864

Introduction

864 is a universal **programmer** that supports programmable integrated circuits or devices manufactured in various technologies. Powerful internal pin-driver electronics controls logic levels, pull-up/pull-down, clock, ground, one power supply and two programming supplies and is able to read all 48 pins independently. This advanced design gives 864 the ability to handle almost every programmable device in DIL package up to 48 pins without any adapters and/or family modules. This design philosophy allows B+K PRECISION to easily add new devices to the device list, giving you the freedom to implement the optimum device in your designs.

864 is also a **tester** of TTL/CMOS logic circuits and various memories. Furthermore, it can generate user-definable **test pattern sequences**. 864 is a true universal and a true low-cost programmer, providing the best "value for money" in today's market.

864 works with almost any IBM compatible PC, AT or higher, portable or desktop personal computers. No special interface card is required to connect to the PC since 864 uses the **standard parallel printer port**. The 864 control program also supports bi-directional protocols for the parallel connection to the PC printer port providing fast and reliable **communication speed**.

The programmer has on-board intelligence and is controlled by powerful Microcontroller system and support devices. 864 has been designed for **multitasking operating systems** and is able to perform time-critical programming sequences independently of the PC operating system status and without being interrupted by any other parallel process running on the PC. Consequently, 864 functions flawlessly on systems running Windows 3.x, Windows 95/98/Me/NT/2000/XP.

864 performs **device insertion test** (wrong or backward position) and contact check (poor contact pin-to-socket) before it programs any device. These capabilities, supported by current limit protection and signature-byte check, help prevent chip damage due to operator error.

Built-in protection circuits help prevent damage of the target device due to mains supply fluctuations, communication errors or if the PC operating system fails. In the event of such errors the 864 performs independently of the PC exactly specified special sequences so that the target device remains intact. 864 performs **self test** (diagnostic tests), including verification of pin-driver voltage/level, for accurate timing of the signals

applied to the target device and for reliable communication with the PC.

864 incorporates optimal PCB design criteria to minimize unwanted effects at the pins of the target socket (such as ground-bouncing and supply/programming voltage glitches). All the inputs of the 864, including the socket, are **protected against ESD** and whilst inserted the target device is also protected against ESD damage.

864 performs programming **verification** at the marginal level of supply voltage, which, obviously, improves programming yield and guarantees long data retention.

The 864 is driven by an **easy-to-use**, **control program** with pull-down menus, hot keys and on-line help. You can select the target device by its class, by manufacturer or simply by typing a fragment of vendor name or part number. Besides the standard device-related commands (blank check, read, program, verify) have been implemented some test functions (illegal bit test, insertion test), and some special functions (production mode - start the action immediately after insertion of device into ZIF socket). The control program permits data manipulation within the buffer and between the buffer and associated files, and performs automatic file format detection and conversion.

The control program provides an **auto-increment function** that enables you to assign individual serial numbers to each programmed device, this function simply increments a serial number in the buffer each time a new device is inserted in the socket. Furthermore, the function enables the operator to read serial numbers and/or any programmed device identification signatures from a file.

Various **socket converters** are available for the 864, DIL to PLCC, DIL to PSOP, DIL to SOIC, DIL to TQFP and DIL to TSOP. Software controlled pin-swapping capability together with universal converters are what give the 864 the ability to program the target device in any package type. For example, just one DIL44 to PLCC44 converter will allow the 864 to handle any PLCC44 target device in the current device list. Most devices with more than 48 pins require a simple adapter usually available from B+K PRECISION or easily built by the user from information provided in the file "adapters.txt" included with the control program.

It is important to remember that in most cases new devices require **only a software upgrade** since the 864 has 48 true pin drivers, which can perform as required under program control. With our prompt service new devices can be added to the current list within hours!

Advanced design, including protection circuits, original brand components and careful manufacturing allows us to provide a **one-year warranty** on parts and labor for the 864 (limited 25,000-cycle warranty on ZIF socket).
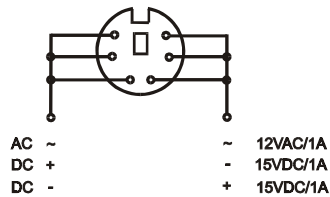
864 elements

① 48 pin ZIF (**Z**ero **I**nsertion **F**orce) socket
② LED indicator power/sleep
③ LED indicators for work result
④ YES! Button
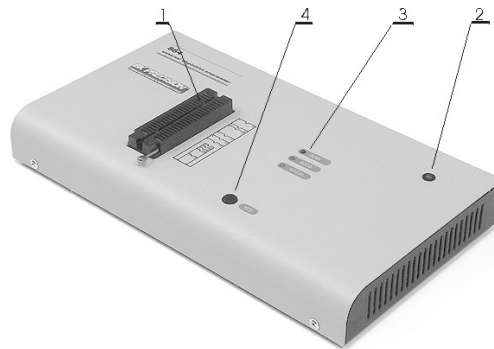
⑤ Connector for PC <-> 864 communication cable
⑥ Power supply connector

Power supply connector

AC ~	~	12VAC/1A
DC +	-	15VDC/1A
DC -	+	15VDC/1A
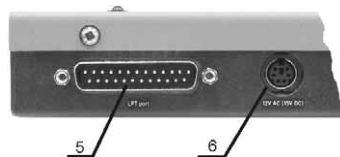
Note: *When the 864 programmer isn't active, control program switch the programmer into "sleep mode". In this state it consumes less than 1W of power. Therefore the programmer has no On/Off switch. When the power LED indicator glows with a low intensity the 864 is in sleep mode.*

Connecting 864 to the PC

Switch off PC and programmer. Insert the communication cable included with your 864 programmer package to a free printer port on your PC. If your computer is equipped with only one printer port, substitute the programmer cable for the printer cable. Connect the opposite cable end to the programmer. Screw on both connectors to counter-connectors. This is very important. It may be uncomfortable to switch between printer cable and programmer cable, though it is not recommended to operate the 864 programmer through a mechanical printer switch. Use of an electronic printer switch is impossible. But you can install a second multi-I/O in your computer, thus obtaining a supplementary printer port, says LPT2. So your printer may remain on LPT1 while the programmer on LPT2.

Switch on the PC.
Connect the mains connector of the power supply (or the wall-plug power supply itself) to a mains plug, then connect the mini-DIN connector to the programmer's connector labeled "12VAC". At this time all 'work result' LEDs (and 'POWER' LED) light up successive and then switch off. Once the POWER LED lights with low brightness then the 864 programmer is ready to run.
Next run the control program for 864.

Note: *When the PC is switch off and you turn on programmer, LED maybe not blinking, before programmer maybe permanent on reset.*

Caution! *If you don't want to switch off your PC when connecting the 864, proceed as follows*:
- *When connecting the programmer to the PC: FIRST insert the communications cable and THEN the power-supply connector.*
- *When disconnecting the programmer from the PC: FIRST disconnect the power-supply connector and THEN the communication cable.*

From 864's point of view the connecting and disconnecting sequence is irrelevant. Protection circuits on all programmer inputs keep it safe. **But think of your PC please**.

Note: *Programmer's protection electronics protect the target device and the programmer itself against either short or long-term power failures and, partly, also against a PC failure. However, it is not possible to grant the integrity of the target device due to incorrect, user-selected programming parameters. Target device may be not destroyed by forced interruption of the control program (reset or switch-off PC), by*

removing the physical connection to the programmer, but the content of actually programmed cell may remains undefined. Don't unplug the target device from the ZIF socket during work with devices (LED BUSY shine).

Problems related to the 864 ⇔ PC interconnection, and their removing

If you have any problems with 864 ⇔ PC interconnection, see section **Common notes** please.

Self test and Calibration

If you feel that your programmer does not react according to your expectation, please run the programmer self test using Diagnostic POD, enclosed with the standard delivery package. For optimal results with programmer we recommend you undertake every 6 months, an extended test and to check the calibration. See instructions for self test in the **Diagnostics** menu of PG4UW.
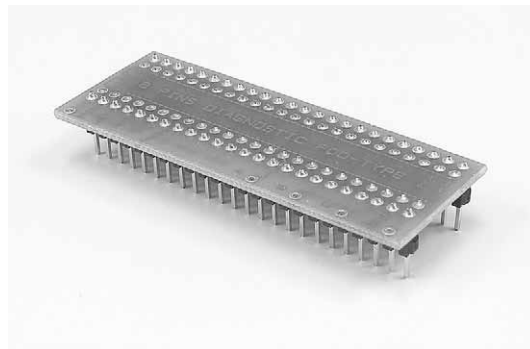
Technical specification

Socket, pin drivers and DACs

- 48-pin DIL ZIF (Zero Insertion Force) socket accepts both 300/600 mil devices up to 48-pin
- Three D/A converters for VCCP, VPP1, and VPP2, with controllable rise and fall time and current limitation
- TTL driver provides H, L, CLK, pull-up, pull-down, or tri-state on all 48 pins
- full support of Low Voltage circuits from 1.8 V up
- autocalibration

Device support

Programmer
- EPROM: NMOS/CMOS, 27xxx and 27Cxxx series, from 16Kbit to 32Mbit with 8/16 bit data width, full support for LV series
- EEPROM: NMOS/CMOS, 28xxx, 28Cxxx, 27EExxx series, with 8 / 16 bit data width
- Flash EPROM: 28Fxxx, 29Cxxx, 29Fxxx, 29BVxxx, 29LVxxx, 29Wxxx, 49Fxxx series, from 256Kbit to 32Mbit, with 8 / 16 bit data width, full support for LV series
- serial E(E)PROM: 17Cxxx, 24Cxxx, 24Fxxx, 25Cxxx, 59Cxxx, 85xxx, 93Cxxx, NVM3060, MDAxxx series, full support for LV series
- PROM: Harris, NS, Philips, Tesla, TI
- NV RAM: Dallas DSxxx, SGS/Inmos, MKxxx series
- PLD: AMD PALCE, GALs, PEELs series
- Microcontrollers 48 series: 87x41, 87x42, 87x48, 87x49, 87x50 series
- Microcontrollers 51 series: 87xx, 87Cxxx, 87LVxx, 89Cxxx, 89Sxxx, 89LVxxx, Philips 87C748..752 series
- Microcontrollers Microchip PIC: PIC12xxx, PIC16xxx, PIC17Cxxx, PIC18xxx series
- Microcontrollers Atmel AVR: AT90Sxxxx series
- Microcontrollers NEC (uPD78Pxxx series), SGS-Thomson (ST6 series), Zilog (Z8 series), etc.

I.C. Tester
- TTL type: 54,74 S/LS/ALS/H/HC/HCT series
- CMOS type: 4000, 4500 series
- static RAM: 6116 .. 624000
- user definable test pattern generation

Package support

- package support includes DIP, PLCC, SDIP, SOIC, PSOP, TSOP, TQFP and other (ask for package converters)

- support all devices in DIP with default ZIF-48 socket
- support PLCC28, PLCC32 and PLCC44 with universal adapter (optional accessory, to be ordered separately)
- compatible with third-party adapters for non-DIP support

Programming speed

Note. *These times strongly depend on PC speed, LPT port type and operating system free resources. Therefore are given values of two different PC configurations for comparison.*

Device	Operation	Time A	Time B
27C010	programming and verify	39 sec	32 sec
AT29C040A	programming and verify	110 sec	90 sec
AM29F040	programming and verify	165 sec	139 sec
PIC16C67	programming and verify	46 sec	41 sec

Time A conditions: *Pentium MMX, 250 MHz, ECP/EPP, WIN98.*
Time B conditions: *Athlon, 750 MHz, ECP/EPP on PCI bus, WIN98.*

Device operations

- **standard:**
  - automatic ID-based selection of EPROM/Flash EPROM
  - blank check
  - read
  - program
  - verify
  - erase
  - configuration and security bit program
  - illegal bit test
  - checksum
- **security**
  - insertion test
  - contact check
  - ID byte check
- **special**
  - production mode (automatic start immediately after device insertion)
  - automatic device serial number incrementation

Buffer operations

- view/edit, find/replace
- fill/copy, move, byte swap, word/dword split
- checksum (byte, word)
- print

Supported file formats

- unformatted (raw) binary
- HEX: Intel, Intel EXT, Motorola S, MOS, Exormax, Tektronix, ASCII-space-HEX
- JEDEC (ver. 3.0.A)

PC system requirements

See section *Introduction/ PC requirements*

General

- operating voltage 12..15V AC/max.1A (adapter included in package)
- power consumption - max. 12W in active mode, approx. 1W sleep mode
- dimensions 275x157x47 mm
- weight (without external adapter) 1.5 kg
- operating temperature 5°..40°C
- humidity 20%.80%, non condensing

Package included

- 864 programmer
- connection cable
- diagnostic POD for self test
- anti-dust cover to ZIF socket
- power supply adapter 12VAC/12W
- user manual
- 3.5" diskette with software
- "DEVICE PROBLEM REPORT" form
- registration card
- transport case

Additional services

- Keep Current
- AlgOR
- free technical support (phone/fax/e-mail).
- free lifetime software update via Web site.