

### Applications:

- › Case erection
- › Vision system
- › Move blending

### Product News

- › HPGL interpreter
- › New HMI options
- › EMC footprint filter

# Motion Intelligence

advanced motion control technology for machine designers

## › More HMI Choices

Baldor has added four new options to its touch-screen human-machine interface (HMI) range:

- › A low-cost black and white option with a 3.8 inch screen -



- › A simple graphic LCD with numeric keypad and action buttons -



- › 2 large colour displays with a choice of 10.4 inch or 12.1 inch screens (not shown).

The panels are fully supported by Mint motion software for simple integration into motion control-related application programs, and can be interfaced to motion controllers via RS232/RS422 or the CAN fieldbus.

The new expanded range also features a faster programming tool, and has been reduced in price.

More details via [www.baldor.com](http://www.baldor.com)

## More flexible Wrapping

MintDrive provides a single-box motion and I/O solution for controlling case erection and glue dispensing on Kappa's award-winning wrap-around packaging machine

A motion control system based on a standalone intelligent drive and matched brushless servo motor, is providing a flexible upgrade for Kappa's wrap-around packaging machinery. Developed by Baldor, the control system provides a compact solution, and additionally introduces new flexibility through its built-in multi tasking capability.

### Rapid Product Changes

The machine is the System 2100 case/tray packer from Kappa Corrugated UK's packaging systems division. This end-of-line equipment collates groups of cartons and packs them into cases or trays for transit and/or display, and is widely used by leading breakfast cereal manufacturers. The machine can be reconfigured in minutes for different case and tray sizes.

The motion control system operates autonomously, after receiving high-level command signals from a PLC controlling the overall process. As a collated group of cereal cartons move into the machine, they are loaded into the partially erected corrugated blank.

### Controlled Precision

A single-axis MintDrive then controls the flight chains that move the blank and its contents through stages of folding, and sealing using hot melt adhesive. As the case erection process begins, the drive indexes the materials to a precise starting position, by moving forward a certain number of encoder counts, while also taking data from a photocell sensor and dynamically micro-adjusting the target position as required.

continued on page 2

### Application:

Case erection machinery

### Motion controller:

MintDrive  
BSM servo motors

### Key design advantages:

Single-box solution  
Simple programming using Mint's multi-tasking features  
Matched motor database for ease of set-up

# Rapid Eye Movement

A linear motor positioning stage has helped AmFax to deliver a compact and high-throughput vision system for the production testing of Cinch's unique CIN::APSE connectors for state-of-the-art microprocessors.

## Rapid and Precise

Designed for mounting high-end server and workstation processors onto PCBs, a CIN::APSE socket contains as many as 1296 wire filament contacts on a 1 mm (0.04 inch) pitch, with a profile as short as 0.8 mm (0.03 inch). AmFax's customized automatic test equipment (ATE) – Precision Vision – verifies the manufacturing integrity of each of these contacts using a number of vision testing techniques.

Each test sequence is performed on a fixture containing 20 connectors - and up to 26,000 individual test points - demanding a camera positioning system capable of making rapid and precise moves.

## Compact Design

The sheer throughput required, coupled with the compactness of linear motor technology compared with rotary-driven alternatives, convinced AmFax to go straight for a linear motor solution.

Baldor helped AmFax to specify the X-Y motion subsystem,

choosing a dual-axis linear stepper motor stage from its LMDS series, capable of accelerations to 19.62 meters/sec/sec (2G) and a movement resolution of 2.5 µm.

This stage, with a travel area of 300 x 200

**“Linear motor technology has proved to be an enabling technology”**

mm (11.8 x 7.9 inch), carries a high-resolution camera fitted on a third motion axis for fine positioning - a load totalling around 2kg.

(4.41lbs) In use, the stage makes around

1600 moves to test the 20 connectors in each fixture, grabbing an image of a 4 x 4 array of contacts at each step. The compactness of the

stage compared with alternatives such as rotary motor driven ballscrews - with everything contained within the platen's 300 x 200 mm (11.8 x 7.9 inch) frame - was a key attraction for AmFax. It allowed the final test system to



**Compact high-speed motion in the shape of an LMDS linear motor stage helped AmFax create a flexible manufacturing vision test solution**

be implemented in a compact bench top form factor resembling a photocopier - with clear access to the test area.

## Robust, Zero-maintenance

With such a high number of cycles, the 'zero-maintenance' nature of the LMDS stage with its air bearing, was another important factor for AmFax in providing a robust and repeatable test system suited to the rigours of intensive production testing.

“Linear motor technology has proved to be an enabling technology for this area of automatic testing, delivering the speed required for economic production testing sequences”, says Simon Pape, design engineer at AmFax. “The ergonomics of the ATE was also aided by the motion technology - providing unobstructed access to the test area for unit-under-test changeover”.

### Application:

Vision testing system

### Motion solution:

LMDS linear stepper X - Y stage

### Key design advantages:

Compactness compared with rotary alternatives  
Speed and acceleration of linear motors  
Zero maintenance design



Continued from page 1

## Integrated I/O Fires Adhesive

As the flights are on a continuous chain, the case is then in a precise position for each of the subsequent erection stages. While passing through these stages, the drive's integral digital outputs are used to control guns that fire adhesive in a stitched pattern onto the corrugated flaps as they are being folded.

## Compact Single Box Solution

The decision to use an intelligent drive provided a compact solution, because it incorporates a

machine control system running the BASIC-like Mint motion language, including I/O for the associated sensing and actuation tasks and a CAN fieldbus which is used to interface a human-machine interface (HMI).

## Multitasking Makes It Easier

It also helped provide a more elegant solution because of its built-in multitasking capabilities, which allowed the application program to be broken down into smaller, self-contained, tasks of indexing, gluing, and recipe editing. This software modularity has helped to enhance the

operating efficiency of the machine, as it allows operators to adjust and optimize glue pattern recipes on-the-fly. If the length of the glue pattern needs reducing because it is visible for example, the operator can now achieve this in seconds - without stopping the machine and losing production.



# If you're a speed freak, consider move blending

The move blending capability of the Mint motion language allows moves to be overlapped to speed motion and increase productivity. Professor Paolo Mint introduces the commands

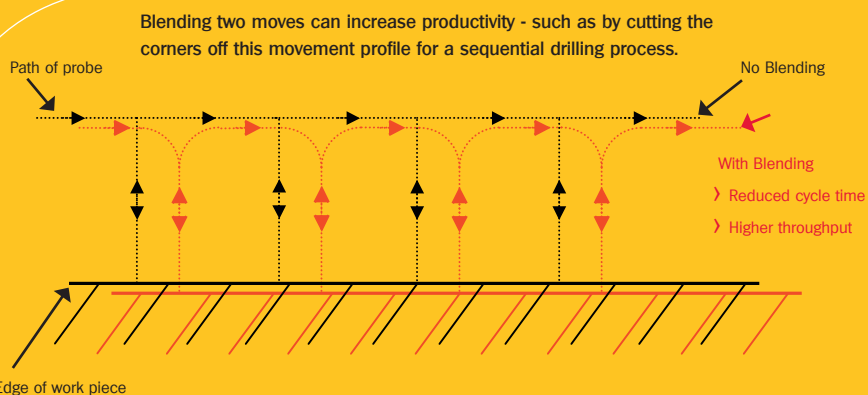
Overlapping moves can increase the throughput in a wide variety of applications such as pick-and-place, materials handling, probe positioning and CNC machinery. Consider the hole drilling application shown here - rounding the corners of the movement profile can easily increase throughput by 10%+. The Mint language - in conjunction with the move buffer on NextMove motion controllers - offers commands that makes this very easy to implement for 2D or 3D applications. Mint has three blend commands:

**BLEND** - which allows you to manually initiate blending at whatever point you want - such as after a digital input is received.

## **BLENDMODE** and **BLENDDISTANCE**

- these commands work together and allow blending to be automatically applied at every vector change, with control over the point at which the blending starts. In the example shown, the drill starts moving to the next point as it completes the up stroke. Just two lines of code are required for this; the first two in this Mint routine demonstrating the complete movement sequence as shown.

This code also illustrates the use of the move buffer, another efficiency-enhancing facility of Mint which gives users a great deal of application flexibility. In this example the move buffer is loaded with three move commands before being started by the GO command. Control actions can also be embedded into a sequence of moves like this, to allow I/O task to be synchronized with the move sequences. The buffer also allows motion on multiple axes to be synchronized. And when used in contoured mode it helps to optimize motion by merging the moves together - a facility which is used to effect in the new HPGL interpreter featured in this newsletter.



' Enable automatic blending to speed up move sequence and  
' acceleration adjustment mode for smoother corner control.

**BLENDMODE**[0,1] = **\_bmAUTOMATIC** + **\_bmADJUST\_ACCEL**;

**BLENDDISTANCE**[0,1] = **2**; ' Start blending 2 units from end of vector move

**VECTORR**[0,1] = **0, 10**

' Load Move - drill down

**GO**[0,1]

' Trigger motion

**OUTX.0** = **1**

' Turn on Output 0 to start the drill

**Pause IDLE**[0,1]

' Wait for axes to be idle

' Load a sequence of 3 moves into the move buffer and start together

**VECTORR**[0,1] = **0, -10**

' 1st...Load move - drill up

**VECTORR**[0,1] = **10, 0**

' 2nd...load move - drill along

**VECTORR**[0,1] = **0, 10**

' 3rd...load move - drill down

**GO**[0,1]

' Trigger drill movement to next hole position

**Pause IDLE**[0,1]

' Wait for axes to be idle

**VECTORR**[0,1] = **0, -10**

' Load move - drill up

**GO**[0,1]

' Trigger motion

**OUTX.0** = **0**

' Turn off Output 0 to stop the drill

A detailed application note on the move buffer and move blending can be downloaded from [www.supportme.net](http://www.supportme.net).

## > Footprint Filter

Baldor has added a *footprint* style powerline EMC filter to its range, that is compatible with all single-phase drives from the **MicroFlex**, **FlexDrive**, **Flex+Drive** and **MintDrive** lines.

The filter mounts between the drive and the panel, adding just 40mm (1.57inch) to the depth - saving both space and wiring compared with traditional discrete panel-mounting filters.



