust, rugged aluminum IP51 protected
Flange mount	310 x 162 footprint 62 / 83 / 120 height	highly flexible easy expandable compact, complete solution robust, rugged aluminum IP51 protected



Detail of flange mounting solution



Rugged DIN-rail clamp



Lockable power connector

### Customized housings

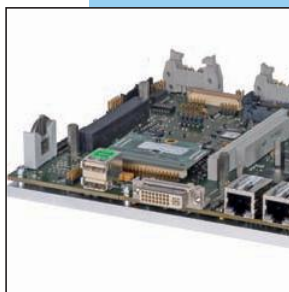
Version	Size mm	Case characteristics
OEM standard	270 x 162 footprint 310 x 162 footprint 62 / 83 / 120 height special height possible	with own look (color & foil) special front plate engraving possible
MIL / Outdoor	adjusted acc. needs 304 x 234 footprint min. 75 height	fully customized for harshest environment up to IP67 protected connectors acc. requirements
Open Frame Cooling plate	adjusted acc. needs min. 264 x 164 footprint min. 43 height	adaptable to customer case with secure passive cooling concept



Pentium M 1.8 GHz with integrated fibre optic distribution, firewall



IP67 MIL case for any CPU solution



CPU solution mounted on a cooling plate

# MPL Fanless Panel PC Systems



Compact customized  
PANEL 12 system



## The unique features of the MPL Panel PC

System are the high flexibility and

availability to integrate the TFT

panel/screen according to your

requirements. Integration of additional

features will adjust the system to the

customer's specific needs.

MPL Panel PCs are specifically designed

and produced for rugged and sensitive

environments. We offer customer tailored

Panel PC products for specified markets

even in small quantity!

## Specialties

- Extended temperature solutions
- Fan free and noiseless
- Housings in stainless steel and aluminum
- Up to IP65 / NEMA4 protection level from all directions
- Long-term availability – same form, fit, function
- Space saving, slim and compact All-in-one solutions
- Various mounting / installation options possible

## Application areas

MPL embedded computers have been successfully operating for many years in the following application areas:

- Automotive
- Food Industry
- Communication -
- Defense
- Maritime
- Railways
- Traffic
- Medical & Healthcare

as well as other applications where reliable, rugged, long-term available computers are needed.

## Options

- Touch screen
- Wide DC input voltage range
- UPS integration – for safe shut down or autonomous operation
- WLAN integration
- Integration of additional cards
- HDD / SSD



### LCD characteristics

LCD characteristics develop and change quickly in a fast moving market. MPL is not aligned to a certain display manufacturer, therefore we are free to use almost any LCD on the market. This flexibility allows us to tailor our Panel-PC according customer specifications.

#### *Name us your requirements:*

- Display size (6" up to ...)
- Resolution (VGA, SVGA, XGA, SXGA; 4:3 or 16:9,...)
- Brightness (sunlight readable, transfective needs, dimming)
- Contrast ratio
- Viewing angle and main view direction
- Backlight type (CCFL or LED)
- Temperature range

### Touch characteristics

We can integrate in our Panel PC units any of the currently known Touch technologies, namely resistive, capacitive and infrared. Let us know you preference and MPL will integrate this into your system.

### Mechanical characteristics

We are able to modify our mechanical housings to your needs, so let us know about your specific demands.

- Mounting options: DIN-Rail, Flange, VESA75, VESA100
- Housing surface: Stainless steel, aluminum
- Protection level: IP51 up to IP65 (from all directions)

As a reference we have developed Panel PCs with 6.3", 6.5", 12.1", 15", 17", 19" and LCD

**Please talk to us about your specific needs and we will provide the best solution!**



*Detailed front view of brushed stainless steel housing*



*Detailed back view of brushed stainless steel housing*



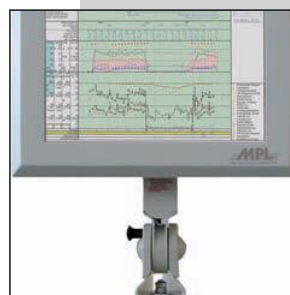
*PIP with integrated 6,5" LCD and Touch (extended temperature)*



*Connector view for IP51 Panel solution*

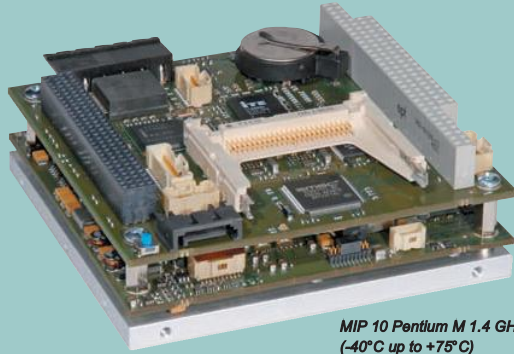


*IP65 cable feed through solution*



*Panel 12 mounted on adjustable swivel arm*

# MPL Embedded CPU Boards



MIP 10 Pentium M 1.4 GHz  
(-40°C up to +75°C)



**The MPL Embedded CPU Boards (MIP) represents a distinguished solution for today's demanding Industrial needs. The products are easily expandable over PC/104 or PC/104-Plus. These embedded CPU boards are designed from inception to operate under both extreme and normal conditions as solid state units with no fans or CPU derating/throttling. MIP products are rugged enough to be used in any application.**

MPL Embedded CPU Boards are designed around both x86 and PowerPC technology. These products have long-term availability, they are ruggedized by design, have extended temperature capabilities and are based on more than 25 years of MPL design experience. MPL Embedded CPU boards are the most unique products in this industry.

## Specialties

- Low power designs
- Operational temperature range of -40°C up to +85°C
- Complete, flexible CPU board solutions
- Long-term availability guarantee

## Applications

The MPL Embedded CPU boards are the ideal solution for any application that demands a high performance computer / controller with a low power consumption and long term availability.

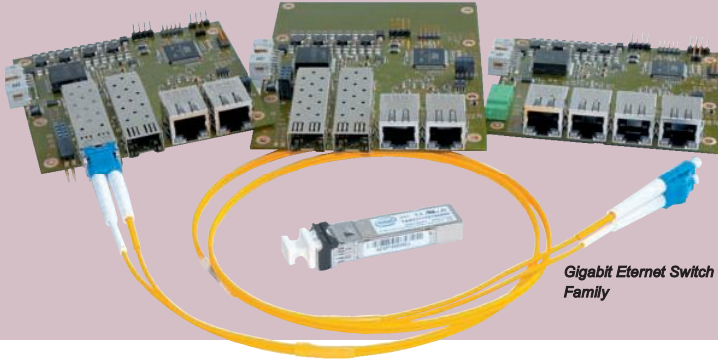
Typical applications for the boards are:

- Automotive
- Communication
- Maritime
- Traffic
- Space
- Defense
- Railways
- Medical & Healthcare

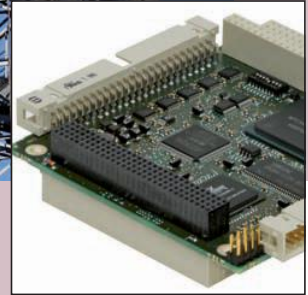
as well as other applications where reliable, rugged, long-term available Embedded CPU board are needed.



# MPL Peripherals



Gigabit Ethernet Switch Family



Intelligent PC/104-Plus analog and timing I/O card

## MPL Rugged Peripheral Cards

The Peripheral Boards are designed for easy integration into all MPL Embedded Computer and CPU Board products as well as other 3rd party CPU products. MPL Peripheral boards are designed from inception to meet the same rugged and tough specifications we demand for our Embedded Computer and CPU board products.

## Specialties

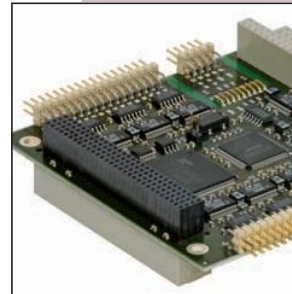
- Full design in accordance to the relevant specifications
- The real rugged peripheral for any need
- Operational temperature range -40°C up to +85°C
- System resource friendly
- Several assembly versions and options are available
- Long-term availability guarantee

## Networking Products

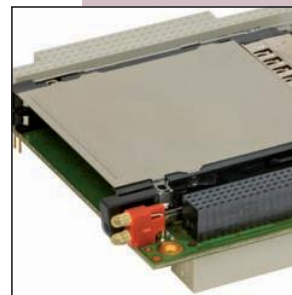
MAGBES	5 port manageable Gigabit Ethernet switch, PC/104 Format (copper & fiber optic interfaces, Jumbo frames supported)
TX2FX	Ethernet Media Converter – RJ45 to SFP, Jumbo frames supported
TRIGET	PC/104-Plus module with up to 3 Gigabit Ethernet controller

## I/O Products

OSCI	PC/104-Plus card with 4 or 8 serial ports (RS-232/RS-422/RS-485)
PATI	PC/104-Plus PowerPC controlled analog and timing I/O intelligence
PCCARD	PC/104-Plus PC Card adapter
IOCARD	Universal analog & digital IO card for PIP
IDE2CF	Compact flash adapter for IDE port



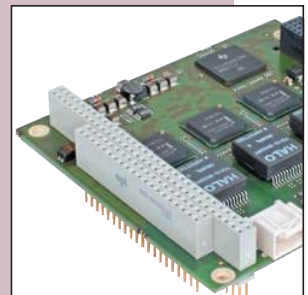
4 or 8 port serial PC/104-Plus card



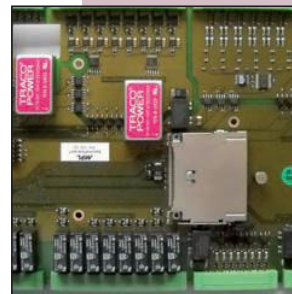
PC/104-Plus PC Card adapter



Ethernet Media Converter, RJ45 to SFP



Triple GigE Controller module

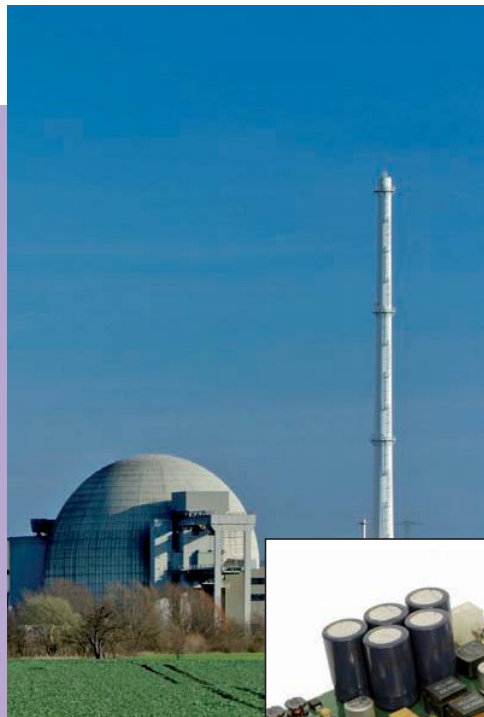


Universal analog & digital I/O card

# MPL OEM & customer specific solutions



Customized Embedded Computer Solution



## OEM products

All MPL products are available even in small quantities as individual OEM products or as custom/semi-custom products. Talk to us if you would like to add your brand or OEM logo on one of our products. MPL's broad range of customers and references underlines the trust, reputation and capability of MPL AG. Just tell us what you need and MPL will deliver the right solution for you.

## Full customized products

A customer product designed with MPL is a success due to the broad know-how in various technologies (Intel, PowerPC, ARM, FPGA...). MPL is capable to design fast and cost optimized your product. Bring us your specifications as early as possible to help to evaluate the ideal solution for your needs.

## References

- AAI
- ABB
- AOS TECHNOLOGIES
- AREVA
- ASCOM
- BEL
- BOEING
- GASUNIE
- IAEA
- KAMAN
- MATHWORKS
- MEDRONICS
- NASA
- OMNITECNICA
- RELIANCE
- SIEMENS
- THALES
- VARIAN



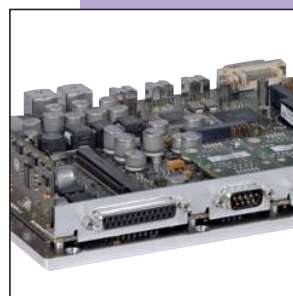
Medical: modification of a 20 years old product without SW change



Industry: Support of 20ms power cut



Defence: Mission controller with Power PC



Avionics: UAV flight control systems, Pentium M 1.4 GHz



Communication: IP67 protected Fiber optic switch



Vision: High Speed Camera up to 32'000 pictures/second, 100G shock



## **WORLDWIDE DISTRIBUTOR AND SUPPORT NETWORK FROM MPL**

### **Local sales support**

Our distributors are near you! To serve our customers best we have a worldwide distributor network which will handle your local pre and post sales support.

### **Technical support from the engineer**

Our customers get direct access to our design engineers to assist with initial product function and operation. We do not work with call centers or large support teams, but rather we rely upon our prompt courteous service while giving customers direct access to our design engineers to resolve any support issues.

**MPL – The Company You Trust**



**High-Tech • Made in Switzerland**

MPL AG Elektronik-Unternehmen  
Täferstrasse 20  
CH-5405 Baden-Dättwil  
Tel.: +41 56 483 34 34  
Fax: +41 56 493 30 20  
Email: [info@mpl.ch](mailto:info@mpl.ch)  
[www.mpl.ch](http://www.mpl.ch)