



## **ELAN DIGITAL SYSTEMS LTD.**

LITTLE PARK FARM ROAD,  
SEGENSWORTH WEST,  
FAREHAM,  
HANTS. PO15 5SJ.  
TEL: (44) (0)1489 579799  
FAX: (44) (0)1489 577516  
e-mail: [support@pccard.co.uk](mailto:support@pccard.co.uk)  
website: <http://www.pccard.co.uk>

# **CF232 COMPACT FLASH™ CF+ CARD USER'S GUIDE**



**Also covers CF232-R, CF232-R15,  
CF232-5, CF232-5R, CF232-5R15**

Compact Flash is a trademark of Sandisk Corporation. All other Trademarks are duly acknowledged.

### **REVISION HISTORY**

<b>ISSUE</b>	<b>PAGES</b>	<b>DATE</b>	<b>NOTES</b>
1	8	20.08.2001	FIRST ISSUE
2	9	23.04.2002	H/W Rev3.00
3	9	24.05.2002	Electrical Specs Updated
4	9	07.07.2003	Add ruggedised version data

# Table of Contents

1. OVERVIEW .....	3
2. ABOUT THE CF232 .....	4
3. INSTALLING THE CF232 .....	5
3.1 DOS & WINDOWS 3.1X.....	5
3.2 WINDOWS 95, 98, 98SE, ME, NT4, 2000, XP .....	5
3.3 WINDOWS CE, POCKETPC.....	5
4. CF232 REGISTER INTERFACE.....	6
5. HARDWARE SPECIFICATION .....	7
5.1 PINOUT .....	7
5.2 ELECTRICAL.....	8
5.3 POWER CONSUMPTION .....	8
5.4 MECHANICAL .....	8
5.5 ENVIRONMENTAL.....	8
5.6 NOTES ON SERIAL DATA THROUGHPUT.....	8
5.7 BAUD RATE SETTINGS.....	9

## DISCLAIMER

**This document has been carefully prepared and checked. No responsibility can be assumed for inaccuracies. Elan reserves the right to make changes without prior notice to any products herein to improve functionality, reliability or other design aspects. Elan does not assume any liability for losses arising out of the use of any product described herein; neither does it convey any licence under its patent rights or the rights of others. Elan does not guarantee the compatibility or fitness for purpose of any product listed herein. 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.**

**Source code supplied with Elan PC-Cards and Compact Flash cards is provided “as-is” with no warranty, express or implied, as to its quality or fitness for a particular purpose. Elan assumes no liability for any direct or indirect losses arising from use of the supplied code.**

**Copyright © 2001,2002,2003 Elan Digital Systems Ltd.**

## 1. OVERVIEW

The CF232 card is an RS232 Serial card with the following features:

- Tiny TypeI Compact Flash form factor for CF+ equipped PDAs, Handheld PCs, laptops etc.
- DOS, Windows 3.1x, 95, 98, 98SE, Me, NT4, 2000, XP, CE, PocketPC compatible using O.S. standard drivers
- Industry standard 16550 register set
- Transmission rates up to 115.2K Baud as standard.
- H/W Rev3.00 cards have switchable x1 or x8 baud rate giving up to 921Kbaud.
- Works at 3.3V or 5V
- Full hardware modem control line support
- Compatible with all standard serial comms software
- Works in PC-Card slots using Compact Flash adapter (not supplied as standard but available as an option)
- CF232-5 has host supply pin instead of “RI” for powering external devices
- Standard PC IO port decode for COM1 to COMn
- “Any” IO port and interrupt decode option for best pnp flexibility
- ESD protected RS232 ports.
- Software controlled power management.
- Low power consumption.
- Supplied with 300mm DB9-male terminated cable with standard” com port pin-out.

This guide aims to familiarise you with the way that the CF232 works and so will help you to maximise its performance in your application.

Elan will be happy to quote for either customisation of the CF232 if its exact specifications do not quite meet your needs, or to create complete application software.

## 2. ABOUT THE CF232

The CF232 card is an RS232 serial card with Elan's own 16550 compatible UART ASIC device, called the VPU16550. The serial data and control lines are buffered using ESD protected RS232 drivers.

Industry standard baud rates up to 115.2K baud are supported, together with 16-byte deep TX and RX FIFOs. On H/W Rev3.00 cards, a small switch is located at the back edge of the card, which allows selection of "x1" or "x8" baud rate multiplier. This feature allows up to 921KBaud operation without needing special device drivers on the host (in x8 mode you simply multiply the setting shown on the host by 8 to get the real serial data rate e.g. 19200Baud set on host with x8 mode gives 153600Baud true rate in hardware). See section 5 for the switch settings.

For further information please refer to the VPU16550 data sheet available from our website, <http://www.pccard.co.uk>

The CF232 conforms to the industry standard Compact Flash+ interface that allows connection of peripherals to the system bus of a laptop, handheld PC or PDA. The CF+ specification extends the earlier memory-only Compact Flash interface to allow I/O devices and extra power for the card. The CF232 is an I/O type device and therefore requires a CF+ capable slot.

## **3. INSTALLING THE CF232**

### **3.1 DOS & Windows 3.1x**

Operation in DOS or Windows 3.1 requires 3<sup>rd</sup> party Card and Socket Services drivers to be properly installed and configured. Follow your software vendor's instructions on how to do this.

The CF232 requires no extra drivers to operate in DOS. Insertion of the card should create a familiar “happy beep” as the host software configures the card a standard DOS COM port. Resource allocation and troubleshooting is all down to the 3<sup>rd</sup> party software and any issues that may arise during configuration of the CF232 should be addressed to the vendors of this software.

The CF232 has been tested with:

SystemSoft Cardware  
Award Cardwizard

### **3.2 Windows 95, 98, 98SE, Me, NT4, 2000, XP**

The “generic” serial drivers in these Operating Systems support the CF232. No extra driver software is needed but you will need to install Card Center Pro, or use the INF file that can be found on the first disk of the installation set.

Installing the supplied Card Center Pro software that comes with your product will copy the INF file into the Windows/INF folder. Windows will use this INF file to “recognise” the CF232 card. Alternatively, when Window's does a first-time search for the driver for the CF232 card, you can use Disk#1 from the CCP set.

### **3.3 Windows CE, PocketPC**

There is no need to install any software for Windows CE or PocketPC. Simply insert the CF232 card and it will appear in a list when you go to set up a “Connection” .

## 4. CF232 REGISTER INTERFACE

Full details of the CF232's register interface can be found in the VPU16550 data sheet, available at Elan's website

<http://www.pccard.co.uk>

For reference, the CF232 and the CF232-5 both behave as a 5V card to the host system because Vs1 and Vs2 pins are no connects. This is to make the host default to 5V when possible, giving the highest RS232 output signals and therefore best noise margins. The Card Information Structure does not define any 3.3V tuples because some platforms will also take this as a sign to run at 3.3V even when 5V is available. On a PDA or HPC, the host will power the card at 5V if its available, or 3.3V otherwise (despite there being no 3.3V tuple entries).

## 5. HARDWARE SPECIFICATION

### 5.1 PINOUT

The CF232 is supplied with a 300mm long Type45 cable that terminates with a DB9 Male connector with female screwlocks (to match the port at the back of a PC). The pin-out below applies to **both** the CF232/CF232-5 card and the DB9 male connector on the supplied cable (the cable is pinned one-to-one).

The CF232-R and -5R both have a permanently attached 300mm cable with the same type of DB9 connector as described above.

The CF232-R15 and -5R15 have a 1.5m permanently attached cable with bare ends, as colour coded below.

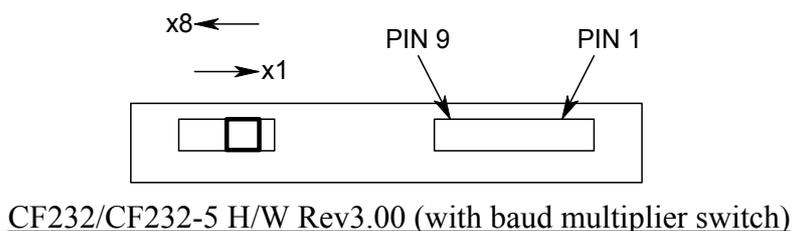
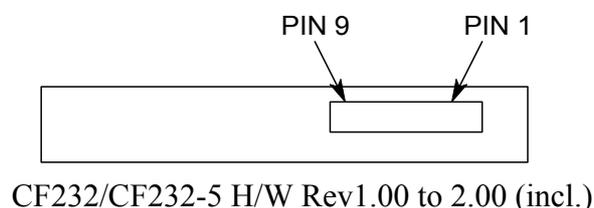
PIN	NAME	Colour (-R15 and -5R15 models)	FUNCTION
1*	DCD	Black	Data Carrier Detect input
2	RX	Brown	Receive Data input
3	TX	Red	Transmit Data output
4	DTR	Orange	Data Terminal Ready output
5	GND	Yellow	GROUND (0V)
6	DSR	Green	Data Set Ready input
7	RTS	Blue	Request To Send output
8	CTS	Mauve	Clear To Send input
9	RI or Host Vcc*	Grey	Ring Indicate input (CF232) or Host Vcc (CF232-5)
Shield	-	Black sleeved	See note*

\*Pin 1 is nearest the edge of the card.

\* Total Host Vcc current available is limited by the host's capabilities. Exceeding its maximum could damage the CF232-R and/or the host. The Host Vcc output may be at 5V or 3.3V.

\*The cable shield is grounded at the card-end, runs the full length of the cable and is n/c at the equipment end i.e. does not connect to the DB9 shell to help to avoid ground loops.

For ref: mating connector type: Honda rmc-e9f2s-bsla2n-a2 (CF232 & CF232-5)



## 5.2 ELECTRICAL

All figures quoted are typical parameters @ 25° C

RS232 SIGNALS:	Typical output level $\pm 5.5V$ (open circuit voltages)
ESD PROTECTION:	All RS232 signal lines on the CF232 card are protected against electrostatic discharge (ESD) <ul style="list-style-type: none"><li>• 15kv - human body model</li><li>• 8kv - IEC1000-4-2,contact discharge</li><li>• 15kv - IEC1000-4-2,air-gap discharge</li></ul>
UART CLOCK SPEED:	1.8432MHz, max baud rate 115.2KBaud On H/W Rev3.00 cards switch selectable Baud rate multiplier: x1: UART CLOCK is 1.8432MHz ->115.2KBaud max x8: UART CLOCK is 14.7456MHz->921.6KBaud max

## 5.3 POWER CONSUMPTION

All figures quoted are typical parameters @ 25° C

VCC CURRENT:	20mA typical @ 5V, 13mA typical @ 3.3V
IN STANDBY MODE :	14mA typical @ 5V, 5mA typical @ 3.3V

## 5.4 MECHANICAL

CARD MASS:	10g typical.
FORM FACTOR:	36.4mm x 42.8mm x 3.3 mm overall card size
-R MODELS:	The -[5]R and -[5]R15 models use a cable gland that is 3.9mm thick and protrudes 10.3mm from the back edge of the card. Both use oval cable that measures 7mm x 1.7mm approx, with shield and 9x 7/0.1mm conductors. The -[5]R15 options have 20mm long wires with 2mm tinned conductors

## 5.5 ENVIRONMENTAL

HUMIDITY:	<80% non-condensing
TEMP:	0-50° C ambient

## 5.6 NOTES ON SERIAL DATA THROUGHPUT

The maximum serial baud rate of 921KBits/sec does not imply that the maximum sustained throughput rate of the serial port will be as high. The actual throughput rate that can be achieved depends on many factors including the host PC speed, the serial data source's data block size and whether the block are "back-to-back" ,

whether the interrupt in use on the host is being shared by other devices leading to increased latency etc.

As a simple rule of thumb, using the standard serial drivers on a fast PC will allow throughput rates of 400-600KBits/sec although these rates can't be guaranteed and will be application specific.

## **5.7 BAUD RATE SETTINGS**

The table below illustrates the common baud rate values available for each of the baud rate multiplier switch positions:

<b>HOST SETTING</b>	<b>SWITCH = x1</b>	<b>SWITCH = x8</b>
300	300	2400
1200	1200	9600
2400	2400	19200
4800	4800	38400
9600	9600	76800
19200	19200	153600
38400	38400	307200
57600	57600	460800
115200	115200	921600