Intermec

Service Manual

EasyCoder® PM4i Bar Code Label Printer

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Contents

About This Manual

This Service Manual is intended to facilitate installation, troubleshooting and repair of the Intermec EasyCoder PM4i printers in the versions delivered at the date of publishing. Thus, all information on the Intermec Fingerprint (FP) firmware is based on version 8.10 and information on the Intermec Programming Language (IPL) is based on version 2.10. The on-going product improvement can be followed in the Printer Technical Bulletins from Intermec.

Note that even if the printers are technically identical (with the exception of the keyboard overlay), Fingerprint and IPL make the printer work quite differently and certain devices and options are not supported by IPL.

Generally, illustrations in this manual show printers with a Fingerprint-compatible keyboard.

This Service Manual is supplemented by the following publications, which the service technician also should keep easily available in their latest versions:

- Intermec EasyCoder PM4i, User's Guide (Fingerprint version)
- Intermec EasyCoder PM4i, User's Guide (IPL version)
- Intermec EasyCoder PM4i, Spare Parts Catalog
- Installation Instructions for various options
- Intermec Direct Protocol v8.10 (or later), Programmer's Reference Manual
- Intermec Fingerprint v8.00 (or later), Tutorial
- Intermec Fingerprint v8.10 (or later), Programmer's Reference Manual
- IPL Programming, Reference Manual (rev. 006 or later)

Please note that the operations described in this manual only should be carried out by skilled and authorized personnel with proper training and full understanding of written English. The printers contain wires and circuits with up to 380V, which implies the risk of electrical shock. Moving parts may also cause harm, if incorrectly manipulated.

It is assumed that the reader possesses reasonable skills in mechanics and electronics and is familiar with the Intermec programming languages (Fingerprint or IPL) and their related standard application programs. It is also assumed that the reader has access to the standard tools of an electronics workshop.

Notices and Approvals

FCC Notice (United States of America)

WARNING

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

DOC Notice (Canada)

Canadian Dept. of Communication REGULATIONS COMPLIANCE (DOC-A)

This digital apparatus does not exceed the class A limits for radio noise emissions from a digital apparatus as set out in the radio interference regulations of the Canadian Department of Communication.

Ministère des Communications du Canada CONFORMITE DE REGLEMENTS (DOC-A)

Le présent appareil numérique n'émet pas de bruits radio-électriques dépassant les limites applicables aux appareils numériques de classe A prescrites dans le règlement sur brouillage radioélectrique édicté par le Ministère des Communications du Canada.

GS Notice (Germany)

ALLgemeine Vorschrift

Reparaturen oder sonstige Eingriffe, die sich nicht auf normale Bedienung der Maschine beziehen, dürfen ausschließlich nur von einem **ausgebildeten, zuständigen Fachmann** vorgenommen werden.

EU Standard EN 55022 (The European Union)

WARNING

This is a Class A ITE product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Declaration of Conformity (CE)

We,

Intermec Printer AB
Idrottsvägen 10
Box 123
S-431 22 Mölndal
Sweden

declare under our sole responsibility[1] that the product

EasyCoder PM4i

to which this declaration relates
is in conformity with the following standards

EMC:
EN 61000-6-4:2001

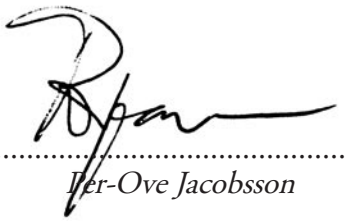
EN 61000-6-2:2001(EN 61 000-4-2)

Electrical Safety:
EN 60 950

following the provisions of Directives

89/336/EEC and **73/23/EEC**

Mölndal 2003-03-12



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Per-Ove Jacobsson

[1]/. Intermec assumes no responsibility regarding the CE Directive if the printer is handled, modified or installed in other manners than those described in the manuals.

1 Models and Options

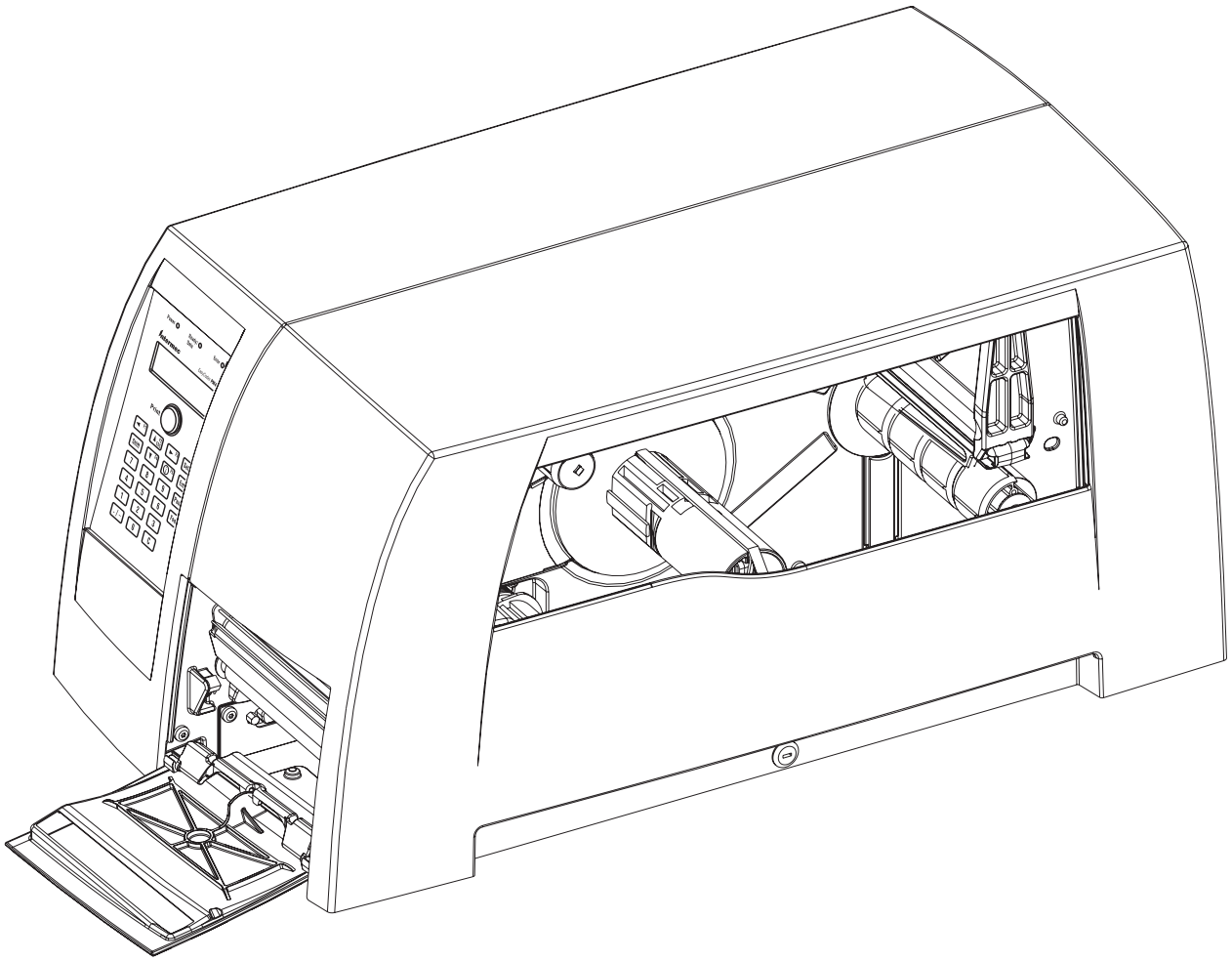
This chapter describes how to identify the various models in the EasyCoder PM4i-series of printers, provides comprehensive technical specifications, and gives all important measurements.

1.1 Identification

Main Model

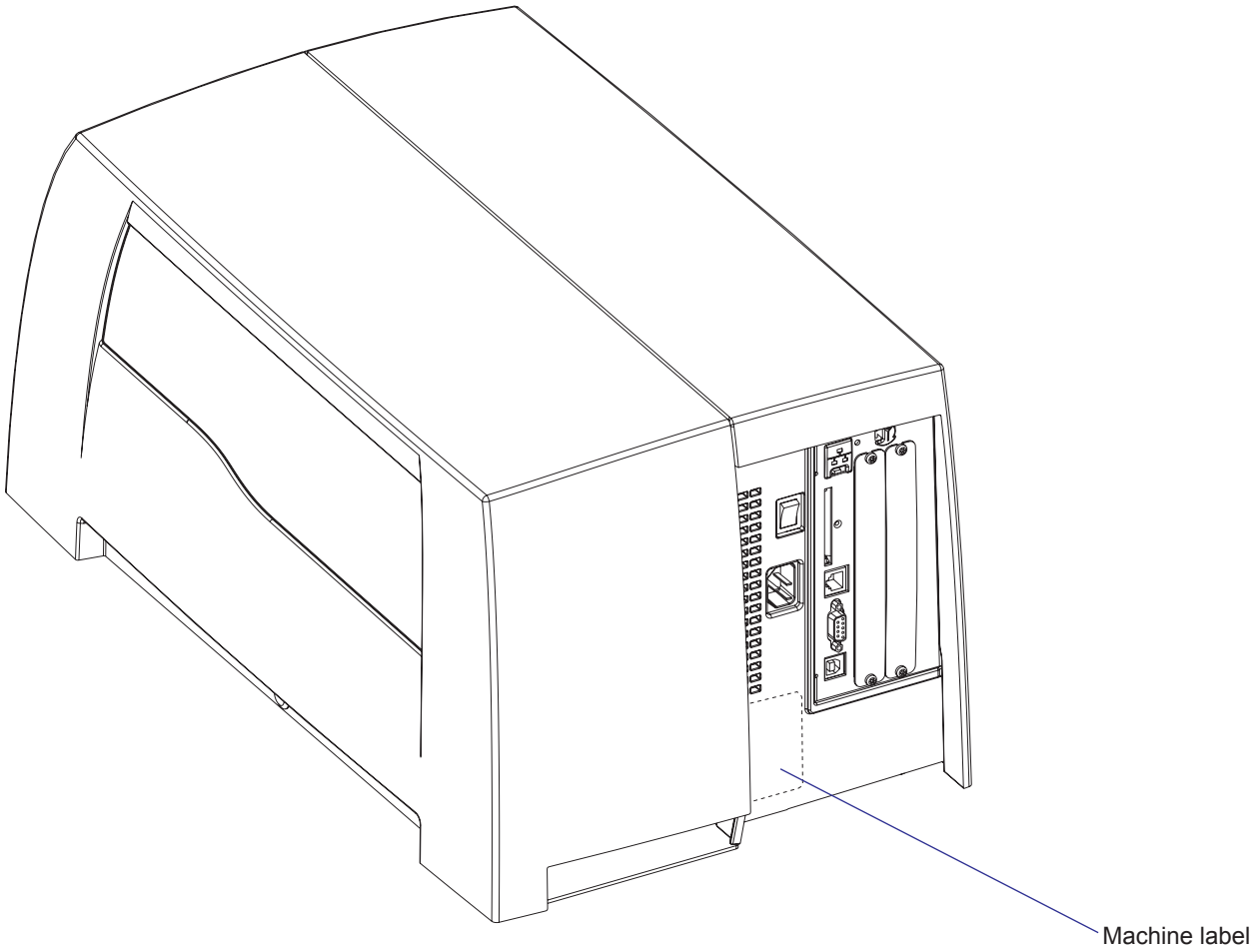
The EasyCoder PM4i comes in one main model, which can be modified in regard of media handling, printhead density, interfaces, firmware, etc. As standard, the printer has an 8 dots/mm (203.2 dpi) printhead and is capable of both direct thermal and thermal transfer printing,

The printer runs either Intermec Fingerprint Programming Language (FP) v8.10 (or later) or Intermec Programming Language (IPL) v2.10 or later. Externally, the difference is visible on the keyboard overlay. Fingerprint printers have 23 keys and IPL printers have 8 keys (see Chapter 2).



To identify the printer, start by reading the machine label attached to the rear of the printer. The machine label contains type, part number, serial number, and signs of approval.

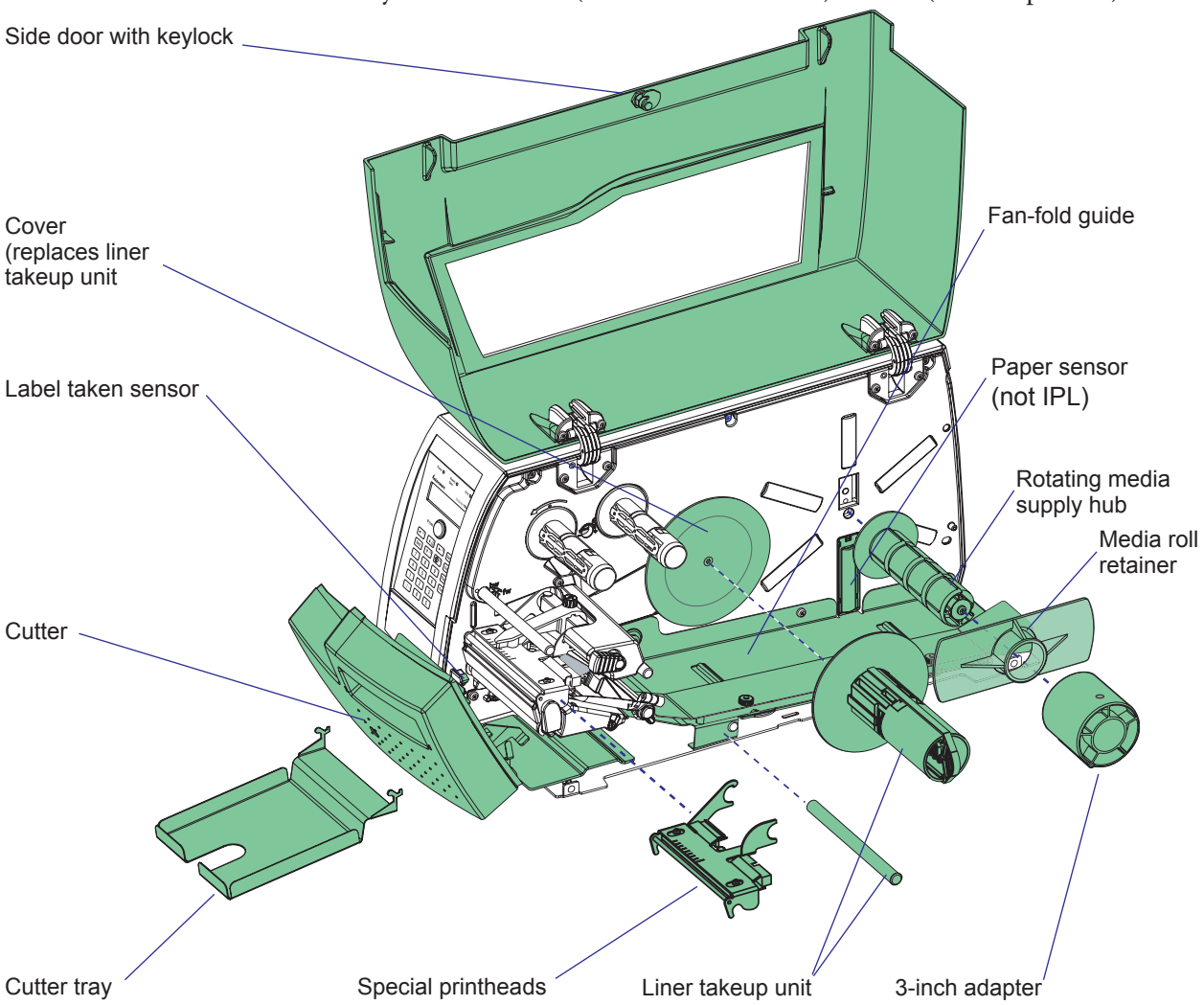
The printer can use any 100 to 240 VAC, 50 to 60Hz voltage. There is no manual voltage selector.



Options for EasyCoder PM4i

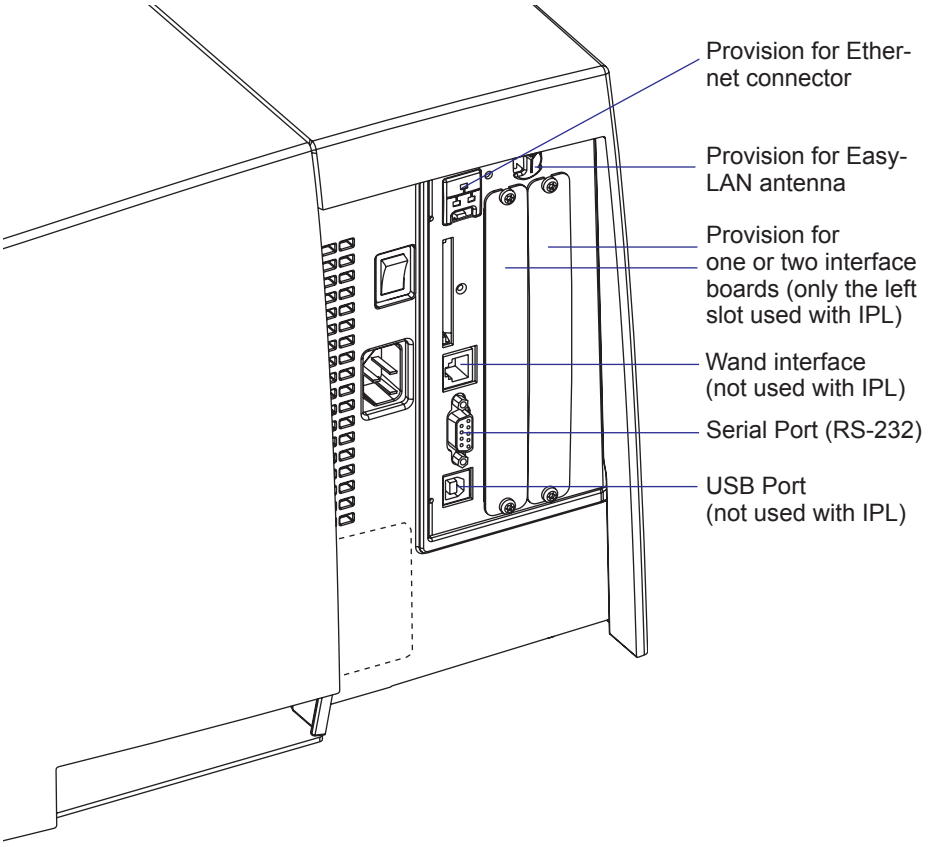
The EasyCoder PM4i can be fitted with a number of options:

- Special Printheads (300 dpi and/or thick media) (300 dpi not supported by IPL) (see Chapter 7)
- Label Taken Sensor (see Chapter 9)
- Integral Liner Takeup Unit (see Chapter 8)
- Media Supply Hub (replaces supply post) (see Chapter 5)
- 3-inch Adapter (for media supply hub) (see Chapter 5)
- Media Roll Retainer (for media supply hub) (see Chapter 5)
- Paper Sensor (not IPL) (see Chapter 5)
- Fan-Fold Guides (see Chapter 5)
- Cutter with Tray (see Chapter 10)
- Side Door with Keylock (see Chapter 3)
- Real Time Clock Circuit (not IPL) (see Chapter 13)
- One or two interface boards of various types (only one parallel board with IPL) (see Chapter 14)
- EasyLAN interface (Ethernet or Wireless) (see Chapter 14)



Interfaces

The printers are as standard provided with one serial RS-232 port, one serial USB port, and one wand interface. The USB port and the wand interface are not supported by IPL. In addition, one EasyLAN interface and one or two extra interface boards can be fitted, see Chapter 14. IPL does only support the EasyLAN interface and one parallel interface board.



Checking Hardware and Firmware

Finally, you may want to inspect the electronics compartment. To do so, carefully follow the instructions in Chapter 11.

Always switch off the power and remove the power cord before removing the cover over the electronics compartment! Dangerous voltage!

In the electronics compartment, check:

- Type of CPU board?
  - Check number and size of Flash SIMMs.
  - Check size of SDRAM SIMM.
- Any optional interface board fitted?
  - Check type, straps, and optional circuits.

Refer to Chapters 13 and 14 for more information.

Being delivered with either Intermec Fingerprint v8.xx programming language or IPL v2.xx (Intermec Programming Language), the printer can eisily be converted from Fingerprint to IPL or vice versa using a firmware card or special software. The keyboard overlay will also need to be switched. The type of firmware is indicated by the messages in the display window.

Fingerprint only

If the printer is working and possible startup program can be interrupted, the type of program in the printer can be identified. Connect printer and computer, open a suitable communication program, and start up the printer in Fingerprint's immediate mode. The instruction FILES allows you to check what files the various parts of the printer's memory contain. The statements FONTS and IMAGES can be used for the same purpose regarding fonts and images. Use the VERSION$ function to check version of the Intermec Fingerprint firmware.

You can read the setup in the Setup Mode or using Intermec Shell, which also allows you to print test labels containing the present setup values. To enter Shell if a custom-made autoexec-file prevents access, lift the printhead and press any key on the printer's keyboard (except the <**Shift**> key), then turn on the power while continuing to press the key. When the Shell countdown begins, release the key and press <**Enter**> to start Shell. Do not forget to lower the printhead if you want to print for example test labels. Refer to the User's Guide and to Appendix 1 in this Service Manual for more information on the Setup Mode and the Intermec Shell startup program.

If the printer still does not work, you may need to interview the user.

IPL only

The Test/Service part of the Setup Mode allows several types of test labels to be printed (see the *User's Guide* and Appendix A). IPL also has a number of commands that return valuable information on the printer's status (see *IPL Programming, Reference Manual*).

1.2 EasyCoder PM4i Specifications

Printing		
Print Technique	Thermal Transfer and Direct Thermal	
Printhead Resolution	8 dots/mm (203.2 dpi) 11.81 dots/mm (300 dpi)	Standard Option (not IPL)
Print Speed (variable)	100 to 200 mm/sec. (approx. 4 to 8 in./sec.) 100 to 150 mm/sec. (approx. 4 to 6 in./sec.)	8 dots/mm (203.2 dpi) 11.81 dots/mm (300 dpi)
Print Width (max)	104 mm (4.095 in.) = 832 dots 105.7 mm (4.161 in.) = 1248 dots	8 dots/mm (203.2 dpi) 11.81 dots/mm (300 dpi)
Print Length (max)	32767 dots = 409.5 cm (161.25 in.)[1]	
Media Width (min/max)	25 to 114.3 mm (1.00 to 4.5 in.)	
Media Roll Diameter (max)	213 mm (8.38 in.)	
Media Roll Core Diameter	38 to 40 mm (1.5 in.) or 76 mm (3 in.)	
Ribbon Width (min/max)	25 to 110 mm (1 to 4.33 in.)	
Ribbon Roll Diameter, Outer (max)	82 mm (3.2 in.)	450 m (1475 ft)[2]
Ribbor Roll Core Diameter, Inner	25.4 mm (1 in.)	
Print Directions	4	
Modes of Operation		
Tear Off (Straight-through)	Yes	
Cut Off	Option	With paper cutter
Peel Off (Self-strip)	Option	With liner takeup unit
Firmware (Fingerprint)		
Operating System	Intermec Fingerprint v8.10	Incl. Direct Protocol
Smooth Fonts	TrueDoc and TrueType fonts	
Built-in scaleable fonts (std)	15	Unicode fonts[3]
Built-in bar code symbologies (std)	45	
Startup Program (std)	Intermec Shell v8.0	
Firmware (IPL)		
Operating System	IPL v2.10	
Built-in scaleable fonts (std)	13 scaleable + 21 simulated bitmap	
Built-in bar code symbologies (std)	31	
Startup Program (std)	None	
Physical Measures		
Dimensions (W×L×H)	298×543×261 mm (11.7×21.4×10.3 in.)	
Weight (excluding media)	approx. 13.5 kg (30 pounds)	
Ambient Operating Temperature	+5°C to +40°C (+41°F to +104°F)	
Humidity	20 to 80% non-condensing	
Electronics		
Microprocessor	32 bit RISC	
On-board Flash SIMMs	2 sockets (for 4 or 8 MB each)	Std. 1 × 4MB
On-board SDRAM SIMM	1 socket (for 8 or 16 MB)	Std. 1 × 8MB
Power Supply		
AC Voltage	90 to 265 VAC, 45 to 65Hz	
PFC Regulation	IEC 61000-3-2	
Power Consumption	Standby 15W; Peak 300W	

Sensors		
Label Gap/Black Mark/Out of Media	Yes	Variable position
Printhead Lifted	Yes	
Ribbon End/Ribbon Low	Yes	IPL only ribbon end
Paper Low	Yes (not IPL)	
Controls		
Control Lamps	3	
Display	2 × 16 character LCD with background light	
Keyboard (Fingerprint)	22 keys membrane-switch type	
Keyboard (IPL)	7 keys membrane-switch type	
Print or Feed/Pause button	1	
Beeper	Yes	
Data Interfaces		
Serial	1×RS-232 + 1×USB	USB not supp. by IPL
Bar Code Wand	1	Not supported by IPL
Connection for Interface Boards	1 + 2	1 EasyLAN + 2 other
Finisher Interface	1	For cutter etc.
Memory Card Adapter	1	CompactFlash cards
Accessories and Options		
Special printheads	8 dots/mm: Thick media 11.81 dots/mm: Standard and Thick media	203.2 dpi 300 dpi (not IPL)
Paper Cutter	Option	For cut-off operation
Paper Cutter Tray	Option	For cut-off operation
Integral Self-strip Unit w. Liner Takeup	Option	For peel-off operation
Rotating Media Supply Hub	Option	Replaces supply post
3-inch Adapter	Option	For media supply hub
Media Roll Retainer	Option	For media supply hub
Internal Fan-fold Guide	Option	
Side Door with Keylock	Option	
Label Taken Sensor	Option	
Real Time Clock	Option (not IPL)	10+ years life
RS-232 Interface Cable	Option	
Parallel Interface Cable	Option	
IEEE 1284 Parallel Interface Board	Option	
Double Serial Interface Board	Option (not IPL)	
Serial/Industrial Interface Board	Option (not IPL)	
EasyLAN Ethernet Interface	Option	Model EasyLAN100i2
EasyLAN Wireless Interface	Option	Model Wireless100i2
External Alphanumeric Keyboard	Option (not IPL)	
CompactFlash Cards	Option	8MB to 1GB. Not CF+
Compact Flash Card Protection Plate	Option	

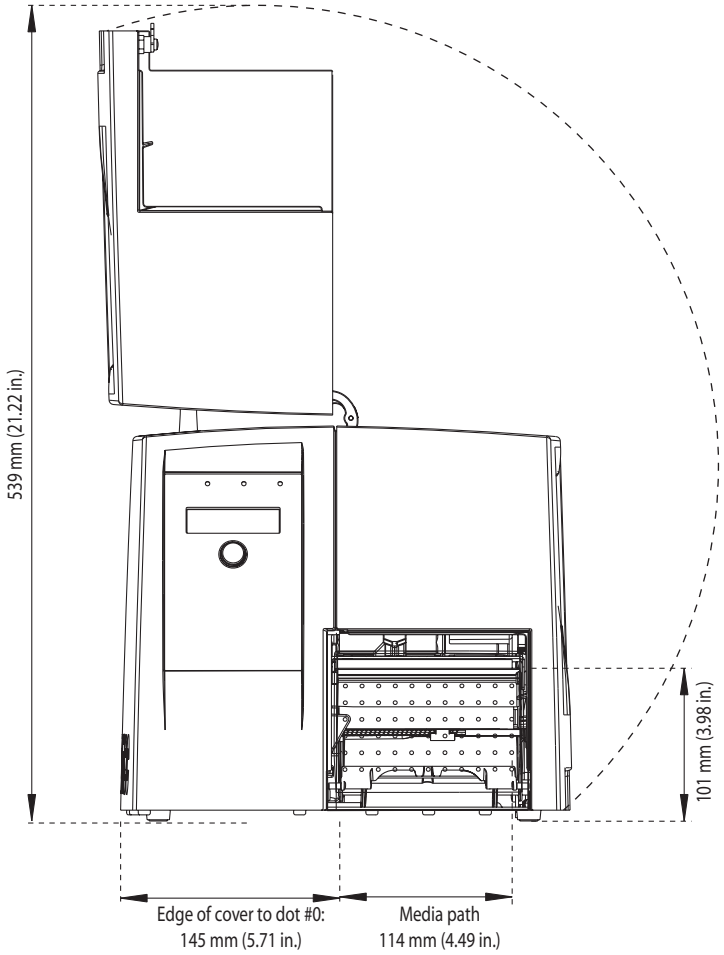
[1]/. The max. print length is also restricted by the amount of free SDRAM memory.

[2]/. Max. ribbon length depends on ribbon thickness.

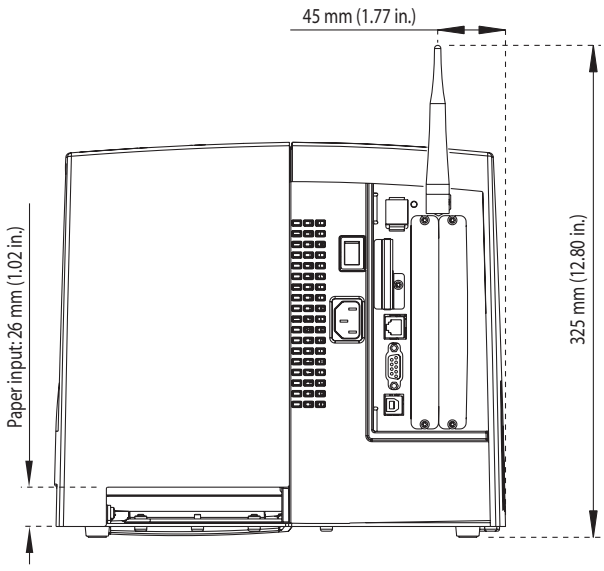
[3]/. Latin, Greek, and Cyrillic fonts according to Unicode standard are included.

1.3 Measures EasyCoder PM4i

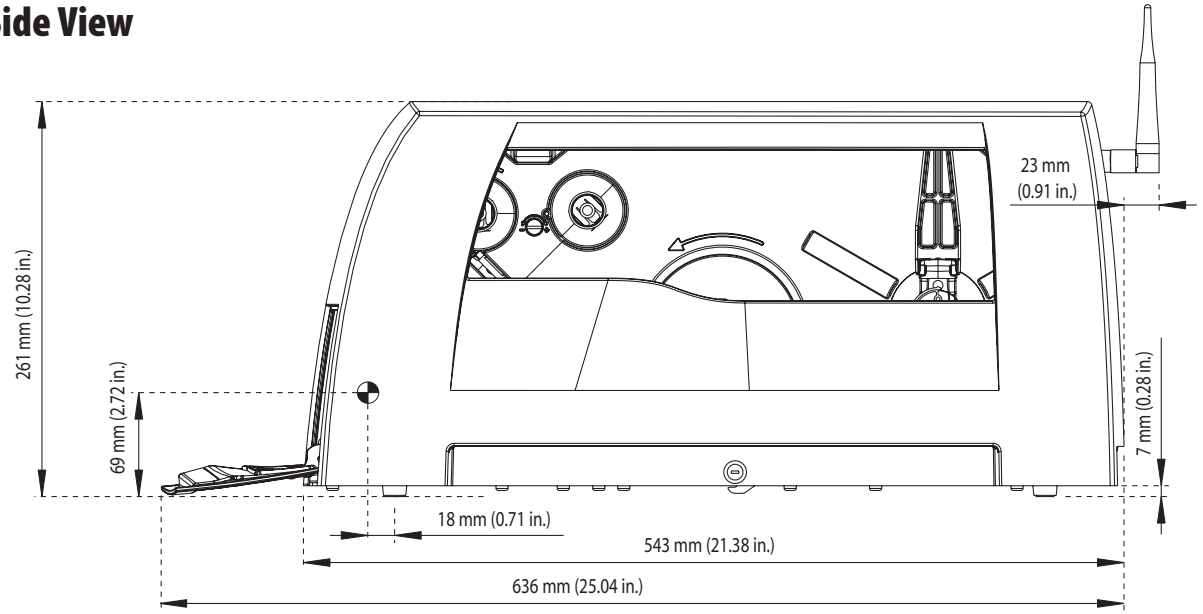
Front View



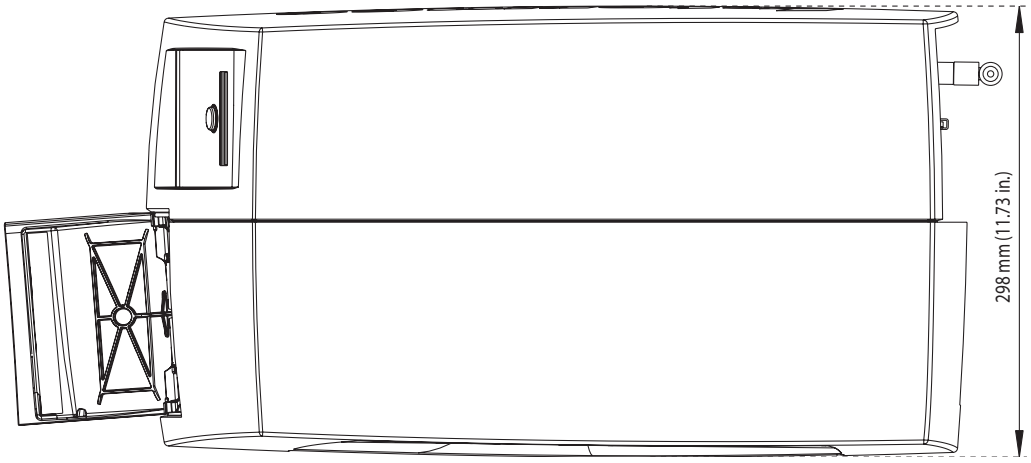
Rear View



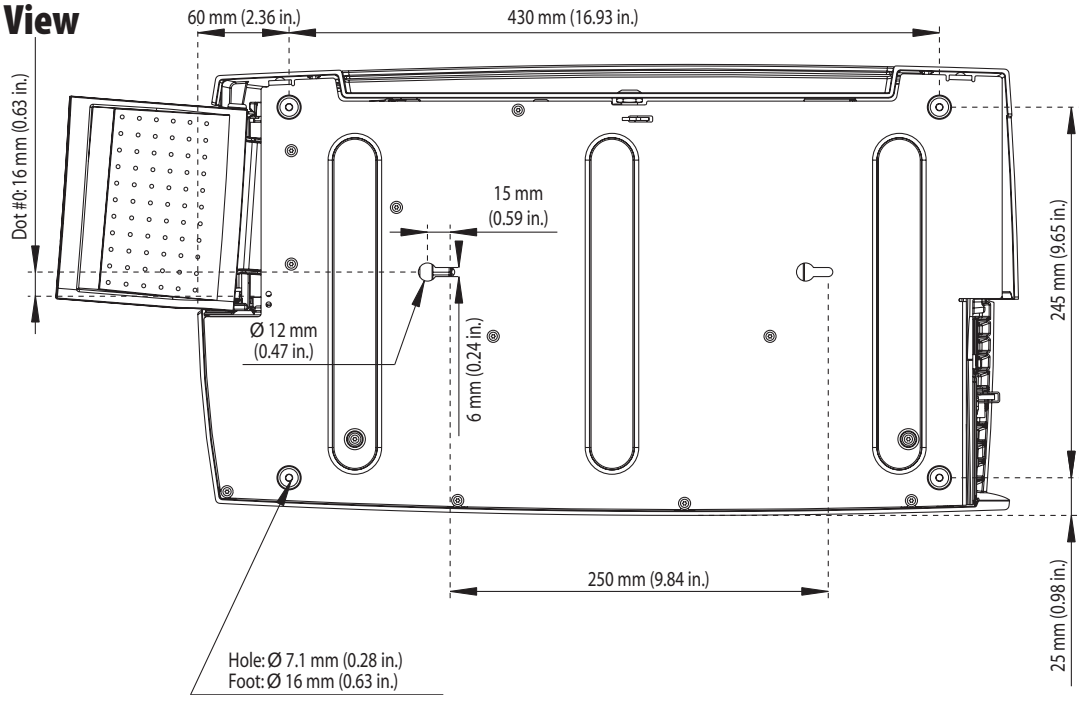
Side View



Top View

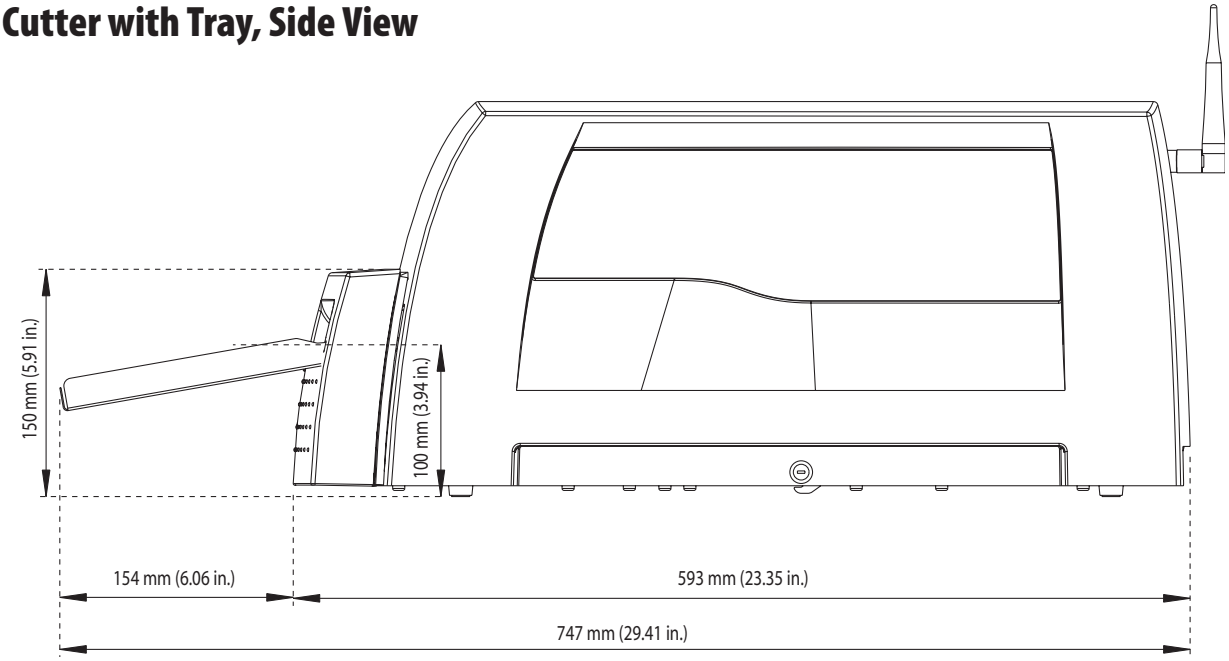


Bottom View

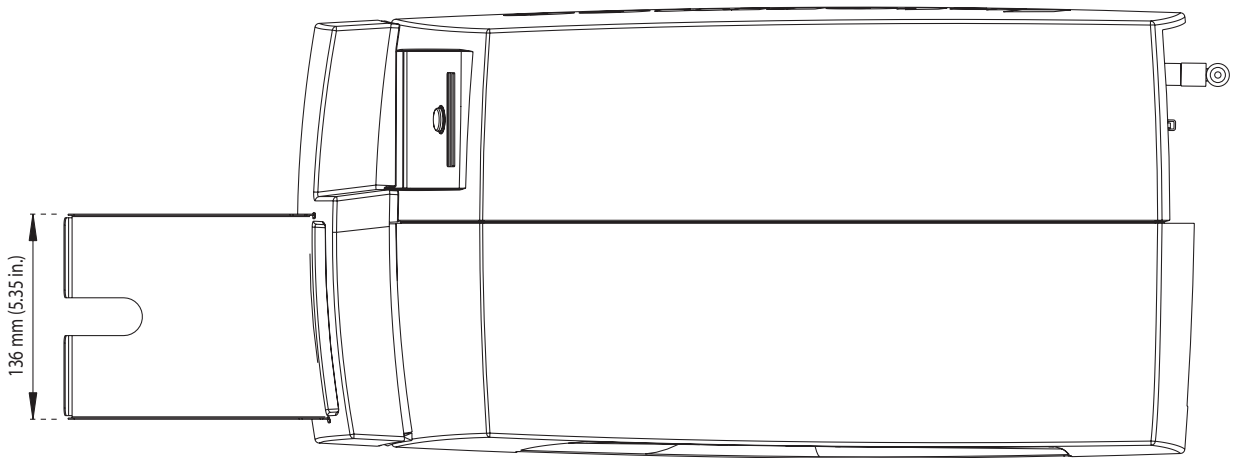


At least 60 mm (2.3 inches) of free space behind the printer is required for the connectors, and for inserting and removing a memory card.

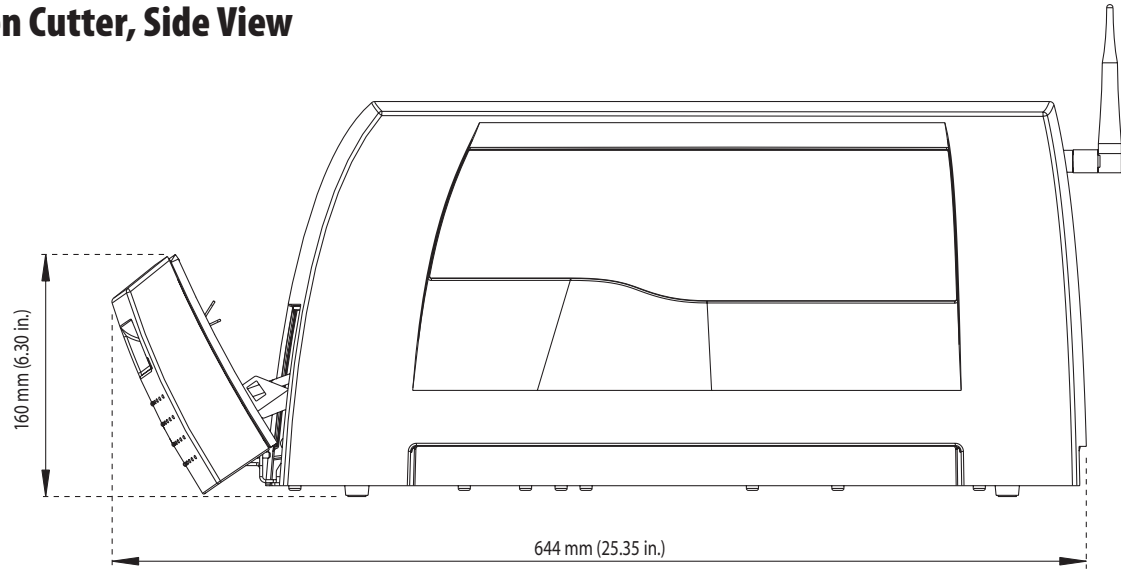
Cutter with Tray, Side View



Cutter with Tray, Top View



Open Cutter, Side View



2 Front and Keyboard

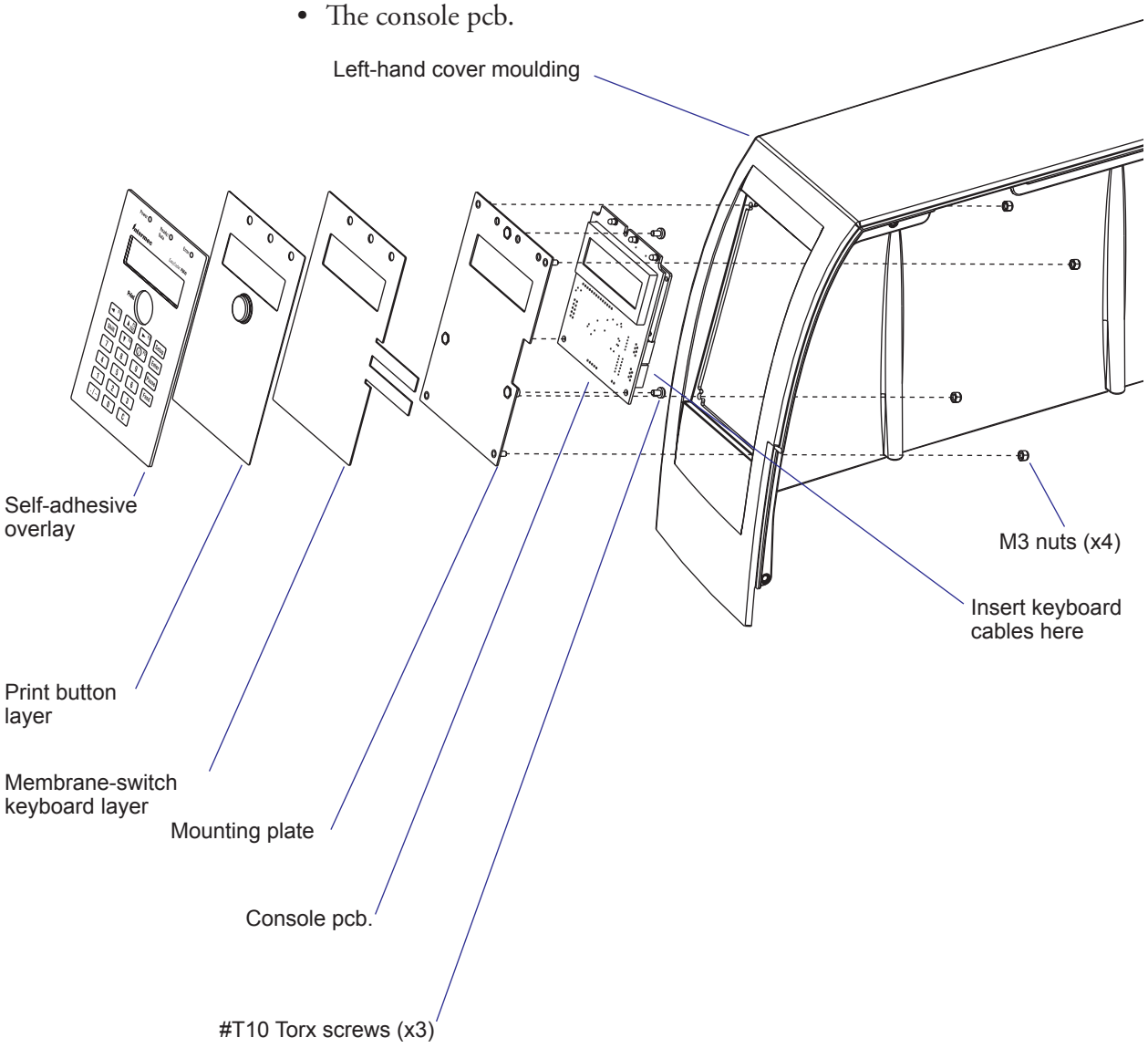
This chapter describes the keyboard and display fitted at the front of the EasyCoder PM4i.

2.1 Front

The front and left-hand moulding is made as a single integrated unit which covers the front of the printer and the electronics compartment. The entire moulding is illustrated in Chapter 3.

The front contains:

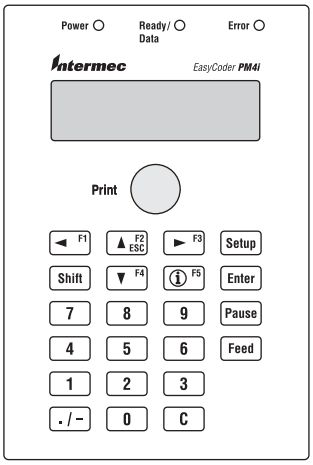
- The membrane-switch keyboard with overlay and print or feed/pause button.
- The console pcb.



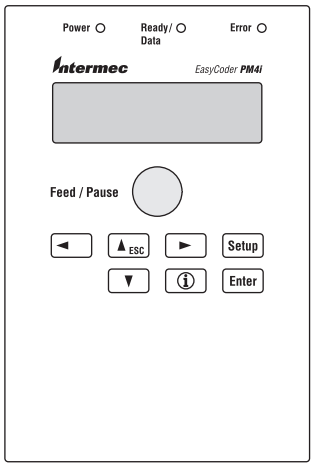
2.2 Keyboard

Keyboard Overlay

The keyboard overlay fitted on the print button layer using a non-permanent adhesive to allow easy replacement. Custom-made overlays could also be printed and used to replace the standard overlays for customized applications or in areas, where the English text is not acceptable. There are two standard overlays; one for Fingerprint and one for IPL.



Fingerprint overlay



IPL overlay

Print Button Layer

The print button layer is permanently glued to the the membrane-switch keyboard layer and contains a yellow print button dome, that activates a switch on the membrane keyboard layer. The print button dome protrudes through a hole in the keyboard overlay.

Membrane-switch Keyboard Layer

The keyboard is of membrane switch type and is permanently glued to the mounting plate. There are 23 switches including the print button switch. The keys have fixed functions in the immediate and setup modes, but can also be assigned various functions in Intermec Fingerprint programs. In IPL, the keys are not user-programmable.

Two flat cables connect the membrane-switch keyboard to P2 and P3 on the console pcb.

Mounting Plate

The mounting plate holds both the overlay/print button/membrane-switch keyboard assembly and the console pcb. It is fitted to the left-hand cover moulding using four M3 nuts accessible from the inside.

2.3 Console pcb.

The console pcb contains an LCD (Liquid Crystal Display) and three LED (Light Emitting Diode) control lamps. It also serves as a connection point between the keyboard and the I^2C bus on the CPU board. It is attached to the mounting plate using three #T10 Torx screws.

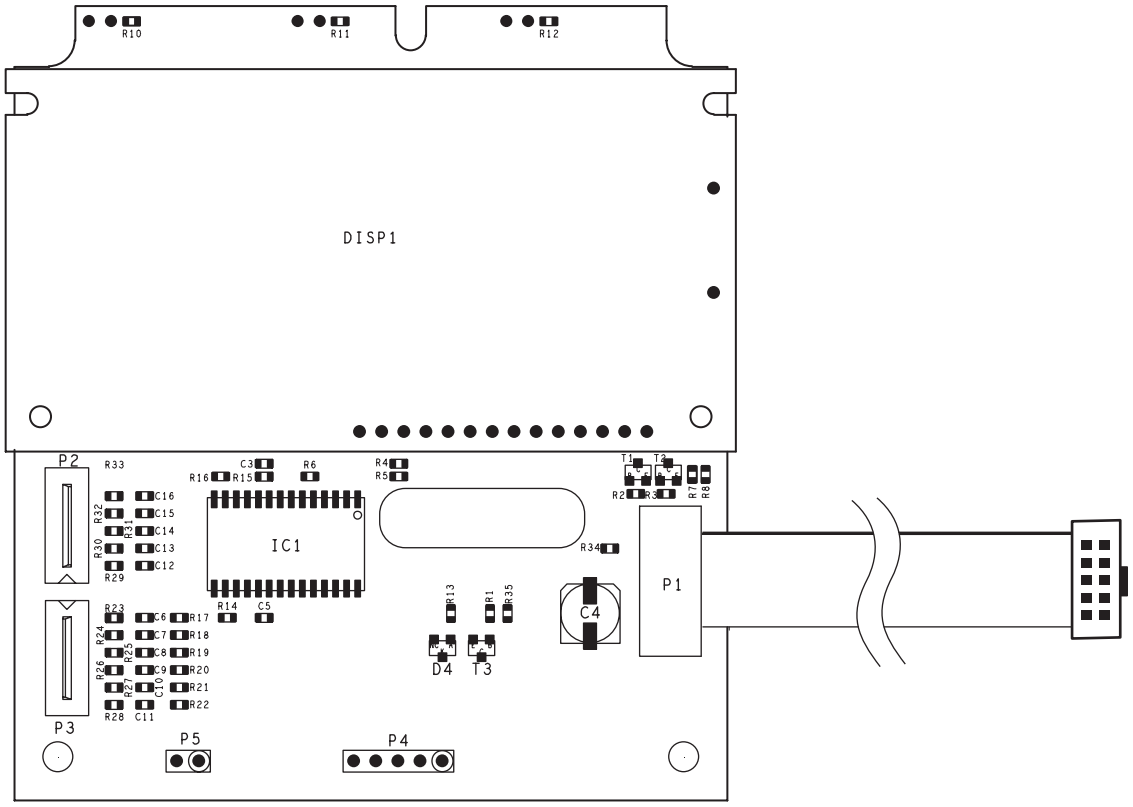
The display has 2 × 16 character with a 5 × 7 dots matrix and background light. 8 characters are programmable.

The left-hand LED control lamp (marked “Power”) shines green when the power is on. Power on is also indicated by the display’s background light.

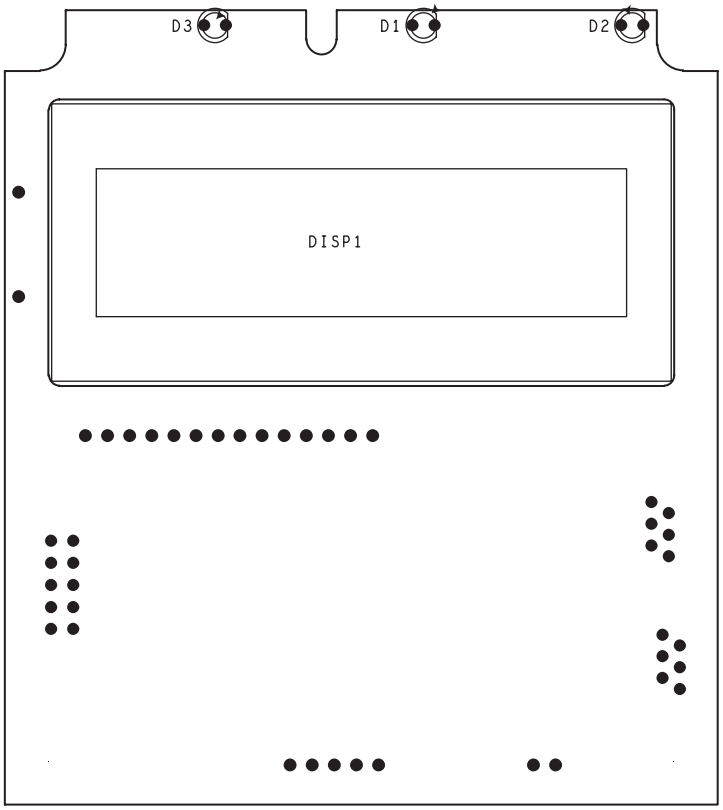
The other two LEDs are programmable using the Fingerprint instructions LED ON and LED OFF. There is no such facility in IPL. The center LED (marked “Ready”) is green and blinks when data are received. The right-hand LED (marked “Error”) is red.

The console pcb is connected to J50 at the front of the CPU board via a permanently fitted 10-p flat cable. This cable must be disconnected from the CPU board before the cover can be entirely removed.

1-971651-26 Console pcb.; Components

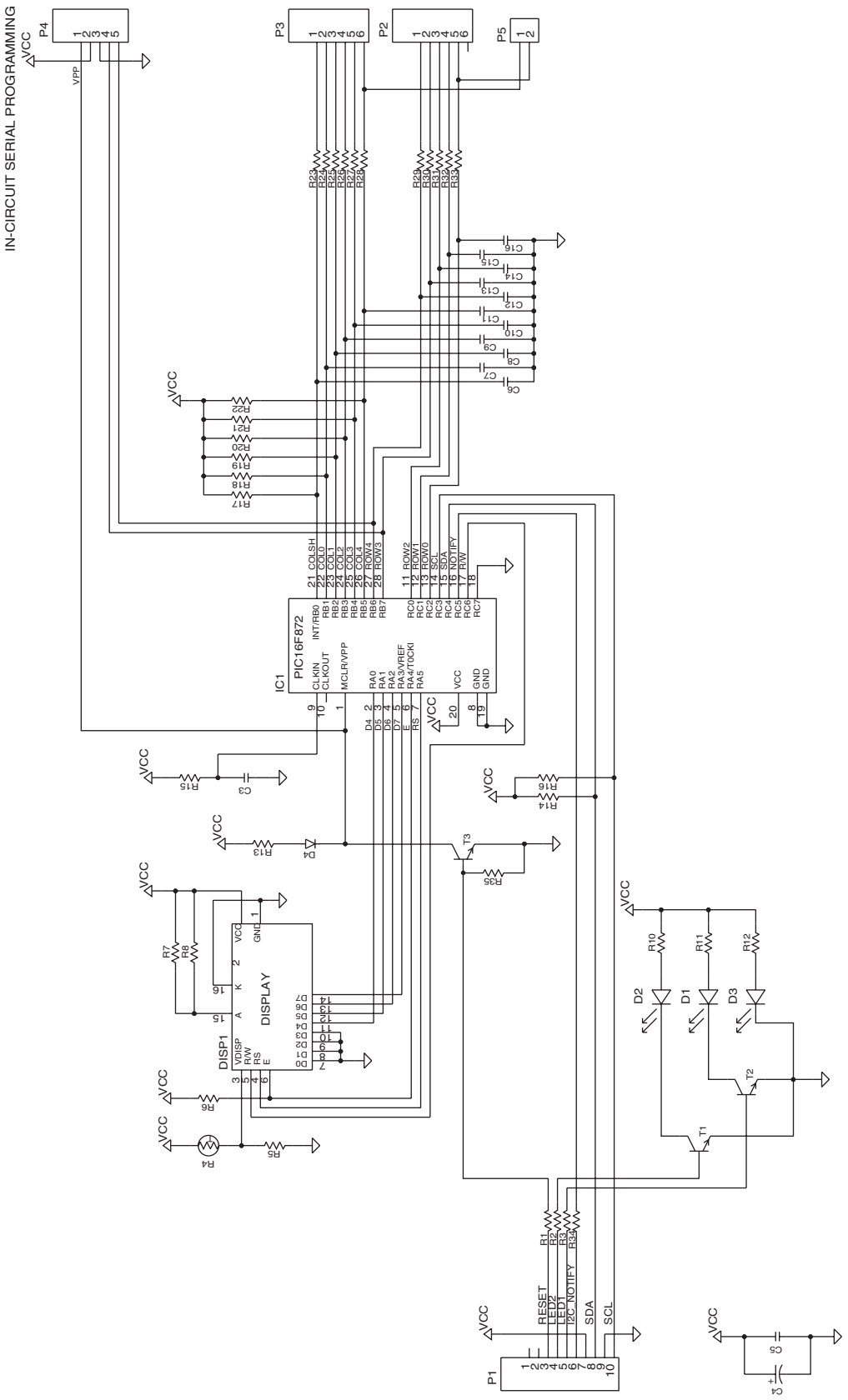


Component Side



Soldering Side

1-971651-26 Console pcb.; Schematics



3 Covers and Doors

This chapter describes the covers and doors used on the EasyCoder PM4i printers. It covers the following topics:

- The right-hand doors, that is the doors that cover the print mechanism and media compartment.
- The front and left-hand cover that contains the console and protects the electronics compartment.
- The front door, that protects the front of the print mechanism.

3.1 Right-Hand Door

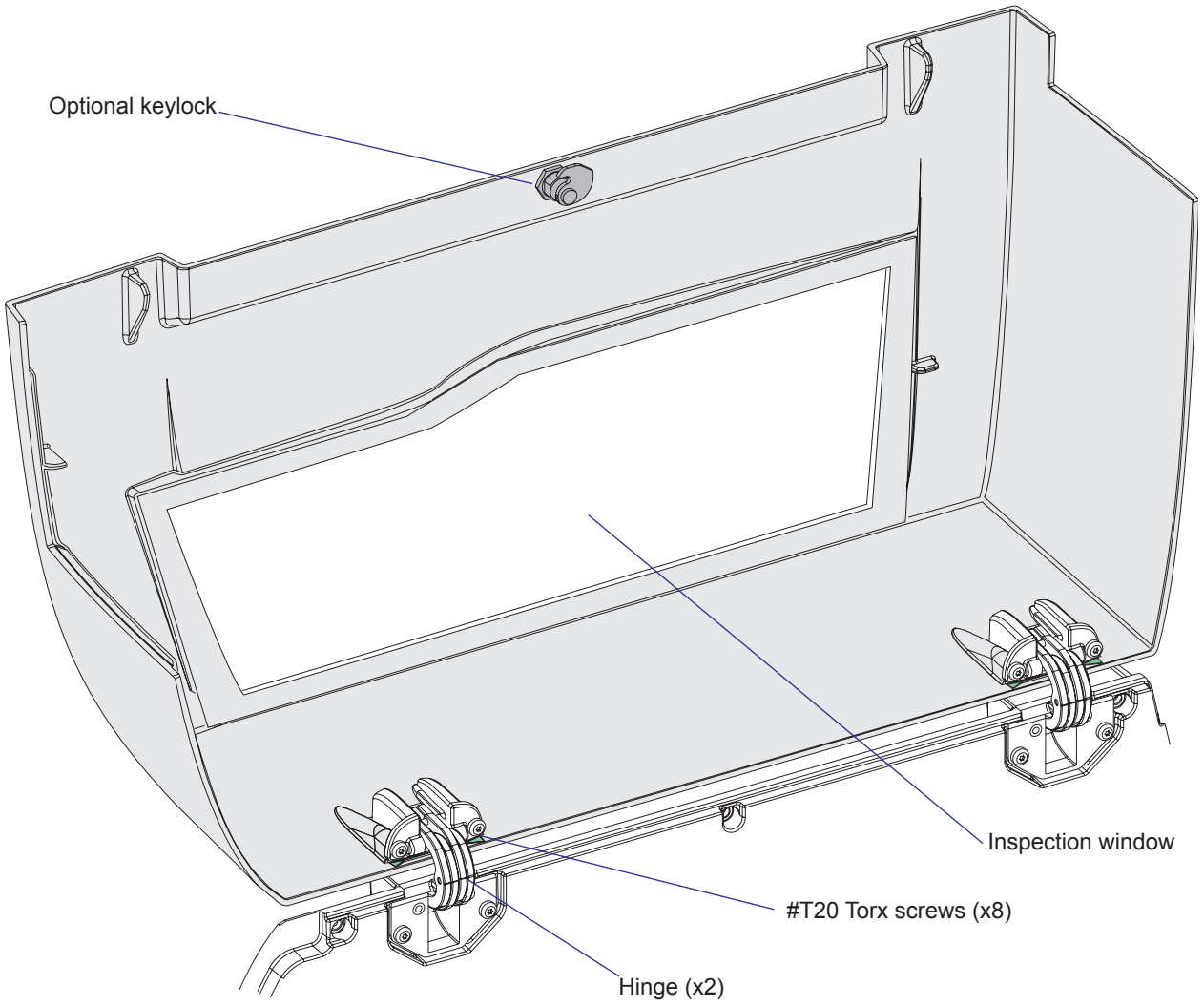
The EasyCoder PM4i comes as standard with a large door that covers the print mechanism and the ribbon and media supplies. It has an inspection window that allows the operator to check the remaining amount of ribbon and media without having to open the door. The door swings upwards using two hinges fitted between the center section and the door by means of four #T20 Torx screws each.

The rear part of the right-hand door has an inlet for external media supplies, such as fan-folded tickets and tags.

The standard door can be replaced by an optional door fitted with a keylock that engages the bottom plate. Thus, valueable media, such as travel or event tickets can be protected from theft. When replacing the right-hand door, remove the screws that hold the hinges to the door. This preserves the adjustment of the hinges.

Warning

The right-hand door is rather heavy. Make sure that the door is not accidentally closed while you have your fingers inside the media compartment, which may cause bodily harm.



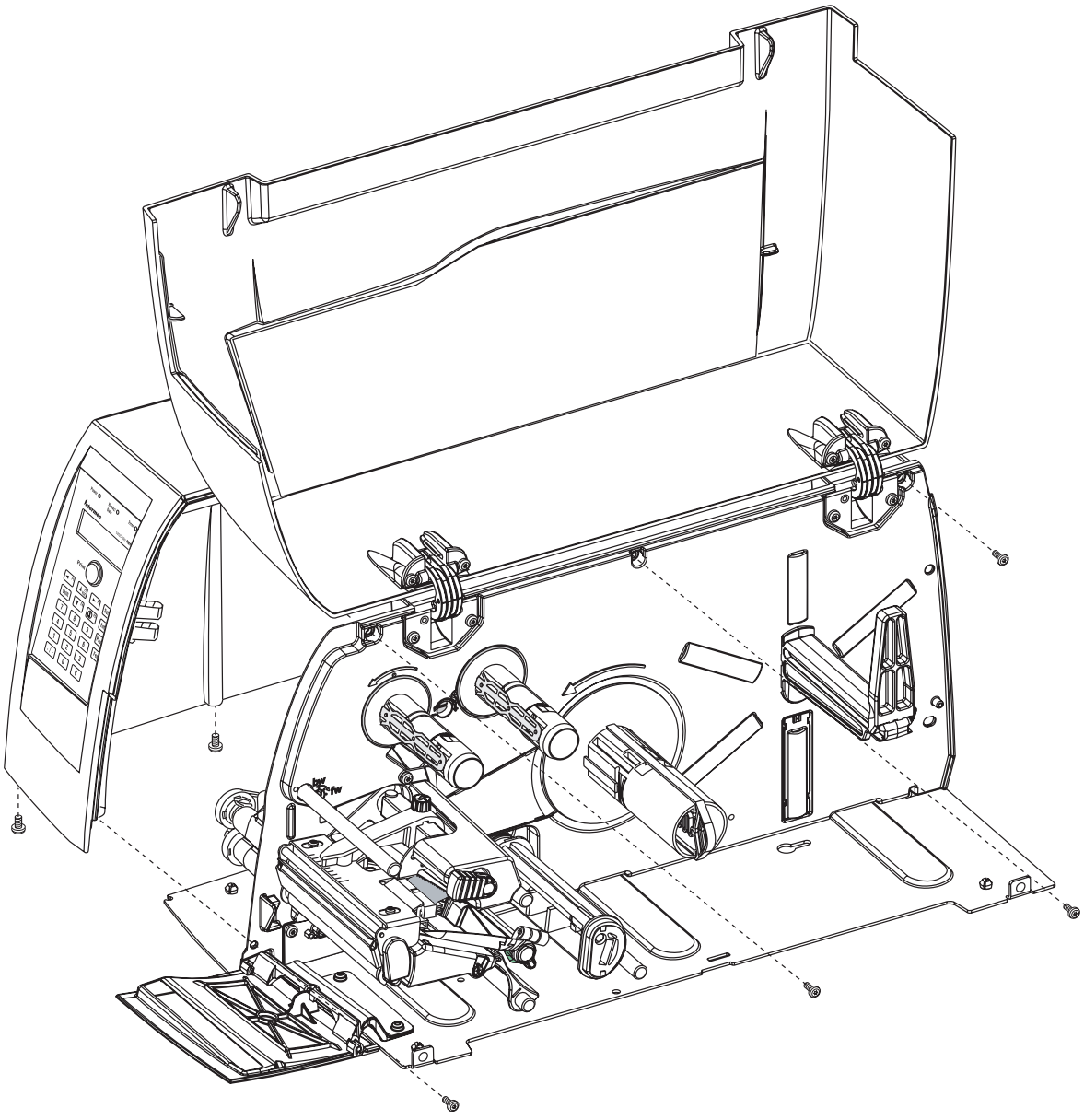
3.2 Front and Left-Hand Cover

The front/left-hand cover is fitted with a number of user interface devices, see Chapter 2.

Removing the front/left-hand cover gives access to:

- The electronics incl. CPU board, AC connection, power supply, and any optional interface pcb.
- The motor, belts, and pulleys of the media feed and the optional liner takeup unit and ribbon feed motor.

The left-hand cover plate is fitted to the center section using eight #T20 Torx screws; four are accessible from the media compartment and the other four from the underside of the bottom plate.



To remove the cover, proceed this way:

- Disconnect the power cord.

Warning

The electronic compartment contains wires and components with dangerous voltage (up to 380V). Make sure that the printer is switched off and the power cord is disconnected before the left-hand cover is removed.

- Turn the printer over so it rest on its left-hand cover. Use a soft cloth or similar to avoid scratches.
- Open the right-hand door.
- Using a #T20 Torx screwdriver, remove the four screws that holds the cover along the lower left edge of the bottom plate and the four screws that hold the cover to the center section (see illustration).
- Put the printer back on its feet and remove the cover while disconnecting the console cable from the CPU board.
- Put the cover aside taking care to avoid scratches.

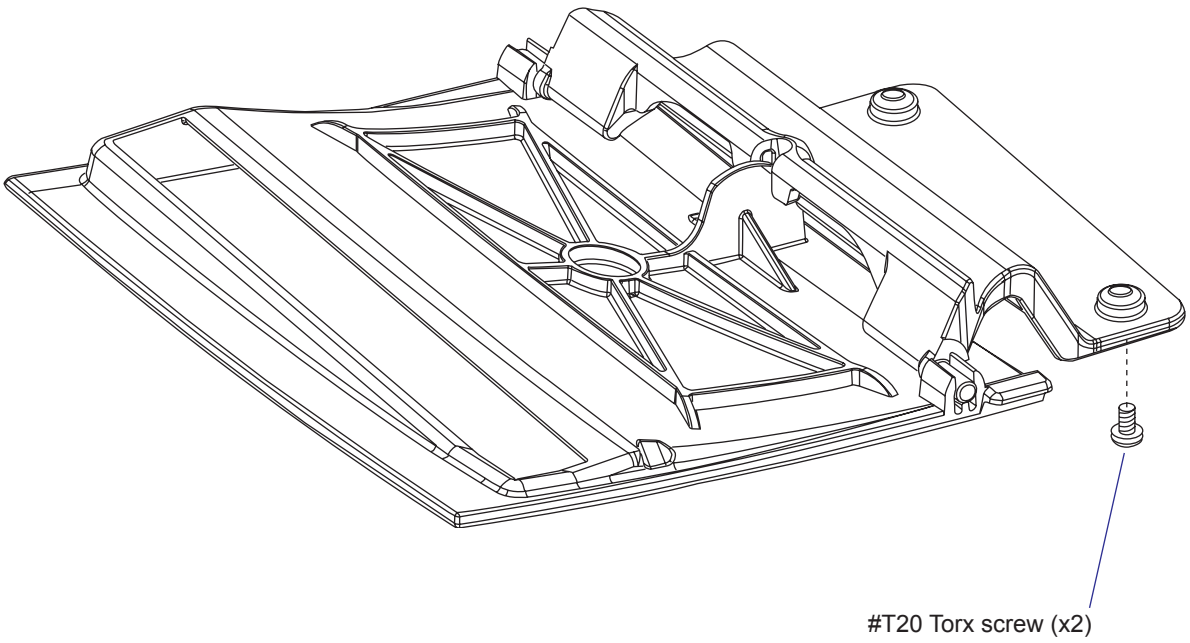
Install the cover like this:

- Put back the left-hand cover in reverse order. Route the cable from the console unit above the ribbon motor to prevent it from being entagled in the headlift mechanism. Connect the cable to connector J50 at the upper right corner of the CPU board. Make sure that the lower edge of the cover is pressed inwards as far as it goes before tightening the screws.

3.3 Front Door

The front door protects the print mechanism and is affixed with two #T20 Torx screws to the upper side of the bottom plate. It cannot be used together with a cutter.

The door can be tilted down to facilitate media and ribbon load.



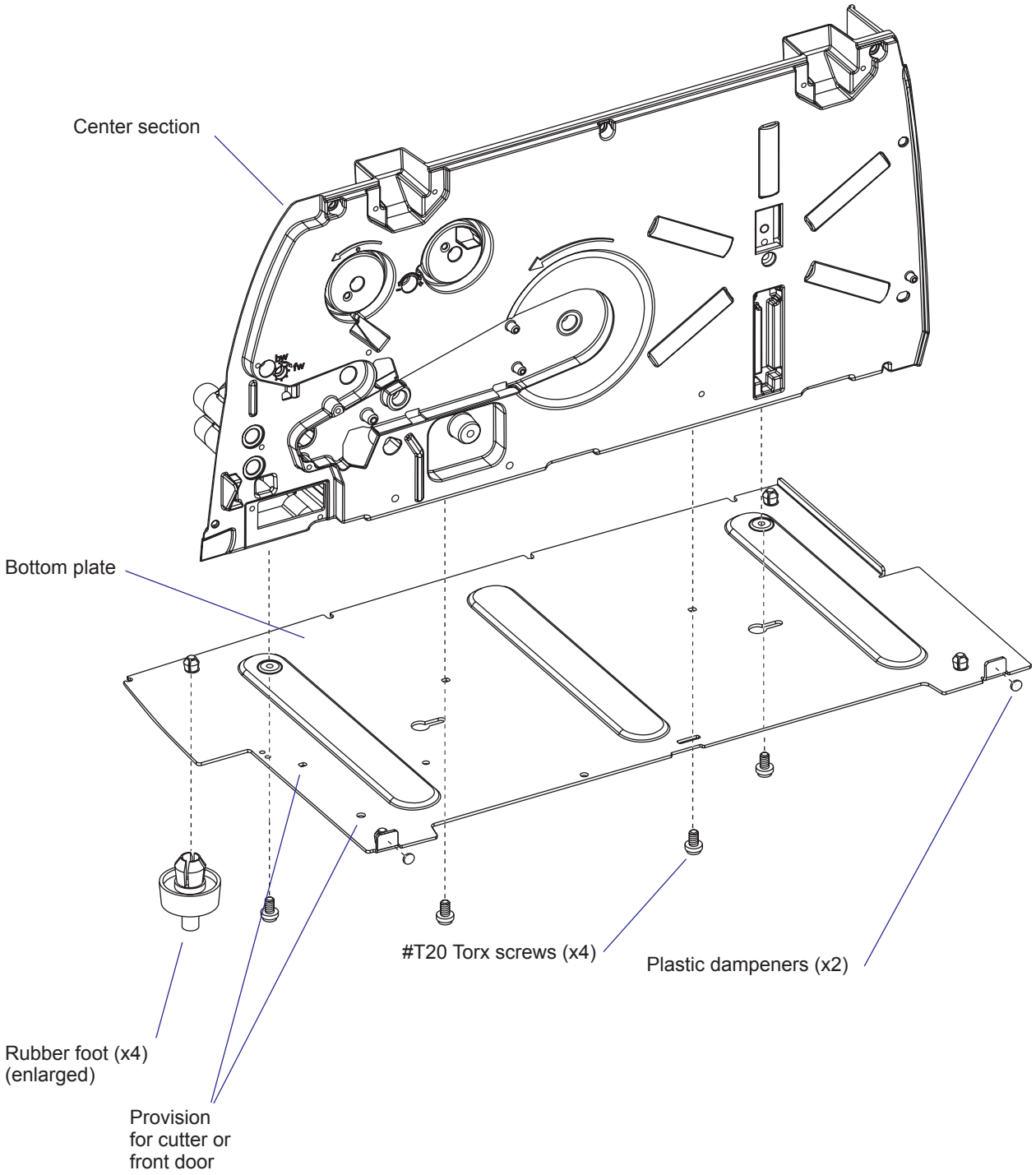
4 Chassis

This chapter describes the center section, bottom plate, and rubber feet, of the EasyCoder PM4i printers.

4.1 Description

The printer's chassis consists of two main parts:

- The center section
- The bottom plate



4.2 Center Section

The center section is where most parts are fitted, such as the print mechanism, the transfer ribbon mechanism, the liner takeup unit, and the media supply. The center section is fitted to the bottom plate by a total of four #T20 Torx screws.

In the electronics compartment, the CPU board and power supply unit are fitted to the center section. The power supply unit is also attached to the bottom plate using two screws.

The electronic compartment contains wires and components with dangerous voltage. Make sure that the printer is switched off and the power cord is disconnected before the bottom plate is removed.

4.3 Bottom Plate

The bottom plate is fitted with four easily replaceable rubber feet. These feet could be removed and the holes be used to bolt the printer to a frame, table or similar. The holes have a diameter of 7.1 mm (0.28 inches). To reduce noise, fit rubber dampeners between the table and the printer if you bolt it in place.

When fitting a replacement foot, insert it through the bottom plate and firmly press the pin so the rivet expands on the upper side of the plate.

The two keyholes should not be used to bolt the printer to a frame, or the bottom plate may be bent. These holes are only used for fixtures during manufacturing.

There are two self-adhesive plastic dampeners attached to two tabs along the right edge of the bottom plate to reduce noice when the right-hand door is closed.

5 Media Supply

This chapter explains the media supply roll post and the two types of adjustable media edge guides. It also covers the rotating media supply hub with the 3-inch adapter, the media roll retainer, and the paper low sensor. Finally, it describes how an external media supply can be used in a standard EasyCoder PM4i printer and in a printer fitted with an internal fan-fold guide.

5.1 Internal Supply

Being of a modular design for maximum flexibility, the EasyCoder PM4i can use either a media supply roll post or a rotating media supply hub inside the media compartmen. Alternatively, an external media supply (for example a box of fan-folded tickets) behind the printer can be used, preferably in connection with an internal fan-fold guide.

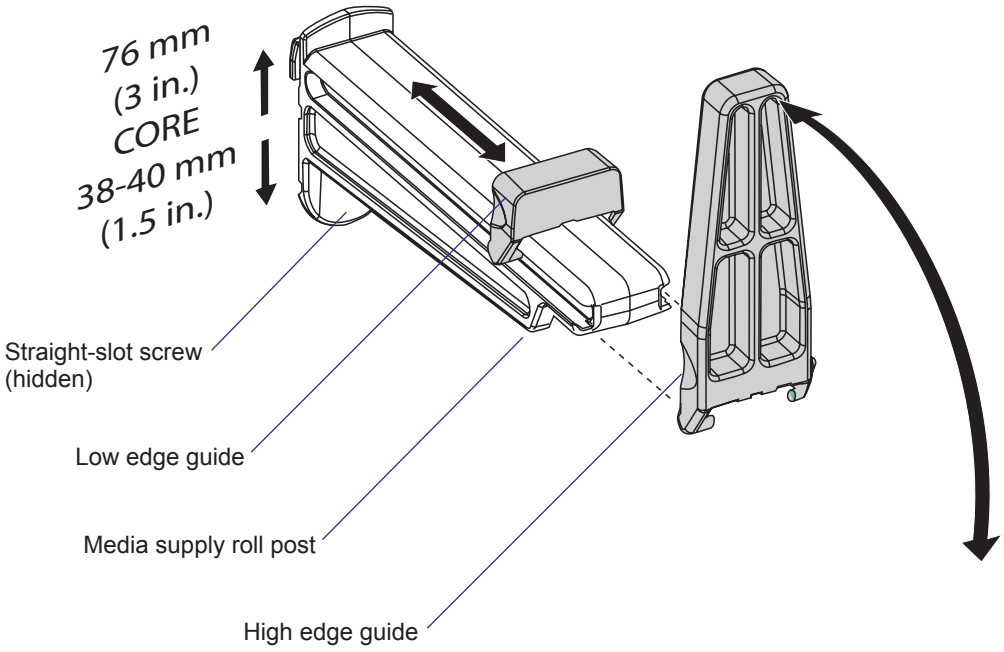
Media Supply Roll Post

The media supply roll post fits both 38 to 40 mm (1.5 inch) and 76 mm (3 inches) media roll cores because the post can be moved vertically in a slot in the center section. The bottom position is used for small cores and the top position is used for large cores. The post is locked by a straight-slot screw.

There are two edge guides delivered with the EasyCoder PM4i; a low guide is fitted as standard and a high guide is packed with the other accessories. The operator can switch between the two guides at will. Just pull out the guide as far as it goes and twist it carefully, so it disengages the post.

Both guides can be tilted down to a horizontal attitudes when they are in their extreme outer positions. In case of the low edge guide, this is not necessary when 76 mm (3 in.) media cores are used.

After the media roll has been loaded, it is important that the edge guide is adjusted so the roll becomes flush with the center section.

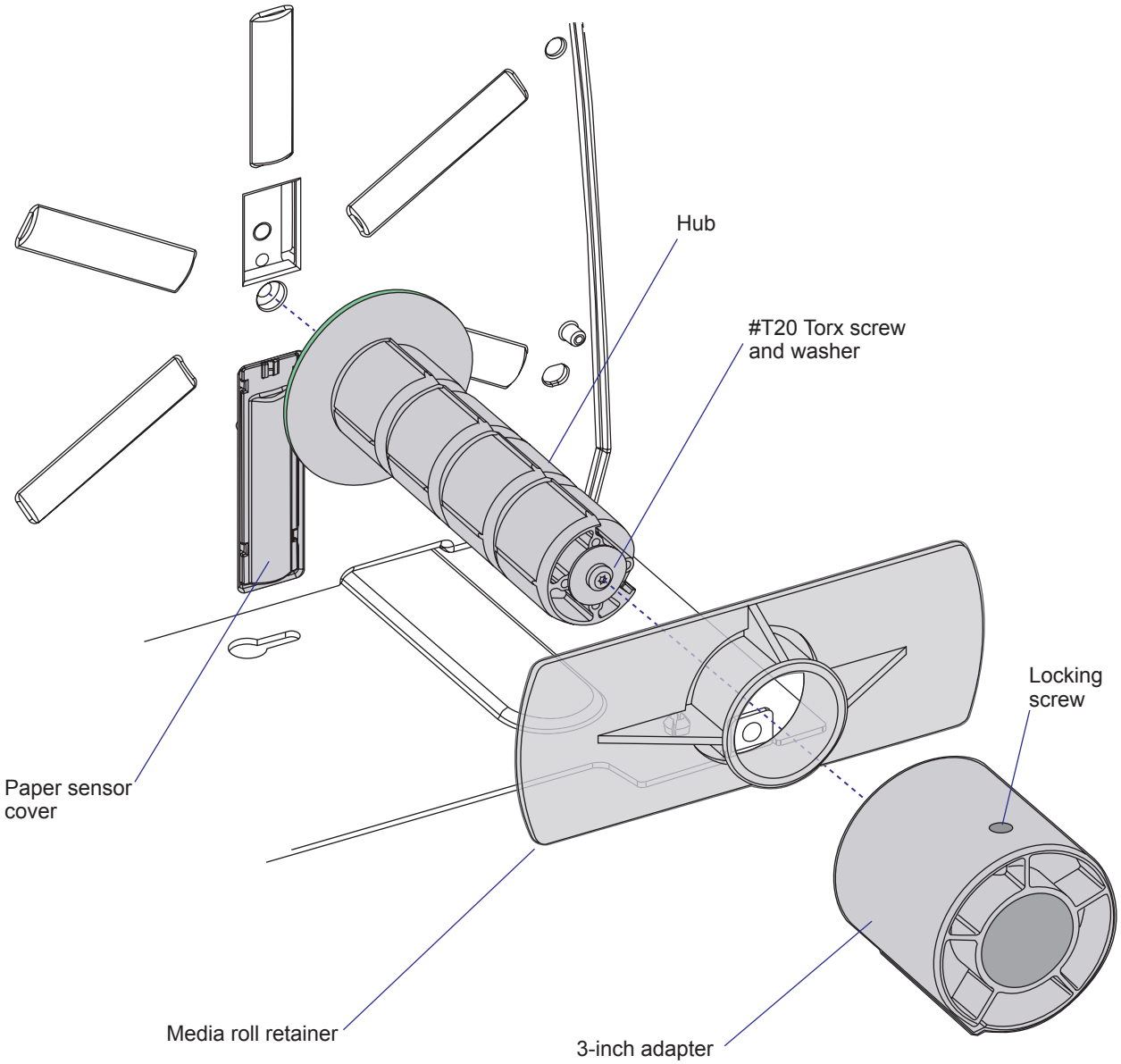


Media Supply Hub

The rotating media supply hub consists of four bobbin modules on threaded shaft that is fitted to the center section. To remove the bobbins from the shaft, remove the #T20 Torx screw and washer and pull out the bobbin modules. When fitting or removing the shaft, protect it using a piece of tape or similar to avoid dents and marks.

The hub is design to fit media roll cores with an internal diameter of 38 to 40 mm (1.5 inches). 76 mm (3 inches) cores can also be accepted by fitting an optional 3-inch adapter on the hub. Secure the adapter on the hub using the locking screw. Make sure that the screw hits an even plastic surface on the hub (not a metal leaf-spring).

Some media rolls have a tendency to become unwound in an outward spiraling direction. Thus, Intermec offer an optional media roll retainer, that can be pressed onto the media supply hub after the media has been loaded and keeps the media in place even if the printer is tilted sideways. The retainer restricts the media width to max. 100 mm (3.94 inches).



Paper Sensor (Fingerprint only)

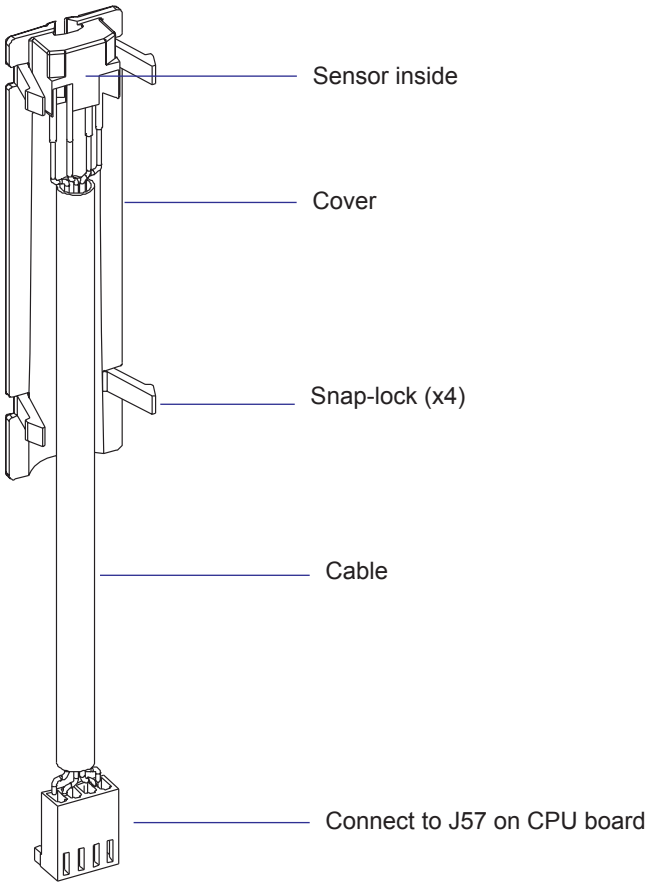
The paper sensor can only be used in connection with a media supply hub and allows the firmware to detect when the diameter of the remaining media becomes less than a value set in the Setup Mode (Media/Paper/Low Diameter). This affects SYSVAR(46) which switches from 0 to 1. Thus, a Fingerprint program can be created, that reads SYSVAR(46) and uses it to issue for example audible alarms or error messages to notify the operator of a pending out-of-media condition.

The sensor detects a pattern of dark and light sectors at the back of the disk at the inner end of the media supply hub. By comparing the rotation speed of the hub and the print speed, the firmware can calculate the diameter of media roll.

The paper sensor assy is snap-locked to the center section below the media supply hub and is connected to J57 on the CPU board (see Chapter 13.3). The cover is always fitted regardless of it contains a sensor or not.

Adjustment

- Enter the Setup Mode and follow the path:
  Media/Paper/Paper Sensor
- In the Paper Sensor menu, press <Enter> to perform a Testfeed.
- The printer will feed out a few labels and feed the ribbon accordingly.
- While the media feed mechanism is operating, the paper sensor is auto-adjusted and the resulting adjustment value is shown in the lower line of the menu (read-only).

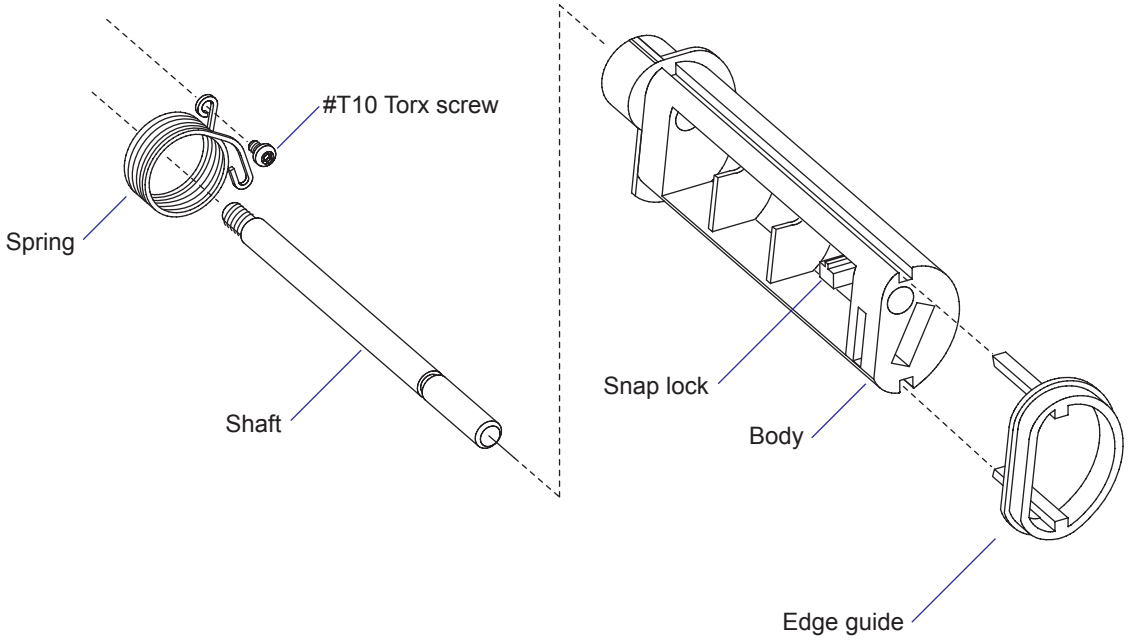


5.2 Label Slack Absorber

The EasyCoder PM4i is provided with a spring-loaded slack absorber between the media supply and the print mechanism. The slack absorber compensates for jerks in the media when the printing starts and stops in order to make the media feed as smooth as possible. The label slack absorber body is snap-locked to a threaded shaft attached to the center section. One end of the spring is attached to the center section using a #T10 Torx screw and the other to the body of the absorber.

A green plastic edge guide is fitted to the body of the label slack absorber and can be adjusted for various media widths.

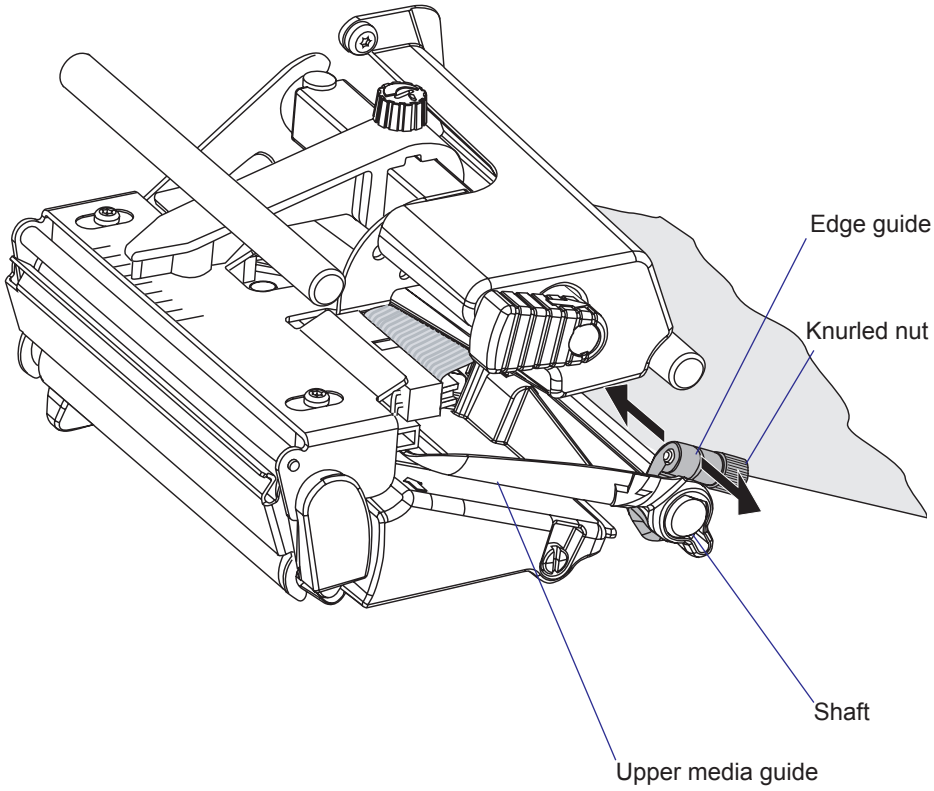
To remove the slack absorber, disengage the snap-lock inside the body and pull it away from the shaft. Protect the shaft from scratches using for example insulating tape and remove it using a pair of pliers. Assemble in reverse order.



5.3 Print Mechanism Edge Guide

To the rear of the print mechanism is an adjustable edge guide. The guide is fitted onto a shaft affixed to the center section. The same shaft also holds the upper part of the media guide. The edge guide can be moved along the shaft to fit various media widths and be locked using a knurled nut.

Before removing the edge guide, first remove the upper media guide as described in Chapter 7.5.



5.4 Internal Fan-Fold Guide

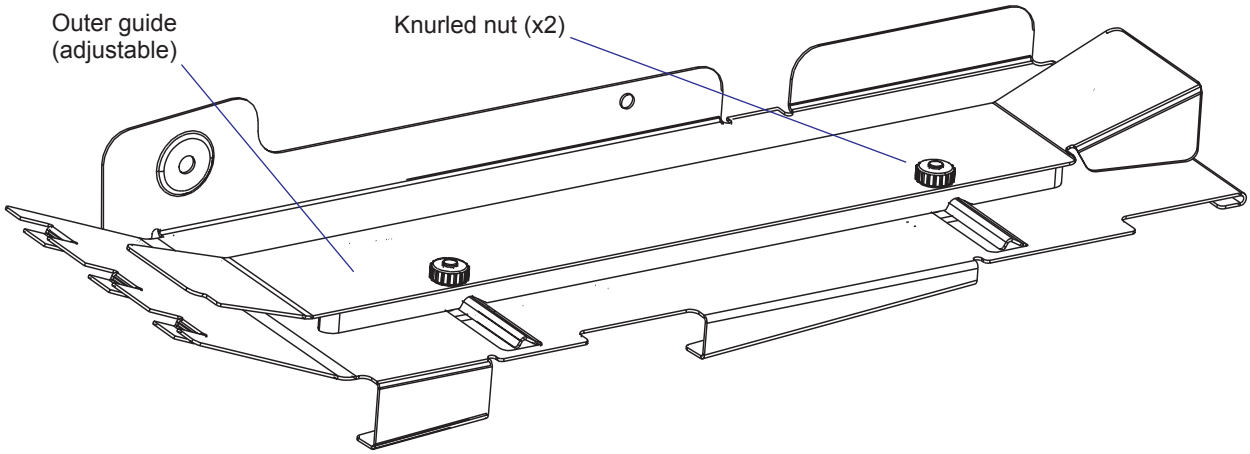
For temporal use of an external supply, the media can be routed through the slot in the rear part of the right-hand door and use the existing edge guides. However, for permanent use of an external supply of, for example, fan-folded tickets or tags, it is recommended to use the optional internal fan-fold guide.

The internal fan-fold guide is a factory-installed option. The fan-fold guide is fitted to the bottom plate and center section. The S-shaped guide behind the print mechanism, the label slack absorber, the internal liner rewind unit, and the media supply roll post or hub are omitted.

The fan-fold guide can be adjusted from full media width down to 40 mm (1.57 in.) by untightening two knurled nuts and moving the outer guide inwards or outwards accoiding to the media width. Then tighten the nuts.

The fan-fold guide cannot be used in connection with peel-off (self-strip) operation.

As the media will be not be fully protected by the printer cover, the user should take care to protect the exposed media supply from dust, dirt, etc. Direct thermal media should also be protected from heat, direct sunlight, moisture, oil, platicizers, fat, etc.



6 Transfer Ribbon Mechanism

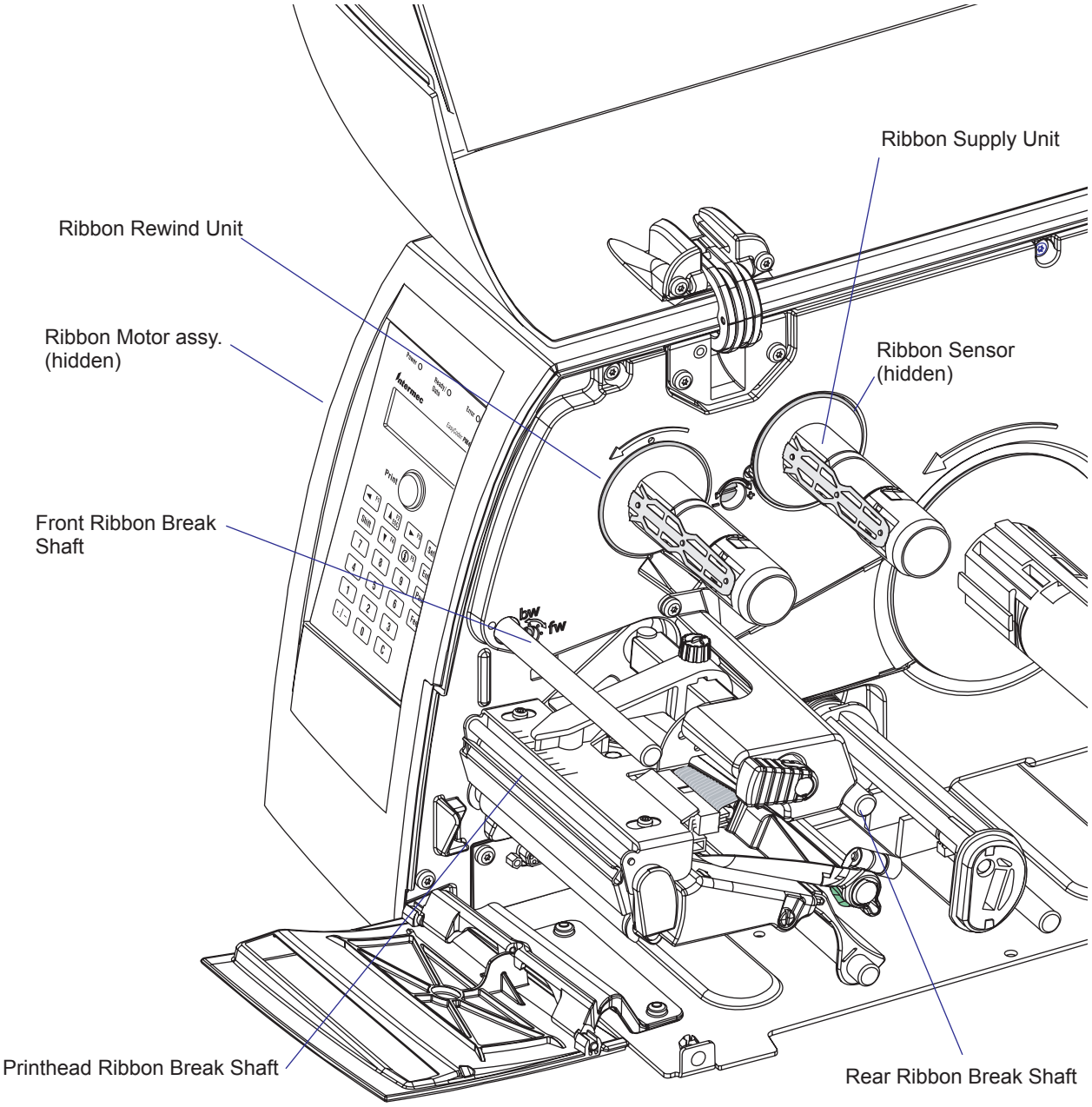
This chapter describes the mechanism that drives the thermal transfer ribbon in the EasyCoder PM4i printer. It covers the following topics:

- Description
- Ribbon supply unit
- Ribbon rewind unit
- Ribbon sensor
- Ribbon motor
- Front ribbon break shaft
- Printhead ribbon break shaft

6.1 Description

The thermal transfer ribbon mechanism is standard in EasyCoder PM4i. The mechanism consists of seven main parts:

- Ribbon supply unit (see Chapter 6.2)
- Ribbon rewind unit (see Chapter 6.3)
- Ribbon sensor (see Chapter 6.4)
- Ribbon motor assy. with gearbox (see Chapter 6.5)
- Adjustable front ribbon break shaft (see Chapter 6.6)
- Rear ribbon break shaft intergrated with the print mechanism
- Printhead ribbon break shaft (see Chapter 6.7)



6.2 Ribbon Supply Unit

Description

The ribbon supply unit accommodates the supply of thermal transfer ribbon. For troublefree printing, use ribbons recommended by Intermec.

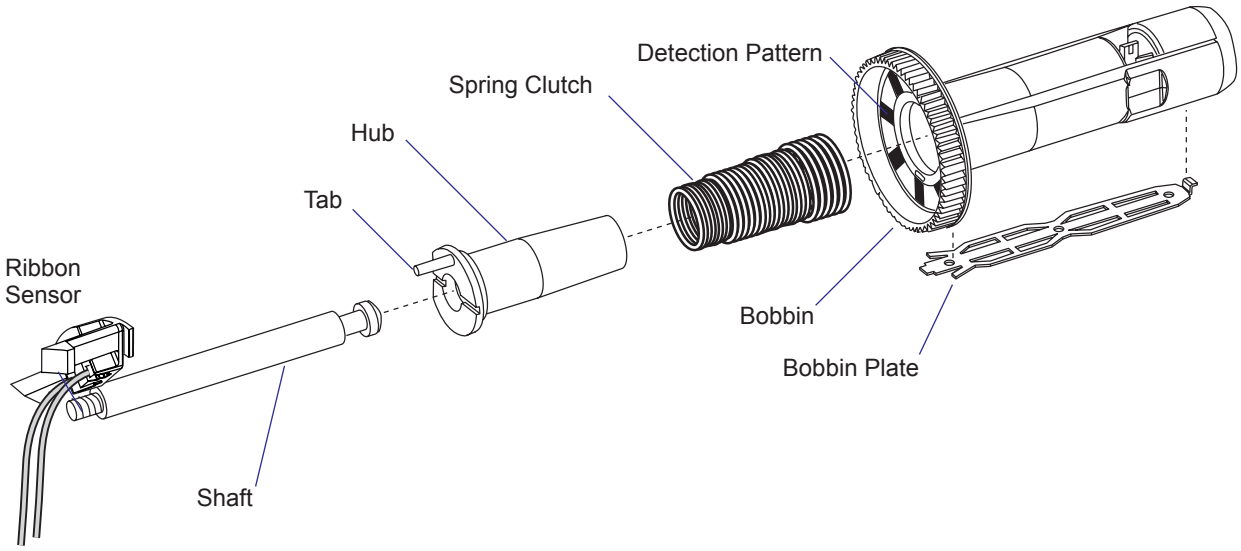
Ribbon Specifications

Width:	25 to 110 mm (1 to 4.33 in.)
Roll diameter (outer), max.:	82 mm (3.2 in.)
Roll core diameter (inner):	25.4 mm (1.00 in.)
Ribbon length, max.:	approx. 450 m (1,475 ft)

The unit is designed to keep the ribbon tight all the time in order to avoid wrinkling and creases, which would ruin the printout. It consists of a shaft, screwed into the center section, on which a bobbin is snap-locked. Inside the bobbin is a hub with a tab that engages a hole in the center section and a spring clutch. The bobbin is fitted with a plate that holds the cardboard core of the ribbon roll.

Inside the inner end of the bobbin is a pattern of reflecting and non-reflecting sectors by means of which the ribbon sensor can detect the rotation of the bobbin.

When the bobbin is rotated, the spring clutch is unwound and tries to pull the ribbon back onto the roll. As the pulling force increases, the clutch starts to slip and the ribbon can be unwound while still being kept tight. The bobbin can rotate in both directions. Thus, ribbons wound with the ink-coated side facing either inwards or outwards can be used.



Replacement

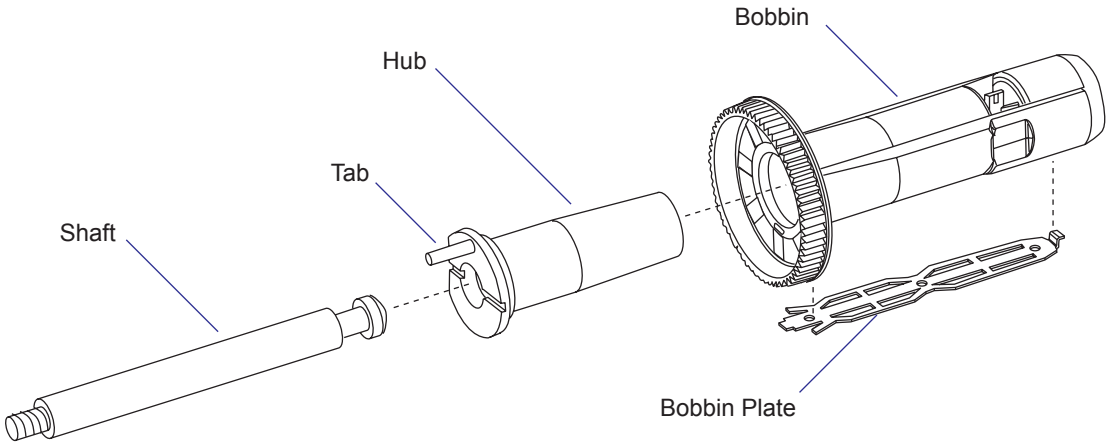
- Pry the two legs of the snap-lock in the bobbin apart using a pair of flat-tipped screwdrivers while pulling out the bobbin with the spring clutch and hub. Avoid removing the hub and spring clutch from the bobbin.
- If the shaft needs to be removed, use a piece of isolating tape to protect the shaft from being scratched by the tool.
- Reassemble in reverse order.

6.3 Ribbon Rewind Unit

Description

For logistic reasons, the ribbon rewind unit consists of the same parts as the ribbon supply unit (see Chapter 6.2) with the exception that there is no spring clutch.

The ribbon rewind bobbin winds up the used ribbon on its cardboard core after printing. It is driven via a gearbox by the ribbon motor. A gear wheel in the gearbox engages the cogs along the rim of the inner part of the bobbin. The bobbin rotates counterclockwise to wind up the ribbon during printing or clockwise to allow the ribbon to follow the media when it is pulled back.



Replacement

- Pry the two legs of the snap-lock in the bobbin apart using a pair of flat-tipped screwdrivers. At the same time, pull out the bobbin.
- Remove the hub from the shaft, if necessary.
- If the shaft needs to be removed, use a piece of isolating tape to protect the shaft from being scratched by the tool.
- Reassemble in reverse order. Take care so the cogs along the rim of the bobbin engage the gear wheel in the gearbox properly.

6.4 Ribbon Sensor

Description

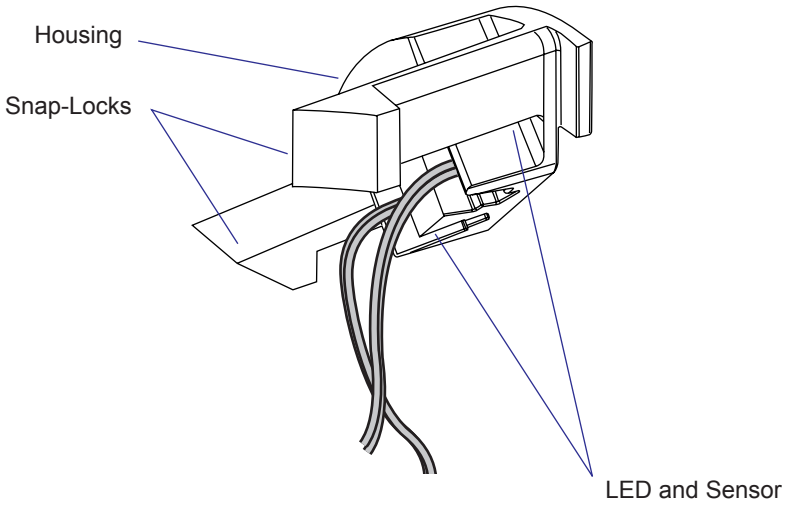
The ribbon sensor is snap-locked to the center section from the media compartment side and is completely enclosed by the ribbon supply unit (see Chapter 6.2). The sensor consists of a plastic housing with a LED and a photoelectric sensor.

The light from the LED is alternately reflected or absorbed by black and silver-colored sectors on a label fitted at the inner end of the ribbon supply bobbin. The signals from the sensor allow the firmware to detect the speed with which the bobbin rotates and compare it with the speed of the media feed.

If no bobbin rotation is detected during media feed, the Fingerprint firmware assumes an error condition (error 1027 *"Out of transfer ribbon"*) provided the printer is set for thermal transfer printing. In IPL, the error message "*Ribbon out"* is displayed.

When the printer is set for direct thermal printing, the ribbon motor is switched off and the takeup will not work. If a ribbon is nevertheless loaded, it will be pulled out in front of the printer by the advancing media without any warning.

The ribbon sensor is connected to J56 on the CPU board (see Chapter 13.3).



Replacement

- Open the media compartment door.
- Remove the cover over the electronics compartment as described in Chapter 10.2, taking all precautions against electric shock.
- Remove any transfer ribbon from the ribbon supply unit.
- Remove the ribbon supply bobbin with hub and spring clutch as described in Chapter 6.2.
- Disconnect the sensor's cable from J56 on the CPU board.
- From inside the electronics compartment, compress the snap-locks and pry out the sensor into the media compartment.
- Install a replacement sensor unit in reverse order.

Adjustment (Fingerprint)

Low diameter

In the Setup Mode, it is possible to specify the diameter (in millimeters) of the ribbon supply roll, where a ribbon low condition should be detected. By default, this parameter (Media/Paper Type/Transfer/Low Diameter, see Appendix A) is set to 0, which disables the function. To enable it, enter the desired value.

By reading SYSVAR(26) in a Fingerprint application program, the status of the ribbon low sensor can be polled. SYSVAR(26) returns 0 if the diameter of the ribbon supply roll is greater and 1 if it is less than the value entered in the Setup Mode.

Note that a full forward rotation of the supply bobbin must have been completed. If not, 0 will be returned.

Note: When the ribbon low function is enabled, error condition 1083 *"Ribbon low"* is reported every tenth time SYSVAR(26) = 1 is detected in connection with a PRINTFEED.

Sensitivity

- Enter the Setup Mode and follow the path:
  Media/Paper Type/Transfer/Ribbon Sensor
- In the Ribbon Sensor menu, press <Enter> to perform a Testfeed.
- The printer will feed out a few labels and feed the ribbon accordingly.
- While the ribbon mechanism is operating, the ribbon sensor is autoadjusted and the resulting adjustment value is shown in the lower line of the menu (read-only).

Adjustment (IPL)

There is no facility for adjusting neither the low diameter or nor the sensitivity of the ribbon sensor in IPL.

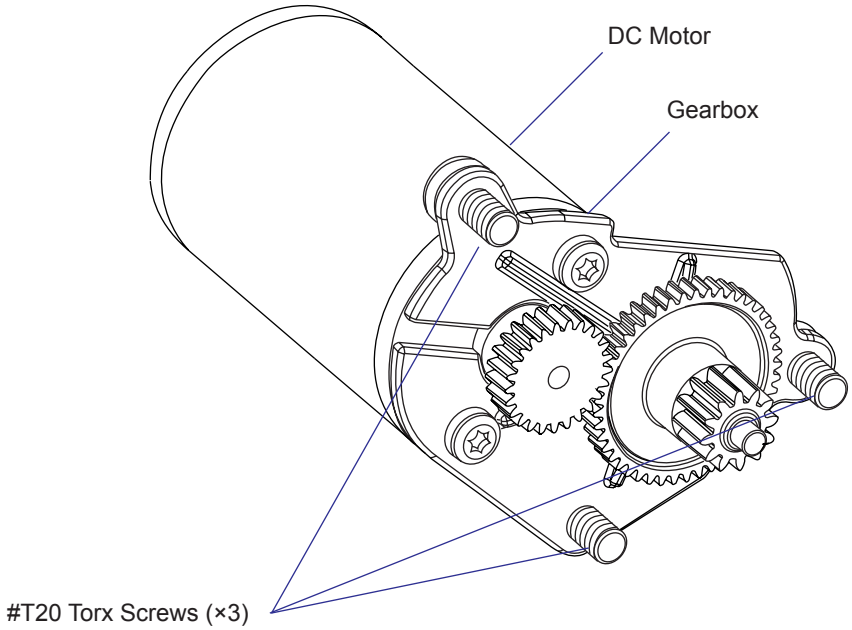
6.5 Ribbon Motor

Description

The ribbon motor assy consists of a 24 VDC motor with a gearbox. The gearbox engages the cogs along the rim of the ribbon rewind bobbin and rotates it in either direction according to the polarity of the power.

The power comes to the ribbon motor via a cable connected to P6 on the Power Supply Unit (see Chapter 12.3).

The ribbon motor assembly is a complete unit and should not be taken apart. It is fitted to the electronics compartment side of the center section using three #T20 Torx screws.



6.6 Front Ribbon Break Shaft

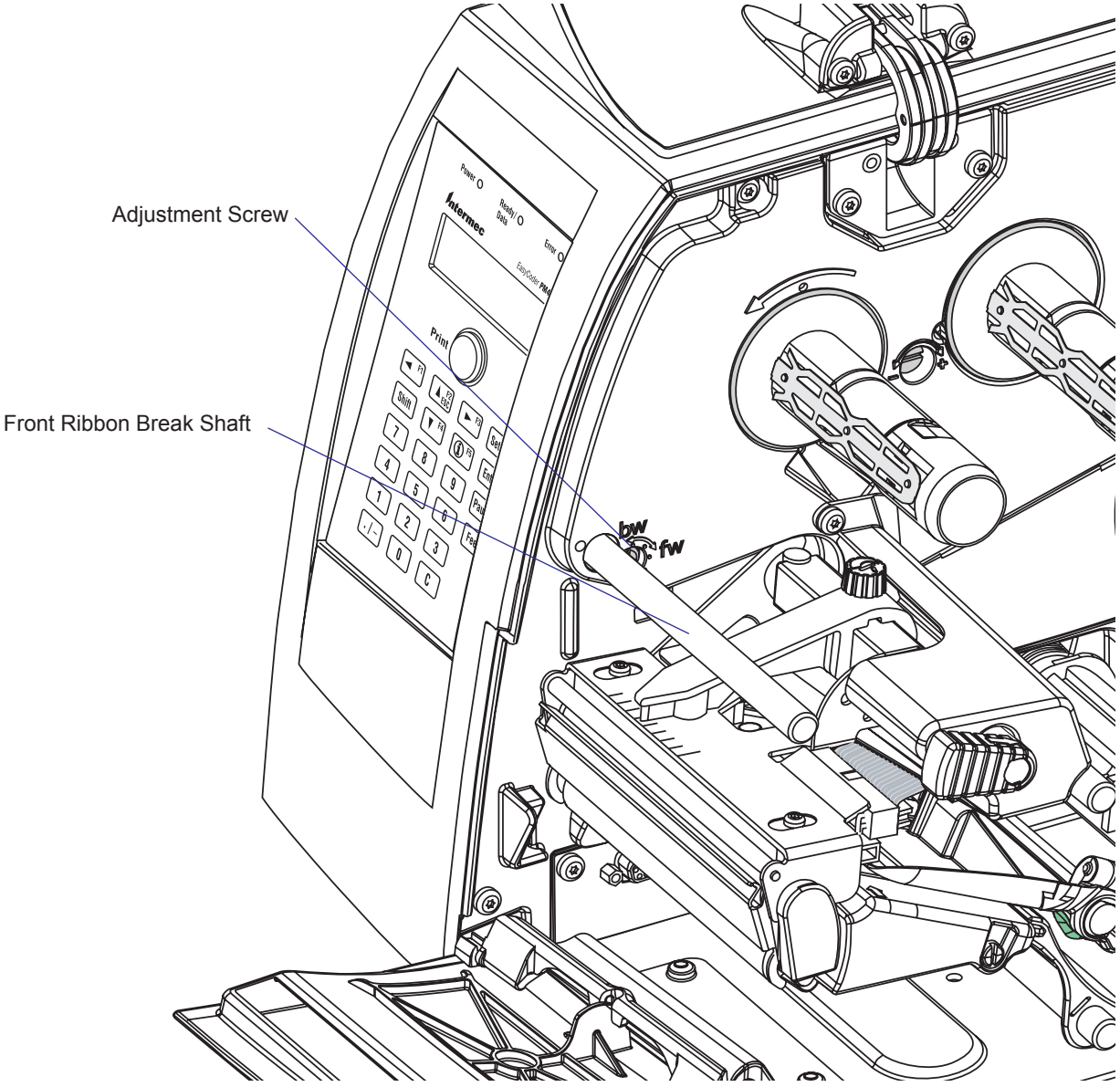
Description

The front ribbon break shaft serves two purposes: to keep the ribbon away from the print mechanism and to compensate for any lack of parallelity in the other parts of the ribbon mechanism. The shaft is screwed into a plate inside the center section. The shaft and the plate can be tilted using a straight-slot screw from the media compartment (also see last illustration in Chapter 7.1).

- If the ribbon tends to slide outwards, turn the screw carefully clockwise (fw) to move the outer end of the break shaft forward.
- If the ribbon tends to slide inwards, turn the screw carefully counter-clockwise (bw) to move the outer end of the break shaft backward.

Caution

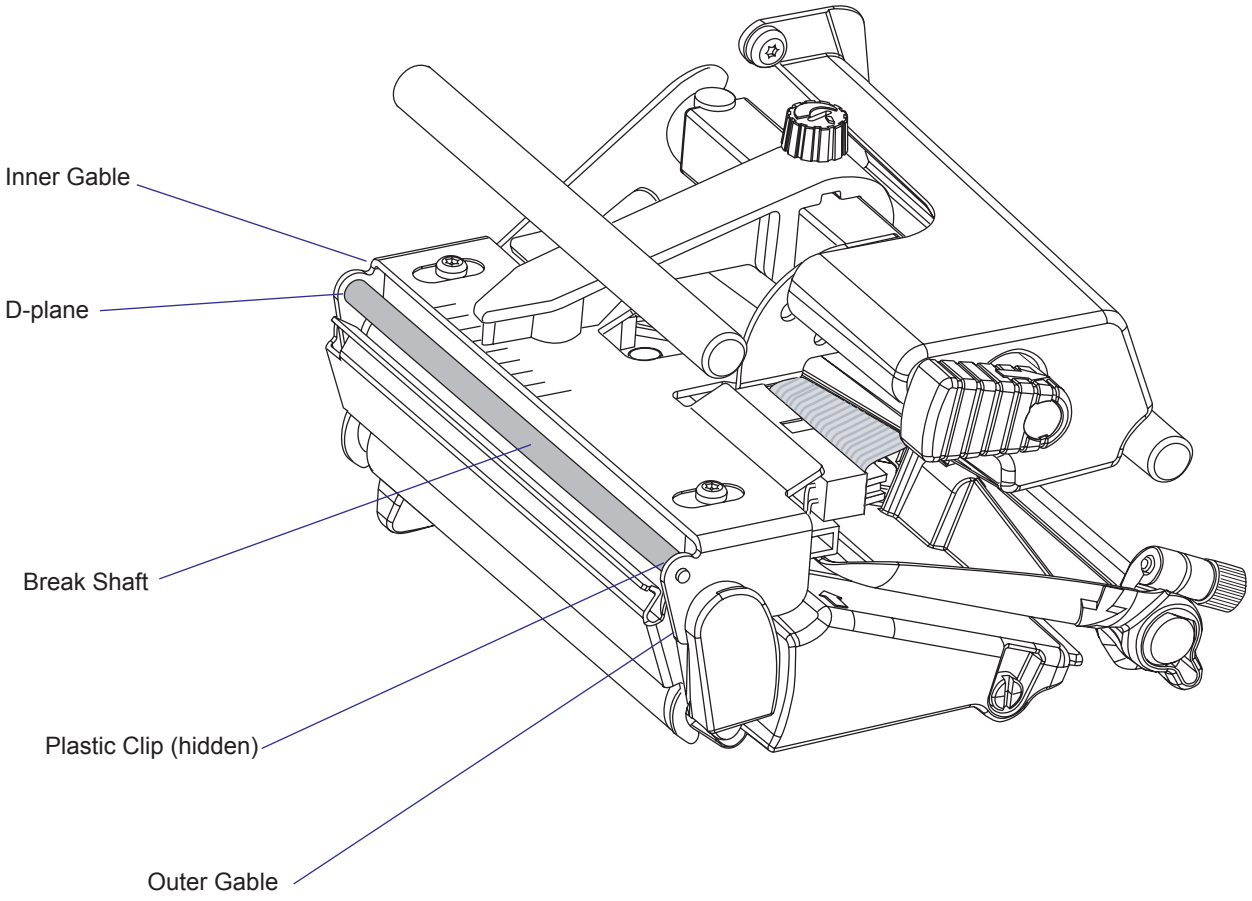
Before adjusting the break shaft, make sure that there is no other cause for the wrinkling of the ribbon (see Chapter 15.13).



6.7 Printhead Ribbon Break Shaft

Description

The printhead ribbon break shaft keeps the ribbon away from the front edge of the printhead and minimizes the friction. The shaft is fitted between the two gables of the printhead bracket. The inner gable has a D-shaped hole and the outer gable has a round hole. The shaft is held in place by a plastic clip inside the outer gable.



Replacement

- Pry away the plastic clip, taking care not to lose it.
- Pull the shaft in the direction towards the outer gable until it disengages from the inner gable.
- Tilt out the inner end so it can bypass the inner gable and pull it out of the outer gable.
- Reassemble in reverse order taking care so the D-plane on the shaft fits into the D-shaped hole in the inner gable.

7 Print Mechanism

This chapter describes the print mechanism of the EasyCoder PM4i printer and explains how to adjust the various functions and replace part subject to wear. It covers the following topics:

- Description
- Platen roller
- Stepper motor
- Belts
- Label stop sensor
- Printhead
- Headlift sensor
- Headlift mechanism
- Media feed principles

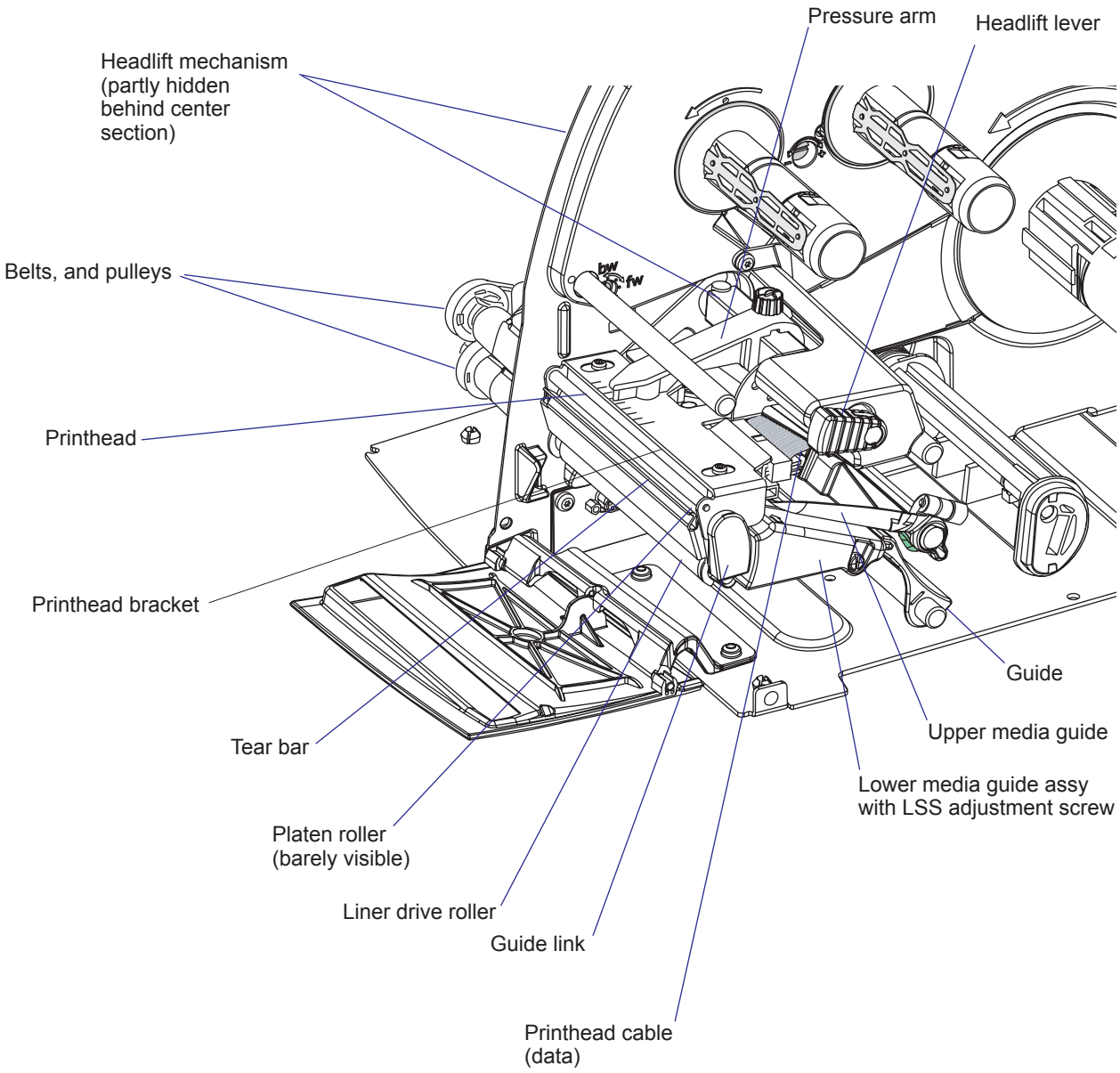
7.1 Description

The print mechanism is fully integrated with center section (see Chapter 4.2), the transfer ribbon mechanism (see Chapter 6), and optional liner takeup unit (see Chapter 8).

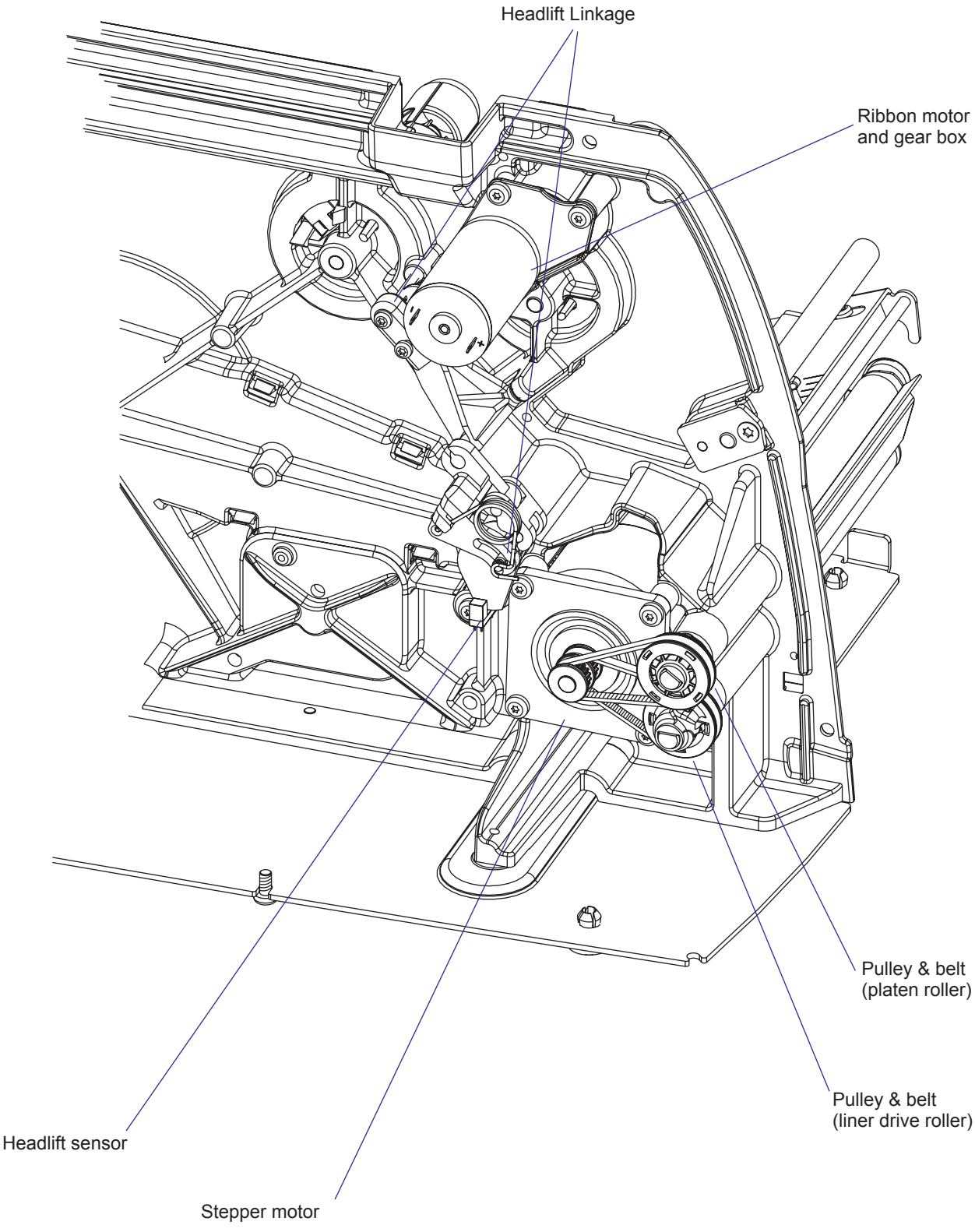
The main parts of the print mechanism are:

- The rubber-coated platen roller drives the media past the printhead and provides counter-pressure.
- The liner drive roller is used for peel-off operation and helps pulling the liner towards the takeup unit.
- The stepper motor drives the platen roller and the liner drive roller via two timing belts inside the electronics compartment. It also drives the optional liner takeup unit via a third belt running inside the center section. The liner drive roller and the takeup unit belt are always fitted.
- The tear bar makes it easier to tear-off continuous stock. It also helps separate labels and liner during peel-off printing.
- The label stop sensor (LSS) controls the media feed and checks for out-of-media conditions.
- The printhead produces the heat that blackens the direct thermal media or melts the ink of the transfer ribbon in bitmap patterns that make up letters, graphics, or bar codes.
- The headlift mechanism presses the printhead against the direct thermal media or thermal transfer ribbon, or raises the printhead to allow media and ribbon replenishment.

The parts of the print mechanism, as seen from the media compartment side of the center section, are illustrated below.



The parts of the print mechanism fitted inside the electronics compartment in an EasyCoder PM4i printer are illustrated below.



7.2 Platen Roller

Description

The platen roller is coated with silicon rubber. It is imperative that the roller is kept clean and is free from uneven wear or dents. The platen roller is identical to the liner drive roller, so these rollers could be switched. The same applies to the pulleys and belts. It is normal that the platen roller needs to be replaced after a period of time depending on print volume and other circumstances. The roller is supported by two permanently lubricated plain bearings pressed into the center section.

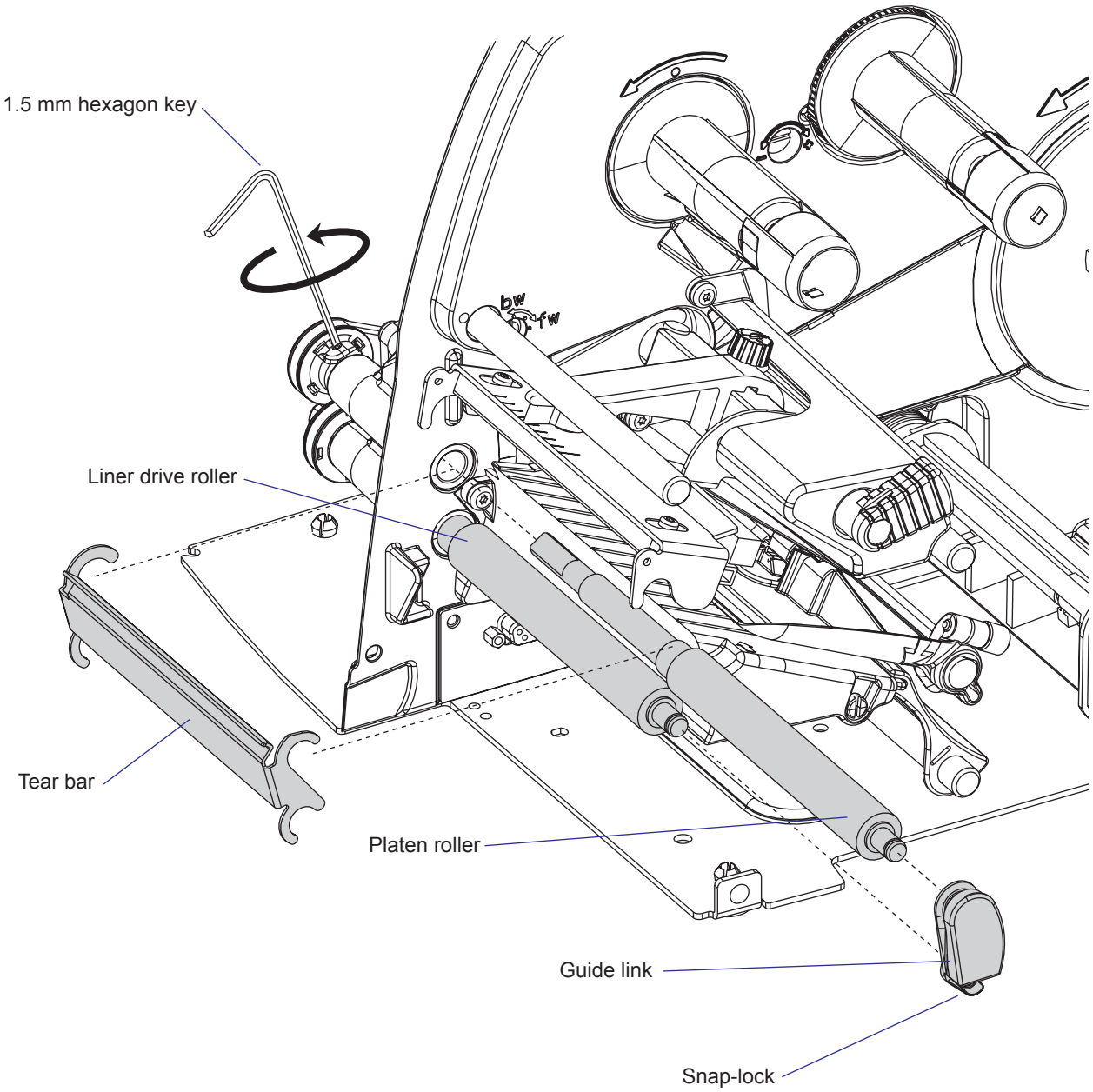
If the platen roller is manually rotated, while the power is switched on, the stepper motor may work as a generator and damage the stepper motor driver on the Power Supply Unit (see Chapter 12). A typical example is when the operator tears out media that has stuck on the platen roller without switching off the power first. Also see Flash Info #59, Feb-26-03.

Replacement

Also applies to the liner drive roller.

- Switch off the power and disconnect the power cord.
- Remove the front/left-hand cover, see Chapter 3.2.
- Raise the printhead to open position.
- Remove the tear-off bar by pulling the plate **upwards**. Avoid bending the hooks, which will make it loose-fitting.
- Press down the snap-lock at the bottom of the guide link and pry the guide link away from the shafts of the platen roller and the liner drive roller.
- Using a 1.5 mm hexagon key, loosen the grub screw in the pulley of the roller.
- Hold the pulley and belt while pulling out the roller.
- Reassemble in reverse order, making sure that the tear bar snaps at the inner end of the liner drive roller.

  When fitting back the pulley, check that the grub screw hits the flat side of the D-shaped end of the roller shaft. Tighten firmly. Check that the belts are fitted properly over the pulleys on both the two rollers and the stepper motor.


1.5 mm hexagon key
Liner drive roller
Tear bar
Platen roller
Guide link
Snap-lock
bw
fw

7.3 Stepper Motor

Description

The stepper motor drives the platen roller and the liner drive roller using a double-belt pulley and two timing belts inside the electronics compartment. It also drives the optional liner takeup unit using a pulley on the opposite side of the motor and a long belt that runs inside a recess in the center section. The pulleys are permanently fitted and cannot be replaced.

The stepper motor is driven in micro-stepping mode with 8 steps/dot at 8 dots/mm (203.2 dpi), which means that the theoretical feed error will be negligible. However, mechanical conditions such as a worn platen roller or a slippery liner may adversely affect the accuracy.

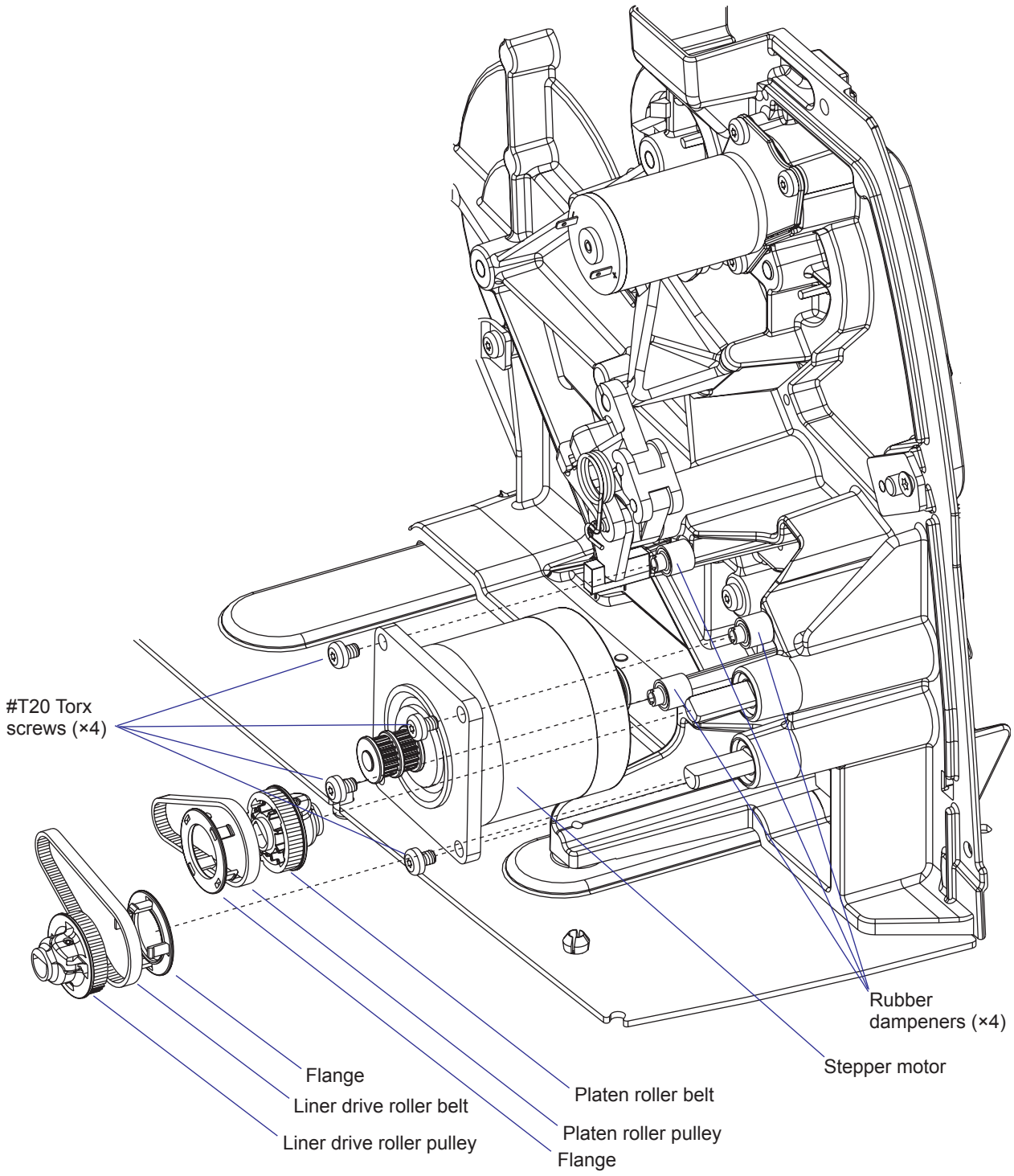
The stepper motor is fitted using four #T20 Torx screws and rubber noise dampeners inside a moulding protruding from the center section.

Replacement

Replace the stepper motor as follows:

- Switch off the power and disconnect the power cord.
- Remove the front/left-hand cover, see Chapter 3.2.
- Disconnect the stepper motor cable from P10 on the Power Supply Unit.
- Dismantle the stepper motor from the bracket by removing the four #T20 Torx screws.
- If the printer has a liner takeup unit (see Chapter 8), remove the media guide assy (see Chapter 7.5) to gain access to the belt running from the stepper motor to the liner takeup unit.
- Remove the belts from the stepper motor pulleys. If no liner takeup unit is fitted, you can leave its timing belt in the recess in the center section.
- Loosen the 1.5 mm hexagonal grub screws that hold the pulleys of the platen roller and liner drive roller and remove the pulleys and belts.
- Remove the stepper motor.
- Replace the rubber dampeners with a fresh set.
- Put back the stepper motor. If there is an optional liner takeup unit, start by fitting its belt to the motor's inner pulley. If no takeup unit is fitted, make sure that the pulley does not engage the belt. Then fit the belt and pulley to the liner drive roller and finally the belt and pulley to the platen roller.
- Fit the four screws that hold the flange of the stepper motor.
- Connect the cable of the stepper motor to P10 on the Power Supply Unit.
- Put back all remaining parts.

The dampeners, the belts, and the pulleys are identical. Normally, there is no need to separate the flanges and the pullies.



7.4 Belts

Description

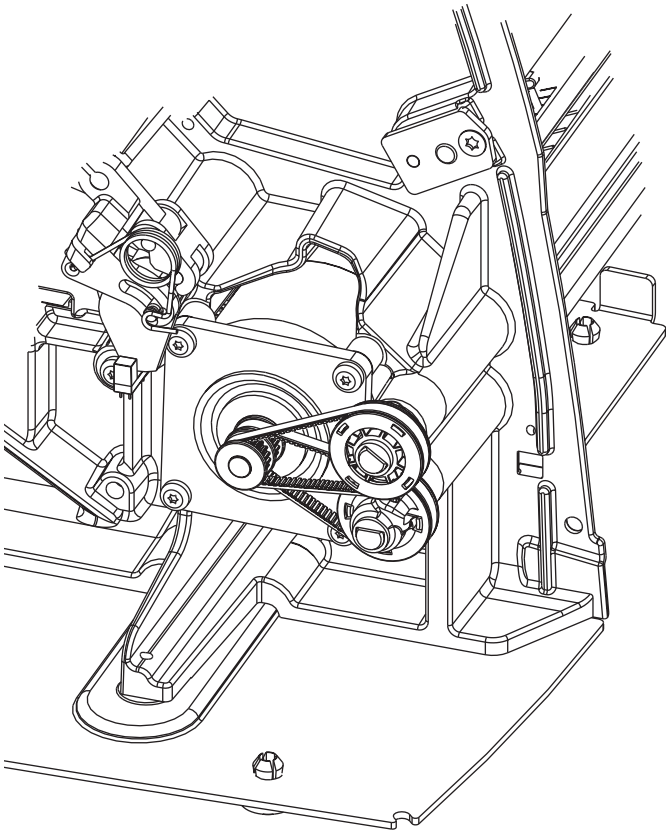
The print mechanism has two timing belts, one that drives the platen roller and another that drives the liner drive roller. The belts are subject to wear and may need periodic replacement.

Replacement

Replace a worn out or broken belt using the same method as when replacing the stepper motor, see Chapter 7.3.

Adjustment

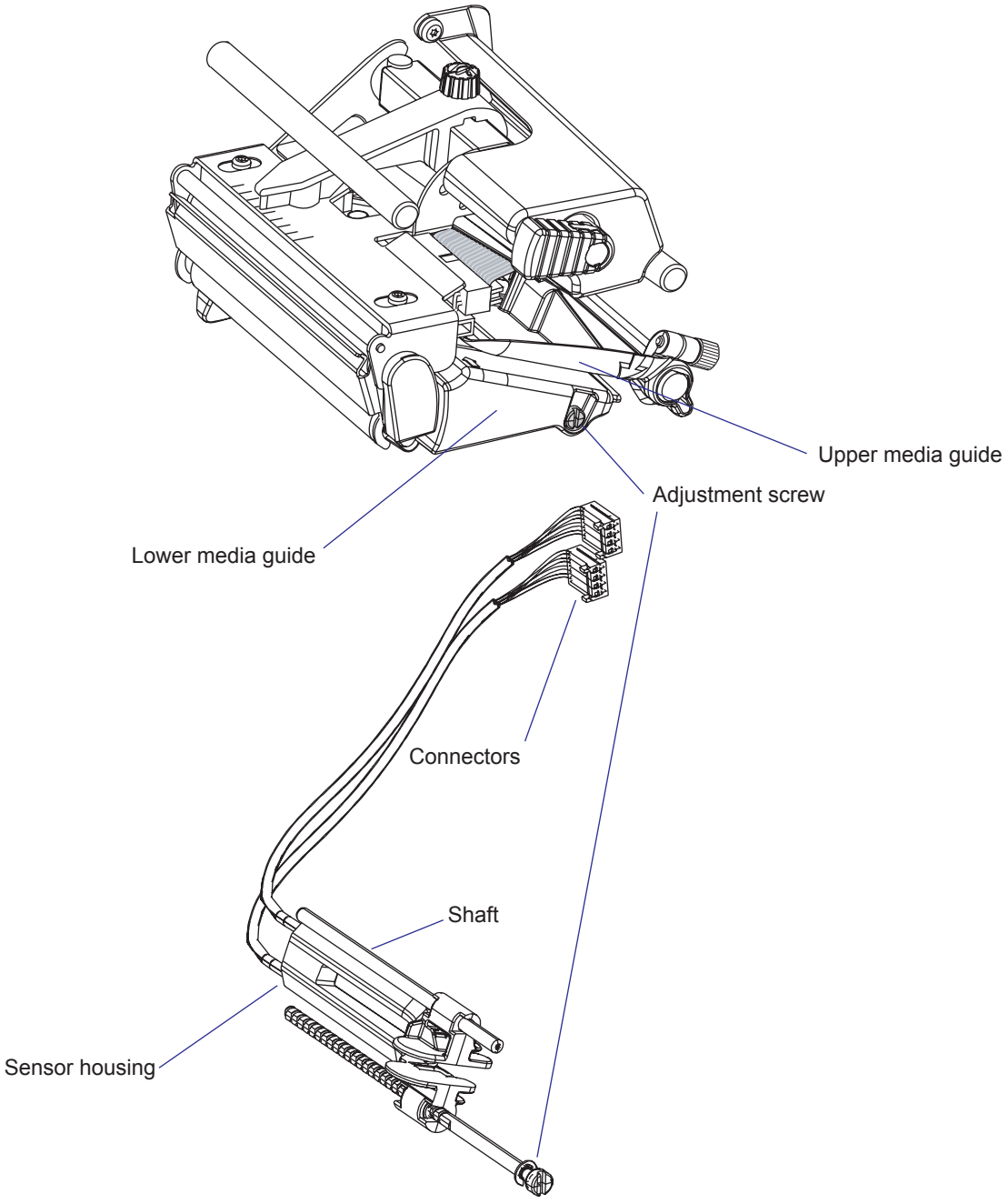
The tension of the belts cannot be adjusted.



7.5 Label Stop Sensor

Description

The label stop sensor (LSS) controls the media feed. It consists of two sets of sensors and diodes fitted in a fork-shaped sensor housing. One part runs on top of the upper media guide and the other part runs inside the lower media guide assembly. Each part has one light-emitting diode and one photoelectrical receiver. The sensor housing slides along a shaft fitted to the lower media guide when the straight-slot adjustment screw is rotated. The LSS can be moved laterally from the inner edge of the media and 57 mm (2.24 in.) outwards, which corresponds to the center of a full width media. The sensors are protected from the media by the two transparent media guides. The upper media guide can be removed to facilitate cleaning. The sensor are connected to the CPU board.



Working Principles

The label stop sensor serves a number of purposes, depending on how the printer is set up in regard of media type in Fingerprint and IPL respectively:

Label (w gaps)/Gap

A beam of light is emitted from the diode in the lower part and received by the sensor in the upper part. The firmware detects the **front** of each label, that is, when the light is completely interrupted by the opaque label, as opposed to the semi-transparent liner in the gaps between labels. If no label has been detected during a media feed corresponding to more than 150% of the set label length, a "next-label-not-found" condition is assumed. If a renewed print operation gives the same result, an "out-of-paper" condition is assumed.

Ticket (w mark)/Mark

Normally, a beam of light is emitted from the diode in the lower part. The beam is reflected back to the sensor in the lower part by the white media, or is absorbed by a black mark. The firmware detects when the front edge of a black mark passes the sensor, that is, when light starts to be absorbed. If no mark has been detected during a media feed corresponding to more than 150% of the set ticket length, a "next-label-not-found" condition is assumed. If a renewed print operation gives the same result, an "out-of-paper" condition is assumed.

By switching the cables from the upper and lower part of the LSS on the CPU board, black marks on top of the media can be detected.

Ticket (w gaps)/Gap

The light is emitted from the diode in the lower part and received by the sensor in the upper part. The light will either pass uninterrupted through a detection gap in the media or be blocked by the non-transparent ticket. The firmware detects the rear edges of detection gaps, that is, when the light starts being interrupted. If no ticket has been detected during a media feed corresponding to more than 150% of the set ticket length, a "next-label-not-found" condition is assumed. If a renewed print operation gives the same result, an "out-of-paper" condition is assumed.

Var. Length Strip and Fix Length Strip/Continuous

The light is emitted from the diode in lower part and received by the sensor in the upper part. The beam will either be blocked by the media or be completely uninterrupted when the printer runs out of continuous stock. The firmware assumes an out-of-paper condition if the light has not been interrupted within a media feed corresponding to 150% of the set length.

General

The information on where the gaps or marks are presently positioned relative the LSS (and thereby also relative the dot line on the printhead) is saved as an "invisible" file in the flash memory's file operating system (see Chapter 12.2). However, if the printhead is raised, or if the power is interrupted during printing, this file may be cleared, which will affect any labels between the LSS and the dot line. In this case, readjust the LSS by a TESTFEED operation (Fingerprint) or by pressing the Feed/Pause button (IPL).

Note (Fingerprint only): It is possible to decide if the media feed data will be cleared or not when the printhead is raised by means of the Fingerprint instruction SYSVAR(28). By default, the media feed data are not cleared.

The LSS checks for gaps or marks at every dot of positive media feed (feed out/print), but gaps or marks are ignored at negative media feed (retract). Gaps and black marks up to 170 dots (21.3 mm/0.84 inches) are allowed.

Adjustment of the Sensitivity

The LSS should always be adjusted when the user changes to another brand (sometimes even a new batch) of media, and when a defective sensor has been replaced. This is especially the case with self-adhesive labels on liner, because the transparency of the liner may vary and the difference between labels and gaps may be too small. Before starting the adjustment, check that both the upper and lower sensor are clean and free from obstructions and that the edge guides are adjusted so as to guide the media with a minimum of play. Also check that both parts of the LSS are in the same lateral position and aligned with any gaps or black marks.

Fingerprint only

As standard, there are four ways to adjust the LSS:

- Performing a TESTFEED by simultaneously pressing the "Shift" and "Feed" keys on the printer's built-in keyboard.
- Selecting the TESTFEED option in Intermec Shell.
  Four values are displayed showing how the sensor has been adjusted.
  1. A measured value lower than the displayed value is interpreted as media detected.
  2. A measured value higher than the displayed value is interpreted as no media detected.
  3. Gain, that is, the sensitivity of the sensor.
  4. Drive, that is, the intensity of the light-emitting diode.
- Selecting the TESTFEED option in the Setup Mode.
- Executing a TESTFEED statement in a Fingerprint program.

The printer feeds out 1.5 times the set label length or less while testing all levels of the LSS at each millimeter of media feed. The LSS is adjusted according to the result of the check and a full label is fed out according to the present feedadjust setup.

The label stop sensor/black mark sensor can be turned off for a specified amount of media feed using the LBLCOND statement, see *Intermec Fingerprint v8.xx Programmer's Reference Manual.*

IPL only

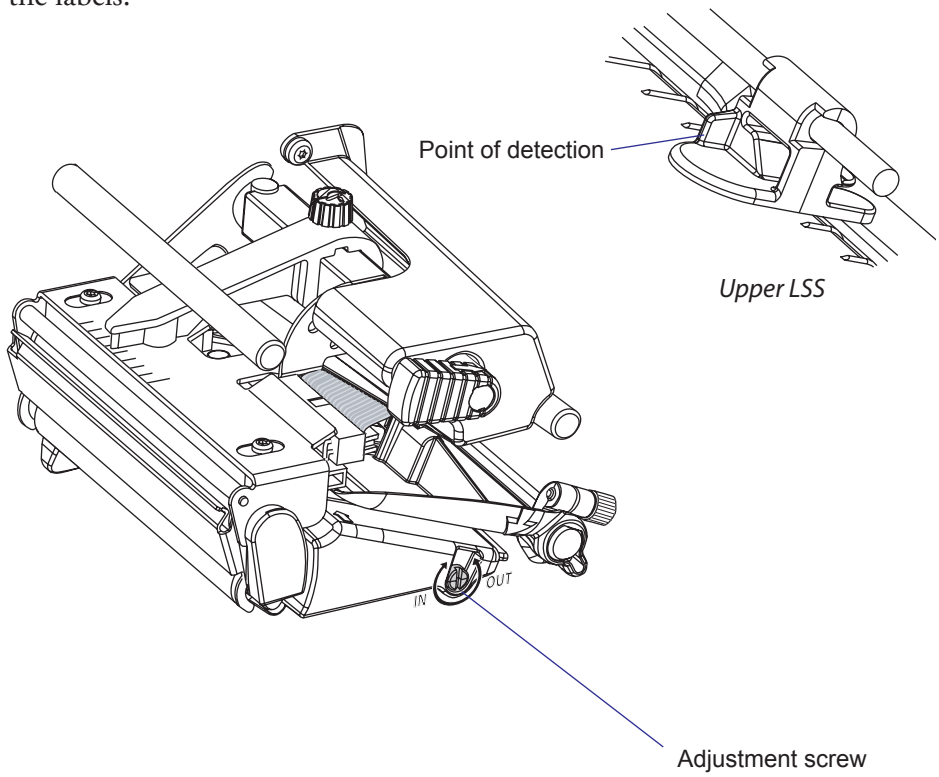
The sensitivity of the LSS is configured at startup. To force adjustment of the sensitivity (corresponding to a TESTFEED in Fingerprint), raise and close the printhead and then press the Feed/Pause key.

Adjustment of the LSS Lateral Position

The LSS can be moved continuously across the media path. Use a straight-slot screwdriver or a similar tool to turn the adjustment screw.

- Rotate the screw clockwise to move the detection point towards the center section. The extreme position is aligned with the inner edge of the media path.
- Rotate the screw counterclockwise to move the detection point outwards, away from the center section. The extreme position is 57 mm (2.24 in.) outward the inner edge of the media path (that is, at the center of a full width media).

When using irregularly shaped labels, align the LSS with the front tips of the labels.



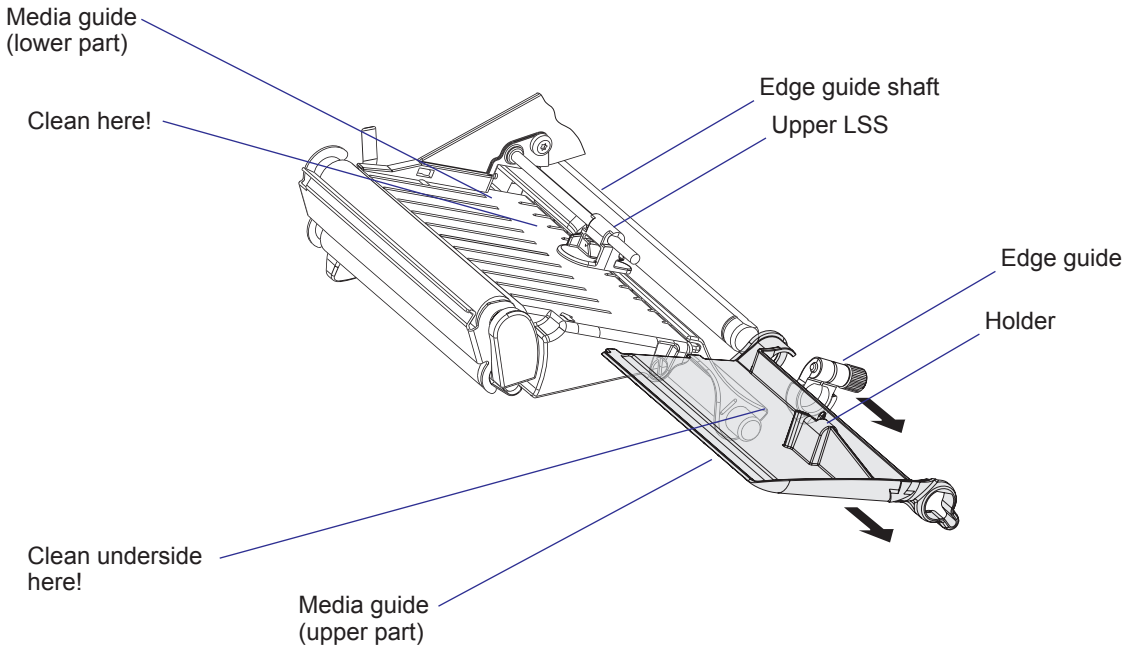
Cleaning the Media Guide

The upper part of the media guide assembly can be removed for occasional cleaning.

- Raise the printhead.
- Loosen the screw on the edge guide.
- Pull both the upper media guide and the edge guide straight out along the shaft.
- Clean both the upper and lower media guides where the LSS runs using a cleaning card or a soft cloth moistened with isopropyl alcohol.
- Assemble in reverse order making sure that the LSS shaft fits into the holder on the upper media guide.

Warning

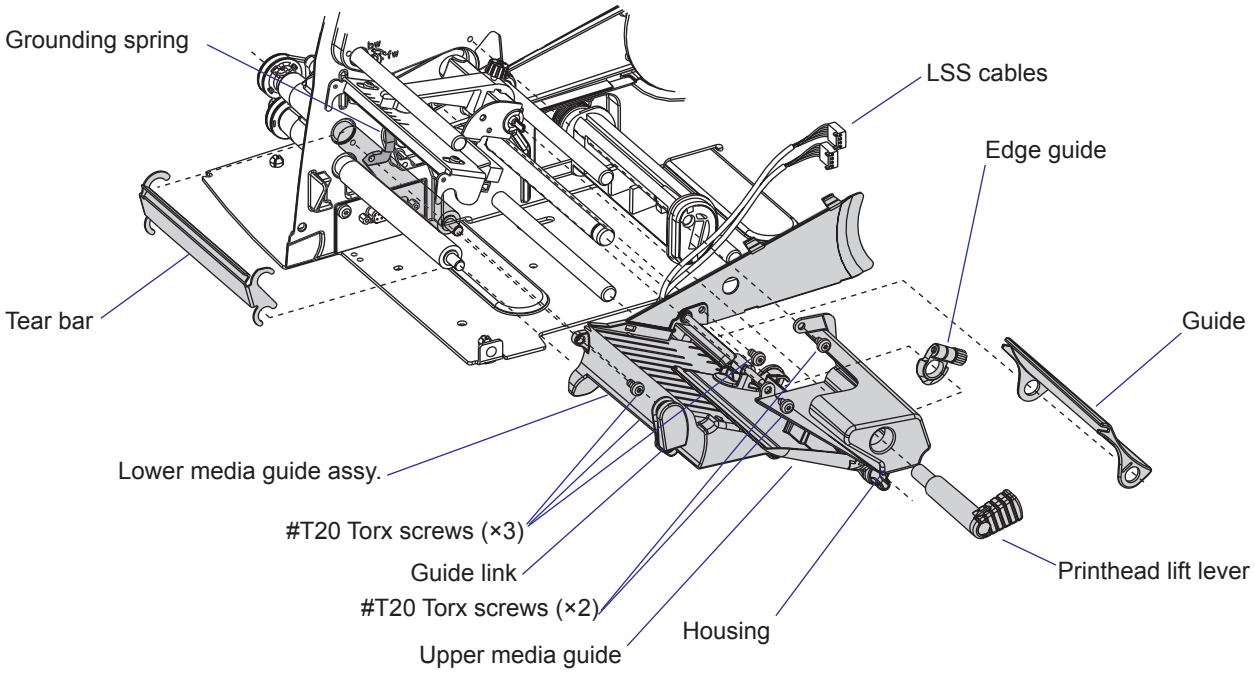
Isopropyl alcohol [$(CH_3)_2CHOH$; CAS 67-63-0] is a highly flammable, moderately toxic, and midly irritating substance.



Replacing the Sensors

To replace the LSS sensors, proceed as follows:

- Switch off the power and disconnect the power cord.
- Remove the front/left-hand cover, see Chapter 3.2.
- Remove the tear bar and the guide link, see Chapter 7.2.
- Pull out the S-shaped guide at the rear of the print mechanism.
- Pull out the upper media guide and the edge guide, see "Cleaning the Media Guide" on the previous page.
- Pry out the printhead lift lever, remove the two #T20 Torx screws that hold the housing, and remove the housing.
- Disconnect the cables from connectors J54 and J55 on the CPU board.
- Remove the three #T20 Torx screws that hold the lower media guide assembly and pull it out while carefully manipulating the cables and connectors through the slot in the center section. Release the snap-locks on the part that covers the timing belt to the liner takeup unit. Be careful not to lose the grounding spring.
- Remove the E-ring that locks the LSS adjustment screw to the wall of the lower media guide (see the first illustration in this chapter).
- Replace the sensor assy with a new set and lock it with the E-ring.
- Connect the cable from the lower part (marked "BM") to J54 on the CPU board and the one from the upper part (marked "GAP") to J55. (The cables can be switched in order to detect black marks on top the media instead of at the back.)
- Reassemble in reverse order making sure that the grounding spring is fitted straight up. When pressing back the printhead lift lever, lower the printhead, lock the pressing arm and hold it forcefully so as to prevent the headlift mechanism from coming apart.



7.6 Printhead

Description

The printing is produced by the thermal printhead, which consists of a line of very small, closely spaced resistors on a ceramic tile fitted across the media path. When a current is led through the resistors, commonly called "dots," these will be heated very quickly. When the current is shut off, the dots cool down just as fast.

As the media is fed past the dots, the hot dots will produce a number of black spots on heat sensitive (direct thermal) media, or on other face materials via a thermal transfer ribbon. The spots can be combined into bitmap patterns, which make up characters, bar codes, images, lines, and boxes.

The direct thermal printing method requires special media coated with a thin layer of heat-sensitive chemicals. As the media is fed past the dots, the heat from the dots will make the chemicals react, producing a dark salt, which makes up the imprint under each dot.

In the thermal transfer printing method, a special "ink"-coated transfer ribbon is used. When the ribbon is heated by a dot on the printhead, the "ink" melts and sticks to the receiving face material, where the ink immediately becomes solid again, producing a black spot. Transfer ribbons normally do not smear at room temperature, neither before nor after printing. Nor do the printed labels smear, even if the printout may be smudged by extensive rubbing if an unfortunate combination of ribbon and face material is used. The thermal transfer method makes it possible to use a wide range of face materials for printing, for example papers, boards, plastics, foils, etc. However, an original transfer ribbon from Intermec should always be used.

Information on how to switch between direct thermal and thermal transfer printing is provided in the User's Guide.

The basis for all measures and positioning in both the Fingerprint and IPL programming languages is the size of printhead dots.

In an 8 dots/mm (203.2 dpi) printhead, which is standard, each dot has a nominal size of 0.125 mm (4.92 mils). This means that a heated dot under standardized conditions will produce a black spot which has a diameter of 0.125 mm (4.92 mils).

In an 11.81 dots/mm (300 dpi) printhead, which is an Fingerprint-only option, each dot has a nominal size of 0.086 mm (3.33 mils). This means that a heated dot under standardized conditions will produce a black spot which has a diameter of 0.086 mm (3.33 mils).

Depending on dot temperature, exposure time, media and ribbon characteristics, etc., the spot may actually be somewhat smaller (weak print) or larger (black print), but that does not affect the calculation of distances, sizes, and positions.

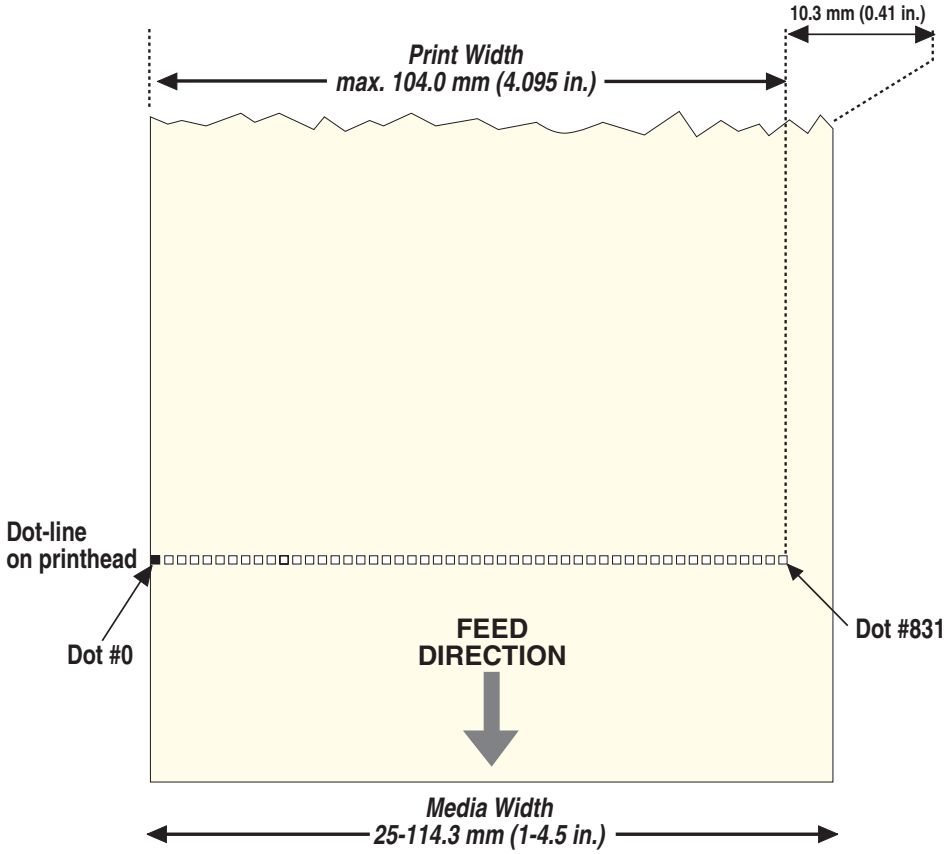
At startup, the printer auto-detects the printhead density as well as the head resistance. The printhead can also be checked using the Fingerprint instructions HEAD, FUNCTEST, and FUNCTEST$. In IPL, the number and size of the dots in the printhead is returned to the host by the command **<STX><ESC>H<ETX>**.

Print Window

The EasyCoder PM4i has as standard an 8 dots/mm (203.2 dpi) printhead or as an Fingerprint-only option an 11.81 dots/mm (300 dpi) printhead. In addition to the normal printheads, which are designed for a media thickness up to 175 µm (7 mils), there are also 8 dots/mm and 11.81 dots/mm printheads for media thicknesses from 170 to 220 µm (6.6 to 8.7 mils).

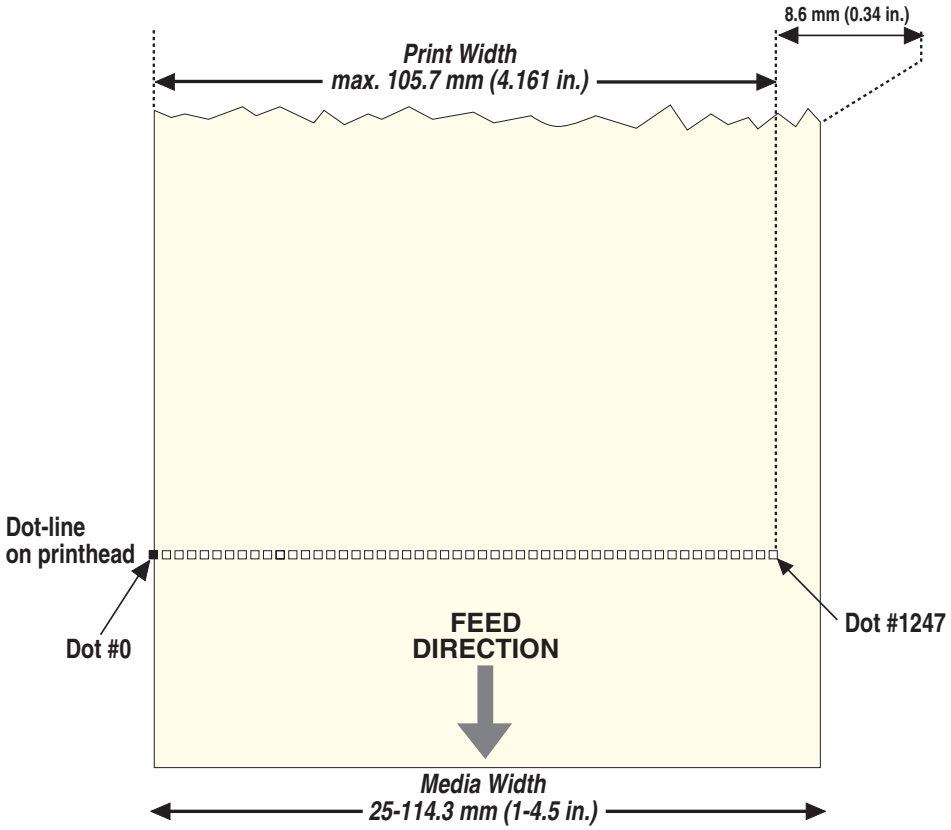
8 dots/mm Printhead

Density	8 dots/mm	(203.2 dots per inch)
Print width	104 mm	(4.095 inches)
Number of dots	832	
Dot size	0.125 mm	(4.92 mils)



11.81 dots/mm Printhead (not IPL)

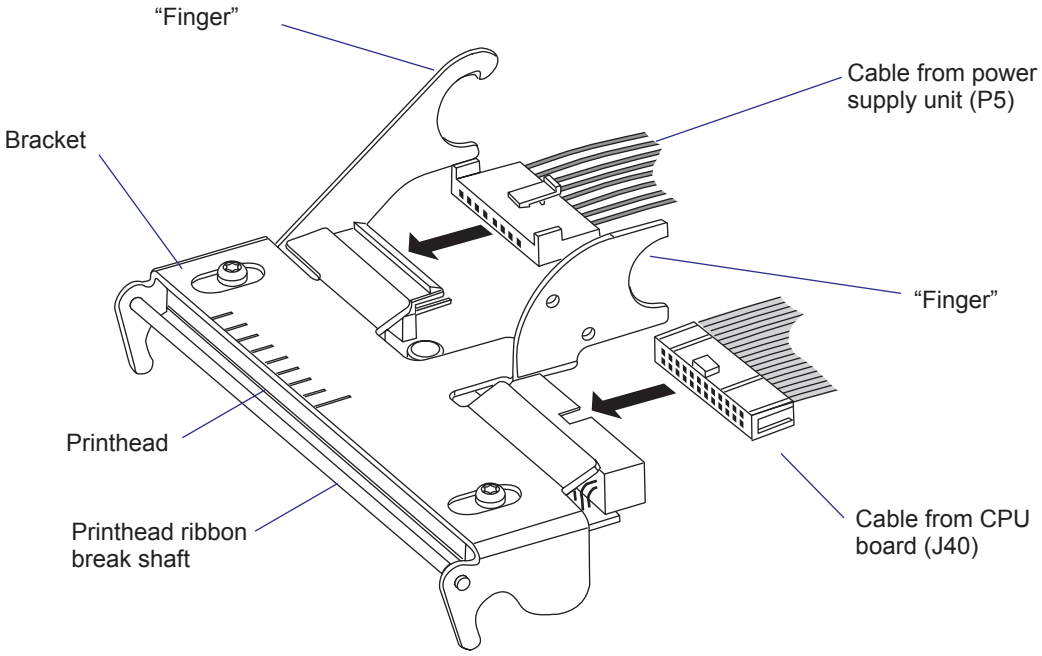
Density	11.81 dots/mm	(300 dots per inch)
Print width	105.7 mm	(4.161 inches)
Number of dots	1248	
Dot size	0.085 mm	(3.33 mils)



The printhead is fitted to a bracket using two screws. The printhead, the printhead ribbon break shaft, and the bracket are always delivered as a complete assembly. Two hooked fingers at the rear of the bracket are fitted over the headlift shaft so as to hold the printhead in place. A U-shaped tab on the outer side of the bracket engages the guide link when the printhead is closed, making sure that the printhead becomes properly aligned with the platen roller. There are no facilities for adjusting the position of the printhead relative the platen roller, neither longitudinally nor laterally.

There are two cables from the printhead to the CPU board:

- The innermost cable is used for the power to the printhead and is connected to P5 at the front of the Power Supply Unit.
- The outermost cable is used for data to the printhead and is connected to J40 on the CPU board.



Replacing the Printhead

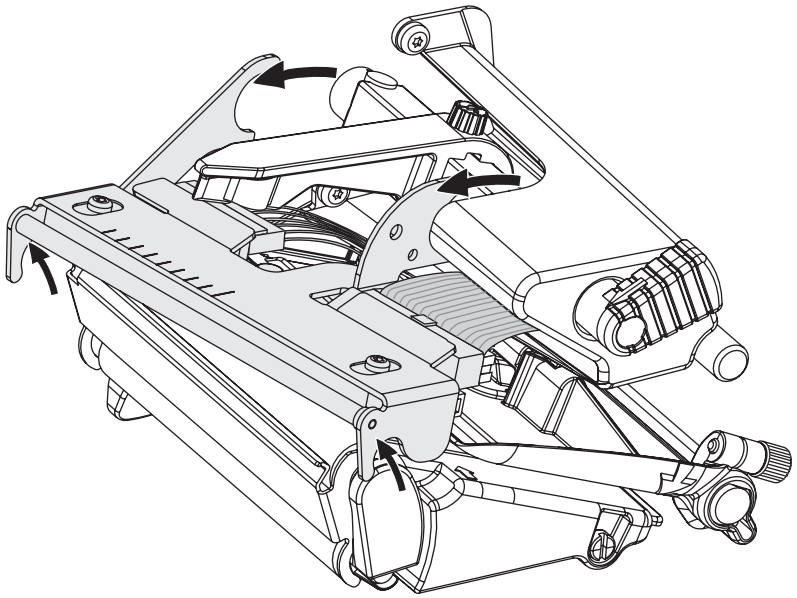
The printhead is a consumable part subject to wear from both the direct thermal media or the thermal transfer ribbon and from the rapid heating and cooling process during printing. Thus, it will require periodic replacement depending on print volume, type of media or ribbon, amount of energy to the printhead, print speed, ambient temperature, and several other factors.

Caution

Be careful not to use printheads designed for EasyCoder F4 or F4 Compact Industrial printers, or there will be a short-circuit that will prevent the printer from starting up or even cause a fuse to blow.

To replace a defective or worn printhead, proceed as follows:

- Switch off the power.
- Open the right-hand door.
- Turn the printhead lift lever clockwise to raise the printhead.
- Remove any media and ribbon from the print mechanism.
- Carefully pull the printhead bracket away from the magnet in the pressure arm.
- Disconnect the printhead bracket from the print mechanism and pull out the printhead while twisting it outwards as far as the cables allow.



- Disconnect the two cables from the printhead. Note the snap-lock on the inner connector. Pull at the connectors, not at the cables!
- Connect the two cables to the replacement printhead.
- Put back the printhead in reverse order and check that the printhead cables run freely.
- Lower the printhead so the magnet engages the printhead bracket.
- Switch on the power. The printer's firmware automatically measures the printhead resistance and density at startup.
- Load the media and ribbon again.

Precautions

Some simple measures can be taken by the user to prevent premature wear-out:

- Clean the printhead regularly, as described in the User's Guide. Not only will a dirty printhead produce an inferior printout, but any residue on the dots will prevent heat to dissipate through the media.
- Follow the Intermec's recommendations regarding Paper Type or Media Sensitivity setup. Too much energy to the printhead will wear it out rapidly.
- Do not use higher Print Speed setting than necessary.
- Low ambient temperature requires more energy to the printhead dots than room temperatures and will therefore cause more wear to the printhead. High print speed accelerates the wear. Thus, at low temperatures, select as low a print speed as acceptable.
- In Fingerprint, do not use a higher Contrast setting than necessary, especially not in combination with the highest Label Constant or Ribbon Constant settings.
- In IPL, do not use a higher Darkness setting than necessary.
- Do not use a higher printhead pressure than necessary.
- Never print outside the media path. Dots that are not in contact with the media will not be cooled properly.
- When using media with less than full width, be careful to adjust the printhead lift arm so there is an even pressure across the media. Not only will an uneven pressure impair the printout quality, but it may also prevent the dots from being properly cooled. Moreover, a sharp outer media edge in direct contact with the printhead may cause excessive mechanical wear on some dots, which may be visible when printing on wider media later.
- When using preprinted labels or labels with some type of varnish or non-standard top coating for direct thermal printing, use original Intermec labels or inks recommended by leading manufacturers of direct thermal media. The labels must not contain any aggressive substances such as chloride or grinding substances such as titanium dioxide.
- Only use transfer ribbons recommended by Intermec.

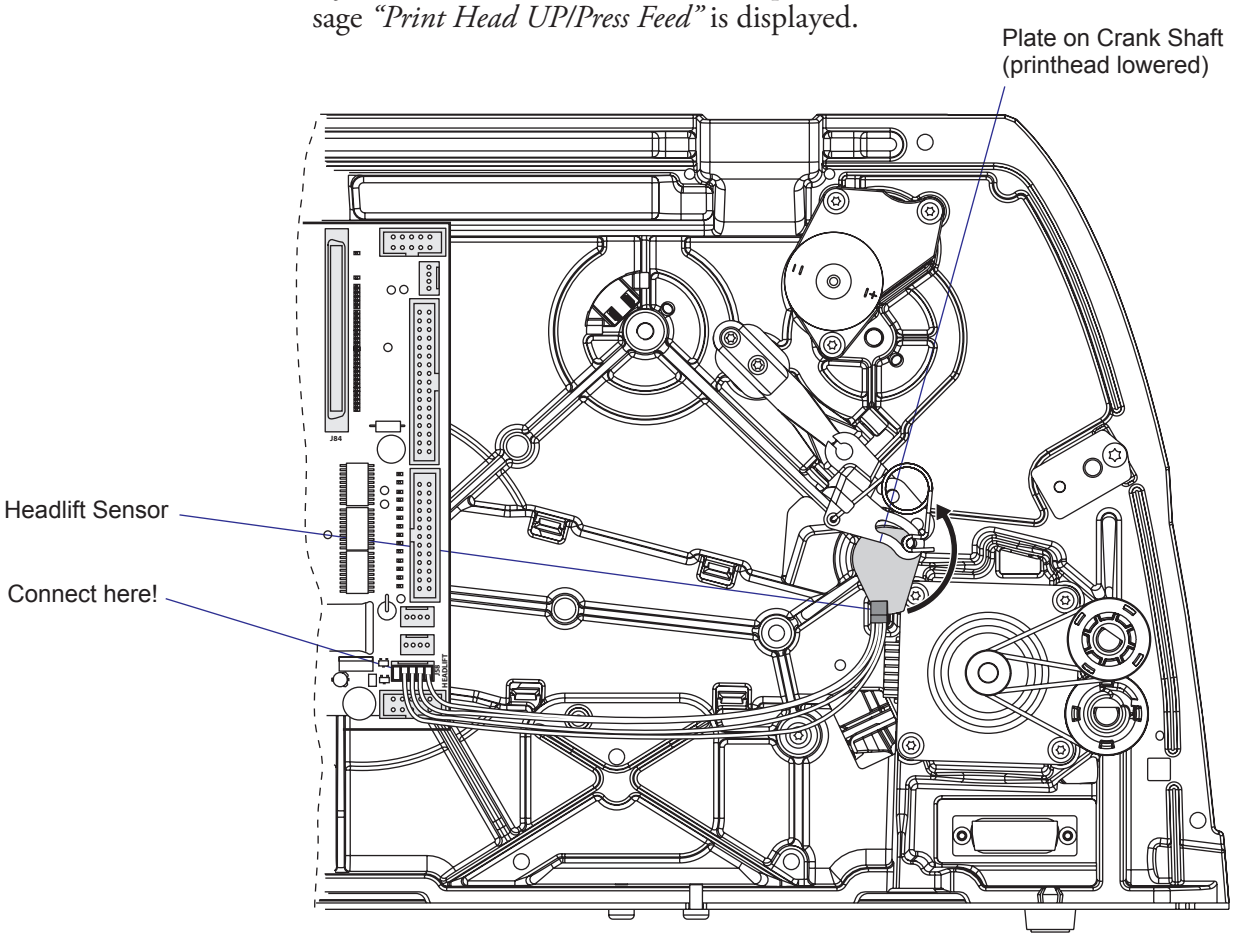
7.7 Headlift Sensor

Description

The purpose of the headlift sensor is to detect whether the printhead is raised or lowered. To avoid the risk of overheating the printhead dots, printing cannot be performed when the sensor detects that the printhead is raised (the media serves to cool the printhead). An ever so slightly raised printhead would also impair the printout quality. Thus, it is important that the printhead is properly engaged and a sufficient pressure is applied before the sensor detects a "Closed" condition.

The sensor is fitted using a barbed shaft that is pressed into a hole in the center section. The sensor consists of a light-emitting diode and a photo-electric sensor with housing and cables. The headlift sensor is connected to J58 (marked "HEADLIFT") on the CPU board.

A beam of light is constantly transmitted from the diode. When the printhead is in closed position, the light beam is interrupted by an angular plate at the end of the crank shaft. As soon as the headlift lever is activated, and even before the printhead starts to raise, the plate is moved out of the sensor gap and the sensor can detect the light beam. This condition is managed by the firmware. In Fingerprint, an error message (1022 *"Head Lifted"*) will be returned if you try to print a label. In IPL, the error message *"Print Head UP/Press Feed"* is displayed.



Sensor Replacement

Before deciding to replace the sensor, check that the sensor is free from dust, and other objects that can block the light.

Replace the sensor as follows:

- Switch off the power, remove the power cord, and remove the front/ left-hand cover.
- Raise the printhead.
- Disconnect the sensor's cable from the CPU board.
- Pull the sensor straight out using a pair of pliers. The sensor has a barbed shaft inserted into a hole in the center section moulding and requires some force to come out.
- Make sure the hole is clear from any remnants of the old sensor.
- Reassemble in reverse order. The sensor's cable should be connected to J58 (marked "HEADLIFT") on the CPU board.
- In Fingerprint, check that the sensor works properly using a PRSTAT statement, see *Intermec Fingerprint v8.xx, Programmer's Reference Manual*.
- In IPL, check that the sensor works properly using the Label Path Open Sensor Value (**<STX>L<ETX>**), see *IPL Programming, Reference Manual*.

7.8 Headlift Mechanism

Description

The headlift mechanism is used to raise and lower the printhead to allow media and ribbon load and also to apply a proper printhead pressure against the media. See Chapter 7.1 and the next page for illustrations!

The headlift is operated by the green headlift lever in the print mechanism. The lever is snap-locked at the end of the crank shaft, which runs inside the pressure shaft. At the other end of the crank shaft and inside the electronics compartment is an angular plate, which is used by the headlift sensor to detect whether the printhead is lowered or raised (see Chapter 7.7).

A small eccentrically fitted knob on the angular plate runs in a crescent-shaped slot in the lifting arm. A coil spring presses the knob down in the slot and helps lifting the printhead. The lifting arm is connected by a link to the pressure link, which pivots in extensions from the center section. Thereby the rotating movement of the crankshaft is transformed into a lateral movement.

The upper part of the pressure link is spring-loaded in relation to the center section. Thus, when the lever is turned towards lowered printhead position, the pressure is increased. The pressure is factory-adjusted by means of two screws inside the electronics compartment and fine-adjusted by the operator using a straight-slot screw accessible through a hole in the center section.

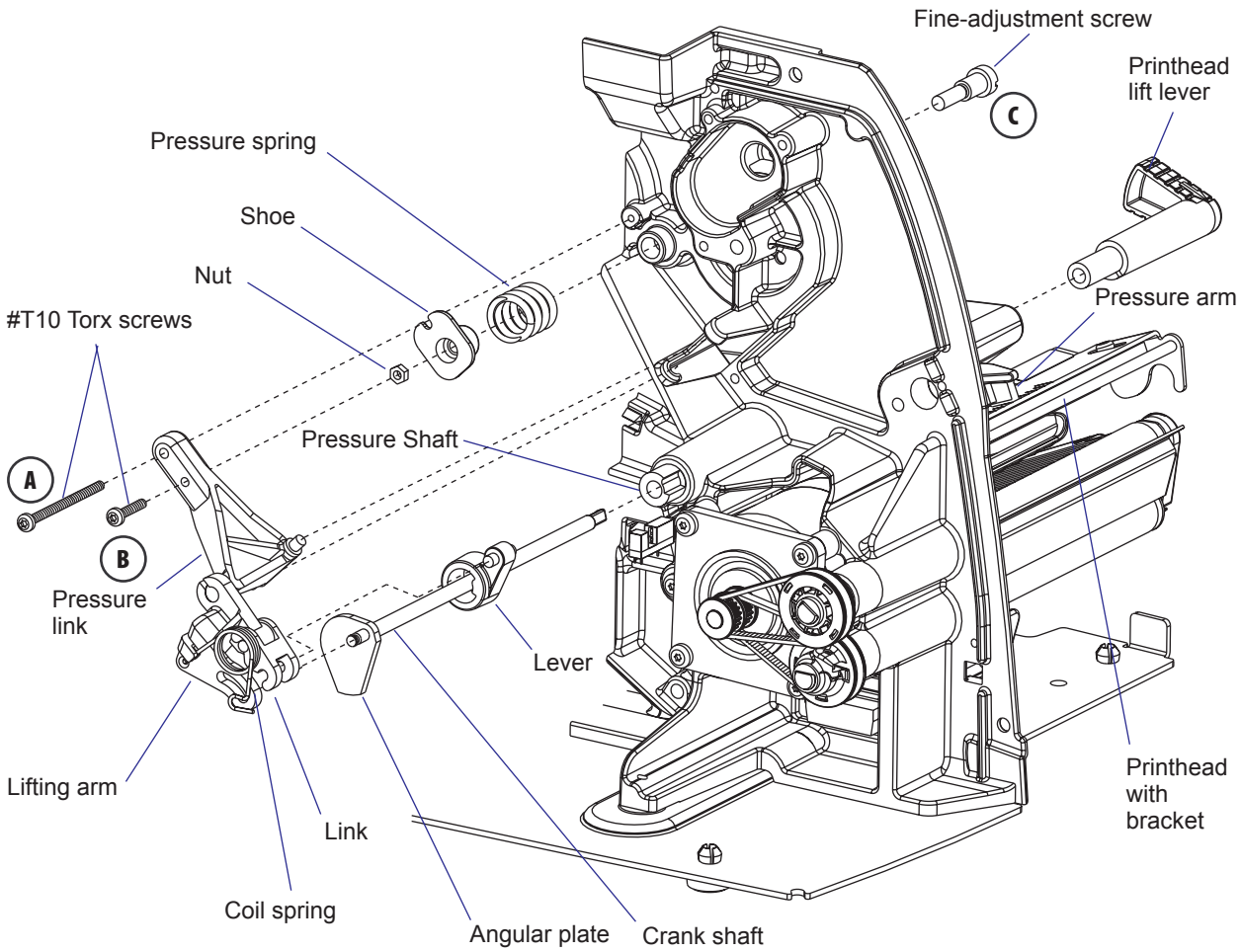
The lifting arm is connected to the pressure shaft by a lever. The pressure shaft runs through the center section to the print mechanism, where the pressure arm is fitted on the shaft. A magnet at the tip of the pressure arm holds the printhead bracket. The arm can be moved laterally to apply its pressure at the center of the media, regardless of media width.

The printhead bracket hangs loosely on the pressure shaft in two hooked “fingers.” When the printhead is lowered, semicircular guides at both sides of the bracket engage the inner part of the platen roller and a slot in the guide link, ensuring that the printhead will be properly aligned with the platen roller.

When the printhead lift lever is activated from lowered position, the printhead will not start to move immediately, but the angular plate on the crank shaft will start to rotate out of the gap in the headlift sensor, indicating a “printhead lifted” condition. When the lever has reached a more or less vertical position, a clicking noise will be heard and the printhead is raised from the platen roller. Now the coil spring between the angular plate and the lifting arm will help the operator finish the movement of the lever and hold the printhead firmly in raised position.

When the printhead lift lever is turned from raised to lowered position, the operator has to overcome a slight pressure from the coil spring until the lever passes a vertical position. Then the printhead snaps into place and the spiral spring applies its pressure. In the final part of the movement, the angular plate is rotated into the gap of the headlift sensor indicating a "printhead closed" condition.

This exploded view shows the parts of the headlift mechanism. Also refer to illustrations in Chapter 7.1 for assembled views.



The transfer ribbon mechanism have been omitted in the illustration above to improve visibility.

Printhead Pressure Adjustment

The pressure of the thermal printhead against the media is factory adjusted using the following method, which could also be used by a skilled service technician. Operators should only use the fine-adjustment screw accessible from the media compartment.

- Slit a piece of plastic tube lengthwise and put it on the tear bar in order to minimize the friction. On the thermal transfer-capable printers, the tube must not interfere with the printhead ribbon break shaft.
- Fit a 300 g (0.66 lb) weight at the end of a full width strip of liner.
- Loosen the upper #T10 Torx screw (A) in the electronics compartment. Note: The designations “A”, “B”, and “C” refer to the illustration on the previous page.
- Using a 5.5 mm spanner, loosen the nut on screw (B).
- Loosen the lower #T10 Torx screw (B) in the electronics compartment until the nut almost comes off.
- Tighten the fine-adjustment screw (C) until it comes as far into the shoe as possible and the spiral spring becomes compressed.
- Lower the printhead.
- Tighten screw B until it meets the end of screw C.
- Raise the printhead and put the liner strip between the printhead and platen roller so the weight hangs freely over the tear bar. Lower the printhead.
- Loosen screw B until the strip starts to slip and tighten it again until the strip stops to slip.
- Tighten screw B two (2) full turns and lock it with the nut. Now the printhead has a pressure of approximately 4.2 kgs.
- Loosen screw C four full turns to decrease the pressure (each turn represents approximately 0.5 kp of pressure).

Do not use a higher printhead pressure than necessary, because it may increase the wear of the printhead and shorten its life.

- Tighten screw A until it has a play of ±0.1 mm (4 mils) to the lifting link and lock it with blue Loctite. The tightness of this screw affects the resistance in the printhead lift lever.
- Fine-adjust using screw C according to printout samples (preferably test labels). Differences in media thickness, stiffness, width, etc. may require slightly higher or lower pressure. Generally, thicker and/or stiffer media requires more printhead pressure. However, a very high pressure setting on screw C may require readjustment of screw A or there will be no printhead pressure at all.
- If necessary, lubricate moving parts with MolyKote P6 30 L Plastislip or a similar grease.

Printhead Pressure Alignment Adjust

The printer is factory-adjusted for full media width. When using media less than full width, it is recommended to adjust the pressure arm so it becomes centered in relation to the media. Thereby, an even pressure across the media is obtained.

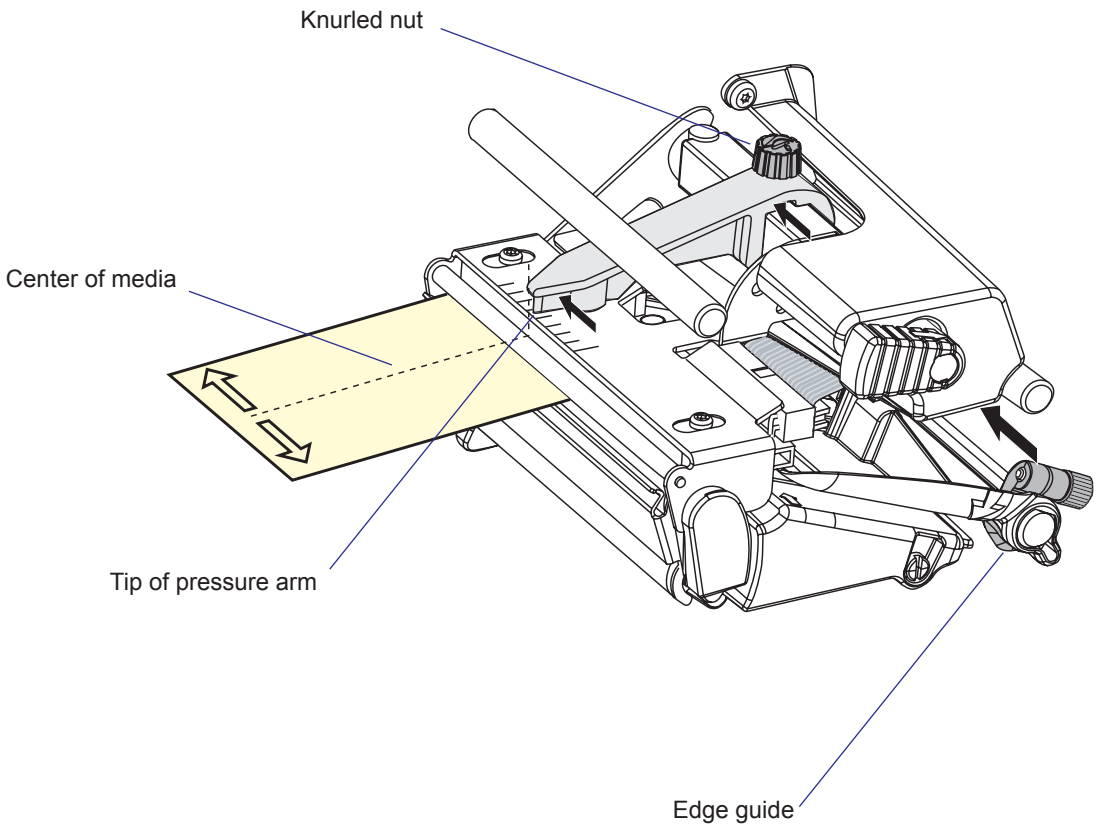
A poorly adjusted pressure arm may be detected by a weaker printout on the inner part of a less than full width media. Similarly, when reverting to a wider media, the arm should be adjusted, or the printout on the outer part of the media could be weak.

To adjust the pressure arm, proceed as follows:

- Loosen the straight-slot screw that holds the pressure arm. Move the arm inwards or outwards until the arrow on the tip of the arm becomes centered in relation to the media.

Note: While moving the arm, push at the part where the screw is situated, not at the tip. If the arm is hard to move, raise the printhead and pull the printhead bracket free from the magnet in the pressure arm.

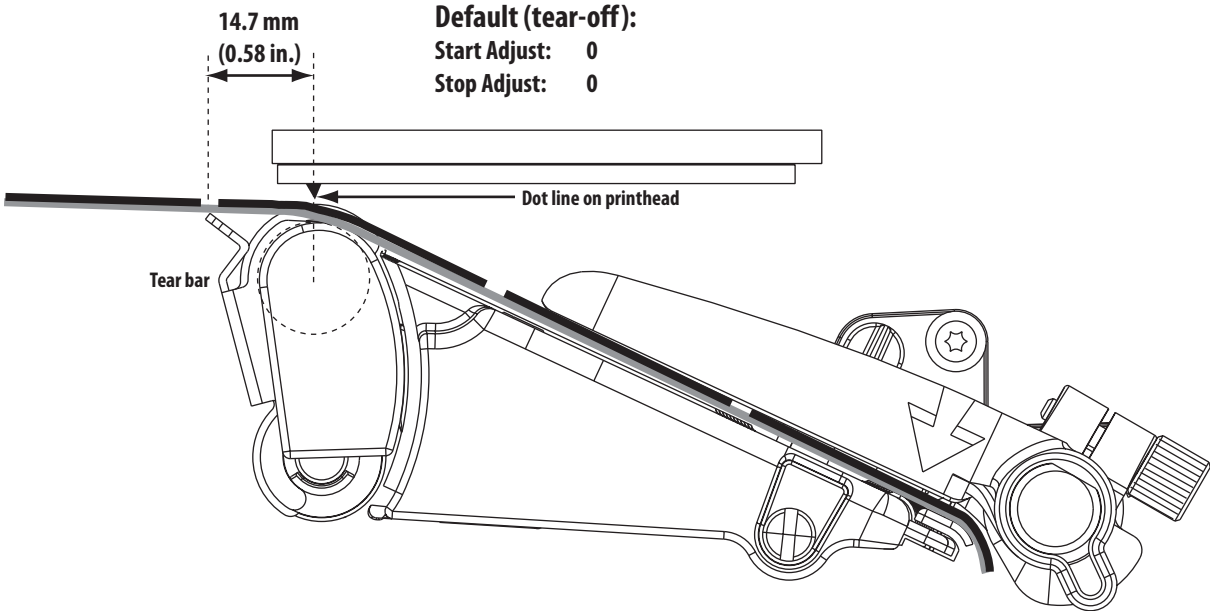
- After having centered the arm, lock it by tightening the screw.
- Adjust all edge guides (print mechanism, label slack absorber, and media supply roll post.



7.9 Media Feed Principles

Fingerprint only

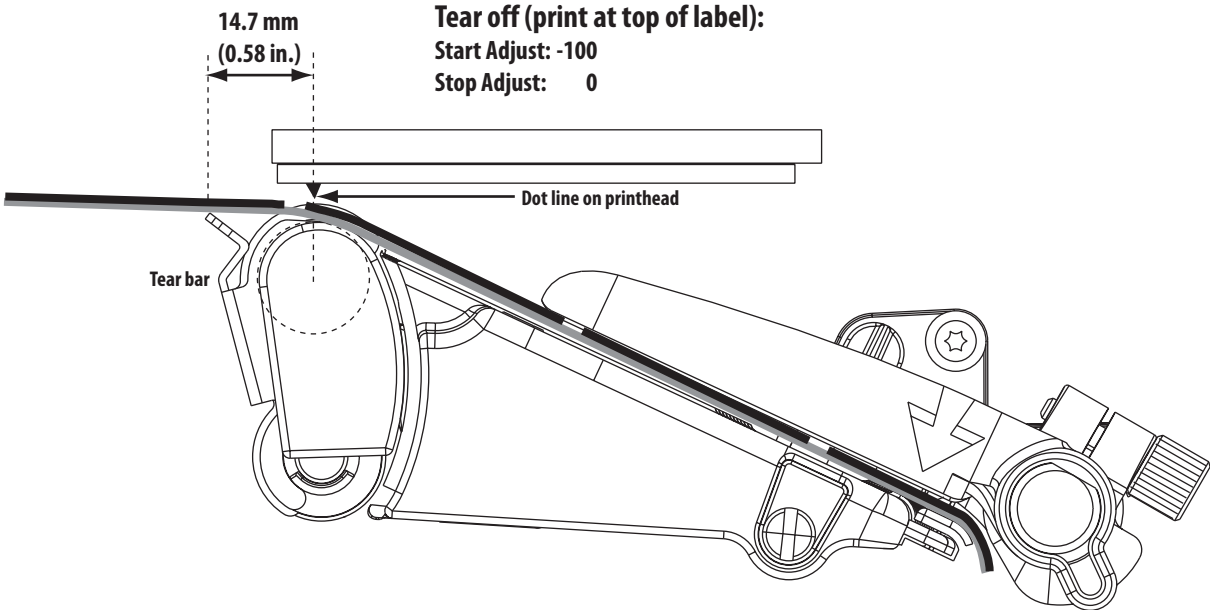
The Start and Stop Adjust parameters in the Fingerprint Setup Mode control how the media will be positioned in relation to the printhead when the printing starts and after the printing is completed, respectively. By default, the Start and Stop Adjust parameters are both set to 0, which is suitable for tearing off the media against the tear bar, for example between labels or at the perforation in a pre-perforated continuous stock. However, because the dot line on the printhead is situated 14.7 mm (0.58 inches) back from the tear bar, the printing will not start at the top of the label but further back along the media path.



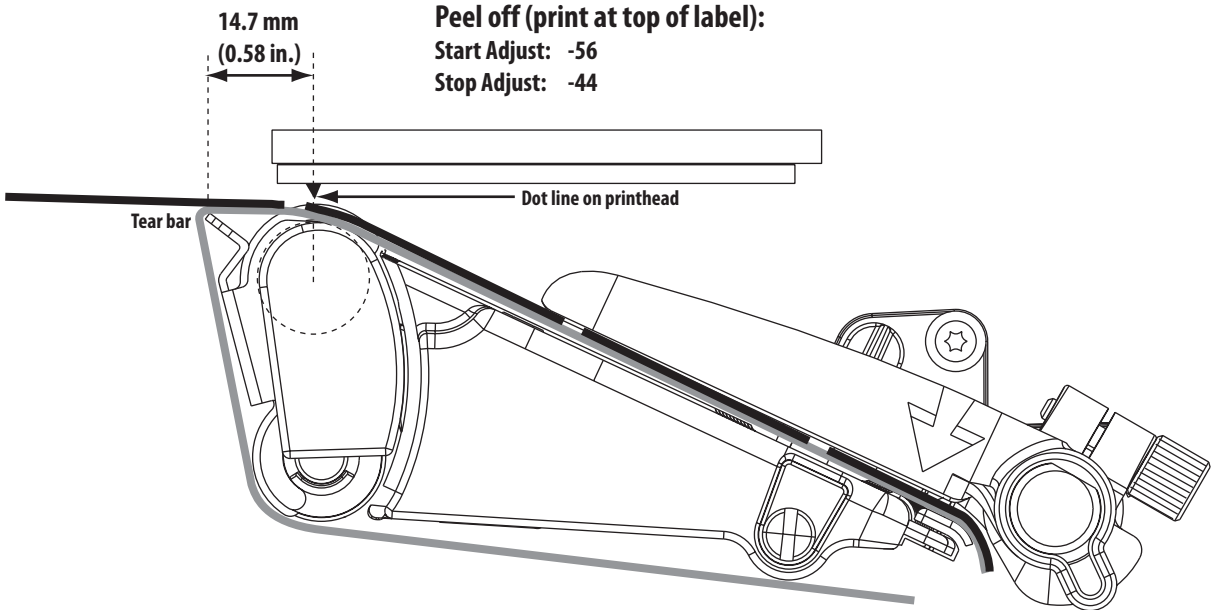
Note: Due to several factors, media feed measurements are not exact and may vary somewhat between applications and individual printers. There is inevitably a small amount of slippage between media and platen roller, which in its turn is affected by printhead pressure, type of media or liner, thickness of the media, roll size, type of media supply device, etc. The platen roller may be worn, giving it a slightly smaller diameter and/or less friction. There is also a certain amount of inexactness in the media feed mechanics and belts and so on. Therefore, the operator cannot expect to reach exact Start and Stop Adjust values simply by calculation. Use the measurements given in this chapter to calculate rough starting points and use the trial-and-error method to find values that give the desired result.

Note: All calculations and feed adjust values in this Chapter 7.9 refer to 8 dots/mm (202.3 dpi) printheads.

In many cases, it is desired to start the printing immediately at the top of the label. Actually, what you want to do is to pull back the edge of the media to the dot line. You can do this by means of a negative Start Adjust value (for example -100 dots = 12.5 mm/0.49 inches). Be careful not to enter too large a value, or the media may come loose from platen roller.



When using peel-off operation, the labels would drop from the liner and get stuck on for example the desk if you use the default Start Adjust value 0. Use a Stop Adjust value of around -44 (= 5.5 mm/0.22 inches) instead: that is, after the printing is completed 5.5 mm/0.22 inches less of media feed than normal will be performed. However, if you still want to print from the top of the label, you must compensate by a Start Adjust value of around -56 (= 7.0 mm/0.28 inches). Note that the sum of the Start and Stop Adjust values always is 100 dots (12.5 mm/0.49 inches), which corresponds to the distance between dot line and tear bar minus a margin for the gap between labels and certain slippage.



A special case is tickets with black marks. It is recommended to place the black mark adjacent to the perforation or the intended tear-off line. If the black mark is placed further down the media, this must be compensated for by a negative Stop Adjust setting.

IPL only

In IPL, the media feed is affected by the mode of operation. There are three such modes:

- Tear-off (straight-through)
  (default)
- Peel-off (self-strip)
  (enabled/disabled by **<STX><SI>T***n***<ETX>** command)
- Cut-off
  (activated/deactivated when the cutter is enabled/dispabled in the Setup Mode or by **<STX><SI>C***n***<ETX>** command)

Each mode has a fixed amount of media feed, which can be fine-adjusted using the Label Rest Point parameter in the Setup Mode (See Appendix A, Setup/Media/Lbl Rest Point) or an **<STX><SI>f***n***<ETX>** command.

The type of detection is decided by the Media Type parameter in the Setup Mode (See Appendix A, Setup/Media/Media Type).

8 Liner Takeup Unit

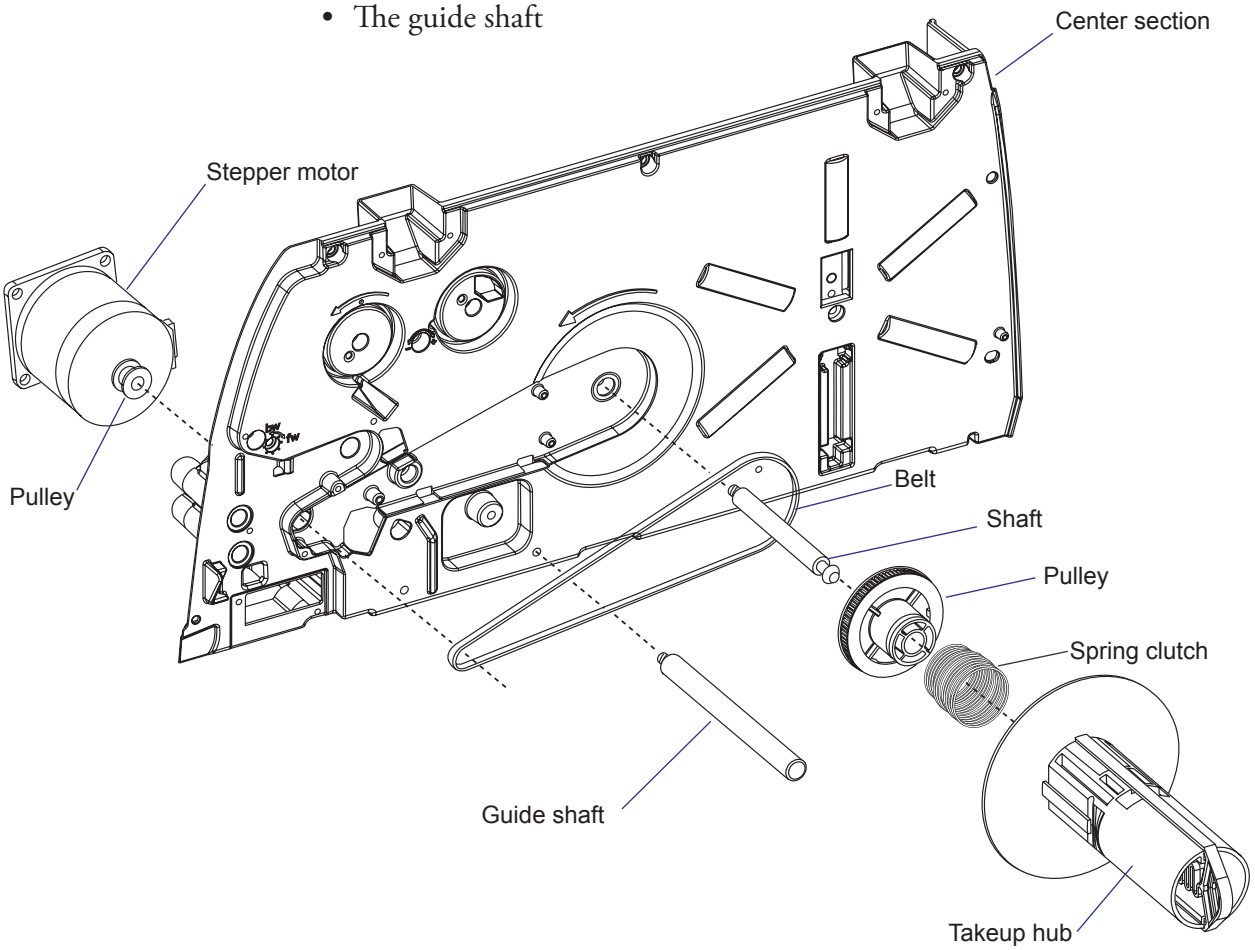
This chapter descibes the optional liner takeup unit and covers the following topics:

- Description
- Takeup unit parts
- Fitting a liner takeup unit
- Replacing the timing belt

8.1 Description

The liner takeup unit is a factory installed option that is used for peel-off (self-strip) operation. Peel-off means that self-adhesive labels are automatically separated from the liner (backing paper) after printing and the liner is wound up on a hub inside the printer's media compartment. Peel-off operation cannot be combined with fan-fold guides. The rewind unit is made up by the following main parts:

- The takeup hub assy (see Chapter 8.2 for details)
- The timing belt (fitted in all printers)
- The guide shaft



The takeup hub is driven by a pulley on the right side of the stepper motor via a timing belt, which runs in a recess in the center section behind the media guide assy. (To simplify manufacturing, the timing belt is fitted in all printers, but when there is no takeup unit it does not engage the pulley of the stepper motor). The dimensions of the pulleys make the takeup hub rotate somewhat faster than the media is being fed out, thus providing a certain tension to the liner. A wrapped spring clutch inside the takeup hub allows it to slip so as to limit the tension. An extra guide shaft fitted to the center section separates the liner from the media path.

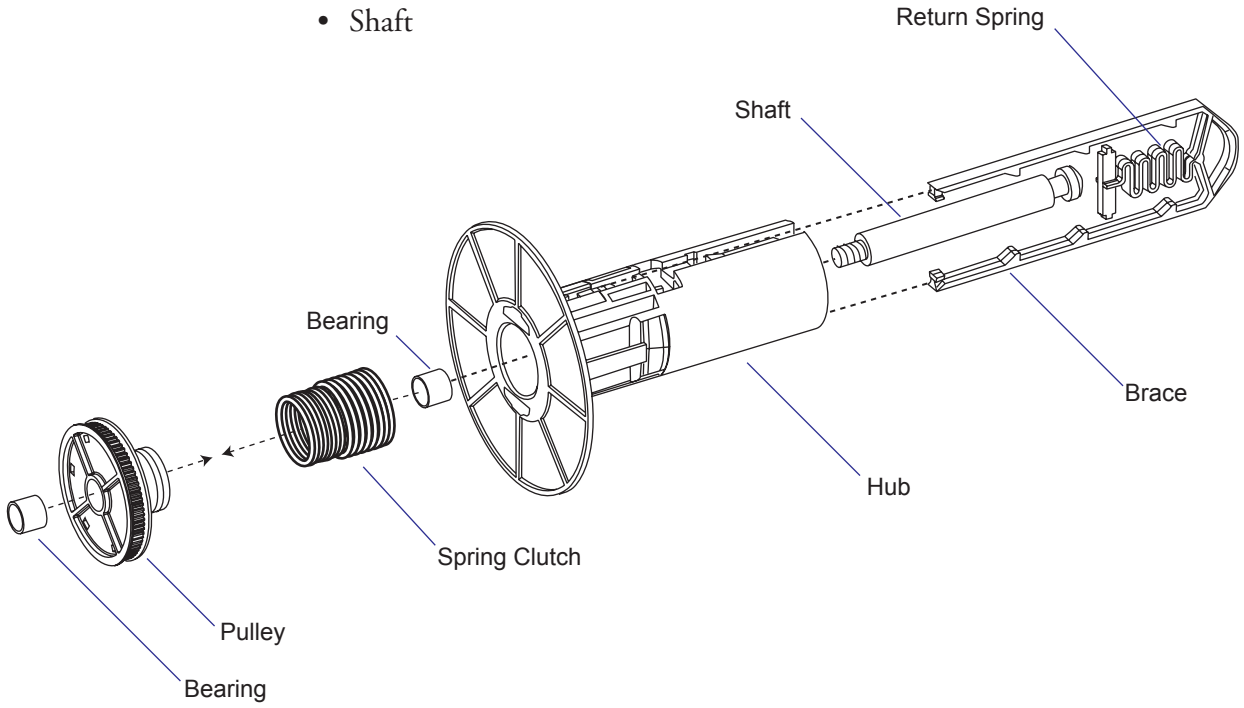
The liner drive roller (standard) underneath the platen roller helps pulling the liner (see Chapter 7.1).

The tension of the timing belt cannot be adjusted.

8.2 Takeup Unit Parts

The liner takeup unit consists of the following parts:

- Timing belt pulley (with flange and bearing)
- Hub (with spring clutch, bearing, and brace)
- Shaft



The threaded shaft is screwed into the center section. The timing belt pulley is fitted on the shaft and the timing belt is fitted around the pulley. The spring brake is mounted inside the bobbin and fits around the outer end of the pulley. It provides the necessary friction to keep the liner tight without pulling it too hard.

The brace collapses when being pulled out. The plastic spring inside the brace returns and expands the brace when it is released. Thus, the wound up liner can easily be removed at media replenishment.

The bobbin is held on the shaft by a snap-lock of the same type as the ribbon supply and rewind hubs (see Chapters 6.2 and 6.3).

When no rewind unit is fitted, the recess in the center section is covered by a circular cover plate, which can be removed using a #T20 Torx screwdriver.

8.3 Fitting a Liner Takeup Unit

Even if the liner takeup unit is intended to be factory-fitted, it is quite easy to upgrade a printer with such a device:

- Remove the cover plate from the center section using a #T20 Torx screwdriver.
- Pull out the rear part of the timing belt from inside the media guide assy.
- Fit the takeup pulley into the recess in the center section and wrap the timing belt around it. When you pull the timing belt, it will engage the pulley of the stepper motor.
- Screw the takeup shaft through the rewind pulley and into the center section using a pair of pliers. Then screw the takeup guide shaft into the center section. Use tape or similar to protect the shafts from being scratched by the tool.
- While rotating it, press the takeup hub onto the shaft and the pulley. Press until the snap-lock engages the groove in the shaft.

8.4 Replacing the Timing Belt

Replace a broken or worn-out timing belt like this:

- Remove the media guide assy. as described in Chapter 7.5, “Label Stop Sensor/Replacing the Sensors.”
- Pull out the rewind bobbin from the shaft. You will need two straight-slot screwdrivers or a special tool to pry the two legs of the snap-lock out of the groove in the shaft.
- Separate the pulley from the takeup hub while taking care so the spring clutch stays inside the hub.
- Fit a new timing belt over the pulley of the stepper motor.
- Put back the takeup pulley and rewind hub as described in Chapter 8.3.
- Reassemble remaining parts in reverse order.

9 Label Taken Sensor

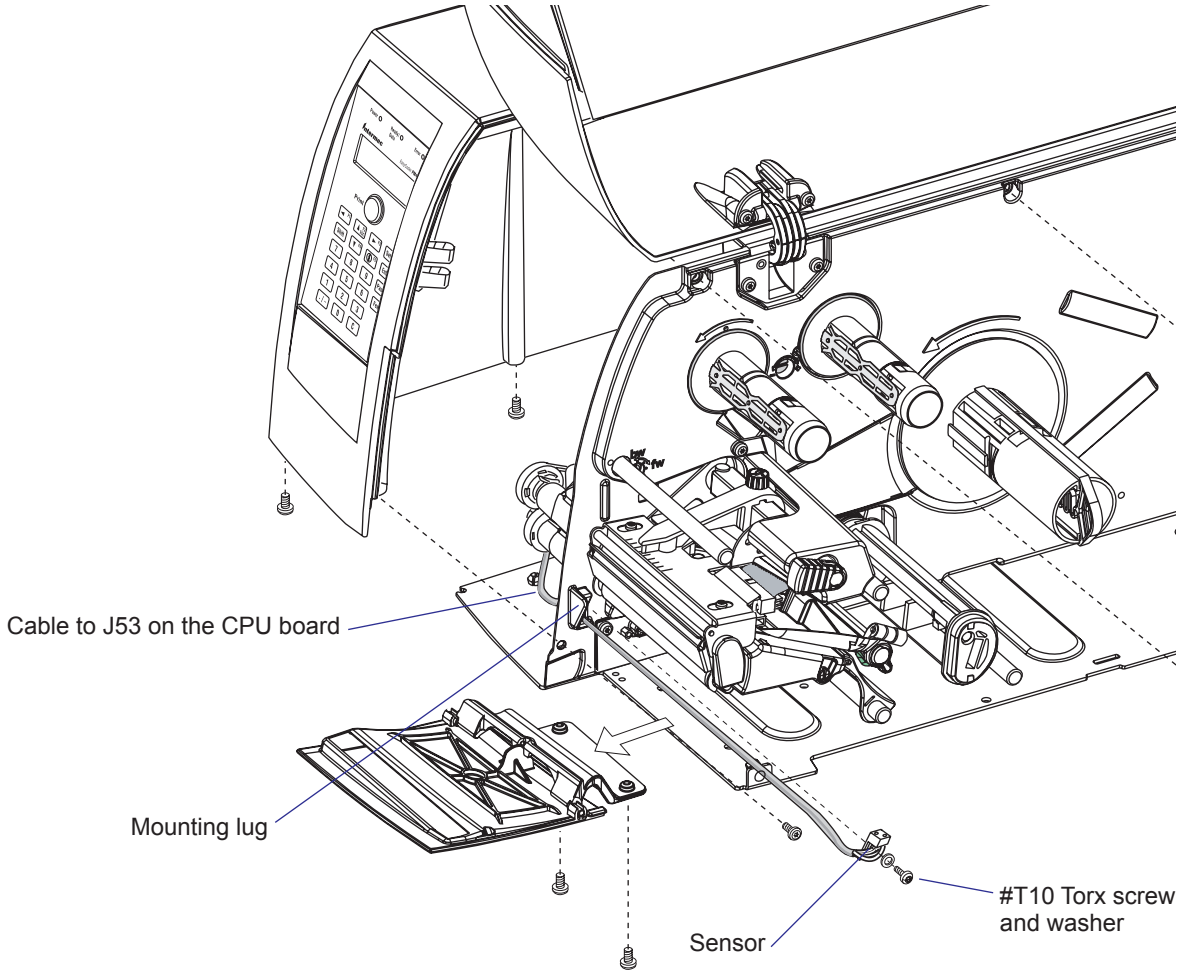
This chapter describes the optiona label taken sensor and covers the following topics:

- Description
- Replacement
- Activating the LTS
- Adjustment

9.1 Description

The Label Taken Sensor (LTS) is a factory-installed or field-installable optional device, which enables the printer's firmware to detect if the latest printed label, ticket, tag, etc. has been removed before printing another copy. It cannot be used in conjuction with a paper cutter, see Chapter 10.

The label taken sensor consists of a photoelectric sensor with a connection cable. The sensor is fitted to a lug at the front tip of the center section using a #T10 Torx screw and a washer. The cable is secured to the bottom plate inside the electronics compartment using two self-adhesive cable clips.



A LED (light-emitting diode) in the LTS emits a narrow beam of light, which will be reflected back to a photoelectric sensor by any label, ticket, tag, piece of strip, or liner, that has not been removed from the outfeed area. A prerequisite is that the media is fed out along the center section of the printer.

The LTS is connected to J53 on the CPU board. The sensitivity is adjusted in the Setup Mode, see Chapter 9.3.

The theoretical point of detection of the LTS is situated 20.7 mm (0.81in.) outside the inner edge of the media path and immediately in front of the tear bar.

9.2 Replacement

The LTS comes as a complete assembly of sensor and cable. To replace a faulty LTS, proceed as follows.

- Switch off the power and disconnect the power cord.
- Remove the left-hand cover as described in Chapter 3.2.
- Remove the front door as described in Chapter 3.3.
- Disconnect the LTS cable from the CPU board.
- Remove the #T10 Torx screw nad washer that hold the sensor.
- Pull the LTS through the hole in the center section into the electronics compartment.
- Fit a new LTS assembly in reverse order.
- Start up the printer, enter the Setup Mode and adjust the sensitivity of the new LTS as described in Chapter 9.3.

9.3 Activating the LTS

In Fingerprint, the label taken sensor is enabled using the instruction LTS& ON.

In IPL, the self-strip mode must be enbled. This can also be done by executing the following commands:

```
<STX>R<ETX>          (Enter print/configuration mode)
<STX><SI>t1<ETX>     (Enable self-strip)
```

9.4 Adjustment

The sensitivity of the Label Taken Sensor (LTS) may need to be adjusted according to the ambient light conditions and the reflective characteristics of the back side of the media.

Fingerprint

The sensitivity can be adjusted in the Setup Mode (see Appendix 1), or by using setup files or setup strings (see *Intermec Fingerprint v8.xx, Programmer's Reference Manual*). In the Setup Mode, the LTS setup options are only displayed if an optional label taken sensor is installed in the printer.

- **LTS Adjust:**
  Press <**Enter**>. A label is fed out. Remove the label and press <**Enter**> again. A menu shows the sensitivity automatically selected by the firmware and the range in which the LTS will work. Press <**Enter**> again and you will proceed to the LTS Test menu.
- **LTS Test:**
  Press <**Enter**>. A label is fed out. Remove the label and a new label should be fed out automatically. Repeat until you are sure the LTS works properly. Then press <**Enter**> to stop and exit.
- **LTS Value:**
  Press <**Enter**>. You can enter a new value in the range indicated in the LTS Adjust menu (see above). Min/max values are in the range 0-10.

IPL

The sensitivity can be adjusted in the Setup Mode (see Appendix 1).

- In the Setup Mode, select the Configuration option.
- Select LTS Calibration and press the ▼ key.
- Press <**Enter**>
- A number of labels are fed out. Remove the labels and press <**Enter**>.
- The sensor has now been automatically adjusted and the resulting sensitivity is displayed as a numeric value in the range of 8 to 14.

10 Paper Cutter

This chapter descibes the optional paper cutter for EasyCoder PM4i. The chapter covers the following topics:

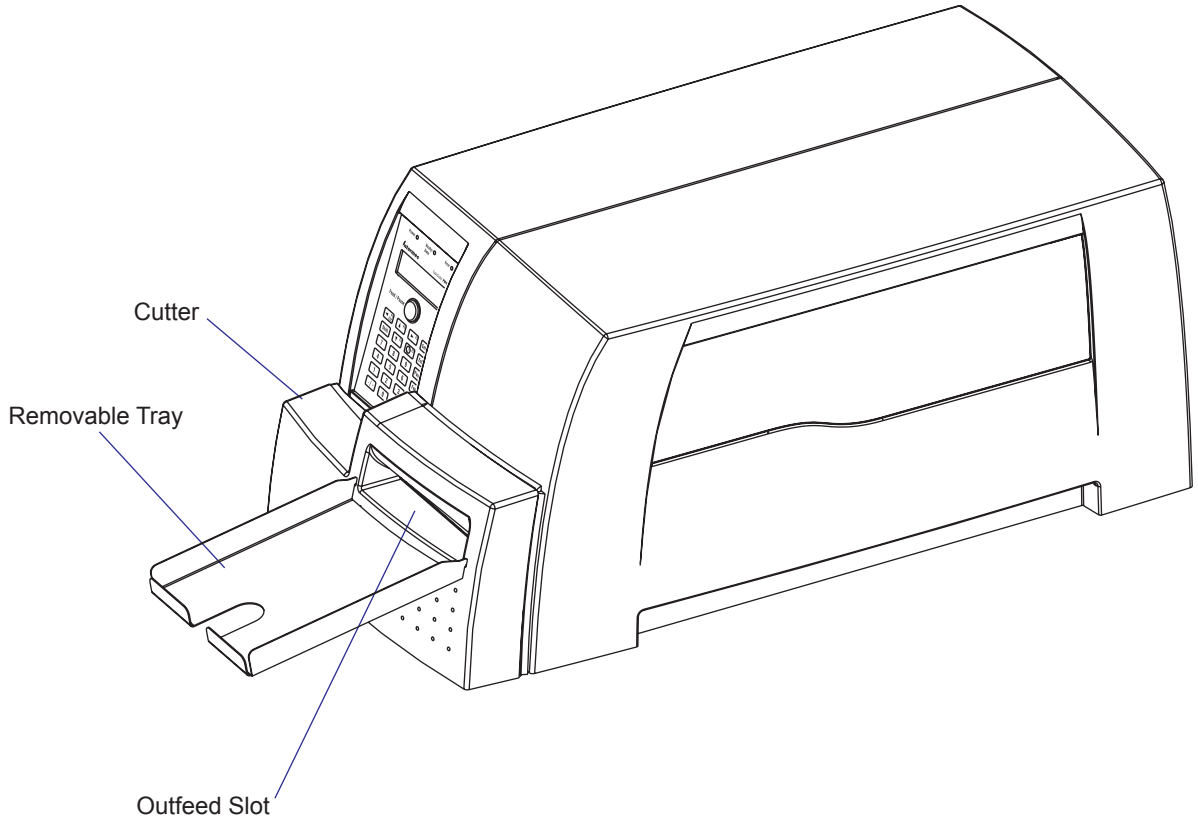
- Description
- Installation
- Controlling the cutter
- Media load
- Servicing
- Cutter PCB

10.1 Description

The cutter is a factory-installed or field-installable option for the Easy-Coder PM4i. The cutter automatically cuts off the media after printing according to instructions in the controlling firmware. The cut off portions of media are presented at the front of the cutter and can be collected on a removeable tray.

The cutter can be tilted forward to facilitate media load. As a safety measure, the cutter can only operate when being completely closed.

The cutter prevents an optional label taken sensor from working, even if it not necessary to remove it before fitting the cutter.



The cutter is primarily intended to cut paper-based media in the form of continuous stock. It is also possible to cut through the liner between labels, but be careful not to cut through the labels themselves, because the adhesive will stick to the cutting blade and may cause malfunction.

Avoid cutting soft plastic-based media.

Minimum media thickness: 78µm

Maximum media thickness: 175µm

For measures, refer to Chapters 1.6 and 1.7.

The weight of the cutter is approximately 1.8 kg (4.0 lb).

10.2 Installation

The cutter is easy to install and requires no modification of the printer itself.

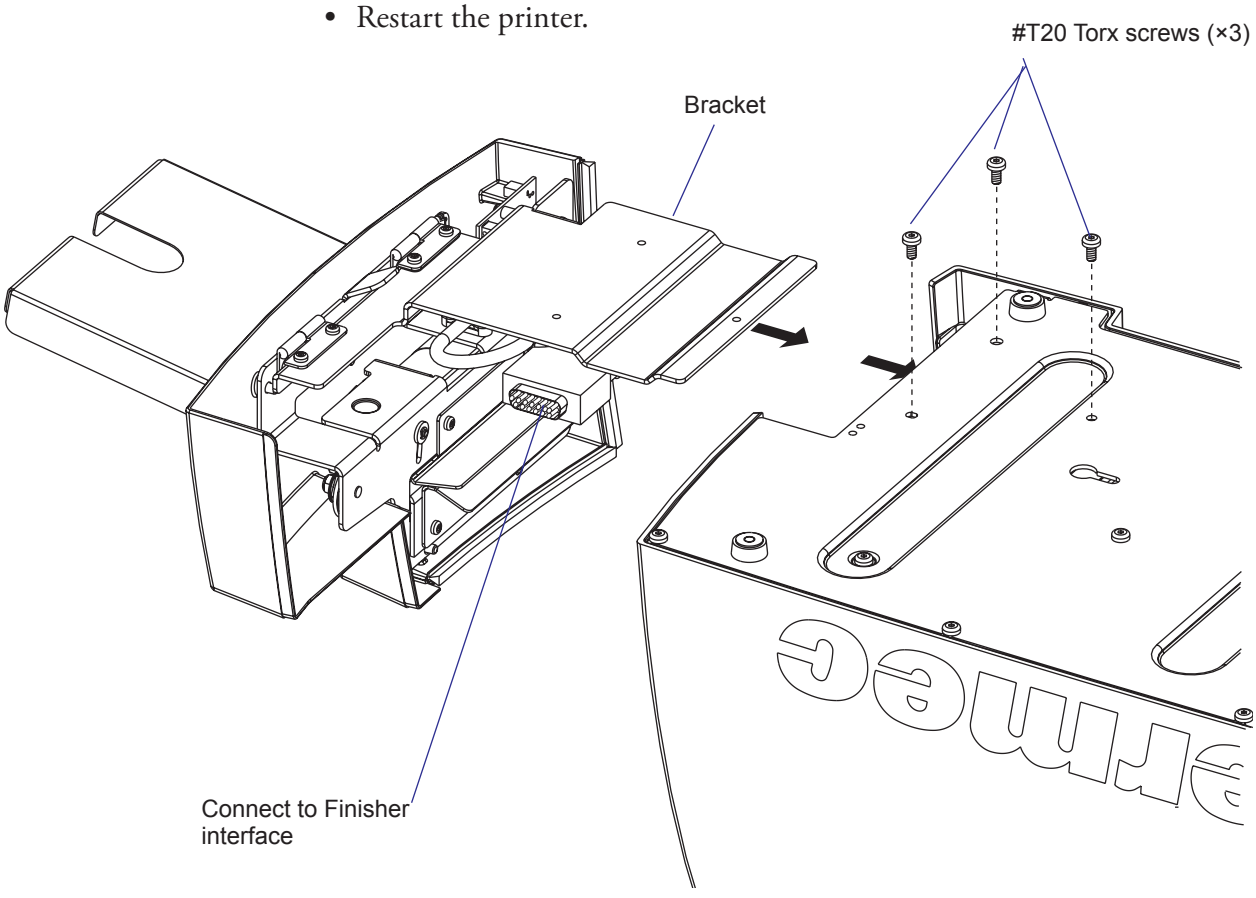
The installation kit contains:

- Cutter unit (1)
- Tray (1)
- #T20 Torx screws(3)
- Installation Instructions (1)

The only tool required is a #T20 Torx screwdriver.

Install the cutter this way:

- Turn the printer upside down on a soft piece of cloth or similar.
- Remove the front door, see Chapter 3.3.
- Insert the cutter bracket between the printer's bottom plate and print mechanism so the three thread bushings on the bracket fits into the corresponding holes in the printer's bottom plate. Fit it using the three #T20 Torx screws included in the kit.
- Turn the printer back on its feet.
- Open the right-hand door.
- Connect the cutter cable to the Finisher interface connector underneath the print mechanism.
- Restart the printer.



10.3 Controlling the Cutter

Fingerprint

The cutter is activated by CUT or CUT ON statements, see the *Intermec Fingerprint v8.xx,*or the *Intermec Direct Protocol v8.xx* manuals. Application programs may have related facilities for operating the cutter.

The edge will cut through the media approx. 33 mm (1.3 inches) in front of the printer's dot line. The following values are recommended for cutting:

Type of Cutting	8 dots/mm printhead	11.81 dots/mm printhead
Cut between labels w. gaps		
Start adjust:	- 325 dots	- 480 dots
Stop adjust:	+ 240 dots	+ 354 dots
Cut fix and variable length strip (no liner!)		
Start adjust:	- 340 dots	- 502 dots
Stop adjust:	+ 340 dots	+ 502 dots

IPL

The cutter can be enabled/disabled in the Configuration part of the setup mode or using the command <STX><SI>Cn<ETX>, where n= 0 disables the cutter and n=1 enables it. When the cutter is enabled, the media feed is automatically adjusted for cut-off operation.

When the cutter is not enabled, a cut operation (advance label and cut) can be executed using the command <STX><SO><ETX>.

Also see *IPL Programming, Reference Manual*.

10.4 Media Load

Load media following the descriptions in the User's Guide for Media Load/Cut-Off operation (optionally with Quick-Load guides). The cutter is held by a snap lock and can be tilted forward to facilitate media load. Always engage the printhead in order to hold the media before closing the cutter.

10.5 Servicing

The cutter mechanism and the circuit board becomes accessible when the cover is removed. The cover is held by one #T20 Torx screw. It is not necessary to remove the entire cutter unit.

The cutter shears will need to be cleaned from adhesive residue if the cutter has been used for cutting through labels, something that is not advisible. Use isopropyl alcohol (see warning text on the container). The extreme positions of the moving cutting shear (that is, the shear is in top or home/bottom position) is detected by a sensor at the tip of the circuit board and a microswitch at the right side of the cutter assy.

Fingerprint only

If the following errors occur, clean the shears from adhesive residue and the sensor from dust.

- 1701 *"Cutter error1"*
  A cut has been performed but the shear has stopped on its way back to home (bottom) position.
- 1702 *"Cutter error2"*
  The cutter has failed to cut after several attempt (3 is default) and the shear has returned to home (bottom) position.
- 1703 *"Cutter error3"*
  The cutter has failed to cut and the shear has stopped before returning to home (bottom) position.

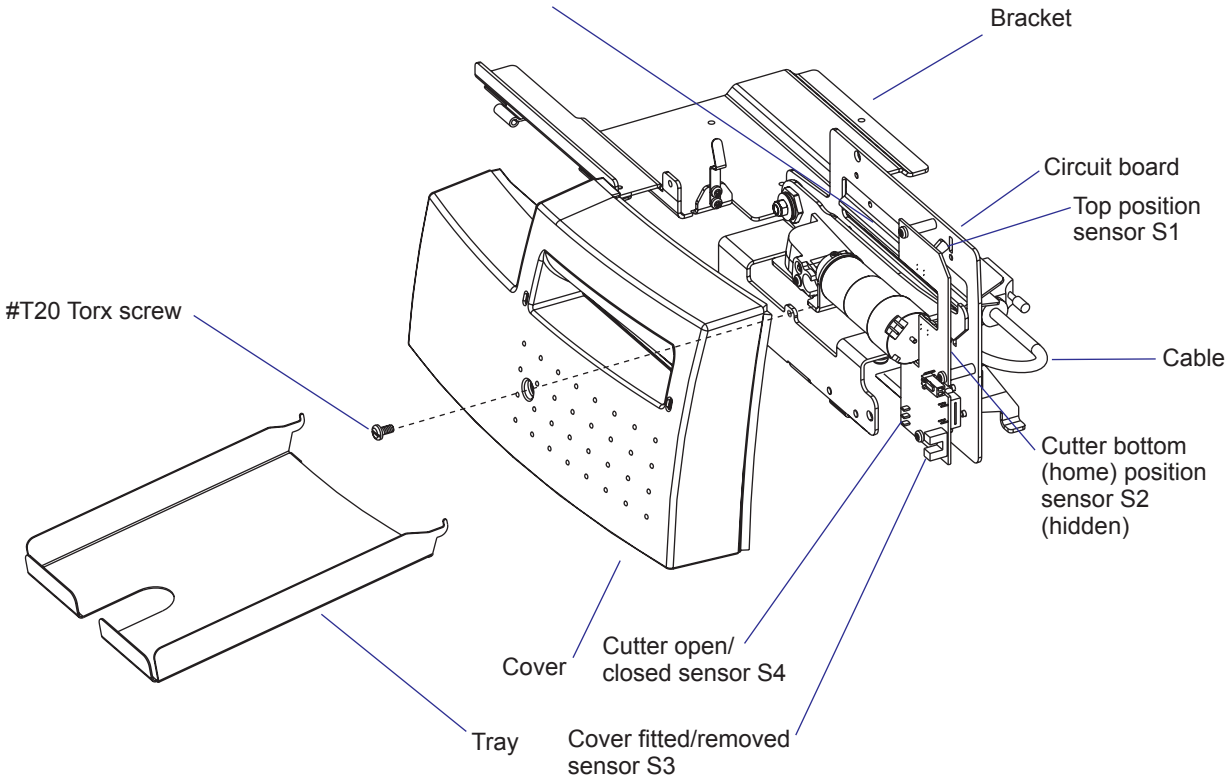
If the cutter cable connector has come loose from Finisher interface, Error 37, *"Cutter device not found"* or Error 1059, *"Cutter does not respond"* will occur.

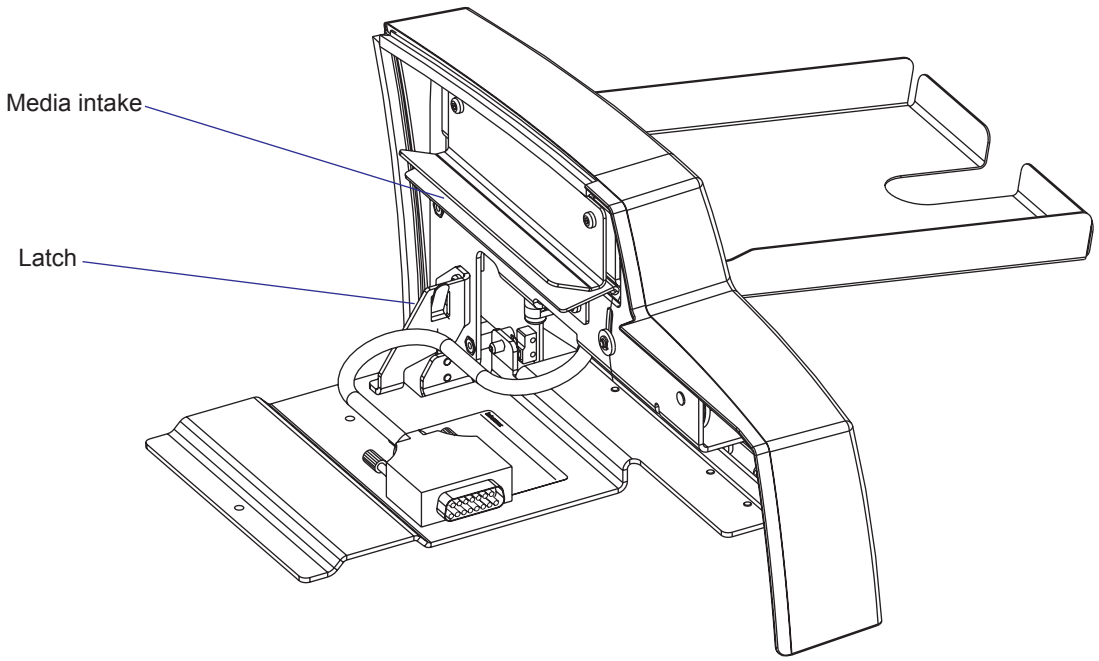
If the "cutter open/closed" microswitch on the cutter assy is faulty, Error 1704, *"Cutter open"* will occur, even if the cutter in fact is closed.

IPL only

IPL reports if the cutter has failed to return to home position by displaying the message *"Open&shut cutter."* Follow that instruction. If the error persists, clean the shears from adhesive residue and the sensor from dust.

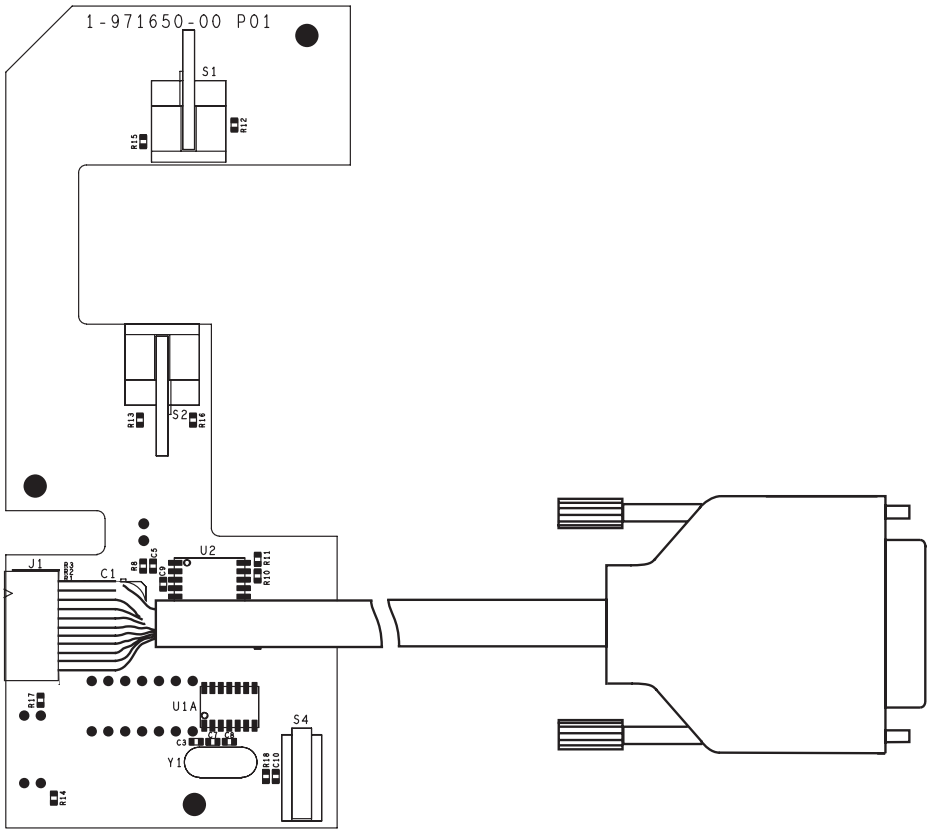
Lubricated Parts
No isolpropyl alcohol here!



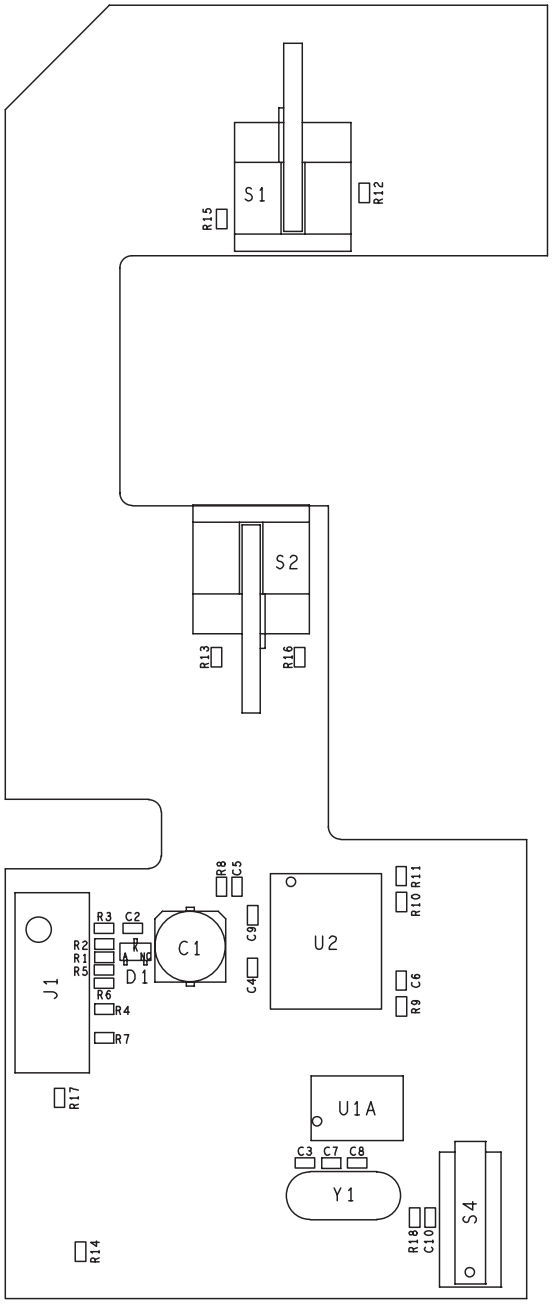


10.6 Cutter PCB

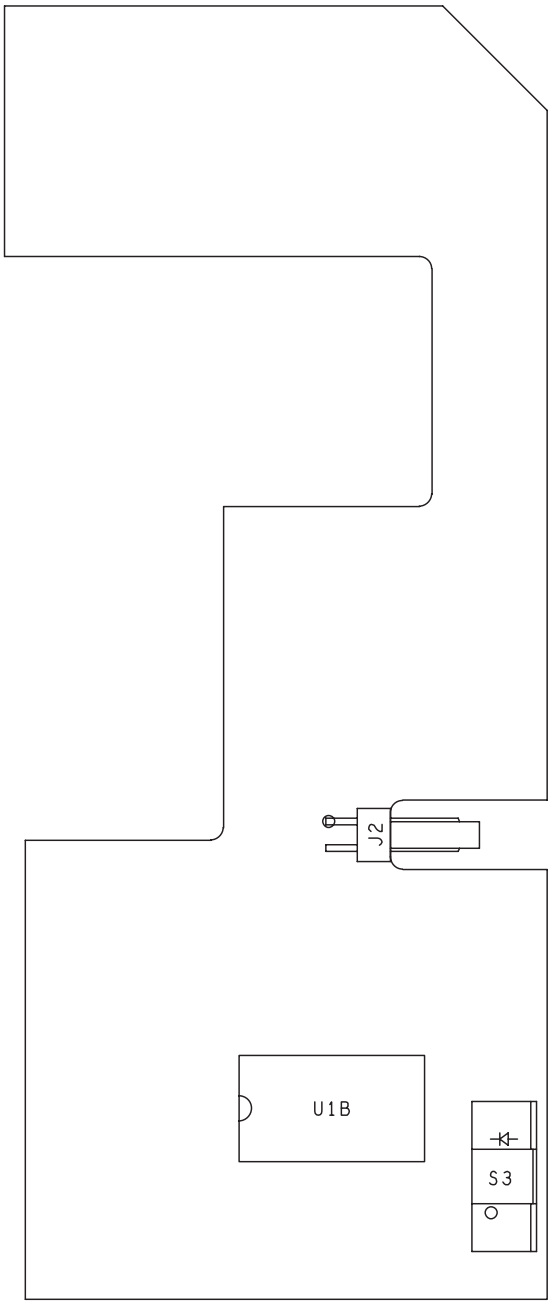
1-971650-50 Cutter Circuit Board assy.



1-971650-25 Cutter Circuit Board; Components

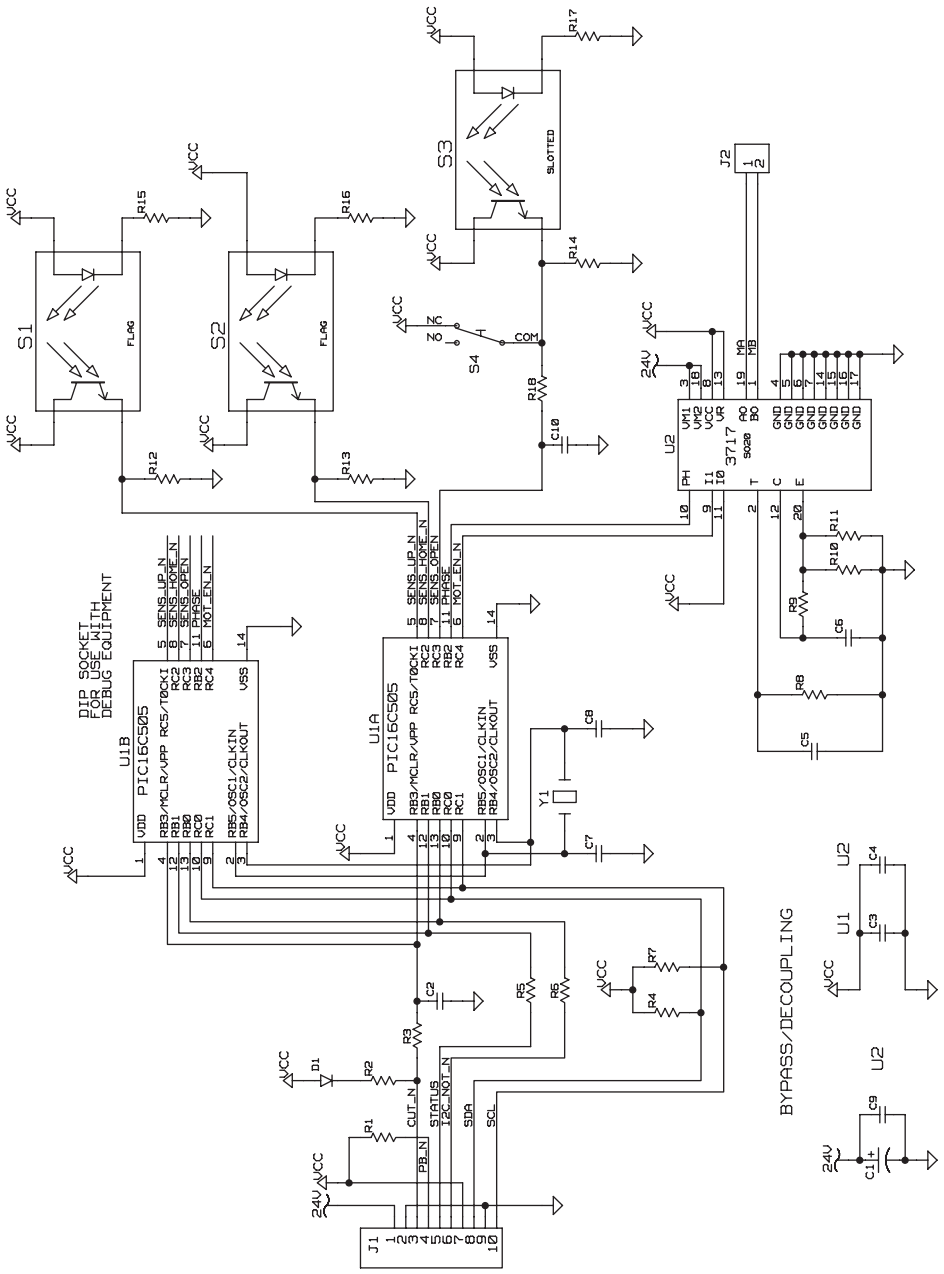


Primary Side



Secondary Side

1-971650-25 Cutter Circuit Board; Schematics



11 Electronics Compartment

This chapter describes how to access the electronics compartment and shows the main parts.

The electronics compartment contains wires and circuits with high voltage. Before removing the front/left cover or the bottom plate, make sure that the power is off and the power cord is disconnected from the printer.

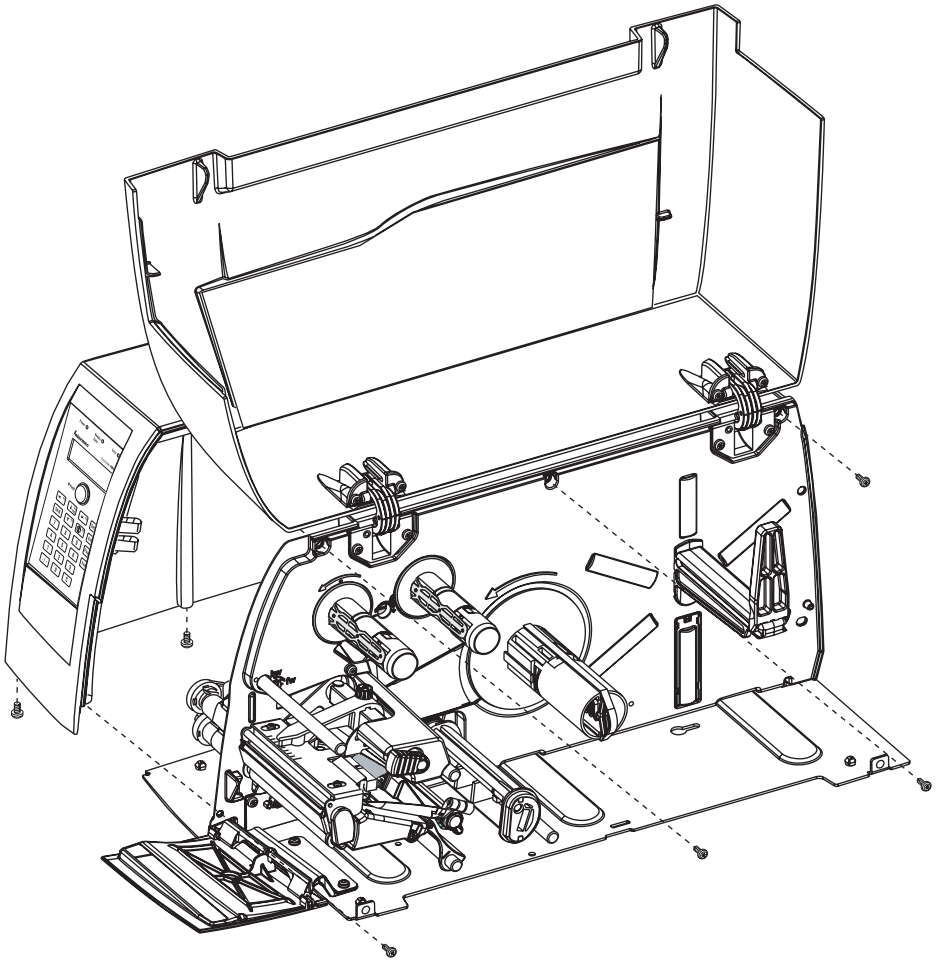
11.1 Introduction

The Electronics Compartment is off limits to the normal user, but for the authorized service technician, it contains a number of parts of great interest:

- The stepper motor and timing belts of the platen and liner drive rollers.
- The ribbon feed motor.
- The headlift mechanism and sensor.
- The CPU board.
- The power supply unit.
- Optionally one or two extra interface boards and/or one EasyLAN board.

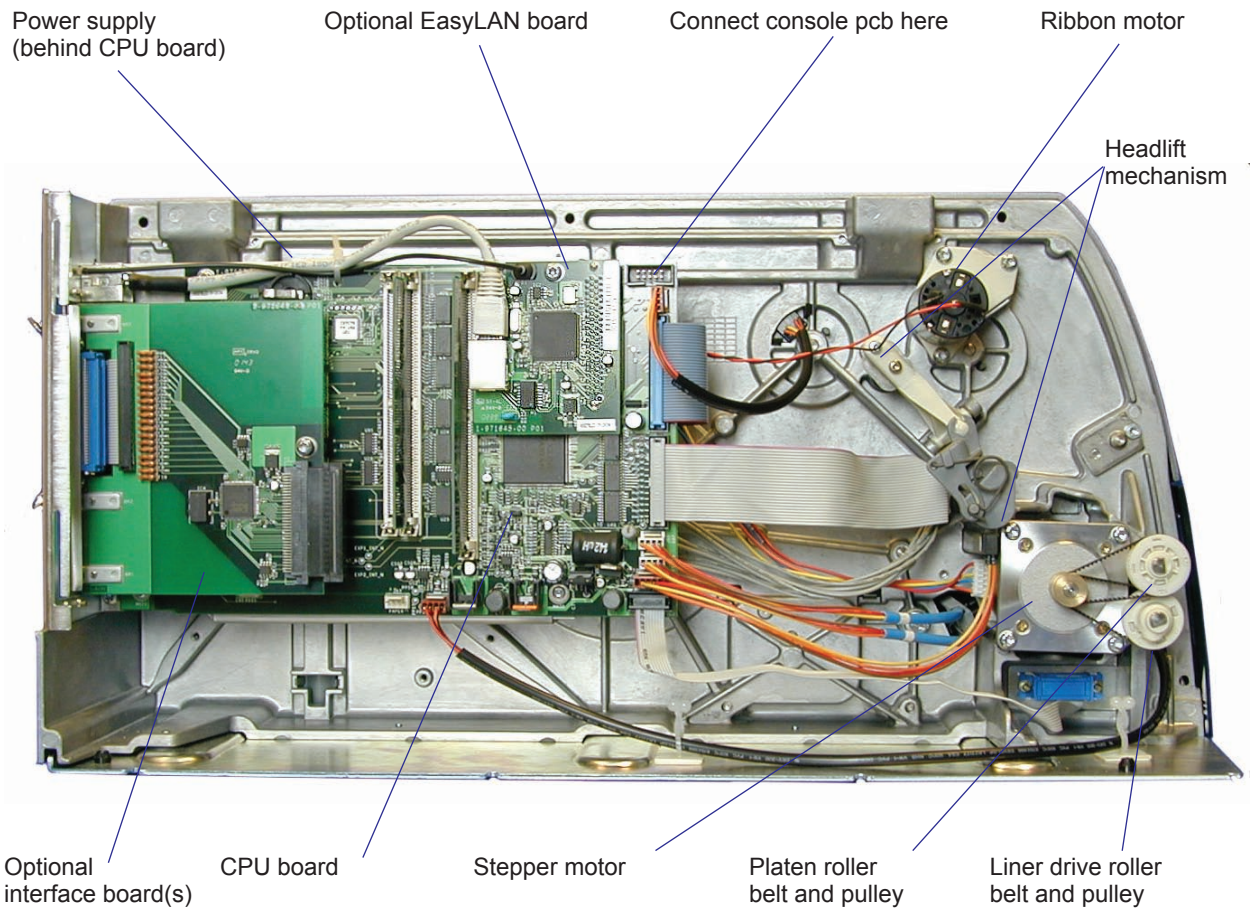
11.2 Accessing the Electronics Compartment

To gain access to the electronics compartment, remove the front/left-hand cover as described in Chapter 3.2. To completely remove the cover, you will need to disconnect the cable to the console pcb from J50 on the CPU board.



11.3 Main Parts

This is what you may see when you remove the front/left-hand cover from an EasyCoder PM4i printer.



12 Power Supply

This chapter describes the power supply unit (PSU) which is fitted in the electronics compartment, see Chapter 11.

The electronics compartment contains wires and circuits with high voltage. Before removing the front/left cover or the bottom plate, make sure that the power is off and the power cord is disconnected from the printer.

The chapter covers the following topics:

- Description
- Replacement
- Components
- Schematics

12.1 Description

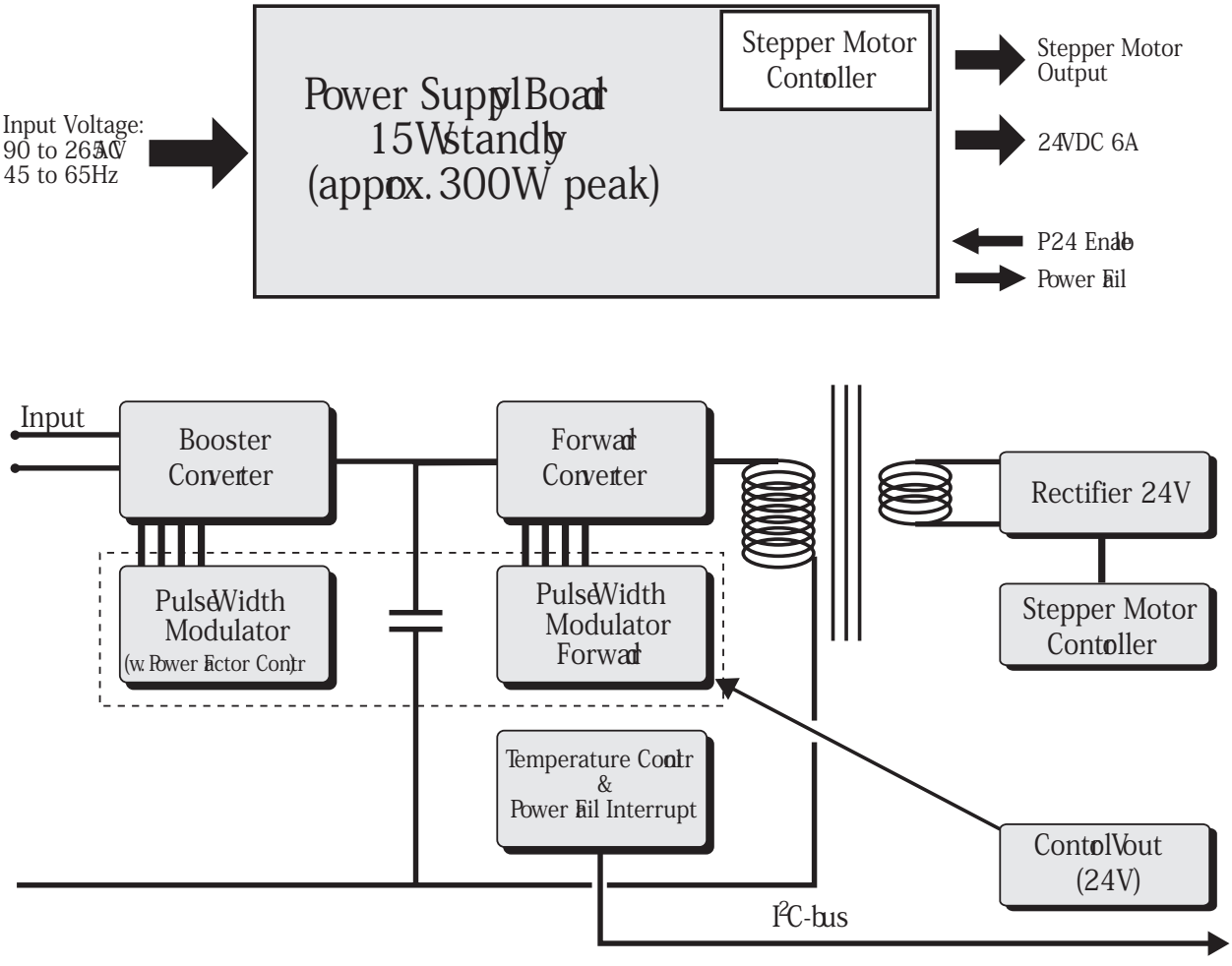
The Power Supply Unit (PSU) is identical in all EasyCoder PF2/4i- and PM4i-series printers. It is situated inside the electronics compartment between the CPU board and the center section.

No attempt to repair this unit is allowed. Never replace a blown fuse, but replace the entire PSU.

The power supply unit is primary-switched with power correction factor controller so as to comply with the CE regulations, which require a sinus-shaped load curve. It is designed for input voltages in the range of 90 to 265 VAC, 45 to 65Hz. There is no manual switch.

The unit requires 15W at standby and 300W peak. It produces 24VDC only; all other voltages are transformed from 24VDC by the CPU board. The CPU board controls the PSU over the I2C bus, where also identification and error signals are transmitted to the CPU board. Voltage and temperature are monitored and the unit is over-current protected.

The PSU consists of the following main parts:



Power Factor Control

The power factor control transforms the AC input voltage to 385 VDC by sensing the shape of the curve of the input voltage and chopping it to short pulses, where the pulse amplitude follows the shape of the curve. The booster is protected by two 4A fuses.

Forward Converter

The forward converter transforms 385 VDC to 24 VDC 0-6A. The 24VDC is the bulk voltage and is used for all parts of the printer. Other voltages needed for internal devices are locally transformed from 24VDC.

Connections

P1 24VDC to CPU board, control lines, and I^2C bus communication between PSU and CPU board.

P5 24 VDC to printhead

P6 Ribbon motor

P7 Not used

P8 ISR connector (not used)

P10 Stepper motor

X1 Input voltage 90 to 265 VAC, 45 to 65Hz

Overheating Protection

The power supply unit is fitted with a sensor that will shut down the unit in case of overheating (Power Fail Interrupt or PFI) and another sensor that will warn the main CPU if the power supply is getting hot (Notify). A Power Fail Interrupt (PFI) signal will warn the logics so valuable data can be saved before power is lost. Before a print operation is executed, the Notify signal is checked. If the Notify signal is activated, a warning is shown in the display and the main CPU will reduce the power consumption to avoid shutdown by detaining the printing until the Notify signal is deactivated.

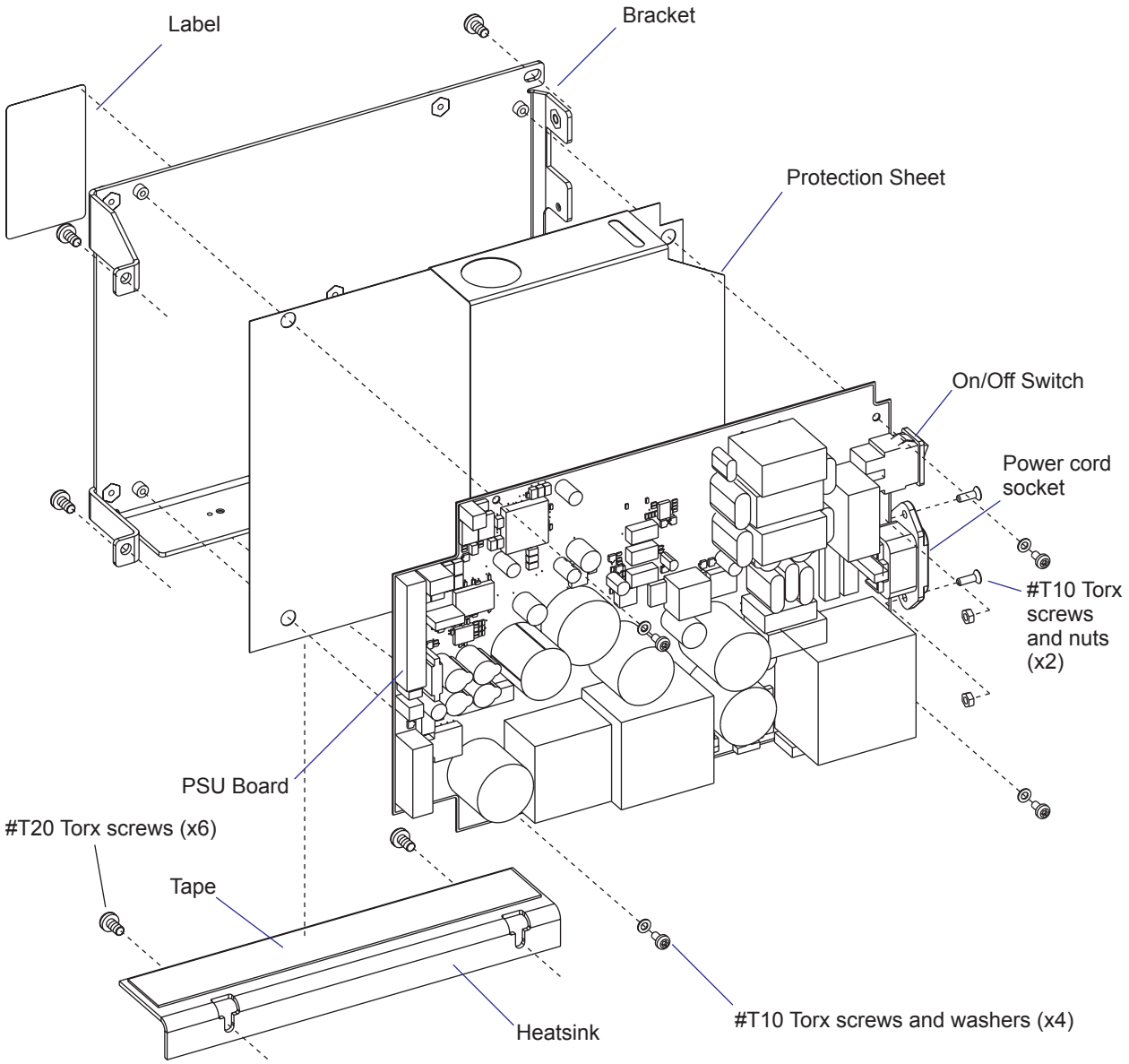
Primary switched power supplies are generally difficult to repair. If one component fails due to aging or overload, a number of other components will also break as a consequence. They are hard to troubleshoot, because the PSU often is "dead" or the fuses blow immediately. It is also impossible to guarantee the life of a repaired PSU, because components may still work but be on the verge of failing. Thus, if a fuse blows, do not attempt repairing the PSU, but replace the entire unit!

12.2 Replacing the Power Supply Unit

The PSU comes as a complete unit consisting of a large metal bracket to which the following parts are factory-fitted:

- Plastic protection sheet
- Power supply pcb (attached to the bracket using four #T10 Torx screws and washers)
- AC power cord socket (attached to the bracket using two #T10 Torx screws and nuts)
- On/off switch (attached to the bracket using snap-locks)
- Label
- Heatsink (attached to bracket using doublesided tape)

The bracket and heatsink are fitted to the center section using six #T20 Torx screws.

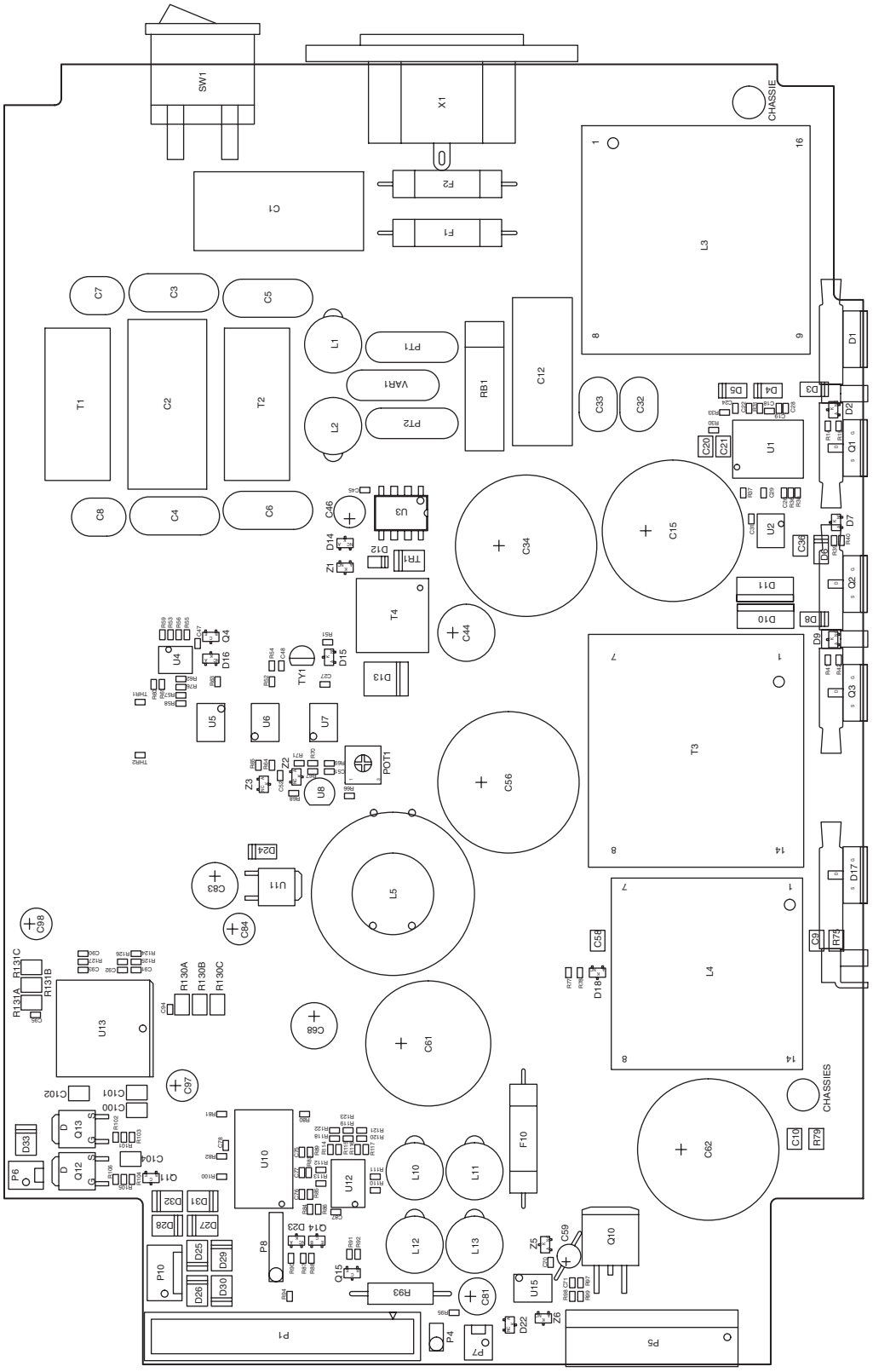


Power supply unit without heatsink (simplified drawing)

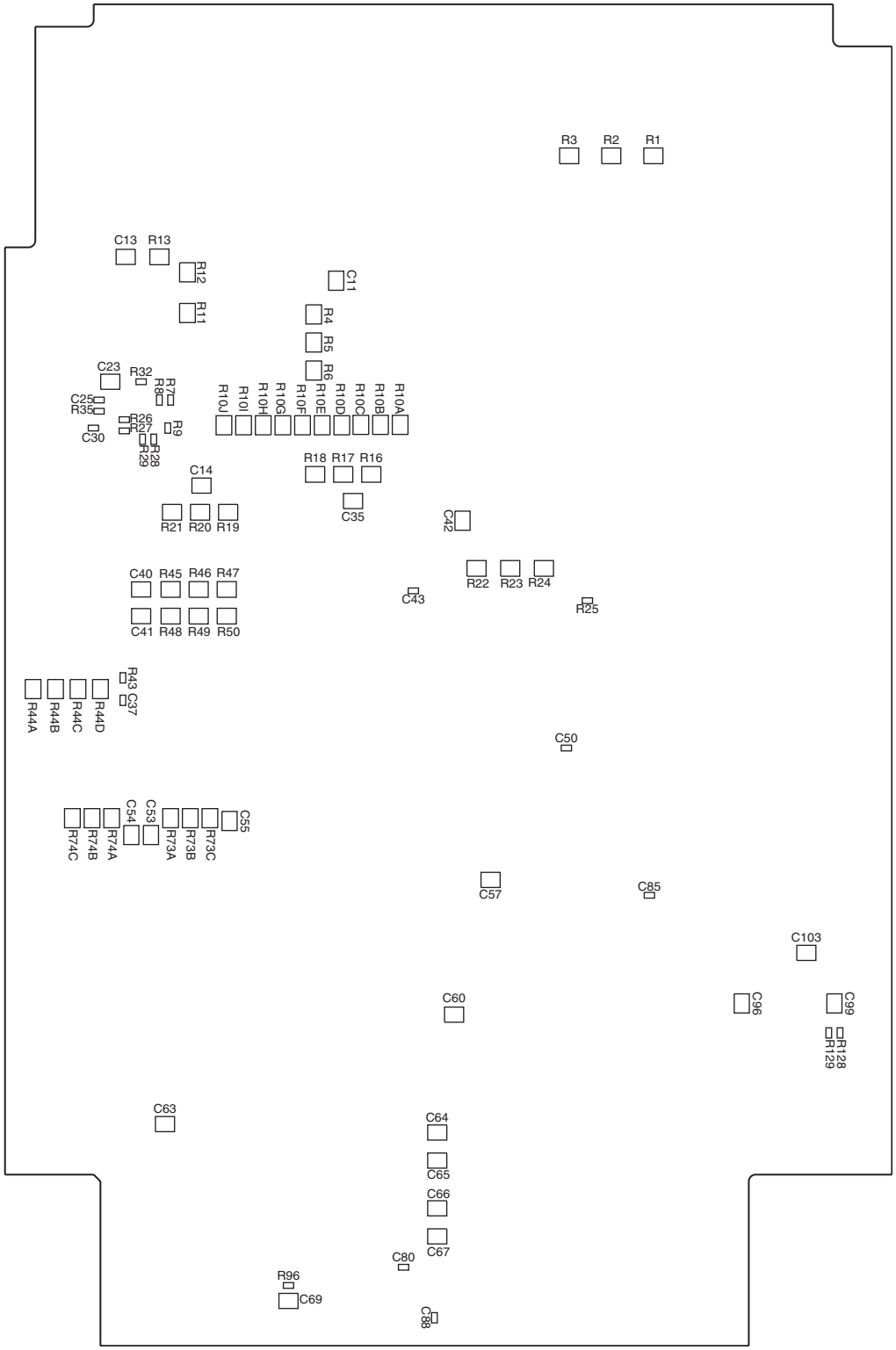
Replacement Procedure

- Take precautions to avoid any electrostatic discharges.
- Switch off the printer and disconnect the power cord and all interface cables on the rear plate.
- Remove the front/left-hand cover as described in Chapter 3.2.
- Remove any interface bord connected or attached to the CPU board.
- Disconnect all cables from the CPU board and remove it (see Chapter 13.3). The CPU board is held to the PSU bracket using four #T20 screws and one hexagonal spacer.
- Remove the six #T20 Torx screws that hold the PSU bracket/heatsink assy to the center section.
- Do not dismantle the PSU. Replace the entire unit!
- Assemble in reverse order.

12.3 Components

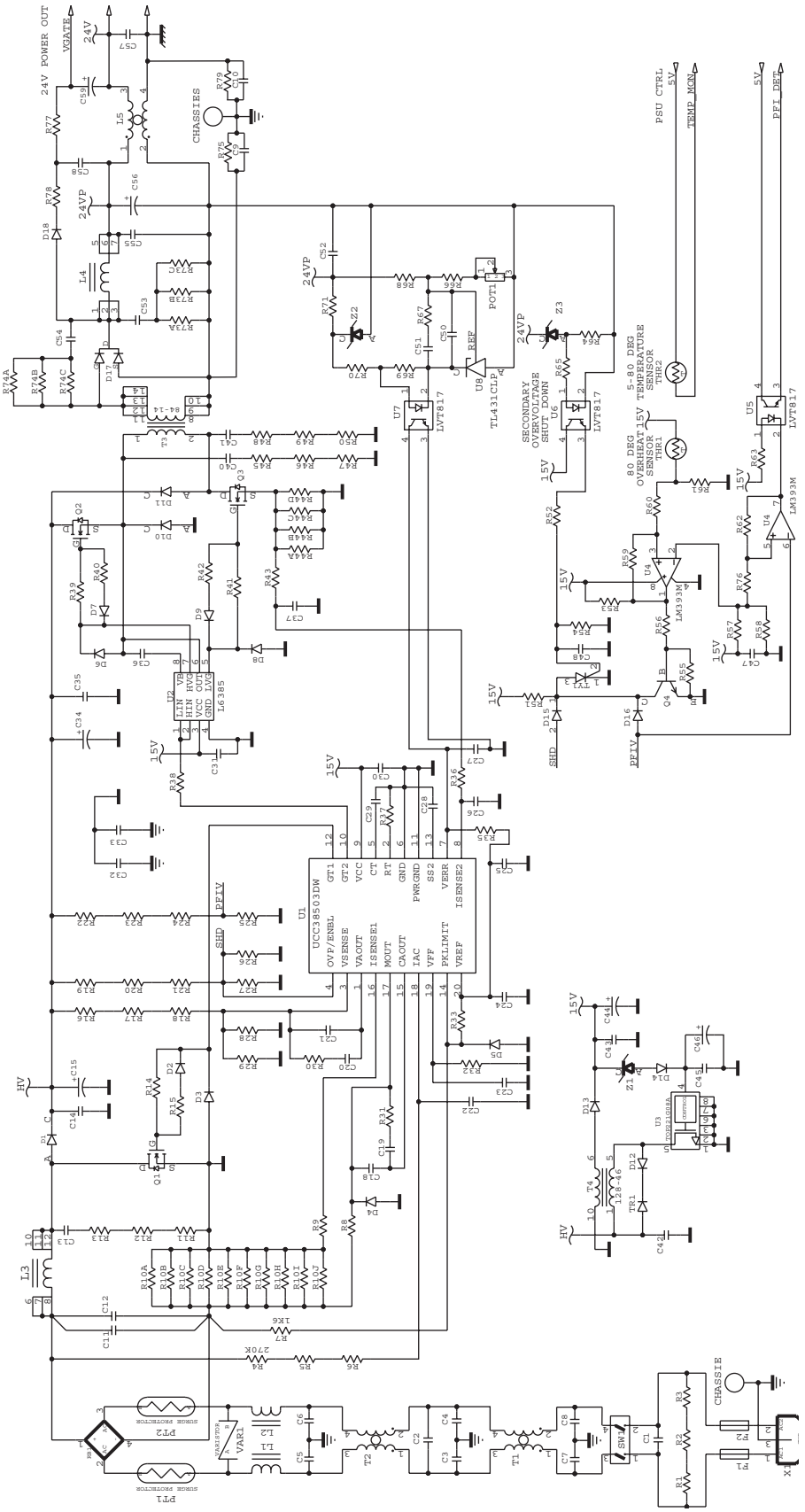


1-971631-25 Power Supply Unit; Component side

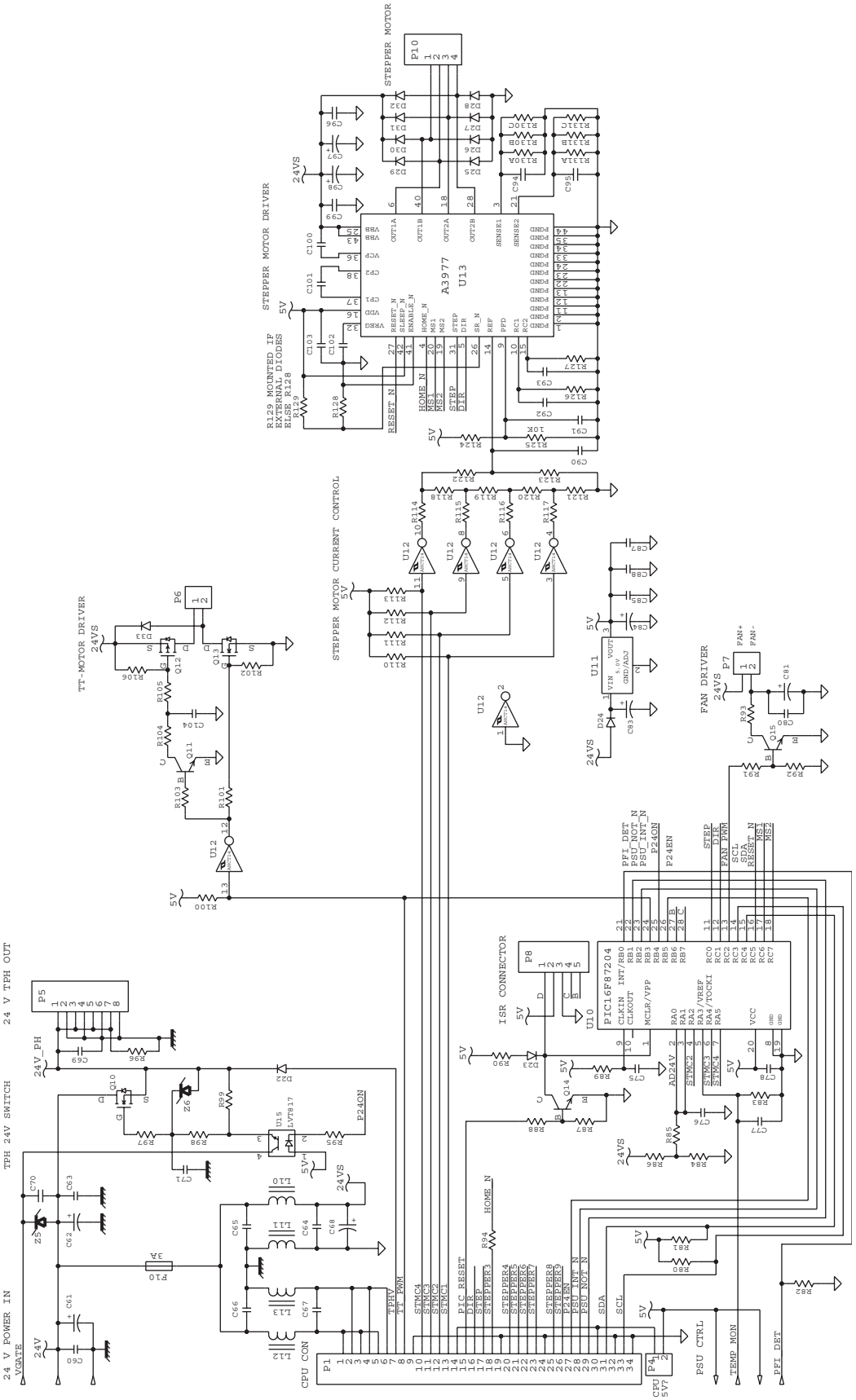


1-971631-25 Power Supply Unit; Soldering side

12.4 Schematics



1-971631-25 Power Supply Unit; AC to 24VDC



1-971631-25 Power Supply Unit; Driver and CPU Interfaces

13 CPU Board

This chapter describes the CPU board which is fitted in the electronics compartment, see Chapter 11.

The electronics compartment contains wires and circuits with high voltage. Before removing the front/left cover or the bottom plate, make sure that the power is off and the power cord is disconnected from the printer.

Before touching the CPU board, take precautions to aviod any electrostatic discharges.

The chapter covers the following topics:

- Description
- Circuits
- Connectors
- Test points
- Startup
- Components
- Schematics

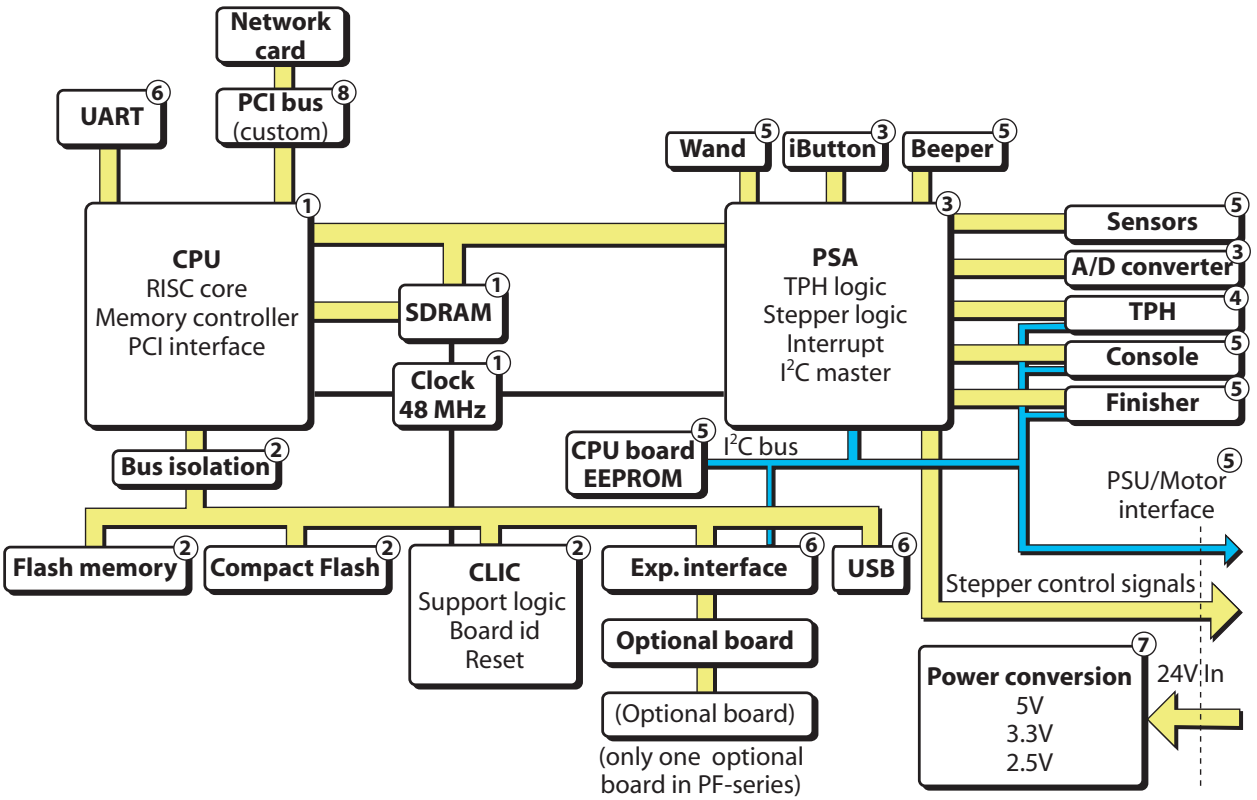
Note: Devices and file systems, such as "/c:" or "uart1:", are only used in Fingerprint. Some may also exist in IPL, but are hidden to the user.

13.1 Description

The CPU board is a four-layer board with most of its circuits surface-mounted. Inside the laminate are a combined VCC layer (5V/3.3V/2.5V) and a GND layer. The front and back sides are signal routing layers.

The hardware contains of the following main functions:

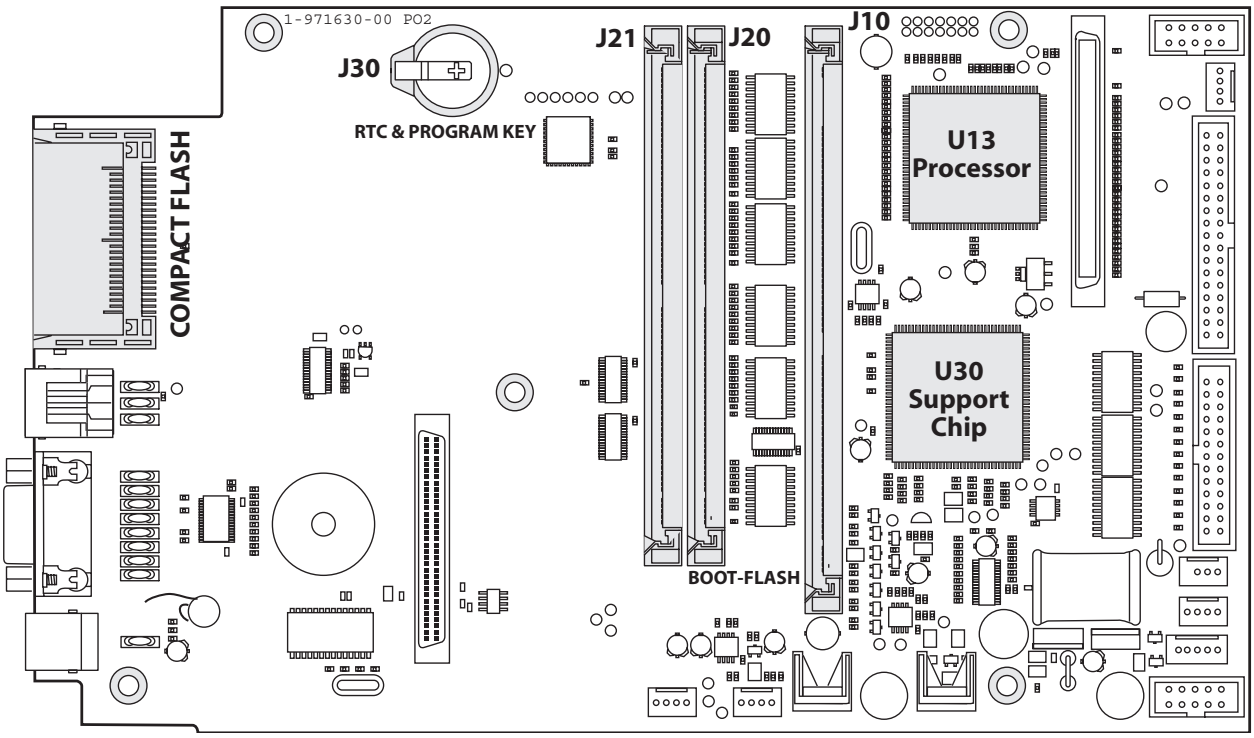
- Processor core
- Thermal printhead driver
- Stepper motor control logic
- Sensor drivers
- Communication, such as UART, USB, etc.
- Flash memory SIMM for the firmware and non-volatile storage
- SDRAM SIMM for working memory
- A/D converter for sensor adjustment, etc.
- Compact Flash memory card expansion
- Expansion bus
- PCI bus (custom)



1-971630-25 CPU board; Block Diagram
(numbers refer to schematics in Chapter 13.7)

13.2 Circuits

Components mentioned in this chapter are marked with gray in the drawing below.



Processor (U13)

The processor is a 32-bit RISC offering about 125 MIPS at the internal clock speed 96MHz. The internal bus speed is twice the external bus speed at 48MHz. The processor has several features, such as integrated SDRAM controller, PCI bridge, DMA, UART, timers, etc.

Support Chip (U30)

The PSA (Processor Support ASIC) is a programmable logic device, which is programmed by the firmware at each startup. It contains most of the printer-specific and other logic functions, such as

- Printhead data and strobe control
- Stepper and DC motor logic
- Sensor interface
- Timers and interrupt control
- Control logic for bar code wand and the electronic key/RTC
- I^2C master
- Beeper signal generation
- Interface to A/D converter, console, finisher, etc.

Flash Memory (J20 and J21)

There are two sockets for Flash SIMMs (marked "BOOT FLASH" and "EXP FLASH"). A SIMM (Single Inline Memory Module) must **always** be fitted in J20 since this bank is the Bootbank. As standard, a single 4MB flash SIMM is fitted. It contains the following sectors:

Device[1]	Size	Type	Used for
–	128K	Boot	Startup
/c	2048K	User file system or Kernel[1]	FP: Customer's programs, files, images IPL: Formats, images, fonts
/c	1856K	User file system	FP: Customer's programs, files, images IPL: Formats, images, fonts
–	32K	TMP area	Media feed info, odometer value, etc.
–	32K	Parameters	Media feed info, odometer value, etc.

[1]/. Devices are used in Fingerprint, but are hidden in IPL.

[2]/. This sector can be used for the kernel or for the file system (/c). If it is used for the file system, the kernel is placed in the file system under the /c/boot directory, which is the normal configuration, enabling the size difference between 2048K and the real kernel size to be used in /c. Refer to the *Intermec Fingerprint v8.xx, Programmer's Reference Manual* for a complete list of files stored in /c and /rom by default. The kernel includes Fingerprint or IPL firmware, bar codes, standard fonts, standard images, Intermec Shell, auxiliary programs, default setup values, and the EasyLAN home page files.

The flash memory retains its content at power off without any battery backup. It consists of sectors that can be erased and written to over and over again. This is done automatically in the background. At power-up, the flash memory is reorganized to avoid fragmentation. Before a sector is erased, its content will be copied to a temporary area as a safety measure if something should go wrong, for example a power failure. For the /c file system in Fingerprint, this area is 64K and is included in the sectors in the table above. For the parameters, it is the 32K TMP sector.

The Boot sector is necessary for Intermec Fingerprint or IPL to start. There is a boot sector in all flash SIMMs at delivery, but the firmware will only accept the boot sector of a SIMM fitted in J20 (marked "BOOT FLASH"). The boot sector is only protected when the flash SIMM is fitted in socket J20 ("BOOT FLASH"). If you move flash SIMMs from one CPU board to another, make sure that the SIMM containing the boot sector is fitted in J20 ("BOOT FLASH") on the other board, or the boot sector will be overwritten.

The Intermec Fingerprint firmware is either stored in the /c file system or in a dedicated area on the boot flash (2MB large). If it is stored in the file system, removing or exchanging an EXP FLASH in J21 may render the printer unstartable. To cure this condition, use a CompactFlash card containing an upgrade file (kernel) to reload the firmware.

As illustrated in the table above, a total nominal capacity of 3904K is used for the /c file system (MIFS, or FOS) and fonts. In Fingerprint, practically, around 2 MB are available to the user (about 200-400K less if the kernel is in the dedicated area).

Exactly which fonts, images, files, and programs are stored in the Fingerprint file system may vary between customers and applications.

The parameters sectors store the PFSVARs (see SETPFSVAR Fingerprint statement), odometer values, and a few other "invisible" files with data, that are required for the printer to start up with the same settings as when it was shut off, for example information on the position of label gaps in relation to the LSS.

The printer's permanent memory can be expanded by fitting a second 4MB or 8MB flash memory SIMMs in sockets J21. 4MB and 8MB flash SIMMs can be mixed at will. Flash SIMMs are custom-made and can only be ordered from Intermec.

Note: The first time the printer is started with a SIMM in J21 ("EXP FLASH"), the memory is not increased to enable cloning the first SIMM. The expansion is not done until the second time the printer is started.

Flash Memory Available to the User

J20 (Boot)	J21 (Exp)	J20 (Boot)	J21 (Exp)	SUM
4MB SIMM	–	1.8MB	–	1.8MB
4MB SIMM	4MB SIMM	1.8MB	4MB	5.8MB
4MB SIMM	8MB SIMM	1.8MB	8MB	9.8MB
8MB SIMM	–	5.8MB	–	5.8MB
8MB SIMM	4MB SIMM	5.8MB	4MB	9.8MB
8MB SIMM	8MB SIMM	5.8MB	8MB	13.8MB

SDRAM Memory (J10)

The SDRAM memory (Synchronous Dynamic Random Access Memory) is the printer's temporary memory (Fingerprint device "tmp:"). It will lose its content when the power is switched off or at a power failure. Thus, it should only be used for data that can easily be recreated or that are only relevant for one power-on cycle. It is much faster than the flash memory. Therefore, at startup the kernel is copied from the Flash memory to the SDRAM, where the various instructions are executed.

One SDRAM SIMM (standard size 8MB) must always be installed in socket J10 (SDRAM0-1).

The SDRAM is also used for the font cache and various buffers. The remainder is used for the two print image buffers where the bitmap patterns are stored prior to printing. One buffer is used for the label that is being printed, while the other receives the bitmap for next label as the Intermec Fingerprint instructions are processed. By switching between the buffers, batch printing without stopping between labels can be achieved.

The size of the buffers depends on two factors:

- Number of physical dots on the printhead.
- Present label length setup value in dots.

Calculate the buffer size according to this formula:
(No. of dots / 8 + 4) × (Media length in dots) = Buffer size in bytes
(Buffer size in bytes) / 1024 = Buffer size in kbytes
Buffer size in kbytes × 2 = Memory requirement in kbytes

Example:
The number of dots on the 8 dots/mm printhead of an EasyCoder PM4i is 832.
"Media; Length" is set to 1500 dots (= 187.5 mm/7.38 inches)
[[(832 / 8) + 4) × (1500)] / 1024] × 2 = 316 kbyte total

If a longer print length or more storage space is required, the printer can be fitted with a 16MB SDRAM instead of the standard 8MB. However, regardless of memory size there is an absolute print length limit of 32,767 dots (4,095 mm/161.2 inches).

Electronic Key Circuit (J30), Fingerprint-only option

The optional electronic key circuit is an iButton which contains a real-time clock. It has a built-in battery backup with a life of at least 10 years. When the printer is on, the circuit is power supplied via the CPU board and will not consume any power from the battery. The circuit also contains 4Kbits (500 bytes) of battery backed-up memory for the devices "lock:" and "storage:".

The Electronic Key Circuit (J30) contains an integrated lithium battery. Replace only with original Electronic Key Circuits from Intermec. Dispose of used Electronic Key Circuits according to local regulations for lithium batteries.

Since the communication between the RISC processor and the electronic key circuit is comparatively slow, the content of the key circuit is copied to SDRAM at startup and used from there. At power off, the content is read back to the key circuit, provided there is time enough. Thus, there is

a small risk that new data may be lost, before it has been saved back to the electronic key circuit. The original data in the electronic key circuit will not be damaged, if the read-back process should fail.

Memory Card Adapter (J22)

The CPU board has a built-in memory card adapter which can use standard Type I CompactFlash memory cards with a size of 8MB to 1GB (thickness 3.3 mm/0.13 in.). It is **not** suited for other types of memory or I/O cards! Cards marked "CF+" and Type II cards (thickness 5.0 mm/0.20 in.) cannot be used.

In Fingerprint, CompactFlash cards can be used to expand the printer's memory (device "card1:"). IPL does not support CompactFlash cards as a means of expanding the memory.

Memory cards are only detected by the firmware at startup and must thus be inserted in the memory card adapter before the power is switched on or the printer is rebooted.

Memory cards must only be inserted or removed when the power is off.

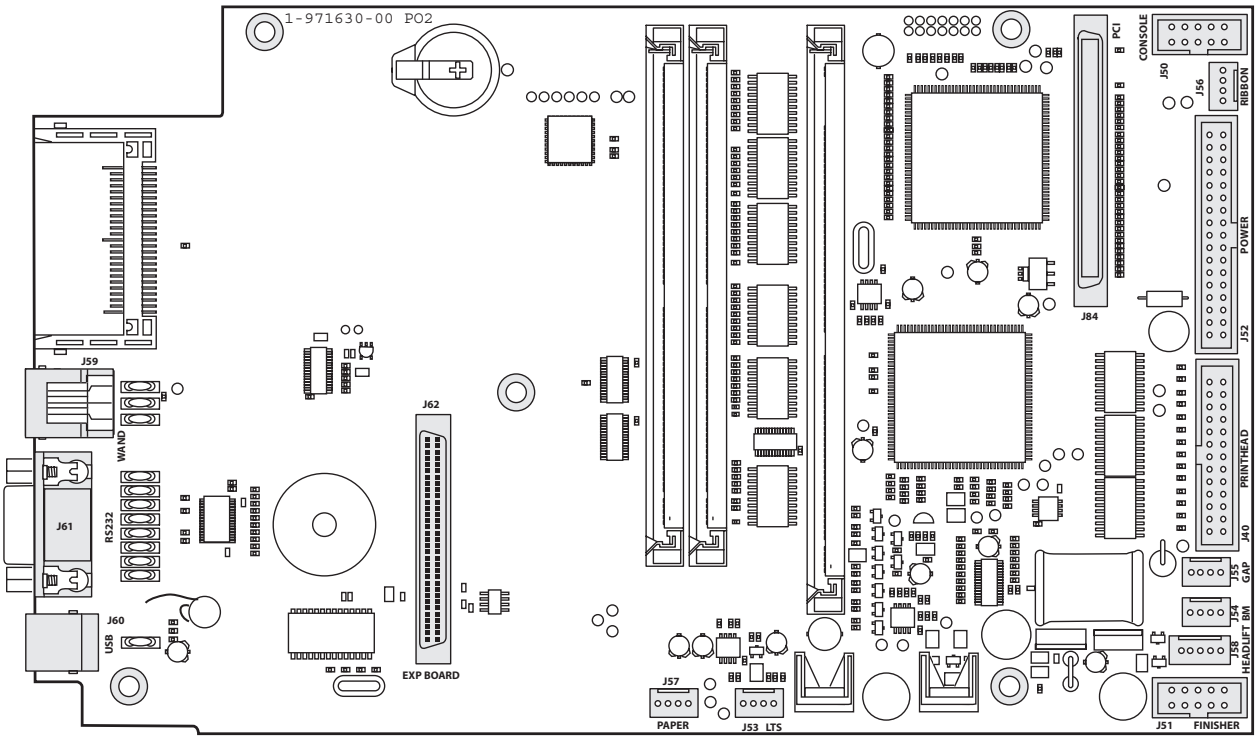
Preprogrammed CompactFlash Memory Cards

There are four types of preprogrammed CompactFlash memory cards from Intermec.

- ***Font Cards***
  Font stored in font cards can only be used while the card is present in the printer's memory card adapter.
- ***Font Install Cards (Fingerprint only)***
  Install additional fonts in the printer's memory. These fonts can be used without the card being present.
- ***Firmware Cards***
  Install a new firmware kernel in the printer including standard fonts. Used for upgrading the firmware or switching between Fingerprint and IPL.
- ***Configuration Cards***
  Configures a CPU board for the type of printer in which it is installed, see Chapter 13.8, or changes the printer's EasyLAN setup.

13.3 Connections

The following connectors on the CPU board are used in the printer for communication with various devices and sensors.



Left side (from top down)

J59 Bar Code Wand (not supported by IPL)

J61 RS-232

J60 USB (not supported by IPL)

Bottom (from left to right)

J62 Expansion board(s) (optional interface boards)

J57 Paper Sensor (option, not supported by IPL)

J53 Label Taken Sensor (option)

J51 Finisher

Top (from left to right)

J84 PCI (EasyLAN interface, option)

J50 Console (keyboard, display, and print or feed/pause button)

Right side (from top down)

J56 Ribbon Low sensor

J52 Power from PSU

J40 Data to printhead

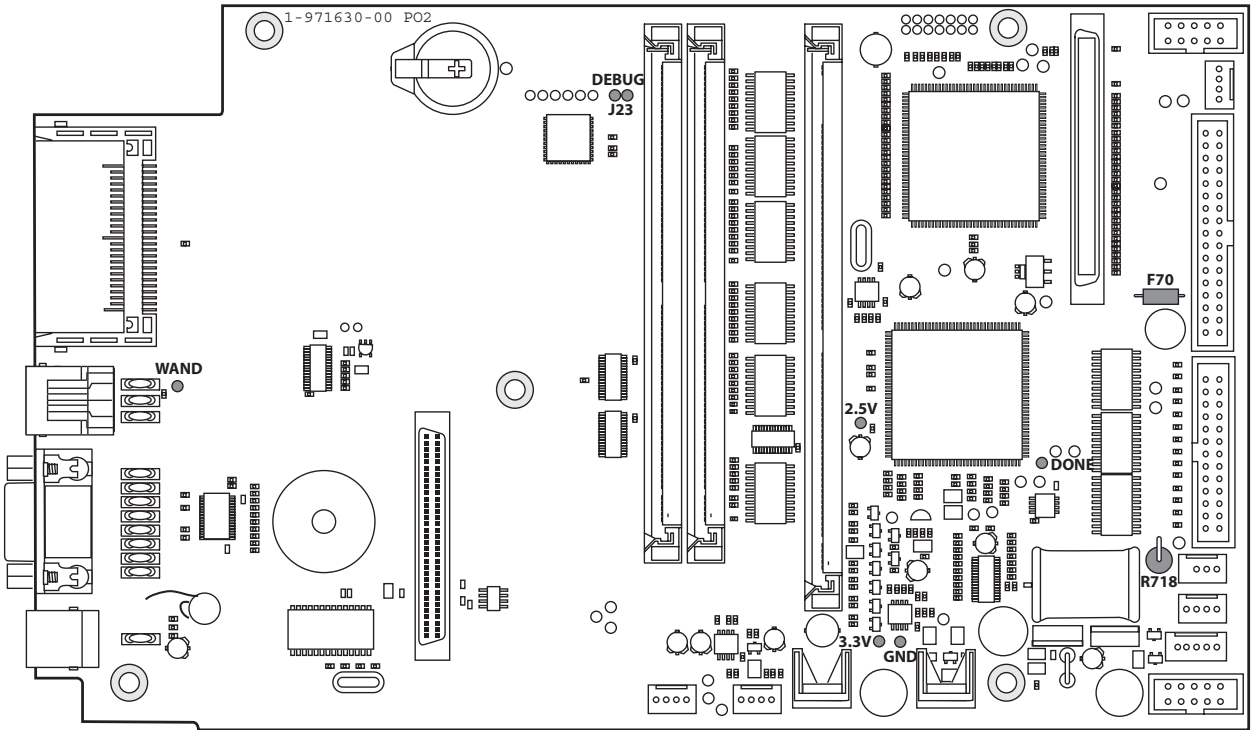
J55 LSS (gap)

J54 LSS (black mark)

J58 Headlift sensor

13.4 Test Points

The CPU board is provided with many test points. Only those of immediate interest to the field szervice technician are shown below. If further testing or servicing is required, exchange the CPU board and return the faulty board to s service center.



Test Points

If available, use an oscilloscope to measure the various voltages. When using for example a multimeter, a fluttering value may indicate an erroneous voltage.

GND Ground

2.5V 2.5V –> GND (max ± 0.2V)

3.3V 3.3V –> GND (max ± 0.2V)

5.0V R718 –> GND (max ± 0.2V)

24V F10 left side –> GND (allowed deviation, see Chapter 12)
(If no voltage on the left side, check the right side. If voltage there, fuse is blown, else cable or PSU trouble.)

DONE High level = U30 programmed, see Chapter 13.5

DEBUG Startup check, see Chapter 13.5

WAND Use an oscilloscope. OK if there is a pulse train when the wand is reading a bar code.

13.5 Startup

The prerequisite for the printer to start is that a flash memory SIMM with a boot sector is fitted in J20. A SDRAM SIMM must also be installed in J10.

At power up, the printer starts executing code in the boot sector and one of the following sequences will be performed:

1. A Compact Flash card with a firmware is recognized.

- The firmware will be copied from the memory card to the internal SDRAM.
- The processor will start to execute code from SDRAM.
- The firmware on the memory card will be copied to the internal flash memory.

2. A valid firmware is recognized in the internal flash memory.

- The firmware will be copied to SDRAM and the processor will start execute code from SDRAM.

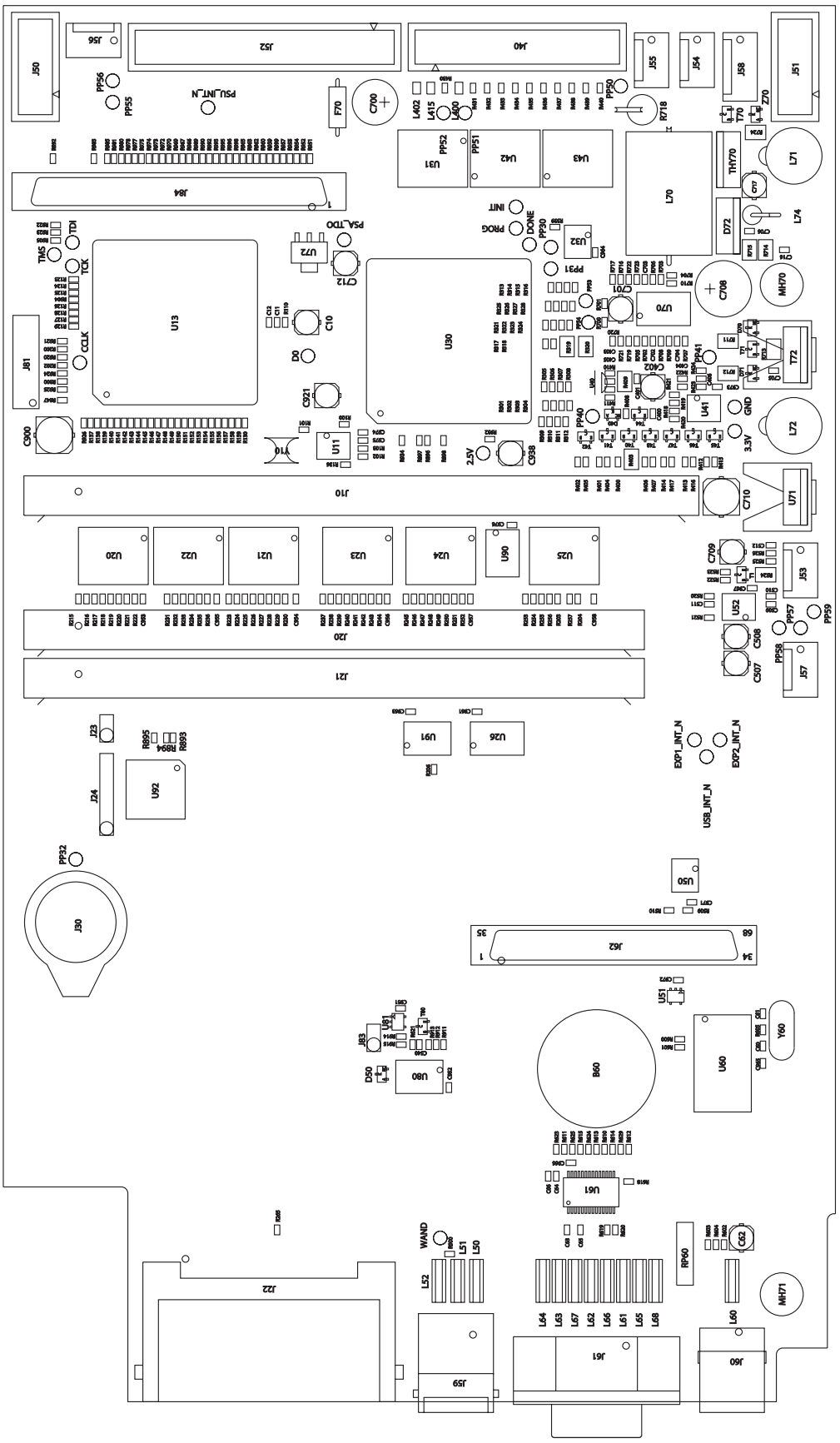
If the printer is fitted with an EasyLAN interface, there are also facilities for updating the firmware from the printer's home page.

After the initial boot sequence is performed, the number of steps will be taken before the printer starts, which includes programming the support chip (U30). The startup procedure can be followed on the printer's display.

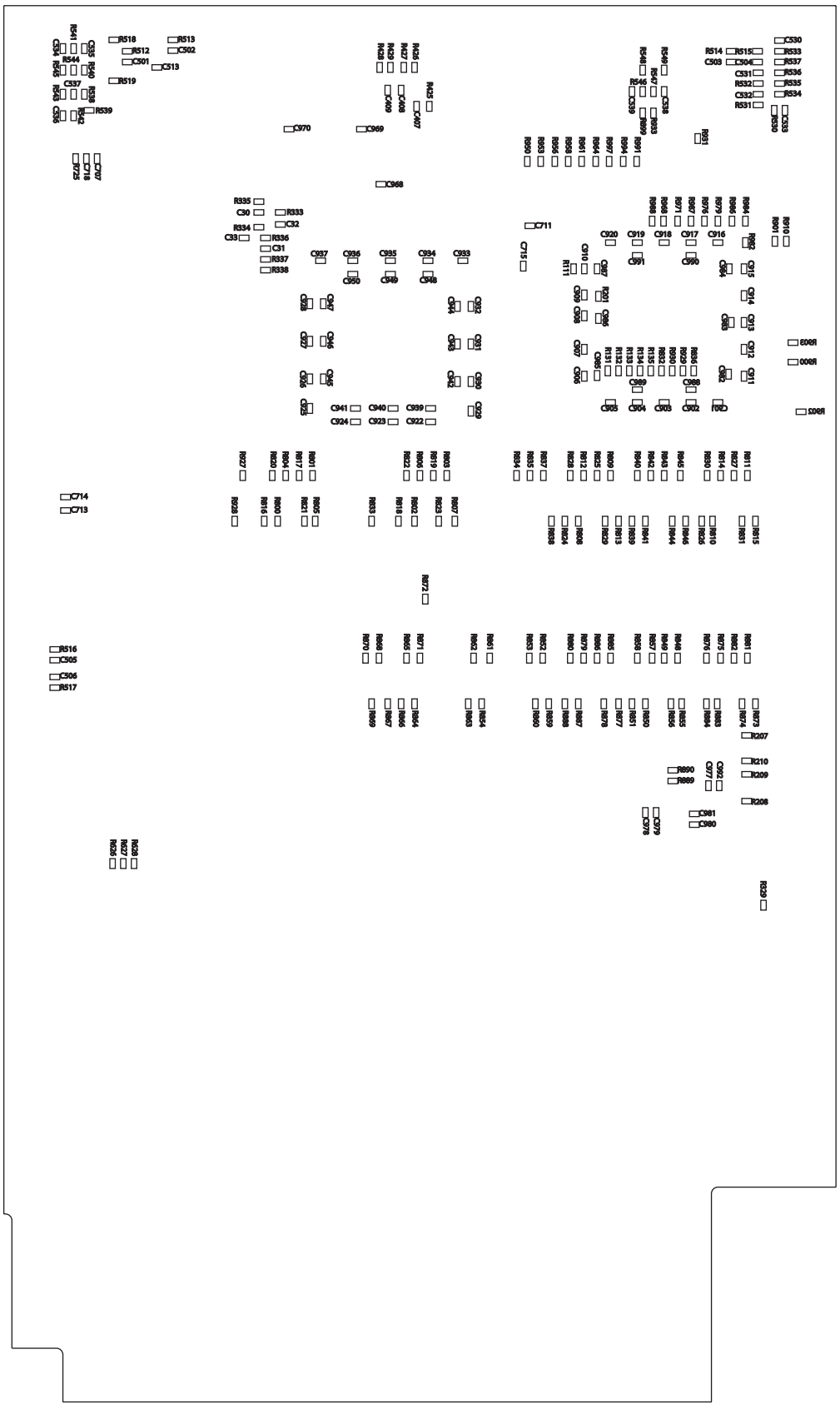
You can also follow the startup from the host provided a strap is temporarily fitted at J23 (DEBUG) on the CPU board. Connection between printer and host should use the default serial communication setup (9600 baud, 8 bits, parity none, 1 stop bit) on the standard serial port "uart1:". For each of the steps, either “OK” or “Fail” is returned on "uart1:". In addition, some other useful information is also returned.

Refer to Appendix B for information on how to upgrade the firmware.

13.6 Components

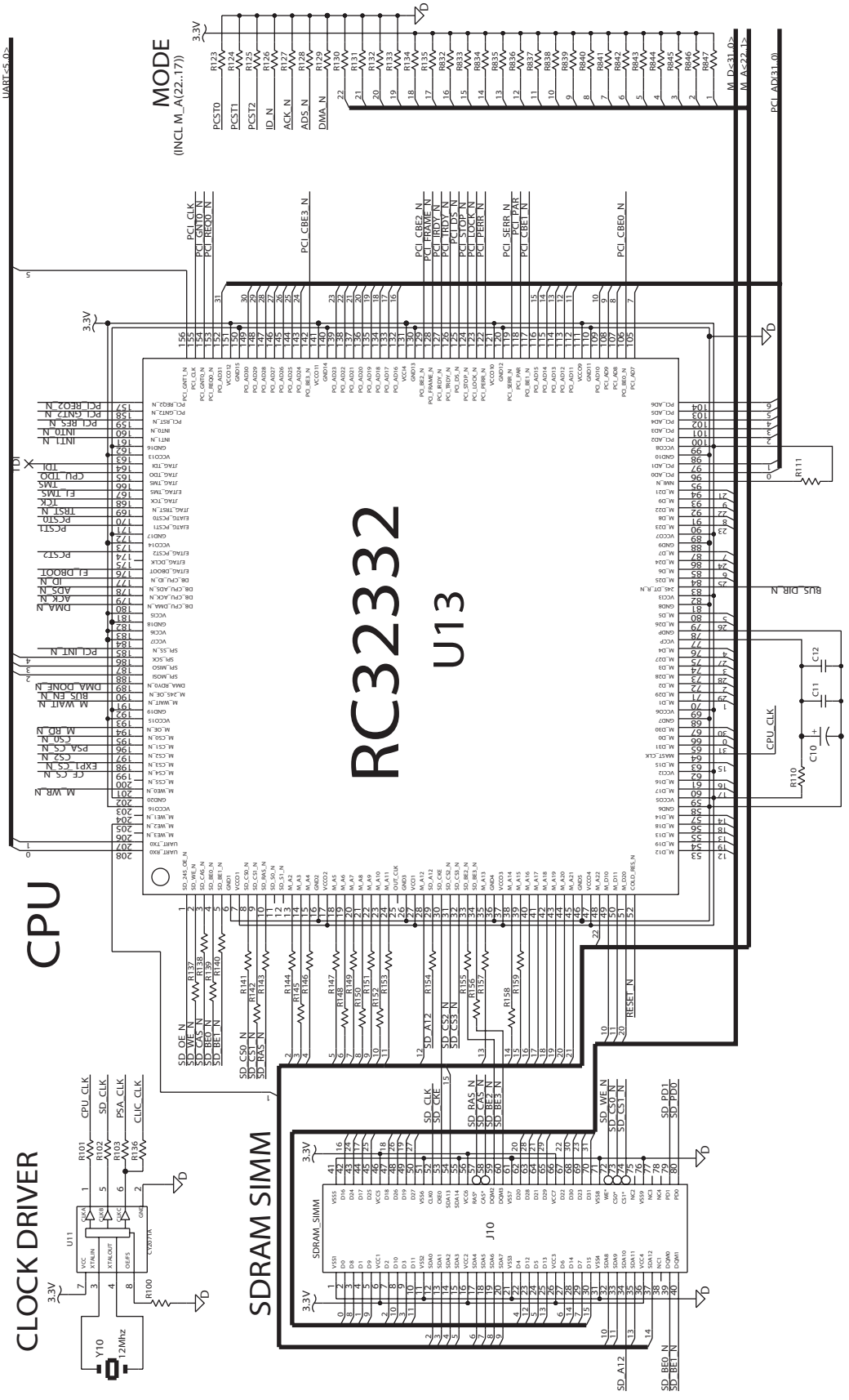


1-971630-25 CPU Board; Component Side

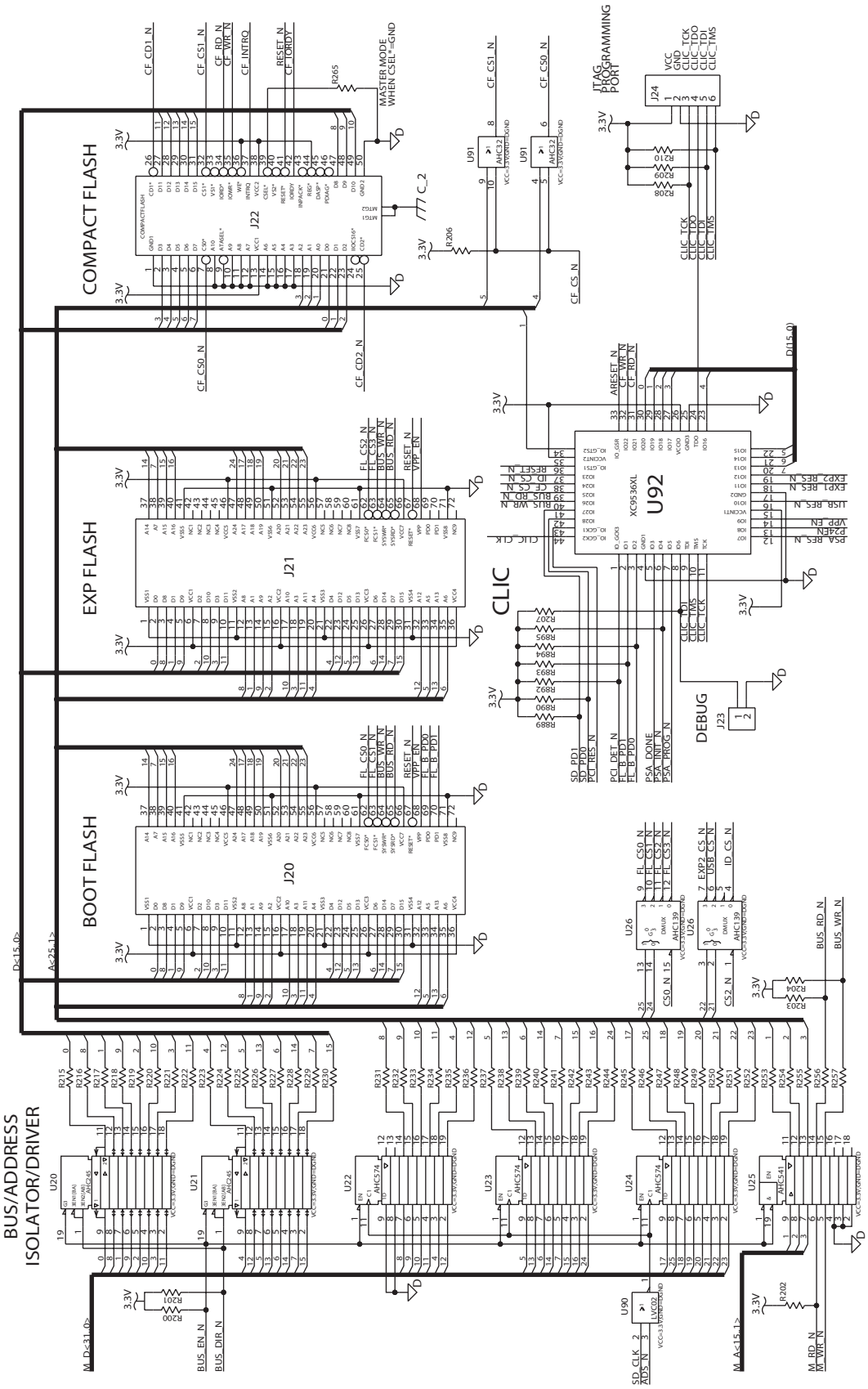


1-971630-25 CPU Board; Soldering Side

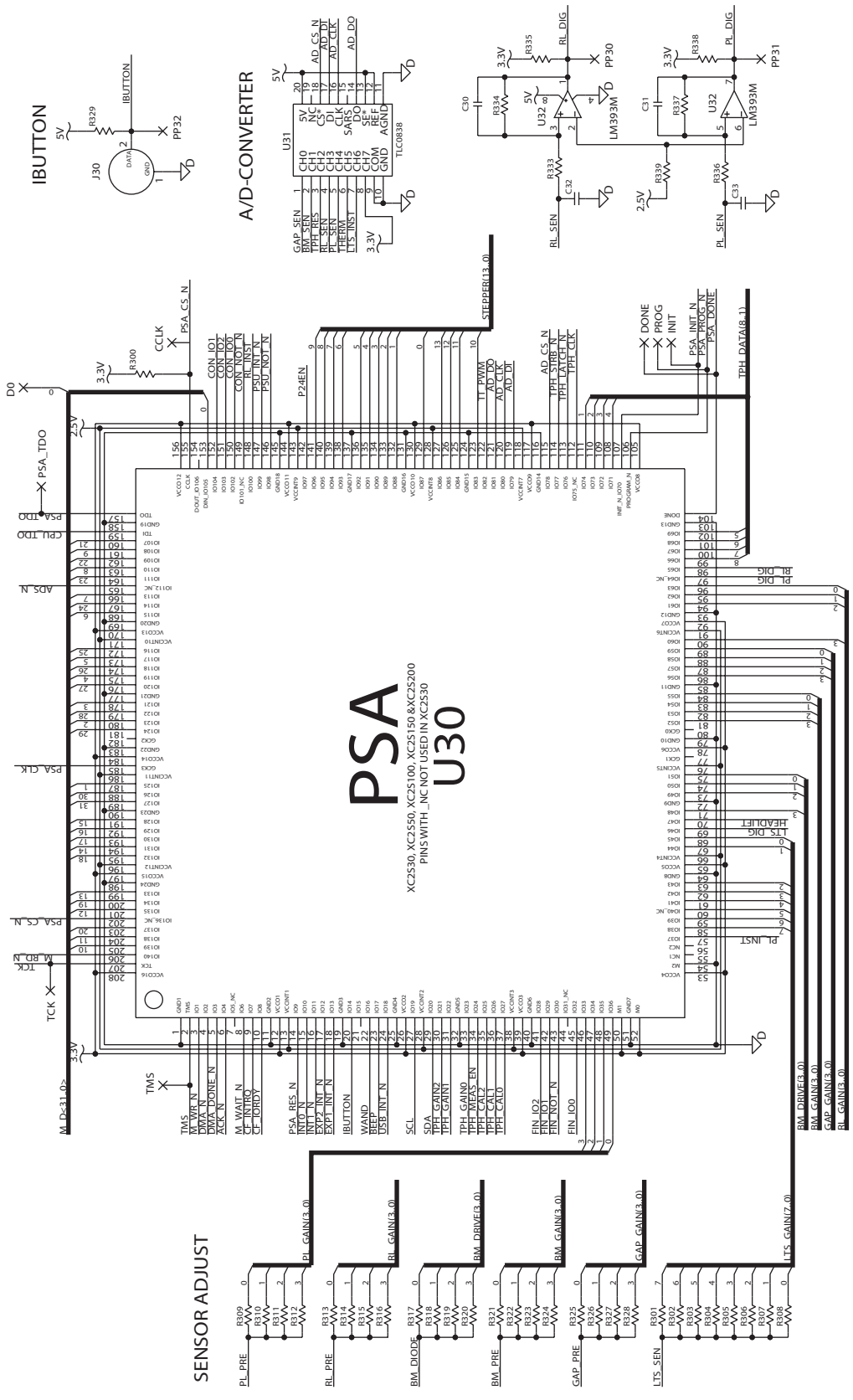
13.7 Schematics



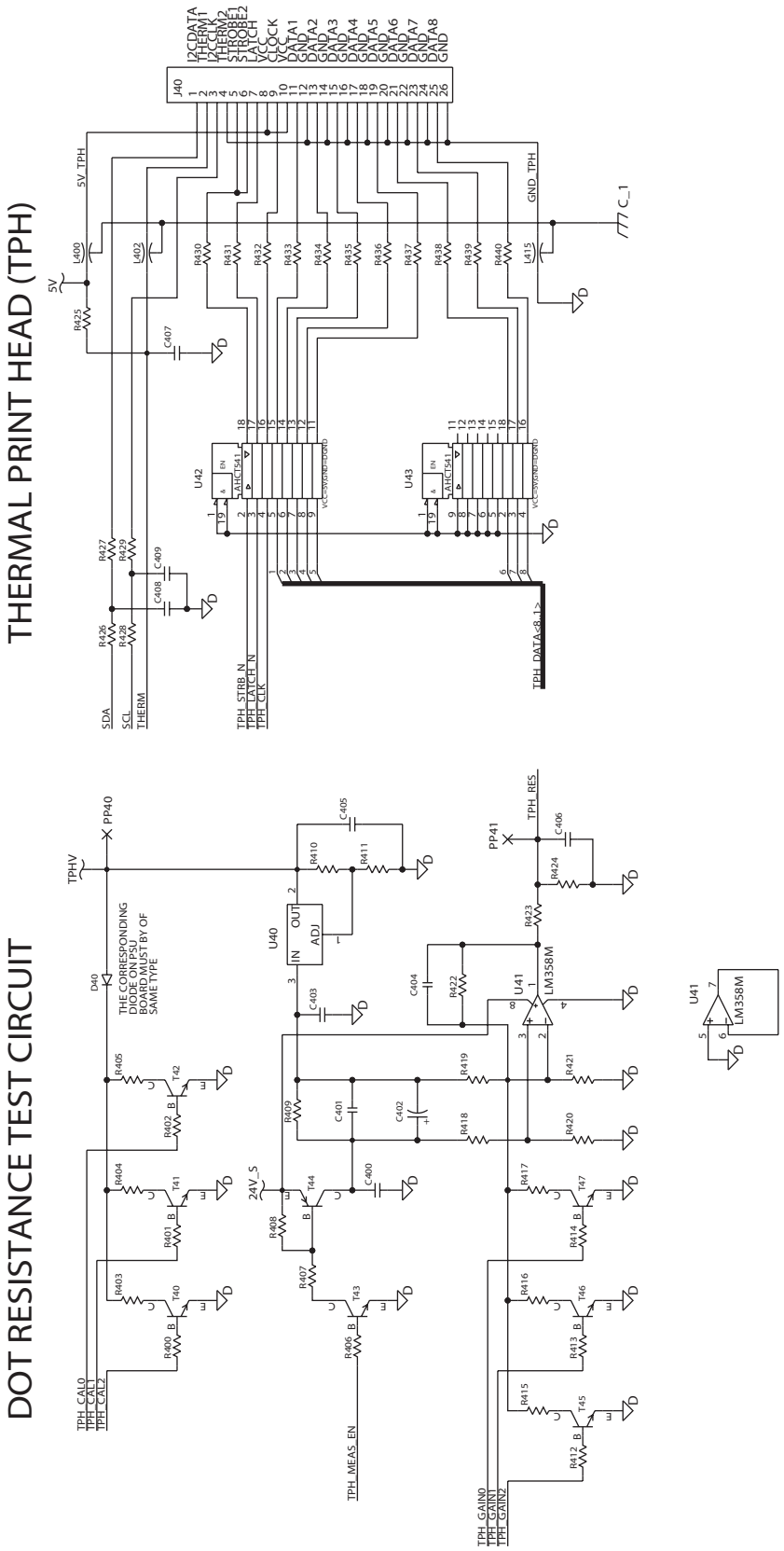
1-971630-25 CPU Board; Core (Schematics #1)



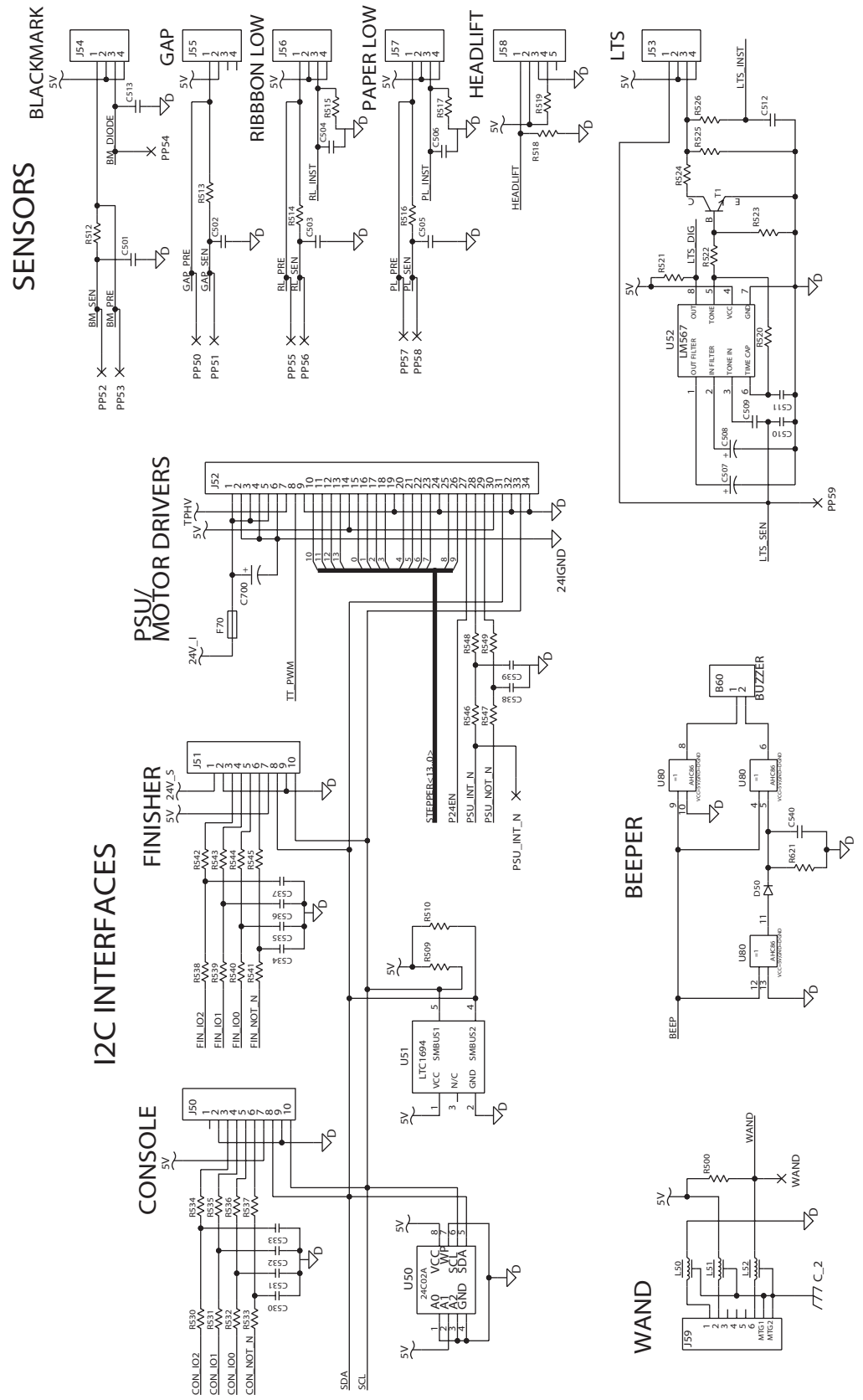
1-971630-25 CPU Board; Flash Interfaces (Schematics #2)



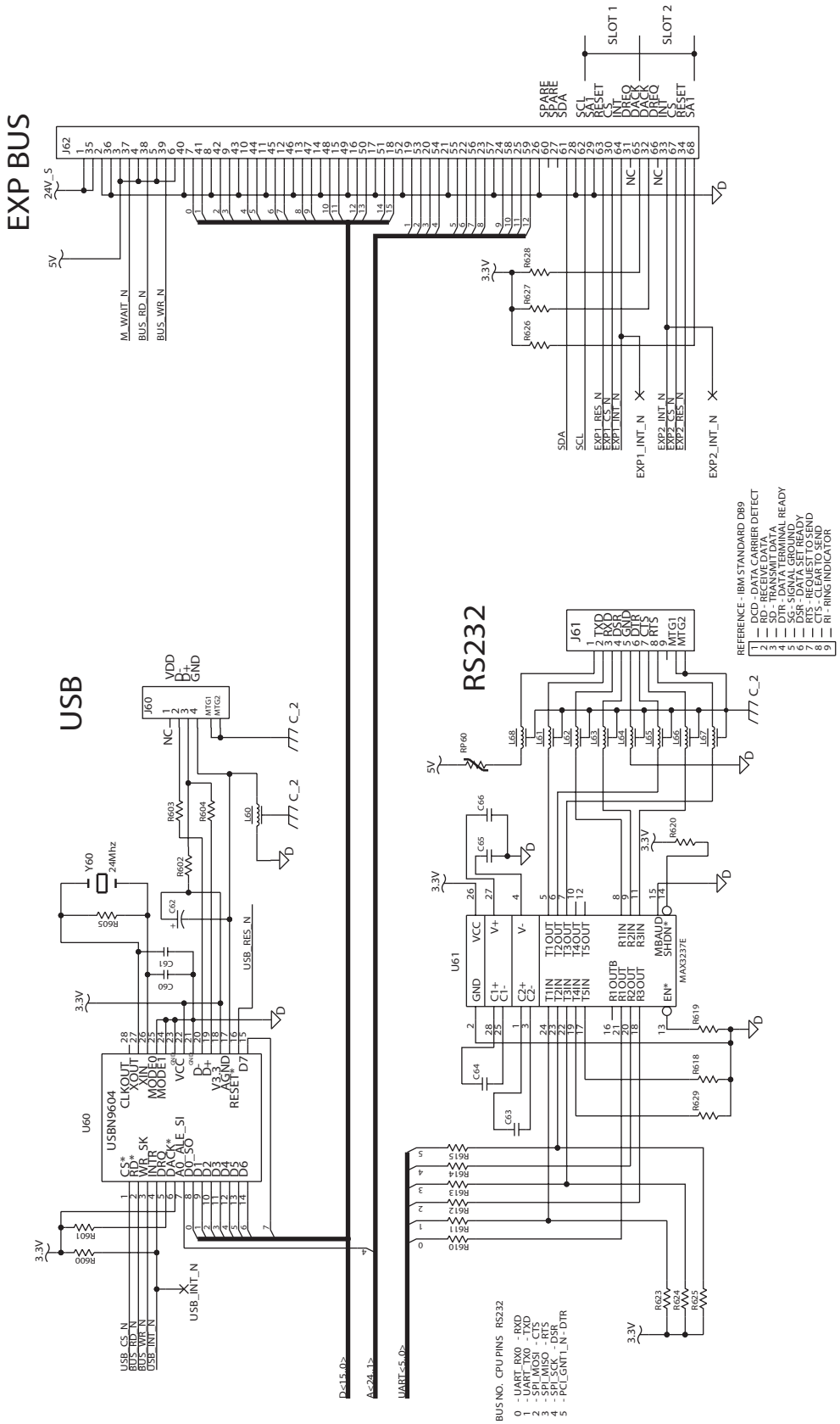
1-971630-25 CPU Board; PSA (Schematics #3)



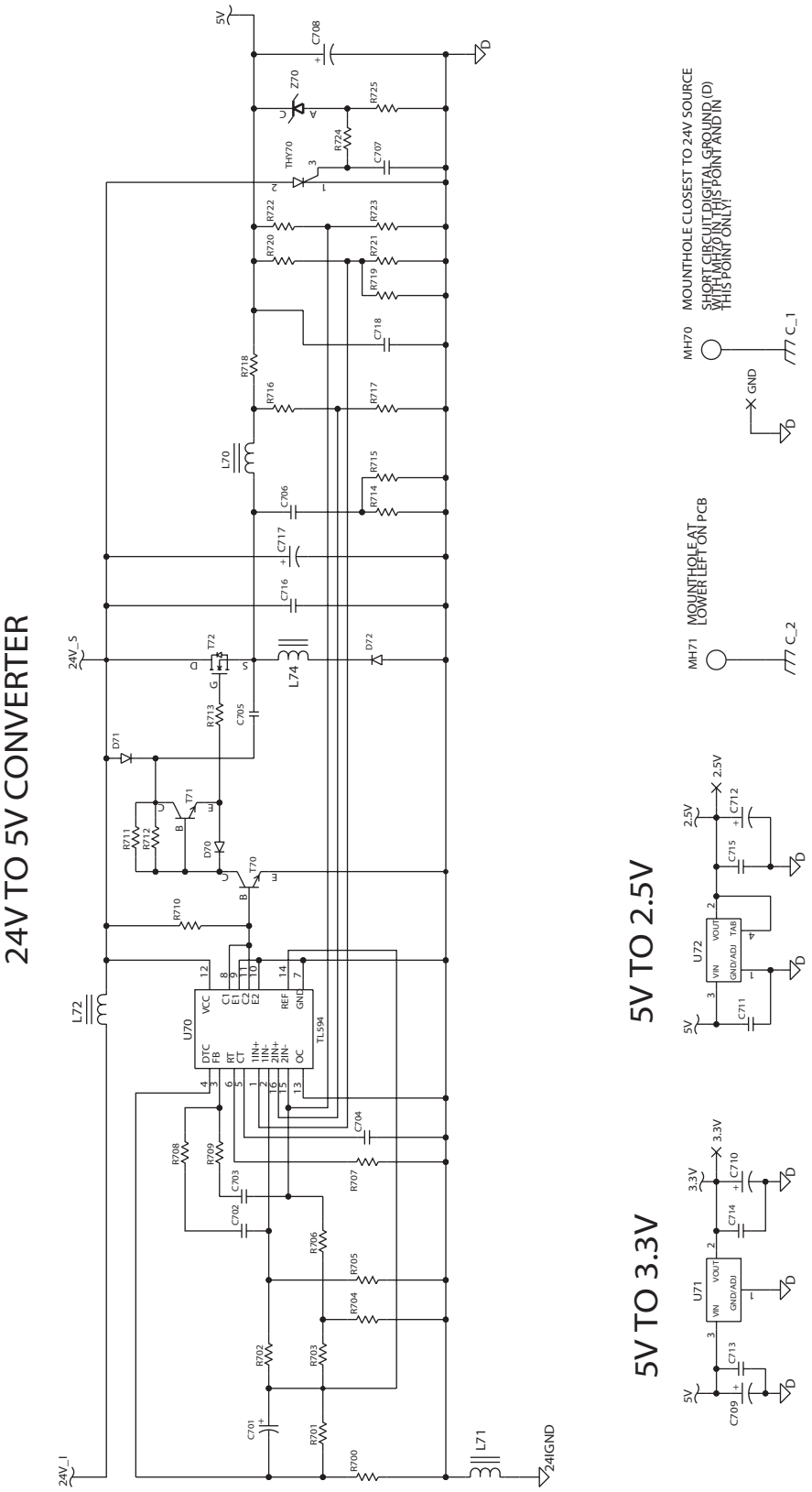
1-971630-25 CPU Board; Thermal Printhead Interface (Schematics #4)



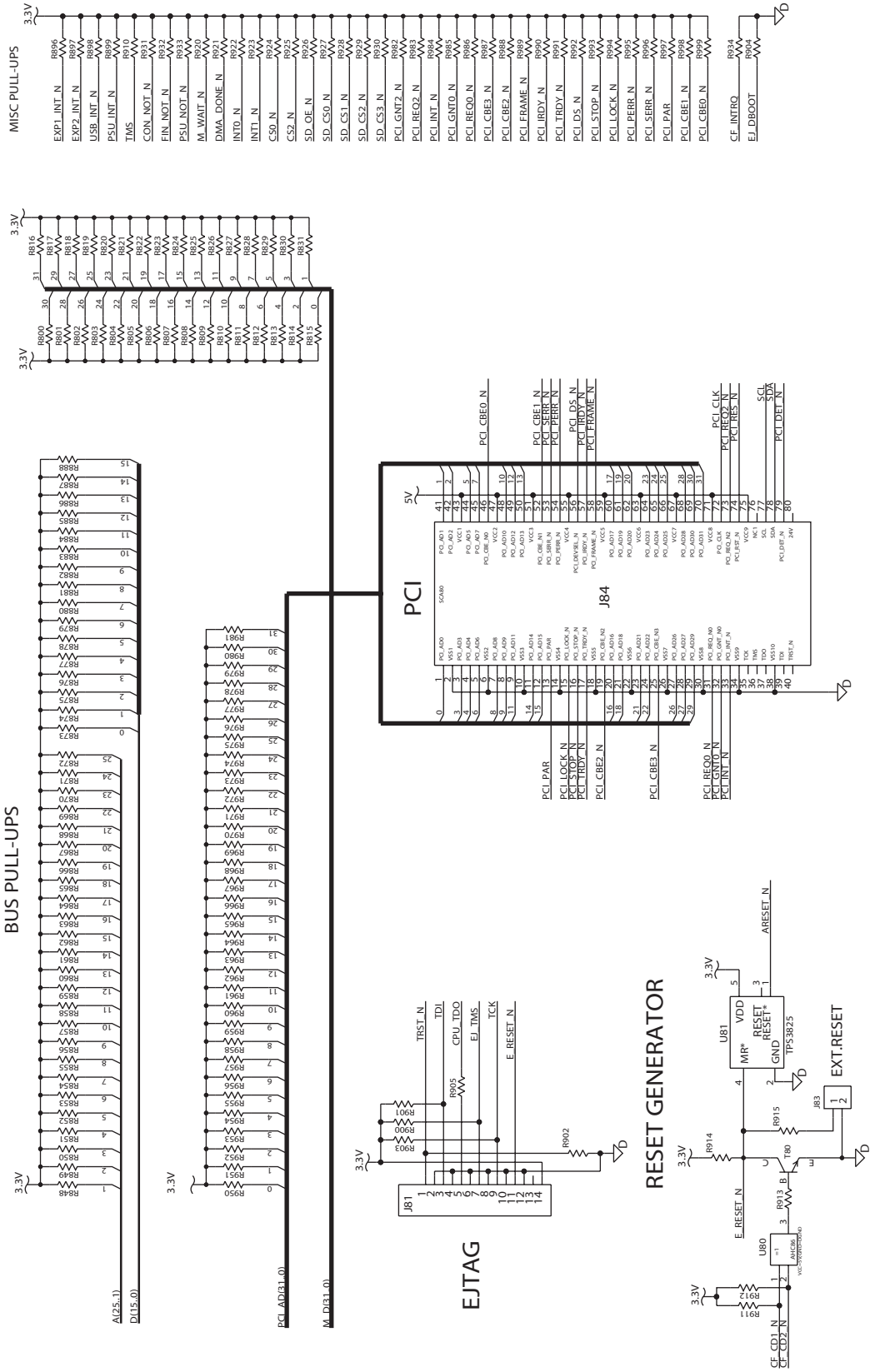
1-971630-25 CPU Board; Internal Interfaces (Schematics #5)



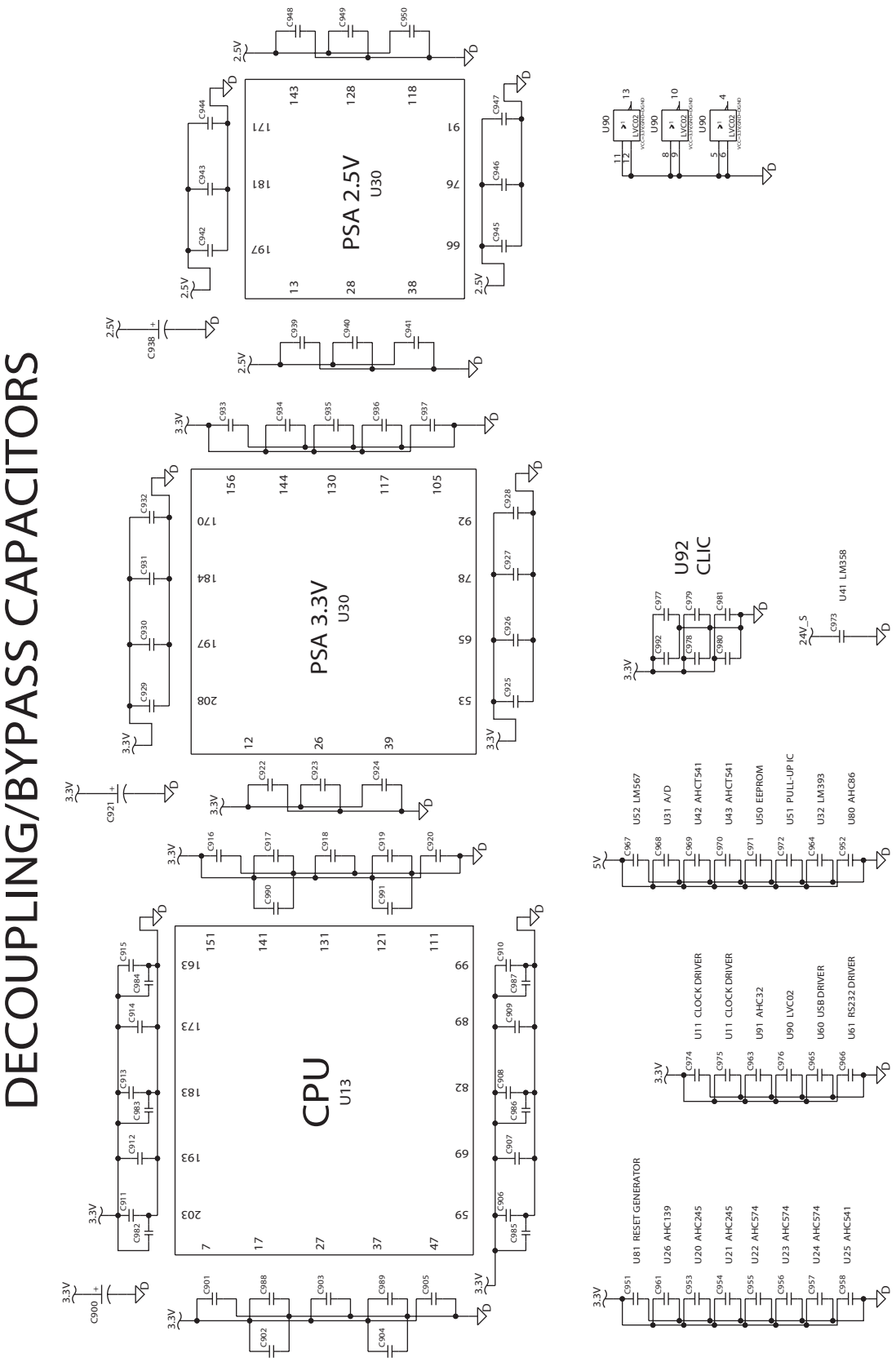
1-971630-25 CPU Board; External Interfaces (Schematics #6)



1-971630-25 CPU Board; Power (Schematics #7)



1-971630-25 CPU Board; Pull-ups (Schematics #8)



1-971630-25 CPU Board; Bypass/Decoupling (Schematics #9)

13.8 Replacing the CPU board

Replace the CPU board this way:

- Switch off the power.
- Remove the front/left-hand cover as described in Chapter 3.2.
- Remove any optional interface boards.
- Disconnect all cables from the CPU board.
- Remove the four #T20 Torx screws and the hexagonal spacer that hold the CPU board to the plate that covers the power supply unit.
- Lift out the CPU board and remove all SIMMs and any real time clock. Take precautions against electrostatic discharges!
- Fit the SIMMs and possibly the real-time clock on the new board and install it in reverse order.

The same CPU-board can be used for a range of EasyCoder printers. However, the firmware can not detect in which type of printer the CPU board is installed. All replacement CPU boards are preprogrammed for the EasyCoder PF2/4i-series printers, which means that replacement CPU boards always must be reconfigured after being installed in an EasyCoder PM4i printer.

If the printer feeds out labels in a peculiar way, the CPU board may be configured for the wrong type of printer (there is a difference in the distance between the dot line and the LSS position). You can easily check if the CPU board is correctly configured by printing the "Hardware Info" or "HW" test label in the Setup Mode or sending the Fingerprint instruction `PRINT VERSION$(1)`.

If the CPU board needs to be reconfigured, do like this:

- Switch off the power.
- Insert a configuration card in the memory card slot.
- Switch on the power.
- Using the same method as in the Setup Mode, select the correct printer type from the menus shown in the display window.
- Switch off the power.
- Remove the card.
- Switch on the power again and check.

14 Interfaces

This chapter describes the various communication interfaces for the EasyCoder PM4i printers. However, some interfaces are not supported by the Intermec Programming Language (IPL) even though the connectors are present.

The chapter describes three categories:

- Standard built-in interfaces
  - RS-232 interface
  - USB interface (not supported by IPL)
  - Bar code wand interface (not supported by IPL)
- Optional interface boards
  - Serial/Industrial interface board (not supported by IPL)
  - Double Serial interface board (not supported by IPL)
  - RFID Serial interface board
  - IEEE 1284 Parallel interface board
- EasyLAN interface boards
  - EasyLAN Ethernet interface
  - EasyLAN Wireless interface

The EasyCoder PM4i can—in addition to the standard built-in interfaces—also be fitted with one or two optional interface boards and one EasyLAN interface board.

Note: Device designations, such as "uart1:", "usb1:", or "net1:", apply only to Fingerprint, not to IPL.

14.1 Introduction

In Fingerprint, "auto" is by default the standard IN and OUT communication port, that is, the printer will scan all communication channels for incoming data. To select a specific communication port as standard IN and/or standard OUT port, use an Intermec Fingerprint SETSTDIO statement (see *Intermec Fingerprint v8.xx, Programmer's Reference Manual).* This gives better performance. Note that many application programs, for example Intermec Shell, contain instructions that select the correct standard I/O for the application in question. The settings for the selected communication channel will appear in the display window when pressing the <info> key on the printer's keyboard.

In IPL, all communication channels are always scanned for incoming data and the firmware automatically switches to the same channel for output too. The settings for the active communication channel will appear in the display window when pressing the <info> key on the printer's keyboard.

The standard interfaces (RS-232, USB, and Wand) are fitted directly on the rear of the CPU board with connectors protruding through slots in the printer's rear plate. USB and Wand are not supported by IPL.

All optional interface boards, except the EasyLAN boards, are fitted in a slot on the printer's standard rear plate and connected to the CPU board via a flat cable. If no interface board is fitted, the slot is closed by a cover plate.

The EasyLAN boards are fitted directly to the front of the CPU board and connected by wire to a connector or antenna. There are provisions for both the wired EasyLAN connector and the EasyLAN wireless antenna on the standard rear plate. All rear plates have slots for two interface boards as well as for the standard interface connectors.

14.2 RS-232 Serial Communication Port ("uart1:")

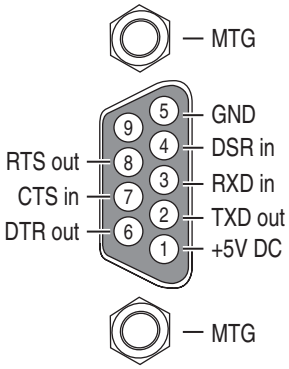
The EasyCoder PM4i printers are always fitted with one RS-232 communication port. In Intermec Fingerprint, this port is designated "uart1:" (uart = **U**niversal **A**synchronous **R**eceiver and **T**ransmitter.) The circuitry is fitted on the CPU board (see Chapter 13) and has a fixed set of signals in a DB-9pin female connector which protrudes through a slot in the printer's rear plate.

Protocol

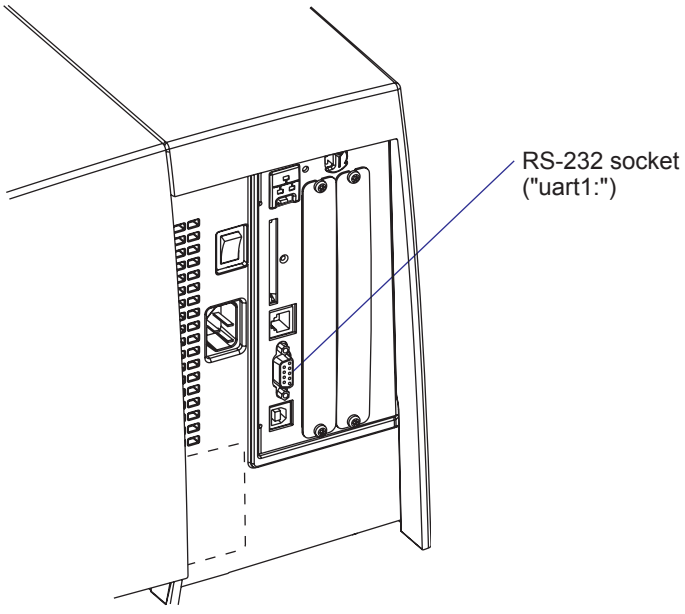
Default setup

Baud rate:	9600
Char length:	8 bits
Parity:	None
Stop bits:	1
RTS/CTS:	Disabled
ENQ/ACK:	Disabled
XON/XOFF:	Disabled in both directions
New line:	CR/LF

Signals on serial port ("uart1:")

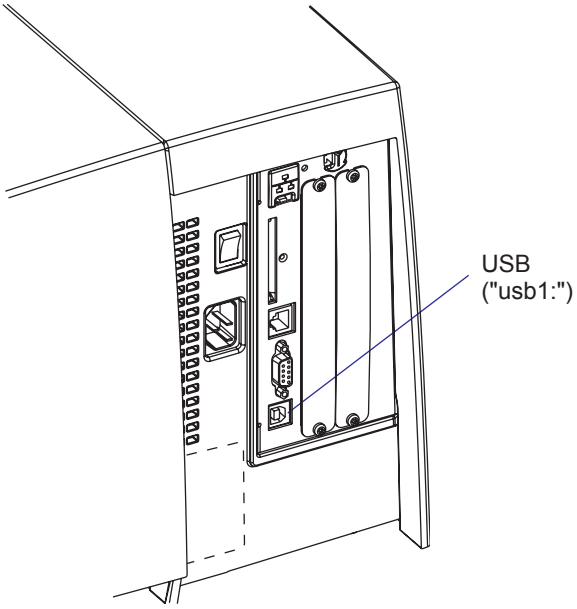


DB-9 socket	Signal	Meaning
1		External +5VDC max 500 mA (automatic switch-off at overload, short-circuit protected)
2	TXD	Transmit data
3	RXD	Receive data
4	DSR	Data set ready
5	GND	Ground
6	DTR	Data terminal ready
7	CTS	Clear to send
8	RTS	Request to send
9	–	Not used



14.3 USB Interface ("usb1:")

The EasyCoder PM4i printers are, as standard, fitted with a USB (**U**niversal **S**erial **B**us) interface connector on the CPU board. USB is not supported by IPL.

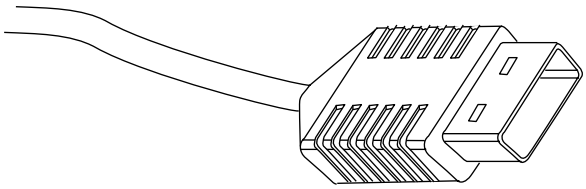


The supported USB version is USB 1.1 (also called “USB 2.0 full speed”).

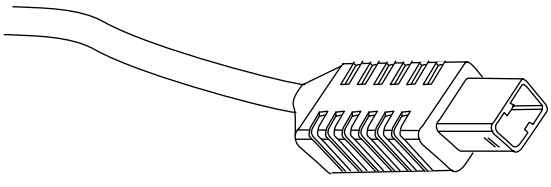
To use the USB interface for printing from a PC, you need a USB-compatible Intermec InterDriver installed in your PC. The printer works only as a “slave”, that is, the USB interface is not suitable for programming. Unlike for example RS-232, there is no communication setup in regard of baud rate, parity, handshaking, etc. Select the USB interface as standard IN/OUT channel in Intermec Fingerprint, the Intermec Direct Protocol, or Intermec Shell as device "usb1:" (communication channel 6).

The EasyCoder PM4i printers are so called “self-powered devices.” We recommend that you only connect one printer to each USB port on the host, either directly or via a hub. Other devices, like a keyboard and a mouse, can be connected to the same hub. If you need to connect more than one Intermec USB printer to a host, you should use different USB ports.

Using a USB Class A/B cable, connect the Class A plug to the PC or hub and the Class B plug to the printer.



USB Class A connector.
Connect to PC or hub.



USB Class B connector.
Connect to USB port on printer’s rear plate.

14.4 Bar Code Wand Interface (wand:)

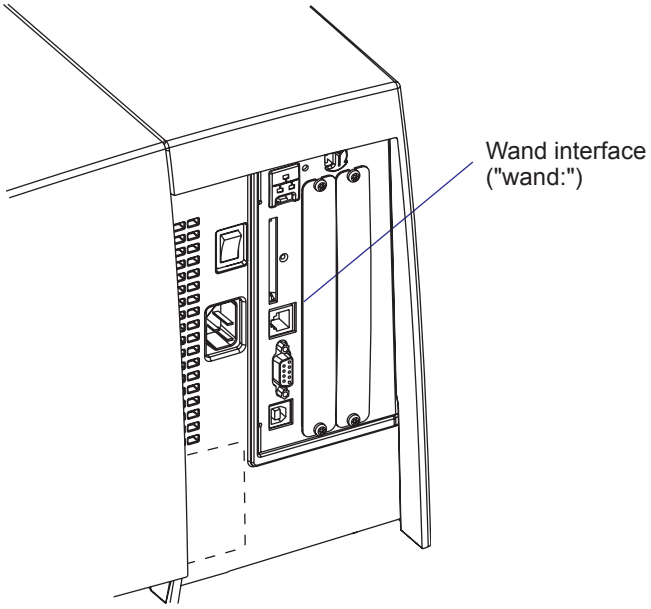
The printer has a socket (J59) on the CPU board for connecting a bar code wand or scanner. The socket is accessible through a slot in the printer's rear plate. The bar code wand interface is not supported by IPL.

If the Code 128 bar code that contains the character FNC3 is read via this port, the data will be treated as a setup string and will change the printer's setup accordingly. A setup bar code may contain a single parameter or a combination of up to 3 or 4 setup parameters. Refer to the *EasySet Bar Code Wand Setup* manual for more information on how to produce setup bar codes.

The printer will acknowledge that a bar code has been successfully read by emitting a short beep signal.

If no FNC3 character is found in the bar code, the data will be stored in a buffer which could be read by specifying the "wand:" device. The buffer is small, so it is recommended to use short bar code data (max. 36 characters) and read the buffer regularly to avoid overflow.

For more demanding applications or for reading bar codes other than Code 128, choose a regular bar code scanner from Intermec's wide product range and connect it to a serial port.



14.5 Installing an Optional Interface Board

To install an optional interface board, proceed as follows (the illustrations show a Serial/Industrial Interface board).

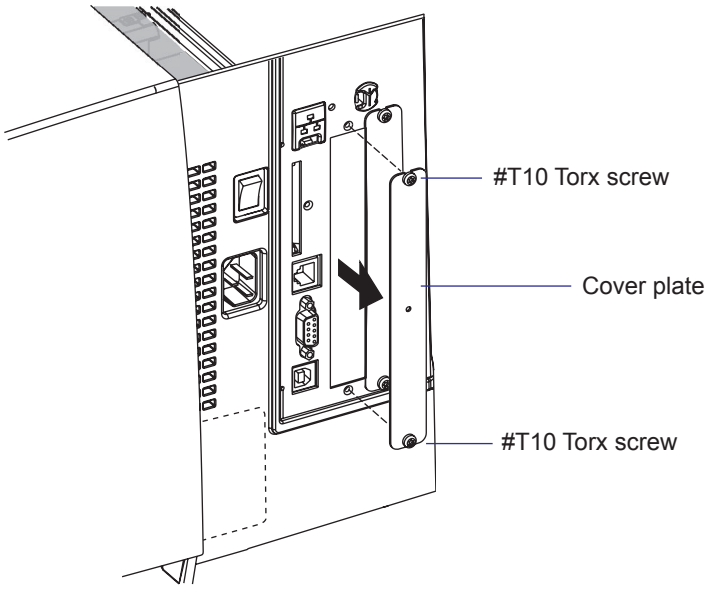
Note: This chapter does not apply to installation of any type of EasyLAN interface board, which instead is described in Chapter 14.9. The general description DOES however apply to the installation of RFID interface boards, and RFID-specific information has been marked in the text.

- Open the electronics compartment, see Chapter 11.2.

Warning

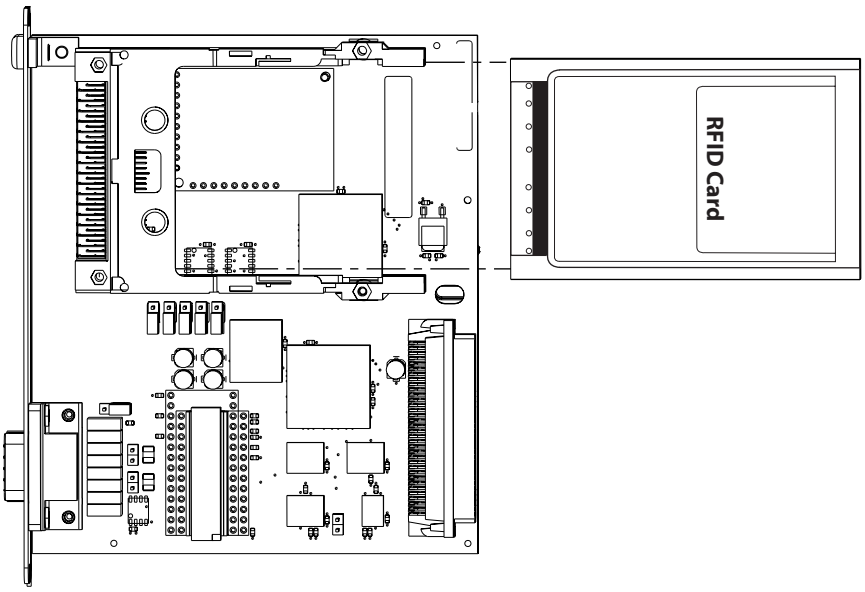
Switch off the power and disconnect the power cord. The electronics compartment contains high voltage components and wires. Do not open the electronics compartment before the printer is safely disconnected from any AC supply.

- Remove the two #T10 Torx screws that hold the inner interface cover plate. Remove the cover plate.

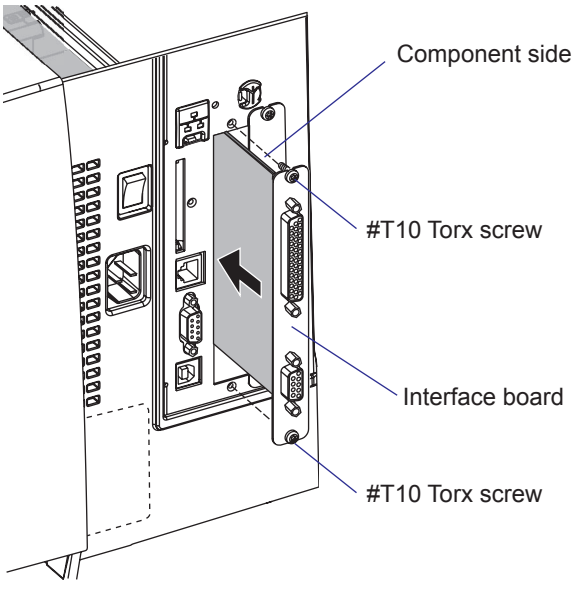


- Save the cover plate for possible later use. Keep the screws.
- Remove the #T20 Torx screw fitted on the hexagonal spacer at the center of the CPU board. Keep the screw.
- If necessary, fit or remove circuits and straps on the interface board according to the descriptions of each board later in this chapter.

- RFID only: If the interface board has been designed to hold an RFID radio module, slide the module into its designated slot. Note: Jumpers J5-J9 must be set to comply with the type of radio module installed. See Chapter 14, section 8.

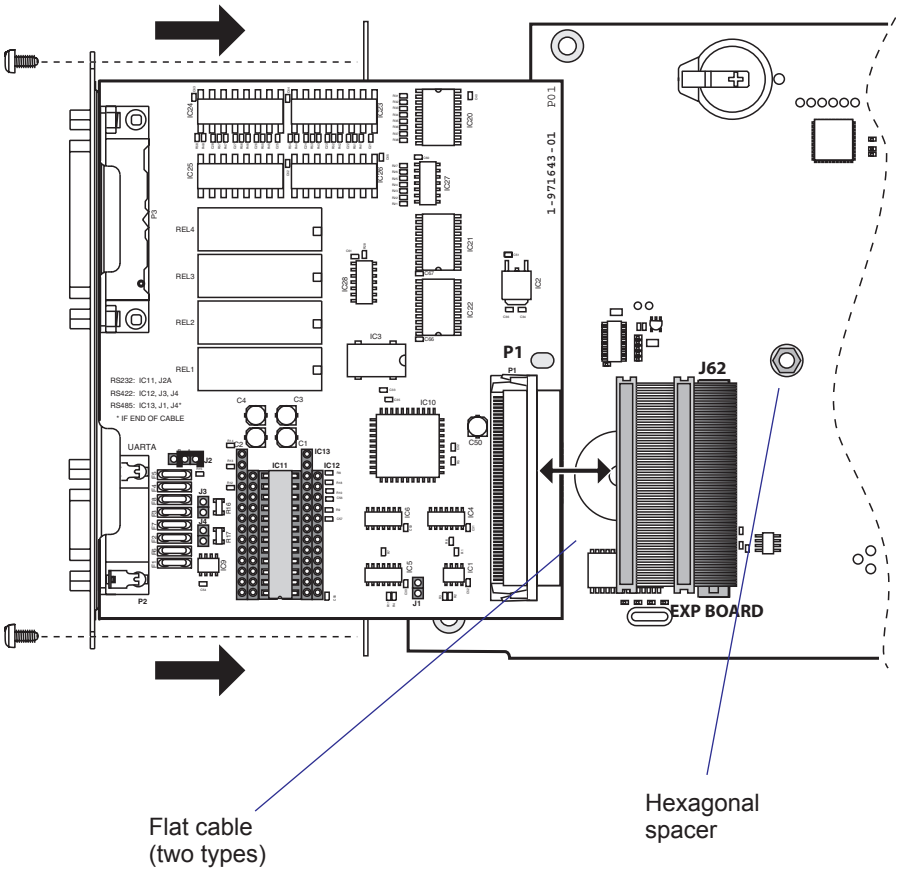


- Attach the flat cable included in the kit to connector J62 (marked "EXP BOARD") on the CPU board (see illustration on the next page).
- Insert the interface board with the component side facing right, as seen from behind.

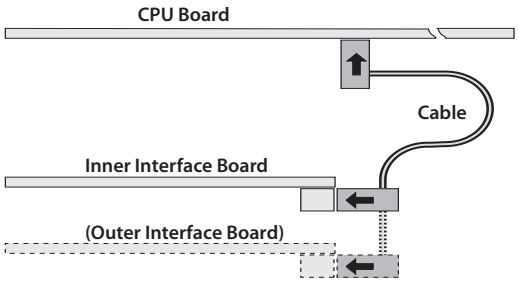


- Attach the interface board to the printer's rear plate using the two screws left over when you removed the original cover plate.

- Using the #T20 Torx screw you previously removed, attach the interface board to the hexagonal spacer at the center of the CPU board.
- The kit contains two flat cables, one with two connectors for use with a single interface board and one with three connectors for use with double interface boards. Connect the appropriate flat cable to connector P1 on the interface board, also see the next page.



- The flat cable should run as illustrated below.



- Put back the cover over the electronics compartment.
- Connect the communication cables to the connectors on the printer's rear plate.
- RFID only: Apply the RFID label to the rear plate of the interface board. Make sure the specifications printed on the label correspond to those of the board and radio module.
- Connect the power cord and switch on the power.

- In case the interface board provides additional serial communication ports, enter the Setup Mode to set the proper communication parameters for these ports.

If you need to install two interface boards, first install the inner board, then the outer one using the same flat cable from one of the kits. Put the hexagonal spacer included in the kit between the inner and the outer interface board. The list below shows which combinations are allowed in Fingerprint and IPL respectively and how the ports will be designated in Fingerprint.

Allowed interface combinations (Fingerprint)			
Left-hand slot	**Ports**	**Right-hand slot**	**Ports**
Double Serial	uart2: + uart3:	–	–
Double Serial	uart2: + uart3:	IEEE 1284	centronics:
Double Serial	uart2: + uart3:	Double Serial	uart4: + uart5:
Double Serial	uart2: + uart3:	RFID	uart4:
Serial/Industrial	uart2:	–	–
Serial/Industrial	uart2:	Serial/Industrial	uart3:
Serial/Industrial	uart2:	IEEE 1284	centronics:
Serial/Industrial	uart2:	RFID	uart3:
IEEE 1284	centronics	–	–
IEEE 1284	centronics	Double Serial	uart2: + uart3:
IEEE 1284	centronics	Serial/Industrial	uart2:
IEEE 1284	centronics	RFID	uart2:
RFID	uart2:	Double Serial	uart4: + uart5:
RFID	uart2:	IEEE 1284	centronics
RFID	uart2:	Serial/Industrial	uart4:

Allowed interface combinations (IPL)			
Left-hand slot	**Ports**	**Right-hand slot**	**Ports**
IEEE 1284	parallel	RFID	serial*
RFID	serial*	IEEE 1284	parallel

Remarks:
- The left-hand slot is the slot closest to the center section.
- Always start by fitting an interface board in the left-hand slot.
- RS-485 is only supported by "uart2:"
- The serial port (*) refers to the RFID interface. The 9-pin contact on the back plate of the interface board is not functional on IPL printers.

When fitting driver circuit and straps before installing the interface board, make sure that the circuit is not fitted upside down (see front end markings in the illustrations). Also make sure that the "legs" of the circuit fit into the slots in the socket and are not bent. Take ample precautions to protect the board and circuits from electrostatic discharges.

14.6 Serial/Industrial Interface Board (not IPL)

Description

The Serial/Industrial Interface Board is a Fingerprint-only optional device for EasyCoder PM4i. It provides these printers with two extra interfaces.

The Serial/Industrial Interface kit contains:
- One Industrial Interface Board fitted with straps and circuits for RS-232
- One hexagonal spacer
- Two flat cables
- One Installation Instruction booklet

Serial Interface ("uart2:" or "uart3:")

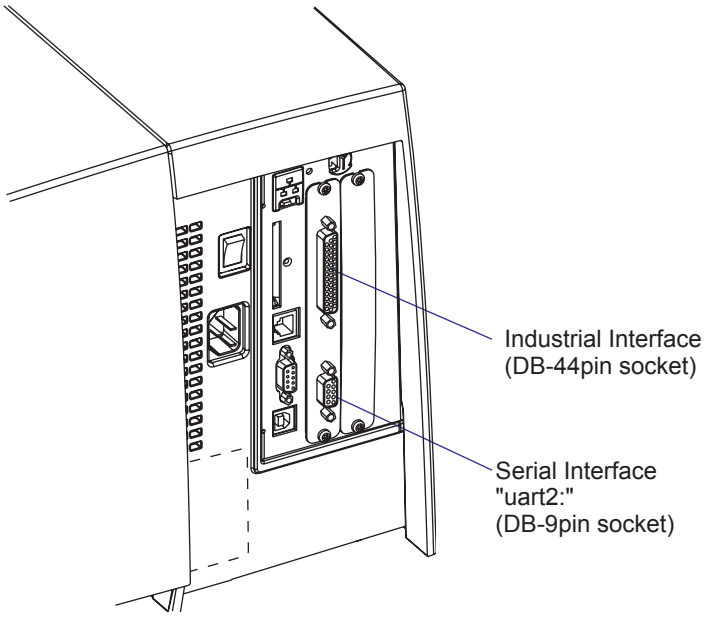
This interface contains one serial communication port ("uart2:" or "uart3:") which can be configured for one of the following alternatives:
- RS-232 non-isolated
- RS-422 isolated, full duplex (reconfiguration required)
- RS-485 isolated, half duplex (reconfiguration required)

Selection of type of serial interface is decided by fitting various types of socket-mounted driver circuits and straps.

Industrial Interface

This interface contains eight digital IN and eight digital OUT ports with optocouplers, plus four OUT ports with relays.

The status of all ports can be read by means of PORTIN functions and the OUT ports can be set using PORTOUT ON/OFF statements (see *Intermec Fingerprint v8.xx, Programmer's Reference Manual).* Thus, it is possible to design Intermec Fingerprint application programs which control not only the printer but also various external devices, for example in a production line. The digital IN ports can read the status of various sensors and the program can, for example, switch control lamps on or off, open or close gates, and start or stop conveyor belts accordingly using the relays and the digital OUT ports.

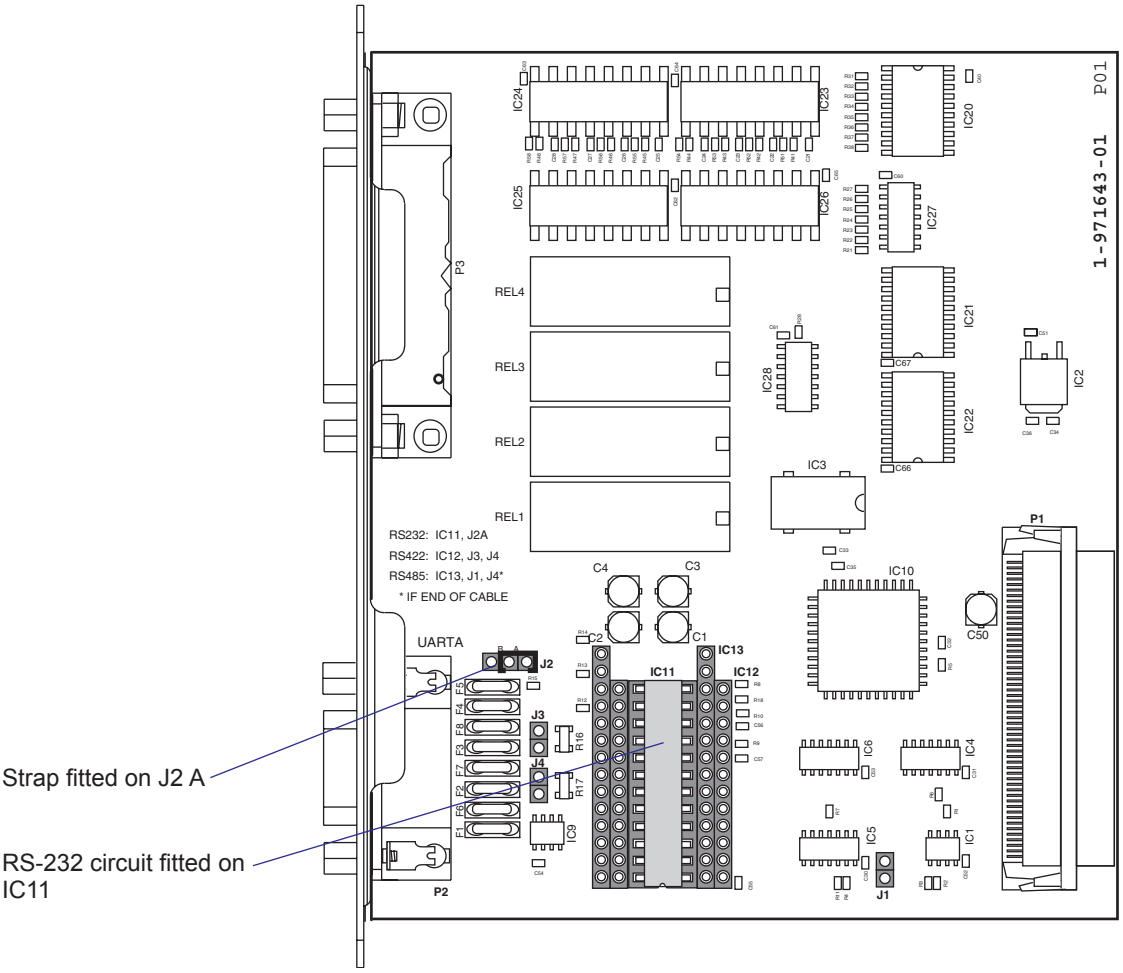


Serial Port Configuration

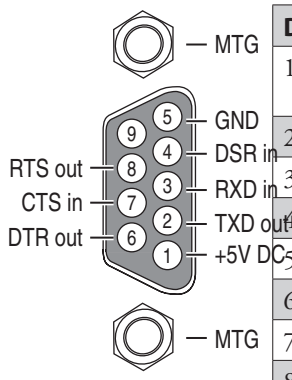
The serial communication port "uart2:" or "uart3:" is as standard configured for RS-232 but can be reconfigured for two other types of serial communication by fitting certain driver circuits and straps. The circuits can be ordered separately from Intermec:

- RS-422 isolated, full duplex
- RS-485 isolated, half duplex

RS-232 Non-isolated (standard)

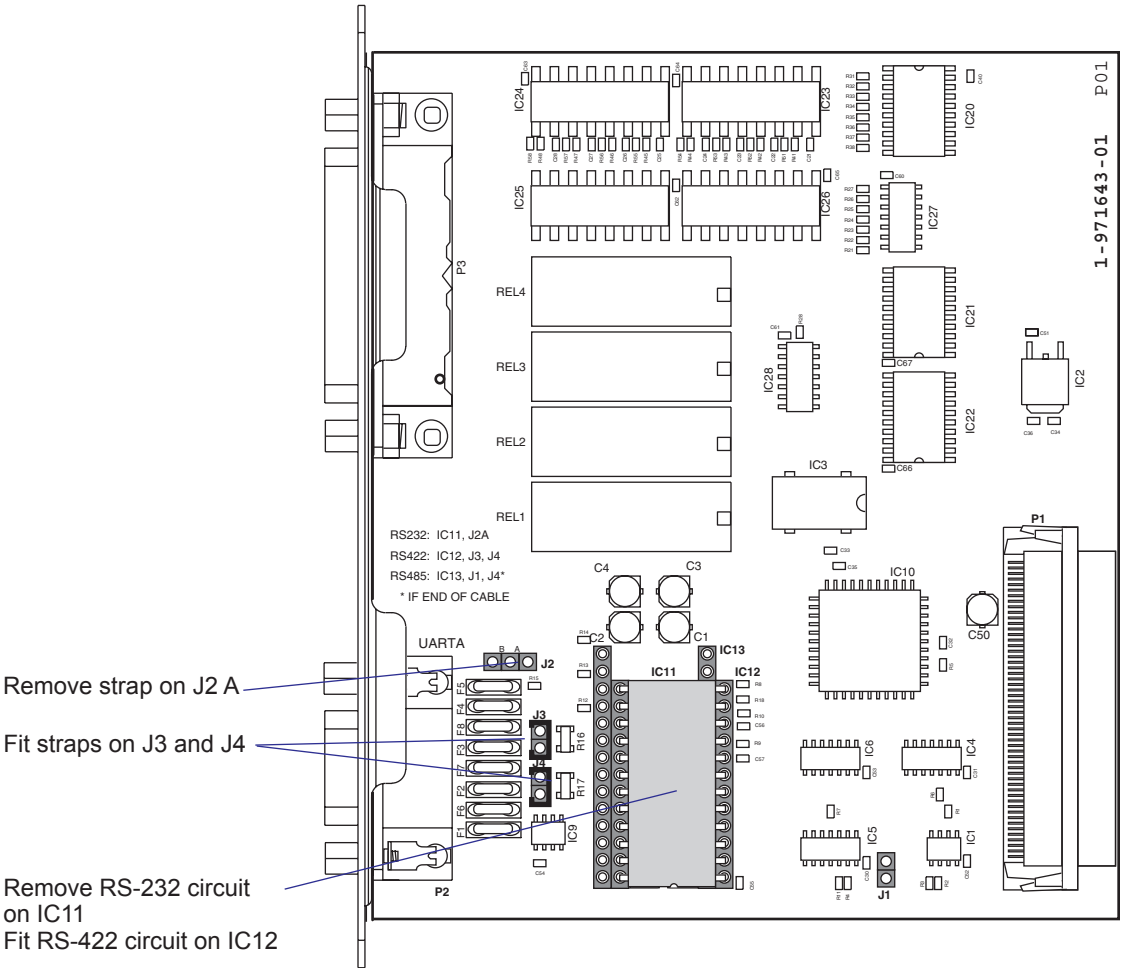


Connector Configuration (RS-232 on "uart2:" or "uart3:")

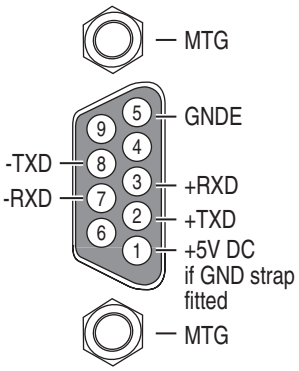


DB-9 socket	Signal	Meaning
1		External +5VDC max 500 mA (automatic switch-off at overload, short-circuit protected)
2	TXD	Transmit data
3	RXD	Receive data
4	DSR	Data set ready
5	GND	Ground
6	DTR	Data terminal ready
7	CTS	Clear to send
8	RTS	Request to send
9	–	Not used

RS-422 Isolated, Full Duplex (reconfiguration required)

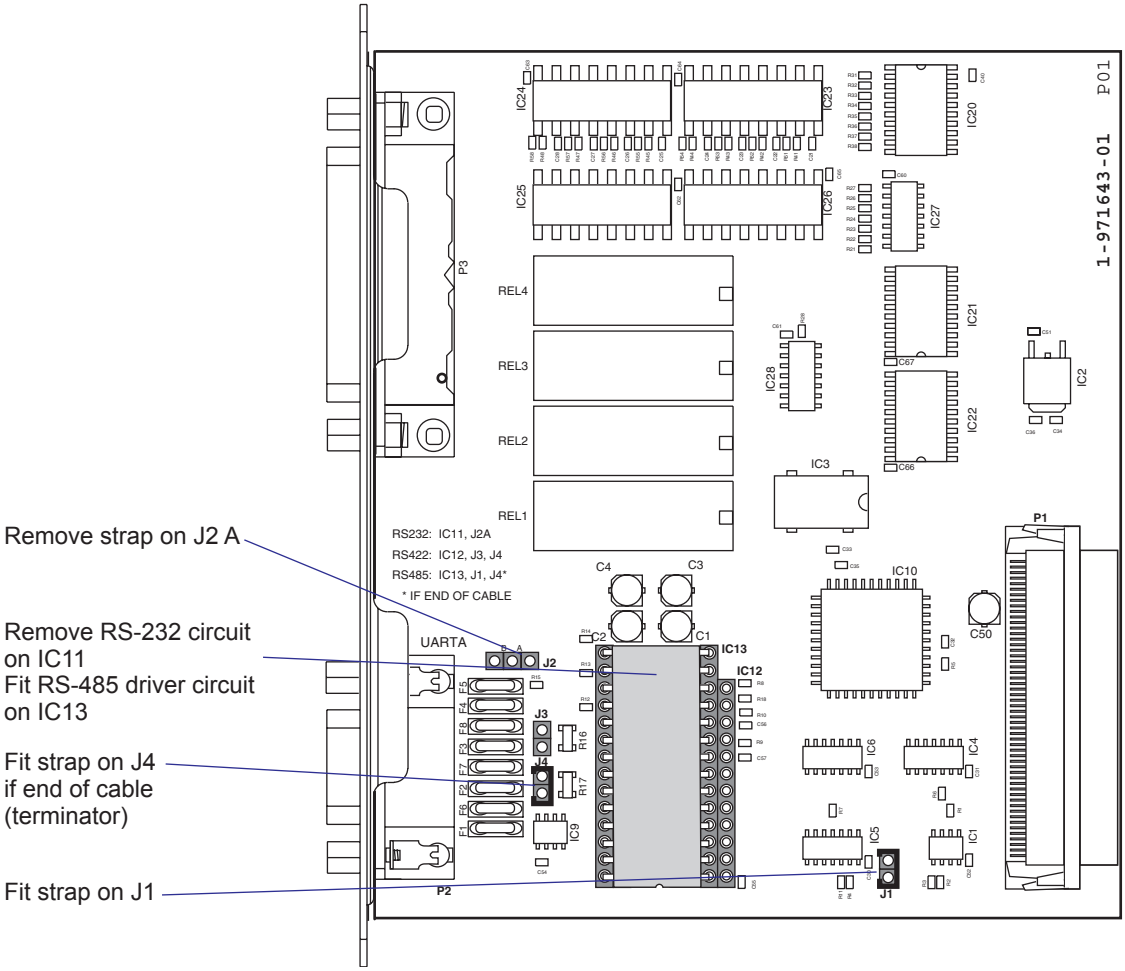


Connector Configuration (RS-422 Isolated on "uart2:" or "uart3:")

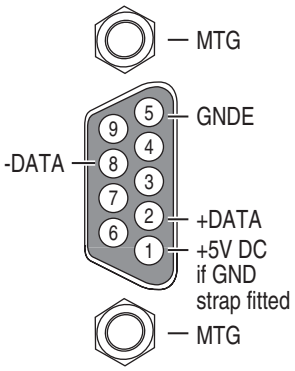


DB-9 socket	Signal	Meaning
1		External +5VDC max 500 mA (automatic switch-off at overload, short-circuit protected) provided strap is fitted on J2:A which spoils the galvanical isolation
2	+TXD	+Transmit data
3	+RXD	+Receive data
4	–	
5	GNDE	Ground
6	-	
7	-RXD	-Receive data
8	-TXD	-Transmit data
9	–	

RS-485 Isolated, Half Duplex (reconfiguration required)



Connector Configuration (RS-485 Isolated on "uart2:" or "uart3:")



DB-9 socket	Signal	Meaning
1		External +5VDC max 500 mA (automatic switch-off at overload, short-circuit protected) provided strap is fitted on J2:A which spoils the galvanical isolation
2	+DATA	
3	–	
4	–	
5	GNDE	Ground
6	–	
7	–	
8	-DATA	
9	–	

Note: The increased use of LAN networks has made the RS-485 interface somewhat obsolete, because RS-485 requires a special communication protocol and a dedicated wiring system limited to 1,200 m (4,000 ft). We only recommend RS-485 for existing applications and advice the customer to consider a LAN network solution for new applications.

Industrial Interface Configuration

The Industrial Interface provides:

- 8 digital IN ports with optocouplers (Opto In)
- 8 digital OUT ports with optocouplers (Opto Out)
- 4 OUT ports with relays (Relay Out)

The Industrial Interface has no straps or circuits to be fitted or removed. All signals are available on a DB-44pin socket and the various ports are controlled by the Intermec Fingerprint instructions PORTIN and PORTOUT ON/OFF (see *Intermec Fingerprint v8.xx, Programmer's Reference Manual*).

Digital Opto In

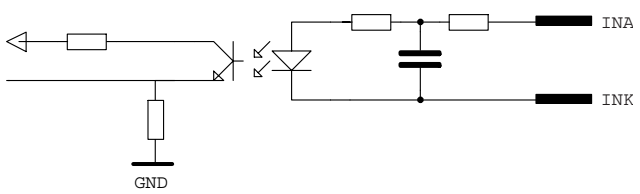
The status of the digital IN ports can be read using PORTIN functions. If a current is led through the optocoupler of the port, PORTIN returns the value -1 (true), else it returns the value 0 (false).

Signal	Description	Min.	Typical	Max.
Vin [High]	Input Voltage High	10V	24V	40V
Vin [Low]	Input Voltage Low	-1V	0V	1V

Connector Configuration

Pin	Signal Name	Description	Fingerprint Ref. No.
10	IN1A	Anode Opto In Channel 1 +	101 (301)
40	IN1K	Cathode Opto In Channel 1 -	
26	IN2A	Anode Opto In Channel 2 +	102 (302)
11	IN2K	Cathode Opto In Channel 2 -	
41	IN3A	Anode Opto In Channel 3 +	103 (303)
27	IN3K	Cathode Opto In Channel 3 -	
12	IN4A	Anode Opto In Channel 4 +	104 (304)
42	IN4K	Cathode Opto In Channel 4 -	
28	IN5A	Anode Opto In Channel 5 +	105 (305)
13	IN5K	Cathode Opto In Channel 5 -	
43	IN6A	Anode Opto In Channel 6 +	106 (306)
29	IN6K	Cathode Opto In Channel 6 -	
14	IN7A	Anode Opto In Channel 7 +	107 (307)
44	IN7K	Cathode Opto In Channel 7 -	
30	IN8A	Anode Opto In Channel 8 +	108 (308)
15	IN8K	Cathode Opto In Channel 8 -	

The Fingerprint reference numbers inside the parentheses refer to a second Serial/Industrial interface board.



Simplified schematics of a digital IN port.

Digital Opto Out

The current to each optocoupler of the digital OUT ports can be turned on and off using PORTOUT ON/OFF statements.

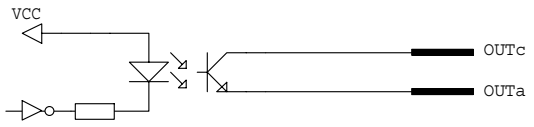
The status of the ports can be read using PORTIN functions. If a current is led through the optocoupler of the port, PORTIN returns the value -1 (true), else it returns the value 0 (false).

Signal	Description	Max.
Vceo	Collector-Emitter breakdown voltage	35V
Veco	Emitter-Collector breakdown voltage	6V
	Collector Current	15 mA
Vog	Output to ground (optocoupler)	100V

Connector Configuration

Pin	Signal Name	Description	Fingerprint Ref. No.
20	Out1c	Collector Opto Out Channel 1	221 (421)
5	Out1e	Emitter Opto Out Channel 1	
35	Out2c	Collector Opto Out Channel 2	222 (422)
21	Out2e	Emitter Opto Out Channel 2	
6	Out3c	Collector Opto Out Channel 3	223 (423)
36	Out3e	Emitter Opto Out Channel 3	
22	Out4c	Collector Opto Out Channel 4	224 (424)
7	Out4e	Emitter Opto Out Channel 4	
37	Out5c	Collector Opto Out Channel 5	225 (425)
23	Out5e	Emitter Opto Out Channel 5	
8	Out6c	Collector Opto Out Channel 6	226 (426)
38	Out6e	Emitter Opto Out Channel 6	
24	Out7c	Collector Opto Out Channel 7	227 (427)
9	Out7e	Emitter Opto Out Channel 7	
39	Out8c	Collector Opto Out Channel 8	228 (428)
25	Out8e	Emitter Opto Out Channel 8	

The Fingerprint reference numbers inside the parentheses refer to a second Serial/Industrial interface board .



Simplified schematics of a digital OUT port.

Relay Out

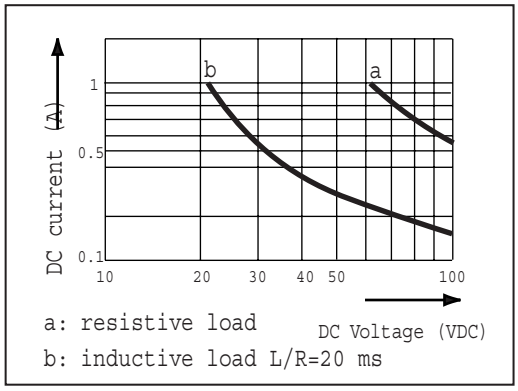
The relays of the OUT ports can be individually activated using PORTOUT ON/OFF statements.

The status of the ports can be read by means of PORTIN functions. If a relay is activated, PORTIN returns the value -1 (true), else it returns the value 0 (false).

Max AC Load Breaking Capacity

Signal	Description	Max.
I	Current	1A
Psw AC	Switching power	100VA AC
Usw AC	Switching voltage	100V AC

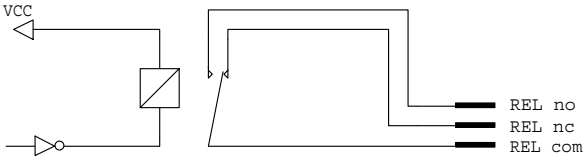
Max DC Load Breaking Capacity



Connector Configuration

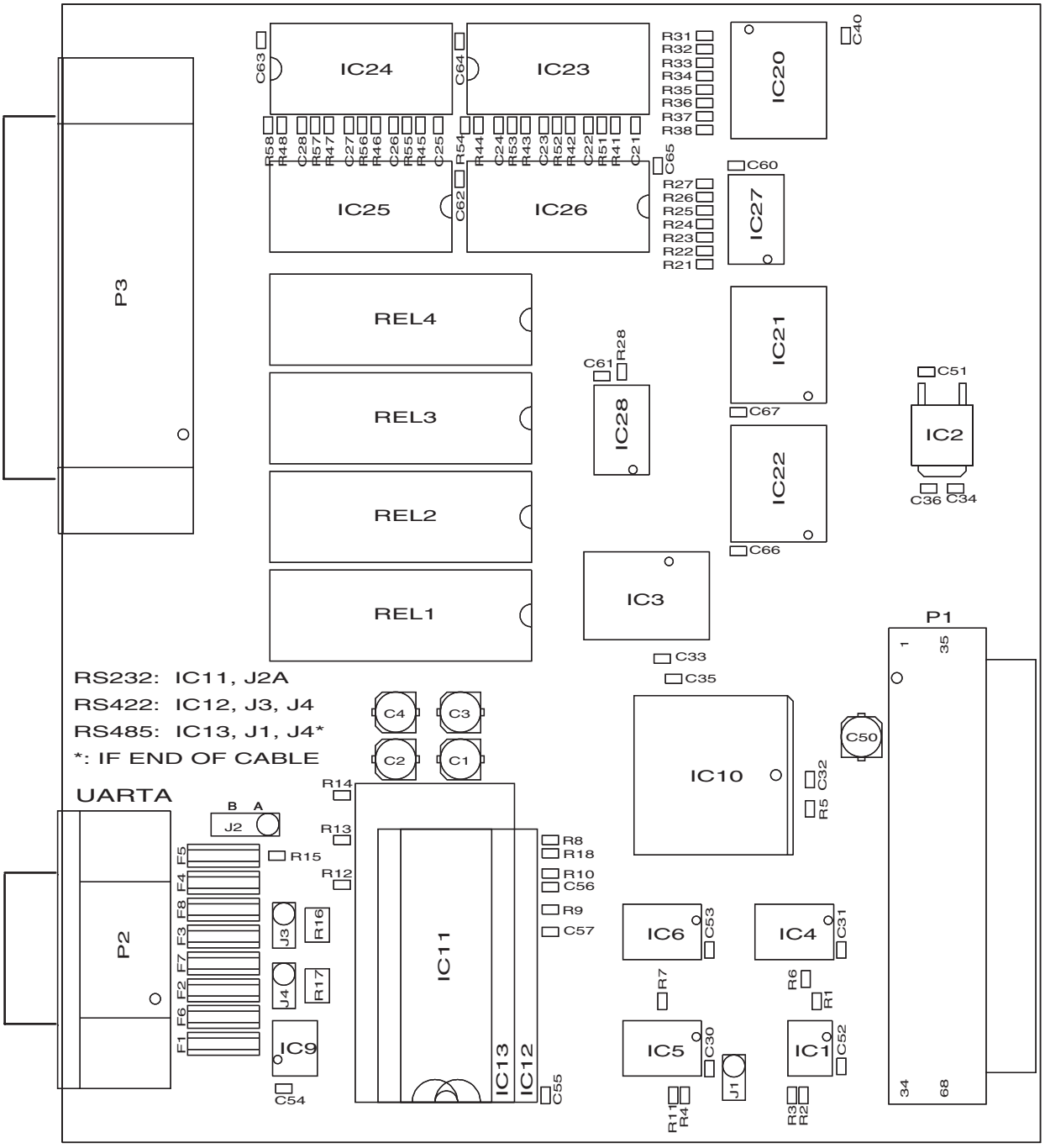
Pin	Signal Name	Description	Fingerprint Ref. No.
16	REL1nc	Relay 1 Normally Closed	201 (401)
1	REL1no	Relay 1 Normally Open	
31	REL1com	Relay 1 Common	
17	REL2nc	Relay 2 Normally Closed	202 (402)
2	REL2no	Relay 2 Normally Open	
32	REL2com	Relay 2 Common	
18	REL3nc	Relay 3 Normally Closed	203 (403)
3	REL3no	Relay 3 Normally Open	
33	REL3com	Relay 3 Common	
19	REL4nc	Relay 4 Normally Closed	204 (404)
4	REL4no	Relay 4 Normally Open	
34	REL4com	Relay 4 Common	

The Fingerprint reference numbers inside the parentheses refer to a second Serial/Industrial interface board.



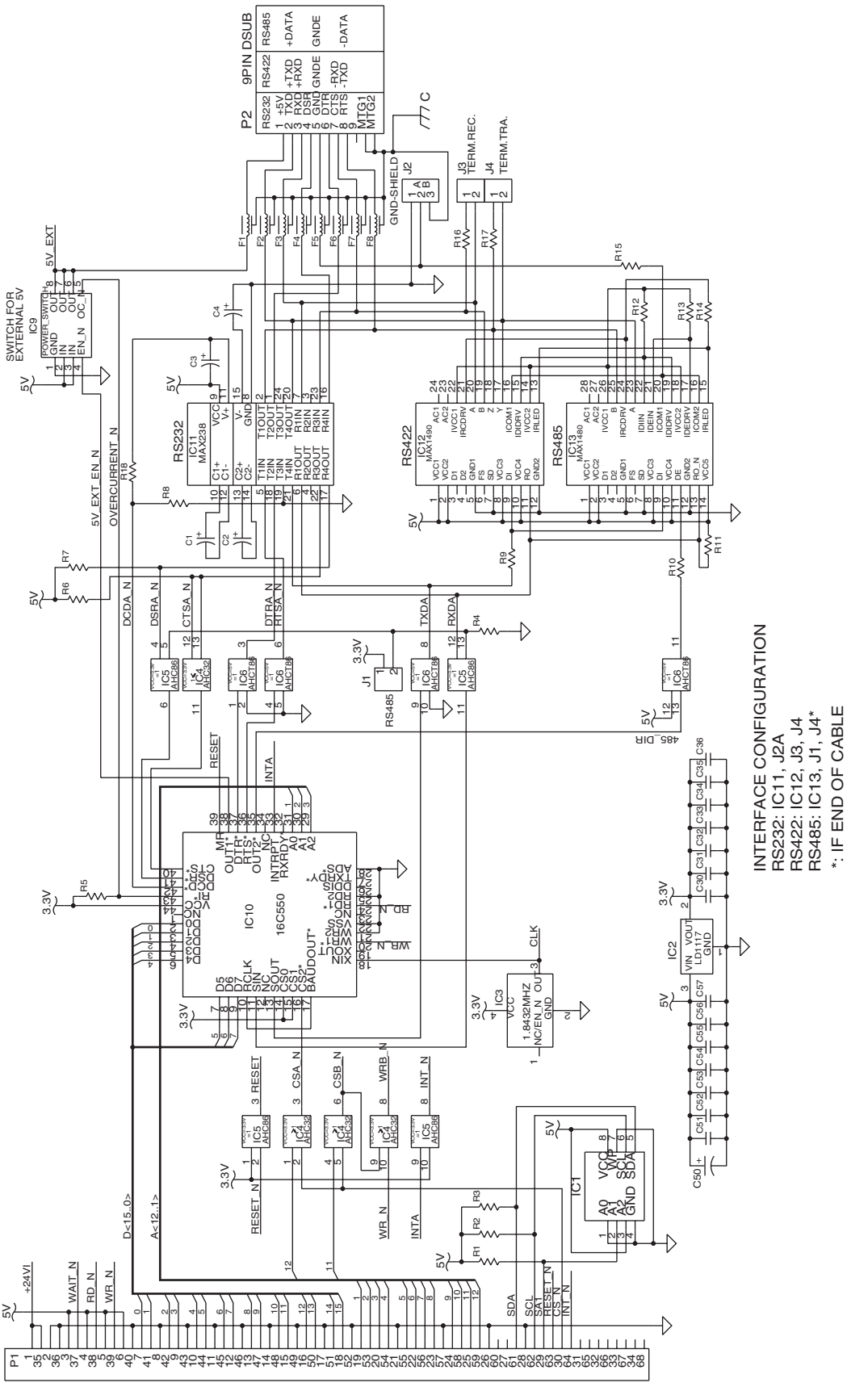
Simplified schematics of a relay OUT port.

Components



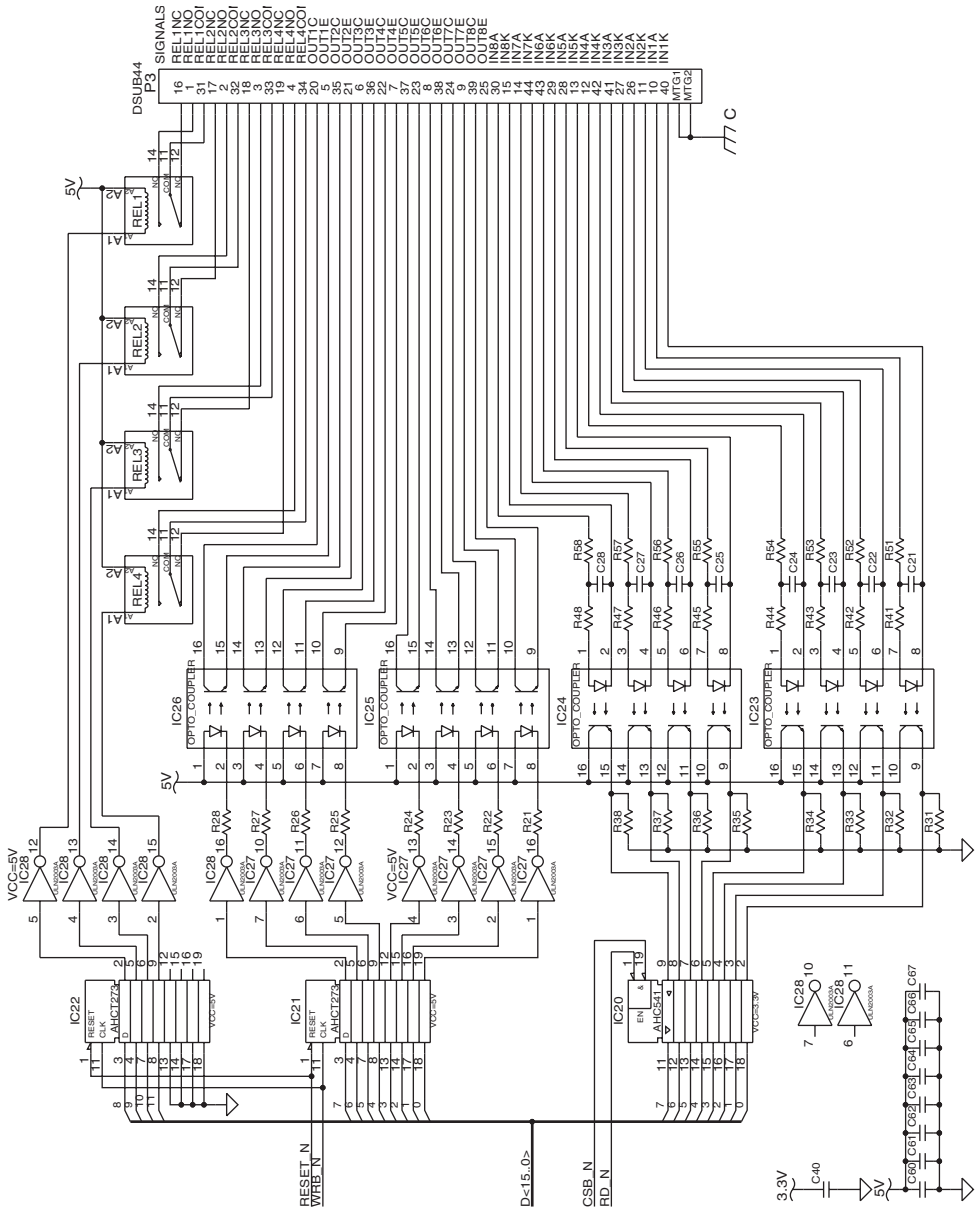
1-971643-26 Serial/Industrial Interface Board; Component side

Schematics; Serial Port



1-971643-26 Serial/Industrial Interface Board; Schematics 1

Schematics; Industrial Interface



1-971643-26 Serial/Industrial Interface Board; Schematics 2

14.7 Double Serial Interface Board (not IPL)

Description

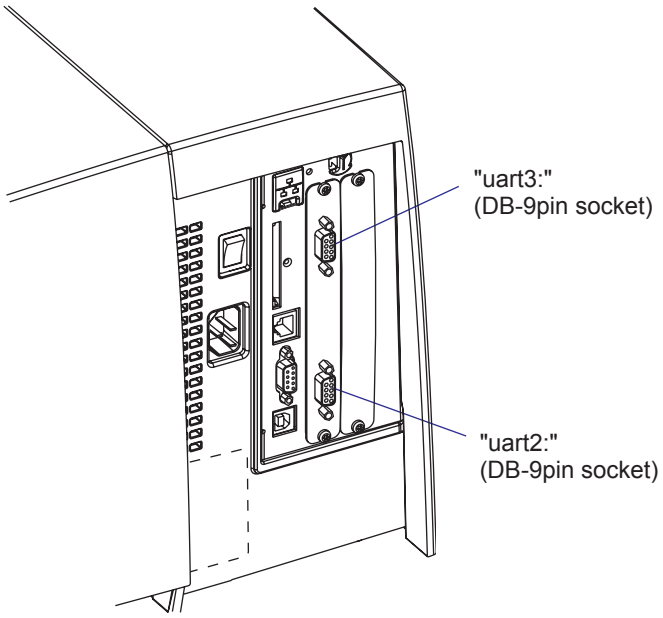
The Double Serial Interface Board (DUART) is a Fingerprint-only optional device for EasyCoder PM4i printers. It provides these printers with two extra serial interfaces.

"uart2:"
This interface can be fitted with straps and circuits for one of the following alternatives:
- RS-232 non-isolated
- RS-422 isolated, full duplex
- RS-485 isolated, half duplex

"uart3:"
This interface can be fitted with straps and circuits for one of the following alternatives:
- RS-232 non-isolated
- RS-422 non isolated, full duplex
- 20 mA Current Loop.

The Double Serial Interface Kit contains:
- One interface board fitted for RS-232 on both ports.
- Two flat cables
- One hexagonal spacer
- One Installation Instruction booklet

Circuits for modifying the board for RS-422 non-isolated, RS-422 isolated, RS-485 isolated, or 20 mA current loop can be bought separately from Intermec.

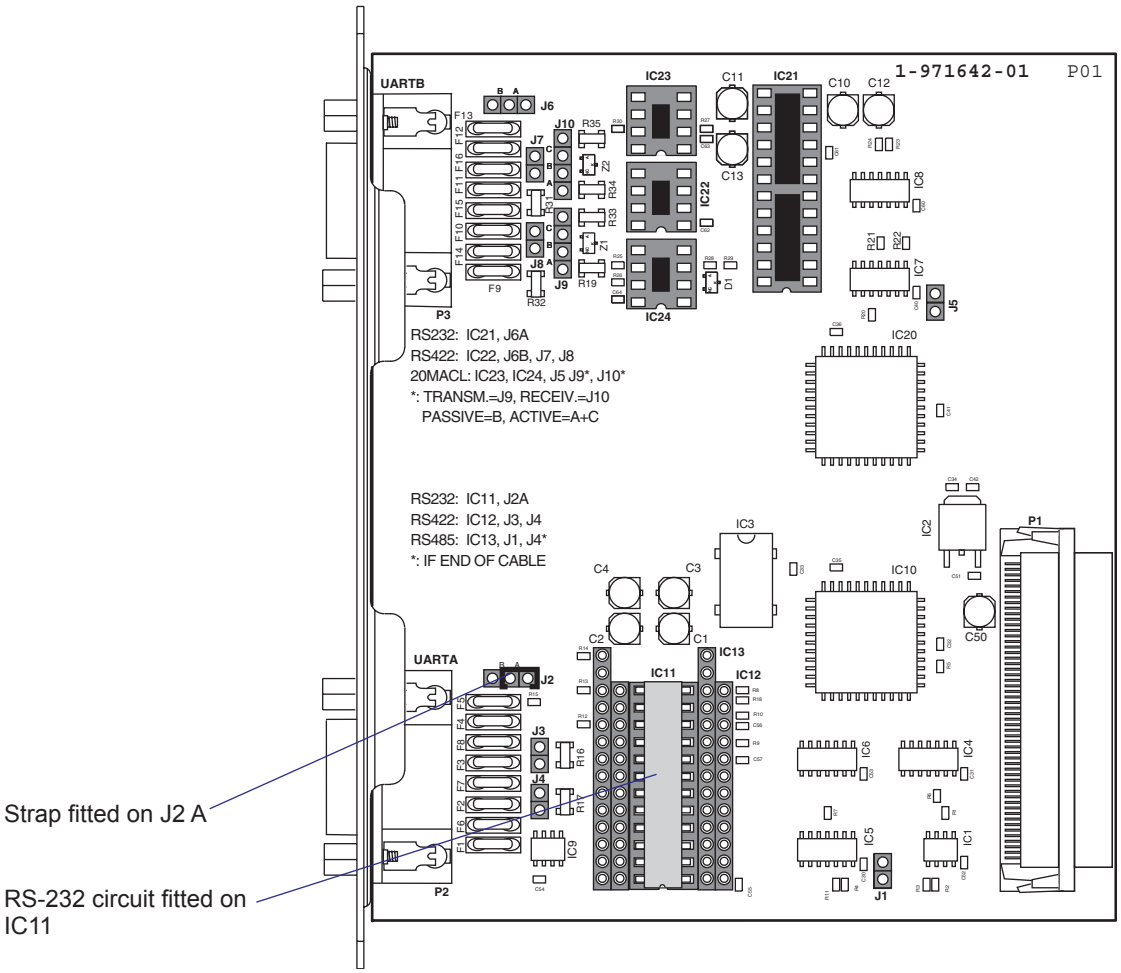


"uart2:" Configuration

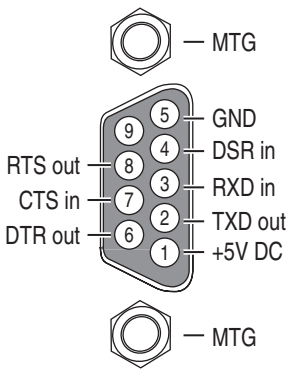
The serial communication port "uart2:" can be configured for three different types of serial communication by fitting or removing certain driver circuits and straps:

- RS-232 non-isolated
- RS-422 isolated, full duplex
- RS-485 isolated, half duplex

RS-232 Non-isolated (standard)

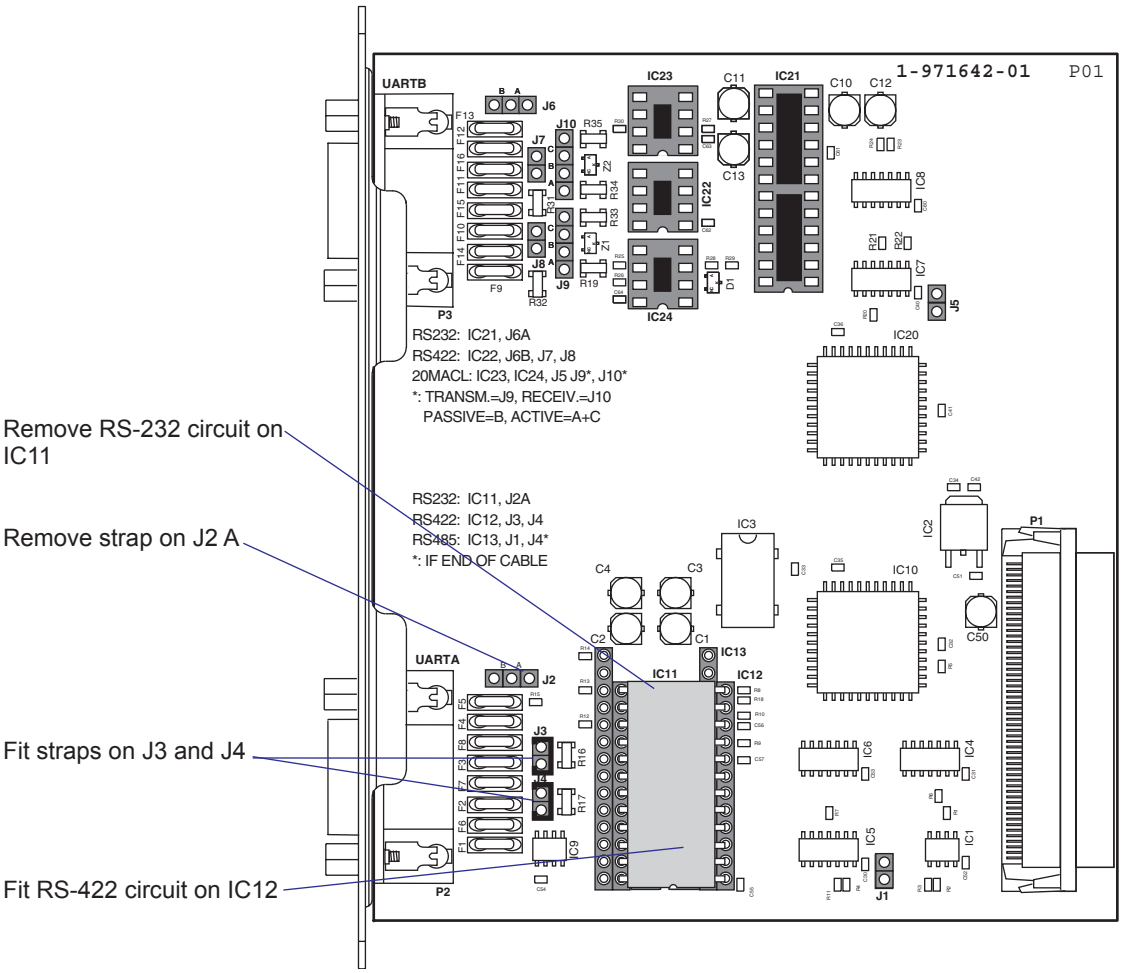


Connector Configuration (RS-232 on "uart2:")

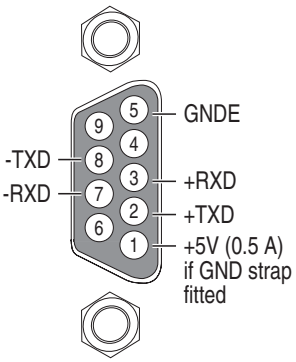


DB-9 socket	Signal	Meaning
1		External +5VDC max 500 mA (automatic switch-off at overload, short-circuit protected)
2	TXD	Transmit data
3	RXD	Receive data
4	DSR	Data set ready
5	GND	Ground
6	DTR	Data terminal ready
7	CTS	Clear to send
8	RTS	Request to send
9	–	Not used

RS-422 Isolated, Full Duplex (reconfiguration required)

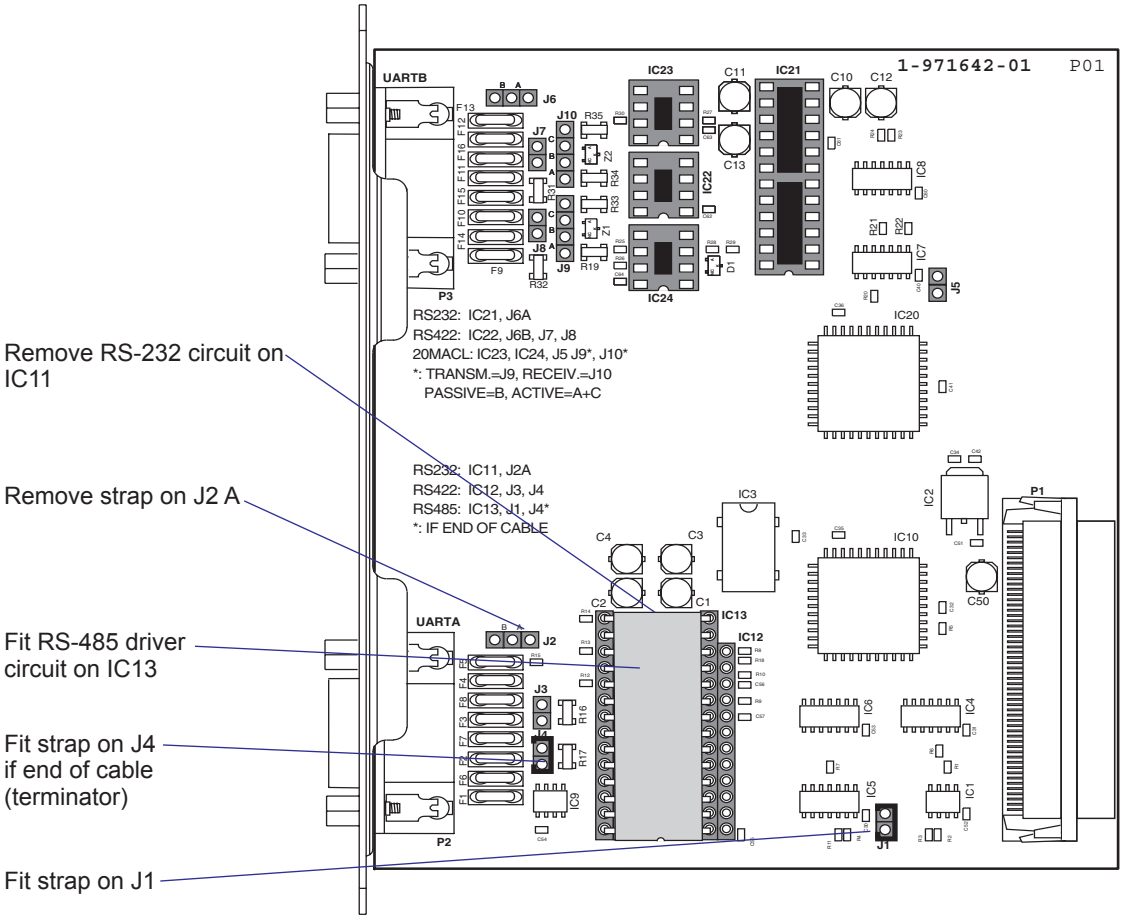


Connector Configuration (RS-422 Isolated on "uart2:")

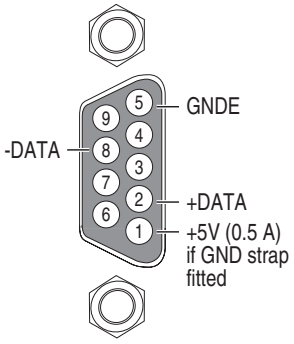


DB-9 socket	Signal	Meaning
1		External +5VDC max 500 mA (automatic switch-off at overload, short-circuit protected) provided strap is fitted on J2:A which spoils the galvanical isolation
2	+TXD	+Transmit data
3	+RXD	+Receive data
4	–	
5	GNDE	Ground
6	-	
7	-RXD	-Receive data
8	-TXD	-Transmit data
9	–	

RS-485 Isolated, Half Duplex (reconfiguration required)



Connector Configuration (RS-485 Isolated on "uart2:")



DB-9 socket	Signal	Meaning
1		External +5VDC max 500 mA (automatic switch-off at overload, short-circuit protected) provided strap is fitted on J2:A which spoils the galvanical isolation
2	+DATA	
3	–	
4	–	
5	GNDE	Ground
6	–	
7	–	
8	-DATA	
9	–	

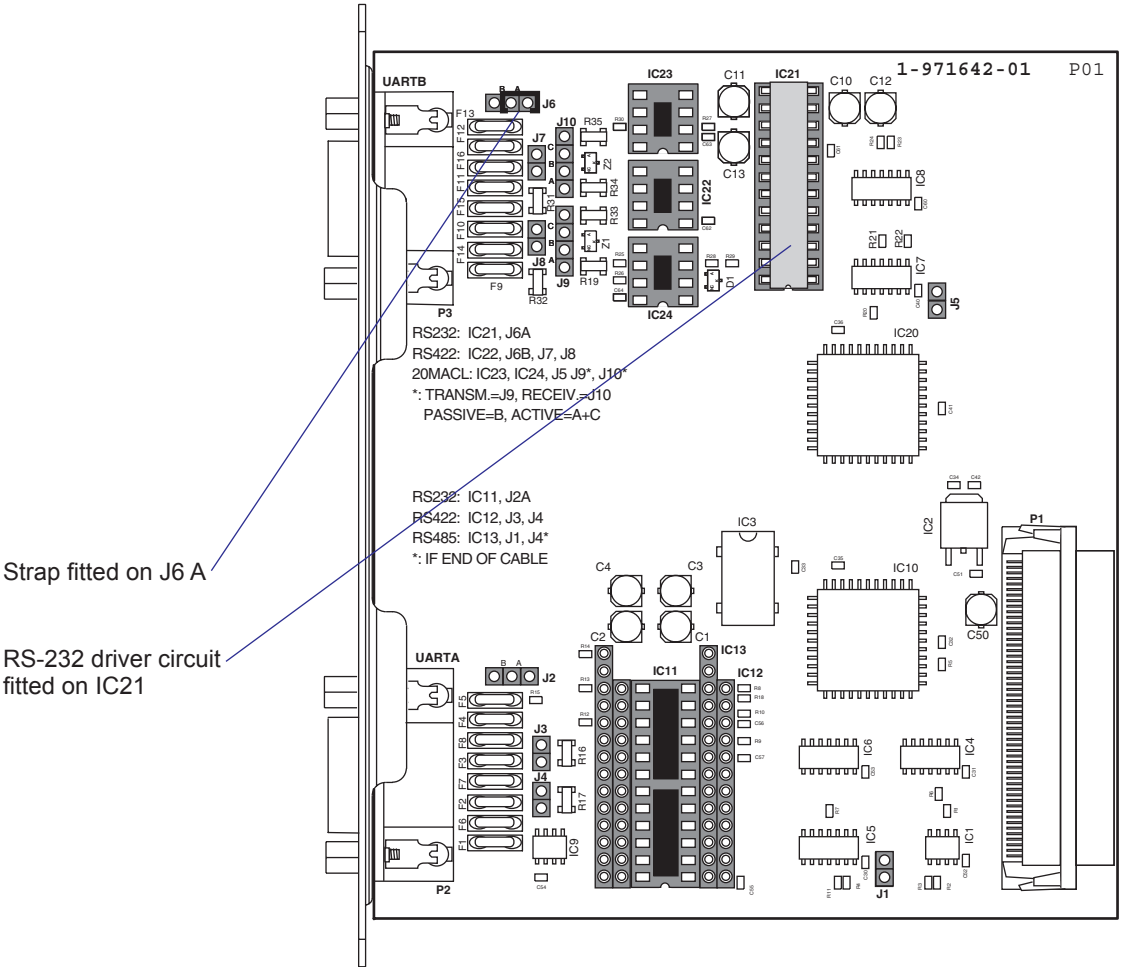
Note: The increased use of LAN networks has made the RS-485 interface somewhat obsolete, because RS-485 requires a special communication protocol and a dedicated wiring system limited to 1,200 m (4,000 ft). We only recommend RS-485 for existing applications and advice the customer to consider a LAN network solution for new applications.

"uart3:" Configuration

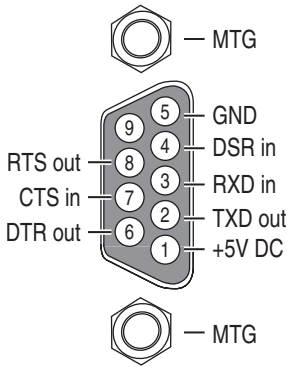
The serial communication port uart3: can be configured for three different types of serial communication by fitting or removing certain driver circuits and straps:

- RS-232 non-isolated
- RS-422 non-isolated, full duplex
- 20 mA Current Loop

RS-232 Non-isolated (standard)

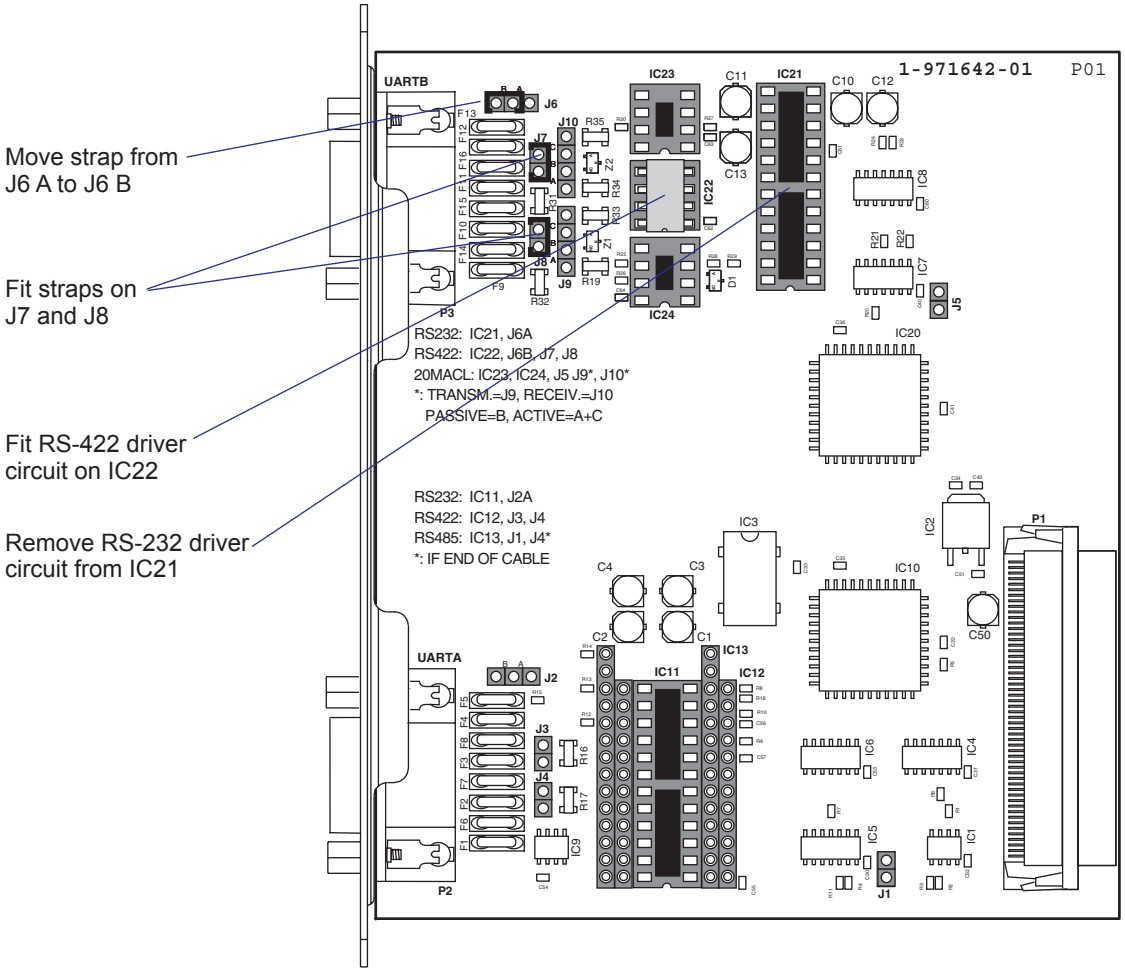


Connector Configuration (RS-232 on "uart3:")

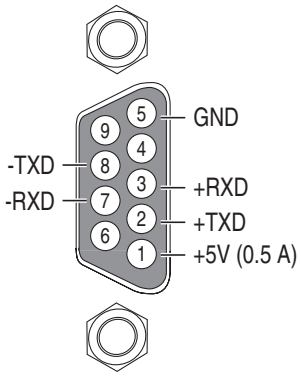


DB-9 socket	Signal	Meaning
1		External +5VDC max 500 mA (automatic switch-off at overload, short-circuit protected)
2	TXD	Transmit data
3	RXD	Receive data
4	DSR	Data set ready
5	GND	Ground
6	DTR	Data terminal ready
7	CTS	Clear to send
8	RTS	Request to send
9	–	Not used

"uart3:" RS-422 Non Isolated, full duplex (reconfiguration required)

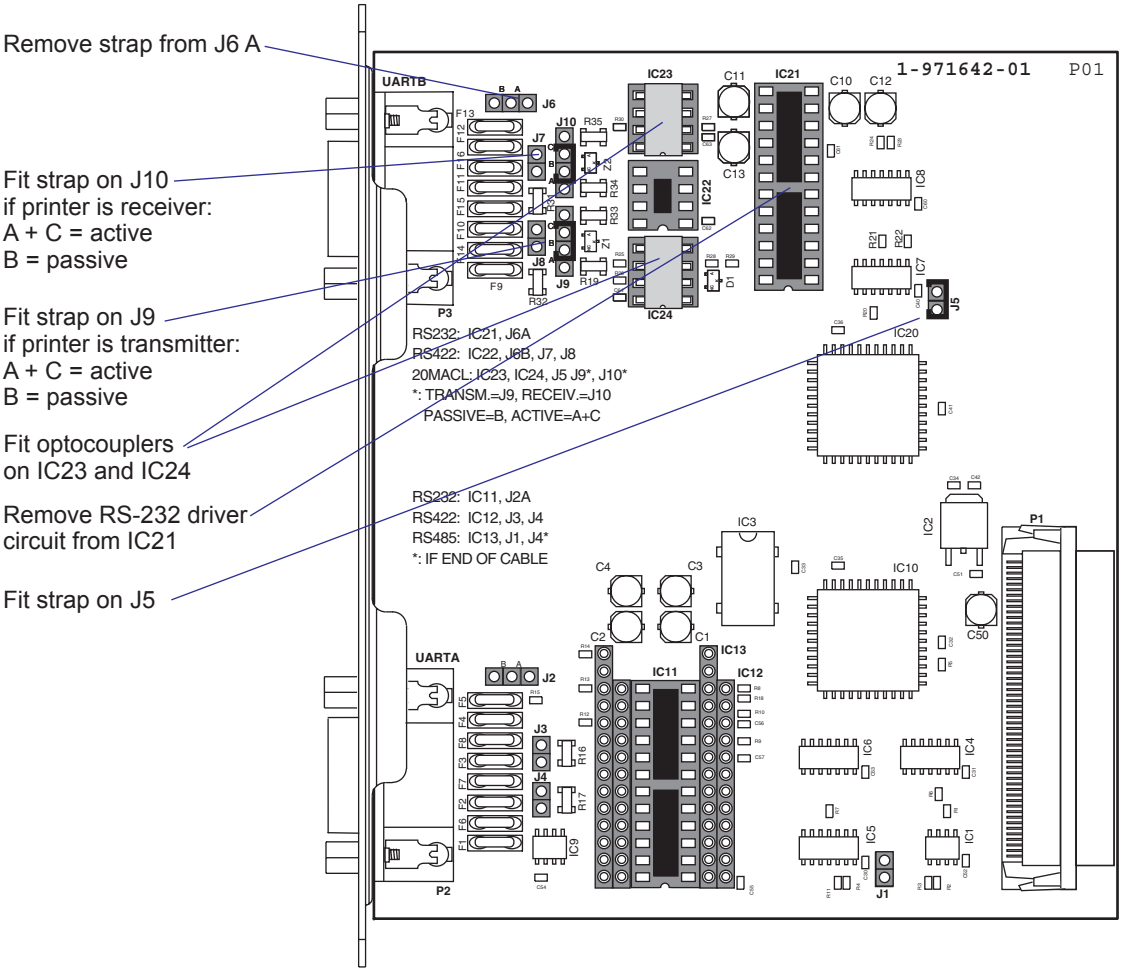


Connector Configuration (RS-422 Non-isolated on "uart3:")

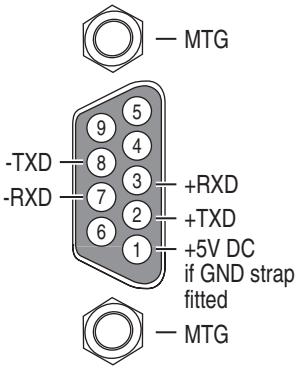


DB-9 socket	Signal	Meaning
1		External +5VDC max 500 mA (automatic switch-off at overload, short-circuit protected) if strap is moved from J6 B to J6 A.
2	+TXD	+Transmit data
3	+RXD	+Receive data
4	–	
5	GNDE	Ground
6	-	
7	-RXD	-Receive data
8	-TXD	-Transmit data
9	–	

"uart3:" 20 mA Current Loop (reconfiguration required)



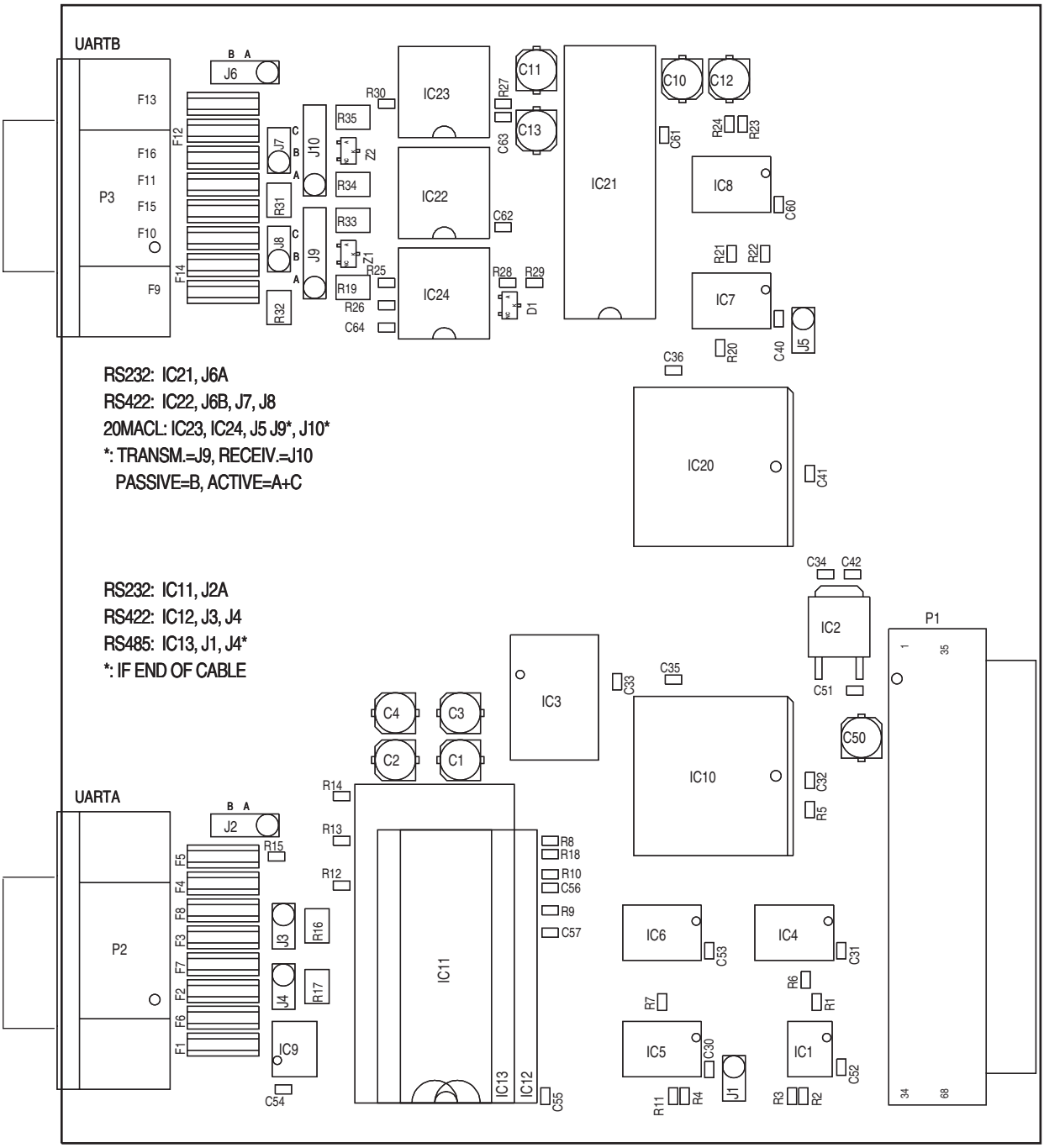
Connector Configuration (20 mA Current Loop on "uart3:")



DB-9 socket	Signal	Meaning
1		External +5VDC max 500 mA (automatic switch-off at overload, short-circuit protected) provided a strap is fitted on J6 A which spoils the galvanic isolation.
2	+TXD	+Transmit data
3	+RXD	+Receive data
4	–	
5	GNDE	Ground
6	-	
7	-RXD	-Receive data
8	-TXD	-Transmit data
9	–	

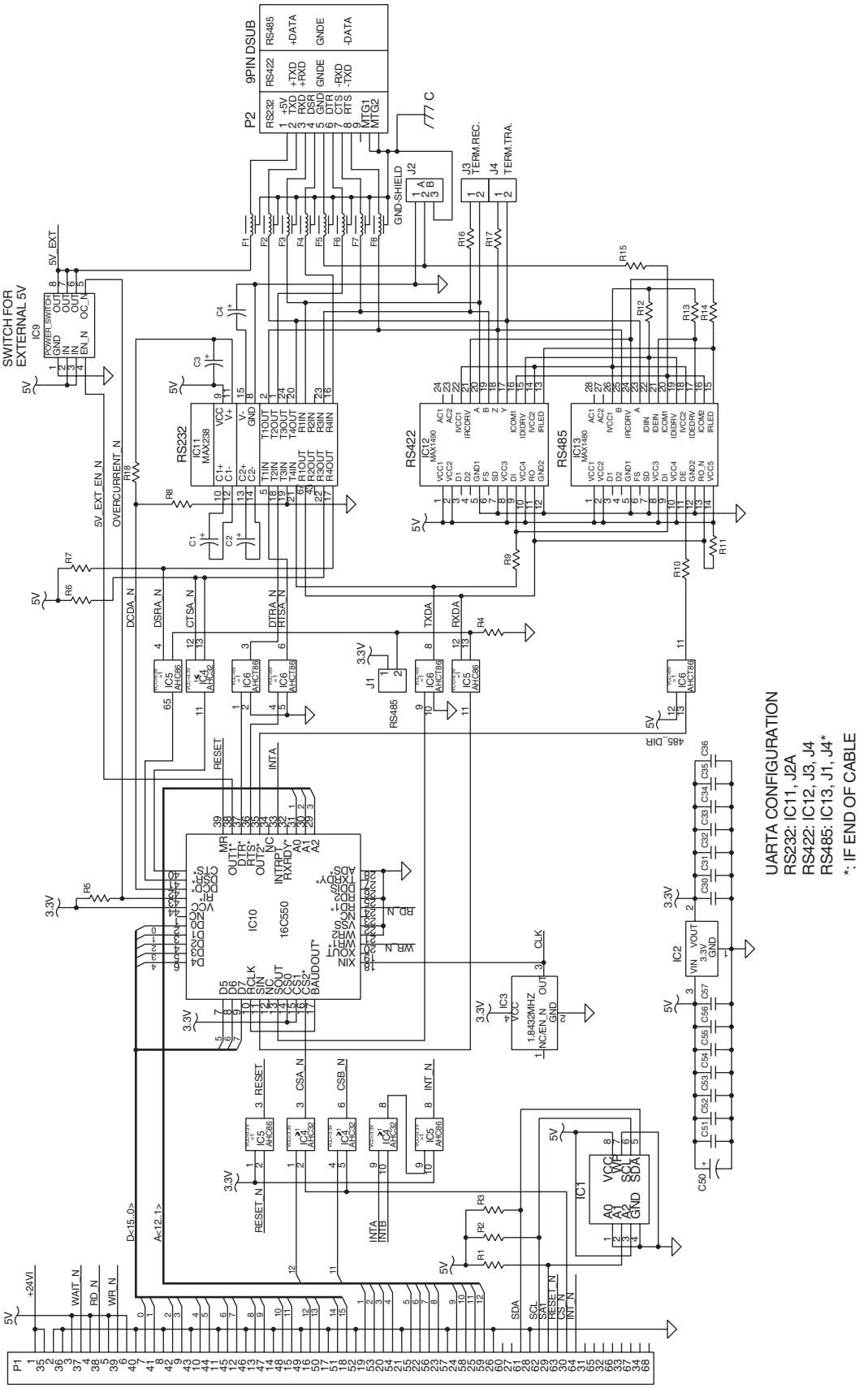
Note: Max. recommended baud rate 9600.

Components



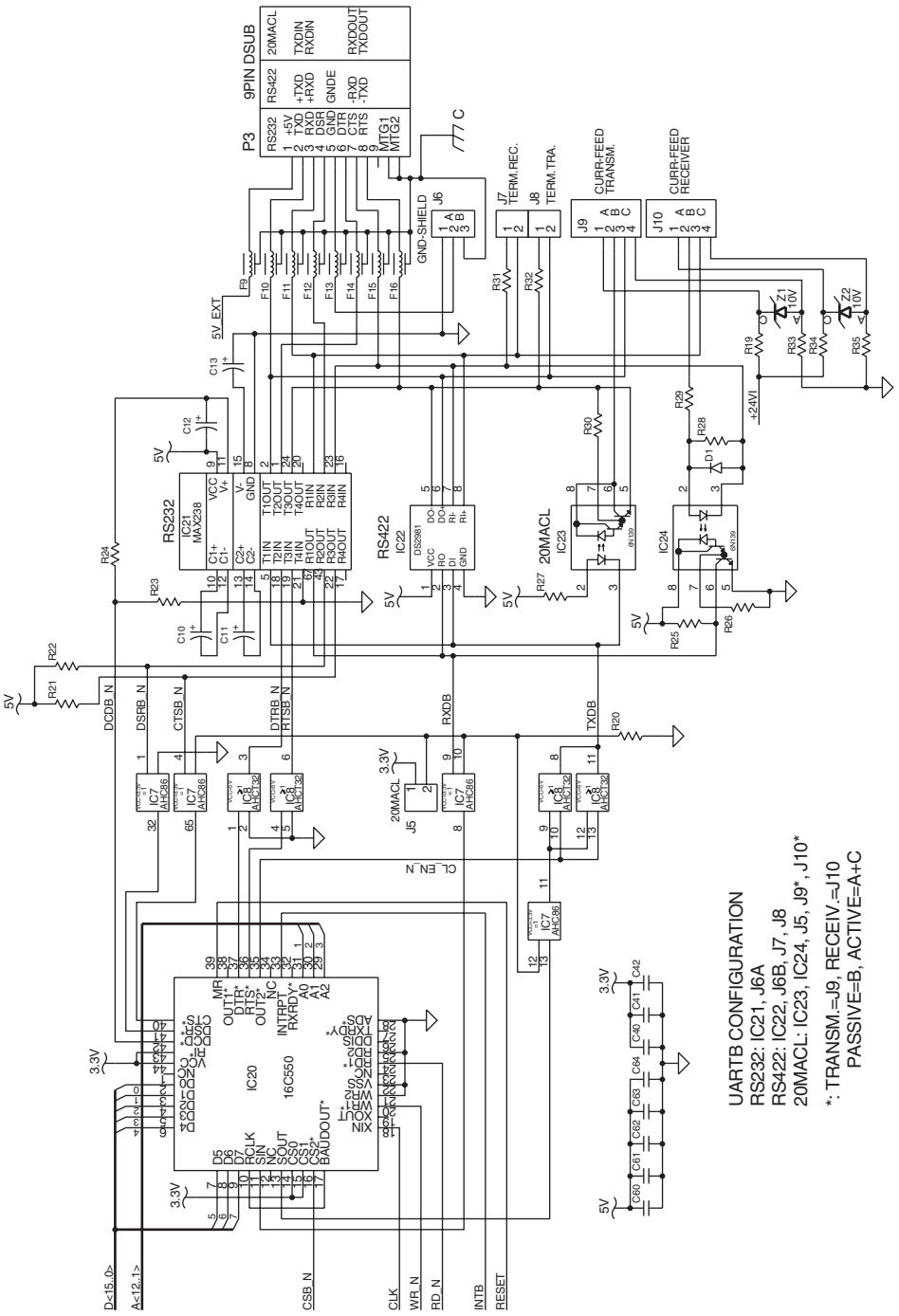
1-971642-26 Serial/Industrial Interface Board; Component side

Schematics "uart2:"



1-971642-26 Double Serial Interface Board; Schematics 1

Schematics "uart3:"



1-971642-26 Double Serial Interface Board; Schematics 2

14.8 RFID Serial Interface Board

Description

The RFID Serial Interface Board is an optional device for EasyCoder PM4i printers. It provides these printers with one serial interface port and RFID functionality. It is supported by both Fingerpint and IPL.

The RFID Serial Interface Board is available as part of the RFID Kit (Class 1, 915 MHz) which contains:

- One RFID Serial Interface Board
- One 915 MHz Radio Module
- One Dual Slot I/O Bus Cable (Flat Cable)
- One RFID Antenna
- Two MRT 4x8 Screws
- One MRT 3x5 Screw
- One Spacer Screw (17mm)
- One RFID label
- One Quick Start Guide booklet
- One Installations Instructions booklet

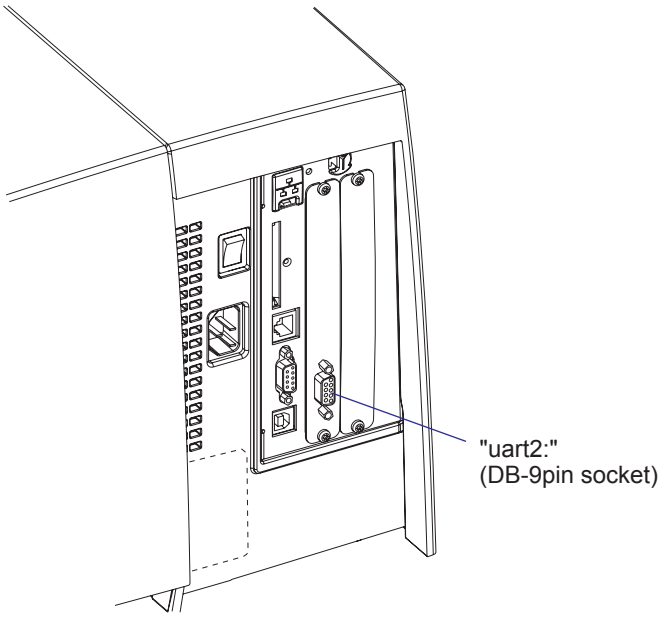
"uart2:"

This interface can be fitted with straps and circuits for one of the following alternatives:

- RS-232 non-isolated
- RS-422 isolated, full duplex
- RS-485 isolated, half duplex

"uart3:"

Jumpers J5-J9 can be fitted with straps to provide support for two different types of RFID modules.

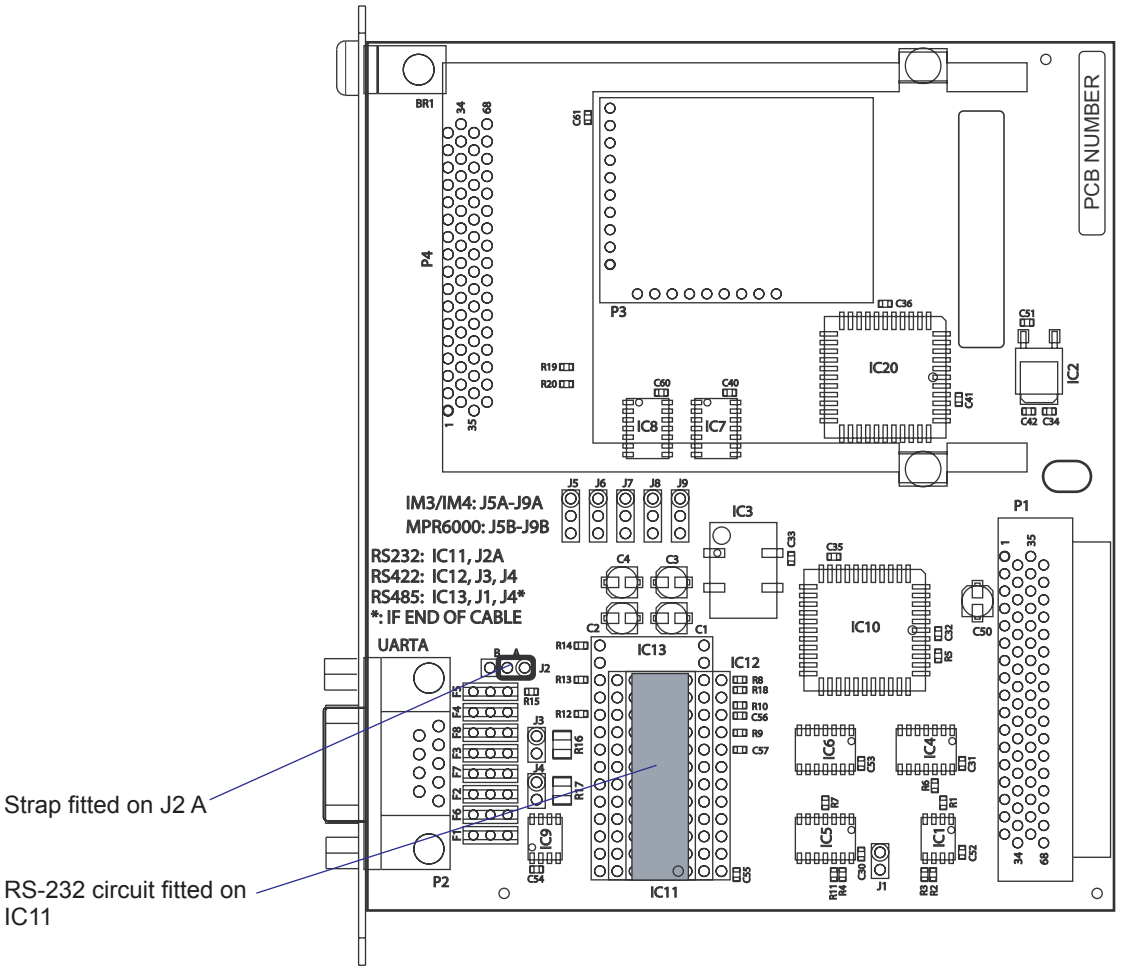


"uart2:" Configuration

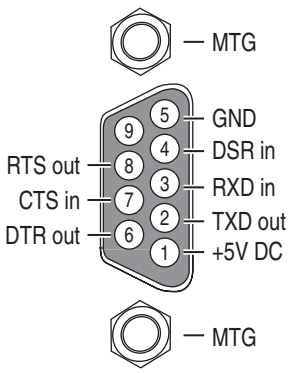
The serial communication port "uart2:" can be configured for three different types of serial communication by fitting or removing certain driver circuits and straps:

- RS-232 non-isolated
- RS-422 isolated, full duplex
- RS-485 isolated, half duplex

RS-232 Non-isolated (standard)

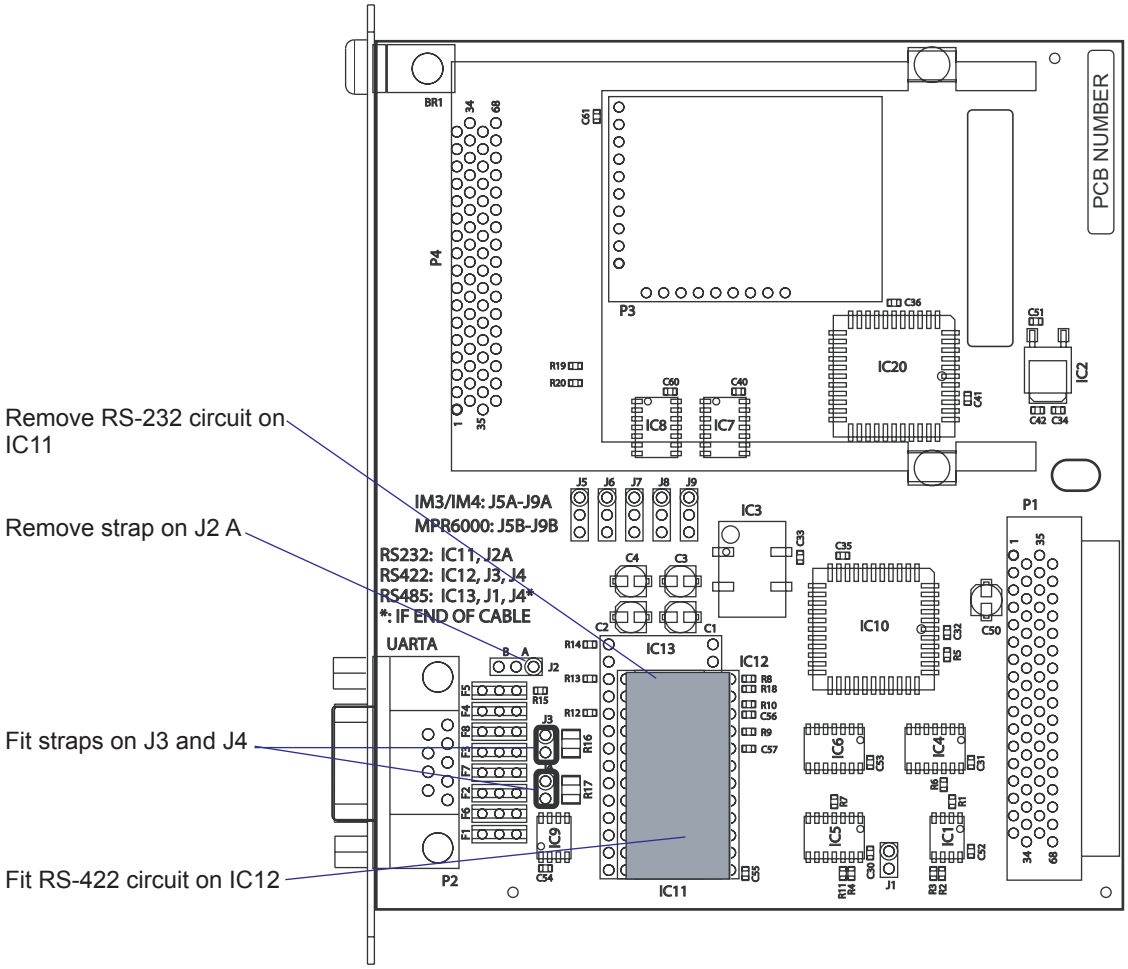


Connector Configuration (RS-232 on "uart2:")

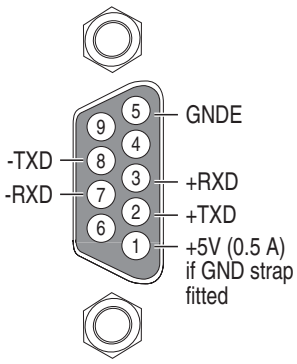


DB-9 socket	Signal	Meaning
1		External +5VDC max 500 mA (automatic switch-off at overload, short-circuit protected)
2	TXD	Transmit data
3	RXD	Receive data
4	DSR	Data set ready
5	GND	Ground
6	DTR	Data terminal ready
7	CTS	Clear to send
8	RTS	Request to send
9	–	Not used

RS-422 Isolated, Full Duplex (reconfiguration required)

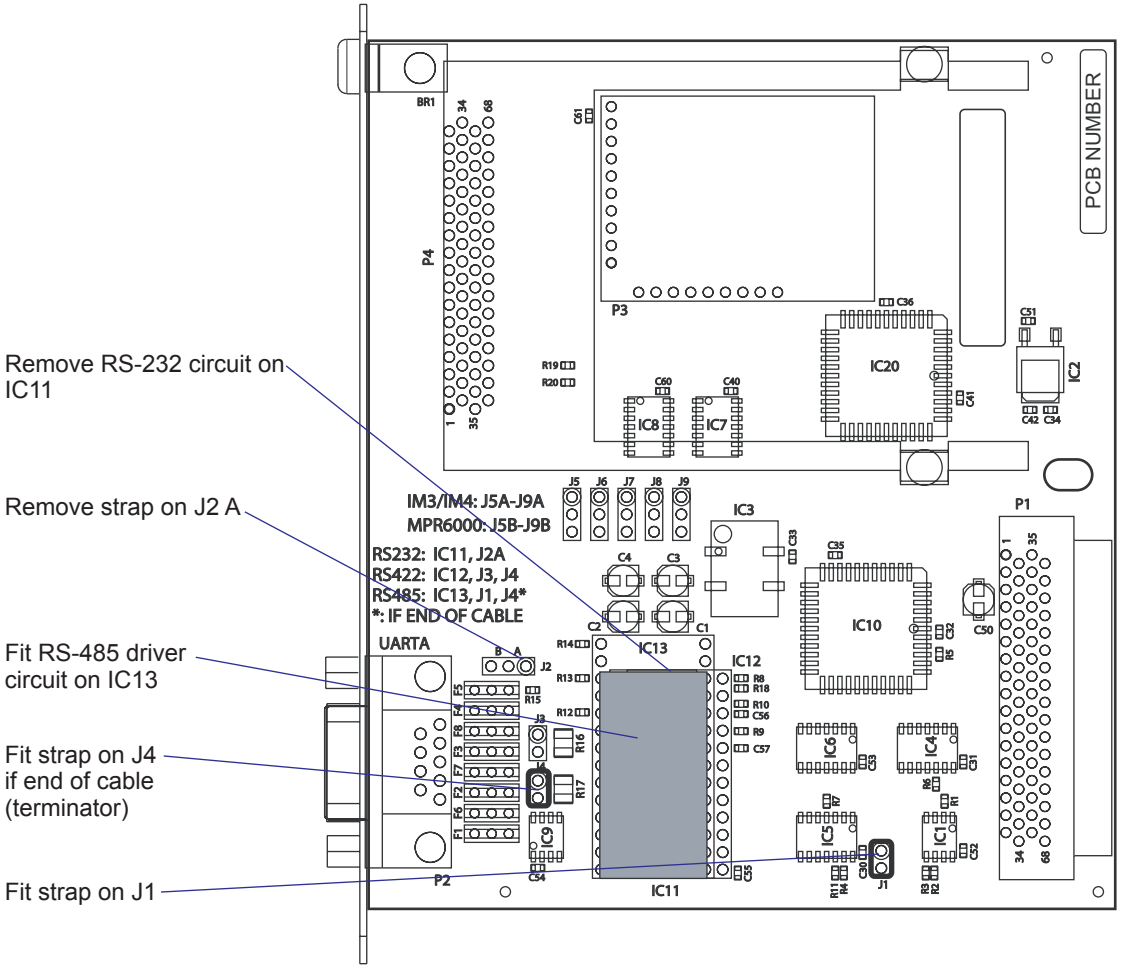


Connector Configuration (RS-422 Isolated on "uart2:")

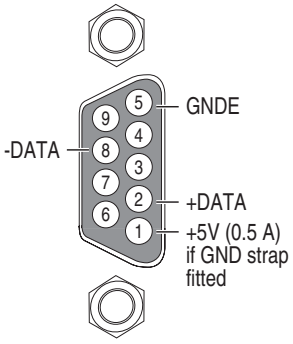


DB-9 socket	Signal	Meaning
1		External +5VDC max 500 mA (automatic switch-off at overload, short-circuit protected) provided strap is fitted on J2:A which spoils the galvanical isolation
2	+TXD	+Transmit data
3	+RXD	+Receive data
4	–	
5	GNDE	Ground
6	-	
7	-RXD	-Receive data
8	-TXD	-Transmit data
9	–	

RS-485 Isolated, Half Duplex (reconfiguration required)



Connector Configuration (RS-485 Isolated on "uart2:")



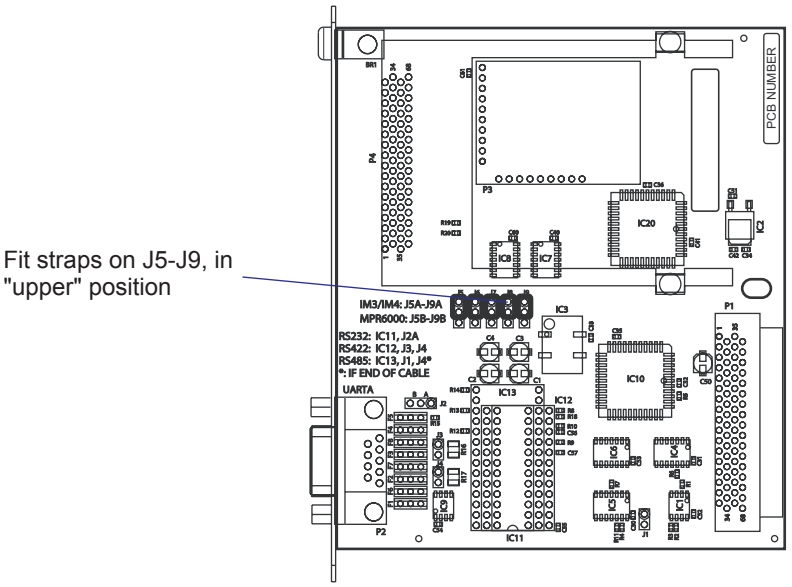
DB-9 socket	Signal	Meaning
1		External +5VDC max 500 mA (automatic switch-off at overload, short-circuit protected) provided strap is fitted on J2:A which spoils the galvanical isolation
2	+DATA	
3	–	
4	–	
5	GNDE	Ground
6	–	
7	–	
8	-DATA	
9	–	

Note: The increased use of LAN networks has made the RS-485 interface somewhat obsolete, because RS-485 requires a special communication protocol and a dedicated wiring system limited to 1,200 m (4,000 ft). We only recommend RS-485 for existing applications and advice the customer to consider a LAN network solution for new applications.

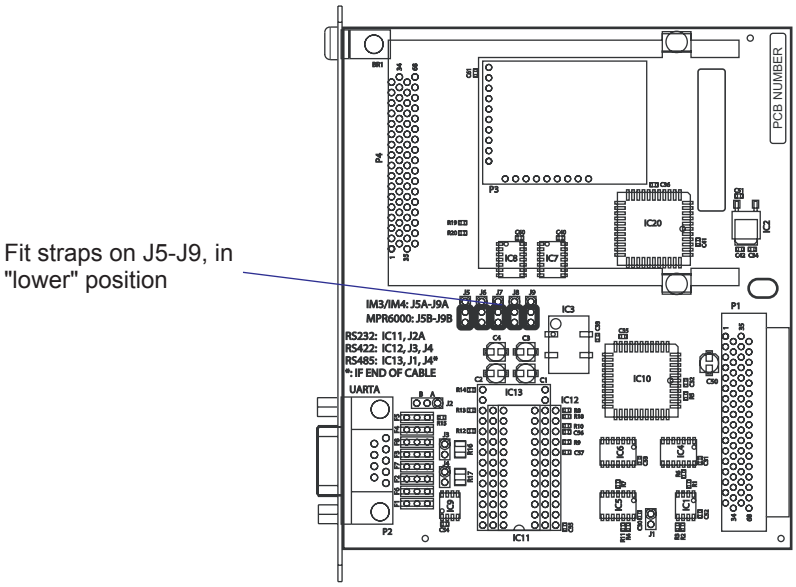
"Module Select" Configuration

Straps can be fitted to jumpers J5-J9 to provide support for two different types of RFID radio modules:

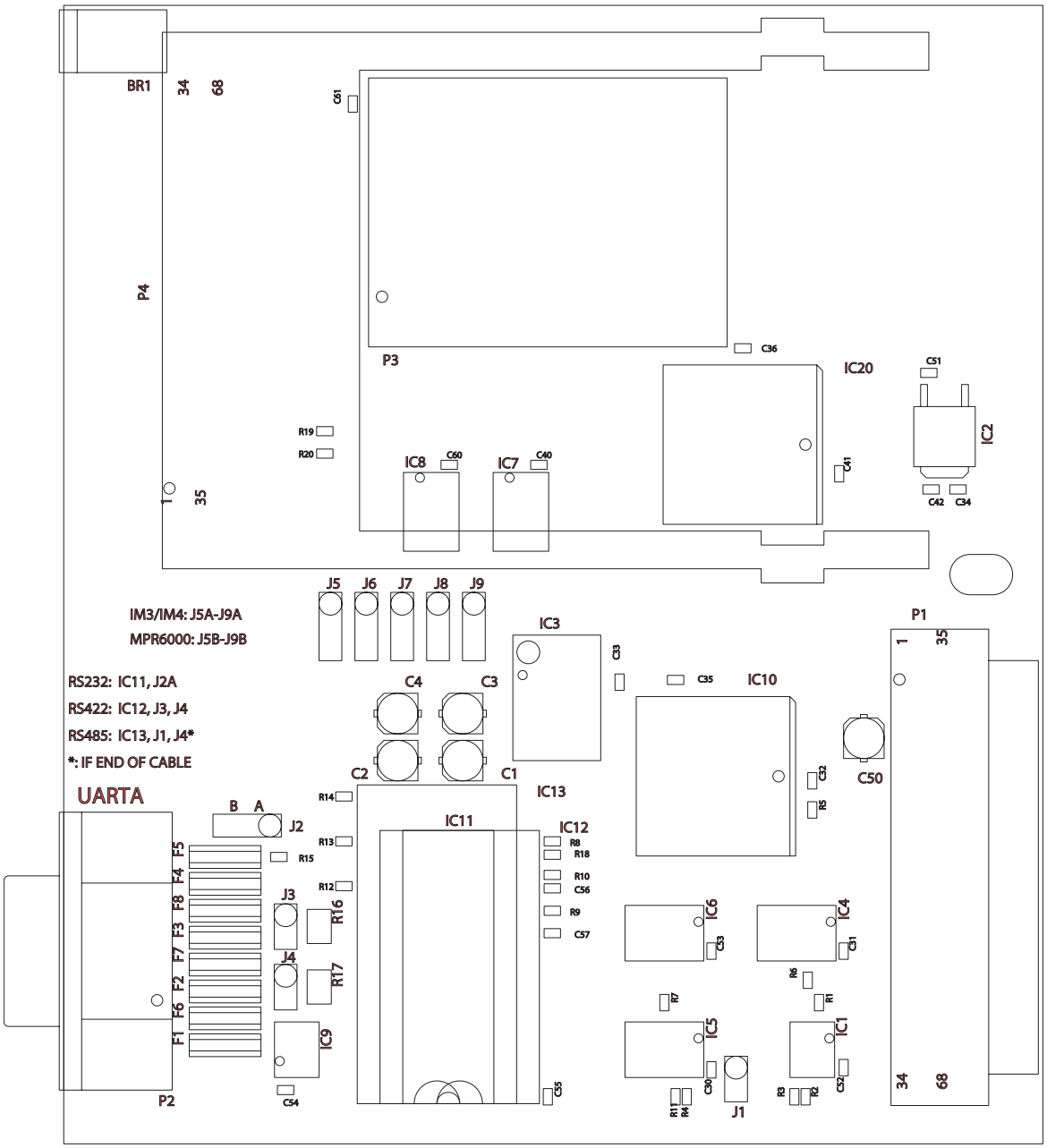
IM3/IM4



MPR6100

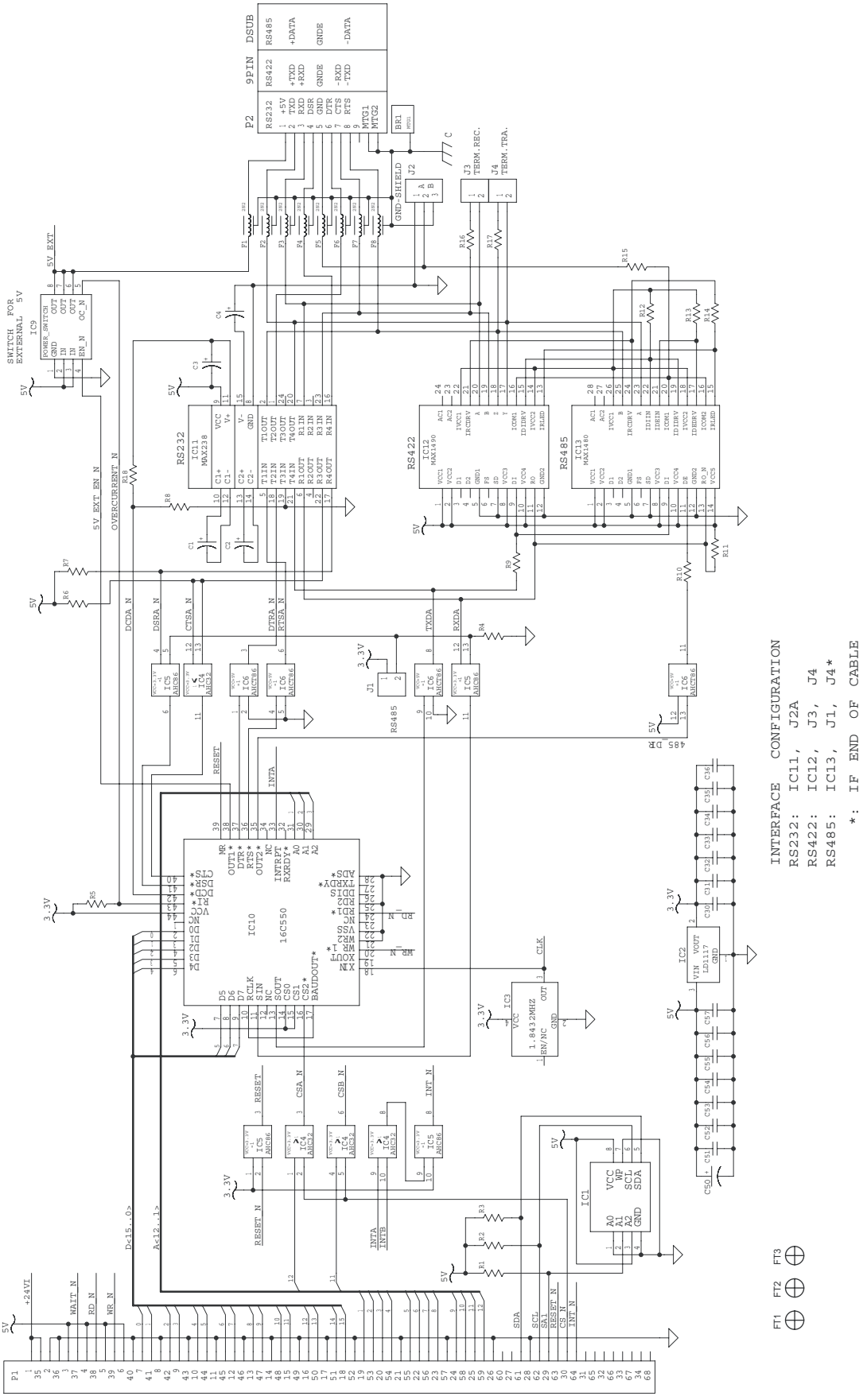


Components



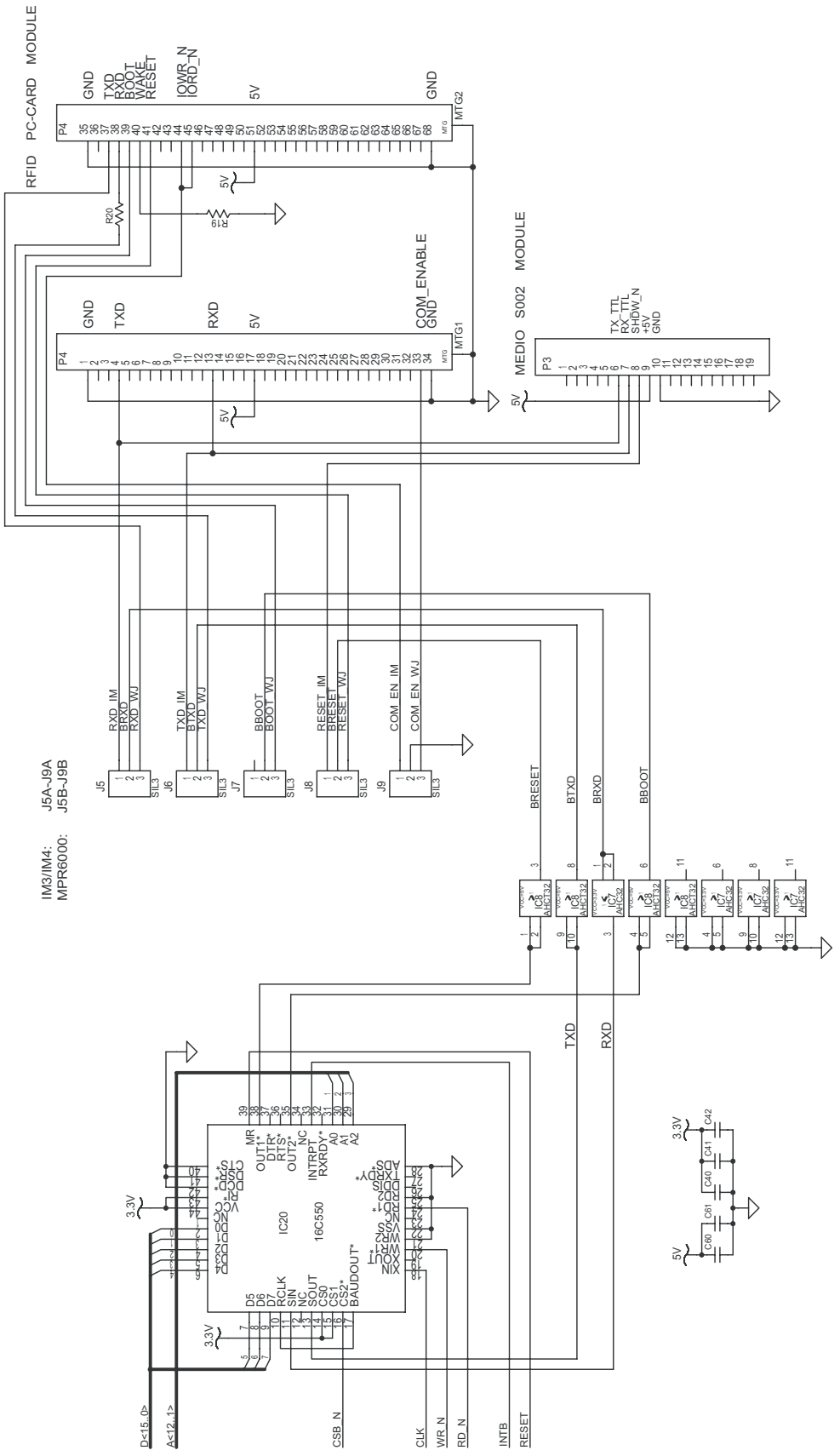
1-971644-53 RFID Serial Interface Board; Component side

Schematics "uart2:"



1-971644-53 RFID Serial Interface Board; Schematics 1

Schematics "Module Select"



1-971644-53 RFID Serial Interface Board; Schematics 2

14.9 IEEE 1284 Parallel Interface Board

Description

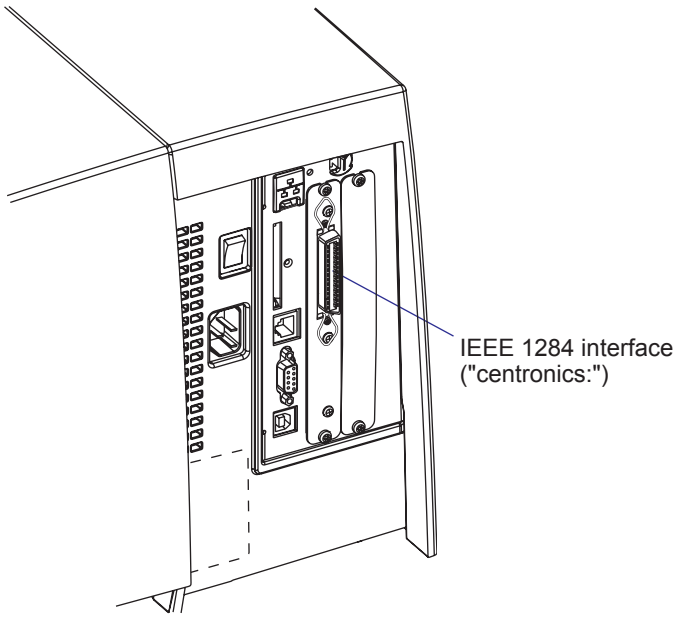
The IEEE 1284 Parallel Interface Board is an optional device for Easy-Coder PM4i printers. It provides these printers with one parallel interface port and is supported by both Fingerpint and IPL.

The parallel communication port is addressed in Intermec Fingerprint as device centronics: (communication channel 4). The board is IEEE1284-I compatible. Nibble, byte, ECP, and EPP modes from printer to host are not presently supported.

The IEEE 1284 Parallel Interface kit contains:

- One Parallel Interface Board
- Two flat cables
- One hexagonal spacer
- One Installations Instructions booklet.

There are neither any straps nor any other types of physical configuration on this interface board, nor any options in the Setup Mode.

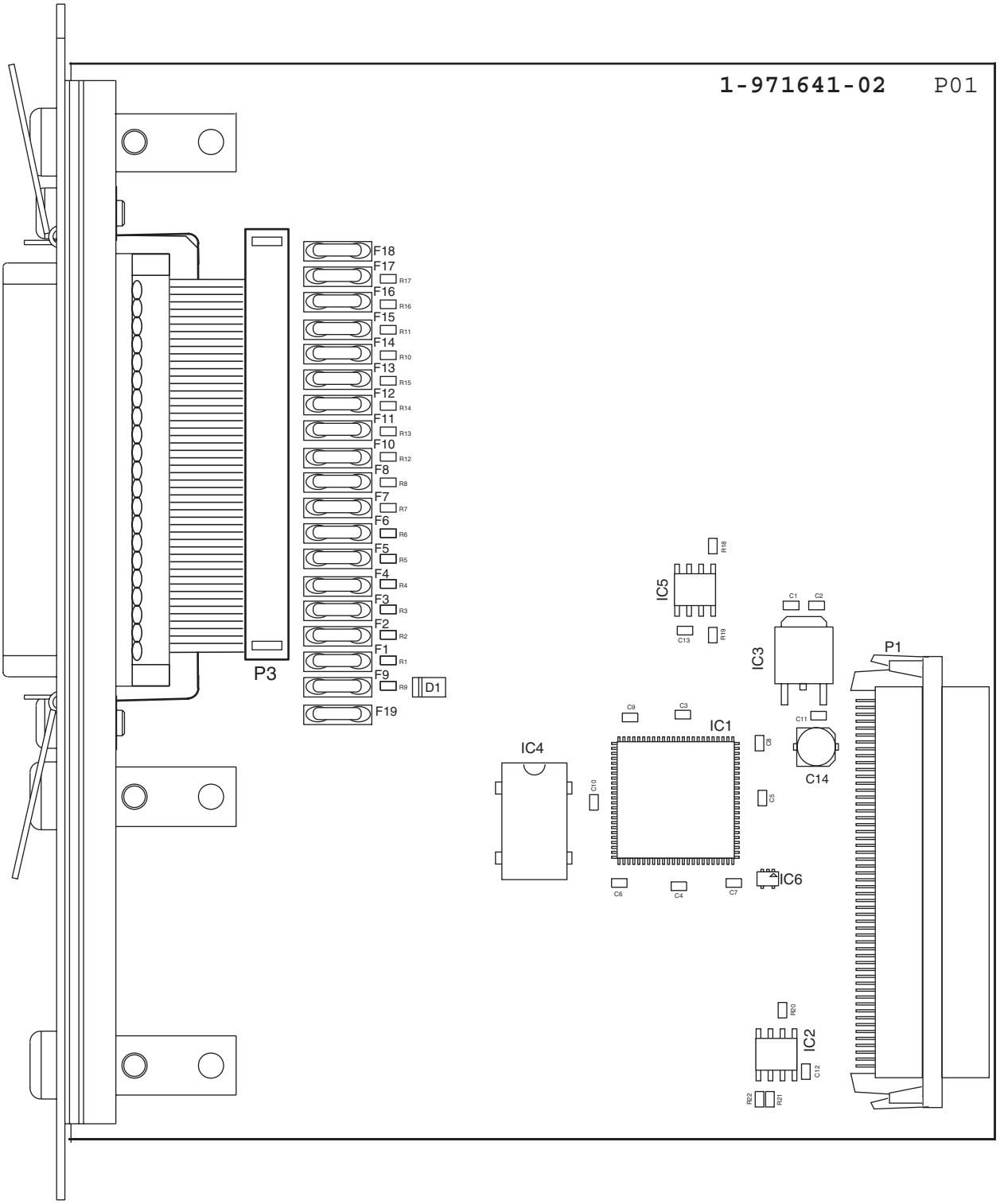


Connector Configuration

The IEEE 1284 board has a standard 36pin IEEE 1284 B socket with the following configuration:

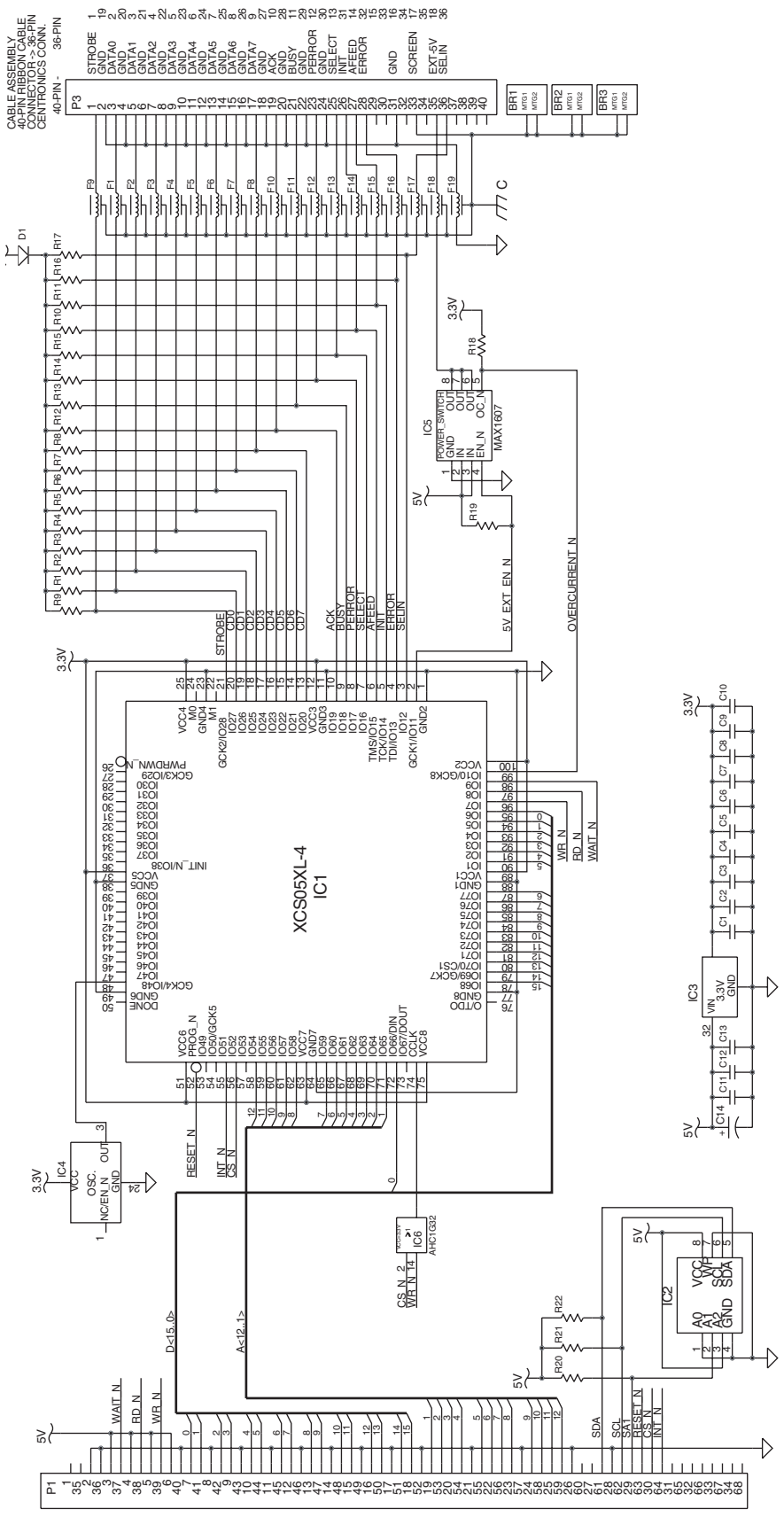
Pin	Signal	Remark
1	DSTROBE	
2	DATA 0	
3	DATA 1	
4	DATA 2	
5	DATA 3	
6	DATA 4	
7	DATA 5	
8	DATA 6	
9	DATA 7	
10	ACK	
11	BUSY	
12	PE	
13	SELECT	
14	AF	
15	N/C	
16	GND	
17	SCREEN	
18		External +5VDC max 500 mA (automatic switch-off at overload, short-circuit protected)
19	GND	
20	GND	
20	GND	
21	GND	
22	GND	
23	GND	
24	GND	
25	GND	
26	GND	
27	GND	
28	GND	
29	GND	
30	GND	
31	INIT	
32	ERROR	
33	N/C	
34	N/C	
35	N/C	
36	SELECTIN	

Components



1-971641-27 IEEE 1284 Parallel Interface Board; Component side

Schematics



1-971641-27 IEEE 1284 Parallel Interface Board; Schematics

14.10 EasyLAN Ethernet Interface Board

Description

This section describes how to install an EasyLAN Ethernet network interface in an EasyCoder PM4i printer and how to connect it to a 100base TX Fast LAN, WAN, Intranet, or Internet network via a wired connection.

The installation instructions describes how to physically install the interface board in a printer. Configuration and setup are described in the *EasyLAN Interface Kit, Installation Instruction*s and the *Intermec EasyLAN, User's Guide* on the attached CD-ROM.


Warning

This interface kit must only be physically installed by an authorized service technician.

Printer Firmware

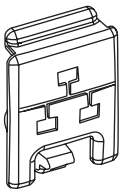
The printer must either be fitted with Intermec Fingerprint v8.00 (or later) or IPL v2.00 (or later). In Intermec Fingerprint, the network port is addressed as device "net1:" (communication channel #5).

Installation Kit

The EasyLAN Interface Kit contains:
- One EasyLAN interface board
- One light guide
- One hexagonal threaded spacer
- One network extension cable
- One cable tie
- One serial number label
- One CD-ROM with software and manuals
- One Installation Instruction booklet

The only tool required for the installation is a #T20 Torx screwdriver.

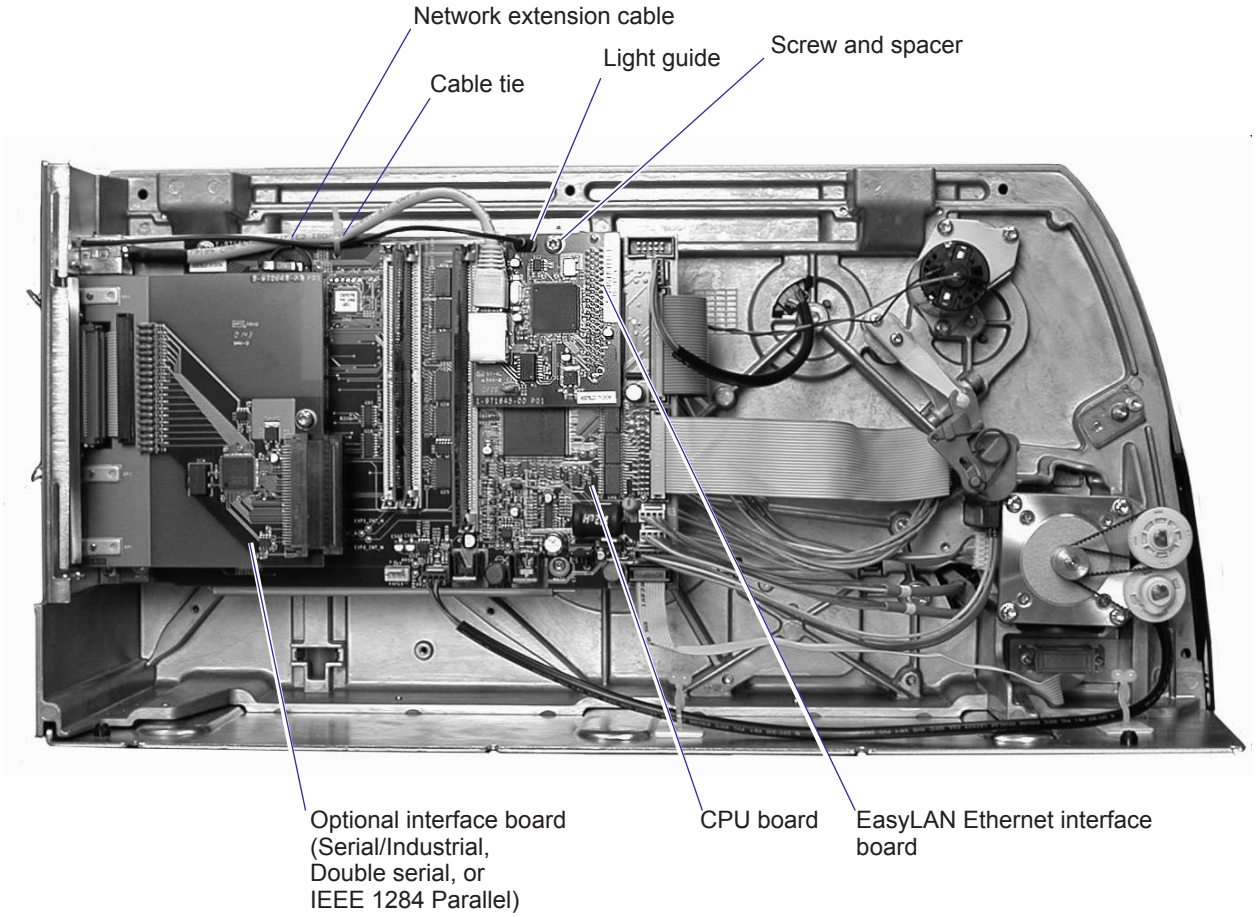
Installation Instructions

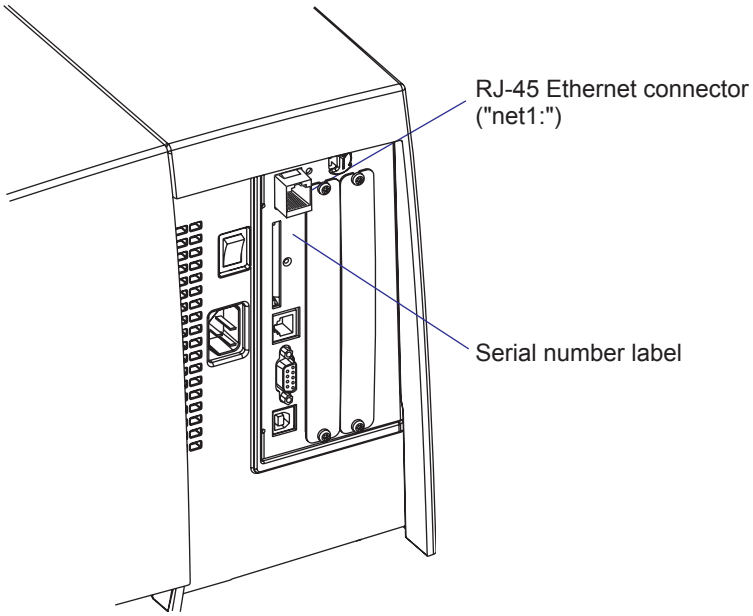


LAN connector plug

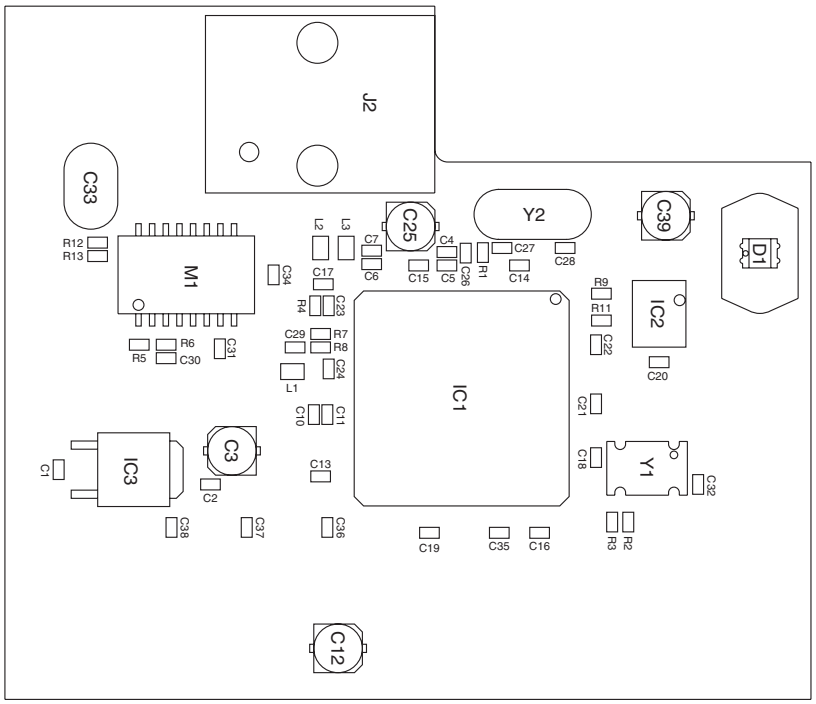
Also see illustration on the next page.

- Switch off the printer and disconnect the power cord.
- Disconnect all communication cables.
- Remove the front/left-hand cover as described in Chapter 3.2.
- Remove the LAN connector plug, which is snap-locked at the top of the rear plate.
- Remove the #T20 Torx screw that holds the upper/front part of the CPU board to the power supply unit and replace it with the hexagonal spacer included in the kit. Keep the screw.
- Connect the EasyLAN board to the PCI connector (J84) on the CPU board so the hole in the interface board becomes aligned with the spacer.
- Secure the EasyLAN board with the #T20 Torx screw you previously removed.
- From the inside of the electronics compartment, press the metal socket of the network extension cable into the square hole in the rear plate (where you removed the LAN plug) until it is held by its snaplock.
- Route the extension cable over the SIMMs on the CPU board and connect it to the RJ-45 socket on the EasyLAN interface board (J2).
- From the outside, insert the thin end of the light guide through the small hole next to the RJ-45 socket on the rear plate. Press the clear plastic “lamp” in place. Connect the other end to the black plastic socket (D1) on the EasyLAN interface board.
- Pull the cable tie through the hole in the upper edge of the CPU board between the SIMMs and the RTC socket. Secure both the extension cable and the light guide with the cable tie.
- Fit the serial number label on the rear plate below the RJ-45 socket and to the right of the memory card slot.
- Put back the front/left-hand cover. Route the cable from the display unit above the ribbon motor. Connect the cable to connector J50 at the upper front corner of the CPU board.
- Connect the power cord and switch on the power.
- Enter the Setup Mode and print the test label “Hardware Info” in Fingerprint or “HW” in IPL to see if the printer detects the EasyLAN Ethernet interface board. For information on how to enter the Setup Mode and print test labels, refer to the User’s Guide for the printer in question.
- After startup, enter the Setup Mode to set up the network parameters. See Appendix A. Setting the network parameters in IPL, when the server does not support DHCP or BOOTP, is described in *EasyLAN Interface kit, Installation Instructions*.

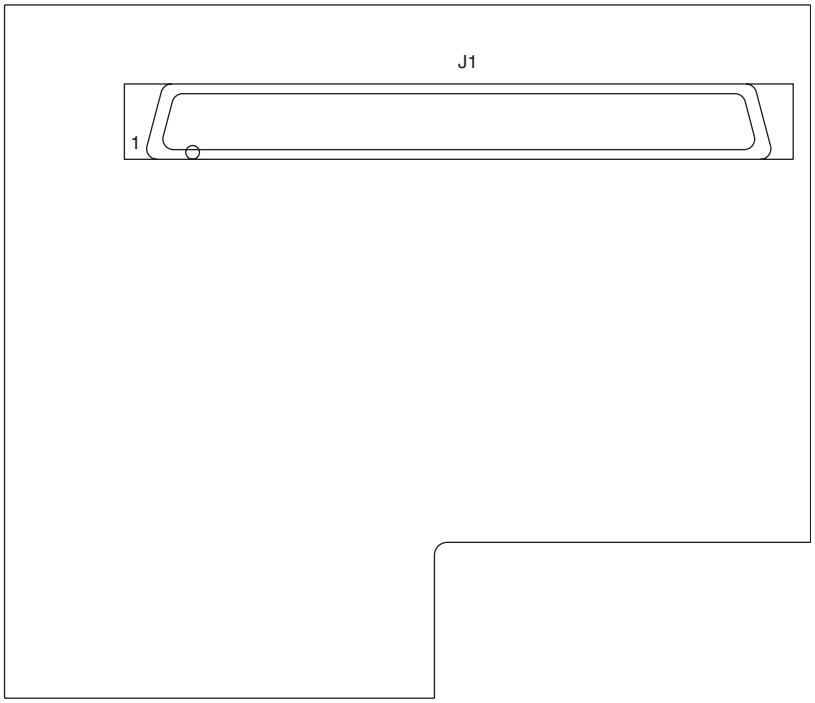

Network extension cable
Light guide
Screw and spacer
Cable tie
Optional interface board (Serial/Industrial, Double serial, or IEEE 1284 Parallel)
CPU board
EasyLAN Ethernet interface board


RJ-45 Ethernet connector ("net1:")
Serial number label

Components

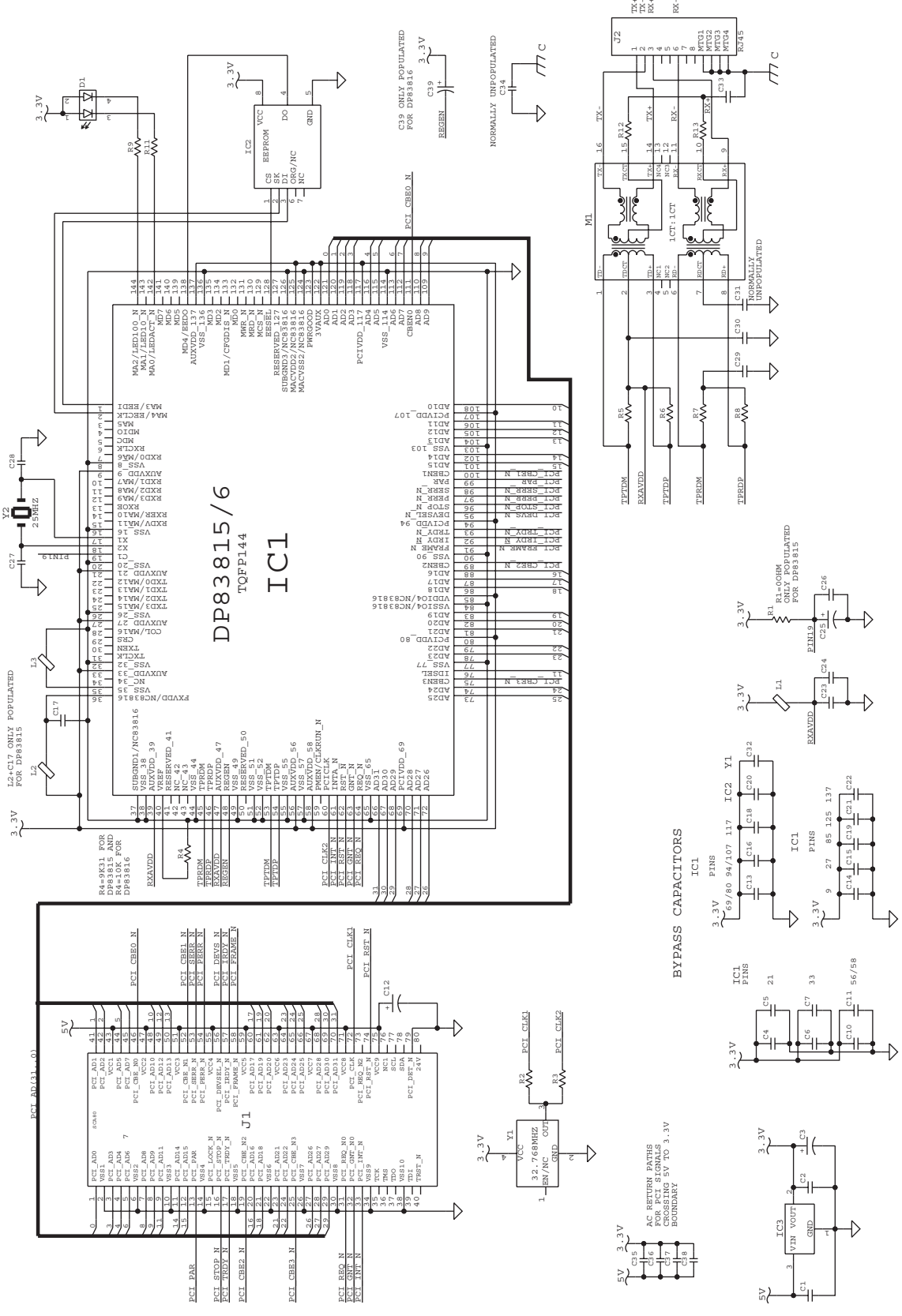


1-971645-26 EasyLAN Interface Board; Component side



1-971645-26 EasyLAN Interface Board; Soldering side

Schematics



1-971645-26 EasyLAN Interface Board; Schematics

14.11 EasyLAN Wireless Interface Board

Description

This section describes how to install an EasyLAN Wireless network interface in an EasyCoder PM4i printer and how to connect it to a LAN, WAN, Intranet, or Internet network via a wireless connection.

The installation instructions describes how to physically install the interface board in a printer. Configuration and setup are described in the *EasyLAN Wireless Kit, Installation Instruction*s and the *Intermec EasyLAN, User's Guide* on the attached CD-ROM.

This interface kit must only be physically installed by an authorized service technician. The device is country/region specific and must be ordered for the correct country/region. Use of this device in other region than shown on the device home page/test label may violate applicable law.

Printer Firmware

The printer must either be fitted with Intermec Fingerprint v8.10 (or later) or IPL v2.10 (or later). In Intermec Fingerprint, the network port is addressed as device "net1:" (communication channel #5).

Installation Kit

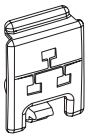
The EasyLAN Interface Kit contains:

- One EasyLAN adapter board complete with radio module fitted
- Rear plate (for EasyCoder PF2/4i-series printers only)
- RJ-45 plug (for EasyCoder PM4i only)
- One light guide
- One hexagonal threaded spacer
- One antenna extension cable
- One antenna
- One cable clip
- One cable tie
- One CD-ROM with software and manuals
- One Installation Instruction booklet

The only tools required for the installation are #T10 and #T20 Torx screwdrivers and a small wrench.

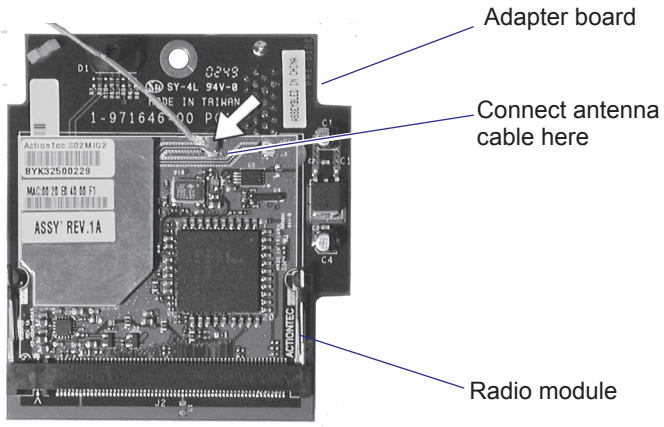
Installation Instructions

- Switch off the printer and disconnect the power cord.
- Disconnect all communication cables.
- Remove the front/left-hand cover as described in Chapter 3.2.
- Remove any present EasyLAN Ethernet interface including cables etc. Fit the RJ-45 plug included in the kit into the square hole left by the RJ-45 Ethernet connector.



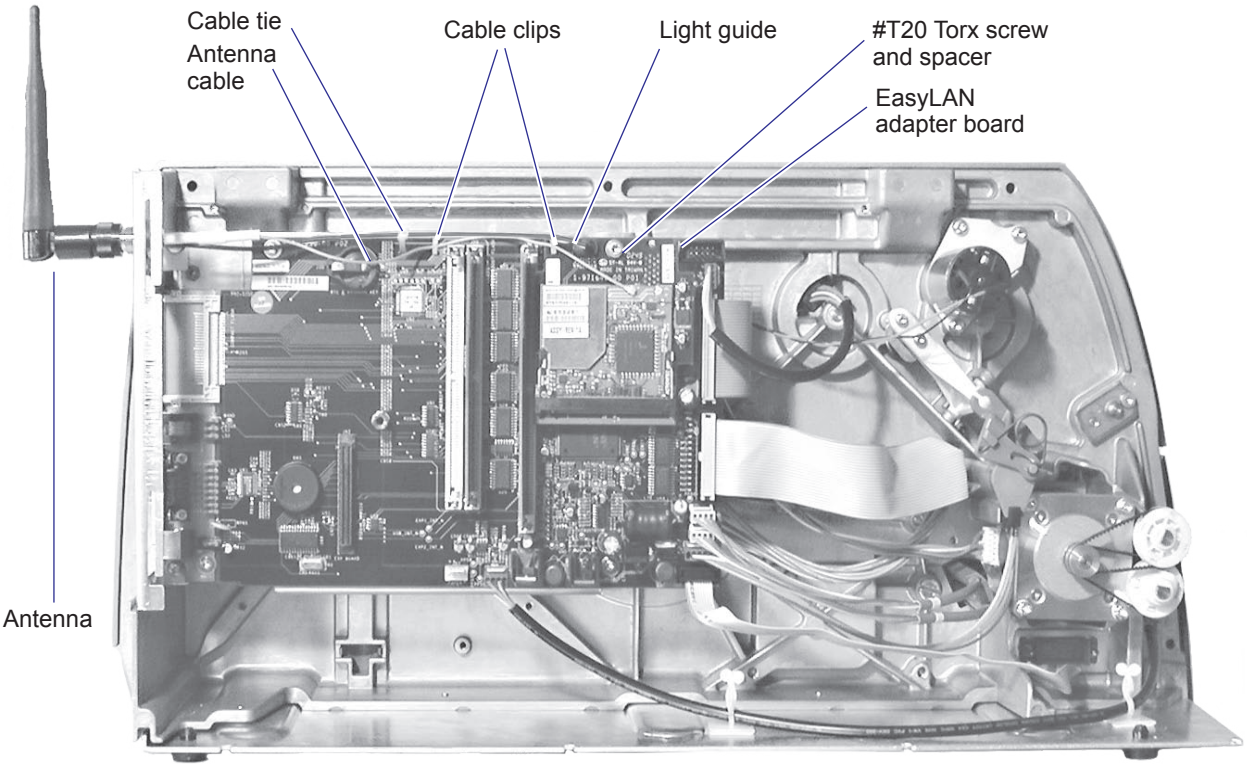
- Remove the antenna plug, which is snap-locked into the rear plate.

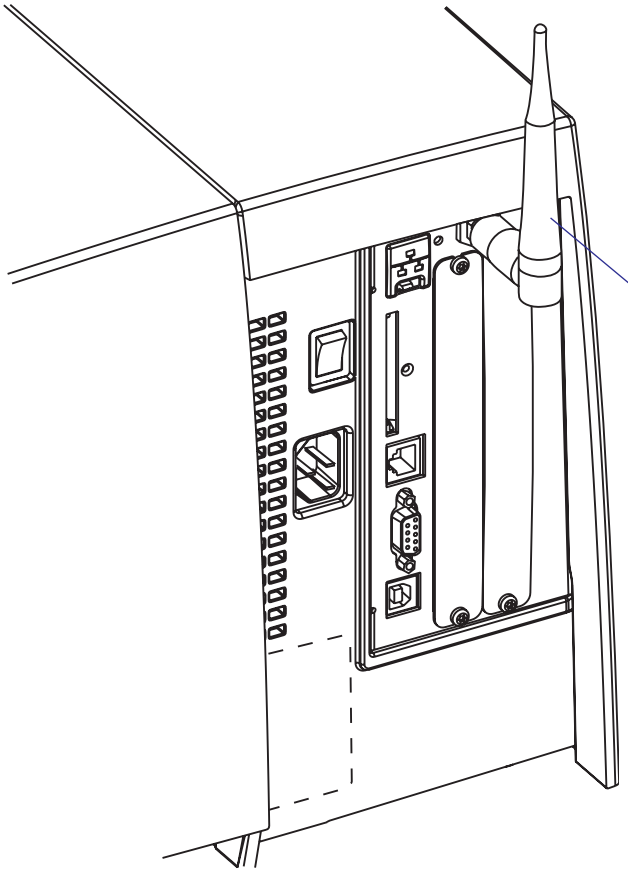
- Connect the antenna cable to the radio module, which is factory-fitted on the EasyLAN adapter board, as illustrated below. Support the upper edge of the radio module with a finger while connecting the cable.



- Remove the #T20 Torx screw that holds the upper/front part of the CPU board to the power supply unit and replace it with the hexagonal spacer included in the kit. Keep the screw.
- Connect the EasyLAN adapter board to the PCI connector (J84) on the CPU board so the hole in the board becomes aligned with the spacer and secure the board with the #T20 Torx screw.
- Route the antenna cable over the SIMMs on the CPU board towards the rear plate and secure it using the cable clips included in the kit. One clip is factory-fitted on the EasyLAN adapter board and the other should be fitted in the small hole at the top of the CPU board immediately to the rear of the memory SIMM sockets.
- From the inside of the electronics compartment, insert the antenna connector through the round hole in the rear plate and lock it with the washer and nut on the outside.

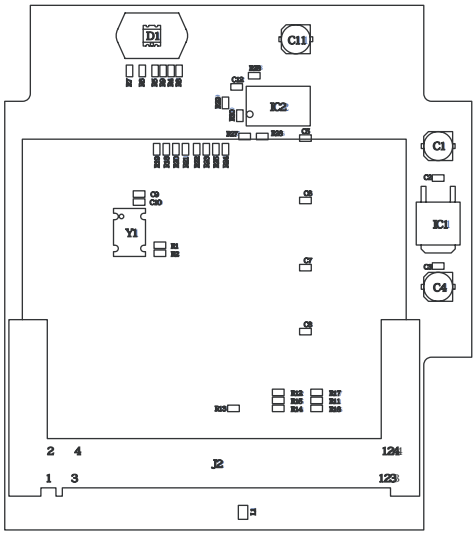
- Fit the antenna to the connector of the antenna cable and bend the hinge so the antenna points straight up.
- From the outside, insert the thin end of the light guide through the small hole next to the antenna on the rear plate. Press the clear plastic "lamp" in place. Connect the other end to the black plastic socket (D1) at the top of the EasyLAN adapter board. Secure it with the cable tie through the hole at the upper edge of the CPU board.
- Put back the front/left-hand cover. Route the cable from the display unit above the ribbon motor. Connect the cable to connector J50 at the upper front corner of the CPU board.
- Connect the power cord and switch on the power.
- Enter the Setup Mode and print the test label "Hardware Info" in Fingerprint or "HW" in IPL to see if the printer detects the EasyLAN Wireless interface board. For information on how to enter the Setup Mode and print test labels, refer to the User's Guide for the printer in question.
- Set up the network parameters. There are several methods:
  - Connect the printer and a PC and run the EasyLAN Network Setup wizard, which can be found on the attched CD-ROM. Requires a PC running Windows 98 or later.
  - Insert a CompactFlash Card containing a configuration file in the printer and start it up. Configuration Compact Flash cards can be created using the EasyLAN Network Setup wizard on the attached CD-ROM.
  - Fingerprint:
    Establish an RS-232 communication with the printer and set it up using Fingerprint setup strings or setup files. IP address, netmask, default router, and name server can also be set using the printer's built-in keyboard. Only requirement on the PC side is a terminal program that can transmit and receive ASCII characters on an RS-232 line. See *EasyLAN Wireless Kit, Installation Instructions*.
  - IPL:
    Establish an RS-232 communication with the printer and set it up using IPL commands. Only requirement on the PC side is a terminal program that can transmit and receive ASCII characters on an RS-232 line. Select the method of obtaining IP address, netmask, default router, and name server automatically from the server using the printer's built-in keyboard. This requires a server that supports DHCP and/or BOOTP. See *EasyLAN Wireless Kit, Installation Instructions*.



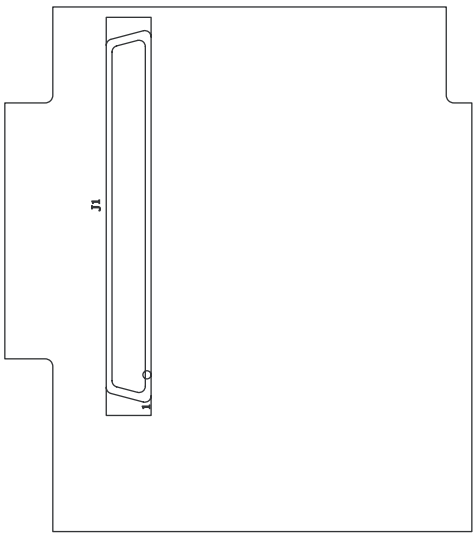


Antenna
(packed separately when the EasyLAN Wireless interface is factory-installed)

Components



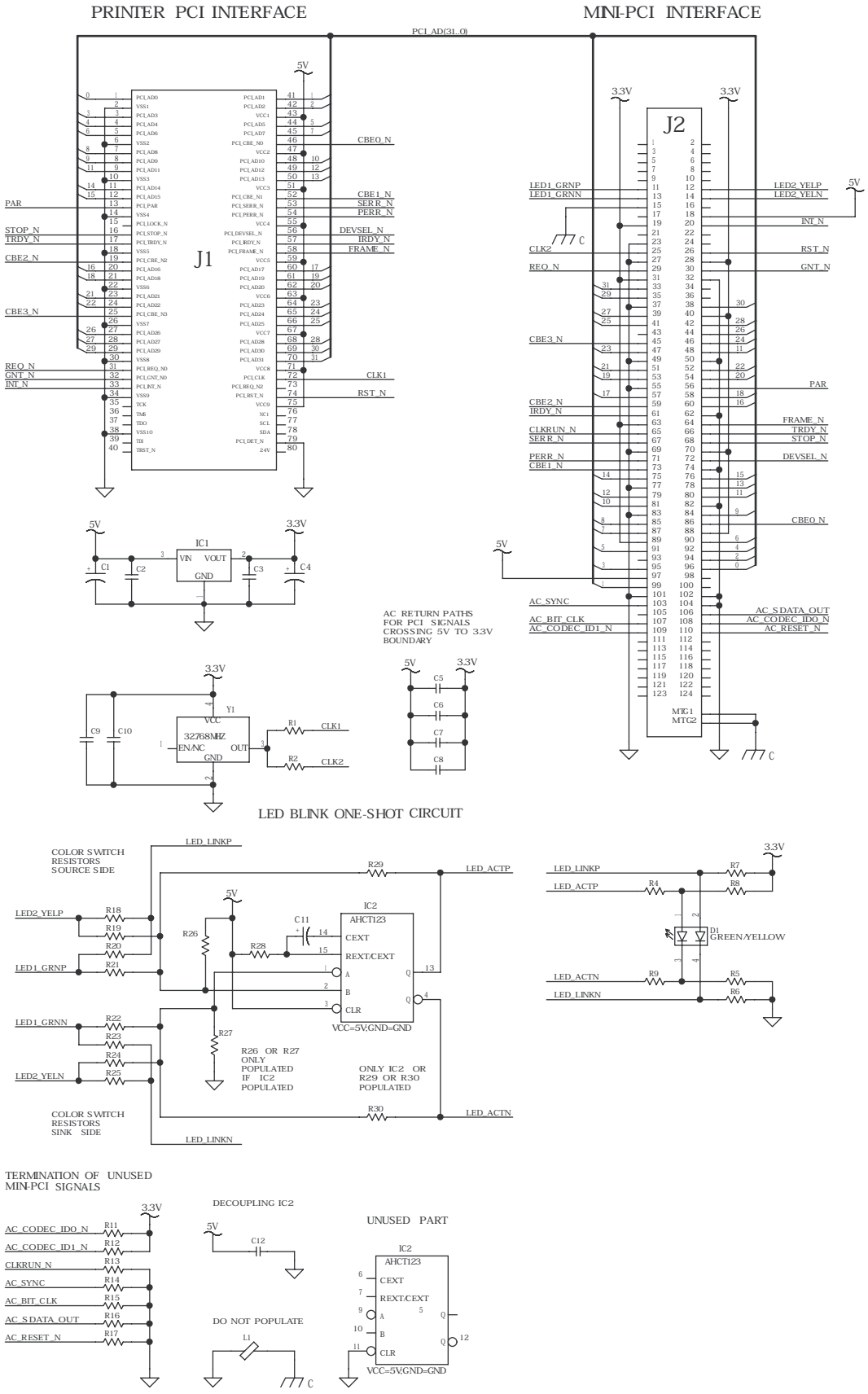
Primary Side



Secondary Side

1-971646-26 Adapter Board

Schematics



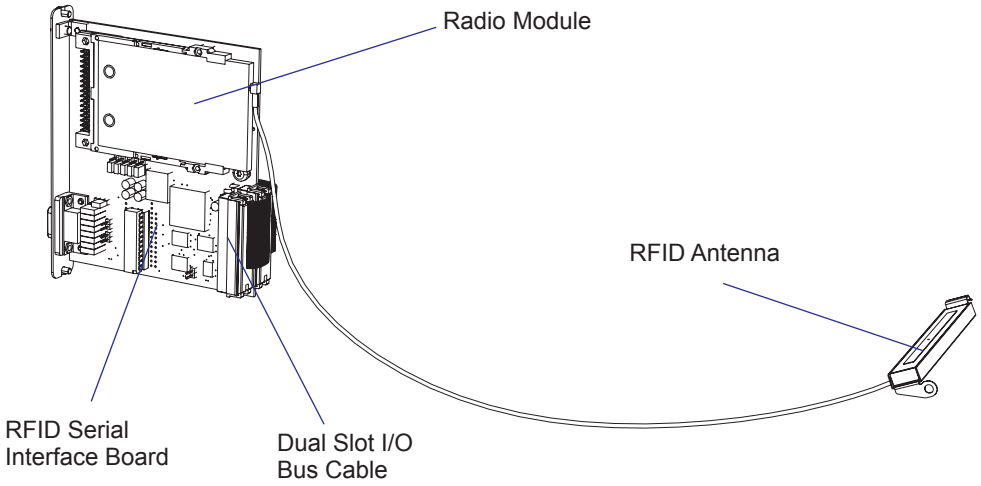
1-971646-26 Adapter Board

15 RFID

This chapter describes the various components included in Intermec RFID kits for the EasyCoder PM4i printer.

15.1 RFID Kit (Class 1, 915 MHz)

The following sections describe how to replace the individual parts of this kit. For more detailed information and illustrations of the different steps involved, please refer to the *Installation Instructions* document that ships with the kit.



Replacing the Antenna

- Disconnect the power cord and open the electronics compartment, see Chapter 3.2.
- Detach the antenna cable from the radio module.

Caution: To prevent damage, handle the radio module delicately and be careful when attaching or detaching the antenna cable.

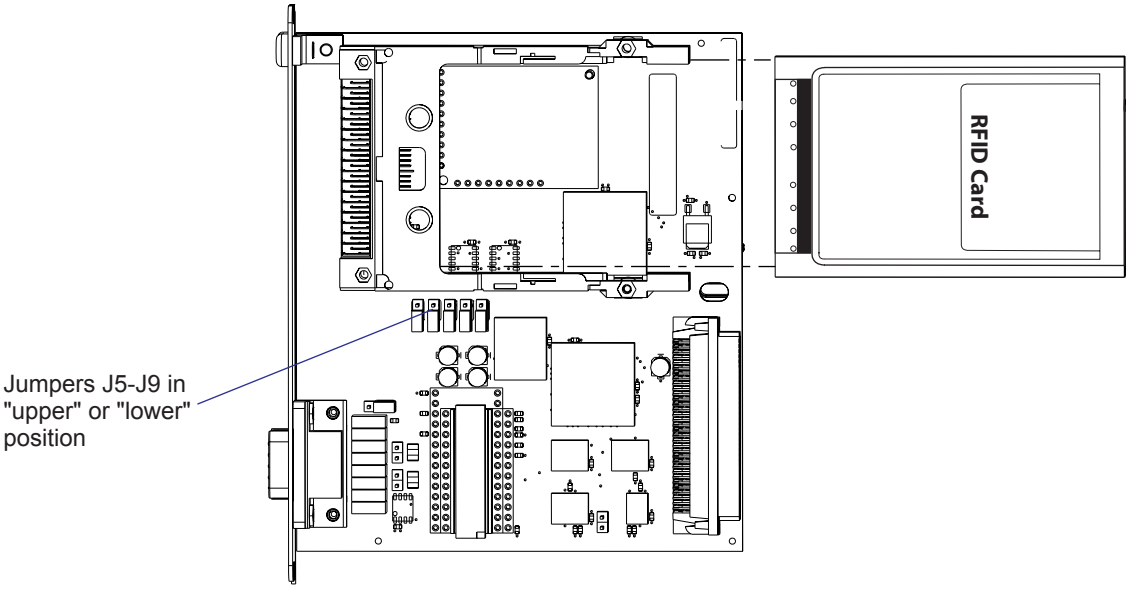
- The antenna is fitted underneath the printhead in the media compartment. Here is how to remove it:
  - First, remove the screw which holds the antenna to the center deck.
  - Pry the antenna loose, and proceed by carefully pulling the antenna cable out of the electronics compartment through the hole in the center deck.
- Take the cable end of your replacement antenna, and feed it through the opening in the center deck. This operation can be facilitated by laying the printer down on its left side (to prevent damage to electrical components, be sure to put back the metal chassis prior to this).
- In the electronics compartment, connect the antenna to the upper contact on the radio module.
- Put back the cover over the electronics compartment. Follow the procedure as described in Chapter 3.2.

Replacing the Dual Slot I/O Bus Cable ("Flat Cable")

This procedure is described in section 14.5 ("Installing an Optional Interface Board").

Replacing the Radio Module

- Disconnect the power cord and open the electronics compartment, see Chapter 3.2.
- Remove the old radio module, and slide the new one in place. The label should be facing outward.



- Make sure jumpers J5-J9 are set to their correct position (tampering with the jumpers is not necessary if, for example, a faulty unit is replaced with a unit of the same model). Refer to section 14.8 for more information on this issue.

Upgrading the radio module's firmware

- Remove the Radio Module from the RFID serial interface board as described above.
- Download the latest firmware version from the Intermec Global Services & Support website to a computer equipped with a PCMCIA slot. Insert the Radio Module in the slot and install the new firmware.

Replacing the RFID Serial Interface Board

Please refer to section 14.5 ("Installing an Optional Interface Board") for information on how to replace this part.

Verifying RFID functionality

Once a part (or parts) have been replaced, it is important to verify that the RFID-equipped printer works properly before put into active use.

Recommendations for printers running Fingerprint

Turn on the printer and set **RFID > ON** either via the Setup menu, the web page or by using the command `SETUP "RFID,ON"`. Run a TEST-FEED to make sure the printer can communicate with the RFID tag.

Recommendations for printers running IPL

Turn on the printer and set **RFID > ON** either via the Setup menu, the web page or by using the command <STX><SI>J1<ETX>. Raise and lower the printhead, and then push FEED or run the command <STX><FF><ETX>.

16 Troubleshooting

This chapter explains how to diagnose and fix problems that may occur in an EasyCoder PM4i printer, even if great effort has been made to ensure troublefree printing. Some parts are, however, subject to wear and may need periodical replacement, such as the printhead.

Please note that replacement parts are generally only available as complete modules (see the Spare Parts Catalog or Spare Parts List).

This chapter is supplemented by the Technical Bulletins that are distributed as soon as any new problem has been reported and a remedy has been found.

16.1 Diagnosing

To diagnose the printer for faults, take steps in the following order:

- In case the printer is running the Intermec Fingerprint firmware, use Intermec Shell to check printer's setup and functions. Intermec Shell can be accessed regardless of any running autoexec.bat files as described below.
- Browse through the remainder of this chapter to find symptoms that apply to the faulty printer.
- Refer to the *Printer Technical Bulletins* for updated information.

Fingerprint only

The keyboard, display messages, sounds, and other functions will be custom-configured, if a custom-made program is running in the printer. Normally, such a program is started at power-on using an autoexec.bat file.

The procedure of starting up Intermec Shell, bypassing any other autoexec.bat files the printer's memory, is called the Test Mode. In fact, the Test Mode is just a convenient way of accessing Intermec Shell and, via Intermec Shell, also the Setup Mode.

Note: Any changes done in the Test Mode will remain after leaving the Test Mode.

Entering Intermec Shell in the Test Mode

- Switch off the power.
- Raise the printhead.
- Press any key on the printer's built-in keyboard, with the exception of <Shift>, and keep on pressing it.
- Switch on the power.
- The printer will start the initialization procedure.
- Release the key.
- The printer will start up Intermec Shell.
- Press <Enter> before the 5 sec. countdown is completed.

Inside Intermec Shell you have a variety of options, for example:

- Enter the Setup Mode to check or change the setup. Before changing the setup, you should print out or write down the settings so you can restore them before returning the printer.
- Make a printout of the present setup values.
- Perform testfeed operations.
- Print test labels to check the printout quality.
- Reset all setup values to default. Before resetting the setup, you should print out or write down the settings so you can restore them before returning the printer.
- Enter Intermec Fingerprint, for example to check what files the printer's memory contains or to list files.

- Restart the printer and leave the Test Mode.

Refer to the Intermec Shell Overview in Appendix 1 or in the User's Guide.

If the printer works normally in the Test Mode, it is likely that the malfunction is either due to communication problems, abnormal conditions at the site of operation, or a custom-made program.

Fingerprint and IPL

Use this short-list to find the symptom that applies to the printer:

16.2 No Reaction at Power Up

Description:

There is no visible reaction when the power to the printer is switched on.

- The Power LED does not light up.
- There is no text in the display window.

Possible Causes and Suggested Remedies:

- **No power in AC wall socket.**
  - Check with some other electrical device or a voltage meter.
- **Power cord connectors not completely inserted in printer's power cord receptacle or in wall socket.**
  - Disconnect and firmly connect both ends of power cord. Try again.
- **Faulty power cord.**
  - Replace and try again.
- **Cable between CPU board and power supply not properly connected.**
  - Test as described in Chapter 16.5 using test points on CPU board (see Chapter 13.5).
- **Power Supply overload.**
  - Too high a temperature in the power supply unit. Leave the power on and wait for the power supply to cool off (may take up to half an hour). When the temperature returns to normal, the printer will automatically restart. If the error persists, examine the power supply as described in Chapter 16.5.
- **Faulty power supply unit.**
  - Refer to Chapter 16.5.
- **Faulty console unit.**
  - Refer to Chapter 16.6.
- **Wrong type of printhead fitted (designed for EasyCoder F-series) causing a short-circuits because of different cablings.**
  - Check part number and label on printhead. If wrong type, replace with a correct one.
  - If the printer still refuses to start up, check if fuse F70 on the CPU board has blown. Normally, this condition is very unlikely to happen and no harm should be done to either the electronics or the printhead.

16.3 Printer Stops Working after Startup

Description:

The printer stops working after a successful startup.

- The Power LED is lit.
- The <Feed>, <Setup>, and <Print> keys, work properly.

Possible Causes and Suggested Remedies:

- **Communication problems?**
  - Refer to Chapters 16.8-16.10.
- **Printer malfunction?**
  - Check if the printer can print test labels in the Test Mode.

Description:

The printer stops working after a successful startup.

- The Power LED is lit.
- There is no reaction on software commands.
- There is no reaction on any keys on the printer's keyboard.

Possible Causes and Suggested Remedies:

- The printer's main program has halted due to high external disturbances from other electrical sources.
  - Restart the printer and find out if there are disturbances coming via the 115/230 VAC supply, via a communication channel, or from other electrical appliances.
- **CPU board failures.**
  - Refer to Chapter 16.4.
- **Power Supply Unit failures.**
  - Refer to Chapter 16.5.
- **Console errors.**
  - Refer to Chapter 16.6.

Description:

The printer stops working after a successful startup.

- The Power LED is not lit.

Possible Causes and Suggested Remedies:

- **Error in the supply of AC power to the printer.**
  - Refer to Chapter 16.2.
- **Faulty console, faulty power LED, or faulty cabling between CPU board and console.**
  - Refer to Chapter 16.6.

16.4 CPU Board Failures

Description:

The power LED is lit, but the printer has one of the following faults:

- The printer refuses to start.
- The program execution is halted.
- The stepper motor does not work.
- At startup, the message "Starting" is displayed followed by the message "Timed Out."

Possible Causes and Suggested Remedies:

- **Flash or SDRAM SIMMs not properly fitted.**
  - A SIMM is not fully inserted in its socket. Remove all SIMMs and fit them back again, making sure they are being firmly held by the snap-locks.
- **No Boot Flash SIMM in socket J20.**
  - A Flash SIMM containing a boot sector must be fitted in socket J20, or the printer will not start.
- **Fluttering voltages.**
  - Check voltages on the CPU board test points, see Chapter 13.4. If a voltage flutters with an interval of approximately one second, there may be a short-circuit on the CPU board. If a voltage is missing, there is probably an error in the power supply unit, see Chapter 16.5.
- **Startup error.**
  - Execution of the initial boot sequence can be checked as described in Chapter 13.5. If the execution stops prematurely, try changing to a Flash SIMM that works in another printer. If that does not help, note where the startup sequence is halted and contact Intermec's Printer Product Support dept.
  - If there is no reaction neither on the display nor on the serial channel, there is a major error on the CPU board. Check the Flash and SDRAM SIMMs by installing them in another printer. Inspect the CPU board visually in the area of the processor (U13) and the support chip (U30). If no obvious fault is detected, replace the CPU board.

16.5 Power Supply Unit Failures

Description:

The printer refuses to print.

- The message “Temperature high please wait”(FP) or “Printhead hot” (IPL) appears in the display window.

The power supply unit contains wires and circuits with dangerous voltages. For safety reasons, it is strictly forbidden to try to repair a power supply unit or to replace a blown fuse. Generally, in a primary-switched power supply, a blown fuse is an indication that components in the power supply has been damaged or degraded. Even if you could get the power supply working by replacing a fuse, there is a risk that it soon will fail again and more components will be damaged. Therefore, whenever a fuse blows, always replace the entire power supply unit.

Possible Causes and Suggested Remedies:

- **Power Failure Interrupt signal activated because of a Power Supply overload.**
  - Too high a temperature in the power supply unit, for example caused by extreme ambient temperatures (possibly in connection with large black areas in the print image, high speed printing, and media that require a high energy level), triggers the automatic overheating protection switch.

    Leave the power on and wait for the power supply to cool down (may take up to half an hour). When the temperature returns to normal, the printer will automatically restart. If the error persists, examine the power supply (also see Chapter 12).

Description:

The printer stops working or functions are unstable.

- The power LED is unstable, weak or not lit.
- Stepper motor does not run.
- No or very weak printout.

Possible Causes and Suggested Remedies:

- **Wrong or missing voltages from power supply.**
  - Check voltages using the test points on the CPU board (see Chapter 13.4).
  - Check the cable between the power supply unit and the CPU board. If the cable is OK, replace the power supply unit.
  - Blown fuse in power supply. Replace the entire power supply unit. Do not replace a blown fuse and do not attempt to repair the power supply unit (see “Warning” notice).
  - Stepper motor driver damaged because the platen roller has been manually rotated while power was on. Replace PSU.

16.6 Console Errors

Description:

The complete console is “dead”.

- Power LED is not lit.
- Green background lighting in display window is not lit.
- The 5V on the CPU board is OK (see Chapter 13.4).

Possible Causes and Suggested Remedies:

- **Defective cable.**
  - The cable between the CPU board and the console pcb. may be defective or not properly connected. Check cable and connector J50 on CPU board.
- **Defective console pcb.**
  - Replace. Do not attempt to repair.

Description:

No keys on the keyboard seem to be working or no keybeep.

- Power LED is lit.
- Green background lighting in display window is lit.

Possible Causes and Suggested Remedies:

- **Bad connection between keypad and console pcb.**

- Check connections on the two flat cables between the keypad and connectors P2 and P3 on console pcb.

- **Keys disabled or keyboard remapped by a custom-made program (Fingerprint only).**
  - If the printer does not respond to any keys in the Test Mode, the keyboard is defective and needs to be replaced.
- **Keybeep disabled by a custom-made program (Fingerprint only).**
  - If no beep is heard when the keys are pressed in the Test Mode, but the printer nevertheless responds to the keys, the beeper is out of order.
- **Keyboard damaged by moisture.**
  - Soaking the keyboard with, for example, water or cleaning fluids, may cause short-circuits. Let it dry, replace if necessary.

Description:

No messages appear in the display window after power-up.

- Power LED is lit.
- Green background lighting in display window is lit.

Possible Causes and Suggested Remedies:

- **Display not utilized by custom-made program (Fingerprint only).**
  - If there is no display function in the Test Mode, the display is out of order and the console unit needs to be replaced. Else, check out the custom-made program.

16.7 Error Messages

Description:

An error message appears in the display window or is returned via a serial port.

- The printer stops functioning.
- The Error LED is usually lit.
- Consult the *Intermec Fingerprint v8.xx, Programmer's Reference Manual* or *IPL Programming, Reference Manual* for the meaning of the different error codes and use that information to correct the error.

Depending on the firmware, printer's mode, or running program, there are different ways of giving the error message.

Immediate Mode (Fingerprint only)

- The firmware can detect and return three error conditions, provided the printhead is lowered and a media feed is executed.
  - Error 1005 ("Out of paper")
  - Error 1027 ("Out of transfer ribbon")
  - Error 1031 ("Next label not found")

Programming Mode (Fingerprint only)

- At every erroneous instruction during programming, the printer transmits an error code on the selected standard OUT channel (serial communication only), provided the verbosity is not disabled. The same applies if programming errors are detected when the program is run.
- When a program is executed, the same errors as in the Immediate Mode will be detected. The execution stops and an error message is transmitted. It is recommended to included some kind of error handler in any custom-made application program, for example ERRHAND.PRG.

Intermec Direct Protocol (Fingerprint only)

- Six error conditions can be detected. Note that by default verbosity is **off** in the Intermec Direct Protocol.
  - Error 1005 ("Out of paper")
  - Error 1006 ("No field to print")
  - Error 1022 ("Head lifted")
  - Error 1027 ("Out of transfer ribbon")
  - Error 1031 ("Next label not found")
  - Error 1606 ("Testfeed not done")

  The Intermec Direct Protocol has a programmable error-handler. Refer to the *Intermec Direct Protocol v8.xx, Programmer's Reference Manual*.

IPL only

- Six possible errors are indicated by messages in the display window:
  - Printhead hot (Printhead over-temperature)
  - Paused (Empty/paused)
  - Paper out (Out of media)
  - Ribbon out (Out of transfer ribbon
  - Print head UP/Press Feed (Printhead lifted)
  - Open&shut cutter (Cutter error)

Some additional errors can be returned to the host as an ASCII number by the <BEL> command, see *IPL Programming, Reference Manual*.

Firmware Error

- In case the CPU is unable to access data on a given address, the internal program will light up the red error LED regardless of any error-handling program.

16.8 No Communication (general)

Description:

The following actions are valid for all communication interfaces installed in the printer.

Possible Causes and Suggested Remedies:

- **Defective cable between printer and host.**
  - Check that the communication cable is correctly inserted and that it is of the correct type and is correctly configured.
  - Check that any clips or ground screws are properly engaged.
  - Inspect cable for physical damage.
  - Disconnect and connect the cable a few times to rub off possible oxide from the connectors.
  - Try using another identical cable.
- **Defective cable between interface board and CPU board.** This does not apply to the serial port ("uart1:"), the USB port, or any EasyLAN board which all are fitted directly on the CPU board.
  - Check that the cable is connected correctly.
  - Inspect cable for physical damage.
  - Disconnect and connect the cable a few times to rub off possible oxide from the connectors.
  - Replace the cable.
- **Error in host.**
  - Try connecting the printer to another host computer.
- **Erroneous data.**
  - If using Fingerprint, check if the data string contains the correct characters using the Line Analyzer program included in Intermec Shell (see the *User's Guide*).

16.9 No Serial Communication

Description:

The following actions are valid for the standard serial interface ("uart1:") fitted on the CPU board and to some extent also to any other serial interfaces on optional interface boards. Also see Chapter 16.8.

Possible Causes and Suggested Remedies:

- **Communication setup mismatch.**
  - Press the <i/F5> key or enter the Setup Mode to check that the printer and host are set for the same communication parameters, such as baud rate, parity, character length, stopbits, new line and handshaking. It is stongly recommended to use some kind of handshaking, for example XON/XOFF or RTS/CTS.
- **Damaged RS-232 driver circuit.**
  - With the aid of an oscilloscope, or some kind of line analyzer (“breakout box”), verify that the interface signals to and from the CPU board are correct. The RS-232 driver (U61) could have been damaged as a result of voltage transients from the interface, necessitating the CPU board to be replaced. Repeated damage is an indication of insufficient cable screening, or the electrical environment being too noisy.
- **Circuits or straps on an optional interface board missing or fitted incorrectly.**
  - See configuration instructions in Chapter 14.
- **No supply voltage.**
  - Verify that the +3.3VDC and +5VDC voltages are present (see Chapter 13.4).
- **No external +5VDC.**
  - The printer supplies max. 500 mA. The current is automatically switched off at higher loads. Check the consumption of the connected device.
  - The switch (RP60 on the CPU board; IC9 on the Industrial Interface Board and the Double Serial Interface Board) may be out of range and need to be replaced.
- **Too long communication cables.**
  - RS-232 max. 10-15 m (33-49 ft).
  - RS-422 max. 1,200 m (4,000 ft).
  - RS-485 max. 1,200 m (4,000 ft).
  - Current Loop max. 500 m (1,500 ft).

- **Input buffer on host overflow.**
  - The input buffer should normally be handled by the software of the host. Increase the receive buffer in the printer to a large value, restart the host to empty its input buffer and try again.
- **No response from printer a custom-made program is run (Fingerprint only).**
  - The verbosity can be controlled using the Fingerprint instructions VERBON/VERBOFF and SYSVAR(18). In the Intermec Direct Protocol, verbosity is disabled by default. Check the program for instructions that affect the verbosity.
  - Verify that the correct communication port is selected as standard IN/OUT channel.

16.10 Network Communication Troubles

This section applies both to EasyLAN Ethernet and EasyLAN Wireless communication between a printer and a local area network. It does not cover general network troubles in other types of equipment, such as wiring, access points, routers, switches, servers, etc. It is assumed that the network is in good working order, that is, other devices connected to the network works well and the trouble can be pinpointed to the printer.

Description:

The printer cannot communicate with the network after the network interface has been installed.

Possible Causes and Suggested Remedies:

- **Defect interface board or bad connection between interface board and CPU board.**
  - Print a Hardware test label in the Setup Mode to see if the printer recognizes the interface board. Also check if the Network node is shown in the Setup Mode. If not, switch off the power, disconnect the interface board, clean the connectors, and connect the interface again. Switch on the power. Print a new Hardware test label. If the troubles remains, replace the interface board.

    Wireless only: Also check visually that the radio module is properly connected to the adapter board. If the radio module is not connected properly, the Network node will be displayed in the Setup Mode but the wireless interface will not be recognized on the hardware test label.
- **Bad internal cabling.**
  - Ethernet only: Check that the network extension cable is properly connected to the interface board. Visually check the cable for breaks or shavings.
  - Wireless only: Check that the antenna cable is properly connected to the connection point marked “MAIN” on the radio module. Visually check the cable for breaks or shavings.

    Check that the antenna is properly connected and is pointing straight up.
- **Bad connection between printer and an Ethernet networ**k
  - Check the network LED indicator at the back of the printer. There should be a green light flashing occasionally showing network activity or a solid yellow background light if connected to a 100 Mbps network. Note that there is no background light indication provided for 10 Mbps wired networks.
  - Check that the network cable is connected correctly to the network wall socket, hub, or similar and to the RJ-45 socket on the printer’s rear plate.

- Check that the cable connecting to the network is not of "crossover" type. Use a straight "pin to pin" cable to connect to a LAN, but use a crossover cable to connect directly to a PC.

  If you are trying to connect the printer directly to a PC via a crossover network cable, you may need to disable the web browser's proxy settings on your computer to get in contact with the printer's web pages.

- **Bad communication between printer and a Wireless network**
  - Check the network LED indicator at the back of the printer. There should be a green light flashing occasionally showing network activity, or a solid yellow background light if the network card is associated with an access point, or flashing yellow light if the network card is searching for an access point.
  - Press the <**i**> key on the printer's front panel and browse to the network information. There you can see the present signal strength and channel. If both are 0, the network card is not associated with any access point and/or the WLAN settings are wrong.
  - Check if the access point is on.
  - Check if the access point lists the MAC address of the network card.
  - Check if other devices associated with this access point are working.
  - Inspect the location and see if there is any reason why the radio transmission between printer and access point is prevented, such as shielding objects like walls, shelves, fork lifts, metal grids, etc. Sometimes, just moving the printer around a little may help.

    For demanding applications, Intermec offers a series of high gain antennas that can replace the standard antenna.
  - Check SSID settings.
  - Check WEP settings. Note that you must have the same WEP key settings in both the printer and the access point in regard of both the content of the WEP keys and the order of the WEP keys. However, you can have one active WEP key selected in the printer and another in the access point.
  - Check the region setting, which can be found on the Network Info test label.

Description:

The printer seems to be physically connected to the network but cannot communicate.

Possible Causes and Suggested Remedies:

- **Bad IP Settings in printer**
  - Use a PC connected to the same network as the printer. First of all verify the network configuration of the printer as described in the Installation Instructions provided with the kit.

PC Settings

You should verify that the PC has a working connection to the network. Do this by opening a **Command Prompt** and type the command that corresponds to your operating system:
- For Windows 95, 98 and ME, use the command *WINIPCFG*.
- For Windows NT4, 2000 and XP, use the command *IPCONFIG*.

The PC will show a table with its configuration containing the settings for IP-address, Subnet Mask and Default Gateway. Verify these settings to be sure that the computer is correctly configured to access your network.

Printer Settings
Check the IP address of the printer. Press the <**i**> key on the printer's keyboard and use the <◀> and <▶> keys to browse to the IP address. In Fingerprint, a prerequisite is that the standard IN port is set either to "auto" or "net1:", which can be done using Intermec Shell.

Another method is using the Setup Mode:

Press the <**Setup**> key, on the printer's internal keyboard, and step your way to "*NETWORK*" using the <▶> key.

By pressing <**Enter**> on the printer, you can step through the configuration to verify the settings.

Press <**Setup**> to exit the Setup Mode.

More information about configuration settings can be obtained by printing a test label.

Also check on the printer's home page (Configuration [TCP/IP]) that the net1 TCP Port Number is correct (default 9100).

Verifying IP Address
In the *User's Guide* of the printer, you will find information on how to print test labels in the chapter *"Setting Up the Printer"*. Print the network test label and find the IP Address field. If the IP address is set to 0.0.0.0, the network card has not received a IP address. Verify the *IP SELECTION* setting under the *NETWORK* menu in the Setup Mode. See the *Installation Instructions* for information on various methods for setting the IP address automatically or manually.

Verifying Subnet Mask
Check subnet mask of PC and printer and make sure they belong to the same segment. For example:

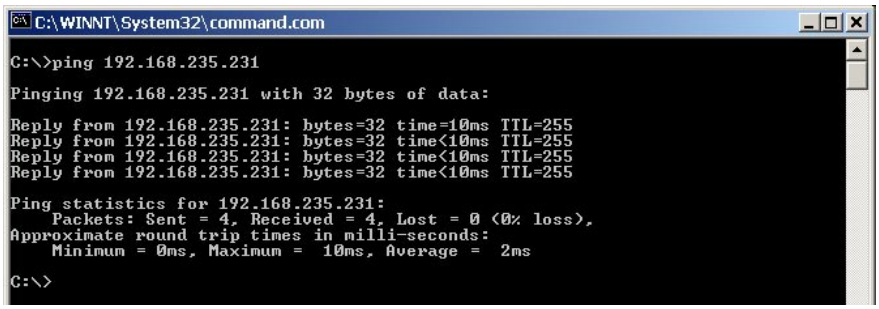
If they have the subnet mask	The numbers in the PC and Printer IP addresses have to be
255.255.255.0	<Same>.<Same >.<Same >.<Any >
255.255.0.0	<Same>.<Same >.<Any >.<Any >
255.0.0.0	<Same>.<Any >.<Any >.<Any >
Other subnet masks	Contact the network administrator

In case the addresses are not in the same network segment, the printer may not be reachable from the LAN side. Check the configuration with the administrator.

Pinging the Printer

Start the **Command Prompt**. In the Command Prompt, type *Ping <printer IP-Address>* and then click **OK**.

This command sends an echo command to the EasyLAN to check if the PC and the printer can reach each other through the network. The following figure shows a correct response to the Ping command.



The first reply to the first Ping command often takes more time than the following. This is a normal behavior. The first time the Ping command is executed, the PC needs some extra time to perform a "discovery" of the network address (ARP request). The Ping command makes the printer's network LED flash green.

If you have completed the test procedure and all the conditions are met, but you do not get any answer to the Ping command, then you probably have a hardware problem.

Description:

The performance of a Wireless network connection ceases to work or the performance deteriorates after having worked properly for some time after installation.

Possible Causes and Suggested Remedies:

- **Bad radio connection between printer and access point.**
  - Either the printer or the access point has been moved after installation or some kind of obstruction has come between printer and access point. In principle, there should be a free line-of sight between the access point and the antenna. There is also a distance limit.

    Check the signal strength.

    - Check network test label for statistics.

    - Try moving either the printer or the access point (or both) or consider fitting a higher gain antenna.
- **Slow response.**
  - Too many devices associated with the same access point.

16.11 Sensor Malfunctions

Label Stop Sensor (LSS)

Description:

Label (ticket) gap or black mark not detected by the label stop sensor (LSS) or wrong amount of media feed.

Possible Causes and Suggested Remedies:

- **Lost or obsolete media feed data, for example after a headlift, change of media, or replacement of the sensor.**
  - In Fingerprint, perform a TESTFEED operation, for example by simultaneously pressing <Shift> and <Feed> or selecting the Testfeed option in the Setup Mode.
  - In IPL, adjust the media feed by pressing the Feed/Pause button.
- **Bad LSS lateral alignment.**
  - Check that the gaps or marks actually pass between the upper and lower parts the label stop sensor (lateral alignment), see Chapter 7.5.
  - Check that both parts of the LSS are adjusted to the same lateral position, see Chapter 7.5.
- **Light path obstructed.**
  - Check that both the upper and lower sensors as well as the windows in the upper and lower guide plates are clean and free from dust, stuck labels, or other matters that may interfere with the path of light.
- **Printer set for wrong media type.**
  - Set up the printer for the correct media type.
- **Media feed detection using PRSTAT (Fingerprint only).**
  - PRSTAT AND 8 only checks for out-of-media conditions once as opposed to the normal error checking (errors 1005 and 1031) that checks for out-of-media conditions more or less continuously. Thus. when using PRSTAT, a dark spot or a bad media angle can give an incorrect out-of-media indication, especially when using tickets (w. mark).
- **Bad connection**
  - Check the LSS cables and make sure that they are correctly connected to J54 and J55 on the CPU board, see Chapter 13.3.
- **Faulty sensor or diode.**
  - Replace LSS as described in Chapter 7.5.
- CPU board not configured for the right type of printer.
  - Reconfigure the CPU board as described in Chapter 13.8.

Headlift Sensor

Description:

- The printer does not work, although the printhead is lowered.
- Error condition 1022 *"Head lifted"* (FP) or *"Print Head UP/Press Feed"* (IPL) is indicated at any attempt of printing a label.

Possible Causes and Suggested Remedies:

- **Headlift sensor blocked.**
  - Check the sensor for dust or foreign objects.
- **Bad connection.**
  - Check that the sensor's cable is connected to J58 on the CPU board. Inspect cable for damage.
- **Faulty sensor.**
  - Replace as described in Chapter 7.7.

Label Taken Sensor (LTS)

Description:

The label taken sensor (LTS) is not working properly.

Possible Causes and Suggested Remedies:

- **Intermec Fingerprint instruction missing.**
  - The LTS must either be enabled using an LTS& ON statement, or the status of the LTS must be polled using a PRSTAT function in the current Intermec Fingerprint program.
- **IPL instruction missing.**
  - The self-strip mode must be enabled using the commands **<STX>R<ETX>** and **<STX><SI>t1<ETX>**.
- **Bad connection.**
  - Check that the LTS is correctly connected to J53 on the CPU board.
  - Check that the cable between CPU board and sensor is not damaged.
- **Dirty sensor.**
  - Make sure that the active parts of the sensor are not obstructed by dust or foreign objects.
- **Wrong LTS sensitivity.**
  - The sensitivity of the sensor's receiver and the light intensity of the sensor's emitter are adjustable, see Chapter 9.3.
- **Interference from sunlight or lamps.**
  - Shield the sensor from interfering light source.
- **Defective sensor.**
  - If still no reaction, the sensor is probably defective. Replace.

Ribbon Sensor

Description:

The ribbon sensor is not working properly.

Possible Causes and Suggested Remedies:

- **Bad sensor adjustment (Fingerprint only).**
  - Adjust the sensor in the Setup Mode as described in Chapter 6.4.
- **Bad connection or faulty sensor.**
  - Cable between the ribbon sensor and J56 on the CPU board damaged or not correctly connected?
  - Sensor blocked by dust or foreign matters? Clean.
  - Faulty ribbon sensor? Replace.
- **Bad detection pattern inside ribbon supply bobbin.**
  - Check the black and silvery sector pattern at the inner end of the ribbon supply bobbin for scratches or dust.

Paper Sensor (Fingerprint only)

Description:

The ribbon sensor is not working properly.

Possible Causes and Suggested Remedies:

- **Bad sensor adjustment.**
  - Adjust the sensor in the Setup Mode.
- **Bad connection or faulty sensor.**
  - Cable between the paper sensor and J57 on the CPU board damaged or not correctly connected?
  - Sensor blocked by dust or foreign matters? Clean.
  - Faulty paper sensor? Replace.
- **Bad detection pattern inside media supply bobbin.**
  - Check the black and silvery sector pattern at the inner end of the media supply bobbin for scratches or dust.

16.12 Printing Troubles

The best way to start is to get an overall check of the printout quality by printing a series of test labels in the Test Mode.

If you suspect a defective printhead, you can check it out using the following Intermec Fingerprint instructions (see *Intermec Fingerprint v8.xx, Programmer's Reference Manual*):

- FUNCTEST$ ("HEAD")
- HEAD
- SYSVAR(21)
- SYSVAR(22)

Description:

No printout at all.

Possible Causes and Suggested Remedies:

- **Bad connection.**
  - Is the cable between the printhead and P5 on the Power Supply Unit fitted correctly and not broken or otherwise damaged?
  - Is the cable between the printhead and J40 on the CPU board fitted correctly and not broken or otherwise damaged?
- **Dirty printhead.**
  - Is the printhead clean? Residue from label adhesive, thermal paper topcoating, or preprint ink prevents the printhead from functioning correctly. Clean the printhead as described in the *User's Guide*.
- **Wrong type of direct thermal media.**
  - In case of direct thermal printing, verify that the media is intended for direct thermal printing (not thermal transfer!) and of an approved quality.
- **Wrong type of thermal transfer ribbon.**
  - In case of thermal transfer printing, verify that the stock of ribbon is of an approved quality.
- **Transfer ribbon loaded incorrectly.**
  - Verify if the ribbon is laoded with the ink-coated side facing the receiving face material. If not, reload the ribbon as described in the *User's Guide*.
- **Transfer ribbon mechanism failure.**
  - See Chapter 16.13
- **Wrong printhead voltage.**
  - Check that the printhead voltage +24VDC ±2V (see Chapter 13.4). If the power on the CPU board is OK, but the trouble remains, disconnect the power cable on the inner side of the printhead and use probes to measure the voltage during printing between two adjacent lines in the socket (see Chapter 12.4, connector P5 for schematics).

- **Wrong printhead pressure.**
  - Check that the printhead is pressing against the media with a sufficient force, see Chapter 7.8.
- **Headlift sensor out of order.**
  - Check the headlift sensor as described in Chapter 16.11.

Description:

Overall weak printout.

Possible Causes and Suggested Remedies:

- **Various reasons.**
  - Check as for "No printout at all".
- **Wrong Contrast/Darkness setup.**
  - Check setup for extremely low value.
- **Wrong Paper Type/Media Sensitivity setup.**
  - Verify that setup matches the direct thermal media or the combination of transfer ribbon and media.
- **Wrong printhead voltage.**
  - Measure the +24VDC on the CPU board, see Chapter 13.4.
- **Printhead pressure too low.**
  - Adjust as described in Chapter 7.8.

Description:

Weaker printout on either inner or outer part of label.

Possible Causes and Suggested Remedies:

- **Bad printhead pressure alignment.**
  - Adjust the position of the headlift arm as described in Chapter 7.8.

Description:

Overall too dark printout (bleeding). Too dark a printout is particularly troublesome when printing compact bar codes, in which case spaces between the bars become less distinctive, and consequently less readable.

Possible Causes and Suggested Remedies:

- **Wrong Contrast/Darkness setup.**
  - Check Contrast/Darkness setup for extremely high value.
- **Wrong Paper Type/Media Sensitivity setup.**
  - Verify that setup matches the direct thermal media or the combination of transfer ribbon and media.
- **Wrong printhead voltage.**
  - Measure the +24VDC on the CPU board, see Chapter 13.4.

Description:

Weak or missing printout of some dots.

Possible Causes and Suggested Remedies:

- **Dirty printhead or platen roller.**
  - Examine the printhead and the platen roller for dust, adhesive residue, or visible damage.
  - Clean or replace.
- **One or two missing dots.**
  - May be due to mechanical damage to the printhead. Try to establish why such damage have occurred in order to prevent future failures of this kind. (Hard foreign particles, electrostatic discharge?)
  - If the printer has been used for printing on less than full width labels for some time, the platen roller and possibly also the printhead may have become worn from the outer edge of the media. This will show up when reverting to wider labels. Change the platen roller and possibly also the printhead.
- **Preprinted ink has got stuck to the dot line.**
  - Avoid preprinted labels with ink that has a low melting point (less than +225°C/+437°F).
- **Many dots, or a block of dots, are missing.**
  - The internal IC circuit of the printhead is probably damaged. Replace the printhead.

Description:

Unexpected black printout (completely or partially).

Possible Causes and Suggested Remedies:

- **Wrong printhead voltage.**
  - If the printer unexpectedly produces completely or partially black printout, or prints a black line across the media at startup (regardless of label layout), check that the printhead voltage +24VDC ±2V (see Chapter 13.4). If the power on the CPU board is OK, but the trouble remains, disconnect the power cable on the inner side of the printhead and use probes to measure the voltage during printing between two adjacent lines in the socket (see Chapter 12.4, connector P5 for schematics). If too high, in the range of 40 to 50V during printing, replace the power supply unit.
  - The printhead is most certainly damaged too and will also need to be replaced.

Description:

Media feed does not work properly.

Possible Causes and Suggested Remedies:

- **Faulty stepper motor.**
  - Connect a replacement stepper motor to P10 on the Power Supply Unit (see Chapter 12) and perform a print or feed operation. If this motor runs, the original stepper motor is probably damaged and needs to be replaced (see Chapter 7.3).
- **Dirty or worn platen roller.**
  - Inspect the platen roller for visible wear. Replace if necessary (see Chapter 7.2).
  - Clean the platen roller using a cleaning card or a soft cloth moistened with isopropyl alcohol. Paper dust or adhesive residue can deteriorate the media feed function or make the media slip.
- **Intermec Fingerprint instruction missing.**
  - Verify that a print command is actually issued in the current Intermec Fingerprint program.
- **Power Supply Unit malfunction or bad connection.**
  - The stepper motor could be incorrectly connected to P10 on the PSU, or its drive circuit (U13) on the PSU could be damaged.
  - Check that all pins in the connector of the stepper motor's cable are fully inserted.
  - Measure the +24VDC on the CPU board, see Chapter 13.4. If there is no power, when an attempt to print is made, the power supply unit is probably faulty.

Description:

Excessive wear of printhead.

Possible Causes and Suggested Remedies:

- **Various reasons.**
  - Refer to Chapter 7.6 "Printhead/Precautions" for advices on how to reduce the wear of the printhead.

Description:

Printing is slow and halted inbetween labels.

Possible Causes and Suggested Remedies:

- **RFID mode is ON**
  - The printer is trying to access an RFID label that is not there. Turn it off with the following commands:

    `SETUP "RFID,OFF"` (Fingerprint)

    <SI>J0 (IPL)

16.13 Transfer Ribbon Troubles

Description:

The thermal transfer ribbon breaks.

Possible Causes and Suggested Remedies:

- **Wrong brand of ribbon**.
  - Check if the transfer ribbon is of an approved brand. If not, recommend the customer to use approved brands only.
- **Bad ribbon load.**
  - Check that the ribbon is routed so it runs above upper guide (that is, the one where the upper part of the LSS is fitted).
- **Wrong paper type setup.**
  - Check that the printer is set up correctly for the type of thermal transfer ribbon in use, see the *User's Guide*.
- **Wrong printhead voltage.**
  - Check printhead voltage, see Chapter 13.4.

Description:

The thermal transfer ribbon wrinkles.

Possible Causes and Suggested Remedies:

- **Media misalignment.**
  - Is the edge guide positioned so as to guide the media closely along the printer's center section?
  - Is the media supply roll as far in on the post or hub as possible?
- **Ribbon misalignment.**
  - Are both the ribbon supply roll and the ribbon rewind core pressed as far in on their hubs as possible?
- **Ribbon path obstructed.**
  - Check that nothing obstructs the path of the transfer ribbon.
- **Wrong or uneven printhead pressure.**
  - Check that the pressure arm is center-aligned in the relation to the width of the media, see Chapter 7.8.
  - Check the printhead pressure, see Chapter 7.8. Decrease the pressure somewhat and test for both wrinkles and printout contrast. You may need to feed out 25-50 cm of ribbon (1-2 ft.) before you can see any effect.
- **Bad ribbon break shaft adjustment.**
  - Check the adjustment of the front ribbon break shaft, see Chapter 6.6. Do not change the adjustment before you have performed all other checks mentioned above.

Description:

No transfer printout.

Possible Causes and Suggested Remedies:

- **Refer to Chapter 16.12 for general printout troubles.**
- **Bad ribbon load.**
  - Transfer ribbon loaded incorrectly so the ink-coated side does not face the receiving face material. Reload ribbon.

Description:

Ribbon fed out in front of printer.

Possible Causes and Suggested Remedies:

- **Printer is set up for direct thermal printing, but a ribbon is loaded.**
  - Remove ribbon or change the paper type setup to thermal transfer.
- **Ribbon rewind motor does not run.**
  - Cable between ribbon motor and P6 on the Power Supply Unit broken or not correctly connected?
  - Faulty ribbon sensor? See Chapter 16.11.
  - Faulty ribbon motor? Replace.
  - Faulty CPU board? Replace.
  - Faulty Power Supply Unit? Replace.

16.14 Liner Takeup Troubles

Description:

The internal liner takeup unit does not work properly.

Possible Causes and Suggested Remedies:

- **Bad liner takeup or bad separation of labels from liner at the tear bar.**
  - Check that the media is routed correctly as described in the *User's Guide*.
  - Check that the liner is securely locked to the takeup hub by the brace, so it cannot slip.
  - Check the setup for incorrect media type and feed adjust settings.
- **Takeup unit slips.**
  - Spring clutch inside the takeup hub is broken.
  - Either the outside of the pulley or the inside of the hub has become worn.
- **Either the liner drive roller in the print mechanism or the takeup hub is not driven by the stepper motor.**
  - Check if any of the belts from the stepper motor is broken or has come off the pulleys, see Chapter 8.2.
- **Neither the liner drive roller in the print mechanism nor the takeup hub is driven by the stepper motor.**
  - Check if the stepper motor runs. If not, check as for "Media feed does not work" in Chapter 16.12.
  - Check if both the belts from the stepper motor are broken or have come off the pulleys, see Chapter 8.2.

16.15 Memory Card Troubles

Description:

The printer cannot read a memory card. Note that in IPL, memory cards are not used to expand the printer's memory.

Possible Causes and Suggested Remedies:

- **Memory card not inserted at startup.**
  - The card must be inserted before the power is switched on or the printer is rebooted.
- **Memory card incorrectly inserted.**
  - Check that the card is inserted as far as it goes.
- **Bad contact between card and adapter.**
  - Switch off the printer. Pull out and insert the card a few times to rub off any oxide on the connectors.
- **Wrong type of memory card.**
  - The memory cards must be Type I CompactFlash cards (thickness 3.3 mm/0.13 in.) commonly used with digital cameras. PCMCIA-cards or Type II CompactFlash cards (thickness 5 mm/0.20 in.) cannot be used. If a CompactFlash card is marked CF+, it is probably not a regular memory card and cannot be used.
- **Error in content of the card.**
  - If you have access to a PC equipped with a CompactFlash card reader, list the memory content of the PC memory card to see if it is correct.
  - If you can communicate with the printer via a PC, you could see what files are stored in the memory card and their sizes with the aid of Intermec Fingerprint command FILES "card1:".
  - Try to format the card in the printer using the Fingerprint instruction FORMAT "card1:",A. Also see *Intermec Fingerprint v8.xx, Programmer's Reference Manual*.
- **Hardware error.**
  - Inspect the memory card for mechanical damage.
  - Examine the memory card adapter on the CPU board for damaged card mating pins, breakage, or bad soldering.

16.16 Paper Cutter Troubles

Description:

The printer cannot detect the cutter.

- In Fingerprint, error 37, *"Cutter device not found"* or Error 1059, *"Cutter does not respond"* occurs.

Possible Causes and Sugged Remedies:

- **No reboot has been performed after installation.**
  - Cycle the power to the printer.
- **Cable between cutter pcb and CPU board is not fitted properly.**
  - Check that the cable has not come loose from the cutter pcb and is fitted so all the slack is between the cable cover and the cutter, see Chapter 10.2.
- **Faulty cable, cutter pcb, or CPU board.**
  - Replace one at the time, reboot, and check.

Description:

The cutter does not cut.

Possible Causes and Sugged Remedies:

- **Error 1704, "Cutter open" occurs in Fingerprint.**
  - Check that the cutter is positively in closed position.
  - The microswitch on the cutter assy may be defect. Replace the cutter assy.
  - Faulty cable, cutter pcb, or CPU board. Replace one at the time, reboot, and check.
- **Errors 1701-1703 occurs in Fingerprint.**
  - Check the "cutter top position" sensor on the cutter pcb for dust and similar. Clean if necessary.
  - Check the cutting shears and cutter mechanism for adhesive residue, label shavings, stuck labels, or other things that may prevent the cutter from operating mechanically. Clean if necessary, but do not use any solvent that can dissolve the grease.
  - Replace the cutter assy or cutter pcb, one at the time.
- **No error occurs but cutter does still not cut.**
  - If using Fingerprint, check that the application program utilizes the Fingerprint statements CUT or CUT ON/OFF correctly. See the *Intermec Fingerprint v8.xx, Programmer's Reference Manual*.

Description:

The cutter cuts at the wrong place.

Possible Causes and Sugged Remedies:

- **Faulty LSS or bad Feedadjust setup.**
  - In Fingerprint, perform a Testfeed to adjust the LSS.
  - In IPL, adjust the media feed by pressing the Feed/Pause button.
  - Check Start- and Stopadjust setup values (Fingerprint only).
  - Check application for FORMFEED<nnn> instructions (Fingerprint only).

16.17 RFID Troubles

Description:

"No tag found" is displayed when a TESTFEED is attempted.

Possible Causes and Sugged Remedies:

- **The inlay could be broken.**
  - Replace the inlay or use an entirely new label.
- **You are not currently using RFID media.**
  - Load the printer with RFID media.
- **The current TAGADJUST value is incorrect.**
  - Align the label with the edge of the tear bar (Fingerprint) or dot line (IPL). Leave the lid open and measure the distance between the middle of the inlay and a point orthogonally right above the antenna. Convert the distance to dots.

    TAGADJUST = Distance * $TPH_{resolution}$(mm)

    Enter the TAGADJUST value in the SETUP menu with the command:

    `SETUP "RFID,ON,TAGADJUST,<value>"` (Fingerprint)

    `<SI>J1,<value>` (IPL)

    Example:

    TPH resolution 203 dpi
    DISTANCE 15 mm
    TAGADJUST = 15 * 203 / 25.4 = 120 dots

Description:

An application writing to Class 1 RFID tags produces a large number of VOID labels.

Possible Causes and Sugged Remedies:

- **Verify that the TAGADJUST value is set correctly.**
  - Follow the procedure as described above
- **The output power to the antenna could need adjusting.**
  - This can be done with a run command, setting the output power to a value between 15 and 27 dBm, where 27 dBm is 0.5 W and every 3 dBm decrease means half the output power.

    `run "wjsetpower read|write <value>"`
    (Fingerprint)

    `<STX><ESC>.x,wjsetpower read|write <value><ETX>`
    (IPL)

The current setting can be read with the command (Answer is in dBm):

```
run "wjgetpower read|write"                    (Fingerprint)
<STX><ESC>.x,wjgetpower read|write<ETX>         (IPL)
```

Example:

```
run "wjsetpower read 24"
run "wjgetpower read"
> 24
```

Description:

None of the RFID commands work. The message "RFID inactive" is displayed.

Possible Causes and Sugged Remedies:

- **The RFID mode has been switched OFF.**
  - Turn it on with the following commands:

```
SETUP "RFID,ON"          (Fingerprint)
<SI>J1                   (IPL)
```

Description:

Printing on non-RFID media is slow and printing is halted inbetween labels.

Possible Causes and Sugged Remedies:

- **RFID mode is ON**
  - Turn it off with the following commands:

```
SETUP "RFID,OFF"         (Fingerprint)
<SI>J0                   (IPL)
```

Description:

After the printer has been loaded with a new roll of RFID media, it is unable to write to the tags.

Possible Causes and Sugged Remedies:

- **The printer has not yet identified the RFID media type.**
  - If RFID media is changed without the printer having been turned OFF, it resets the inlay type and waits for a TESTFEED to identify the new RFID media. A TESTFEED should take care of this problem.

Description:

RFID operations yield "Not supported by tag type" error messages.

Possible Causes and Sugged Remedies:

- **A command tries to access a tag data segment that is not available on the current RFID media.**
  - Example: Performing TAGWRITE or TAGREAD operations on the ”@DATA” segment for Class 1 RFID media.
- **A command is referring to a tag format that is not available on the current RFID media.**
  - Example: using TAGFORMAT "NUM" for Class 1 media, or trying to write an EPC-96 format to a 64-bit tag.
- **A command is used together with a "level" that is not allowed for a particular tag type.**
  - Example: using TAGPROTECT ”UNLOCKP” on Class 1 media or TAGPROTECT ”ON” for Gen 2 tags.

Description:

Data can be written unlawfully to a write-protected ISO 18000-6B tag.

Possible Causes and Sugged Remedies:

- **For some ISO 18000-6B tag chips the functionality to protect the tag memory from being rewritten has not been implemented.**
  - Switch to tags with a different chip that have this functionality implemented.

Description:

TAGWRITE commands yield "Invalid parameter" error messages.

Possible Causes and Sugged Remedies:

- **The user is trying to store an excessive amount of data in the tag's memory.**
- **An invalid value has been entered, e.g. an uneven number of characters for one of the "HEX" formats or an incorrect number of digits for a parameter defining an EPC-format.**

Description:

TAGREAD commands yield "Wrong number of parameters" error messages.

Possible Causes and Sugged Remedies:

- **The number of required parameters depend on what TAGFORMAT has been defined for the read operation.**
  - See the manual for Fingerprint v8.60 or later. Additional information can be found in the EPC Tag Data Standard (v1.1, revision 1.27) document available via http://www.epcglobalinc.org/standards_technology/specifications.html.

Description:

The message "Error in filename" is displayed when RFID mode is set to ON.

Possible Causes and Sugged Remedies:

- **No RFID kit is installed in the printer.**

Description:

ISO 18000-6B tags work fine, but reading Class 1 tags yield a "No tag found" error message.

Possible Causes and Sugged Remedies:

- **ISO 18000-6B tags are addressed with the IM3 or IM5 RFID reader. For these modules, Class 1 support has not been implemented yet. Class 1 tags require an MPR6100 RFID Radio Module.**
  - An MPR6100 can be ordered from Intermec Sales as part of an upgrade kit ("RFID Kit (Class 1, 915 MHz").

Description:

"RFID" does not show up in the SETUP tree.

Possible Causes and Sugged Remedies:

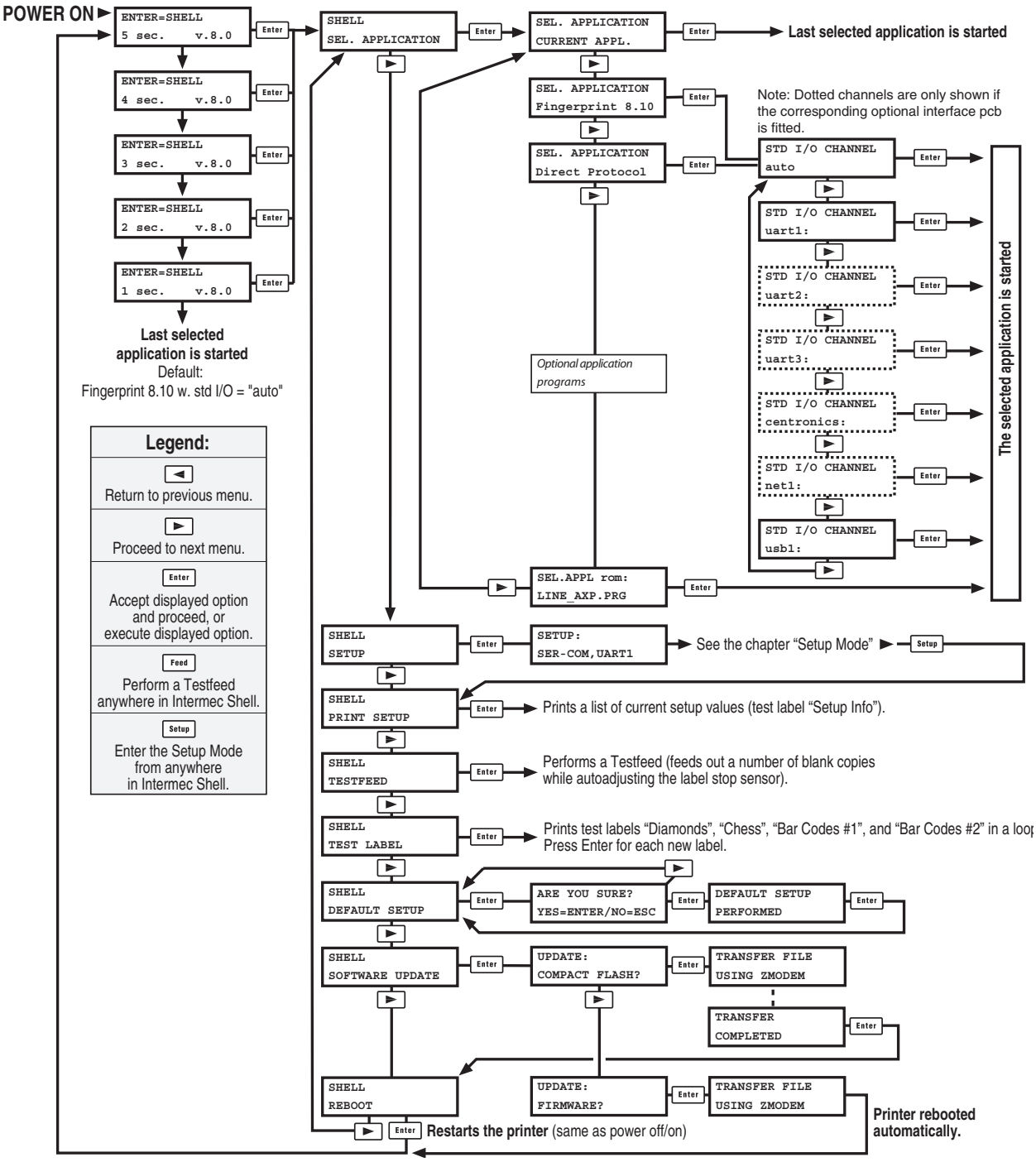
- **The printer does not communicate properly with the RFID hardware.**
  - Check that the RFID kit has been installed in accordance with the installation instructions. Check that the jumpers on the RFID option board are set to the correct position (see section 14.8).
  - Print a hardware test label to see what hardware the printer has recognized, confirm that the RFID option board is present on the label (this rules out potential errors in the board or I/O cable).
  - Test the RFID radio module by downloading and installing the latest firmware. If the module proves faulty, replace it.

A Program Overviews

This appendix shows overviews of the Intermec Shell and the Intermec Fingerprint Setup Mode followed by overviews of the IPL Setup Mode.

Refer to the User's Guides for information on the various parameters and instructions for navigation.

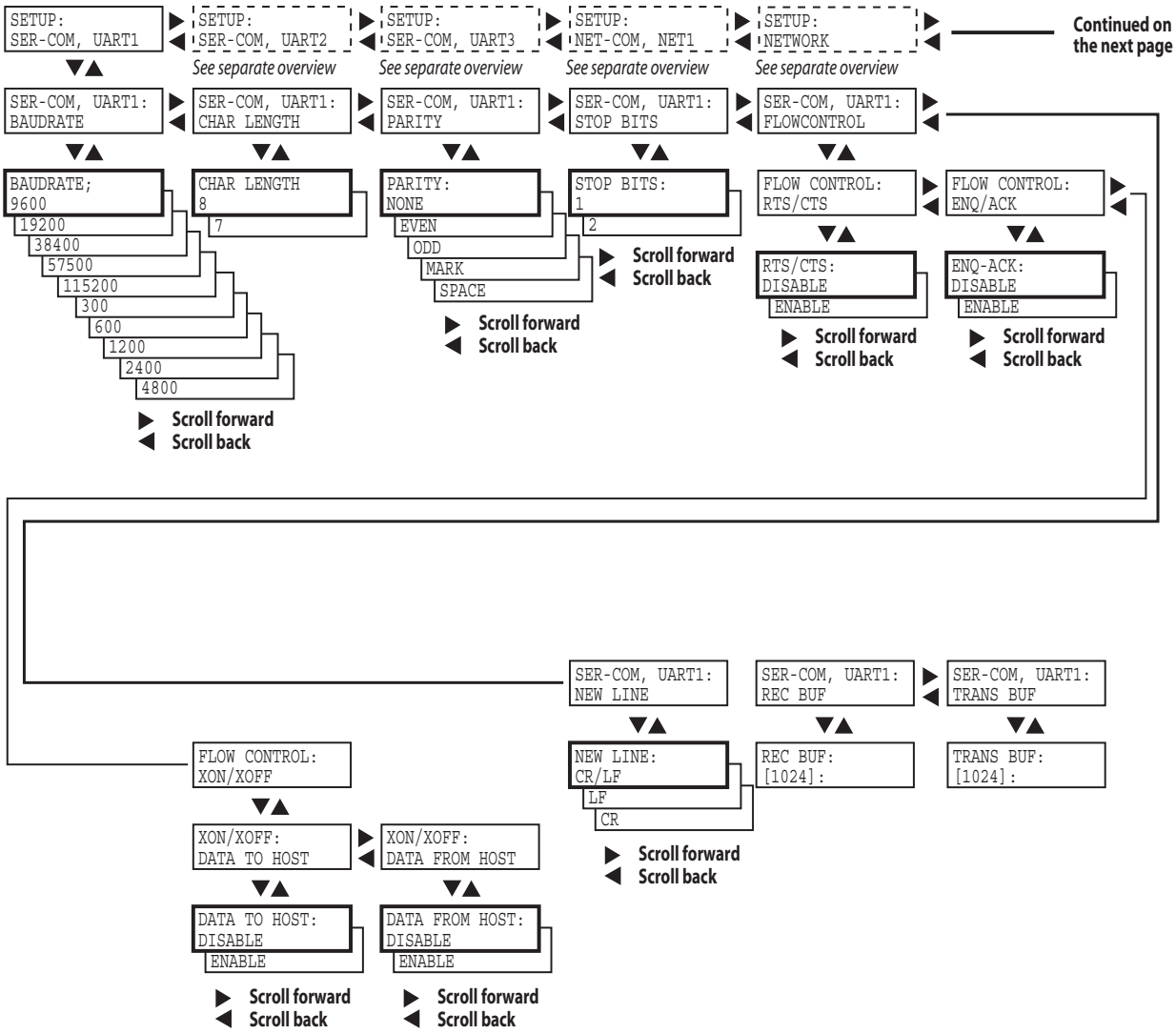
Intermec Shell v8.0 Overview



Note: To enter Intermec Shell if a custom-made autoexec-file prevents access, lift the printhead and press any key on the printer's keyboard (except the <Shift> key), then turn on the power while continuing to press the key. When the Shell countdown begins, release the key and press <Enter> to start Shell. Do not forget to lower the printhead if you want to print for example test labels.

Setup Mode Overview (FP v8.10)

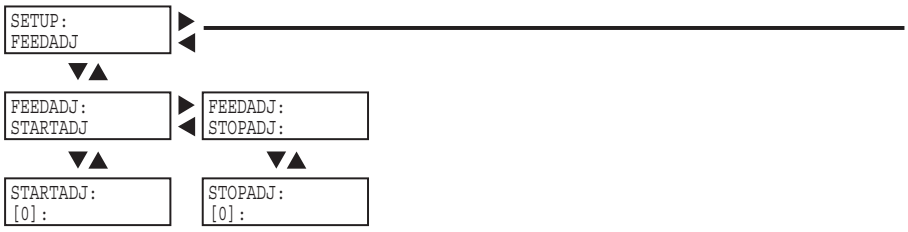
Ser-Com, uart1:



Setup Mode Overview (FP v8.10)

Feed Adjust

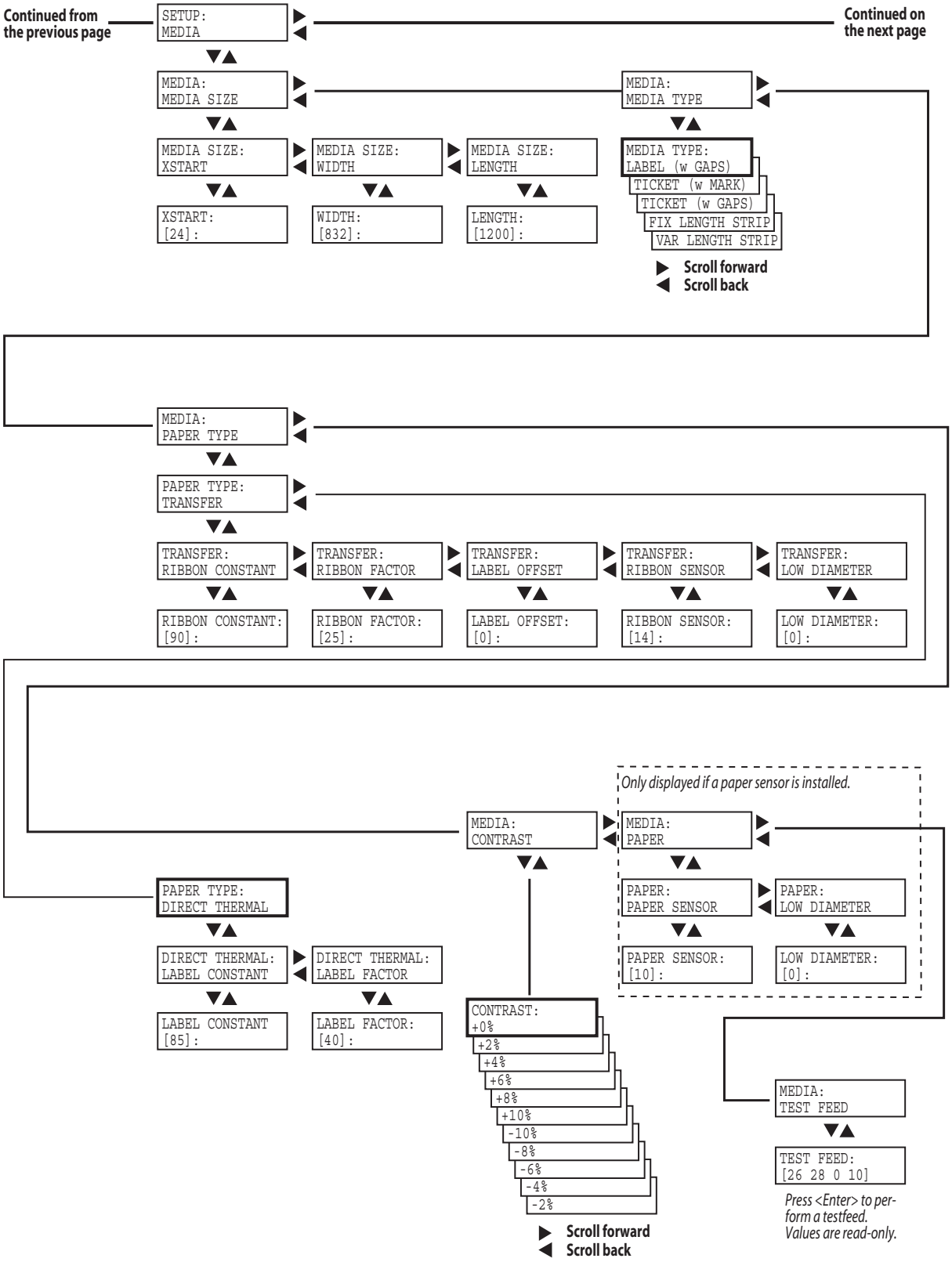
Continued from the previous page



Continued on the next page

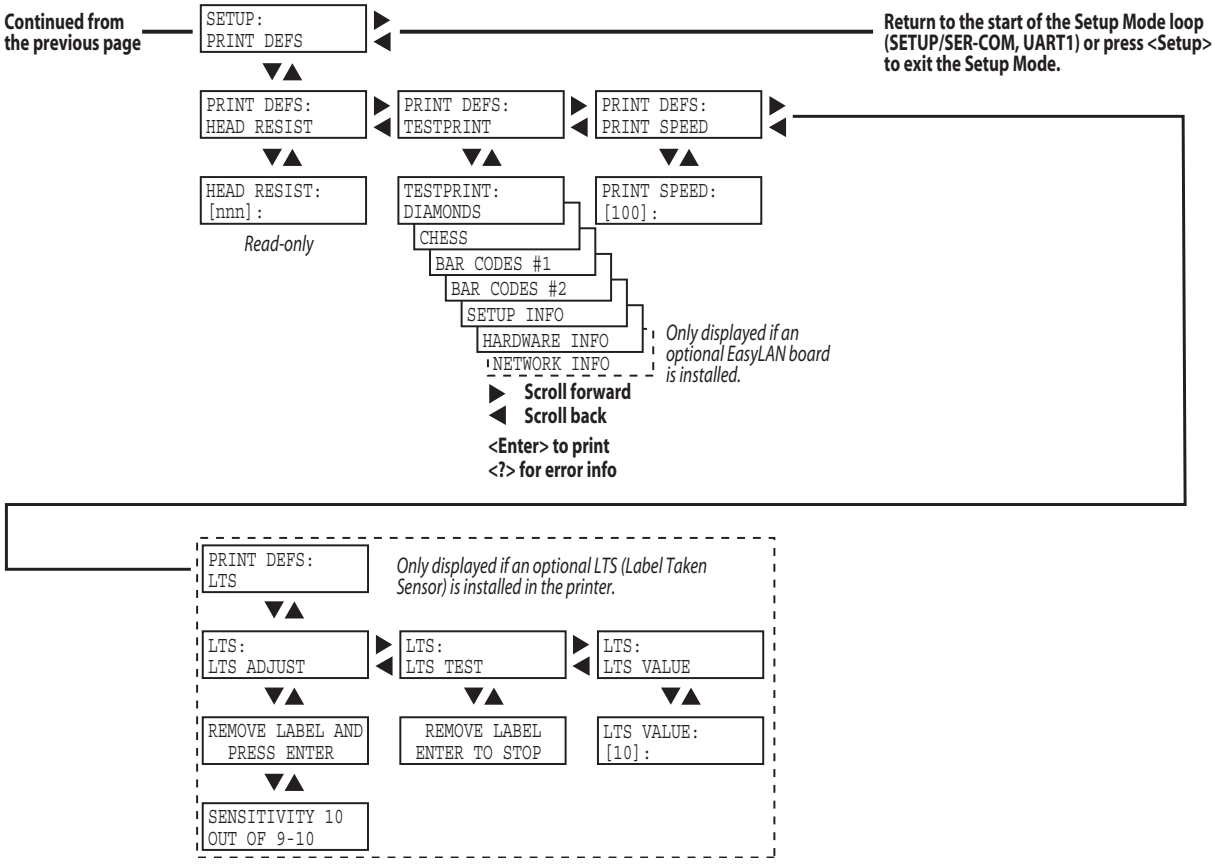
Setup Mode Overview (FP v8.10)

Media

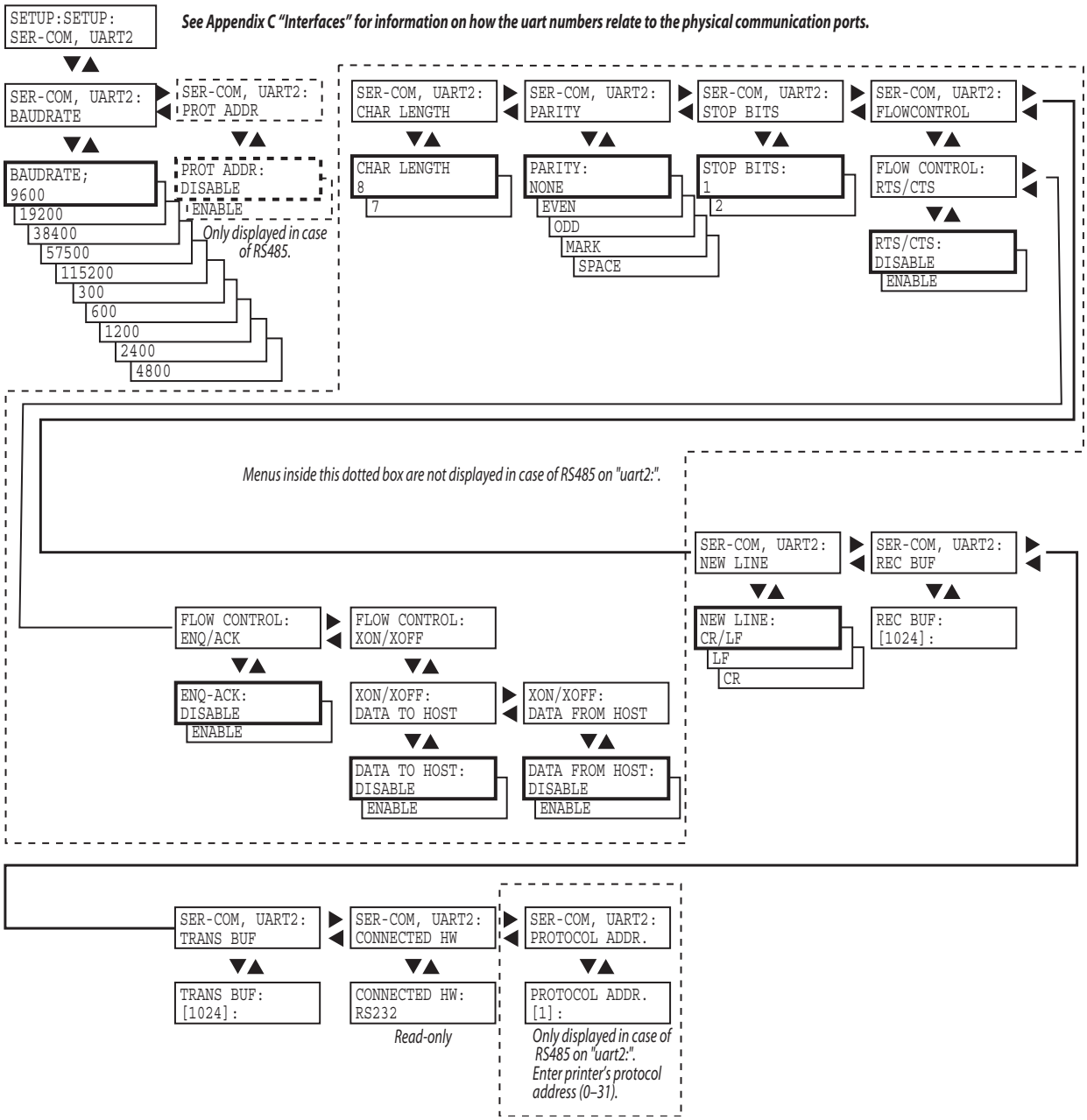


Setup Mode Overview (FP v8.10)

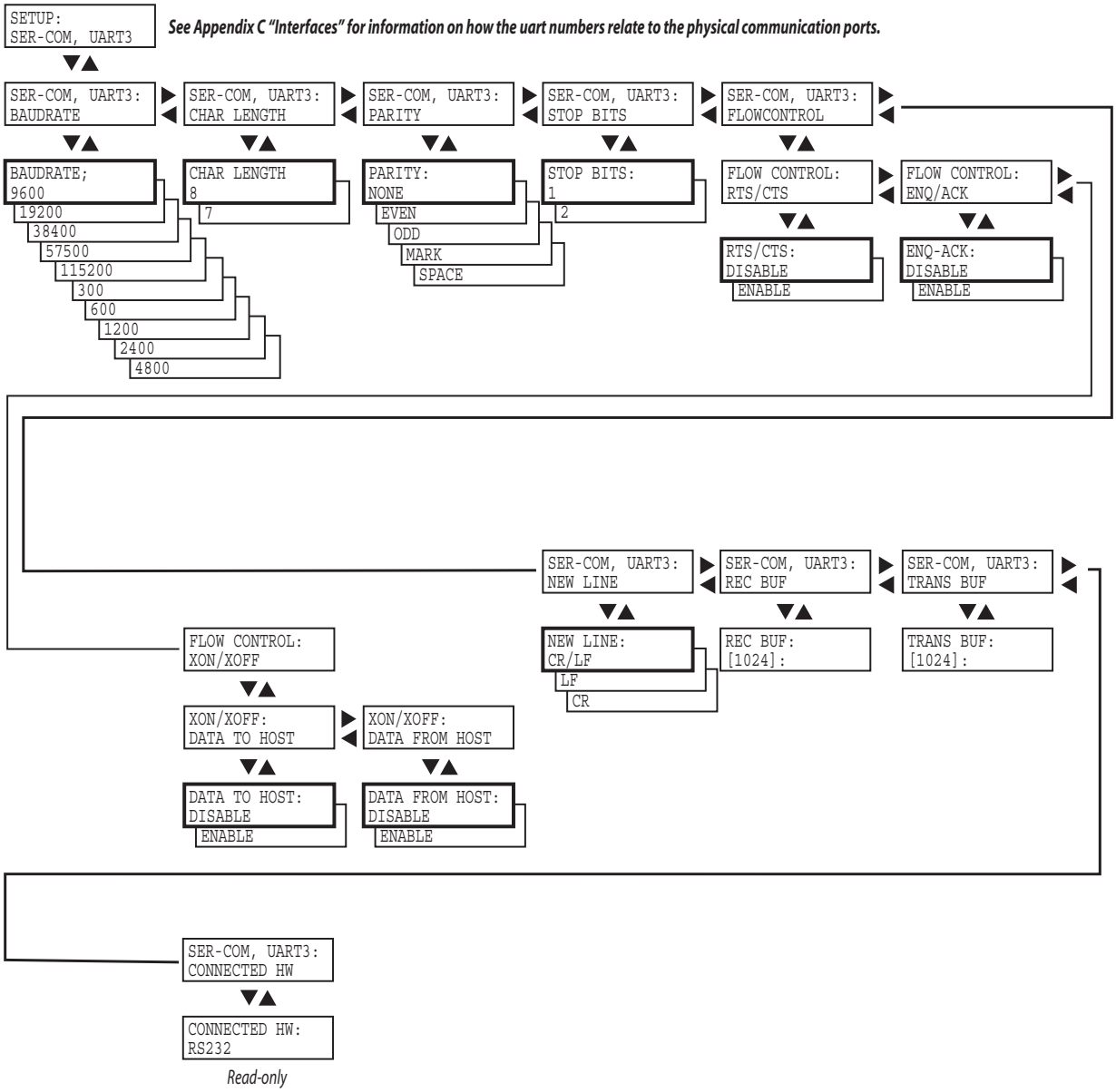
Print Defs



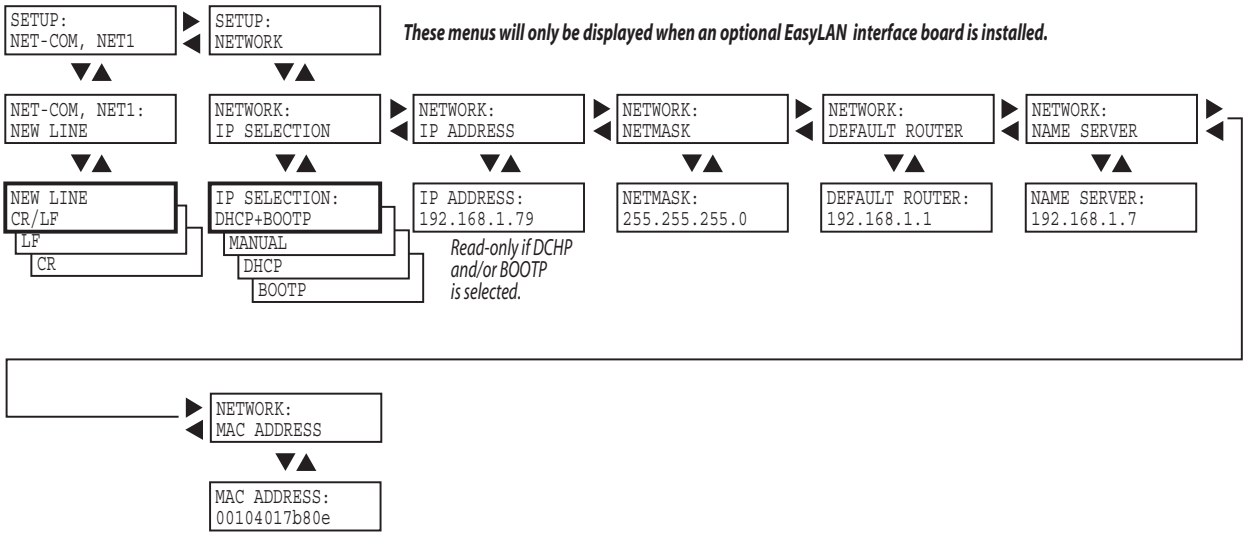
Setup Mode Overview (FP v8.10) Ser-Com, uart2



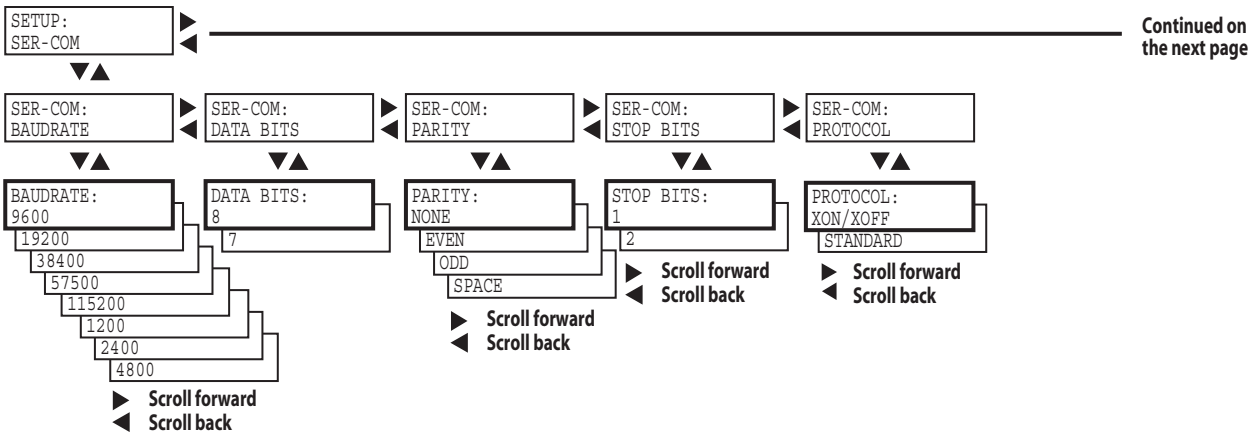
Setup Mode Overview (FP v8.10) Ser-Com, uart3



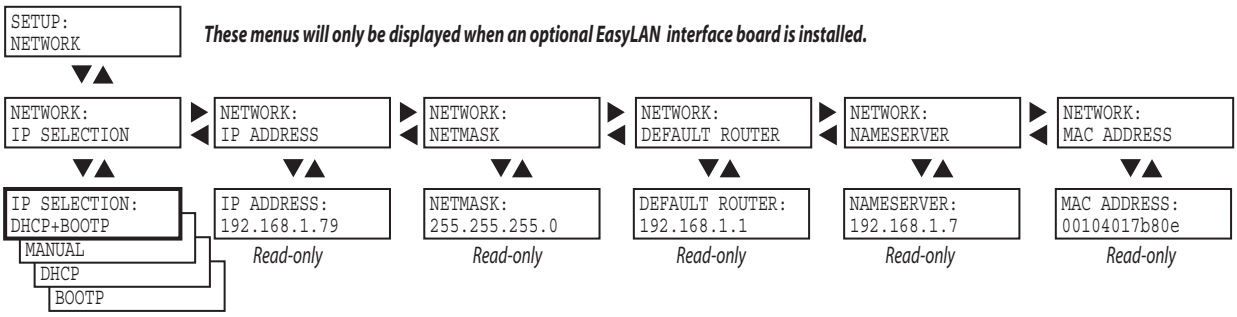
Setup Mode Overview (FP v8.10) Network Communication



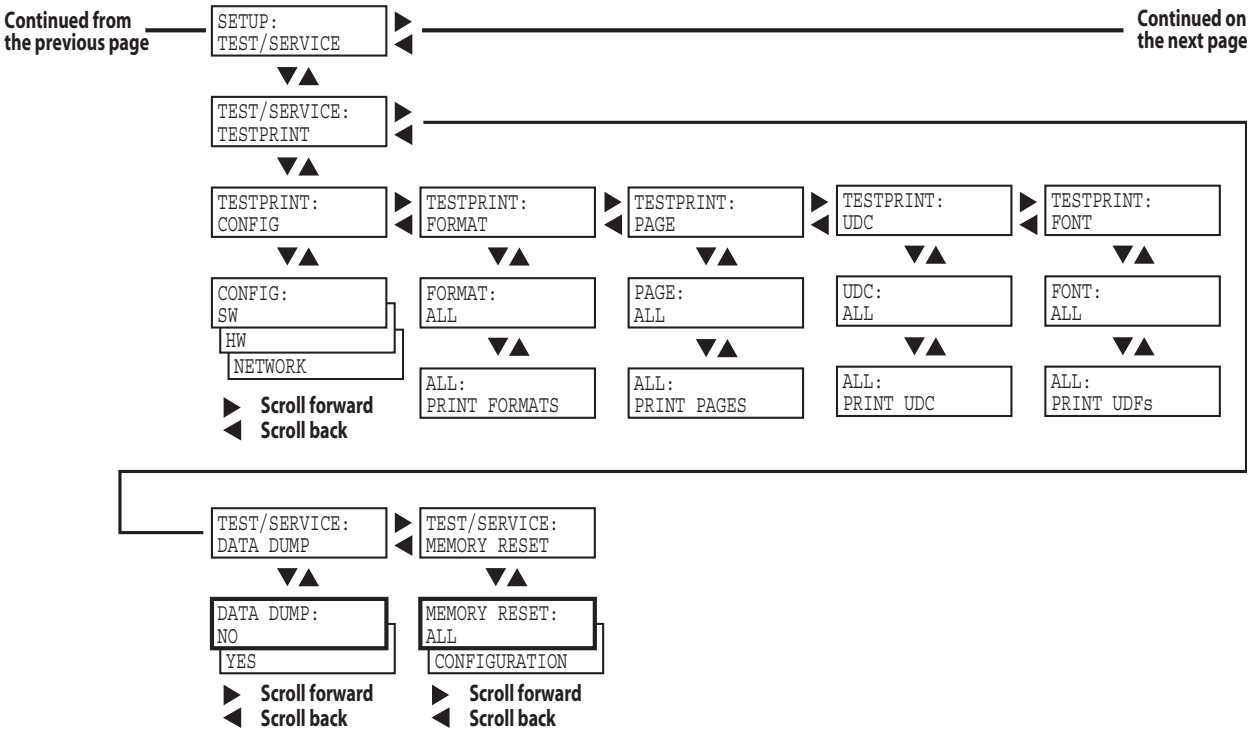
Setup Mode Overview (IPL v2.10) Serial Communication



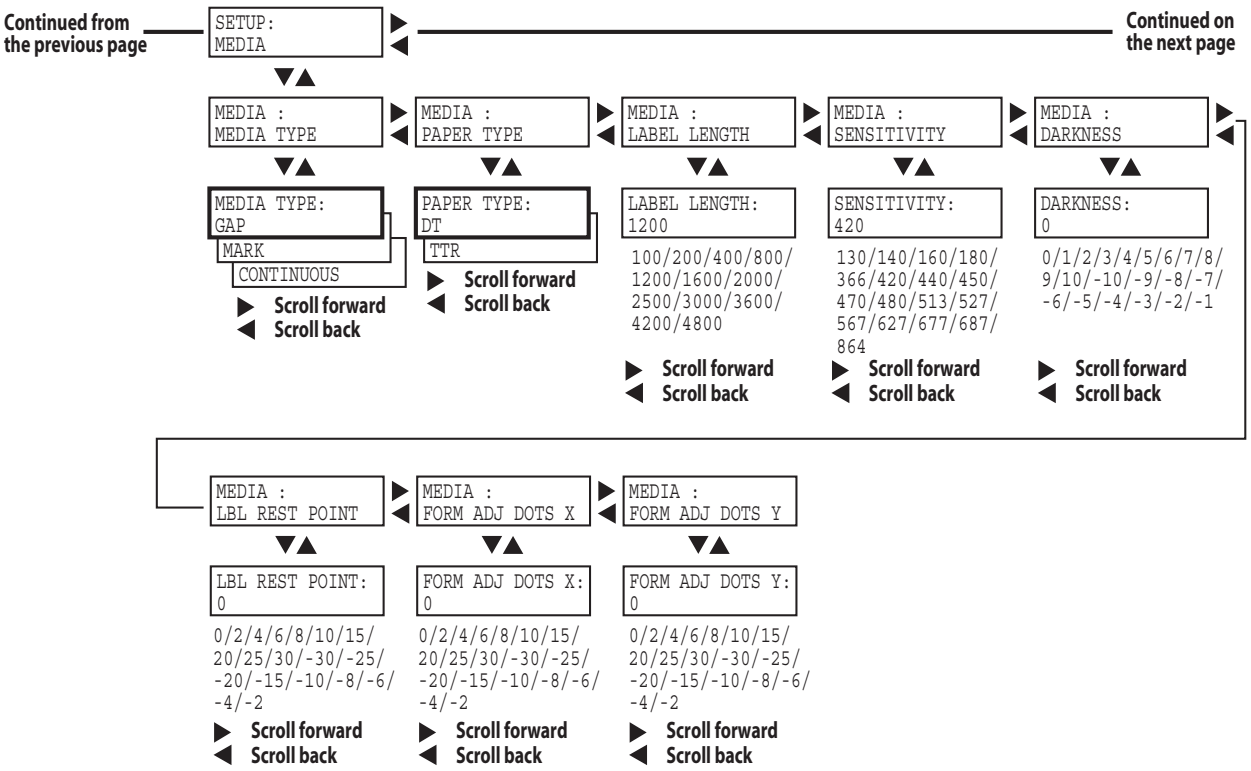
Setup Mode Overview (IPL v2.10) Network (option)



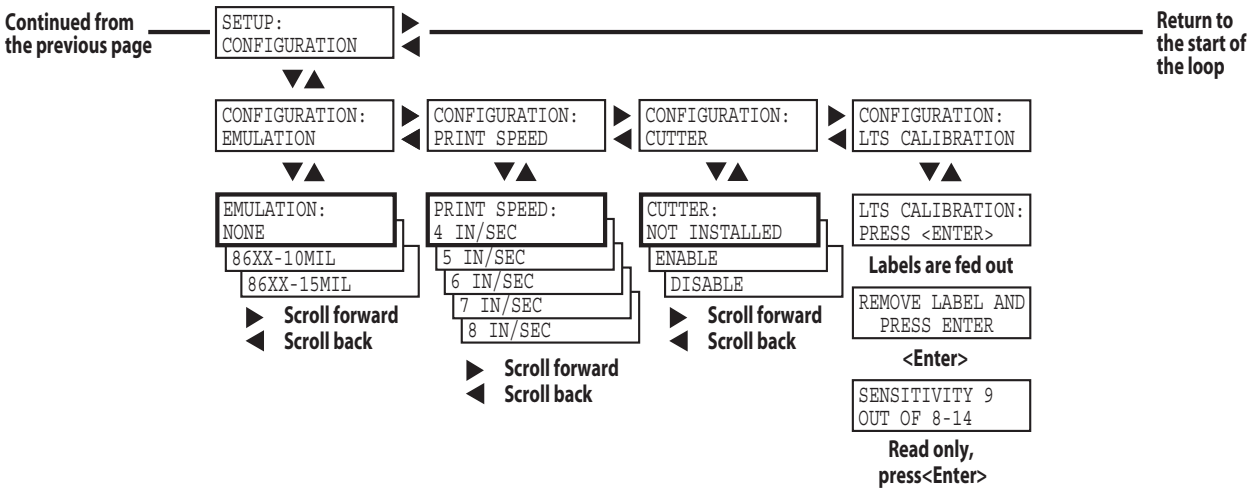
Setup Mode Overview (IPL v2.10) Test/Service



Setup Mode Overview (IPL v2.10) Media



Setup Mode Overview (IPL v2.10) Configuration



B Firmware Upgrading

This appendix describes various methods for upgrading the printer's firmware and for switching from Intermec Fingerprint to IPL or vice versa.

Introduction

All EasyCoder PM4i printers can use both Fingerprint v8.xx and IPL v2.xx firmware. There are many ways to upgrade or exchange printer's firmware. Use the most convenient way. You can either do it from host by sending the file to the printer or by inserting a CompactFlash card in the memory card slot at the printer's rear plate. There are 3 different file types containing the firmware. The file types are related to the way of upgrade procedure. The files can be obtained from Intermec.

File Description

File name	Type of file
1-972020-xx.bin (for FP) 1-972105-xx.bin (for IPL)	These **.bin** files contain the firmware kernel file only. To be sent on serial port to printer using a communication program, for example HyperTerminal or Printset, or via FTP. Can also be stored on a CompactFlash card.
1-972021-xx.bin (for FP) 1-972106-xx.bin (for IPL)	These **.bin** files contain the firmware kernel file and the factory default setup parameter values. To be stored on a CompactFlash card. Note: These files remove all files except the firmware files, so it is advised to make a backup before running such a file. They are primarily intended to allow restoring forgotten passwords.

Another format is **.uff** files, which are created by, for instance, NetPrintSet. They contain the kernel and optional instructions (if necessary), images, fonts, etc. To be stored in CompactFlash memory cards.

General Principles

- During upgrading, do not switch off the printer. Wait and follow the prompts in the printer's display.
- If changing firmware from IPL to Fingerprint, we recommend to erase memory to factory setup setting [FORMAT "/c",A] after the upgrade procedure is completed.
- Some update of Fingerprint may show the error "mcs: Error during setup" at host terminal. This just means that there was an instruction that erased "/c" [FORMAT "/c",A]. This is a normal condition! The error shows that no setup file [.setup.saved] is detected on "/c". The "/rom" setup file is copied automatically into "/c" which gives printer a factory setup setting.
- If an EasyLAN interface board is installed, by default only admin is allowed to upgrade. See *EasyLAN User's Guide* for more information.

Upgrading From a Memory Card

This chapter describes how to upgrade the printer from a CompactFlash card.

1 Insert the card and switch on the printer. The printer's display will automatically show ongoing steps. The procedure ends with a normal startup of the printer.

2 Switch off the printer and remove the card. Printer is ready for use.

CompactFlash cards with firmware (Fingerprint or IPL) can be ordered from Intermec. Empty CompactFlash cards can be ordered from Intermec or procured locally.

If there are more than one firmware files on the memory card, it is not forseeable which one will be selected. However, by renaming the desired file to FIRMWARE.BIN, you can make sure that the file will be selected.

How to make an upgrading card

There are two possible places to program a CompactFlash card. One is your PC CompactFlash card slot, another is the printer's card slot.

At the PC-side

1 Use a computer fitted with a PCMCIA slot and a CompactFlash adapter and insert the CompactFlash card.

2 Copy the upgrade .bin or .uff file to the CompactFlash card.

At the printer side (Fingerprint only)

1 Insert the CompactFlash card in the slot at the printer's rear plate.

2 Start up the printer and select Intermec Shell.

3 Press <Enter> to go to the "Sel. Application" menu.

4 Press <⇒> repeatedly to browse to "SOFTWARE UPDATE".

5 Press <Enter> to go to "UPDATE: COMPACT FLASH?"

6 Press <Enter>.

7 Start sending the file using a communication program, for example HyperTerminal. The communication program must use zmodem. (There is a one-minute time-out on the printer side.) Shell will automatically rename the file to FIRMWARE.BIN to make sure that this file will upgrade the printer.

8 Switch off the printer and remove the card.

Note: A special case is if the CompactFlash card already has a Fingerprint firmware. Inserting such card will always install firmware in the printer according to CompactFlash card. However, perhaps you like to install a later firmware version picked from the web. If so, proceed like this:

1. Insert the CompactFlash card with a upgrade firmware on. Switch on and wait for a completed upgrade and the normal startup of the printer so you are in Fingerprint mode.
2. Activate the Shell program from "/rom" like this:
   ```
   LOAD "/rom/SHELLXP.PRG"
   MERGE "/rom/ERRHAND.PRG"
   RUN
   ```
3. In Shell, select the option “UPDATE: COMPACT FLASH?” and press <Enter>.
4. Send the .bin or .uff file from the host using zmodem.

Upgrading From the Host

Software Suggestions

1. Intermec PrintSet (IPL and Fingerprint)

Install Intermec Printset software and a serial cable. Intermec PrintSet is included in the printer companion CD. It can also be obtained from the Intermec Printer Support Web.

2. Terminal program (Fingerprint only)

Use Terminal program included in Windows (95/98/Me or NT/2000/XP) and a serial cable. At serial communication, the software has to be prepared by a protocol Zmodem and have same communication settings on both side. We recommend hardware handshaking (RTS/CTS).

3. Command prompt with FTP

Use command prompt in Windows Windows (95/98/Me or NT/2000/XP) and an Ethernet network.

4. Intermec NetPrintSet (Fingerprint only)

Use Intermec NetPrintSet software and a serial cable. Intermec NetPrintSet can be obtained from the Intermec Printer Support Web.

Cable Suggestions

RS-232 Serial Cable

DB-9pin female -> DB-9pin male (see *Spare Parts Catalog*)

Ethernet Cable

Intermec does not provide any Ethernet cable.The cables are normally provideed locally. At a straight connection between a host and printer, a cross RJ45 cable is needed.

Parallel Cable

(see *Spare Parts Catalog*)

How to use Intermec PrintSet and serial cable.

1. Connect a serial cable between host and printer
2. Start up the printer and select Fingerprint via Shell and to listen on serial port "uart1:" on for example baud rate 115,200.
3. Start PrintSet. The program will automatically set the communication parameters and is ready for use.
4. Select ”DataXfer\Change firmware”. Depending on settings, PrintSet may ask for the admin’s password.
5. Send one of the following files:
   1-972020-xx.bin (Fingerprint)
   1-972105-xx.bin (IPL)
6. After file is received in printer, it will automatically replace the firmware and boot up with the new one.
7. The printer’s display will automatically show ongoing steps. The procedure ends with a normal startup of the printer.

How to use MS HyperTerminal and a serial cable (Fingerprint only)

1. Connect a serial cable between host and printer.
2. Start the HyperTerminal or a similar terminal program. Select port com1. Use a high communication speed (115,200 baud).
3. Start up the printer and select Fingerprint via Intermec Shell[1] to listen on serial port "uart1:".
4. Make sure that your are in contact with printer by typing for example FONTS and the printer will respond showing fonts.
5. Type a download command[2] so printer is ready for receiving data:
   `RUN "dlk"`
   Select .bin upgrade file. Now printer waits for about 1 minute to get the file sent using zmodem as protocol.
6. Go to “Send file” and send it.
7. After file is received in printer, it will automatically replace the firmware and the printer will boot up with the new one.
8. The printer’s display will automatically show ongoing steps. The procedure ends with a normal startup of the printer.

[1]/. In Intermec Shell it is also possible to select printer to be in the receiving mode. Start up Intermec Shell and use <⇒> to browse to “Software Update\Update:Firmware”. (You have one minute to send the file.) Also check the printer’s baud rate in the Setup Mode. Continue with items 6-8. If the printer is fitted with an EasyLAN board, **user** must be allowed to upgrade.

[2]/. **dlk** only works if the current user is allowed to update. **RUN "su admin"** could be required.

How to use command prompt FTP and Ethernet

1. Connect a printer on Ethernet LAN or by a cross cable between host and printer
2. Open an FTP session to the printer typing this command from your Windows command prompt: **`FTP <`***ip address of the printer***`>`**
3. You will get a prompt asking you for User: type **`admin`** or **`user`**. You may get a prompt for a Password: type **`pass`** (default; case sensitive).

Note: The user you log in as must be allowed to upgrade.

4. After some answers on your screen you will see the prompt FTP>. At this point type **`bin`** + <Enter>, then type **`hash`** + <Enter>.
5. Now send the firmware to the printer with the command: **`put <filename.bin> FLASH`**
6. Some ###### will appear on your screen showing the ongoing transfer.
7. The printer's display will automatically show ongoing steps. The procedure ends with a normal startup of the printer.
8. Close FTP session typing **`bye`** + <Enter>.
9. After file is received in printer it will automatically replace the firmware and the printer will boot up with the new one. The printer's display will automatically show ongoing steps and the procedure ends with a normal startup of the printer.

How to use Intermec NetPrintSet and serial cable (Fingerprint only)

What is NetPrintSet

NetPrintSet is a printer configuration utility for Intermec printers that allows you to upgrade or configure the printer. Makes font upgrades and other maintenance a child's play. Available both as Netscape plugin and standalone executable.

- The Netprintset can merge printer's necessary file to one file either using a CompactFlash card or download direct to printer. Necessary files are for example Images, Fonts, Firmware, or other custom-made files.
- How to use? Please refer to the Help included in the software.

If upgrading directly via NetPrintSet and printer

1. Start up the printer and select Shell. Press <Enter> to go to the "SEL. APPLICATION" menu. Use <⇒> to browse to "SOFTWARE UPDATE". Press <Enter> to go to the "UPDATE: COMPACT FLASH?" menu. Use <⇒> to go to "UPDATE: FIRMWARE?". Finally, press <Enter>.

   User might not be allowed to update.
2. Start to send the file from the software. (There is a one-minute timeout before the printer exits the receive mode.)
3. After file is received in printer, it will automatically replace the firmware and the printer will boot up with the new one.

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EasyCoder PM4i—Service Manual

1-960588-02