Konica Minolta
IJ Technologies, Inc.
established Jan 4, 2005

From R&D to “Business Oriented”

Mission
To Change the printing world
with Konica Minolta’s
IJ Technology

http://konicaminolta.com/worldwide/japan/hij/
1. IJ Head
   1. Current Head Family
   2. Customers’ requests
      1. Small Drop + Gray Scale
      2. Aqueous Capable
      3. Slim Chassis for : Compact Head Carriage / Line Alignment
      4. Separate Ink Path for : Low Cost Printer / Multi-Color Application
      5. Individual Nozzle Control
      6. Easier Operation
   3. Expanded Head Family
   4. A bit of Future Technology

2. Business Model
   1. Open Policy
   2. Ink Partners
Current Head Family Overview

**Shared wall structure (3 Cycle Driven)**

1. Same design, Same Connector *(Plug& Play Interchangeable)*
2. Gray Scale / Binary in one head
3. High Quality & High Speed with 4pl Gray Scale Mode without Light ink

<table>
<thead>
<tr>
<th>Type</th>
<th>nozzle</th>
<th>dpi</th>
<th>ink</th>
<th>pl</th>
<th>KHz with</th>
<th>KHz without</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>512</td>
<td>360</td>
<td>Oil Solvent</td>
<td>42</td>
<td>7.6</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>M</td>
<td>512</td>
<td>360</td>
<td>UV Aqueous</td>
<td>14</td>
<td>12.8</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>S</td>
<td></td>
<td>360</td>
<td>Special</td>
<td>4</td>
<td>20</td>
<td>X</td>
<td>(X)</td>
</tr>
</tbody>
</table>

*DPN* - Drive Per Nozzle

**Non-Shared wall structure (Independently Driven)**

<table>
<thead>
<tr>
<th>Type</th>
<th>nozzle</th>
<th>dpi</th>
<th>ink</th>
<th>pl</th>
<th>KHz with</th>
<th>KHz no</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>256</td>
<td>180</td>
<td>Aqueous</td>
<td>15</td>
<td>15</td>
<td>X</td>
<td>Textile (KM IJ TPV)</td>
</tr>
<tr>
<td>M/S</td>
<td>128</td>
<td>90</td>
<td>Special</td>
<td>15</td>
<td>15</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Highest accuracy (Display etc.)
Customers’ Request

1. Small Drop Size + Gray Scale
2. Aqueous Capable
3. Slim Chassis for:
   1. Compact Head Carriage
   2. Line Alignment
4. Separate Ink Path for:
   1. Low Cost Printer
   2. Multi Color Solution
5. Individual Nozzle Control
6. Easier Operation
7. Easy Integration
Small Drop Size + Gray Scale
## Double Stitch Configuration

<table>
<thead>
<tr>
<th>Application</th>
<th>Head</th>
<th>Configuration</th>
<th>Res.</th>
<th>Freq.</th>
<th>Vol.</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Speed Print</td>
<td>KM512 LN/LH</td>
<td>360dpi Double Stitch</td>
<td>360</td>
<td>7.6kHz x 2</td>
<td>42 pl</td>
<td>1.04 m/sec</td>
</tr>
<tr>
<td>High Quality Print</td>
<td>KM512 MN/MH</td>
<td>720dpi Stitch</td>
<td>720</td>
<td>12.8kHz</td>
<td>14 pl</td>
<td>0.45 m/sec</td>
</tr>
</tbody>
</table>

### Explanation
- **Application:**
  - **High Speed Print**
  - **High Quality Print**

- **Head:**
  - KM512 LN/LH
  - KM512 MN/MH

- **Configuration:**
  - 360dpi Double Stitch
  - 720dpi Stitch

- **Resolution (Res.):**
  - 360
  - 720

- **Frequency (Freq.):**
  - 7.6kHz x 2
  - 12.8kHz

- **Volume (Vol.):**
  - 42 pl
  - 14 pl

- **Speed:**
  - 1.04 m/sec
  - 0.45 m/sec
Head : KM512MH/MN (14pl)
Number : 12
Speed : 17.8 inch/sec (0.45m/s)
**KM512 MN/MH with Slim Chassis**

Product Name: KM512 MN/MH-Slim (TBD)

Feature:

- 512 nozzles / 14pl / 12.8kHz
- Same Electrical Interface as KM512 MN
- Narrower Chassis Enables Compact Carriage
- Still “Stitched Alignment” Available
- One Ink Inlet

Sample Delivery:
Available on August, 2005 (TBD)

Previous Model

Specifications:

- 73(W) x 15(D) x 70(H) mm
- Ink inlet
- 40 mm
**Slim Chassis : Head Configuration**

A. Carriage for Swath Printer

- Adjust Mechanism
- Off-center screw

B. Line Alignment for Single Pass

- Nozzle Area (36.096 mm)
- Head Width (73 mm)

**Contribute to**

- a. Smaller Carriage
- b. Narrow Print Bar
KM512 LN/LH-2in1 (Fat Chassis)

Product Name: KM512 LN/LH-2in1 (TBD)

Feature:

- **256 x 2** nozzles / **180dpi x 2** / 42pl / 7.6kHz
- Same Electrical / Mechanical Interface as KM512 LN
- **2** Independent Ink Inlet
- Previous **Fat** Type Chassis (Not Slim)
- Print **2** Colors with 256 Nozzles Each at 180dpi
- **3** Heads for **6** Different Inks (C, M, Y, K, LC, LM)
- Sample Delivery: Available on April, 2005
“2 in 1” : 1 Head / 2 Color Print
“2 in 1” : 1 Head / 2 Color Print

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
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<tbody>
<tr>
<td>KM</td>
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<td>KM</td>
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<td>Blue Cyan</td>
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<tr>
<td>Magenta</td>
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<td>Magenta</td>
<td>Magenta</td>
</tr>
<tr>
<td>2色混合</td>
<td>2色混合</td>
<td>2色混合</td>
<td>2色混合</td>
<td>2色混合</td>
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</table>
# Latest Head Family

**Shared wall structure (3 cycle driven)**

<table>
<thead>
<tr>
<th>Type</th>
<th>Casing</th>
<th>nozzle</th>
<th>npi</th>
<th>ink</th>
<th>pl</th>
<th>kHz</th>
<th>with</th>
<th>w/out</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>Fat</td>
<td>512</td>
<td>360</td>
<td>Oil</td>
<td>42</td>
<td>7.6</td>
<td>X</td>
<td>X</td>
<td>Single-pass : 360dpi Binary</td>
</tr>
<tr>
<td></td>
<td>Slim</td>
<td>256 x 2</td>
<td>180 x 2</td>
<td>Solvent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 Colors : Low Cost Printer</td>
</tr>
<tr>
<td>M</td>
<td>Fat</td>
<td>512</td>
<td>360</td>
<td>UV</td>
<td>14</td>
<td>13</td>
<td>X</td>
<td>X</td>
<td>Fine print image</td>
</tr>
<tr>
<td></td>
<td>Slim</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 Step GS / Binary (as you like)</td>
</tr>
<tr>
<td></td>
<td>Fat 2 in 1</td>
<td>256 x 2</td>
<td>180 x 2</td>
<td>Special</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 Colors : Low Cost Printer</td>
</tr>
<tr>
<td>S</td>
<td>Fat</td>
<td>512</td>
<td>360</td>
<td>Special</td>
<td>4</td>
<td>20</td>
<td>X</td>
<td>X</td>
<td>High Quality Print : 1440 (+) dpi</td>
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<tr>
<td></td>
<td>Slim</td>
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<td>Aqueous</td>
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<td>4 Step GS - Max 7dpm / Binary</td>
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</tbody>
</table>

**Non-Shared wall structure (Independently driven)**

<table>
<thead>
<tr>
<th>Type</th>
<th>Casing</th>
<th>nozzle</th>
<th>npi</th>
<th>ink</th>
<th>pl</th>
<th>KHz</th>
<th>DPN-yes</th>
<th>DPN-no</th>
<th>Application</th>
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</thead>
<tbody>
<tr>
<td>M</td>
<td>Plastic</td>
<td>256</td>
<td>180</td>
<td>Aqueous</td>
<td>15</td>
<td>15</td>
<td>X</td>
<td>X</td>
<td>Textile (KM IJ TPV)</td>
</tr>
<tr>
<td>M</td>
<td>SUS 316</td>
<td>128</td>
<td>90</td>
<td>Special</td>
<td>15</td>
<td>10</td>
<td>X</td>
<td>X</td>
<td>Highest Accuracy (Display etc.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DPN : Drive per Nozzle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>SUS 316</td>
<td>128</td>
<td>90</td>
<td>Special</td>
<td>6</td>
<td>10</td>
<td>X</td>
<td>X</td>
<td>Highest Accuracy (Display etc.)</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>DPN : Drive per Nozzle</td>
<td></td>
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</table>
Individual Nozzle Control
**ICB - Intermediate Conversion Board**

The Intermediate Conversion Board (ICB)

**ICB** is a small circuit board mounted on IJ head.

**ICB** has FPGA, waveform amplifier, heater controller.

Driving conditions are determined by registers, which is rewritten through serial interface.

Interface between ICB and printer is only narrow flexible cable (24pin FFC eg)

**ICB** can reduce number of signals dramatically!

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**Head:** KM512LH

**Flexible Cable**

**FPGA**

**Ink Inlet**

**LVDS**

**Printer Board**

**Carriage Board**

**ICB**

**Head**

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Easy Integration

- Evaluation Kit
- Drive board
Konica Minolta’s Future Technology

MEMS Technology

- Leveraged by Former Minolta’s Technology

Silicon Channel

Silicon Micro Flow Mixer

x 100

x 350
Konica Minolta’s Future Technology

• Next Generation: Some Keywords
  – Ultimate Form of Shear Mode Head End Shooter
  – Low Voltage Drive
  – Low Heat Generation
  – Compact
  – “Printbar Oriented”
1. Open Policy
   1. Open Waveform
   2. Open Information

2. Ink Partners
   1. Open and Equal to Reliable Partners (External / Internal)
   2. Ready to assist Optimization