Diagnosing Ink Cartridge Detection Issues

Ink Cartridge System Theory

The Ink Cartridge system utilizes a series of sensors to monitor the condition of each cartridge that is installed in an Inkjet Printer.

Cartridge IC Chip

IC Chip is attached on the ink cartridge and records the following Information:

- Ink Type
- Cartridge Capacity
- Lot No.
- Ink Consumption Amount
- Operation Time
- Insertion Time
- Flag Information
- Serial No.

IC Holder Sensors

Three sensors, located on the IC Holder, detect physical properties of the Ink Cartridge as well as read and write information to the IC Chip. The Ink Empty Sensor and the Ink Cartridge Sensor are part of the IC Holder Assembly. The IC Chip Sensor is a separate board and is not part of the IC Holder Assembly.
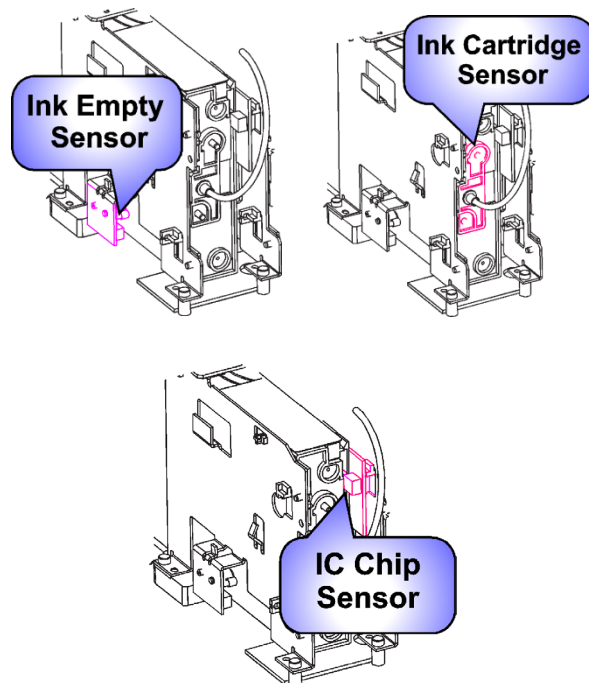
Ink Empty Sensor

- Detects a flag on the Ink Cartridge that indicates a cartridge is empty.

Ink Cartridge Sensor

- Detects the presence of an Ink Cartridge inserted in the IC Holder.

Ink Cartridge IC Chip Sensor

- Reads information from and writes information to the Ink Cartridge IC Chip.

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Ink Level Monitoring
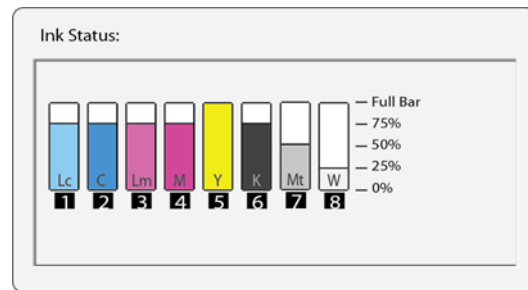
Ink Level Monitoring by the Printer

Because there is no physical monitor of how much ink remains in a cartridge, the printer uses internal "counters" to determine the amount of ink that has been used. The Ink Remaining Menu displays the estimated ink remaining in the a given cartridge.
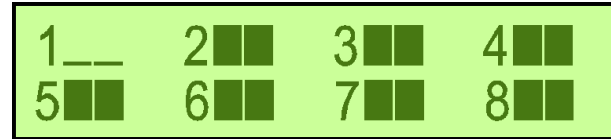
Ink Level Monitoring in VersaWorks

Ink Status

The Ink Status section within the Printer Status window indicates the amount of ink remaining in the cartridge. The amount of ink represented in this window is an estimate based on how much ink the printer has determined remains in the cartridge

Low Ink Warning

When VersaWorks calculates that the amount of ink required to print a job is greater than the amount of ink the printer has estimated to be in the cartridge, the user will be prompted. This warning may not always be accurate, as ink usage is only an estimate. This warning can be disabled in the Printer Settings window.

VersaWorks shows only 5 levels of ink:

- **Full Bar** - 75% or more remaining
- **75% Bar** - 50% or more but less than 75%
- **50% Bar** - 25% or more but less than 50%
- **25% Bar** - 1% or more but less than 25%
- **Empty Bar** - Less than 1%

Hardware Related Symptoms

WRONG CARTRIDGE

Wrong Cartridge Error

Generally indicates that a cartridge of the wrong color or ink type has been inserted.

Troubleshooting Common Causes

- Verify all cartridges are of the correct ink type.
- Verify all cartridges have been inserted into the correct slot for a given color.

Rare Causes

- Faulty Ink Cartridge IC Chip Sensor (IC Holder)
- Faulty Ink Cartridge IC Chip
- Other Hardware failure – PCB Board or Cable

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```
1__  2██  3██  4██
5██  6██  7██  8██
```
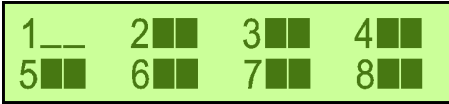
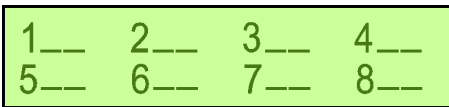## False Empty Cartridge Warning

Significant ink remains in the Ink Cartridge but the machine warns it is empty.

Troubleshooting Common Causes

- Verify the indicated Ink Cartridge is empty – *A small amount of ink will remain in an empty cartridge.
- Verify use of new Roland OEM Ink Cartridges

Rare Causes

- Faulty Ink Cartridge
- Faulty Ink Empty Sensor (IC Holder)
- Other Hardware failure – PCB Board or Cable

```
1__  2__  3__  4__
5__  6__  7__  8__
```

Multiple Cartridges Empty Warning

Significant ink remains in multiple Ink Cartridges but the machine says they are empty.

Troubleshooting Common Causes

- Verify the indicated Ink Cartridges are empty – *A small amount of ink will remain in an empty cartridge.
- Verify use of new Roland OEM Ink Cartridges.

Rare Causes

- Faulty Ink Cartridges
- Faulty Ink Empty Sensors (IC Holder)
- Other Hardware failure – PCB Board or Cable

Frequent Periodic Cleaning While Printing

This is a normal printer action when third party inks are being used. This periodic cleaning is implemented to protect the printheads from damage that can be caused by third party inks.

Troubleshooting Common Causes

- Verify use of new Roland OEM Ink Cartridges.
- Verify the Periotic Cleaning Function is Disabled

Rare Causes

- Faulty Ink Cartridge IC Chip Sensor (IC Holder)
- Faulty Ink Cartridge IC Chip
- Other Hardware failure – PCB Board or Cable

Common Troubleshooting Measures

Sensor Check

```
SERVICE MENU    ◄↕    1 2 3 4 5 6 7 8    ◄
SENSOR CHECK    ►     C C C C C C C C
```

The real-time status of the Ink Cartridge Sensor and the Ink Empty Sensor is displayed in Service Mode under the SENSOR CHECK menu.

Cartridge Status Definitions

*This menu will vary slightly between models. Detailed information about the SENSOR CHECK function, for a specific model, can be found in Section 4-1 of the applicable Service Manual.*

Blank = Cartridge not inserted, Ink remains
C = Cartridge inserted, Ink remains
E = Cartridge not inserted, Ink empty
* = Cartridge inserted, Ink empty

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Sensor Check Scenarios

An infinite number of Sensor Check Scenarios are possible. These are only few examples.

Normal Cartridge Status

```
1 2 3 4 5 6 7 8        ◄
C C C C C C C C
```
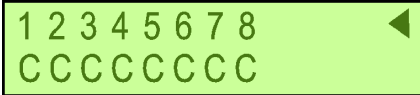
Troubleshooting Common Causes

- This is the normal status if all Ink Cartridges are inserted and all contain ink.

Rare Causes

- This is the normal status if all Ink Cartridges are inserted and all contain ink.
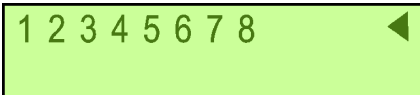
All Cartridges inserted but read empty

```
1 2 3 4 5 6 7 8        ◄
* * * * * * * *
```

All Cartridges not inserted but read full

```
1 2 3 4 5 6 7 8        ◄
```

Troubleshooting Common Causes

- Verify use of new Roland OEM Ink Cartridges.
- Verify that all Ink cartridges are inserted and not actually empty.

Rare Causes

- Faulty Ink Cartridges.
- Faulty Ink Empty or Ink Cartridge Sensors (IC Holder).
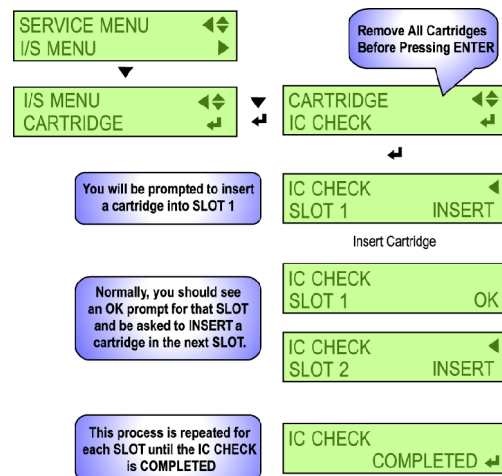- Other Hardware failure – PCB Board or Cable.

IC Check

IC CHECK is a Service Mode function that allows the machine to check the status of both the IC Chip Sensor and the Ink Cartridge IC Chip. A normal IC Check process and IC Check errors are Illustrated below.

Normal IC Check

A normal IC Check should be completed with no System or Slot Errors.

**This menu will vary slightly between models. Detailed information about the IC CHECK function, for a specific model, can be found in Section 4-1 of the applicable Service Manual

```
SERVICE MENU    ◄◆
I/S MENU         ►
        ▼
I/S MENU        ◄◆
CARTRIDGE        ↵
```

```
Remove All Cartridges
Before Pressing ENTER

CARTRIDGE       ◄◆
IC CHECK         ↵
        ↵
```

```
You will be prompted to insert
a cartridge into SLOT 1

IC CHECK        ◄
SLOT 1    INSERT
```

Insert Cartridge

```
Normally, you should see
an OK prompt for that SLOT
and be asked to INSERT a
cartridge in the next SLOT.

IC CHECK
SLOT 1        OK

IC CHECK        ◄
SLOT 2    INSERT
```

```
This process is repeated for
each SLOT until the IC CHECK
is COMPLETED

IC CHECK
        COMPLETED ↵
```

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IC Check Errors

Errors during the IC Check Procedure can indicate problems with a specific part of the IC System.

```
IC CHECK
      SYSTEM ERROR ↵
```
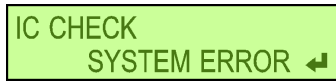
An IC SYSTEM ERROR is very rare and generally indicates a communication error related to hardware.

Troubleshooting Common Causes

- Verify use of new Roland OEM Ink Cartridges.
- Verify that all IC System cable connections are seated correctly.

Rare Causes

- Faulty Ink Cartridges
- Faulty Ink Empty or Ink Cartridge Sensors (IC Holder)

    Other Hardware failure – PCB Board or Cable

```
IC CHECK
SLOT 1        ERROR ↵
```

A SLOT ERROR generally indicates a problem with an IC Chip or an IC Chip Sensor on the SLOT number indicated in the error.

Troubleshooting Common Causes

- Verify use of new Roland OEM Ink Cartridges.
- Verify that the Ink cartridge in question was inserted correctly.

Rare Causes

- Faulty Ink Cartridges
- Faulty Ink Empty or Ink Cartridge Sensors (IC Holder)

    Other Hardware failure – PCB Board or Cable

```
REMOVE
ALL CARTRIGES
```

A REMOVE ALL CARTRIDGES error indicates a cartridge in inserted.

Troubleshooting Common Causes

- Verify all cartridges have been removed.

Rare Causes

- Faulty Ink Cartridge Sensor (IC Holder)

    Other Hardware failure – PCB Board or Cable

History Reports

Service and history reports can point to specific issues regarding the IC System.

Normal IC History Report

A normal history report should contain all of the information about the cartridges and point to a properly functioning IC system.

```
Model        : XR-640
Version      : 1.20
Serial No.   :
No:          SERIAL/  INK TYPE/  CAP./LOT No/  CONSUM./              TIME/INS./    FLAG
1:14da896f050000d9/  MAX2 C   / 400cc/2710A / 209.768cc/0y036d21h52m08s/  2/00000000
2:14fca38f05000042/  MAX2 M   / 400cc/2709A / 214.044cc/0y036d21h52m02s/  2/00000000
3:1430b16f0500005f/  MAX2 Y   / 400cc/2718A / 215.996cc/0y036d21h52m29s/  2/00000000
4:14a24274050000c4/  MAX2 K   / 400cc/2716A / 208.170cc/0y036d21h52m19s/  2/00000000
5:1452a4750500007f/  MAX2 Lc  / 400cc/2713B / 206.398cc/0y036d21h54m34s/  2/00000000
6:143bbf730500002f/  MAX2 Lm  / 400cc/2712A / 208.208cc/0y036d21h54m41s/  2/00000000
7:1447bd9005000088/  MAX2 W   / 200cc/2914A /  84.790cc/0y002d01h16m10s/  1/00000000
8:1419a59505000076/  MAX2 MT  / 200cc/2723A /  88.455cc/0y007d19h06m13s/  3/00000000
```

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No IC Information on Peck Report

Troubleshooting Common Causes

- Verify use of new Roland OEM Ink Cartridges.
- Verify the Firmware has been updated to the latest version
- Cross-check with a printed History Report – IC information may not be recorded correctly when using the Peck Tool on older models. Some early models do not have an IC Chip Sensor so this information is not available on the History Report.

Rare Causes

- Faulty Ink Cartridges
- Faulty Ink Empty or Ink Cartridge Sensors (IC Holder)
- Other Hardware failure – PCB Board or Cable

Consumption is Greater than Capacity

Troubleshooting Common Causes

- Verify use of new Roland OEM Ink Cartridges.

Rare Causes

- Faulty Ink Cartridges
- Faulty Ink Empty or Ink Cartridge Sensors (IC Holder)
- Other Hardware failure – PCB Board or Cable

This is almost always a sure sign of Third Party Ink.

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