# The Pen

User's Guide
for
Prototype EP2B

## Safety precautions

Warning! Do not expose the Pen to naked flames or extreme temperatures, otherwise the battery may explode and cause injury!

Warning! Do not allow children to play with the Pen. They could injure themselves or others, or accidentally damage the Pen!

# Contents

# Introduction

The Pen is an advanced, multi-functional, digital, hand-held device that can read and write text, take digital photographs, and be used as a mouse for your computer. The Pen is designed for use with a host device such as a personal or laptop computer, a mobile phone or a hand-held device. Information is transferred between the Pen and the host by a Universal Serial Bus (USB) connector or *Bluetooth™* wireless technology.

To get the most out of your Pen, it is a good idea to learn the different parts and functions before you start to use it.

## Parts of the Pen

Front
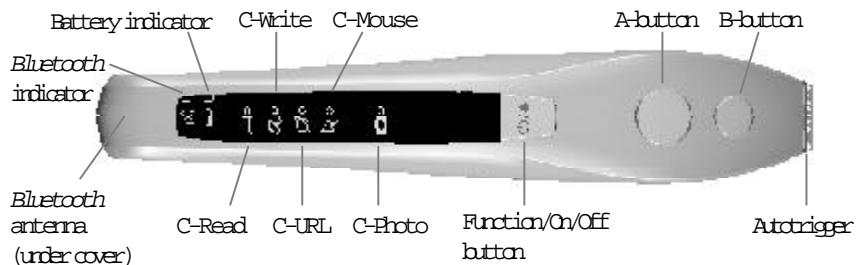
Each function of the Pen is represented by a symbol on the display, and each symbol has a corresponding Light Emitting Diode (LED) indicator. When a function is selected, its indicator is lit green.

Back

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## Functions of the Pen

The Pen has the following functions:

**C-Read**

read text using OCR (optical character recognition);
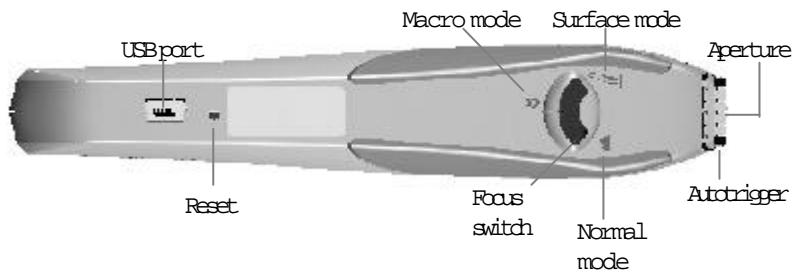
**C-Write**

write text by drawing letters or symbols on a patterned surface;

**C-URL**

read a URL (universal resource locator) and start a browser;

**C-Mouse**

use the Pen as a mouse for a computer;

**C-Photo**

take normal or close-up digital photographs.

### Selecting C-Read, C-Write, C-URL or C-Mouse

Move the Focus switch at the back of the Pen to the Surface mode position ( ).
The Pen is now set for C-Read, C-Write, C-URL or C-Mouse. C-Read is
the default function. If you click the Function button on the front of the
Pen, the next function is selected and its indicator is lit. Click the Function
button repeatedly until the desired function is selected. Note that C-Photo
cannot be selected by using the Function button.

If the Focus switch is in the Surface mode position when the Pen is
switched on, C-Read is selected by default and the C-Read indicator is
lit.

### Selecting C-Photo

Move the Focus switch to the Normal (   ) or Macro (   ) mode positions.
The Pen is now set for normal or macro photography respectively, and the
C-Photo indicator is lit. The Function button is disabled.

If the Focus switch is set for photography when the Pen is switched on,
C-Photo is selected by default. To change to another function, move the
Focus switch to the Surface mode position and select the desired function.

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## Pen battery

The battery of the Pen is not fully charged when the Pen is delivered. We recommend that you charge the battery before you use the Pen for the first time. Plug the USB connector of the charger adapter into the USB port on the back of the Pen and connect the charger adapter to a mains electrical supply. The battery can only be charged in an ambient temperature of between +5°C (+41°F) and +45°C (+113°F).

Warning! Do not expose the Pen to naked flames or extreme temperatures, otherwise the battery may explode and cause injury!

Extreme temperatures also affect the life and efficiency of the battery.

When the battery is charged after a long period of inactivity, it pre-charges for between 5 and 30 minutes before normal charging starts. It takes approximately 3 hours to fully charge the battery from empty, but 90% of the full charge is reached after 1 hour. You can use the Pen while it is charging, but not when it is pre-charging.

If a USB connection (see below) is used for communication between the Pen and the host device, the battery charges through the USB cable. Charging times may vary, depending on your host device.

 The Battery indicator on the Pen's display shows the status of the battery.

| Battery indicator | Indication |
| --- | --- |
| Flashing red | Low battery |
| Steady red | Pre-charging |
| Flashing green | Charging with charger cable or USB cable |
| Steady green | Fully charged battery |

# Connecting to a host device

You can connect the Pen to the host device either by using *Bluetooth* wireless technology, either integrated into the device or as an external adapter, or by using a USB cable.

To use all the functions of the Pen, the software that accompanies the Pen must be installed on the host device. If you connect to the host via a USB cable, some functions such as C-Write, C-Read and C-Mouse can be used

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without the host software being installed.

If the Pen fails to communicate with the host, please refer to the Trouble-shooting section at the end of this User's Guide.

## USB connection

If the host device is equipped with a USB interface, you can use a USB cable to communicate with the host.

1. Connect a USB cable between the USB interface of the host and the USB port on the back of the Pen.

2. Press the On/Off button for one second to switch the Pen on. A USB connection is established between the Pen and the host device.

3. C-Read starts and its indicator is lit.


Note! When you are connected via a USB cable, the C-Photo function is disabled.

## *Bluetooth* connection

*Bluetooth* wireless technology is a global specification for personal area wireless connectivity. The technology uses a globally available frequency range intended to ensure communication compatibility worldwide. The transmission range of *Bluetooth* devices is normally limited to about 10 meters (30 feet). Take care not to cover the *Bluetooth* antenna with your hand, otherwise the transmission range may decrease. The antenna is located inside the Pen, close to the *Bluetooth* indicator.

### Connecting to a *Bluetooth* host device for the first time

*Bluetooth* wireless technology allows the Pen to communicate with a *Bluetooth* host device without using cables. To establish a connection the Pen and the host must be within 10 meters (30 feet) of each other, but they need not be within line-of-sight.

1. Make sure that the Pen is not attached to the host device by a USB cable.

2. Press the On/Off button for one second to switch the Pen on. The *Bluetooth* indicator flashes green as the Pen waits to be detected by the host.

3. To make a connection, you must accept the Pen at the host device. This initialization procedure is called pairing. When the Pen and the host device are paired, a *Bluetooth* connection is established.

 The *Bluetooth* indicator lights steady green and an "up-sound" is generated. The "up-sound" is an audible tone at an ascending frequency.

4. The default function starts and the corresponding indicator is lit.

If a host is not detected before timeout, the *Bluetooth* indicator flashes red for three seconds and the Pen is then switched off automatically.

If an established *Bluetooth* connection fails – for instance if you move the Pen beyond the range of the host – the *Bluetooth* indicator flashes red, a "down-sound" is generated, and the Pen tries to re-connect. The "down-sound" is an audible tone at a descending frequency.

When the connection is re-established, the *Bluetooth* indicator lights green and an "up-sound" is generated.

## Connecting to a previously paired host device

1. Press the On/Off button for one second to switch the Pen on. The *Bluetooth* indicator flashes green until the Pen is detected by the previously paired host device.

2. When the *Bluetooth* connection is established, the *Bluetooth* indicator lights steady green and the "up-sound" is generated.

3. The default function starts and the corresponding indicator is lit.

If no *Bluetooth* connection is established before timeout, the Pen is switched off automatically.

## Changing the host device

The Pen can be paired with only one host device at a time. To change to a new host device you must repeat the pairing procedure.

1. Make sure that your Pen is within 10 meters (30 feet) of the new *Bluetooth* host device.

2. Switch the Pen on by simultaneously pressing the A-button, the B-button and the Function button. Hold these three buttons pressed for one second.

3. The Pen waits until it is detected by the new host device, then the

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*Bluetooth* indicator flashes green.

4. To make a connection, the Pen must be accepted by the new host device. When the pairing procedure is finished, a *Bluetooth* connection is established. The *Bluetooth* indicator lights steady green and the "up-sound" is generated.

5. The default function starts and the corresponding indicator is lit.

# Using the Pen

Always remember to establish a connection with a host device before using your Pen. If you have any problems while using the different functions of the Pen, please refer to the Troubleshooting section at the end of this User's Guide.

## Holding the Pen

The way in which you hold the Pen is important for optimum performance. When using the Pen for reading or writing text or as a mouse, hold the Pen between your thumb and index finger, with the back of the Pen towards you. The Pen should be vertical, with its tip flat against the working surface.
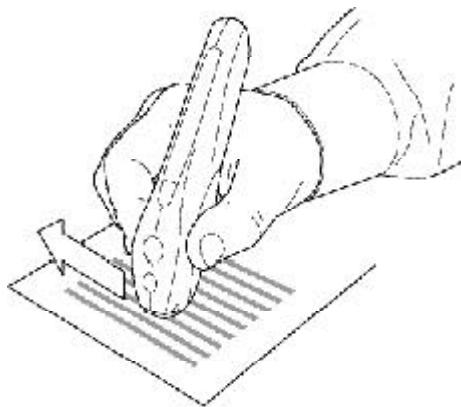


When using the Pen for photography, please see the section Taking photographs.

## Reading text (C-Read)

When C-Read is selected, the Pen is set to read printed text. The text that is read is automatically transferred to the cursor position in the active program in the host device. Your Pen is set to recognize the languages defined by the Pen's region version. If you try to read text in another language, some characters may be interpreted incorrectly. The region version of the Pen can be changed on the host device.

1. Move the Focus switch at the back of the Pen to the Surface mode position ( ).

2. Click the Function button to select C-Read, if it is not already selected. The C-Read indicator lights steady green when C-Read is selected( ).

3. Place the Pen over the first character to be read. It is important to keep the tip of the Pen flat against the text surface. Make sure that the opening covers the entire height of the line of text to be read. Gently press the Pen downwards so that the Autotrigger is pushed into the Pen. The Autotrigger is transparent and glows slightly when it is activated.

4. Move the Pen along the line of text, no faster than 15 cm/s (5 inches/s). When reading and interpreting the text, the C-Read indicator flashes green.

5. Lift the Pen when you reach the end of the line of text. The Autotrigger is de-activated.

6. The text that has been read is transferred to the cursor position on the screen of the host device.

7. While C-Read is active (C-Read indicator steady green), you can insert a tab character or a backspace into the text. Inserting a tab moves the cursor in the host application to a new position, for instance the next cell in a table. A backspace deletes the last read character.

   To insert a tab, press the A-button. To insert a backspace, press the B-button.

## Writing text (C-Write)

When C-Write is selected, the Pen is set to write characters that are transferred directly to the active program in the host device. You can write upper and lower-case characters as well as symbols. Writing upper-case

characters is the same as using the SHIFT key on a keyboard. You can also insert a tab, and use a backspace to delete a previously sent character.

For the Pen to recognize the characters you draw, the following conditions must be met:

• The characters should resemble the C-Write Prototypes as closely as possible. You will find these prototypes at the end of this User's Guide.

• A character must be drawn in a single stroke. The dot on each prototype indicates the starting point of the stroke.

• The height of the character should be at least 1 cm (1/4 in).

• You must draw the characters on a patterned surface, such as the page of a book or magazine.

• Solid colors or simple repetitive patterns (lines, squares, grids) should be avoided.

1. Move the Focus switch at the back of the Pen to the Surface mode position ( ).

2. Click the Function button to select C-Write if necessary. The C-Write indicator lights steady green when C-Write is selected( ).

3. To draw a lower-case character, hold the Pen vertically against a patterned surface and gently press down to activate the Autotrigger. Draw the character. Hold the Autotrigger pressed while forming the entire character.

   To draw an upper-case character, press the A-button once before you begin to draw the character. The C-Write indicator flashes while SHIFT is active. SHIFT is de-activated when the Autotrigger is released.

   To draw a symbol, press the Autotrigger briefly against the surface to activate symbol mode. After writing a symbol, the Pen automatically returns to normal mode. To quit symbol mode without writing a symbol, draw a backspace symbol.

   To erase the previously sent character, press the B-button (with the Autotrigger de-activated). In this event the Pen sends a backspace. The last character can also be erased by writing a backspace character.

4. When you have finished drawing the character, release the Autotrigger.

5. The character is transferred to the cursor position on the screen of the host device.

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## Reading a URL (C-URL)

A URL is the address of a web page, for instance http://www.open.com. When C-URL is selected, the Pen is set to read a URL. The URL is transferred to the host device, where it is opened by a browser.

1. Move the Focus switch at the back of the Pen to the Surface mode position ( ).

2. Click the Function button to select C-URL. The C-URL indicator lights steady green when C-URL is selected( ).

3. Read a URL in the same way as you read text in C-Read. Redundant characters are automatically deleted to form a correct URL.

4. The URL is transferred to the host device, a browser is started and the web page defined by the URL is opened.

## Using the Pen as a mouse (C-Mouse)

When C-Mouse is selected, the Pen functions as a mouse for a host computer. **If a** *Bluetooth* connection is established, you can use your Pen as a wireless mouse. You can still use your regular mouse even if C-Mouse is selected.

1. Move the Focus switch at the back of the Pen to the Surface mode position ( ).

2. Click the Function button to select C-Mouse. The C-Mouse indicator lights steady green when C-Mouse is selected( ).

3. Hold the Pen upright and move it over a patterned surface, making sure that you apply enough pressure to activate the Autotrigger.

4. The cursor on the screen of the host device follows the movement of the Pen.

The A-button acts as the left mouse button and the B-button acts as the right mouse button. These buttons can be used regardless of whether the Autotrigger is activated or de-activated.

## Taking photographs (C-Photo)

The C-Photo function turns your Pen into a digital camera. You can choose between two focal length settings:

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- `Normal mode`
  Use this mode to take photographs of people and landscapes. The focus ranges from 0.8 m (31.5 in) to infinity.

- `Macro mode`
  Use this mode to take close-up photographs of objects. The focus is 13 cm (5 in).

In addition the Pen has two levels of image resolution: high resolution (640x480 pixels) and low resolution (320x240 pixels).

Note! You must establish a *Bluetooth* connection to be able to take photographs with the Pen. C-Photo is disabled when you use a USB connection.

1. Move the Focus switch at the back of the Pen to the desired setting:

    Normal mode

    Macro mode

2. The C-Photo indicator lights ().

3. A viewfinder appears on the screen of the host device.

4. Direct the aperture of the Pen towards the object to be photographed. The image is shown on the screen.

   Note! The aperture is inside the tip of the Pen.

5. Press the A-button to take a high resolution photograph, or press the B-Button for a low resolution photograph.

6. The image in the viewfinder freezes and is transferred to the host as a JPG file.

# Additional information

### Upgrading the software

When upgrading the software, a USB connection to a PC is required.

1. Attach the Pen to the PC via a USB cable.

2. Press the F-button and the B-button simultaneously until the Battery indicator lights, then release the buttons.

3. The Pen is now in upgrade mode and ready to receive new software.

## Care and maintenance

Precautions

The aperture of the Pen is entirely unprotected. Do not allow sharp objects enter the aperture as this could damage the optics. Keep the Pen in a clean, dust-free place.

The Pen must not be used in damp or wet environments or close to strong radio transmitters.

The Pen must not be exposed to naked flames or extreme high or low temperatures. The working temperature range of the Pen is 0 to +40°C (+32 to +104°F).

Do not attempt to disassemble your Pen. It does not contain any consumer serviceable components.

Warning! Do not allow children to play with the Pen. They could hurt themselves or others, or accidentally damage the Pen!

Cleaning

You can wipe the housing of the Pen with a moist cloth. Do not immerse the Pen in water, or use solvents to clean it.

You can use a lens brush to remove dust from the optics inside the aperture.

Disposing of the Pen

Do not discard the Pen in domestic or municipal waste. Please check your local regulations for the disposal of electric components.

## Technical specifications

General

| | |
|---|---|
| Dimension (l x h x w): | 143 x 28 x 27 mm (5.63 x 1.10 x 1.06 in) |
| Weight: | 65 g (2.32 oz) |
| Processor: | Argus ( 32-bit ARM 7-based RISC CPU by C Technologies AB) |
| Memory: | 8MB Flash Memory<br>8MB SDRAM |
| Connectivity: | Wireless: *Bluetooth*<br>Cable: USB protocol HID |

| | |
|---|---|
| Power: | Rechargeable Li-Ion battery |
| File format: | JPEG |
| Optics: | 4 lenses (3 aspheric, 1 diffractive) |
| Sensor: | Color CMOS |
| Temperature: | Operational:  0 to +40°C (+32°F to +104°F)<br>Storage:    -20 to +55°C (+55°C to +131°F) |

## Normal mode

| | |
|---|---|
| Image resolution: | VGA (640 x 480 pixels) (high)<br>QVGA (320 x 240 pixels) (low) |
| Colors: | Full color, 24-bit |
| Focus distance: | 0.8 m (31.5 in) to infinity |
| F number: | 4.0 |
| Focal length: | 7.7 mm (0.3 in) |
| Horizontal field of view: | 36 degrees |
| Exposure time: | Program automatic w light measurement in image sensor |
| Light measurement: | Center weighted |
| White balancing: | Automatic |
| Trigger delay: | ? 0.5 s |

## Macro mode

| | |
|---|---|
| Image resolution: | VGA (640 ( 480 pixels) (high)<br>QVGA (320 ( 240 pixels) (low) |
| Colors: | Full color, 24-bit |
| Focus distance: | 0.13 m (5.11 in) |
| F number: | 4.1 |
| Focal length: | 7.4 mm (0.29 in) |
| Horizontal field of view: | 37 degrees |
| Exposure time: | Program automatic w light measurement in image sensor |
| Light measurement: | Center weighted |
| White balancing: | Automatic |
| Trigger delay: | ? 0.5 s |

Surface mode

| | |
|---|---|
| Image resolution: | 100 x 120 pixels |
| Focus distance: | 1 mm (0.039 in) |
| F number: | 4.6 |
| Focal length: | 5.1 mm (0.2 in) |
| Character size: | 5–22 points |
| Reading speed: | 15 cm/s (5 in/s) |
| OCR accuracy: | 99% (English OCR w dictionary) |

## Approvals

FCC
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.

(2)   This device must accept any interference recieved, including interference that may cause undesired operation.

The user shall be aware of that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

## Troubleshooting

If your Pen does not function properly, please check this troubleshooting section before contacting your retailer.

| Problem | Possible cause and solution |
|---|---|
| Communication | |
| The Pen does not start. (No indicator lit.) | 1. Ensure that the battery is charged.<br>2. Reset the Pen by carefully inserting the tip of a paper clip or similar object into the reset hole. |
| The Pen is on, but is not communicating with the host. | 1. Is the host software installed on the host device?<br>2. With Bluetooth: Is the Pen paired with the host?<br>3. With USB: Is the cable connected properly?<br>4. Restart the Pen. |
| Battery | |
| The charger is attached but the battery doesn't seem to be charging, i.e. the Battery indicator is not lit (flashing green or steady red). | 1. Disconnect the Pen from the charger. Connect the Pen to the PC instead to see if charging is possible (the Battery indicator is lit green). If so, then the charger is probably faulty and must be replaced.<br>2. Reset the Pen by carefully inserting the tip of a paper clip or similar object into the reset hole. |
| Functions | |
| When the Function button is pressed, the C-Photo indicator cannot be reached. | 1. Check that the Focus switch is in the Macro or Normal position.<br>2. Reset the Pen by carefully inserting the tip of a paper clip or similar object into the reset hole. |

| When the Function button is pressed to reach other functions, only the C-Photo indicator is lit. | 1. Check that the Focus switch is in the Surface position. |
| | 2. Reset the Pen by carefully inserting the tip of a paper clip or similar object into the reset hole. |
| The Pen is on but does not read the text properly. (C-Read, C-URL) | 1. Check that the Focus switch is in the Surface position. |
| | 2. Check that C-Read or C-URL has been selected. |
| | 3. Are you trying to read a language not recognized by your Pen? |
| | 4. Are you holding the Pen so that its tip covers the text? |
| | 5. Is the Autotrigger lit when you press it against the surface of the text? If not, the Pen cannot read the text. |
| | 6. Is the original readable? |
| | 7. Reset the Pen by carefully inserting the tip of a paper clip or similar object into the reset hole. |
| The Pen is on but you can't write with it. (C-Write) | 1. With Bluetooth: Is the Pen paired with the host? |
| | 2. With USB: Is the cable connected properly? |
| | 3. Check that the Focus switch is in the Surface position. |
| | 4. Check that C-Write has been selected. |
| | 5. Are you using a patterned surface to write on? |
| | 6. Are you trying to write characters not recognized by your Pen? Check the prototypes in the User's Guide. |
| | 7. Is the Autotrigger lit when you press it against the surface of the text? If not, the Pen cannot read the text. |

| | |
|---|---|
| | 8. Reset the Pen by carefully inserting the tip of a paper clip or similar object into the reset hole. |
| The Pen is on, but you can't take photographs. | 1. Note that C-Photo can only be used with Bluetooth communication. Not with USB.<br><br>2. Is the Pen paired with the host?<br><br>3. Check that the Focus switch is in the Macro or Normal position.<br><br>4. Reset the Pen by carefully inserting the tip of a paper clip or similar object into the reset hole. |
| Images are out of focus. | 1. If you are aiming at a close range target like a business card, make sure that the focus switch is in the Macro position and that the target is about 10 cm (13 cm to be exact) from the tip. If the Focus switch is in the Normal position, the target must be at least 1 meter away. |

# C-Write Prototypes

## Letters, digits and shift

| Shift | Space | Backspace | New line | |
|-------|-------|-----------|----------|---|
| ↓ | ← | → | ╱ | |
| Aa | Bb | Cc | Dd | Ee |
| a | b | c | d | e |
| Ff | Gg | Hh | Ii | Jj |
| f | g | h | i | j |
| Kk | Ll | Mm | Nn | Oo |
| k | L | m | n | o |
| Pp | Qq | Rr | Ss | Tt |
| p | q | r | s | t |
| Uu | Vv | Ww | Xx | Yy |
| u | v | w | x | y |

| Zz | | | | |
|---|---|---|---|---|
| Z | | | | |

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

| 6 | 7 | 8 | 9 | 0 |
|---|---|---|---|---|
| 6 | 7 | 8 | 9 | 0 |

## Special characters

| Ç | Æ | Ø | | | |
|---|---|---|---|---|---|
| C | Œ | Ø | | | |

## Accents and umlaut

Write the letter first and then the accent or umlaut.

Example: Ä=a+

| ¨ | ° | ^ | ´ | ` | ~ |
|---|---|---|---|---|---|

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## Symbols

Enter symbol mode by pressing the Autotrigger briefly.

| . | , | : | ; | / | \ |
|---|---|---|---|---|---|
| . | 9 | ♭♭ | ♭♭ | / | \ |
| ( | ) | [ | ] | { | } |
| C | ) | [ | ] | { | } |
| - | + | * | = | $ | @ |
| — | + | X | Z | S | O |
| " | # | _ | < | > | ? |
| N | h | — | < | > | ? |
| ¿ | ! | ¡ | £ | § | ß |
| ¿ | ! | ! | L | S | β |
| % | | | | | |
| ∞ | | | | | |