



ELAN DIGITAL SYSTEMS LTD.
LITTLE PARK FARM ROAD, SEGENSWORTH WEST,
FAREHAM, HANTS. UK. PO15 5SJ.
tel: (44) (0)1489 579799 fax: (44) (0)1489 577516
e-mail: support@elan-digital-systems.co.uk
website: www.pccard.co.uk

J_ SERIES HARDWARE GUIDE **(COVERS J101 to J107)**

REVISION HISTORY

ISSUE	PAGES	DATE	NOTES
C	26	30.04.97	
D	26	14.08.97	Windows 95 installation notes

Disclaimer

This document has been carefully prepared and checked. No responsibility can be assumed for inaccuracies. Elan reserves the right to make changes without further notice to any products herein to improve reliability, function and design. Elan does not assume any liability arising out of the application or use of any product described herein: neither does it convey any license under its patent rights nor the rights of others. Elan products are not authorised for use as components in life support services or systems. Elan should be informed of any such intended use to determine suitability of the products.

Trademarks:

IBM: Personal Computer XT (PC/XT)

IBM: Personal Computer AT (PC/AT)

IBM: Personal Computer PS/2

IBM: Micro Channel

Microsoft: MS-DOS.

Microsoft: Windows

SystemSoft Corp: CardSoft

Copyright (C) 1997 Elan Digital Systems Ltd

Table of Contents

Disclaimer.....	3
Table of Contents.....	5
Section 1: Introduction	7
1.1 Hardware Overview	7
Hardware Variants	7
1.2 Software Overview.....	12
Section 2: Hardware Installation	14
2.1 Novice PC Expansion Card Installers	14
J102 and J104 Installation.....	14
J101, J103, J105 J106 and J107 Installation.....	15
2.2 Technical Installation Notes.....	15
ISA I/O Addresses	15
J103, J104, J105, J106 and J107 Boot Option	17
2.3 Do's and Don'ts.....	18
Appendix A: Elan PCMCIA Products and Services.....	19
Appendix B: Service and Technical Support Information.....	20
Appendix C: Glossary of PCMCIA Terms.....	21
Appendix D: OEM Guide To Direct Chip Access	23
Appendix E: J10xMEMF Utility V3.04	25

Section 1: Introduction

1.1 Hardware Overview

The 'J' Series of PCMCIA reader/writer card drives allow the desktop PC to support both PCMCIA memory and I/O cards.

The 'J' Series card drive plugs into the IBM AT expansion bus (ISA) and can interface with EPROM, OTP, FLASH, SRAM, EEPROM and ROM technology cards. The PCMCIA compatible slot also supports I/O cards such as modems, LANs and ATA hard disk drives.

There are several variants of the 'J' Series. All have a control board that plugs in the expansion (ISA) bus of the PC, and have one or two PCMCIA sockets.

The 'J' Series card drive has extremely fast memory card programming and read times, up to 100 times faster than similar centronics or RS232 based units. The PC expansion bus and power supplies are fully buffered and current protected against defective insertion. The 'J' Series card drive can be used in 16 bit expansion slots as found in most computers and EISA 32 bit slots. Note that it is not compatible with the micro-channel bus as found on the IBM PS/2 series, nor with the PCI bus.

Hardware Variants

J101

Single card slot unit which mounts in a standard 3.5" disk drive frame on IBM AT or Pentium (or compatible). SRAM, FLASH, OTP read/write and I/O card support.

J102

Single card slot unit which is housed in an external case and connects to an IBM AT, or Pentium (or compatible) via a ribbon cable. SRAM, FLASH, OTP read/write and I/O card support.

J103

Single card slot unit which mounts in a standard 3.5" disk drive frame on any IBM AT, or Pentium (or compatible). SRAM, FLASH, ATA and I/O card support.

J104

Single card slot unit which is housed in an external case and connects to any IBM AT, or Pentium (or compatible) via a ribbon cable. SRAM, FLASH, ATA and I/O card support.

J105

Single card slot unit with rear mounting access in any IBM AT, or Pentium (or compatible) - SRAM, FLASH, ATA and I/O card support.

J106

Two card slot unit, front 3.5" disk drive plus rear mounting access drive, for any IBM AT, or Pentium (or compatible). SRAM, FLASH, ATA and I/O card support.

J107

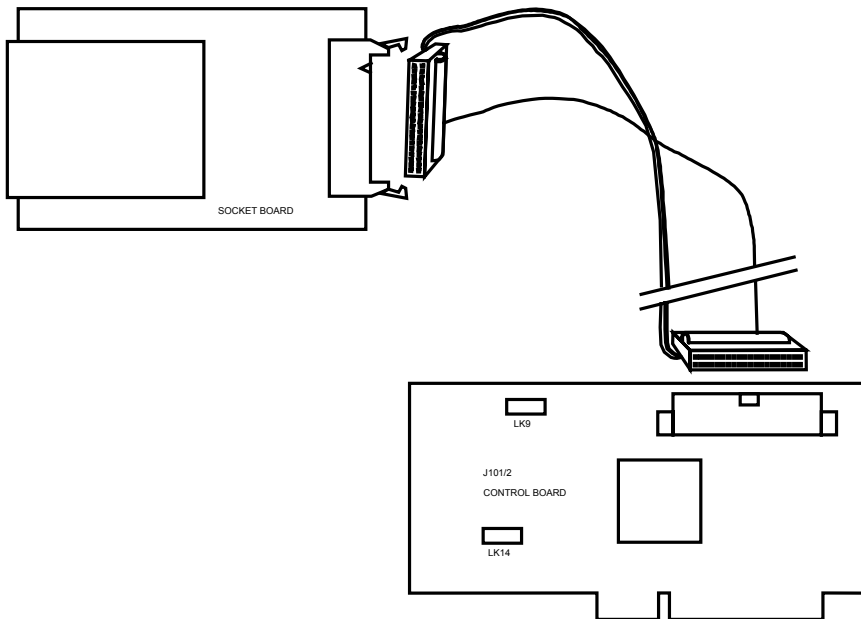
Two card slot unit, external drive, plus rear mounting access drive, for any IBM AT, or Pentium (or compatible). SRAM, FLASH, ATA and I/O card support.

J101 Hardware

The J101 consists of a Control Board that plugs into the ISA bus, a connecting cable and a Card Socket Interface that is mounted in a 3.5" disk drive bay. The J101 components are shown below.

J102 Hardware

The J102 consists of a Control Board that plugs into the ISA bus and has an integral connection cable. The Card Socket Interface sits along side and external to the PC and is plugged into the other end of the connection cable. The J102 components are shown below.



J101/J102 Components

J103 Hardware

The J103 consists of a Control Board that plugs into the ISA bus, connecting cables and a Card Socket Interface that is mounted in a 3.5" disk drive bay. The J103 components are shown below.

J104 Hardware

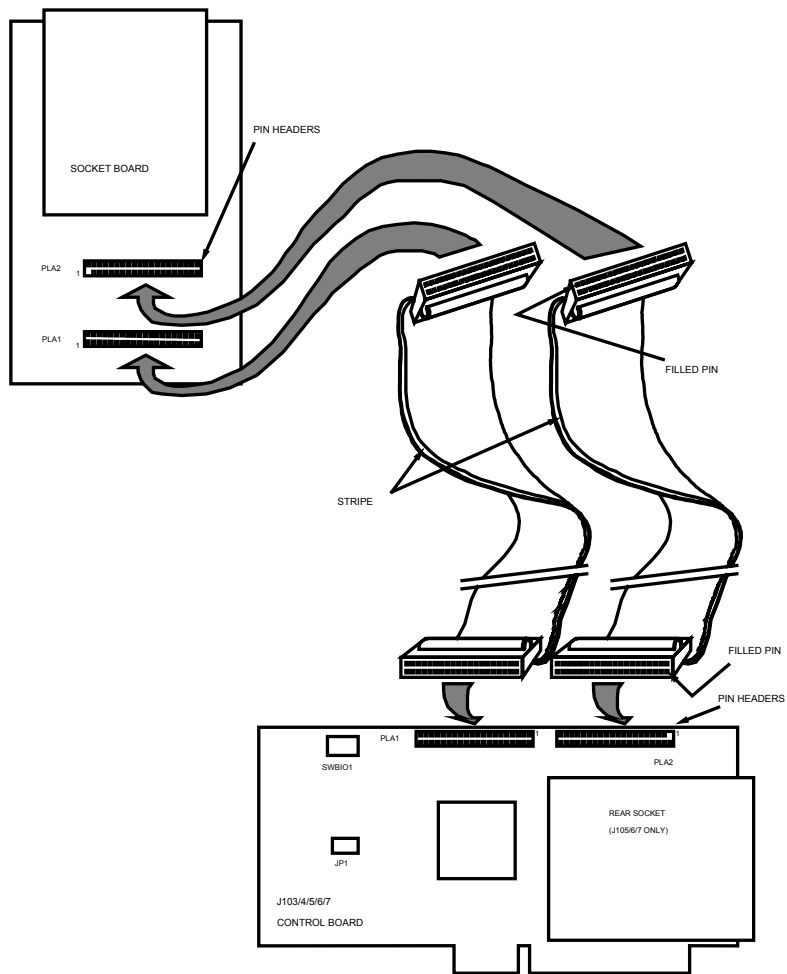
The J104 consists of a Control Board plugs into the ISA bus and has an integral connection cables. The Card Socket Interface sits along side and external to the PC and is plugged into the other end of the connection cable. The J104 components are shown below.

J105 Hardware

The J105 consists of a Control Board that plugs into the ISA bus. A single PCMCIA socket is mounted on the rear of the control board, and is accessible from the rear of the PC.

J106 and J107 Hardware

The J106 and J107 consists of a Control Board plugs into the ISA bus, two ribbon connections cables and a Card Socket Interface.. The J106/7 has two PCMCIA sockets. One socket is fitted on the control board and is accessible via the rear of the PC. The other socket is in a Card Socket Interface mounted in a 3.5" disk drive bay, or in an external box. The components are shown below.



J103/4/5/6/7 Components

1.2 Software Overview

The 'J' Series is a versatile system with many different applications. Different users have different requirements, therefore one of a number of software options can be purchased with the 'J' Series. The software packages can be used on all the 'J' Series hardware variants.

JC_CARD (IN SEPARATE MANUAL)

This is an MS-DOS based application package designed for reading and copying memory cards in "transparent" mode. Transparent mode takes no account of any filing structures on the card, and will read and copy on a direct byte-by-byte basis. It is particularly useful for professional developers and creating exact image copies of cards.

JC_CARD can be used to program OTP, EPROM, EEPROM, SRAM and FLASH cards in both 8 and 16 bit modes. Attribute memory is also be read and programmed. JC_CARD comes complete with a card library supporting a wide range of cards. It also has a range of default settings so that custom cards or unknown cards may be programmed. JC_CARD can also be used to program ATA cards. (Flash or Rotating).

The menu driven application can be operated both by keyboard or mouse and supports program, read, blank check, bit check, erase and checksum functions. It includes an integral hex and ASCII editor and may be configured to program only parts of cards. JC_CARD is extremely rapid and will program a 1MByte FLASH card in around 10 seconds. (dependent on PC speed)

JC_DRIV (IN SEPARATE MANUAL)

For OEMs who do not require disk filing systems on memory cards, the JC_DRIV suite of programs can easily be integrated into other "custom" systems. JC_DRIV is also ideal for production environments for programming and copying cards by unskilled operators using batch files or other control programs.

The JC_DRIV programs perform program, read, bit check, erase, blank check and checksum functions on memory cards in transparent mode. Transparent mode access the card directly on a byte/word basis. JC_DRIV programs are invoked on the DOS command line and can be configured to send status information to the screen or return information via DOS error level codes. JC_DRIV comes complete with a full card library for OTP, SRAM and FLASH devices.

JC_DRIV does not fit into the PCMCIA hierarchy of software layers as it accesses the 'J' series hardware directly and therefore does not require JC_SOCKET Socket Services.

JC_SOFT (MANUAL ON DISK)

This is Elan's presentation of licensed CardSoft from SystemSoft Corp.

The manual for JC_SOFT is included on the distribution disk as a "self extracting archive" Run the EXE files called: CSPH_DOC, CSRN_DOC, CSTR_DOC, CSUG_DOC to extract the Word for Windows documents.

Section 2: Hardware Installation

If you are experienced in installing PC expansion cards, skip the next section and read Section 2.2.

2.1 Novice PC Expansion Card Installers

The 'J' Series card drive can be used on almost all PC's. If you are unsure about the compatibility of your machine, please contact your local agent.

J102 and J104 Installation

Control Board

After disconnecting mains power from the PC, remove the top cover of the PC to expose the expansion bus. (This is the line of sockets where extra cards may be inserted). Select an empty 16 bit (a two connector rather than single connector slot). Remove the metal blanking plate nearest to the selected slot. Remove the ribbon cable from the card socket interface by pressing the two "ears" on the black connector located on the back of the interface. Then thread the ribbon cable through the aperture in the rear of the PC made by removing the blanking plate. Carefully push the control board into the expansion slot. This may be a little fiddley and require a degree of force to push the control board fully home. For secure insertion be sure to screw the J102/J104 rear blanking plate to the PC cover.

Card Interface Unit

Now refit the PC cover and connect the ribbon cable back into the card interface unit. For the J102, be sure to press the connector "ears" towards each other to ensure the connector is fully home.

For the J104 you will have to remove the card interface unit case by removing the four screws, two at each side. One of the cables is polarised, so it will fit onto only one of the headers. On the other non-polarised connector, be sure that the red stripe is closest to pin 1 on the header, or the same way as the cable from the polarised connector.

Now replace the PC cover, power up your PC and refer to the Installation section of the required software option.

J101, J103, J105 J106 and J107 Installation

After disconnecting mains power from the PC, remove the top cover of the PC to expose the expansion bus. (This is the line of sockets where extra cards may be inserted). Select an empty 16 bit slot (a two connector slot rather than a single connector slot). Carefully push the control board into the expansion slot. This may be a little fiddley and require a degree of force to push the control board fully home. For secure insertion be sure to screw the 'J' Series rear blanking plate to the PC cover.

If you have a J105, skip this paragraph. There are two 40 way ribbon cables to connect from the Control Board to the Card Interface Unit. One of the cables is polarised, so it will fit onto only one of the headers. On the other non-polarised connector, be sure that the red stripe is closest to pin 1 on the header, or the same way as the cable from the polarised connector. If the card drive bay is for a 5 1/4" bay, you will require a 5 1/4" to 3 1/2" conversion kit, available from most PC suppliers. Then screw the socket interface unit into the drive bay.

Now replace the cover, power up your PC and refer to the Software Installation Section for the options you wish to install. If any problems are incurred, refer to the Trouble Shooting section in the appropriate software option section or the next section on Technical Installation.

2.2 Technical Installation Notes

This section should normally be of interest for more technically oriented installers.

ISA I/O Addresses

The following tables show the I/O settings for the 'J' series variants.

J101/102

LK9	LK14	I/O (inclusive)
O	O	3E0.. 3E7 (default)
C	O	2E0.. 2E7
O	C	300.. 307
C	C	310.. 317

Table 2.2-1 J101/2 I/O settings

x=don't care (not used) O = OPEN C = CLOSED

J103/4/5/6/7

JP1			I/O (inclusive)	Logical board number for multi-installation using JC-SOFT
A	B	C		
O	O	X	3E0.. 3E1	0 (default)
O	C	X	3E0.. 3E1	1
C	O	X	3E2.. 3E3	2
C	C	X	3E2.. 3E3	3

Table 2.2-2 J103/4/5/6/7 I/O settings

x=don't care (not used) O = OPEN C = CLOSED

Memory Space Requirements

The J-Series also uses a variable size block of upper memory space up to 64Kbyte, usually defaulting to D0000H. This setting should cause no problems on most PC's. See the relevant section for each software option for memory requirements and installation notes.

Windows 95

The J-Series is compatible with Windows 95 Card & Socket services. To install, use the "Install New Hardware" wizard in the control panel, do not allow Windows to search for the hardware (it will not detect it). Select "PCMCIA socket" and from the list of hardware manufacturers select "Vadem PCIC compatible PCMCIA controller". Follow the on-screen instructions to complete installation.

J103, J104, J105, J106 and J107 Boot Option

The J103/4/5/6/7 can be fitted with a boot option. If your control board has an empty IC socket, then you do not have the boot option. Contact your Elan agent if you wish to upgrade. See Section on the Boot Option in the J-Series CardSoft manual, or contact Elan for details of JC-HDE (ATA boot). The boot option ROM can be located at various memory locations, set by SWBI01. The following table shows the options.

SWBI01				Addresses (inclusive)
*1	2	3	4	
-	-	-	-	C0000... C7FFF - don't use
-	ON	-	-	C8000... CFFFF
-	-	ON	-	D0000... D7FFF - recommended
-	ON	ON	-	D8000... DFFFF - recommended
-	-	-	ON	E0000... E7FFF - may not work in some PC's
-	ON	-	ON	E8000... EFFFF - don't use
-	-	ON	ON	disable boot ROM
-	ON	ON	ON	disable boot ROM

Table 2.2-3 Boot Option ROM Addresses

* = This switch controls Vpp to the Flash BIOS chip to allow in-system reprogramming. It should normally be OFF.

- = OFF

Multiple Installations

J101/J102

For OEM users only, writing their own drivers, upto 4 x J101 or 4 x J102 may be used in a single PC, by setting each drive to a unique I/O address. This will not work with JC-SOFT.

J103, J104, J105 J106 and J107

Two J103, J104, J105, J106 or J107's may be installed in a PC. Software option JC_SOFT will operate with upto four card slots. See the J-Series CardSoft Manual for details. If you experience any difficulty with erratic card insertion/ejection beeps when using two J103/4/5/6/7's you may need a utility called "VADEMIRQ.EXE". Please contact Elan for technical assistance.

2.3 Do's and Don'ts

The 'J' Series card drive will tolerate hot PCMCIA card insertion without damage to the system. However in order not to damage cards, do not remove a Flash, EPROM or OTP card from the slot during program and erase operations. As a guide, if the activity LED is on, don't remove the card.

Your PCMCIA cards are expensive and are dependent on clean contacts for correct operation. Therefore treat you cards with care and keep the contacts away from dirt and debris. Preferably return to the case after use. If undue force is required to insert a card, do not attempt to force the card home. Most likely you have a card with a damaged pin or you have inserted it with incorrect orientation and you may damage the 'J' Series card socket.

Do not insert and remove the control board or disconnect the ribbon cable while your PC is on. Do not change any links on the control board while the PC is powered on.

If your using OTP cards, make sure that you really have the correct data and file before you program. OTP means One-Time-Program. Do not remove OTP cards during a programming operation.

The 'J' Series control board contains static sensitive components. When handling use the edge of the board to avoid hand contact with the components.

Appendix A: Elan PCMCIA Products and Services

Card Copying

For multiple memory card copying, the J-Group Copy Station is a very high speed stand alone production card copier capable of copying 8 to 32 cards concurrently. These units support OTP, EEPROM, EPROM, FLASH, SRAM and ATA technology cards.

Elan also has a card programming service for large and small volume runs.

PCMCIA Specifications

Elan can supply the latest PCMCIA specifications. Each purchase of the PCMCIA specification also includes free specification updates, automatically mailed.

PCMCIA Design and Consultancy Services

Elan Digital Systems is an active member of PCMCIA and has acquired extensive technical and commercial knowledge of this fast moving area. Elan can provide PCMCIA consultancy for software applications, PCMCIA interfaces and PCMCIA card design. Elan uses its own internal design and manufacturing facilities to provide a complete solution.

Appendix B: Service and Technical Support Information

The 'J' Series is a fully buffered and protected interface and will normally provide trouble-free operation. If you do experience problems, in the first instance contact your distributor (if applicable) otherwise:

Elan Digital Systems Ltd.
Elan House, Little Park Farm Road
Segensworth West, Fareham
Hampshire PO15 5SJ U.K.

Tel: +44 (0) 1489 579799
Fax: +44 (0) 1489 577516

e.mail: support@elan-digital-systems.co.uk
website: www.elan-digital.demon.co.uk

New cards are appearing continuously with different programming parameters and functionality. Elan Digital Systems provides regular software updates for the 'J' Series. Talk to your Elan agent for details.

If the unit is being used for OTP programming the 'J' Series card drive should be recalibrated at 18 month intervals.

Advice can be given on all aspects of the programmer's operation and the problems encountered when interfacing with other systems.

In the event of a return being necessary please use the original packing material, or pack very carefully to minimise damage in transit. Equipment received in inadequate packing will be returned in new packing which will be charged for.

Please note: All "returns" to Elan are made at the sender's risk and expense.

Appendix C: Glossary of PCMCIA Terms

ATA - A standard defining an interface for IDE type hard disks as used on the IBM AT. PCMCIA employs a modified form of the standard.

ATTRIBUTE - See Common Memory

CIS - The Card Information Structure is a PCMCIA defined data structure designed to provide information about the card for the host. It usually resides in the attribute memory. It can also be placed on the Common Memory. SRAM cards don't have to have a CIS if they are MS-DOS formatted. Also in practice most FLASH cards are treated similarly.

COMMON MEMORY- PCMCIA cards consist of two memory spaces. The common memory is up to 64Mbyte in size and is use for data storage. Common memory is always present in PCMCIA memory cards, but not always in I/O cards. Attribute memory space is a shadow memory area usually normally used for configuration information. Attribute memory sometimes is not present in the attribute memory space..

EPROM -A memory technology that may be erased by exposure to ultra violet light. This arrangement is rare on PCMCIA cards. Before programming the card area to be accessed must be in the erased state.

EEPROM -A memory technology that can be electrically programmed on a byte by byte basis without prior erasure.

HEXADECIMAL - A number of base 16.

FLASH - A memory technology that can be erased only in zones. The zone size can vary from a few bytes to the whole card dependent on the manufacture. Erasure must occur before the card can be reprogrammed

JEIDA -A non-profit industry association based in Japan to promote the 68 pin card standard. The JEIDA standards mirror the PCMCIA standards except in a few minor details.

MS-DOS/DOS - An operating system for IBM PC and compatibles.

OTP -An abbreviation for One Time Programmable. This is a memory technology used on the card that can only be programmed once and not erased.

PCMCIA - A non-profit industry association based in USA to promote the 68 pin card standard.

ROM - A memory technology that is read only and cannot be programmed or erased.

SRAM - A memory technology that can be programmed on a byte by byte basis without prior erasure.

TYPE I, II, III: This defines how thick the card is, Type III being 10.5mm thick. JEIDA also has defined a Type IV card.

WINDOWS - A graphical based operating system for IBM PC and compatibles.

Appendix D: OEM Guide To Direct Chip Access

Preface

This Appendix details how to talk at the chip level to the J Series drive for OEM users who wish to write all their own software. It is not recommended that J101/J102 users attempt to program OTP cards directly. This requires access to the J Series unique features.

The J Series is register compatible with the Intel 82365SL PCIC chip. It also has unique additional registers. Please refer to Intel data sheet. All models that have front sockets are configured as Socket A. The rear socket on the J105 and J106 is configured as Socket B.

J101 and J102 I/O Address Space

Normally the Intel 365 resides at I/O address 3e0h and 3e1h. The J101/J102 s occupies 8 I/O locations and can be positioned at base address 2E0h, 300h, 310h, and 3E0h. (See Section 2.2)

The extra registers should not normally be accessed. If data is written to these registers erroneously, high voltages may be placed on the card.

The only extra ports that should be accessed are as follows:

Base Address + 2: J Series ID. Upper nibble set to Eh, lower nibble variable.

Base Address + 6: Bit 7 set high will turnoff the activity LED. All other bits should *always* be set to 0.

(note the activity LED will illuminate automatically on any card access, but only for period of access, for example a single read will illuminate the card for only 400ns approx.)

J101 and J102 Write Protect Over-ride Circuit

Some PCMCIA cards can be fitted with the Write Protect line inverted or set on. To overcome this feature, the J Series has special circuitry to overcome this limitation.

However this feature is power-on default. So unless it is cleared, the J Series will not recognise the Write Protect status on any card.

To clear it, you must write 14h to Index 42, (socket B, register 2).

Power-On

The 82365SL has several power control lines.

Enable VPP 5(turns 5V on VPP) connected to A:VPP2_EN1

Enable VPP 12 (turns 12V on VPP) connected to A:VPP_EN1

Enable VCC (turns 5V onto VCC) connected to /A:VCC_EN

The power on time for VPP is quite slow (200ms). Also users should allow 1.5 seconds for it to decay after switch-off.

J101/J102 Vpp_Valid

If the PCIC ID (register 1) is 83h , then the VPP_VALID (A:GPI) must be read from the corresponding register and bit of socket B). This is only relevant if you are using VPP at 12V.

Wait States

For 250ns cards or slower on a 8Mhz ISA bus add 1 wait state. For a 12Mhz ISA bus for 120ns, 200ns and 300ns add 1,2, and 3 wait states accordingly. (note that not all J-Series variants will operate at 12MHz).

Appendix E: J10xMEMF Utility V3.04

This utility can be used to check your system for an empty window in the upper memory space. You can use it in three ways:

1. Is a window at a particular address range available?
2. Return address for window of requested size.
3. Print a report of upper memory usage.

Usage: J10XMEMF [-sSize] <-aAddress> <-r> <-q> <-p> <-v> <-e>

-sSize = window set to 4, 8, 16, 32 or 64K (default)
-aAddress = address paragraph where to start test (C000 to DF00)
-r = don't do any writes when testing (default write-on)
-q = suppress display messages to screen
-p = display report of upper memory space. (ignores size and address) n
-v = display report with diagnostics
-e = check upto EFFFF

If the program is invoked without any switches, a help screen is printed.

The algorithm searched for BIOS, EMS pages, XMS managed UMB's and then does a byte write/restore test. Finally it will do a read test on the area. If the <-r> switch is used, the write/restore test is omitted.

In <-q>, quiet mode, no messages are displayed to screen, but DOS Error level codes are returned. Contact Elan Digital Systems for details on these codes.

Example1: "J10xMEMF -s32 -r" -search for 32K space omitting write/restore test.

Example2: "J10xMEMF -p " - lists a report on spare space.

Example3: ""J10xMEMF -s4 -aC800 -q" -look for 4K space at C800 in quiet mode

AFTER SALES SUPPORT AND SERVICE

In the case of operating difficulties (and before making any returns) please contact either Elan direct or your local sales office:-

ELAN DIGITAL SYSTEMS LTD

ELAN HOUSE
LITTLE PARK FARM ROAD
SEGENSWORTH WEST
FAREHAM, HANTS. PO15 5SJ
ENGLAND

TEL: 44 (0) 1489 579799

FAX: 44 (0) 1489 577516

e.mail: elan-digital-systems.co.uk

website: www.elan-digital.demon.co.uk

Advice can be given on all aspects of the programmer's operation and the problems encountered when interfacing with other systems.

In the event of a return being necessary please use the original packing material, or pack very carefully to minimise damage in transit. Equipment received in inadequate packing will be returned in new packing which will be charged for.

Please note: All "returns" to Elan are made at the sender's risk and expense.