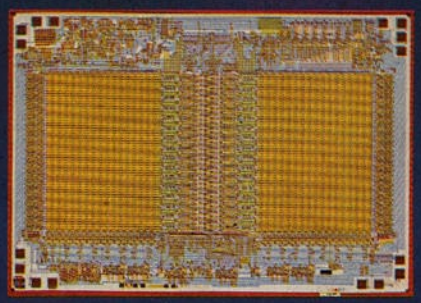
PROTON

YOUR PARTNER IN MICRO-ELECTRONICS

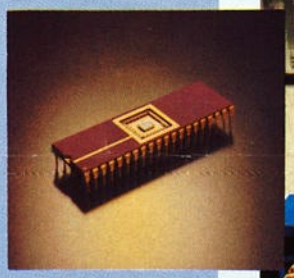


Proton Electronics is an active, innovating company in design and production of microelectronic components (chips), printed circuit boards and systems. Proton is located in Naarden, The Netherlands. Founded in 1973, Proton started concentrating on microelectronics in 1975. Proton's experience in schematic- and PCB-design is profound: in 1984 the 250th design came off the C.A.D.-computer. In the early 80's the design-techniques at Proton changed dramatically. Computers are now involved in the total design-process. Starting with the design-rule-check up to the computer aided quality control of the final product.

Proton foresaw the impact of (semi-) custom chips in this industry. Now, the most important technologies are supported by Proton. From the somewhat 'aged' programmable logic array to the advanced 'standard-cell' methode.
Single-chip microprocessors are another specialty of Proton.

Next to the designs on customer's specification (or description of desired system) Proton also develops her own microelectronic products. These products are mainly offered to O.E.M.'s. Proton became well-known for intelligent keyboard-designs. The Compactboard 80, a 8 bit high-performance / low-cost micro-computerboard was succesfully introduced.

Another example of Proton's capabilities is a videoterminal design, where the majority of the electronics is concentrated in 2 VLSI-chips. Cost and size of the resulting terminalboard are reduced dramatically compared to conventional designs.
Even the most sophisticated hardware will prove to be useless without good software. Proton has an extensive experience in development of system-software (operating systems, compilers and interpreters).



Application-software is usually written by Proton's customers, except for dedicated projects, s.a. Proton's terminal-board.
In many cases assembly is done by Proton's customers, therefore Proton has a limited production capacity in-house. External capacity however is available. Proton has access to modern productionmethodes (like automatic insertion) in Holland and the Far-East. If desired Proton can supply 'hard to get' components to O.E.M.-customers. By offering a complete service from chip to system Proton Electronics is:

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(Semi-)Custom Chip design

Proton supports all major design techniques:

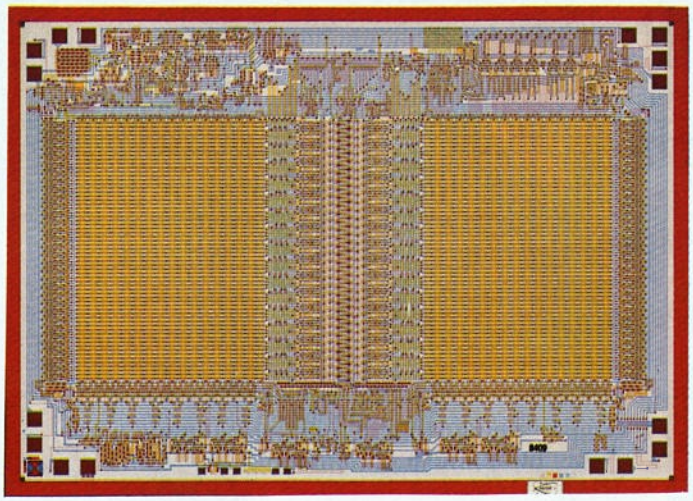
Field programmable logic array's (PAL's)
PAL's are considered to be the first step in integration. PAL's usually replace 4-12 standard IC's. Imple-mentation-time is short (some weeks). Since they are field programmable, PAL's can be used for low-volume applications an allow revisions. For higher volumes, mask-programmed versions are available at substantially lower cost.

Gate-Arrays
Gate-arrays feature a higher gate-count, compared to PAL's. Due to higher initial cost, Gate-arrays are intended for volume-applications.

Standard-cell technique
The Standard-cell methode is very close to full-custom: each layer is custom. A Standard-cell is a high-level 'module' of i.e. a NAND-gate, a flip-flop, or even a microprocessor. Compared with full-custom, develop-ment-time is short. Efficiency (logic functions vs. chipsize) is superior to Gate-Array's at higher initial cost.

Full-custom
With full-custom optimal efficiency c be achieved, however at very high initial cost. Full-custom is therefore the right technique for very-high-volume applications (such as RAM's). Full-custom is currently not supported by Proton. Access to full-custom however is available.

Single-Chip microprocessors
Used for dedicated control-applica-tions, they usually replace a micro-processor, RAM, ROM, I/O and (some times) UART('s) and A/D concerter(s). Intended for volume-applications, but cost is relatively low. New variations single-chip microprocessors are coming up faster and faster. Standard-cell technique is one important reas for this.

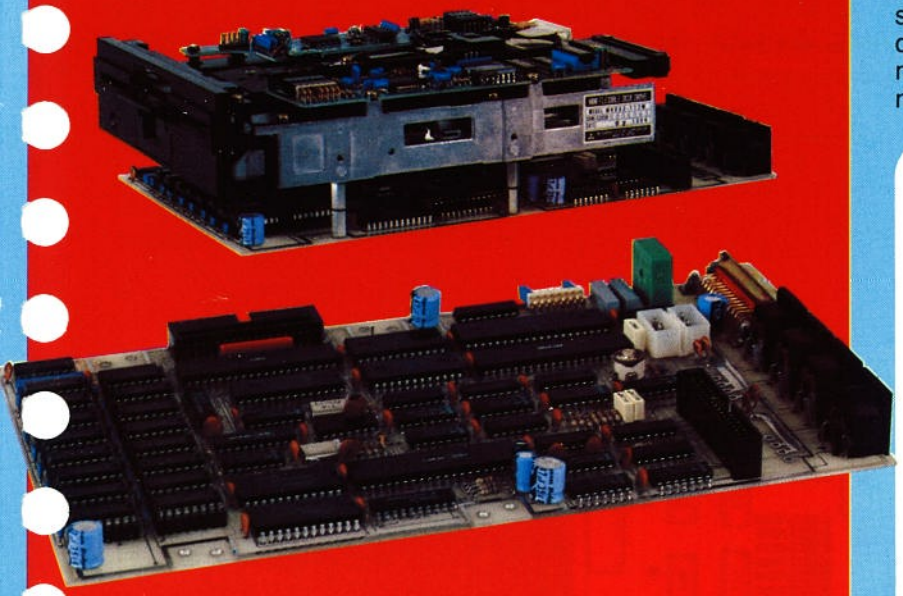


Proton invested heavily in customchips and is prepared for the expected increasing demand.

COMPACTBOARD 80

The compactboard is the first **complete** CP/M-compatible computerboard, that fits under a 5¼" diskdrive.

Just add diskdrive('s), keyboard, videomonitor and power-supply to create a powerful system.



Features

* fast Z80 8MHz CPU
* supports CP/M® software
* on board videogeneration by ultrafast VLSI videoprocessor
* full ASCII characterset + extended semigraphics on a 24 x 80 screen, softwareswitch for 40 characters (viewdata) in color
* videoattributes: underline, inverse, blink and half-intensity
* fast (hardware) videofunctions: scroll, line insert/delete and character insert/delete to speed up application programs
* 64 K RAM, on-board expandable to 128 K
* floppy-disc controller for single-, double-, and quad-density drives up to 3,3 Mb (per drive)

Connectors for:

* composite video (monochrome) and RGB (color) monitor
* serial keyboard
* parallel printer
* serial printer RS232 half- and full-duplex, switchable baudrates
* modem 1200/75 baud
* 1-4 floppy-disk drives
* AMP powerconnectors for the drives
* AMP connector for power supply

All connectors are located at the rearside of the board, for direct use (no extra connectors/ cables required).

Enclosures are available.

Since 1975 Proton develops digital and/or analog applications on customer's specification. Computer aided-simulation, PCB-design and -testing are important features. Combined with the use of custom-chips, software-development and if desired assembly and/or supply of (vital) components. Proton offers a really complete service. Apart from the custom-design's, Proton developed and will continue to develope own microelectronic products, aimed at the O.E.M.-market. Representative examples include:

TERMINAL CHIPSET

The Proton terminalchipset contains most electronics for a complete 'smart' terminal. Just add a videomonitor and ASCII-keyboard, 4K of RAM and some cheap components. Very small size and extreme low cost are achieved by 2 custom VLSI chips: an advanced 'standard cell' 8 bit microprocessor and a high speed Video Display Processor.

This is all you need to create a complete videoterminal

Features:

* 24 rows of 80 characters
* Emulation of 4 popular terminals: Televideo TVI 910, Lear Siegler ADM 5/3A, Hazeltine 1410 and ADDS 25, expanded with line insert/delete and character insert/delete.
* Buffer for incoming data
* Connector for serial ASCII keyboard
* composite videomonitor output.
* RS232-interface
* Semi graphic characterset included
* Options: RGB, 60 Hz/525 lines (50HZ/625 lines standard), printerinterface

Intelligent keyboard KB3+

Proton keyboards distinquish themselve by a **solid construction** (steel mounting plate, lifetime switches 10.000.000), **flexibility** by the internal microprocessor and approved (since 1982) **state of the art software.** The KB3+ keyboard adds simple-to-use wordprocessing facilities to your computer.

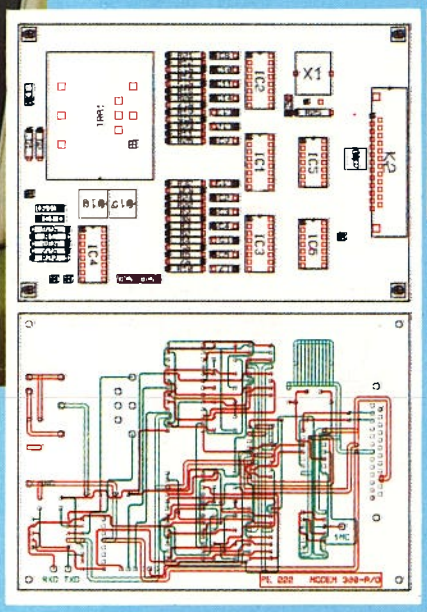
Features:

* 91 key's (expandable to 101), redefinable in Prom
* 16 levels of 46 function key's each
* 5 levels are in use for Basic, Pascal, Logo (2x) and Wordstar instructions
* 11 levels are user-programmable. Each function key can contain a basically unlimited number of characters
* Max. capacity is 14.000 characters
* Unique user programmable 'abbreviation-to-test' mode. I.e.: 'a sap' can be send as 'as soon as possible'
* Serial output enables the use of coiled cable' (serial to parallel-converter is available)

The organisation behind Proton

Proton electronics employs 'only' 12 people, dedicated customer-oriented specialists. Proton feels that small scale is essential for her flexibility.

In order to ensure customer required capacity, Proton established relations with important local design-houses, production-units and software-houses.



Other external services offered are the design and production of plastic (injection molded) or metal cases, system-assembly and application programs on customer specification. In this way Proton offers a really complete service from chip to system.

Custom designs

Proton's versatile and experienced (since 1975) micro-electronics design team is ready to translate customer's wishes into working silicon, boards or systems.

Proton is experienced in all disciplines of micro-electronics design:

* schematic design of digital and analog electronics
* (semi-)custom chips (Field programmable logic arrays, gate arrays, standard-cell, full custom and single-chip microprocessors)
* Computer-Aided-Design of printed-circuit boards

Computer-aided-instruction in practice

Proton designed a microcomputer-system for C.A.I. Up to 64 students can attend an 'electronic' examination or training. The C.A.I.-system controls a slide-projector or videodiscplayer, which shows a situation. A cassette-recorder 'asks' a question. The student 'answers' by pushing a button, representing 'yes' or 'no'. The C.A.I.-system can also be used for 'electronic' enquiries with multiple-choice questions.

The people behind PROTON

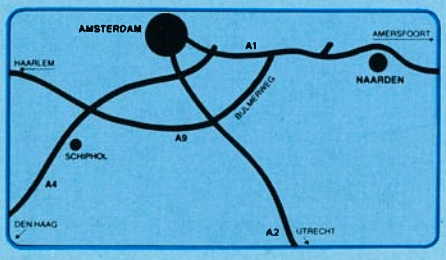
Proton Electronics can be considered as a team of specialists.

Application- and customer-oriented thinking is their major goal.

They are supported by Proton's management-team:

J. Post
commercial and general manager

A.J. Kool
technical manager



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