

User's Manual Of PR9



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Safety Regulations

The printer **PR9** fulfill the safety regulations according to DIN EN 60950-1 for computer systems.

The mains cable must be connected to a ground protected wall-socket. The selected voltage of the printer needs to fit to the local voltage.

The power plug must be easily accessible at any time so that it can be disconnected immediately in case of danger or for maintenance purposes.

Comme le cable de secteur sert de dispositif d'arrêt-urgence, sa connexion à l'imprimante doit être tout le temps accessible.

Before installing the printer, check the surrounding conditions in which the printer will be placed (see next page, Operating Environment).

During a thunderstorm you should never attempt to connect or disconnect any data transfer cables.

The power supply should only be opened and checked by authorized personnel. Repairs and maintenance may only be attempted by authorized personnel as well. Repairs done inappropriately may cause damage and severe danger for the user.

General Installation Precautions

To ensure optimum printer functionality and to avoid making service calls for problems that are not directly caused by the product itself, bear in mind the information provided in the following sections.

Electrical Power Supply

Make sure that the electrical wall outlet to which the printer is connected has a valid ground and that it is able to supply the power needed by the machine. A wall outlet without ground can cause functional problems and can be a safety hazard.

Do not plug the printer to electrical wall outlets that are already being used by equipment that could cause electrical noise and excessive voltage fluctuations (fans and air conditioners, large photocopiers, lift motors, TV radio transmitters and signal generators, high frequency safety devices, and so on).

Common office equipment (calculating machines, typewriters, small photocopiers, terminals and personal computers) can share the same outlet as long as they do not cause excessive electrical noise.

Environmental Conditions

The environmental conditions in which the product can work properly referring to a normal air-conditioned office environment (environmental temperature of 15 up to 35 °C, relative humidity of between 15 and 85%).

During machine storage and operation, make sure that condensation does not form as the result of extreme environmental variations. Dust, dirt and smoke can cause the parts in motion to wear excessively, short circuits (in the presence of a high degree of humidity). High temperatures and low humidity can cause problems due to static electricity.

Locating the Machine

- The printer must be installed on a flat, vibration free surface.
- Do not position the machine near air conditioning systems, heat sources or in direct sunlight.
- Do not obstruct the printer's ventilation slots.
- If the printer is installed in a cabinet, make sure that it has good ventilation so as to avoid overheating.
- Install the printer in a position so that paper jams can be cleared easily.

Work Environment

An environment that is too cold, hot or humid could be the cause of certain malfunctions. The machine must not be positioned near air conditioning system vents or exposed to direct sun light. Make sure that the machine's internal ventilation slots are not blocked, especially if the printer is installed in furniture.

Printer Operating Condition

Check that the internal parts of the machine have no dirt deposited or residue of paper or ink that could interfere with the performance of the printer's different components. Make sure there is no internal damage caused by the insertion of documents with metal clips, staples, pins or similar. Ensure that the parts specified are correctly lubricated.

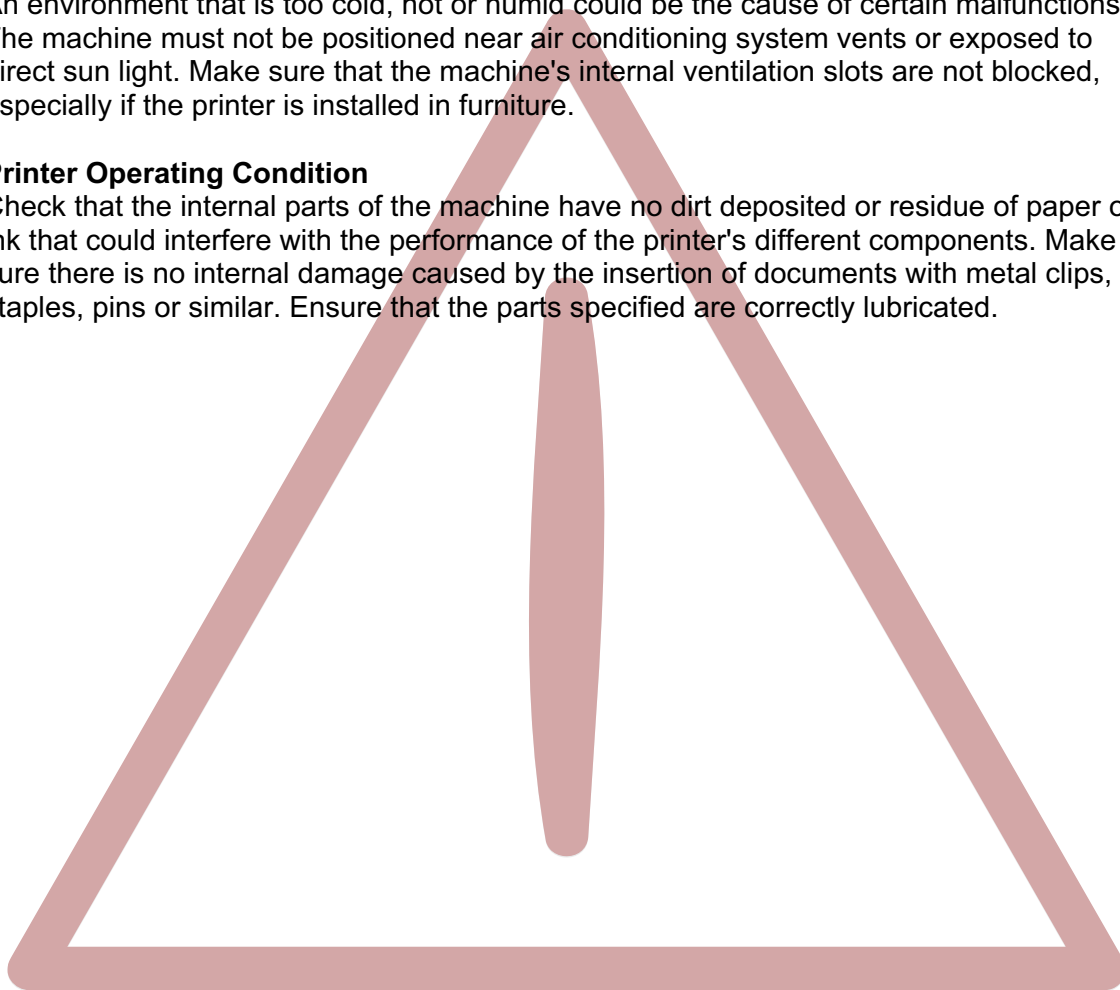


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Preface

About this Manual

This manual covers the printer in combination with an interface module.

The interface is an integral part of the printer, and the type of interface used significantly influences the behaviour or operation of the printer.

The structure of this manual is such that the operator is led step-by-step through the various procedures. It starts with the unpacking and setting-up, moves on to detailed instructions for operating the printer and ends with the mounting of options.

The manual is divided into the following chapters:

1. Getting Started

This chapter covers the unpacking and setting-up of the printer and the installation of the ribbon cassette. By the end of this chapter the printer should be fully functional and tested in its primary form. It is not yet connected to the host computer system and no options are mounted.

2. Operating the Printer

This chapter discusses in great detail the operation of the operator panel, all menu functions, and the general operation of the menu.

3. Configuring the Printer

This chapter explains how to configure the printer so that it can communicate with the corresponding system environment. Then this chapter thoroughly describes the printer's operating controls. In the last part you will find tables with the possible values of the menu items.

In this chapter you will also find a detail explanations of individual menu items.

4. Maintenance

This chapter shows how to clean the printer and how to remove the Alignment Unit.

5. Options

This is a description of the available options, the Tractor Unit and the USB Port.

6. Technical Data

All technical details or data about the printer can be found here.

7. Interface Description

This chapter gives hints about possibilities to connect the printer to the various computer systems and explains particularities depending on the version of the operating system. Additionally, cable connection is illustrated.

8. Firmware Update

You will be advised to update the printer's firmware irregularly to strengthen PR 9's functions.

9. Trouble Shooting and Diagnostics

Suggests how to identify and correct simple problems.

Appendix

A. Character Set Table

All printer supported character sets are listed in this chapter.

B. Oki Emulation Commands

Quick reference for Oki Printer Emulation.

C. IBM ProPrinter Emulation Commands

Quick reference for IBM ProPrinter X24 and IBM ProPrinter II Emulation.

D. EPSON LQ Emulation Commands

Quick reference for EPSOM LQ Emulation.

E. OLIVETTI Emulation Commands

Quick reference for Olivetti Emulation.

Conventions Used in this Guide

The following conventions are used:

Bold	Headlines and important information.
Note:	Contains special advice to facilitate handling.
Caution:	Contains important information to prevent damage of the equipment.
[STOP ■]	Key functions are always depicted in brackets.

Abbreviations and Acronyms

DRAFT	D raft Q uality
HSD	H igh S peed D raft
LCD	L iquid C rystal D isplay
LED	L ight E mitting D iode
LQ	L etter Q uality
MACRO	User defined group (1 up to 3) of stored parameter
NLQ	N ear L etter Q uality
PH	P rint H ead

1. Getting Started

1.1 Unpacking

Check each item against the check list detailed below. Contact your supplier immediately

if any item is missing or damaged.

1.1.1 Delivery Contents Printer PR 9

Check each item against the check list detailed below. Contact your supplier immediately

if any item is missing or damaged.

- Printer **PR 9** (1)
- Power Cord (2)
- PR 9 Cartridge (Ribbon Cassette) (3)
- Printout of the default menu configuration (4)
- CD-ROM of the User's Manual (5)



1.2 Requirements to the location of the printer

Environmental Conditions

This printer is designed to be installed in a typical office environment. We claim that customer must follow these operation explanation as below for printer's well working status and safety of operator:

- Install the printer in an area away from any heat source, air conditioner, or strong airflow.
- Avoid installing the printer where it is exposed to moisture or heat (eg. direct sunlight).
- Avoid installing the printer in a dusty or humid environment.
- Do not put printer to the high temperature, shake or wet environment. And no exposure to direct sunlight. For example boiler, humidifier or fridge.
- Position the Printer on a stable level surface.

Preconditions for Installation

- Place the printer on the stand or a table.
- When processing fanfold paper always place the printer with its front edge slightly off the edge of the table.

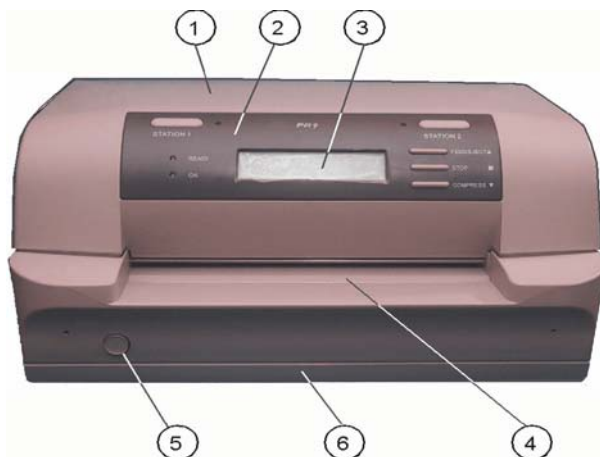
Power Requirements

- No special wiring is required. A typical office wall outlet is sufficient. Make sure that the electrical wall outlet to which the printer is connected has a valid ground and that it is able to supply the power needed by the machine.
- Do not plug into the same wall outlet other equipment besides the printer such as coffee machines, copy machines, or air conditioners.

1.3 A First Look at the Printer

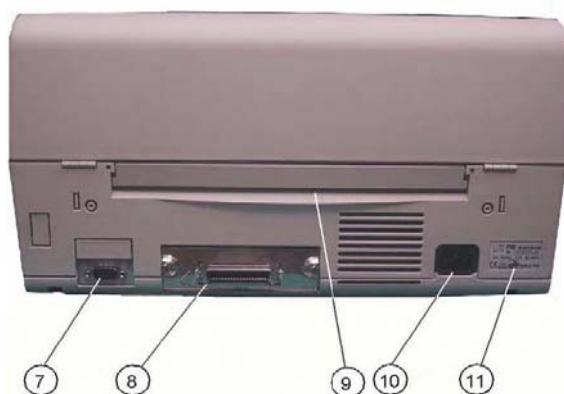
1.3.1 Front View

- Top Cover (1)
- Operator Panel (2)
- Display (3)
- Front Paper Feeding Platform (4)
- Power Switch (5)
- Bottom Frame (6)



1.3.2 Rear View

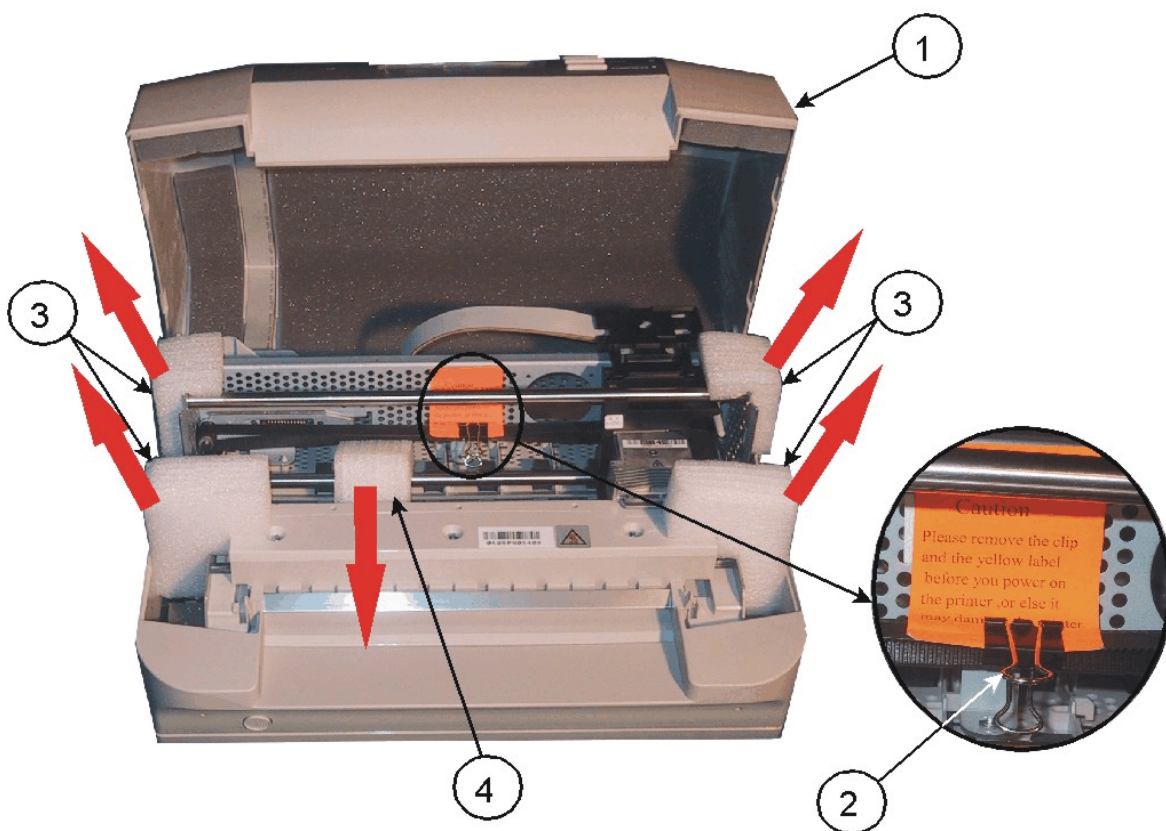
- Serial Interface Connector (7)
- Option Interface Board Slot (8) for detail see chapter 5 **Options**
- Rear Paper Feeding Path (9)
- Power Cord Socket (10)
- Electrical Label (11)



1.4 Remove Transport Lock

Note: Please do not connect the printer's power cord at this moment, otherwise the printer may be damaged permanently.

- Open the top cover (1) first.
- Remove the black iron clip (2) and yellow label, from the print head carriage.
- Take out the four foam-rubber cushions (3) which on the both sides of carriage.
- Remove the foam-rubber cushions (4) to the front by lifting up.



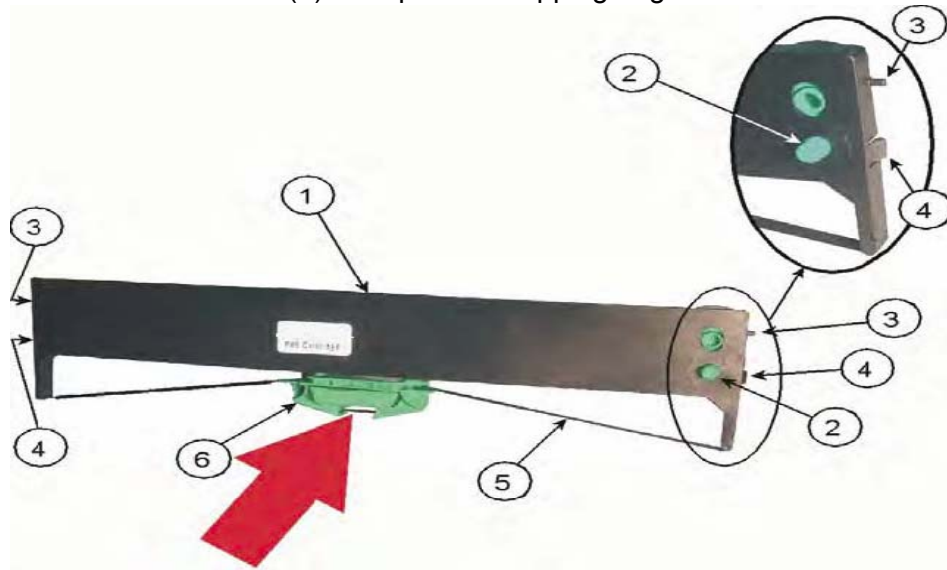
Re-packing Information

To ensure maximum protection when transporting the printer, always:

- Remove the mains cable.
- Remove the ribbon cassette.
- Reposition the transport lock.
- Pack the printer in its original packing material and ship in its original package.

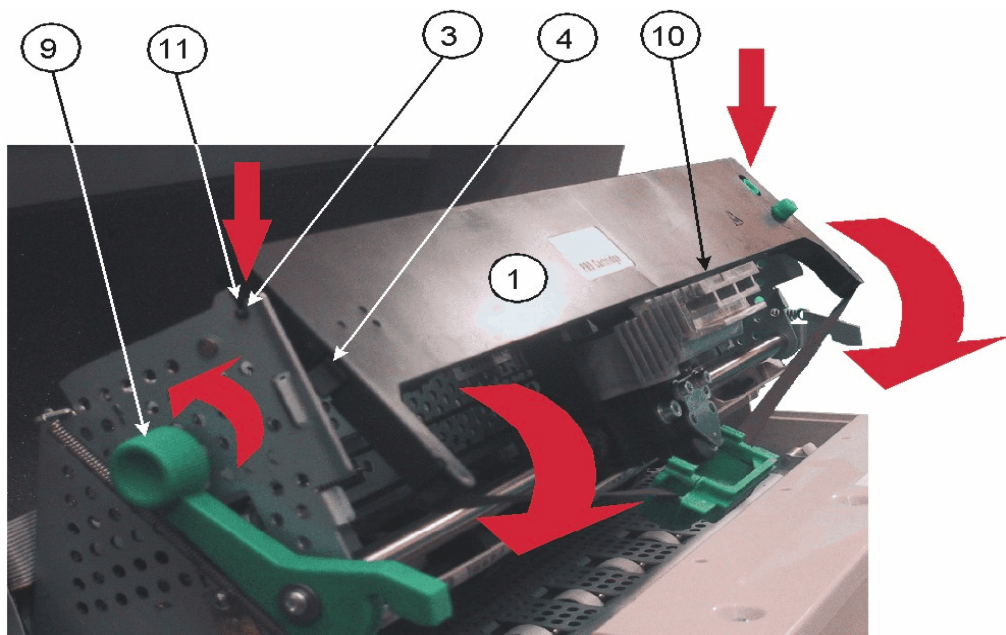
1.5 Ribbon Installation

- Take out the ribbon Cassette (1) from plastic wrapping bag.



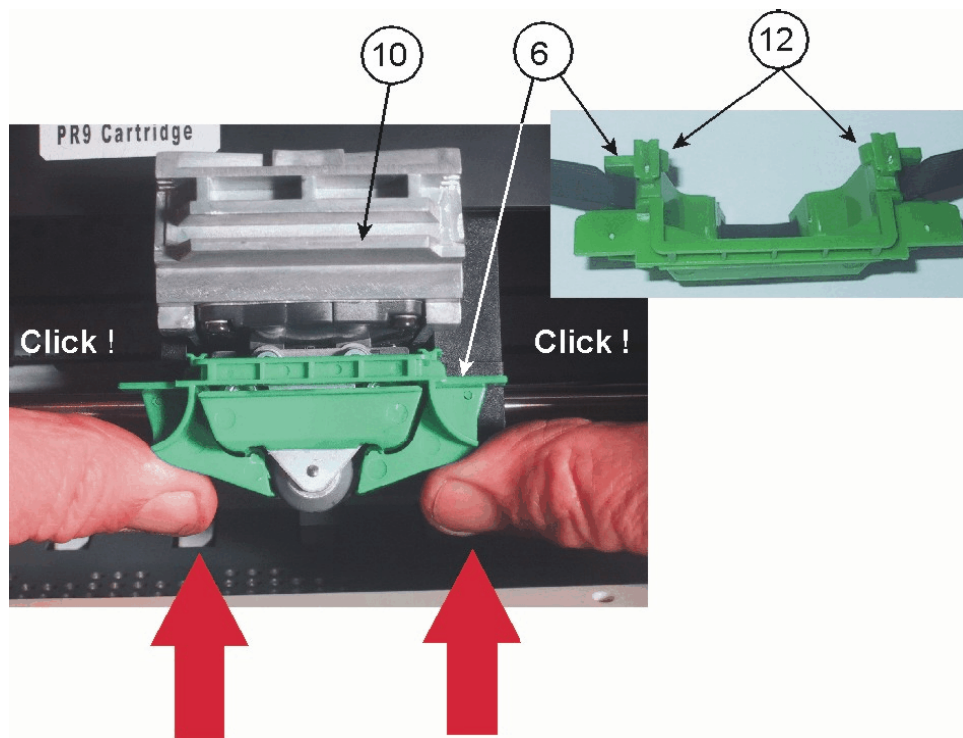
Installing:

- Power the printer on.
- Remove the Ribbon Guide (6) by sliding down from the Ribbon Cassette (1).
- Open top cover.

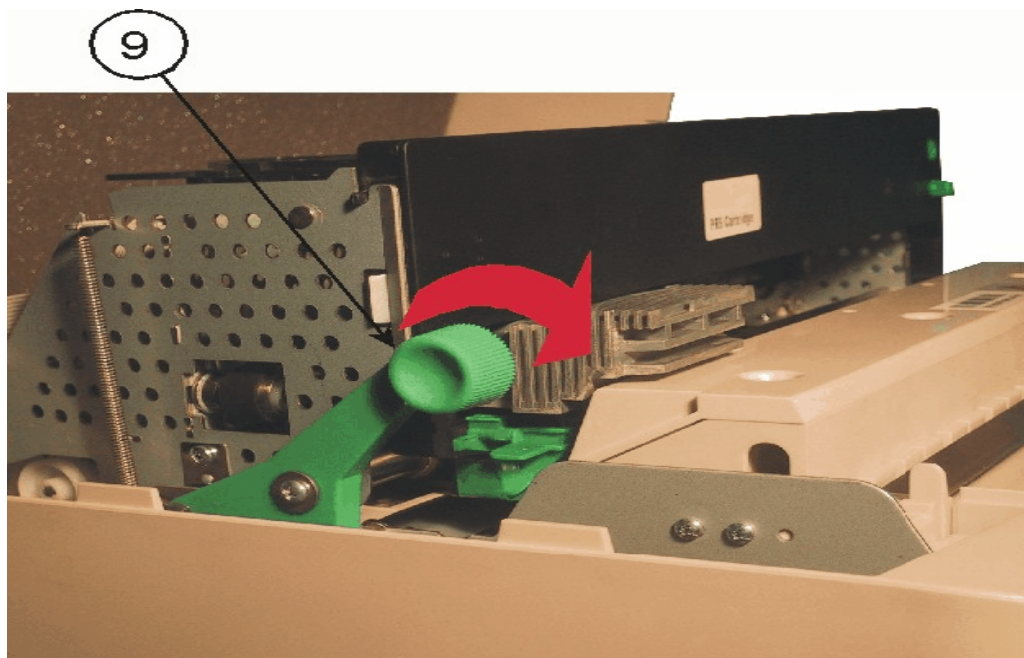


- Swivel the green print unit lift handle (9) backwards to lift the print unit entirely.
- Move print head (10) to the centre.
- Insert the fixation pins (3) at the both ends of ribbon cassette (1) into the slots (11) at both ends of print unit frame.
- Try to push ribbon cassette (1) by rotation as shown in the picture above.
- Press the ribbon cassette fixation block (4) into both ends slot of print unit until you hear a **"CLICK"**.

Getting Started



- Insert ribbon guide (6) into print head (10) and press it up to make sure that the two tabs (12) on the ribbon guide (6) have been fixed.
- Move the print head (10) to the right and left side until the ribbon is tight.



- Swivel the green print unit lift handle (9) to let print unit back to its normal Position.
- Close top cover.

1.6 Mains Connection and Power On

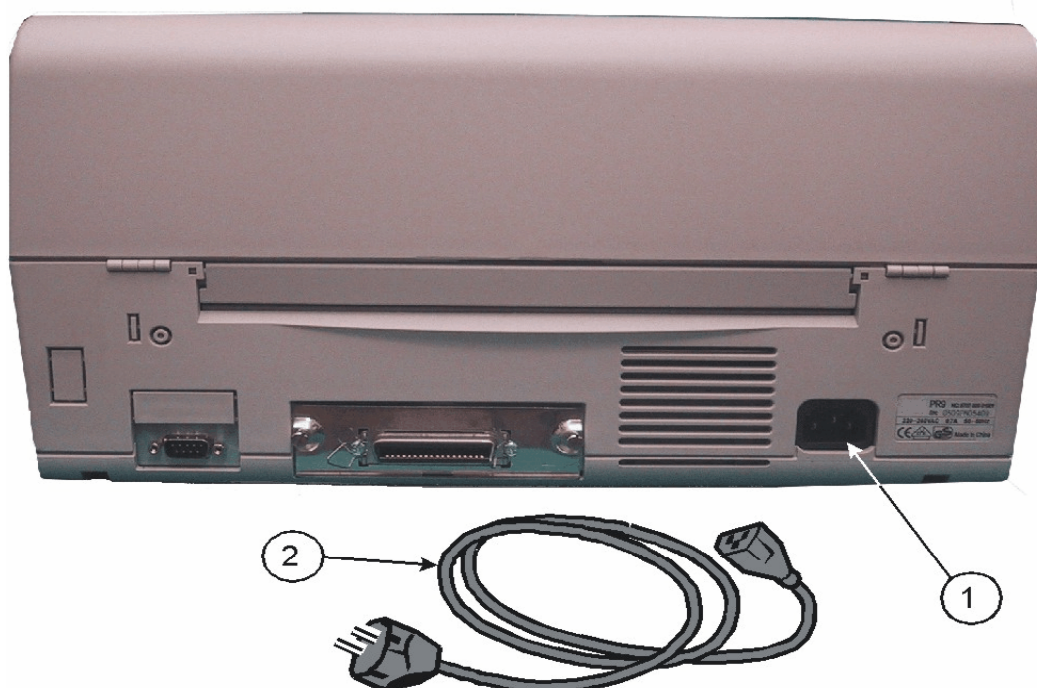
WARNING: Before plug the power cord into the electrical wall outlet and power on the printer, voltage rating indicated on the electrical data plate must be checked to correspond to the local mains.

Note: Power switch (3) must be in off position.



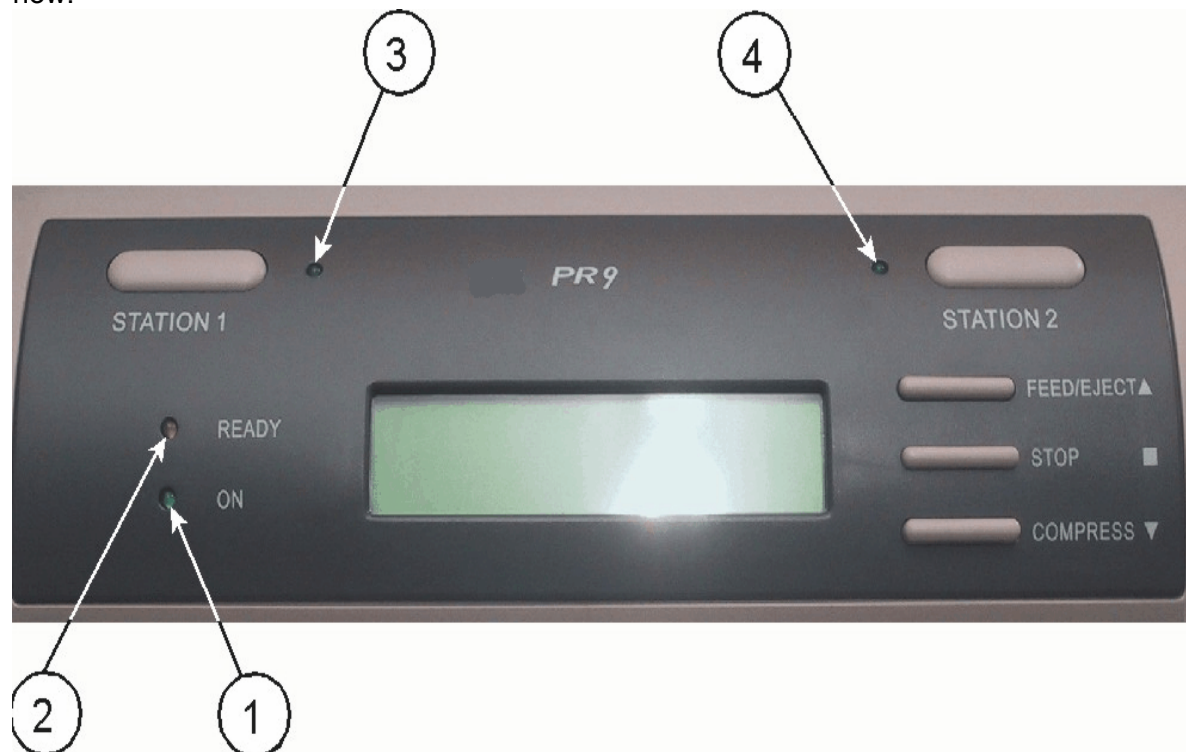
OFF POSITION

- Connect the printer to the mains using the power cord (2).
- First connect the cable to the power cord socket (1) and then to the mains.
- Do not plug into the same wall outlet other equipment besides the printer such as coffee machines, copy machines, or air conditioners.



Getting Started

The operator can press down front power switch (3 in figure before) to power on printer now.



After power on:

- The **ON** (1) indicator will be light up
- After a short delay the **READY** (2), **STATION 1** (3), and **STATION 2** (4) indicator will be all lighted.
- Several seconds later the print head start initialization action. You hear a sound of the movement.
- Only **ON** indicator will be light after initialization has been finished.

Note: Any printing medium in the printer paper path will be ejected.

The display shows the message: **PR9 SERIAL1 OLIVETTI ***)

ON-LINE

*) The emulation (hear OLIVETTI) is dependent on your order.

1.7 Print Test

1.7.1 Selftest

The following steps show which keys to use to start a test printout.

KEY / or action	DISPLAY
[STATION 2] and [COMPRESS ▼] (synchronously)	OFF-LINE MODE MENU SETUP
[COMPRESS ▼]	OFF-LINE MODE MENU PRINTING
[STOP ■]	MENU PRINTING INSERT A4 SHEET
After feeding an A4 paper the printer will start process automatically if the operator put the print medium into the paper feeding path. The user needn't align the print medium with the left or right border of the printer. The printer itself will look after the alignment.	MENU PRINTING PRINTING; WAITING...
If printing finished, printer will eject paper.	MENU PRINTING PRINTING; WAITING...
[STATION 2]	MENU PRINTING FINISH; PRESS STAT2
[STATION 2]	OFF-LINE MODE MENU PRINTING
[STATION 2] and [COMPRESS ▼] (synchronously)	PR9 SERIAL1 OLIVETTI ON-LINE

Note: A sample of the Menu Printing you will find on the next page.

1.7.2 Selftest Printing Contents

For different menu setup configuration, there will be different printed out selftest printing contents. Concerning your printer's menu configuration please refer to printer packing enclosed sheet.

PR9/K10-P VER1.09 T2 FPGA. 1.3 CCG. GB18030 CG. 002

PRINTER ID: 00000690257301



NEEDLES TEST:

```

1 2 3 4 5 6 7 8 9 0 1 1 1 1 1 1 1 1 1 2 2 2 2 2 0 E
                      1 1 1 1 1 1 1 1 1 2 2 2 2 2 0 E
1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 D V

```

CURRENT USER: MACR01

	MACR01*	MACR02	MACR03
CONFIGURE			
INTERFACE:	CX	DUAL INTERFACE	DUAL INTERFACE
RS1 EMULATION:	----	OLIVETTI	OLIVETTI
BAUD RATE(RS1):	----	9600	9600
BITS/CHARACTER(RS1):	----	8	8
PARITY(RS1):	----	NONE	NONE
STOP BITS(RS1):	----	1	1
DSR(RS1):	----	NO	NO
CX EMULATION:	IBM	OKI	OKI
CX STROBE EDGE:	RISING EDGE	RISING EDGE	RISING EDGE
CHINESE CODE STD:	GB18030	GB18030	GB18030
DRAFT SPEED:	NORMAL	NORMAL	NORMAL
LQ TYPE:	LQ2	NLQ1	NLQ1
NEEDLES SWITCH:	YES	YES	YES
SPECIAL FORMS:	NO	NO	NO
BIM DIRECTION:	UNIDIRECTION	UNIDIRECTION	UNIDIRECTION
NEEDLE COMPENSATION:	NO	NO	NO
PNS #2000K:	SINGLE SHEET	SINGLE SHEET	SINGLE SHEET
PNS #2001K:	400	400	400
PNS #2002K:	NO	NO	NO
PNS #2003K:	NO	NO	NO
PNS #2004K:	205mm	205mm	205mm
IBM CONFIGURE			
EMULATION:	IBM X24		
AGM:	YES		
PRINTING MODE:	LATIN		
HIGH SPEED PRINTING:	YES		
CPI:	12		
LPI:	6		
CHARACTER DEFINITION:	DRAFT		
LF+CR:	YES		
CR+LF:	NO		
LEFT MARG.(1/60"):	0		
TOP MARG.(1/60"):	0		
IBM CHARACTER SET:	PC		
PC CHARACTER SET:	437 (INT)		
PC TABLE:	TABLE 2		
BOF IBM-PP LIKE:	YES		
TOF IBM-PP LIKE:	YES		
ZERO SLASH:	NO		
LINE LENGTH:	94		
INSERT MODE:	DIRECT		
PAGE LENGTH:	12		
RESET WHEN EJECT:	NO		
COMPRESS:	17.1		

1.7.3 Dr. Grauert (print a letter)

The following steps show which keys to use to start a test printout.

KEY / or action	DISPLAY
[STATION 2] and [COMPRESS ▼] (synchronously)	OFF-LINE MODE MENU SETUP
[COMPRESS ▼]	OFF-LINE MODE MENU PRINTING
[COMPRESS ▼]	OFF-LINE MODE PRINTING TEST
[STOP ■]	PRINTING TEST USER'S GUIDE
[COMPRESS ▼] up to the message ⇒	PRINTING TEST Dr. Grauert
[STOP ■]	Dr. Grauert INSERT A4 SHEET
After feeding an A4 paper the printer processes the printing.	PRINTING TEST PRINTING; WAITING...
If printing finished, printer will eject paper.	PRINTING TEST FINISH, PRESS STAT2
[STATION 2]	PRINTING TEST Dr. Grauert
[STATION 2] and [COMPRESS ▼] (synchronously)	PR9 SERIAL1 OLIVETTI ON-LINE

```

Eilzustellung

Norddeutsche Farbwerke KG
Herrn Dr. Grauert
Große Elbstraße 64
2000 Hamburg 4

Org. III 5/37      H-A      4 34      22.04.75
17.04.75      Volkmann

Vordruckgestaltung für den allgemeinen Schrift-
verkehr, für das Bestell- und Rechnungswesen      E i l t

Sehr geehrter Herr Dr. Grauert,

Sie können das Schreiben der Briefe, Bestellungen, Rechnungen usw.
sowie das Bearbeiten des Schriftguts rationalisieren, wenn die
Vordrucke Ihres Unternehmens den folgenden Normen entsprechen:

DIN 676 Geschäftsbrief; Vordrucke A4
DIN 677 -; Vordruck A5
DIN 679 Geschäftspostkarte; Vordrucke A6

DIN 4991 Vordrucke im Lieferantenverkehr; Rechnung
DIN 4992 -; Bestellung (Auftrag)
DIN 4993 -; Bestellungsannahme (Auftragsbestätigung)
DIN 4994 -; Lieferschein/Lieferanzeige
DIN 4998 Entwurfsblätter für Vordrucke

Diese Normen enthalten alle Einzelheiten für den sinnvollen und
zweckmäßigen Aufdruck. Wenn dazu bei der Beschriftung genormter
Vordrucke DIN 5008 'Regel für Maschinenschriften' beachtet wird,
entstehen übersichtliche und werbewirksame Schriftstücke.

Die beigefügten 6 Mustervordrucke zeigen, daß das Beachten der
Normen die künstlerische und werbewirksame Gestaltung der Vor-
drucke nicht ausschließt.

Da wir uns auf die Herstellung genormter Vordrucke spezialisiert
haben, können wir besonders billig liefern. Eine Prob Bestellung
wird Sie und Ihre Geschäftsfreunde von den Vorteilen überzeugen.

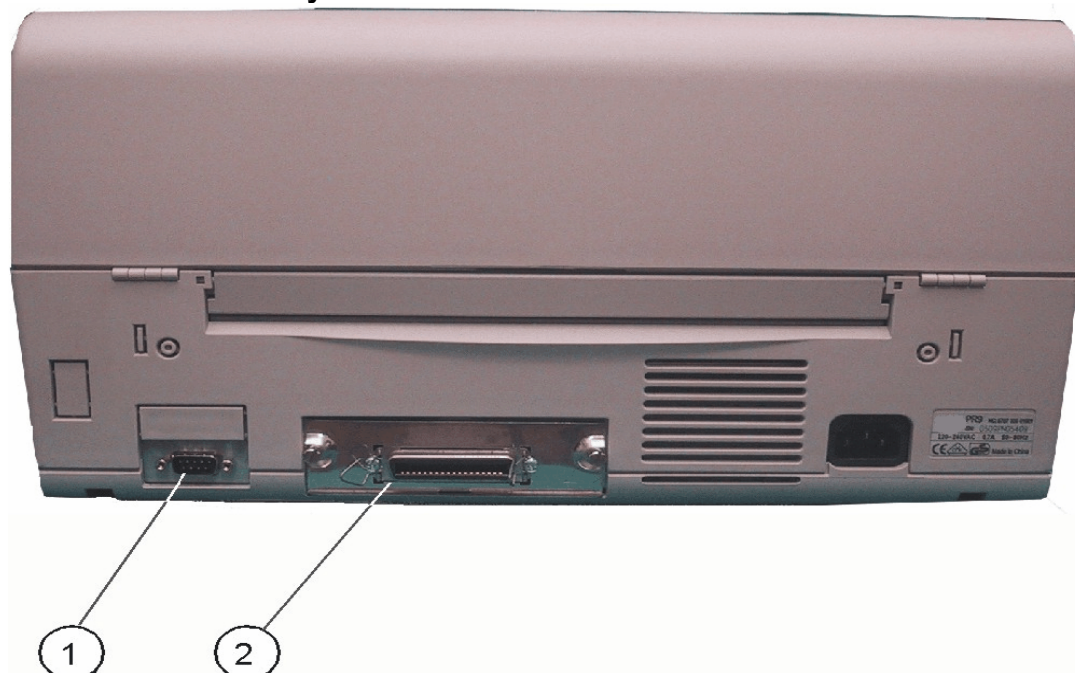
Mit bester Empfehlung

NORAG
Druckerei und Verlagshaus KG

Herrmann
Anlagen
6 Mustervordrucke

```

1.8 Connection to the System



1.8.1 Serial/Parallel Interface

- Switch the printer and the computer **OFF**.
- Connect the interface cable coming from the computer to the printer's standard RS232 C serial (1) port or to the optional Centronics Parallel (2) port.

The following values are default settings, see chapter **1.7.2 Selftest Printing Contents**.

- Interface Dual Interface
- Baud-Rate (RS1) 9600 BPS
- Bits/Characters (RS1) 8 bit
- Parity (RS1) None
- Stop Bits (RS1) 1
- ≤ DSR (RS1) No

After powering the printer ON both interfaces, serial and parallel, are available for data transfer due to the shared mode. The port to which data is sent becomes active automatically.

For detail information to the ports see Chapter **7 Interface Description**.

1.9 Installing the Printer Drivers

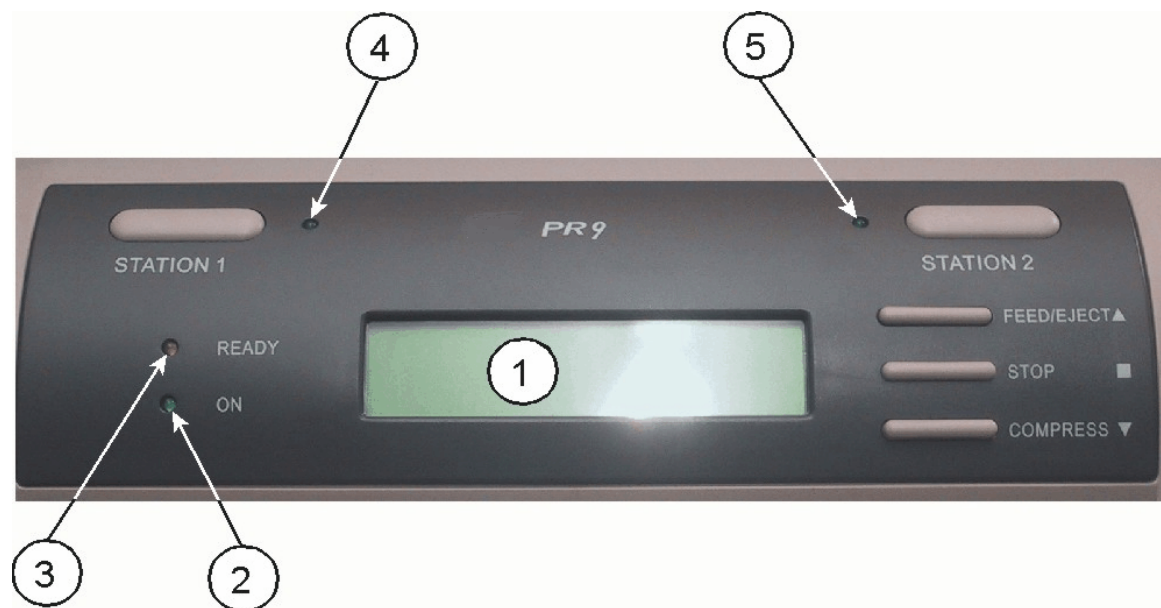
- You will find the printer drivers on the CD-ROM.

2. Printer Operation

2.1 Operator Panel

The Operator Panel

- controls the set-up for communication with the host computer;
- controls various parameter settings;
- allows manual control of the paper handling;
- gives information about the printer's status.



1 Two lines **L**iquid **C**ystal **D**isplay (LCD) Display

The LCD Display (1) indicates the current status of the Printer. If any error occurs (e.g. **PLEASE CLOSE COVER**) the corresponding error message will be displayed. The green

LED (2) lights only if the Printer is powered on and in the **On-line Mode**.

Light **E**mitting **D**iode (LED)

2 Online LED

3 Ready LED (flashing if receiving data)

4 Station 1 LED (user 1 active; only lighting up if a second serial Interface is installed and a special software is working)

5 Station 2 LED (user 2 active; only lighting up if a second serial Interface is installed and a special software is working)

2.2 Function Keys

The five function keys operate differently in the on line or off line mode. Please refer to the following table for details when pressing the function keys.

If the Printer is powered on, the display shows in line two **ON-LINE** and the green LED (2) lights. The Printer is in the **On-line Mode** and ready to receive and print data.

On-line Mode / Off-line Mode

In this mode only the **[STOP ■]** key is active and the green LED (2) lights. By pressing the key the Printer changes into the **Off-line Mode** or back into the **On-line Mode**.

Menu-Mode

To set the Printer into the **Menu-Mode**, press the **[STATION 2]** and **[COMPRESS ▼]** together. Depending on the state of the Printer the four right hand keys have multiple functions. For further information see paragraph **2.5 Menu-Mode**.

Function Key	On-line	Off-line	Menu-Mode
[STATION 1]	<ul style="list-style-type: none"> – assign Printer to user 1 (only active if a second serial Interface is installed and with OLIVETTI emulation) 		
[STATION 2] Menu-Mode = SKIP	<ul style="list-style-type: none"> – assign Printer to user 2 (only active if a second serial Interface is installed and with OLIVETTI emulation) – hold down the key during power on, after the Printer resets, insert A4 sheet, the Printer will print current menu parameters – press together with [COMPRESS ▼] to change into Menu-Mode 		<ul style="list-style-type: none"> – press together with [COMPRESS ▼] to change from the Menu-Mode into the On-line Mode – go back to the next higher Menu level if there is one, or leave the Menu mode without saving
[FEED/EJECT ▲] Menu-Mode = UP or LEFT depending on the actual menu level	<ul style="list-style-type: none"> – Feed or eject paper depending on the printing process 		<ul style="list-style-type: none"> – select in the Menu-Mode the previous item in the highest menu level – go up to the next item in a selected group

Function Key	On-line	Off-line	Menu-Mode
[STOP ■] Menu-Mode = ACCEPT	<ul style="list-style-type: none"> – stop printing and change to Off-line Mode 	<ul style="list-style-type: none"> – change to On-line Mode and continue printing 	<ul style="list-style-type: none"> – O.k. or confirm the actual item
[COMPRESS ▼] Menu-Mode = DOWN or RIGHT depending on the actual menu level	<ul style="list-style-type: none"> – activates or cancels compression printing 		<ul style="list-style-type: none"> – select the following item in the highest menu level – go down to the next item in a selected group
[STATION 2] together with [COMPRESS ▼]	<ul style="list-style-type: none"> – change into the Menu-Mode 		<ul style="list-style-type: none"> – go back into the On-line Mode
[STATION 2] together with [STOP ■]	<ul style="list-style-type: none"> – in “Data backup” mode of HEX PRINTING, the Printer will save the 8K data which it received lately in flash memory 		
[FEED/EJECT ▲] together with [COMPRESS ▼]	<ul style="list-style-type: none"> – in “Data backup” mode of HEX PRINTING, the Printer will clear all received data which it backs up. 		

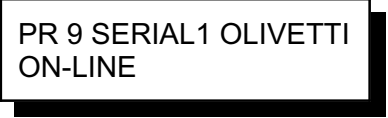
2.3 Liquid Crystal Display (LCD)

The LCD indicator gives information about the status of the Printer. In general it can be distinguished between:

- ONLINE messages
- OFFLINE messages
- Menu Information

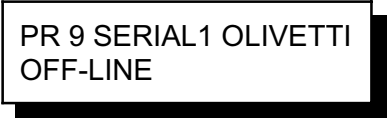
The LCD has two lines with 20 characters per line. After power on the display shows for example:

- in the upper line: the head line with the Printer name, the actual Interface, and the Emulation
- in the second line: the status.



PR 9 SERIAL1 OLIVETTI
ON-LINE

After pressing the **[STOP ■]** key you get the **OFF-LINE** message.



PR 9 SERIAL1 OLIVETTI
OFF-LINE

After entering the **MENU MODE** by pressing the **[STATION 2]** and **[COMPRESS ▼]** keys together the Printer displays:



OFF-LINE MODE
MENU SETUP

You can enter the Menu Mode from the **On-line** or **Off-line Mode**.

In this state it is possible to use all four keys at the right hand side of the Operator Panel in the way as described in the table in paragraph **2.2 Function Keys**.

2.4 Load Print Medium

The Printer can deal with single sheet, cheque, multi copy carbon paper, passbook and credit card. The Printer will start inserting the sheet automatically when the operator puts the print medium into paper feeding path. Users needn't bother aligning the print medium with the left or right border of the Printer. The Printer itself aligns automatically.

Note: As soon as the auto alignment process starts after you put in a medium, please release the medium.

Note: To avoid both poorer printing quality and jam when using a passbook, please make sure there is no curl or tear on the passbook. In addition, when printing a new passbook, please fold it toward the opposite direction to flatten it before inserting it into the Printer.

2.5 Menu Mode

All selectable features are accessible via the operator panel and combined in the Printer MENU.

This feature provides:

- easy configuration (language, etc.)
- quick parameter changes
- activation of test functions

There are six entry points in the highest level:

- MENU SETUP Set up the Menu parameters for various modules (common configuration and different emulation) and the important Save function is included.
- MENU PRINTING Printout of the Menu which is in use.
- PRINTING TEST A printout of the user's guide, the ASCII character sets, Chinese character set, and character attributes is possible.
- ADJUSTMENT Include printing the current settings of the photoelectric sensor, re-setting up the photoelectric sensor and printing the new settings, setting up the left margin, setting up the top margin, alignment adjusting for bi-direction print, and run-in printing etc.
- DEBUG TEST A Hexdump-function is available and a soft test for reading a magnetic stripe.
- INFO INQUIRY Inquire current parameters settings of both software and hardware, including the version (version number, nonstandard issue tag, special simulation etc.), a hardware configuration (characters generators, optional interface connections, a scanner, the sprocket), PCB ID, firmware check sum etc.

2.5.1 To Confirm a Macro Selection and Save the Settings

- Press **[STOP ■]** key; the confirmed value will now be shown in the head line.



MENU SETUP
SELECT CURRENT MACRO

- Press **[STOP ■]** key again.



SELECT CURRENT MACRO
MACRO1

- Now it is possible to scroll up or down with the **[FEED/EJECT ▲]** or **[COMPRESS ▼]** key.
- Save the selected item immediately by pressing the **[STOP ■]** key again.
- The display shows:



SELECT CURRENT MACRO
SAVING, PLEASE WAIT

- After the saving procedure the Printer changed to the On-line Mode.

2.6 The PR 9 Emulations

The printer PR 9 will be delivered with four different Emulations

- **OKI Emulation**
- **EPSON LQ-1600k Emulation**
- **IBM ProPrinter X24 Emulation**
- **P.P.II Emulation**

Note: Depending on the selected Emulation you must also select the corresponding Printer Driver.

3. Configuring the Printer

Main Functions and Entry Points into the Menu

The following Main Functions are available:

- **Menu Setup**
With this function you are able to modify the parameters of the printer configuration.
For a detail information look at paragraph **3.4**.
- **Menu Printing**
Printout of the Printer ID, a Needle Test and the parameter setting of the three Macros.
For a detail information look at paragraph **3.2**.
- **Printing Test**
The printing of User's Guide, ASCII character set, Chinese character set, character attributes, Dr. Grauert (print a letter). For a detail information look at paragraph **3.5**.
- **Adjustment**
Printing current photosensor parameters, reset photosensor parameters and printing; adjust left margin, top margin and bi-direction printing, run-in printing, inquire photosensor value, reset hardware parameters. For a detail information look at paragraph **3.6**.
- **Debug / Test**
Hex printing (include: data backup, printing backup data, directly dump), magnetic stripe operation (include read and write). For a detail information look at paragraph **3.7**.
- **Info Inquiring**
Inquiry the current setting parameters of software or hardware, including a version (version number, special version tag, special emulation, FPGA Version, etc.), hardware configuration (character's generators, optional interface, scanner, sprockets), printer ID. For a detail information look at paragraph **3.8**.

3.1 What is Configuration?

This chapter describes how to use the operator panel and menu settings to set up or configure your printer, so that the printer and your computer system can communicate correctly with each other.

Communication between the two requires that both, the computer operating system and the printer have the same communication settings or features. The most important of those are:

- bit/character,
- baud rate,
- parity,
- stop bits,
- DSR.

You may also need to change some of the printer's other features depending on your hardware and application requirements, for example:

- special forms
- paper handling.

The MENU mode allows you to access the configuration memory. All settings of the printer are stored in this memory and can be printed. The possible settings are described in detail on the following pages. A detail description of all Menu settings you will find in paragraph **3.4 Menu Setup Description**.

The standard parameter setting can be printed by using the function **PRINT MENU**. The following steps show which keys to use to start this printout.

KEY / or action	2 Line DISPLAY
[STATION 2] and [COMPRESS ▼] (synchronously)	OFF-LINE MODE MENU SETUP
[COMPRESS ▼]	OFF-LINE MODE MENU PRINTING
[STOP ■]	MENU PRINTING INSERT A4 SHEET
Insert the paper	MENU PRINTING PRINTING; WAITING...
[STATION 2]	MENU PRINTING FINISH; PRESS STAT2
[STATION 2]	OFF-LINE MODE MENU PRINTING
[STATION 2] and [COMPRESS ▼] (synchronously)	PR9 SERIAL1 OLIVETTI ON-LINE

3.2 Standard Configuration

The standard configuration (factory setting) is reflected in the following printout.

PR9/K10-P VER2.09 T7 FPGA. 2.4 CCG. GB18030 CG. 003

PRINTER ID: 00000AECE8AD01



NEEDLES TEST:

[illegible]

CURRENT USER: MACRO01

CONFIGURE	MACRO1*	MACRO2	MACRO3
INTERFACE:	DUAL INTERFACE	DUAL INTERFACE	DUAL INTERFACE
RS1 EMULATION:	OLIVETTI	OLIVETTI	OLIVETTI
BAUD RATE (RS1):	9600	9600	9600
BIT/CHARACTER(RS1):	8	8	8
PARITY (RS1):	NONE	NONE	NONE
STOP BITS (RS1):	1	1	1
DSR (RS1):	NO	NO	NO
CX EMULATION:	IBM	OKI	OKI
CX STROBE EDGE:	RISING EDGE	RISING EDGE	RISING EDGE
CHINESE CODE STD:	GB18030	GB18030	GB18030
DRAFT SPEED:	NORMAL	NORMAL	NORMAL
LQ TYPE:	NLQ1	NLQ1	NLQ1
NEEDLES SWITCH:	YES	YES	YES
SPECIAL FORMS:	NO	NO	NO
BIM DIRECTION:	UNIDIRECTION	UNIDIRECTION	UNIDIRECTION
NEEDLE COMPENSATION:	NO	NO	NO
PMS #2000K:	SINGLE SHEET	SINGLE SHEET	SINGLE SHEET
PMS #2001K:	400	400	400
PMS #2002K:	NO	NO	NO
PMS #2003K:	NO	NO	NO
PMS #2004K:	205mm	205mm	205mm
PMS #2005K:	ERROR	IGNORED	IGNORED

```

OLIVETTI CONFIGURE
EMULATION:  PR9 PR9 PR9
TOF PR40 LIKE:  NO NO NO
PRINTING MODE: CHINESE          UNICODE          UNICODE
ASCII CHARACTER SET:  OPTION 1  OPTION 1  OPTION 1
HIGH SPEED PRINTING: NO  YES YES
CPI: 12  12  12
LPI: 6    6    6
CHARACTER DEFINITION:  LQ  LQ  LQ
LF+CR  NO NO NO
LEFT MARG.(1/60):  0    0    0
TOP MARG.(1/60):  0    0    0
CHARACTER SET:  OLIVETTI  OLIVETTI  OLIVETTI
OLI CHARACTER SET:  ST15INT ST15INT ST15INT
BIM DEFAULT DPI:  96  96
VERT. RESOLUTION:  1/240  1/240  1/240
LINE LENGTH:      94  94  94
RESET WHEN EJECT: NO NO NO
COMPRESS:  16.6 16.6 16.6

```

```

IBM CONFIGURE
EMULATION:  IBM X24
AGM:  YES
PRINTING MODE:  CHINESE
ASCII CHARACTER SET:  OPTION 1
HIGH SPEED PRINTING:  YES
CPI:  12
LPI:  6
CHARACTER DEFINITION:  DRAFT
LF+CR:  YES
CR+LF:  NO
LEFT MARG.(1/60):  0
TOP MARG.(1/60):  0
IBM CHARACTER SET:  PC
PC CHARACTER SET:  437 (INT)
PC TABLE:  TABLE 2
BOF IBM-PP LIKE:  YES
TOP IBM-PP LIKE:  YES
ZERO FLASH:  NO
LINE LENGTH:  94
INSERT MODE:  DIRECT
PAGE LENGTH:  12
RESET WHEN EJECT:  NO
COMPRESS:  17.

```

Note: An asterisk (★) behind MACRO indicates the active macro.

3.2.1 Explanation of the printout on the previous pages

In the headline behind the term **VER2** the revision level of the printer's firmware can be found.

Then, following the Printer Identification and in the next line a needle test.

The next part of the printout is a list of the **MACRO** settings.

In this case **MACRO 1** is marked with an asterisk (*) which identifies it as the active macro.

Note: A "Macro" is a summary of application specific parameter settings for a user. It is possible to have a total of three macros, each with a different summary of VALUE settings for different applications.

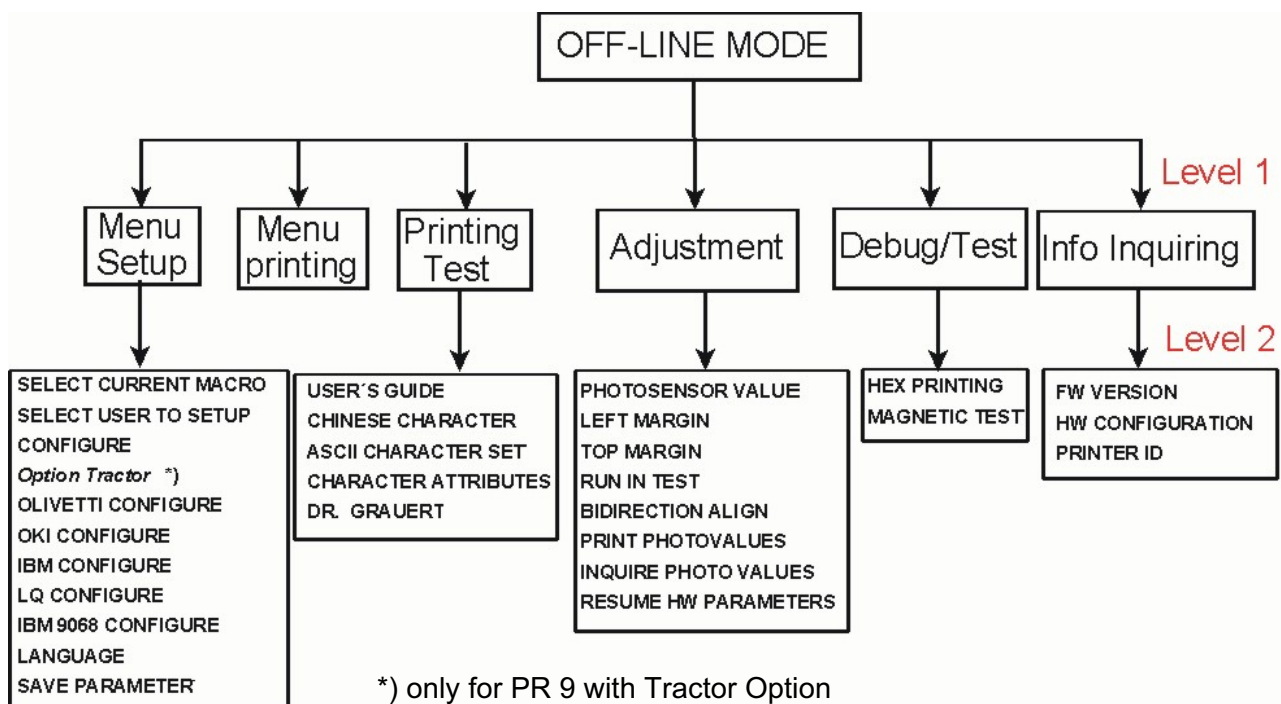
Whenever you make modifications in the active macro without saving them you will find the new settings under the heading **CURRENT USER**. Unless they are saved, the modifications will stay active only until the printer is switched off. When the printer is switched on again the macro settings marked with the asterisk will be reactivated.

Note: The **CURRENT USER** will be selected by MACRO 1, MACRO 2, or MACRO 3.

3.3 Menu Structure

Press **[STATION 2]** and **[COMPRESS ▼]** together to start the Menu-Mode in Off-line operation.

The Menu Mode starts with **MENU SETUP** in level 1.



3.3.1 How to use the Key in the Menu Mode

If you want to enter a menu setup, you should press down **[STATION 2]** and **[COMPRESS ▼]** key simultaneously in on-line mode, entering the off-line mode and then selecting **MENU SETUP** (see also Paragraph **2.2 Function Keys**).

During the Menu Mode the key's definition is as following:

- **[FEED/EJECT ▲]** upwards; it may cycle to the previous item from the first one.
- **[COMPRESS ▼]** downwards; it may cycle to the following item from the last one.
- **[STOP ■]** accept the selected item or value
- **[STATION 2]** go back to the previous menu level or back to the top level.

The LCD display shows on the first line the current level, and on the second line the next level.

3.3.2 The emulations of PR 9

The PR 9 printer offers the following emulations:

- **OLIVETTI**
Including the option **Magnetic Stripe Reader / Writer** (see paragraph **3.4.5**)
- **OKI**
- **IBM**
- **LQ**
- **IBM 9068**

You can modify the emulation you need by entering the corresponding menu setup.

3.4 Menu Setup Description

MENU SETUP was classified into **10** modules

- **SELECT CURRENT MACRO** (see paragraph **3.4.1**)
- **SELECT USER TO SETUP** (see paragraph **3.4.2**)
- **CONFIGURE** (see paragraph **3.4.3**)
- **OPTION TRACTOR** (see chapter **5 Options**) *)
- **OLIVETTI CONFIGURE** (see paragraph **3.4.4**)
- **OKI CONFIGURE** (see paragraph **3.4.6**)
- **IBM CONFIGURE** (see paragraph **3.4.7**)
- **LQ CONFIGURE** (see paragraph **3.4.8**)
- **IBM 9068 CONFIGURE** (see paragraph **3.4.9**)
- **LANGUAGE** (see paragraph **3.4.10**)
- **SAVE PARAMETERS** (see paragraph **3.4.11**)

To modify various modules' parameters you should enter a corresponding module. Before modifying printer parameters, please select the desired macro first. The current macro is the one to be changed.

*) only for PR 9 with Tractor Option

3.4.1 SELECT CURRENT MACRO

The printer stores up to three user settings in MACRO 1 up to MACRO 3.

Use the **[STOP ■]** key to activate this function. The active macro is displayed first. Press the **[COMPRESS ▼]** key until you find the macro for your application and selected it with the **[STOP ■]** key. The printer will save the selected macro immediately. After the procedure the printer changes into the ON-LINE mode and will now work with the new settings.

3.4.2 SELECT USER TO SETUP

With the module **SELECT USER TO SET UP** you have the choice between MACRO 1, MACRO 2, and MACRO 3. Select the macro witch should be changed.

Note: If you have selected all new items and have these confirmed with the **[STOP ■]** key, don't forget to activate the module **SAVE PARAMETERS**.

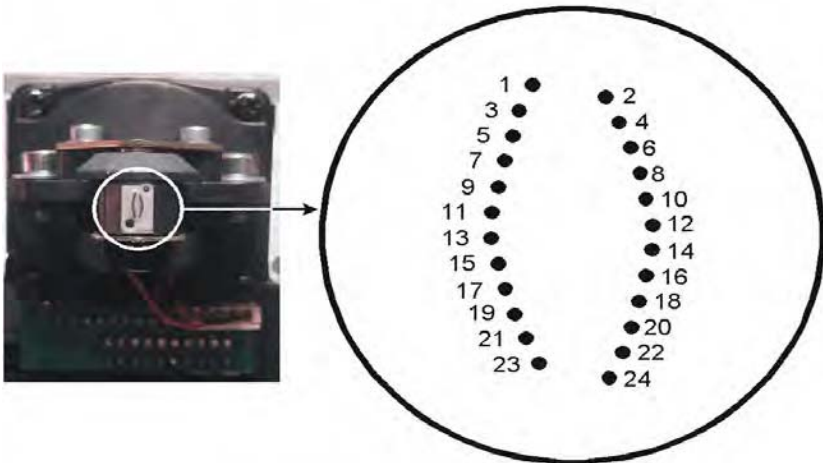
3.4.3 CONFIGURE

The following items can be modified according to the PR 9 parameters.

Note: In the different emulations the items shown are not equal. The option's which are printed in **bold** indicate the actual setting.

CONFIGURE			
Parameter	Option	Explanation	Note
RESUME DEFAULT VALUE	NO YES	Select resume default value or not, If select YES , jump to SAVE PARAMETERS the parameters will be resumed the default value if pressing [STOP ■] to confirm.	This option is mainly used to resume the default value when the menu parameters have been changed in disorder.
INTERFACE	DUAL INTERFACE SERIAL1 CX	Select the interface you want to use.	DUAL or CX will be selected only if an optional interface card is installed.
RS1 EMULATION	OLIVETTI OKI IBM LQ1600K IBM 9068	Select your RS1 emulation	

CONFIGURE			
Parameter	Option	Explanation	Note
MODIFY RS1 CONFIG	NO YES	If YES configure also Baud Rate, bits/character, parity and stop bit. NO not used with CX EMULATION .	
BAUD RATE (RS1)	2400 4800 9600 19200	Controls the speed of the data transfer. The baud rate for the printer should be corresponding to the settings of the computer.	Only displayed if MODIFY RS1 CONFIG is set to YES
BITS/CHARACTER (RS1)	87	Number of bits that represent a character.	Only displayed if MODIFY RS1 CONFIG is set to YES
PARITY (RS1)	NONE EVEN ODD	The data transfer will be checked by an even or odd parity bit.	Only displayed if MODIFY RS1 CONFIG is set to YES
STOP BITS (RS1)	12	Number of stop bits which are in use.	Only displayed if MODIFY RS1 CONFIG is set to YES
DSR (RS1)	NO YES	SERIAL 1 handle the DSR signal or not.	Only displayed if MODIFY RS1 CONFIG is set to YES
CX EMULATION	IBM LQ 1600K IBM 9068 OLIVETTI OKI	The emulation determines the set of commands available for the printer:	
CX STROBE EDGE	RISING EDGE FALLING EDGE	Select the trig mode of the printer strobe signal (CX present).	
DRAFT SPEED	NORMAL HIGH SPEED	Select printer speed in draft mode.	
LQ TYPE	NLQ1 NLQ2 LQ2	Select the printer type in LQ mode.	
NEEDLES SWITCH	YES NO	YES = activated No = ignored	

CONFIGURE				
Parameter	Option	Explanation	Note	
SPECIAL FORMS	NO YES	YES reduce the speed of paper handling, and add some special management to support special forms, e.g. thin paper, paper with different thickness.		
BIM DIRECTION	UNIDIRECTION BIDIRECTION	Select printing direction for graphics.		
NEEDLE COMPENSATION	NO YES	Select needle compensation or not when the needle is broken.		
<div>Needle Position</div> <div></div>				
	HS COMPENSATION	NO YES	Select heigh speed compensation or not	Only displayed if NEEDLE COMPENSATION is set to YES
	BROKEN NEEDLE NO.	1 up to 24	Choose the one needle from needle 1 up to needle 24 for compensation.	Only displayed if NEEDLE COMPENSATION is set to YES
PNS SELECTION		YES NO	Whether the following PNS items are valid or not.	
	PNS #2000K	SINGLE SHEET 205 mm 220 mm	The selection will influence the ejection of the paper. Single Sheet means A4	Only displayed if PNS SELECTION is set to YES

CONFIGURE			
Parameter	Option	Explanation	Note
PNS #2001K	400 selectable: 200 up to 1000 in steps of 100	Digital filter (CX STB)	Only displayed if PNS SELECTION is set to YES
PNS #2002K	NO Yes	reserved	Only displayed if PNS SELECTION is set to YES
PNS #2003K	NO Yes	reserved	Only displayed if PNS SELECTION is set to YES
PNS #2004K	205 mm YES NO 145 mm	Printhead moves out of paper with vertical movement or not . NO , the print head never moves out of paper edge. 145 mm / 205 mm , the print head moves out of the paper if the paper width is less than 145 or 205 mm. YES the print head always moves out of the paper.	Only displayed if PNS SELECTION is set to YES
PNS #2005K	ERROR SPACE CHAR1 CHAR2 IGNORE		Only displayed if PNS SELECTION is set to YES

3.4.4 OLIVETTI CONFIGURE

The following items can be modified according to the OLIVETTI parameters.

Note: In the different emulations the items shown are not equal. The option's which are printed in **bold** indicate the actual setting.

OLIVETTI CONFIGURE			
Parameter	Option	Explanation	Note
EMULATION	PR9 PR40+	Select your printer	
TOF PR40 LIKE	NO YES	Selecting the top margin. NO , the physical top margin of 4.23 mm. YES , 7.4 mm	TOF = Top Of Form

OLIVETTI CONFIGURE			
Parameter	Option	Explanation	Note
PRINTING MODE	CHINESE LATIN BIG-5 UNICODE	Select the printing mode	
HIGH SPEED PRINTING	YES NO A4 SHEET FANFOLD PAPER	Selecting high speed printing mode. NO = no draft mode. A4 SHEET = always draft mode when the paper is A4 Sheet. FAN FOLD PAPER = always draft mode when the paper is fan fold paper. YES: = the print mode always is draft.	
CPI	10, 12, 12.9, 15, 16.6, 17.1, 18, 20, 30	Defines the number of characters printed per inch.	
LPI	5 6 8	Defines the number of lines per inch.	
CHARACTER DEFINITION	LQ OCR-A OCR-B DRAFT	Selecting the font quality: draft, letter quality, OCR-A, or OCR-B.	
LR+CR	NO YES	YES: LF = LF + CR NO: LF = LF	
LEFT MARG. (1/60")	0 -6 up to +6	To adjust the left margin more to left or right in units of 1/60" inch (about 4 mm).	
TOP MARG. (1/60")	0 -6 up to +6	To adjust the top margin more up or down in units of 1/60" inch (about 4 mm).	TOF = Top Of Form
CHARACTER SET	OLIVETTI IBM/PC	Selecting the character set as Olivetti or IBM/PC.	
IBM CHARACTER SET	PC ISO	Selecting the IBM character set as PC or ISO.	Only displayed if IBM/PC in Character Set is selected.

OLIVETTI CONFIGURE			
Parameter	Option	Explanation	Note
PC CHARACTER SET	437(INT) 210(GR) 220(E) 850(LATIN 1) 851(GREEK) 852(LATIN 2) 855(CYRILLIC) 857(LATIN 5) 858(LATIN EURO) 860(P) 862(IL) 863(CAN. FR.) 864(ARABIC) 865(NORDIC) 866(CYRILLIC) DK/N DK 1252(PC-WIN LATIN1) 1250(PC-WIN LATIN2) CHINA CHN2 990(PC-886-BG) 991(PC-GBR)	Selecting your code page of the PC character set.	Only displayed if PC in IBM Character Set is selected.
	ISO CHARACTER SET CPOLUNIX ISO 8859/15 ISO 8859/1 ISO 8859/2 ISO 8859/5 ISO 8859/6 ISO 8859/7 ISO 8859/8 ISO 8859/9		Only displayed if IBM in IBM Character Set is selected.

OLIVETTI CONFIGURE			
Parameter	Option	Explanation	Note
OLI CHARACTER SET	ST15CND ST15CIBC ST15DK/N ST15IL ST15F ST15UK ST15D ST15GR ST15INT ST15ITA ST15P ST15USSR ST15SDC ST15E ST15E2 ST15S/SF ST15CH ST31 ST15TR ST15USA ST15YU ST15ARABIC	Selecting your code page of the OLIVETTI character set.	Only displayed if OLIVETTI in Character Set is selected.
BIM DEFAULT DPI	72 96	Setting the default DPI (dot per inch) of the graphic printing under 8 needles graphics.	
VERT. RESOLUTION	1/216 1/240	Setting the vertical resolution as 1/216 inch or 1/240 inch.	
LINE LENGTH	80 90 94	Selecting the line length in the unit of characters number of 10 CPI.	
RESET WHEN EJECT	NO YES	NO = no reset YES = the printer will be reset when eject a form.	
COMPRESS	16.6 17.1	Setting the CPI which command ESC > sets 16.6 = 16.6 CPI 17.1 = 17.1 CPI	see Control Codes
PNS SELECTION	NO YES	Whether the following PNS items is valid.	
PNS #2020K	NO YES	NO = normal passbook printer mode. YES = journal printing mode.	Only displayed if PNS SELECTION is set to YES . Relative with the PNS7010K of PR2E.

OLIVETTI CONFIGURE			
Parameter	Option	Explanation	Note
PNS #2021K	NO YES	Process of invalid code: NO = command error if invalid code is received; YES = ignore the invalid code.	Only displayed if PNS SELECTION is set to YES . Relative with the PNS7011K of PR2E.
PNS #2022K	NO YES	Setting the bottom margin (Bottom of Form). NO = normal mode; YES = PR 9 feed paper to the max position when the current vertical position is right for the bottom limit, but the feed paper value exceed the bottom limit. And PR9 report ESC r X when it receive the command ESC j .	Only displayed if PNS SELECTION is set to YES . Relative with the PNS7015K of PR2E. see Control Codes
PNS #2023K	NO YES	Selecting the special function of the command ESC ! sp nnn ; NO = same as PR2, the space setting of the full corner characters is same as half corner characters. YES = the space setting of the full corner characters is double as half corner characters.	Only displayed if PNS SELECTION is set to YES . Relative with the PNS7014K of PR2E.
PNS #2024K	NO YES	NO = normal mode; YES = ASCII characters printing and the graphic printing in a same line are enabled.	Only displayed if PNS SELECTION is set to YES . Relative with the PNS7016K of PR2E.
PNS #2025K	NO YES	reserved	Only displayed if PNS SELECTION is set to YES .
PNS #2026K	NO YES	reserved	Only displayed if PNS SELECTION is set to YES .

3.4.5 Option Horizontal Magnetic Stripe Reader / Writer (MSRW) CONFIGURE

The following items can be modified according to the MSWR parameters.

Note: You will find the following parameter after the last parameter of **OLIVETTI CONFIGURE**.

OPTION HOR. MSRW CONFIGURE			
Parameter	Option	Explanation	Note
END SENTINEL	C F	Selecting the end control of the magnetic record	Only for PR9/K with the version 1.07 or higher.
DISPLACEMENT	STANDARD +10 +20	Selecting the position displacement of the magnetic record.	Only for PR9/K with the version 1.07 or higher.
POSITION ADJUST	0 -7 up to +7	Select the adjusted value for the vertical position of the magnetic record when reading the magnetic stripe.	Only for PR9/K with the version 1.07 or higher.
RETRY	1, 3, 5	Selecting the retry value for reading the magnetic stripe.	Only for PR9/K with the version 1.07 or higher.
STRIPE HANDLE	NORMAL FAST	Selecting the stripe handle mode. NORMAL = measure the width of a passbook when reading the magnetic stripe every time. FAST = measure the width of a passbook only one time. The next reading procedures are using the founded width.	Only for PR9/K with the version 1.07 or higher.

3.4.6 OKI CONFIGURE

The following items can be modified according to the OKI parameters.

Note: In the different emulations the items shown are not equal. The option's which are printed in **bold** indicate the actual setting.

OKI CONFIGURE			
Parameter	Option	Explanation	Note
AUTO COMPRESSION	NO YES	Determine whether automatically condense current line for printing, when current line length exceeds the allowed line length.	
LINE LENGTH COMPRESS	NO YES	Determine whether the line width to compress.	
COMPRESS PROPORTION	101/LINE (85%) 108/LINE (80%) 115/LINE (75%) 123/LINE (70%) 133/LINE (65%) 144/LINE (60%) 157/LINE (55%) 170/LINE (50%)	Select the proportion of automatically on the condensation mode.	
FAN FOLD LEFT MARG.	0 0 up to 7	Select the left margin for the columns of fan fold paper in n/10 inches.	
PAPER EMPTY WARNING	NO YES	NO = blocking of the parallel port, when there is no paper in the PR 9. YES = no blocking	
ONE BYTE BUFFER	NO YES	NO = the parallel port is not set into a one byte buffer. YES = the parallel port is set into a one byte buffer.	
HIGH SPEED PRINTING	YES NO A4 SHEET FAN FOLD PAPER	Selecting high speed printing mode. NO = no draft mode. A4 SHEET = always draft mode when the paper is A4 Sheet. FAN FOLD PAPER = always draft mode when the paper is fan fold paper. YES: = the print mode always is draft.	
LPI	5 6 8	Determines the number of lines per inch.	

OKI CONFIGURE			
Parameter	Option	Explanation	Note
CHARACTER DEFINITIONS	DRAFT LQ	Select printing in draft or LQ mode.	
LR+CR	YES NO	YES: LF = LF + CR NO: LF = LF	
CR+LF	NO YES	NO: CR = CR YES: CR = CR + LF	
LEFT MARG. (1/60")	0 -6 up to +6	To adjust the left margin more to left or right in units of 1/60" inch (about 4 mm).	
TOP MARG. (1/6")	0 -1 up to +6	Adjust the top margin in units of 1/6 inch.	TOF = Top Of Form
TOP MARG. (1/60")	0 -5 up to +5	Adjust the top margin in units of 1/60 inch (about 4 mm).	TOF = Top Of Form
LINE LENGTH	80 90 94	Set line length in units of characters number of 10 characters per inch (CPI).	
RESET WHEN EJECT	NO YES	NO = no reset YES = the printer will be reset when eject a form.	
PNS SELECTION	NO YES	Whether the following PNS items is valid.	
PNS #2060K	NO YES	Process of command ESC % 9 n1 n2 NO: when n2 = 0 set line spacing to zero. YES: when n2 = 0 ignore this command.	Only displayed if PNS SELECTION is set to YES . Relative with the PNS7020K of PR2E.
PNS #2061K	NO YES	Process of command HT(09) NO: execute LF+CR if H-TAB is not valid. YES: ignore this command	Only displayed if PNS SELECTION is set to YES . Relative with the PNS7021K of PR2E.
PNS #2062K	NO YES	Determine whether to reset automatically line condensation when Form Feed command executed. NO = reset YES = not reset	Only displayed if PNS SELECTION is set to YES .
PNS #2063K	NO YES	Determine whether to ignore all the code 0x20 at the end of line. NO = Ignore 0x20 YES = not ignore any code	Only displayed if PNS SELECTION is set to YES .

3.4.7 IBM CONFIGURE

The following items can be modified according to the IBM parameters.

Note: In the different emulations the items shown are not equal. The option's which are printed in **bold** indicate the actual setting.

IBM CONFIGURE			
Parameter	Option	Explanation	Note
EMULATION	IBM X24 IBM PPII	Select your printer emulation	
AGM	NO YES	NO = ignore AGM graphic printing YES = AGM graphic printing is active	AGM is only for IBM X24 printers valid.
HIGH SPEED PRINTING	YES NO A4 SHEET FAN FOLD PAPER	Selecting high speed printing mode. NO = no draft mode. A4 SHEET = always draft mode when the paper is A4 Sheet. FAN FOLD PAPER = always draft mode when the paper is fan fold paper. YES: = the print mode always is draft.	
CPI	10 12 15 17.1 20	Defines the number of characters printed per inch.	
LPI	5 6 8	Defines the number of lines printed per inch.	
CHARACTER DEFINITION	DRAFT LQ	Selecting the printing quality.	
LF+CR	NO YES	YES: LF = LF + CR NO: LF = LF	
CR+LF	NO YES	NO: CR = CR YES: CR = CR + LF	
LEFT MARG. (1/60")	0 -6 up to +6	To adjust the left margin more to left or right in units of 1/60" inch (about 4 mm).	
TOP MARG. (1/60")	0 -6 up to +6	Adjust the top margin in units of 1/60 inch (about 4 mm).	TOF = Top Of Form

IBM CONFIGURE			
Parameter	Option	Explanation	Note
IBM CHARACTER SET	PC ISO	Select PC character set or ISO character set.	PC continued with PC CHARACTER SET; ISO continued with ISO CHARACTER SET.
PC CHARACTER SET	437(INT) 210(GR) 220(E) 850(LATIN 1) 851(GREEK) 852(LATIN 2) 855(CYRILLIC) 857(LATIN 5) 858(LATIN EURO) 860(P) 862(IL) 863(CAN. FR.) 864(ARABIC) 865(NORDIC) 866(CYRILLIC) DK/N DK 1252(PC-WIN LATIN1) 1250(PC-WIN LATIN2) CHINA CHN2 990(PC-866-BG) 991(PC-GER)	Select the code page of the PC character set.	Only displayed if IBM CHARACTER SET is set to PC .
ISO CHARACTER SET	CPOLUNIX 8859/15 8859/1 8859/2 8859/5 8859/6 8859/7 8859/8 8859/9	Select the code page of the ISO character set.	Only displayed if IBM CHARACTER SET is set to ISO .
PC TABLE	TABLE 1 TABLE	Select the PC Table 1 or Table 2	
BOF IBM-PP LIKE	NO YES	Setting the bottom margin NO = 2.3 mm YES = 10 mm	BOF = B ottom O f F orm
TOP IBM PP LIKE	NO YES	Setting the top margin. NO the physical top margin (adjustable) YES = 7.4 mm	TOF = T op O f F orm

IBM CONFIGURE			
Parameter	Option	Explanation	Note
ZERO SLASH	NO YES	Select the printout of 0 (0x30 = zero) YES = the 0 will be printed with a slash on it (e.g. 0).	
LINE LENGTH	80 90 94	Setting the line length in unit of character of 10 CPI.	
INSERT MODE	DIRECT PR2 LIKE	Selecting the paper insert mode. DIRECT = PR9 insert paper directly when paper alignment. PR2 LIKE = PR9 insert paper when printing data is received, it is same procedure as PR2.	
PAGE LENGTH	11 12	Setting the page length in the units of an inch.	
RESET WHEN EJECT	NO YES	NO = no reset YES = the printer will be reset when eject a form.	
COMPRESS	16.6 17.1	Setting CPI which command SI set. 16.6 = 16.6 CPI 17.1 = 17.1 CPI	
PNS SELECTION	NO YES	Whether the following PNS item is valid or not.	
PNS #2080K	NO YES	NO = Double height printing and bold printing are permissible in any print pitch.	Only displayed if PNS SELECTION is set to YES . Relative to the PNS4001K of PR2E.

3.4.8 LQ CONFIGURE

The following items can be modified according to the LQ parameters.

Note: In the different emulations the items shown are not equal. The option's which are printed in **bold** indicate the actual setting.

LQ CONFIGURE			
Parameter	Option	Explanation	Note
AUTO COMPRESSION	NO YES	Determine whether automatically condense current line for printing, when current line length exceeds the allowed line length.	
LINE LENGTH COMPRESS	NO YES	Determine whether the line width to compress or is fixed by the menu setting.	
COMPRESS PROPORTION	101/LINE (85%) 108/ LINE (80%) 115/ LINE (75%) 123/ LINE (70%) 133/ LINE (65%) 144/ LINE (60%) 157/ LINE (55%) 170/ LINE (50%)	Select the proportion of the automatic line condensation.	
FAN FOLD LEFT MARG.	0 0 up to +7	Select the left margin for the 80 columns fan fold paper in steps of 1/10 inch.	
PAPER EMPTY WARNING	NO YES	NO = blocking of the parallel port, when there is no paper in the PR 9. YES = no blocking	
HIGH SPEED PRINTING	YES NO A4 SHEET FAN FOLD PAPER	Selecting high speed printing mode. NO = no draft mode. A4 SHEET = always draft mode when the paper is A4 Sheet. FAN FOLD PAPER = always draft mode when the paper is fan fold paper. YES: = the print mode always is draft.	
LPI	5 6 8	Defines the number of lines printed per inch.	

LQ CONFIGURE			
Parameter	Option	Explanation	Note
CPI OF CHINESE FONT	5 6 6.7 7.5	Select CPI of Chinese character.	
CPI OF WEST FONT	10 12 15 17 20	Select CPI of ASCII character.	
CHARACTER SET	PC ISO	Select PC character set or ISO character set.	PC continued with PC CHARACTER SET; ISO continued with ISO CHARACTER SET.
PC CHARACTER SET	437(INT) 210(GR) 220(E) 850(LATIN 1) 851(GREEK) 852(LATIN 2) 855(CYRILLIC) 857(LATIN 5) 858(LATIN EURO) 860(P) 862(IL) 863(CAN. FR.) DK/N DK 1252(PC-WIN LATIN1) 1250(PC-WIN LATIN2) CHINA CHN2 990(PC-866-BG) 991(PC-GER)	Select the code page of the PC character set.	Only displayed if IBM CHARACTER SET is set to PC .
ISO CHARACTER SET	CPOLUNIX 8859/15 8859/1 8859/2 8859/5 8859/6 8859/7 8859/8 8859/9	Select the code page of the ISO character set.	Only displayed if IBM CHARACTER SET is set to ISO .
CHARACTER DEFINITION	DRAFT LQ	Selecting the printing quality.	
LF+CR	NO YES	YES: LF = LF + CR NO: LF = LF	

LQ CONFIGURE			
Parameter	Option	Explanation	Note
CR+LF	NO YES	YES: CR = LF + CR NO: CR = CR	
LEFT MARG. (1/60")	0 -6 up to +6	To adjust the left margin more to left or right in units of 1/60" inch (about 4 mm).	
TOP MARG. (1/6")	0 -1 up to +6	Adjust the top margin in units of 1/6 inch.	TOF = Top Of Form
TOP MARG. (1/60")	0 -5 up to +5	Adjust the top margin in units of 1/60 inch (about 4 mm).	TOF = Top Of Form
ZERO SLASH	NO YES	Select the printout of 0 (0x30 = zero) YES = the 0 will be printed with a slash on it (e.g. Ø).	
LINE LENGTH	80 90 94	Setting the line length in unit of character of 10 CPI.	
RESET WHEN EJECT	NO YES	NO = no reset YES = the printer will be reset when eject a form.	
PNS SELECTION	NO YES	Whether the following PNS item is valid or not.	
PNS #2100K	NO YES	YES = Reset automatically line condensation when Form Feed command executed. NO = no reset	Only displayed if PNS SELECTION is set to YES .
PNS #2101K	NO YES	NO = ignore 0x20 at the end of a line. YES = don't ignores 0x20 at the end of a line.	Only displayed if PNS SELECTION is set to YES .
PNS #2102K	NO YES	YES = Process of the horizontal and vertical movement command: ESC \$; ESC \; ESC (v) NO = ignore the command	Only displayed if PNS SELECTION is set to YES . This PNS is only active on ver. 1.08 or higher.

3.4.9 IBM 9068 CONFIGURE

The following items can be modified according to the IBM 9006 parameters.

Note: In the different emulations the items shown are not equal. The option's which are printed in **bold** indicate the actual setting.

IBM 9068 CONFIGURE			
Parameter	Option	Explanation	Note
PRINTER ID	1D 1E	Selecting the printer ID: 1D = 4748 1E = 9055-001	
SERIAL PROTOCOL	EFFECTIVE CTS/FDD NO CTS/FDD	Selecting the serial communication interface with the host system. EFFECTIVE CTS/FDD = CTS/FDD active. NO CTS/FDD = CTS without FDD.	FDD = Finance D evice D river
HIGH SPEED PRINTING	NO YES	Selecting high speed printing mode. NO = no draft mode. YES = the print mode always is draft.	
LEFT MARG. (1/60")	0 -6 up to +6	To adjust the left margin more to left or right in units of 1/60" inch (about 4 mm).	
TOP MARG. (1/60")	0 -6 up to +6	To adjust the top margin in units of 1/60" inch (about 4 mm).	TOF = Top O f Form
BOF ADJUST (0.5 mm)	0 -10 up to +10	Adjust the bottom margin in units of 0.5 mm	BOF = B ottom O f Form
FEED ADJUST (1/10")	0 -10 up to +5	Adjustment when the form feed 10 inch, 0.5 inch	This item will be valid with the release ≥ 2.09 .
LPI	5 6 8	Defines the number of lines printed per inch.	
UNIDIRECTION PRINT	EFFICIENCY IGNORE	Select the printing direction for graphics or ignore.	
LF+CR	NO YES	YES : LF = LF + CR NO : LF = LF	
CR+LF	NO YES	YES : CR = LF + CR NO : CR = CR	

IBM 9068 CONFIGURE				
Parameter		Option	Explanation	Note
CPI OF COMPRESS		17.1 18	Setting CPI in condensed mode which command SI set. 17.1 = 17.1 CPI 18 = 18 CPI	
CPI		10 12 15	Defines the number of characters printed per inch.	
LINE LENGTH		82.5 94	Setting the line length in unit of character of 10 CPI.	
RESET WHEN EJECT		NO YES	NO = no reset YES = the printer will be reset when eject a form.	
IGNORE ERROR		NO YES	NO = invalid code results are going into error. YES = an invalid code will be ignored.	
BEEP WARNING		BEEP ON BEEP OFF	Select the alarm sound when an end of document is detected or ignore the beep sound.	
PNS SELECTION		NO YES	Whether the following PNS item is valid or not.	
	PNS #2120K	NO YES	NO = normal bottom margin limit. YES = special bottom margin limit	Only displayed if PNS SELECTION is set to YES .
	PNS #2121K	NO YES	reserved	Only displayed if PNS SELECTION is set to YES .

3.4.10 LANGUAGE

The operator panel may display its messages in two languages. Select one out of the following: **ENGLISH** or **CHINESE**.

3.4.11 SAVE PARAMETERS

Any desired changes to the default settings can be saved here. After power on the new settings are activated.

While this function is operating the display shows the message

- **SAVING, PLEASE WAIT** and then
- **SAVED, RESTART PR 9.**

Now the printer changed into the **ON -LINE** mode.

3.5 PRINTING TEST

There are five test printouts available:

- User's Guide
- Chinese Characters
- Ascii Character Set
- Character Attributes
- Dr. Grauert (print a letter)

3.5.1 USER'S GUIDE

In the User's Guide you will find detail information. So it is possible to print out the User's Guide by your self. If this function is selected, the printer asks for A4 sheets. After inserting an A4 sheet the printer starts the print-out.

With the **[STATION 2]** key it is possible to skip the selection.

3.5.2 CHINESE CHARACTER

With this selection are three prints possible:

- Printing All Fonts
- Print Two Byte Font
- Print Four Byte Font

3.5.3 ASCII CHARACTER SET

The stored ASCII character sets are:

- GB
- ROMAN
- CHINESE 1
- CHINESE 2
- INT 437
- CANADIAN FRENCH
- OCR A
- OCR B

3.5.4 CHARACTER ATTRIBUTES

All included character attributes are printed here.

3.5.5 Dr. GRAUERT

This test printout produces a standard letter (ECMA-132) which can be used for measuring the printer's throughput.

3.6 ADJUSTMENT

Adjustment can be used to adjust and check some built-in parameters of the printer. It may enhance the print performance. Sometimes, it's possible to improve the rationality of the page layout according to the practical environment. The printer has been adjusted corresponding to factory standard before it is delivered.

Warning: The user who wants to adjust these parameters of the printer should be a professional engineer or be guided by a professional engineer.

User usually should not change the settings. If the printer has to be adapted, the user should have already well understood the involved parameters. Or else the printer may miss normal function. The following introduce the adjustable parameters.

These parameters below allow manipulation on operator panel:

- Photosensor Value (see paragraph 3.6.1)
- Left Margin (see paragraph 3.6.2)
- Top Margin (see paragraph 3.6.3)
- Run In Test (see paragraph 3.6.4)
- Alignment Adjustment for Bi-directional Printing (see paragraph 3.6.5)
- Printing Photosensor Value (see paragraph 3.6.6)
- Inquire Photosensor Values (see paragraph 3.6.7)
- Resume HW Parameters (see paragraph 3.6.8)

3.6.1 PHOTSENSOR VALUE

All the photo sensor value has been adjusted to correct values in the factory, but after using it for many days, some unexpected change may happen for some reason, such as using unacceptable paper. In order to make the printer work correctly, please adjust the photo sensor value again.

After entering adjustment, you have to do the following steps:

Key or action	Two line display
Select Adjustment	ADJUSTMENT PHOTSENSOR VALUE
[STOP ■] There is a noise of the rollers and the green lamp of Station 2 light up	PHOTSENSOR VALUE INSERT SHEET; PRESS ■
insert paper and press [STOP ■]	PHOTSENSOR VALUE INSERT SHEET; PRESS ■
The printer insert the paper and start the setup of the photo sensor. Paper eject after adjustment.	PHOTSENSOR VALUE END. PRESS ■ TO PRINT
[STOP ■]	PHOTSENSOR VALUE INSERT A4 SHEET
Insert paper; after print the values the paper will be eject	PHOTSENSOR VALUE FINISH; PRESS STAT 2
[STATION 2]	ADJUSTMENT PHOTSENSOR VALUE

Key or action	Two line display
[STATION 2] Note: The adjustment is only active during power on.	OFF-LINE MODE ADJUSTMENT
[STATION 2] and [COMPRESS ▼] together to leave the off-line mode	SAVE PARAMETERS ■ ACCEPT ST2 = IGNORE

The new values of adjustment to be default settings can be saved now or ignore the new values. After saving and power OFF and ON the new adjustment is still activated.

3.6.2 LEFT MARGIN

The **[FEED/EJECT ▲]** key reduce the current value (left margin is moving to the left side) and the **[COMPRESS ▼]** key increases the current value (moving to the right side).

After entering adjustment, you have to do the following steps:

Key or action	Two line display
Select Adjustment	ADJUSTMENT PHOTOSENSOR VALUE
[COMPRESS ▼] until LCD shows	ADJUSTMENT LEFT MARGIN
[STOP ■] to select	LEFT MARGIN 17 ▲ = LEFT ▼ = RIGHT
Press [FEED/EJECT ▲] or [COMPRESS ▼] to find the new left margin. The range is from zero up to 133.	LEFT MARGIN 20 ▲ = LEFT ▼ = RIGHT
Insert an A4 sheet to control the setting. The printer will insert the paper automatically, print the current margin and eject the paper.	LEFT MARGIN (20) ▲ = LEFT ▼ = RIGHT
[STOP ■] to accept	LEFT MARGIN SAVE PARAMETERS
Display after saving	ADJUSTMENT LEFT MARGIN

3.6.3 TOP MARGIN

The **[FEED/EJECT ▲]** key reduce the current value (top margin is moving upwards) and the **[COMPRESS ▼]** key enlarge the current value (moving downwards).

After entering adjustment, you have to do the following steps:

Key or action	Two line display
Select Adjustment	ADJUSTMENT PHOTOSENSOR VALUE
[COMPRESS ▼] until LCD shows	ADJUSTMENT TOP MARGIN
[STOP ■] to select	TOP MARGIN 030 ▲ = UP ▼ = DOWN
Press [FEED/EJECT ▲] or [COMPRESS ▼] to find the new top margin. The range is from zero up to 214.	TOP MARGIN 042 ▲ = UP ▼ = DOWN
Insert an A4 sheet to control the setting. The printer will insert the paper automatically, print the current margin and eject the paper.	TOP MARGIN (042) ▲ = UP ▼ = DOWN
[STOP ■] to accept	TOP MARGIN SAVE PARAMETERS
Display after saving	ADJUSTMENT TOP MARGIN

3.6.4 RUN IN TEST

After selecting the Run in Test the printer will insert a sheet and start nonstop printing.

Key or action	Two line display
Select Adjustment	ADJUSTMENT PHOTOSENSOR VALUE
[COMPRESS ▼] until LCD shows	ADJUSTMENT RUN IN TEST
[STOP ■] to select The yellow Ready lamp lights up.	RUN IN TEST PLEASE INSERT SHEET
The printer starts printing horizontal lines after inserting a paper.	RUN IN TEST NO: 00 printing, finish: 00
Now it is possible to stop printing by pressing the [STOP ■] key.	RUN IN TEST NO: 00 printing, finish: 00
[STOP ■] continued printing	RUN IN TEST NO: 00 printing, finish: 00
Power off the printer to leave the continued printing.	

Note: Use Bidirectional Alignment Adjust to correct an offset in the vertical lines (see paragraph 3.6.5).

3.6.5 BIDIRECTIONAL ALIGNMENT ADJUSTMENT

After selecting the Bidirectional Alignment it is possible to align the printing of vertical lines.

Key or action	Two line display
Select Adjustment	ADJUSTMENT PHOTOSENSOR VALUE
[COMPRESS ▼] until the LCD shows:	ADJUSTMENT BIDIRECTION ALIGN
[STOP ■] to select The yellow Ready and green Station 2 lamp lights up.	BIDIRECTION ALIGN RESULT OF ALL SPEED
Press the [STOP ■] key	BIDIRECTION ALIGN INSERT A4 SHEET
The printer starts printing vertical lines after inserting a paper.	BIDIRECTION ALIGN FINISH; PRESS STAT2
[STATION 2]	BIDIRECTION ALIGN RESULT OF ALL SPEED
Now press [FEED/EJECT ▲] or [COMPRESS ▼] until you can select the font and CPI which you want to align (e.g. DRAFT 12 CPI).	BIDIRECTION ALIGN DRAFT 12CPI
Press the [STOP ■] key to accept the selection.	BIDIRECTION ALIGN 000 ▲ = LEFT ▼ = RIGHT
Use the [FEED/EJECT ▲] or [COMPRESS ▼] key for alignment (e.g. left 5 times). If you are going to the right the numeric value will be indicated by an minus sign (e.g. -005).	BIDIRECTION ALIGN 005 ▲ = LEFT ▼ = RIGHT
Insert an A4 sheet and the printer starts a control print of your selection.	BIDIRECTION ALIGN 005 ▲ = LEFT ▼ = RIGHT
Press the [STOP ■] key to accept and save your selection.	DRAFT 12CPI SAVE PARAMETERS
Now you can select an other font for alignment or leave the function.	BIDIRECTION ALIGN DRAFT 12CPI
If you want to leave the off-line mode press [STATION 2] and [COMPRESS ▼] together.	SAVE PARAMETERS ■ ACCEPT ST2 = IGNORE
Because the parameters are saved, press [STATION 2] to ignore.	PR9 SERIAL1 OLIVETTI *) ON-LINE

*) The displayed line is depending on the selected Emulation.

3.6.6 PRINT PHOTO VALUES

With the selecting of Print Photo Values you can start a print out photo sensor values.

Key or action	Two line display
Select Adjustment	ADJUSTMENT PHOTOSENSOR VALUE
[COMPRESS ▼] until the LCD shows:	ADJUSTMENT PRINT PHOTO VALUES
[STOP ■] to select The yellow Ready and green Station 1 lamp lights up.	PRINT PHOTO VALUES INSERT A4 SHEET
The printer starts printing the values after inserting a paper.	PRINT PHOTO VALUES FINISH, PRESS STAT2
[STATION 2]	ADJUSTMENT PRINT PHOTO VALUES
If you want to leave the off-line mode press [STATION 2] and [COMPRESS ▼] together.	SAVE PARAMETERS ■ ACCEPT ST2 = IGNORE
Press [STATION 2] to ignore.	PR9 SERIAL1 OLIVETTI *) ON-LINE

*) The displayed line is depending on the selected Emulation.

Sample of the Print Photo Values:

Sensor	Ref. Level	Current	Valid
Paper Pres. 1	0341	0040	Y
Paper Pres. 2	0341	0040	Y
Paper Allin. 1	0372	0048	Y
Paper Allin. 2	0348	0040	Y
Paper Allin. 3	0351	0040	Y
Paper Allin. 4	0341	0040	Y
Paper Edge	0347	0120	Y

3.6.7 INQUIRE PHOTO VALUES

The inquiry of the photosensor can be classified into

- Photo Value-set and
- Photo Value-actual.

For both selections you can inquire 7 class photosensor values

- Paper Intro1
- Paper Intro2
- Paper Alline 1
- Paper Alline 2
- Paper Alline 3
- Paper Alline 4
- Paper Edge

You can check each photosensor value by pressing **[COMPRESS ▼]** (means move downwards) or **[FEED/EJECT ▲]** (means upwards).

Key or action	Two line display
Select Adjustment	ADJUSTMENT PHOTOSENSOR VALUE
[COMPRESS ▼] or [FEED/EJECT ▲] until the LCD shows:	ADJUSTMENT INQUIRE PHOTO VALUES
[STOP ■] to select	INQUIRE PHOTO VALUES PHOTO VALUE SET
For inquire press [STOP ■] continue with [COMPRESS ▼] or [FEED/EJECT ▲] to check various values	INTRO CUR VOL. 0260
Press [STATION 2] to exit	INQUIRE PHOTO VALUES PHOTO VALUE SET

Now you can select other operations you want.

3.6.8 RESUME HARDWARE PARAMETERS

All standard default settings of the firmware will be restored. The contents of the Page Counter will not be changed, but all other settings are reset.

Key or action	Two line display
Select Adjustment	ADJUSTMENT PHOTOSENSOR VALUE
[COMPRESS ▼] until the LCD shows:	ADJUSTMENT RESUME HW PARAMETERS
[STOP ■] to select The yellow Ready and green Station 1 and Station 2 lamp lights up.	RESUME HW PARAMETERS ■ ACCEPT ST2 = IGNORE
Press [STOP ■] to accept	ADJUSTMENT RESUME HW PARAMETERS
or [STATION 2] to ignore	OFF-LINE MODE ADJUSTMENT
If you want to leave the off-line mode press [STATION 2] and [COMPRESS ▼] together.	SAVE PARAMETERS ■ ACCEPT ST2 = IGNORE
Press [STATION 2] to ignore.	PR9 SERIAL1 OLIVETTI *) ON-LINE

*) The displayed line is depending on the selected Emulation.

3.7 DEBUG / TEST

The Debug / Test parameter defines the execution of control sequences when Hex-printing has been activated. The incoming or stored data from the host are printed in hex mode. This is an excellent help for the programmer.

The Debug/ Test mode is arrange into two groups:

- Hex Printing
- Magnetic Test

In the Hex Printing mode we will find five groups:

- Data Backup Mode
- Printing Saved Data
- Printing Last Data
- Printing Flash Data
- Directly Dump

The HEX print is divided into three groups:

- 1. the transmission code first with five bytes
- 2. values of the data in HEX
- 3. ASCII code of the printed data

Sample: 1. 2.

 00000 00 0C 07 0D 07 0D 07 0D 07 0D 07 0D

3.

0 ♀ • ♪ • ♪ • ♪ • ♪ • ♪

3.7.1 DATA BACKUP MODE

The Data Backup Mode is using the buffer of the printer. All receiving data from the host are saved first. To get data printed select after saving the data the function Printing Saved Data (see paragraph 3.7.2).

Note: The new to be saved data will overwrite the saved data before.

Key or action	Two line display
Select Debug / Test	DEBUG/TEST HEX PRINTING
[COMPRESS ▼]	HEX PRINTING DATA BACKUP MODE
[STOP ■] to select You hear a short beep.	HEX PRINTING WAITING FOR DATA ...
The receiving data from the host will be stored in the buffer of the printer.	HEX PRINTING OPERATE NATURALLY
[STOP ■] to stop hex printing	HEX PRINTING OPERATE NATURALLY
If you want to leave the off-line mode press [STATION 2] and [COMPRESS ▼] together.	SAVE PARAMETERS ■ ACCEPT ST2 = IGNORE
Press [STATION 2] to ignore.	PR9 SERIAL1 OLIVETTI *) ON-LINE

*) The displayed line is depending on the selected Emulation.

3.7.2 PRINTING SAVED DATA

All before in the buffer of the printer saved data can be printed in HEX format with this function.

Note: The saved data are printed **with two bytes first** (in the sample in bold), which indicates the length of the saved data.

Sample: 00000 **00 0C** 07 0D 07 0D 07 0D 07 0D 07 0D

0 ♀ • ♪ • ♪ • ♪ • ♪ • ♪

Key or action	Two line display
Select Debug / Test	DEBUG/TEST HEX PRINTING
[COMPRESS ▼] until the LCD shows:	HEX PRINTING PRINTING SAVED DATA
[STOP ■] to accept The green Station 2 lamp is flashing.	HEX PRINTING INSERT A4 SHEET
The printer starts printing vertical lines after inserting a paper.	HEX PRINTING PRINTING, WAITING...
After printing and eject the page the LCD shows:	HEX PRINTING POWER OFF OR OTHERS

3.7.3 PRINTING LAST DATA

All last used and in the buffer of the printer saved data can be printed in HEX format with this function.

Key or action	Two line display
Select Debug / Test	DEBUG/TEST HEX PRINTING
[COMPRESS ▼] until the LCD shows:	HEX PRINTING PRINTING LAST DATA
[STOP ■] to accept The green Station 2 lamp is flashing.	HEX PRINTING INSERT A4 SHEET
The printer starts printing vertical lines after inserting a paper.	HEX PRINTING PRINTING, WAITING...
After printing and eject the page the LCD shows:	HEX PRINTING POWER OFF OR OTHERS

3.7.4 PRINTING FLASH DATA

All in the flash saved data can be printed in HEX format with this function.

Key or action	Two line display
Select Debug / Test	DEBUG/TEST HEX PRINTING
[COMPRESS ▼] until the LCD shows:	HEX PRINTING PRINTING FLASH DATA
[STOP ■] to accept The green Station 2 lamp is flashing.	HEX PRINTING INSERT A4 SHEET
The printer starts printing vertical lines after inserting a paper.	HEX PRINTING PRINTING, WAITING...
After printing and eject the page the LCD shows:	HEX PRINTING POWER OFF OR OTHERS

3.7.5 DIRECTLY DUMP

The receiving data from the host will not stored first in the buffer of the printer. They will be printed directly after being received by the printer.

Note: The directly printed data are printed **without the two bytes first**. So there is no indication of the length of the printed data.

Sample: 00000 07 0D 07 0D 07 0D 07 0D 07 0D 07 0D

• ♪ • ♪ • ♪ • ♪ • ♪ • ♪ • ♪

Key or action	Two line display
Select Debug / Test	DEBUG/TEST HEX PRINTING
[COMPRESS ▼] until the LCD shows:	HEX PRINTING DIRECTLY DUMP
[STOP ■] to accept The green Station 2 lamp is flashing.	HEX PRINTING INSERT A4 SHEET
The printer starts printing vertical lines after inserting a paper.	HEX PRINTING PRINTING, WAITING...
After printing and eject the page the LCD shows:	HEX PRINTING POWER OFF OR OTHERS

Note: During the Directly Dump process, if the printer ejects paper automatically, it indicate that the printing has been finished, but if the printer do not eject paper automatically, press **[FEED/EJECT ▲]** key to eject the paper.

Caution: The performance in the two different modes is different. In the Data Backup Mode, the printer not only prints in HEX, but also execute the programmer correctly (the bell will sound six times). But in the Directly Dump, the printer just prints in HEX.

3.7.6 MAGNETIC TEST

The Magnetic Test is for the optional Magnetic Stripe Reader / Writer. It works only for the PR 9/K with the firmware version 1.07 or higher.

Note: The optional Magnetic Stripe Reader / Writer in a special version and not used in Europe.

3.8 INFO INQUIRING

You get information of the current setting parameters of software or hardware. This information is important for the system engineer and service staff.

You can select the following parameter:

- FW VERSION
- HW CONFIGURATION
- PRINTER ID

3.8.1 FW Version

The parameter firmware version shows:

- version number
- special version tag

e.g.:

```
FW VERSION
VER2.09 T7FPGA:2.4
```

Note: In this sample indicates **VER2.09** the version number (firmware release), and **T7** the special version tag.

3.8.2 HW Configuration

The parameter hardware configuration gives information over:

- characters generators
- optional interface
- scanner (only with Magnetic Test)

e.g.:

```
HW CONFIGURATION
GB18030 CX
```

3.8.3 Printer ID

The display shows the identification of the printer:

e.g.:

```
PRINTER ID
00000AECE8AD01
```

4. Maintenance

Preferred Material

The following materials and cleaning lubricants are recommended when maintaining the printer:

- Lint-free soft cloth
- Light vacuum cleaner.

4.1 Cleaning Surrounding Areas

The user should clean the printer every six months. If you experience paper feed problems or if the print head carriage movement is hampered, cleaning should be carried out more often.

Maintenance work of PR 9 printer is very simple, all you need to do is:

- remove the ribbon and
- remove the Alignment Unit

to clean printer regularly.

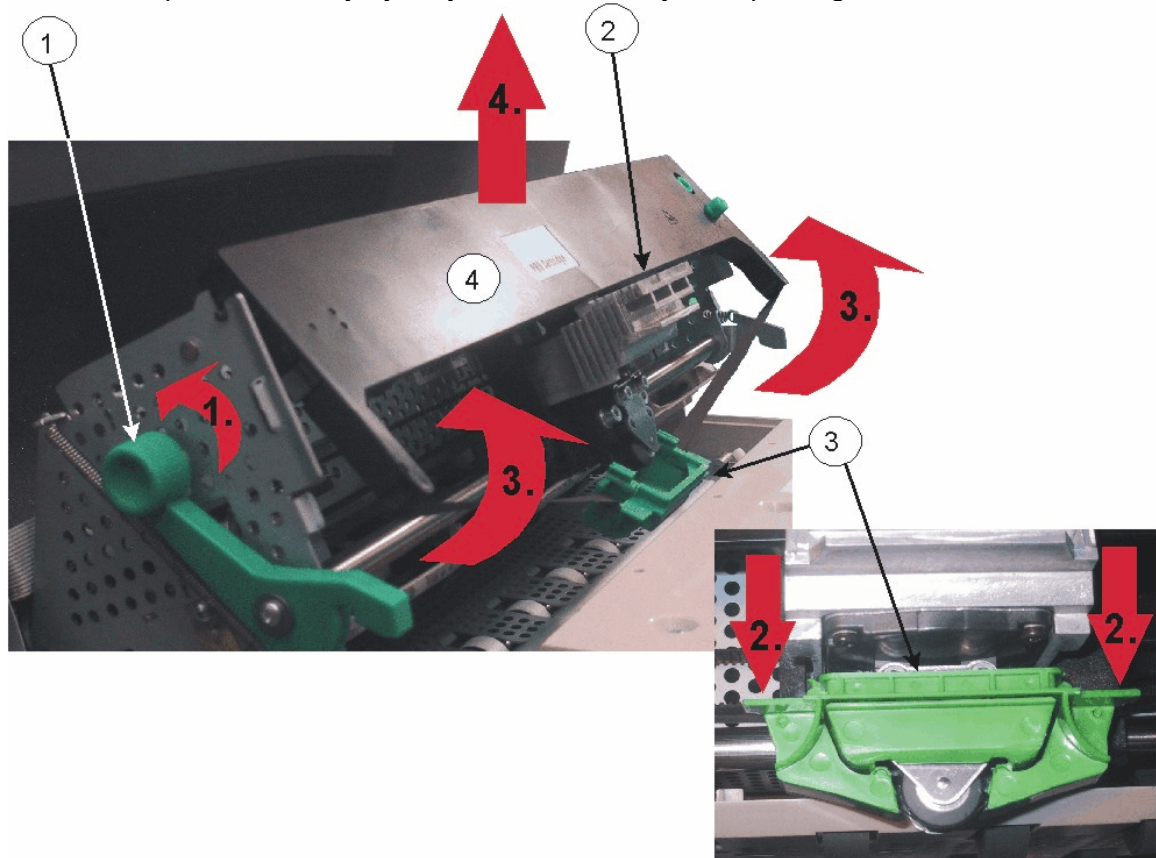
Note: Before doing the cleaning, please switch off the printer and unplug the power cord first.

Don't use alcohol, liquor or brushes with hard hair to clean the printer. Be careful not to let water and other liquid flow into the inner of printer.

4.1.1 Remove the Ribbon

- Power the printer on.
- Open the top cover; the print head (2) is moving to the centre.
- Step 1: swivel the green print unit lift handle (1) backwards to lift the print unit entirely.
- Step 2: loosen the green ribbon guide (3) by pressing downwards.
- Step 3: lift the ribbon cassette (4) by rotation as shown in the picture below.
- Step 4: take the ribbon cassette (4) out of the printer.
- Power the printer off.

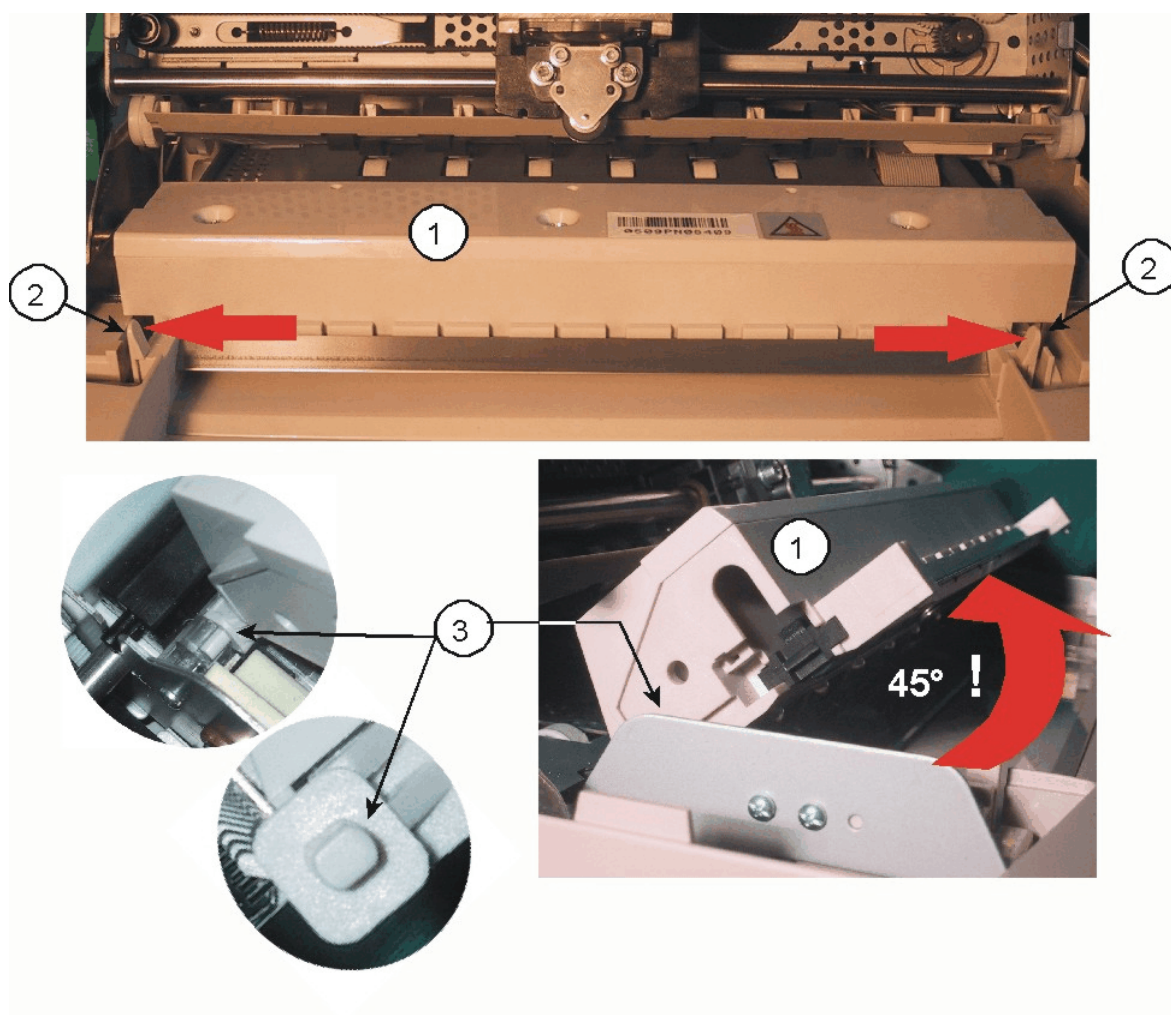
Caution: The print head may be very hot immediately after printing.



4.1.2 Remove the Alignment Unit

- Power the printer off
- Open the Top Cover
- Swivel the green print unit lift handle (see the photo on the page before) backwards to lift the print unit entirely.
- Press both Levers (2) to the outside of the printer
- Swivel the Alignment Unit up to about **45°**. Now the Pins (3) on both sides of the Alignment Unit (1) are in the correct position.
- Lift the Alignment Unit (1) out of the printer.

Note: Both pins (3) are flatten and so is it only possible to take out the Alignment Unit in an angle of **45°**!



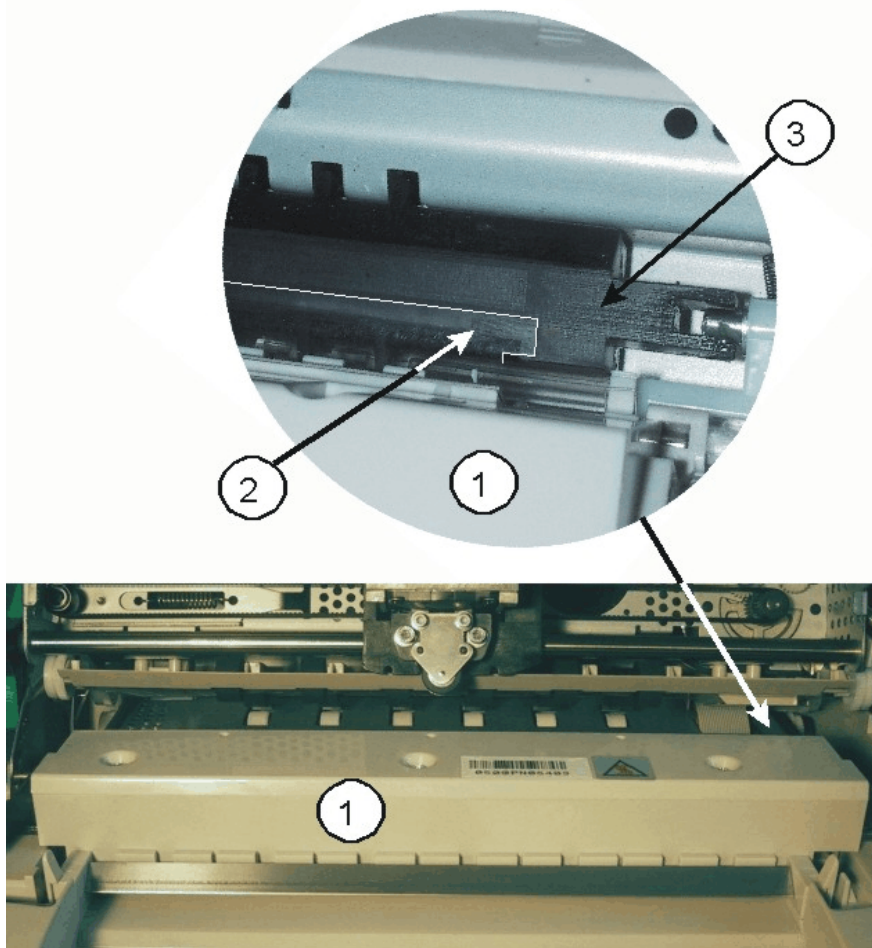
4.1.3 Cleaning Procedure

- Thoroughly brush and vacuum all accessible areas to any paper flock and dust.
- Clean the black platen's surface, the transport rollers.
- Clean also the rollers on the lower side of the Alignment Unit.
- Clean the covers and operator panel with damp, lint-free cloth. Do not use some cleaning solvents or excessive amount of water.

4.1.4 Install the Alignment

- Mount the Alignment Unit. Execute the removing procedure in reverse sequence.

Attention: Take care that the foil (2) at the rear side of the Alignment Unit (1) will not be damaged and is flat over the Print Bar (3)!



4.1.5 Install the Ribbon Cassette

- Insert the Ribbon Cassette. (see paragraph 1.5)
- Swivel down the Print Unit with the green print unit lift handle to its normal position.
- Close the Top Cover.
- Connect the Power Cord.

5. Options

5.1 Tractor Unit for Printer PR 9

One of the options for the printer PR 9 is a special Tractor Unit. With this unit the printer controls fanfold paper.

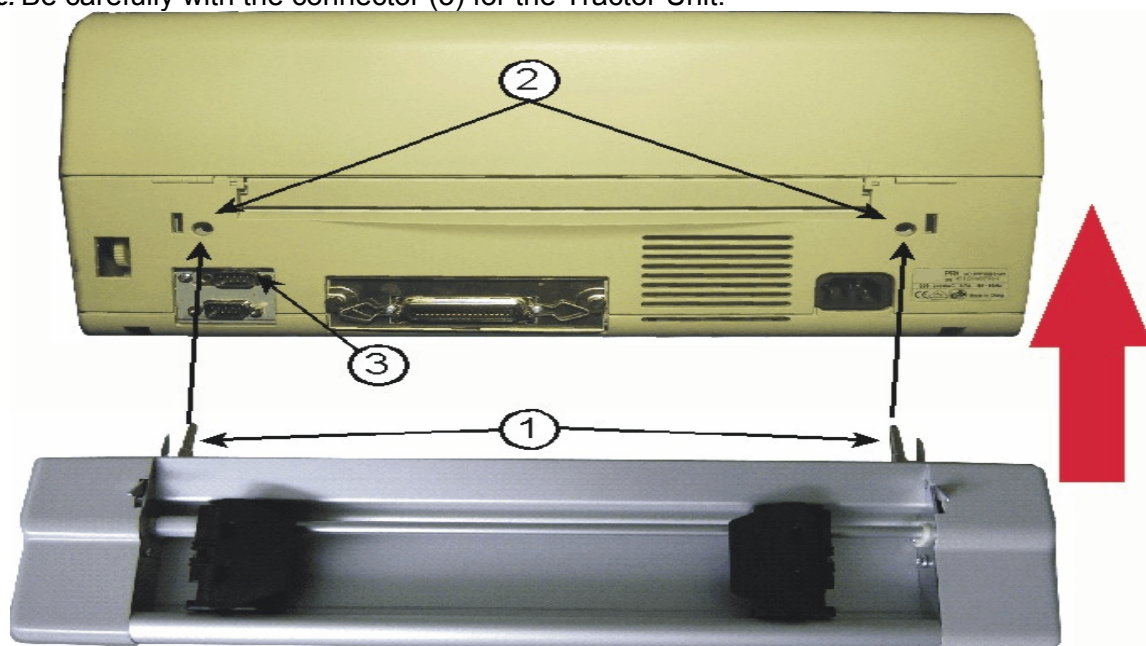


5.1.1 Assembly

To use the PR 9 Tractor Unit, please make sure that the hardware of PR 9, which you use, supports a Tractor Unit. If you are not sure, ask your system manager.

- To connect a Tractor Unit to Printer PR 9, first turn off the PR 9.
- Slide both two pins (1) of the Tractor Unit into these corresponding slots (2), which are in the rear of the PR 9.
- Press the Tractor Unit to the printer until you hear a click.

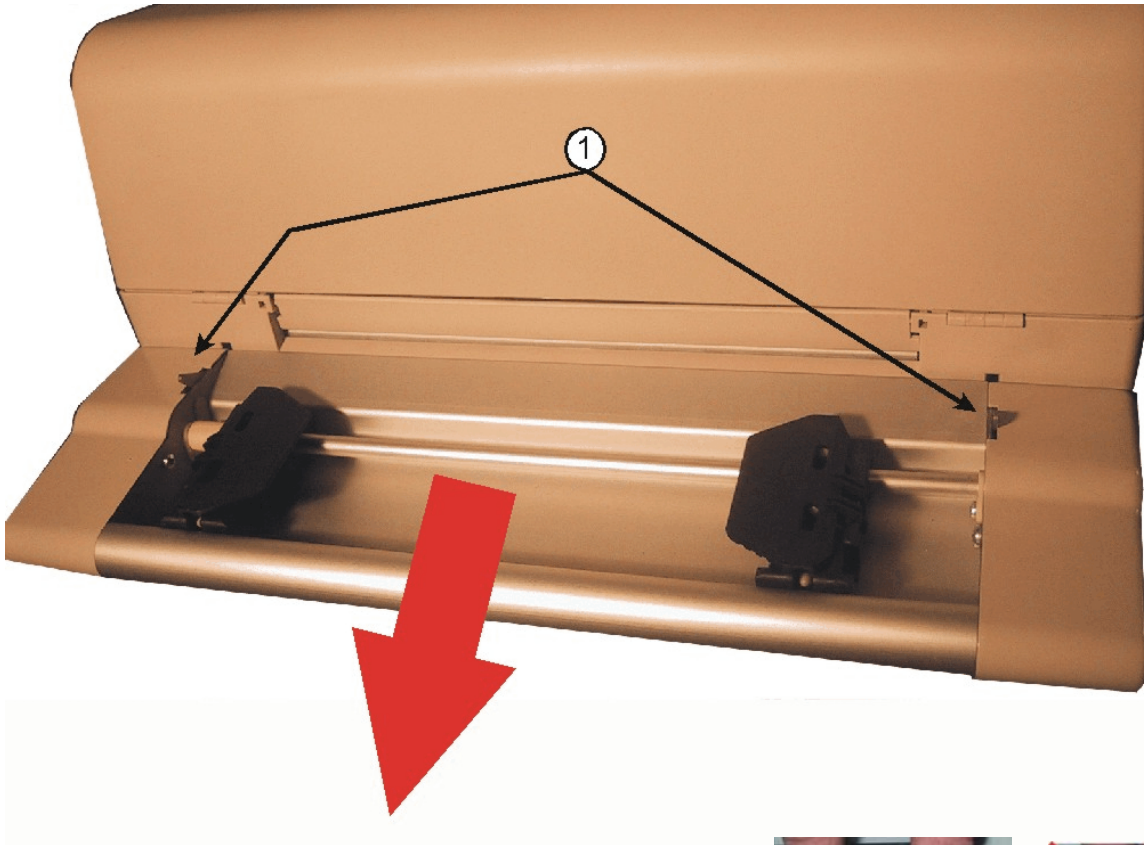
Note: Be careful with the connector (3) for the Tractor Unit.



Warning: Be sure to use the right firmware, which supports the Tractor Unit. The Tractor Unit is not supported by some early PR 9 firmware releases.

5.1.2 Disassembly

- To unload a Tractor Unit from PR 9, first turn off the PR 9.
- Press down each of the two levers (1) of the Tractor Unit.
- Draw the Tractor Unit backward to get free the Tractor Unit from Printer PR 9.



5.1.3 Loading Paper

- Roughly adjust the right tractor (2) to the paper width.



- Open the tractor covers (3) and insert the paper.



- Close the tractor covers (3).
- Tighten the upper edge of the fanfold paper by slightly pushing the right tractor to the right. Make sure not to stress the paper too much.

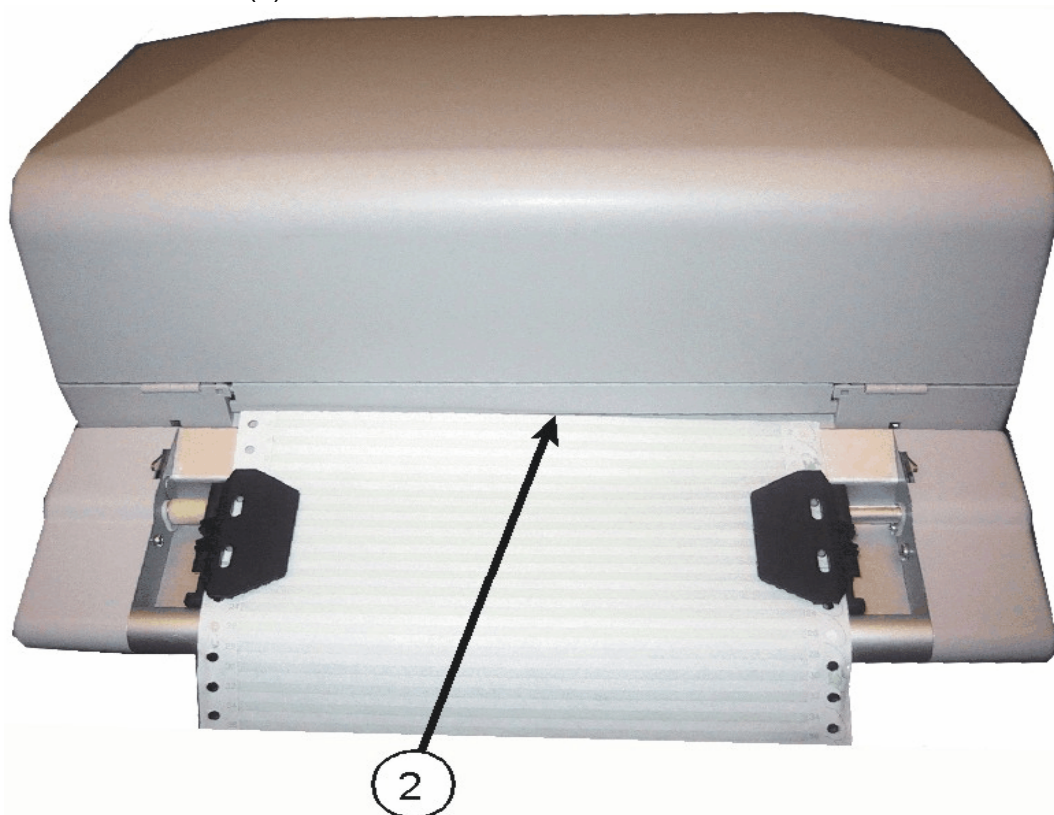
Note: To avoid paper bottom measurement error, please do not use those fanfold paper, which length is less than 5 inches.
Be sure to avoid top of the paper overstepping the tractor wheel too much, when installing the fanfold paper.

5.1.4 Tear Off Edge and Park Position

- In front of the Printer PR 9 you will find the Tear Off Edge (1).



- The Park Position (2) of the PR 9 is at the rear.



5.1.5 Key Functions

You can select PR 9 working mode as normal mode or as tractor working mode by pressing the keys if there is a Tractor Unit connected to the PR 9.

Function Key	On-line Mode		Off-line Mode
	Normal Mode	Tractor Mode	Tractor Mode
[FEED/EJECT ▲] together with [STOP ■]	switching into the tractor working mode	switching into the normal working mode The printer will insert fanfold paper. If the fanfold paper had already in the PR 9 but the paper is not at the tear-off position, then the PR 9 will move the paper to the tear-off position. Otherwise if there is one paper in the printer and the paper position is at the tear-off position, then the PR 9 will move the fanfold paper to top of form position.	

Note: When working on tractor mode, **TRACTOR** will be displayed on the PR 9 LCD. To let paper return to the top of form position from the Tear-off position, you can wait 10 seconds or you can press the **[FEED/EJECT ▲]** and **[STOP ■]** key together.

Function Key	On-line Mode		Off-line Mode
	Normal Mode	Tractor Mode	Tractor Mode
[FEED/EJECT ▲]	the PR 9 ejects paper	<p>If there is no paper in the printer, then the PR 9 will try to insert paper once.</p> <p>If paper had already in the PR 9 and paper is not at the Tear-off position, then the PR 9 will move the paper to the Tear-off position.</p> <p>If there is paper in the printer and the paper position is at the Tear-off position, then the PR 9 will move paper position to top of form position.</p> <p>tractor top adjustment sub-mode: Positive direction top adjust in 1/20 inch per pressing.</p> <p>To move paper return to the top of form position from the Tear-off position, you can wait 10 seconds or you can press [FEED/EJECT ▲]</p>	In case fanfold paper positive-direction vertical movement the sum is more than 12 inches, PR 9 does a formfeed, otherwise PR 9 moves fanfold paper to park position.
[STATION 2] together with [FEED/EJECT ▲]		Enter tractor top adjustment sub-mode.	
[STOP] together with [COMPRESS ▼]		<p>PR 9 switches from working mode to normal mode.</p> <p>If there is a paper in the printer, it will move the paper to the Tear-off position first and draws back the paper to the Park position automatically after 10 seconds.</p>	
[COMPRESS ▼]			Negative-direction top adjust in 1/20 inch per pressing.

5.1.6 Corresponding Menu Setting up

Auto choose tractor working mode for each port (RS1 or CX).

There are three items under **CONFIGURE** menus set:

- **MANUAL**
- **TRACTOR**
- **NORMAL**

5.1.7 Configure Option Tractor

OPTION TRACTOR		
Parameter	Option	Explanation
TRACTOR MODE (RS1)	TRACTOR MANUAL Normal	TRACTOR : when this item is selected, PR 9 switches to tractor mode if any data arrives at the corresponding port. MANUAL : when this item is selected, PR 9 working mode, normal mode or tractor mode, is only determined by buttons. It is also the default selection for all ports. NORMAL : when this item is selected, PR 9 switches to normal mode if any data arrives at the corresponding port.
TRACTOR MODE (CX)	TRACTOR MANUAL Normal	
PAGE LENGTH (1")	11 1 up to 30	Set page length for Tractor mode in steps of 1 Inch.
PAGE LENGTH (1/60")	0 0 up to 50	Set page length for Tractor mode in steps of 1/60 Inch.
TOP ADJ (1/20")	0 -6 up to +6	Adjust the Top Of Form in steps of 1/20 Inch
LEFT MARG. (1/20")	0 -6 up to +20	Set Left Margin for Tractor mode in steps of 1/20 Inch.
TEAR WAIT (1s)	10 3 up to 15	Set Tear Off time in seconds for Tractor mode.
TEAR BF. SW	YES NO	

Note: The Off line operations, such as **MENU PRINTING** or **PRINTING TEST**, are only supported on normal mode.

5.2 Optional Devices

Following optional devices can be provided:

- Serial interface port 2
- USB interface (in preparation)

Add the second interface port

Printer has basic configuration of one standard serial and parallel communication interface. At the rear of printer there is a second interface installation slot, this slot is be used in the standard Version by the parallel interface. A special version of PR 9 can be provide without the parallel interface port.

This slot can be used than for option boards and cards as below:

- Second serial interface board and USB interface board
- Second serial interface board or
- USB interface board

Note: When printer equipped with second or more other data communication interface boards, interface working mode can be selected by menu setup configuration.

– Working with single communication port

- Printer can only work according to the interface mode and emulation selected by menu configuration, even if printer has been equipped with more interface boards.

– Working with dual-port

- If printer has been equipped with option interface board, operator can set up printer working mode to be dual-port mode through the operator panel to meet different usage requirement.
- If printer has been installed second serial port board and USB interface board, there are only two serial ports(first serial port and second serial port) can work synchronously. Under this configuration, printer can check witch port is active. Any one of these two ports, if its data has been received, printer will be under the control of this port, and be kept in this state till this port task is end. Two ports are independent. And two ports have the same configuration except emulation mode. Emulation mode can be shifted by commands.
- If printer has been installed with second parallel interface board and configured as dual-port activity, it will check witch port buffer has data. If any one of these two ports detect data has been received, printer will be under the control of the port and it will be kept in this state till port task is end. Dual-port functionality and corresponding parameters can be selected though operator panel. Under the especial circumstance, each port can has its own emulation mode, and using commands can shift emulation mode.
- If printer hardware configuration has two interface and the setup item interface in the menu is UAL then it can print out two interface corresponding emulation configuration in self-test sheet. Printer can set which port to be active and emulation mode according to host communication port

6. Technical Data

6.1 Technical Specification

Printhead:

- Number of needles: 24
- Needle Diameter: 0.25 mm
- Needle Material: tungsten carbide
- Needle alignment: staggered two lines, 12+12
- Matrix form: diamond-shaped
- Multi-copy print: 1+6
- Thermal protection: PTC
- Life of print head: >600 million dots/needle

Font:

- Latin character: HSD, Draft, Roman, Sans Serif, Italic, OCR-A, OCR-B, E13B.
- Chinese character: GB18030 (SONG Style), UNICODE and BIG-5 traditional Chinese character.

Character Set:

- Chinese character: GB18030
- ASCII character: 54 codepages

CPI:

- Chinese character:
5CCPI, 6CCPI, 6.9CCPI, 7.5CCPI, 8.3CCPI, 8.5CCPI, 9CCPI, 10CCPI
- ASCII character:
10CPI, 12CPI, 13.8CPI, 15CPI, 16.6CPI, 17.1CPI, 18CPI, 20CPI

LPI: 1/5", 1/6", 1/8", n/72", n/180", n/216", n/240", n/360"

Printing Speed:

	HSD	Draft	NLQ	LQ
Chinese Character (CCPS)	200	150	75	50
ASCII Character (CPS)	400	300	150	100

Form Feed Speed: 32 cm/s

Alignment Speed: <0.3 s

Bar Code Printing: EAN 8, EAN 13, UPC-A, UPC-E, Code 39, Code 128, Codabar, 2 of 5 industrial, 2 of 5 interleaved

Graphics Dot Matrix Density:

- 9 needles: 60 DPI, 72 DPI, 80 DPI, 96 DPI, 120 DPI, 240 DPI
- 24 needles: 60 DPI, 120 DPI, 180 DPI, 240 DPI, 360 DPI

Machine ID: each machine has an unique ID Number.

Diagnose:

- Self-diagnose,
- Hex print,
- Remote interrupt by interface,
- Remote intelligence service by interface,
- Self-test when power on.

Ribbon Cassette:

- Ribbon: black fabric
- Ribbon Length: 18 m
- Ribbon Width: 7 mm
- Useful ribbon Life: 5 million characters (HSD)

Machine Character:

- Dimensions: 398 x 296 x 215 mm (W x D x H)
- Weight: 9.0 kg (Basic Model)

Electric Character:

- Rated Voltage: 220 VAC \pm 10%
- Frequency: 50 HZ / 60 HZ
- Power Consumption: operating approx. 170 W (max), 15 W Standby

Environment:

- Temperature: 5 - 35° C
- Humidity: 15 - 85% (no frost)
- Noise level: < 54 dBA acc. to ISO 7799

Quality Characteristics:

- MTBF: \geq 10,000 hours
- EMC and radio interference character: acc. to CCC.

6.2 Document Specification and Technical Instruction

Disposable Form:

- Single sheet or multi-copy paper
- Bill (card)
- Horizontal or vertical passbook

Caution: If the print media do not accord to the above character, you have to discriminate it carefully before you use it.

Printing Media Character:

- Input media handwork
- Margin align automatically
- Max thickness 2.2 mm
- Max width 245 mm
- Max length per line 10 CPI (238 mm)

- Standard of top of page of document and passbook
 (measured from the character's bottom):
 - PR 9 emulation = 4.3 mm
 - IBM PP II = 4.3 mm

- The min distance from the last basic printing line to the page bottom margin:
 - 5 mm (0.2 inch)

- Min value of document rear (measured from the character bottom):
 - PR 9 emulation = 3.1 mm
 - IBM PP II = 10 mm

- Min rear value of the passbook page:
 - 5 mm

- Left and right margin value of document LH/RH:
 - min 3.1 mm \pm 0.3 mm

- Left and right margin value of passbook LH/RH
 - min 3.1 mm \pm 0.3 mm

- Min distance between last basic line character above the cord and horizontal cord:
 - 5 mm

- Min distance between last basic line character below the cord and horizontal cord:
 - 8 mm

- Distance between character Axial wire and vertical cord
 - 5.08 mm

Document

– Single and multi-copy Sheet:

- Max width 245 mm
- Min width 80 mm
- Suggested max length 297 mm
- Permitted max length 450 mm
- Single sheet weight: 45 g - 160 g/m² (when you set the **SPECIAL FORM** to **YES**, it can print thin paper with above 35 g/m²)
- Thickness of single sheet 0.06 mm - 0.28 mm
- Weight of original and Duplicated document 40 - 60 g/m²
- Weight of carbon 20 - 34 g/m²
- Max number of duplicated document 1+ 4 (paper weight equal average document value)
- Recommended weight

original	50 g/m ²
last copy	60 g/m ²
- Multicopy gluing At the top or on the side
- Max paper weight of multicopy forms 380 g/m²
- Printing quality (with multicopy forms) LQ or NLQ

– Horizontal Passbook

- Max width when open 241 mm
- Min width when open 90 mm
- Max length when open 220 mm
- Min length when open 85 mm
- The followings are recommended:
 - Max thickness with book open 2 mm
 - Cover thickness 0.2 mm - 0.5 mm
 - Type of Binding Thread-sewn, without metal staples or clips

Note: New or folded passbooks have to be flatting before put it into a printer!

– Document

- Single/multi copy
- Min length 70 mm

7. Interface Description

7.1 Serial Interface

Standard **PR 9** has one asynchronous V24 RS232C serial interface with 9 cores connected to the host.

Technical Character:

The following parameters can be modified in SET-UP:

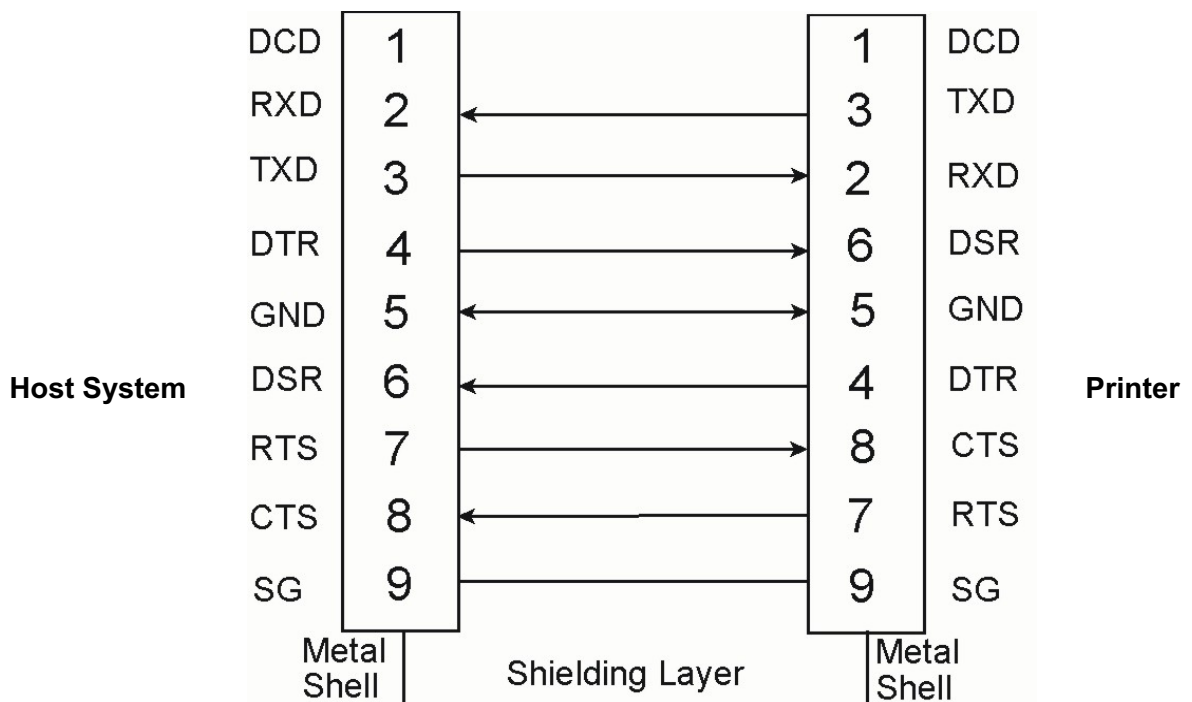
- BAUD RATE: 2400, 4800, 9600, 19200 (bit/s)
- BITS/CHARACTER: 7 or 8 bits
- STOP BITS: 1 or 2 bits
- PARITY: none, even or odd.
- DSR: YES or NO

Communication Cable:

- HOST: 9 PINS (DB-9S)
- PRINTER: 9 PINS (DB-9S)

This protocol uses the following signal lines:

- Receive Data (RXD)
- Transmit Data (TXD)
- Data Terminal Ready (DTR)
- Projective Ground (GND)
- Data Set Ready (DSR)
- Clear To Send (CTS)
- Ready To Send (RTS)
- Signal Ground (SG)



7.2 Parallel Interface

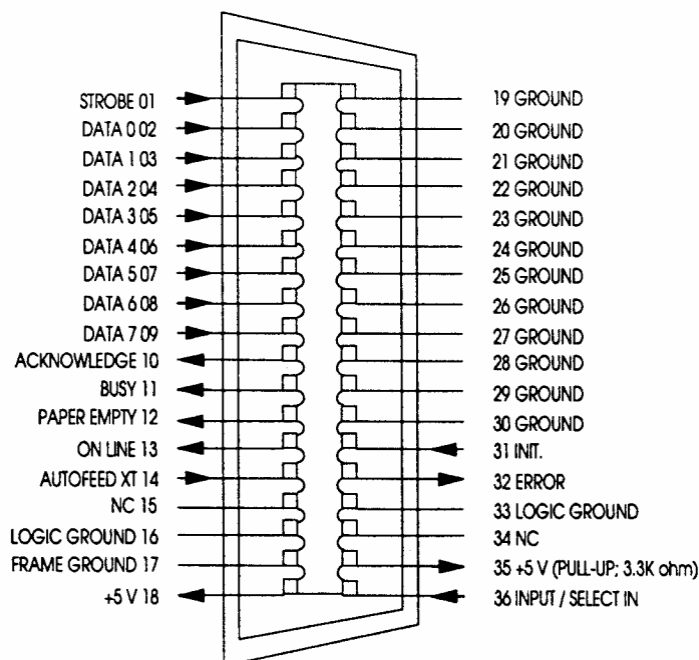
The PR 9 parallel interface according to IEEE 1284-1994 standard, support SPP, nibble, byte protocol.

Instruction of parallel interface as follows:

Technical Character:

- Compatibility: CENTRONICS
- Logic circuit: TTL
- Data format: 7 or 8 bits
- Logic level: 0 - 5 V
- Connector: 36 pins

All the input and output signal was connected to a 5V voltage by a 2.2k ohm resistance
Interface signal:



7.3 USB Interface (in preparation)

- USB characters
- Type: terminal
- Reference standard: Universal Serial Bus
- Transmission speed: ≥ 200 kbps

8. Firmware Update

You will be advised to update the printer's firmware irregularly to strengthen PR 9's functions and will offer the necessary firmware file to users (usually the firmware file is named **flash.mot**).

To update PR 9's firmware please follow the steps below:

- Copy the firmware file **flash.mot** to a Personal Computer.
- Connect PR 9 to one of the PC's parallel ports (usually LTP1 port), and power on the PC.
- Connect a 220-V power line to the PR 9 printer.
- Press the **[STOP ■]** key and push the **power button** together to power on the PR 9.
- Do not release the **[STOP ■]** key until the current firmware's edition is displayed on the printer's LCD.



PR 9 VERx xx TX

- Hold on to press the **[STOP ■]** key until LCD shows as:



RELEASE STOP KEY

- After LCD's displaying become stable, you can release the **[STOP ■]** key and the LCD will display "PROGRAM UPDATE".



PROGRAM UPDATE

- Copy the firmware file **flash.mot** binary to the PC's parallel port, which is connected to the PR 9. Usually we suggest the user to use the command under MS-DOS like this:

c:\>copy flash.mot lpt1 /b

Firmware Update

- Now the downloading process will begin.



UPDATE BUSY

- During the downloading process PR 9's LCD will display how many bytes the printer has received.



PROGRAMMING 13BB0

- The whole downloading process will last about three minutes. After updating is finished successfully, LCD shows:



UPDATE O.K.

- Now the PR 9 will automatically reset after downloading process finished.
- Firmware upgrading finished after PR 9's automatically resetting finish, and PR 9 can be used normally.

Warning: Power off during the process of firmware upgrading is forbidden, otherwise the printer will be destroyed.

9. Troubleshooting

How to Use This Section

There are some examples, which will help you to solve the printer troubles that may occur during use.

Warning: If there are mechanical or electrical troubles, don't repair by yourself. Ask your service centre for help.

If you cannot find the troubles in the following pages, please contact your local service office for technical support.

1. Find the category in which your problem occurs. The problem categories are:
 - Power-related Problems
 - Uncompleted Power On
 - Ribbon or Carriage related Problems
 - Paper-related Problems
 - Print-related Problems
 - No Printout
2. Find the symptom description that most closely matches the printer symptom.
3. Try the first suggestion under that heading.
4. If the suggestion does not cure the problem, try the next suggestion.
5. If none of the suggestions enable you to continue printing, or if the fault is not listed, contact your service office.

9.1 Power-related Problems

- The power indicator does not come on when power is switched on.
- Check that the power cord and plug are securely fitted to the printer and to an electrical outlet.
- Ask for the power connector connections to be verified.
- Ask for the building electrical supply to be verified.

9.2 Uncompleted Power On

After you powered on the printer, the printhead does not return to the left edge, which means the printer did not finish the internal self test.

- Check whether the component used to protect the printhead and the sponge have been removed or not.
- Check if there is any object which is blocking the motor.
- Check whether the top cover is closed or not.
- Restart the printer to try again.
- Check whether the printhead moves smoothly or not.
- Check whether the ribbon box is settled correctly or not.

9.3 Ribbon or Carriage-related Problems

– Ribbon Problems

- Make sure that the ribbon is:
 - Stretched correctly;
 - Not worn thin or dry;
 - Not torn or damaged in any other way;
 - Not jammed.
- If the ribbon box is damaged, replace it with a new one.

– Carriage does not move smoothly

- Examine the paper pathway. Remove any obstructions. Check that all packing material is removed.
- Examine the carriage area for obstructions. Remove where necessary.

9.4 Paper-related Problems

– The printer does not accept the sheet

- Check whether the document is within specifications or not
- Check whether the document is inserted and aligned correctly or not

– Fanfold Paper is not positioned at perforation for tear-off feature

- Select the correct form length using the Set-up feature.
- Reset top of form by performing a Parking function.

– Paper tears or jams

- Examine the paper path; remove any obstructions.

Note: To clean the paper path remove the Alignment Unit as described in **paragraph 4.1.2.**

- Paper is ropy, such as crimp.
- Multi-carbon does not bond well together.
- Too thick, too thin or too many sheets of paper.
- There is residue of paper or fibre on the printing media.
- Paper with clip or pin (which would damage the printer seriously)

Note: See **paragraph 6.2 Document Specification.**

– Paper jam with printer including the optional Tractor Unit

- Is the fanfold paper too loose or too taut between the tractors?
- If the holes in the paper are deformed at their outer edges, the paper is too taut.
- If the paper rises between the tractors, it is too loose.
- Readjust the tractor spacing so that the paper lies smoothly but without any tension.
- Ensure that the paper is horizontally aligned on the pins.

9.5 Print-related Problems

Note: The PR 9 printer has the function of overheating protection. If overheating protection will be active the printer may slow down printing speed or even stop printing after a long time printing (until printhead's temperature returns normal). This function can prevent print head from being destroyed if print head is over heated.

- **Print faint or of poor quality.**
 - Have you used the correct paper? See Chapter 6 **Technical Data** which contains a full specification of the paper you can use. Replace the paper if it does not match the specification.
 - Make sure that the ribbon is stretched correctly.
 - Does the ribbon need changing? Replace it with a new ribbon if necessary.
 - Is the ribbon cartridge properly installed? Adjust as necessary.
- **Characters do not print evenly or are not uniform in pitch**
 - Examine the paper pathway for dirt or other obstruction that may cause the gap between print head and platen to vary. Remove the obstruction.
 - Incorrect installation of ribbon box or the ribbon tied.
- **Part of printed text is missing (loss of data)**
 - If you are using Serial communication check the buffer control setting in Set-up.
 - Check the data flow control setting on the host computer.
- **Dot Missing**
 - If white lines appear on characters at certain fixed position, there are probably several needles broken or crooked. When this happens, please contact your printer supplier to replace the damaged printhead.

Note: Please avoid printing on the edge of the paper! It may cause printer needle broken.

9.6 No Printout

- **Self-test printout does not start**
 - Make sure that you have closed the cover.
 - Check if paper is loaded in the printer.
 - Check if ribbon cassette is installed correctly on printer.
- **Printing does not start**
 - Check if the physics and logic connection between printer and host system are correct and at least one LED should be light.
 - Check if LCD displays **ON LINE** and check if the communication interface parameters have been set up correctly.
 - Make sure that the printer is connected to the host computer. (Refer to Paragraph 1.8 **Connection to the System**). Make sure that connectors are properly fixed at both ends.
 - Make sure that the printer is receiving data from the host computer.
 - Make sure that the correct protocol is enabled.
 - Make sure that you have selected the correct port (if the automatic feature has not been selected).
 - Make sure that paper is loaded.
 - Make sure that the ribbon is installed.
 - Examine the ribbon path. Does the ribbon pass in front of the whole printhead? Adjust the ribbon if necessary.

Appendix A Code Pages

Code page of **PR 9**

Under OLIVETTI Emulation: set code page by changing menu configuration or command **ESC [nnn** on line.

nnn	OLIVETTI Character Set	IBM/PC Character Set			
		nnn	PC Character Set	nnn	ISO Character Set
"000"	International	"700"	PC-437 International	"600"	ISO 8859/1 Latin 1
"010"	ST15INI International	"701"	PC-220 Spain 2	"602"	ISO 8859/9 Latin 5
"020"	ST15D Germany	"710"	PC-865 North Europe (Sweden)	"605"	ISO 8859/2 Latin 2
"030"	ST15P Portugal	"711"	PC- DK/N Denmark / Norway	"615"	ISO 8859/5 Slavic
"040"	ST15E Spain	"712"	PC-DK Denmark	"617"	ISO 8859/15
"050"	ST15DK/N Denmark / Norway	"720"	PC-860 Portugal	"620"	ISO 8859/6 Arabia
"060"	ST15F French	"730"	PC-863 Canada (French)	"623"	ISO 8859/7 Greece
"070"	ST15ITA Italy	"740"	PC-850 Latin 1	"625"	ISO 8859/8 Hebrew
"080"	ST15S/SF, Sweden/Finland	"741"	PC-858 Europe	"680"	OLI-UNIX
"090"	ST15CH Swiss	"742"	PC-857 Latin 5		
"100"	ST15UK Britain	"750"	PC-852 Latin 2		
"110"	ST15USA America	"770"	PC-851 Greece		
"140"	ST15GR Greece **	"771"	PC-210 Greece *		
"150"	ST15IL Israel **	"780"	PC-855 Slavic		
"170"	ST15E2 Spain 2**	"781"	PC-862 Israel		
"180"	ST15USSR	"782"	PC-864 Arabia		
"200"	ST15YU Yugoslavia *	"783"	PC-866 Slavic		
"410"	ST31 * *	"640"	PC-WIN Latin 1		
"500"	ST15CND Canada**	"645"	PC-WIN Latin 2		
"510"	ST15SDC SDC	"910"	CHINA		
"520"	ST15TR Turkey**	"911"	CHN2		
"530"	ST15ARABIC	"912"	PC-866-BG(Bulgaria)		
"540"	ST15CIBC	"913"	PC-Ger.(Germany)		

A.1 Olivetti

OLIVETTI CHAR SET

ST15INI

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F

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2		"	2	B	R	b	r									
3		#	3	C	S	c	s									
4		⌘	4	D	T	d	t									
5		%	5	E	U	e	u									
6		&	6	F	V	f	v									
7		'	7	G	W	g	w									
8		(8	H	X	h	x									
9)	9	I	Y	i	y									
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OLIVETTI CHAR SET

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2		"	2	B	R	b	r									
3		#	3	C	S	c	s									
4		\$	4	D	T	d	t									
5		%	5	E	U	e	u									
6		&	6	F	V	f	v									
7		'	7	G	W	g	w									
8		(8	H	X	h	x									
9)	9	I	Y	i	y									
A		*	:	J	Z	j	z									
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OLIVETTI CHAR SET

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2		"	2	B	R	b	r									
3		#	3	C	S	c	s									
4		\$	4	D	T	d	t									
5		%	5	E	U	e	u									
6		&	6	F	V	f	v									
7		'	7	G	W	g	w									
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OLIVETTI CHAR SET

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3		£	3	C	S	c	s									
4		\$	4	D	T	d	t									
5		%	5	E	U	e	u									
6		&	6	F	V	f	v									
7		'	7	G	W	g	w									
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9)	9	I	Y	i	y									
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OLIVETTI CHAR SET

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3			£	3	C	S	c	s								
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5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
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OLIVETTI CHAR SET

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2		"	2	B	R	b	r									
3		£	3	C	S	c	s									
4		\$	4	D	T	d	t									
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6		&	6	F	V	f	v									
7		'	7	G	W	g	w									
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9)	9	I	Y	i	y									
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OLIVETTI CHAR SET

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2		"	2	B	R	b	r									
3		#	3	C	S	c	s									
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6		&	6	F	V	f	v									
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OLIVETTI CHAR SET

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3			£	3	C	S	c	s								
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5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
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OLIVETTI CHAR SET

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2		"	2	B	R	b	r									
3		£	3	C	S	c	s									
4		\$	4	D	T	d	t									
5		%	5	E	U	e	u									
6		&	6	F	V	f	v									
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9)	9	I	Y	i	y									
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OLIVETTI CHAR SET

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2		"	2	B	R	b	r									
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6		&	6	F	V	f	v									
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OLIVETTI CHAR SET

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6		&	6	F	V	Φ	Ω									
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8		(8	H	X	H	X									
9)	9	I	Y	I	Y									
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OLIVETTI CHAR SET

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6		&	6	F	V	f	v									
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OLIVETTI CHAR SET

ST15 USSR

OLIVETTI CHAR SET

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2		"	2	B	R	b	r	â	ü	Â	Ç	˘	¥	þ		
3		#	3	C	S	c	s	à	Ä	À	Pt	ı	©	Ð		
4		\$	4	D	T	d	t	ù	Ö	Û	^	¿	«	ý		
5		%	5	E	U	e	u	û	Ü	Ô	ˆ	·	±	Ý		
6		&	6	F	V	f	v	ø	ß	Ø	´	ä	²	®		
7		'	7	G	W	g	w	õ	š	Õ	,	ó	³	þ		
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9)	9	I	Y	i	y	ò		—	€	ı	¶	ð		
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OLIVETTI CHAR SET

ST15CND

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3		#	3	C	S	c	s				Ⓑ	↓	Ê			
4		\$	4	D	T	d	t				Ⓒ	▽	È			
5		%	5	E	U	e	u				Ⓔ	△	É			
6		&	6	F	V	f	v				Ⓔ	→	Ë			
7		'	7	G	W	g	w				Ⓖ	⌘	Î			
8		(8	H	X	h	x				Ⓗ	*	Ï			
9)	9	I	Y	i	y				Ⓘ	£	Ô			
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OLIVETTI CHAR SET

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2			"	2	B	R	b	r								
3			£	3	C	S	c	s								
4			\$	4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(8	H	X	h	x								
9)	9	I	Y	i	y								
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OLIVETTI CHAR SET

ST15TR

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2		Ğ	2	B	R	b	r									
3		#	3	C	S	c	s									
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5		%	5	E	U	e	u									
6		&	6	F	V	f	v									
7		'	7	G	W	g	w									
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9)	9	I	Y	ı	y									
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OLIVETTI CHAR SET

ST15ARABIC

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0			0	@	P	`	p	€			♦	ك	ث	ص	ك	ك
1		!	1	A	Q	a	q				ل	ا	ا	ض	ك	ك
2		"	2	B	R	b	r				ئ	٢	ل	ط	ج	ل
3		#	3	C	S	c	s				ث	٣	ب	ظ	ح	م
4		\$	4	D	T	d	t				ث	٤	ن	ع	خ	م
5		%	5	E	U	e	u				ل	٥	ة	غ	ع	م
6		&	6	F	V	f	v				ى	٦	ث	ف	ع	ن
7		'	7	G	W	g	w				ب	٧	ج	ق	ع	ن
8		(	8	H	X	h	x				«	٨	ح	ك	غ	ه
9		)	9	I	Y	i	y				»	٩	خ	ل	غ	ه
A		*	:	J	Z	j	z					لا	ن	م	غ	ه
B		+	;	K	[	k	{					ب	:	ن	غ	ه
C		,	<	L	\	l	|						ة	ر	ه	ي
D		-	=	M	]	m	}					ب	ث	و	ق	ي
E		.	>	N	^	n	~						ء	س	ق	ن
F		/	?	O	_	o							ن	ش	-	ل

OLIVETTI CHAR SET

ST15CIBC

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0					0	@	P	`	p	Ç	É					Ù
1		!	1	A	Q	a	q	ü								
2		"	2	B	R	b	r	é							À	Ò
3		#	3	C	S	c	s	â	ô						Â	
4		\$	4	D	T	d	t								È	
5		%	5	E	U	e	u	à							Ê	
6		&	6	F	V	f	v	û								
7		'	7	G	W	g	w	ç	ù						Ë	
8		(	8	H	X	h	x	ê								
9		)	9	I	Y	i	y	ë		€						
A		*	:	J	Z	j	z	è	Ü						Î	
B		+	;	K	[	k	{	ï	φ						Ï	
C		,	<	L	\	l	|	î								
D		-	=	M	]	m	}									
E		.	>	N	^	n	~								Ô	
F		/	?	O	_	o										

A.2 PC Character Sets

PC CHAR SET

437(INT)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç	É	á	⌘	⌘	⌘	⌘	⌘
1			!	1	A	Q	a	q	ü	æ	í	⌘	⌘	⌘	⌘	⌘
2			"	2	B	R	b	r	é	Æ	ó	⌘	⌘	⌘	⌘	⌘
3	♥		#	3	C	S	c	s	â	ô	ú	|	|	⌘	⌘	⌘
4	♦		\$	4	D	T	d	t	ä	ö	ñ	|	-	⌘	⌘	⌘
5	♣	§	%	5	E	U	e	u	à	ò	Ñ	|	+	⌘	⌘	⌘
6	♠		&	6	F	V	f	v	ã	û	ä	|	|	⌘	⌘	⌘
7			'	7	G	W	g	w	ç	ù	ó	⌘	⌘	⌘	⌘	⌘
8			(	8	H	X	h	x	ê	ÿ	¿	⌘	⌘	⌘	⌘	⌘
9			)	9	I	Y	i	y	ë	Ö	⌘	⌘	⌘	⌘	⌘	⌘
A			*	:	J	Z	j	z	è	Ü	⌘	⌘	⌘	⌘	⌘	⌘
B			+	;	K	[	k	{	ï	Φ	½	⌘	⌘	⌘	⌘	⌘
C			,	<	L	\	l	|	î	£	¼	⌘	⌘	⌘	⌘	⌘
D			-	=	M	]	m	}	ì	¥	ì	⌘	=	⌘	⌘	⌘
E			.	>	N	^	n	~	Ä	Pt	«	⌘	⌘	⌘	⌘	⌘
F			/	?	O	_	o		Å	f	»	⌘	⌘	⌘	⌘	⌘

PC CHAR SET

220(E)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0					0	@	P	`	p	Ç	É	á	⌘	⌘	α	≡
1			!	1	A	Q	a	q	ü	í	í	⌘	⌘	⌘	β	±
2			"	2	B	R	b	r	é	Ó	ó	⌘	⌘	⌘	Γ	≥
3	♥		#	3	C	S	c	s	â	ô	ú	|	|	⌘	π	≤
4	♦		\$	4	D	T	d	t	ä	ö	ñ	|	-	⌘	Σ	∫
5	♣	§	%	5	E	U	e	u	à	ò	Ñ	⌘	⌘	⌘	σ	∫
6	♠		&	6	F	V	f	v	À	û	à	⌘	⌘	⌘	μ	÷
7			'	7	G	W	g	w	ç	ù	ó	⌘	⌘	⌘	τ	≈
8			(	8	H	X	h	x	ê	Á	¿	⌘	⌘	⌘	Φ	°
9			)	9	I	Y	i	y	ë	Ö	¡	⌘	⌘	⌘	θ	•
A			*	:	J	Z	j	z	è	Ü	⌘	⌘	⌘	⌘	Ω	•
B			+	;	K	[	k	{	ï	ò	½	⌘	⌘	⌘	δ	√
C			,	<	L	\	l	|	î	£	¼	⌘	⌘	⌘	∞	n
D			-	=	M	]	m	}	ì	Ú	ï	⌘	=	⌘	ø	²
E			.	>	N	^	n	~	Ä	Pt	«	⌘	⌘	⌘	ε	■
F			/	?	O	_	o		È	Ï	»	⌘	⌘	⌘	∩	

PC CHAR SET

865(NORDIC)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0					0	@	P	`	p	Ç	É	á	⌘	L	⌘	α	≡
1			!	1	A	Q	a	q	ü	æ	í	⌘	⌘	⊥	⌘	β	±
2			"	2	B	R	b	r	é	Æ	ó	⌘	⌘	⌘	⌘	Γ	≥
3	♥		#	3	C	S	c	s	â	ô	ú	|	|	⌘	⌘	π	≤
4	♦		\$	4	D	T	d	t	ä	ö	ñ	|	—	⌘	⌘	Σ	∫
5	♣	§	%	5	E	U	e	u	à	ò	Ñ	⌘	⌘	⌘	⌘	σ	∫
6	♠		&	6	F	V	f	v	ä	û	ä	⌘	⌘	⌘	⌘	μ	÷
7			'	7	G	W	g	w	ç	ù	ó	⌘	⌘	⌘	⌘	τ	≈
8			(	8	H	X	h	x	ê	ÿ	¿	⌘	⌘	⌘	⌘	Φ	°
9			)	9	I	Y	i	y	ë	Ö	⌘	⌘	⌘	⌘	⌘	Θ	•
A			*	:	J	Z	j	z	è	Ü	⌘	⌘	⌘	⌘	⌘	Ω	•
B			+	;	K	[	k	{	ï	ø	½	⌘	⌘	⌘	⌘	δ	√
C			,	<	L	\	l	|	î	£	¼	⌘	⌘	⌘	⌘	∞	n
D			—	=	M	]	m	}	ì	Ø	ì	⌘	⌘	⌘	⌘	ø	²
E			.	>	N	^	n	~	Ä	Pt	«	⌘	⌘	⌘	⌘	ε	■
F			/	?	O	_	o		Å	f	α	⌘	⌘	⌘	⌘	∅	∅

PC CHAR SET

DK/N

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0					0	@	P	`	p	Ç	É	á	⌘	L	⌘	α	≡
1			!	1	A	Q	a	q	ü	æ	í	⌘	⌘	⊥	⌘	β	±
2			"	2	B	R	b	r	é	Æ	ó	⌘	⌘	⌘	⌘	Γ	≥
3	♥		#	3	C	S	c	s	â	ô	ú	|	|	⌘	⌘	π	≤
4	♦		\$	4	D	T	d	t	ä	ö	ñ	|	-	⌘	⌘	Σ	∫
5	♣	§	%	5	E	U	e	u	à	ò	Ñ	|	+	⌘	⌘	σ	∫
6	♠		&	6	F	V	f	v	ã	û	õ	||	|	⌘	⌘	μ	÷
7			'	7	G	W	g	w	ç	ù	õ	⌘	||	⌘	⌘	τ	≈
8			(	8	H	X	h	x	ê	ÿ	¿	⌘	⌘	⌘	⌘	Φ	°
9			)	9	I	Y	i	y	ë	Ö	ã	||	⌘	⌘	⌘	θ	·
A			*	:	J	Z	j	z	è	Ü	Ã	||	⌘	⌘	⌘	Ω	·
B			+	;	K	[	k	{	ï	ø	ℓ	⌘	⌘	⌘	⌘	δ	√
C			,	<	L	\	l	|	î	£	ñ	⌘	⌘	⌘	⌘	∞	ⁿ
D			-	=	M	]	m	}	ì	Ø	ï	⌘	=	⌘	⌘	∅	²
E			.	>	N	^	n	~	Ä	Ł	³	⌘	⌘	⌘	⌘	ε	■
F			/	?	O	_	o		Å	ł	α	⌘	⌘	⌘	⌘	∩	

PC CHAR SET

DK

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç	É	á	⌘	L	⌘	α	≡
1			!	1	A	Q	a	q	ü	æ	í	⌘	⊥	⌘	β	±
2			"	2	B	R	b	r	é	Æ	ó	⌘	⌘	⌘	Γ	≥
3	♥		#	3	C	S	c	s	â	ô	ú	|	⌘	⌘	π	≤
4	♦		\$	4	D	T	d	t	ä	ö	ñ	|	—	⌘	Σ	∫
5	♣	§	%	5	E	U	e	u	à	ò	Ñ	⌘	⌘	⌘	σ	∫
6	♠		&	6	F	V	f	v	ã	û	õ	||	⌘	⌘	μ	÷
7			'	7	G	W	g	w	ç	ù	Õ	⌘	⌘	⌘	τ	≈
8			(	8	H	X	h	x	ê	ÿ	¿	⌘	⌘	⌘	Φ	°
9			)	9	I	Y	i	y	ë	Ö	ã	||	⌘	⌘	θ	•
A			*	:	J	Z	j	z	è	Ü	Ä	||	⌘	⌘	Ω	•
B			+	;	K	Æ	k	æ	ï	ø	ℓ	⌘	⌘	■	δ	√
C			,	<	L	Ø	l	ø	î	£	ñ	⌘	⌘	■	∞	n
D			—	=	M	Å	m	å	ì	Ø	ï	⌘	⌘	■	ø	²
E			.	>	N	^	n	~	Ä	Ł	³	⌘	⌘	■	ε	■
F			/	?	O	_	o		Å	ł	α	⌘	⌘	■	∩	

PC CHAR SET

860(P)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç	É	á	☒	Ł	ł	α	≡
1			!	1	A	Q	a	q	ü	À	í	☒	⊥	⌊	β	±
2			"	2	B	R	b	r	é	È	ó	☒	⌈	π	Γ	≥
3	♥		#	3	C	S	c	s	â	ô	ú	|	|	ł	π	≤
4	♦		\$	4	D	T	d	t	ã	õ	ñ	|	-	Ł	Σ	∫
5	♣	§	%	5	E	U	e	u	à	ò	Ñ	|	+	F	σ	J
6	♠		&	6	F	V	f	v	Á	Ú	ä	||	|	π	μ	÷
7			'	7	G	W	g	w	ç	ù	ó	||	||	||	τ	≈
8			(	8	H	X	h	x	ê	ï	¿	|	Ł	⌈	φ	°
9			)	9	I	Y	i	y	Ê	Ï	Ð	||	||	⌋	θ	•
A			*	:	J	Z	j	z	è	Ü	¬	||	||	Γ	Ω	•
B			+	;	K	[	k	{	í	Φ	½	||	||	■	δ	√
C			,	<	L	\	l	|	ô	£	¼	||	||	■	∞	n
D			-	=	M	]	m	}	ì	Ù	¡	||	=	■	ø	²
E			.	>	N	^	n	~	Ë	Þ	«	|	||	■	ε	■
F			/	?	O	_	o		Â	Ó	»	|	±	■	∩	

PC CHAR SET

863(CAN. FR.)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0					0	@	P	`	p	Ç	É	|	⌘	L	⌘	α	≡
1			!	1	A	Q	a	q	ü	È	´	⌘	⌘	⌘	β	±	
2			"	2	B	R	b	r	é	Ê	ó	⌘	⌘	⌘	Γ	≥	
3	♥		#	3	C	S	c	s	â	ô	ú	|	⌘	⌘	π	≤	
4	♦		\$	4	D	T	d	t	Â	Ë	¨	⌘	⌘	⌘	Σ	∫	
5	♣	§	%	5	E	U	e	u	à	Ï	,	⌘	⌘	⌘	σ	∫	
6	♠		&	6	F	V	f	v	¶	û	³	⌘	⌘	⌘	μ	÷	
7			'	7	G	W	g	w	ç	ù	—	⌘	⌘	⌘	τ	≈	
8			(	8	H	X	h	x	ê	æ	î	⌘	⌘	⌘	Φ	°	
9			)	9	I	Y	i	y	ë	ô	¬	⌘	⌘	⌘	θ	•	
A			*	:	J	Z	j	z	è	Ü	¬	⌘	⌘	⌘	Ω	•	
B			+	;	K	[	k	{	ï	Φ	½	⌘	⌘	⌘	δ	√	
C			,	<	L	\	l	|	î	£	¼	⌘	⌘	⌘	∞	n	
D			-	=	M	]	m	}	—	Û	¾	⌘	⌘	⌘	∅	²	
E			.	>	N	^	n	~	À	Ô	«	⌘	⌘	⌘	ε	■	
F			/	?	O	_	o		§	f	»	⌘	⌘	⌘	±	∩	

PC CHAR SET

850(LATIN 1)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0					0	@	P	`	p	Ç	É	á	⌘	L	ò	ó	-
1			!	1	A	Q	a	q	ü	æ	í	⌘	⌘	±	Ð	β	±
2			"	2	B	R	b	r	é	Æ	ó	⌘	⌘	⌘	Ê	Ô	=
3	♥		#	3	C	S	c	s	â	ô	ú	|	|	Ë	Ò	¼	
4	♦		\$	4	D	T	d	t	ä	ö	ñ	|	-	È	Ö	¶	
5	♣	§	%	5	E	U	e	u	à	ò	Ñ	Á	†	ı	Õ	§	
6	♠		&	6	F	V	f	v	ã	û	ä	Â	ã	Í	μ	÷	
7			'	7	G	W	g	w	ç	ù	ó	À	Ã	Î	þ	,	
8			(	8	H	X	h	x	ê	ÿ	¿	©	ℓ	Ï	Þ	°	
9			)	9	I	Y	i	y	ë	Ö	®	||	||	⌘	Ú	¨	
A			*	:	J	Z	j	z	è	Ü	¬	||	||	⌘	Û	·	
B			+	;	K	[	k	{	ï	ø	½	||	||	■	Ü	¹	
C			,	<	L	\	l	|	î	£	¼	||	||	■	Ý	³	
D			-	=	M	]	m	}	ì	Ø	ı	Φ	=	|	Ÿ	²	
E			.	>	N	^	n	~	Ä	×	«	¥	||	||	ÿ	■	
F			/	?	O	_	o		Å	f	»	⌘	⌘	■	'		

PC CHAR SET

858(LATIN EURO)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0					0	@	P	`	p	Ç	É	á	⌘	L	ð	Ó	-
1			!	1	A	Q	a	q	ü	æ	í	⌘	⌘	±	Ð	ß	±
2			"	2	B	R	b	r	é	Æ	ó	⌘	⌘	τ	Ê	Ô	=
3	♥		#	3	C	S	c	s	â	ô	ú	|	|	Ë	Ò	¾	
4	♦		\$	4	D	T	d	t	ä	ö	ñ	|	-	È	Ö	¶	
5	♣	§	%	5	E	U	e	u	à	ò	Ñ	Á	†	€	Õ	§	
6	♠		&	6	F	V	f	v	ã	û	ä	Â	ã	Í	μ	÷	
7			'	7	G	W	g	w	ç	ù	ó	À	Ã	Î	þ	,	
8			(	8	H	X	h	x	ê	ÿ	¿	©	ℓ	Ï	Þ	°	
9			)	9	I	Y	i	y	ë	ö	®	||	||	Ɔ	Ú	“	
A			*	:	J	Z	j	z	è	Ü	¬	||	||	Ɔ	Ó	•	
B			+	;	K	[	k	{	ï	ø	½	||	||	■	Ù	¹	
C			,	<	L	\	l	|	î	£	¼	||	||	■	Ý	³	
D			-	=	M	]	m	}	ì	Ø	¡	φ	=	|	Ý	²	
E			.	>	N	^	n	~	Ä	×	«	¥	||	||	Ï	—	■
F			/	?	O	_	o		Å	f	»	γ	α	■	'		

PC CHAR SET

857(LATIN 5)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0					0	@	P	`	p	Ç	É	á	⌘	L	o	ó	-
1			!	1	A	Q	a	q	ü	æ	í	⌘	⌘	⌘	⌘	⌘	⌘
2			"	2	B	R	b	r	é	Æ	ó	⌘	⌘	⌘	⌘	⌘	⌘
3	♥		#	3	C	S	c	s	â	ô	ú	|	|	Ë	ò	¾	
4	♦		\$	4	D	T	d	t	ä	ö	ñ	|	-	È	õ	¶	
5	♣	§	%	5	E	U	e	u	à	ò	Ñ	Á	+		Õ	§	
6	♠		&	6	F	V	f	v	ã	û	Ğ	Â	ă	Í	μ	÷	
7			'	7	G	W	g	w	ç	ù	ğ	À	Ă	Î		,	
8			(	8	H	X	h	x	ê	ï	¿	©	ℓ	Ï	×	°	
9			)	9	I	Y	i	y	ë	ö	®	||	||	||	||	||	
A			*	:	J	Z	j	z	è	Ü	¬	||	||	||	||	||	
B			+	;	K	[	k	{	ï	ø	½	||	||	||	||	||	
C			,	<	L	\	l	|	î	£	¼	||	||	||	||	||	
D			-	=	M	]	m	}	ı	Ø	ı	Φ	=	|	ÿ	²	
E			.	>	N	^	n	~	Ä	Ş	«	¥	||	||	||	||	
F			/	?	O	_	o		Å	ş	»	||	||	||	||	||	

PC CHAR SET

852(LATIN 2)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0					0	@	P	`	p	Ç	É	á	⌘	L	đ	Ó	-
1			!	1	A	Q	a	q	ü	Ł	í	⌘	⌘	⊥	Đ	ß	”
2			"	2	B	R	b	r	é	Í	ó	⌘	⌘	⌘	Ď	ô	‘
3	♥		#	3	C	S	c	s	â	ô	ú	|	|	Ě	Ň	ˇ	
4	♦		\$	4	D	T	d	t	ä	ö	Ą	†	-	ǎ	ń	˘	
5	♣	§	%	5	E	U	e	u	ű	Ł	ą	Á	†	Ń	ň	§	
6	♠		&	6	F	V	f	v	ć	Ź	Ž	Â	À	Í	Š	÷	
7			'	7	G	W	g	w	ç	Ś	ż	Ě	ǎ	Î	š	˙	
8			(	8	H	X	h	x	ł	ś	Ę	Ś	Ł	ě	Ř	°	
9			)	9	I	Y	i	y	ë	Ö	ę	||	||	Ĳ	Ú	”	
A			*	:	J	Z	j	z	Ő	Ü		||	||	ŕ	˙		
B			+	;	K	[	k	{	ő	ť	ž	||	||	■	Ů	ů	
C			,	<	L	\	l	|	î	ť	č	||	||	■	ý	Ř	
D			-	=	M	]	m	}	ž	Ł	ş	Ž	=	Ť	Ý	ř	
E			.	>	N	^	n	~	Ä	×	«	ž	||	||	Ů	ť	■
F			/	?	O	_	o		Ć	č	»	ſ	■		’		

PC CHAR SET

851(GREEK)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0					0	@	P	`	p	Ç	ı	ı	ı	ı	ı	ı
1			!	1	A	Q	a	q	ü		ı	ı	ı	ı	ı	ı
2			"	2	B	R	b	r	é	ó	ı	ı	ı	ı	ı	ı
3	♥		#	3	C	S	c	s	â	ô	ú	|	|	X	ı	φ
4	♦		\$	4	D	T	d	t	ä	ö	A	|	-	Ψ	κ	χ
5	♣	§	%	5	E	U	e	u	à	γ	B	K	+	Ω	λ	§
6	♠		&	6	F	V	f	v	À	û	Γ	Λ	Π	α	μ	ψ
7			'	7	G	W	g	w	ç	ù	Δ	M	P	β	ν	,
8			(	8	H	X	h	x	ê	Ω	E	N	Ł	γ	ξ	°
9			)	9	I	Y	i	y	ë	Ö	Z	ı	ı	ı	ı	ı
A			*	:	J	Z	j	z	è	Ü	H	ı	ı	ı	ı	ı
B			+	;	K	[	k	{	ï	á	½	ı	ı	ı	ı	ı
C			,	<	L	\	ı	|	î	£	θ	ı	ı	ı	ı	ı
D			-	=	M	]	m	}	Έ	έ	I	ı	ı	ı	ı	ı
E			.	>	N	^	n	~	Ä	ή	«	0	ı	ı	ı	ı
F			/	?	0	_	o		Η	ί	»	ı	ı	ı	ı	ı

PC CHAR SET

210(GR)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	A	P	ι	▤	⊥	⊥	ω	Ω
1			!	1	A	Q	a	q	B	Σ	κ	▤	⊥	⊥	á	±
2			"	2	B	R	b	r	Γ	T	λ	▤	⊥	⊥	é	≥
3	♥		#	3	C	S	c	s	Δ	Υ	μ	|	⊥	⊥	ή	≤
4	♦		\$	4	D	T	d	t	E	Φ	ν	|	⊥	⊥	ü	∫
5	♣	§	%	5	E	U	e	u	Z	X	ξ	|	⊥	⊥	í	J
6	♠		&	6	F	V	f	v	H	Ψ	ο	|	⊥	⊥	ó	÷
7			'	7	G	W	g	w	Θ	Ω	π	⊥	⊥	⊥	ú	≈
8			(	8	H	X	h	x	I	α	ρ	⊥	⊥	⊥	ü	°
9			)	9	I	Y	i	y	K	β	σ	|	⊥	⊥	ώ	£
A			*	:	J	Z	j	z	Λ	Υ	ς	|	⊥	⊥	Ά	·
B			+	;	K	[	k	{	M	δ	τ	⊥	⊥	⊥	Έ	√
C			,	<	L	\	l	|	N	ε	υ	⊥	⊥	⊥	Η	ⁿ
D			-	=	M	]	m	}	Ξ	ζ	φ	⊥	=	⊥	Ι	²
E			.	>	N	^	n	~	O	η	χ	⊥	⊥	⊥	Ο	■
F			/	?	O	_	o		Π	θ	ψ	⊥	⊥	⊥	Υ	

PC CHAR SET

855(CYRILLIC)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0					0	@	P	`	p	ђ	љ	а	▯	Л	л	Я -
1			!	1	A	Q	a	q	ѣ	Љ	А	▯	⊥	Л	р	ы
2			"	2	B	R	b	r	ѓ	њ	Б	▯	Т	м	Р	Ы
3	♥		#	3	C	S	c	s	ѓ	Њ	Б	|	└	М	с	з
4	♦		\$	4	D	T	d	t	ё	ћ	ц	└	-	н	С	З
5	♣	§	%	5	E	U	e	u	Ё	ћ	Ц	х	└	Н	т	ш
6	♠		&	6	F	V	f	v	е	ќ	д	Х	к	о	Т	Ш
7			'	7	G	W	g	w	Є	Ќ	Д	и	К	О	у	э
8			(	8	H	X	h	x	с	ђ	е	И	Ц	п	У	Э
9			)	9	I	Y	i	y	Ѕ	ђ	Е	||	Г	Ј	ж	щ
A			*	:	J	Z	j	z	і	џ	Ф	||	⊥	Г	Ж	Щ
B			+	;	K	[	k	{	І	џ	Ф	└	└	▯	В	Ч
C			,	<	L	\	l	|	ї	ю	Г	Д	||	▯	В	Ч
D			-	=	M	]	m	}	Ї	Ю	Г	Й	=	П	Ь	
E			.	>	N	^	n	~	ј	ъ	«	Й	||	я	Ь	▯
F			/	?	0	_	o		Ј	ъ	»	└	ѡ	▯	№	

PC CHAR SET

862(IL)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	X	]	á	█	L	u	α	≡
1			!	1	A	Q	a	q	⌈	⌋	í	█	⊥	⌒	β	±
2			"	2	B	R	b	r	λ	υ	ó	█	τ	π	Γ	≥
3	♥		#	3	C	S	c	s	⌈	⌋	ú	|	⌈	u	π	≤
4	♦		\$	4	D	T	d	t	⌈	⌋	ñ	⌈	—	⌈	Σ	∫
5	♣	§	%	5	E	U	e	u	⌈	⌋	Ñ	⌈	⌈	F	σ	∫
6	♠		&	6	F	V	f	v	⌈	⌋	á	⌈	⌈	π	μ	÷
7			'	7	G	W	g	w	⌈	⌋	ó	⌈	⌈	⌈	τ	≈
8			(	8	H	X	h	x	⌈	⌋	ç	⌈	⌈	⌈	Φ	°
9			)	9	I	Y	i	y	⌈	⌋	⌈	⌈	⌈	⌈	θ	▪
A			*	:	J	Z	j	z	⌈	⌋	⌈	⌈	⌈	⌈	Ω	•
B			+	;	K	[	k	{	⌈	⌋	½	⌈	⌈	█	δ	√
C			,	<	L	\	⌈	⌋	⌈	⌋	¼	⌈	⌈	█	∞	n
D			—	=	M	]	m	}	⌈	⌋	¥	⌈	⌈	█	∅	²
E			.	>	N	^	n	~	⌈	⌋	Pt	«	⌈	⌈	ε	█
F			/	?	O	_	o		⌈	⌋	»	⌈	⌈	█	∩	

PC CHAR SET

864(ARABIC)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0					0	@	P	`	p	°	β	♦	φ	ذ	—	ـ
1			!	1	A	Q	a	q	▪	∞	—	۱	ء	ر	ف	ّ
2			"	2	B	R	b	r	•	∅	ل	۲	آ	ز	ق	ن
3	♫		#	3	C	S	c	s	√	±	£	۳	ا	س	ك	ه
4	*		\$	4	D	T	d	t		½	α	ε	ؤ	ش	ل	ه
5	=	§	%	5	E	U	e	u	—	¼	ل	و	ع	ص	م	ى
6	||		&	6	F	V	f	v	|	≈	ل	٦	ث	ض	ن	ي
7			'	7	G	W	g	w	†	«	ل	۷	ا	ط	ه	خ
8			(	8	H	X	h	x	‡	»	ل	٨	ب	ظ	و	ق
9			)	9	I	Y	i	y	‡	ل	ب	٩	ة	ع	ى	لا
A			*	:	J	Z	j	z	‡	ل	ت	ف	ت	غ	ب	ل
B			+	;	K	[	k	{	⊥		ث	:	ث	|	ض	ل
C			,	<	L	\	l	|	⌈		،	س	ج	ـ	ك	
D			-	=	M	]	m	}	⌈	لا	ج	ش	ح	÷	غ	ي
E			.	>	N	^	n	~	⌈	لا	ح	ص	خ	×	غ	■
F			/	?	O	_	o		⌈	،	خ	؟	ب	ع	م	

PC CHAR SET

866(CYRILLIC)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	A	P	a	⌘	L	Ц	p	Ё
1			!	1	A	Q	a	q	Б	С	б	⌘	⊥	т	с	ё
2			"	2	B	R	b	r	В	Т	в	⌘	т	п	т	Є
3	♥		#	3	C	S	c	s	Г	У	г	|	т	ц	у	е
4	♦		\$	4	D	T	d	t	Д	Ф	д	┌	—	Е	ф	ї
5	♣	§	%	5	E	U	e	u	Е	Х	е	└	+	х	ї	
6	♠		&	6	F	V	f	v	Ж	Ц	ж	||	└	п	ц	ў
7			'	7	G	W	g	w	З	Ч	з	п	||	||	ч	ў
8			(	8	H	X	h	x	И	Ш	и	└	└	ш	°	
9			)	9	I	Y	i	y	Й	Щ	й	||	└	щ	▪	
A			*	:	J	Z	j	z	К	Ъ	к	||	└	г	ъ	•
B			+	;	K	[	k	{	Л	Ы	л	└	└	■	ы	√
C			,	<	L	\	l	|	М	Ь	м	└	└	■	ь	№
D			-	=	M	]	m	}	Н	Э	н	└	=	■	э	⌘
E			.	>	N	^	n	~	О	Ю	о	└	└	■	ю	■
F			/	?	O	_	o		П	Я	п	└	└	■	я	

PC CHAR SET

1252(PC-WIN LATIN1)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0			0	@	P	`	p	€			°	À	Ð	à	ð	
1		!	1	A	Q	a	q		'	i	±	Á	Ñ	á	ñ	
2		"	2	B	R	b	r	,	'	¢	²	Â	Ò	â	ò	
3		#	3	C	S	c	s	f	“	£	³	Ã	Ó	ã	ó	
4		\$	4	D	T	d	t	„	”	¤	´	Ä	Ô	ä	ô	
5		%	5	E	U	e	u	...	•	¥	µ	Å	Ö	å	ö	
6		&	6	F	V	f	v	†	-	|	¶	Æ	Ö	æ	ö	
7		'	7	G	W	g	w	‡	-	§	·	Ç	×	ç	÷	
8		(	8	H	X	h	x	^	~	¨	,	È	Ø	è	ø	
9		)	9	I	Y	i	y	%	™	©	¹	É	Ù	é	ù	
A		*	:	J	Z	j	z	Š	š	à	ó	Ê	Ú	ê	ú	
B		+	;	K	[	k	{	<	>	«	»	Ë	Û	ë	û	
C		,	<	L	\	l	|	Œ	œ	¬	¼	Ì	Ü	ì	ü	
D		-	=	M	]	m	}			-	½	Í	Ý	í	ý	
E		.	>	N	^	n	~			®	¾	Î	Þ	î	þ	
F		/	?	O	_	o				ÿ	¯	Ž	İ	ß	ï	ÿ

PC CHAR SET

1250(PC-WIN LATIN2)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0			0	@	P	`	p	€			°	Ř	Đ	ř	đ	
1		!	1	A	Q	a	q		‘	˘	±	Á	Ñ	á	ñ	
2		"	2	B	R	b	r	,	'	˘		Â	Ň	â	ň	
3		#	3	C	S	c	s		“	Ł	ł	Å	Ó	å	ó	
4		\$	4	D	T	d	t	„	”	α	´	Ä	Ô	ä	ô	
5		%	5	E	U	e	u	...	▪	Α	μ	Í	Ő	í	ő	
6		&	6	F	V	f	v	†	-	|	¶	Ć	Ö	ć	ö	
7		'	7	G	W	g	w	‡	-	§	·	Ç	×	ç	÷	
8		(	8	H	X	h	x			”		Č	Ř	č	ř	
9	.)	9	I	Y	i	y	%	™	©	ą	É	Ů	é	ů	
A		*	:	J	Z	j	z	Š	š	Ş	ş	Ę	Ú	ę	ú	
B		+	;	K	[	k	{	<	>	«	»	Ě	Ů	ě	ů	
C		,	<	L	\	l	|	Ś	ś	¬	Ł	Ě	Ü	ę	ü	
D		-	=	M	]	m	}	ř	ř	-	”	Í	Ý	í	ý	
E		.	>	N	^	n	~	Ž	ž	®	ŕ	Î	Ť	î	ť	
F		/	?	0	_	o		Ž	ž	Ž	ž	Đ	ß	đ	·	

PC CHAR SET

CHINA

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	€	É	á	⌘	⌘	⌘	⌘	⌘
1		!	1	A	Q	a	q	ü	æ	í	⌘	⌘	⌘	⌘	⌘	⌘
2		"	2	B	R	b	r	é	Æ	ó	⌘	⌘	⌘	⌘	⌘	⌘
3	♥	#	3	C	S	c	s	â	ô	ú	|	|	⌘	⌘	⌘	⌘
4	♦	¥	4	D	T	d	t	ä	ö	ñ	|	-	⌘	⌘	⌘	⌘
5	♣	§	%	5	E	U	e	u	à	ò	Ñ	⌘	⌘	⌘	⌘	⌘
6	♠	&	6	F	V	f	v	ã	û	ä	|	|	⌘	⌘	⌘	⌘
7		'	7	G	W	g	w	ç	ù	ó	⌘	⌘	⌘	⌘	⌘	⌘
8		(	8	H	X	h	x	ê	ÿ	¿	⌘	⌘	⌘	⌘	⌘	⌘
9		)	9	I	Y	i	y	ë	Ö	⌘	⌘	⌘	⌘	⌘	⌘	⌘
A		*	:	J	Z	j	z	è	Ü	⌘	⌘	⌘	⌘	⌘	⌘	⌘
B		+	;	K	[	k	{	ï	Φ	½	⌘	⌘	⌘	⌘	⌘	⌘
C		,	<	L	\	l	|	î	£	¼	⌘	⌘	⌘	⌘	⌘	⌘
D		-	=	M	]	m	}	ì	¥	¡	⌘	⌘	⌘	⌘	⌘	⌘
E		.	>	N	^	n	~	Ä	Pt	«	⌘	⌘	⌘	⌘	⌘	⌘
F		/	?	O	_	o		Å	f	»	⌘	⌘	⌘	⌘	⌘	⌘

PC CHAR SET

CHN2

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	€	É	á	⌘	L	⌘	α	≡
1			!	1	A	Q	a	q	ü	æ	í	⌘	⊥	⌘	β	±
2			"	2	B	R	b	r	é	Æ	ó	⌘	⌘	⌘	Γ	≥
3	♥		#	3	C	S	c	s	â	ô	ú	|	⌘	⌘	π	≤
4	♦		¥	4	D	T	d	t	ä	ö	ñ	|	-	⌘	Σ	∫
5	♣	§	%	5	E	U	e	u	à	ò	Ñ	⌘	⌘	⌘	σ	∫
6	♠		&	6	F	V	f	v	ã	û	ä	|	⌘	⌘	μ	÷
7			'	7	G	W	g	w	ç	ù	ó	⌘	⌘	⌘	τ	≈
8			(	8	H	X	h	x	ê	ÿ	¿	⌘	⌘	⌘	Φ	°
9			)	9	I	Y	i	y	ë	Ö	⌘	|	⌘	⌘	θ	•
A			*	:	J	Z	j	z	è	Ü	⌘	|	⌘	⌘	Ω	•
B			+	;	K	[	k	{	ï	Φ	½	⌘	⌘	■	δ	√
C			,	<	L	\	l	|	î	£	¼	⌘	⌘	■	∞	n
D			-	=	M	]	m	}	ï	¥	¡	⌘	=	■	∅	²
E			.	>	N	^	n	ˉ	Ä	Pt	«	⌘	⌘	■	ε	■
F			/	?	O	_	o		Å	f	»	⌘	⌘	■	∩	

PC CHAR SET

990(PC-866-BG)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0					0	@	P	`	p	A	P	a	p	L	⌘	α ≡
1			!	1	A	Q	a	q	Б	С	б	с	⊥	⌘	β ±	
2			"	2	B	R	b	r	В	Т	в	т	⌘	⌘	Γ ≥	
3	♥		#	3	C	S	c	s	Г	У	г	у	⌘	⌘	π ≤	
4	♦		\$	4	D	T	d	t	Д	Ф	д	ф	—	⌘	Σ ∫	
5	♣	§	%	5	E	U	e	u	Е	Х	е	х	†	№	σ ∫	
6	♠		&	6	F	V	f	v	Ж	Ц	ж	ц	⌘	⌘	δ μ ÷	
7			'	7	G	W	g	w	З	Ч	з	ч	⌘	⌘	τ ≈	
8			(	8	H	X	h	x	И	Ш	и	ш	⌘	⌘	φ °	
9			)	9	I	Y	i	y	Й	Щ	й	щ	⌘	⌘	∅ ·	
A			*	:	J	Z	j	z	К	Ъ	к	ъ	⌘	⌘	Ω ·	
B			+	;	K	[	k	{	Л	Ы	л	ы	⌘	⌘	δ √	
C			,	<	L	\	l	!	М	Ь	м	ь	⌘	⌘	∞ n	
D			—	=	M	]	m	}	Н	Э	н	э	=	⌘	∅ ²	
E			.	>	N	^	n	~	О	Ю	о	ю	⌘	⌘	ε ■	
F			/	?	O	_	o		П	Я	п	я	⌘	⌘	∅ ∩	

PC CHAR SET

991(PC-GER)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0			0	§	P	`	p	€	É	á	⌘	L	⌘	α	≡	
1		!	1	A	Q	a	q	ü	æ	í	⌘	⊥	⌘	β	±	
2		"	2	B	R	b	r	é	Æ	ó	⌘	⌘	π	Γ	≥	
3		#	3	C	S	c	s	â	ô	ú	|	⌘	⌘	π	≤	
4		\$	4	D	T	d	t	ä	ö	ñ	⌘	—	⌘	Σ	∫	
5		%	5	E	U	e	u	à	ò	Ñ	⌘	⌘	⌘	σ	∫	
6		&	6	F	V	f	v	ä	û	ä	⌘	⌘	⌘	μ	÷	
7		'	7	G	W	g	w	ç	ù	ó	⌘	⌘	⌘	τ	≈	
8		(	8	H	X	h	x	ê	ÿ	¿	⌘	⌘	⌘	φ	°	
9		)	9	I	Y	i	y	ë	Ö	⌘	⌘	⌘	⌘	θ	•	
A		*	:	J	Z	j	z	è	Ü	⌘	⌘	⌘	⌘	Ω	•	
B		+	;	K	Ä	k	ä	ï	Φ	½	⌘	⌘	⌘	δ	√	
C		,	<	L	Ö	l	ö	î	£	¼	⌘	⌘	⌘	∞	n	
D		—	=	M	Ü	m	ü	ï	¥	¡	⌘	=	⌘	ø	²	
E		.	>	N	^	n	ß	Ä	Pt	«	⌘	⌘	⌘	ε	■	
F		/	?	0	_	o	Ä	f	»	⌘	⌘	⌘	⌘	∩		

A.3 ISO Character Sets

ISO CHAR SET

8859/1

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0			0	@	P	`	p				°	À	Ð	à	ð	
1		!	1	A	Q	a	q				ı	±	Á	Ñ	á	ñ
2		"	2	B	R	b	r				¢	²	Â	Ò	â	ò
3		#	3	C	S	c	s				£	³	Ã	Ó	ã	ó
4		\$	4	D	T	d	t				¤	´	Ä	Ô	ä	ô
5		%	5	E	U	e	u				¥	µ	Å	Ö	å	ö
6		&	6	F	V	f	v				|	¶	Æ	Ö	æ	ö
7		'	7	G	W	g	w				§	·	Ç	×	ç	÷
8		(	8	H	X	h	x				¨	,	È	Ø	è	ø
9		)	9	I	Y	i	y				©	¹	É	Ù	é	ù
A		*	:	J	Z	j	z				ª	º	Ê	Ú	ê	ú
B		+	;	K	[	k	{				«	»	Ë	Û	ë	û
C		,	<	L	\	l	|				¬	¼	Ì	Ü	ì	ü
D		-	=	M	]	m	}				-	½	Í	Ý	í	ý
E		.	>	N	^	n	~				®	¾	Î	Þ	î	þ
F		/	?	O	_	o					¯	¿	Ï	ß	ï	ÿ

ISO CHAR SET

8859/9

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0			0	@	P	`	p				°	À	Ğ	à	ğ	
1		!	1	A	Q	a	q				ı	±	Á	Ñ	á	ñ
2		"	2	B	R	b	r				¢	²	Â	Ò	â	ò
3		#	3	C	S	c	s				£	³	Ã	Ó	ã	ó
4		\$	4	D	T	d	t				¤	´	Ä	Ô	ä	ô
5		%	5	E	U	e	u				¥	µ	Å	Ö	å	ö
6		&	6	F	V	f	v				|	¶	Æ	Ø	æ	ø
7		'	7	G	W	g	w				§	·	Ç	×	ç	÷
8		(	8	H	X	h	x				¨	,	È	Ø	è	ø
9		)	9	I	Y	i	y				©	¹	É	Ù	é	ù
A		*	:	J	Z	j	z				ª	º	Ê	Ú	ê	ú
B		+	;	K	[	k	{				«	»	Ë	Û	ë	û
C		,	<	L	\	l	|				¬	¼	Ï	Ü	ï	ü
D		-	=	M	]	m	}				-	½	Í	İ	í	ı
E		.	>	N	^	n	~				®	¾	Î	Ş	î	ş
F		/	?	O	_	o					—	¿	Ï	ß	ï	ÿ

ISO CHAR SET

8859/2

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0			0	@	P	`	p				°	Ř	Đ	ř	đ	
1		!	1	A	Q	a	q				À	à	Á	Ñ	á	ñ
2		"	2	B	R	b	r				˘	˘	Â	Ň	â	ň
3		#	3	C	S	c	s				Ł	ł	Ǻ	Ó	ǻ	ó
4		\$	4	D	T	d	t				Ɑ	´	Ǻ	Ô	ǻ	ô
5		%	5	E	U	e	u				Ĺ	ĺ	Ľ	Ő	ı	ő
6		&	6	F	V	f	v				Š	š	Č	Ö	č	ö
7		'	7	G	W	g	w				§	˘	Ç	×	ç	÷
8		(8	H	X	h	x				¨	˘	Č	Ř	č	ř
9)	9	I	Y	i	y				Š	š	É	Û	é	û
A		*	:	J	Z	j	z				Ş	ş	È	Ú	è	ú
B		+	;	K	[k	{				Ť	ť	Ě	Ů	ě	ů
C		,	<	L	\	l					Ž	ž	Ě	Ü	ě	ü
D		-	=	M]	m	}				-	˘	Í	Ý	í	ý
E		.	>	N	^	n	~				Ž	ž	Î	ı	î	ı
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ISO CHAR SET

8859/5

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0			0	@	P	`	p				A	P	a	p	№	
1		!	1	A	Q	a	q				Ё	Б	С	б	с	ё
2		"	2	B	R	b	r				Ђ	В	Т	в	т	ђ
3		#	3	C	S	c	s				Ѓ	Г	У	г	у	ѓ
4		\$	4	D	T	d	t				Є	Д	Ф	д	ф	е
5		%	5	E	U	e	u				Š	Е	Х	е	х	š
6		&	6	F	V	f	v				І	Ж	Ц	ж	ц	і
7		'	7	G	W	g	w				Ї	З	Ч	з	ч	ї
8		(8	H	X	h	x				Ј	И	Ш	и	ш	ј
9)	9	I	Y	i	y				Љ	Й	Щ	й	щ	љ
A		*	:	J	Z	j	z				Њ	К	Ъ	к	ъ	њ
B		+	;	K	[k	{				Ћ	Л	Ы	л	ы	ћ
C		,	<	L	\	l					Ќ	М	Ь	м	ь	ќ
D		-	=	M]	m	}				-	Н	Э	н	э	š
E		.	>	N	^	n	~				Ў	О	Ю	о	ю	ў
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ISO CHAR SET

8859/15

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0				0	@	P	`	p					°	À	Ð	à	ð
1		!	1	A	Q	a	q					ı	±	Á	Ñ	á	ñ
2		"	2	B	R	b	r					¢	²	Â	Ò	â	ò
3		#	3	C	S	c	s					£	³	Ã	Ó	ã	ó
4		\$	4	D	T	d	t					€	Ž	Ä	Ô	ä	ô
5		%	5	E	U	e	u					¥	μ	Å	Ö	å	ö
6		&	6	F	V	f	v					Š	¶	Æ	Ö	æ	ö
7		'	7	G	W	g	w					§	·	Ç	×	ç	÷
8		(	8	H	X	h	x					š	ž	È	Ø	è	ø
9		)	9	I	Y	i	y					©	¹	É	Ù	é	ù
A		*	:	J	Z	j	z						º	Ê	Ú	ê	ú
B		+	;	K	[k	{					«	»	Ë	Û	ë	û
C		,	<	L	\	l						¬	Ⓔ	Ì	Ü	ì	ü
D		-	=	M]	m	}					-	œ	Í	Ý	í	ý
E		.	>	N	^	n	~					®	ÿ	Î	Þ	î	þ
F		/	?	O	_	o						—	¿	Ï	ß	ï	ÿ

ISO CHAR SET

8859/6

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ı		!	ı	A	Q	a	q							ء	ف ر ء
ŗ		"	ŗ	B	R	b	r							آ	ق ز °
ŕ		#	ŕ	C	S	c	s							ا	ك س ا
ε		\$	ε	D	T	d	t		Ɑ					ؤ	ل ش و
ο		%	ο	E	U	e	u							ء	م ص لء
ŕ		&	ŕ	F	V	f	v							ئ	ن ض ئ
ŷ		'	ŷ	G	W	g	w							ا	ه ط ا
ˆ		(	ˆ	H	X	h	x							پ	و ظ پ
ˆ		)	ˆ	I	Y	i	y							ة	ى ع ة
A		*	:	J	Z	j	z							ت	ي غ ت
B		+	;	K	[	k	{				:			ث	"
C		,	<	L	\	l	|				,			ج	"
D		-	=	M	]	m	}				-			ح	"
E		.	>	N	^	n	~							خ	'
F		/	?	O	_	o								د	'

ISO CHAR SET

8859/7

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0					0	@	P	`	p				°	ü	π	π
1		!	1	A	Q	a	q						'	±	A	P α ρ
2		"	2	B	R	b	r						'	²	B	β ς
3		#	3	C	S	c	s						£	³	Γ	Σ γ σ
4		\$	4	D	T	d	t							'	Δ	T δ τ
5		%	5	E	U	e	u							™	E	Υ ε υ
6		&	6	F	V	f	v						|	'	A	Z Φ ζ φ
7		'	7	G	W	g	w						§	·	H	X η χ
8		(	8	H	X	h	x						¨	ˆ	Θ	Ψ θ ψ
9		)	9	I	Y	i	y						©	ˆ	H	I Ω ι ω
A		*	:	J	Z	j	z							ˆ	I	K Ĩ κ ï
B		+	;	K	[	k	{							«	»	Λ Ÿ λ ü
C		,	<	L	\	l	|							¬	ˆ	O M á μ ó
D		-	=	M	]	m	}							-	½	N É ν ú
E		.	>	N	^	n	~							ˆ	Υ	Ξ η ξ ω
F		/	?	O	_	o								-	Ω	O í o

ISO CHAR SET

8859/8

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p			°				ˆ]
1		!	1	A	Q	a	q				±				ı	Ų
2		"	2	B	R	b	r				¢	²			ˆ	Ų
3		#	3	C	S	c	s				£	³			ˆ	Ų
4		\$	4	D	T	d	t				¤	´			ˆ	Ų
5		%	5	E	U	e	u				¥	µ			ˆ	Ų
6		&	6	F	V	f	v				|	¶			ˆ	Ų
7		'	7	G	W	g	w				§	·			ˆ	Ų
8		(	8	H	X	h	x				¨	,			ˆ	Ų
9		)	9	I	Y	i	y				©	¹			ˆ	Ų
A		*	:	J	Z	j	z				×	÷			ˆ	Ų
B		+	;	K	[	k	{				«	»			ˆ	Ų
C		,	<	L	\	l	|				¬	¼			ˆ	Ų
D		-	=	M	]	m	}				-	½			ˆ	Ų
E		.	>	N	^	n	~				®	¾			ˆ	Ų
F		/	?	O	_	o					-				ˆ	Ų

ISO CHAR SET

CPOLUNIX

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0					0	@	P	`	p				°	À	À	à
1		!	1	A	Q	a	q						±	Á	Ñ	á
2		"	2	B	R	b	r						²	Â	Ò	â
3		#	3	C	S	c	s						³	Ã	Ó	ã
4		\$	4	D	T	d	t						´	Ä	Ô	ä
5		%	5	E	U	e	u						µ	Å	Ö	å
6		&	6	F	V	f	v						¶	Æ	Ø	æ
7		'	7	G	W	g	w						·	Ç	Ɔ	ç
8		(	8	H	X	h	x						¸	È	Ø	è
9		)	9	I	Y	i	y						¹	É	Ù	é
A		*	:	J	Z	j	z						º	Ê	Ú	ê
B		+	;	K	[	k	{						»	Ë	Û	ë
C		,	<	L	\	l	|						¼	Ì	Ü	ì
D		-	=	M	]	m	}						½	Í	Ý	í
E		.	>	N	^	n	~						¾	Î	Þ	î
F		/	?	O	_	o							¿	Ï	ß	ï

A.4 OCR-A Character Sets

OCR-A

ST15INI

0 1 2 3 4 5 6 7 8 9 A B C D E F

0	0	P	€
1	1	A Q	
2	"	2 B R	
3	£	3 C S	
4	#	4 D T	
5	%	5 E U	
6	&	6 F V	
7	'	7 G W	
8	{	8 H X	
9	}	9 I Y	
A	*	: J Z	
B	+	; K	
C	~	¡ L	|
D	-	= M	ψ
E	.	¡ N	
F	/	? O	

OCR-A

ST15DK/N

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F

0						0		P								€
1						1		A								Q
2						"		2		B						R
3						£		3		C						S
4						#		4		D						T
5						%		5		E						U
6						&		6		F						V
7						'		7		G						W
8						{		8		H						X
9						}		9		I						Y
A						*		:		J						Z
B						+		;		K						
C						~		¡		L						|
D						-		=		M						¿
E						.		¡		N						
F						/		?		O						

A.5 OCR-B Character Sets

OCR-B

ST15INI

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F

0					0	@	P	`	p	€						
1		!	1	A	Q	a	q									
2		"	2	B	R	b	r									
3		#	3	C	S	c	s									
4		¤	4	D	T	d	t									
5		%	5	E	U	e	u									
6		&	6	F	V	f	v									
7		'	7	G	W	g	w									
8		(	8	H	X	h	x									
9		)	9	I	Y	i	y									
A		*	:	J	Z	j	z									
B		+	;	K	[	k	ƒ									
C		,	<	L	\	l	|									
D		-	=	M	]	m	}									
E		.	>	N	^	n	~									
F		/	?	0	_	o										

OCR-B

ST15DK/N

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F

0						0	'	P	`	p	€					
1			!	1	A	Q	a	q								
2			"	2	B	R	b	r								
3			£	3	C	S	c	s								
4			\$	4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	Æ	k	æ								
C			,	<	L	Ø	l	ø								
D			-	=	M	ß	m	ß								
E			.	>	N	^	n	^								
F			/	?	0	_	o	_								

Appendix B OKI-Emulation Commands

Characters used in control functions appear in monospaced type. The table below explains some of the conventions used.

A pair of numbers separated by a slash (/) character indicates Column/Row notation. This notation refers to the location of a character in a standard code table, such as ASCII. (example: 1/B = 1B is the hex-code for Escape)

Spaces appear between characters in sequence for clarity; they are not part of the format.

At the begin of this chapter you will find a listing of the OKI Emulation commands classified by Hex Code and at the end a Hex - Decimal conversion table.

The following conventions are used in the command listings:

Conventions:

ESC	Escape (1/B), introduces an escape sequence.
FS	(1/C), introduce an extension commands command sequence for Chinese mode.
<i>Pn</i>	Numeric parameter, or number of units that specify a distance or quantity pertaining to the escape sequence, control function or control string. Accepted values are 0...9999, may be preceded by + or -. If the parameter is in normal notation like "200" the programming in hex-code is according to a ASCII table. ("200" = 32,30,30 in hex).
<i>n1..n2..n3....nn</i>	A series of parameters pertaining to the escape sequence, control function or control string.
*	Indicates multiplied by

B.1 Command Index (By Hex Code)

Note: **NOP** in column **Description** means the command P will be ignored. That means, all bytes of this command are discarded.

FS commands are valid only in Chinese mode.

ASCII Code	Hex Code	Description
BS	08	Backspace
HT	09	Horizontal Tabulation
LF	0A	Line Feed
VT	0B	Vertical Tabulation
FF	0C	Form Feed
CR	0D	Carriage Return
SO	0E	Set Line Double-Width
DLE B	10 42	Printer Soft Reset
DC1	11	On Line
DC3	13	Off Line
DC4 n_1 until $n_{k+1} \leq n_k$ or $n_i = 0$	14 n_1 until $n_{k+1} \leq n_k$ or $n_i = 0$	Set Vertical Tabulation
CAN	18	Clear The Print Buffer
ESC VT n_1 n_2	1B 0B n_1 n_2	Line Feed Lines
ESC \$ @	1B 24 40	Set CHINA Mode
ESC % 1 n_1 n_2 d_1 d_2 ... $d(3*n_1*n_2-1)$ $d(3*n_1*n_2)$	1B 25 31 n_1 n_2 d_1 d_2 ... $d(3*n_1*n_2-1)$ $d(3*n_1*n_2)$	180 dpi BIM Print
ESC % 2 n_1 n_2 d_1 d_2 .. $d(3*n_1*n_2-1)$ $d(3*n_1*n_2)$	1B 25 32 n_1 n_2 d_1 d_2 .. $d(3*n_1*n_2-1)$ $d(3*n_1*n_2)$	90 dpi BIM Print
ESC % 3 n_1 n_2	1B 25 33 n_1 n_2	Forward Horizontal Skip
ESC % 4 n_1 n_2	1B 25 34 n_1 n_2	Backward Horizontal Skip
ESC % 5 n	1B 25 35 n	Forward Vertical Skip
ESC % 6 n_1 n_2	1B 25 36 n_1 n_2	CR to a Specified Position
ESC % 8 n	1B 25 38 n	Backward Vertical Skip
ESC % 9 n_1 n_2	1B 25 39 n_1 n_2	Set Line Spacing to $n_2/120$ inch
ESC % : n	1B 25 58 n	Set SHIFT JIS Mode Character Density
ESC % B	1B 25 42	Set Bidirectional Print Mode
ESC % U	1B 25 55	Set Unidirectional Print Mode
ESC &	1B 26	Set ANK Mode to Hiragana Mode

ASCII Code	Hex Code	Description
ESC '	1B 27	Set ANK Mode to Katakana Mode
ESC (n1 n2	1B 28 n1 n2	Set Left Margin
ESC (H	1B 28 48	Reset CHINA Working Mode
ESC) n1 n2	1B 29 n1 n2	Set Right Margin
ESC ,	1B 2C	Set/Reset CHANGCHUN Condensed Mode
ESC 5	1B 35	Set Top of form
ESC 6	1B 36	Set Line Pitch to 6 LPI
ESC 8	1B 38	Set Line Pitch to 8 LPI
ESC <	1B 3C	Set Character 50% Condense
ESC >	1B 3E	Reset Character 50% Compression
ESC @	1B 40	Printer Soft Reset
ESC A	1B 41	NOP
ESC B	1B 42	Set Elite HS ANK Mode
ESC D	1B 44	Set High Speed Print Mode
ESC E	1B 45	Set Elite HD ANK Mode
ESC F n1 n2	1B 46 n1 n2	Set Page Length
ESC G n1 n2	1B 47 n1 n2	NOP
ESC H	1B 48	Set Pica HD ANK Mode
ESC I	1B 49	Set High Density Print Mode
ESC L n1 n2 ... n(2k-1) n(2k) NULL NULL	1B 4C n1 n2 ... n(2k-1) n(2k) NULL NULL	Set Horizontal Tab
ESC M	1B 4D	NOP
ESC N	1B 4E	Set Pica HS ANK Mode
ESC O	1B 4F	Set Low Noise Print Mode
ESC R	1B 52	Reset Double Width Print Mode
ESC S	1B 53	NOP

Appendix B OKI-Emulation Commands

ASCII Code	Hex Code	Description
ESC T	1B 54	Set Eject direction of single Document
ESC U	1B 55	Set Double Width Print Mode
ESC V	1B 56	NOP
ESC X	1B 58	Set Underline Print
ESC Y	1B 59	Reset Underline Print
ESC [	1B 5B	Set Double Height Print Mode
ESC]	1B 5D	Reset Double Height Print Mode
ESC ^ n	1B 5E n	Change Emulation Type
ESC b	1B 62	NOP
ESC e	1B 65	Set Triple Height Print Mode
ESC f	1B 66	Reset Triple Height Print Mode
ESC g	1B 67	Set Triple Width Print Mode
ESC h	1B 68	Reset Triple Width Print Mode
ESC l	1B 69	Set Emphasized Print Mode
ESC j	1B 6A	Reset Emphasized Print Mode
ESC k	1B 6B	Set SHIFT JIS Working Mode
ESC l	1B 6C	Set WESTERN Working Mode
ESC m	1B 6D	Set Double-Strike mode
ESC n	1B 6E	Reset Double-Strike mode
ESC x n1 n2 n3 n4 n5 n6 n7	1B 78 n1 n2 n3 n4 n5 n6 n7	Set Bar Code Parameters
ESC y ... NUL NUL	1B 79 ... NUL NUL	Bar Code Print
ESC z n	1B 7A n	Set/Reset E13B Code
ESC | n	1B 7C n	Set Document Type
FS \$ n	1C 24 n	Set Chinese Character Spacing
FS %	1C 25	NOP
FS 0	1C 30	NOP
FS 2 n1 n2 d1 d2...d71 d72	1C 32 n1 n2 d1 d2...d71 d72	User-Defined Character Download
FS B n	1C 42 n	Set/Reset OCR-Character Print mode
FS J	1C 4A	Set Character Left Rotate 90 degree Print
FS K	1C 4B	Reset Character Left Rotate 90 degree Print

ASCII Code	Hex Code	Description
FS N	1C 4E	Set Superscript Mode
FS O	1C 4F	Reset Superscript Mode
FS P	1C 50	Set Subscript Mode
FS Q	1C 51	Reset Subscript Mode
FS R	1C 52	Set Superscript/ Subscript Mode
FS S	1C 53	Reset Superscript/ Subscript Mode
FS _	1C 5F	Set Half-Corner Character Compose Print
FS g	1C 67	NOP
FS h	1C 68	NOP
FS p	1C 70	Set Chinese Character Double-Width Mode
FS q	1C 71	Reset Chinese Character Double-Width Mode
FS r	1C 72	Set CHINA Half-Corner Character Mode
FS s	1C 73	Reset CHINA Half-Corner Character Mode
FS t	1C 74	Set Half-Corner Character Rotation Forbidden
FS u	1C 75	Set Half-Corner Character Rotation Allowed
FS v n	1C 78 n	NOP

B.2 Command Description (by function)

When you select the **EMULATION: IBM ProPrinter II** or **IBM ProPrinter X24** parameter in the setup, the machine interprets all the commands of the IBM ProPrinter's, grouped by their functions, as follows:

- **Basic Operations**
- **Margins**
- **Line Feed**
- **Print Position**
- **Print Pitches**
- **Print Attributes**
- **Tabulation**
- **Graphics**
- **Bar Code Mode**
- **Other Functions**
- **Ignored Commands**
- **Chinese Mode**
- **Ignored Commands in Chinese Mode**

B.2.1 Basic Operations

Before printing, the printer stores the image of a line in the print buffer. All the commands concerning this section result in immediate printing of the buffer contents.

- **BS** : Backspace
- **CR** : Carriage return
- **DLE B** : Printer Soft Reset
- **FF** : Form feed

BS

Backspace

This command causes the horizontal print position to move left one character space (according to the active character pitch and character space).

Hex: (08)H
Decimal: (08)D
Octal: (10)O

Note: If movement is beyond the left margin, it will position on the left margin.

CR**Carriage Return**

This command causes the current line buffer to print and position the Print head to the left margin.

Hex: (0D)H
 Decimal: (13)D
 Octal: (15)O

DLE B**Printer Soft Reset**

This command code sets all the parameters to the default conditions.

Hex (10 42)H
 Decimal (16 66)D
 Octal (20 102)O

FF**Form Feed (Eject)**

This command causes the current line buffer to print and eject paper (for cut form) or executes a form feed (for fanfold paper).

Hex: (0C)H
 Decimal: (12)D
 Octal: (14)O

B.2.2 Margins

- **ESC F *n* ... :** Set page length
- **ESC 5:** Set Top of Form
- **ESC (*n* :** Set Left Margin
- **ESC) *n* :** Set Right Margin

ESC F *n1 n2*

Set Page Length

This command code specifies page length to (*n1* & 0x0f) * 10 + (*n2* & 0x0f) lines.

Hex (1B 46 *n1 n2*)H
 Decimal (27 70 *n1 n2*)D
 Octal (33 106 *n1 n2*)O

ESC 5

Set Top of form

This command code specifies the top of form to current vertical position.

Hex (1B 35)H
 Decimal (27 53)D
 Octal (33 65)O

ESC (*n1 n2*

Set Left Margin

This command code sets **left margin** to (*n1* * 256 + *n2*)/180 inch

Hex (1B 28 *n1 n2*)H
 Decimal (27 40 *n1 n2*)D
 Octal (33 50 *n1 n2*)O

right margin - left margin > 1.5 inch

Note: If in data field this code will be ignored.

ESC) *n1 n2*

Set Right Margin

This command code sets **right margin** to (*n1* * 256 + *n2*)/180 inch

Hex (1B 29 *n1 n2*)H
 Decimal (27 41 *n1 n2*)D
 Octal (33 51 *n1 n2*)O

right margin - left margin > 1.5 inch

B.2.3 Line Feed

- **ESC T *n*** : Set eject direction of single document
- **ESC VT *n* ...** : Line feed lines
- **ESC % 9 *n* ...** : Set line spacing as $n/120$ inch
- **LF** : Line feed
- **SO** : Set line double width

ESC T *n***Set Eject direction of single Document**

This command code sets document eject direction.

Hex (1B 54 *n*)H
 Decimal (27 84 *n*)D
 Octal (33 124 *n*)O

n = '0': Sets forward as document eject direction.
n = '1': Sets rearward as document eject direction.

ESC VT *n1 n2***Line Feed Lines**

This command code executes line feed ($n1 * 10 + n2$) lines.

Hex (1B 0B *n1 n2*)H
 Decimal (27 11 *n1 n2*)D
 Octal (33 13 *n1 n2*)O

n1 = 0x00 up to 0x0F
n2 = 0x00 up to 0x0F

$(n1 * 10 + n2) < 165$

ESC % 9 *n1 n2***Set Line Spacing to $n/120$ inch**

This command code sets line spacing to $n2/120$ inch. Line spacing can be set to zero only if OKI PNS2060 in menu is set.

Hex (1B 25 39 *n1 n2*)H
 Decimal (27 37 57 *n1 n2*)D
 Octal (33 45 71 *n1 n2*)O

LF**Line Feed**

Line feed to next print line

Hex	(0A)H
Decimal	(10)D
Octal	(12)

This command code causes the current characters in print buffer to print and causes the presentation position to move vertically to the next printing line. The default line pitch is determined by menu and also line pitch can be changed by follow command codes:

ESC 6, ESC 8 and ESC % 9 *n1 n2*.

SO**Set Line Double Width**

This command code set the **double width** print attribute for the followed printable characters in current line.

Hex	(0E)H
Decimal	(14)D
Octal	(16)O

B.2.4 Print Position

- **ESC % 3 *n1 n2*** : Forward horizontal skip
- **ESC % 4 *n1 n2*** : Backward horizontal skip
- **ESC % 5 *n*** : Forward vertical skip
- **ESC % 8 *n*** : Backward vertical skip

ESC % 3 *n1 n2***Forward Horizontal Skip**

This command code causes the presentation position to move $(n1 * 256 + n2)/180$ inches to the right.

Hex (1B 25 33 *n1 n2*)H
 Decimal (27 37 51 *n1 n2*)D
 Octal (33 45 63 *n1 n2*)O

$(n1 * 256 + n2)/180 > 0$; **right margin** - $(n1 * 256 + n2)/180 > \text{left margin}$

ESC % 4 *n1 n2***Backward Horizontal Skip**

This command code causes the presentation position to move $(n1 * 256 + n2)/180$ inches to the left.

Hex (1B 25 34 *n1 n2*)H
 Decimal (27 37 52 *n1 n2*)D
 Octal (33 45 64 *n1 n2*)O

$(n1 * 256 + n2)/180 > 0$; $(n1 * 256 + n2)/180 < \text{right margin}$

Note: If current print position - $(n1 * 256 + n2)/180 < \text{left margin}$ then the presentation position is specified to **left margin**.

ESC % 5 *n***Forward Vertical Skip**

This command code causes the current characters in print buffer to print and moves the presentation position forward $n/120$ inch.

Hex (1B 25 35 *n*)H
 Decimal (27 37 53 *n*)D
 Octal (33 45 65 *n*)O

ESC % 6 *n1 n2*

CR to a Specified Position

This command code specifies the presentation position to $(n1 * 256 + n2)/180$ inch.

Hex	(1B 25 36 <i>n1 n2</i>)H
Decimal	(27 37 54 <i>n1 n2</i>)D
Octal	(33 45 66 <i>n1 n2</i>)O

$(n1 * 256 + n2)/180 \leq \text{right margin}$

$(n1 * 256 + n2)/180 \geq \text{left margin}$

ESC % 8 *n*

Backward Vertical Skip

This command code causes the current characters in print buffer to print and moves the presentation position backward $n/120$ inch.

Hex	(1B 25 38 <i>n</i>)H
Decimal	(27 37 58 <i>n</i>)D
Octal	(33 45 70 <i>n</i>)O

B.2.5 Print Pitches

- **ESC k** : Set Shift JIS working mode
- **ESC 6** : Set Line Pitch to 6 LPI
- **ESC 8** : Set Line Pitch to 8 LPI
- **ESC <** : Set character 50% condense
- **ESC >** : Reset character 50% compression
- **ESC % : n** : Set Shift JIS mode character density

ESC k**Set SHIFT JIS Working Mode**

This command code sets working mode to SHIFT JIS mode. Code **ESC I** can change this mode.

Hex	(1B 6B)H
Decimal	(27 107)D
Octal	(33 153)O

- Under this mode Chinese character's default pitch is 6.9 CPI
- Western character's default pitch is 13.8 CPI.

ESC 6**Set Line Pitch to 6 LPI**

This command code sets line pitch to 6 LPI.

Hex	(1B 36)H
Decimal	(27 54)D
Octal	(33 66)O

ESC 8**Set Line Pitch to 8 LPI**

This command code sets line pitch to 8 LPI.

Hex	(1B 38)H
Decimal	(27 56)D
Octal	(33 70)O

ESC <**Set Character 50% Condense**

This command code sets characters 50% condense, all printable characters after this code will be compressed 50% and horizontal skip steps will be halved. This compression will keep valid before horizontal extension command code or code **ESC >** received.

Hex (1B 3C)H
 Decimal (27 60)D
 Octal (33 74)O

ESC >**Reset Character 50% Compression**

This command code resets character 50% condense.

Hex (1B 3E)H
 Decimal (27 62)D
 Octal (33 76)O

ESC % : *n***Set SHIFT JIS Mode Character Density**

This command code specifies SHIFT JIS mode character density

Hex (1B 25 39 *n*1 *n*2)H
 Decimal (27 37 57 *n*1 *n*2)D
 Octal (33 45 71 *n*1 *n*2)O

- n* = 0 :** resets the former character density set
- n* = 1 :** sets character density to 10 CPI
- n* = 2 :** sets character density to 12 CPI
- n* = 3 :** sets character density to 16.6 CPI

Note: Every time you want to change the SHIFT JIS mode character density you must use the parameter ***n* = 0** first.

B.2.6 Print Attributes

- **ESC B** : Set Elite high speed ANK mode
- **ESC D** : Set high speed mode
- **ESC E** : Set Elite high density ANK mode
- **ESC H** : Set Pica high density ANK mode
- **ESC I** : Set high density print mode
- **ESC N** : Set Pica high speed ANK mode
- **ESC O** : Set low noise print mode
- **ESC R** : Reset double width print mode
- **ESC U** : Set double width print mode
- **ESC X** : Set underline print
- **ESC Y** : Reset underline print
- **ESC e** : Set triple height print mode
- **ESC f** : Reset triple height print mode
- **ESC g** : Set triple width print mode
- **ESC h** : Reset triple width print mode
- **ESC i** : Set emphasized print mode
- **ESC j** : Reset emphasized print mode
- **ESC m** : Set double strike mode
- **ESC n** : Reset double strike mode
- **ESC % B** : Set bidirectional print mode
- **ESC % U** : Set unidirectional print mode
- **ESC [** : Set double height print mode
- **ESC]** : Reset double height print mode

ESC B**Set Elite High Speed ANK Mode**

This command code sets a sub mode, Elite high speed print mode.

This sub mode is only valid when working mode is WESTERN. Under this sub mode all western characters will be printed with the pitch of **12 CPI** and the quality of **draft**.

Hex	(1B 42)H
Decimal	(27 66)D
Octal	(33 102)O

ESC D**Set High Speed Print Mode**

This command code specifies the print quality to draft.

Hex	(1B 44)H
Decimal	(27 68)D
Octal	(33 104)O

ESC E**Set Elite High Density ANK Mode**

This command code sets a sub mode, Elite high density print mode.

This sub mode is only valid when working mode is WESTERN. Under this sub mode all western characters will be printed with the pitch of **12 CPI** and the quality of **NLQ**.

Hex (1B 45)H
 Decimal (27 69)D
 Octal (33 105)O

ESC H**Set Pica High Density ANK Mode**

This command code sets a sub mode, Pica high density print mode.

This sub mode is only valid when working mode is WESTERN. Under this sub mode all western characters will be printed with the pitch of **10 CPI** and the quality of **NLQ**.

Hex (1B 48)H
 Decimal (27 72)D
 Octal (33 110)O

ESC I**Set High Density Print Mode**

This command code specifies the print quality to **NLQ**.

Hex (1B 44)H
 Decimal (27 68)D
 Octal (33 104)O

ESC N**Set Pica High Speed ANK Mode**

This command code sets a sub mode Pica high speed print mode.

This sub mode is only valid when working mode is WESTERN. Under this sub mode all western character will be printed with the pitch of **12 CPI** and the quality of **draft**.

Hex (1B 4E)H
 Decimal (27 78)D
 Octal (33 116)O

ESC O**Set Low Noise Print Mode**

This command code specifies the print quality to **draft**.

Hex	(1B 4F)H
Decimal	(27 79)D
Octal	(33 117)O

ESC R**Reset Double Width Print Mode**

This command code resets double width print mode.

Hex	(1B 52)H
Decimal	(27 82)D
Octal	(33 122)O

Note: This code can also reset the mode set by code **FS p**.

ESC U**Set Double Width Print Mode**

This command code sets double width print mode.

Hex	(1B 55)H
Decimal	(27 85)D
Octal	(33 125)O

Note: Code **ESC R**, **ESC g**, and **ESC <** can reset this mode.

ESC X**Set Underline Print**

This command code sets underline printing.

Hex	(1B 58)H
Decimal	(27 88)D
Octal	(33 130)O

Note: Code **ESC Y** can reset this mode.

ESC Y **Reset Underline Print**

This command code resets underline printing.

Hex	(1B 59)H
Decimal	(27 89)D
Octal	(33 131)O

ESC e **Set Triple Height Print Mode**

This command code sets triple height print mode. Code **ESC f** can reset this mode.

Hex	(1B 65)H
Decimal	(27 101)D
Octal	(33 145)O

Note: One line's base line is at the character's bottom and line spacing is determined by the highest character.

ESC f **Reset Triple Height Print Mode**

This command code resets triple height print mode.

Hex	(1B 66)H
Decimal	(27 102)D
Octal	(33 146)O

ESC g **Set Triple Width Print Mode**

This command code sets triple width print mode. Code **ESC h** can reset this mode.

Hex	(1B 67)H
Decimal	(27 103)D
Octal	(33 147)O

ESC h **Reset Triple Width Print Mode**

This command code resets triple width print mode.

Hex	(1B 68)H
Decimal	(27 104)D
Octal	(33 150)O

ESC I**Set Emphasized Print Mode**

This command code starts emphasized print mode.

Hex	(1B 69)H
Decimal	(27 105)D
Octal	(33 151)O

ESC j**Reset Emphasized Print Mode**

This command code resets the emphasized print mode.

Hex	(1B 6A)H
Decimal	(27 106)D
Octal	(33 152)O

ESC m**Set Double Strike mode**

This command code starts double strike mode, in which all text characters are struck twice.

Hex	(1B 6D)H
Decimal	(27 109)D
Octal	(33 155)O

Note: Code **ESC n** can reset this mode.

ESC n**Reset Double Strike mode**

This command code resets double strike mode.

Hex	(1B 6E)H
Decimal	(27 110)D
Octal	(33 156)O

ESC % B**Set Bidirectional Print Mode**

This command code sets print mode to bidirectional print, code **ESC % U** can change this mode.

Hex	(1B 25 42)H
Decimal	(27 37 66)D
Octal	(33 45 102)O

ESC % U

Set Unidirectional Print Mode

This command code sets print mode to unidirectional print, code **ESC % B** can change this mode.

Hex	(1B 25 55)H
Decimal	(27 37 85)D
Octal	(33 45 125)O

ESC [

Set Double Height Print Mode

This command code sets double height print mode.

Hex	(1B 5B)H
Decimal	(27 91)D
Octal	(33 133)O

Code **ESC [** can reset this mode.

Note: One line's base line is at the character's bottom and line spacing is determined by the highest character.

ESC]

Reset Double Height Print Mode

This command code resets double height print mode.

Hex	(1B 5D)H
Decimal	(27 93)D
Octal	(33 135)O

B.2.7 Tabulation

- **ESC L** : Set horizontal tab stops
- **DC4** : Set Vertical Tabulation
- **HT** : Horizontal tabulation

ESC L**Set Horizontal Tab**

Set horizontal tab stops

Hex (1B 4C)H
 Decimal (27 76)D
 Octal (33 114)O

ESC	L	n1	n2	n3	n4	n(2x - 1)	n(2x)	NULL	NULL
-----	---	----	----	----	----	-------	-----------	-------	------	------

This command code specifies horizontal tab stops to:

$(n(i)i * 256 + n(i+1))/180$ inch ($i = 2k+1$)

left margin + $(n(i)i * 256 + n(i+1))/180 \leq$ **right margin**

Note: Maximal 30 tab stops are allowed.

HT**Horizontal Tabulation**

Set horizontal tabulation

Hex (09)H
 Decimal (09)D
 Octal (11)O

If the H-tab had already set by code **ESC L**, then this command code moves the presentation position to the right to the next horizontal tab stop, otherwise OKI PNS2061 in menu will determine whether do **CR** and **LF** one time at this moment or not.

DC4**Set Vertical Tabulation**

In PR 9, this command code gets characters continuously until printer encounter zero or current character is less than the former one.

Hex (14)H
 Decimal (20)D
 Octal (24)O

D.2.8 Graphics

- **ESC % 1 *n1 n2* ...** : 180 DPI BIM print
- **ESC % 2 *n1 n2* ...** : 90 DPI BIM print

ESC % 1 *n1 n2*

180 DPI BIM Print

This command code specifies 180 DPI, 24 dot/column BIM print.

Hex	(1B 25 31 <i>n1 n2</i>)H
Decimal	(27 37 49 <i>n1 n2</i>)D
Octal	(33 45 61 <i>n1 n2</i>)O

(*n1* * 256 + *n2*) defines the column number and (*n1* * 256 + *n2*) * 3) defines the BIM data number.

ESC % 2 *n1 n2*

90 DPI BIM Print

This command code specifies 90 DPI, 24 dot/column BIM print.

Hex	(1B 25 32 <i>n1 n2</i>)H
Decimal	(27 37 50 <i>n1 n2</i>)D
Octal	(33 45 62 <i>n1 n2</i>)O

(*n1* * 256 + *n2*) defines the column number and (*n1* * 256 + *n2*) * 3) defines the BIM data number.

B.2.9 Bar Code Mode

- **ESC x n ... :** Set Bar Code mode
- **ESC y ... NUL NUL:** Bar Code print
- **ESC z n :** Set / reset E13B code

ESC x n1 n2 n3 n4 n5 n6 n7**Set Bar Code Parameters**

This code sets parameters for bar code printing.

Hex (1B 78 n1 n2 n3 n4 n5 n6 n7)H
 Decimal (27 120 n1 n2 n3 n4 n5 n6 n7)D
 Octal (33 170 n1 n2 n3 n4 n5 n6 n7)O

Note: This command code is a new code and is only valid in **PR 9**,

n1 n2 bar code type
n3 n4 bar code height
n5 n6 bar code width
n7 = 0 no human readable line
n7 = 1 has human readable line

Note: $(n1 * 10 + n2) < 9$
 $(n3 * 10 + n4) < 99$
 $(n5 * 10 + n6) \geq 10$ and $(n5 * 10 + n6) \leq 34$
 $n7 = 0, 1$

ESC y ... NUL NUL**Bar Code Print**

This code gets bar code data and print bar code.

Hex (1B 79 ...NUL NUL)H
 Decimal (27 121 ...NUL NUL)D
 Octal (33 171 ...NUL NUL)O

Note: This command code is a new code and is only valid in **PR 9**.
 Bar code data must ended by **two continuous zero**.

ESC z n**Set/Reset E13B Code**

This command code can set and reset **E13B** Code mode.

Hex	(1B 7A)H
Decimal	(27 122)D
Octal	(33 172)O

Note: E13B Code mode is only valid when working mode is SHIFT JIS mode; while E13B Code mode is valid, two byte code 0xa6 0xa1, 0xa6 0xa2, 0xa6 0xa3, 0xa6 0xa4, 0xa6 0xa5, 0xa6 0xa6, 0xa6 0xa7, 0xa6 0xa8, 0xa6 0xa9, 0xa6 0xaa, 0xa6 0xab, 0xa6 0xac, 0xa6 0xad, 0xa6 0xae will be printed as E13B code.

n = 1 :	sets E13B Code mode
n = 0 :	resets E13B Code mode

B.2.10 Other Functions

- **CAN** : Clear print buffer
- **ESC I** : Set Western working mode
- **ESC &** : Set ANK mode to Hiragana mode
- **ESC ':** Set ANK mode to Katakana mode
- **ESC (H** : Reset CHINA working mode
- **ESC \$ @** : Set CHINA mode
- **ESC | n** : Set document type
- **ESC , n** : Set / Reset CHANGCHUN condensed mode
- **ESC @** : Printer soft reset
- **ESC ^ n** : Change Emulation

CAN**Clear buffer**

This command code clears the print buffer.

Hex	(18)H
Decimal	(24)D
Octal	(30)O

ESC I**Set WESTERN Working Mode**

This command code sets working mode to WESTERN mode.

Hex	(1B 6C)H
Decimal	(27 108)D
Octal	(33 154)O

Code **ESC k** and **ESC (H** can change this mode.

ESC &**Set ANK Mode to Hiragana Mode**

This command code sets the ANK sub mode to Hiragana mode.
Code **ESC ':** can change this mode.

Hex	(1B 26)H
Decimal	(27 38)D
Octal	(33 46)O

Note: ANK mode is only valid when working mode is WESTERN mode.

ESC '

Set ANK Mode to Katakana Mode

This command code sets the ANK sub mode to katakana mode.
Command code **ESC &** can change this mode.

Hex	(1B 27)H
Decimal	(27 39)D
Octal	(33 47)O

Note: ANK mode is only valid when working mode is WESTERN mode.
Katakana mode is the default ANK sub mode!

ESC (H

Reset CHINA Working Mode

This command code resets working mode CHINA.

Hex	(1B 28 48)H
Decimal	(27 40 72)D
Octal	(33 50 110)O

ESC | n

Set Document Type

This command code sets document type.

Hex	(1B 7C n)H
Decimal	(27 124 n)D
Octal	(33 174 n)O

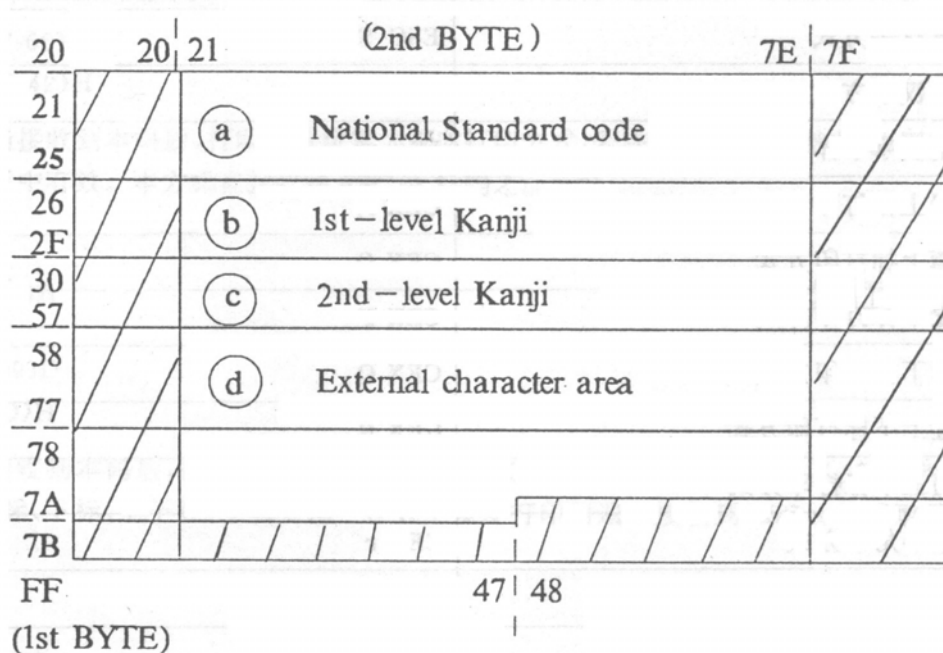
- If **n** equal to **L** then document is defined as fanfold paper.
- If **n** equal to **C** then document is defined as single paper.
- If **n** equal to **P** then document is defined as passport.

ESC \$ @**Set CHINA Mode**

This command code sets printer working mode to CHINA mode.

Hex (1B 24 40)H
 Decimal (27 36 64)D
 Octal (33 44 100)O

Code **ESC (H** and **ESC k** can change this working mode. In this mode all characters, except single byte command codes, will be regarded as two byte code.

**ESC , n****Set / Reset CHANGCHUN Condensed Mode**

This command code can set or reset CHANGCHUN condensed mode

Hex (1B 2C n)H
 Decimal (27 44 n)D
 Octal (33 54 n)O

- n = 2 :** Sets CHANGCHUN condensed mode compress proportion: 70%.
n = 1 : Resets CHANGCHUN condensed mode.

ESC @

Printer Soft Reset

This control sets all the parameters to the default conditions.

Hex	(1B 40)H
Decimal	(27 64)D
Octal	(33 100)O

ESC ^ *n*

Change Emulation Type

This command code causes the current characters in print buffer to print and changes current emulation.

Hex	(1B 5E <i>n</i>)H
Decimal	(27 94 <i>n</i>)D
Octal	(33 136 <i>n</i>)O

- n* = 0 :** Change to **IBM** Emulation
- n* = 1 :** Change to **OLIVETTI** Emulation
- n* = 2 :** Change to **EPSON LQ** Emulation

B.2.11 Ignored Commands

- **DC1** On line
- **DC3** Off line
- **ESC A :** NOP
- **ESC G *n* ... :** NOP
- **ESC M :** NOP
- **ESC S :** NOP
- **ESC V :** NOP
- **ESC b :** NOP
- **VT** Vertical Tabulation

DC1**On Line**

This command code does nothing in PR 9.

Hex (11)H
 Decimal (17)D
 Octal (21)O

DC3**Off Line**

This command code does nothing in PR 9.

Hex (13)H
 Decimal (19)D
 Octal (23)O

ESC A**NOP**

This command code does nothing in PR 9.

Hex (1B 41)H
 Decimal (27 65)D
 Octal (33 101)O

ESC G *n1 n2***NOP**

This command code does nothing in PR 9.

Hex (1B 47 *n1 n2*)H
 Decimal (27 71 *n1 n2*)D
 Octal (33 107 *n1 n2*)O

ESC M **NOP**

This command code does nothing in PR 9.

Hex	(1B 4D)H
Decimal	(27 77)D
Octal	(33 115)O

ESC S **NOP**

This command code does nothing in PR 9.

Hex	(1B 53)H
Decimal	(27 83)D
Octal	(33 123)O

ESC V **NOP**

This command code does nothing in PR 9.

Hex	(1B 56)H
Decimal	(27 86)D
Octal	(33 126)O

ESC b **NOP**

This command code does nothing in PR 9.

Hex	(1B 62)H
Decimal	(27 98)D
Octal	(33 142)O

VT **Vertical Tabulation**

This command code does nothing in PR 9.

Hex	(0B)H
Decimal	(11)D
Octal	(13)O

D.2.12 Chinese Mode

- **FS \$ n :** Set Chinese Character's Spacing
- **FS 2 n1 n2** User Defined Character Download
- **FS B n** Set / Reset OCR Character Print mode
- **FS J** Set Character Left Rotate 90 degree Print
- **FS K** Reset Character Left Rotate 90 degree Print
- **FS N** Set Superscript Mode
- **FS O** Reset Superscript Mode
- **FS P** Set Subscript Mode
- **FS Q** Reset Subscript Mode
- **FS R** Set Superscript/ Subscript Mode
- **FS S** Reset Superscript / Subscript Mode
- **FS _** Set Half Corner Character Compose Print
- **FS p** Set Chinese Character Double Width Mode
- **FS q** Reset Chinese Character Double Width Mode
- **FS r** Set CHINA Half Corner Character Mode
- **FS s** Reset CHINA Half Corner Character Mode
- **FS t** Set Half Corner Character Rotation Forbidden
- **FS u** Set Half Corner Character Rotation Allowed

FS \$ n**Set Chinese Character's Spacing**

This command code sets Chinese character's spacing.

Hex	(1C 24 n)H
Decimal	(28 36 n)D
Octal	(34 44 n)O

This code specifies **Half Corner** character's spacing to $n/180$ inch and when n is less than 128 this code specifies Full Corner character's spacing to $n/90$ inch, when n is greater than 127 this code specifies **Full Corner** character's spacing to $255/180$ inch.

FS 2 n1 n2**User Defined Character Download**

This command code downloads user defined character's bit map to RAM. Each character's bit map must be defined as a 72 byte sequence. Every time use this code can only load one character's bit map to RAM.

Hex	(1C 32 n1 n2)H
Decimal	(28 50 n1 n2)D
Octal	(34 62 n1 n2)O

Note: ($n1 \& 0x80$) = 0x78 , 0x79 , 0x7a
 $n2 > 0x20$ and $n2 < 0x7f$

FS B n**Set / Reset OCR Character Print mode**

This code can set or reset OCR Character print mode.

Note: This command code is a new code and is only valid in **PR 9**.

Hex (1C 42 n)H
 Decimal (28 66 n)D
 Octal (34 102 n)O

OCR Character print mode is only valid when working mode is **WESTERN**.

n = 0 : resets OCR Character print mode
n = 1 : sets OCR A character
n = 2 : sets OCR B character

FS J**Set Character Left Rotate 90 degree Print**

This command code sets character left rotate 90 degree print mode.

Hex (1C 4A)H
 Decimal (28 74)D
 Octal (34 112)O

This mode is valid when working mode is **SHIFT JIS** mode or when working mode is CHINA mode. When this mode is valid all printable characters, except those are listed below, will be rotated to left 90 degree.

Position (16)		Characters	Position (16)		Characters
Byte1	Byte2		Byte1	Byte2	
21	27	"	21	54	≡
21	2D	...	21	55	≅
21	32	[	21	56	≈
21	33	]	21	57	~
21	34	<	21	58	∞
21	35	>	21	59	≠
21	36	«	21	5A	↵
21	37	»	21	5B	↶
21	38	┐	21	5C	≤
21	39	└	21	5D	≥
21	3A	ℙ	21	5E	∞

Position (16)		Characters	Position (16)		Characters
Byte1	Byte2		Byte1	Byte2	
21	3B	』	21	5F	∴
21	3C	【	21	7A	→
21	3D	】	21	7B	←
21	3E	[	21	7C	↑
21	3F	]	21	7D	↓

Position (16)		Characters	Position (16)		Characters
Byte1	Byte2		Byte1	Byte2	
23	28	(	23	5B	[
23	29	)	23	5D]
23	3C	<	23	7B	{
23	3D	=	23	7D	}
23	3E	>			

Position (16)	Characters	Position (16)	Characters
28	(	5B	[
29	)	5D]
3C	<	7B	{
3D	=	7D	}
3E	>		

FS K**Reset Character Left Rotate 90 degree Print**

This command code resets character left rotate 90 degree print mode.

Hex (1C 4B)H
 Decimal (28 75)D
 Octal (34 113)O

FS N**Set Superscript Mode**

This command code sets superscript mode.

Hex (1C 4E)H
 Decimal (28 78)D
 Octal (34 116)O

Note: This mode is valid when working mode is **SHIFT JIS** mode or when working mode is **CHINA** mode.

FS O**Reset Superscript Mode**

This command code resets superscript mode.

Hex (1C 4F)H
 Decimal (28 79)D
 Octal (34 117)O

FS P**Set Subscript Mode**

This command code sets subscript mode.

Hex (1C 50)H
 Decimal (28 80)D
 Octal (34 120)O

Note: This mode is valid when working mode is **SHIFT JIS** mode or when working mode is **CHINA** mode.

FS Q**Reset Subscript Mode**

This command code resets subscriptmode.

Hex (1C 51)H
 Decimal (28 81)D
 Octal (34 121)O

FS R**Set Superscript / Subscript Mode**

This command code sets superscript/subscript mode.

Hex	(1C 52)H
Decimal	(28 82)D
Octal	(34 122)O

Note: This mode is valid when working mode is **SHIFT JIS** mode or when working mode is **CHINA** mode. When this mode is valid, the former of two continuous one byte character will be printed as superscript and the later one will be printed as subscript.

FS S**Reset Superscript / Subscript Mode**

This command code resets superscript / subscript mode.

Hex	(1C 53)H
Decimal	(28 83)D
Octal	(34 123)O

FS _**Set Half Corner Character Compose Print**

This command code sets Half Corner character compose print mode.

Hex	(1C 5F)H
Decimal	(28 95)D
Octal	(34 137)O

Note: This mode is valid when working mode is **SHIFT JIS** mode or when working mode is **CHINA** mode. When this mode is valid and character left rotate 90 degree print mode is valid the coming two half corner characters, after this code, will be put together to print.

FS p **Set Chinese Character Double Width Mode**

This command code sets Chinese character double width mode.

Hex	(1C 70)H
Decimal	(28 112)D
Octal	(34 160)O

Note: This mode is valid when working mode is **SHIFT JIS** mode or when working mode is **CHINA** mode. When this mode is valid, all printable characters will be specified as double width characters.
Code **ESC R**, **ESC q**, **ESC g**, and **ESC <** can reset this mode.

FS q **Reset Chinese Character Double Width Mode**

This command code resets Chinese character double width mode.

Hex	(1C 71)H
Decimal	(28 113)D
Octal	(34 161)O

Note: This code can also clear the Chinese character's double width attribute that made by code **ESC U**.

FS r **Set CHINA Half Corner Character Mode**

This command code sets CHINA Half Corner Character mode and reset Subscript Mode, Subscript Mode, Superscript / Subscript Mode.

Hex	(1C 72)H
Decimal	(28 114)D
Octal	(34 162)O

Note: CHINA Half Corner Character mode is only valid when working mode is **CHINA**. Code **FS s** can reset this mode.

FS s **Reset CHINA Half Corner Character Mode**

This command code resets CHINA Half Corner Character mode.

Hex	(1C 73)H
Decimal	(28 115)D
Octal	(34 163)O

FS t**Set Half Corner Character Rotation Forbidden**

This command code clears the Half Corner character's rotational attribute, which made by code **FS J**. So after this code no Half Corner character is allowed to rotate, until the printer encounter code **FS u**.

Hex	(1C 74)H
Decimal	(28 116)D
Octal	(34 164)O

FS u**Set Half Corner Character Rotation Allowed**

This command code enables the code **FS J** to make Half Corner Character rotate.

Hex	(1C 75)H
Decimal	(28 117)D
Octal	(34 165)O

D.2.13 Ignored Commands in Chinese Mode

- **FS % *n*** : NOP
- **FS 0 *n1 n2*** NOP
- **FS g** NOP
- **FS h** NOP
- **FS v** NOP

FS % *n* **NOP**

This command code does nothing in PR 9.

Hex (1C 25 *n*)H
 Decimal (28 37 *n*)D
 Octal (34 45 *n*)O

FS 0 *n1 n2* **NOP**

This command code does nothing in PR 9.

Hex (1C 30 *n1 n2*)H
 Decimal (28 48 *n1 n2*)D
 Octal (34 60 *n1 n2*)O

FS g **NOP**

This command code does nothing in PR 9.

Hex (1C 67)H
 Decimal (28 103)D
 Octal (34 147)O

FS h **NOP**

This command code does nothing in PR 9.

Hex (1C 68)H
 Decimal (28 104)D
 Octal (34 150)O

FS v

NOP

This command code does nothing in PR 9.

Hex	(1C 76 n1)H
Decimal	(28 118 n1)D
Octal	(34 166 n1)O

B.3 Hex - Decimal Conversion Table

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240
1	1	17	33	49	65	81	97	113	129	145	161	177	193	209	225	241
2	2	18	34	50	66	82	98	114	130	146	162	178	194	210	226	242
3	3	19	35	51	67	83	99	115	131	147	163	179	195	211	227	243
4	4	20	36	52	68	84	100	116	132	148	164	180	196	212	228	244
5	5	21	37	53	69	85	101	117	133	149	165	181	197	213	229	245
6	6	22	38	54	70	86	102	118	134	150	166	182	198	214	230	246
7	7	23	39	55	71	87	103	119	135	151	167	183	199	215	231	247
8	8	24	40	56	72	88	104	120	136	152	168	184	200	216	232	248
9	9	25	41	57	73	89	105	121	137	153	169	185	201	217	233	249
A	10	26	42	58	74	90	106	122	138	154	170	186	202	218	234	250
B	11	27	43	59	75	91	107	123	139	155	171	187	203	219	235	251
C	12	28	44	60	76	92	108	124	140	156	172	188	204	220	236	252
D	13	29	45	61	77	93	109	125	141	157	173	189	205	221	237	253
E	14	30	46	62	78	94	110	126	142	158	174	190	206	222	238	254
F	15	31	47	63	79	95	111	127	143	159	175	191	207	223	239	255

Appendix C IBM ProPrinter X24 and IBM ProPrinter II Commands

Characters used in control functions appear in monospaced type. The table below explains some of the conventions used.

A pair of numbers separated by a slash (/) character indicates Column/Row notation. This notation refers to the location of a character in a standard code table, such as ASCII. (example: 1/B = 1B is the hex-code for Escape)

Spaces appear between characters in sequence for clarity; they are not part of the format.

At the begin of this chapter you will find a listing of the IBM ProPrinter Emulation commands classified by Hex Code and at the end a Hex - Decimal conversion table.

The following conventions are used in the command listings:

Conventions:

ESC	Escape (1/B), introduces an escape sequence
Pn	Numeric parameter, or number of units that specify a distance or quantity pertaining to the escape sequence, control function or control string. Accepted values are 0...9999, may be preceded by + or -. If the parameter is in normal notation like "200" the programming in hex-code is according to a ASCII table. ("200" = 32,30,30 in hex).
n1..n2..n3....nn	A series of parameters pertaining to the escape sequence, control function or control string.
SP	Is standing for Space (hex 20).

Note: Some commands or parameter may be different for a specific **Printer type**. In those case it will be indicated by the **Printer name** to which printer a command or parameter applies.

C.1 Command Index

This table shows the IBM ProPrinter X24 and IBM ProPrinter II Emulation commands classified by Hex Code.

Mnemonic	Hex Code	Function
BS	08	Backspace
HT	09	Horizontal tabulation
LF	0A	Line feed forward
VT	0B	Vertical tabulation
FF	0C	Form feed
CR	0D	Carriage return
SO	0E	Double width (one line)
SI	0F	16.6/17.1 cpi (Condensed)
DC1	11	Activate printer - system connection (select printer)
DC2	12	10 cpi (Pica)
DC3	13	Deactivate printer-system connection
DC4	14	Cancel double width (one line)
CAN	18	Clear print buffer
ESC BEL E	1B 07 45 ...	Change Emulation
ESC * ...AGM	1B 2A ...	Select Alternate Graphics Mode AGM
ESC -	1B 2D ...	Underline
ESC 0	1B 30	Line feed = 1/8"
ESC 1	1B 31	Line feed = 7/72"
ESC 2	1B 32	Line feed = 1/6" or Activate ESC A n
ESC 3 ...	1B 33 ...	Line feed = n/216"
ESC 4	1B 34	Top of form
ESC 5	1B 35 ...	Automatic line feed after CR
ESC 6	1B 36	Table 2 of character set
ESC 7	1B 37	Table 1 of character set
ESC :	1B 3A	12 cpi (Elite)
ESC =...	1B 3D ...	Customized characters (DLL)
ESC A ...	1B 41 ...	Line feed = n/72"
ESC B	1B 42 ...	Vertical tabulation program
ESC C ..	1B 43 ...	Form length as no. lines
ESC C NUL ...	1B 43 00 ...	Form length in inches

Mnemonic	Hex Code	Function
ESC D	1B 44 ...	Horizontal tabulation program
ESC E	1B 45	Bold face
ESC F	1B 46	Cancel bold face
ESC G	1B 47	Double-pass printing
ESC H	1B 48	Cancel double-pass printing
ESC I ...	1B 49 ...	Select print mode
ESC J ...	1B 4A ...	One n/216" line feed (for graphics)
ESC K ...	1B 4B ...	normal resolution BIM
ESC L...	1B 4B ...	double resolution BIM
ESC N ...	1B 4E ...	Bottom of form
ESC O	1B 4F	Cancel bottom of form
ESC P ...	1B 50 ...	Proportional spacing
ESC Q ETX	1B 51 03	Deactivate printer-system connection
ESC R	1B 52	Cancel tabulation stop
ESC S ...	1B 53 ...	Superscript/subscript
ESC T	1B 54	Cancel superscript/subscript
ESC U ...	1B 55 ...	Uni/bidirectional printing
ESC W ...	1B 57 ...	Double width (continued)
ESC X...	1B 58 ...	Left and right margins
ESC Y ...	1B 59 ...	Double resolution BIM
ESC Z ...	1B 5A ...	Quadruple resolution BIM
ESC [@ ...	1B 5B 40 ...	Double height/width
ESC [A ...	1B 5B 41 ...	Triple height/width
ESC [g ...	1B 5B 67 ...	High Resolution Graphics
ESC \	1B 5C ...	Print characters from table 3
ESC]	1B 5D	Line feed backward
ESC ^	1B 5E	Print a character from table 3
ESC _	1B 5F ...	Over line
ESC d ...	1B 64	Relative Forward Horizontal Movement
FS S ...	1C 53 ...	Adjust characters space

C.2 Command Description (by function)

When you select the **EMULATION: IBM Proprinter X24** or IBM **ProPrinter II** parameter in the setup, the machine interprets all the commands of the IBM ProPrinter X24 and IBM ProPrinter II printer, grouped according to their codes, as follows:

- **Basic Operations**
- **Margins**
- **Line Feed**
- **Print Pitches**
- **Print Attributes**
- **Tabulation**
- **Graphics**
- **Down Line Loading of Customized Characters (DLL)**
- **Other Functions**

C.2.1 Basic Operations

Before printing, the printer stores the image of a line in the print buffer. All the commands concerning this section result in immediate printing of the buffer contents.

- **BS** : Backspace
- **CR** : Carriage return
- **FF** : Form feed
- **HT** : Horizontal tabulation
- **LF** : Line feed
- **VT** : Vertical tabulation

BS

Backspace

Hexadecimal code : 08

Moves the print head back one print pitch of the selected value.

Special features:

- by two steps, if double width has been selected
- ignored if the current position is the start of the line
- a fixed step (10 cpi), if proportional spacing has been selected

CR

Carriage Return

Hexadecimal code: 0D

Prints the current line and sets the printing position at the left margin.

Also causes a line feed, if the parameter **CR + LF = YES** has been selected during the setup or if **ESC 5 1** is transmitted from host.

FF**Form Feed**Hexadecimal code: 0C

Prints the current line and advances the document to the next page. If the length of form is not long enough, ejects the form from the front feeder.

If the parameter **LF + CR = YES** has been selected from the Set-Up, the printing position is set at the left margin.

HT**Horizontal Tabulation**Hexadecimal code : 09

Advances the print head to the next horizontal tabulation stop (defined using **ESC D**). The default setting is one stop every 8 characters, beginning at position 9. If the position of the next stop is beyond the right margin, the printer ignores the command.

LF**Line Feed Forward**Hexadecimal code: 0A

Prints the current line and executes a line feed of a value determined by the vertical spacing selected.

If the parameter **LF + CR = YES** has been selected from the Set-Up, the printing position is set at the left margin.

VT**Vertical Tabulation**Hexadecimal code: 0B

Moves the print head to the next vertical tabulation stop (set using **ESC B**). If there is no vertical tabulation program or if the next tabulation stop lies outside the predefined printing area, it executes a line feed only.

If the parameter **LF + CR = YES** has been set in the SETUP, a carriage return is also executed.

C.2.2 Margins

- **ESC 4 :** Top of form
- **ESC C *n* :** Form length as no. of lines
- **ESC C NUL *n* :** Form length in inches
- **ESC N *n* :** Bottom of form
- **ESC O :** Cancel bottom of form
- **ESC X *n1 n2* :** Left and right margins

ESC 4

Top of Form

Hexadecimal code: 1B 34

Sets the first line of the form in the current position. It does not change the current form length.

ESC C *n*

Form Length in No. of Lines

Hexadecimal code: 1B 43 *n*

n = 1 - 255

Defines the form length as a number of print lines. The space occupied depends on the value of the current line feed. This space remains unchanged, even if the line feed is changed, until the printer is switched off or a new form length command is received.

Resets the line counter and fixes the current position as the start of the page (top of form).

ESC C NUL *n*

Form Length in Inches

Hexadecimal code: 1B 43 00 *n*

n = 1 - 30

Defines the form length directly in inches (30 max). One inch is equal to 25.4 mm. It resets the line counter and sets the top of form at the current position.

ESC N *n***Bottom of Form**Hexadecimal code: 1B 4E *n**n* = 0 - 255

Defines the number of line feeds (of the current value) not to be printed (to be skipped) between the end of the current page and the start of the next (bottom margin + top of form).

This setting is cancelled by **ESC O** and **ESC C *n***.

ESC O**Reset Bottom of Form**Hexadecimal code: 1B 4F

Cancels the bottom of form.

ESC X *n1 n2***Left and Right Margins**Hexadecimal code: 1B 58 *n1 n2**n1, n2* = 1 - 255

Parameter *n1* indicates the number of the column, in the current print pitch, for the left margin.

Parameter *n2* indicates the number of the column, in the current print pitch, for the right margin.

Value *n2* - *n1* **must** be more than 1. Values that go beyond the right edge of the paper are set back to the right margin.

When parameters *n1* and/or *n2* are set to 0, they indicate that the current margins remain valid.

The margins are set according to the current print pitch, but their absolute position does not change, even if the pitch is then changed.

C.2.3 Line feed

- **ESC 0 :** Line feed = 1/8"
- **ESC 1 :** Line feed = 7/72"
- **ESC 2 :** Line feed = 1/6" or Activate ESC A n
- **ESC 3 n :** Line feed = n/216" or n/180" (ProPrinter X24); n/216" (ProPrinter II)
- **ESC A n :** Line feed = n/72" or n/60 (ProPrinter X24); n/72" (ProPrinter II)
- **ESC J n :** One line feed of n/216" or n/180 (ProPrinter X24); n/216" (ProPrinter II)
- **ESC] :** Line feed backward
- **ESC [\ c1 c2 t1 t2 n1 n2 :** Line feed Value Modification **(ProPrinter X24)**

ESC 0**Line Feed - 1/8"**Hexadecimal code: 1B 30

Sets the 1/8" (3.175 mm) line feed.

Remains valid until a new line feed command is received.

ESC 1**Line Feed - 7/72"**Hexadecimal code: 1B 31

Sets the 7/72" (2,47 mm) line feed.

It remains valid until a new line feed command is received.

ESC 2**Line Feed = 1/6" or Activate ESC A n**Hexadecimal code: 1B 32

Sets the line feed of the value according to **ESC A n**, when it is followed by this command.
It remains valid until a new line feed command is received.

Line feed - 1/6":

Sent alone, it sets the 1/6" (4,23 mm) line feed. This is the line feed recommended for alphanumeric texts and ensures that semi graphic characters meet perfectly.

ESC 3 n**(IBM ProPrinter X24)****Line Feed - n/216" or n/180**Hexadecimal code: 1B 33 n

n = 1 - 255

If the parameter **AGM : NO** has been selected in the SETUP ,it sets the n/216" (0,1176 x n mm) line feed; If the parameter **AGM : YES** has been selected in the SETUP ,it sets the n/180" (0,141 x n mm) line feed.

This is the line feed recommended for graphic printing (BIM). If programmed to 24/216", it ensures that the various lines in 8-needle graphic printing meet perfectly.

It remains valid until a new line feed command is received.

To obtain precise line feeds, always use multiples of 3 for parameter **n**.

ESC 3 n **(IBM ProPrinter II)****Line Feed - $n/216''$** Hexadecimal code: 1B 33 n

$$n = 1 - 255$$

Sets the $n/216''$ (0,1176 x n mm) line feed.

This is the line feed recommended for graphic printing (BIM). If programmed to 24/216'', it ensures that the various lines in 8-needle graphic printing meet perfectly.

It remains valid until a new line feed command is received.

Note: To obtain precise line feeds, always use multiples of 3 for parameter n .

ESC A n **(IBM ProPrinter X24)****Line Feed - $n/72''$ or $n/60''$** Hexadecimal code: 1B 41 n

$$n = 1 - 85$$

If the parameter **AGM : NO** has been selected in the SETUP ,it sets the $n/72''$ (0,3528 x n mm) line feed; If the parameter **AGM : YES** has been selected in the SETUP ,it sets the $n/60''$ (0,432 x n mm) line feed.

It will only be executed when the command **ESC 2** is received. Until then, the current line feed remains valid.

Note: $n = 0$ does not change the current line feed.

ESC A n **(IBM ProPrinter II)****Line Feed - $n/72''$** Hexadecimal code: 1B 41 n

$$n = 1 - 85$$

Sets the $n/72''$ (0,3528 x n mm) line feed.

It will only be executed when the command **ESC 2** is received. Until then, the current line feed remains valid.

Note: $n = 0$ does not change the current line feed.

ESC J *n***(IBM ProPrinter X24)****One Line Feed of *n*/216" or *n*/180"**Hexadecimal code: 1B 4A *n*

$$n = 1 - 255$$

Prints the buffer and feeds the paper line feed. If the parameter **AGM : NO** has been selected in the SETUP, the paper line feed by *n*/216"; If the parameter **AGM : YES** has been selected in the SETUP, the paper line feed by *n*/180".

It also executes a carriage return, if the parameter **LF + CR : YES** has been selected in the SETUP.

The value of *n* must be a multiple of 3 (minimum line feed). In 8-needle graphic printing, the value 24/216" ensures that the lines meet perfectly.

ESC J *n***(IBM ProPrinter II)****One Line Feed of *n*/216"**Hexadecimal code: 1B 4A *n*

$$n = 1 - 255$$

Prints the buffer and feeds the paper by *n*/216". It also executes a carriage return, if the parameter **LF + CR = YES** has been selected in the SETUP.

In 8-needle graphic printing, the value 24/216" ensures that the lines meet perfectly.

ESC]**Line Feed Backward**Hexadecimal code: 1B 5D

Prints the current line and executes a line feed backward of a value determined by the vertical spacing selected.

If the parameter **LF + CR = YES** has been selected from the Set-Up, the printing position is set at the left margin.

ESC [*c1 c2 t1 t2 n1 n2***IBM ProPrinter X24 only****Line Feed Value Modification**Hexadecimal code: 1B 5B 5C *c1 t2 n1 n2*

Modifies the values of codes ESC J and ESC 2 as *n*/ 216" or *n*/180".

Parameters *c1*, *c2*, *t1*, *t2* and *n1* have the following fixed decimal values: 4, 0, 0, 0, and 0. Parameter *n2* has the decimal value: 180 or 216.

C.2.4 Print Pitches

- **DC2** : 10 cpi (Pica)
- **ESC :** 12 cpi (Elite)
- **ESC P *n***: Proportional spacing
- **FS S *n1 n2***: Adjust characters space
- **SI**: 16.6/17.1 cpi (Condensed)

DC2**10 cpi (Pica)**Hexadecimal code: 12

Cancels the print pitches set using **SI** and **ESC :**, restoring 10 cpi. It does not cancel Double width.

ESC :**12 cpi (Elite)**Hexadecimal code: 1B 3A

Sets 12 characters per inch starting from the current position.
Cancelled by **DC2**, which restores 10 cpi (Pica).

ESC P *n***Proportional Spacing**Hexadecimal code: 1B 50 *n*

Selects printing with proportional spacing.

In this way, the print pitch changes from one character to another, according to their width. Proportional spacing is canceled by any command that changes the print pitch.
Parameter *n* may be set to the following values:

- n* = 1 (1 or 49)D : sets proportional spacing
- n* = 0 (0 or 48)D : cancels proportional spacing

Note: Takes priority over a different setting made on the operator console.

FS S *n1 n2*

Adjust characters space

Hexadecimal code: 1B 50 *n1 n2*

n1n2 = 00 - 23

The command adjust the characters space to the current characters pitch starting from the current position.

If the *n1n2* value is equal to 00, the character width is not change. If *n1n2* > 23 the value of *n1n2* is set to 23.

It sets the characters width be $(1 + n1n2/24) / (\text{current CPI value})$ inch.

SI

16.6 / 17.1 cpi (Condensed)

Hexadecimal code: 0F

If the parameter **COMPRESS : 17.1** has been selected in the SETUP, it sets 17.1 characters per inch starting from the current position.

If the parameter **COMPRESS : 16.6** has been selected in the SETUP, it sets 16.6 characters per inch starting from the current position.

Cancelled by **DC2**, which restores 10 cpi (Pica).

C.2.5 Print Attributes

- **DC4** : Cancel double width (one line)
- **ESC E** : Bold face
- **ESC F** : Cancel bold face
- **ESC G** : Double-pass printing
- **ESC H** : Cancel double-pass printing
- **ESC I n** : Select print mode
- **ESC S n** : Superscript/subscript
- **ESC T** : Cancel superscript/subscript
- **ESC U n** : Uni/bidirectional printing
- **ESC W n** : Double width (continuous)
- **ESC - n** : Underline
- **ESC _ n** : Overline
- **SO** : Double width (one line)
- **ESC [@** : Double height/width
- **ESC [A ...** : Triple height/width

DC4**Cancel Double Width (One Line)**Hexadecimal code: 14

Cancel double width set by **SO** and restores the previous print pitch.

ESC E**Bold Face**Hexadecimal code: 1B 45

Sets bold face printing until the **ESC F** command, which cancels it, is received.
Bold face is obtained by the printer in one pass only.

ESC F**Cancel Bold Face**Hexadecimal code: 1B 46

Cancels bold face printing set by **ESC E**.

ESC G**Double-Pass Printing**Hexadecimal code: 1B 47

Prints the current font in double pass.

ESC H

Cancel Double-Pass Printing

Hexadecimal code: 1B 48

Cancels printing selected by **ESC G**.

ESC I *n*

(IBM ProPrinter X24)

Select Print Mode

Hexadecimal code: 1B 49 *n*

Selects the print mode and character set, according to the decimal value of parameter *n*:

<i>n</i>	Print Mode
0	Draft 10 cpi sans-serif (standard)
8	Draft 12 cpi (derived from Draft 10 cpi)
16	Draft 17 cpi (derived from Draft 10 cpi)
2	Letter 10 cpi Courier
10	Letter 12 cpi Prestige Elite
18	Letter 17 cpi Courier
3	Letter Proportional
4	Draft 10 cpi downloaded
12	Draft 12 cpi downloaded (derived from Draft 10 cpi downloaded)
20	Draft 17 cpi downloaded (derived from Draft 10 cpi downloaded)
6	Letter 10 cpi downloaded
14	Letter 12 cpi downloaded
22	Letter 17 cpi downloaded (derived from Letter 10 cpi downloaded)
7	Letter Proportional downloaded

ESC I *n*

(IBM ProPrinter II)

Select Print Mode

Hexadecimal code: 1B 49 *n*

Selects the print mode and character set, according to the decimal value of parameter *n*:

<i>n</i>	Print Mode
0	Draft with standard character set
1	12 cpi Fast Font with standard character set
2	SANS SERIF with standard character set
3	ROMAN with standard character set
4	Draft with DRAFT DLL character set
5	Fast Font with DRAFT DLL character set
6	SANS SERIF with DRAFT DLL character set
7	ROMAN with NLQ character set

ESC S *n***Superscript/Subscript**Hexadecimal code: 1B 53 *n*

Sets the printing of small characters in the current pitch. It is obtained by a single printing pass.

Superscript is printed using the top five needles of the print head and subscript with the bottom five needles of the normal character matrix. Both settings are canceled by **ESC T**.

n = 0 (0 or 48)D: superscript

n = 1 (1 or 49)D: subscript

ESC T**Cancel Superscript/Subscript**Hexadecimal code: 1B 54

Cancels the two settings obtained by **ESC S *n***.

ESC U *n***Uni/Bidirectional Printing**Hexadecimal code: 1B 55 *n*

Sets continued uni or bidirectional printing. Parameter *n* may be set to:

n = 0 (0 or 48)D : bidirectional

n = 1 (1 or 49)D : unidirectional

ESC W *n***Double Width (continued)**Hexadecimal code: 1B 57 *n*

Sets/cancels double width.

Parameter *n* sets/cancels double width (the width of the characters is doubled with respect to the preselected print pitch and, as a result, the capacity of the print line is divided by two).

n = 1 (1 or 49)D: sets

n = 0 (0 or 48)D: cancels

ESC - *n*

Underline

Hexadecimal code: 1B 2D *n*

Activate/deactivate underline.

n = 1 (1 or 49)D: activate

n = 0 (0 or 48)D: deactivate

**Underline also the SPACE character, but not horizontal tabulations.
Semigraphic characters cannot be underlined.**

ESC _ *n*

Overline

Hexadecimal code: 1B 5F *n*

Activate/deactivate overline.

The overline is obtained using the first needle (with characters that use the first needle, part of the overline merges with the "crest" of the characters).

n = 1 (1 or 49)D: activate

n = 0 (0 or 48)D: deactivate

Overline also the SPACE character, but not horizontal tabulations. Semigraphic characters cannot be overlined.

SO

Double Width (One Line)

Hexadecimal code: 0E

Prints each character doubling the preset width and, as a result, the number of characters per inch is divided by two.

The **BS** command will move the print head back by a double space.

Valid for one line only. Canceled by **DC4**, **CR**, **LF**, **FF**, **VT**, **ESC W NU**, **ESC J**, **ESC [@ ..** and **CAN**.

ESC [@ *n1 n2 m1 m2 m3 m4***Double Height/Width**Hexadecimal code: 1B 5B 40 04 00 00 00 *m3 m4*

Sets double height and / or double width for the characters printed, with or without changing the line feed.

Parameters *n1* and *n2* indicate the number of bytes that follow and have the following fixed values: (4)D and (0)D respectively.

These two parameters are followed by four bytes (from ***m1*** to ***m4***) which have the following values:

Parameters *m1* and *m2* have a fixed value: (0)D.

Parameter *m3* defines the height of the characters and the line feed according to the decimal values in the table below:

<i>m3</i>	Line feed and height of characters
0	No change with respect to the current settings
1	Unchanged line feed, normal height
2	Unchanged line feed, double height
16	Single line feed, unchanged height
17	Single line feed, normal height
18	Single line feed, double height
32	Double line feed, unchanged height
33	Double line feed, normal height
34	Double line feed, double height

The top half of the byte indicates the line feed (unchanged, single or double); the bottom half of the byte indicates the height of the characters.

Parameter *m4* defines the width of the characters according to the decimal values in the table below:

<i>m4</i>	Width of characters
0	Unchanged width
1	Normal width
2	Double width

The top half of the byte is ignored, while the values of the bottom half of the byte are significant.

ESC [A *n1 n2 m1 m2 m3 m4***Triple Height/Width**Hexadecimal code: 1B 5B 41 04 00 00 00 *m3 m4*

Sets Triple height and/or double width for the characters printed, with or without changing the line feed.

Parameters *n1* and *n2* indicate the number of bytes that follow and have the following fixed values: (4)D and (0)D respectively.

These two parameters are followed by four bytes (from *m1* to *m4*) which have the following values:

Parameters *m1* and *m2* have a fixed value: (0)D.

Parameter *m3* defines the height of the characters and the line feed according to the decimal values in the table below:

<i>m3</i>	Line feed and height of characters
0	No change with respect to the current settings
1	Unchanged line feed, normal height
2	Unchanged line feed, triple height
16	Single line feed, unchanged height
17	Single line feed, normal height
18	Single line feed, triple height
32	Double line feed, unchanged height
33	Double line feed, normal height
34	Double line feed, triple height
48	Triple line feed, unchanged height
49	Triple line feed, normal height
50	Triple line feed, triple height

The top half of the byte indicates the line feed (unchanged, single, double, or triple); the bottom half of the byte indicates the height of the characters.

Parameter *m4* defines the width of the characters according to the decimal values in the table below:

<i>m4</i>	Width of characters
0	Unchanged width
1	Normal width
2	Double width
3	Triple width

The top half of the byte is ignored, while the values of the bottom half of the byte are significant.

C.2.6 Tabulation

- **ESC B ...** : Vertical tabulation program
- **ESC D ...** : Horizontal tabulation program
- **ESC d ...** : Relative Forward Horizontal Movement
- **ESC R** : Cancel tabulation stops

ESC B *n1..n254 k1..k64* NUL

Vertical Tabulation Program

Hexadecimal code: 1B 42 *n1..n254 k1..k64* 00

n = 1 - 254

k = 1 - 64

The values of parameters *n* indicate the lines on which the tabulation stops will be positioned (the top of form is 1). The line feed applied is the current one.

Parameter *k* defines a vertical tabulation program with a maximum of 64 stops.

At power-on, there are no vertical tabulation stops. The sequence **ESC B NUL**, and the command **ESC R**, clear all vertical tabulation stops.

When a vertical tabulation program is executed, all the current vertical tabulation stops are cleared. If there is no vertical tabulation program, the command VT executes a single line feed.

ESC D *n1 .. n255 k1.. k28* NUL

Horizontal Tabulation Program

Hexadecimal code: 1B 44 *n1..n255 k1..k28* 00

n = 1 - 255

k = 1 - 28

The values of the parameters *n* indicate the columns in which the tabulation stops will be positioned (the left edge is column 1). The print pitch applied is the current one. At power-on, the default setting is one tab stop every 8 characters, starting from column 9.

Parameter *k* defines a horizontal tabulation program with a maximum of 28 stops.

The sequence **ESC D NUL** clears all horizontal tabulation stops.

The command **ESC R** clears all the tabulation stops and restores the default condition.

ESC d *n1 n2*

Relative Forward Horizontal Movement

Hexadecimal code: 1B 64 *n1 n2*

where *n1* = 00 - FF
n2 = 00 - FF

Moves the current horizontal position to the right at a distance specified in the *n1* and *n2* parameters.

The distance is computed from the parameters using :
 $\text{distance} = (n2 * 256) + n1$

The distance is specified in dot units using 1/120 inch as horizontal resolution.
Spaces produced by this command are affected by underscore, overscore, and strikethrough. If it goes beyond the right margin, current horizontal position is set to the right margin.

ESC R

Clear All Tabulation Stops

Hexadecimal code: 1B 52

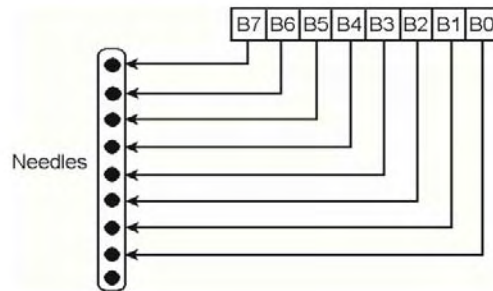
Deletes all the horizontal tabulation stops set by **ESC D ..** and all vertical tabulation stops set by **ESC B ...**

For the horizontal tabulation stops, the default condition is restored:
one stop every 8 characters.

C.2.7 Graphics

The printer can operate in Bit Image Mode (bit map printing), to create illustrations and diagrams. In this way, the image is created by printing each byte received as a vertical line of 8 dots. A dot is printed for each bit set to "1" in the byte sent.

The least significant bit corresponds to the lowest dot on the line, while the most significant bit corresponds to the highest dot.



The graphic print commands only apply to one print line. The line end command **CR/LF** is only recognized when the printer leaves graphic printing to return to alphanumeric printing. As a result, the number of bytes that can follow a command for graphics is limited by the maximum capacity of a print line (and the graphic resolution). The data that exceeds the capacity of the line buffer is ignored.

The graphic commands must therefore be repeated for each print line, if you want to print an image consisting of several lines.

One line can contain both alphanumeric and graphical characters. To calculate the space that the alphanumeric characters occupy inside the graphics, a table is provided later on.

BIM Data/Capacity of the print line with various resolutions

BIM Resolution	80 columns
Normal (ESC K)	480
Double (ESC L, ESC Y)	960
Quadruple (ESC Z)	1920

Space occupied by characters inside BIM data

The table below shows the relationship between the space occupied (as a number of bytes) by a normal character inside a mixed print line (text + graphics).

BIM resolution:	Normal	Double	Quadruple
Pica (10 cpi)	6	12	24
Elite (12 cpi)	5	10	20
Condensed (17.1 cpi)	3.5	7	14

Calculation of the parameters for the BIM data

As the printer cannot recognize ANY command in the BIM data, before printing the graphics, you must define exactly the number of BIM data items that will follow. The graphic commands do this by means of two parameters, which can be calculated in the same way for all resolutions.

These parameters, $n2$ and $n1$, are calculated as follows:

$n2$ = whole number (number of BIM data items divided by 256)

$n1$ = number of BIM data items - ($n2 \times 256$)

In other words: $n1$ is the remainder of the division of which the quotient is $n2$.

Example: To print a full line of graphic data in double resolution with an 80-column printer, 960 bytes must be sent after the command **ESC L**.

Parameters $n1$ and $n2$ are calculated as follows:

$n2$ = whole number of $(960/256) = 3$

$n1$ = $960 - (3 \times 256) = 960 - 768 = 192$

2.7.1 The BIM graphic commands are:

- **ESC K $n1$ $n2$...** : normal resolution BIM
- **ESC L $n1$ $n2$...** : double resolution BIM
- **ESC Y $n1$ $n2$...** : double resolution BIM
- **ESC Z $n1$ $n2$...** : quadruple resolution BIM
- **ESC [g $n1$ $n2$ m ...** : High Resolution Graphics

ESC K $n1$ $n2$ **Normal Resolution BIM**

Hexadecimal code: 1B 4B $n1$ $n2$

Sets normal resolution graphics (60 dots per inch) for a data string the length of which is defined by parameters $n1$ and $n2$.

ESC L $n1$ $n2$ **Double Resolution and Half Speed BIM**

Hexadecimal code: 1B 4C $n1$ $n2$..

Sets double resolution graphics (120 dots per inch), at half speed, for a data string the length of which is defined by parameters $n1$ and $n2$.

ESC Y *n1 n2* ...**Double Resolution BIM**Hexadecimal code: 1B 59 *n1 n2* ..

Sets double resolution graphics (120 dots per inch), at normal speed, for a data string the length of which is defined by parameters *n1* and *n2*.

The capacity of the line is 960 (1632) data items, but the adjacent horizontal dots cannot be printed.

ESC Z *n1 n2***Quadruple Resolution BIM**Hexadecimal code: 1B 5A *n1 n2*..

Sets quadruple resolution graphics (240 dots per inch), at half speed with respect to **ESC K *n1 n2***, for a data string the length of which is defined by parameters *n1* and *n2*.

The capacity of the line is 1920 (3264) data items, but the horizontal adjacent dots cannot be printed.

ESC [g *n1 n2 m* ...**High Resolution Graphics**Hexadecimal code: 1B 5B 67 *n1 n2 m* ..

Selects the graphic printing resolution (BIM with 8 or 24 needles).

Parameters *n1* and *n2* give the amount of graphic data plus 1 (calculation as for other BIM commands).

Parameter *m* defines the type of graphic print resolution according to the following table:

<i>m</i>	Horizontal Resolution	Needles used	Notes
0	60	8	same as ESC K
1	120	8	same as ESC L
2	120	8	same as ESC Y
3	240	8	same as ESC Z
8	60	24	ESC K, high resolution
9	120	24	ESC L, high resolution
11	180	24	Triple density high resolution
12	360	24	Sextuple density high resolution

In high resolution graphics mode (24-needles), each vertical string of dots is controlled by three bytes.

Note: If parameter *m* has the value 2, 3 or 12, the second of horizontally adjacent dots will not be printed.

C.2.7.2 Alternate Graphics Mode (AGM)**(ProPrinter X24)**

As well as the graphic modes described in the previous section, the printer can also print Epson LQ-800/LQ-1000 compatible graphics, using the Alternate Graphics Mode (AGM) feature.

When the Alternate Graphics Mode feature is selected during the SETUP (**AGM : YES**), the values of command codes **ESC 3**, **ESC J**, and **ESC A** are altered with respect to their standard functions, and the command code **ESC *** is activated.

- **ESC 3 n** : Line feed = $n/180''$
- **ESC A n** : Line feed = $n/60''$
- **ESC J n** : One line feed of $n/180''$ (for graphics)
- **ESC * m ...** : AGM graphics mode

ESC 3 n**(IBM ProPrinter X24)****Line Feed - $n/180''$** Hexadecimal code: 1B 33 *n**n* = 1 - 255

If the parameter **AGM : NO** has been selected in the SETUP ,it sets the $n/216''$ (0,1176 x *n* mm) line feed;

If the parameter **AGM : YES** has been selected in the SETUP ,it sets the $n/180''$ (0,141 x *n* mm) line feed.

This is the line feed recommended for graphic printing (BIM). If programmed to $24/216''$, it ensures that the various lines in 8-needle graphic printing meet perfectly.

It remains valid until a new line feed command is received.

To obtain precise line feeds, always use multiples of 3 for parameter *n*.

ESC A n**(IBM ProPrinter X24)****Line Feed - $n/60''$** Hexadecimal code: 1B 41 *n**n* = 1 - 85

If the parameter **AGM : NO** has been selected in the SETUP ,it sets the $n/72''$ (0,3528 x *n* mm) line feed; If the parameter **AGM : YES** has been selected in the SETUP ,it sets the $n/60''$ (0,432 x *n* mm) line feed.

It will only be executed when the command **ESC 2** is received. Until then, the current line feed remains valid.

Note: *n* = 0 does not change the current line feed.

ESC J n**(IBM ProPrinter X24)****One line feed of n/180"** (for graphics)Hexadecimal code: 1B 4A n

$$n = 1 - 255$$

Prints the buffer and feeds the paper line feed. If the parameter **AGM : NO** has been selected in the SETUP, the paper line feed by $n/216''$; If the parameter **AGM : YES** has been selected in the SETUP, the paper line feed by $n/180''$.

It also executes a carriage return, if the parameter **LF + CR : YES** has been selected in the SETUP.

The value of **n** must be a multiple of 3 (minimum line feed). In 8-needle graphic printing, the value $24/216''$ ensures that the lines meet perfectly.

ESC * m n1 n2 AGM**(IBM ProPrinter X24)****Select Alternate Graphics Mode (AGM)**Hexadecimal code: 1B 2A m n1 n2 ...

Allows the selection of 8 or 24-needle graphic mode when **AGM: YES** has been selected during SETUP.

Parameter **m** defines the type of graphic printing resolution according to the following table:

m	Horizontal Resolution	Needles used	Notes
0	60	8	same as ESC K
1	120	8	same as ESC L
2	120	8	same as ESC Y
3	240	8	same as ESC Z
4	80	8	CRT I
6	90	8	CRT II
32	60	24	ESC K, high resolution
33	120	24	ESC L, high resolution
38	90	24	CRT III
39	180	24	Triple density high resolution
40	360	24	Sextuple density high resolution

Parameters n1 and n2 give the amount of graphic data plus 1 (calculations as for other BIM commands).

Normal and high resolution graphics modes (8 and 24 needles respectively) have the same corresponding bit/needle relationships as those described for the standard graphics mode (see **previous section**).

The vertical dot density is 1/180 in.

Example: box 8x8 dots with center point 2x2 dots, standard density, 8 dots / column
hex: 1B 2A 00 08 00 FF 81 81 99 99 81 81 FF

C.2.8 Downloading Customized Characters (DLL)

If you like, you can create "your own" set of characters, and use it in place of the printer's character set. You can redesign all 256 characters, or just some of them, and load them into the printer's memory (DLL = Down Line Loading) using the command **ESC = ...**

Each time you can only load characters in ascending code order. If you want to load characters with non-consecutive codes, you must execute the command repeatedly (for each group of characters with consecutive codes).

The area occupied by the characters is 9 dots high and 12 wide (the 12th dot is always a space). The matrix for constructing the characters has 11 columns with 8 dots per column. Eleven bytes (one per column) define the shape of the character. One dot is printed for each bit set to "1" (as in BIM graphics).

Using the DLL command, you can also create graphic symbols and shaded characters. The graphic symbols are automatically expanded from 8 to 12 dots high (by means of the character attribute) during printing. But be careful: the algorithm for creating the NLQ font style and the bold face may not work properly in these cases.

The table of the new characters will be loaded in the printer's RAM. Remember that the content of the RAM is cleared when you switch off the printer, so the DLL characters are also lost. If you want to reuse your DLL characters, you must reload them whenever you power on.

The DLL characters, to be printed, must be preselected using the command **ESC I n .**

Consult the following command:

ESC = : Customized characters (DLL)

ESC = *n1 n2 ID m*

Customized Characters

Hexadecimal code: 1B 3D *n1 n2..*

character defining parameters: (a b NUL p1..p11)k

Enables customized characters to be created and loads them into the printer's RAM.

Parameters ***n1*** and ***n2*** indicate the number of characters to be created and loaded with the current code sequence.

The ID is a fixed value code which must be: **(20)D** for a Draft Font and **(21)D** for a ROMAN Font. (For further information about NLQ DLL characters, see the relevant section of this chapter).

Parameter ***m*** indicates the decimal code of the first of the standard characters to be replaced with customized characters. The customized characters that follow the first are automatically assigned the following decimal codes.

The other parameters define the attributes of the new character and the arrangement of the dots in the character matrix. They must be repeated for each DLL character.

The sequence **ESC = NUL NUL** (or print power-off) clears all DLL characters from the printer's memory and restores the standard character set.

DLL in Draft Print Mode

DLL in NLQ Print Mode

DLL in Draft

- Print Matrix
- Parameters *n1* and *n2*
- Parameter *m2*
- Parameters *a* and *b*
- Parameters *p1* .. *p11*

Example of How to Create a DLL Character

- Print Matrix:

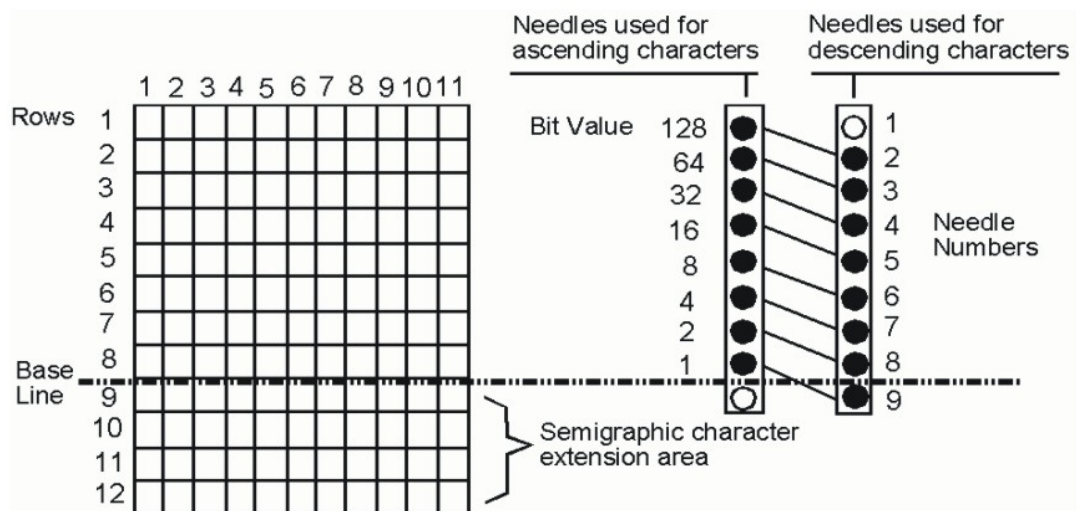


Figure: Draft DLL print matrix

– **Parameters *n1* and *n2***

These two parameters indicate the total number of bytes that will follow in the sequence.

They are calculated as follows:

$n2 = \text{whole number of } (t \text{ divided by } 256)$

$n1 = \text{remainder of } (t \text{ divided by } 256)$

where $t = (\text{number_of_characters} \times 13) + 2$

Example:

To redefine characters "A" to "E" (five characters), proceed as follows:

$t = (\text{number_of_characters} \times 13) + 2 = (5 \times 13) + 2 = 65 + 2 = 67$

$n1 = \text{whole number of } (t / 256) = \text{whole number of } (67 / 256) = 0$

$n2 = \text{remainder of } (t / 256) = \text{remainder of } (67 / 256) = 67$

05-22 Customized Characters

– **Parameter *m***

This parameter indicates the decimal code of the first of the standard characters to be replaced with DLL characters.

Example (continued):

To redefine characters "A" to "E" (from 65 to 69)D:

$m = A = 65$

– **Parameters *a* and *b***

define the attributes that may be assigned to the new characters.

They must be specified for each of the characters.

- **Parameter *a*** indicates whether the character is ascending or descending and whether the character is expanded or not (if it is expanded, it indicates how).

The values of the bits of parameter *a* select the following features:

BIT	Value	Function
7	0	Ascending Character
	1	Descending Character
6 - 2		ignored
1 - 0	0 1	Expanded Character (Bit 7 ignored)
	1 0	Shaded Character (Bit 7 ignored)
	0 0	Normal Character (Bit 7 valid)

If bits 0 and 1 are set to 1 and 0 respectively, the character is expanded to 12 dots; the lines from 9 to 12 will repeat the dots on line 8. These characters can be selected in NLQ.

If bits 0 and 1 are set to 0 and 1 respectively, the character is expanded to 12 dots; the lines from 9 to 12 will repeat the dots of the base of the character of lines 1-4 (for shaded characters as characters with code 176-178). These characters cannot be selected in NLQ.

If both bits 0 and 1 are set to 1 (error), the printer will automatically correct these values to 0, 0 (normal character).

- **Parameter *b*** indicates whether proportional spacing is used or not. The values of the bits of parameter *b* select the following features:

Bit	Value	Function
7		ignored
6 - 4	variable	Binary number indicates the column number of the matrix where the character starts (max value = 7).
3 - 0	variable	Binary number indicates the number of columns occupied by the character, the width of the character. Values >11 are set to 11.

If the character has FIXED spacing, all the bits must be set to ZERO. If a character created with fixed spacing is printed in proportional spacing, it will occupy all 11 columns of the character matrix. Irrespective of the printing mode selected, a twelfth column will always be added to space out the characters.

- **Parameters *p1* .. *p11***

These 11 bytes determine the dots in the columns for forming the character. As in BIM graphic printing, each bit in the various bytes corresponds to a needle of the print head, and a dot will be printed for each bit set to 1.

Example of How to Create a DLL Character

This example shows how to replace the character 2@`0 (64D) with the "up arrow".

The arrow is a descending character with fixed spacing. The values of the parameters are therefore as follows:

$$t = (1 \times 13) + 2 = 15$$

$$n1 = 15$$

$$n2 = 0$$

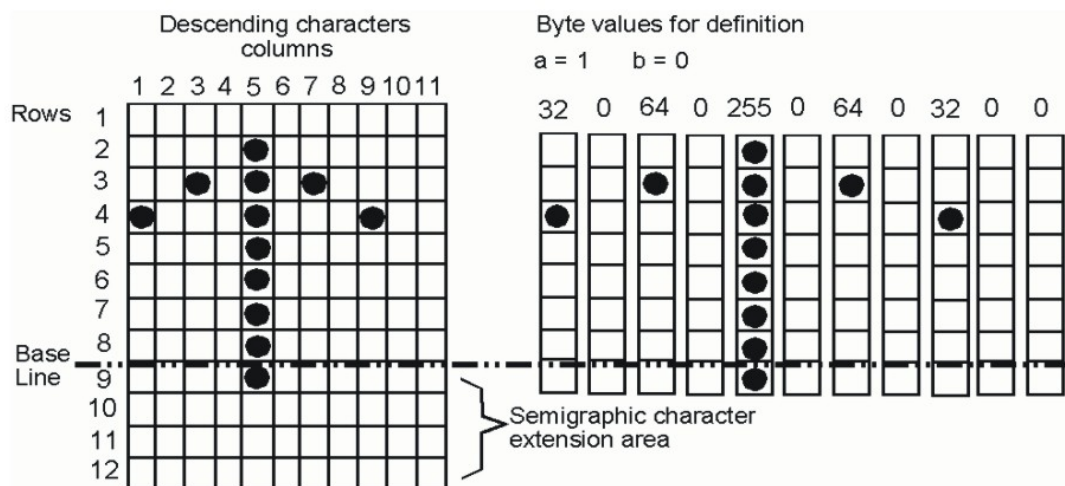
$$m = (64)D$$

$$a = (128)D$$

$$b = 0$$

$$p1 = (32)D; p2 = (0)D; p3 = (64)D; p4 = (0)D; p5 = (255)D;$$

$$p6 = (0)D; p7 = (64)D; p8 = (0)D; p9 = (32)D; p10 = (0)D; p11 = (0)D.$$



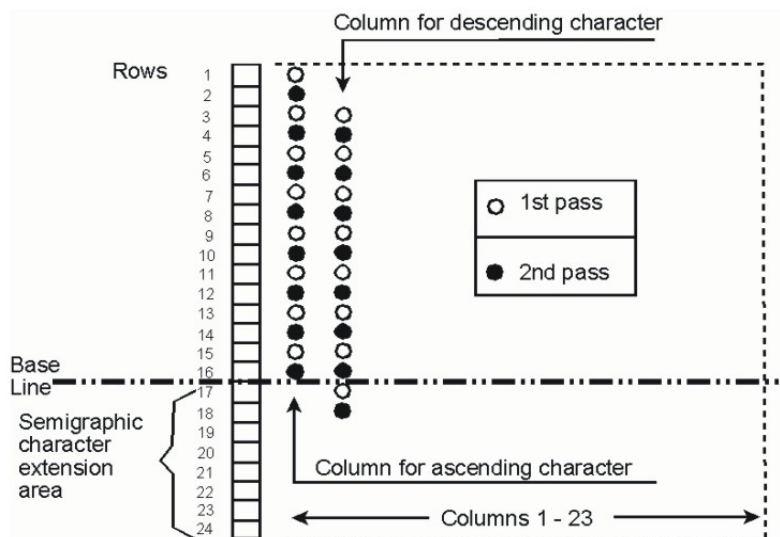
The customized character (up arrow) is loaded into the printer's memory by the following escape sequence:

(27)D; (61)D; (15)D; (0)D; (20)D; (64)D; (128)D; (0)D; (32)D; (0)D; (64)D; (0)D; (255)D; (0)D; (64)D; (0)D; (32)D; (0)D; (0)D .

– DLL in NLQ

DLL characters can also be defined in NLQ SANS SERIF font. The method for creating them differs from the Draft DLL character creation method on the following points:

1. The ID byte must be (21)D.
2. Each character requires 48 bytes for its definition (2 bytes for the attributes and 46 for the shape).
3. The matrix of an NLQ DLL character is printed in two passes (23 columns per pass). The order of the bytes for defining a character is therefore as follows:
 byte 1 : Attribute a
 byte 2 : Attribute b
 byte 3 : 1st column of 1st pass; byte 4 : 1st column of 2nd pass; byte 5 : 2nd column of 1st pass; byte 6 : 2nd column of 2nd pass
 .. byte 47 : 23rd column of 1st pass; byte 48 : 23rd column of 2nd pass.



4. For shaded and expanded characters, attribute **a** has the same meaning as for Draft DLL. But for shaded characters, lines 1, 3, 5 and 7 are copied on the lines at the bottom 17, 19, 21 and 23. For expanded characters (semigraphic), line 15 is copied on lines 17, 19, 21 and 23 and line 16 is copied onto lines 18, 20, 22, and 24.
5. All the bits of the attribute "b" byte will be set to zero, because proportional spacing is not possible for the ROMAN font.

Note: Horizontal adjacent dots cannot normally be printed; they can be in bold face printing.
 If you define consecutive dots, place them in the odd positions of the matrix (3, 5, 7 ..) to obtain characters that can also be printed correctly when printing from right to left.

C.2.9 Other Functions

- **CAN** : Clear print buffer
- **DC1** : Activate printer-system connection
- **DC3** : Deactivate printer-system connection
- **ESC 5 n** : Automatic line feed after CR
- **ESC 6** : Table 2 of character set
- **ESC 7** : Table 1 of character set
- **ESC \ n1 n2** : Print characters from table 3
- **ESC ^** : Print a character from table 3
- **ESC BEL E** : Change Emulation
- **ESC Q ETX** : Deactivate printer-system connection

CAN**Clear Buffer**Hexadecimal code: 18

Clears the contents of the print buffer; all the data is lost.
The current printing position remains unchanged.

DC1**Activate Printer-System Connection**Hexadecimal code: 11

Sets the printer "on-line" until a **DC3** is received.

DC3**Deactivate Printer-System Connection**Hexadecimal code: 13

The printer sends this command via the serial interface to indicate that the buffer is full.
With a parallel interface, it is considered a **NUL**.

ESC 5 n**Automatic Line Feed after CR**Hexadecimal code: 1B 35 *n*

Sets/cancels the execution of an automatic line feed when a CR is received. It takes priority over the setting made in the SET-UP.

n = 1 (1 or 49)D: automatic LF after CR (CR=CR+LF).

n = 0 (0 or 48)D: no automatic LF after CR (CR=CR).

ESC 6**Table 2 of Character Set**Hexadecimal code: 1B 36

Selects table 2 of the character set with the complete set of national characters (default setting).

It takes priority over the setting made in the SET-UP.

ESC 7**Table 1 of Character Set**Hexadecimal code: 1B 37

Selects table 1 of the character set (see the Command Interpreter and Character Sets section), which repeats the control codes in the code positions 128-159.

It takes priority over the setting made in the SET-UP.

ESC \ *n1 n2***Print Characters from Table 3**Hexadecimal code: 1B 5C *n1 n2*

Enables printing of the symbols present in the positions that normally represent control codes.

This command tells the printer to ignore the function of the commands for the codes between 0 and 32 (and, with table 1 selected, also between 128 and 159) and to print the substitute symbols present in these positions.

Parameters ***n1*** and ***n2*** indicate the number of characters to be printed in this way. They are calculated as follows:

n2 = whole number (number of data items/256)

n1 = number of data items - (*n2* x 256)

Having printed the number of symbols determined by parameters *n1* and *n2*, the printer resumes normal operation using the preselected character set (table 1 or 2). The function of control codes 0-32 (and 128-158) is restored and the function of this command ceases.

ESC ^**Print a Character from Table 3**Hexadecimal code: 1B 5E

Has the same function as the command **ESC \ ...**, but only enables one character to be printed, the one that follows the command.

ESC BEL E *n*

Change Emulation

Hexadecimal code: 1B 07 45 *n*

With *n*=08 (Hex), change to Olivetti emulation (PR2 or PR40+) previously set in setup.

With *n*=09 (Hex), change to OKI emulation.

With *n*=0A (Hex), change to LQ emulation.

ESC Q ETX

Deactivate Printer-System Connection

Hexadecimal code: 1B 51 03

Sets the printer **off-line** (in LOCAL mode), until the **DC1**, which restores the connection, is received.

The third element in the sequence **ETX** identifies the model of printer connected (80-column printer).

C.3 Hex - Decimal Conversion Table

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240
1	1	17	33	49	65	81	97	113	129	145	161	177	193	209	225	241
2	2	18	34	50	66	82	98	114	130	146	162	178	194	210	226	242
3	3	19	35	51	67	83	99	115	131	147	163	179	195	211	227	243
4	4	20	36	52	68	84	100	116	132	148	164	180	196	212	228	244
5	5	21	37	53	69	85	101	117	133	149	165	181	197	213	229	245
6	6	22	38	54	70	86	102	118	134	150	166	182	198	214	230	246
7	7	23	39	55	71	87	103	119	135	151	167	183	199	215	231	247
8	8	24	40	56	72	88	104	120	136	152	168	184	200	216	232	248
9	9	25	41	57	73	89	105	121	137	153	169	185	201	217	233	249
A	10	26	42	58	74	90	106	122	138	154	170	186	202	218	234	250
B	11	27	43	59	75	91	107	123	139	155	171	187	203	219	235	251
C	12	28	44	60	76	92	108	124	140	156	172	188	204	220	236	252
D	13	29	45	61	77	93	109	125	141	157	173	189	205	221	237	253
E	14	30	46	62	78	94	110	126	142	158	174	190	206	222	238	254
F	15	31	47	63	79	95	111	127	143	159	175	191	207	223	239	255

Appendix D EPSON LQ-Emulation Commands

Characters used in control functions appear in monospaced type. The table below explains some of the conventions used.

A pair of numbers separated by a slash (/) character indicates Column/Row notation. This notation refers to the location of a character in a standard code table, such as ASCII. (example: 1/B = 1B is the hex-code for Escape)

Spaces appear between characters in sequence for clarity; they are not part of the format.

At the begin of this chapter you will find a listing of the LQ Emulation commands classified by Hex Code and at the end a Hex - Decimal conversion table.

The following conventions are used in the command listings:

Conventions:

ESC	Escape (1/B), introduces an escape sequence.
FS	(1/C), introduce an extension commands command sequence for Chinese mode.
Pn	Numeric parameter, or number of units that specify a distance or quantity pertaining to the escape sequence, control function or control string. Accepted values are 0...9999, may be preceded by + or -. If the parameter is in normal notation like "200" the programming in hex-code is according to a ASCII table. ("200" = 32,30,30 in hex).
n1..n2..n3....nn	A series of parameters pertaining to the escape sequence, control function or control string.
*	Indicates multiplied by

D.1 Command Index (By Code)

Note: **Ignored** in column **FUNCTION** means the command is treated as **NOP**, that means, according to defined command format all bytes of this command are discarded.

FS extension commands are valid only in Chinese mode.

COMMAND	HEX VALUE	FUNCTION
BEL	07	Beep
BS	08	Backspace
HT	09	Horizontal Tabulation
LF	0A	Line feed
VT	0B	Vertical Tabulation
FF	0C	Form feed for fanfold paper or eject paper for cut sheet
CR	0D	Carriage return
SO	0E	Set double width (one line).
SI	0F	Set condensed printing in western mode
DLE B	10 42	Soft reset
DC1	11	On line (Ignored)
DC2	12	Cancel condensed printing for ASCII
DC3	13	Off line (Ignored)
DC4	14	Reset double width for current line.
CAN	18	Cancel line buffer
ESC BEL n	1B 07 n	Change current emulation
ESC SO	1B 0E	Set double width (one line)
ESC SI	1B 0F	Set condensed printing for ASCII
ESC EM n	1B 19 n	Control paper loading/ejecting (Ignored)
ESC SP n	1B 20 n	Adds extra space between each character
ESC ! n	1B 21 n	Master select
ESC \$ n1 n2	1B 24 n1 n2	Set absolute horizontal print position
ESC % n	1B 25 n	Select user-defined set (invalid on PR)
ESC &	1B 26	Define user-defined characters (Ignored)
ESC (- nL nH m d1 d2...d(nH*256+nL-2) d(nH*256+nL-1)	1B 28 2D nL nH m d1 d2...d(nH*256+nL-2) d(nH*256+nL-1)	Set/reset underline
ESC (C nL nH mL mH d1 d2...d(nH*256+nL-3) d(nH*256+nL-2)	1B 28 43 nL nH mL mH d1 d2...d(nH*256+nL-3) d(nH*256+nL-2)	Set page length in defined unit

COMMAND	HEX VALUE	FUNCTION
ESC (G nL nH m d1 d2...d(nH*256+nL-2) d(nH*256+nL-1)	1B 28 47 nL nH m d1 d2...d(nH*256+nL-2) d(nH*256+nL-1)	Select graphics mode (Ignored)
ESC (U nL nH m d1 d2...d(nH*256+nL-2) d(nH*256+nL-1)	1B 28 55 nL nH m d1 d2...d(nH*256+nL-2) d(nH*256+nL-1)	Set vertical unit (m/3600 inch)
ESC (V nL nH mL mH d1 d2...d(nH*256+nL-3) d(nH*256+nL-2)	1B 28 56 nL nH mL mH d1 d2...d(nH*256+nL-3) d(nH*256+nL-2)	Set absolute vertical print position
ESC (X nL nH d1 d2...d(nH*256+nL-1) d(nH*256+nL)	1B 28 58 nL nH d1 d2...d(nH*256+nL-1) d(nH*256+nL)	Set background printing (Ignored)
ESC (^ n1 n2	1B 28 5E n1 n2	Treat the defined data to be printable character (Ignored)
ESC (c nL nH d1 d2...d(nH*256+nL-1) d(nH*256+nL)	1B 28 63 nL nH d1 d2...d(nH*256+nL-1) d(nH*256+nL)	Set TOF and BOF (Ignored)
ESC (t nL nH d1 d2...d(nH*256+nL-1) d(nH*256+nL)	1B 28 74 nL nH d1 d2...d(nH*256+nL-1) d(nH*256+nL)	Assign character table (Ignored)
ESC (v nL nH mL mH d1 d2...d(nH*256+nL-3) d(nH*256+nL-2)	1B 28 43 nL nH mL mH d1 d2...d(nH*256+nL-3) d(nH*256+nL-2)	Set relative vertical print position
ESC * n1 n2 n3...data	1B 2A n1 n2 n3...data	Set AGM graphic mode
ESC + n	1B 2B n	Set n/360-inch line spacing
ESC - n	1B 2D n	Set/Reset underline
ESC / n	1B 2F n	Select vertical tab channel(set)
ESC 0	1B 30	Set 8 LPI
ESC 2	1B 32	Set 6 LPI
ESC 3 n	1B 33 n	Set n/180-inch line spacing
ESC 4	1B 34	Select italic font
ESC 5	1B 35	Cancel italic font
ESC 6	1B 36	Enable printing of upper control codes (Ignored)
ESC 7	1B 37	Enable upper control codes (Ignored, upper control codes are always enabled in PR9)
ESC : n1 n2 n3	1B 3A n1 n2 n3	Copy ROM to RAM (Ignored)
ESC <	1B 3C	Unidirectional mode (Ignored)

COMMAND	HEX VALUE	FUNCTION
ESC @	1B 40	Initialize printer (without HW movement)
ESC A n	1B 41 n	Set n/60-inch line spacing
ESC B n ₁ ...n _i Nul	1B 42 n ₁ ...n _i 00	Set vertical tabs
ESC C NUL n	1B 43 00 n	Set page length in inches
ESC C n	1B 43 n	Set page length in lines
ESC D n ₁ ...n _i Nul	1B 44 n ₁ ...n _i 00	Set table horizontally
ESC E	1B 45	Select bold font
ESC F	1B 46	Cancel bold font
ESC G	1B 47	Select double-strike printing
ESC H	1B 48	Cancel double-strike printing
ESC I n	1B 78 n	Set extended character attributes
ESC J n	1B 4A n	Advance print position vertically
ESC K nH nL d1 d2 ...d(nH*256+nL-1) d(nH*256+nL)	1B 4B nH nL d1 d2 ...d(nH*256+nL-1) d(nH*256+nL)	Set 60dpi 8 needles graphic printing mode
ESC L nH nL d1 d2 ...d(nH*256+nL-1) d(nH*256+nL)	1B 4C nH nL d1 d2 ...d(nH*256+nL-1) d(nH*256+nL)	Set 120dpi 8 needles graphic printing mode
ESC M	1B 4D	Select 12-cpi for ASCII
ESC N n	1B 4E n	Set bottom margin
ESC O	1B 4F	Cancel bottom margin
ESC P	1B 50	Select 10-cpi for ASCII
ESC Q n	1B 51 n	Set right margin
ESC R n	1B 52 n	Select codepage
ESC S n	1B 53 n	Select superscript/subscript printing for ASCII
ESC T	1B 54	Cancel superscript/subscript printing for ASCII
ESC U n	1B 55 n	Set unidirectional or bidirectional printing
ESC W n	1B 57 n	Set/reset double width printing
ESC X n1 n2 n3	1B 58 n1 n2 n3	Ignored
ESC Y nH nL d1 d2 ...d(nH*256+nL-1) d(nH*256+nL)	1B 59 nH nL d1 d2 ...d(nH*256+nL-1) d(nH*256+nL)	Set 120dpi 8 needles graphic printing mode
ESC Z nH nL d1 d2 ...d(nH*256+nL-1) d(nH*256+nL)	1B 5A nH nL d1 d2 ...d(nH*256+nL-1) d(nH*256+nL)	Set 240dpi 8 needles graphic printing mode
ESC \ n1 n2	1B 5C n1 n2	Set relative horizontal print position
ESC a n	1B 61 n	Select justification (Ignored)
ESC b n	1B 62 n	Set vertical tabs in VFU channels

COMMAND	HEX VALUE	FUNCTION
ESC c n1 n2	1B 63 n1 n2	Ignored
ESC g	1B 67	Select 15-cpi for ASCII
ESC j n	1B 6A n	Reverse paper feed
ESC k n	1B 6B n	Select typeface
ESC l n	1B 6C n	Set left margin
ESC p n	1B 70 n	Turn proportional mode on/off
ESC q n	1B 71 n	Select character style (Ignored)
ESC t n	1B 74 n	Set/reset italic font
ESC w n	1B 77 n	Set/reset double height
ESC x n	1B 78 n	Set printing quality
FS SO	1C 0E	Set double width in Chinese character (one line)
FS SI	1C 0F	Set Half-corner code for Chinese character
FS DC2	1C 12	Reset Chinese DBC Chinese character
FS DC4	1C 14	Reset double width in Chinese character on one line
FS ! n	1C 21 n	Set Chinese character attributes
FS &	1C 26	Set Chinese mode
FS - n	1C 2D n	Set/reset underline in Chinese mode
FS .	1C 2E	Set western mode
FS 2 ...	1C 32 n1 n2 d1 ... d72	Load user defined characters
FS D	1C 44	Set two half-corner characters into one
FS J	1C 4A	Set clockwise 90°rotation printing for Chinese character
FS K	1C 4B	Cancel clockwise 90°rotation printing for Chinese character
FS S n1 n2	1C 53 n1 n2	Set character space for Chinese character ($(n1*256 + n2)/180$ inch)
FS T n1 n2	1C 54 n1 n2	Set character space for half-corner Chinese character ($(n1*256 + n2)/180$ inch)
FS U	1C 55	Set the width of half-corner Chinese character to half of that for full-corner Chinese character
FS V	1C 56	Set the width of half-corner Chinese character equal to that for Western characters
FS W n	1C 57 n	Set/reset double-width and double-height Chinese character
FS Y n1 n2 n3	1C 59 n1 n2 n3	Ignored

COMMAND	HEX VALUE	FUNCTION
FS b n	1C 62 n	Ignored
FS c n1 n2	1C 63 n1 n2	Ignored
FS k n	1C 6B n	Ignored
FS r n	1C 72 n	Set/reset super/subscript of Chinese character
FS v n	1C 76 n	Set/reset tab lines (Ignored)
FS x n	1C 78 n	Set Chinese character print quality
DEL	7F	Delete a character

D.2 Command Description (by function)

When you select the **EMULATION: IBM ProPrinter II** or **IBM ProPrinter X24** parameter in the setup, the machine interprets all the commands of the IBM ProPrinter's, grouped by their functions, as follows:

- **Basic Operations**
- **Margins**
- **Line Feed**
- **Print Position**
- **Print Pitches**
- **Print Attributes**
- **Tabulation**
- **Graphics**
- **Other Functions**
- **Ignored Commands**
- **Chinese Mode**

D.2.1 Basic Operations

Before printing, the printer stores the image of a line in the print buffer. All the commands concerning this section result in immediate printing of the buffer contents.

- **BEL**: Beep
- **BS**: Backspace
- **CR**: Carriage return
- **FF**: Form feed

BEL	Beep
------------	-------------

This command causes the buzzer to sound one time.

Hex: (07)H
 Decimal: (07)D
 Octal: (07O)

BS	Backspace
-----------	------------------

This command causes the horizontal print position to move left one character space (according to the active character pitch and character space).

Hex: (08)H
 Decimal: (08)D
 Octal: (10O)

Note: If movement is beyond the left margin, it will position on the left margin.)

CR**Carriage Return**

This command causes the current line buffer to print and position the Print head to the left margin.

Hex: (0D)H

Decimal: (13)D

Octal: (15)O

FF**Form Feed (Eject)**

This command causes the current line buffer to print and eject paper (for cut form) or executes a form feed (for fanfold paper).

Hex: (0C)H

Decimal: (12)D

Octal: (14)O

D.2.2 Margins

- **ESC (C ... :** Set page length
- **ESC C NUL *n* :** Set page length in inches
- **ESC C *n* :** Set page length as *n* lines
- **ESC I *n* :** Set Left Margin
- **ESC N *n* :** Bottom of form
- **ESC O :** Cancel bottom margin
- **ESC Q *n* :** Set Right Margin as *n* Characters
- **ESC (U ... :** Set vertical resolution

ESC (C *nL nH mL mH***Set page length**

-
- (*nH* * 256 + *nL*) defines the number of following bytes in this command.
 - Command **ESC (C 0x02 0x00 mL mH** defines the page length as (*mH* * 256 + *mL*) * vertical resolution.
The vertical resolution is set by command **ESC (U *nL nH m***. The default is 1/360"
 - Others, ignores this command (all bytes of this command are ignored).

Hex: (1B 28 43 *nL nH mL mH*)H
 Decimal: (27 40 67 *nL nH mL mH*)D
 Octal: (33 50 103 *nL nH mL mH*)O

ESC C NUL *n***Set Page Length as *n* Inch**

Set page length as *n* inches.

Hex: (1B 43 0 *n*)H
 Decimal: (27 67 0 *n*)D
 Octal: (33 103 0 *n*)O

ESC C *n***Set Page Length as *n* lines**

Set page length as *n* lines

Hex: (1B 43 *n*)H
 Decimal: (27 67 *n*)D
 Octal: (33 103 *n*)O

ESC I *n*

Set Left Margin

Sets the left margin to *n* columns in the current character pitch.

Hex: (1B 5C *n*)H
 Decimal: (27 108 *n*)D
 Octal: (33 154 *n*)O

ESC N *n*

Set Bottom Margin as *n* Lines

Sets the bottom margin as *n* lines

Hex: (1B 4E-*n*)H
 Decimal: (27 78 *n*)D
 Octal: (33 116 *n*)O

ESC O

Cancel Bottom Margin

Cancel bottom margin

Hex: (1B 4F)H
 Decimal: (27 79)D
 Octal: (33 117)O

ESC Q *n*

Set Right Margin as *n* Characters

Set right margin as *n* characters, the width of character depends on the current mode character attributes.

Hex: (1B 51 *n*)H
 Decimal: (27 81 *n*)D
 Octal: (33 121 *n*)O

ESC (U *nL nH m*

Set vertical resolution as *m* / 3600 inch

Set vertical resolution

Hex: (1B 28 55 *nL nH m*)H
 Decimal: (27 40 85 *nL nH m*)D
 Octal: (33 50 125 *nL nH m*)O

Command **ESC (U 0x01 0x00 *m*** (*m* = 10,20,30,40,50,60) sets vertical resolution as: *m* / 3600 inch.

D.2.3 Line Feed

- **ESC 0 :** Line feed = 1/8"
- **ESC 2 :** Line feed = 1/6"
- **ESC 3 *n* :** Set line spacing as $n/180$ inch
- **ESC A *n* :** Set line spacing as $n/6$ inch
- **ESC J *n* :** Advance $n / 180$ inch vertically
- **ESC j *n* :** Reverse Feed Paper $n / 180$ inch
- **ESC + *n* :** Set line spacing as $n/360$ inch
- **LF :** Line feed

ESC 0**Set 8 LPI**

Sets the 1/8" (3.175 mm) line feed. Set 8 LPI

Hex: (1B 30)H
 Decimal: (27 48)D
 Octal: (33 60)O

ESC 2**Set 6 LPI**

Set the 1/6" (4.23 mm) line feed.

Hex: (1B 32)H
 Decimal: (27 50)D
 Octal: (33 62)O

ESC 3 *n***Set Line spacing as $n/180$ inch**

Set line spacing as $n/180$ inch.

Hex: (1B-33-*n*)H
 Decimal: (27-51-*n*)D
 Octal: (33-63-*n*)O

ESC A *n***Set Line Spacing as $n/6$ inch**

Set line spacing as $n/60$ inch.

Hex: (1B 41 *n*)H
 Decimal: (27 65 *n*)D
 Octal: (33 101 *n*)O

ESC J *n* **Advance *n* / 180 inch vertically**

Advances the vertical print position

Hex: (1B 4A *n*)H
Decimal: (27 74 *n*)D
Octal: (33 112 *n*)O

Advances the vertical print position *n* / 180 inch
The value of *n* should be **01H - FFH** (1D - 255D).

ESC j *n* **Reverse Feed Paper *n* / 180 inch**

Reverse paper feed

Hex: (1B 6A *n*)H
Decimal: (27 106 *n*)D
Octal: (33 152 *n*)O

This command prints data in the buffer, then reverse feed paper *n* / 180 inch, the value of *n* is in **01H - FFH** (1D - 5D).

ESC + *n* **Set Line Spacing as *n*/360 inch**

Set line spacing as *n*/360 inch.

Hex: (1B 2B *n*)H
Decimal: (27 43 *n*)D
Octal: (33 53 *n*)O

LF **Line feed**

This command prints the current line buffer and move the current vertical position to the next printing line (using the existing line pitch).

Hex: (0A)H
Decimal: (10)D
Octal: (12)O

D.2.4 Print Position

- **ESC (V ... :** Set absolute vertical print position
- **ESC (v ... :** Set relative vertical print position
- **ESC \$... :** Set absolute vertical print position
- **ESC \ n1 n2 :** Set relative horizontal print position

ESC (V nL nH mL mH**Set absolute vertical print position**

Hex: (1B 28 56 nL nH mL mH)H
 Decimal: (27 40 86 nL nH mL mH)D
 Octal: (33 50 126 nL nH mL mH)O

The command **ESC (V 0x02 0x00 mL mH**, move the print position to:
 (mH * 256 + mL) * vertical resolution.

Note: With other coding this command will be ignored.

ESC (v nL nH mL mH**Set relative vertical print position**

Hex: (1B 28 76 nL nH mL mH)H
 Decimal: (27 40 186 nL nH mL mH)D
 Octal: (33 50 166 nL nH mL mH)O

The command **ESC (v 0x02 0x00 mL mH** move down vertically
 (mH * 256 + mL) * (vertical resolution) from current position.

Note: With other coding this command will be ignored.

ESC \$ n1 n2**Set absolute vertical printing position**

Set absolute print position

Hex: (1B-24-n1-n2)H
 Decimal: (27-36-n1-n2)D
 Octal: (33-44-n1-n2)O

Set absolute print position as (**n2** * 256 + **n1**)/60 inch or (**n2** * 256 + **n1**)
 (horizontal unit/3600) according to **PNS** setting in menu.

ESC \ n1 n2

Set Relative Horizontal Printing Position

Set relative horizontal printing position

Hex: (1B 5C n1 n2)H

Decimal: (27 92 n1 n2)D

Octal: (33 134 n1 n2)O

The defined unit will be different according to print quality and PNS item in menu:

Draft: move $(n2 * 256 + n1)/120$ inch from the current position

LQ: move $(n2 * 256 + n1)/180$ inch(**ESC/P**) or $(n2 * 256 + n1)$ (horizontal unit/3600) inch (**ESC/P 2**) from the current position.

Note: If this command is received consecutively , the consecutive $(n2 * 256 + n1)$ will be accumulated and set the low 15 bits as valid movement parameter.

D.2.5 Print Pitches

- **DC2:** Cancel condensed printing for ASCII
- **ESC M :** Set western character to be 12 CPI
- **ESC P :** Set western character to be 10 CPI
- **ESC SI :** Set condensed printing of western character
- **ESC g :** Set 15 CPI for western character
- **SI:** Set western character condensed printing

DC2**Cancel condensed printing for ASCII**

Cancel condensed printing for ASCII.

Hex: (12)H
 Decimal: (18)D
 Octal: (22)O

ESC M**Set Western Character to be 12 CPI**

Set western character to be 12 CPI

Hex: (1B 4D)H
 Decimal: (27 77)D
 Octal: (33 115)O

ESC P**Set Western Character to be 10 CPI**

Set western character to be 10 CPI

Hex: (1B-50)H
 Decimal: (27-80)D
 Octal: (33-120)O

ESC SI**Set condensed printing of western character**

This command sets western character to be printed in condensed mode (60% width).

Hex: (1B 0F)H
 Decimal: (27 15)D
 Octal: (33 17)O

ESC g

Set Western Character to 15 CPI

Set 15 CPI for western character

Hex: (1B-67)H

Decimal: (27-103)D

Octal: (33-147)O

SI

Set western character condensed printing

This command causes to print western character as condensed (60% width).

Hex: (0F)H

Decimal: (15)D

Octal: (17)O

D.2.6 Print Attributes

- **DC4** : Reset double width printing (one line)
- **ESC E** : Set bold font
- **ESC F** : Reset bold font
- **ESC G** : Set double strike printing
- **ESC H** : Reset double strike printing
- **ESC I n** : Set extended attributes of character
- **ESC S n** : Set subscript / superscript in western character
- **ESC SO** : Set double width (one line)
- **ESC SP n** : Set western CPI
- **ESC T** : Reset subscript / superscript in western character
- **ESC U n** : Set unidirectional / bidirectional printing
- **ESC W n** : Set / Reset double width
- **ESC p n** : Set / Reset Character Proportion
- **ESC t n** : Set / Reset Italic Printing
- **ESC w n** : Set / Reset Double Height Printing
- **ESC x n** : Set Character Quality
- **ESC - n** : Set / Reset the underline of western character
- **ESC ! n** : Set general attributes of western character
- **ESC 4** : Set italic printing
- **ESC 5** : Reset italic printing
- **ESC (- ...** : Set underline
- **SO** : Double width (one line)

DC4**Reset double width printing**

Reset double width printing for one line

Hex: (14)H
 Decimal: (20)D
 Octal: (24)O

ESC E**Set bold font**

Set bold font

Hex: (1B 45)H
 Decimal: (27 69)D
 Octal: (33 105)O

ESC F

Reset bold font

Reset bold font

Hex: (1B 46)H
 Decimal: (27 70)D
 Octal: (33 106)O
 Reset bold font

ESC G

Set double strike printing

Set double strike printing

Hex: (1B 47)H
 Decimal: (27 71)D
 Octal: (33 107)O

ESC H

Reset double strike printing

Reset double strike printing

Hex: (1B 48)H
 Decimal: (27 72)D
 Octal: (33 110)O

ESC I *n*

Set extended attributes of character

Set extended attributes of character

Hex: (1B 49 *n*)H
 Decimal: (27 73 *n*)D
 Octal: (33 11 *n*)O

- n* = 'A':** Reset double height and width in Chinese character, reset double height and width in western character.
- n* = 'B':** Set double height in Chinese character, set double width in Chinese and western character.
- n* = 'C':** Reset double width in Chinese and western character, set double height in Chinese character.
- n* = 'D':** Set double height and width in Chinese character, set double width in western character.

ESC S *n***Set subscript/superscript in western character**

Set subscript/superscript in western character

Hex: (1B 53 *n*)H

Decimal: (27 83 *n*)D

Octal: (33 123 *n*)O

n = 0: Set superscript in western character

n = 1: Set subscript in western character

ESC SO**Set double width (one line)**

This command sets the printable character to be printed horizontally enlarged (double width), it is valid only for one line.

Hex: (1B 0E)H

Decimal: (27 14)D

Octal: (33 16)O

ESC SP *n***Set western CPI**

Set character pitch of western character.

In Draft, the character width will be set as *n*/120 inch, or else, it will be set as *n*/180 inch.

Hex: (1B 20 *n*)H

Decimal: (27 32 *n*)D

Octal: (33 40 *n*)O

ESC T**Reset subscript / superscript in western character**

Reset subscript / superscript in western character.

Hex: (1B 54)H

Decimal: (27 84)D

Octal: (33 124)O

ESC U *n* **Set unidirectional / bidirectional printing**

Set unidirectional / bidirectional printing.

Hex: (1B 55 *n*)H
 Decimal: (27 85 *n*)D
 Octal: (33 125 *n*)O

***n* = 0:** Set bidirectional printing
***n* = 1:** Set unidirectional printing

ESC W *n* **Set / Reset double width**

Set / Reset double width.

Hex: (1B 57 *n*)H
 Decimal: (27 87 *n*)D
 Octal: (33 127 *n*)O

***n* = 0:** Reset double width
***n* = 1:** Set double width

ESC p *n* **Set / Reset Character Proportion**

Set / Reset character proportion

Hex: (1B 70 *n*)H
 Decimal: (27 112 *n*)D
 Octal: (33 160 *n*)O

***n* = 0:** Reset character proportion
***n* = 1:** Set character proportion

ESC t *n* **Set / Reset Italic Printing**

Set / Reset italic printing

Hex: (1B 74 *n*)H
 Decimal: (27 116 *n*)D
 Octal: (33 164 *n*)O

***n* = 0:** Reset italic printing
***n* = 1:** Set italic printing

ESC w n**Set / Reset Double Height Printing**

 Set / Reset double height printing

Hex: (1B 77 n)H
 Decimal: (27 119 n)D
 Octal: (33 167 n)O

n = 0: Reset double height printing
n = 1: Set double height printing

ESC x n**Set Character Quality**

 Set character quality

Hex: (1B 78 n)H
 Decimal: (27 120 n)D
 Octal: (33 170 n)O

n = 0: print in draft
n = 1: print in NLQ

ESC - n**Set / Reset the underline of western character**

 Set / Reset the underline of western character.

Hex: (1B 2C n)H
 Decimal: (27 44 n)D
 Octal: (33 54 n)O

n = 0: Reset the underline of western character
n = 1: Set the underline of western character

ESC ! *n***Set general attributes of western character**

Set general attributes of western character.

Hex: (1B 21 *n*)H
 Decimal: (27 33 *n*)D
 Octal: (33 41 *n*)O

The general attributes of western character according to the value of *n* :

Bit of <i>n</i>	0	1
7	reset subscript	set subscript
6	reset italic	set italic
5	reset double width	set double width
4	reset oertype	set oertype
3	reset boldface	set boldface
2	reset western condensed character	set western condensed character
1	reset western character proportion	set western character proportion
0	reset western CPI as 12	set western CPI as 12

ESC 4**Set italic printing**

Set italic printing

Hex: (1B 34)H
 Decimal: (27 52)D
 Octal: (33 64)O

ESC 5**Reset italic printing**

Reset italic printing

Hex: (1B 35)H
 Decimal: (27 53)D
 Octal: (33 65)O

ESC (- *nL nH m d1 d2***Set underline**

Set underline

Hex: (1B 28 2D *nL nH m d1 d2*)H
 Decimal: (27 40 45 *nL nH m d1 d2*)D
 Octal: (33 50 55 *nL nH m d1 d2*)O

(*nH* * 256 + *nL*) defines the number of following data in this command.

ESC (- 0x03 0x00 0x01 0x01 d2 (d2 not 0) set underline in western mode

ESC (- 0x03 0x00 0x01 d1 0x00 (d1 not 0) reset underline in western mode

Else, ignore this command (including (*nH* * 256 + *nL*) bytes behind *nH*).

SO**Set double-width printing**

This command causes to print the printable character behind it as horizontally enlarged (double width). This command is only valid for one line.

Hex: (0E)H
 Decimal: (14)D
 Octal: (16)O

D.2.7 Tabulation

- **ESC B ...** : Set vertical tab stops of tab set
- **ESC D ...** : Set horizontal tab stops
- **ESC b ...** : Set vertical tab stops in tab set
- **ESC / n** : Select the current vertical tab set
- **HT** : Horizontal tabulation
- **VT** : Vertical tabulation

ESC B *n1* ... *nk* NUL

Set Tab Stop of Vertical Tab Set 0

Set vertical tab stops at the lines specified by *n1* to *nk* (in the current line spacing) in tab set 0, as measured from the top-of-form position. Tab stop must be in ascending order, code NUL (0x00) will end this command.

A maximum of 16 vertical tab stops can be set for each tab set.

Hex: (1B 42)H
 Decimal: (27 66)D
 Octal: (33 102)O

ESC D *n1* ... *nk* NUL

Set Horizontal Tab Stop

Set horizontal tab stops (in the current character pitch) at the columns specified by *n1* to *nk*, as measured from the left-margin position. Tab stop must be in ascending order, code NUL (0x00) will end this command.

A maximum of 30 horizontal tab stops can be set.

Hex: (1B 44)H
 Decimal: (27 68)D
 Octal: (33 104)O

ESC / *n*

Select vertical tab set

Select the current vertical tab set.

Hex: (1B 2f *n*)H
 Decimal: (27 47 *n*)D
 Octal: (33 57 *n*)O

n = 0 up to 7

ESC b *n m1 ... mk* NUL**Set Vertical Tab in Tab Set *n***

Sets vertical tab stops at the lines specified by ***m1*** to ***mk*** (in the current line spacing) in tab set *n* as measured from the top-of-form position. The tab stops must be in ascending order.

A maximum of 16 vertical tab stops can be set in each tab set

Hex: (1B 61 *n m1 ... mk 00*)H
 Decimal: (27 97 *n m1 ... mk 00*)D
 Octal: (33 141 *n m1 ... mk 00*)O

HT**Horizontal Tabulation**

This command moves the horizontal position to the right to the next horizontal tab stop. If there is no tab stop between the current position and the right margin, this command will be ignored or executed as a **CR + LF** according to menu setup.

Hex: (09)H
 Decimal: (09)D
 Octal: (11)O

VT**Vertical Tabulation**

This command causes the current position to move down to the next vertical tab stop. If there is no tab stop beyond the current position, the printer executes this command as **CR + LF**.

Hex: (0B)H
 Decimal: (11)D
 Octal: (13)O

D.2.8 Graphics

- **ESC K *n1 n2* ... :** Normal resolution graphic printing mode
- **ESC L *n1 n2* ... :** Double resolution graphic printing mode
- **ESC Y *n1 n2* ... :** Double resolution graphic printing mode
- **ESC Z *n1 n2* .. :** Quadruple resolution graphic printing mode
- **ESC * *m n1 n2* ... :** Set AGM print mode

ESC K *n1 n2* ..data ..

Set 60 DPI 8 Needles Graphic Printing Mode

Set graphic print mode to normal resolution. Prints bit image graphics in 8-dot columns, at 60 DPI

Hex: (1B 4B *n1 n2* ..)H
 Decimal: (27 75 *n1 n2* ..)D
 Octal: (33 113 *n1 n2* ..)O

(*n1* + * 256) specify the total number of columns of graphics data following,

ESC L *n1 n2* ..data ..

Set 120 DPI 8 Needles Graphic Printing Mode

Set graphic print mode to double resolution. Prints bit image graphics in 8-dot columns, at 120 DPI.

Hex: (1B 4C *n1 n2* ..)H
 Decimal: (27 76 *n1 n2* ..)D
 Octal: (33 114 *n1 n2* ..)O

(*n1* + *n2* * 256) specify the total number of columns of graphics data following,

ESC Y *n1 n2* ..data ..

Set Graphic Printing in 120 DPI 8 Needles

Set graphic print mode to double resolution.

Hex: (1B 59 *n1 n2* ..)H
 Decimal: (27 89 *n1 n2* ..)D
 Octal: (33 131 *n1 n2* ..)O

Prints bit image graphics in 8-dot columns, 120 DPI at normal speed (consecutive horizontal dots cannot be printed)

(*n1* + *n2* * 256) specify the total number of columns of graphics data following.
 A maximum of 960 (1632) columns on one line.

ESC Z *n1 n2* ..data ..**Set 240 DPI 8 Needles Graphic Printing**

Set quadruple resolution. Prints bit image graphics in 8-dot columns, 240 DPI.

Hex: (1B 5A *n1 n2* ..)H
 Decimal: (27 90 *n1 n2* ..)D
 Octal: (33 132 *n1 n2* ..)O

(*n1* + *n2* * 256) specify the total number of columns of graphics data following.

A maximum of 960 (1632) columns are on one line.

ESC * *m n1 n2* ...data...**Set AGM (Alternate Graphics Mode) print mode**

Select 8 needles or 24 needles graphic printing mode

Hex: (1B 2A *m n1 n2* ...data...)H
 Decimal: (27 42 *m n1 n2* ...data...)D
 Octal: (33 52 *m n1 n2* ...data...)O

m defined the horizontal dot density. As follows:

<i>m</i> (Decimal)	Dot density DPI	Needles used	Notes
0	60	8	same as ESC K
1	120	8	same as ESC L
2	120	8	same as ESC Y
3	240	8	same as ESC Z
4	80	8	
6	90	8	
32	60	24	
33	120	24	
38	90	24	
39	180	24	
40	360	24	

(*n1* + *n2* * 256) defines the total columns of graphic data in this command;
 (1 byte/column for 8 needles mode, 3 bytes/column for 24 needles mode).

D.2.9 Other Functions

- **CAN** : Clear print buffer
- **DLE B** : Soft initialization
- **ESC BEL *n*** : Change Emulation
- **ESC R *n*** : Select code table
- **ESC @**

CAN	Clear buffer
------------	---------------------

Clear the print buffer

Hex: (18)H
 Decimal: (24)D
 Octal: (30)O

DLE B	Soft initialization
--------------	----------------------------

This command clears buffer and initializes printer, it sets all the parameters to the power-on default conditions.

Hex: (10 42)H
 Decimal: (16 66)D
 Octal: (20 102)O

ESC BEL <i>n</i>	Change Emulation
-------------------------	-------------------------

This command causes to print data in the current buffer and change emulation to the corresponding one according to the value of ***n***.

Hex: (1B-07-*n*)H
 Decimal: (27-07-*n*)D
 Octal: (33-07-*n*)O

- n* = 'E':** Change into **OLIVETTI** emulation.
- n* = 'F':** Change into **IBM** emulation.
- n* = 'G':** Change into **OKI** emulation.

Note. All other values of ***n*** will be ignored.

ESC R *n***Select Code Table**

Select country character set in western Code Table according to the value of *n*.

Hex: (1B-52-n)H
 Decimal: (27-82-n)D
 Octal: (33-122-n)O

<i>n</i>	Western character set	<i>n</i>	Western character set
0	America	9	Norway
1	France	10	Denmark 2
2	Germany	11	Spain 2
3	U.K.	12	Latin
4	Denmark 1	...	
5	Sweden	...	
6	Italy	75	PC-866-BG(Bulgaria)
7	Spain1	76	PC-Ger.(Germany)

Note: The area of *n* ≥ **75** is for extended character set.

ESC @**Software initialization**

Hex: (1B-40)H
 Decimal: (27-64)D
 Octal: (33-100)O

This command clears buffer and initializes printer, it sets all the parameters to the power-on default conditions.

D.2.10 Ignored Commands

- **DC1** On line
- **DC3** Off line
- **ESC EM ... :** Set form feed controller
- **ESC X ... :**
- **ESC a ... :** Set Justification
- **ESC c ... :**
- **ESC k ... :** Set Font
- **ESC q ... :** Set/Reset Shadow Font
- **ESC (G ... :** Set raster graphic mode
- **ESC (X ... :** Set background print
- **ESC (c ... :** Set the top and bottom blank of paper
- **ESC (t ... :** Arrange character table
- **ESC (^ ... :** Set print data in character mode
- **ESC < :** Unidirectional Mode
- **ESC : ... :** Copy ROM to RAM
- **ESC % ... :** Select character set
- **ESC &** Define character set
- **ESC 6 :** Set printable character
- **ESC 7 :** Reset printable character

Note: **Ignored** means the command is treated as **NOP**, that means, according to defined command format all bytes of this command are discarded.

DC1	On line
------------	----------------

Hex: (11)H
 Decimal: (17)D
 Octal: (21)O

DC3	Off line
------------	-----------------

Hex: (13)H
 Decimal: (19)D
 Octal: (23)O

ESC EM n	Set form feed controller
-----------------	---------------------------------

Hex: (1B 19 n)H
 Decimal: (27 25 n)D
 Octal: (33 31 n)O

ESC X *n1 n2 n3*

Hex: (1B 58 *n1 n2 n3*)H
 Decimal: (27 88 *n1 n2 n3*)D
 Octal: (33 130 *n1 n2 n3*)O

ESC a *n***Set Justification**

Hex: (1B 61 *n*)H
 Decimal: (27 97 *n*)D
 Octal: (33 141 *n*)O

ESC c *n1 n2*

Hex: (1B 63 *n1 n2*)H
 Decimal: (27 99 *n1 n2*)D
 Octal: (33 143 *n1 n2*)O

ESC k *n***Set Font**

Hex: (1B 6B *n*)H
 Decimal: (27 107 *n*)D
 Octal: (33 153 *n*)O

ESC q *n***Set/Reset Shadow Font**

Hex: (1B 71 *n*)H
 Decimal: (27 113 *n*)D
 Octal: (33 161)

ESC (G *nL nH***Set raster graphic mode**

Hex: (1B 28 47 *nL nH*)H
 Decimal: (27 40 71 *nL nH*)D
 Octal: (33 50 107 *nL nH*)O
 (*nH* * 256 + *nL*) defines the number of following bytes in this command

ESC (X *nL nH***Set background print**

Hex: (1B 28 58 *nL nH*)H
 Decimal: (27 40 88 *nL nH*)D
 Octal: (33 50 130 *nL nH*)O *n*)O

ESC (c nL nH**Set the top and bottom blank of paper**

Hex: (1B 28 63 nL nH)H
 Decimal: (27 40 99 nL nH)D
 Octal: (33 50 143 nL nH)O

ESC (^ n1 n2**Set print data in character mode**

Hex: (1B 28 5E n1 n2)H
 Decimal: (27 40 94 n1 n2)D
 Octal: (33 50 136 n1 n2)O

ESC <**Unidirectional Mode**

Hex: (1B 3C)H
 Decimal: (27 60)D
 Octal: (33 74)O

ESC : n1 n2 n3**Copy ROM to RAM**

Hex: (1B 3A n1 n2 n3)H
 Decimal: (27 58 n1 n2 n3)D
 Octal: (33 72 n1 n2 n3)O

ESC % n**Select character set**

Hex: (1B 25 n)H
 Decimal: (27 37 n)D
 Octal: (33 45 n)O

ESC &**Define character set**

Hex: (1B 26)H
 Decimal: (27 38)D
 Octal: (33 46)O

ESC (t nL nH**Arrange character table**

Hex: (1B 28 74 nL nH)H
 Decimal: (27 40 116 nL nH)D
 Octal: (33 50 164 nL nH)O

ESC 6**Set printable character**

Hex: (1B 36)H
Decimal: (27 54)D
Octal: (33 66)O

ESC 7**Reset printable character**

Hex: (1B 37)H
Decimal: (27 55)D
Octal: (33 67)O

D.2.11 Chinese Mode

- **FS D** Set combined printing
- **FS DC2** : Reset compressed printing for Chinese character
- **FS DC4** : Reset double width printing for Chinese character (one line)
- **FS J** Set Rotation printing
- **FS K** Reset Rotation printing
- **FS S n1 n2** : Set pitch of Chinese character
- **FS SI** : Set Compressed Printing for Chinese Character
- **FS SO** : Set Double Width Printing in Chinese character (one line)
- **FS T n1 n2** : Set pitch of half width Chinese character
- **FS U** : Set Adjustment of half width Chinese character
- **FS V** : Reset Adjustment of half width Chinese character to 12 CPI
- **FS W n** : Set / Reset double height and double width printing
- **FS Y ...** :
- **FS b ...** :
- **FS c ...** :
- **FS k ...** :
- **FS r n** : Set superscript / subscript of Chinese character
- **FS x n** : Set printing quality of Chinese character
- **FS v ...** : Set/Reset table line
- **FS ! n** : Set general attributes of Chinese character
- **FS &** : Set Chinese mode
- **FS .** : Set western character mode
- **FS 2 n1...** : Load character defined by user

FS D	Set combined printing
-------------	------------------------------

Rotation printing of Chinese mode

Hex: (1C 44)H
 Decimal: (28 68)D
 Octal: (34 104)O

In rotation printing of Chinese mode, this command causes the following two **ASCII** codes to be printed in combined mode, these two codes will be on one character's position (the first ASCII is on the left and the second on the right)

Note: This command is valid only for the following two ASCII characters.

FS DC2	Reset Compressed Printing for Chinese Character
---------------	--

Reset compressed printing for Chinese character

Hex: (1C 12)H
 Decimal: (28 18)D
 Octal: (34 22)O

FS DC4 **Reset Double Width Printing for Chinese Character (on one)**

Reset double width printing for Chinese character (one line)

Hex: (1C 14)H
 Decimal: (28 20)D
 Octal: (34 24)O

FS J **Set Rotation printing**

In Chinese mode this command set rotation printing, it is valid until command **FS K** is received

Hex: (1C 4A)H
 Decimal: (28 74)D
 Octal: (34 112)O

FS K **Reset Rotation printing**

Reset Chinese rotation printing in Chinese mode

Hex: (1C 4B)H
 Decimal: (28 75)D
 Octal: (34 113)O

FS S n1 n2 **Set pitch of Chinese character**

Set the character pitch of Chinese character to be $(n1 * 256 + n2)/180$ inch.

Hex: (1C 53 n1 n2)H
 Decimal: (28 83 n1 n2)D
 Octal: (34 123 n1 n2)O

The range of **n2**: 12 up to 255

FS SI **Set Compressed Printing for Chinese Character**

This command causes to print Chinese character in compressed mode, the width of Chinese character will be half of the original.

Hex: (1C 0F)H
 Decimal: (28 15)D
 Octal: (34 17)O

FS SO **Set Double Width Printing in Chinese character (one line)**

This command causes to print characters following this command on the same line as horizontally enlarged (double width) in Chinese mode.

Hex: (1C 0E)H
Decimal: (28 14)D
Octal: (34 16)O

FS T *n1 n2* **Set pitch of half width Chinese character**

Set the character pitch of half width Chinese character to be $(n1 * 256 + n2)/180$ inch.

Hex: (1C 54 *n1 n2*)H
Decimal: (28 84 *n1 n2*)D
Octal: (34 124 *n1 n2*)O

The range of ***n2***: 12 up to 255

FS U **Set Adjustment of half width Chinese character**

Set adjustment mode of half width Chinese character, that means the width of half width character is just the half of the double byte character's width.

Note: **This mode is the power on mode.**

Hex: (1C 55)H
Decimal: (28 85)D
Octal: (34 125)O

FS V **Reset Adjustment of half width Chinese character**

Reset adjustment mode of half width Chinese character, that means the pitch of the half-width character is set to 12 CPI.

Hex: (1C 56)H
Decimal: (28 86)D
Octal: (34 126)O

FS W n**Set / Reset double height and double width printing**

Set / Reset double-height and double width printing of Chinese character.

Hex: (1C 57 n)H
 Decimal: (28 87 n)D
 Octal: (34 127 n)O

n = 0: Reset double-height and double-width printing of Chinese character.
n = 1: Set double-height and double-width printing of Chinese character.

FS Y n1 n2 n3

Hex: (1C 59 n1 n2 n3)H
 Decimal: (28 89 n1 n2 n3)D
 Octal: (34 131 n1 n2 n3)O

FS b n

Hex: (1C 62 n)H
 Decimal: (28 98 n)D
 Octal: (34 142 n)O

FS c n1 n2

Hex: (1C 63 n1 n2)H
 Decimal: (28 99 n1 n2)D
 Octal: (34 143 n1 n2)O

FS k n

Hex: (1C 6B n)H
 Decimal: (28 107 n)D
 Octal: (34 153 n)O

FS r n **Set superscript / subscript of Chinese character**

Set superscript / subscript of Chinese character

Hex: (1C 72 n)H
Decimal: (28 114 n)D
Octal: (34 162 n)O

n = 0: Set superscript of Chinese character
n = 1: Set subscript of Chinese character

Command **FS DC2** can cancel this command.

FS x n **Set printing quality of Chinese character**

Set printing quality of Chinese character

Hex: (1C 78 n)H
Decimal: (28 120 n)D
Octal: (34 170 n)O

n = 0: set NLQ quality of Chinese character
n = 1: set DRAFT quality of Chinese character

FS - n **Set / Reset underline of Chinese character**

Set / Reset underline of Chinese character

Hex: (1C 2C n)H
Decimal: (28 44 n)D
Octal: (34 54 n)O

n = 0: Reset underline of Chinese character
n = 1: Set underline of Chinese character

FS v n **Set / Reset table line**

Set / Reset table line

Hex: (1C 76 n)H
Decimal: (28 118 n)D
Octal: (34 166 n)O

FS ! *n***Set General Attributes of Chinese character**

Hex: (1C 21 *n*)H
 Decimal: (28 33 *n*)D
 Octal: (34 41 *n*)O

Set general attributes of Chinese character according to *n*, as follows:

Bit of <i>n</i>	0	1
7	reset underline	set underline
6	empty operation	none operation
5	reset superscript and subscript	set superscript and subscript
4	reset ¼ angle Chinese character	set ¼ angle Chinese character
3	reset double height of Chinese character	set double height of Chinese character
2	reset double width of Chinese character	set double width of Chinese character
1	reset half angle Chinese character	set half angle Chinese character
0	reset rotation to the left printing	set rotation to the left printing

FS &**Set Chinese mode**

Set Chinese mode

Hex: (1C 26)H
 Decimal: (28 38)D
 Octal: (34 46)O

FS .**Set western character mode**

Set western character mode

Hex: (1C 2E)H
 Decimal: (28 46)D
 Octal: (34 56)O

FS 2 *n1 n2 d1 d2 ... d72*

Load character defined by user

This command downloads the dot matrix and codes of a user defined character(double byte character) into printer's RAM, the dot matrix is 24x24, that is 72bytes for dot matrix .

Hex: (1C 32 *n1 n2*)H

Decimal: (28 50 *n1 n2*)D

Octal: (34 62 *n1 n2*)O

n1 and ***n2*** define the specific codes for the user-defined character:

n1 is the high byte, (*n1* & 0x7f) must be 0x78,0x79 or 0x7a

n2 is the low byte, (*n2* & 0x7f) must be in the range of 0x21 to 0x7e.

D.3 Hex - Decimal Conversion Table

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240
1	1	17	33	49	65	81	97	113	129	145	161	177	193	209	225	241
2	2	18	34	50	66	82	98	114	130	146	162	178	194	210	226	242
3	3	19	35	51	67	83	99	115	131	147	163	179	195	211	227	243
4	4	20	36	52	68	84	100	116	132	148	164	180	196	212	228	244
5	5	21	37	53	69	85	101	117	133	149	165	181	197	213	229	245
6	6	22	38	54	70	86	102	118	134	150	166	182	198	214	230	246
7	7	23	39	55	71	87	103	119	135	151	167	183	199	215	231	247
8	8	24	40	56	72	88	104	120	136	152	168	184	200	216	232	248
9	9	25	41	57	73	89	105	121	137	153	169	185	201	217	233	249
A	10	26	42	58	74	90	106	122	138	154	170	186	202	218	234	250
B	11	27	43	59	75	91	107	123	139	155	171	187	203	219	235	251
C	12	28	44	60	76	92	108	124	140	156	172	188	204	220	236	252
D	13	29	45	61	77	93	109	125	141	157	173	189	205	221	237	253
E	14	30	46	62	78	94	110	126	142	158	174	190	206	222	238	254
F	15	31	47	63	79	95	111	127	143	159	175	191	207	223	239	255

Appendix E OLIVETTI Emulation Commands

Characters used in control functions appear in monospaced type. The table below explains some of the conventions used.

A pair of numbers separated by a slash (/) character indicates Column/Row notation. This notation refers to the location of a character in a standard code table, such as ASCII. (example: 1/B = 1B is the hex-code for Escape)

Spaces appear between characters in sequence for clarity; they are not part of the format.

At the end of this chapter you will find a Hex - Decimal conversion table.

The following conventions are used in the command listings:

Conventions:

ESC	Escape (1/B), introduces an escape sequence.
FS	(1/C), introduce an extension commands command sequence for Chinese mode.
<i>Pn</i>	Numeric parameter, or number of units that specify a distance or quantity pertaining to the escape sequence, control function or control string. Accepted values are 0...9999, may be preceded by + or -. If the parameter is in normal notation like "200" the programming in hex-code is according to a ASCII table. ("200" = 32,30,30 in hex).
<i>n1..n2..n3....nn</i>	A series of parameters pertaining to the escape sequence, control function or control string.
<i>SP</i>	Is standing for Space (hex 20).

E.1 Control Commands**E.1.1 Chinese Mode Control Commands**

Command	Hex Code	Explanation
FS &	1C 26	Set Chinese mode
FS .	1C 2E	Set Western mode (Reset Chinese mode)
FS k	1C 6B	Set full corner ASCII code
FS g	1C 67	Set half corner ASCII code (Reset full corner ASCII code)

E.1.2 Medium Control Commands

Command	HEX CODE	Explanation
ESC Q nnn ESC Z	1B 51 <i>n n n</i> 1B 5A	Set page length to nnn lines
ESC J nnn	1B 4A <i>n n n</i>	Set left margin to nnn characters
ESC T nnn	1B 54 <i>n n n</i>	Set top margin to nnn/216 inch (or nnn/240 inch, based on menu set)
ESC M nnn	1B 4D <i>n n n</i>	Set bottom margin to nnn lines
ESC & nn	1B 26 <i>n n</i>	Set Row spacing to nn/216 inch (or nn/240 inch, based on menu set)

E.1.3 Character Spacing Commands

Command	HEX CODE	Explanation
ESC <	1B 3C	Set 10 CPI
ESC =	1B 3D	Set 12 CPI
ESC >	1B 3E	Set 16.6 CPI (or 17.1 CPI based on menu set)
ESC a n	1B 61 <i>n</i>	CPI select
ESC ?	1B 3F	Set Proportion character

E.1.4 Character Attribute Commands

Command	HEX CODE	Explanation
ESC R nnn	1B 52 n n n	character quality and style select
ESC 3	1B 33	Set double width typing
ESC 4	1B 34	Reset double width typing
FS h	1C 68	Set treble width typing
FS j	1C 6A	Reset treble width typing
ESC d	1B 64	Set double width double height typing
ESC e	1B 65	Reset double width double height typing
ESC w n	1B 77 n	Set/Reset vertical extension typing
ESC ! SP nnn	1B 21 20 n n n	Set character right space to nnn/120 inch
FS S nn	1C 53 n n	Set character spacing
ESC (	1B 28	Set Boldface
ESC)	1B 29	Reset Boldface
ESC * n	1B 2A n	Set over line/underline
ESC +	1B 2B	Reset over line/underline
ESC ` n	1B 60 n	Set superscript / subscript
ESC {	1B 7B	Reset superscript / subscript
FS J n	1C 4A n	Set character left rotate 90 degree typing
FS K	1C 4B	Reset character left rotate 90 degree typing
FS [T n	1C 5B 54 n	Set/Reset special forms
ESC } g n1 n2	1B 7D 67 n1 n2	Character extension select

E.1.5 Typing Control Commands

Command	Hex Code	Explanation
ESC S 5	1B 53 35	Set printer to normal state
ESC S 1	1B 53 31	Set printer to journal printer state?clean the print buffer?no initial commands required?
LF	0A	Line feed
FF	0C	Form feed
CR	0D	Carriage return
HT	09	Set Horizontal table
ESC 7	1B 37	Reverse line feed
ESC H nnn	1B 48 <i>n n n</i>	Set horizontal print position to nnn characters
ESC I nnn	1B 49 <i>n n n</i>	Feed paper nnn lines
ESC L nnn	1B 4C <i>n n n</i>	Set vertical print position to nnn Lines
ESC O	1B 4F	Paper eject
ESC ^ 0	1B 5E 30	Switch to IBM emulation
ESC ^ 1	1B 5E 31	Switch to OKI emulation
ESC [nnn	1B 5B <i>n n n</i>	PC character set select
BEL	07	Beep
DEL	7F	Clear print buffer

E.1.6 BMP Commands

Command	Hex Code	Explanation
ESC 1 p mmmm nnn	1B 31 <i>pp m m m m n n n</i>	BMP mode select
ESC 2	1B 32	Exit BMP mode
ESC X nnn	1B 58 <i>n n n</i>	Set relative horizontal print position
ESC ! G n	1B 21 47 <i>n</i>	Needle control select

E.1.7 User Defined Character Commands

Command	Hex Code	Explanation
ESC h 0 n m d0 d1 d2 D1 D2... Dm	1B 68 30 <i>nn mm</i> d0 d1 d2 D1 D2 ... Dm	Customer's character download
ESC h 0 n m d1 d2 d3 ... d72	1B 68 30 F8 d1 d2 d3 ... d72	Set Customer's characters and symbols
ESC : 000	1B 3A 30 30 30	Copy character set to RAM
ESC m n 0	1B 6D <i>m n</i> 30	ROM/RAM character select

E.1.8 Printer State Control Commands

Command	Hex Code	Explanation
ESC Z	1B 5A	Printer initial state require
ESC / 7	1B 2F 37	Printer initial state return
ESC //	1B 2F 2F	Printer initial state return
ESC i	1B 69	Printer configure state require
ESC p x y z k	1B 70 <i>xx yy zz kk</i>	Printer configure state require return
ESC j	1B 6A	Printer current state require
ESC r x	1B 72 <i>x</i>	Printer current state require return
ESC SP B	1B 20 42	Printer medium state require
ESC B id m ESC Z	1B 42 35 <i>xx</i> 1B 5A	Printer medium state require return
ESC SP b	1B 20 62	Printer firmware ID require
ESC b idrel.1;idver.1; ... idrel.n;idver.n ESC Z	1B 62 <i>n</i> 2E <i>nn xx</i> 3B <i>nn n</i> 3B ... 1B 5A	Printer firmware ID require return
ESC SP a	1B 20 61	SET-UP require
ESC a byte1 byte2 byte3 ... byten ESC Z	1B 61 <i>byte1 byte2 byte3 ... byten</i> 1B 5A	SET-UP require return
ESC I	1B 6C	Error state clear
ESC n	1B 6E	Select Olivetti control mode
ESC 0	1B 30	Reset
ESC U n	1B 55 <i>n</i>	Operator state require

Command	Hex Code	Explanation
ESC r x	1B 72 x	Operator state require return
ESC .	1B 2E	Set automatic operation
ESC -	1B 5F	Set manual operation

E.1.9 Magnetic Stripe and Bar Code Control Commands

E.1.9.1 Bar Code Control Commands

Command	Hex Code	Explanation
ESC x m1;m2; h;z;n ESC Z	1B 78 <i>m1</i> 3B <i>m2</i> 3B <i>xx</i> 3B <i>xx</i> 3B <i>n</i> 1B 5A	Set Bar Code attribute
ESC y ... ESC Z	1B 79 ... 1B 5A	Set Bar Code data to print

E.1.9.2 Equipment Set Commands

Command	Hex Code	Explanation
ESC Y E k1 k2	1B 59 45 <i>xx xx</i>	Horizontal magnetic mode select
ESC # n	1B 23 <i>n</i>	ESC L nnn command control
ESC | A nnn	1B 7C 41 <i>n n n</i>	Set logical left margin to nnn/120 inch
ESC | B nnnn	1B 7C 42 <i>n n n n</i>	Set Pass book width to nnnn/120 inch
ESC ' n	1B 27 <i>n</i>	Pass book mode select
ESC / m nnnn	1B 2F <i>m n n n n</i>	Set vertical printer position (unit is set by menu)
ESC -	1B 2D	Detect medium length
ESC } -	1B 7D 2D	Detect medium width
ESC S nnnn	1B 53 <i>n n n n</i>	Medium size return

E.2 Hex - Decimal Conversion Table

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240
1	1	17	33	49	65	81	97	113	129	145	161	177	193	209	225	241
2	2	18	34	50	66	82	98	114	130	146	162	178	194	210	226	242
3	3	19	35	51	67	83	99	115	131	147	163	179	195	211	227	243
4	4	20	36	52	68	84	100	116	132	148	164	180	196	212	228	244
5	5	21	37	53	69	85	101	117	133	149	165	181	197	213	229	245
6	6	22	38	54	70	86	102	118	134	150	166	182	198	214	230	246
7	7	23	39	55	71	87	103	119	135	151	167	183	199	215	231	247
8	8	24	40	56	72	88	104	120	136	152	168	184	200	216	232	248
9	9	25	41	57	73	89	105	121	137	153	169	185	201	217	233	249
A	10	26	42	58	74	90	106	122	138	154	170	186	202	218	234	250
B	11	27	43	59	75	91	107	123	139	155	171	187	203	219	235	251
C	12	28	44	60	76	92	108	124	140	156	172	188	204	220	236	252
D	13	29	45	61	77	93	109	125	141	157	173	189	205	221	237	253
E	14	30	46	62	78	94	110	126	142	158	174	190	206	222	238	254
F	15	31	47	63	79	95	111	127	143	159	175	191	207	223	239	255