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InStep I User Manual
For Version I 3.25

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Overview

As of manual version 3.02 the software and hardware manuals are combined into a "User Manual". The separate software and hardware manuals should only be used with firmware versions of 1.25 and earlier. The appropriate hardware manual is determined by the Hardware Revision number.

The InStep control module is intended to be used in conjunction with a stepper drive and motor or a servodrive with step input and a servomotor. It provides stop/start registration control of processes such as self-adhesive labelling, overprinting etc. This operation can be speed synchronised with another operation such as the product conveyor or printing machine.

It is housed in a DIN rail mountable enclosure. The enclosure can be opened by operating two small catches to enable the user to configure the unit via several jumpers located inside. This allows very diversified applications while maintaining the same hardware minimising the need for several units to be kept for spares.

The enclosure has 16 screw terminals and two modular RJ12 "phone type" connectors. The two connectors are for serial communications to PLC's, touch screens, computers and other user interfaces. The base unit provides for RS485 and RS422 communications in both half and full duplex operation over either 1 or 2 pair cables. Up to 8 units may be daisy chained or multidropped from the one cable to allow 1 user interface to control several axes of motion.

All inputs are independently jumperable to change their polarity for use with either sinking (NPN) or sourcing (PNP) input devices. The outputs can be changed for sinking or sourcing type but all must be the same type.

The amount of I/O available is in fact limited by the terminals fitted to this enclosure and an expansion board is available which will plug onto the existing board and then fit into a wider enclosure that has 24 terminals. This will provide more I/O and optionally an RS-232 interface.
When using the RS-232 interface the RS-485/422 interface will still be available to multidrop to other units.

A green LED has been added between the two serial connectors to indicate that the internal 5V supply is functional.

In order to minimise the amount of firmware versions two of the input terminals have jumpers which can select 1 of 3 available input signals and two of the output terminals can be jumpered to one or more of 4 available output signals. Also there are 8 jumpers to select various options. Three of these will usually be used to select the unit's address on the multidrop network.

Wiring

Power

A power supply of between 12 and 28 volts DC is required to be connected to terminals 1 and 2. The total power requirement is 100mA plus input and output currents.

Inputs

All input are required to either sink or source between 5 and 12mA at between 12 and 28 volts DC. Refer to jumper description table to select polarity of inputs.

Outputs

All outputs can sink or source up to 100mA each at the same voltage as supplied to the power supply terminals. Refer to configuration section for changing polarity.

Serial Communications

The two serial communications connectors are wired pin for pin and have exactly the same function as each other. Two are provided solely to assist in daisy chaining multiple units together. One socket is normally used as "in" and the other as "out". However this does not have to be the case. When 2 wire (half-duplex mode) is selected pins 2 and 3 may be used as "in" and 3 and 4 as "out".

Configuration

Configuration consists of selecting the appropriate jumpers for your application and installing the appropriate output driver IC in position IC9. The jumpers are fully explained in the jumper description table. The unit is normally supplied with an NPN output driver IC, however it can be ordered with a PNP type or changed in the field. The correct IC for NPN outputs is ULN2803A and for PNP outputs is UDN2981A. Be sure to set jumpers J9 and J10 correctly to match the installed IC or damage will result!

Mounting

The InStep module can be mounted on 35mm DIN rail and should be mounted with terminals 1 to 4 uppermost and the rail clip at the bottom. If the InStep module is disassembled to facilitate the changing of jumpers etc, it should be reassembled so that terminals 13 to 16 are at the rail clip end of the housing. If the module must be mounted on a vertically mounted DIN rail it should be mounted with terminal 1 lowermost. This would place the side label uppermost.

Serial Communications

Communications with the InStep module is via the serial port located on the front of the module.
Up to 8 modules may be daisy chained together to allow one master device to communicate with all units using only one communication port. The address of each unit is selected via the first three jumpers on the option port. Commands are issued by the master device in the system and the modules either simply act on this command or respond if it was a query type command.
All messages to and from the InStep modules have the following field format:
Header, Address, Command, Optional value and Carriage return.
e.g.; 1P2AB<CR>
Where,
- The semicolon character (3B hex) is the header. All messages on the network begin with this header character.
- 1 is the address on the network. The PLC or computer, etc is always address zero. Jumpers on the option port set the address of the InStep units. The valid range is 1 to 8.
- P is the command. All messages from the master have this field. All responses from the InStep modules do not have this field.
- 2AB is the value. Whether this field exists and its width depends on the command. All responses from the InStep modules have this field.
- <CR> is the message terminator. All messages are terminated by a carriage return (0D hex) character.
Some commands are queries only and so no value field is allowed.
Some command values are in decimal ASCII others are in hexadecimal ASCII.
All response values are in hexadecimal ASCII.
All command letters and hex digits A to F must be in upper case.
Leading zeroes are not required in commands.
Leading zeroes are always returned to the width of the value field.
Space and Line Feed characters in commands are ignored.
Responses are always directed to address zero.
Out of range characters in data will cause unpredictable results. (i.e. other than 0 to 9 and A to F)

As of version 3.15 a semicolon anywhere in the command string will clear the input buffer and start a new command/query reception. Previously the semicolon header was only scanned for after the previous string was terminated by a carriage return. This meant that if a carriage return was garbled or lost the next string would be appended to the previous one and both then ignored, as it would be an invalid string. Also from this version the backspace character (08) will delete the previous character sent. This does not apply to the header or address characters!

Command Descriptions

A - <u>A</u>dvance

Function	Sets the advance value or queries the current value.
Range	0 to 65,535 decimal in command, 0 to FFFF hexadecimal in response.
Default	100 (64 hex.)
Description	This command sets the number of steps to move after the gap sensor has activated. If a value is entered that is less than the decel (F command) setting the stored value will be equal to the decel setting. If the decel is adjusted this value must be entered again to adjust the entered advance value. If the speed compensation is selected on the option port, the value here must be at least 32 plus decel to allow the speed compensation to work over the entire speed range

B - Batch Count   *Not implemented yet (Temporary use implemented)*

Function	Sets or queries the batch counter. (Sets fixed move length).
Range	0 to FFFFFF hexadecimal. (0 to 65,535 dec in command, 0 to FFFF hex in response).
Default	0
Description	This command forces a value into the batch counter register. Normally used to reset the count. (Sets the length in steps of the move done when the fixed move input is activated).

C - Total Count   *Not implemented yet*

Function	Sets or queries the total counter.
Range	0 to FFFFFF hexadecimal
Default	0
Description	This command forces a value into the total counter register. Normally used to reset the count. Disabled as of V3.07.

D - Coder Delay   *Partial implementation*

Function	Sets or queries the coder delay.
Range	0 to FFFF
Default	0
Description	This command sets the delay in steps between either the start of dispensing or the stopping and the print signal coming on depending on the type of batch coder selected. At the moment 0 disables and any value enables with a small delay. Any odd value causes checking for a printer OK signal at IN4, even values look for a printer faulty signal.

E - <u>E</u>nable

Function	Enables the dispensing of labels.
Range	0 or 1
Default	Depends on state of J28. (Refer to Option Port Table)
Description	When set to 1 enables the dispensing of labels at the next product sensor activation or when set to 0 disables the dispensing of labels at the end of the currently dispensing label. Also used to reset a missing label fault shutdown.

F - Forward label   *Not implemented yet (Temporary use implemented)*

Function   Allows the labeller to skip over a missing label to prevent one product not being labelled. (Number of Deceleration Steps after advance finished.)
Range   0 to FF
Default   0 or off (0A)
Description   The number of labels between the gap sensor and the peeler bar is set here. When the missing label approaches the peeler bar a double length index is performed to skip over the missing label allowing all products to be labelled. (Temporarily used for number of deceleration steps. Re-enter advance after changing this value!)

G - Manual Dispense (<u>G</u>o)

Function   Starts the label sequence independent of the product sensor.
Range   No value allowed!
Default   N/A
Description   This command allows the operator to dispense a label without having to operate the product sensor.

H - Batch Preset   *Not implemented yet*

Function   Sets or queries the batch preset value.
Range   0 to FFFFFF hexadecimal
Default   0 or off
Description   This command sets the count at which the batch counter will activate the output and reset the counter.

I - <u>I</u>nput Port Status

Function   Returns a value indicating the status of the input port.
Range   No value allowed!
Default   N/A
Description   This command returns two hex digits representing the status of the 8 bit input port. A value of 00 is all off. Refer to the port assignment tables for the function of each input.

J - Jig Delay

Function   Sets or queries the jig delay.
Range   0 to 65,535 decimal in command, 0 to FFFF hexadecimal in response.
Default   0 or off
Description   This command sets the steps between product detection and activating the jig solenoid output. A value greater than zero enables Jig Control Mode. If you select this mode you must select a mode with the 'U' command as well! If Knife mode is selected in Option2 (w) this value cannot be changed from zero!

j - Jig Hold Delay

Function   Sets or queries the jig hold delay.
Range   0 to 65,535 decimal in command, 0 to FFFF hexadecimal in response.
Default   0 or off
Description   This command sets the steps between the dispense stopping and the deactivation of the jig solenoid. It is up to the operator to ensure correct product spacing. You must ensure the product is released before the following product is detected by the product sensor or that product will be ignored. This setting is only used when in Jig Control Mode which is enabled by the J command above, so you can leave the value in here always.

K - Air Blast Time (Knife Down Time)

Function   Sets or queries the air blast time.
Range   0 to 255 decimal in command, 0 to FF in response.
Default   0 or off
Description This command sets the air blast time in milliseconds. The air blast is for machines with an air box attachment. The air blast time occurs after the product delay and before the label starts to move. As of version 3.18 if the knife mode is set in option2 (w) this command adjusts the knife down time and air blast cannot be used.

L - Length Measuring

Function   Turns the length measuring function on or off.
Range   0, 1 or 2
Default   0 or off
Description This command turns the length measuring function on (1) or off (0). When turned on the number of steps to dispense the label is transmitted to the master device shortly after the label is dispensed. Value returned is number of steps in hexadecimal. As of version 3.24, whilst length measuring mode is on the "L2" command can be issued. This will calculate the "no gap skip" missing label length and if successful, turn length measuring off.

M - Master Speed

Function   Queries the speed of the master encoder.
Range   No value allowed!
Default   N/A
Description This command allows the user to check the operation of the master encoder. To convert the value returned into a rate in kHz, divide the value into 1000 decimal.
i.e. Speed (kHz) = 1000/Value. If value is 1F4 then 1000/500 = 2kHz.
Note: This is the time between the last two encoder pulses so when the encoder has a stopped a value will still be indicated.

N - Missing Label Length

Function   Sets or queries distance required to trip on missing label fault.
Range   0 to 65,535 decimal in command, 0 to FFFF hexadecimal in response.
Default   16 (4096 steps), V3.06 to 3.19A default was 5 (4096)
Description From version 3.06 to 3.19A the missing label function worked like this:
If a label dispense takes more than the number of steps set here the labeller will disable and turn on the Missing Label and Bussed Fault Outputs. A value of 0 allows infinite length, 1 = 256, 2 = 512, 3 = 1024, 4 = 2048, 5 = 4096, 6 = 8192, 7 = 16384 and 8 = 32768 steps. Prior to Ver 3.06 0 or 1 = 8192 steps and 2 = infinite.
From version 3.20 on it can work in either of two ways:
If the value entered here is less than 64 the missing label function works as above except that the number of steps is set differently. The number of steps at which the labeller will stop is 256 times the value set here. So a value of 16 gives the same as the old default value of 5 (256 x 16 = 4096). This gives a much more precise way to set the trip point.
If the value is greater than 63 the "no gap skip" style of missing label is implemented. This allows the labeller to skip past missing labels (or blocked label gaps) as if they never happened. It works by simulating the label gaps presence at the number of counts specified here. So the number entered here should be the label length minus the label advance setting. If the actual gap occurs after the gap is simulated, the actual gap position will override the simulated one to maintain correct registration. If you change the advance after setting this value you should redo this setting to cater for the new advance value. If the "gap skip" is done four times consecutively the labeller will disable and turn on the Missing Label and Bussed Fault Outputs. Also, refer to L command.

O - Output Port Status

Function   Returns a value indicating the status of the output port.
Range   0 to FF hexadecimal
Default   N/A
Description This command allows the user to force the state of the output port bits. As a query it returns two hex digits representing the status of the 8-bit output port. A value of 00 is all off. Refer to the port assignment tables for the function of each output.

P - Label Position

Function   Sets or queries the label position value.
Range   0 to 65,535 decimal in command, 0 to FFFF hexadecimal in response.
Default   0
Description This command sets the delay in steps between the product sensor activation and the start of dispense effectively changing the position of the label on the product.

Q and q - Stop Dispense (Quit)

Function   Used to stop the dispense of a label.
Range   No value allowed!
Default   N/A
Description This command stops the label dispense independent of the gap sensor. 'Q' simulates the gap sensor signal; 'q' causes instant deceleration and stop (i.e. no advance).

R - Ramp Select

Function   Sets or queries the acceleration ramp.
Range   0 to 5
Default   3
Description This command selects 1 of 6 acceleration ramp profiles. A value of 5 is the softest.

S - Set Speed

Function   Sets or queries the set speed
Range   0 to 9999 in command, 0 to FFFF hexadecimal in response.
Default   480 hex, 8957 dec. Was 300 hex, 9341 dec. prior to V3.17. Was 9231 dec. prior to V3.05
Description This command sets the speed of dispensing when no master encoder is used. Sync ratio of zero must be set for this value to take effect. A value in the 9000's is typical with a larger number being a faster speed.

T - Two Label Spacing

Function   Sets or queries the two label spacing value
Range   0 to 65,535 in command, 0 to FFFF in response.
Default   0 or off
Description This command sets the number of steps to pause between the first and second label of a set. A value of 0 turns this function off.

t - Two Label Spacing Advance

Function   Sets or queries the two label spacing advance value
Range   0 to 65,535 in command, 0 to FFFF in response.
Default   90 (5A hex.)
Description This command sets the number of steps of advance for the first label of a two label set. No deceleration is done after this and after the spacing delay the second label starts with no acceleration to maintain the correct spacing at all speeds. This setting is only valid when speed compensation factor is selected, otherwise the 'A' setting is used.

U – Spin Up Delay

Function   Sets or queries the spin up delay.
Range   0 to 65,535 in command, 0 to FFFF in response.
Default   0 or off
Description This command can enable one of two modes. A value of 1 puts the InStep into "Jig Only Mode". In this mode the normal product sensor is ignored and the sequence is started by the "Jig In" input. When a larger value is entered, the "Orient Jig Mode" is turned on. This command sets the number of steps to pause before the registration scanner is enabled. This is to ensure the product is spinning in the jig at the correct speed. In orient jig mode the normal product scanner is ignored and the cycle is initiated by a sensor connected to the "Jig In" input. This initiates the spin up delay. When this is complete, the sensor connected to the "Colour Sensor" input is enabled. When the colour sensor sees a leading edge the normal dispense sequence is started. A value of 0 turns both jig modes off.

V - Version

Function   Queries the version number of the installed firmware.
Range   No value allowed!
Default   N/A
Description This command returns the installed firmware's version number in the following format:
                 A letter to indicate the type.
                 A major version number followed by a decimal point.
                 Two minor version digits to indicate revision level.
                 A space or letter to indicate special versions.

v – Serial Number

Function   Queries the serial number of the device.
Range   No value allowed!
Default   N/A
Description This command returns the serial number in the following format:
                 A letter to indicate the number or versions this unit has had. (A is original)
                 The serial number in decimal in a fixed six digit format.

W - Option Port (DIP Switch)

Function   returns a value indicating the option port status.
Range   No value allowed!
Default   N/A
Description Returns two hex digits representing the status of the 8-bit option port, refer to the port assignment tables for the jumper functions. A value of 00 is all off. Also used to load a new setting. Bit 0 corresponds to J24.

w - Option Port2

Function	Sets or queries the option2 port status. (Implemented in V 3.16)
Range	0 to FF.
Default	0
Description	Two hex digits representing the status of the 8-bit option2 port. A value of 00 is all off.

> Bit 7 – End of Reel Mode. Only in Servotron mode! No effect here!
> Bit 6 – 1000M Mode. When on changes the functions of the Printer OK and Fault In inputs. Print OK changes to Safety Circuit Activated and Fault In changes to External Enable. Refer to Servotron manual for further details.
> Bit 5 – Counter Memory. Only in Servotron mode! No effect here!
> Bit 4 – Knife Mode. Changes the air blast function into a label cutter function. Normally used in a Reeltek Protag application machine.
> Bit 3 – Stepper Boost. When on changes the servo enable output function to a stepper drive boost. Prior to V 3.16 stepper boost was always selected when servo not selected.
> Bit 2 – Servo OK input polarity. DO NOT SET! Servotron use only!
> Bit 1 – Printer Fault polarity. DO NOT SET! Servotron use only!
> Bit 0 – Fixed Pull Mode. DO NOT SET! Servotron use only!

X - Examine RAM

Function	Returns the value stored at the specified RAM address.
Range	0 to 2FF hexadecimal in command as address, 0 to FF returned as data.
Default	N/A
Description	This command is for debugging purposes only and requires an intimate knowledge of the firmware to interpret the responses. The top of RAM is actually $23F.

Y - Synchronisation Ratio

Function	Sets or queries the sync ratio
Range	0 to 255 decimal in command, 0 to FF in response.
Default	128 decimal (80 hex) or 100%
Description	This command sets the sync ratio between the master encoder and the output pulse rate FF is 50%, 10 is 800% Refer to table for correct value. A value of 0 causes the master encoder to be ignored and the set speed value to take effect.

Z - Internal Port

Function	Returns a value indicating the internal port status or can force output bits.
Range	0 to FF
Default	N/A
Description	Returns two hex digits representing the status of the 8 bit internal port, refer to the port assignment tables for individual bit functions and states. A value can be written to the port in order to force the state of the output bits on that port, the input bits remain unaffected.

[- Write RAM

Function	Writes the specified data into the specified RAM location.
Range	0 to FF hexadecimal
Default	N/A
Description	This command has a special data format, there are two data fields separated by a comma. The data in front of the comma is the address to write to and the data after the comma is the data to be written. This command is for debugging purposes only and requires an intimate knowledge of the firmware to use it successfully.

Inputs

> All inputs are selectable for NPN (1 to 2) or PNP (2 to 3) input devices. The function of each input follows.

PRODSENS - Product Sensor

This input initiates the labelling sequence. It starts with a transition from off to on of this input. See jumper J7 for input polarity selection. Terminal 9 on a standard InStep.

GAPSENS - Gap Sensor

This is the registration input. It is normally connected to a fork sensor that detects the gap between the labels on the backing paper. The label advance starts counting with an off to on transition of this input. See jumper J8 for input polarity selection. Terminal 10 on a standard InStep.

ENC - Master Encoder

This is where the encoder for the product speed is connected. The encoder is usually coupled to the conveyor or vacuum belt of the machine. See jumper J32 and J33 for input polarity selection. The pulses per rev of the encoder and its gearing to the conveyor / belt should be selected so that the rate is the same as the step rate of the motor. It is best to be on the low side of one to one if this cannot be achieved. The encoder should have an open collector 24VDC output. See jumpers J32 and 33 for input polarity selection. Terminal 11 on a standard InStep. If the Diff. Enc. Option board is fitted the encoder should have a 5 volt differential line driver output (RS-422). Terminal 11 becomes the A input and terminal 12 is the A/ input

IN1 – Colour Sensor (Product Sensor 2)

This input only functions in Orientation Mode. It triggers the labelling cycle just as the normal product scanner does however only after the orient part of the cycle is complete. See jumper J1 for input polarity selection. Terminal 5 on a standard InStep. Implemented in V I 1.16B

IN2 – Jig In Sensor/Product Gate

This input is usually a proximity detector mounted on the orientation jig to indicate when the jig is closed. It initiates the spin up delay in orient jig mode. If option port jumper J31 is installed this input becomes the product sensor gate input. In this mode this input must be on before a product detection will start the dispense cycle. See jumper J2 for input polarity selection. Terminal 6 on a standard InStep. Implemented in V I 1.16B

IN3 – Fixed Pull Input

This input initiates the fixed move cycle. This move simply accelerates at the set rate then moves for the amount of steps set by the "B" command. This move is made irrespective of the gap sensor. See jumper J3 for input polarity selection. Terminal 7 on a standard InStep. Implemented in V I 1.16B

IN4 – Printer OK

This input is connected to the printer OK/fault output of the printer controlled by the InStep module. When the printer is enabled by the Coder Delay (D) command with an odd value this input must be on otherwise the InStep is disabled and the bussed fault output is turned on. If an even value is used in D the input must be off for printer OK. As of V3.19A the printer fault input is only checked just after the label dispense is completed. This allows it to possibly serve as an actual print confirmation input (from a contrast scanner for instance) or just a simple printer fault signal monitor. See jumper J4 for input polarity selection. On a standard InStep, J21 controls which terminal this signal is connected to. 1 to 2 is terminal 8, 2 to 3 is terminal 12. Implemented in V I 1.19

IN5 - Reset

Not implemented yet.

IN6 - Disable (Bussed Fault In)

This input disables the labelling when on. Prior to version 3.12B this was edge triggered which allowed resetting while input still on. It is normally used in the "bussed" mode where jumper J34 on InStep (or J60 on InStep Plus) is installed. When several units are connected together via their IN6 or OUT7 terminals all units will be disabled when a fault occurs on any one unit. See J6 for input polarity selection. On a standard InStep J23 controls which terminal this signal is connected to. 1 to 2 is terminal 8, 2 to 3 is terminal 12.

Note: IN6 and OUT7 polarities must be the same and on InStep J20 and J23 must be set correctly to bring them out to terminals. Implemented in V I 1.16

Outputs

All outputs are selectable for NPN or PNP however they must all be one or the other. Selection is made by changing IC9. For NPN use ULN2803A, for PNP use UDN2981A. Jumpers J9 and J10 must be set to suit. The polarity of OUT8 (if fitted) is selected by J55.

STEP – Step Signal

This output is used to drive the pulse input of the stepper or servo drive. Terminal 3 on a standard InStep.

OUT1 – Coder

This output is the start trigger for a date coder etc. Jumper J27 selects whether the coder is of the type that prints while the web is stationary (e.g. hot stamp) or moving (e.g. ink jet). Terminal 13 on a standard InStep.

OUT2 – Servo Enable

This output is used to disable a servo drive when a fault occurs or it is commanded so. Terminal 14 on a standard InStep. Implemented in V I 1.18. Was on OUT4 from V I 1.18 to 1.19E.

OUT3 – Missing Label (Labeller Fault)

This output is turned on when a missing label has been detected. It is reset by sending the "E1" command. Terminal 15 on a standard InStep.

OUT4 – Jig Solenoid (Knife Up Solenoid)

This output connects to the solenoid that controls jig closure. J17 controls which terminal this signal is connected to. 1 to 2 is terminal 16, 2 to 3 is terminal 4. Implemented in V I 3.02. Was Servo Enable from V I 1.18 to 1.19E. As of version 3.18 this output can be used for a cutter knife up solenoid if Knife Mode is selected with Option2 (w).

OUT5 – Air Blast (Knife Down Solenoid)

This output is turned on when an air blast time is entered with the K command at the end of the product delay and before the servo starts to move. J18 controls which terminal this signal is connected to. 1 to 2 is terminal 16, 2 to 3 is terminal 4. Implemented in V I 1.19 As of version 3.18 this output can be used for a cutter knife down solenoid if Knife Mode is selected in the Option2 menu.

OUT6 – Air Assist

This output is turned on at the start of the servo moving and off at the beginning of decel. J19 controls which terminal this signal is connected to. 1 to 2 is terminal 16, 2 to 3 is terminal 4. Implemented in V I 1.19

OUT7 – Bussed Fault Out

This output is turned on when there is a labeller fault or a printer fault. This output can be tied to input 6 with J34 on a standard InStep to implement the "bussed fault" mode. J20 controls which terminal this signal is connected to. 1 to 2 is terminal 16, 2 to 3 is terminal 4. Implemented in V I 1.16.

Tables

InStep Command Summary

Command	Without Data	With Data	Data Range	Default
A	Returns Advance Value	Sets Label Advance	0 to 65535	100 dec
B	Returns Batch Count	Sets Batch Count	0 to 65535	0
C	Returns Total Count	Sets Total Count	Not done	N/A
D	Returns Coder Delay	Sets Coder Delay	0 to FFFF	?
E	Returns Enable Status	Sets Enable On or Off	0 or 1	0
F	Returns Forward Label Value	Sets Forward Label Count	0 to FF	0A hex
G	Manual Dispense (Go)	Returns ?<BELL><CR>	N/A	N/A
H	Returns Batch Preset Value	Sets Batch Preset	0 to FFFFFF	0
I	Returns Input Port Status	Returns ?<BELL><CR>	0 to FF	N/A
J	Returns Jig Delay	Sets Jig Delay	0 to 65535	0
j	Returns Jig Hold Delay	Sets Jig Hold Delay	0 to 65535	0
K	Returns Air Blast Time	Sets Air Blast Time	0 to 8191	0
L	Returns Length Measure Status	Sets Length Measure On or Off or sets mislab value	0, 1 or 2	0
M	Returns Master Speed	Returns ?<BELL><CR>	0 to FFFFFF	N/A
N	Returns Missing Label Status	Sets Missing Label Length	0 to 65535 <3.20 0 to 8	16 5
O	Returns Output Port Status	Sets Output Port Bits	0 to FF	N/A
P	Returns Label Position Value	Sets Label Position	0 to 65535	0
Q	Manual Stop Dispense (Quit)	Returns ?<BELL><CR>	N/A	N/A
q	Manual Instant Stop	Returns ?<BELL><CR>	N/A	N/A
R	Returns Selected Ramp	Selects Acceleration Ramp	0 to 5	3
S	Returns Set Speed	Sets Set Speed	0 to 9999	8957 d
T	Returns Two Label Spacing Value	Sets Two Label Spacing	0 to 65535	0
t	Returns Two Label 1st Label Advance	Sets Two Label 1st Label Advance	0 to 65535	90 dec.
U	Returns Spin Up Delay Value	Sets Spin Up Delay	0 to 65535	0
V	Returns Firmware Version	Returns ?<BELL><CR>	A0.00 to Z9.99Z	N/A
v	Returns Serial Number	Returns ?<BELL><CR>	A000000 to Z999999	N/A
W	Returns Option Port Status	Returns ?<BELL><CR>	0 to FF	N/A
w	Returns Option2 Status	Sets Option2 Port	0 to FF	0
X	Returns ?<BELL><CR>	Returns RAM value	0 to FF(2FF)	N/A
Y	Returns Sync Ratio	Sets Sync Ratio	0 to 255	128 dec
Z	Returns Internal Port Status	Sets Internal Port Output Bits	0 to FF	N/A
[	Returns ?<BELL><CR>	Write data to RAM location	0,0 to FF,FF	N/A
Any Other	Returns ?<BELL><CR>	Returns ?<BELL><CR>		

Option Port Assignment

Option Number	Jumper Number	Description	Notes
1	J24	Address Bit One	Refer address selection table
2	J25	Address Bit Two	Refer address selection table
3	J26	Address Bit Three	Refer address selection table
4	J27	Coder Type Select	On = Moving Type [1]
5	J28	Enable State On Power Up Select	On = Enabled at power up
6	J29	Select Mitsubishi/SIG servo for below	On = SIG, Off = Mitsubishi [2]
7	J30	Speed Compensation Factor	On = Apply for Servodrives
8	J31	Product Sensor Gate	On = Gate sig Req'd on IN2. V1.20

Input Port Assignment

Input Number	Description	Base Unit Terminal Number	With Expansion Terminal Number	Notes
1	Colour Sensor	5	7	Orient Mode Only
2	Jig In Sensor / Prod Gate	6	8	Orient Mode / J31
3	Fixed Length Trigger	7	9	Implemented in V I 1.16B
4	Printer OK	8/12	10	Implemented in V I 1.19
5	Reset	8/12	11	Not Implemented
6	Disable (Bussed Fault In)	8/12	16	Implemented in V I 1.16
7		N/A	17	
8		N/A	18	
9		N/A	12	
10		N/A	6	

Output Port Assignment

Output Number	Description	Base Unit Terminal Number	With Expansion Terminal Number	Notes
1	Coder	13	19	Refer to Note 1
2	Servo Enable	14	20	Implemented in V I 1.18
3	Missing Label	15	21	On = Missing label Fault
4	Jig Solenoid/Knife Up[3]	16/4	22	Implemented in V I 3.02
5	Air Blast/Knife Down	16/4	23	Implemented in V I 1.19
6	Air Assist	16/4	24	Implemented in V I 1.19
7	Bussed Fault Out	16/4	4	Implemented in V I 1.16
8		N/A	5	

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[1] When moving type coder is selected and enabled via the D command, the output will come on just after the acceleration has completed and turn off just after the label stops. The opposite will occur when this jumper is off.

[2] SIG selection was unavailable prior to V3.06. V3.06 with 'G' suffix had SIG selected. From V1.16 to V3.06 this jumper was Output Freq = 2x Input Frequency, On = 2x Input Freq with Y128

[3] Knife mode set by 'w' command, implemented in V I3.18.

Internal Port Assignment

Bit Number	Description	Notes
0	Communication Error Output	Set to a 1 on error (noise, framing or overrun)
1	Option Port Load Output	1 = Load enabled
2	RS-485 Receive Enable Output	0 = Receiver enabled
3	Gap Sensor Input	1 = Input activated (label gap in sensor)
4	Product Sensor Input	1 = Input activated (Product sensed)
5	Gap Sensor Enable Output	1 = Gap Sensor Input enabled
6	Product Sensor Enable Output	1 = Product Sensor Input enabled
7	RS-485 Transmit Enable Output	1 = Transmitter enabled

Synchronisation Value Table

Sync Percent	Value in Dec	Value in Hex	Sync Percent	Value in Dec	Value in Hex
50	255	FF	160	80	50
60	213	D5	170	75	4B
70	183	B7	180	71	47
80	160	A0	190	67	43
90	142	8E	200	64	40
100	128	80	250	51	33
110	116	74	300	42	2A
120	106	6A	400	32	20
130	98	62	600	21	15
140	91	5B	800	16	10
150	85	55			

To calculate the value to use with the Y command use the following formula:

$$\text{Y value} = 12800 / \text{Sync in percent}$$

Address Selection Table

Bit 3 J26	Bit 2 J25	Bit 1 J24	Address
Off	Off	On	1
Off	On	Off	2
Off	On	On	3
On	Off	Off	4
On	Off	On	5
On	On	Off	6
On	On	On	7
Off	Off	Off	8

InStep Jumper Descriptions

Jumper	Description	Default
J1 to J8	These three point jumpers select the polarity of the signal required to operate the inputs. Jump 1 to 2 for sinking (NPN) type input devices. Jump 2 to 3 for sourcing (PNP) type input devices. J1 to J6 correspond to input 1 to 6 respectively. J7 is for the product sensor input. J8 is for the label sensor input.	1 to 2 jumpered
J9 and J10	These jumpers are set to match the type of output driver IC installed in position IC9. Jump both 1 to 2 for NPN type IC (ULN2803A) Jump both 2 to 3 for PNP type IC (UDN2981A) Note: jumpers must be set correctly or damage will result!	1 to 2 jumpered
J11 and J12	These jumpers connect the transmit and receive signals between the RS 485 driver IC and the microcontroller. They are always installed except when an option card connects to these pins	1 to 2 jumpered
J13 and J14	J13 connects signal TXA to RXA on the serial port connectors. J14 connects signal TXB to RXB on the serial port connectors. These are both jumpered for 2 wire half-duplex RS485 comms and both off for 4 wire full duplex RS485/RS422 comms.	Jumpers off
J15 and J16	These jumpers connect a resistive termination network to the receive lines of the serial port connectors. These are both jumpered to connect the termination network. Note: The termination network should only be connected in the last unit connected to the RS485/RS422 network.	Jumpers off
J17 to J20	These jumpers connect output signals OUT4, OUT5, OUT6 and OUT7 to either output terminal 16 (OUTA) or terminal 4 (OUTB). As there are insufficient terminals for all the signals available, these jumpers allow the user to choose which signals are brought out to the terminals. Jumpering 1 to 2 brings the respective signal out on OUTA and jumpering 2 to 3 connects it to OUTB.	J17, 1 to 2 jumpered J18, 2 to 3 jumpered J19 and J20 jumpers off
J21 to J23	These jumpers connect input terminals 8 (INA) and 12 (INB) to either input signal IN4, IN5 or IN6. As there are insufficient terminals for all the signals available, these jumpers allow the user to choose which signals are connected to the terminals. Jumpering 1 to 2 connects the respective signal to INA and jumpering 2 to 3 connects it to INB. J22 can be used to connect to the Diff Enc PCB if fitted. Do not use 2 to 3 on J21 or J23 if Diff Enc PCB fitted!	J21, 1 to 2 jumpered J22, jumper off J23, 2 to 3 jumpered
J24 to J31	These jumpers select various software options. These options may change with the software version. Refer to separate table for usage	Refer to option port table.
J32 and J33	These jumpers are set to match the polarity of the output of the master encoder connected to terminal 11. Jumper J32 and J33 1 to 2 for NPN output encoders. Jumper J33 2 to 3 and J32/1 to J33/1 for PNP output encoders. J32/3 is only used for connection to the Diff Enc PCB if fitted.	J32, 1 to 2 jumpered J33, 1 to 2 jumpered
J34	This jumper when installed connects IN6 to OUT7 for a bussed fault line to use between multiple units. Ensure J6 is set to match output IC if this jumper is fitted.	Installed
J36	Used to route additional signals to Rev. 1 Expansion Board only.	Not Fitted

InStep Terminal Descriptions

Terminal Number	Terminal Name	Description	Comment
1	+24V	Connect a 12 to 28 volt power supply to this terminal to provide the InStep module with power.	
2	0V	This is the 0 volt reference terminal for the power supply and the I/O terminals.	
3	STEP	This is the step output that connects to the stepper or servo drive.	Polarity depends on IC9
4	OUTB	This is an output terminal. Its function depends on jumpers J17 to J20. Polarity depends on IC9.	J17 2 to 3 equals OUT4 J18 2 to 3 equals OUT5 J19 2 to 3 equals OUT6 J20 2 to 3 equals OUT7
5	IN1	Product Sensor 2 input.	J1 controls polarity
6	IN2	Jig In/Product Gate input.	J2 controls polarity
7	IN3	Fixed Pull input	J3 controls polarity
8	INA	This is an input terminal. Its function depends on jumpers J21 to J23	J21 1 to 2 equals IN4 J22 1 to 2 equals IN5 J23 1 to 2 equals IN6
9	PRODSENS	This is the product sensor input terminal.	J7 controls polarity
10	GAPSENS	This is the label gap sensor input terminal.	J8 controls polarity
11	ENC or A	This is the master encoder input terminal. If Diff Enc PCB fitted is A input.	J32 and J33 control polarity
12	INB or A/	This is an input terminal. Its function depends on jumpers J21 to J23 If Diff Enc PCB fitted is A/ input.	J21 2 to 3 equals IN4 J22 2 to 3 equals IN5 J23 2 to 3 equals IN6
13	OUT1	Printer output.	Polarity depends on IC9
14	OUT2	Servo Enable/Stepper Boost output.	Polarity depends on IC9
15	OUT3	Missing Label output	Polarity depends on IC9
16	OUTA	This is an output terminal. Its function depends on jumpers J17 to J20. Polarity depends on IC9.	J17 1 to 2 equals OUT4 J18 1 to 2 equals OUT5 J19 1 to 2 equals OUT6 J20 1 to 2 equals OUT7

Serial Communication Sockets Pin Descriptions

Pin Number	Pin Name	Description	Comment
1	GND	0 volt or ground	
2	TXA	Transmit positive side	Transceive positive side if J13 installed
3	TXB	Transmit negative side	Transceive negative side if J14 installed
4	RXA	Receive positive side	Same as pin 2 if J13 installed
5	RXB	Receive negative side	Same as pin 3 if J14 installed
6	GND	0 volt or ground	

Note: Both serial communication sockets are wired together pin for pin. Two are provided to aid daisy chaining multiple units together. Pin 1 is the leftmost when looking at a plug with the cable leading away from you and the contacts facing down. When viewing the sockets, pin 1 is the one nearest terminals 9 to 12.

InStep Labelling Modes and Sequence Chart

Step No.	Step	Comments
1	Product Input On	All modes except Jig Only/Orient and Man Dispense
2	Product Gate Input On[1]	Only if selected on option port (InStep I J31 or InStep II bit 7)
3	Jig Delay	Jig Control Mode Only[2] (Jig Delay > 0)
4	Jig Solenoid Output On	Jig Control Mode Only (Jig Delay > 0)
5	Jig In Input Off[3,4] (Jig In)	Jig modes only (Jig Only/Orient Mode starts here) (S U D > 0)
6	Spin Up Delay[5]	Orient jig mode only (Spin Up Delay > 1)
7	Colour Sensor/Prod 2 Input[6]	Orient jig mode only (Spin Up Delay > 1)
8	Label Position Delay	All modes except manual release
9	Air Blast Output On	Air Blast Mode Only (Man Dispense starts here) (AB Time > 0)
10	Air Blast Time	Air Blast Mode Only (Air Blast Time > 0)
11	Air Blast Output Off	Air Blast Mode Only (Air Blast Time > 0)
12	Air Assist Output On	All modes
13	Acceleration	All modes (Except 2nd label of two label set as of V3.07)
14	Printer Output Off/On	Only if Printer enabled (D > 1) (Off/On selected on option port)
15	Run in Sync or Set Speed	All modes
16	Gap Sensor Input On	All modes
17	Label Advance	All modes (Gets setting from t command on 1st label of 2 label)
18	Air Assist Output Off	All modes
19	Two Label Spacing Delay	Two Label Mode Only (Two Label Spacing > 0)
20	Back to step 9 on first pass	Two Label Mode Only (Two Label Spacing > 0)
21	Deceleration	All modes (Prior to V1.18C was done on 1st label of 2 label set)
22	Knife Down On/Up Off	Knife Mode Only (Option2 bit 4 on and Knife Down Time > 0)
23	Knife Down Time	Knife Mode Only (Option2 bit 4 on and Knife Down Time > 0)
24	Knife Up On/Down Off	Knife Mode Only (Option2 bit 4 on and Knife Down Time > 0)
25	Jig Hold Delay	Jig Control Mode Only (Jig Delay > 0)
26	Jig Solenoid Output Off	Jig Control Mode Only (Jig Delay > 0)
27	Printer Output On/Off	Only if Printer enabled (D > 1) (Off/On selected on option port)
28	Product Input Enabled	Only if labelling still enabled (E = 1)

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[1] If selected, the Gate Input must be on at the instant of the product sensor coming on or the sequence will restart. Therefore, the timing is always controlled by the Product Sensor Input.

[2] When using Jig Control Mode you must select either Jig Only or Orient Jig Mode as well. If not, the sequence will stall after the Jig Solenoid is turned on.

[3] The sense of the Jig In Sensor Input has been changed so that off = jig in. This was done to allow the use of a more standard N.O. proximity sensor in the orient jig mechanism.

[4] Because the Product Gate and Jig In share the same input, it is not practical to have both enabled at the same time. However, this is not normally a limitation as gating is usually only used on a rotary type machine where an orientation jig cannot be fitted

[5] The Spin Up Delay is used to ensure the product is spinning smoothly in the jig before the Colour Sensor/Prod 2 is enabled. This prevents false triggers from the Colour Sensor.

[6] Sending anything over serial port while waiting for the colour sensor input to be activated will cause the sequence to reset without dispensing. As of version S3.17C re-activation of product scanner while the previous product is still in the jig will cause a sequence reset as well.

InStep I Version Update Summary

Version I 3.01 - 17/05/2000
Changes: First released version.
Fixes: None.
Additions: None.

Version I 3.01A - 13/06/2000
Changes: None.
Fixes: Master Encoder speed bug fixed. Had high byte OK but low byte was random. This bug only affects Ver. 3.xx.
Additions: None.

Version I 3.02 - 05/07/2000
Changes: None.
Fixes: None.
Additions: Jig Control Mode. Added "j" command.

Version I 3.03 - 08/08/2000
Changes: None.
Fixes: Changed detection system for bulk erase mode to eliminate false erase at power up. This fix affects only Ver. 3.xx.
Additions: None.

Version I 3.03A - 09/08/2000
Changes: None.
Fixes: Added extra security against noise on interrupt pin. Product sensor enable must be on before product interrupts are accepted. This fix covers all versions.
Additions: None.

Version I 3.04 - 25/08/2000
Changes: None.
Fixes: Fixed length errors in Fixed Length mode. This fix covers all versions.
Additions: End of Reel input instead of fixed length in InStep II version.

Version I 3.05 - 11/09/2000
Changes: None.
Fixes: Fixed problem when Air Blast enabled, it occasionally caused Servo Enable to go off. Also changed offset of Set Speed so that 9999 doesn't cause a speed higher than can be output.
Additions: None.

Version I 3.06 - 29/10/2000
Changes: None.
Fixes: Acceleration now goes through all accel steps at every speed. Corrects changing product delay with changing speed. Not done for InStep II version as of this date!
Additions: Adjustable missing label. Ability to select SIG speed compensation table (G suffix) at compile time.

Version I 3.06T - 29/10/2000
Changes: Has SIG compensation table selected.
Fixes: None.
Additions: Special version for Peats Ridge Rotary. Adds two speed dispense to apply label longer than product pitch. Second sync ratio set with 'C' command and change point set in number of steps of label set by 'H' command. Not to be included in standard version at this stage.

Version I 3.07 - 12/12/2000

Changes: Changed function of J29 from 2x input freq to SIG speed compensation table select.
                 Changed range of 'X' command to max 2FF hex. to access all of RAM.
Fixes: None.
Additions: Added 't' command to select a different advance for the first label of a two label set.
                 Removed acceleration from start of second label of two label set to allow for proper two
                 label spacing.

Version I 3.07B - 27/03/2001

Changes: Changed SIG speed compensation tables top two values too give more compensation.
                 This is based on 3.07, but this new table will be included in subsequent versions.
Fixes: None.
Additions: None.

Version I 3.09 - 12/04/2001

Changes: None relevant to this version. Versions 3.07A, 3.08 and 3.09 involved changes that only
                 affected the Servotron version. However changes were made to common sections of the
                 firmware to facilitate their implementation.
Fixes: None relevant to this version.
Additions: None relevant to this version.

Version I 3.10 - 27/04/2001

Changes: None relevant to this version.
Fixes: X and x commands now reject ASCII characters above 'F'. Done mainly to reject lowercase
                 a to f.
Additions: None relevant to this version.

Version I 3.10A - 02/05/2001

Changes: Gap sensor now enabled at start of dispense, not at end of accel. This allows smaller labels
                 or longer advances than previously.
Fixes: None relevant to this version.
Additions: None.

Version I 3.11 - 08/05/2001

Changes: None.
Fixes: Fixed manual dispense where prod sensor still activated following automatic dispense.
Additions: None.

Version I 3.12 - 07/06/2001

Changes: None.
Fixes: None relevant to this version.
Additions: None.

Version I 3.12A - 15/06/2001

Changes: None.
Fixes: Fixed problem where if a serial "E1" command was sent during a dispense it would cause a
                 missing label fault. "E1" command now rejected if already enabled. (Returns [BELL]?).
Additions: None.

Version I 3.12B - 28/06/2001

Changes: An External fault (Bussed fault in) can no longer be reset while the fault is still present.
Fixes: None.
Additions: None.

Version I 3.12C - 21/07/2001

Changes: None.
Fixes: Fixed problem introduced in 12B where needed two reset enables to recover from bussed fault if they were tied together (as in most InStep I's). Added time delay after reset.
Additions: None.

Version I 3.12D - 24/08/2001

Changes: None.
Fixes: Fixed problem in jig control mode. Product sensor was enabled before jig out input on.
Additions: None.

Version I 3.13 - 10/09/2001

Changes: Improved master following through master stop and re-start. Top byte of master speed received through serial port is now the number of output pulses per input pulse leftover.
Fixes: None.
Additions: None.

Version I 3.14 - 02/10/2001

Changes: Fault Out now comes on with Fault In.
Fixes: None.
Additions: Not relevant to this version.

Version I 3.14A - 19/10/2001

Changes: None.
Fixes: Fixed problem where if first attempted dispense was made with master encoder stopped it would dispense at very slow speed. (Starting master encoder fixes it till InStep turned off).
Additions: None.

Version I 3.14B – 15/11/2001

Changes: None.
Fixes: Fixed problem present since 3.13 where motor stutters occasionally.
Additions: None.

Version I 3.15 - 16/07/2002

Changes: Comms input buffer is cleared on reception of a semicolon header anywhere in the string.
Fixes: None.
Additions: Sending a backspace character deletes the previous character except for header and address.

Version I 3.15A - 16/08/2002

Changes: None.
Fixes: Fixed a problem where if labelling is disabled (by a fault or by E0) during a dispense and then re-enabled before that label finishes (usually when master has stopped) it would cause a missing label fault as the gap sensor was disabled by E1.
Additions: None.

Version I 3.16 - 29/08/2002

Changes: Many changes only relevant to Servotron version
Fixes: None.
Additions: Added 'w' command to set OPTION2.

Version I 3.16F - 22/10/2002

Changes: Changed CPU frequency from 4.9MHz to 7.3MHz and rescaled delays to remain the same.
Fixes: Fixed problem with 15ms delay after ready for next. Now only happens if prod still on.
Additions: None.

Version I 3.17 - 19/11/2002

Changes: None relevant to this version.

Fixes: Changed default set speed from 300hex (9341 dec.) to 480hex (8957 dec.) to correct actual
                  speed back to the same as before CPU frequency change in V3.16F.
Additions: None.

Version I 3.17A - 03/12/2002

No changes applicable to 'I' version.

Version I 3.17B - 17/01/2003

Changes: None.
Fixes: Fixed problem where if prod sensor still on fixed move input not enabled. Also if fixed
                 move input is operated during a normal dispense and held on, the fixed move would start at
                 the end of the normal dispense. Now needs to be activated after dispense is finished.
Additions: None.

Version I 3.17C - 10/03/2003

Changes: None.
Fixes: Fixed some problems with jig/orientation modes. In these modes when label position was
                 zero sometimes label was not dispensed. Also fixed a fixed delay at end of spin up that
                 could cause position errors under certain conditions. Also fixed spin up testing for a value
                 of 1, it only used to check the bottom byte for a 1 so 257 looked like 1.
Additions: In jig/orientation modes if the product sensor is re-activated while the previous product is
                 still in the jig the sequence is reset.

Version I 3.18 - 27/03/2003

Changes: None.
Fixes: None.
Additions: Added knife mode for a cutter to operate at the end of dispense. Set in Option2 and uses air
                 blast setting and output for knife down and jig solenoid output for knife up. So if this mode
                 is selected you can't use air blast or jig control modes.

Version I 3.19 - 16/05/2003

Changes: None.
Fixes: Added 45ms delay after knife up in knife mode. This prevents label starting next dispense
                 before knife has actually gone up.
Additions: Added two bits to Option2. Bit 6 is for 1000M mode. This changes the function of two of
                 the inputs. One is Print OK input changes to Safety Circuit Monitor and the other is Fault In
                 changes to External Disable. The other is bit 7 for EOR mode. E has no function in this
                 version. The other two could be used here but probably won't be so refer to Servotron
                 manual if you want to use them.

Version I 3.19A - 29/05/2003

Changes: Printer OK test changed to only do a one shot test and the completion of label dispence.
                 This allows actual print presence test with contrast scanner while still allowing printer fault
                 relay testing as before.
Fixes: None.
Additions: None.

Version I 3.20 - 24/06/2003

Changes: None.
Fixes: None.
Additions: Added full "no gap skipping" to missing label function. Refer to Missing Label Length (N)
                 command for further details.

Version I 3.21 - 17/08/2003

No changes applicable to 'I' version.

Version I 3.22 - 10/10/2003

Changes: Changed the range of adjustment of the air blast from 0 to 255 to 0 to 8191 milliseconds.
Fixes: None applicable to this version.
Additions: None.

Version I 3.22A - 15/11/2003

No changes applicable to 'I' version.

Version I 3.22B - 14/12/2003

Changes: None.
Fixes: Fixed problem where missing label of zero did not disable missing label detection. This error was introduced in V3.20.
Additions: None.

Version I 3.22C - 19/01/2003

Changes: None.
Fixes: Fixed manual dispense, it could be re-triggered before the previous cycle had finished. This is most apparent when using air blast as a second air blast is done on re-trigger.
Additions: None.

Version I 3.22D - 29/03/2004 No changes applicable to 'I' version.

Version I 3.23 - 17/06/2004

Changes: None.
Fixes: Fixed a problem with the 'Q' command. If issued when gap was on from start of dispense it would not work.
Additions: Added 'q' command, this just does deceleration and stops. (Q simulates gap)

Version I 3.24 - 13/12/2004

Changes: Changed transmit to be a background task. Also added a forced 20ms turnaround delay between the end of receiving and the start of transmitting the response. This helps prevent output pulse glitches and aids in half-duplex communications to hosts with a slow turnaround time. e.g. PC's running Windows™ and buggy PLC's
Fixes: None.
Additions: None.

V3.24S (02/02/05) was a special version for Webmaster now updated.
V3.24F (11/02/05) was a test version to attempt to allow faster speeds, abandoned.
V3.25a (03/04/05) was a special Webmaster version based on part completed 3.25, now updated.

Version I 3.25 - 06/05/2005

Changes: None affecting this version.
Fixes: Fixed a problem highlighted by addition below where a pause can occur during acceleration. This is caused by having a value in h register when accel occurs.
Additions: Added L2 command to partially automate the setup of the "no gap skip" mode of missing label. Also added 'v' command to display the serial number of the PCB.

V3.25d (05/04/06) Special for Model 500 Tamp Labeller See Servotron manual.
V3.25Q (18/06/06) Special version where product sensor debounce is only 2ms for trailing edges.
V3.25U (09/02/07) Special version with quiet zone for orient jig mode needs no trigger for certain time before trigger is armed to look for complex marks.
V3.25F, S and 3.26, A are all only applicable to Servotron, see that manual.