

# **Decoded RFID Scan Module**

## **Psion Specification, TTL Serial Interface**

Psion Part No. : A2382-1014-01  
User Guide : Version 1.30

idS product code: cst-305

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**Exhibit 11a/11b, Sheet 1 of 9**

**FCC ID: ILPWARFIDHF**

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# Conditions of Use



## WARNING

This product provides powerful features that allow the contents of Radio Frequency Identification (RFID) tags to be inspected, altered and (in some cases) permanently locked. It is the responsibility of the user to ensure that they are fully conversant with the wide range of features that are offered by tags supported by this product. No responsibility can or will be accepted by id Systems Ltd for any tags that are corrupted or permanently locked through direct or indirect use of this product.

It is not the purpose of this guide to provide an overview of the features of each type of tag supported by these products; the user is referred to the corresponding data sheets available from the appropriate tag manufacturer.

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## 1.1 Introduction

The high frequency RFID Scan Module is a compact, high performance engine designed for integration within the Psion Workabout RFID to provide RFID read/write capability for 13.56MHz tags and smart labels available from leading vendors.

The Scan Module is (where possible) physically and electrically compatible with industry standard bar code scan engines manufactured by Symbol, PSC and other leading vendors.

Each Scan Module integrates a powerful micro controller and RFID engine, which provide all the intelligence required for reading from and writing to tags and smart labels, together with an antenna that provides exceptional performance for its size. Communication with a Module is achieved through a powerful serial protocol, which supports configuration, status and data interchange with a Psion Workabout.

The Scan Module A2832-1014-01 is custom made for Psion Enterprise Computing Ltd (our part number cst-305) for integration within the Workabout.

## 1.2 Product overview

Key product features include:

- Direct compatibility with industry standard bar code scan engines (i.e. Symbol SE1200 and PSC LM500);
- Supports industry standard read/write tags and smart labels available from Gemplus (FOLIO), OMRON (V700), Philips Semiconductors (I.CODE) and Texas Instruments (Tag-it);
- Small form factor and lightweight;
- Single supply operation (+5V DC) and simple electrical interface to a Workabout;
- Low power modes (including power on/off control) for applications where optimum battery life is required;
- Bi-directional TTL serial interface supports scan module configuration, and exchange of tag read/write data.

## 1.3 Supporting products

Please note that a number of additional products are also available to support this Scan Module (Table 1).

Product Code	Description
doc-130	Serial protocol guide
acc-140	Tag sample kit – High frequency (I.CODE and Tag-it)
swr-250	Psion Workabout RFID Developer's Kit, which includes: API/DLL for SIBO™; tag sample kit; Tag Application Notes; serial protocol guide and complete documentation.

Table 1 – Supporting products

## 1.4 Product range

Our product range for low (125/134kHz) and high (13.56MHz) frequency RFID tags and smart labels includes: OEM boards and modules; interfaces for hand-held computers; fixed position readers; and long-range systems, all supported by a wide range of software development tools.

Our products support the following tag and smart label technologies, in a number of combinations:

Low frequency tags from :
<b>EM Marin</b> (H4001/2/3/5, H4102, V4050, V4150, V4066, V4069 and V4070), <b>Gemplus</b> (Gemfly), <b>ISO</b> (FDX-B and HDX), <b>Metget</b> , <b>Philips</b> (hitag1, hitag2, PCF7930, PCF7931 and PCF79736), <b>Sokymat</b> (Magic, Nova, Titan, Unique and Zodiak), <b>Temic</b> (e5530 and e5550 – standard configurations) and <b>Texas Instruments</b> (TIRIS)
High frequency tags and smart labels from :
<b>Gemplus</b> (ARIO10, ARIO40 and FOLIO), <b>OMRON</b> , <b>Philips Semiconductors</b> (I.CODE) and <b>Texas Instruments</b> (Tag-it).

Most of our reader products are based on our innovative Multi Standard Reader (MSR) architectures, which provide simultaneous and transparent support for tags and smart labels from different vendors.

Our product range also includes a number of Scan Modules for leading low frequency tags.

Product Code	Description
oem-165	Scan Module to support low frequency (125kHz) ASK tags
oem-175	Scan Module to support low frequency (134.2kHz) ASK and FSK tags

## 1.5 Restrictions of usage

When this product is integrated within the Psion Workabout RFID, labelling requirements must be met to allow the final product to be marketed in approved regions. Table 2 shows the status of the approved module.

Product Code	FCC ID	RTTE Marking	Notes
A2832-1014-01	ILPWARFIDHF	CEPT SRD 9f GB	Non-harmonised EU frequency

Table 2 : Approval Status

**WARNING:** This Scan Module may only be connected to battery powered equipment. Connection to a mains power supply is strictly prohibited in the US and may result in penalties for improper usage for which id Systems Ltd accept no responsibility or liability.

**WARNING:** This Scan Module operates on a non-harmonised frequency band and may not be sold in some EU countries without prior written permission from the relevant radio authorities. id Systems Ltd accept no responsibility or liability for penalties imposed due to unauthorised use in these countries.

## 1.6 Labelling

The following additional information must be placed in a prominent position on a Psion Workabout RFID that contains a Scan Module:

**This equipment contains CE and FCC marked module**  
**Psion Enterprise Computing**  
**Model No. A2832-1014-01**  
**FCC ID ILPWARFIDHF**  
**CEPT SRD 9f GB**

**This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.**

**CE(!) FCC**  
**0891**

All marking must be clearly legible without the need of magnification by a person with 20/20 vision. The CE and FCC logos must be at least 5mm high and the notified body number underneath the CE mark must be 2mm high. The label must be indelible, not easily removed or attacked by solvents.

**WARNING:** Failure to attach a label as outlined above may result in serious penalties from the relevant authorities for which id Systems Ltd accept no responsibility or liability.

Products are currently certified and available for use within the European Union and North America. Please contact our sales department should the FCC and CE type approvals fall outside the scope of approvals for your territory, or if you require copies of the relevant certificates.

## 2.1 Handling considerations

An RFID Scan Module contains sensitive electronic components that require careful handling. Specifically, electrostatic discharge can damage integrated circuits and other components that form part of each Scan Module, and therefore the usual static precautions should be observed when handling Modules.

## 2.2 Connections

The Scan Module electrical interface is defined in Table 3. A Module uses TTL compatible drivers and receivers, and is thus compatible with standard TTL and CMOS logic levels.

The Power On signal (PWR\_ON) is active low, and is pulled to ground through a 100kOhm resistor. To place a Scan Module into low power mode, the PWR\_ON signal should be driven to Vcc. In this mode, a Scan Module will draw less than 100 microamps supply current.

Please note that for optimum range Vcc should be +5V DC  $\pm$  0.2V, with less than 50mV noise and ripple.

Electrical interconnect with a Scan Module is via an eight pin ZIF (Zero Insertion Force) connector, with 0.5mm pitch board-side contacts. This connector is manufactured by Elco (part number 08-6210-008-001-800) and Molex (part number 52746-0890). Interconnecting cables are available from Parlex Inc (Industrial Way, Salem, NH 03079, USA).

Pin	Signal	Function
1	VCC	+5V DC power input
2	n/c	No connection
3	PWR_ON	Remote enable, active low
4	RXD	Data received by a Scan Module (TTL)
5	TXD	Data transmitted from a Scan Module (TTL)
6	n/c	No connection
7	GND	Ground
8	GND	Ground

Table 3 : Electrical interface

## 2.3 Serial interface

A bi-directional TTL serial interface is implemented on each Scan Module. Transmit and receive data lines only are used; no hardware handshaking is supported.

The serial protocol that defines Scan Module configuration, status monitoring and data interchange is described in a separate document (doc-130); it is also available for download from our web site ([www.idsys.co.uk](http://www.idsys.co.uk)).

A Product Development Kit (PDK) is available to support development of custom software for RFID applications.

# Using a Scan Module

# 2

## 2.4 Read/write ranges

Typical operating ranges are summarised in Table 4. These have been measured at Vcc of +5.0V DC, and with a tag and reader's antennas in optimum orientation.

Tag Type	Typical Read range (mm)	Typical Write range (mm)
Philips I.CODE, 70 by 40mm	0 to 65	0 to 60
Texas Tag-it, 70 by 40mm	0 to 60	0 to 40

Table 4 : Ranges for high frequency tags

## 2.5 Mechanical

Bar Code Scan Engines incorporate a metallic or plastic chassis, which provides mounting holes for an engine. This chassis is not available (or required) for RFID Scan Modules mounted within the Workabout housing.

Figure 1 provides mechanical data for our scan module.

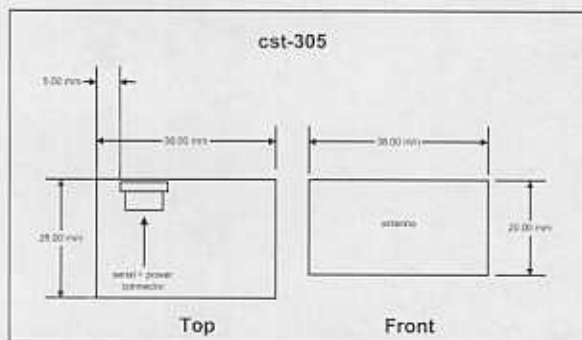


Figure 1 : Mechanical dimensions

## 2.6 Miscellaneous

There are a number of differences between our existing range of RFID OEM boards, and this high frequency module. These are:

- The buzzer command is not supported (there is no buzzer on the board!);
- There is no generic write command (the second option of the *RF\_Write Block* command);
- Configuration 'Text len' parameter is ignored (*CL\_SetConfig* command);
- The commands *CL\_MemRead* and *CL\_MemWrite* are not supported;
- Autobaud is not supported;
- *CFG\_PulseOutput* and *CFG\_Continuous* options are not supported



id Systems design and manufacture a wide range of innovative products, both for low (125/134kHz) and high (13.56MHz) frequency RFID tags and smart labels, available from leading vendors.

Our extensive product range provides transparent support for tags from different manufacturers, and includes OEM boards and modules, hand-held readers, interfaces for popular hand-held computers and fixed position readers. All our supported by powerful software development tools and libraries.

id Systems also offer partnerships to create custom RFID products and solutions, providing our partners with:

- cost effective development of innovative products, supporting all leading RFID and smart label technologies
- complete solutions, from custom readers and antennas to library and application software
- low risk development, through deployment of our extensive hardware and software technologies for all industry standard contactless technologies
- immediate access to skilled developers, dedicated and responsive to application requirements, with comprehensive experience of all leading technologies
- competitive advantage through reduced time to market

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