



Series 1746L  
**GEMCO**<sup>®</sup>  
PLC LDT Interface Module

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# Installation & Programming Manual



For Allen-Bradley<sup>®</sup> SLC 500 I/O Chassis



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## Preface

This manual will instruct the user in installing and programming the Series 1746L Gemco PLC LDT Interface Module. Chapter 2 contains information on installing the 1746L PLC LDT Interface Module and the LDT/Cable. Chapter 3 provides instructions on programming the 1746L, while Chapter 4 contains an Application Example. Specifications and a Wiring Diagram can be found in Appendix A and Appendix B, respectively.

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Version 0.1**

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# Chapter 1: Introduction & Overview

The Series 1746L PLC LDT Interface Module interfaces with a Linear Displacement Transducer (LDT) and incorporates Allen-Bradley SLC 500 I/O interface technology, and is completely compatible with the A-B series 1746 I/O chassis. The unit monitors machine/process position and delivers absolute position data with up to 0.001” resolution per scan of the SLC 500 processor.

Each 1746L PLC LDT Interface Module can have up to two LDT inputs and two discrete inputs. The discrete inputs can be configured as either a “movement detect” or “position hold”.

Configuration data, such as wire speed and offset position, is programmed through the output image table. Monitoring data, such as the current LDT position and velocity, is reported back to the SLC 500 processor through the input image table.

The 1746L PLC LDT Interface Module is designed to read the signals from the following Gemco magnetostrictive LDTs:

- Series 951 Quik Stik II™
- Series 952 BlueOx™
- Series 955 Smart Brik™

The Series 951 and 952 LDTs are available in four different versions:

- (1) Start/Stop (SS)
- (2) Control Pulse (CP)
- (3) Variable Pulse External Interrogation (VP)
- (4) Variable Pulse Internal Interrogation (VPI)

Each version is supported by the 1746L PLC LDT Interface Module. The position has a resolution of 0.001” and the velocity has a resolution of 0.001 in/s.

An upper and a lower limit can be programmed into the unit for each LDT. When the limit has been exceeded, a bit will be set in the input image table. When the position is below the limit or equal to the limit, the bit will be cleared.

## 1.1: I/O Image Table

Data is passed between the SLC 500 processor and the Series 1746L PLC LDT Interface Module through the I/O image table. This table contains 8 input words and 8 output words.

Because there are more than 8 parameters to program, the 1746L PLC LDT Interface Module uses a command based programming sequence to enter parameters into the system. The first word of

the output image table is a bit register. This bit register contains a programming bit used to initiate the programming sequence. The second word is the command word and the other 6 words are used for the command parameters. In order to program a parameter, the command is entered into the command word and the parameter values are entered in the parameter words. The programming bit in the bit register is set to a 1 to indicate there is new data in the output image table. It is the 0 to 1 transition that will trigger the 1746L to read and process the data and then either set the acknowledge bit or the data error bit.

## 1.2: Output Image Table

The 8 words in the output image table are used to program parameters into the 1746L PLC LDT Interface Module. The following describes all the parameters that need to be programmed.

### LDT Type

This parameter will notify the 1746L what type of LDT is attached to the unit. The LDT type could be: Start/Stop (SS), Control Pulse (CP), Variable Pulse (VP), Variable Pulse Internal (VPI), or a liquid level LDT (STIK). **There is no default value. The parameter must be programmed by the user.**

### Input Type

Each input can be configured as “movement detect” or a “position hold” input. **There is no default value. The parameter must be programmed by the user.**

### Wire Speed

The wire speed for each LDT needs to be programmed into the unit so that the inch value can be calculated. **The default value is 9.0 $\mu$ s/in.**

### Recirculations

The number of recirculations in the LDT needs to be programmed into the unit so that the inch value can be calculated correctly. **The default value is 1.**

### LDT Length

The LDT length must be programmed for a VPI mode. This is used for LDT fault detection. The value is entered in inches to the tenth decimal place. **The default value is 999.9 inches.**

### Home Position

This will electronically program an offset into the unit. The new position is programmed into the 1746L. For the two channel version of the module, there are two separate home positions. The home position is sent in multiple words. **The default value is zero.**

### Counts Direction

The counts direction indicates whether the counts should be increasing as the magnet moves away from the LDT head or decreasing as the magnet moves away from the LDT head. **The default value is decreasing as the magnet moves away from the head.**

**Move Time**

This value is used when the input is configured as a movement detect. This value is the time that movement should be detected after the input has gone high.

**No Move Time**

This value is used when the input is configured as a movement detect. This value is the time that no movement should be detected after the input has gone low.

**Command Bit Register**

The command bit register is used for programming and clearing error flags. This bit register is monitored continuously. Any 0 to 1 transition will cause the 1746L to act. (See Page 7: Command Bit Register for details)

**Programming Bit**

A programming bit is set to indicate to the 1746L that there is new data in the output image table. When the 1746L LDT Interface Module detects a low to high transition on this bit, it reads the data in the output image table and programs the correct parameters.

**Inch/mm Conversion**

This bit will indicate whether the unit of measurement is in inches or mm (millimeters). When this bit is set, the position and velocity data is reported back in mm to the hundredth decimal place. When this bit is cleared, the unit of measurement will be reported back in inches to the thousandth decimal place.

## 1.3: Input Image Table

The input image table is used to monitor the data from the 1746L PLC LDT Interface Module. There are 8 words associated with the input image table.

**Position**

The position of each LDT is sent back to the SLC 500 processor through the input image table. The position takes up two words in the input image table and can range from -2,147,483.648 to 2,147,483.647 inches. However, the 1746L LDT Interface Module is designed to work in the positive range only. For 1746L with two LDT positions, there are two separate positions shown in the input table, each 2 words in length.

**Velocity**

The velocity of each LDT will be sent back to the SLC 500 processor through the input image table. The velocity will take up 1 word in the table. For cards with two LDT inputs, there will be two separate velocity values shown in the input image table. The velocity will range from -32.768 to 32.767 in/s.

**Status Bit Register**

A Status Bit Register will show various flags for the LDT input card. (See page 12 for Status Bit Register details).

**Acknowledge Bit**

This bit is set to indicate that the LDT input card recognized the 0 to 1 transition on the programming bit and programmed the parameters requested. It is cleared when the programming bit goes back to zero.

**Error Bit**

This bit is set to indicate that the LDT input card recognized the 0 to 1 transition on the programming bit but encountered an error when processing the data. It is cleared when the programming bit goes back to zero.

**Input State Bit(s)**

These bits reflect the state of the inputs on the front of the 1746L LDT Interface Module. When the input is active, the bit is a 1 and when the input is inactive, the bit is a 0.

**Upper and Lower Limit Warning Bit(s)**

These bits will indicate when an LDT has exceeded the upper or lower limit set for that specific LDT. For the upper limit warning, the bit is set if the position of the LDT is greater than or equal to the upper limit value. For the lower limit warning, the bit is set if the position is less than or equal to the lower limit value. These bits are cleared when the position goes back into the operating range.

**Movement Detection Bit(s)**

There are 2 bits associated with each input. The first bit indicates when the input is active and there is no movement detected on the LDT within a programmed amount of time. If this occurs, the bit is set. If however, movement is detected, the bit is cleared. The second bit is for when the input is inactive and there is movement detected on the LDT within a programmable amount of time. If this occurs, the bit is set. If however, there is no movement detected when the input is inactive, the bit is cleared.

**LDT Fault Bit(s)**

This bit is set when an LDT is disconnected. It is cleared when there is no error. For cards with two LDT circuits, there will be two separate error bits. These bits will automatically clear when the error condition clears.

**LDT Disconnected Bit(s)**

This bit is set when no LDT connect is detected on the LDT circuitry. It is cleared when there is an LDT connected. For 1746L LDT Interface Modules with two LDT channels, there are two separate error bits. These bits will automatically clear when the error condition clears.

The following is how the Input Image Table would look for a single channel card and a dual channel card:

	Single Channel	Dual Channel
Word 0	Status Bit Register	Status Bit Register
Word 1	Position 1 (high)	Position 1 (high)
Word 2	Position 1 (low)	Position 1 (low)
Word 3	Velocity 1	Velocity 1
Word 4		Position 2 (high)
Word 5		Position 2 (low)
Word 6		Velocity
Word 7		

**Non-Volatile Memory**

The non-volatile memory on the 1746L card is provided in the form of EEPROM. Because this is not battery backed memory, no battery maintenance is required. The user can save the 1746L LDT Interface Module configuration to EEPROM. The “Save Configuration”, Command 6, is used to do this.

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**NOTE:** The EEPROM on the 1746L is only guaranteed to 10,000 write cycles. Because of this it is recommended that this command be used sparingly.

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**Configuration**

There are two versions of the board. The first version will support one LDT and one input. The second version will support two inputs and two LDTs. The LDT type and the input configuration need to be programmed through the backplane by the user.

## 1.4: Face Panel

The Monitor’s operating status is indicated by the two (2) LEDs on the face panel.

**RUN**            The green LED indicates that the card is operational.

**FAULT**         The red LED indicates there is a card fault, or when there is a transducer fault.

There are four typical causes for a transducer fault:

1. Broken LDT cable
2. Improperly wired cable
3. Faulty LDT
4. Non-compatible LDT

**Inside Face Panel Door**

Plug-in connector with 16 terminals. (See Appendix B: Wiring Diagrams)



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# Chapter 2: Installation

## **I/O Rack Installation & Removal**

Before installation, confirm that the I/O power is compatible with the Series 1746L PLC LDT Interface Module. (See Appendix A: Specifications, Power Requirements). The Series 1746L PLC LDT Interface Module can be installed into any open slot in the A-B SLC 500 rack. Align the module's circuit board with the top and bottom card guides and gently slide in until it latches securely. To remove the module, depress the top and bottom latches and slide the module out of the rack.

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**NOTE:** The Series 1746L has a convenient plug-in terminal strip. Therefore, the module can be removed or replaced without rewiring the terminal strip.

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## **LDT Installation**

The 1746L is designed to use Gemco Models 951, 952 and 955 LDTs. Specifications, mounting guidelines and outline drawings for these LDTs are available from the factory.

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**NOTE:** The Gemco Series 1746L LDT Interface Module is compatible with other LDT inputs. Contact the factory for details.

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## **LDT Cable Installation**

It is recommended that the LDT cable be run in a separate conduit and should be a continuous uninterrupted length. LDT cable installation is covered in the Wiring Diagram in Appendix B of this manual. The maximum cable length using Belden 9873 (or equivalent) is 1,000 feet.

## **Power Requirements**

See Appendix A: Specifications

# Chapter 3: Setup & Programming

## Getting Started

Before the 1746L PLC LDT Interface Module can communicate with the A-B SLC 500 processor, the system must be configured to include the 1746L PLC LDT Interface Module. This is done through either the APS Software or the hand-held controller. When defining the system, the program will prompt for a SPIOGA ID code. The ID code for the 1746L PLC LDT Interface Module is: **3535**. This tells the processor that the 1746L uses 8 input words and 8 output words.

## Output Image Table

Because there are more than 8 parameters to program, the 1746L Interface Module uses a command based programming sequence to enter parameters into the system. The first word of the output image table is the command bit register. This bit register contains a programming bit used to initiate the programming sequence. The second word is the command word and the other 5 words are used for the command parameters as shown in the table below:

Output Image Table	Description
Word 0	Command Bit Register
Bits 15	Programming Bit
Bits 14 - 8	Reserved
Bits 7	Data Format Bit
Bits 6	Velocity Bit
Bits 5 - 1	Reserved
Bit 0	Inch/mm
Word 1	Command Register
Word 2	Parameter 1
Word 3	Parameter 2
Word 4	Parameter 3
Word 5	Parameter 4
Word 6	Parameter 5
Word 7	Parameter 6

## Command Bit Register

The Command Bit Register has been defined below:

Bit 15	14	13	12	11	10	9	8
PROG	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD	RSVD
Bit 7	6	5	4	3	2	1	0
Data Format	Velocity	RSVD	RSVD	RSVD	RSVD	RSVD	INCH/MM

## Programming Bit

The software monitors the programming bit for a 0 to 1 transition. When this is detected, it reads the command register and processes the data based on the command specified. If the command data and parameter data are valid, the acknowledge bit is set in the input image table bit register. If the data is invalid, the error bit will be set in the input image table bit register. These bits are cleared when the programming bit is set back to zero.

### **Data Format Bit**

The purpose of this bit is to add an option that will allow the customer to display the position value in a more readable format. By setting bit 7 of the Command Bit Register to one, the position will be displayed in the following format: The thousandths digits will be displayed in the high word and the hundredths, tens, and ones digits will be displayed in the low word. See example below and specifications for position update times.

#### **Example:**

Position is 35111 (35.111 inches)

Without the data format option (Command Bit Register, bit 7=0), the position would be displayed in the input image table as:

0                   ; high word  
-30425           ; low word

With the data format option selected (Command Bit Register, bit 7=1), the position would be displayed in the input image table as:

35                 ; high word  
111               ; low word

With the new data format option selected, the position can range from 0 to 32767999.

### **Velocity Bit**

The purpose of this bit is to add an option that will allow the customer to turn off the velocity display. By turning off the velocity feature, the position update time decreases. Velocity is on when bit 6 of the Command Bit Register is zero (default). The velocity is turned off when bit 6 of the Command Bit Register is one. See specification for position update times.

## Inch/mm Bit

When the Inch/mm bit is cleared, the position and velocity data is in inches. When this bit is set, the units of measurement are in millimeters.

## Command 1: Configuration

Command 1 is used to configure the system for the type of LDTs and inputs. The 1746 LDT Interface Module can support 5 different types of LDTs:

- Control Pulse
- Start/Stop
- Variable Pulse
- Variable Pulse Internal

This command also configures the two inputs. They can be programmed to be either movement detection or position hold. Input 1 is dedicated to LDT 1 and input 2 is dedicated to LDT 2.

The parameters for this command have been defined below:

Output Image Table	Description
Word 0	Bit Register
Word 1	Command Register (1)
Word 2	Parameter 1 Password (1111)
Word 3	Parameter 2 LDT 1 Type
Word 4	Parameter 3 Input 1 Type
Word 5	Parameter 4 LDT 2 Type
Word 6	Parameter 5 Input 2 Type
Word 7	Parameter 6 Reserved

**Parameter 1** is a password to verify that this change is to take place. The password is **1111**. This is to prevent an accidental change in the system. Parameter 2 contains the LDT type number for LDT 1:

LDT Type Number	Description
0	No LDT
1	Control Pulse
2	Start/Stop
3	Variable Pulse
4	Variable Pulse Internal
5	Pro-Stik

**NOTE:** The Variable Pulse with external interrogation mode is not compatible with the 952 probe. When using a 952 probe, select a different mode of operation.

Any other configuration numbers will generate an error. The default configuration is zero.

**Parameter 3** is the input type.

Input Type Number	Description
0	No Input
1	Movement Detection
2	Position Hold

**Parameters 4 and 5** are the same as 2 and 3 only they define the LDT and input types for the second channel (optional). The default configuration is no input.

### Command 2: Position Scaling Data

This command will program the LDT characteristics. The parameters for this command have been defined below:

Output Image Table	Description
Word 0	Bit Register
Word 1	Command Register (2)
Word 2	Parameter 1 LDT Number
Word 3	Parameter 2 Speed of Wire
Word 4	Parameter 3 Count Direction
Word 5	Parameter 4 Recirculations
Word 6	Parameter 5 LDT Length (VPI only)
Word 7	Parameter 6 Reserved

**Parameter 1** indicates which LDT is being used.

**Parameter 2** sets the speed of wire. The speed of wire is an integer number to the nanoseconds/in. The default value for the speed of wire is 9000.

**Parameter 3** determines whether the position is moving toward or away from the LDT head. A zero in this parameter indicates decreasing position and a one in this parameter indicates increasing position. The default setting is increased.

**Parameter 4** contains the number of recirculations the LDT is configured for. The minimum number of recirculations is 1. The maximum number of recirculations is 64. The default value is 1.

**Parameter 5** contains the LDT length to the tenth of an inch. For example, if the LDT length is 12 inches, the parameter would be 120. This is required only for the VPI LDT and is used to detect a loss of magnet. The default value is 999.9 inches.

A Save Configuration Command will save these values to non-volatile memory.

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**NOTE:** The EEPROM on the 1746L is only guaranteed to 10,000 write cycles. Because of this it is recommended that this command be used sparingly.

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### Command 3: Home Positioning Data

This command resets the position of the LDT specified. The parameters for this command have been defined as follows:

Output Image Table	Description
Word 0	Bit Register
Word 1	Command Register (3)
Word 2	Parameter 1 LDT Number
Word 3	Parameter 2 Home Position (high word)
Word 4	Parameter 3 Home Position (low word)
Word 5	Parameter 4 Reserved
Word 6	Parameter 5 Reserved
Word 7	Parameter 6 Reserved

**Parameter 1** will specify whether the new position is for LDT 1 or 2.

**Parameters 2 and 3** contain the new position that the LDT is to reset its position to. When this command is received, the home position will be checked for what is valid.

The default value is no offset. A save configuration command will save this offset to EEPROM.

**NOTE:** The EEPROM on the 1746L is only guaranteed to 10,000 write cycles. Because of this it is recommended that this command be used sparingly.

#### Command 4: Upper and Lower Limits

This command programs the upper and lower limits for the specified LDT. The parameters for this command are defined below:

Output Image Table	Description
Word 0	Bit Register
Word 1	Command Register (4)
Word 2	Parameter 1 LDT Number
Word 3	Parameter 2 Lower Limit (high word)
Word 4	Parameter 3 Lower Limit (low word)
Word 5	Parameter 4 Upper Limit (high word)
Word 6	Parameter 5 Upper Limit (low word)
Word 7	Parameter 6 Reserved

**Parameter 1** contains the LDT number that the lower and upper limits are assigned to. This is either a 1 or 2.

**Parameters 2 and 3** contain the lower limit value. These are inch values to the thousandth of an inch, or mm to hundredth of a millimeter.

**Parameters 4 and 5** contain the upper limit value. These are inch values to the thousandth of an inch, or mm to hundredth of a millimeter.

**Example:** If the lower limit is set at 10 inches, the lower limit value would be 0 for the high word and 10000 for the low word.

The upper and lower limits must be greater than or equal to zero and the upper limit must be greater than the lower limit. The default value for the lower limit is zero and the default value for the upper limit is 180 inches.

### Command 5: Move Timeout Data

This command programs the move detect timeout and the no move detect timeout. The parameters for this command are defined below:

Output Image Table	Description
Word 0	Bit Register
Word 1	Command Register (5)
Word 2	Parameter 1 Input Number
Word 3	Parameter 2 Move Timeout
Word 4	Parameter 3 No Move Timeout
Word 5	Parameter 4 Reserved
Word 6	Parameter 5 Reserved
Word 7	Parameter 6 Reserved

**Parameter 1** is the LDT input number. The number is either 1 or 2.

**Parameter 2** is the timeout for when movement should be detected when the input is activated. The unit of measurement is to the 0.01s. The default value is 1 second (100). A time of zero will disable this check.

**Parameter 3** is the timeout for when no movement should be detected when the input is deactivated. The unit of measurement is to the 0.01s and the default value is 1 second (100). A time of zero will disable the check for no movement.

### Command 6: Save Configuration

This command saves the data to the EEPROM. The parameters for this command are defined below:

Output Image Table	Description
Word 0	Bit Register
Word 1	Command Register (6)
Word 2	Parameter 1 Password 1 (2222)
Word 3	Parameter 2 Password 2 (3333)
Word 4	Parameter 3 Reserved
Word 5	Parameter 4 Reserved
Word 6	Parameter 5 Reserved
Word 7	Parameter 6 Reserved

**NOTE:** The EEPROM on the 1746L is only guaranteed to 10,000 write cycles. Because of this it is recommended that this command be used sparingly.

**Parameters 1 and 2** will contain a code that will be verified by the software before any of the data is saved to EEPROM. Password 1 is 2222 and Password 2 is 3333.

### Input Image Table

The Input Image Table is used to send the system data back to the SLC Processor. There are 8 data words in the Input Image Table. The I/O Image Table will vary depending on the configuration as shown below:

	Single Channel	Dual Channel
Word 0	Status Bit Register	Status Bit Register
Word 1	Position 1 (high)	Position 1 (high)
Word 2	Position 1 (low)	Position 1 (low)
Word 3	Velocity 1	Velocity 1
Word 4		Position 2 (high)
Word 5		Position 2 (low)
Word 6		Velocity
Word 7		

## Status Bit Register

The bit register has been defined below:

Bit 15	14	13	12	11	10	9	8
ACK	DATA ERR	INPUT STATE 1	INPUT STATE 2	UPPER LIMIT 1	LOWER LIMIT 1	UPPER LIMIT 2	LOWER LIMIT 2
Bit 7	6	5	4	3	2	1	0
MOVE ERR 1	NO MOVE ERR 1	MOVE ERR 2	NO MOVE ERR 2	LDT 1 FAULT	LDT 1 NO CONN	LDT 2 FAULT	LDT 2 NO CONN

### Acknowledge Bit

This bit is used to acknowledge a command from the output image table. If all the data is valid in the command, the acknowledge bit is set to indicate to the SLC processor that the command was processed. This bit is cleared when the programming bit is cleared in the output image table.

### Data Error Bit

This bit is used to indicate an error was detected in the command sent from the output image table. This bit is set if an error is detected in the command parameter data. This bit is cleared when the programming bit is cleared in the output image table.

### Input State 1

This bit will reflect the state of input 1 from the front of the unit.

### Input State 2

This bit will reflect the state of input 2 from the front of the unit.

### Upper Limit 1

This bit is set when the position exceeds the programmed upper limit for LDT 1. It is cleared when the position is less than or equal to the programmed upper limit.

### Lower Limit 1

This bit is set when the position falls below the programmed lower limit for LDT 1. It is cleared when the position is greater than or equal to the programmed lower limit.

### Upper Limit 2

This bit is set when the position exceeds the programmed upper limit for LDT 2. It is cleared when the position is less than or equal to the programmed lower limit.



### **Lower Limit 2**

This bit is set when the position falls below the programmed lower limit for LDT 2. It is cleared when the position is greater than or equal to the programmed lower limit.

### **Move Error 1**

This bit is set if there is no movement detected within a specified time period after input 1 has become activated. This bit is cleared when input 1 is deactivated.

### **No Move Error 1**

This bit is set if there is movement detected within a specified time period after input 1 has been deactivated. This bit is cleared when input 1 is activated again.

### **Move Error 2**

This bit is set if there is no movement detected within a specified time period after input 2 has become activated. This bit is cleared when input 2 is deactivated.

### **No Move Error 2**

This bit is set if there is movement detected within a specified time period after input 2 has been deactivated. This bit is cleared when input 2 is activated again.

### **LDT Fault 1**

This bit is set when a loss of magnet has been detected on LDT 1. It is cleared when a valid position is available for LDT 1.

### **No LDT Connect 1**

This bit is set when a no LDT connect is detected on LDT 1. It is cleared when a valid position is available for LDT 1.

### **LDT Fault 2**

This bit is set when a loss of magnet has been detected on LDT 2. It is cleared when a valid position is available for LDT 2.

### **No LDT Connect 2**

This bit is set when a no LDT connect is detected on LDT 2. It is cleared when a valid position is available for LDT 2.

### **Position**

The scaled position is shown in two registers, position high and position low to the thousandth of an inch.

**Example:** If the LDT position is 10.045 inches, the position high would read 0 and the position low would read 10045. The position data can range from -2,147,483.648 to 2,147,483.647, however, the module is designed to work in the positive range only.

### **Velocity**

The velocity is shown in 1 word and ranges from -32.768 to 32.767 in/s.

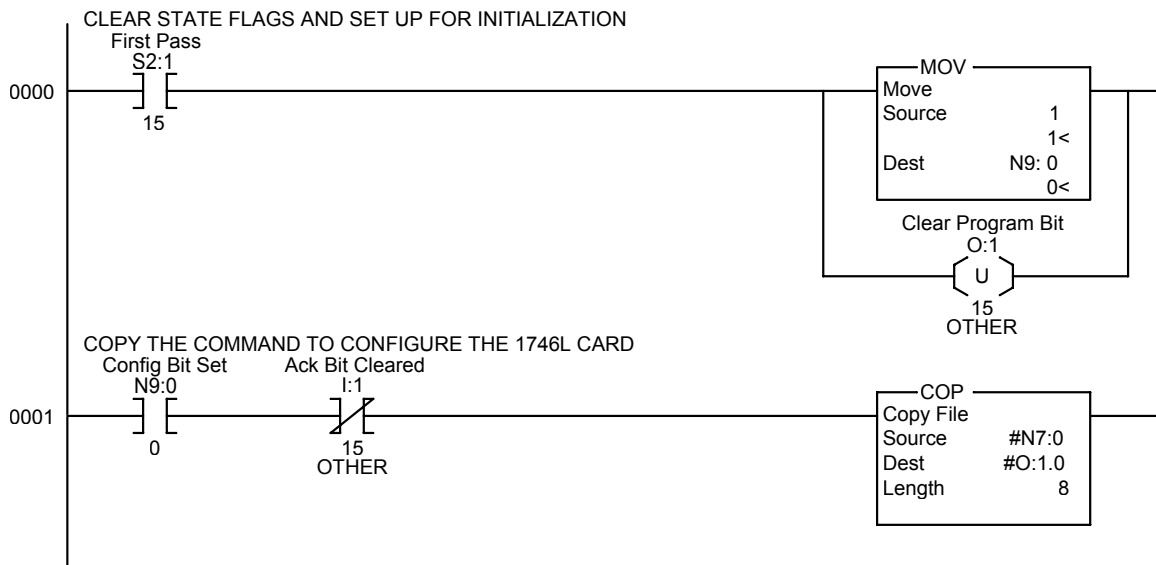
# Chapter 4: Application Examples

The following is an example program for setting up the 1746L LDT Interface Module. The 1746L LDT Interface Module is installed in slot 1 of the SLC 500 rack.

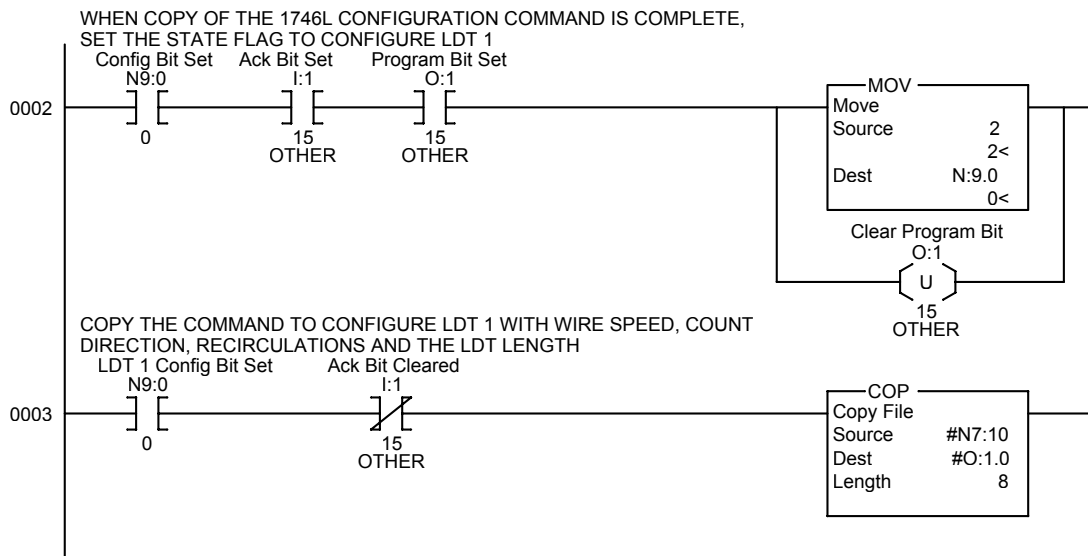
The following data defines the command parameters and state flags that are used to program the 1746L LDT Interface Module:

Configuration Command	#N7:0
LDT Configuration Command for LDT 1	#N7:10
LDT Configuration Command for LDT 2	#N7:20
Program State Flags	#N9:0
1746L Configuration	#N9:0/0
LDT 1 Configuration	#N9:0/1
LDT 2 Configuration	#N9:0/2

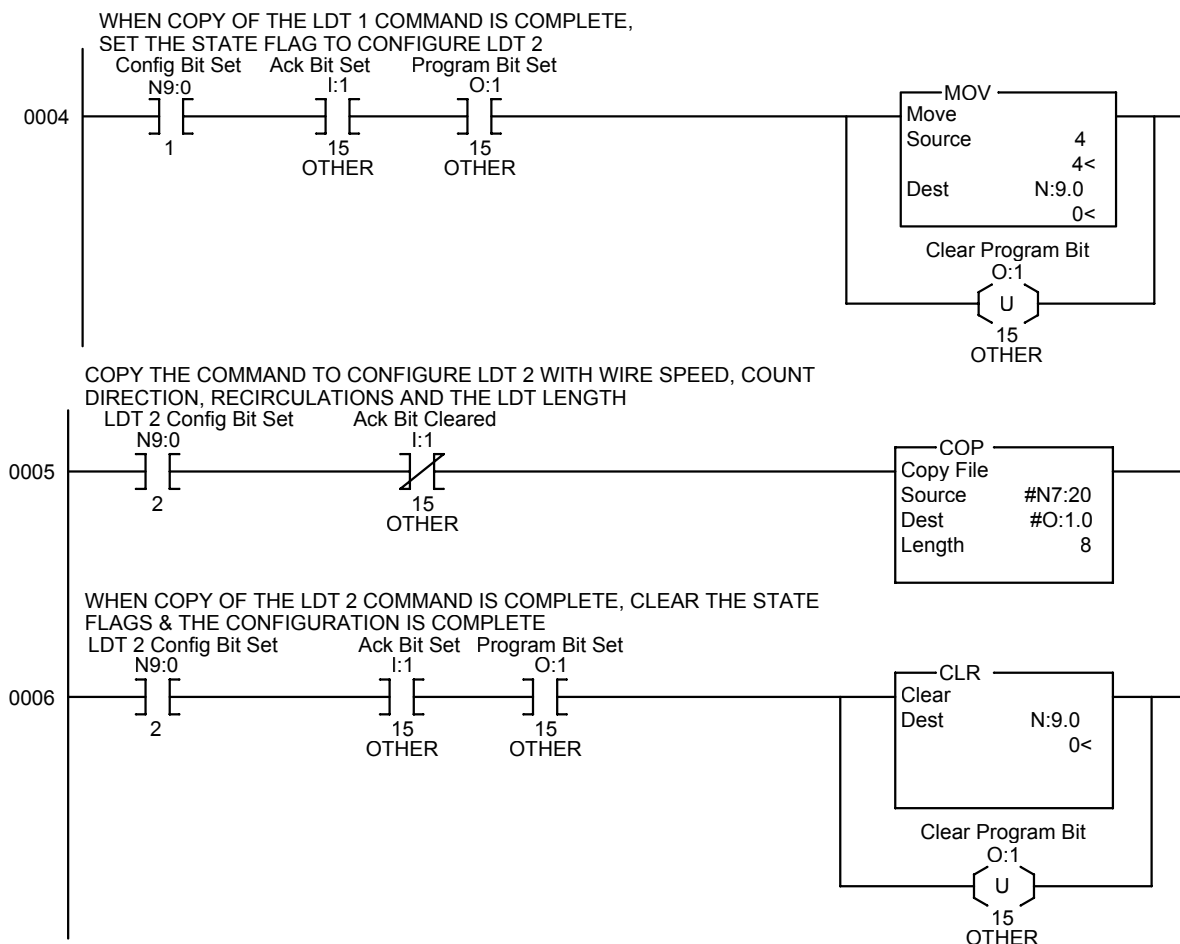
On the first scan, the start 1746L configuration flag is set. When this flag is set, the configuration command is copied into the output image table with the programming bit set. The parameters sent with this command tell the unit that LDT 1 and 2 are control pulse LDTs and the inputs are configured for position hold. This will continue until the command has been acknowledged in the input image table.



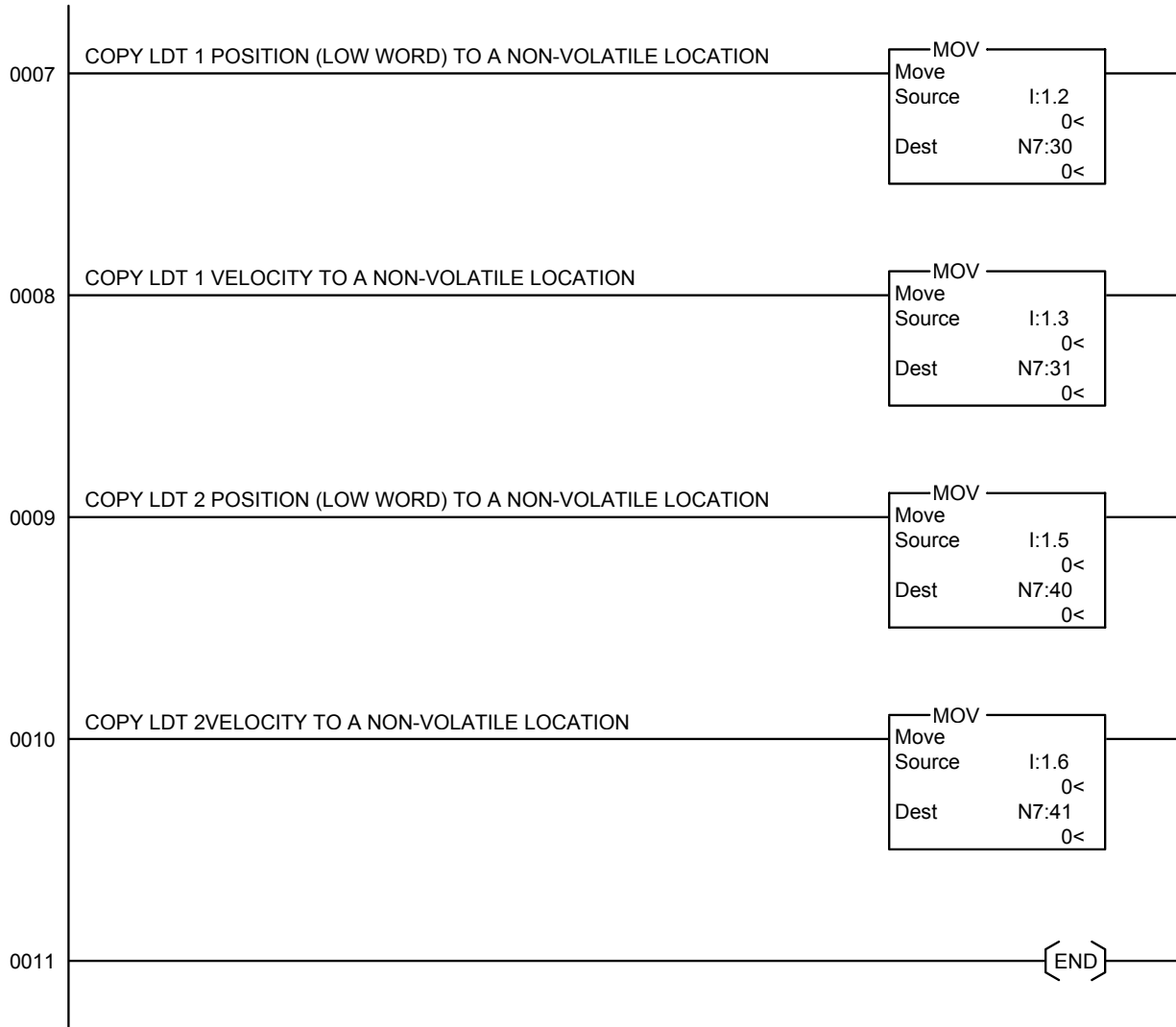
When the configuration command is complete, the program will copy the LDT configuration command for LDT 1 into the output image table with the programming bit set. This command will configure LDT 1 for the speed of wire, count direction, recirculations, and LDT length. The speed of wire for LDT 1 is 9.300 $\mu$ s/inch. The counts are defined as increasing from the LDT head. There is only 1 recirculation and the LDT length is 12.0 inches. This continues until the command has been acknowledged.



When the LDT configuration data has been acknowledged for LDT 1, the program will copy the configuration data for LDT 2 into the output image table. The speed of wire is defined as  $9.272\mu\text{s}/\text{inch}$ . The counts will be increasing from the LDT head. There is one recirculation in the LDT and the LDT length is 24.0 inches. This will continue until the command is acknowledged by the 1746L LDT Interface Module.



After configuration is complete, the program will copy the position of LDT 1 and LDT 2 from the input image table into a non-volatile location.



Offset	0	1	2	3	4	5	6	7	8	9
N7:0	-32768	1	1111	1	2	1	2	0	0	0
N7:10	-32768	2	1	9300	1	1	120	0	0	0
N7:20	-32768	2	2	9272	1	1	240	0	0	0
N7:30	0	0	0	0	0	0	0	0	0	0
N7:40	0	0	1							

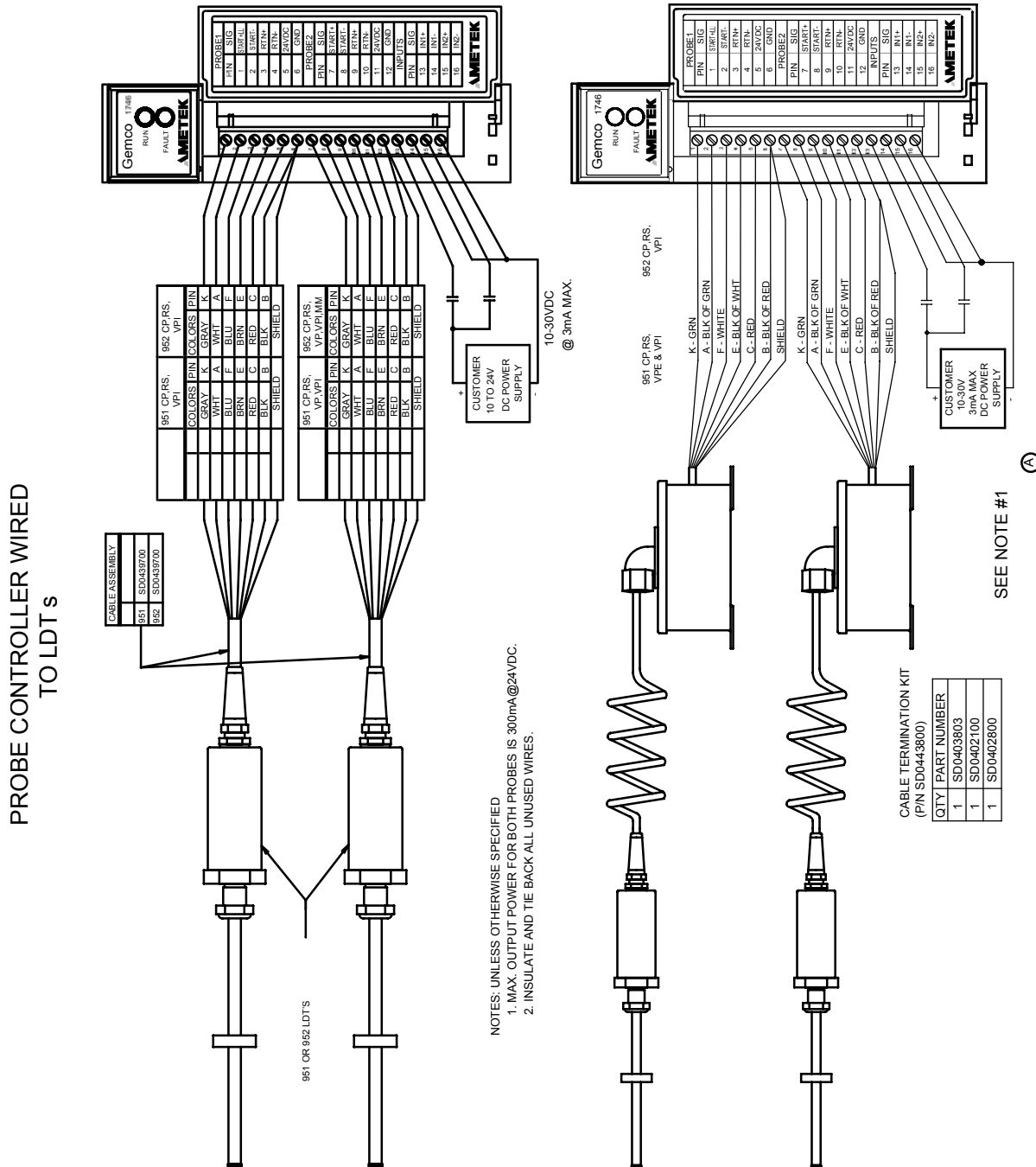
Offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
N9:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

# Appendix A: Specifications

<b>Power Requirements:</b>	0.500A max. @ 5 Vdc 0.0A @ 24 Vdc +24Vdc Output: Protection: Thermal, Over-Current, Short Current: 300 mA @ +24Vdc Max. Regulation: +24Vdc +/- 5% Max		
<b>Resolution:</b>	0.001” or 0.01mm		
<b>Update Times (per LDT):</b>		<b><u>No Recircs</u></b>	<b><u>W/Recircs</u></b>
	<b>w/Velocity</b>		
	(w/o Data Format)	4.0mS	6.0mS
	(w/ Data Format)	4.5mS	6.5mS
	<b>w/o Velocity</b>		
	(w/o Data Format)	3.0mS	4.5mS
	(w/ Data Format)	3.5mS	5.0mS
<b>Velocity:</b>	0.1” accuracy 0.001” resolution		
<b>Temperature Range:</b>	Operating:	32 - 131°F (0 - 55°C)	
	Storage:	0 - 150°F (-17 - 65°C)	
<b>Auxiliary Inputs:</b>	10 - 30Vdc max. @ 3 mA (active when power is applied)		
<b>Module ID Code:</b>	<b>3535</b> (Reserve 8 input and 8 output words I/O image table)		
<b>I/O Isolation:</b>	500 Vac		

# Appendix B: Wiring Diagram

Wiring Diagram for Series 1746L PLC LDT Interface Module.



# **GEMCO**

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