BeeProg+ in use at Elektor
The meaning of 'One for All'

Jan Buiting (Elektor UK/US editorial)

Many readers are curious to know just what gear, software and tools is in daily use in the Elektor Labs. One really crucial piece of equipment is our BeeProg+ multi-device microcontroller programmer system.

The guys from Elektor Labs are talkative like no other and good e-pranksters from time to time. On the cathode (down) side, they suffer from perennial writer's block and are too modest about their discoveries of real gems in electronics and embedded land. In other words, they are sitting on heaps of useful information you have to pull from them — from hidden FAT32 partitions or from under their desks. That happens to be my job.

A little history — from the lab

It must have been in 2005 when a Slovakian company called Elnec kindly supplied a sample of their SmartProg2 multi-device programmer for writing a few words about in Elektor (**Figure 1**). That was duly done but the programmer was never returned — sure, we told Elnec, they did not mind. In fact the SmartProg2 was so good it was sort

**Figure 1.
Elnec's SmartProg2 was
used for a number of years
in the Elektor Labs for
one-off microcontroller
programming and small
series.**

of confiscated for use in the Elektor Labs, more specifically in the ESS department (Elektor Software Service) where it went into permanent service. Since then, many hundreds of master devices for microcontrollers, (E)PROMs, EEPROMs and other programmable devices have been 'burned' on the SmartProg2 for use in our prototype circuits (or binning or erasing if an error was found). The programmer was also cheerfully used by lab workers Luc, Robert-Jan, Chris, Antoine, Paul and myself (for occasional programming of 24C16 EEPROMs). For a number of years we laughed at every new micro thrown at us by Silicon Valley's joint forces. We pulled the latest device parameters from the Elnec website, plugged in the odd adapter board and burned a guinea pig.

Here I have to mention that Elektor, unlike some of its competitors, is an independent publication not restricted to one specific kind of microcontroller for use in published projects. A solid principle for sure (very open-minded & all that) but one that calls for programming support of a galaxy of devices from an ever longer list of manufacturers great & small, famous & obscure. Equally long is the list of device housings like SOIC, PLCC, DIP, you mention it. While you (or your boss) may be happy to stick to just one brand and have a matching programmer to burn your own micros,

**Figure 2.
At Elektronica 2008
meeting up with Elnec
representatives Jan and
Vladimir.**

here at Elektor we have far wider requirements because we will strive to support whichever microcontroller our readers care (or dare?) to propose for their projects, once accepted for publication.

In Munich

The story continues in Munich, at the 2008 edition of the immense 'Elektronica' show, with an unplanned visit to the booth of Elnec. Joined by Paula Brady, Elektor's advertisement executive, I talked to Elnec's Sales & Marketing Director Vladimir Doval and R&D Director Jan Puobis (see **Figure 2** for the backdrop). Vladimir explained that many of Elnec's programmers were marketed under different brand names in countries all over the world.

In Continental Europe, for example, the programmer covered in this article is known as **BeeProg+** and sold by Elnec directly [1]. In the UK, the brand name is **Dataman-48Pro+** [2], in the USA, **BK Precision Model 866B** [3]. Together we recalled the story of the SmartProg2 supplied to Elektor and discussed the range of programmers currently manufactured by Elnec. It seemed to me that the BeeProg+ was the logical successor to the SmartProg2 and Vladimir did not hesitate to send me one by courier — it was on my desk within a week.

In the lab again

You can guess what happened. At Elektor House the BeeProg+ box was immediately opened by the lab guys to "inspect the build quality" but really to satisfy their instinctive urge to know "what's inside" (**Figure 3**). They were greeted by two (!) Spartan FPGAs, a PIC18F micro, a Cypress CY7 chip and lots of assorted logic, all on three high-density stacked boards. In what little time it took them to fit the cover again, and me to tell that the BeeProg+ was a 'Universal 48-pindrive programmer with USB/LPT interface and ISP capability', the software was installed on the resident ESS PC and the unit powered up. The programmer was in full use within the hour and according to the main user, Jan Visser of our ESS, its distinct advantages are (quote):

1. "versatility to the highest level"
2. "kissable software"
3. "device updates whenever I need them"
4. "a socket converter to suit even the quirkiest of IC housings"
5. "ISP connectivity alongside the friendly 48-pin ZIF socket"
6. "great for small series too"

(end quote). As with the SmartProg2, I had to pull the BeeProg+ from my colleagues' hands to get the photos done for this article. It is truly a Programmer's Delight.

45k+devices supported

Recently the lab guys ran into "this horrible IC" they were struggling to get programmed and in fact an entire project based upon it, the *LED Spinning Top with Special Effects* (December 2008) almost got delayed for publication. Almost. I decided to make a case of it and asked Vladimir at Elnec for a matching TQFP32 adapter (# 70-0135) to 'do' this particular Atmel beast, the ATmega8-16AU. Within a week, shouts of hooray and a working prototype. Still later, a highly successful article.
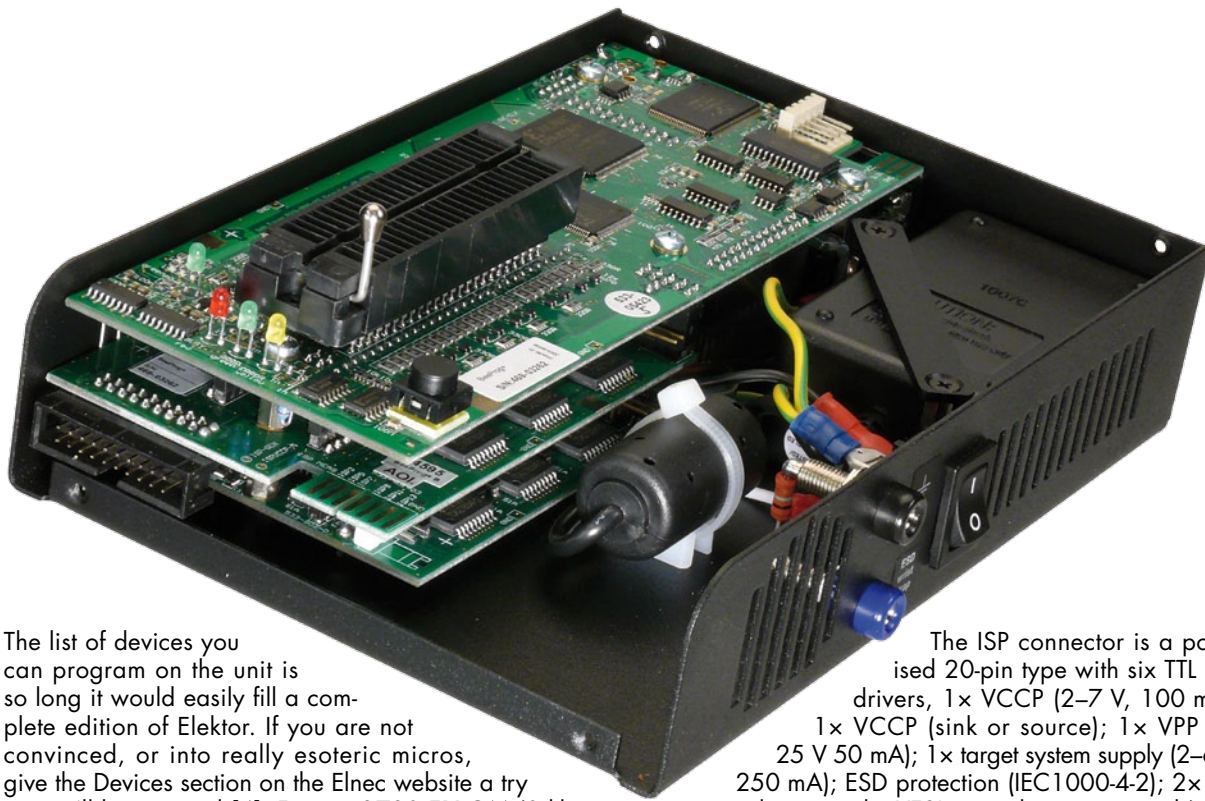
The list of devices you can program on the unit is so long it would easily fill a complete edition of Elektor. If you are not convinced, or into really esoteric micros, give the Devices section on the Elnec website a try — you'll be amazed [4]. From a 2708 EPROM (8 kbit and 30 years old) right up to Actel IGLOOs, it's all there. The most recent device list we found (v. mid March 2009) had a length of **45,797 devices.** The Beeprog+ is also capable of testing logic ICs (54/74 S/LS/ALS//H/HC/HCT series, 4000, 4500 series) and static RAMs (6116 through 624000). It also supports user definable test pattern generation.

The socket converter list at [5] may well be the longest I have seen. From commonly found housings like DIL, TSSOP, SOIC and PLCC right up to esoteric stuff like QFP256 and FBGA484. The socket converters are very high quality builds without exception, but relatively expensive compared to the programmer proper.

Technically speaking

The BeeProg+ has three internal DACs for the programming voltages VCCP (0–8 V, 1 A), VPP1 and VPP2 (both 0–26 V, 1 A) supporting controllable rise and fall time. It has a USB 2.0 high-speed compatible port with up to 480 MBit/s transfer rate, and an FPGA based IEEE1284 (ECP/EPP) slave printer port with up to 1 MB/s transfer rate.

The pindrivers on the ZIF socket are capable of 'being' either TTL (H, L, CLK, pull-up and pull-down) or analogue (1.8–26 V) with protection against overcurrent, power failure and ESD (IEC1000-4-2).

The ISP connector is a polarised 20-pin type with six TTL pin-drivers, 1× VCCP (2–7 V, 100 mA); 1× VCCP (sink or source); 1× VPP (2–25 V 50 mA); 1× target system supply (2–6 V, 250 mA); ESD protection (IEC1000-4-2); 2× status indicator and a YES! equivalent input signal (max. 0.8 V active level).

Out of the box

The BeeProg+ comes with diagnostic pods (test adapters) for ISP and ZIF-48, an ISP flatcable, an anti-dust cover for the ZIF socket, a USB cable, software on CD, and paperware (including a fine manual). Remarkably the programmer also supports the vintage 25-way parallel printer connection. The power supply is internal and happily takes anything between 110 and 240 volts AC, 50 or 60 Hz.

A quad version of the BeeProg+ is also available under the name **Beehive4+** while a nest of eight BeeProg+s is contained in the stand-alone BeeHive8S.

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Internet Links

[1] www.elnec.com

[2] www.dataman.com

[3] www.bkprecision.com

[4] www.elnec.com/search/device-list/?prog=22

[5] www.elnec.com/products/socket-converters/

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