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USER GUIDE

to the

ApI300

Thermal Printer

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2 INTRODUCTION

This document is a User Guide, written for the person connecting and using the Able Systems Ap1300 thermal printer. Please read this Guide carefully before making any connection.

A separate Programmer Guide provides details of the control codes, and describes the internal operation of this product.

2.1 NOTES ON PRINTER FIRMWARE REVISIONS (INCLUDING FLASH)

Able Systems reserves the right to modify and improve the firmware in its printer products at any time. Whilst every effort is made to ensure backward compatibility, no guarantee in this respect is given or implied.

The Ap1300 includes a flash-reprogrammable microcontroller. This allows firmware upgrades under customer control. Refer to the factory for more information.

2.2 COPYRIGHT NOTICE AND DISCLAIMER

Copyright subsists in all Able Systems intellectual property, including controller firmware (embedded software) and circuit diagrams, pin connection lists and application data. No warranty in respect of patent rights of Able Systems Limited or of third parties is given. Unauthorised reproduction or amendment of controller firmware may result in prosecution.

Design Registration of the Ap1300 printer has been applied for.

Fujitsu is a registered mark of its owner Fujitsu Limited. References to this or other owners' marks in this document are for illustrative purposes only.

Able Systems do not assume responsibility for interchangeable functionality of other parties' command sets.

2.3 DOCUMENTATION REVISION HISTORY

Title (and Revision Number)	Issue Date	Comments
User Guide to the Ap1300 Rev 1.0	11 Mar 2004	This document is the original release
User Guide to the Ap1300 Rev 1.1	07 Dec. 2006	Modified

2.4 ORDERING PART CODES, OPTIONS AND ACCESSORIES

The following table details full Able Systems part codes for products related to the Ap1300 printer:

	ASL Product Code	Description
Printers	07-AP1300	Standard RS-232 printer (includes 1800mAH NiMH Battery Pack)
	07-AP1300-IR	As standard printer, with additional IrDA interface
	07-AP1300-BT	As standard printer, with additional Bluetooth interface
Evaluation Kits	07-Ap1300-KIT1	Complete kit suitable for evaluation of 07-AP1300 printer
	07-Ap1300-IR-KIT1	Complete kit suitable for evaluation of 07-AP1300-IR printer
	07-Ap1300-BT-KIT1	Complete kit suitable for evaluation of 07-AP1300-BT printer
	Each kit contains the following items: Ap1300 Printer (Standard, IrDA or Bluetooth version, including battery pack) 'Universal' input trickle charger D-9 data cable for PC 2 standard paper rolls Wall / Belt Mounting bracket and fixing kit Primary Cell Cradle Quick-start guide N.B. Alternative items may be substituted if stock is unavailable.	
Paper	04-A05836TPR1	Thermal Paper Roll (36 mm dia, 14.5 m long approx)
Power Packs	07-AP1300BP-01	Battery Pack (1800 mAH NiMH)
Chargers	07-BC1300	'Universal' input trickle charger (UK/Euro/USA)
	07-BC1300B	UK plug style trickle charger
	07-BC1300FC	'Universal' input fast charger and vehicle charger (UK/Euro/USA/Aus)
Cables and Adaptors	07-AP1300-D9	Data cable with D-9 for direct PC connection
	07-AP1300BR-01	Combined wall-mounting bracket and Belt-clip
	07-AP1300-PCC	Primary Cell Cradle (Fits 4 x AAA primary non-rechargeable cells)
Support Utilities	07-AP800FEU	Font Editor Utility software for PC
	Setup Utility	}
	Flash Upgrade Utility	} Available from the factory on request.
	Windows Drivers	}

N.B. The list of options and accessories available is likely to change over time. Please check our web site (<http://www.able-systems.com>) for the most up-to-date information.

3 MODES OF OPERATION

The Ap1300 has three operating modes, when not actually printing:

- "Idle Mode": ready to accept data, but no data are in the buffer awaiting printing, and the printer motor is not running;
- "Sleep Mode": effectively switched off;
- "Spool Mode": active, but storing data for later printing.

Modes are indicated by different colour combinations on the front-panel LED (see section 6). No light is emitted in sleep mode.

No hardware power switch is fitted, as power control is either automatic or by command from the host computer. To save power, the printer enters sleep mode after a period of inactivity, factory-set to 4 minutes, but is programmable from the host. It can also be programmed to stay idle indefinitely or to go to sleep on command.

3.1 IDLE MODE

In idle mode, the printer is ready to receive data, which will be printed as soon as complete lines or graphics patterns are decoded. It responds to the paper feed button in the normal way, and can also produce a demonstration print (see below). Power consumption is such that a fully-charged battery pack would last up to 10 hours, but the printer will normally switch from idle mode into sleep mode when there is no activity, extending battery life.

3.2 SLEEP MODE

In sleep mode, power consumption is negligible, but data stored in the buffer are lost. Special routines allow for data to be printed out automatically before going to sleep. User programmable settings such as Baud rate and operational preferences are, however, retained during sleep mode or battery replacement. The system designer can maximise battery life by arranging that the printer is generally in sleep mode, except when printing.

The printer enters sleep mode as follows:

- by command from the host;
- at the end of the (programmable) period of inactivity (This period is extended in spool mode);
- the battery voltage falls below a pre-set lower limit.

But, the Ap1300 will never enter sleep mode when:

- a charger is connected;
- data is being received;
- the RS-232 "Wake-up" control line is 'active';
- an IrDA connection is present ("Ap1300-IR" only).

The printer is woken up from sleep mode as follows:

- by pressing the paper feed button;
- by connecting the external battery charger;
- by an RS-232 data stream from the host: a certain period of logical '0' bits is required, typically a string of 50 NUL characters at 9,600 Baud. These data will be lost. There is a delay of up to 100 ms before the serial output lines are established and the printer is ready to accept data;
- by the RS-232 "Wake-up" control line becoming 'active';
- by Infra-Red activity ("Ap1300-IR" only).

3.3 SPOOL MODE

In spool mode, data is received and stored, but not printed. This is useful when printing needs to be suppressed during data transfer (for example in mobile radio systems); or when the printer is unable to print because the paper has run out or the lid is open.

The Ap1300 will automatically enter spool mode when the paper is out, when the head is up, or if some other error condition occurs, or alternatively by command from the host. Spool mode may be cleared by host command, automatically when the condition is cleared, or by "double-clicking" the feed button. Power consumption in spool mode is similar to that in idle mode.

4 BATTERY PACKS

4.1 OVERVIEW OF BATTERY OPERATION

The Ap1300 is normally supplied with a standard 1.8Ah NiMH battery pack. The primary power for the printer comes from the battery pack.

The printer can operate with or without a charger connected. If required, the charger can be operated continuously to keep the battery fully charged, although a high printing duty cycle may reduce the charge in the battery. Operation from the charger alone is not possible: a battery pack must always be fitted.

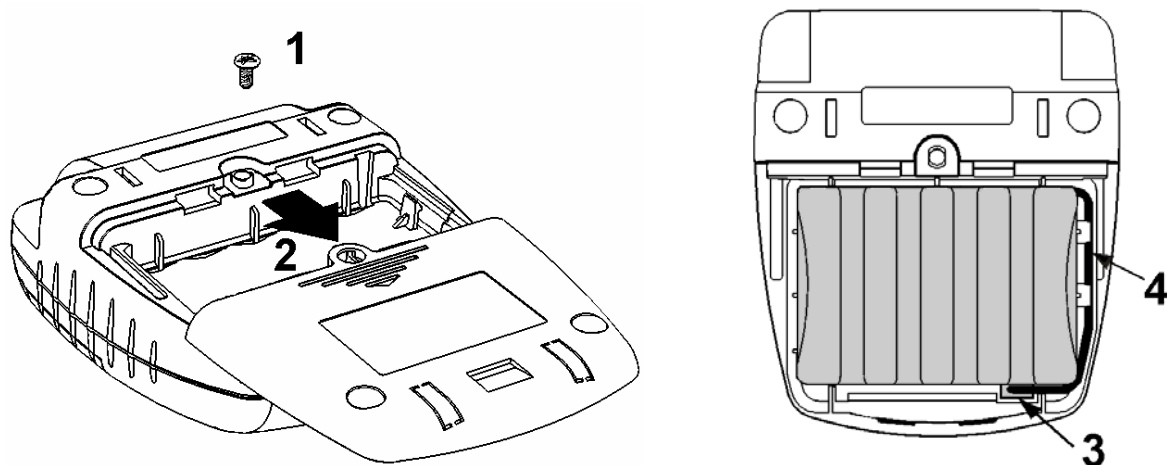
N.B. For safety the battery pack is shipped fitted into the battery compartment, but discharged and disconnected.

Before use, the battery must be connected (see below) and then fully charged.

4.2 FITTING AND CONNECTING THE BATTERY PACK

The procedure for connecting the battery pack is as follows:

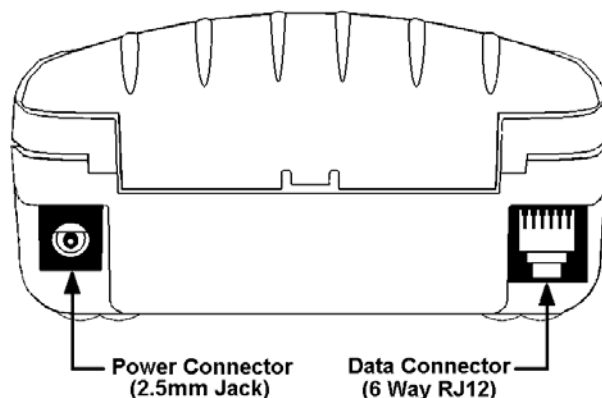
1. Remove the screw from the battery compartment door (if fitted),
2. Push down, and slide back the battery compartment door,
3. Fit the battery pack connector taking care to insert it correctly,
4. Fit the battery pack ensuring wires are correctly routed and not trapped.



4.3 CHARGING THE BATTERY

Plug the battery charger into a suitable mains outlet socket and insert the jack plug into the power connector at the rear of the printer. The LED will flash orange to show that the printer is on charge.

There is also the option of charging the printer via the jack socket in the D9 data connector.



N.B. Please note that while the printer may be used as normal when trickle charging, any printing during a fast charge cycle will terminate the fast charge process.

4.4 BATTERY PACK HANDLING PRECAUTIONS



WARNING! Battery Handling Precautions

The battery pack is fitted with an internal safety fuse, but the user must take care to avoid short-circuiting the contacts by preventing them from touching any metallic object. For example, the battery pack should never be carried loose in a pocket where it could rub against coins, keys or other metallic objects.

Short-circuiting the contacts of the battery pack will cause a heavy current to flow, which may lead to excessive heating of the battery pack or any metallic objects connected to it. This could cause burns, or start a fire.



WARNING! Do Not Try To Open The Battery Pack

The standard battery pack contains five Nickel-Metal-Hydride Cells. Exposing the cells increases the risk of leakage or short-circuiting.

CAUTION: It is strongly recommended that the external charger is disconnected whenever the battery pack is removed or replaced.

Please observe local standards for the handling, transport and disposal of Nickel-Metal-Hydride Cells.

4.5 BATTERY PACK CAPACITY

The Ap1300 is supplied with a 1.8Ah NiMH battery pack. This battery pack should be recharged while installed in the printer. This takes about 15 hours with the Trickle Charger, or about 3 hours with the Fast Charger. The capacity of the battery pack when fully charged will normally be sufficient to print normal text along about four full rolls of paper. However, the amount of printing which can be achieved depends greatly on the printing density, idle time and other factors such as the ambient temperature and the history of the battery pack.

With the printer awake but idle, a fully charged battery would last for up to 10 hours, but the built-in sleep mode shuts down the printer completely, reducing energy consumption to a negligible rate.

In the event of the battery becoming exhausted, the printer will automatically protect its own control circuitry by entering sleep mode if the instantaneous battery voltage drops below a threshold (e.g. during a particularly heavy section of print). In this case data stored in the buffer is lost.

The battery pack should be capable of up to 500 complete charge and discharge cycles, though this may be reduced in very repetitive applications. If a particular battery pack appears not to be holding charge as well as expected, it may be worn out and should be replaced by a new one. Please consult the factory for further details and recommended battery treatment.

During battery charging, especially fast charging, the printer may become quite warm. This can crease the paper within the mechanism. The system designer may wish to feed out some paper before printing begins, either controlled from the host, or by the user pressing the paper feed button.

4.6 PRIMARY CELL CRADLE

Also available, as an accessory, is a battery cradle suitable for 4 x AAA primary (non-rechargeable) cells. If the standard rechargeable NiMH battery pack becomes discharged and there is no time, or no available mains charger, to recharge it, then the AAA battery cradle may be used to power the printer for short periods.

N.B. The cradle is suitable for 1.5V primary (non-rechargeable) cells only.

4.7 ALTERNATIVE POWER ARRANGEMENTS

Alternative arrangements, such as direct power from a vehicle 12V or 24V starter battery, or direct power from a high capacity voltage source, will be made available in due course. Please contact the factory if your application requires such power arrangements.

5 PAPER

Pressing the paper feed button when the printer is idle advances paper at typically 50 mm per second, depending on the battery voltage. However, the feed button has several additional functions:

A single press and release of the button:

- in idle or spool mode, advances paper (in steps of 1/16 mm);
- in sleep mode, wakes up the printer into idle mode;

"Double-clicking" the button: (i.e. pressing and releasing twice in quick succession just like a PC mouse)

- in idle mode, prints a demo/test message including the firmware version, encoded calibration data, and the full character set;
- in spool mode, or having been out of paper, prints any stored data and enters idle mode.

Some of the functions of the paper feed button can be invoked or disabled under control of the host.

5.1 LOADING PAPER

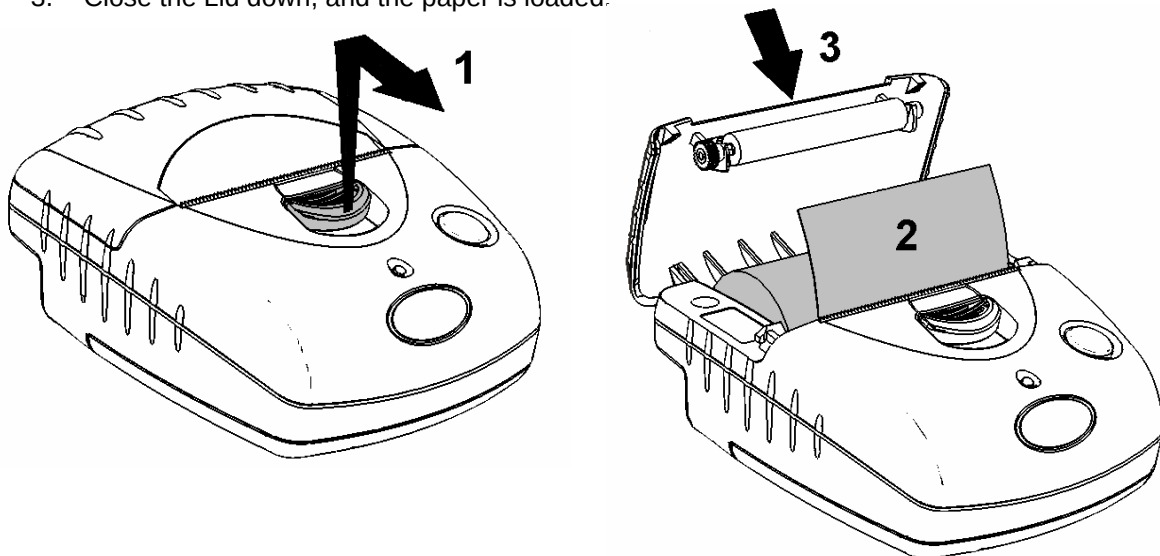
Paper rolls must be 57.5 ± 0.5 mm wide, 36 mm maximum diameter, and have the thermally sensitive coating on the outside. The printer can accept rolls which are coreless or wound on a core.

Suitable rolls are available as ASL Product Code:

04-A05836TPR1 Thermal Paper Roll (36 mm dia, 14.5 m long approx)

The procedure for loading paper is as follows:

1. Slide the Lid Release Button forwards until the Lid springs open.
2. Unwind a small amount of paper from the roll and Insert the Paper Roll into the Printer.
3. Close the Lid down, and the paper is loaded.



After loading, check that the paper advances properly, and tear off any excess by pulling the paper sharply towards you across the serrated tear bar. In the event of a jam or other paper loading problem, release the lid and straighten the paper before closing again.

5.2 PAPER OUT AND HEAD UP SENSORS

A reflective optical Paper Out sensor within the mechanism detects an out-of-paper condition, and/or senses black marks to register with pre-printed forms. A mechanical Head Up sensor detects when the lid is open.

By default, the printer enters Spool mode automatically if either sensor becomes active. Spool mode is automatically exited, and any stored data printed, when new paper is loaded and the lid closed. This behaviour may be modified. Please refer to the Programmers' Guide for details of how to configure these functions.

6 LED INDICATIONS

The LED indicator at the front of the Ap1300 has a number of colour combinations, which repeat in up to a 4-phase pattern to provide status information (see table below).

In summary, if the LED is constant green it indicates that the printer is operating normally from its battery pack. Flashing on and off indicates that Spool mode is active and no printing can take place. Orange advises the battery is being charged. Red warns of a low battery or other problem.

No light indicates that the unit is in sleep mode, has a flat battery, or the battery is not connected.

LED Pattern Table

Pattern	Battery	Buffer Mode
<i>Constant Green</i>	<i>Running</i>	<i>Normal</i>
<i>Fast Flashing Green</i>	<i>Running</i>	<i>Spool *</i>
<i>Long Green - Short Red</i>	<i>Battery Low</i>	<i>Normal</i>
<i>Short Green - Short Red</i>	<i>Battery Low</i>	<i>Spool *</i>
<i>Short Green - Long Orange</i>	<i>Trickle Charging</i>	<i>Normal</i>
<i>Long Orange Flashing</i>	<i>Trickle Charging</i>	<i>Spool *</i>
<i>Fast Flashing Orange</i>	<i>Fast Charging</i>	<i>Spool (Printing prohibited)</i>
<i>Fast Flashing Red</i>	<i>Error Condition</i>	<i>Spool (Printing prohibited)</i>
<i>No light</i>	<i>Flat, or in sleep mode</i>	

* (Spool may have resulted from Paper Out or Head Up conditions)

Although this table may seem complicated, few applications will produce many of the combinations.

Other LED Patterns

Other LED patterns may be programmed into the Ap1300 on request or by the system designer. Please refer to the Programmers' Guide for details of how to configure these functions.

7 PRINTER OPERATION AND PROGRAMMING

The Ap1300 utilises a Fujitsu FTP-628MCL103 printer mechanism, with a fixed (parallel) print head with 384 horizontally-arranged thermal elements. The paper is advanced by a stepper motor, and printing takes place in a single dot row for each step of the paper. Each printed dot is approximately 1/8 mm square. The printing speed and dot density are controlled according to the battery voltage and the head temperature.

Various printing modes, including graphics, are invoked by 'Escape' sequences. Control codes and status report protocols are described in detail in the Programmers' Guide, available separately.

7.1 DATA BUFFER

The Ap1300 has a nominal 20k byte buffer to optimise throughput: this enables data to be received into the buffer while previous lines are being printed. Printing will be initiated on receipt of a valid logical line of data or a complete graphics pattern.

The buffer may be cleared by data command or by a hardware reset. A partially full line will be printed on receipt of an appropriate control code, or after a programmable timeout delay.

7.2 SPOOL MODE

Spool mode is can be entered by:

- a command from the host;
- Paper Out condition or Head Up condition being sensed;
- fast charging detected;
- an error condition (e.g. head over temperature, battery over voltage, etc).

In spool mode, the buffered data are stored without being printed until the mode is exited by:

- a command from the host;
- the 'causing condition' (e.g. Paper Out or Head Up) being cleared;
- the paper feed button being double-clicked.

7.3 CHARACTER PRINTING AND FONTS

The default 32-column character set is formed from a 24x10 dot matrix, and is based on the industry standard IBM® character set Code Page 437. This character set has been modified to include the Euro symbol (‘€’) at position 80H (128 Decimal), in place of the usual capital C with cedilla (‘Ç’).

Various combinations of single or double width, single or double height, inverted, underlined, and other attributes may be mixed within a line.

Customised fonts may be created using the Able Systems Font Editor Utility, and downloaded to the Ap1300. Only a single custom font may be loaded in the printer at one time.

7.4 GRAPHICS PRINTING AND OTHER PROGRAMMING MODES

Various dot-addressable graphics modes are supported, at up to 384 dots per line. The Windows driver operates in the graphics mode. Refer to the Programmer's Guide for full details of this and other advanced programming modes.

8 INTERFACE DETAILS

8.1 RS-232 SERIAL INTERFACE (ALL MODELS)

N.B. This section applies to all models of the Ap1300

All models of Ap1300 printer have an industry standard RS-232 interface. The default parameters are 9600 baud, 8 data bits, 1 stop bit and no parity. Other baud rates can be programmed by control codes, or by using a setup utility available from the factory.

Serial data is expected in standard RS-232C format with -12V meaning 'mark' or '1' and +12V a logical '0', with reference to the common ground. The serial data output line, TxD, transmits XON/XOFF and status information to the host at the same Baud rate and in the same format as the serial data input. The hardware busy line is true (nominal -12V) when busy. Both serial output lines will relax to approximately 0V when the Ap1300 is in sleep mode, and the user must allow a short period after awakening before relying on the values of these signals.

Some host equipment use a constant space condition (+12V) to indicate a reset condition or wait state. Some battery powered host equipment present the same output signal when they go to sleep. The Ap1300 can be set to ignore this condition as detailed in the Programmer's Guide, but even then this type of host behaviour may result in one or more spurious characters being received and printed by the Ap1300, or the Ap1300 may be prevented from going to sleep.

8.2 IrDA INTERFACE (AP1300-IR ONLY)

N.B. This section applies only to the Ap1300-IR

The Ap1300-IR features an Infra-Red window on the front of the body. It includes special hardware which wakes the printer when any Infra-Red activity is detected. In order to reduce the occurrence of 'false triggers', the sensitivity of this wake-up sensor is reduced. It may be necessary to bring the host IrDA device fairly close to the Ap1300-IR before it will wake up.

Once awake, the printer will attempt to communicate with an IrDA compliant primary device. The printer supports 'point-to-point' applications (i.e. one primary device and one secondary device). It operates only as a secondary device, and cannot initiate a link between devices. It does not support 'multi-point' applications.

If a link is established then the printer shows a red LED through the IR window on the front. The link will continue as long as the devices are maintained in line-of-sight and within operating range. While a link is maintained, data may be exchanged freely between the two devices.

The protocols supported by the Ap1300-IR are as follows: IrPHY V1.0, IrLAP, IrLMP, IAS, TinyTP and IrCOMM 9-wire.

8.3 BLUETOOTH INTERFACE (AP1300-BT ONLY)

N.B. This section applies only to the Ap1300-BT

The Ap1300-BT includes a fully compliant class 2 Bluetooth 1.1 implementation.

At present, there is no facility to wake the printer by bluetooth activity. The printer must be awake before any data can be transferred to it via the bluetooth interface.

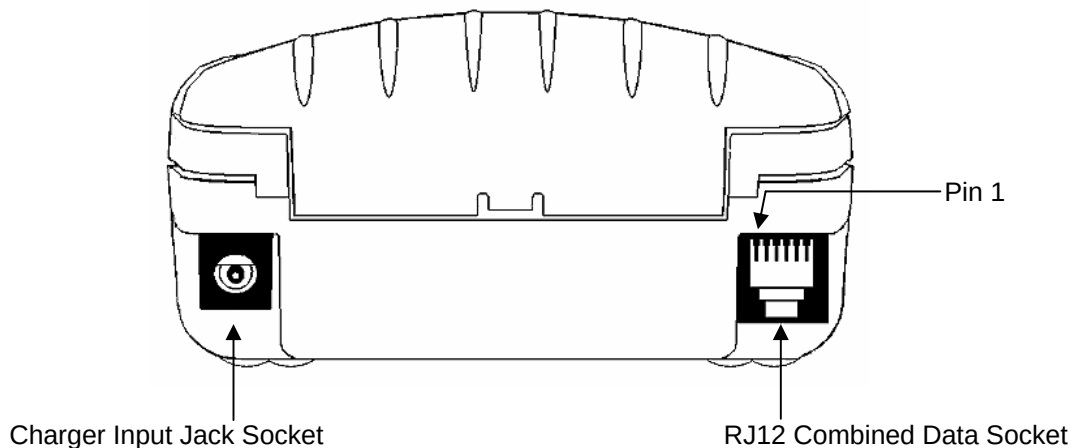
The protocols and profiles supported by the Ap1300-BT are as follows: LM, L2CAP, RFCOMM, SDP, TCS, SPP (Serial Port Profile).

Please contact the factory if further details or alternative profiles are required.

9 CONNECTIONS AND EMC PRECAUTIONS

9.1 CONNECTOR DETAILS

The Ap1300 has two user connectors shown below:



9.2 CONNECTOR PINOUTS

Charger Input Jack Socket Detail

Pin	Dimension (mm)	Function
Inner	Inside Ø 2.5	Positive / Charger Input
Outer	Outside Ø 5.5	Negative / 0V Common

The maximum insertion length is 12 mm.

RJ12 Combined Data Socket Detail

RJ12 Pin	Input / Output (Ap1300)	Ap1300 Function
1	i/p	Optional Charger Input
2	i/p	Wake-up Input
3	i/p	RS-232 Rx data
4	o/p	RS-232 Tx data
5	o/p	RS-232 Busy
6	---	0V Common (RS-232 signal return and Charger return)

9.3 BATTERY CHARGER DETAILS

The Ap1300 monitors charge current into the printer, but does not regulate it in anyway. In order to fully and safely charge the batteries a suitable current-regulated charger must be connected. This may be a simple current source for trickle charging, or a more complex intelligent fast charger with automatic fast charge termination.

The following mains powered battery chargers are available:

- UK trickle charger (ASL Product Code 07-BC1300B)
- 'Universal' trickle charger (ASL Product Code 07-BC1300)
- 'Universal' intelligent fast charger (ASL Product Code 07-BC1300FC)

(Note: The 'Universal' intelligent fast charger also features a nominal 12-32Vdc input with a cigar lighter plug for vehicle use)

Alternatively, the user may make their own charger arrangements. The recommended battery trickle charge supply current is 250mA +/- 25mA, at between 6V and 8V. An external charger supply must have an output current which remains within this range between these voltage extremes.

N.B. This connection is for a current-regulated battery charger only. Do not connect a standard voltage power supply. Serious damage may result from inappropriate connections. (Please contact the factory if you are unsure about this).

9.4 COMBINED DATA/CHARGER ADAPTOR CABLE

A data cable suitable for connecting the Ap1300 to a standard PC is available (ASL Product Code 07-AP1300-D9). This cable features an integrated charger jack socket in the housing of the D-9 plug. For trickle charging, the charger may optionally be connected directly into the Ap1300 charger Jack Socket, or indirectly into the Jack Socket in the data cable, thus giving the maximum system wiring flexibility. It is recommended to use the internal socket when fast charging. The details for the charger jack socket in the D-9 plug are the same as for the internal socket in the printer.

The connections to a standard PC COM port are as follows:

D-9 Pin	Name	Function (refers to PC)	Ap1300 Pin
3	TxD	Serial Data Output	3
2	RxD	Serial Data Input	4
4	DTR	Handshaking Output	2
6 & 8	CTS & DSR	Busy Input	5
5	SGND	Signal Common 0V	6

The wake-up input (pin 2 of the RJ-12) can be driven by a normal RS-232 handshaking output and activates the printer when a positive voltage ('space' condition) is asserted. Connecting it to the PC DTR signal wakes the printer when the COM port is 'opened'. It may alternatively be tied to a positive voltage in the range +3V -> +12V to keep the printer awake permanently. In this case, the printer will 'attempt' to go to sleep if the normal inactivity time-out elapses, but will merely reset and then re-start. This behaviour may be avoided by switching off the sleep period timeout.

9.5 EMC AND FCC STATEMENT

The Ap1300 is fully EMC (Electro-Magnetic Compatibility) and FCC compliant and is marked accordingly. A full Declaration of Conformity, in accordance with the EMC Directive 89/336/EEC (and as amended) is available from Able Systems on request.

Conformance	FCC Statement
EMC Directive: 89/336/EEC Low-Voltage Directive: 73/23/EEC FCC Title 47, Part 15, Sub-part B. Class B device FCC ID: TGZAP13XXBT Bluetooth Variant Only Bluetooth Certified Module Contains FCC ID: TGZBT001 Bluetooth Specification 1.2 Bluetooth Class 2 device R&TTE Directive: 1999/5/EC	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.

Modifications not expressly approved by this company could void the user's authority to operate the equipment. **NOTE:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- . Reorient or relocate the receiving antenna.
- . Increase the separation between the equipment and receiver.
- . Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- . Consult the dealer or an experienced radio/TV technician for help.

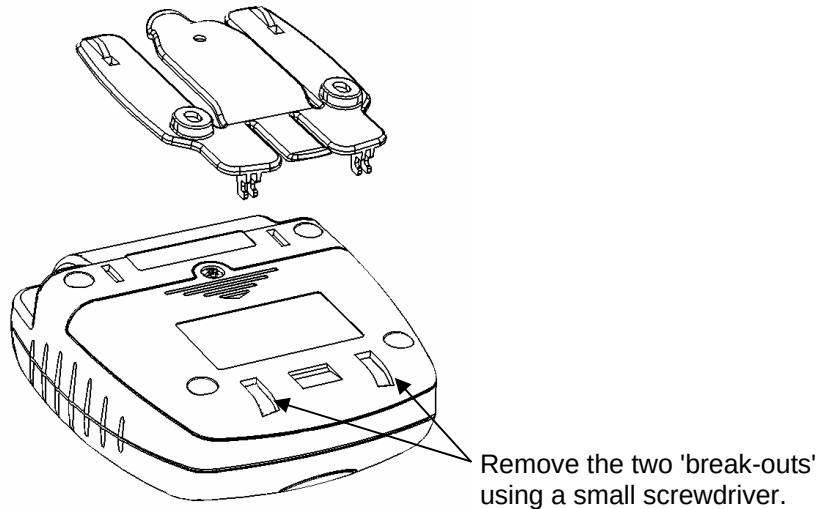
9.6 EMC Caution

System EMC compliance remains the responsibility of the system designer. It is recommended that screened cables are used; earthing arrangements will depend on the application. Further advice is available from Able Systems on request.

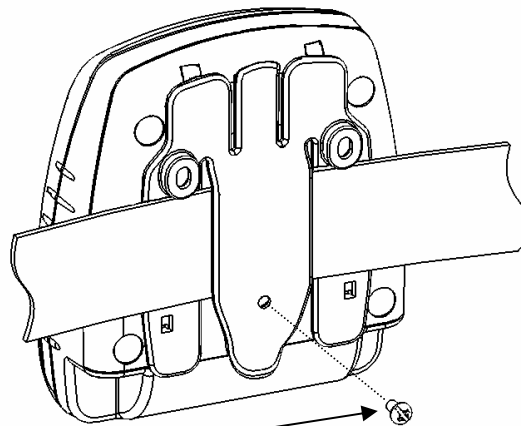
10 WALL AND BELT MOUNTING INSTRUCTIONS

A combined bracket/clip suitable for fixing the Ap1300 to a wall or belt is available (ASL Product Code 07-AP1300BR-01). The bracket is included in the evaluation kits, and is supplied complete with wall plugs and screws.

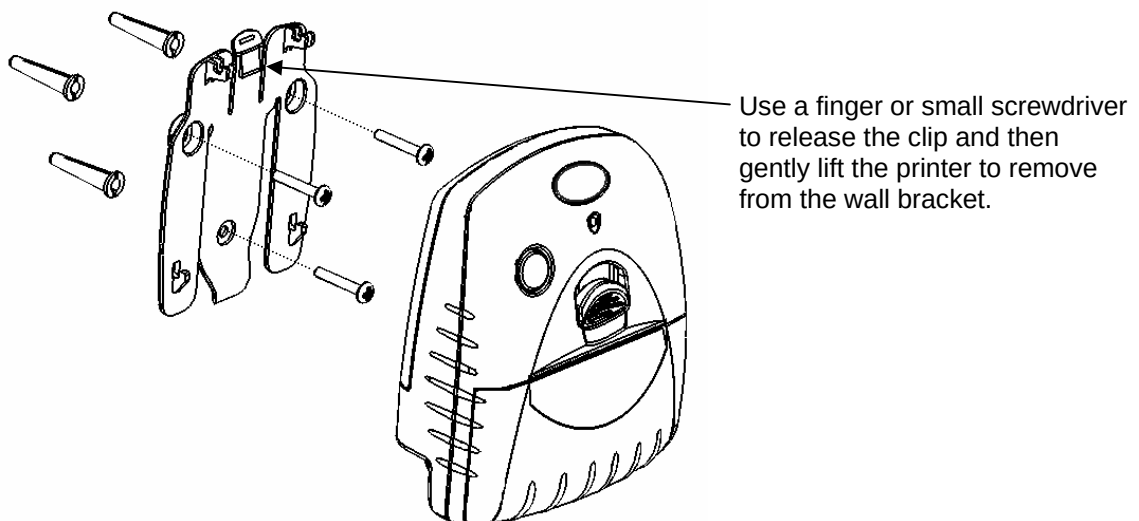
The bracket snaps into the bottom of the printer, and when used to clip to a belt, it may be secured by using the supplied extended screw. Prior to use, two small 'break-outs' must be removed from the battery cover of the Ap1300 as shown below:



When fitting to a belt, the bracket should be slotted onto the printer first, and then the entire assembly clipped over the belt as shown:



When fitting to a wall, the bracket must be located on the wall using screws and wall plugs as shown. The printer may then be clipped into place and removed as required.



11 GETTING STARTED

You may find that you can connect up the printer to your Personal Computer (PC), and everything works perfectly first time. However, there are many variables, and the following guide may help if you find you need some assistance. These are only suggestions, and may not work with all PC's.

11.1 CONNECTING TO A PC – A CHECKLIST

- First, you need to **GET THE PRINTER GOING**

Make sure that the battery pack is fitted and connected. Remember that operation from the charger alone is not possible: a battery pack must always be fitted. **Also remember that battery packs are normally supplied disconnected and discharged. They should be connected and then fully charged before use (e.g trickle charged for at least 15 hours).**

Wake the printer up by pressing the paper feed button once and releasing it. The LED indicator should light; if it does not, the battery may be flat (or not fitted correctly): connect up the charger, and the light will come on. Other LED colours are discussed in Section 6, for example when the printer is out of paper.

When the printer is awake, load paper and then press the feed button to check that paper feeds. Press the paper feed button again twice in quick succession (like double-clicking a PC mouse) and the printer should print a self-test message. This will show that the printer is operational, and also reports the way in which the printer's serial data interface is configured.

- Next, you need to make some **HARDWARE CONNECTIONS**

The back panel of a PC typically includes several D-type (keystone-shaped) connectors. One of these is usually:

D-9 Plug (male): COM1: Serial port for mouse, modem, serial printer, etc

You can use any available serial port for the Ap1300. COM1: is assumed in what follows, as most likely to be available.

You will need a suitable cable. Use either a standard cable from Able Systems (see Section '9.4 Combined Data/Charger Adaptor Cable'), or make up your own using the information in the same section.

- Now you will need to **SET UP YOUR COMPUTER'S SERIAL PORT** to match the printer (it is also possible to change the printer's settings, but not until you have established communication with the computer).

Your proposed application program may have a way of doing this, or you can get to the DOS prompt [eg C:\>] and type the following command line (assuming you have connected the printer to COM1:):

MODE COM1:9600,N,8,2 [RETURN]

This will set up the port (COM1:) to **9600** baud, **No** parity, **8** data bits, and **2** stop bits which is the default setting for the Ap1300.

- Now, **SEND SOME DATA TO THE PRINTER** from your computer. An easy way to do this from the DOS prompt is to type:

DIR >COM1: [RETURN]

This should send a directory listing to the printer. The lines will probably overflow, but it will at least show that the communication between the computer and the printer is working.

You can also send data from **QBASIC**:

**OPEN "COM1:9600,N,8,2" FOR RANDOM AS #1
PRINT#1, "Hello"**

Alternatively, in Windows, use the **TERMINAL** program to send some text to the printer.

Or, you can use the special Able Systems set-up software **AP8612.EXE** which we can supply on a floppy disc, or by e-mail on request: this will allow the printer settings to be changed and includes some diagnostic routines.

11.2 WINDOWS™ PRINTER DRIVERS

A Windows driver specifically written for the Ap1300 is available from Able Systems, and can be requested by email via our World Wide Web site (see below). It may be necessary to adjust some settings in your Application to produce the desired result.

It is important to recognise that other Windows printer drivers, even for ESCPOS compatible printers, may not work with the Ap1300, as they format everything as dot graphics patterns, in a way which is unique to each kind of printer. The Windows "Generic Text Only" printer driver should, however, work in a limited manner.

11.3 YOUR APPLICATION PROGRAM

Once communications between your computer and the printer have been established, you can try driving the printer from your application program. As referred to in the Programmers Guide, the Ap1300 has a control code set based on the EPSON ESCPOS protocol. Many of the commands are as closely compatible as they can be, given the mechanical differences between printers, but if the application program was originally written for another printer, it may need to be modified.

11.4 ON-LINE INFORMATION

Able Systems maintains a site on the World Wide Web. This includes application data updates, product announcements, and e-mail facilities for customer support.

The Windows Driver can be requested from this site: please note that this is a third-party product, and Able Systems do not accept responsibility for the installation or use of this program. Further details are given on the web site.

The **URL** of our **web site** is: <http://www.able-systems.com>
Our **e-mail address** is: contact@able-systems.com

11.5 IF ALL ELSE FAILS...

You are always welcome to contact Able Systems or your local supplier for specific assistance. We would also appreciate reports of any errors in our documentation, or suggested improvements.

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