Related Applications or Terminology

- Modifying final / target position ‘on the fly’
- Cut to length with registration control
- Press feeder component alignment
- Move until trigger
- Emergency target change
- Label feeding - label position correction

Overview

In some applications it is useful to change the target position of an axis during a move, without stopping motion until the new demand position has been reached.

Examples of this include cutting pre-printed material to length, or detecting the current position of a label or product and making a correction to this 'on the fly'. It can also be applied to press feeder systems, where it is crucial to align a component with the press tool.
Mint motion control products provide a solution to this requirement with the INCR (increment relative position) and INCA (increment absolute position) commands.

These commands work by simply replacing the original target position for a move already in progress with a new final position. The commands can also be used operate in the same manner as MOVER (move relative) and MOVEA (move absolute) if so desired.

**Application Example - Cut to Registration**

A typical application utilising these features would be cutting pre-printed material to length so that the printed information is always in the same location on the resulting sheet of material. This is often referred to as ‘cut registration’.

In this example, nip rollers controlled by a MintDrive™ or Flex+Drive™ servo-control amplifier draw printed material from an unwind system, or printing line, into the jaws of a cutter.

Both Flex+Drive™ and MintDrive™ provide all of the necessary control interfaces to allow implementation of functions such as firing the cutter and receiving the print registration mark signals from an optical sensor.

If an operator interface (HMI) is required, for example to allow the operator to enter the nominal ‘repeat length’ of material to be pulled by the nip rollers’ motor, this too can be easily integrated into the system.

As material is fed through the machine a sensor detects a pre-printed registration mark. This sensor is connected to the high speed ‘Fast Input’ to both automatically latch the position of the Nip Roll axis in 1µS (FASTPOS) and to call a section of code placed within a pre-defined Mint event (FASTIN).

This type of program flow is known as ‘event driven’ code and the response to a digital input signal is often referred to as an 'interrupt service routine'.

The captured position returned by the FASTPOS keyword can be used to calculate a new target position for the Nip Roll axis. In this case our new desired position will be set so that the material will always be cut in the correct place relative to the printed registration mark – i.e. the target position is always a fixed distance ahead of where the register mark was detected.

The new target position is loaded using either the INCR or INCA commands. This cycle is repeated for each cut length.
The core MintMT code for this example might look something like this:

```plaintext
' ***TIP*** Use leading _ to indicate program constants
Dim fInitDistance As Float = 10000 ' Define a variable for the theoretical cut length
Dim fNewDistance As Float = 0 ' Define a variable for the new target position
Const _fPrintOffset As Float = 1000 ' Print_Offset is the distance from sensor to cut line

' ***TIP*** Use a Macro (DEFINE) to represent digital output1 with real application names
Define opCUTTER_SOLENOID = OUTX(1)
' ***TIP*** You can also use constants to represent axes with real application names
Const _nNipRolls = 0

' This loop executes continuously
Loop
    POS(_nNipRolls) = 0 ' set the axis start position to 0 each time
    INCA(_nNipRolls) = fInitDistance ' Initiate a move of the initial distance
    GO(_nNipRolls)
    Pause IDLE(_nNipRolls) ' Wait for motion to complete

    opCUTTER_SOLENOID = _on ' Fire the cutter
    WAIT = 250 ' wait 250mS second for the cut to complete
    opCUTTER_SOLENOID = _off ' Switch off the cutter solenoid
    WAIT = 250 ' wait 250mS sec for cutter to clear material
End Loop

' Fast Interrupt triggers the EVENT FASTINx (where x denote the input number)
Event FastIn5

    ' new target = mark absolute position + an offset
    fNewDistance = Fastpos(_nNipRolls) + _fPrintOffset

    INCA(_nNipRolls) = fNewDistance ' Modify current target position to the new one
    GO(_nNipRolls)

End Event

Startup

'Digital Input Configuration – Input 5 active high and +ve edge triggered
INPUTMODE(0) = 000100000 ' *** TIP *** Bit-mapped keywords are easier to understand if you specify
INPUTACTIVELEVEL(0) = 011111111 ' the setting using binary number
INPUTPOSTRIGGER(0) = 000000000 ' format
FASTSELECT(_nNipRolls) = 5 ' Input 5 captures Fast position
FASTLATCHMODE(_nNipRolls) = 0 ' Always capture Fast position when triggered

End Startup
```