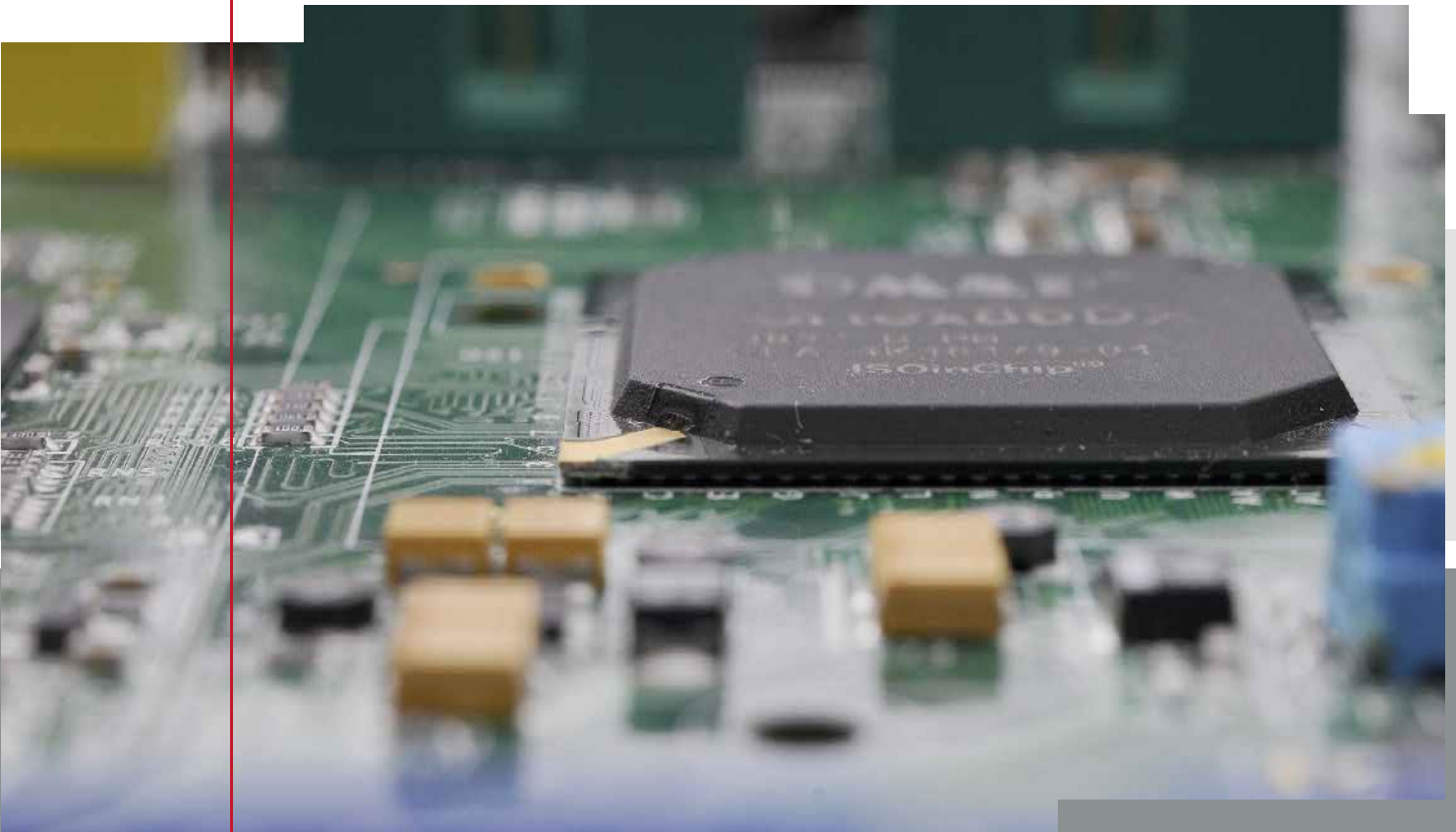


Industrial PC single boards  
with long-term availability.



- Touchpanel PCs based on the BCC3 single board in many different versions.
- Your electronic solutions: derived swiftly and economically from basic designs.
- With pre-installed Windows XP or Linux 2.6.
- 1 GHz for high computing power.



## 01 PC-based hardware - X86 compatible

PC-based technology implies X86-compatibility of the processor system. This offers crucial advantages:

- Software development is clearly simplified.
- Programs are tested on normal PCs and then installed on the target device.
- Existing or free programs, program parts or drivers are available.
- Interfaces and methods are compatible.
- Development tools (compilers, debuggers) are far less expensive than the versions needed for special processors.
- It is easier to recruit engineers and technicians for these platforms.

## 02 Your electronic solutions - even for small quantities

For more than 10 years, Baudisch Electronic has been developing and producing PC-based components for use in industry, communication and security systems as well as data technology.

The corresponding strategy is based on combining the mainboard with the customer application on one single printed circuit board:

The single board solution.

This results in a space-saving implementation with all the necessary components in the right place.

There is no need to compromise on account of existing shape factors.

The omission of plugs, connectors and cables saves money and drastically improves operational reliability.

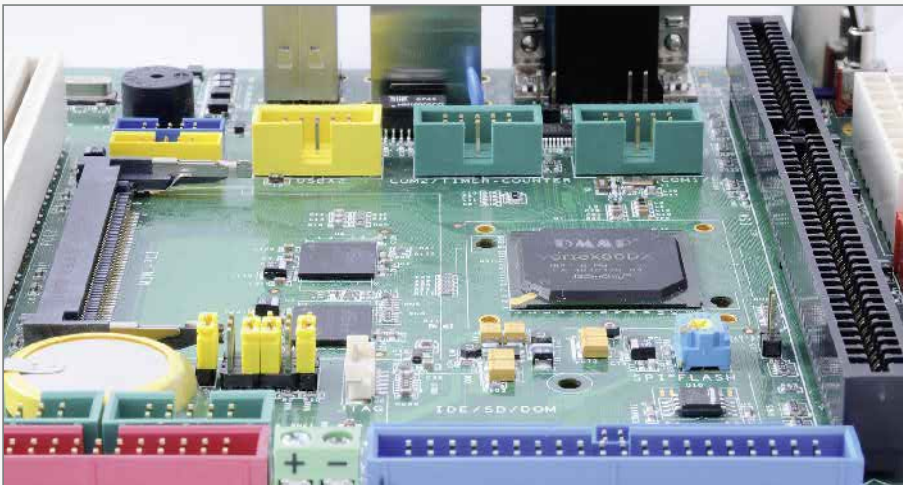
The customized design pays off for uniform applications even in small quantities: the development costs will have been recouped already after a few series of 100 each.

## 03 Your new product: step by step

The development of your product with the efficient X86 CPU core can begin on the basis of the evaluation board or one of our standard designs. With our support, you will be creating first software functions on the new hardware platform within a matter of hours.

Would you like implementation of the software solution to be in good hands too?

No problem. Our software developers will produce the required application for you following prior consultation. Here again we offer the necessary milestones step by step. From a short test and demonstration application through to the stable series solution.



Evaluation boards or standard designs put us one step ahead toward the successful product.

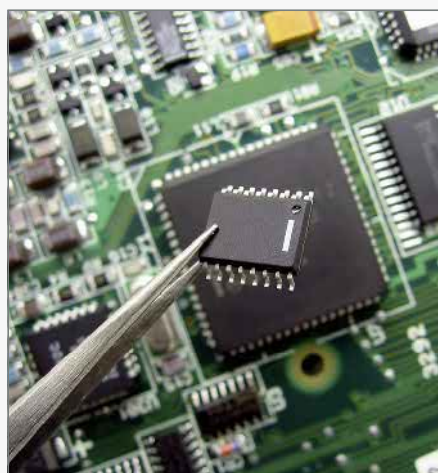
## 04 Standard design as assembly version

Not every requirement always needs a new layout.

We supply our multivendor standard designs in your specific version in series of 100 each and more.

They are configured only with the interfaces that you really need.

This saves lots of time, as well as development and series costs.



## 05 86DX: An SoC (SystemOnChip)

"System on a chip" refers to the integration of essential elements of a design on a silicon chip. This brings the advantages of saving costs, as well as miniaturization.

For many years, DM&P has used this technology as the basis for efficient embedded computers right in line with market demand.

The new 86DX constitutes a milestone in terms of value for money.

The module permits implementation of 86-compatible controls with absolutely minimum part cost.



## 06 About DM&P

DM&P is a company with headquarters in Taipei/Taiwan and sites in Japan, China and the USA. In 2007, the workforce of 300 employees generated sales of just around 30 million US\$ with the company's own boards, complete devices and SoCs.

DM&P has been supplying the Vortex86SX since 2007. The predecessor of the 86DX has a clock frequency of 300 MHz and forms the basis for successful products such as the eBOX (small black box PC) and many OEM applications.

The first sample Vortex86DX was supplied to us and other development partners at the end of 2008. This SoC prepares the basis for operating Windows XP (integrated FPU, clock frequency increased to 1 GHz).

Another version, the 86MX, became available at the end of 2009. This module has an internal graphic controller and HD sound as an alternative to the ISA bus of the 86DX. The 86MX facilitates the implementation of compact visualization systems and mini PCs.

## 07 Decision criteria for 86DX

### Low procurement costs

The following costs of conventional CPUs are already included in the scope of supply of the 86DX:

- Processor up to 1 GHz
- Ethernet controller
- MAC address / EEPROM
- BIOS Flash / BIOS license
- IO module / USB / SD

### Technology

X86 compatibility: this has been the most successful processor platform since 1980.

Energy efficiency  
2.02 watt at 800 MHz. This reduces the complexity of switching controllers and periphery, as well as saving power.

Only a few additional parts are necessary.

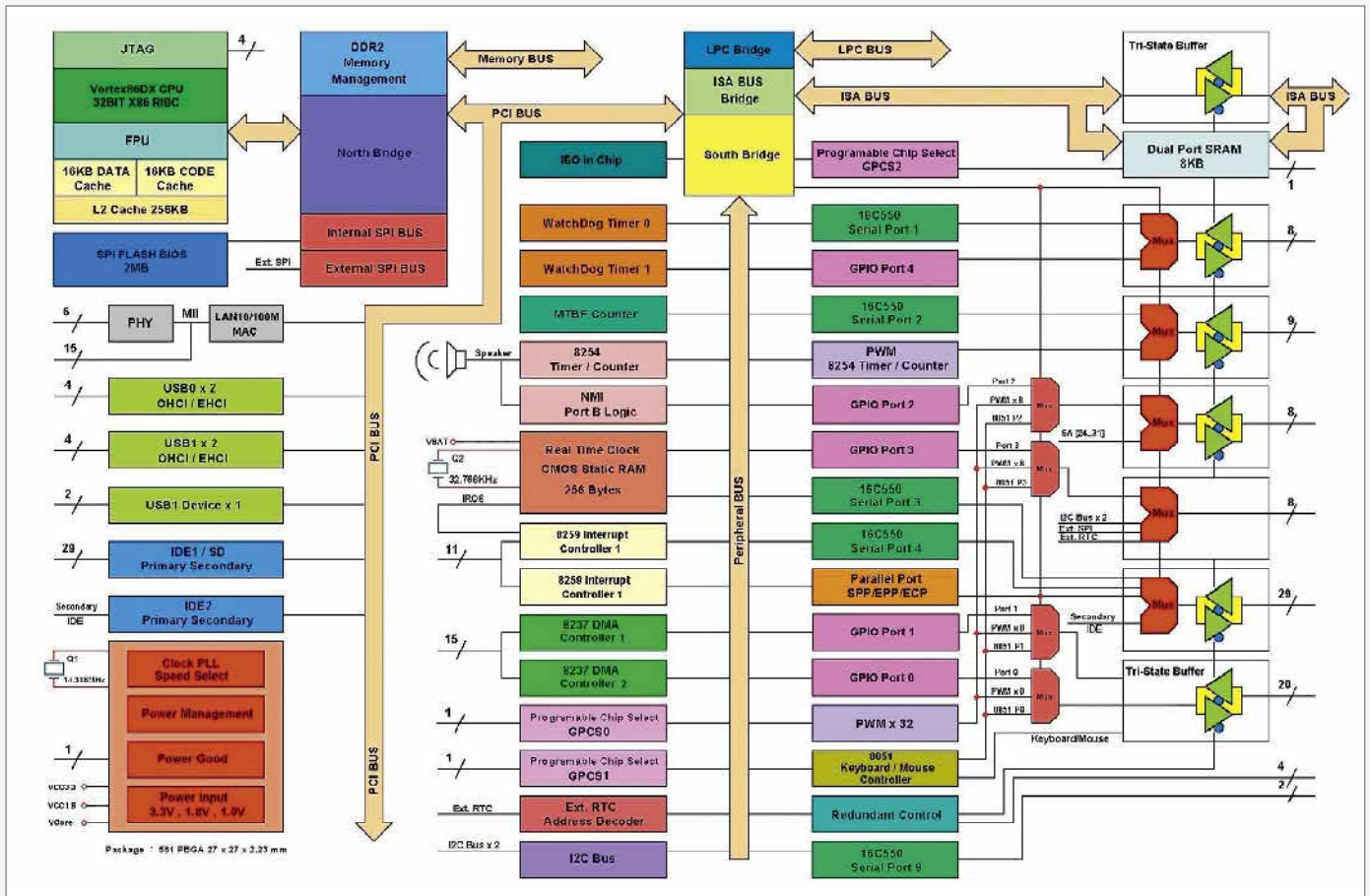
### Free drivers and support

The DM&P homepage offers extensive tools, images and support.

10-year lifecycle support is offered for 86DX (2008 to 2017).

Baudisch Electronic is available as efficient partner.

## 08 86DX block diagram



## 09 Features of 86DX

Together with the main properties described in the previous section, the Vortex86DX SoC also offers further interesting features:

5 serial interfaces per UART. A TXD-enable signal simplifies implementation of RS422/485.

4x USB 2.0 host and a USB device interface.

Up to 40 GPIO signals can be used, with up to 32 ports as PWM outputs for simple generation of analog output signals.

Up to 4 drives can be connected thanks to two IDE channels. IDE1 is used for 2 flash cards. Alternatively, SD cards can also be operated directly, changing the drives to IDE2.

MTBF counter: an internal counter records the operating time of the CPU over the entire service life.

Device data such as the serial number are also saved if necessary.

An RTC (clock) is integrated, needing only a quartz and a battery to be provided externally.

The BIOS is stored in the internal EPROM Flash (2 MB). Updates are simply carried out per JTAG adapter or via LAN.

External components can be connected up with two programmable chip select outputs and 2 external interrupt pins.

Sound: a CM119 audio chip can be connected via USB. This provides the line-out and mic-in interfaces.

## 10 Universal platform BCC3

The **B**audisch **C**ontrol **C**enter Generation **3** ( BCC3 ) is a standard hardware that permits many different solutions on the basis of one single printed circuit board design.

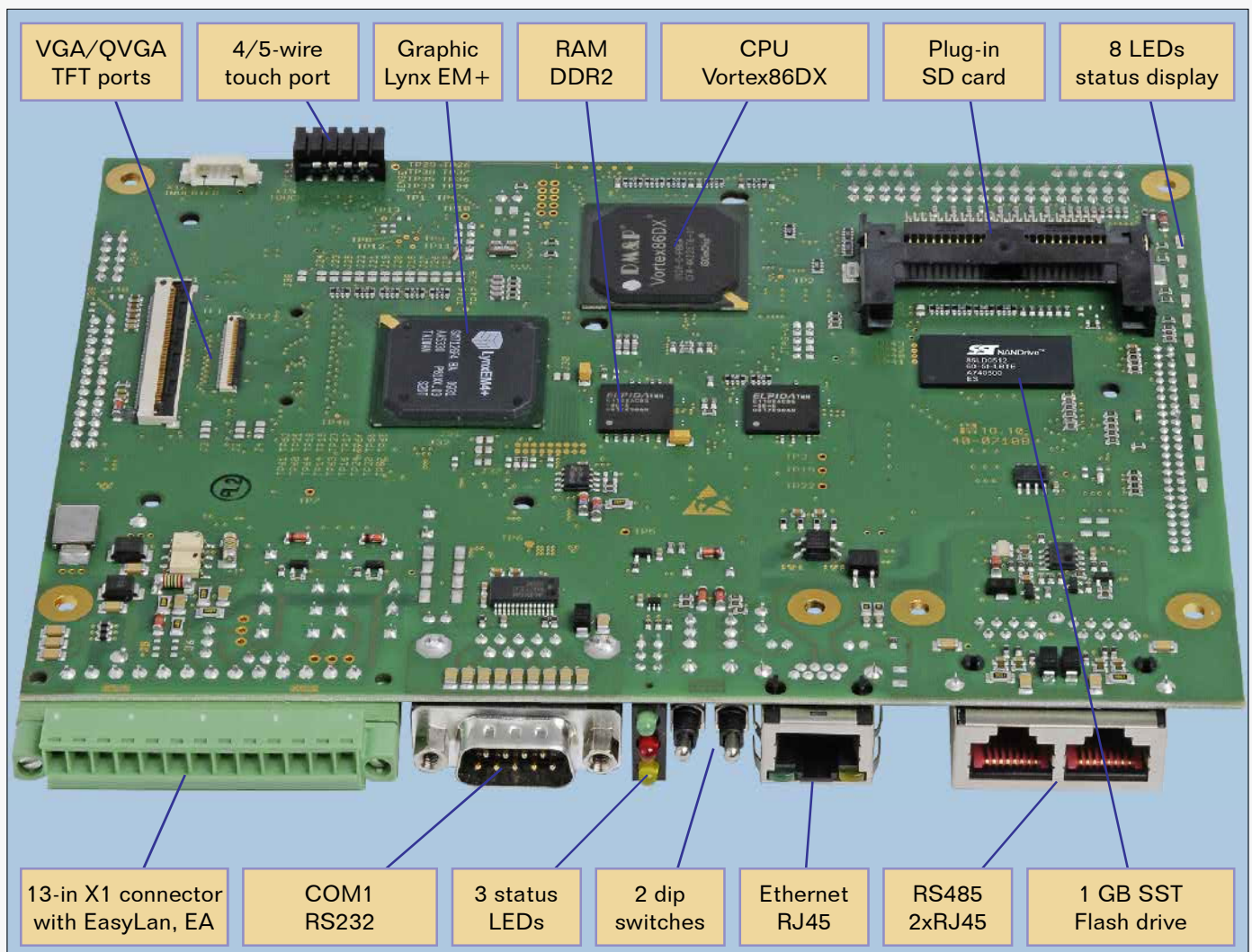
You choose your own configuration version (there are currently 31 options) according to your requirements.

You can use swiftly implemented sandwich modules to add further interfaces and features.

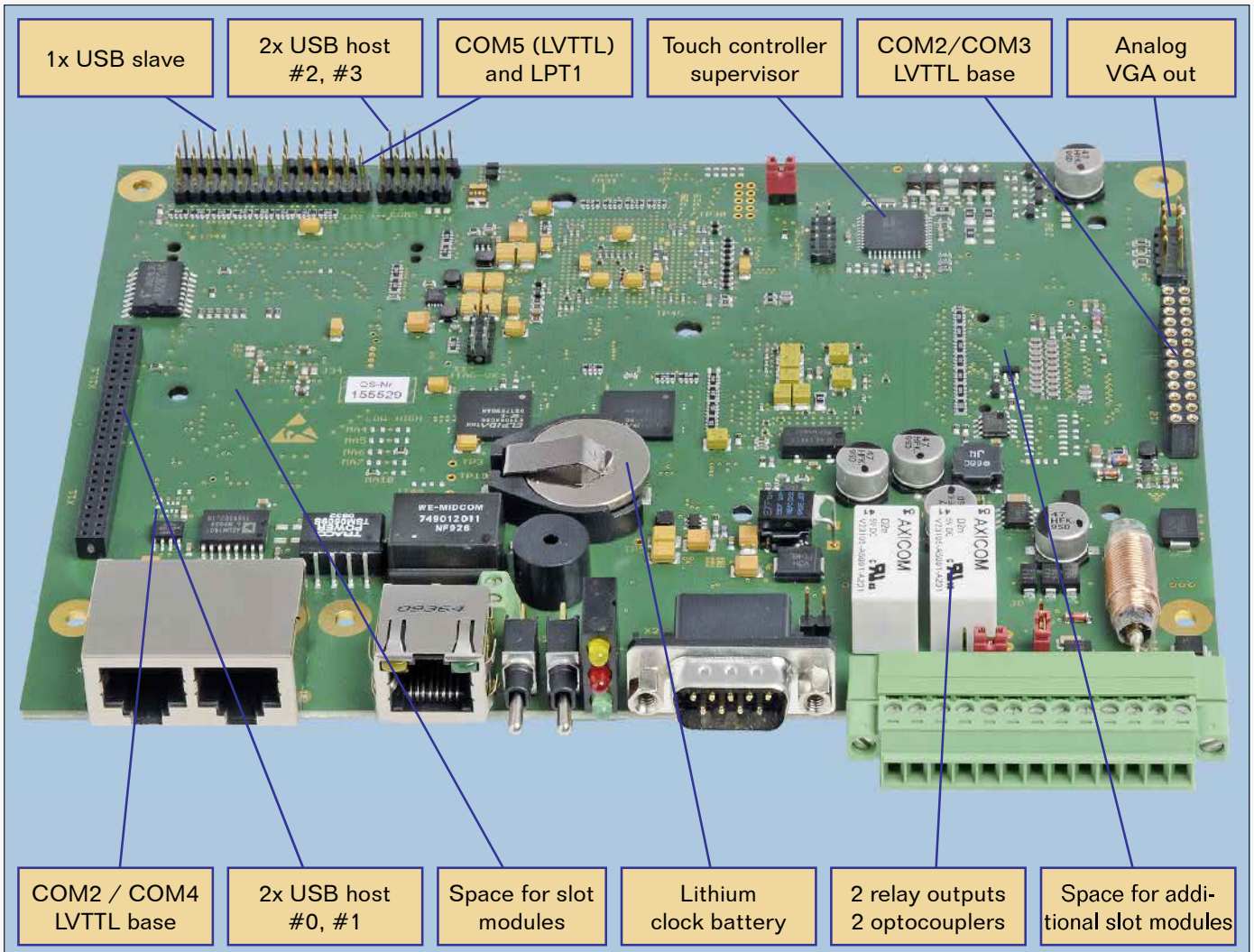
The following diagrams show the essential elements of this component.



## 11 Processor side



## 12 Module side



## 13 Excerpt from the product range

**Article No.:** 33-1105

**Name:** CPU-BCC3-BASE

Basic component assembly: 256 MByte DDR2, 1 GHz CPU, CF socket, Ethernet 100MBit, 3xUSB, COM1-RS232, COM9 EasyLan, 5-pin X1 connector.

**Article No.:** 33-1108

**Name:** CPU-BCC3-TFTVGA

As 33-1107, but interface for VGA or SVGA TFT panel, CRT-VGA analog port, 2 OptoIn, 2 OptoOut, module slots.

**Article No.:** 33-1106

**Name:** CPU-BCC3-CONTROL

Component as 33-1105, 13-pin X1 connector, 1 GB SST Flash, 2 dip switches, 3 LEDs, 2 OptoIn, 2 RelayOut, socket strips for module slots.

**Article No.:** 33-1107G

**Name:** BCC3-GEH-QVGA

Add-on set with metal housing for 33-1107 in switchboard operation. Adapter for top-hat rail, set of cables for 2 USB connections.

**Article No.:** 33-1107

**Name:** CPU-BCC3-TFTQVGA

Component as 33-1106, but graphic controller SM712, integrated TFT touchpanel 3.5" in QVGA (320 x 240) with holder, touch controller, 1 OptoIn, 1 RelayOut, 1 RS232 to X1.

**Article No.:** 33-1155

**Name:** Door panel VGA 10.4"

Component 33-1108 ready for use with 10.4" touch display in high-gloss anodized aluminium design housing, wall-mounting, 128 MB CF Card.

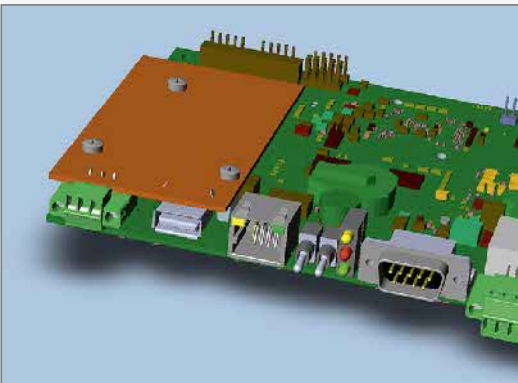


## 14 TFT and touchscreen

A 3.5" colour display with touchscreen can be plugged in directly to the processor side of BCC3. Corresponding holes have been drilled in the board to fasten a holder that takes the display. One cut-out is sufficient in the housing lid.

### Types of compatible displays and touchscreens:

- 3,5" LB035Q02-TD01 ( QVGA, LED backlight, integrated touchscreen )
- 6.4" LB064V02EA ( VGA, 800 cd/m<sup>2</sup>, separate 5-wire Elo touchscreen )
- 10,4" LB104V3-A1 ( VGA, 400 cd/m<sup>2</sup>, separate 4- or 5-wire touchscreen )
- 12.1" LB121S03-TD02 ( SVGA 800 x 600, 400 cd/m<sup>2</sup>, 4-wire touchscreen )



The internal SM712 graphic chip with 4 MB video RAM is suitable for controlling displays of up to 1280 x 1024 pixel, with 18 bit colour as TTL-TFT interface. The touch controller processes 4- and 5-wire resistive touchscreens of various makes.

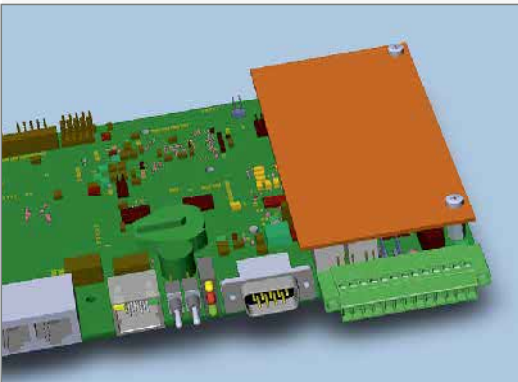
## 15 Module slots

The design permits the integration of various slot modules for highly versatile extension of the component.

Socket strips are provided on the module side of the board for accommodating up to two sandwich modules (see diagram for arrangement).

Operating voltages and the following TTL signals are available for the additional modules: COM2, COM3, COM4, COM5, LPT1, USB hosts, USB slave, GPIOs, VGA.

Without the need for the RS485 port on the base board, the additional module can offer a plug-in connection on the front.



## 16 X1 connector

The device connection consists of a 5-pin plug-in screw terminal. The extended assembly versions have a 13-pin connector.

1	Shielding, housing potential	8	Relay output 2.1 or TXD2
2	Ground 0V, supply	9	Relay output 2.2 or GND
3	12V/24V DV supply	10	Digital input 1+
4	EasyLan databus	11	Digital input 1 -
5	Ground for EasyLan databus	12	Relay output 1.1
6	Digital input 2+ or DTR2	13	Relay output 1.2
7	Digital input 2- or RXD2		



## 17 SST NANDrive FlashDisk

In some assembly versions, a chip is integrated as primary hard disk directly on the printed circuit board in a BGA housing. The low housing height permits low structural sizes for customized designs.

An ATA controller integrated in the NANDrive provides performance, uniform cell usage and automatic power management.

Commercial grade ( option SST\_1GB\_PC )  
SST85LD1001K-60-PC-LBTE  
1 GByte - 10 million writing cycles, -0 °C to +70 °C

Industrial grade ( option SST\_1GB\_RI )  
SST85LD1001T-60-RI-LBTE  
1 GByte - 100 million writing cycles, -40 °C to +85 °C

BCC3 also has an additional socket for inserting a CF card (industrial grade is recommended) as a further drive.



## 18 BCC3 Technical data

Feature	Description
CPU:	DM&P Vortex86DX
Clock frequency:	600 MHz, 800 MHz, 1 GHz ( changeover by solder bridge ), 1 GHz default.
BIOS:	AMI BIOS - core 8
System memory:	256MB DDR2 onboard at 300 MHz (DDR2-600)
Cache:	L1: 16K I-cache, 16k D-cache, L2: 128 kB
Bus:	Internal PCI bus to graphic controller SM712 PCI bus and ISA bus available in customized designs.
Hardware watchdog:	programmable from 30.5 us to 512 seconds
LAN:	integrated R6040, 10/100Mbps Ethernet controller, RJ45 connection with status LEDs.
Operating voltage:	12 VDC or 24 VDC, tolerance +/- 20%
Power:	from 2 watt. The power pack must be rated for min. 1A cold start.
Relay outputs:	max. load rating 3A and 48V
Large printed circuit board:	180 x 130 x 1.6 mm.
Maximum structural heights:	module side 15.2 mm, CPU side 6.9 mm, minimum 24.0 mm inner height for housing.
Temperature range:	-40 °C to +75 °C when using an industrial grade Flash disk, or limited to the temperature range restricted by the Flash disk or TFT.
CPU cooling:	we recommend a passive heat sink on the CPU (BGA heat sink 28 x 28 x 7 mm) for operation at 800 MHz or 1 HZ to comply with the positive temperature range.
EMC test:	EN 55022, EN50081-1 in combination with a metal housing



## 19 Baudisch.door panel

Baudisch.door panels are efficient, compact touchpanel computers for universal use in building management systems or in industrial applications.

The devices are fitted internally with the BCC3 component in the TFT version (article number [33-1108](#)), together with a TFT touchscreen display.

Housing: solid aluminium, high-gloss structure surface.

Depth: front 15 mm, total 37 mm

Protection class: IP65 (apart from backplane)

Installation: directly to the wall or counter sunk.

Changeover to vertical display  
( under Linux and Visual CX )

Connection: all connections inside, concealed cable entry point.

Versions: 6.4" VGA ( 640 x 480 )

10.4" VGA ( 640 x 480 )

10.4" SVGA ( 800 x 600 )

12.1" SVGA ( 800 x 600 )

Data of the 10.4" VGA version:

Dimensions: 270 x 200 x 37 mm

Weight: approx. 2.4 kg

Article number: [33-1155](#)

## 20 Compact control with touchscreen

This device is used as universal control in switchboards or technical applications.

The 3.5" TFT touchscreen lets the technician and user proceed swiftly with diagnosis and configuration of his system.

Housing: stainless steel or coated aluminium.

Installation: slots onto 35 mm top-hat rail.

Mounted directly to the wall.

With rubber feet for desk-top use.

Dimensions: 186 x 146 x 36 mm

Weight: 600 g

Article number: [33-1107](#) / [33-1107G](#)

## 21 Measuring, analysing and controlling

This compact industrial device was developed in next-to-no time on behalf of a customer. It contains the proven 86DX technology with stable operation under Linux using 1 GHz clock frequency. It has a touchscreen for operation.

**Application:** records measurements from external analog sensors with subsequent evaluation and documentation of the results. Integrated PLC functions for complete control and regulation of machine processes.

**Special features:** an internal FPGA records all measured data via an AD converter, thus permitting constant real-time cycles. Profibus DP as chip solution directly on the mainboard.

**Display:** 3.5" TFT touchscreen, resolution 320 x 240.

**Housing:** aluminium, high-gloss structure surface.

Touch pen holder next to the display.

Foil with customer logo integrated in front panel.

**Installation:** housing 144 x 96 mm for integration in switchboard.

**Protection class:** IP65 on the front.



## 22 IP phone system / communication server

BCC3 can be used as an IP telephone system. An integrated OpenSip server acts as the exchange for connecting phone calls and video pictures. The integrated TFT touchscreen display permits swift and simple configuration of user data and rights.

Log data of all transactions can be saved on the plug-in CF drive. In addition, all kinds of log converters and intelligent interface converters are a simple task for this system.



## 23 Data logger

The efficient computer is also ideal for applications such as data loggers and recording systems.

Systems for recording measured data can be simply connected to the versatile interfaces. The integrated software records measured data and makes this available straightaway thanks to the web interface.

All data are saved on an independent drive (changeable CF card). In this case, the actual operating system is installed in captive fashion on the permanently configured NANDrive.





## 24 Linux image with 2.6 core

For many years, our BCC2 system (SC520 X86 processor by AMD) has shown stable operation under Linux. This experience continues in BCC3.

We provide a system that has gone through sustained testing on the basis of a 2.6 core and adapted distribution, without license fees.

Our OEM Linux distribution already includes demonstration applications of key system functions for a swift introduction to software development.

- Web server for adjusting own configuration data and network parameters.
- FPT access to internal drives. Installation of a RAM disk.
- Access to the console via Telnet or SSH / Putty
- Demonstration applications of VisualCW in combination with touchscreens



## 25 Windows XP, Windows XP embedded

Now with the BCC3 product and the Vortex86DX processor, for the first time Windows XP can also run on our components.

A pre-installed image (license-free test version) is provided free of charge. Licensed versions are also available on request.

## 26 VisualCX

VisualCX is a platform-independent visualization tool by Baudisch Electronic GmbH. This product has been successfully used in our communication panel for many years and offers many functions.

It permits simple creation of screen pages with pictures, buttons, texts and graphics in XML together with interactive functions and links based on an integrated VisualC interpreter.

So-called plug-ins (DLLs) can be integrated in VisualCX for connection to the hardware and for interface communication and databases.

You can program your application quickly and simply under VisualCX without needing hardware-related know-how. The application programmed in this way can operate under Windows on the development PC as easily as on the target hardware. This simulation possibility offers great time savings when developing a visualization.

## 27 Customized layouts

Do you need another shape factor, additional interfaces or features?

This doesn't entail any costly new developments. The essential workload is included in the layout of the CPU core. We adopt this complete, tested technology entirely with circuitry and all PCB tracks as basis for the design.

All that's needed is an adaptation development.



## 28 Verification, CE symbol and series launch

All properties of the customized design are checked using first samples based on a test plan. EMC testing plays an important role here.

For many years we have had our own EMC laboratory. All necessary measures to achieve conformity are ascertained at an early point in time while development is in progress.

The focus here is in circuitry technology and an EMC-compliant PCB track design. In series production, this is more efficient than expensive shielding measures.

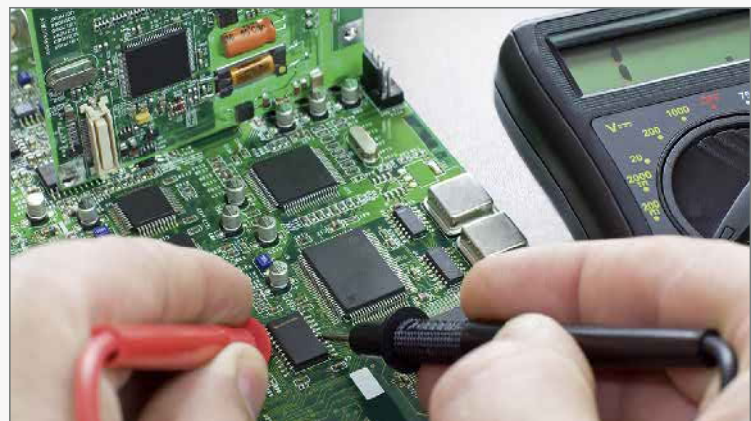
The laboratory also tests and appraises products developed by third parties.



## 29 Service and support

Even after the series launch, our development department continues to accompany your product through its entire service life. This results in efficient implementation of technical alterations, new components and optimization.

This is an important factor. Nothing is as dynamic as customers and markets. If you can adapt your products quickly and flexibly to new requirements, you can keep a step ahead of the competition.



## 30 In-house product: fast and flexible

From the product idea via series production through to support, all the steps are in the experienced hands of the workforce in Wäschenbeuren.

Together with high technical quality and highly reliable project handling, this also forms the basis for short implementation times.

Short time-to-market factors. Thanks to our portfolio.

## 31 SMD processing



Economic production of prototypes and series is possible with our own SMD line.

The machinery and systems are state of the art and of the very best:

- Creamed solder printing:  
Ekra E1 with vision system
- Assembly:  
Mimot Advantage in completion
- Soldering:  
Asscon vapor phase in-line production



## 32 THT: fully automated selective soldering

Two-sided arrangement of complex SMD parts (BGA, fine pitch) is vitally necessary in compact embedded boards.

But the use of SMD technology is often unsuitable for connectors and weighty components.

This is why THT parts ("pin through hole" technology) is used for good mechanical strength, again in two-sided arrangement.

The THT soldering process needs a system that provides constant results without encroaching on the already assembled SMD components, from the small soldered point of a semiconductor through to massive attachment soldering for connectors.

The Versaflo selective soldering system permits this constantly high processing quality of THT soldering points, even on both sides of the component. This is why we don't have any manually soldered points and experiments with soldering masks on wave-soldering systems.

The lead-free soldered points of the system have the same quality all year round.

Your guarantee for a reliable product.



## 33 Visual inspection

Visual series inspection of all electronic components is handled by the Quin system by SLC. To this end, high-resolution pictures are generated of both sides of the SMD assembly, followed by interactive comparison with reference pictures.

This is a highly reliable method of detecting missing or incorrectly positioned parts and poor soldered points.

In addition, the pictures archive the component status in the production process, forming the basis for subsequent traceability.

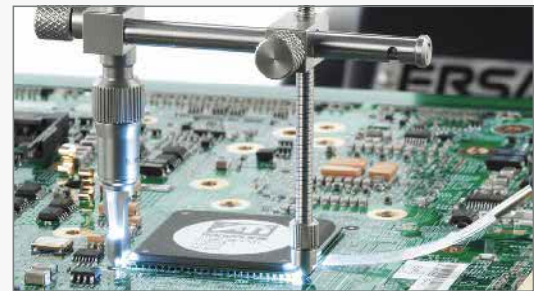


## 34 BGA controls & microscopy

As a rule, complex boards have a BGA housing ( **B**all **G**rid **A**rray ). This is a chip on its own small board with soldering balls on the back. During the soldering process, the approx. 500 connection points fuse with the mainboard.

Quality assurance of this process is obligatory for every batch and every shift. A special microscope workplace provides appropriate pictures of the solder between BGA and mainboard, which is often only 0.5 mm high.

In contrast to conventional X-ray testing, this permits an assessment of the surface as well as the soldering form.



## 35 Electric testing

Product-specific test rigs are available for verification of all electronic properties. All interfaces are tested under communication load. Tools are also used to test the CPU and memory chip.

As a rule, the electric test sequence includes thermal treatment of the component. In the heat cabinet, every series part runs through a preprogrammed temperature cycle over a 24-hour period. The product will only be delivered to the customer after successfully passing the subsequent complete final test.



## 36 Quality management

All our departments are certified to ISO 9001:2000 and are regularly audited by DEKRA. But the experiences of our customers are far more important to us than this bit of paper. This is why internal quality measures go way beyond the requirements of this standard.





Baudisch Electronic

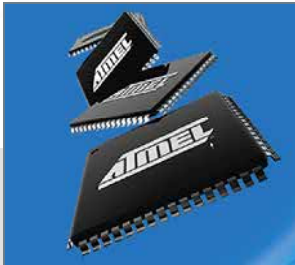
# Baudisch embedded products

## An astonishingly wide range of possibilities.

## Made in Germany.



DM&P Vortex86 solutions



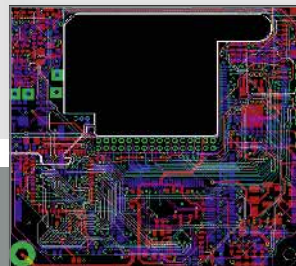
ATMEL AVR integration



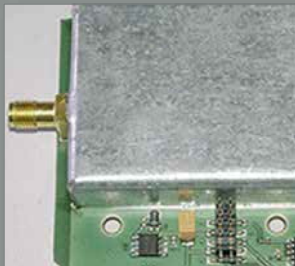
dsPIC33 / PIC16 controller



Embedded product developments

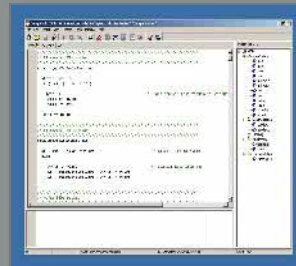


Circuit diagrams & layouts



Cordless RF developments

Our expertise puts you in the lead:  
  
We're passionate about electronics



Embedded software C / C++



In-house EMC laboratory



Prototype construction - bulk production



Software development

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