Introduction

Main cover

Interlock
actuators

Card
hopper
cover

Transfer toggle
Rotate clockwise
to separate
transfer rollers

Laminating
station

ID/Key *(optional)*

Card
Hopper

Push
buttons

Indicator
lamps

Mag
encoder
(optional)

Cleaning
station

Print
station

Flip
station

Card transport knob
For manual reposition-
ing of the card truck
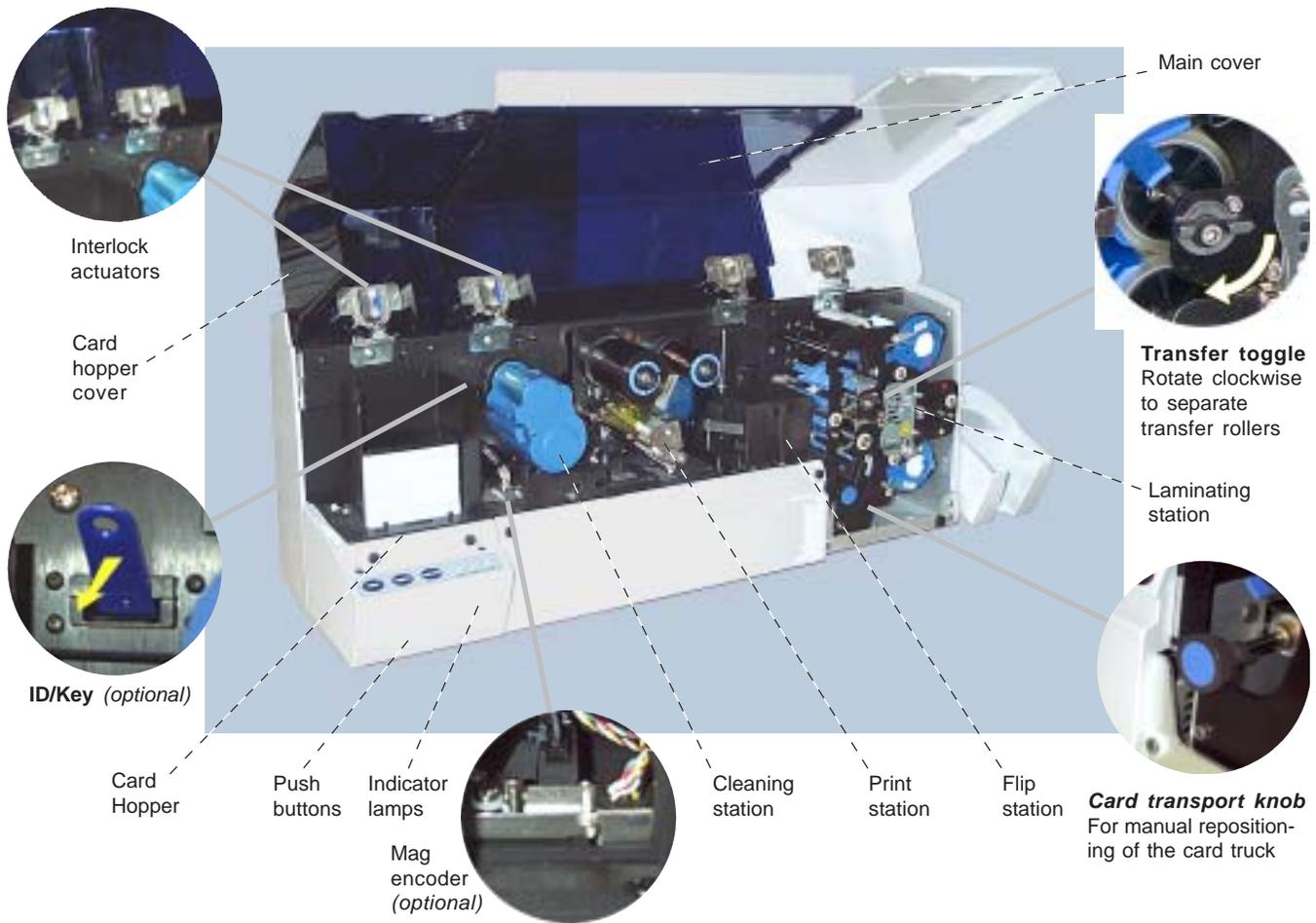
Overview

The P640i Printer is a complete, fully automatic photo ID
card fabricator. It comprises six functional elements:

- *Card hopper*
- *Magnetic ("mag") encoder - optional feature*
- *Cleaning station*
- *Print station*
- *Flip station*
- *Laminator*

Because the P640i Printer is fully automatic, it requires
no attention from the operator other than media loading
and an occasional vacuuming.

Although you don't need a detailed knowledge of the
printer to use the printer effectively, an overall understand-
ing of what goes on can help you troubleshoot effectively.

How you load the cards, color ribbon and laminate is im-
portant - see Section 2. ***Careful attention to media han-
dling takes care of most problems!***

Photo ID card printing

The process used in the P640i Printer is known as ***digital
thermal transfer***, a means of printing clean, durable im-
ages directly onto the PVC surface of photo ID cards.

There are two different thermal transfer technologies, both
used in the P640i Printer: **dye sublimation** ("dye sub"),
which uses the three process colors **Y**ellow/**M**agenta/**C**yan
for photos and graphics, and **mass transfer** for machine-
readable black text and bar codes.

Both types of printing are done with a single print head
comprising a row of tiny heating elements, 300 to the
inch, each driven indepen-
dently by the printer control-
ler. Sandwiched by spring
pressure between the print
head and the card being
printed is the color ribbon,
usually a series of process-
color dye panels (**Y, M** and
C) for dye sub, plus a panel
of black resin (**K**) for mass
transfer.
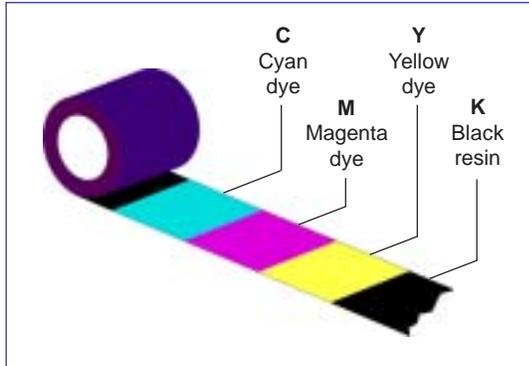
This is the usual pattern for a P640i Printer ribbon. Y, M and C are the three "dye sub" process colors. The K panel is for infrared-readable bar codes and other data, usually on the back of the card. A second K panel (YMCKK) is sometimes provided to allow black resin printing on both sides of the card.
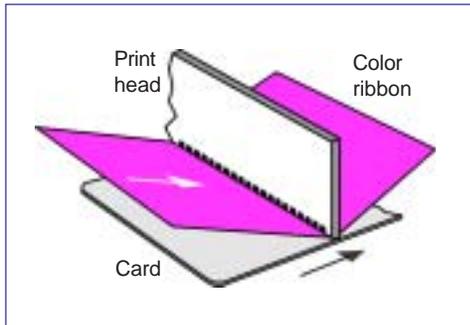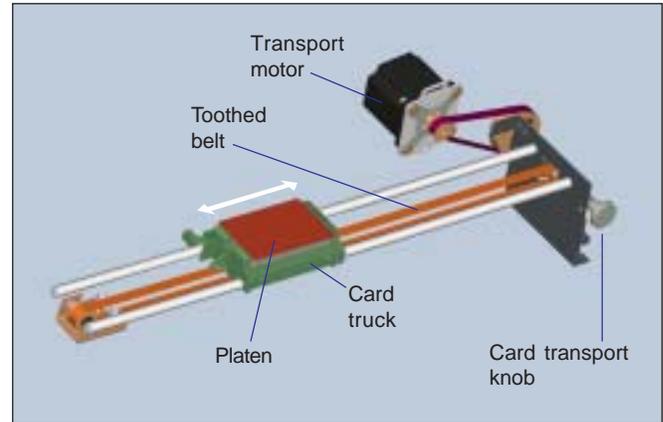

As the ID card is driven through the print station, the color ribbon is metered out from the supply roll at the same speed. Each color reqires a separate "pass" of the card. The black dots at the bottom edge of the print head depict the heating elements - in practice, at 300 to the inch, they are too small to be seen with the naked eye.
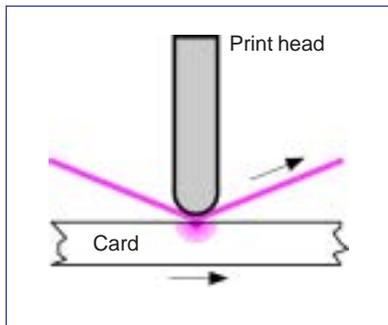
Color migrates from the dye ribbon onto the ID card, the spread of the dye depending on the amount of heat applied by the print head element. Each time it comes to a dye panel boundary, the print head lifts to allow the card to back up, then lowers again to print the next color.

## What makes the P640i a different kind of printer ...

***The print station in the P640i has no pinch rollers that need cleaning to maintain accuracy***
In the P640i the card is transported on a belt-driven truck that maintains precise registration through the entire process of picking, cleaning, and multi-pass printing. This means perfect color-to-color registration time after time - no slippage, no deterioration in print quality over time.

What to expect when you turn on the power ...

1. Nothing happens for two or three seconds, then;

2. The READY light flashes yellow (indicating that the laminator is warming up), and you will hear the fan running , and a clicking sound inside the printer (the flip station resetting itself). Finally;

3. After a few minutes (3 to 5), the READY light will show steady green, indicating that the printer is ready to print.
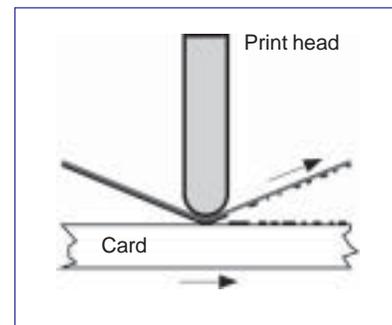

The K (black) panel is a resin that "mass transfers" onto the surface of the card, instead of migrating into it. With mass transfer the printer has little control over a pixel's size or density - it's either there or it isn't. K printing is used for bar codes because it is machine readable, whereas YMC dyes are not.
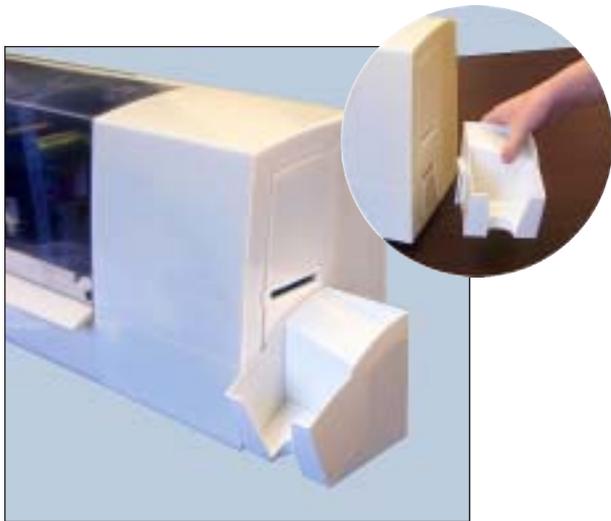
*The receiving tray for printed ID cards hooks onto the right side panel.*

Power cord entry and ON-OFF switch are located on the rear panel.

Ethernet   USB   Parallel
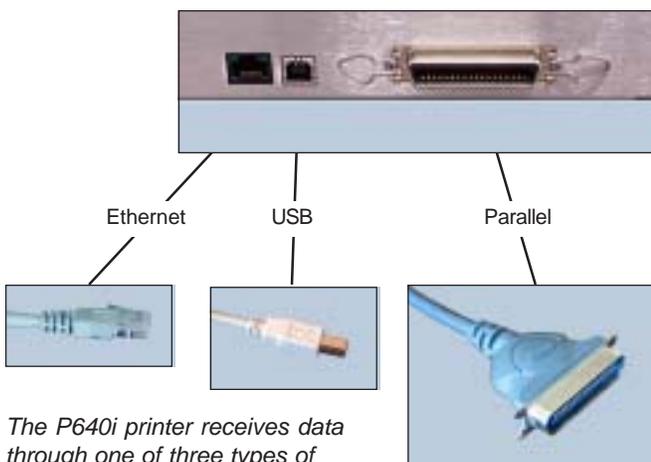
The P640i printer receives data through one of three types of connector: Ethernet (optional feature), USB (standard feature) or Parallel (Centronics type, optional feature).

Test card

You may sometimes be asked to print a test card. This is the pattern stored in the printer's memory (it has nothing to do with the computer). If the printer is functioning properly, it will be printed when the PRINT button on the front panel is pressed following power-up.
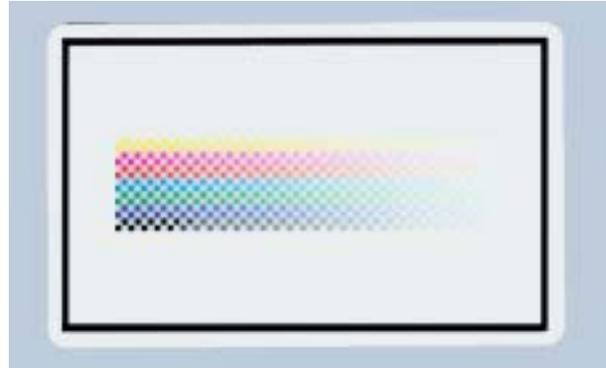
Push buttons and Indicator lights

PRINT button

Press the PRINT button to print the image stored in the printer's memory. When the printer is powered up, the memory is loaded with a checkerboard test pattern, above.

In regular on-line use, the PRINT button reprints the last image downloaded from the computer to the buffer memory.

If you press and hold the PRINT button for more than two seconds, the printer will ***continuously reprint*** the image in the buffer. Stop this action by pressing the button momentarily while printing is in process.

Note that pressing the PRINT button will have no effect if any of the following applies: 1. An error condition exists; 2. You have set up the print driver to print color on both sides of the card, or; 3. The optional hardware lockout key, ***ID/Key,*** is missing (but this does not disable the checkerboard print-out available after power-up).

If you wish, the PRINT button can be disabled through the printer driver, see page TN8-7.

RIBBON button

This button is used to synchronize the ribbon – in other words, to position it correctly under the print head.

Standard YMCK color ribbon

In typical applications, the ribbon type is YMCK, and the back of the card is printed first. In such cases, pressing the RIB-BON button will advance the color ribbon to bring the leading edge of the next black panel under the print head.

If back side printing is not enabled, the printer will synchronize on the next yellow panel when the RIBBON button is pressed.

LAMINATE button

If either (or both) of the laminate *transfer rollers* is not loaded with a laminate patch, then pressing the LAMINATE button will correct the condition, *provided* the cassette(s) is not out of laminate. If both rollers are already loaded, the LAMINATE button has no effect.

A typical use of the LAMINATE button is in reloading a transfer roller after removing the first hand-cut patch of laminate following installation of a fresh roll.

INDICATOR LIGHT SUMMARY

Depending on the condition they are reporting, the three indicator lights, READY, MEDIA and ALARM, can be in one of three states: **Off**, **On** (steady), or **Flashing**.

The READY indicator is bi-colored. Its two color channels, **green** and **yellow**, function independently.

READY indicator

Green = Ready to print, or printer busy.
Yellow = Laminator not at operating temperature.

MEDIA indicator
Normally **Off**.
On = Any media outage.

ALARM indicator

Normally **Off**.
On = Error condition requiring intervention.

## What the indicator lights tell you ...

☼ = light on   ☼●☼● = light flashing

READY		MEDIA	ALARM	Printer status
GREEN	**YELLOW**	**ORANGE**	**RED**	
☼				Ready to print
☼●☼●				Printer busy
	☼●☼●			Laminator heating up, but not yet at operating temperature
	☼			Laminator heaters in sleep mode (when not in use, the heaters cool at 1°F per minute)
			☼●☼●	Printhead temperature error.
		☼		No cards in magazine, color ribbon out, cleaning tape out, laminator cassette(s) out.
		☼●☼●		Mag encoding write failure
			☼	**Serious error conditions**, including: **MAIN COVER OPEN**, Laminator too hot, card transport stalled, card not seated properly, mag encoding verification error, head lift failure, ribbon jam, card jam (any location), card missing (any location), no gap between laminator patches.

A typical card production sequence

Several variations are possible, such as multi-pass color printing on the back surface (instead of the black-only printing shown here).

1 Blank cards are loaded face down in the hopper, with the mag stripe (if any) toward the front.
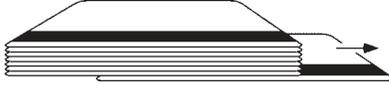
2 The carriage pushes the bottom card out of the deck, carrying it under the mag encoder.

Mag encoder

3 After passing under the encoder, the card surface is cleaned by a tacky roller (which is itself decontaminated periodically by adhesive tape in the cleaning cassette).

Cleaning roller
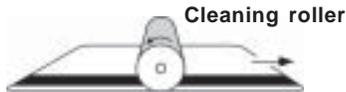
4 The carriage drives the card under the print head, which transfers black characters and/or bar code from the K panel onto the back surface of the card.

5 The carriage pushes the back-printed card into the flip station, which elevates the card then flips it through 180º.
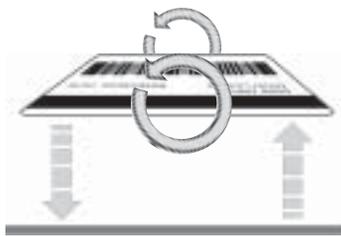
6 The card, now face up, is returned to the carriage, which is then reversed into position for a second cleaning operation.

FRONT AURFACE NOW ON TOP

7 After its face cleaning the card is driven under the print head again, this time to print a **yellow** (Y) dye image - the first of three color passes.
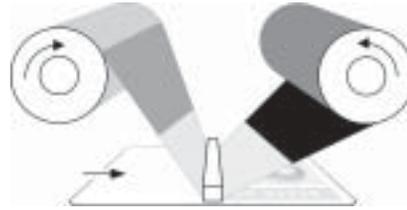
8 The carriage reverses the card into position for the second color pass, **magenta** (M), followed by another reverse-and-print cycle for the third color pass, **cyan** (C).
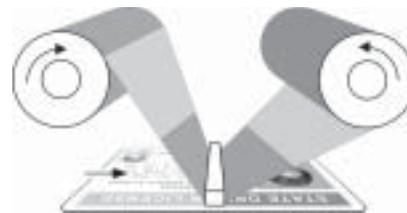
9 Now fully printed, the card re-enters the flip station, which this time acts only as an elevator (no flipping) to bring the card up to the laminator level.

Ejector arm

Laminator infeed rollers
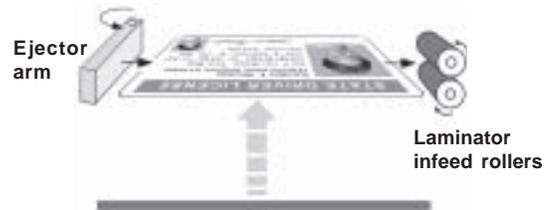
10 An ejector arm propels the card into the laminator infeed rollers, which in turn drive the card between the two white transfer rollers, step 11.

11 Each transfer roller is "loaded" with a patch of laminate, cut from the top and bottom cassettes shortly after the **previous** card passed through the laminator.

Upper cassette

Cutter

Upper transfer roller
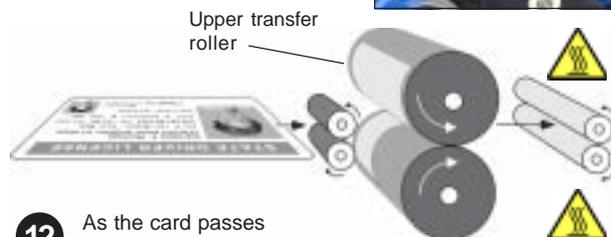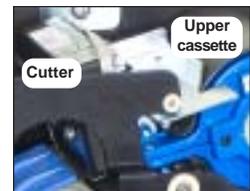
12 As the card passes between the transfer rollers the laminate patches are rolled into place. They are then permanently bonded to the card by a pair of heated rollers applying pressure to the top and bottom surfaces.