



KONICA MINOLTA

Industrial IJ Head Applicable to Wide Range of Inks

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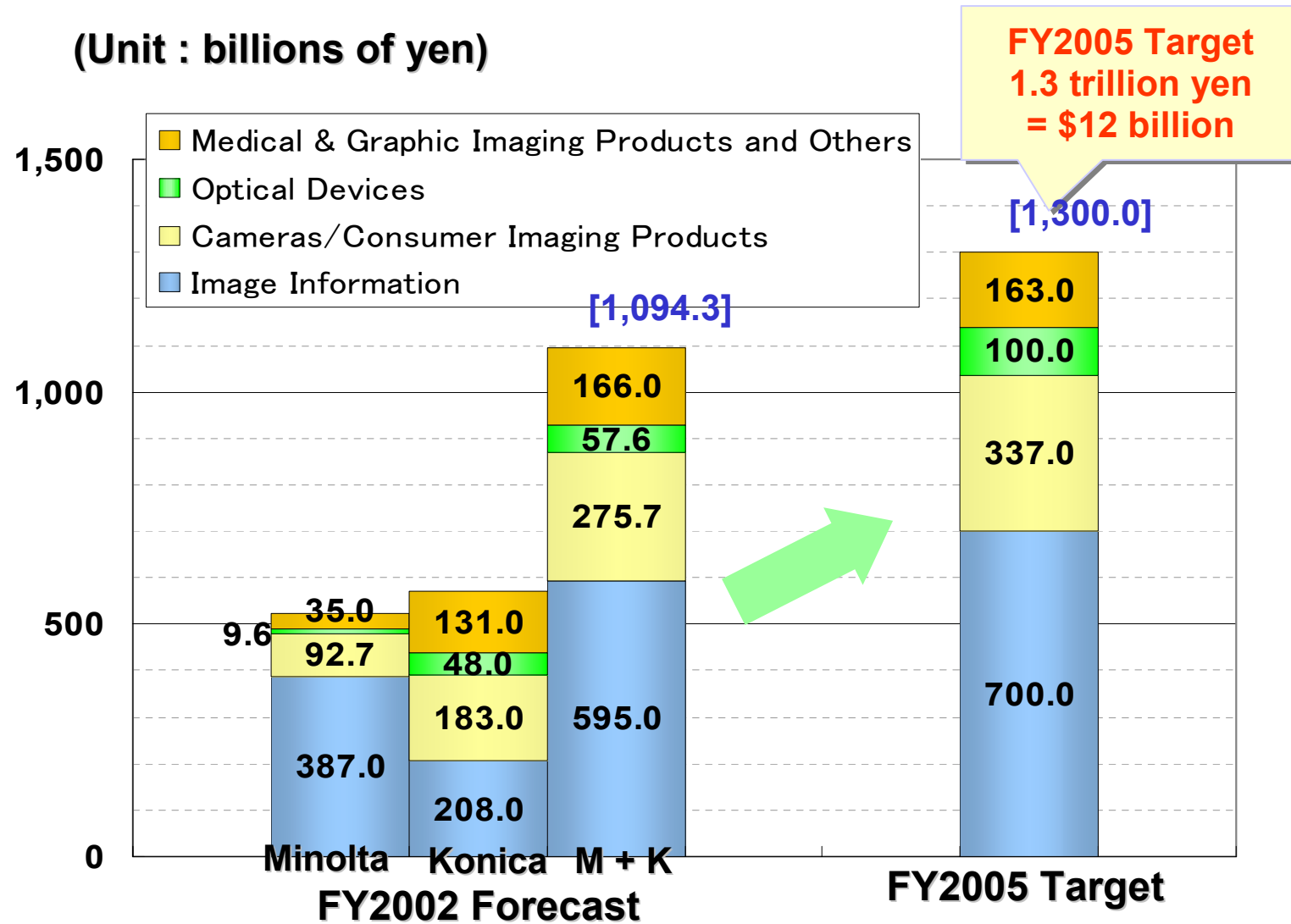
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KonicaMinolta



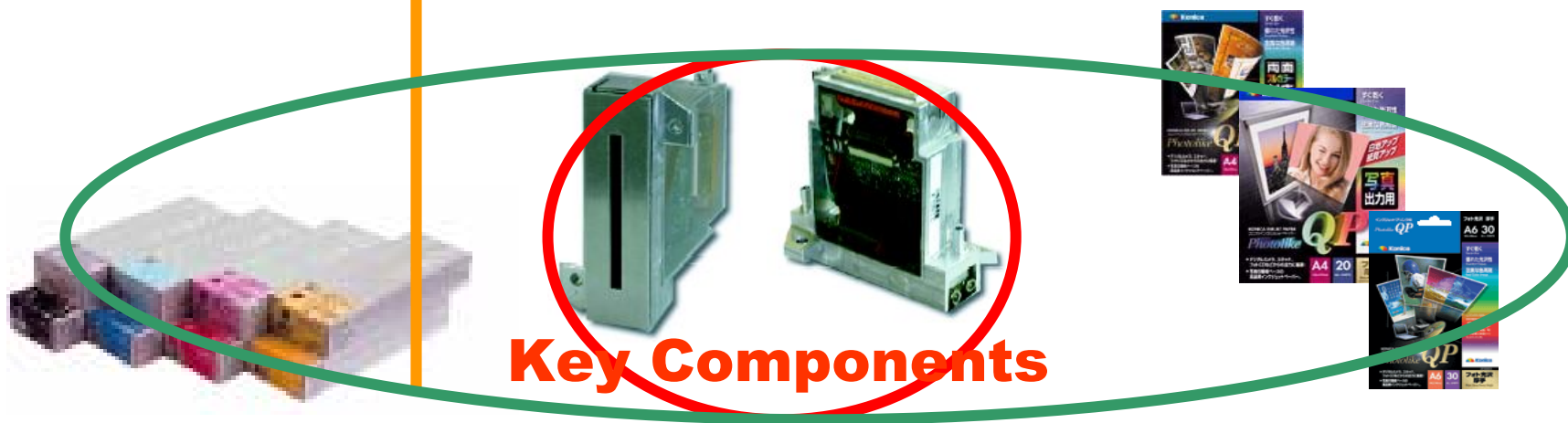
(Unit : billions of yen)



IJ Business Development



Integration

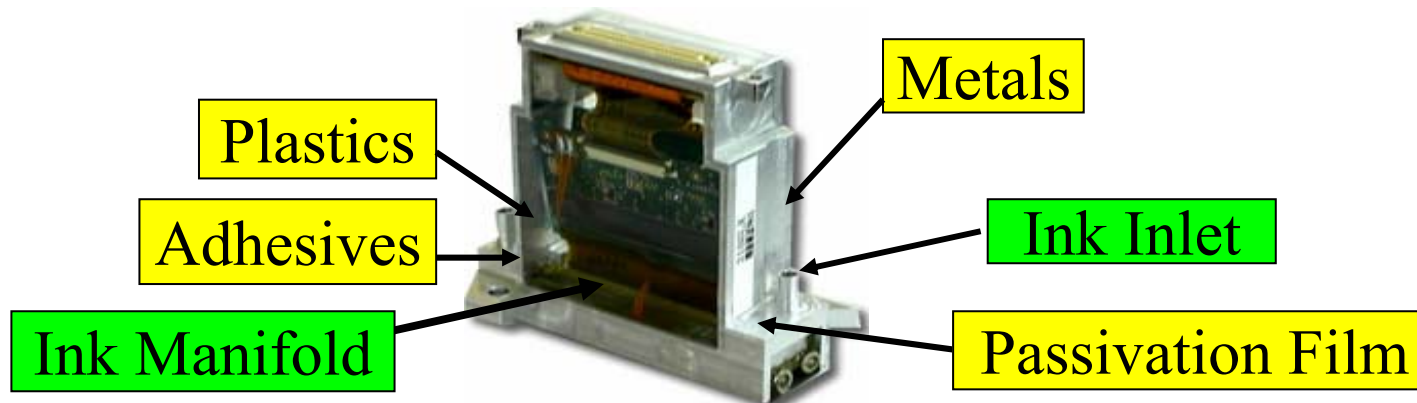


Key Components

Technology Required for Solvent Ink

Requirements for Components of IJ Head

- No Chemical and Physical Change: dissolve, swelling, deforming
- No Mechanical and Electrical Change: stress, strain
- No Influence on Ink Property: Pigment Dispersion
Collapse, cohesion, viscosity change
- No Influence on Ink Reactivity:
ex) UV curable ink; hardening, decrease sensitivity
Organic EL materials; decrease emitting efficiency



Adhesives Applicable for Solvent Inks



- Requirements for Solvent Resistance of Adhesives
 - Property of Adhesives
 - Hardness
 - High glass transition temperature
 - Process Usability of Adhesives
 - Viscosity and thixotropy
 - Curing temperature

- We have developed new epoxy adhesives.
 - Highly network structure obtained by new epoxy compounds and new hardener.

Newly- Developed Adhesive

Material Compatibility of Epoxy Adhesives			
	A	B	C
SOLVENT INK	bad	good	excellent
UV INK	bad	good	excellent
OIL INK	good	good	excellent
NMP	bad	bad	good
Butyl Lactate	bad	bad	good
Cyclohexanone	bad	bad	good
Anisole	bad	bad	good
Xylene	bad	good	good
Ethyleneglycohol mono-butylether	bad	bad	good
Ethyleneglycohol butylether acetate	bad	bad	good

A:normal epoxy glue
 B:network epoxy glue
 C:highly network epoxy glue

Stable Ejection of Solvent Inks



- Difficulty of Stable Jetting of Solvent Ink
 - oil-based > UV curable > solvent-based
 - more volatile
 - generation of mist
 - pigment dispersion
 - high viscosity
- KonicaMinolta resolves the difficulty by harmonizing head performance with ink properties.
 - stability improvement by **waveform** modification
 - **Temperature control** by built-in heater



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Drop Formation of Various Inks



Aqueous Ink



Oil Ink



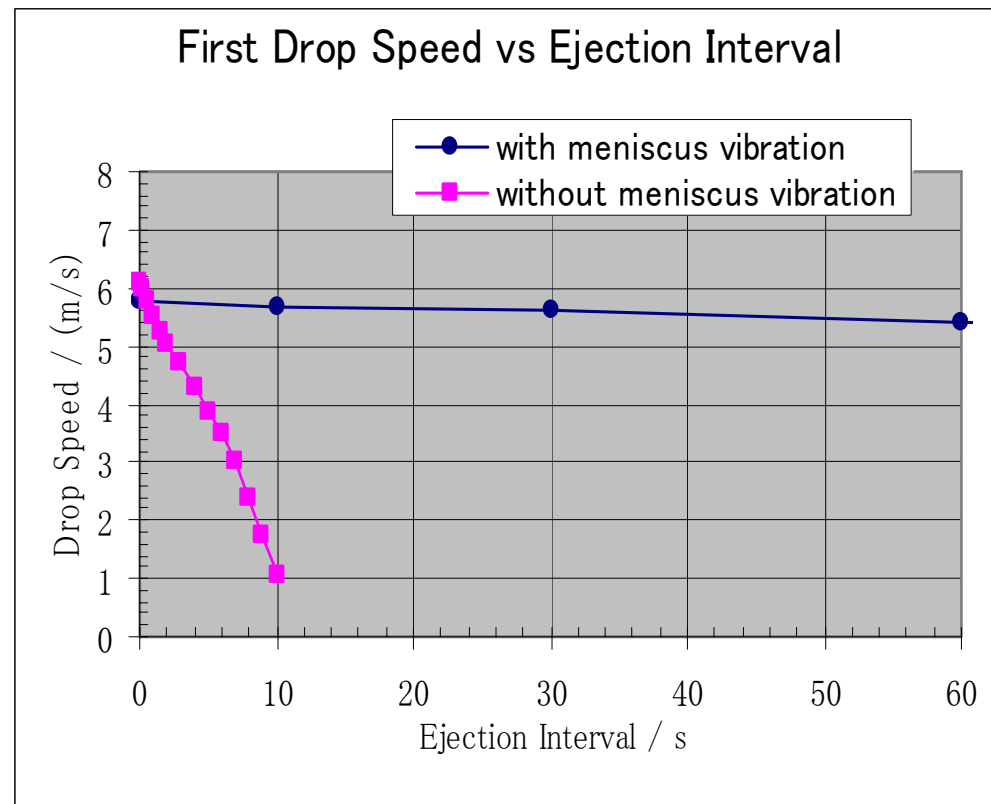
low high
Surface Tension

Stability Improvement -1-

- Waveform Modification
 - For highly volatile solvent-based inks,
“shaking” waveform shall be applied, in order
 - to assist mixing of ink close to meniscus
 - to prevents increase of viscosity of ink near meniscus
 - to maintain the stability of drop ejection

Modified Waveform

Shaking Waveform = shaking pulse + ejecting pulse

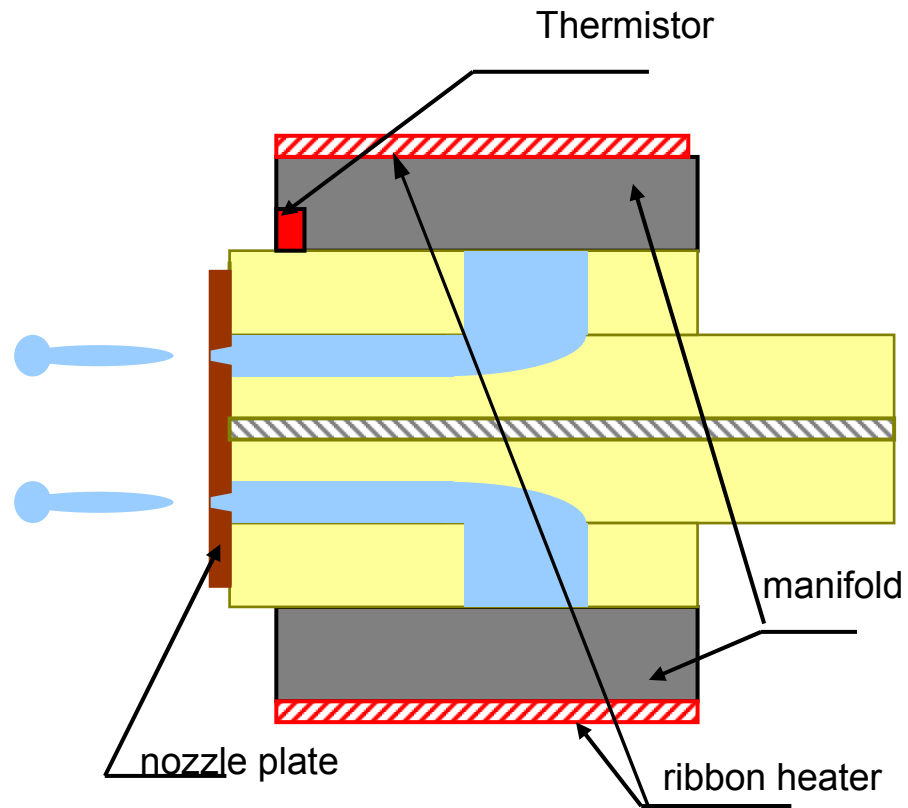


Stability Improvement -2-

- Waveform Modification
 - For non-Newtonian inks and polymer containing inks, “shaking” waveform shall be applied, in order
 - to assist mixing of ink close to nozzle corn
 - to prevents return to viscous state of ink
 - to decrease the viscous change through ejecting
 - to maintain the stability of drop formation

Useful for UV curable ink containing oligomer components and/or polymer rich inks

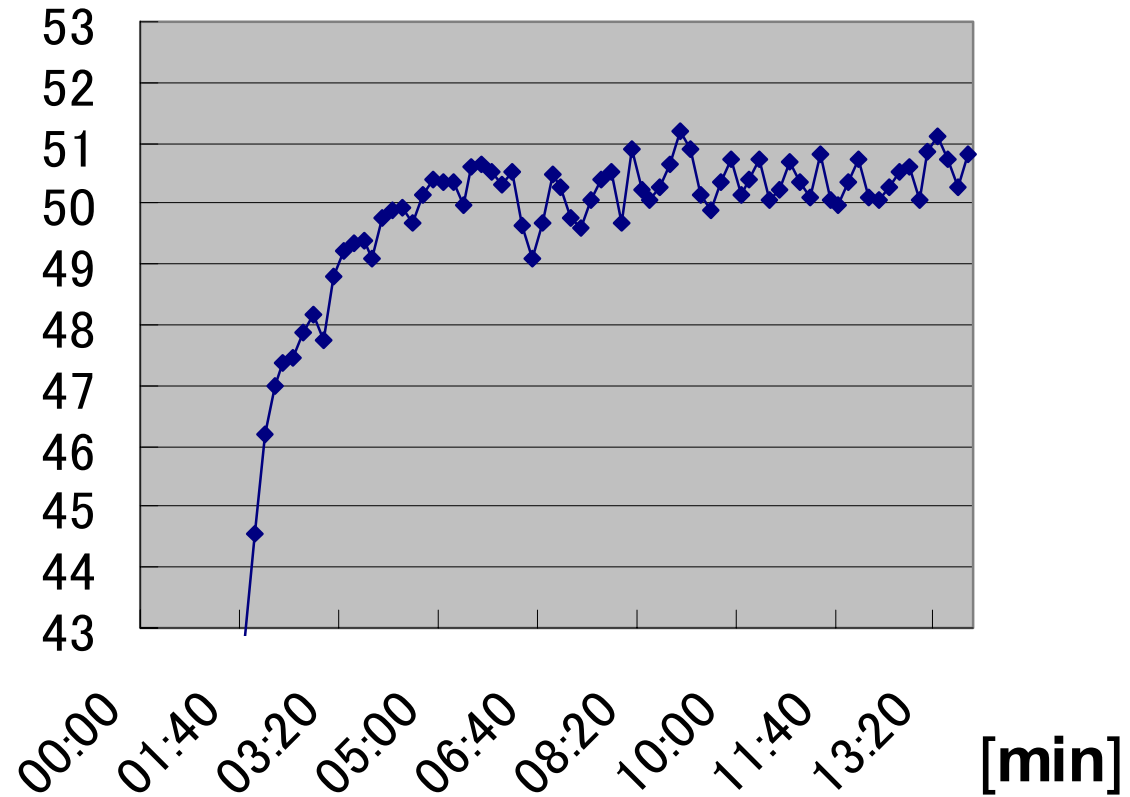
Temperature Control by built-in Heater



Temperature Control

Head Temperature Controlled at 50°C

[Temp °C]



512 Nozzle Head Family Member

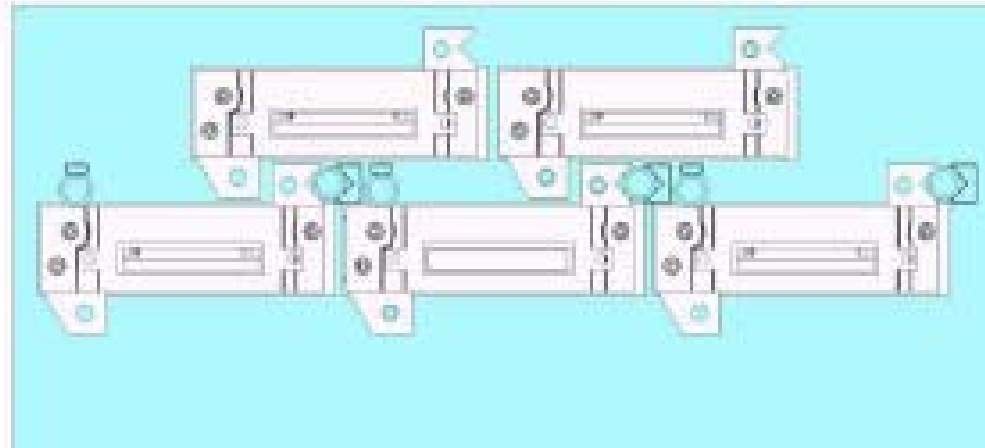
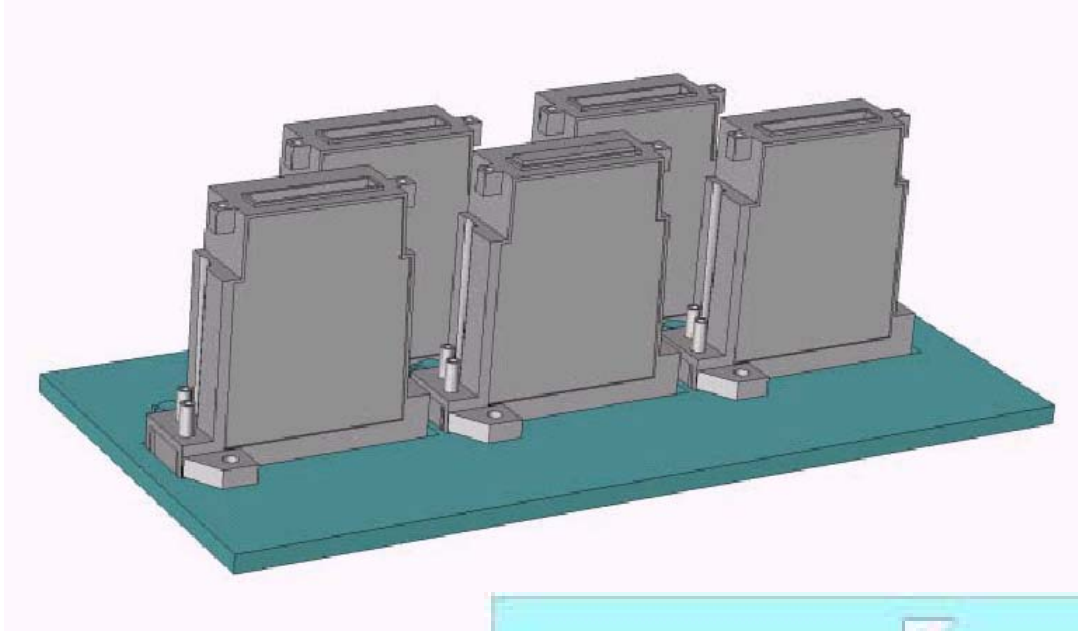


3 Cycle Driven Head

Type	nozzle	dpi	ink	pl	KHz	built in Heater		Application
						with	without	
L	512	360	Oil Solvent UV (Aqu.) Special	42	7.6	X	X	Single-pass
M				14	12.8	X	X	Fine print image 4 Step Gray Scale
S				4-6	(TBD)	X	X	Super fine image Multi Gray Scale

X sample available (X) coming soon

Easy to Stitch



Multi Color

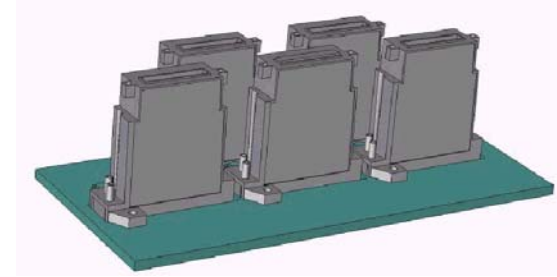


Single Pass

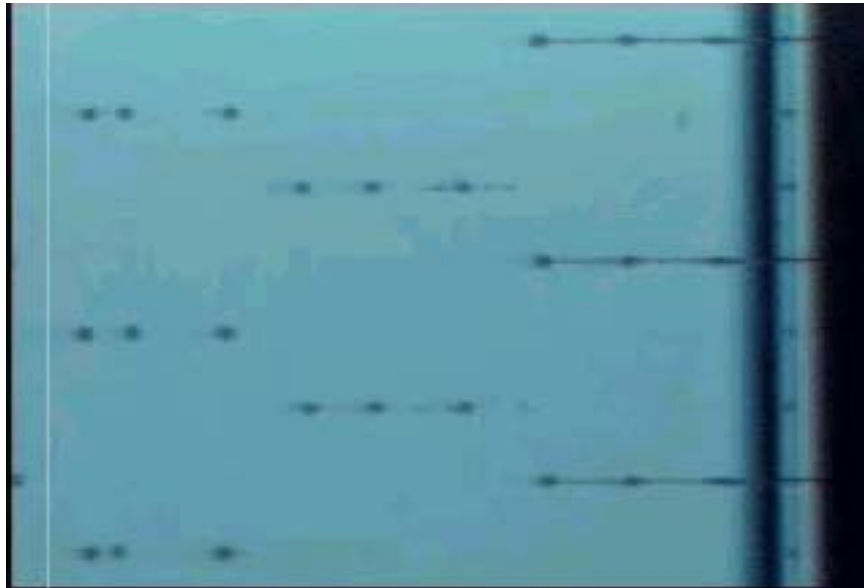
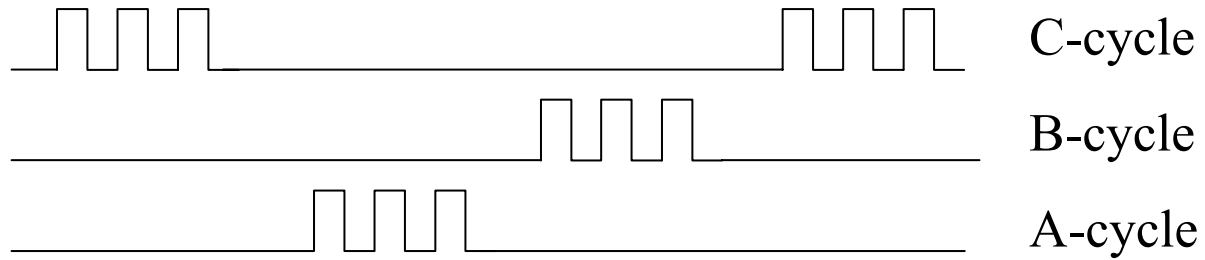


Type512L/LH & Type512M/MH

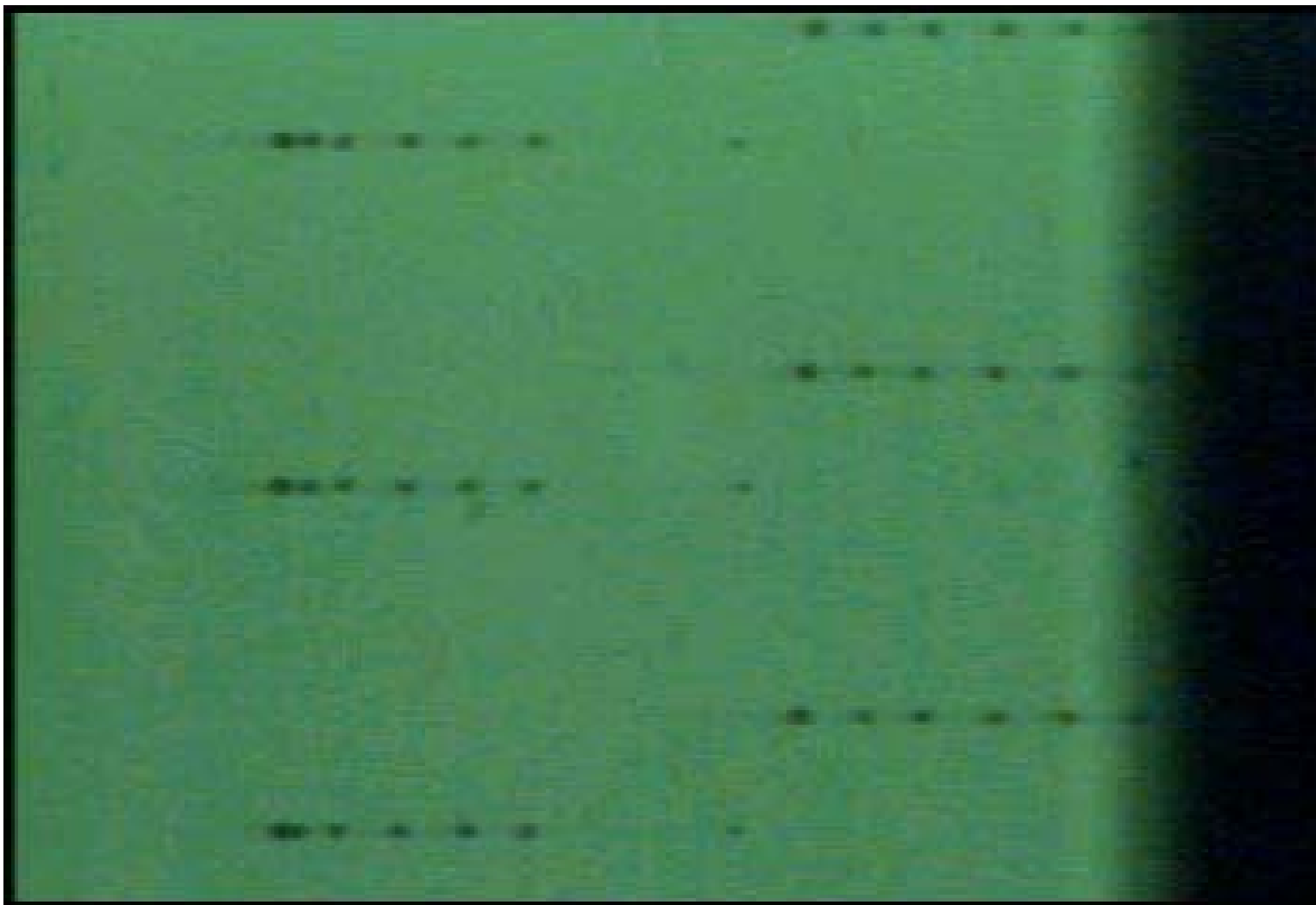
- Type 512L_/LH
 - Ideal for **Single-pass** print
 - Coding/Marking
 - Industrial
 - (Outdoor) Signage
- Type 512M_/MH
 - Fine Image Quality** (Smaller Drop Size)
 - Higher Driving Frequency
 - (Indoor) Signage
 - Industrial
 - where small drop size required



5. Gray Scale Technology



Multi Step Gray Scale



Summary

1. KonicaMinolta IJ Head Technologies for Industrial Applications
 1. New epoxy [adhesives developed](#)
 2. Modified [waveform](#) increase jetting stability for volatile solvent based inks and non Newtonian inks
 3. Built-in heater for [ink temperature controls](#)
2. 512 Head Family , good for ...
 1. One Pass Printing
 2. Line Stitch Alignment
 3. Grey Scale Applications