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Programmable Logic Device Development Tools

PLD Starter Kit

KANDA SYSTEMS

This starter kit is an easy to use starting kit for any electronics engineer/student who wishes to learn how to use Programmable Logic Devices (PLD's) in their designs. Familiarity can be gained on using 16V8, 20V8 and 20V10 devices typically.

Features:

● Programmer unit which connects to a PC Parallel port (Parallel lead inc.)
● The programmer has on-board status LEDs indicating power, low supply & programming activity. A 24 pin ZIF socket allows easy loading of devices to be programmed
● PLD Trainer Unit, this is a demonstration board on to which a programmed PLD can be tried out. The unit has 10 input switches for simulating input signals to the PLD and a switchable output which can be routed either to a seven segment display, or 8 individual LEDs.

Both units have an on-board regulator and DC input socket.

Power requirements are 9v DC 300mA.

● A sample ATF16V8B device is included

All software is supplied on 3.5" disks and an Atmel CD-ROM is included as a reference for all the datasheets required for the kit.

SEM850

PLD Starter Kit.....................................Order Code 318-7718   **each**

MACH™ ISP Starter Kit

LATTICE-VANTIS

The MACH Starter Kit by Vantis allows for evaluation of In-System-Programming (ISP) with MACH devices and benefits of 'Design Direct' programmable logic software in designing with complex PLDs. The software enables design, simulation and programming of Vantis CPLD and PAL devices. It supports JEDEC file generation and includes MACHPRO software for ISP from PC parallel port.

The kit provides IEEE JTAG testability eliminating separate programming/testing stations, thereby avoiding multiple handling steps, facilitating quick time designs.

System requirements: Wins 95, 98 or NT, AMD K6 or Pentium CPU.

Kit includes: ● CD-ROM with 'Design Direct' CPLD software, MACHPRO software, Databook, Applications notes
● 44-pin ISP board   ● Buffered programming cable
● MACH ISP manual hardcopy   ● M4-32/32 and 64/32 samples
● Readme installation procedure

SEM751

MACH4-SK44 Starter Kit ....Order Code 301-0120   **each**

MAX7000s

ALTERA

These devices are ideal for system-level integration, featuring ISP, six output enable signals, two global clocks, fast input registers and programmable slew-rate control. ISP uses JTAG, allowing for devices to be programmed and the design board functionally tested, saving on manufacturing steps and on testing times.

The PL Byteblaster programming cable and the PLS-WEB CD-ROM is all that is required for prototyping.

SEM731

Mftrs. List No.	Macrocells	I/O pins	Speed (ns)	Pins/Package	Order Code	Price Each		
						1+	10+	100+
EPM7032SLC44-6	32	36	6	44 PLCC	**300-5811**			
EPM7032SLC44-10	32	36	10	44 PLCC	**300-5800**			
EPM7032STC44-6	32	36	6	44 TQFP	**300-5847**			
EPM7032STC44-10	32	36	10	44 TQFP	**300-5823**			
EPM7064SLC44-6	64	36	6	44 PLCC	**300-5872**			
EPM7064SLC44-10	64	36	10	44 PLCC	**300-5860**			
EPM7064STC44-6	64	36	6	44 TQFP	**300-5951**			
EPM7064STC44-10	64	36	10	44 TQFP	**300-5914**			
EPM7128SLC84-10	128	36	10	84 PLCC	**300-5975**			
EPM7128SLC84-15	128	36	15	84 PLCC	**300-5963**			
EPM7128STC100-10	128	36	10	100 TQFP	**300-5999**			
EPM7128STC100-15	128	36	15	100 TQFP	**300-5987**			

PL-Byteblaster programming cable...Order Code 302-6530   **each**
PLS-WEB CD-ROM development software, includes data and application notes ..Order Code 301-0193   **each**

CPLD Design System

XILINX

SMD

The XPLA Designer, provides software and application solutions to a range of fast zero power eXtended Programmable Logic Array (XPLA®) CPLDs. The design tool supports both 3V and 5V devices and is PC Windows (3.1X and Windows 95) based, offering design entry, editing, synthesis, device fitting, function simulation, and full timing simulations. The design entry could be via high-level constructs and low-level directives. Popular state machine constructs, truth tables and Boolean equations are supported. The user is able to rapidly simulate designs via interactive waveform entry and analysis by developing simulation scripts for complex vector patterns. 32 macrocell devices are supported.

SEM393

Device	Macrocells	Gate Equivalents	Inputs, I/O	Operating Voltage	Speed (ns)	Pins/Package	Mftrs. List No.	Order Code	Price each		
									1+	10+	100+
3032	32	1000	36/32	3V	8	44 PLCC	PZ3032-12A44	**790-382**†			
3064	64	2000	36/32	3V	10	84 PLCC	PZ3064-12A84	**283-551**†			
5032	32	1000	36/32	5V	6	44 PLCC	PZ5032-10A44	**790-394**†			
5064	64	2000	36/32	5V	7.5	84 PLCC	PZ5064-10A84	**283-563**†			
							† Available until stocks are exhausted				

PZXPLAMSM XPLA Designer ....Order Code 790-400   **each**

VHDL Easy Design Software

The VHDL Easy Design Software is produced by MINC. The software allows design entry using VHDL and will output an EDIF file or equivalent, which can be ported to a design compiler e.g. XPLA Designer or XPLA Professional. Pack contains CDROM (with VHDL Easy and XPLA Designer software), compact wallet and step-by-step tutorial booklet for Philips Coolrunner designs).

SEM687

PZVHDLEZ MSC ……………………………Order Code 120-492†　　each

† Available until stocks are exhausted

Warp2+™ VHDL Compiler

CYPRESS

- Supports Cypress PLDs, CPLDs and FPGAs.
- VHDL (IEEE 1076 and 1164) high level language compiler.
- State of the art optimisations and reduction algorithms.
- Supports Boolean, state table, gate level, Register Transfer Language (RTL), Aldec editor

The Cypress CY3120 (Warp2+) VHDL compiler facilitates device independent design over the Cypress PLD and CPLD range and offers portable design solutions across multiple devices. Warp2+ will be hosted by IBM PC-AT and Windows. It utilises a fully compliant subset of IEEE 1076 VHDL including Enumerated Types, Operator Overload, For ...... Generate and support for integer arithmetic. Also included with the CY3120 is a timing simulation from Aldec, a functional graphical waveform simulator enabling on screen entry and modification of stimulus waveforms.

SEM263

CY3120 (Warp2+) VHDL Compiler ………Order Code 301-1203　　each

FPGA Starter Kit

KANDA SYSTEMS

This kit is a complete development environment as an introduction into the use of Field Programmable Gate Arrays (FPGAs). The kit provides a wealth of VHDL examples and gives a wide range of projects all of which are based around the 40K ATMEL family. The kit specifically programs the ATMEL AT40K20 device.

The starter kit comprises of:

- Comprehensive FPGA book
- Main PCB
- Adapter board
- Cable
- Dongle
- Atmel IDS CD (Version 6)
- Programming Software
- Registration card

On-Board Features

- AT40K20 device included
- Configurator & ISP
- Sockets for AVR microcontroller (AT90S8515) and 4 x 512KB EEPROMS
- Infra-red Transmitter
- Infra-red receiver/decoder
- 2 x ADCs (High precision and high speed)
- 1 x DAC
- 8 x Programmable switches & LEDs
- 2 x Serial ports
- PWM voltage output (up to 500mA)
- Multiple clocks - 40MHz, 10MHz, 4.9512MHz and 32.768KHz
- 6 Digit direct drive LCD Display
- Interface for 2 line x 16 intelligent LCD
- AC or DC power supply input

System requirements:

- PC, minimum Pentium
- WIN 95 or NT4
- At least 32MB RAM (64MB recommended)

SEM852

FPGA Starter Kit ……………………………Order Code 318-7690　　each
AT40K20-2DQC ……………………………Order Code 323-5970　　each

Get Going With 40K Series FPGAs

KANDA SYSTEMS

A comprehensive book which is also supplied with the FPGA Starter kit, **Order Code 318-7690**, introduces the reader to the Field Programmable Gate Array (FPGA). It starts with an overview on FPGAs and covers the architecture of one particular family of FPGAs, the ATMEL AT40K series. Using the tools five simple designs are looked at, illustrating several features of the architecture and how they are implemented. Finally, more advanced designs are looked at which directly access the use of the FPGA starter kit and its peripherals.

SEM853

Get Going With 40K Series FPGAs……………Order Code 318-7706　　each

The TRAC Development Kit

ZETEX

TRAC is field Programmable Analogue Device which brings the benefits of a structured, top-down approach to analogue signal processing.

The TRAC Development Kit enables instant prototyping of TRAC designs, allowing engineers to prove their ideas and get them speedily to market. This is achieved by the integration of software, hardware and the device which is fully reconfigurable. An analogue application is designed and simulated by the Windows based, drag and drop software and the data is sent to the hardware to programme the device.

The fully functional TRAC development board includes four TRAC020 devices (each with 20 cells per device, digitally programmable to one of eight top-level functions) to permit prototyping of designs up to 80 cells, and boards can be daisy-chained for more ambitious projects. As well as a parallel interface for programme download, an EEPROM is also included for non-volatile programme storage.

The Development Kit includes:

- DC power supply
- Applications library
- Parallel interface cable
- Manual and documentation
- Design, simulation and download software

SEM536

TRAC020LHUK Development Kit for UK ………Order Code 325-2231　　each
TRAC020LHEURO Development Kit for Europe ..Order Code 325-2255　　each

Description	Mftrs. List No.	Order Code	Price Each		
			1+	10+	100+
20 Cell TRAC, 16/SSOP Package	TRACS2Q16	SMD 325-2218			
20 Cell TRAC, 36/SSOP Package	TRAC020LHQ36	SMD 325-2220			
20 Cell TRAC, 40/DIL Package	TRAC020D40	676-032†			

† Available until stocks are exhausted

continued

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Programmable Logic Device Developement Tools — Continued

ispPAC

New

The ispPAC system comprises of a development kit and associated devices which bring analogue functions such as sum/difference, gain/attenuation, integration and high order filters under the control of a program-mable routing architecture. The individual PACells have programmable gain and frequency response with user definable routing so that separate internal blocks may be either connected together, or connected to external pins on the device, in this way analogue functions may be produced without compromising performance or bandwidth.

The devices are In-System Programmable, and the development kits include the necessary cables and software together with an evaluation board and sample devices.

The PAC-Designer kit includes:
- PAC-Designer 'Getting Started Manual'
- Software on CD-ROM
- isp Interface to connect to PC parallel port
- Evaluation board

Applications:
- Single 5V supply signal conditioning
- Active filters, Gain stages, Summing blocks
- Analogue Front-Ends for Data Acq. systems
- Sensor signal conditioning

SEM889

Description	Mftrs. List No.	Order Code	Price Each		
			1+	10+	100+
Evaluation kit for ispPAC 10 devices.................................	ISPPAC-Designer system 10	**333-1568**			
Evaluation kit for ispPAC 20 devices.................................	ISPPAC-Designer system 20	**333-1570**			
ispPAC with four Instrument Amplifier stages, 28pin DIP ..	ISPPAC10-01PI	**332-7784**			
ispPAC with four Instrument Amplifier stages, 28pin SOIC	ISPPAC10-01SI	**332-7796**			
ispPAC with two Instrument Amplifier stages, 8-bit DAC and Fast dual comparator, 44 pin PLCC	ISPPAC20-01JI	**332-7802**			

Memory Kits

PCMCIA Card Driver
Card Wizard
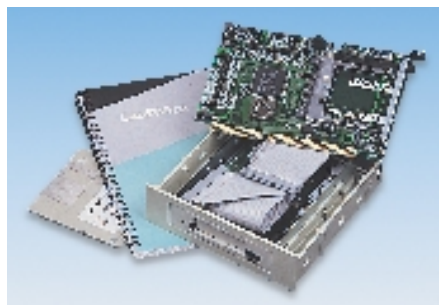
Card Wizard is a Reader/Writer for all 2.01 compatible type 1, 2 or 3 cards.

Connecting to a standard 16 bit ISA slot, Card Wizard transforms your desktop PC. It presents one type 3 slot on the back ideal for Ethernet or Modem cards, and 13.5mm high slot in a 3.5" or 5.25" bay on the front for type 1, 2 or 3 cards. All the necessary driver software is provided in addition to a comprehensive manual. Card Wizard will support all Memory, ATA cards and I/O devices meeting PCMCIA 2.01 specification.

SEM332

Card Wizard ....Order Code 640-955   **each**

Serial EEPROM Designer's Kit
Supports 24C/24LC/24XX/59C/85C/93C/93LCXX Families

MICROCHIP

Microchip's Serial EEPROM Designer's Kit includes everything necessary to quickly develop a robust and reliable Serial EEPROM based design and greatly reduce the time required for system integration and hardware/software debug.

The Total Endurance software model enables designers to quickly choose the best Serial EEPROM for the specific application and perform trade-off analysis with voltage, temperature, write cycle and other system parameters in order to achieve the desired erase/write endurance or product lifetime.

Microchip's SEEVAL (Serial EEPROM Evaluation and Programmng System) will accept any Microchip Serial EEPROM in DIP package and enable the designer or system integrator to read, or erase any byte or the entire array.

Contents include :
- Microchip Total Endurance® software model
- Microchip Serial EEPROM sample pack
- Microchip SEEVAL® evaluation and programming board
- RS232 serial cable
- Microchip SEEVAL® software

SEM424

Supplied with a universal power supply. UK or International power supply optional. UK and European mains plug lead available separately.

Serial EEPROM Designer's Kit ....Order Code .790-965	**each**
Power Supply 9V, 500mA (UK 240Vac)........Order Code 110-899	**each**
Power Supply 9V, 900mA (IEC 110- 240Vac) .Order Code 110-711	**each**
UK mains plug lead ....Order Code 439-319	**each**
European mains plug lead ....Order Code 210-699	**each**

8 Bit Microprocessor Kits & Development Tools

05BTutor Kit

(M) **MOTOROLA**
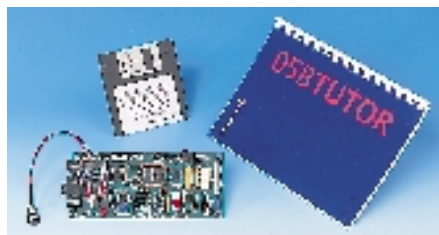
The Ultimate Tutor is an easy-to-learn, easy-to-install teaching tool for introduction to the M68HC05 range. It allows for learning at own pace from basics to understanding the M68HC05 architecture. On-disk demonstration programs are given which introduce new aspects of assembly language programming and highlight fea-tures of the 68HC05, allowing the programming concepts gained to be applied to trainees/designers applications. The 3.5in disk contains emulation and downloading software. External peripheral components may be used with the training board to extend understanding.

Kit includes:
- Demo board assembly
- Tutorial book
- Software disk
- Schematic diagrams
- 9V PP3 battery

Minimum requirements:
- IBM compatible PC (DOS/Wins) or a Power Mac 7.5 or later
- 1+ serial port
- 3.5in floppy disk drive
- 9 to 9 pin serial cable

SEM607

	Order Code	Price Each
05BTutor, M68HC05 Tutorial System	**111-510**	

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Semiconductors – Starter Kits

Farnell

M68HC05 In-Circuit Simulator Kits

MOTOROLA

Motorola's Programmer/In-Circuit Simulator (ICS) kits help develop and debug target systems incorporating members of the 68HC05 microcontroller family. The kits provide an interface to users target system for Windows based editing, assembly, software simulation, programming and in-circuit simulation. The inputs/outputs of the target can be used during code simulation.

Features:
- Windows based Integrated Development Environment (IDE) with editor, assembly, debugger and simulator – runs under Wins 3x and '95
- Programs EPROM, OTP, or EEPROM microcontrollers

- MCU samples
- Serial cable (PC to ICS)
- Power Supply
- MCU technical databook
- Software/Hardware user's manual
- Applications guide
- 68HC05 CD-ROM

SEM608

	Order Code	Price Each
M68ICS05B design-in kit for 68HC705B16 devices	**111-521**	
M68ICS05C design-in kit for 68HC705C8A/9A devices	**111-533**	

MC68HC08 In-Circuit Simulator Kits

These Programmer/In-Circuit Simulator (ICS) kits help develop code and debug target systems incorporating the MC68H(R)C908 range of FLASH microcontrollers. The Windows based development environment incorporates an assembler, editor, simulator and debugger which provide an ideal platform to write and debug code for this range of devices.

Features:
- Windows based IDE interface
- Programs, Simulates and Emulates the selected devices
- JL/JK Unit can accept DIL and SOIC 20/28 pin devices

- Serial cable and all Header cables supplied
- Universal power supply included
- MCU samples
- Technical manuals and software supplied

SEM891

	Order Code	Price Each
M68ICS08JL-kit ...development kit for MC68H(R)C908JLx/JKx	**332-4400**	
M68ICS08GP-kit ...development kit for MC68HC908GP32	**333-3413**	
M68ICS08JB-kit ...development kit for MC68HC908JB8xx NEW	**348-0197**	

SK-5xx Starter Kits

Infineon technologies

Each starter kit contains an evaluation board which connects to a PC via RS-232 and allows for capabilities of the featured microcontrollers to be assessed and development of applications to be carried out quickly and easily. The board has a wire wrap area and RAM and FLASH memory for program download. Evaluation versions of third party development software are provided, with restricted code size, as well as full data on the microcontroller, the board manual and application notes. The starter kit CD-ROM also contains code examples, both source and executable.

SEM678

SK-504, Starter Kit for C504 microcontroller…Order Code 119-880	**each**
SK-515, Starter Kit for C515 microcontroller…Order Code 119-908	**each**
SK-167, Starter Kit for C167 microcontroller…Order Code 119-910	**each**

DAvE CD-ROM

Infineon technologies

DAvE - Digital Application Engineer CD-ROM aids evaluation and comparison of the C500 and C166 families of microcontrollers, allowing selection of correct device for application. It is a source for all standard information on Siemens embedded technology with access to user's manual, data, application notes etc. It helps with programming of the selected device via intelligent wizards, configure the device and auto-generate C-level templates with driver functions for on chip peripherals and interrupt controls.

SEM677

DAvE, Digital Application Engineer CD-ROM ..Order Code 119-738	**each**

8051 Based Microcontrollers

Dallas 87C520 Starter System

EQUINOX

This system is aimed at developers looking to evaluate/program the high speed Dallas 87C520 microcontrollers. The kit is based around a 'Universal 8051 Monitor Module' which allows user code to be downloaded into external RAM and then single-stepped under PC control using the Keil 'dScope' debugger. The system is supplied with an advanced Windows Integrated Development Environment (IDE), Keil C51 Compiler, Assembler and Debugger. This makes it ideal for evaluation and small projects.

Features:
- Integrated Development Environment (IDE) including an ANSI C Compiler, Macro Assembler, project management utility and software simulator/debugger (limited to 2K total code output)
- Universal 8051 Monitor Module including two serial port channels allowing one for debugging information and one for user serial communications hardware and a prototyping area
- Includes a UK power supply, serial and parallel cables
- Ideal for evaluation purposes and small projects

SEM765

EQ-DS520-ST1 (UK) Dallas 87C520 Starter System ..Order Code 302-2250	**each**
EQ-DS520-ST1 (EU) Dallas 87C520 Starter System ..Order Code 327-0282	**each**

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Semiconductors – Starter Kits

8051 Based Microcontrollers — Continued

51LPC

The LINK-51 Evaluation Kit comes with EMIT° 3.0 (Embedded Micro Internetworking Technology) Evaluation networking software for the 51LPC family of 80C51-based microcontrollers. EMIT software is a device networking software based on standard Internet technologies that network 8- and 16-bit embedded devices to each other and the Internet.

LINK-51 provides a development environment for embedded network connectivity into electronic devices, including:

- 51LPC microcontroller
- EMIT 3.0 evaluation software
- 51LPC - based evaluation board
- Electronic documentation on disk

EMIT software allows access to the on-board 51LPC via web browser, as well as connection of several micro enabled devices via a local RS232/485 network.

Note: The software provided has a 30 day evaluation period from installation. This does not disable the product completely but remote connection to the device through a Gateway from an internet connection will be lost.

Features:

Device Application Tools
- Device object server
- Assembly source code - 8051
- C source code - 8051
- Device debugging tools
- Package data table creation utility
- Device network connectivity software

User Interface Tools
- Web browser graphical user interface
- Java Bean compliant interface objects
- Dynamic Services for batch process data gathering
- C simulators of EMIT - enabled devices
- EMIT Access Library client application toolkit

Electronic Documentation
- Complete description of the EMIT architecture
- Step by step tutorials on how to use the references board and easily created user interfaces
- Start to finish development process guidelines
- Development procedures for the different user interface options
- Programming instructions and examples on integration with a device
- Reference details on EMIT components and utilities

Hardware Reference Design
- LINK-51 evaluation board for the 51LPC family
- RS232 support
- Expansion interface bus for other hardware products

LINK-51, the 51LPC Evaluation Kit for the P87LPC764	Order Code 309-5745	each

The 51LPC microcontroller family features include:
- C51 compatible
- 2.7V to 6V operating range
- Brownout detection
- Twice the 8051 execution time
- Two 16-bit counters/timers
- Two analogue comparators
- Full duplex UART
- I²C comms port
- Watchdog timer
- Active low reset
- Configurable oscillator
- LED drive capability
- Up to 18 I/Os

SEM776

Mftr.	Pins	Description	Mftrs. List No.	Order Code	Price Each 1+	10+	100+
87 PS	20	8-bit CPU, 4Kb OTP PROM, 128 bytes RAM - 20MHz	P87LPC764BD	SMD 309-5721			
87 PS	20	8-bit CPU, 4Kb OTP PROM, 128 bytes RAM - 20MHz	P87LPC764BN	309-5733			

80C5X Starter Kits

Bluebird Electronics
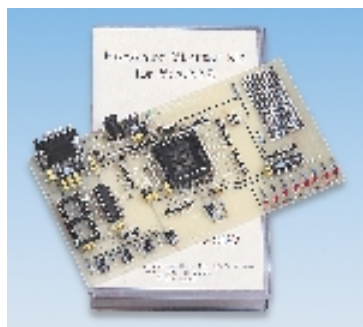
Three separate development boards, designed for Farnell by Bluebird Electronics, for Philips 80C552, Infineon 80C515/535 and Infineon 80C517/537 8051 based micro-controllers. The product is aimed at engineers looking for a quick development board to test out their ideas before laying out the production design.

Each kit contains a screen printed double sided PCB with all port pins available to the developer, PLCC socket for the processor, RS232 interface with driver IC, socket and decode for 8, 16 or 32K EPROM, 5 push buttons - one dedicated to reset, 2.5mm power socket, 12MHz crystal, driver IC with 8 LEDs, 200 hole patch area, circuit diagram and assembly notes.
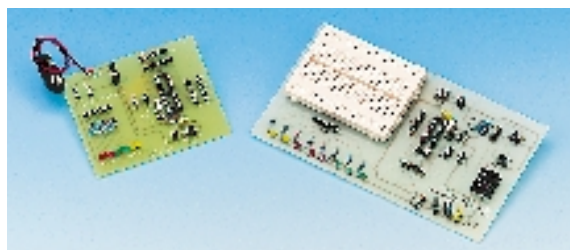
SEM320

	Order Code	Price Each
Hardware kit for 80C552 micros	638-900	
Hardware kit for 80C515/535 micros	638-912	
Hardware kit for 80C517/537 micros	638-924	

87C750/751 Development Kits

Bluebird Electronics

Two kits are available for 87C750/751 development, designed to getting projects off the ground with minimum of effort and expense. The I/O is pinned out to give maximum flexibility during development and both boards handle the 24 pin DIL package. All the necessary components are included i.e. sockets, regulator, reset components, LED's resonator etc. A circuit diagram and construction notes are also included.

The 87C75/751 Project Board (120-066) has an additional prototyping block, slide and push switches and connector for an external 9V supply.

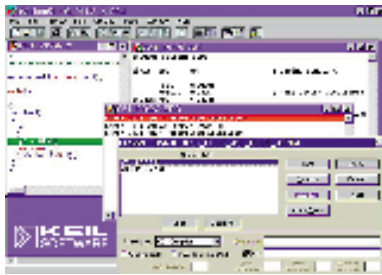Use in conjunction with DS750 Development Kit (485-068).

SEM225

87C750 HSK	Order Code 527-749	each
87C750 PROJ....................................	Order Code 120-066	each

Keil - 8051 Software Development Tools **KEIL**

The Keil PK51 Professional Developers Kit comprises of a comprehensive suite of development tools for the 8051 family. The Windows Integrated Development Environment encompasses an optimising ANSI-C compiler, Macro Assembler, Software Simulator and Target Debugger, Integrated Editor and a powerful Project Management Utility. The C-compiler generates highly optimised code for any 8051 derivative and features microcontroller-specific language extensions allowing all resources of the target micro to be utilised.

Features:
● Windows Intergrated Development Environment compatible with Windows 3.11, 95 and NT
● Optimising ANSI-C compiler
● Macro Assembler
● Software Simulator and Target Debugger
● Integrated Editor
● Powerful Project Management Utility
● Supports code generation for most 8051 derivatives which feature either internal or external code memory

Device Support:
● Generic 8051/8052/87C families
● Atmel 89C and 89S families
● Dallas 80C320/520/530
● Philips 87C750/751/752
● Infineon 80C517

SEM681

PK51-2K, Keil PK51-2K - 8051 Tool Set.......Order Code 121-058   **each**

Keil PK51 2K to 8K Upgrade **KEIL**

This software package allows an existing user of the Keil 'PK51-2K' 8051 Toolset to upgrade to a version which can generate up to 8K bytes of executable program code. The upgrade includes floating point mathematical libraries making it ideal for scientific and educational projects. A full suite of reference documentation is also included.

Features:
● Upgrade from PK51-2K to 8K bytes version
● Integrated Development Environment (IDE) including an ANSI C Compiler, Macro Assembler, project management utility and software simulator/debugger (limited to 8K total code output)
● Floating point mathematical libraries making it ideal for scientific/educational projects
● Full Keil PK51 Reference Manual Set
● Supports most popular 8051 devices

SEM762

PK51-8K-UPG Keil PK51 2K to 8K Upgrade ....Order Code 302-2262   **each**

Micro-Pro PLUS device Programming System
Supports Atmel, Dallas, Intel, ISSI, Philips, Temic, etc.

This programming system has the ability to program the on-chip code/EEPROM space of most 8051 microcontroller derivatives from Atmel, Dallas, Philips, Intel ISSI and Temic. Support for the majority of the Atmel AVR microcontroller family is also offered together with a selection of Atmel products including EEPROM and FLASH memories. The powerful Windows interface software supports code and data buffers, setting of special option bits and a device auto-program utility. System contents include a programmer, parallel cable, software and mains power supply adaptor.

Features:
● Supports programming of on-chip memory of most 8051/251 and Atmel AVR microcontrollers
● Supports programming of many Atmel serial and parallel EEPROM devices plus a selection of Atmel FLASH memories
● Powerful Windows Interface Software (compatible with Win 3.11, 95 and NT)
● Compatible with binary and Intel HEX files
● Accepts 8/20/40 pin DIL devices without adaptor
● Fast programming algorithims (many approved by manufacturer)
● Field upgradeable programmer by virtue of FPGA architecture
● Connects to PC parallel port

Device Support:
Atmel 89C, 89F, 89S, 90S (AVR) microcontroller families
Atmel serial EEPROM devices
Atmel parallel EEPROM family
Atmel FLASH memory family
Dallas 87C520
Intel 87C51-FA/FB/FC, 87C52, 251
Philips 87C51-FA/FB/FC, 87C52
Temic 87C51, 87C52, 251

Note: not all devices may be supported within a family

SEM356

	Order Code	Price Each
MPW-PLUS (UK) Micro-Pro PLUS Programmer	111-715	
MPW-PLUS (EU) Micro-Pro PLUS Programmer	327-0294	
Re-programming Adaptor	790-151	
PLCC 44 Adaptor	701-040	
SOIC 20 Adaptor	701-051	

Gemini-1 - ISP Programmer for Philips 8051 Flash Microcontrollers **EQUINOX**

Gemini-1 is a CE compliant programmer, supports In-System Programming (ISP) of the Philips 89C51Rx+ FLASH Microcontroller Families using the serial port of the target microcontroller.

Features:
● Supports In-System Programming (ISP) of the Philips 89C51Rx+ FLASH Microcontroller Family
● Connects to PC serial (COM) port using cables supplied
● ISP cable connects to user target system via 10-way header
● Obtains power (+5V) from the target system
● Generates +12V Vpp on-board the programmer
● Powerful 'Programmer Interface Software' (compatible with Win 3.11, 95, 98 & NT)
● Field upgradeable programmer firmware

Device support:
● Philips: 89C51RA+, 89C51RB+, 89C51RC+, 89C51RD+

SEM839

EQ-GEM 1, Gemini-1 ISP Programmer ....Order Code 316-6077   **each**

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Semiconductors – Starter Kits

8051 Based Microcontrollers — Continued

C51 Starter System
8051 FLASH Microcontroller Starter System

This CE compliant starter system provides a comprehensive suite of development tools for the Atmel 8051 microcontroller family. The system hardware comprises of a combined parallel and serial device programmer, feature-packed evaluation module, In-System Programming (ISP) cable and mains power supply. Also included is a powerful Keil Integrated Development Environment (IDE) featuring an editor, Macro assembler, C compiler, linker, software simulator and HEX creator. Sample programs are supplied to help the developer to quickly become familiar with the 8051 microcontroller family and C. It is possible to download code from the IDE straight to the sample AT89S8252 microcontroller fitted in the evaluation module without removing the device from the socket.

- Programs Atmel 89C 20-pin microcontrollers in the ZIF socket
- Programs Atmel 89S microcontrollers in-system via ISP cable
- Evaluation module supplied features 8/20/40 pin microcontroller sockets, LEDs, switches, serial communications etc.
- Includes Keil PK51-2K 8051 Toolset (limited to 2K total code output)
- Fast programming algorithms (many approved by manufacturers)

Device Support:
Atmel (parallel prog mode) – AT89C1051, AT89C2051
In-System Programming – AT89S8252, AT89S53

SEM397

EQ-8051-ST1 (UK) FLASH Starter System........**Order Code 111-806**	**each**
EQ-8051-ST1 (EU) FLASH Starter System........**Order Code 327-0300**	**each**

Atmel 8051 Professional Starter System

This is a CE compliant starter system for engineers wishing to learn programming and development with 8051 microcontrollers. The system hardware comprises of a Micro-ISP serial programmer, an Atmel AT89S8252 microcontroller which features 8K of FLASH and 2K of EEPROM on-chip memory, an 89S Personality Module, a feature packed Evaluation Module and a prototyping module. The 89S Personality Module comes fitted with an AT89S8252 device that can be programmed In-System. The Evaluation Module features LEDs, push buttons, piezo sounder and serial communications and the Prototyping Module features an area where small circuits can be developed. Both the Evaluation and Prototyping Modules plug into the Personality Module providing a completely re-usable development system. The Keil C Compiler is included (limited to 2K total code output) providing a powerful and flexible development environment.

Features:
- Integrated Development Environment (IDE) including an ANSI C Compiler, Macro Assembler, project management utility and software simulator/debugger (limited to 2K total code output)
- Microcontroller 89S Personality Module featuring 40-pin socket and an ISP header
- Evaluation Module featuring LEDs, push buttons, piezo sounder, RS232 serial port and a Prototyping Module featuring an area for small circuits to be developed. These modules plug into the Microcontroller Personality Module
- Micro-ISP serial programmer with Windows software (compatible with Win 95, 98 and NT)
- Connects to a spare PC serial (COM) port
- Field upgradeable programmer firmware

Device Support
Atmel AT89S8252, AT89LS8252, AT89S53, AT89LS53

SEM763

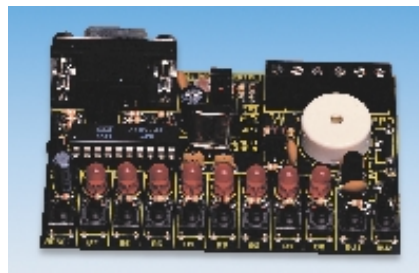|	
EQ-89S-ST1 Atmel 8051 Professional Starter System..............................Order Code 302-2237	**each**

Support Tools for the 8051 family
89C-1051/2051 Demo Module

An evaluation module for the 89C-1051/2051 FLASH microcontrollers.
Features include:
- 8 multiplexed I/O lines - LED/Push button
- RS-232 Serial communications up to 120K Baud
- Inexpensive ADC using on-chip comparator
- Accepts either Atmel 89C1051 or 89C2051
- Supplied complete with pre-programmed 89C2051 and PC serial cable
- C51 software provided includes pitch generation, ambient light meter, serial communications and DVM
- Credit card size - 85 33mm

SEM398

AT-89CX051-DEMO Atmel 89C-1051/2051 Demo Module...............................Order Code 790-357	**each**

89C-1051/2051 OEM Module
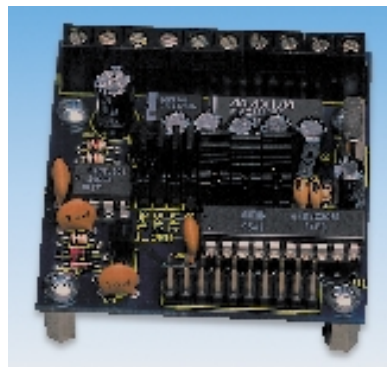
An OEM module for evaluation or design-in into custom products.
Features include:
- Supports Atmel 89C1051 and 89C2051 processors
- RS-485 Serial hardware - allows up to 32 modules to be networked together
- RS-232 Serial hardware - allows connection to terminal (supports one hardware and one software UART)
- 1K bytes EEPROM memory for non-volatile data storage
- A/D circuitry using microcontroller on-chip comparator
- All microcontroller I/O lines brought out to header

SEM399

	Order Code	Price Each
AT-89CX051-OEM Atmel 89C-1051/2051 OEM Module	790-369	

Micro-ISP Programming System

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714

The programmer downloads the program serially, bit by bit, to the microcontroller. By utilising the ISP features of the Atmel 89S and 90S microcontroller families, the devices can be reprogrammed without removing from the target board.

The programming system includes the 8051 socket stealer which allows you to add In-System-Programmability to existing hardware by using an 89S8252 in place of any generic 8051 40-pin DIL microcontroller.

Features include:
- Programmer connects to parallel port
- No power supply required
- Windows-based software
- 8051 socket stealer module
- AT89S8252 microcontroller
- Atmel CD-ROM Data Book
- Full documentation

SEM450

AT-89S-ISP-SYSTEM ....Order Code 795-239   each

8051/AVR Socket Stealer

795-252

795-264

The Socket Stealer Module adds In-System Programmability to existing hardware by simply plugging into the 40-pin or 40-pin microcontroller socket. For 8051 devices the microcontroller is replaced with an Atmel 89S8252 which is then plugged into the Socket Stealer. For AVR devices the existing microcontroller is plugged into the Socket Stealer. Future software revisions can be made without disturbing the microcontroller by simply connecting a Micro-ISP or Activ8r programmer to the ISP header of the Socket Stealer and reprogram in-system.

Features
- Adds In-System programming to existing non-ISP circuit board designs
- Ideal for code development purposes, allowing firmware to be developed and tested quicker and more easily
- Isolates MISO, MOSI and SCK microcontroller pin from target circuit during programming avoiding any contention problems

Device Support
Atmel AVR - Atmel AT90S8515/4414

8051- Atmel AT89S8252

SEM760

	Order Code	Price Each
SS-89S252-P Dual In line 40-pin Socket Stealer (8051)	795-252	
SS-89S252-J PLCC 44-pin Socket Stealer (8051)	795-264	
SS-89S Dual In Line 20-pin Socket Stealer (8051)	120-996	
SS-90S8515-P Dual In Line Socket Stealer (AVR)	302-2365	
SS-90S8515-J PLCC 44-pin Socket Stealer (AVR)	303-1068	

Micro-ISP Series IV - Atmel Microcontroller ISP System

This CE compliant programmer supports In-System Programming (ISP) of the Atmel 89S (8051), 90S (AVR) and ATmega (AVR) FLASH microcontroller families. The programmer connects to any standard PC serial port and comes complete with a 10-way serial programming cable which connects to the user target system. Programming is via a 3-wire SPI bus plus control of the microcontroller RESET line.

Features:
- Programs Atmel 89S (8051), 90S (AVR) and ATmega (AVR) microcontrollers In-System
- Standard version operates with a supply voltage range of 4.6V to 6.0V. Low Voltage version operates with a supply voltage range of 3.0V to 6.0V
- Connects to a PC serial (COM) port
- Serial Programming ribbon cable connects to user target system
- Obtains power from user target system
- Meridian for Windows - Programmer interface software (compatible with Win 3.1, 95, 98 and NT)
- Field upgradeable programmer firmware

Device Support
Atmel AVR - AT90S1200(A), AT90S2313, AT90S2323, AT90LS2323, AT90S2343, AT90LS2343, AT90S4414, AT90S8515, AT90S4434, AT90LS4434, AT90S8535, AT90LS8535, ATmega103(L), ATmega603(L)

Atmel 8051 - AT89S8252, AT89LS8252, AT89S53, AT89LS53

SEM759

UISP-S4 Standard Micro-ISP Serial Programming System ....Order Code 302-2286   each
UISP-LV4 Low Voltage Micro-ISP Serial Programming System ....Order Code 302-2298   each

AVR Professional Starter System

This CE compliant starter system provides a comprehensive suite of development tools for the Atmel AVR RISC microcontroller family. The system hardware comprises of a combined parallel and serial device programmer, feature-packed evaluation module, In-System Programming (ISP) cable and mains power supply. Also included is a powerful software Integrated Development Environment (IDE) featuring an editor, AVR Macro Assembler, AVR BASIC LITE compiler and software simulator. Sample programs are supplied to help the developer to quickly become familiar with the AVR microcontroller family. It is possible to download code from the IDE straight to the sample AT90S1200 microcontroller fitted in the evaluation module without removing the device from the socket.

Features:
- Programmer supports parallel and In-System Programming (ISP) of Atmel 90S (AVR) RISC microcontrollers
- Evaluation module supplied features 8/20/40 pin microcontroller sockets, LEDs, switches, serial communications etc.
- Integrated Development Environment (IDE) including editor, BASIC compiler (restricted to 1Kbytes code) assembler and software simulator
- Programmer/Evaluation module connect to PC serial (COM) port
- Meridian for Windows-Programmer Interface Software (compatible with Win 3.11, 95 and NT)
- Field upgradeable programmer firmware
- CE compliant

Device Support:
AT90S1200, AT90S2343, AT90S2313, AT90S4414, AT90S8515

SEM545

AVR2-ST (UK) AVR Professional Starter System..Order Code 111-764   each
AVR2-ST (EU) AVR Professional Starter System..Order Code 327-0312   each

Atmel AVR Professional Development System

This CE compliant development system provides a comprehensive suite of development tools for the Atmel AVR RISC microcontroller family. The system hardware comprises of a combined parallel and serial device programmer, 'Classic' AVR Microcontroller Personality Module, feature-packed Evaluation Module, Prototyping Module, In-System programming (ISP) cable and UK mains power supply. Also included is an Integrated Development Environment (IDE) featuring an editor, macro assembler, optimised BASIC compiler and software simulator. Extensive on-line help and many examples are provided to help reduce the learning curve.

Features:
- Integrated Development Environment (IDE) including editor, BASIC compiler (limited to 1K code size), assembler and software simulator. The IDE also includes a macro assembler, support for in-line assembly and linking with pre-assembled object files
- Windows programmer software (compatible with Win 95, 98 and NT)
- Classic AVR Microcontroller Personality Module which plugs into the Evaluation and Prototyping Modules
- Evaluation module features eight, 20 and 40-pin microcontroller sockets, LEDs, switches, piezo buzzer, serial communications and LCD connector. The Prototyping Module features an area for small circuits to be developed.
- Connects to a spare PC serial (COM) port
- Field upgradeable programmer firmware

Device Support
AT90S1200(A), AT90S2313, AT90S2323, AT90LS2323, AT90S2343, AT90LS2343, AT90S4414, AT90S8515, AT90S4434, AT90LS4434, AT90S8535, AT90LS8535, ATmega103, ATmega603

SEM764

AVR-DV1 (UK) Atmel AVR Professional Development System ....Order Code 302-2249   each
AVR-DV1 (EU) Atmel AVR Professional Development System ....Order Code 327-0324   each

continued

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Semiconductors – Starter Kits

8051 Based Microcontrollers — Continued

AVR BASIC IDE

AVR BASIC is a powerful Integrated Development Environment (IDE) for the Atmel AVR range of RISC microcontrollers. The BASIC compiler produces very tight AVR machine code by translating the BASIC source into actual run-time assembly code. The Toolset incorporates an editor, optimising BASIC compiler, macro assembler and HEX creator. Assembled output can be viewed along with the source code. An extensive collection of examples demonstrating how to program different aspects of the AVR microcontrollers is included. Compatible with Windows 95, 98 and NT.

Features:

● Integrated Development Environment (IDE) including editor, BASIC compiler, assembler and software simulator. It also includes a macro assembler and support for in-line assembly and linking with pre-assembled object files
● Support for floating point mathematics (full version only)
● Compiled BASIC generates highly optimised AVR machine code. Not a run time interpreter, minimal speed/code overhead compared with assembler
● Comprehensive suite of code examples available
● Breaks the cost barrier for small projects. Ideal for educational, hobbyist and professional use
● Assembly-like commands can be freely mixed with BASIC code
● Not a run-time interpreter, minimal speed/code overhead compared with assembler
● Supports direct access to SRAM, Registers and EEPROM memory
● 1K maximum code size with Lite version, unrestricted code size with full version

Device Support

AVR BASIC Lite - AT90S1200

AVR BASIC Full - AT90S1200, AT90S2313, AT90S2323, AT90LS2323, AT90S2343, AT90LS2343, AT90S4414, AT90S8515, AT90S4434, AT90LS4434, AT90S8535, AT90LS8535, ATmega103(L), ATmega603(L)

SEM757

AVR-BAS-LITE AVR BASIC Lite ....Order Code 111-788	each
AVR-BAS-FULL AVR BASIC Full Version...Order Code 302-2330	each

AVR ICE200 In-Circuit Emulator

New

The ICE200 is a true Real-Time In-Circuit Emulator for the Atmel AVR microcontroller family. The system offers full speed emulation of most AT90S and AT tiny derivatives including emulation of memory, I/O and on-chip peripherals. Full symbolic debugging in 'C' or assembler is supported using the powerful 'AVR Studio' IDE from the Atmel. (AT Mega family not supported.)

The ICE200 comes complete with target pods for 8, 20, 28 and 40 pin standard and A/D derivatives.

Features:

● Non-intrusive single-chip emulation of processor core, I/O, peripherals and EEP-ROM memory using dedicated AVR emulator chip from Atmel
● Emulation pods for 8, 20, 28 and 40 pin DIL devices included
● Full support for devices featuring A/D converters
● Supplied with AVR Studio - Integrated Development Environment:
  - integrated assembler
  - commands include: Run, Break, Trace, Into, Step over, Step out, Run to cursor, Reset
  - Full visibility of, and access to the target AVR Register File, SP, PC and Memory contents
  - Unlimited number of breakpoints

SEM892

	Order Code	Price Each
AVR ICE200 In-Circuit Emulator	330-6070	

Imagecraft AVR C Compiler

This is an ANSI C compiler for Atmel AVR devices with many features only found in more expensive compilers. An Integrated Development Environment (IDE) is provided which includes a flexible editor, target Configuration Wizard and project builder. The compiler includes optimisation, fast compilation, embedded assembly and support for interrupt functions. A comprehensive printed manual and source code examples are provided to aid learning.

Features:

● Integrated Development Environment with automatic rebuilding including a fully ANSI C compliant AVR compiler (compatible with Windows 95, 98 and NT)
● Configuration Wizard to ease loading, adding and changing target configurations and a flexible editor with syntax highlighting
● Full support for floating point data types (IEEE single precision) and long filenames
● Built-in peephole optimiser
● Relocatable assembler, linker and librarian

Device Support

Atmel AT90S2313, AT90S2323, AT90LS2323, AT90S2343, AT90LS2343, AT90S4414, AT90S8515, AT90S4434, AT90LS4434, AT90S8535, AT90LS8535, ATmega103(L), ATmega603(L)

SEM761

IM-AVRC-1 Imagecraft AVR C Compiler ...Order Code 302-2274	each

Keyfob Starter Kit   **KANDA SYSTEMS**

This is a new development in the range of programmers for the ATMEL AT90S series microcontrollers. The programmer consists of a keyfob style case with all the electronics on board to store and download programs of upto 64KBytes of program code. The keyfob is ideal for situations where a new program needs to be loaded onto a device which is in a remote location such as installed equipment on a customer's premises. The programmer does not need any technical expertise to operate, code updates can be achieved by non-technical personnel.

Code is Uploaded onto the keyfob from a PC parallel port via a supplied adaptor and a windows based setup 'wizard' guides you through the simple routines to download all software including serial numbers and configuration information such as code protection.

The target board needs to have the connections available for serial programming.

Spare keyfobs are available.

Features:

● Programs ALL AT90S devices
● 64Byte program capacity
● Programs Data space
● Programs Fuses (on devices which support serial fuse programming)
● Programs Lockbits
● Programs an ID into the keyfob
● All software supplied on 3.5"disk
● All cables and adaptors needed for upload and download are supplied
● Battery included (GP 23A, 12V)

SEM856

Keyfob Starter Kit ....Order Code 318-7688	each
Spare Keyfob ....Order Code 321-6755	each

Arizona Microchip PIC Development Tools

PICSTART Plus - Low Cost Development/Evaluation System
Supports all PIC16/PIC17 families (Replaces PICSTART-16B1 and PICSTART-16C)

The CE compliant **PICSTART Plus** development system from Microchip provides a highly flexible, low cost microcontroller design tool for all PIC 8-bit, programmable devices (DIL packages up to 40 pins).

PICSTART Plus operates on any PC compatible machine running under the Windows® 3.1 and '95 systems. PICSTART Plus is easy-to-use and features Microchip's highly acclaimed MPLAB© integrated development environment, with its built-in editor, MPASM assembler and Windows based MPLAB-SIM simulator. Full documentation, MPLAB/Data on CD-ROM, development programmer and a device sample are also included.

Supplied with a universal power supply. UK or International power supply optional.

UK mains plug lead available separately.

SEM389

	Order Code	Price Each
PICSTART Plus Development/Evaluation System	704-740.	
Power Supply 9V, 500mA (UK 240Vac)	110-899.	
Power Supply 9V, 900mA (IEC 110–240Vac)	110-711.	
UK mains plug lead	439-319	
European mains plug lead	210-699	

PIC IN A BOX – Ultimate PIC Starter Package

PIC IN A BOX is a complete starter kit for those intending to work with the PIC 8-bit microcontroller. Contents include a PICSTART^{PLUS} (programmer, editor, assembler/ simulator software, samples, power supply, all necessary cables and a copy of the Microchip data library on CD-ROM), a copy of "The Beginners Guide to the PIC" and "PIC Cookbook", a Project Board, PIC Soft with additional projects aimed at the beginner and starter guidance notes.

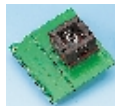**Exclusive to Farnell in conjunction with Nigel Gardner**.

SEM407

	Order Code	Price Each
PIC IN A BOX Starter Package	789-288	
Power Supply 9V, 500mA (UK 240Vac)	110-899.	
Power Supply 9V, 900mA (IEC 110–240Vac)	110-711.	
UK mains plug lead	439-319	
European mains plug lead	210-699	

Programming Adaptors

698-180   698-179   797-005

To assist with product development, the following adaptors have been designed for use with the PICSTART Plus programmer.

SEM689

	Order Code	Price Each
8 pin SOIC to DIL socket module for PICs	698-180	
14 pin SOIC to DIL socket module for PICs	113-554	
18/28 pin SOIC to DIL socket module for PICs	698-179	
44 pin PLCC socket module for PICs	797-005	
68 pin PLCC socket module for PICs	306-0809	
84 pin PLCC socket module for PICs	303-7356	

MPLAB-ICD In-Circuit Debugger

The MPLAB-ICD is a powerful development tool based on the FLASH PIC16F877 and can be used to develop this and other PICmicro microcontrollers from the 16Cxx family. It uses the In-Circuit Debugging capability of the PIC16F87x and In-Circuit Serial Programming (ICSP) protocol to offer a cost effective In-Circuit FLASH programming and debugging from the graphical user interface of the MPLAB-IDE. This allows a designer to develop and debug source code by watching variables, single-stepping and setting break points. The MPLAB-ICD also programs FLASH PIC16F87x family.

The MPLAB-ICD consists of three basic components: ICD module, ICD header and ICD demo board.

System Features:

In-Circuit run-time debugging:

- Real-time code execution
- Single step
- One hardware breakpoint
- Variable watching
- 3.0V to 5.5V
- 32kHz to 20MHz
- Development and Evaluation kit supporting PIC16F87x
- PC communication via serial interface at speeds up to 57600 baud

Uses Microchip's free MPLAB IDE:

- Editor
- Assembler
- Linker
- Simulator
- Project Manager
- Source level symbolic debug
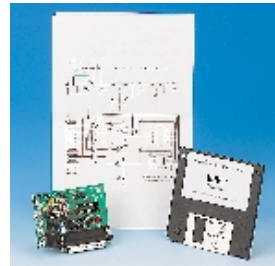- Interface to ICD and other hardware tools

Devices Supported:

PIC16F873/874/876/877
Also included are MPLAB-ICD User's Guide and MPLAB-ICD Tutorial.

SEM777

MPLAB-In-Circuit Debugger ....Order Code 307-0645	**each**

EPIC Plus Programmer

R.F. Solutions

- Low Cost Programmer for: PIC12Cxxx, 16C55x, 16C6xx, 16C7xx, 16C8x,16F8x
- Upgradeable software for future Micros
- Variety of ZIF adapters available
- In-Circuit Serial Programming adapter available
- Operates on power supply, 12Vac, or 2xPP3 batteries
- Includes free Macro Assembler
- Supports Windows '95, NT and DOS

The EPIC Plus is a development level programmer for the mid-range PIC micros. Included with the programmer is an 18-pin socket for programming 8 and 18 pin DIP packages. ZIF adapters are available to program 28 and 40 pin DIP and surface mount devices. An In-Circuit Programming adapter for the 16F84 or 16C84 allows for quick erasing and programming, avoiding continual transfer between the programmer and the target system.

SEM617

MEL-EPIC Programmer ....Order Code 116-816	**each**
MEL-4028ZFR 40/28 pin ZIF socket..............Order Code 116-828	**each**
MEL-8SOICCFR 8 pin SOIC adapter..............Order Code 116-830	**each**
MEL-18SOICCFR 18 pin SOIC adapter...........Order Code 116-841	**each**
MEL-28SOICCFR 28 pin SOIC adapter...........Order Code 116-853	**each**
MEL-ICPAFR In-Circuit Programming adapter .Order Code 116-865	**each**

PIC Tutor and Development Board (PIC-TDB)
Supports PIC12C5xx, PIC16C5x/6x/6xx/7x/84, PIC17C4x/7x
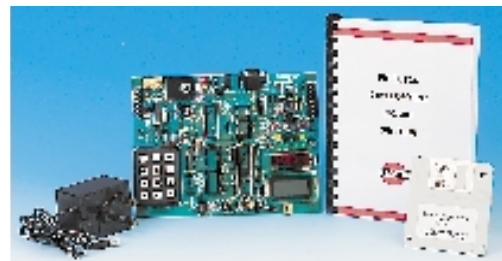
The PIC-TDB is a useful support tool aimed at a wide range of users from beginners to experienced hardware engineers. The board is designed with features which make it ideal as a first step educational tool as well as an advanced and powerful hardware development platform.

With numerous example programs using many features on board, an inexperienced user can familiarise with the assembly language, program structure and internal operation of the PIC device. Full listings of the examples are given, each providing a new useful function for the user to adopt in a specific function, such as driver routines for interfacing the PIC to LCDs, 7 segment LEDs, ADCs, DACs, matrixed keypads, serial communications to EEPROMs and more.

Features:

- LCD (8 2 characters with parallel interface)
- 4 3 matrix keypad
- LED (4 digit with serial interface)
- Real-Time-Clock (day, date, time) with serial interface
- EEPROMs (SPI and I²C serial interfaces)
- 12-bit ADC (serial interface)
- 12-bit DAC (serial interface)
- Programmable gain amplifier
- RS232 interface port
- 8 LED indicators
- 2 PWM outputs
- On-board voltage regulator
- Highly configurable
- Supplied with software examples

Supplied with UK power supply only.

SEM661

PIC-TDB, PIC Tutor and Development Board ...Order Code 117-717	**each**

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717

Semiconductors – Starter Kits

Arizona Microchip PIC Development Tools — Continued

PIC Millennium Board

Bluebird Electronics

The Millennium Board Starter Kit contains all the necessary components to start learning the intricacies of the PIC and is aimed at both Engineers and Students. Students can use the board to help form the core of their learning experience and also use it in "real world" applications in industry.

Once the board is assembled the user can concentrate on the software development. The board is laid out in an uncluttered way with none of the peripheral devices or I/O pins being dedicated. This concept enables maximum flexibility for project development.

The PCB has component ident and pin function information and comprises:-

Basic items - regulator and reset components, choice of a 4 or 8MHz oscillator module to drive the PIC, prototyping block for project expansion, sockets for 40, 28 (narrow), 18 and 8 pin PIC's.

Opto - alphanumeric LCD display module (16 character x 2 line) with separate backlight control, 4 seven-segment LED displays, 6 undedicated LED's.

I/O - 3 x 4 keypad for data input, dual RS232 ports, thermistor, potentiometer, 4 switches, 4 push buttons.

For programming - connectors are provided for an external ICSP programmer for in situ programming.

Full circuit diagram and construction notes are provided.

A 3.5" disk accompanying the kit contains source code examples for both CCS-C compiler and assembler for projects based on the board. Examples of applications include LED flashers, LED to LCD display driving, keyboard interfacing, A/D routines, RS232 interfacing and many more. Each project is supplied with relevant wiring information and is fully commented to assist the user in following the program.

The user will need a programmer such as the PICSTART Plus (704-740) to develop the software and program a PIC Micro.

SEM690

PIC Millennium Board ....Order Code 120-030	each
PIC Millennium Board - Assembled ....Order Code 324-9505	each

PIC Tutorial Board

ARIZONA TECHNOLOGIES

The PIC tutorial, from Arizona Technologies Ltd., offers a system for getting started with the Microchip PIC range of microcontrollers. It is based on demonstration and prototyping PCB, and a Windows help file software suite. It takes the user from first principles of microcontrollers through to advanced programming and hardware design of all facets of a PIC based embedded application.

Device operation is extensively covered with all major peripherals explained by actual working designs. The development tools such as editor, assembler, simulator, in-circuit emulators and programmers are dealt with as are design tips and techniques.

For more advanced applications the add-on tutorial modules are available, each with tutorial sofware.

The kit includes:
- Demonstration/prototyping board
- Tutorial software suite disk
- Microchip CD-ROM
- Microchip CD-ROM
- PCB circuit diagram
- Product registration form

SEM538

	Order Code	Price Each
PIC Tutorial Board	670-431	
Tutorial 1 - Keyboard interface - supplied with 4 4 keypad. Demonstrates how to interface the PIC to the keypad	670-443	
Tutorial 2 - LCD module interface - supplied with 2 16 character module. Demonstrates how to interface the PIC to a display............	670-492	
Tutorial 3 - Interfacing Dallas Touch Memory - supplied with Touch memory. Demonstrates interfacing and applications for tagging and tracking through to access control................................	670-455	
Tutorial 4 - Swept Tone Generator - supplied with miniature loudspeaker and amplifier components. Demonstrates the PWM channel available on the PIC..	670-467	
Tutorial 5 - Real Time Clock application - supplied with 32.768kHz watch crystal. Shows how to generate a real time clock with timer in the PIC	670-479	
Tutorial 6 - Input Capture/Output Compare - Shows capture and compare facilities available on the PIC.......................	670-480	

Low Cost PIC Demonstration Boards

PICDEM 1/2/14A/17 are simple boards which demonstrate the capabilities of several PICmicro families. All necessary hardware is included to run basic demonstration programs which are supplied on a disk. The user can program the samples provided with the PICDEM on PICSTART Plus or PROMATE-II and easily debug/test the sample code. The user can connect the PICDEM with MPLAB-ICE and download the sample code to the emulator and debug/test the code. A prototype area is provided for user hardware.

Included in each PICDEM kit is:
- PICDEM demonstration board
- Product samples
- Demonstration/tutorial software
- Complete documentation

SEM230

PICDEM-1 supports		
PIC16C5x/62x/71, 17C4x......................Order Code 525-789	each
PICDEM-2 supports		
PIC16C62/63/64/65, 16C72/73/74 ....Order Code 563-481	each
PICDEM-3 supports PIC923 and PIC924 Order Code 315-4865	each
PICDEM-14A supports PIC14C000 ....Order Code 111-570	each
PICDEM-17A		
supports PIC17C756/762/766 ....Order Code 306-2235	398.01 each

PIC Project Board 1 and 2

Bluebird Electronics

The PIC Project Boards are designed for development with any of the 18 pin PICs. They can form the basic hardware for both education and prototype development. The kits are supplied in a strong plastic case to protect the completed board. All the necessary components are included i.e. regulator, reset components, LED's, speaker, 4MHz resonator etc.

A circuit diagram and construction notes are included together with a diskette giving application examples which can be used with the board. The Project Boards are best accompanied by a PICSTART PLUS (704-740) programmer.

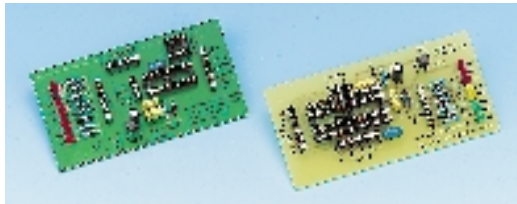Project Board 2 has an additional prototyping block and connector for an external 9V supply.

SEM229

PIC Project Board 1 ....Order Code 527-646	each
PIC Project Board 2 ....Order Code 120-054	each

PIC Hardware Starter Kits

Bluebird Electronics

These kits now have enhanced features. They are ideal for quick prototype evaluation, lab ideas, one off projects and demonstrations, as well as aiding the learning process whilst gaining a working knowledge of the PIC microcontroller.

The 8/18 pin board (459-884) handles the newer 8 pin PICs (12C508, 509, 671 etc.) together with 18 pin PIC - you can use both an 8 pin and 18 pin sockets simultaneously.

The 28 pin board (459-896) will handle all 16C5xx series of PICs in wide (0.6") or narrow (0.3") versions - **not 16Cxx 28 pin**.

All kits comprise 8 LEDs and series resistors, 5V regulator, reset components, socket strips and a 4MHz resonator. The PCB is approx. 48mm x 96mm enabling applications to remain compact.

The kits are best accompanied by a PICSTART^{PLUS} (704-740) programmer.

SEM202

PCBC54 Hardware Kit for 8/18 pin PICs …..Order Code .459-884	each
PCBC55 Hardware Kit for 28 pin PICs (16C5xx) ……………………………Order Code .459-896	each

## PIC16C64/74 Hardware Kit and PIC16C63/73 Adaptor

Bluebird Electronics

The kit has all the standard components featured in the 459-884 and 459-896 hardware kits **above** (8 LEDs, all I/O pinned, regulator, 4MHz resonator etc) but has the addition of a reset button, 4 undedicated push switches, RS232 female connector, RS232 interface driver, socket for an 8 pin EEPROM, and a patch area of 200 holes for user development.

An adaptor is available to convert the PIC16C63/73 DIL pin out to fit into the 40 pin socket on the PIC16C64/74 board.

SEM2

PCB072 Hardware kit for PIC16C64/74 …… Order Code 630-639	each
PICCONV Adaptor for PIC16C63/73 ……….. Order Code 703-473	each

PIC Trainer Project Boards
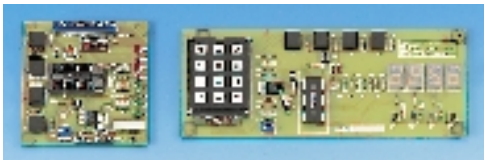
These populated boards are ideal for prototype evaluation and for learning PIC programming. The boards have been designed so that the user can start with a working PCB to reduce development time. The project boards are supported by 'The Engineers Guide to Programming PICs' book, Order Code 183-143. PIC Trainer 1 refers to program examples with some code modifications shown in the last chapter.

PIC Trainer 1 Features push button inputs and LED outputs with provision for a ULN2803 Darlington driver.

● Suitable for 18-pin devices (16C54, 16C56, 16C71 and 16C84)
● Socket provided for a Darlington driver (ULN2803)
● 4 input switches connected to port A
● 8 LEDs connected to port B
● Suitable projects include push button switching, LED pattern generator, delay timers and logic replacement

PIC Trainer 2 Features 4 3 data entry keypad, 4 push button inputs and 4 seven segment display drivers.

● Suitable for 28-pin devices (16C55 and 16C57)
● 4 3 keypad connected to ports A and B
● 4 input switches connected to port B
● 4 7 segment LED displays connected to port B
● Suitable projects include digital clock, simple calculator, key scan and HEX to 7 segment display

Both project boards have:
● ZIF socket for easy insertion of the PIC
● 4MHz crystal for 1µs instruction time
● 5V regulator and a diode to protect against incorrect voltage polarity

The two boards are also available in kit form, without the ZIF sockets.

SEM768

PIC Trainer 1 ……………………………Order Code 300-3942	each
PIC Trainer Kit 1 ……………………………Order Code 300-3954	each
PIC Trainer 2 ……………………………Order Code 300-3980	each
PIC Trainer Kit 2 ……………………………Order Code 300-3991	each

PIC Block MC18D

New

This populated board is a high quality PCB designed to accept any 18 pin DIL PIC or SCENIX microcontroller. Its use is not only confined to being a development board but also due to the features on board. It can also be integrated into a system as a finished product. The PIC BLOCK has an on-board power supply section, input conditioning, output drive of 500mA per channel and all connections are via PCB mounting screw terminals.

Features:
● 6 buffered and filtered inputs to cope with a range of input voltages and noisy environments. Input voltage range 3 to 24V DC
● 6 open collector digital outputs each capable of sinking 500mA
● Power source can be AC 7-20V, or DC 9-28V. A low current regulated 5V supply is available to power external circuits
● An on-board reset button is provided as is space for output pull-up resistors should they be required
● On board 4MHz resonator
● PCB construction all PTH and ground planed on both sides
● Dimensions 81 x 66 x 22mm with 4mm mounting holes

SEM888

PIC Block MC18D …………………………Order Code 332-7980	each

PIC Panic Modules

Bluebird Electronics
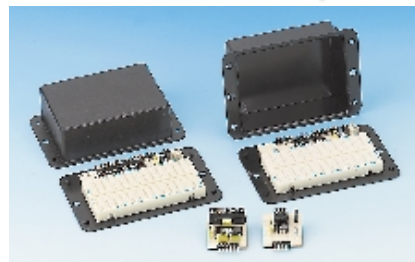
The PANIC modules are a means to quickly produce professionally housed prototyped PIC projects. Two ready assembled modules have been developed to enable prototyping with either 18 or 28 pin 16Cxx PICs and then simply replace the cover and mount accordingly.

The modules comprise a socket for the PIC with all the I/O brought out, a small proto-block, a 78L05 regulator and a socketed 4MHz resonator.

With the addition of a COMMS module, remote data transfer is possible on either RS232 (2xTX, 2xRX pins) or RS485 (with terminating resistor).The modules plug directly into the proto-board and are fitted with screw connectors for external cable connections.

Use with a PICSTART Plus Programmer (704-740) and the PIC of your choice.

SEM691

PANIC18 module	Order Code 113-578	each
PANIC28 module	Order Code 112-203	each
COMM232	Order Code 118-072	each
COMM485	Order Code 118-084	each

continued

Any Questions?

Our technical help desk will provide the answers, free of charge. Please call (65) 788 1922 or e-mail singapore-technical@farnell.com

10
719
Semiconductors – Starter Kits

Contents

CHARLESWATER *Europe*

3M

Vermason

Semiconductors - Static Protection

11

Personnel Grounding

Wrist Band Set

Varmason

- Adjustable wrist-band and 2m ground cord set
- Anti-allergenic band
- In-built 1MΩ resistor
- 10mm socket to banana plug ground cord
- Crocodile clip included
- Replacements available separately

Mftrs. List No.   JA68B

STA2

	Order Code	1+	10+	50+
Price Each				
Wrist Band Set	**738-700**			

Adjustable Wrist Bands, Elasticated

Varmason

- Unique adjusting method
- Re-adjustable
- Comfortable and lightweight, 8gm
- 4mm or 10mm stud
- No metal in contact with skin
- 120mm to 200mm circumference
- Choice of 3 colours

FOR SUITABLE GROUND CORDS SEE 'COILED GROUND CORDS' **PAGE 742**

STA3

	Mftrs. List No.	Order Code	1+	10+	50+	100+
4mm Stud			**Price Each**			
Red	JA43R	**518-414**				
Yellow	JA43Y	**518-426**				
Blue	JA43B	**738-712**				
10mm Stud						
Red	JA48R	**518-438**				
Yellow	JA48Y	**518-440**				
Blue	JA48B	**738-724**				

Disposable Wrist Straps

Varmason

New

- Ideal for visitors to an EPA
- 1.1 metres long
- Easy to use looped fitting
- Comfortable to wear - no adhesive parts
- Crocodile clip enables connection to any grounding point - no need for an EBP
- Individually packaged with full instructions on outer packaging
- Crocodile clip or spade termination
- Built in resistance

140

	Mftrs. List No.	Order Code	1+	10+	50+	100+
Termination			**Price Each**			
Crocodile clip	JC111	**335-8367**				
Spade	JC112	**335-8379**				

High Quality Wrist Bands

SPEIDEL

- Long lasting stainless steel
- Washable
- Fully adjustable – no loose links
- 4mm or 10mm studs

STA104

	Order Code	1+	10+	25+	50+
Price Each					
4mm stud	**162-796**				
10mm stud	**162-802**				

Watch-style Wrist Band

Varmason

- Durable, attractive design
- Stainless steel, hinged links
- 10mm stud
- Lightweight (25g)
- For use with 'coiled ground cords' **page «438618»**

STA87

Order Code	1+	10+	25+
Price Each			
936-819			

High Quality Heel Grounders and Toe Grounders

Varmason

- High durability, conductive rubber heel/toe cups
- Comfortable fit
- Fray-resistant blue earth strap
- Optional sewn-in 1MΩ resistor
- Choice of styles:
  - (a) Reversible cup, with velcro adjustment
  - (b) Reversible cup, with stretch velcro adjustment
  - (c) Standard cup, with elasticated back
  - (d) Standard cup, with stretch velcro adjustment

NB. Should be used with conductive flooring/matting

STA117

	Style	Mftrs. List No.	Order Code	1+	10+	50+
				Price Per Pair		
With 1MΩ Resistor						
Heel grounder	(a)	J8100ST	**168-336** †			
Heel grounder	(a)	J8100B **NEW**	**335-8380**			
Heel grounder	(b)	J8105ST	**168-348**			
Heel grounder	(c)	J8106ST	**168-350** †			
Toe grounder	(d)	J8205ST	**168-361**			
Without Resistor						
Heel grounder	(a)	J8100BZ **NEW**	**335-8410**			

†Available until stocks are exhausted

Heel Grounders and Toe Grounders

Varmason

Heel Grounder

Toe grounder

Heel Grounders are used with flat soled shoes, and feature a durable, reversible conductive rubber heel cradle, and earth strap. Bright pink variant reminds operators to remove when not in use.

Toe Grounders are used with high heeled shoes. Optional in-built 1MΩ resistor. Conforms with **EN100015-1** when both grounders worn.

STA14

	Order Code	1+	10+	50+
		Price Per Pair		
Heel Grounders				
Yellow	**434-425**†			
Bright Pink	**681-179**			
Green (with 1MΩ resistor)	**681-167**			
Toe Grounders				
Yellow	**438-650**†			
Green (with 1MΩ resistor)	**681-180**†			

†Available until stocks are exhausted

Disposable Heel Grounders and Dispenser

Varmason

- Yellow polyester braid with conductive band
- Comfortable to wear
- Fitting instructions included
- Supplied on perforated strips in packs of 50
- Resistance <10⁶ ohm
- Highly visible dispenser
- Free standing, or wall mounted
- Treated with anti-static coating
- Printed with user instructions and ESD logo

Dispenser H = 200, W = 315, D = 56

STA116

	Mftrs. List No.	Order Code	Price Per Pack		
			1+	10+	50+
Heel grounders (pk. of 50)	J8260	**168-373**			
			Price Each		
			1+	5+	25+
Dispenser (inc. 10 Heel grounders)	J827	**168-385**			

Lightweight Wrist Bands and Ground Cords

3M

Best value

- Comfortable, light-weight construction
- Fully adjustable
- Moulded thermo-plastic outer layer
- Conductive interior insert
- Low particle emissions – clean room safe
- Choice of colours
- Low cost ground cords and wrist band/cord sets also available

STA105

	Mftrs. List No.	Order Code	Price Each				
			1+	10+	25+	50+	100+
4mm Stud Wristbands							
Blue	4620	**162-644**					
Green	4621	**162-656**†					
Purple	4622	**162-668**†					
Maroon	4623	**162-670**†					
Lime	4624	**162-681**†					
10mm Stud Wristbands							
Blue	4640	**162-693**					
Lime	4644	**162-700**					
1.5m Coiled Ground Cords							
4mm Skt – Banana plug	4610	**162-711**					
10mm Skt – Banana plug	4614	**162-723**					
1.5m Ground Cord and Wrist Band Set							
4mm blue wrist band	4650	**162-735**					
4mm lime wrist band	4654	**162-747**					
10mm blue wrist band	4670	**162-759**					
10mm lime wrist band	4674	**162-760**					

†Available until stocks are exhausted

Wrist Bands, Cords, Heel and Toe Grounders

3M

Wrist Bands
- Adjustable, breathable fabric
- High-grip hinged closure

Wrist Band Sets (Includes Ground Cords)
- Adjustable, breathable fabric
- 1.5m usable cord length
- 360° rotational movement
- Supplied with crocodile clip

Coiled Ground Cords
- High strength, 1.5m lengths
- Unique strain relief at each end

Shoe Grounders
- Durable and comfortable
- Toe grounder used with high heeled shoes
- Used with conductive flooring
- In-built 1MΩ resisitor

STA100

	Mftrs. List No.	Order Code	Price Each		
			1+	10+	50+
Wrist Band Sets					
Adjustable, heavy duty	2214	**996-816**			
Adjustable, lightweight	2244	**996-828**			
Re-adjustable	2259	**996-841**			
Wrist Bands					
Adjustable, 10mm stud	2981	**996-830**			
Adjustable, 4mm stud	2204	**996-920**			
Coiled Ground Cords					
Lightweight, 10mm skt-10mm skt	2974	**996-877**			
Shoe Grounders					
Heel grounder, 1MΩ	2051	**996-968**			
Toe grounder, 1MΩ	2053	**996-981**†			

† Available until stocks are exhausted

Disposable Wrist Band Set

3M
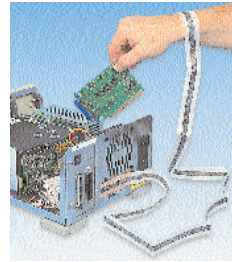
- One-time use only
- 1.2m length
- Copper foil construction
- Hypo-allergenic adhesive fixing
- Breathable non-woven backing material
- Full fitting instructions supplied

STA5

Mftrs. List No.	Order Code	Price Each		
		1+	10+	50+
2209	**595-573**			

Disposable Heel Grounders

3M

- Reliable earth path
- Comfortable
- Suitable for flat heeled shoes
- One grounder on each foot recommended
- Simple to fit

STA15

Order Multiple=10		Price Each		
Mftrs. List No.	Order Code	10+	100+	500+
2045	**595-603**†			

† Available until stocks are exhausted

Wrist Bands, Stainless Steel Expandable
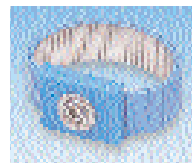
OK Industries

- Durable construction
- Conductive inner band, insulative outer
- 10mm stud fastening
- Adjustable supplied with 4 clip-on extension links
- Tested to MIL STD 202 Method 101
- Conforms with **EN100 015-1**

Mftrs. List No.			
23-0563 = 178-436,	23-0562 = 178-437,		
23-0561 = 178-438,	23-0564 = 179-953		

STA4

	Wrist Circumference	Order Code	Price Each		
			1+	10+	25+
Small					
Medium	130	**178-436**			
Large	150	**178-437**			
Adjustable	170	**178-438**			
	—	**.179-953**			

Statpad™ Shock Protectors

STATPAD

- Avoids painful static shocks
- Simply touch statpad first to discharge static build-up
- Self-adhesive touch pads adhere to most surfaces
- Use wherever static strikes e.g. office, factory, filing cabinets
- Key fob useful for the car
- Supplied with instructions for use

Touch pad H = 2, W = 43, D = 23
Key Fob H = 2, W = 43, D = 85

STA77

	Order Code	Price Per Pack			
		1+	5+	10+	50+
Touch pads (pack of 10)	**681-489** †				
Key Fob (1 per pack)	**681-477**				

† Available until stocks are exhausted

11

741

Semiconductors – Static Protection

Semiconductors – Static Protection

Workstation Equipment

Ground Cords

Varmason **3M**
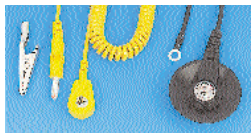
- Large choice of lengths, styles and teminations
- The lightweight coiled cords are ideal for use with wristbands
- Straight cords used with bench mats and fixed earthing points
- 4mm banana plug terminations include croco-dile clips, except where indicated
- All socket terminations incorporate a 1MΩ resistor
- Bench mat ground cord has a moulded protective cover to resist accidental damage
- Conforms with **IEC 61340-5-1, EN100 015-1**

End-to-end resistance (banana plug termination) 1.0MΩ ±5%
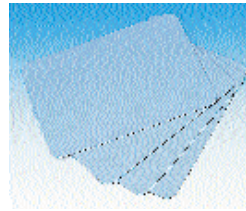(two socket terminations) 2.0MΩ ±5%

STA6

Terminations	Cord Length (m)	Mftrs. List No.	Order Code	1+	10+	50+
Coiled Cord, Yellow						
B/Plug + 4mm skt	2	J4211YC	438-613			
B/Plug + 10mm skt	2	J4221YC	438-625			
10mm socket + 10mm skt	2	J4222YC	438-637			
Coiled Cord, Black						
B/Plug + 4mm skt	1	J4111C	438-583			
B/Plug + 4mm skt	2	J4211C	178-386			
B/Plug + 10mm skt	1	J4121C	438-595			
*B/Plug + 10mm skt	2	J4221C	178-389			
B/Plug + 10mm skt	3	J4321C	264-994			
4mm socket + 10mm skt	2	J4224	179-803			
10mm socket + 10mm skt	1	J4122	438-601			
10mm socket + 10mm skt	2	J4222	179-804			
10mm socket + 10mm skt	3	J4322	265-007			
Lightweight Coiled Cord, Black						
B/Plug + 4mm skt	2	J4464C	179-801			
10mm socket + 10mm skt	2	J4422	518-499			
Straight Cord						
*B/Plug + 4mm skt	1.5	J4611	178-384			
*B/Plug + 10mm skt	1.5	J4621	178-387			
*B/Plug + 10mm skt	2.5	J4721	595-706†			
*B/Plug + 10mm skt	5.0	J4821	178-388			
10mm skt + 10mm skt	0.7	J4923	179-805			
10mm skt + 10mm skt	1.5	J4623	179-806			
10mm skt + 10mm skt	2.5	J4722	595-718			
10mm skt + 10mm skt	5.0	J4822	179-807			
M5 ring tml + 10mm skt	0.7	J4912	595-688			
M5 ring tml + 10mm skt	1.5	J4612	254-307			
Bench Mat Ground Cord						
M5 ring tml + 10mm skt	1.8	J6486	877-670			

* Denotes supplied without crocodile clips

† Available until stocks are exhausted

Bench and Floor Mat Ground Cords

3M

997-250: 4.6m straight cord
- Damage resistant, moulded male stud
- 1 MΩ built-in

997-262: Wristband/mat grounding system
- Snap-on fixing to mat
- Accepts up to 2 wrist straps
- 4.6m length, 1MΩ built-in
- Connects to earthing point

STA92

	Mftrs. List No.	Order Code	Price Each 1+	10+
4.6m straight cord	3040	997-250		
Wristband/mat grounding system	3048	997-262		

Static Dissipative Inspection Mat

CHARLESWATER Europe

- Highly reflective
- Ideal for inspection work and use with micro-scopes
- 3 layer rubber construction
- Includes a grouding kit
- Reversible for extra durability
- Superior resistance to abrasion and chemicals
- Heat resistant, solder and flux proof
- Suitable for use in clean room environments

H = 1.5
W = 203
D = 305

STA113

| Mftrs. List No.	Order Code	Price Each 1+	3+
80298	165-268		

Protective Operator Pad

Varmason

- Prevents damage to bench mats and other worktops
- Use in areas of heavy wear, usually in front of operator
- 6mm static-dissipative foam or 2mm Norastat mat
- Solder splash resistant
- Easy to clean

STA8

Colour	Dimensions W	D	Mftrs. List No.	Order Code	Price Each 1+	5+	10+
Grey	450	380	J0425	738-669			
Grey	600	450	J0426	738-670			
					Price Per Pack		
Norastat Pads (Pack of 5)					1+	5+	10+
Blue	300	400	J06485	162-840			

Pre-Cut Bench Mats, Conductive and Static Dissipative
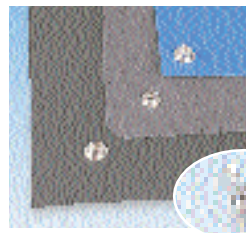
- **Conductive EVA:** easy to clean and chemically inert
  - Non-slip finish, surface resistivity $<10^5 \Omega$/sq
  - Excellent lay flat properties
- **Conductive Vermahide:** Durable soft-feel finish
  - Easy to fit, self-adhesive option
  - Non-slip, solder splash resistant
  - Surface resistivity $10^7 \Omega$/sq typically

- **Static Dissipative Rubber:** 2 layer synthetic material
  - Superior heat and abrasion resistance
  - Static dissipative top layer, solder/flux resistant
  - Conductive under layer
- **Static Dissipative PVC:** Single layer nitrile material
  - Conductive mats and 484-313 have four 10mm studs
  - Static dissipative mats have one 10mm stud fitted
 - Additional screw-on 10mm studs are available

Note: Connections to single layer PVC static dissipative mats be made to a single, common point. The earth bonding point cord, order code 179-222 (see **page 744**) is suitable for this purpose.

STA9

Type Conductive	H (mm)	W (m)	D (m)	Mftrs. List No.	Order Code	Price Each 1+	5+	10+
EVA	1.5	0.6	1.2	J0801	175-810			
EVA	1.5	1.2	2.4	J0802	175-811			
Vermahide	1.5	0.7	1.0	J013CF	179-809			
Conductive, Self-Adhesive								
Vermahide	1.5	0.5	0.7	J0123	738-682			
Vermahide	1.5	0.7	1.0	J0122	738-694			
Static Dissipative – Rubber								
Blue, Norastat	2.0	0.6	1.2	J062B	484-313			
Beige	1.5	0.6	1.2	T2B	557-821			
Grey	1.5	0.6	1.2	T2G	557-833			
Blue, Norastat	2.0	0.6	0.9	J063B	162-814			
Beige, Norastat	2.0	0.6	0.9	J063T	162-826			
Grey, Norastat	2.0	0.6	0.9	J063G	162-838			
Static Dissipative – PVC								
Blue	1.5	0.6	1.2	MAT04B	178-450			
Tan	1.5	0.6	1.2	MAT04T	213-202†			
Screw on stud assembly				J5261S	179-810			

† Available until stocks are exhausted

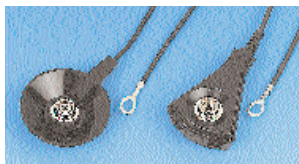### Bench Mat Rolls, 3.0m and 3.3m

Varmason
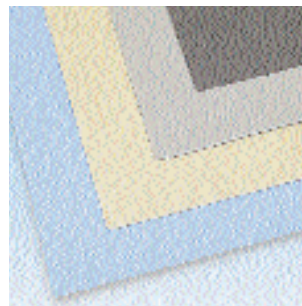
- For cutting to size
- **Vermahide:** Durable, volume conduc-tive grey mat
  - Non-slip, solder splash resistant
  - Economical, ideal for shelf lining
  - Surface resistance $10^7 \Omega$/sq approx.
- **Norastat:** 2 layer heat/wear resistant rubber mat
  - Top layer is static dissipative
  - Homogenous conductive under layer
  - Solder, flux, oil and grease resistant
  - Surface resistance $10^8 \Omega$/sq typically
- Rivet stud assembly and tool (see below) is recommended for earthing

Note: Both these materials have the practical advantage over 3 layer (buried conductive layer) mater-ial in that more than one earthing stud may be used per mat if required, as a reliable link can be formed through contacts to an outer conductive layer.

Surface resistivity (typ.): Vermahide $10^5 \Omega$/square, Norastat (top layer) $10^7 \Omega$/square

Prices are in Singapore Dollars and exclusive of GST

STA11

Type	H (mm)	W (m)	D (m)	Order Code	Price Each		
					1+	5+	10+
Conductive Vermahide							
Charcoal grey	1.5	0.7	3.0	**430-500**			
Static Dissipative							
Beige	2.0	1.2	3.3	**265-100**			
Grey	2.0	1.2	3.3	**265-111**			
Blue	2.0	1.2	3.3	**265-123**			

Rivet Stud Assemblies and Tool
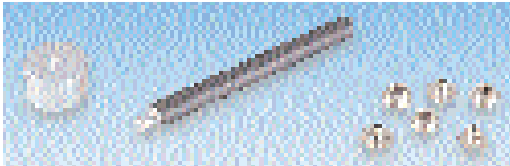
Vermason

Pack of 10mm two-part rivet studs suitable for mounting on anti-static matting up to 5mm thickness such as the VERMAHIDE and NORASTAT matting detailed above.

The assembly tool consists of a dolly and punch for rivetting the studs in the desired location(s) on the mat. It is supplied with instructions.

Note: Connections of elements of an ESD protected area should be made to only one common point on static dissipative mats that do not have a conductive bottom layer to provide a reliable link between studs, i.e. on 3 layer (buried conductive layer) matting.

Mftrs. List No: J5260F = 522-703, J5265 = 265-147

STA12

		Price Each	
Order Multiple=5	**Order Code**	5+	200+
Rivets	**522-703**		
Order Multiple=1		1+	10+
Studding tool	**265-147**		

Floor Mats
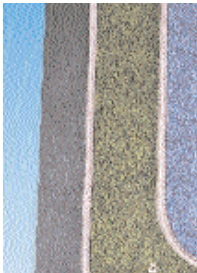
- Conductive EVA: chemically resistant and non-slip. Surface resistivity <10^5 Ω/sq.
- Static Dissipative Vermafelt: heavy-duty bonded fibre flooring. Surface resistivity <10^7 Ω/sq.
- Static Dissipative Normastat: durable, heat and wear resistant rubber. Surface resistivity <10^8 Ω/sq. approx.
- All mats fitted with 2 x 10mm press studs
- Conforms with **BS EN100 015-1**

Mftrs. List No.
C031D = 179-811, C031B = 179-812, C0504 = 213-445

STA13

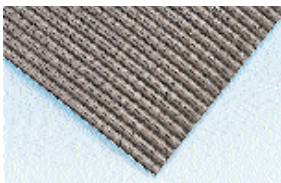| Type	H	W	D	Order Code	Price Each		
Conductive	(mm)	(m)	(m)		1+	5+	10+
EVA	2.5	0.6	1.2	**175-812**			6
EVA	2.5	1.2	2.4	**175-813**			
Static Dissipative							
Vermafelt, green	5.0	1.0	1.5	**179-811**			
Vermafelt, blue	5.0	1.0	1.5	**179-812**†			
Norastat, 2-layer, grey	2.5	1.2	1.5	**213-445**			
† Available until stocks are exhausted							

Ribbed Vinyl Floor Mat

CHARLESWATER Europe

- Non-slip
- Easy to cut
- Cushioned
- Excellent lay-flat properties
- Dark brown colour
- Includes 10mm male grounding snap

H = 3.1mm, W = 1.2m, D = 1.8m

Surface resistivity 2 10^9 Ω/sq   Surface to ground resistance 7.0 10^7 Ω/sq

STA107

		Price Each	
Mftrs. List. No.	**Order Code**	1+	3+
80140	**165-463**		

Conductive Acrylic Paint, 3.8L

CHARLESWATER Europe

- Tough one part floor coating
- Coverage: 28 to 37m² per 3.8L pot
- Excellent electrical properties
- Ideal in manufaturing, test, assembly and stores areas
- Applied with brush, roller or spray
- Colour: Grey
- Adheres to concrete, wood, plastic and metal

NB. Min 2 coats recommened for maximum paint performance

Surface resistivity 3.8 10^5 Ω/sq

STA112

		Price Each	
	Order Code	1+	3+
3.8L Pot	**165-293**		

Table and Floor Mats
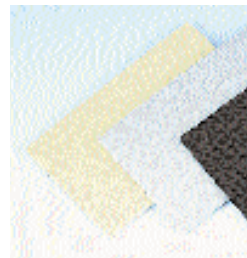
3M

- **2 layer mats:** Static dissipative rubber upper layer, conductive lower
- Heat/Solder splash resistant
- Excellent frictional properties
- Will not drain battery powered pcbs
- **3 layer mats:** Soft vinyl 'sandwich' construction
- Durable static dissipative upper layer
- Conductive middle layer
- Dissipative, non-slip lower foam layer
- 2 female snap fasteners fitted
- Table mats **include** 1 wrist strap grounding system
- Floor mats **include** a 4.6m ground cord
- **3m Ground Cord:** Allows interface of 722 workstation monitor and 733 splitter kit with one or more table mats

STA97

	W (m)	D (m)	Mftrs. List No.	Order Code	Price Each		
					1+	10+	50+
Table Mats – 2 Layer							
Beige	0.6	1.2	8755	**997-006**			
Blue	0.6	1.2	8760	**997-018**			
Grey	0.6	1.2	8765	**997-020**			
Table Mats – 3 Layers							
Beige	0.6	1.2	8212	**997-031**†			
Floor Mats – 2 Layer							
Blue	0.8	11.0	8756	**997-079**			
Grey	0.8	11.0	8761	**997-080**			
Floor Mats – 3 Layers							
Grey	1.2	1.8	8203	**997-110**			
Ground Cord, 3m			2389	**997-122**			
† Available until stocks are exhausted							

Static Safe Chairs

- Stable 5-star base
- Durable woven covers
- Adjustable height and back
- Resistance-to-ground, 10^4 to $10^7\Omega$
- High lift version available with footrest ring
- Seat height range: 877-694 – 460-580mm, 877-700 – 630-760mm

STA81

		Price Each		
	Order Code	1+	5+	10+
Standard	**877-694**			
High lift, with footrest	**877-700**			

11

743

Semiconductors – Static Protection

Workstation Equipment — Continued

Earth Bonding Point Plugs

- Safe and convenient to use
- Utilises mains earth as 'ground'
- 1MΩ resistor in all stud connectors, except 936-868
- Insulated live and neutral pins
- Choice of terminations
- Conforms to **IEC 61340-5-1**

STA16

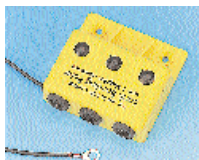| Terminations	Mftrs. List No.	Order Code	1+	10+	50+
UK Style Plug					
1 10mm stud (no int. resistor)	J6301	**936-868**			
3 10mm studs	J6303	**BV 254-356**			
2 4mm studs, 1 10mm stud	J6306	**254-368**			
2 4mm sockets, 1 10mm stud	J6330	**254-370**			
1 2BA binding post	J6321	**595-913†**			
Schuko Style Euro Plug – English Text					
2 10mm studs, 1 4mm studs	J6100	**856-400**			
3 4mm studs	J6102	**322-4739**			
3 10mm studs	J6103	**322-4752**			
2 4mm studs, 1 10mm stud	J6106	**322-4764**			
2 2BA binding posts	J6107	**322-4776**			
Schuko Style Euro Plug – German Text					
2 10mm studs, 1 4mm studs	J6100G	**322-4727**			
3 4mm studs	J6102G	**322-4740**			
3 10mm studs	J6103G	**856-459**			
2 4mm sockets, 1 10mm stud	J6106G	**487-570**			
2 2BA binding posts	J6107G	**855-492**			

† Available until stocks are exhausted

Earth Bonding Point Boxes

- Common grounding point
- 3 termination options
- 2m earth lead supplied
- M5 ring terminals
- 1MΩ resistor in each termination
- Screw mountable
- Conforms with **IEC 61340-5-1**

H = 20, W = 70, D = 67

STA17

Terminations	Mftrs. List No.	Order Code	1+	10+	50+
3 10mm stud	JB215	**596-395**			
3 4mm Plug	JB211	**596-401**			
2 4mm Plug, 1 10mm Stud	JB212	**596-413†**			

† Available until stocks are exhausted

Slimline Earth Bonding Point Bars

- Pre-mounted screws with retaining washers
- Fitted with 1MΩ, 1 Watt resistors
- Made of ABS with ultrasonically welded back cover
- Printed to show 3 press studs as standard

This slim Earth Bonding Point bar is designed to provide an ESD wrist strap bonding point at the workbench. It is slimmer than any EBP, and this feature allows fitting underneath bench tops with narrow edges. (Due to its narrow width it is not possible to connect banana sockets and is therefore designed for when stud connections are required.)

STA133

	Mftrs. List No.	Order Code	1+	10+	50+
3 10mm studs	J6603	**302-6553**			
3 7mm studs	J6604	**302-6565**			
3 4mm studs	J6605	**302-6577**			

Earth Bonding Point Bars

- Common grounding point
- Tough ABS construction
- Screw fixed to underside of bench tops
- 2m earth cord, M5 ring terminated
- In-line 1MΩ resistor for each termination
- 2 termination options
- Conforms to **IEC 61340-5**

Mftrs. List No.
J6503Y = 433-147, J6505Y = 433-159, J6510Y = 433-160

STA18

Terminations	Order Code	1+	10+	50+
3 10mm studs	**433-147**			
2 4mm sockets, 1 10mm stud	**433-160**			

Earth Bonding Point Cord for Mats and wrist straps, 2m

- Ideal for use with static dissipative mats
- 1MΩ embedded resistor
- 10mm press stand socket attachment
- 2 4mm sockets for wrist strap connection
- 4mm plug termination
- Crocodile clip and 10mm press stud adaptor supplied
- Conforms to **EN100 015-1**

STA19

Mftrs. List No.	Order Code	1+	10+	50+
J6459	**179-222**			

Earth Facility Bracket

- Common grounding point
- M5 ring binding post, or 10mm stud earthing point
- 2m earth lead, M5 ring terminated
- Spare M5 ring terminal supplied
- Conforms to **IEC 61340-5-1**

H = 47, W = 50, D = 28

STA20

	Mftrs. List No	Order Code	1+	10+	50+
Binding Post M5 ring Binding Post	JB596	**595-901**			
10mm stud	JB315	**168-397**			

Universal Earth Bonding Point Box

3M

- Accepts 4, 7 and 10mm snap fasteners, banana plugs and 3M GSGS connectors
- Compatible with all European Grounding Systems
- Grounds 2 wrist bands at the same time
- Mounts to any flat surface

STA96

Order Code	1+	10+	50+
996-890†			

† Available until stocks are exhausted

Common Point Grounding Systems

3M

Wrist Strap Grounding Point
- 2 4mm socket terminations
- Supplied with 3m ground cord
- Mounts under most work stations

General Purpose Grounding Point
- 6 terminal strip grounding points
- 3 cable clips
- Protective cover
- Ground cord includes 1MΩ resistor

STA91

	Mftrs. List No.	Order Code	1+	10+
Wrist Strap Grounding Point	3042	**997-274†**		
General Purpose Grounding Point	3047	**997-298†**		

† Available until stocks are exhausted

75mm Width Floor Marking Tape, 33m Roll

- For boundary marking ESD protected areas
- Highly visible
- Adheres to carpets or solid floors
- Hard wearing
- Supplied on 33m rolls, 75mm width

STA21

	Mftrs. List No.	Order Code	1+	10+	50+
Floor tape	C3000	**681-192**			

Caution and Exit Signs

- Anti-static self-adhesive or rigid conductive plastic signs
- 179-866 and 179-867 may be screw fixed or self adhesive pad fixed
- Double-sided sign may be suspended
- Conform to **EN100 015-1**

Mftrs. List No.
J 24 12 = 179-864, J 24 21 = 179-866,
J 24 23 = 179-867, J 24 18 = 254-400,
J 24 41 = 265-044, J 24 36 = 438-662

STA23

Size			Price Each	
Caution, Self-adhesive	**Order Code**	1+	10+	50+
50 100mm	**254-400**			
150 300mm	**179-864**			
Caution, Rigid Screw-on				
150 300mm	**179-866**			
300 600mm	**179-867**†			
Exit, Self-adhesive				
150 300mm	**265-044**†			
† Available until stocks are exhausted				

Caution Signs and Labels **3M**

STA89

	L	H	Mftrs. List No.	Order Code	Price Each		
					1+	10+	50+
Self Adhesive Signs							
Wall Style	152.5	305	7413	**997-316**			
Rigid Wall Sign	305	604	7414	**997-328**			

Ionisation Equipment

Hand-Held Ioniser

- Neutralises positive and negative charges
- Convenient, pistol grip action
- 400mm range
- Reliable, piezo-electric operation
- Requires no power supply, batteries or recharges
- 50,000 trigger operations min.
- Unique 'ion indicator' test device included
- Ideal for field-service, prototyping and production use

STA85

	Price Each	
Order Code	1+	5+
936-856		

Work Station Ionisers `CHARLESWATER Europe`

Personal H = 171, W = 152, D = 63.5   Bench top H = 178, W = 279, D = 229

Ionisers are designed to neutralise charge in areas prone to static build up, by providing a continuous stream of balanced positive and negative ions.

The **Personal Ioniser** is compact, lightweight and easily portable. It has a twin speed fan, and unique alarm circuitry, indicating when the emitter electrodes require cleaning, thus maintaining optimum performance. Air filter supplied. Decay time at 2ft from ioniser front is 4 seconds.

The **Bench Top Ioniser** is durable and efficient and maintains an ion balance under extreme conditions in most environments. It has a powerful variable speed fan and a heater which compensates for the chill factor by raising the ambient air temperature by 10°F. The laminar air flow reduces air turbulance and ion recombination, prolongs cleanliness and increases efficiency. Decay time at 2ft from ioniser front is 2 seconds.

Both ionisers may be wall, shelf or work bench mounted. Recommended working distance from ioniser front for optimum charge neutralisation 0.15m min to 1.07m max.

STA1

	Mftrs. List No.	Order Code	Price Each		
			1+	3+	10+
Supplied with UK Mains Lead					
Personal	92321	**438-716**			
Bench top	92300	**438-728**			
Supplied with 'Schuko' Euro Lead					
Personal	92321EU	**322-5460**			
Bench top	92300EU	**322-5458**			

Vectored Air Ionisation Systems `CHARLESWATER Europe`

Hand-Gun System

Ion Vector System

Photoelectric Switch

The Ion Vector and Neutalising Hand Gun systems are complete ionisation systems designed to deliver a controlled combination of compressed, ion balanced air, to eliminate static charge, whilst removing dust and other contaminants attracted by the static.

The **Ion Vector System** is fixed mounted. Ionised air is delivered via a flexible 1.5m hose, goose-neck nozzle, and stand. It is controlled by either a footswitch (supplied), or optional photo-electric switch for automatic operation on a conveyor belt system.

The **Hand Gun System** is a flexible, hand-held unit. Ionised air is delivered via a 2.1m hose and hand gun nozzle, with thumb operated switch.

Each system comprises a control base unit, air hose, and appropriate nozzle. Base units have quick-connect air line fittings, needle valve air flow adjustment, ion balance ajustment, and replaceable air filter. For operation, a clean, dry air supply is required, and IEC mains cord suggested **order codes 152-575 (UK)** or **210-699 (European 'Schuko') style**.

Input Voltage	220 V ac, 50Hz	Air Consumption	3.5 CFM 30 PSI
Power consumption	2.5W/25W	Recommended PSI	5-100 PSI

STA111

	Mftrs. List No.	Order Code	Price Each	
			1+	3+
Ion Vector System (inc. footswitch)	92100	**165-396**		
Hand Gun System	92105	**165-402**		
Photoelectric Switch	92117	**165-414**		
Replacements				
1.5mm Vector Nozzle	92115	**165-426**†		
2.1m Hand Gun Nozzle	92118	**165-438**†		
Footswitch	92116	**165-440**†		
Air Filters (pack of 2)	92119	**165-451**		
† Available until stocks are exhausted				

Overhead Ioniser `CHARLESWATER Europe`

H = 70, W = 600, D = 130

- Autobalancing with audio/visual alarms
- High air output 4.25-7.35m³/min
- Continuous monitoring for optional performances
- 2 120mm fans
- Compact size

POWER CORD REQUIRED, SEE ORDER CODES 439-307 OR 210-699 (EUROPEAN 'SCHUKO') STYLE
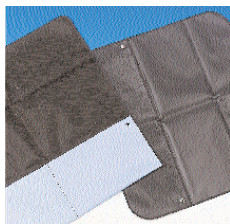
STA110

		Price Each	
Mftrs. List No.	Order Code	1+	3+
92235	**165-475**		

11

745

Semiconductors – Static Protection

Workstation Kits

Field Service Engineer's Kits

Handy, portable static-safe workstation kits. Contents include lightweight fold-up vinyl mat, wristband and coiled cord, and straight ground cord with crocodile clip termination. Mats include 2 pockets for pcb's, components or tools.

Two-layer kit features a blue static dissipative layer (<10^{11}/sq), a conductive layer (<$10\Omega^5$/sq), two 1MΩ resistors in the coiled cord, and one in the straight cord.

Static dissipative kit features a single layer (<$10^9\Omega$/sq), with reinforced corners and edging, and a 1MΩ resistor in each cord.

Both kits conform to **EN100 015-01**.

STA33

Type	Mftrs. List No.	Order Code	1+	Price Each 10+	25+
Two-layer	J7124	**233-018**			
Static dissipative	J7215	**877-682**			

Pocket-Size Field Service Kit

3M

- Kit contents:
  Static dissipative mat with pocket
  Adustable wrist band
  Wrist strap cord (1.5m)
  Extension cord (1.5m)
  Work surface cord (1.5m)
  Crocodile clip
- Small enough to fit a shirt pocket
- Lightweight
- Replacement work surface cord available

STA93

	Mftrs. List No.	Order Code	Price Each 1+	10+
Field service kit	8505	**997-249**		
Replacement work surface cord	3063	**997-286**†		

† Available until stocks are exhausted

Conductive EPA Kit

Vermason

- Low cost
- Vermahide bench mat, 1.0 0.7m, $R_G = 10^4$ to $10^6\Omega$
- Adjustable wristband set
- EPA warning sign, self-adhesive 300 150mm
- EBP plug to fit UK socket
- Straight ground cord 1.5m
- Fitted with UK mains plug

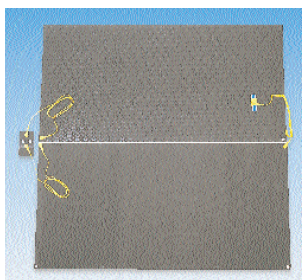Creates a single operator ESD protected workstation. The kit includes a conductive self-adhesive table mat and all the necessary grounding equipment for the operator and mat. **Not to be used where live equipment is being tested**.

STA137

| Mftrs. List No.	Order Code	1+	Price Each 10+	25+
J733	**302-6619**			

Conductive Work Station Kit

TBA

- Prevents static damaging sensitive electronic components
- **Kit contains:**
  Conductive floor and bench mats (1219 610mm)
  Adjustable elasticated wrist strap
  Coiled ground cord, 2.2MΩ terminated, (2m)
  2 straight ground cords, 1.1MΩ terminated, (1.2m)
  Earth reference plate
- Conforms to **EN100 015-1**

STA34

Mftrs. List No.	Order Code	1+	Price Each 10+	25+
KIT0001	**178-422**			

Static Dissipative Workstation Kit

Vermason
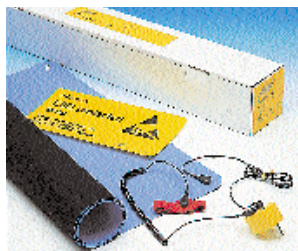
- Attractive, light blue Norastat work surface, 1.2 0.6m R_G 10^6 to 5 10^7 Ω
- Adjustable wristband set
- EPA warning sign, self-adhesive 300 150mm
- EBP plug to fit UK socket
- Straight ground cord 1.5m
- Fitted with UK mains plug

Creates a single operator ESD protected workstation. The kit includes a solder resistant dissipative table mat and all the necessary grounding equipment for the operator and mat. The mat is more durable than a conductive mat and can be used where live equipment is being tested. A dissipative mat also offers a higher level of protection than a conductive mat (charge relaxation vs electrostatic discharge).

STA136

Mftrs. List No.	Order Code	1+	Price Each 10+	25+
J753	**302-6620**			

Static Dissipative Work Station Kit

Vermason

This kit provides the essential items required for use in test, inspection or production areas where live equipment could be worked on within an ESD protected area, and conforms to **EN100 015-1**.

The kit comprises a grey Norastat 2 layer static dissipative bench mat measuring 1200mm 600mm, an elasticated adjustable wristband (518-438) and coiled ground cord (as 178-389), a common point straight ground cord (similar to 179-222), an earth plug with 3 10mm studs (254-356), caution sign, (179-864) and instructions for use.

Fitted with UK mains plug.

STA35

Mftrs. List No.	Order Code	1+	Price Each 10+	25+
J7558F	**484-325**			

Monitored Workstation Kit with Wrist Strap Tester

Vermason

- Attractive, light blue Norastat work surface, 0.9 0.6m R_G 10^6 to 5 10^7 Ω
- Adjustable wristband set
- EPA warning sign, self-adhesive 300 150mm
- Straight ground cord 1.5m
- EBP block with 2 10mm studs and built in wrist strap tester
- Fitted with UK mains power supply

Creates a single operator ESD protected workstation. The kit includes a solder resistant dissipative table mat and all the necessary grounding equipment for the operator and mat. The mat is more durable than a conductive mat and can be used where live equipment is being tested. The ground point includes a built-in wrist strap tester.

STA135

Mftrs. List No.	Order Code	1+	Price Each 5+	10+
J753M	**302-6632**			

11

746

Semiconductors – Static Protection

Workstation Kit with Floor Mat and Wriststrap Tester
With Footstraps

- Attractive, light blue Norastat work surface, 0.9 0.6m R_G 10^6 to 5 10^7 Ω and Norastat floor mat 0.6 0.9m
- Adjustable wristband set and heel grounder pair
- EPA warning sign, self-adhesive 300 150mm
- Two straight ground cords 1.5m
- EBP block with 2 10mm studs and built in wrist strap tester
- Fitted with UK mains power supply

Creates a single operator ESD protected workstation. The kit includes a solder resistant dissipative table mat and all the necessary grounding equipment for the operator and mat. A pair of heel grounders allows the operator to disconnect the wrist strap still ensuring path to ground continuity. The ground point includes a built-in wrist strap tester.

STA134

Mftrs. List No.	Order Code	Price Each		
		1+	5+	10+
J753MC	**302-6644**			

Production/Handling Equipment

Static Dissipative Finger Cots

CHARLESWATER *Europe*

- Provide excellent ESD protection
- Retains tactile sensitivity
- Powder free latex rubber construction

Surface resistivity $10^6 – 10^9$ Ω/sq
Tribogeneration <100V

STA106

20 Pieces Per Pack			Price Per Pack	
	Mftrs. List No.	Order Code	1+	50+
Small	72700	**165-177**†		
Medium	72705	**165-207**		
Large	72710	**165-220**†		

† Available until stocks are exhausted

Anti-Static Vinyl Gloves

CHARLESWATER *Europe*

- Prevents static charge generation
- Protects hands
- Strong light weight construction
- Disposable

Size	Cuff Opening	Length	Palm Width
Small	110	240	90
Medium	110	240	100
Large	120	240	110

Surface resistivity 2 10^{10} Ω/sq
Tribogeneration <200V

STA109

	Mftrs. List No.	Order Code	Price Per Pair	
			1+	50+
Small	72500	**165-049**†		
Medium	72505	**165-062**		
Large	72510	**165-086**†		

† Available until stocks are exhausted
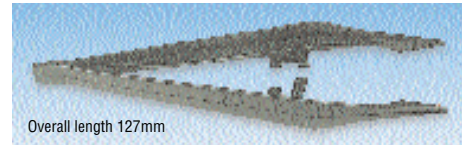
Conductive Gloves

Varmason

- 2 sizes
- Protects hands and components
- Comfortable, elasticated cotton with interwoven conductive strands
- Surface resistivity <10^6 ohms/sq

STA30

Size	Mftrs. List No.	Order Code	1+	Price Per Pair 10+	50+
Small	J3355S	**168-312**			
Medium/Large	J3355M	**168-324**			

Conductive Plastic Tweezers
TBA

Overall length 127mm

Tweezers manufactured in carbon loaded, volume conductive polypropylene. The surface resistivity of the tweezers is in the order of 5kΩ/square. They are ideal for loading static sensitive components and have serrated jaws to aid gripping. Conforms to **EN100 015-1**.

STA32

Mftrs. List No.	Order Code	Price Each		
		1+	10+	25+
TWEE0002	**175-876**			

Conductive PCB Racks

Varmason
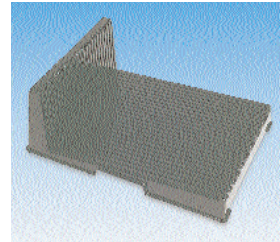
- Conductive polypropylene
- Holds up to 25 circuit boards
- Conforms to **EN100 015-1**

	H	W	D
175-835	125	265	350
175-836	125	265	200

Mftrs. List No.
K 18 24 = 175-835, K 18 22 = 175-836

STA26

Rack Depth	Order Code	Price Each			
		1+	10+	50+	100+
350mm	**175-835**				
200mm	**175-836**				

SMD Reel Rack

Varmason
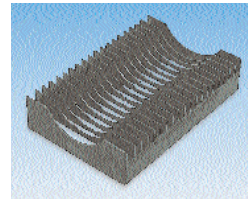
- Conductive polypropylene
- Holds up to 19 reels
- Accepts 7" or 13" reels
- 15mm slot widths
- Conforms to **EN100 015-1**

H = 75, W = 345, D = 230

STA27

Mftrs. List No.	Order Code	Price Each		
		1+	10+	50+
K240	**595-720**			

Large Capacity PCB Rack

Varmason
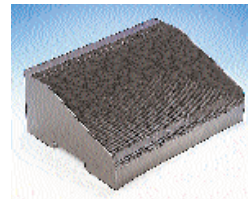
- 48 board capacity
- Groove width/pitch 4mm
- Durable conductive polypropylene
- Free standing or louvre panel mounting
- Conforms to **EN100 015-1**

H = 145, W = 388, D = 286

STA86

Order Code	Price Each		
	1+	10+	25+
936-832			

11

747

Semiconductors – Static Protection

Production/Handling Equipment — Continued

PCB Rack
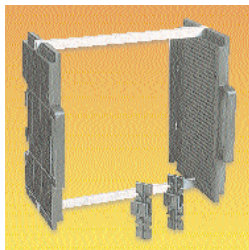
H = 315
W = 320 (standard)
D = 200 (inc. handles)

The antistatic printed circuit rack moulded in carbon loaded polypropylene is designed for safely holding PC boards during all stages of assembly, cleaning and testing. The modules may be combined to give any size, height, width or depth and will accomodate any width of PCB from 15 to 290mm. This may be increased to a maximum of 970mm if the extruded rails are replaced with the 147-395 1 metre rails. Two front handles are used to hold the assembly. Supplied complete with two wall mounting hooks, four back strips to prevent the PCB's from sliding out and two 320mm aluminium extrusion rails with nuts and bolts. May be used for transporting PCBs, in plating, etching and washing applications (subject to acceptance of aluminium and steel nuts and bolts in the solutions).

STA139

	Order Code	Price Each		
		1+	5+	10+
Rack module	.147-394			
Additional rails (1 pair)	147-395			

Conductive Component Tray   TBA

● Conductive polypropylene
● 10mm mate press stud fitted
● Surface resistivity $10^6\Omega$/sq. max
● Conforms to **EN100 015-1**

H = 19, W = 178, L = 305
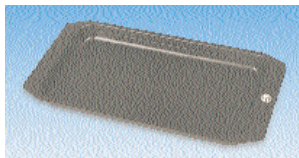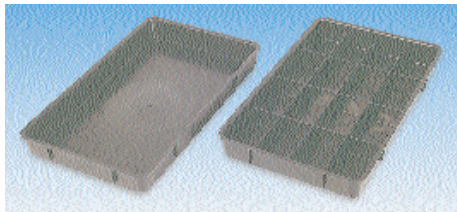
STA28

Mftrs. List No.	Order Code	Price Each		
		1+	10+	25+
TRAY0010	175-874			

Conductive Trays
PCB and Component

Varmason

Overall dimensions: H = 51, W = 280, L = 460

Stackable trays manufactured from conductive polypropylene with surface resistivity of 1MΩ/square or less. Available as an open tray for PCBs or divided into 16 compartments for components. Conforms to **EN100 015-1**.

Mftrs. List No. K1617 = 265-056, K1619 = 265-068

STA29

	Order Code	Price Each		
		1+	10+	25+
PCB	265-056			
Component	265-068			

Conductive Brushes

Varmason

● **Durable**
● **Soft brushes** suited to cleaning delicate items
● **Hard brushes** suited for scrubbing PCBs assemblies
● Conductive polypropylene handles
● Copper-sulphide infused acrylic bristles

NB. For effective operation, user should be earthed

STA25

|	Mftrs. List No.	Order Code	Price Each		
			1+	10+	25+
Soft Brushes					
100mm width	K3050	265-081			
Hard Brushes					
12mm width	K3003	265-070			
25mm width	K3005	518-475			
35 75mm block	K3040	168-660			

Conductive Shorting Connector

Varmason

Supplied in 0.5 metre lengths, the shorting connector may be cut down to fit edge connectors and provides mechanical and electrostatic protection. Conforms to **EN100 015-1**.

STA59

Mftrs. List No.	Order Code	Price Each	
		1+	25+
K 15 04	175-831		

'D' Connector Covers

3M
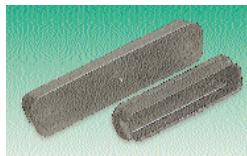
● Prevents static, physical and chemical damage
● Conductive polyethylene construction
● For cable assemblies, computers, peripherals, etc.
● Plug and socket options

STA60

No. of Pins	Mftrs. List No	Order Code	Price Each			
			1+	20+	100+	500+
Plug Covers						
9	4272-9P	596-061				
15	4272-15P	596-073				
25	4272-25P	596-085				
Socket Covers						
9	4272-9S	596-115				
15	4272-15S	596-127				
25	4272-25S	596-139				
50	4272-50S	596-152 †				

† Available until stocks are exhausted

Static Dissipative Tool Roll

Varmason

● Made of 3-layer, hard wearing coated fabric
● 10 pockets
● Outer layers are static dissipative, inner is conductive
● Colour: blue
● Size 310 510mm when open
● R_S: 10^6 to $10^9\Omega$
● Weight: 135g
● Hook and loop closure
N.B. Tools not included

Tools can be safely transported to, and used within, an EPA when stored in a lightweight ESD tool roll. Suitable for both in-house and field engineer use.

STA127

Mftrs. List No.	Order Code	Price Each		
		1+	10+	25+
J7100	302-6735			

Cleaning Products

Anti-Static Cleaning Wipes

CHARLESWATER Europe

● Heavy duty cellulose fibre tissues
● Saturated in anti-static alcohol based cleaning solution
● Convenient, re-closable pop-up dispenser
● Cleans surfaces and eliminates static
● Ideal for computer screens, mats, work surfaces, keyboards, office and manufacturing environments
● Removes dust grease, grime, fingerprints and solder flux
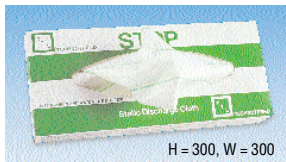
Tissue: H = 146, W = 172, Box: L = 178, Dia = 102

STA108

	Order Code	Price Per Box	
		1+	10+
Box of 160 wipes	165-244		

(side margin) 11 748 **Semiconductors** – Static Protection

Anti-Static Cloths TECHNOTREND

H = 300, W = 300

- Reduces dust attraction
- Anti-static chemical impregnated
- Re-activated with water
- 10m² coverage per cloth per application
- Unique green stripes indicate when cloth requires re-activating
- Supplied in boxes of 50

STA76

Order Multiple=50 Order Code		Price Each	
	50+	500+	2500+
522-715			

Benchtop Cleaner

An anti-static non-abrasive liquid cleaner suitable for use in ESD protected areas on mats, table tops etc. Apply with clean lint-free rag or standard paper towel. Safe on any surface. Removes flux residues, finger marks, dirt and grease. The spray top on the 0.5l bottle will also fit the 1.0l bottle if required.

Mftrs. List No.   J1605F = 265-159,   J1610F = 265-160

STA24

		Price Each		
	Order Code	1+	12+	36+
Bottle with spray top, 500ml	**265-159**			
Refill bottle, 1 litre	**265-160**			

Static Control Spray 3M

- Extra strength
- Removes dirt/stains with ease
- Ideal for workstations, computer screens, floor mats
- Clear, odourless, water-based liquid
- Leaves no residue
- Large 32oz (950ml) trigger spray bottles

STA103

	Mftrs. List No.	Order Code	Price Each		
			1+	10+	50+
Spray bottle, 950ml	8001	**997-146**			
Box of 12 bottles	8001-12	**997-158**			

Static Dissipative Floor Polish

Vermason

- Non-hazardous water based
- Easy to apply, low VOC (volatile organic compounds)
- Zero tribo-generation
- Yields approximately 50m² per litre
- Durable non-slip
- To be used in conjunction with ESD footwear
- Long lasting, low maintenance
- R_S 10^7 to $10^9\Omega$
- Use in conjunction with C903 cleaner, Order Code **302-6668**

Static dissipative floor polish can enhance the features of an existing ESD floor or make a non-ESD floor static dissipative, without the cost of replacing the entire floor. It is a free flowing liquid emulsion which can be easily applied to any hard surfaces or sealed floors i.e. vinyl, concrete, linoleum or ceramic tiles. Complies with **BS EN 100 015/1** and **BS IEC 61340-5-1**.

STA129

		Price Each		
Mftrs. List No.	Order Code	1+	10+	25+
C901	**302-6656**			

Static Dissipative Floor Cleaner

Vermason

- Low VOC
- Low Foam, Zinc free
- Neutral pH – needs no rinsing, non-alkaline
- Static dissipative 10^7 to 10^9 Ω
- Zero tribo-generation
- Non streaking
- 10:1 concentrate
- Dries in 1 hour
- High traffic areas – apply once a week
- Light traffic areas – apply 2-3 times a month

A static dissipative, low VOC, floor cleaner to be used in conjunction with Vermasol floor polish Order Code **302-6656**. Designed to remove dirt and scuff marks from a floor treated with Vermasol polish. Supplied as a 10:1 concentrate this product is also clean room compatible.

STA131

		Price Each		
Mftrs. List No.	Order Code	1+	10+	25+
C903	**302-6668**			

Office Supplies

Static Dissipative Document Wallets and Folders

Vermason

- Will not generate static charge
- Durable, anti-static LDPE construction
- Non-stick – ideal for photocopying
- A4 and A3 sizes
- Printed with ESD logo
- Universal fit, 11 hole spine (wallets only)
- Folders open on two sides
- R_S $<10^{11}\Omega$, T_{1000} $<2s$
- Conform with **IEC 61340-5-1**

STA115

Size	Mftrs. List No.	Order Code	Price Per Pack		
Document Wallets			1+	5+	10+
A4 (100 per pack)	K5202	**168-610**			
Document Folder					
A4 (100 per pack)	K5221	**168-713**			

Static Dissipative Ring Binders

Vermason

- For use within ESD protected areas
- Will not generate static charge
- 0.35mm thick, antistatic PVC covering
- A3 and A4 sizes, 2 or 4 ring
- ESD logos on front and spine
- Transparent label window on spine
- R_S $<10"\Omega$, T_{1000} $<2s$
- Conform with **EN100 015-1**

STA118

Size	Mftrs. List No.	Order Code	Price Each		
			1+	10+	25+
A4 2 ring 50mm	K5105	**168-567**			
A4 4 ring 25mm	K5102	**168-543**			
A4 4 ring 50mm	K5104	**168-555**			

Static Dissipative Clip Boards

Vermason

- Will not generate static charge
- 0.35mm thick, antistatic PVC covering
- Robust, sprung metal clip
- Printed with ESD logo
- Optional cover
- R_S $<10"\Omega$, T_{1000} $<2s$
- Conform with **EN100 015-1**

STA119

	Mftrs. List No.	Order Code	Price Per Pack		
			1+	10+	25+
Clipboard	K5301	**168-634**			

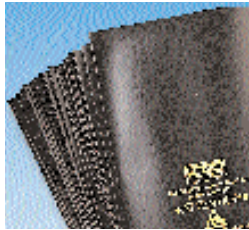**Semiconductors** – Static Protection

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749

Semiconductors – Static Protection

Packaging Materials

Conductive Bags

- 75 micron 'Vermasafe' polyethylene
- High puncture resistance
- Excellent heat sealability
- Surface resistivity <10⁵Ω/sq.
- Fully recyclable
- Conforms with **IEC 61349-5-1**

Note: Print on bag may differ from illustration

Mftrs. List No. BP3/Dimensions W H

STA36

Order Multiple=100			Price Each			
Dimensions (W H)						
mm	inches	Order Code	100+	1K+	5K+	10K+
75 100	3 4	**522-727**				
100 100	4 4	**522-739**				
100 150	4 6	**522-740**				
100 300	4 12	**522-752**				
150 200	6 8	**522-764**				
150 250	6 10	**522-776**				
200 200	8 10	**.522-788**				
150 600	6 24	**522-790**				
200 300	8 12	**522-806**				
250 350	10 14	**522-818**				
300 400	12 16	**522-820**				
400 450	16 18	**522-831**				
450 500	18 20	**522-843**				

Static Dissipative Transparent Bags

Anti-Static Pink Bags:
- Suitable for use in EPA to hold non-ESD sensitive items
- Made of polyethylene 0.075mm thick
- Amine free
- Tough, puncture resistant
- R_S: <10¹¹, T_{1000} <2 sec. at 50% rH
- Heat sealable, recyclable
- Bags printed with ESD logo and text to **IEC 61340-5-1**

Clear Static Zip Bags:
- Suitable for packing electronic components not requiring EDS shielding
- Made of permanently anti-static fully transparent 0.075mm thick film
- Non-contaminating
- Tough, puncture resistant
- R_S: <10¹¹, T_{1000} <2 sec. at 50% rH

Mftrs. List No. BQ3/Dimensions W H

STA38

Order Multiple=100			Price Each		
Dimensions (W H)					
mm	inches	Order Code	100+	1K+	10K+
Anti-Static Pink Bags					
100 150	4 6	**522-855**			
150 200	6 8	**522-867**			
200 250	8 10	**522-879**			
Order Multiple=10			10+	100+	1K+
250 350	10 14	**179-785**			
400 450	16 18	**179-786**			
Clear Static Dissipative Zip Bags					
76 127	3 5	**877-712**			
152 203	6 8	**178-427**			
203 254	8 10	**178-428**			
254 305	10 12	**178-429**			
406 305	16 12	**179-220**			

Static Dissipative Transparent Bags

3M

- Will not generate static charge
- Suitable for use in an EPA
- Ideal for documents and non-sensitive devices
- Distinctive colour

Mftrs. List No. 1620 (H W) (ins.)

STA101

Pack Quantity=100			Price Per Pack		
Dimensions (W H)					
mm	inches	Order Code	1+	10+	50+
3 5	75 125	**996-750**			
5 8	125 200	**996-762**			
8 10	200 250	**996-774**			
10 12	250 300	**996-786**			
12 16	300 400	**996-798**			
15 18	380 450	**996-804†**			

† Available until stocks are exhausted

Transparent Recloseable Bag

Transparent polythene bags treated for anti-static, giving a pink tint. The bag has a recloseable top and white panels suitable for writing. Surface resistivity <10¹³ Ω/sq.

Dimensions (typ.)	85 120mm
Thickness	200 gauge (50µm)
Surface resistivity	10⁹ to 10¹³ ohms/square

STA39

Order Multiple=100	Price Each		
Order Code	100+	1K+	10K+
522-880			

Self-Seal Bubble Bags
Static Dissipative
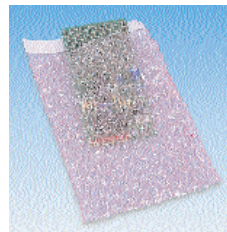
- Self-sealing adhesive closure
- Transparent for easy product indentification
- Will not discharge batteries
- Surface resistivity <10¹³Ω/sq.
- Charge decay <2s for 5kV charge

Mftrs. List No.
ASBB1 = 595-974, ASBB5 = 596-012, ASBB2 = 595-986,
ASBB6 = 596-024, ASBB3 = 595-998, ASBB7 = 596-036,
ASBB4 = 596-000,

STA41

Order Multiple=10			Price Each			
Dimensions (W H)						
mm	Inches	Order Code	10+	100+	1K+	10K+
100 135	4 5¼	**595-974**				
130 185	5 7¼	**595-986**				
180 235	7 9¼	**595-998**				
230 285	9 11¼	**596-000**				
280 360	11 14	**596-012**				
305 435	12 17	**596-024**				
380 435	15 17	**596-036**				

Metallised Bubble Shielding Bags

Vermason
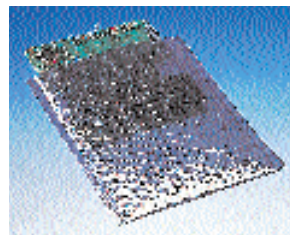
- Combines 'Faraday Cage' and mechanical protection
- Inner layer is amine-free anti-static film
- Middle layer is anti-static bubble, ⌀8mm, H = 5mm
- Outer layer is buried-metal shielding film
- Not labelled or printed
- Re-useable

Shielding bubble bags are made of standard metallised film used on shielding bags laminated to a pink anti-static bubble bag. This type of packaging offers good mechanical protection too. It is partially transparent allowing inspection of contents.

STA132

Pack Quantity=10	Mftrs.		Price Per Pack		
Outer Dimensions	List No.	Order Code	1+	10+	50+
150 250	BA9GK	**302-6589**			
250 300	BA9KL	**302-6590**			
350 450	BA9MP	**302-6607**			

Testable Transparent Shielding Bags
With and Without Recloseable Top

CHARLESWATER Europe

- Re-useable
- Metallic outer layer provides 'Faraday cage' protection
- Conductive, anti-abrasive coating
- Recommended for regular testing
- Strong polyester middle layer
- Static dissipative polyethylene inter layer
- Meets **EN100 015-1, EIA-541** and **MIL-M-38510**
- Surface resistivity 10⁷ to 10⁹Ω/sq.
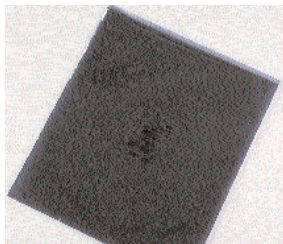- Inner surface resistivity <10¹²Ω/sq.

Mftrs. List No. Standard: CP303/Dimensions W H (ins),
Recloseable Top: CP304/Dimensions W H (ins)

STA43

Order Multiple=10

Dimensions (W H)				Price Each	
mm	inches	Order Code	10+	100+	1K+
Standard					
75 125	3 5	.175-879†			
100 150	4 6	.179-206†			
125 200	5 8	.175-880			
150 250	6 10	.179-207			
200 250	8 10	.175-881			
250 300	10 12	.175-882			
300 400	12 16	179-209			
380 450	15 18	179-210			
With Recloseable Top					
75 125	3 5	254-230			
125 200	5 8	.254-241			
200 250	8 10	.254-253			
250 300	10 12	.254-265			
300 400	12 16	.254-277			
380 450	15 18	254-289			

† Available until stocks are exhausted

Reusable Transparent Shielding Bags 3M

- Metallised outer coating
- Durable construction, scratch resistant
- Testable
- Superior charge dissipation properties
- Surface resistivity <10 Ω/sq
- Recloseable option
- Tested to **ASTMD2103**
- Meets **EIA-541** standard

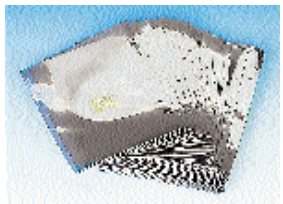Mftrs. List No.
Standard: 2100R (W H) (ins.)
Recloseable: 2100R (W H) (ins.)

STA102

Pack Quantity=100

| Dimensions (W H)				Price Per Pack				
mm	inches	Order Code	1+	5+	10+	25+	50+	
Standard, 2100R Series								
8 10	200 250	996-658†						
10 12	250 300	996-660†						
12 16	300 400	996-671†						
Recloseable, 2110R Series								
4 6	100 150	996-683†						
8 10	200 250	996-695†						
10 12	250 300	996-701†						

† Available until stocks are exhausted

Metalised Shielding Bags Vermason

- Faraday cage protection against ESD
- Buried aluminium layer
- Excellent see-through properties
- Polycarbonate compatible
- $R_S = 10^9 - 5 \cdot 10^{11}\Omega$ inside and out
- T_{1000} @ 12% rH <2s
- Conform with **EN100 015-1**

STA114

100 Per Pack

Dimensions (W H)		Mftrs.		Price Per Pack			
mm	inches	List No.	Order Code	1+	5+	10+	25+
70 120	3 5	BB4DF	168-464				
100 150	4 6	BB4EG	168-476				
150 250	6 10	BB4GK	168-488				
10 Per Pack				1+	10+	50+	100+
200 250	8 10	BB4JK	168-490				
250 300	10 12	BB4KL	168-506				
300 400	12 16	BB4LN	168-518				
400 450	16 18	BB4NP	168-520				

Metalised Shielding Bags 3M
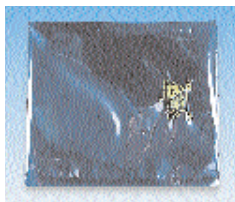
- Low cost
- Buried metalised layer
- Static dissipative outer and inner layers
- Non-testable
- Inner/outer surface resistivity <$10^{11}\Omega$/sq
- Recommended for single use applications
- Optional dual-track recloseable top
- Meets **EIA-541**

Mftrs. List No. Standard: 1900 (W H) (ins),
Recloseable: 1910 (W H) (ins)

STA44

100 Per Pack

| Dimensions (W H)			Price Per Pack			
mm	inches	Order Code	1+	10+	25+	50+
Standard						
70 120	3 5	681-222				
100 150	4 6	681-234				
120 200	5 8	681-246				
150 250	6 10	681-258				
200 250	8 10	681-260				
250 300	10 12	681-271				
300 400	12 16	681-283				
380 450	15 18	681-295				
Recloseable Top			1+	5+	10+	25+	50+
70 120	3 5	681-301					
100 150	4 6	681-313					
120 200	5 8	681-325					
150 250	6 10	681-337					
200 250	8 10	681-349					
250 300	10 12	681-350					
300 400	12 16	681-362					
380 450	15 18	681-374					

Moisture Vapour Barrier Bags Vermason
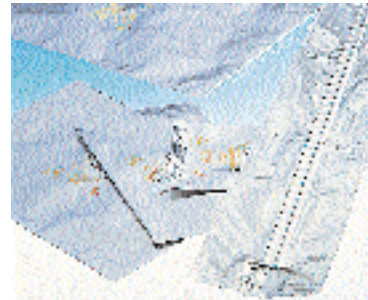
- Outer layer: static dissipative barrier
- Middle layer: Aluminium foil
- Inner layer: static dissipative polyethylene
- R_S: <$10^{11}\Omega$
- MVTR: 0.008g/sqm/24hrs
- Static decay: <0.1sec (5000-50Volts)

Static dissipative, high barrier bags suitable for vacuum packaging and/or nitrogen flushing. Meet the requirement of **MIL B81750C** and **EIA 583**. Offers ESD and EMI/RFI shielding.

STA130

Pack Quantity=100

Dimensions	Mftrs. List No.	Order Code	Price Per Pack		
			1+	10+	25+
100 650	BW9ET	302-6670			
150 650	BW9GT	302-6681			
250 650	BW9KT	302-6693			

Dessicant Sachets and Humidity Indicator Cards Vermason
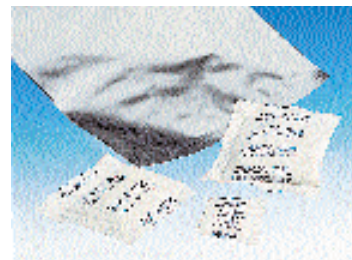
Dessicant Sachets
- Non-indicating fabric
- Paper, heat sealed
- Printed 'Silica gel – do not eat'
- Meets **BS 2540:1991**

For use in conjunction with moisture barrier bags whenever moisture control is a critical factor in the packaging of electrostatic sensitive devices.

Humidity Indicator Cards
- Meets **EIA 583**
- Packed in tins

A low cost method of indicating humidity conditions within moisture barrier bags when used to ship electrostatic sensitive devices.

STA128

Desiccant Sachets (pack of 100)	Mftrs. List No.	Order Code	Price Per Pack		
			1+	5+	10+
10gm	BW902	302-6700			
25gm	BW901	302-6711			
Humidity Indicator Card (pack of 200)	BW900	302-6723			

11

751

Semiconductors – Static Protection

Packaging Materials — Continued

Conductive Foam Matting

- **Low density**
  - for cushioning purposes
  - 6mm thickness
- **High density**
  - will retain IC component leads
  - 6mm thickness
  - 228 127 size fits conductive storage boxes 175-837/838

- **Closed cell**
- 7mm thick 'Vermafoam XL' – for maximum protection performance
- Non-contaminating

| Volume resistance | <10⁴Ω | Surface resistivity | <5 1 0⁴Ω/sq |

Mftrs. List No.   L210633 = 175-849, L250622 = 175-847, L250633 = 175-848, L 26 33 = 179-789

STA45

| Size		Price Each			
Low density	**Order Code**	**1+**	**25+**	**100+**	**250+**
305 305	.175-849				
High density					
228 127	175-847				
305 305	.175-848				
Closed cell					
305 305	179-789				

IC Tubes

Five popular lengths (3, 5, 7, 11 and 20 inch) of pre-holed (unless otherwise stated), anti-static IC tubes in 300 mil and 600 mil configurations allowing for convenient IC storage. Each tube has a selection of holes and the chips are secured by the use of a "thum tak" (for tubes with no holes an end bung is available).

A simple but effective "nail-saver" tool is also available for easy removal/re-insertion of the "thum tak" eliminating sore hands and broken fingernails.

STA141

0.3" (7.62mm)		Order	Order		Price Each		
IC tubes	Lgth.	Multiple	**Code**	**5+**	**50+**	**100+**	**500+**
DIL (no holes)	75	5	**482-985**				
DIL............................	125	5	**445-939**				
DIL............................	175	5	**459-914**				
DIL............................	280	5	**459-926**				
DIL............................	510	5	**485-226**				
SOIC (no holes)	510	5	**638-808**				
0.6" (15.24mm) IC Tubes							
DIL............................	125	5	**445-940**				
DIL............................	175	5	**459-938**				
DIL............................	280	5	**459-940**				
DIL............................	510	5	**485-238**				
Miscellaneous							
TO-220 (no holes)	510	5	**638-821**				
End Bung				**25+**	**50+**	**100+**	
·3" DIL/PLCC 28/32......		25	**482-997**				
·3" SOIC		25	**638-833**				
TO-220		25	**638-845**				
"Thum Tak"/Pin		25	**459-951**				
"Nail-Saver" pin				**1+**	**10+**	**25+**	
remover/inserter		1	**459-963**				

Conductive Printed Circuit Board Cartons
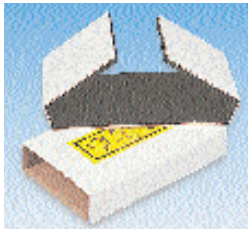
Cardboard sleeve and slider cartons lined with 6mm thick low density conductive foam conforming to **EN100 015-1**. A carton provides excellent protection for transporting PCB's. Range includes sizes for single, double and extended double Eurocards.

Mftrs. List No.
L 31 19 = 175-843, L 31 25 = 175-844, L 31 30 = 175-845,
L 31 22 = 179-792, L 31 28 = 430-444, L 31 31 = 430-456,
L 31 41 = 430-468

STA54

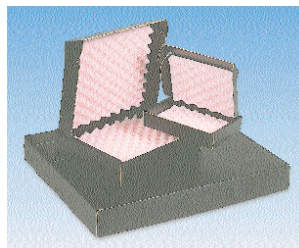| Internal Dimensions				Price Each		
H	W	D	**Order Code**	**1+**	**10+**	**100+**
195	115	30	**175-843**			
250	155	30	**179-792**			
250	195	30	**175-844**			
280	135	45	**430-444**			
300	250	30	**175-845**			
300	250	65	**430-456**			
475	275	45	**430-468**			

Component Boxes

- Strong yet light weight
- Surface resistivity <10⁵ Ω/sq
- Conductive coated, 'E' Flute cardboard
- Pink anti-static foam lined
- Ideal for small components
- Conforms to **EN100 015-1**

STA52

Internal Dimensions			Mftrs.		Price Each		
H	W	D	List No	**Order Code**	**1+**	**10+**	**100+**
25	60	60	CB-1B	**596-206**			
38	100	100	CB-2B	**596-218**			
20	135	50	CB-3B	**596-220**			

Transit Boxes

- Larger versions of 'Component Boxes' (above)
- Conductive coated 'B' flute cardboard
- Suitable for larger components, pcbs and assemblies
- Printed with static warning sign
- Conforms to **EN100 015-1**

STA53

Internal Dimensions			Mftrs.		Price Each				
H	W	D	List No.	**Order Code**	**1+**	**10+**	**50+**	**100+**	**250+**
38	178	127	3080-1B	.**596-231**					
38	229	191	3180-3B	.**596-243**					
64	229	191	3190-4B	**596-255**					
64	267	216	3230-6B	.**596-267**					
64	318	267	3320-8B	**596-279**					
64	394	318	3500-10B	.**596-280**					
					1+	**5+**	**10+**	**25+**	
64	521	394	3610-12B	.**596-292**					

Caution Labels (Reel of 1000)

| Style A | Style B | Style C | Style D |

Style E

- Self-adhesive
- Conform to **EN100 015-1** (Styles A & B), and **IEC 1340-5-1** (Styles C, D & E)
- Suitable for use on packaging and static sensitive equipment
- Supplied on reels of 1000

STA57

	Label Size		Mftrs.		Price Per Reel		
Style	mm		List No.	**Order Code**	**1+**	**10+**	**25+**
Labels (1000/reel)							
A	5	5	L5105	**177-881**			
A	12.5	12.5	L5104	**177-880**			
A	50	50	L5106	**179-787**			
B	16	38	L5101	**177-877**			
B	25	50	L5102	**177-878**			
B	38	76	L5103	**177-879**			
C	12.5	12.5	L5204	**936-777**			
C	50	50	L5206	**936-789**			
D	25	50	L5202	**936-790**			
E	127	50	L5233	**936-807**			

Prices are in Singapore Dollars and exclusive of GST

Static Awareness Labels

3M

Reusable　Single use

- Self adhesive
- Single use or reusable
- Reels of 500
- H = 64, W = 46
- Conform to **EN100 015-1**

STA58

500 Labels Per Reel	Mftrs. List No.	Order Code	1+	Price Per Reel 5+	20+
Reusable	7101	**596-164**			
Single Use	7102	**596-176**			

Clear Anti-Static Tape (66m roll)

SELLOTAPE

- Low electrostatic charge generation
- Ideal for sealing bags, boxes, etc.
- Suitable for use in Electrostatic Protected Areas
- 2 widths, 12mm and 25mm
- Non-marking
- Surface resistivity 10^9 to $10^{11}\Omega$
- Roll diameter 105mm

STA88

Width	Order Code	1+	Price Each 5+	10+	50+
12mm	**936-820**				
25mm	**168-658**				

Packing Tape 66m Roll

Vermason

- Self adhesive
- Highly visible, 50mm width
- PVC tape for secondary packaging
- Anti-static for use in ESD protected areas and proximity packaging
- Anti-static tape conforms to **IEC 61340-5**

STA56

66m Reel	Order Code	1+	Price Per Reel 10+	50+
PVC	**177-882**			
Anti-Static	**254-411**			

Storage

Sprung Lid Conductive Miniature Boxes

A range of conductive sprung lid boxes available with either solid colour or clear lids. Manufactured from carbon loaded polypropylene they are dovetail interlocking which allows the user to build a flexible system to their own requirements.

Mftrs. List No	Lid Type	Internal Dimensions H W D	External Dimensions H W D
SSBC1ABLACK	Solid colour	16 12 12	21 16 28
SSBC1BBLACK	Clear	16 12 12	21 16 28
SSBC2ABLACK	Solid colour	16 28 15	21 32 29
SSBC2BBLACK	Clear	16 28 15	21 32 29
SSBC3ABLACK	Solid colour	16 28 40	21 32 56
SSBC3BBLACK	Clear	16 28 40	21 32 56

STA47

Mftrs. List No.	Order Code	1+	Price Each 10+	100+
SSBC1ABLACK	**596-425**			
SSBC1BBLACK	**596-437**†			
SSBC2ABLACK	**596-449**			
SSBC2BBLACK	**596-450**†			
SSBC3ABLACK	**596-462**			
SSBC3BBLACK	**596-474**†			

† Available until stocks are exhausted

Conductive Storage Boxes
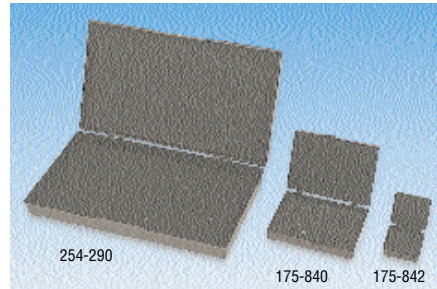
Vermason

254-290　175-840　175-842

- Durable construction
- Conductive polypropylene shells
- 6mm conductive foam linings (<10^5 Ω/sq.)
- Ideal for ICs and other static sensitive components
- Conforms with **IEC 61340-5**
- Hinged lids and secure fastenings
- Surface resistivity <10^5 Ω/sq.

Mftrs. List No.　L 16 51 = 175-837,　L 16 01 = 175-838,　L 16 11 = 175-839,　L 16 21 = 175-840, L 16 31 = 175-841,　L 16 41 = 175-842,　L 16 61 = 254-290

STA48

Internal Dimensions H	W	D	Order Code	Price Each 1+	10+	100+
40	228	126	**254-290**			
30	228	126	**175-837**			
33	138	96	**233-020**			
20	228	126	**175-838**			
13	108	83	**175-839**			
20	91	65	**175-840**			
14	75	51	**175-841**			
11	35	35	**175-842**			

Single IC Carrier

3M

300 mil　400 mil　600 mil
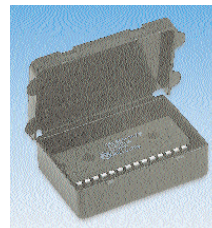
H = 12, W = 39, D = 26

- Unique 'saddle' design protects leads
- Reusable
- Rugged conductive polypropylene
- Hinged lids
- Suitable DIP sizes 0.3" or 0.4" pitch up to 18 pins and 0.6" pitch up to 28 pins

STA51

Order Multiple=5 Mftrs. List No.	Order Code	5+	Price Each 100+	1K+
5701	**595-585**			

Conductive Storage Boxes

3M

- Complete protection against physical and static damage
- **Single Card Carriers** designed for pcbs
- Anti-static protective foam liners
- **Component Carriers** ideal for IC and discrete packages
- Conductive, low density foam inserts
- Tough conductive polypropylene casing
- Robust, secure catches
- Choice of sizes

STA94

H	W	D	Mftrs. List No.	Order Code	Price Each 1+	10+	50+
Single Card Carriers							
32	229	305	8521	**997-160**†			
32	254	203	8520	**997-171**†			
51	203	254	8523	**997-183**†			
51	432	457	8522	**997-195**†			
Component Carriers							
10	83	61	CH44-2	**997-213**†			
15	102	65	CH44-3	**997-225**†			
15	180	65	CH44-4	**997-237**†			

† Available until stocks are exhausted

11

753

Semiconductors – Static Protection

Storage — Continued

Conductive Drawer Storage Unit
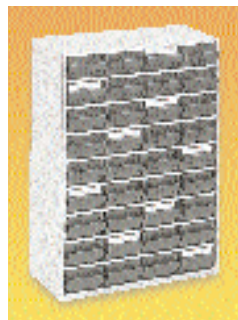

H = 126, W = 113, D = 186

- Compact robust storage system
- Free-standing conductive unit
- Manufactured from carbon loaded polypropylene
- Ideal for surface mount devices
- 6 removable drawers
- 192 covered storage compartments
- 32 compartments/drawer, dia = 18mm, depth = 12mm
- Drawers secured by transparent plastic front cover
- Supplied with 200 labels
- If used outside a static protected area grounding is required

STA46

	Price Each		
Order Code	1+	5+	10+
596-383			

'90 Series' Cabinets
18 and 36 Drawers   **raaco**

18 drawers: H = 57, W = 87, D = 135   36 drawers: H = 35, W = 64, D = 135
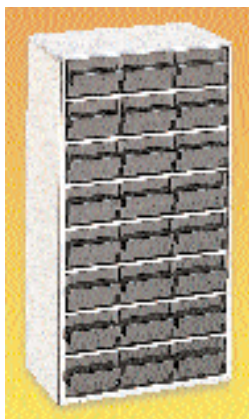Cabinets: H = 420, W = 307, D = 146

Conductive cabinets manufactured in electro-galvanised steel, for the safe storage of electrostatic sensitive devices. Each cabinet is supplied with an earthing lead, incorporating a 1MΩ resistor.
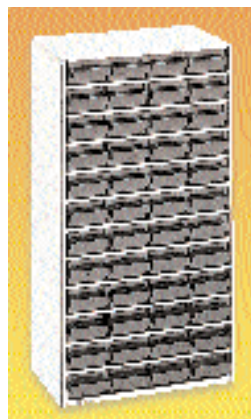
Mftrs. List No.   91802 = 234-886,   93601 = 419-837

SS1X

		Price Each		
Cabinets	Order Code	1+	4+	8+
18 drawer	**234-886**			
36 drawer	**419-837**			
Drawer Dividers		Price Per Pack		
36 drawer, pack of 48	**100-784** .			

'150 Series' Cabinets
24 and 48 Drawers   **raaco**

24 drawers: H = 57, W = 87, D = 135   48 drawers: H = 35, W = 64, D = 135
Cabinets: H = 555, W = 307, D = 150

Conductive cabinets manufactured from electro-galvanised steel, for the safe storage of electrostatic sensitive devices. Each cabinet is supplied with an earthing lead, incorporating a 1MΩ resistor.

Mftrs. List No.   ESD24-02BL = 290-038,   ESD48-01BL = 290-040

SS97X

		Price Each		
Cabinets	Order Code	1+	4+	8+
24 drawer	**290-038**			
48 drawer	**290-040**			
Drawer Dividers		Price Per Pack		
48 drawer, Pack of 48	**100-784**.			

Stackable Conductive Bin Boxes

Stackable

Open
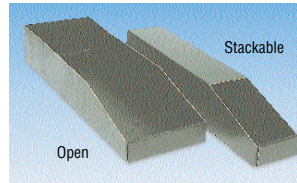
- Conductive coated 'B' Flute cardboard
- Ideal for DIP tubes
- Supplied flat-packed

STA55

Internal Dimensions			Mftrs.		Price Each		
H	W	D	List No	Order Code	1+	10+	50+
Stackable Bins							
108	108	635	2205	**596-322**			
108	203	635	2244	**596-334**			

Test and Calibration

Selecting a Service

Calibration of equipment is essential in any Company who have or are in pursuit of a quality assurance approvals. The Process of calibration ensures the accuracy of measurement and hence gives peace of mind to the user, which is important in R&D, maintenance, and production environments.

Standard Calibration

1. Instruments Calibrated To Manufactures Specification
2. Calibration Labels
3. Integrity Seals
4. Calibration Certificate
5. All Calibration Results Recorded
6. Results Stored For 5 Years
7. Re-Calibration Advice
8. Suitable For ISO9000

Recalibration
Recalibration reminders will be sent out a month before calibration due dates. A return label will be enclosed for your use.
Recalibration charges are indicated by the charge code along side each product and are the same as newly calibrated product.

T301

725 Portable Wrist Strap Monitor   **3M**

H = 28.6, W = 63.5, D = 66.7

● Continuous ground monitor for single operator
● Ideal for workstation and/or field service use
● Compact size
● Alarm indicates:
    Ground disconnection
    Low battery
    High resistance wrist strap
● Improved grounding clip
● Auto switch on/off
● Parking snap stand-by feature
● PP3 battery required, Order Code 908-526

STA99

	Mftrs. List No.	Order Code	Price Each		
			1+	10+	50+
Wrist Strap Monitor	725	`C€` 162-772†			
Dual Conductor Wrist Strap	2368	996-944†.			
Dual Conductor Ground Cord	2360	996-956†.			
Belt Clip	723	996-993†			
				Each	
Standard Calibration Charge		S `C€`	☎		

† Available until stocks are exhausted

Wrist Strap Test Point

H = 178, W = 305

● Wall mounted
● Quick and easy to use
● Clear instructions displayed on the back plate
● Comprises wrist strap checker, earth reference point, back plate and 77mm patch cord

● Green LED and audible tone indicates 'Pass'
● 'Hi-fail yellow LED indication if >35M ohms
● 'Low fail' red LED indication if <900k ohms
● Accepts 4mm/10mm press-studs and banana plugs
● Conforms to **EN 100 015-1**

STA62

Mftrs. List No.	Order Code	Price Each		
		1+	3+	10+
23-9818	`C€` 179-243			
			Each	
Standard Calibration Charge	S `C€`	☎		

Wrist Strap Test Station

Wrist Strap Tester   Wall Panel
H = 145, W = 90, D = 34   H = 300, W = 600

Mftrs. List No.
H221 = 595-925, H201 = 595-937.

● Test station includes tester and wall panel
● "Pass" LED and buzzer
● "High-Fail", "Low-Fail" and "Low battery" LEDs
● Sockets for 4mm shrouded plug, 4mm and 10mm press socket
● Wrist strap tester available separately
● 9V PP3 battery required, Order Code 908-526
● Conforms to **IEC 61340-5-1**

STA63

	Order Code	Price Each		
		1+	5+	20+
Wrist Strap Test Station	`C€` 595-925			
Wrist Strap Tester only Uncalibrated	`C€` 595-937			
			Each	
Standard Calibration Charge	S `C€`	☎		

Personnel Test Stand

● Tests wriststrap and footwear
● Tests to **IEC 61340-5-1**
● Pass range is 0.1 to 35MΩ for footwear, and 0.75 to 35MΩ for wriststrap
● Weight 8kg

This test stand is a free standing test station. It is flat-packed and can be put together in a few minutes. Supplied with footwear tester, H203. Its robust construction makes it suitable for large facilities.

STA123

Mftrs. List No.	Order Code	Price Each		
		1+	5+	10+
H2023	`C€` 302-6796			
			Each	
Standard Calibration Charge	S `C€`	☎		

Footwear Test Station

Footwear Tester: H = 145, W = 90, D = 34
Wall Panel: H = 300, W = 600
Test Mat: W = 390, D = 360

● Combined test unit, wall panel and test mat
● Checks conductive shoes, heel and toe grounders
● "High-Fail", "Low-Fail" and "Low battery" LEDs
● LED and buzzer indicate "pass"
● 20V (open circuit) test voltage
● 9V PP3 battery required, Order Code 908-526
● Conforms to **IEC 61340-5-1**

STA64

Mftrs. List No.	Order Code	Price Each		
		1+	5+	20+
H223	`C€` 595-950			
			Each	
Standard Calibration Charge	S `C€`	☎		

Wrist Strap Auditing Tester

The concept of this auditing system is to test the wrist straps without disconnecting them from their grounding point, hence testing the whole grounding circuit rather than just the wrist strap itself, as it would be done with a conventional tester.

● Checks UK 13 Amp mains socket for good earth and correct wiring
● Can be used for footwear verification
● Ideal for an ESD co-ordinator or auditor
● Pass range: 0.75 to 35MΩ ±6%
● Red LED indicates fail, green LED and buzzer indicate pass

● Function test button
● Main lead is 1 metre long

STA120

	Mftrs. List No.	Order Code	Price Each		
			1+	5+	10+
Mains Plug	H520	`C€` 302-6930			
Schuko Euro Plug	H520EU	`C€` 322-4788			
				Each	
Standard Calibration Charge		S `C€`	☎		

☎ **Please Call our Sales Office**

11
755

Semiconductors – Static Protection

Test and Calibration — Continued

Bench Integrated EBP Touch Tester

- Simply 'Touch to Test' on demand tester
- Can be mounted flush in bench trunking or bench top
- 240V mains powered and earthed
- Test Voltage is 16V
- Pass range: 0.75 to 35MΩ ±6%
- Red LED indicates fail, green LED and buzzer indicate pass
- Function test button
- Front plate: 86 86mm
- Lead is 1 metre long

STA121

	Mftrs. List No.	Order Code	Price Each		
			1+	5+	10+
Mains Plug	H540	[C] 302-6826			
Schuko Euro Plug	H540EU	[C] 322-4806			
			Each		
Standard Calibration Charge		S [C] ☎			

Portable EBP Tester

- Provides Earth Bonding Point and wrist strap tester in one block
- Simply 'Touch to Test' on demand tester
- Operators connected to another EBP in proximity of the instrument can test too
- For bench top or front mounting
- Uses an external power supply
- 5V test voltage
- Pass range: 0.75 to 35MΩ
- Conforms to **IEC 61340-5-1**
- Red LED indicates fail, green LED and buzzer indicate pass
- Supplied with mounting screws, power supply, and calibration certificate

This unique instrument provides an EBP with two 10mm snap fastener connections and a tester in one block, and is to be mounted in a convenient place on the operator workstation. Path to ground can also be tested with this instrument. It can be calibrated using Order Code 595-962 calibration box.

STA122

	Mftrs. List No.	Order Code	Price Each		
			1+	5+	10+
Mains Plug	H580	[C] 302-6814			
Schuko Euro Plug	H580EU	[C] 322-4790			
			Each		
Standard Calibration Charge		S [C] ☎			

Wrist Band and Earth Tester

CHARLESWATER Europe
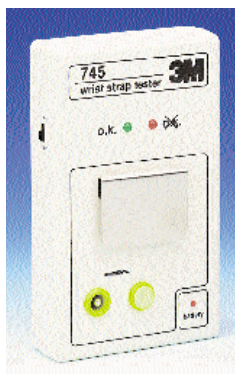
- Simple, easy-to-use earth tester
- Plugs directly into 13A mains sockets
- Gives audible and visual warning of discontinuity between operator, wrist band and ground cord
- Tests mains socket for incorrect polarity
- 'High-Fail' set at 35MΩ, 'Low Fail' at 750kΩ
- 4mm and 10mm press studs, and 4mm banana sockets fitted

H = 92, W = 50, D = 85 (inc. pins)

STA66

Mftrs. List No.	Order Code	Price Each		
		1+	5+	20+
FSK-UK-2	[C] 557-754			
		Each		
Standard Calibration Charge	S [C] ☎			

Wrist Strap Tester

3M

- Compact
- Simple to operate
- LED indication of pass/fail
- Pass range <10MΩ and 750kΩ
- Accepts standard/shrouded banana plugs, and 10mm studs
- Low battery indication
- Supplied with Dual Lock Wall Mounting Kit, battery and instructions
- 746 incorporates a.c. power supply input

H = 32, W = 95, D = 62.5

STA95

	Mftrs. List No.	Order Code	Price Each		
			1+	5+	10+
Wrist Strap Tester	745	[C] 997-134†			
Wrist Strap Tester with PSU	746	[C] 335-8355			
			Each		
Standard Calibration Charge		S [C] ☎			

† Available until stocks are exhausted

Static Sensor

3M

- Measures static voltages on objects and surfaces
- Lightweight hand-held unit
- Accurate LCD display
- 0-1990V and 0-19.9kV ranges
- 2 output jacks for remote monitoring/recording
- Battery level check facility
- Supplied with 9V battery and operating instructions

H = 41, W = 67, D = 111

STA68

Mftrs. List No.	Order Code	Price Each		
		1+	3+	5+
709	[C] 681-453			
		Each		
Standard Calibration Charge	S [C] ☎			

Static Field Meter

3M

- Locates and measures static charges
- Accurate LED display, 0 to ±1999V per inch
- Compact, hand-held design
- 'Sample' and 'Hold' reading feature
- Low battery indicator
- Supplied with isolated plate fixture, lightweight ground card, battery and full operating instructions

H = 33, W = 61, D = 107

STA69

Mftrs. List No.	Order Code	Price Each		
		1+	3+	5+
713	[C] 681-441			
		Each		
Standard Calibration Charge	S [C] ☎			

Portable 100V Test Kit

- Includes H700 tester, one H7007 probe and one HA108 concentric ring probe and leads
- Handy carry case lined with anti-static foam
- Used to measure R_S and R_G of bench and floor surfaces
- Supplied with calibration certificate

This kit provides the necessary equipment required to ensure compliance of the EPA's. It comprises instruments and accessories in a handy carry case.

STA126

☎ **Please Call our Sales Office**

Semiconductors – Static Protection

Farnell

Mftrs. List No.	Order Code	Price Each		
		1+	5+	10+
HA712	C◀ 302-6747			
Standard Calibration Charge	S C◀	Each ☎		

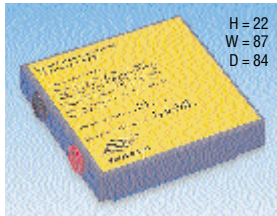## Surface Resistance Test Kit

CALIBRATION SERVICES — Vermason

- Comprehensive kit for point-to-point and point-to-earth resistance measurements
- Kit contains:
  One dual voltage surface resistivity meter (see order code 877-657)
  Two cylindrical probes
  Two 4mm shrouded test leads
- Meter requires a 9V battery, order code **908-526**
- Supplied in tough, attractive carry case

STA82

Order Code		Price Each		
	1+		5+	10+
C◀ 877-669				
Standard Calibration Charge		S C◀	Each ☎	

Surface Resistivity Probe

H = 22
W = 87
D = 84

Vermason

This probe provides a non-destructive means of testing surface resistivity of flat conductive or static dissipative materials, and complies with **EN100 015-1**. The probe has two rubber coated brass electrodes in the recommended parallel bar configuration. The probe may be used with Order Code 676-433 or similar 'megger' meter.

STA70

Mftrs. List No.	Order Code	Price Each	
		1+	5+
H1003	233-006		

Concentric Ring Probe

Vermason

- Built in 2.5kg weight
- Conductive rubber electrodes 63mm and 30mm diameter
- Insulation resistance between electrodes higher than $10^{12}\Omega$ at 1000v test voltage
- Shrouded sockets for connecting to H801
- Supplied in carry case

The concentric ring probe is designed to make surface and volume resistance measurement to **BS IEC 61340-5-1**. It will provide more accurate measurements than a square probe, especially on the high resistance range (for R > $10^9\Omega$), as it features uniform electrification lines on the tested material. The probe is fitted with a mechanism to equally distribute the load between its two electrodes.

STA125

Mftrs. List No.	Order Code	Price Each	
		1+	5+
HA108	302-6759		

Probe Sets

Vermason

- Used to measure R_S, R_G
- HA1011 contains one concentric ring probe and one cylindrical probe
- HA1013 contains one concentric ring probe and two cylindrical probes

Probes are often bought singly but the convenience of probe sets makes them popular too. These sets are packaged in a handy anti-static foam-lined carrying case that measures 300 230 80mm. The case is attractively labelled.

STA124

	Mftrs. List No.	Order Code	Price Each	
			1+	5+
2 piece probe set	HA1011	302-6760		
3 piece probe set	HA1013	302-6772		

Resistance Probe

Vermason

- Tests effectiveness of ESD protected
- Resistance-to-ground, or point-to-point measurements
- Conductive rubber contact surface
- Standard 2.3kg weight
- 4mm safety socket, accepts 'standard' banana plugs
- Complies with **EN100 015-1** and ESD Association Standard No 4.1.
- For use with ohmeter BM80, Order code 626-247

H = 80, Dia = 63

STA71

Mftrs. List No.	Order Code	Price Each		
		1+	5+	25+
H1007	595-731			

Dual Voltage Surface Resistivity Tester

Vermason

- 100V test voltage, 10V below $10^5\Omega$
- Simple push button operation
- 10^4 to $10^{12}\Omega$ range
- Rubber-coated electrodes
- May be used with external probes – order code **595-731**
- Requires a 9V battery see Order Code **908-526**
- Conforms to **EN100 015-1**

STA80

| Order Code		Price Each		
	1+		5+	10+
C◀ 877-657				
Standard Calibration Charge		S C◀	Each ☎	

Surface Resistivity Indicator

Best value — Vermason
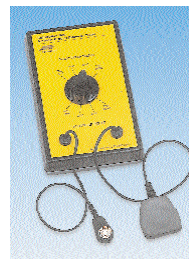
- Ideal for work benches, floors, mats, bags and boxes
- Measures between 10^5 and 10^{13} ohms/sq.
- Yellow warning LED shows >10^{13} insulator
- Red LEDs indicate 10^5-10^{12} range
- Uses ASTM recommended parallel bar method
- Also measures surface-to-ground via cable provided
- Supplied with soft carry case
- Requires PP3 battery, order code **908-526**

H = 25, W = 67, D = 115

STA72

Mftrs. List No.	Order Code	Price Each	
		1+	5+
H703	C◀ 212-878		
Standard Calibration Charge		S C◀	Each ☎

Calibration Unit

Vermason

- All testers require re-calibration annually
- For use with Vermason wrist strap and footwear testers
- Pre-set to **EN100 015-1** settings:
  Upper limit 35MΩ
  Lower limit 0.75MΩ wriststrap
  0.1MΩ footwear
- Full operating instructions included

STA65

Mftrs. List No.	Order Code	Price Each		
		1+	5+	20+
H3000	C◀ 595-962			
Standard Calibration Charge	S C◀	Each ☎		

continued

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