

**Analog Servo Module**  
**ASM-4030/4020**  
**User's Operation Manual**

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**Anitech Systems, Inc.**  
25021 Anza Drive, Valencia, CA 91355 USA  
Phone (661) 257-2184 Fax (661) 257-2025  
Email Mail@Anitech-Systems.com  
Web <http://www.Anitech-Systems.com>

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## Preface

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Welcome to the Media Pro® ASM-4030/4020 User's Operational Manual. Highlighted in this manual are the component features, installation, configuration, software operation, programming reference, examples of typical applications, and technical support information.

This document is provided so users of the Media Pro® 4000 can gain an understanding of the system design and implementation techniques. It is assumed the reader has a basic knowledge of typical show elements and their control requirements. In addition, a basic understanding of programming concepts will help the user understand Anitech System's powerful English based Media Pro® Control Language (MPCL).

For specific information about other Media Pro® 4000 products, please refer to the applicable user manual or on-line help system.

## Related Publications

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The following documents contain additional information concerning ASI Media Pro® 4000 products. To obtain a copy of any of the documents listed below, contact ASI or visit our website.

Document	Description
ABM – 4010	Allen Bradley Remote Input/Output Module (RIO)
AOM – 4010	Analog Output Module - 16 Channel
APC – 4020	Animation Programming Console
ASM – 4030/4020	Analog Servo Module - 8 Channel / 4 Channel with Compliance
DSM – 4020	Digital Sound Module with PCMCIA socket
HMR – 4000	Horizontal Module Rack - 5 Slot
ICM – 4020	Intelligent Control Module
IMC – 4020/4010	Integrated Module Controller
IOM – 4020	Input/Output Module - 16 Bit (24vdc)
LCM – 4020	Lighting Control Module (DMX 512)
SEM – 4020	Serial Expansion Module - 8 Channel (RS-232)
TCM – 4020	Time Code Module (SMPTE)
VMR – 4000	Vertical Module Rack - 18 Slot

## System Requirements

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- IBM PC compatible computer running Windows 95 / 98 environment with 1 serial port at 19.2Kbps.
- The PC should be at least Pentium 90 MHz, with a minimum of 16 Mbytes of Ram.
- The recommended minimum system is Pentium 400MHz or faster with 32M RAM and a serial port at 115.2Kbps.
- An EPP 1284-1994 compatible parallel port is required for animation and is recommended for all other operations, but not required. Downloads for Animation and DSM sound files are much faster over the EPP parallel port.
- Approximately 12 Mbytes of disk space are required for the MP4000/APU4000 software. In addition, we recommend a minimum of 30 Mbytes storage for each show's application files. This size will vary depending on the show configuration and the size of the sound and animation files that may be required.

## Getting Started

---

The Media Pro® 4000 Software is provided on a set of floppy disks. To install the files, follow these directions:

- Place disk 1 into the floppy drive. Open the Explorer and browse **FLOPPY [A:]**
- Double click on **SETUP... .EXE**
- Follow the on-screen installation instructions.
- The default directory **C:\MP4000** will be created and placed on the desktop.
- To enter the program, browse the directory and double click **MP4000.EXE**
- Current versions of the MP4000 software place an icon on the desktop, earlier versions (1998) do not.

## Operating Environment

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All Media Pro<sup>®</sup> Products are manufactured to the highest standards. With proper care and maintenance, they should provide many years of trouble-free service.

To ensure that your equipment has the longest life possible, it should be placed in an area with good ventilation and low humidity, out of direct sunlight and away from heat sources or lamps. Never expose equipment to moisture of any sort. Always maintain a dust, dirt and smoke free environment.

Always remember that high temperature is the enemy of all electronic equipment.

### Environmental Conditions:

Recommended Operating:	10° to 32° C (40° - 90° F)
Storage Temperature:	-40° to 60° C (-4° - 140° F)
Relative Humidity:	0 to 95% (Without Condensation)

## Warranty

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Anitech Systems warrants this product to be free of manufacturing defects for 1 year from the date of purchase. At Anitech System's discretion, Anitech Systems will repair or replace a module that fails due to manufacturing defects.

The warranty does not cover shipping charges or modules damaged due to improper configuration, misapplication, misuse, abuse, accidents, or shipping damage.

## Service Options

---

Obtain a Return Materials Authorization by contacting Anitech Systems.  
The contact information for customer support follows:

E-mail	<a href="mailto:Mail@Anitech-Systems.com">Mail@Anitech-Systems.com</a>
Web	<a href="http://www.Anitech-Systems.com">http://www.Anitech-Systems.com</a>
Telephone	(661)257-2184
Fax	(661)257-2025

### Non-Warranty Modules Returned for Repair -

Charges will be based on parts used, labor, and shipping charges. Make sure the product is properly packed and insured. Anitech Systems is not responsible for damage that occurs during shipment.



# 1

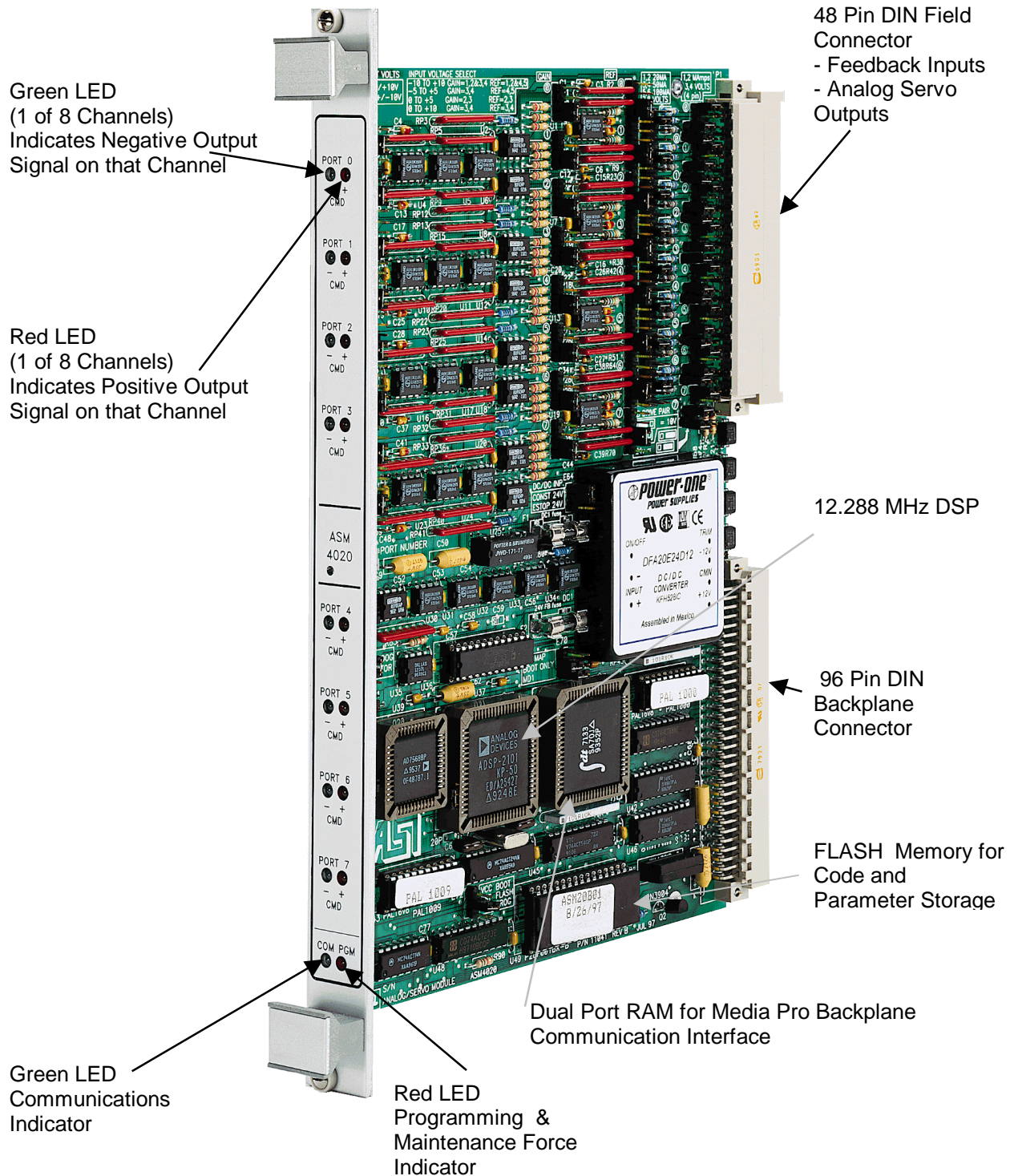
## Section 1 – Introduction

This manual is a technical reference for the Analog Servo Module, ASM-4030 and ASM-4020. It contains specifications, diagrams and instructions to help with the implementation of systems using this product. Most of the information in the manual refers to both models, exceptions and special considerations are noted where applicable.

### 1.1 Module Description

The Analog Servo Module, ASM-4030/4020, is a multi-channel “analog servo” device, providing for closed-loop servo operation of eight channels, or closed-loop compliant operation of four channels, (assigning a second channel for the force feedback). The ASM-4030 has the additional feature of Dual Force Feedback Compliance. Open-loop output is also possible. The module uses a high-speed DSP to calculate the position loop and force feedback from the digitized inputs at several thousand times per second.

**Figure 1-1. Analog Servo Module  
ASM-4020 Shown**



## 1.2 Purpose and Intended Use

The ASM-4030/4020 provides eight ports (channels) that can be configured for

- Analog Voltage or Current Output (Open-Loop)
- Closed Loop Servo (Voltage or Current Output)
- Closed Loop Servo with Compliance (Voltage or Current Output)

There are no quantity restrictions for the ASM-4030/4020 in any Module Rack.

This module is supported by the MP4000 Software utilities. The module can be downloaded with performance parameters for each channel's servo personality. Once the servo channels are tuned using the MP4000 utility software, each channel's controlled device can be moved to a position from an event in a Media Pro cue or data from an animation file.

The module supplies on each channel: +10vdc to power Linear Resistive Transducers, or +24vdc to power Force Feedback Amplifiers, or position sensors.

The module accepts 0 to +5vdc, 0 to +10vdc, -5 to +5vdc, and +/- 10vdc position feedback signals; and -5 to +5vdc, +/- 10vdc, and dual 0 to +10vdc force feedback signals.

The module outputs 0 to +10vdc, 20ma, 50ma, 100ma, +/- 10vdc, +/- 20ma, +/- 50ma, +/-100ma.

## 1.3 Specifications

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- Eight configurable Ports.
- Position & Force Transducer Power Supply: 10vdc or 24vdc.
- 12-bit Analog Output:
  - Unipolar 0 to 10vdc, 20ma, 50ma, 100ma;
  - Bipolar +/- 5vdc, +/- 10vdc, +/- 20ma, +/- 50ma, +/- 100ma.
- 12-bit Feedback Inputs: 0 to 5vdc, 0 to +10vdc, +/- 5vdc, & +/- 10vdc.
- Closed Loop Servo control.
- Closed Loop Servo Compliance Control.
- Programmable Linear Gain, Integral Gain, Velocity Gain, Acceleration, Deceleration, Maximum Velocity, E-Stop Home Position, Ease-In Velocity, Compliance Linear Gain, Compliance  $x^2$  Gain, Analog Calibration Constants, Offset, Stroke
- 1 Amp Fuse (DC-DC Converter)
- 3 Amp Fuse (24vdc for Transducer Power)

# 2

## Section 2 – Preparation for Use

This section details the physical layout and configuration of the Analog Servo Module. It describes the jumpers that need to be set on the board for various applications.

### 2.1 Unpacking and Inspection

Inspect the shipping carton immediately upon receipt for evidence of mishandling during transit. If the shipping carton is severely damaged or water-stained, request that the carrier's agent be present when the carton is opened. If the carrier's agent is not present when the carton is opened and the contents are damaged, keep the carton and packaging materials for the agent's inspection.

It is suggested that all salvageable shipping cartons and packing material be retained for future use in the event the product must be shipped.

### 2.2 Installation Considerations

- ❖ Choose which connector to use (see section 3.3 Keying and Connector Information for more information).
- ❖ For the ASM to operate, 24vdc needs to be supplied to the Constant and / or E-Stop Bus on the backplane to allow the output to respond to position data.
  - Jumper E64 must be set to the powered Constant or E-Stop Bus on the backplane.
    - If E/S Home Position is enabled, in order for the ASM module to work properly, 24vdc must be supplied to the Constant Bus, and Jumper E64 must be set to the Constant Bus.
    - When The E-Stop bus is powered, the ASM will servo the port to the position data. When the E-Stop bus is off, the ASM will servo the port to the E-Stop Home Position.
- ❖ (See the Rack Module Manual for more information on the 24vdc power busses).

## 2.3 User-Configurable Jumpers and Options

The diagrams on these pages provide information for the user-configurable jumpers and options. The configurations for many of the jumpers are the same for the ASM-4030 and the ASM-4020. There are a few jumpers that are specific to the different models and they are labeled, be certain to set the jumpers carefully. There are additional jumpers on the ASM-4030 for the COMPLIANCE SELECT. Refer to the following diagrams:

Figure 2-1a. ASM - 4020

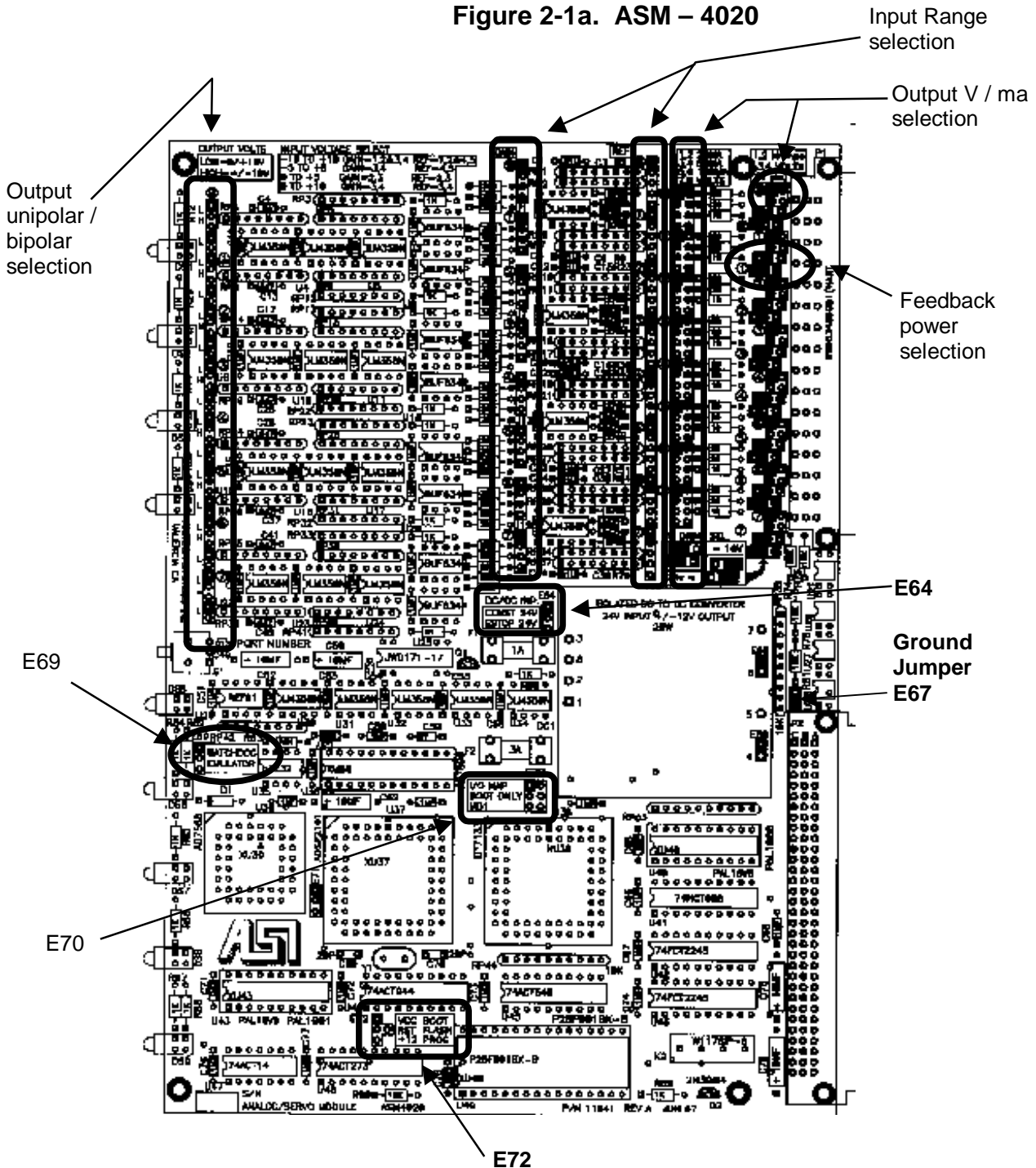
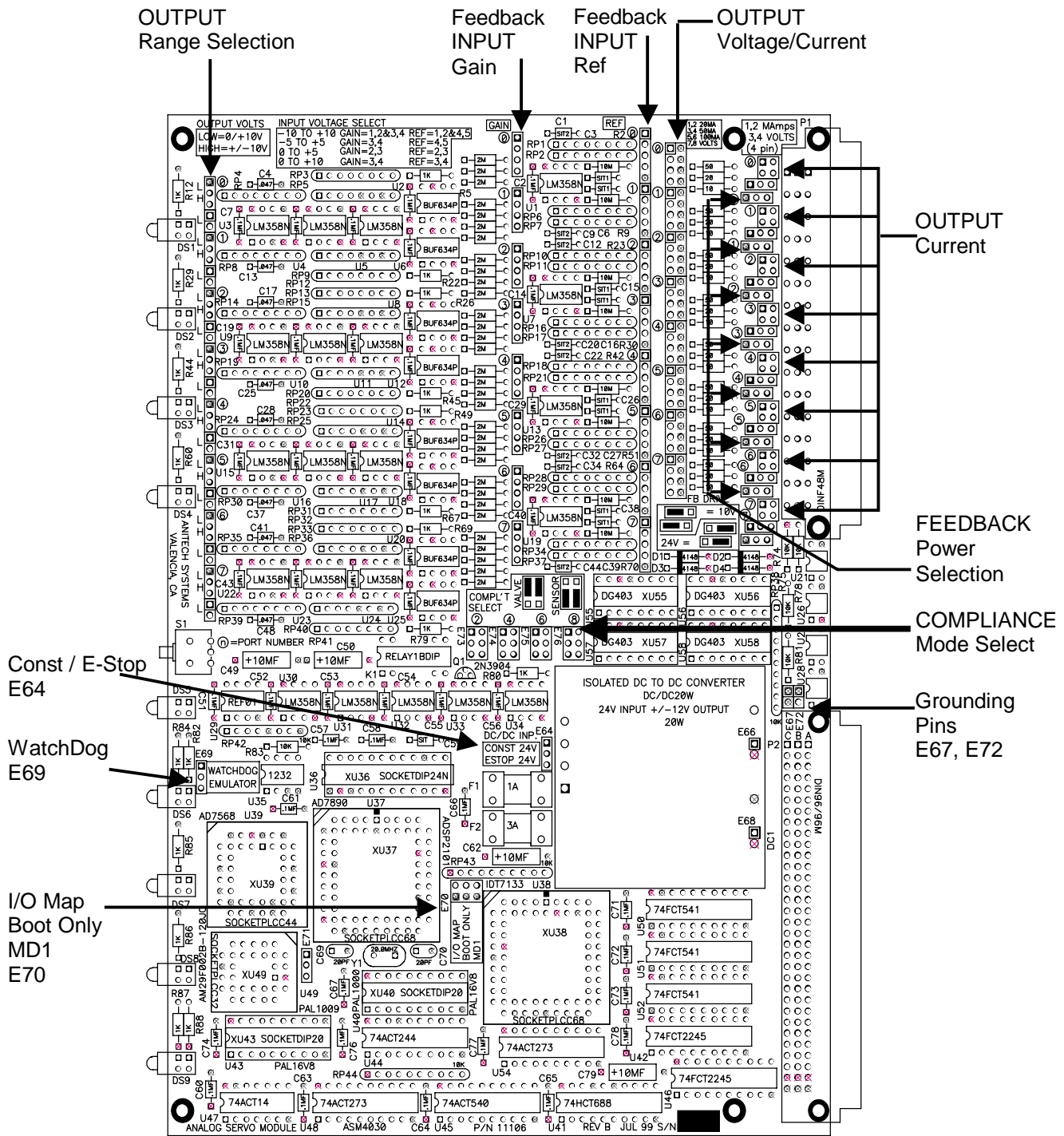


Figure 2-1b. ASM-4030

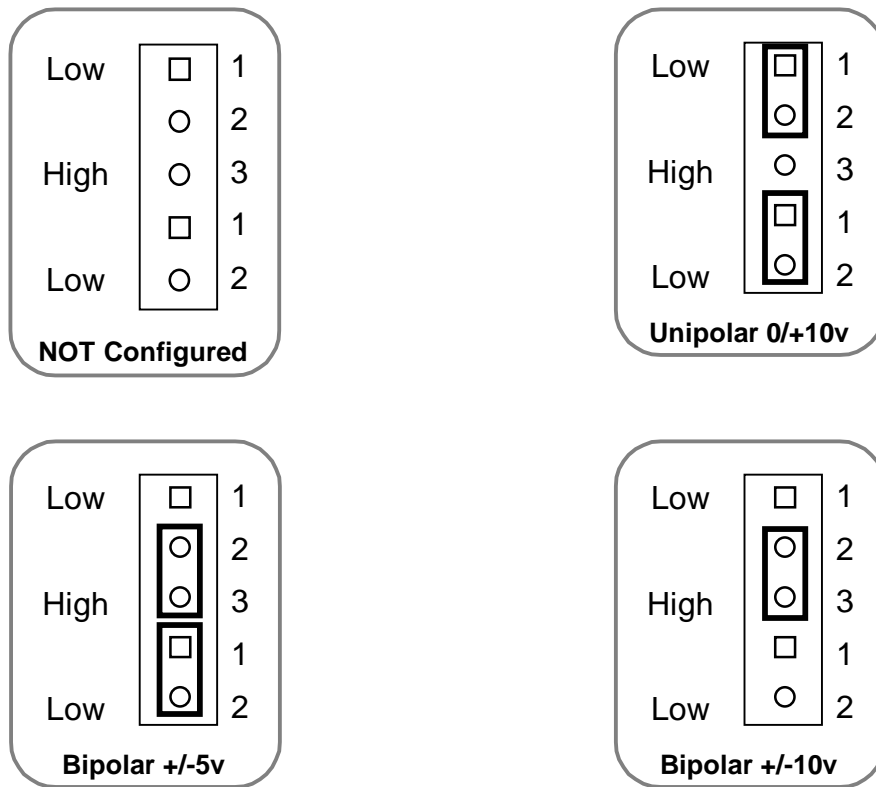


Preparation for Use

### 2.3.1 Output Range Selection

Each channel must be configured to designate the input voltage that will be used. There are 4 different configurations possible for each channel. Refer to the physical layout diagram for jumper pin locations. The Jumpers are placed on the pins according to the chart below, figure 2-2.

Figure 2-2. Output Range Selection



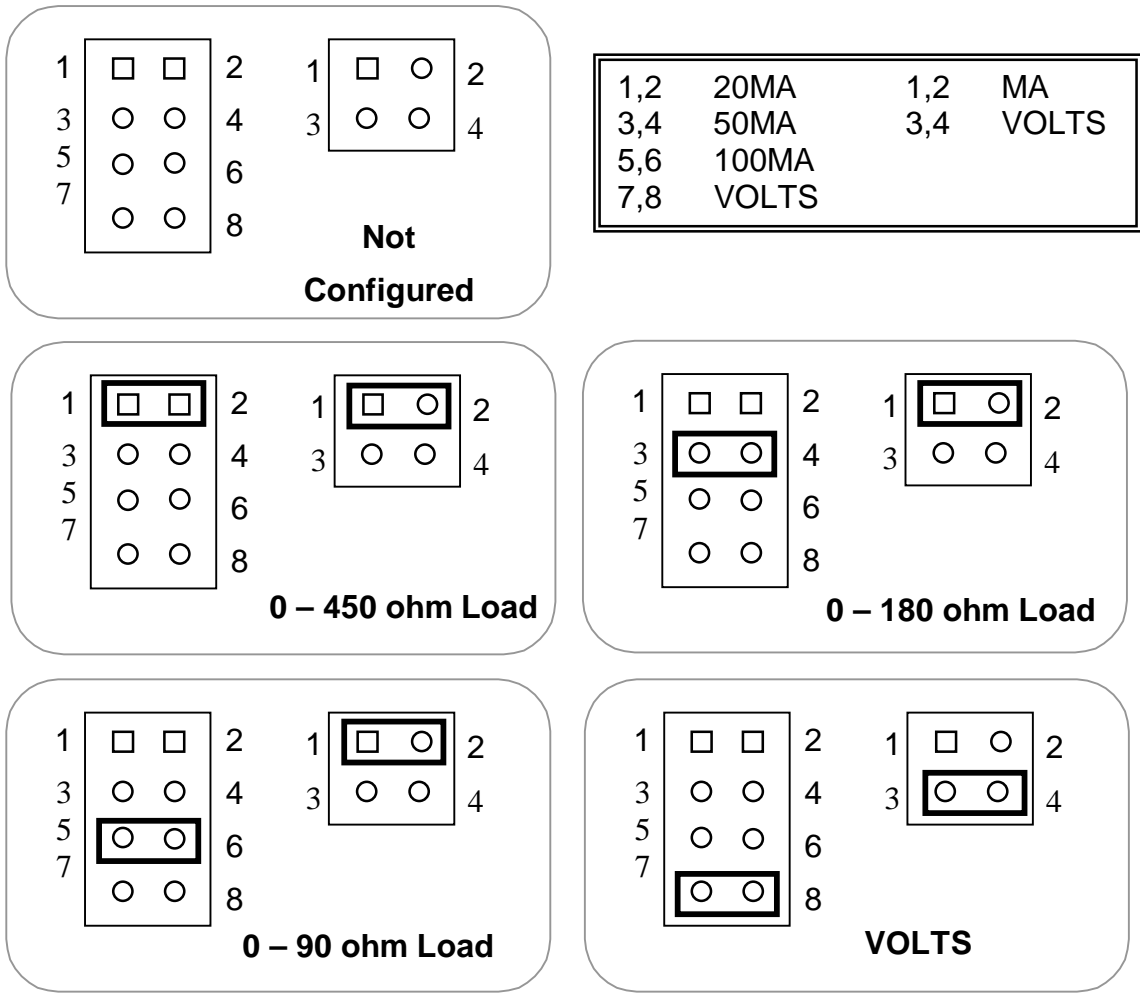
See also figure 2-3 “Output Voltage / Current Selection” on the following page of this manual for additional information.



### 2.3.2 Output Voltage / Current Selection

Each channel must be configured to select the output voltage and current that will be used. There are 5 different configurations possible for each channel. Refer to the physical layout diagram for jumper pin locations. The Jumpers are placed on the chart illustrated below.

Figure 2-3. Output Voltage / Current Selection



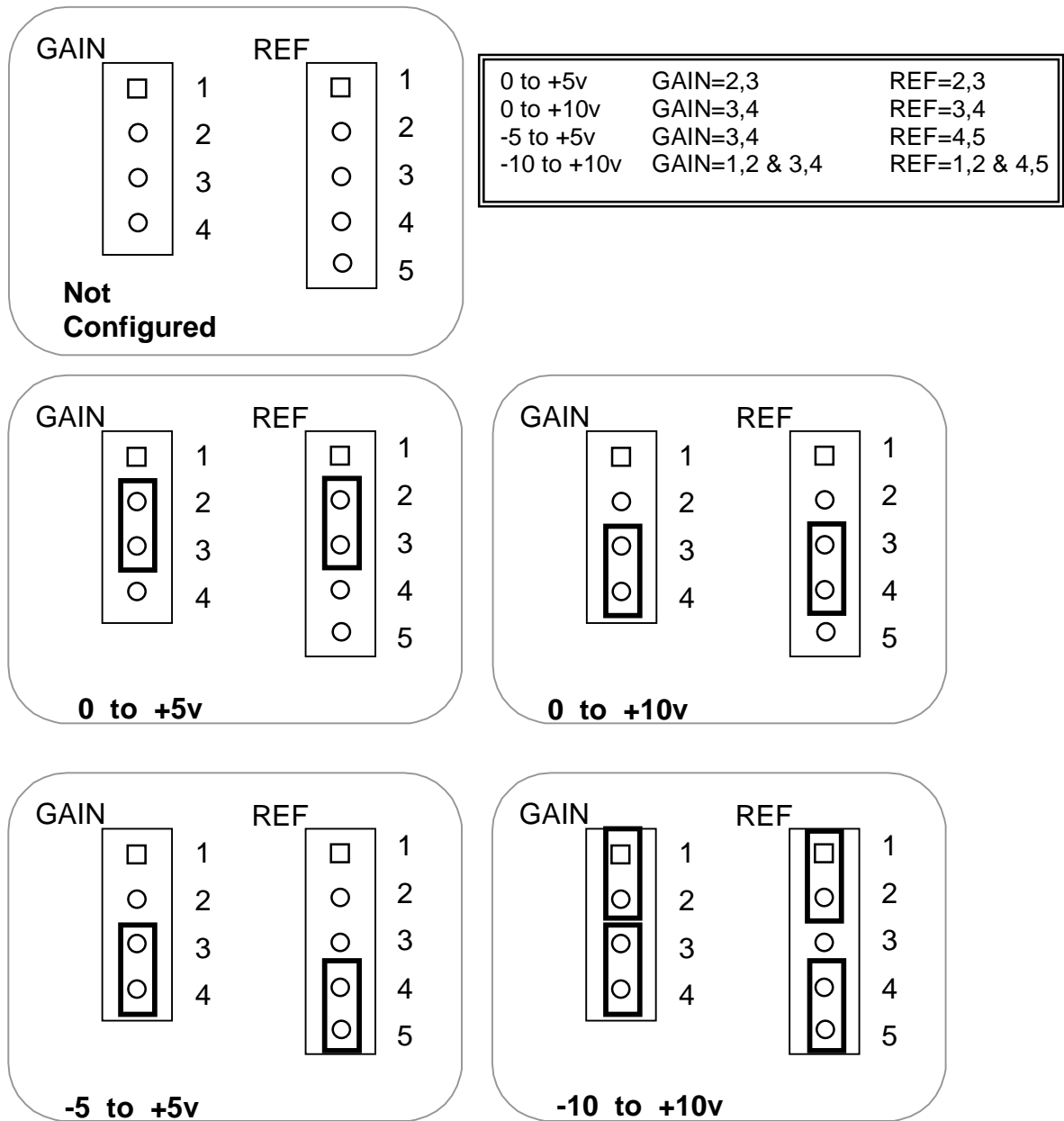
Preparation for Use

**NOTE:** When using current output, the Output Range jumper (refer to figure 2-2) must be set to **Bipolar +/- 10v**

### 2.3.3 Feedback Voltage Range Selection

Each channel must be configured to select the correct feedback voltage range for the type of power input being used. There are 5 possible configurations possible for each channel. Refer to the physical layout diagram for jumper pin locations. The jumper options are illustrated below:

Figure 2-4. Feedback Voltage Range Selection



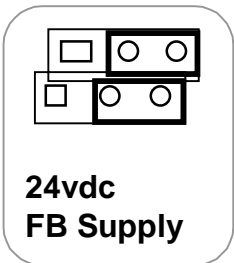
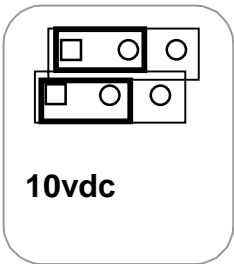
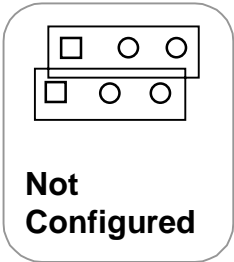
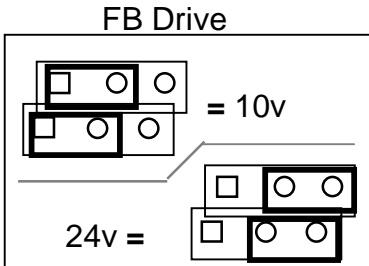
### 2.3.4 Feedback Power Selection

Each channel must be configured to select the correct voltage for the type of power input is being used. There are 3 possible configurations for each channel. Refer to the physical layout diagram for jumper pin locations.

Note: Be certain to have these jumpers installed correctly *before* installing, it is especially critical in the Dual Unipolar Compliance Mode.

The jumper options are illustrated below:

Figure 2-5. Feedback Power Selection



Preparation for Use

### 2.3.5 Typical Jumper Examples

For each channel, there are several jumper pins to set. Following are two examples of typical applications. For Non-compliance mode, only one set of jumper-pins needs to be configured, see figure 2-6. For Compliance mode, there are two sets of jumper-pins to be configured, see figure 2-7.

Figure 2-6. Typical for Closed Loop Servo without Compliance

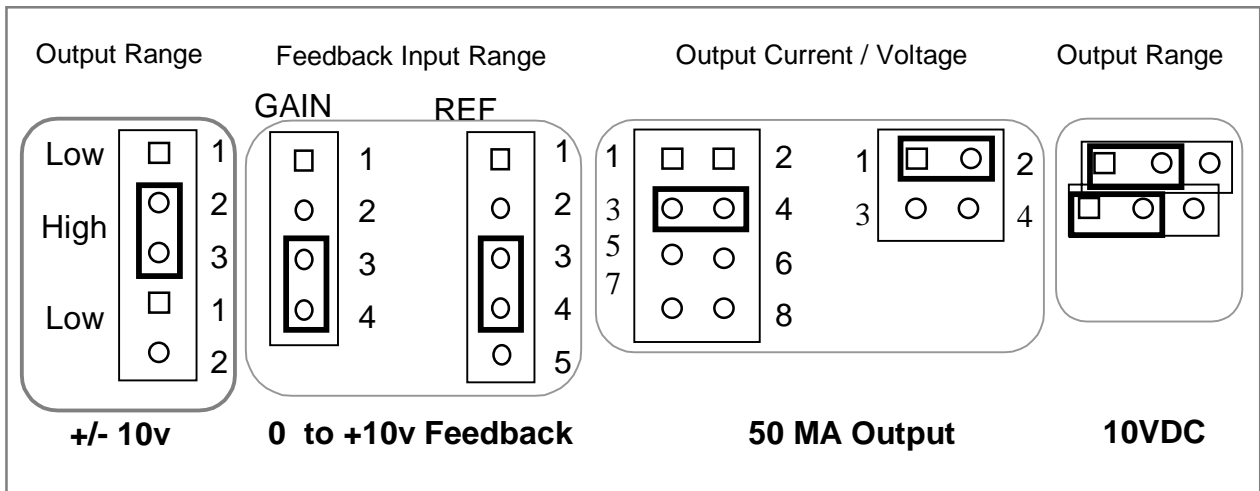
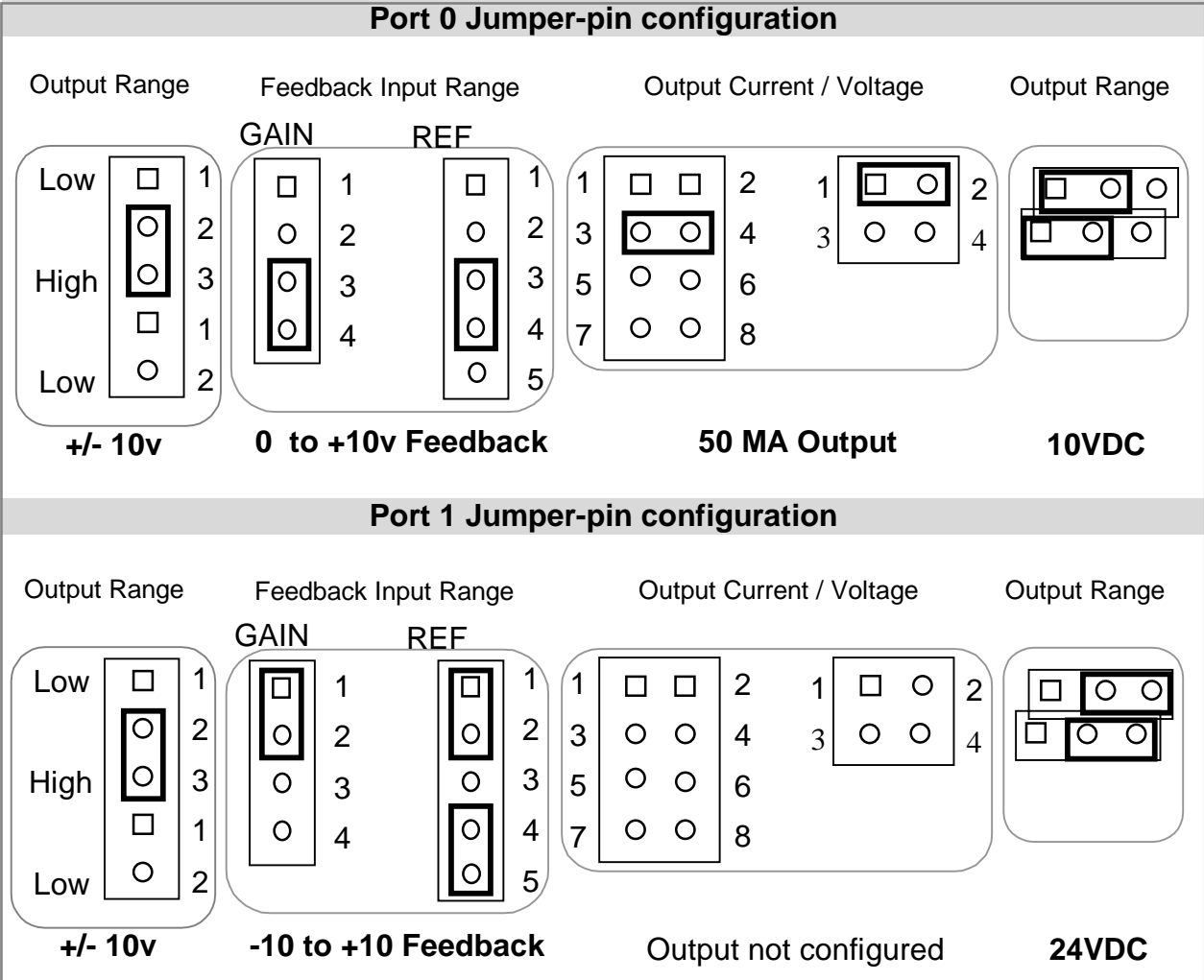


Figure 2-7. Typical for Closed Loop Servo with Compliance

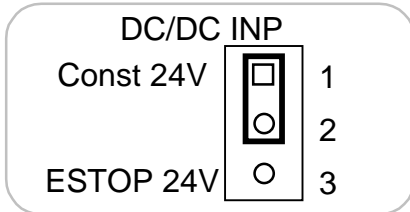


Preparation for Use

## 2.3.6 Additional Jumper Installation Details

### E64

#### Power Bus Source



For normal operation, put a shunt over pins 1 – 2.  
(Factory Configured).

### E66 and E68

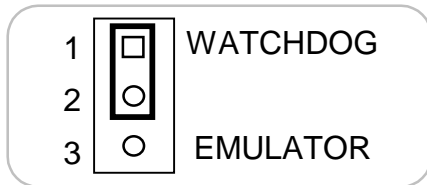
#### DC Power

For normal operations, DC-DC converter installed.

For **NON-ISOLATED** operations, no DC-DC converter installed.  
E66 and E68 pins 1 – 2, are soldered at the factory.

### E69

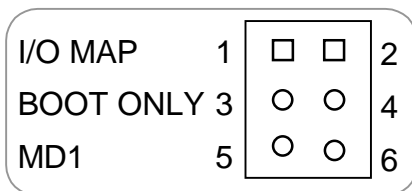
#### Watchdog



For normal operation, put a shunt over pins 1 – 2.  
(Factory Configured).

### E70

#### I/O Map – Boot Only – Md1

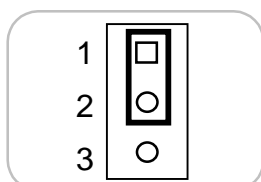


For normal operation:

- I/o Map pins 1 – 2, open, no shunt
  - Boot Only pins 3 – 4, open, no shunt.
  - MD1 pins 5 – 6, open, no shunt.
- (Factory Configured)

### E71

#### DAC Reset



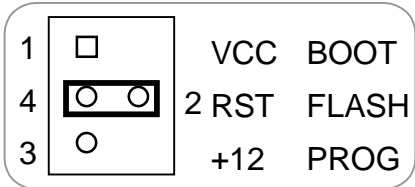
For normal operation, put a shunt over pins 1 – 2.  
(Factory Configured).

### 2.3.7 ASM-4020 Jumpers

The following jumper configurations pertain to the **ASM-4020 ONLY**.

#### E72

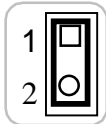
##### Boot Flash Program



For normal operations, put a shunt over pins 2-4 (Factory Configured).

#### E67

##### Analog/Digital Ground



For normal operation, put a shunt over pins 1 – 2. (Factory Configured).

Preparation for Use

4  
0  
3  
0

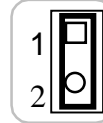
### 2.3.8 ASM-4030 Jumpers

The following jumper configurations pertain to the **ASM-4030 ONLY**.

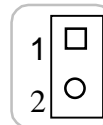
#### E72

##### 24V RET

For normal operation, put a shunt over pins 1 – 2. This is true in the following modes: Servo, Servo Bipolar compliance, Unipolar, Bipolar, Unipolar compliance.



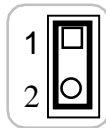
For Dual Unipolar Compliance mode, no shunt across pins 1 – 2.



#### E67

##### Analog/Digital Ground

For normal operation, put a shunt over pins 1 – 2. (Factory Configured).





## 2.3.9 Compliance Selection Jumpers

**Valve** – Place the shunts in the Valve position when using the following modes:

- Unipolar
- Bipolar
- Servo
- Servo with Bipolar compliance
- Servo with Unipolar compliance

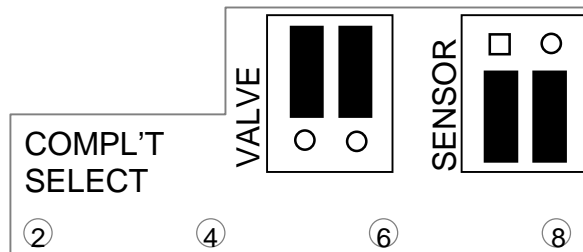
**Sensor** – The only reason to place the shunts in the Sensor position, is when using this mode:

- **Dual Unipolar Compliance Mode**

**NOTE: JUMPERS MUST BE SET CORRECTLY FOR COMPLIANCE MODE. FAILURE TO DO SO WILL RESULT IN DAMAGE TO THE ASM!**

There are three things to consider when configuring the Module for Dual Unipolar Compliance:

- The Compl't Select switch set correctly
- Refer to figure 2-5 (Feedback Power Jumper) before installing the board.
- Correct physical wiring of the power (refer to figure 3-3d).



The jumpers for Dual Compliance mode correspond to the following ports pairs:

- E73 Port 1 Silkscreen reference 2
- E74 Port 3 Silkscreen reference 4
- E75 Port 5 Silkscreen reference 6
- E76 Port 7 Silkscreen reference 8

Position the shunt over the pins of the appropriate set of jumpers for the port being configured in compliance mode.



# 3

## Section 3 – Installation

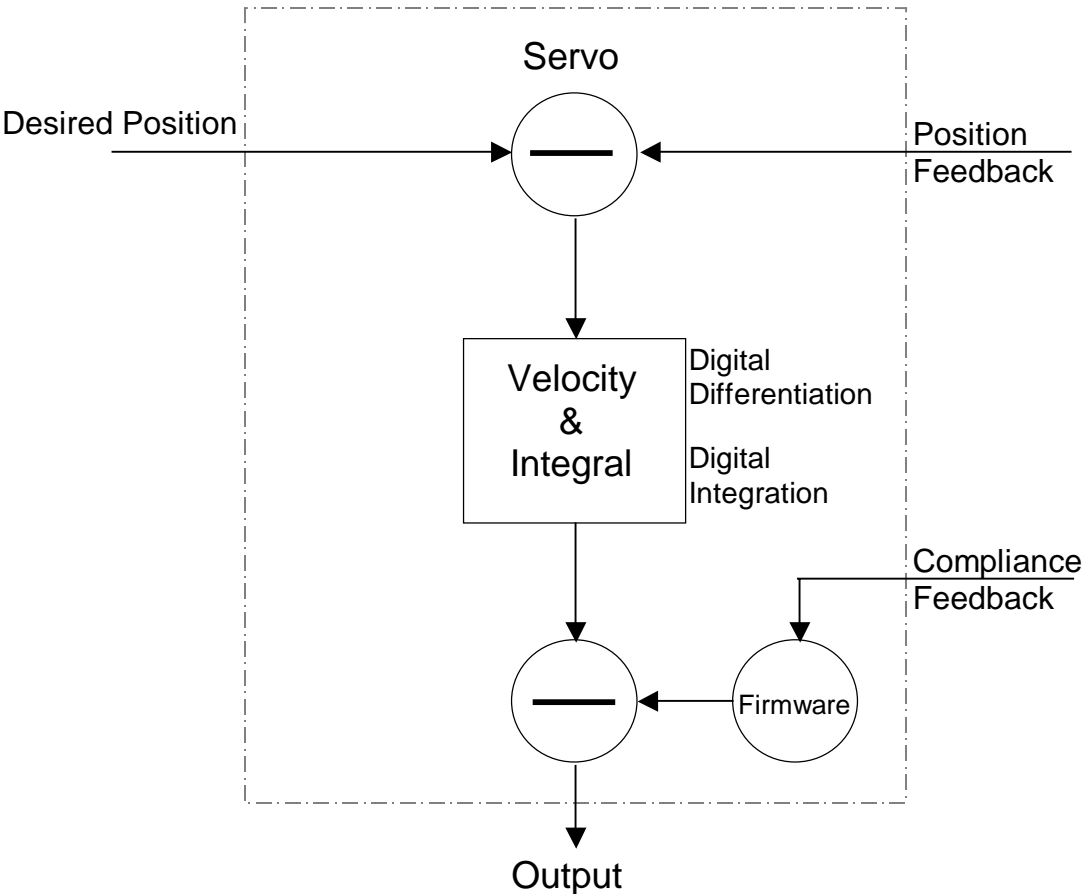
This section describes the configuration and connection details for the Analog Servo Module. It includes examples of typical applications.

The ASM-4030 and ASM-4020 have the same configurations for the Servo, Servo Bipolar compliance, Unipolar, Bipolar, and Unipolar compliance modes. The major difference is the configuration of the Dual Unipolar Compliance mode, which is only available on the ASM-4030.

### 3.1 Compliance Modes

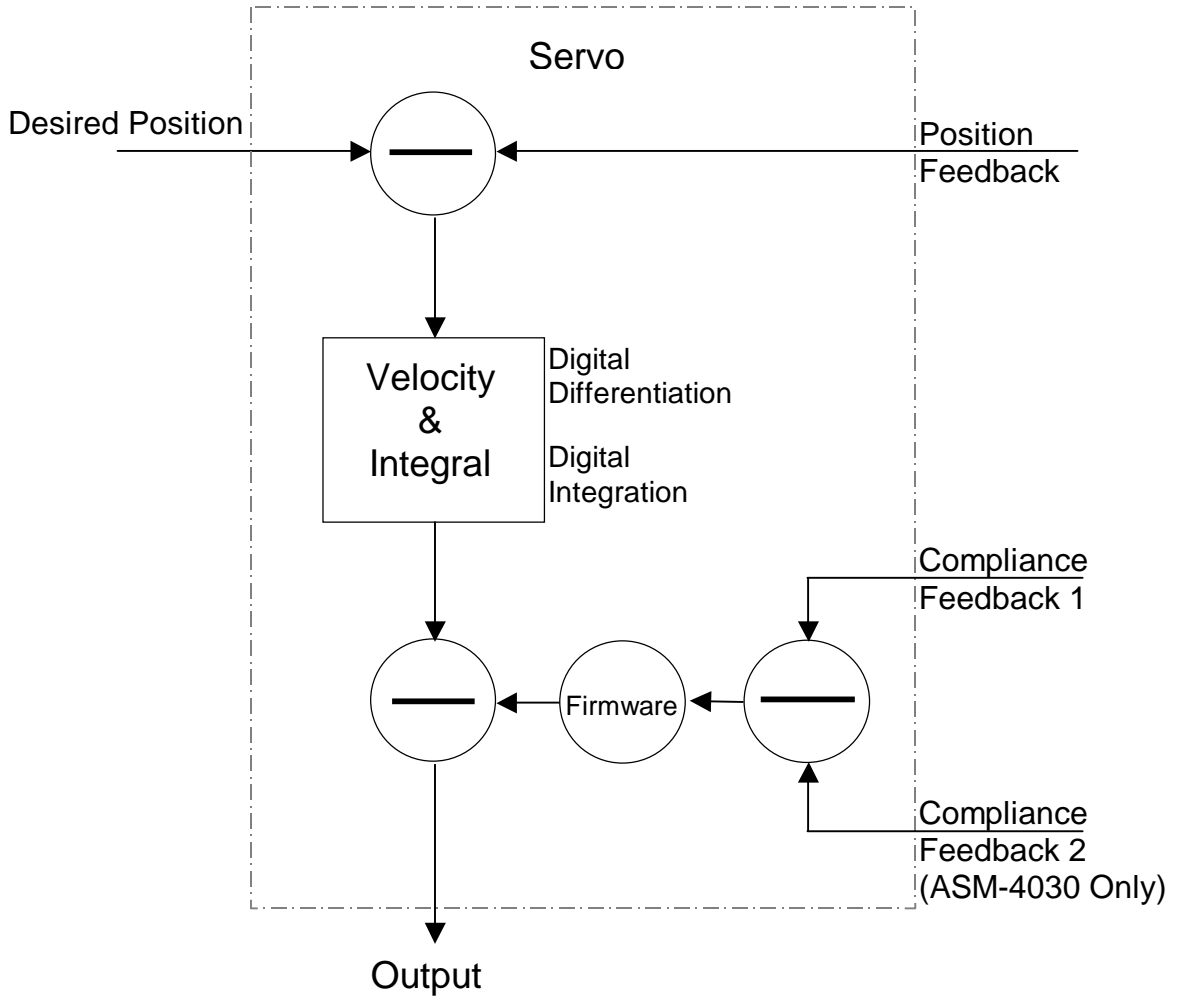
Compliance uses additional feedback that is applied according to the equations in the ASM firmware and the parameters supplied by the user that tends to reduce the output signal. There are two different modes of compliance available, single compliance and dual compliance. The difference between single and dual feedback is that the dual feedback has two feedback inputs and is only available on the ASM-4030. Refer to the following diagrams.

Figure 3-1a. Single Feedback Compliance Diagram



Installation

Figure 3-1b. Dual Feedback Compliance Diagram



### 3.2 Typical Installation Example Diagrams

To install the ASM-4030/4020, power down the system and refer to the following diagrams for typical installation examples:

Figure 3-2a. ASM Resistive Position Feedback

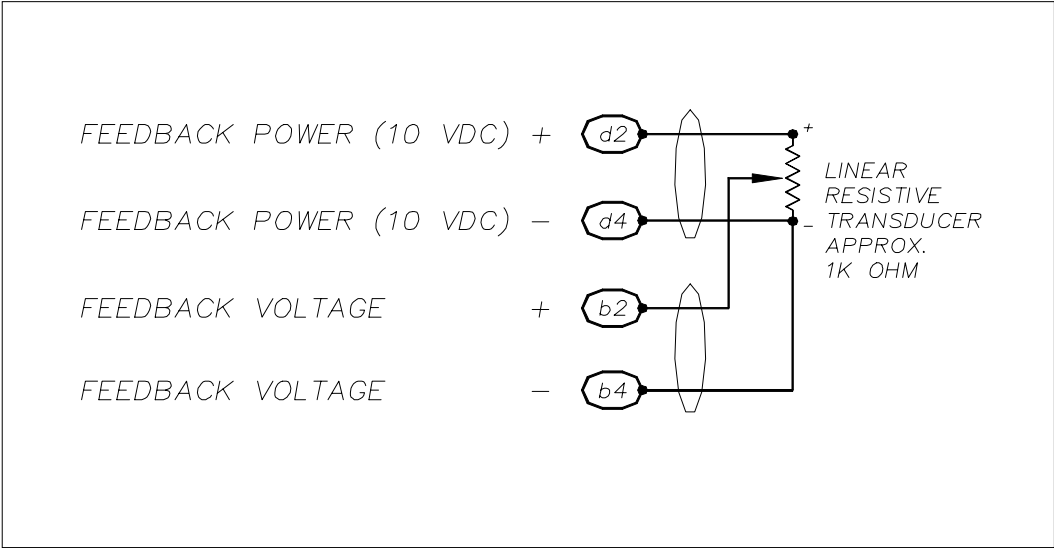
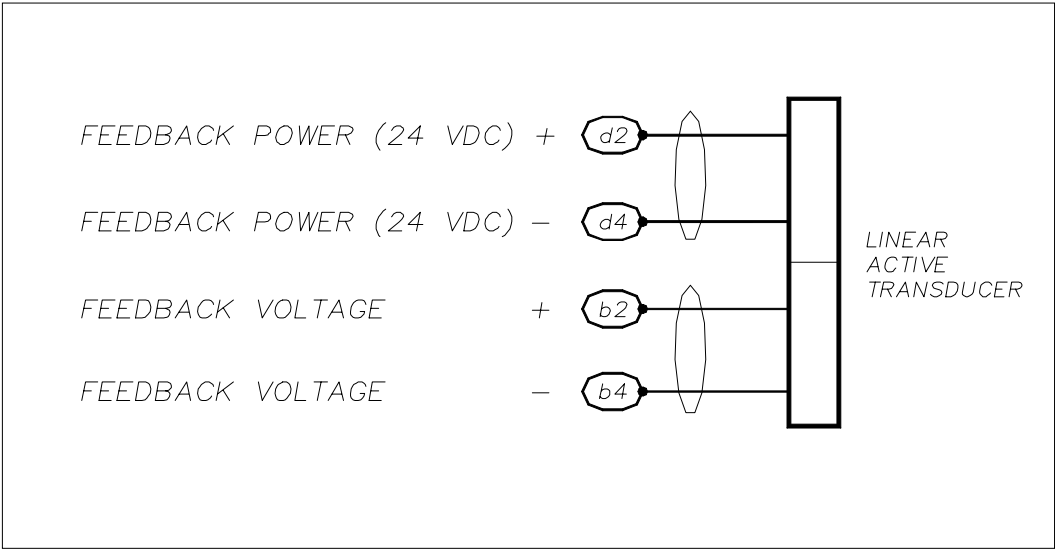


Figure 3-2b. ASM Active Position Feedback



Installation

Figure 3-2c. ASM Active Force Feedback

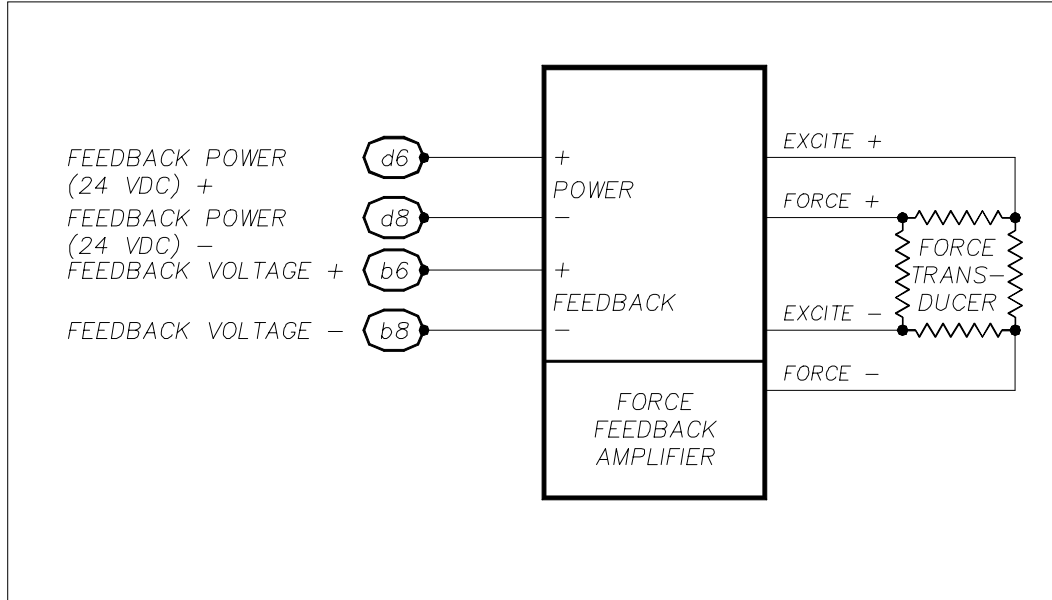


Figure 3-2d. ASM Valve Output, Series Coil

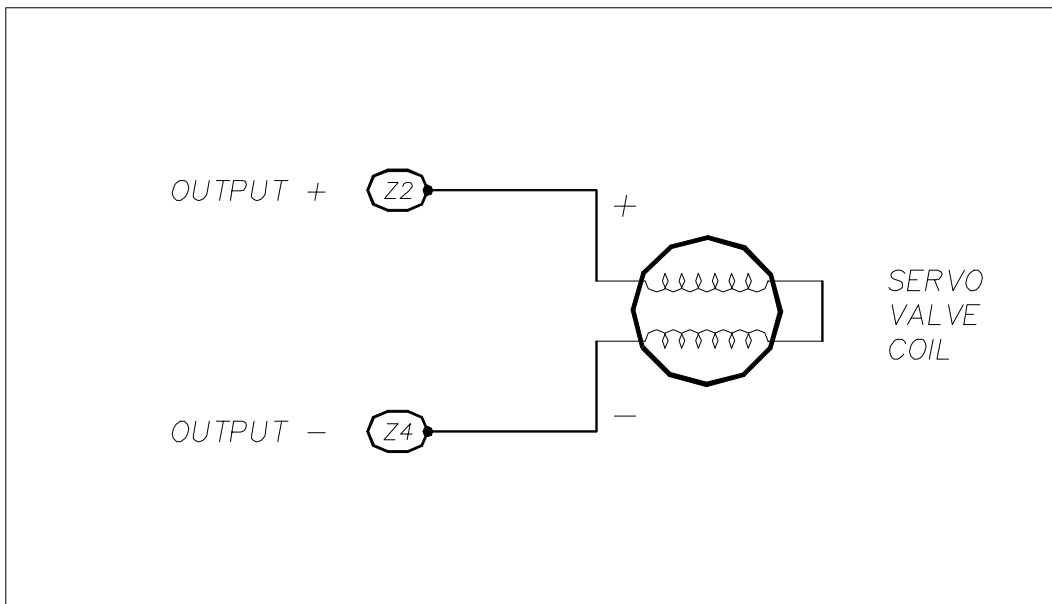


Figure 3-2e. ASM Valve Output, Parallel Coil

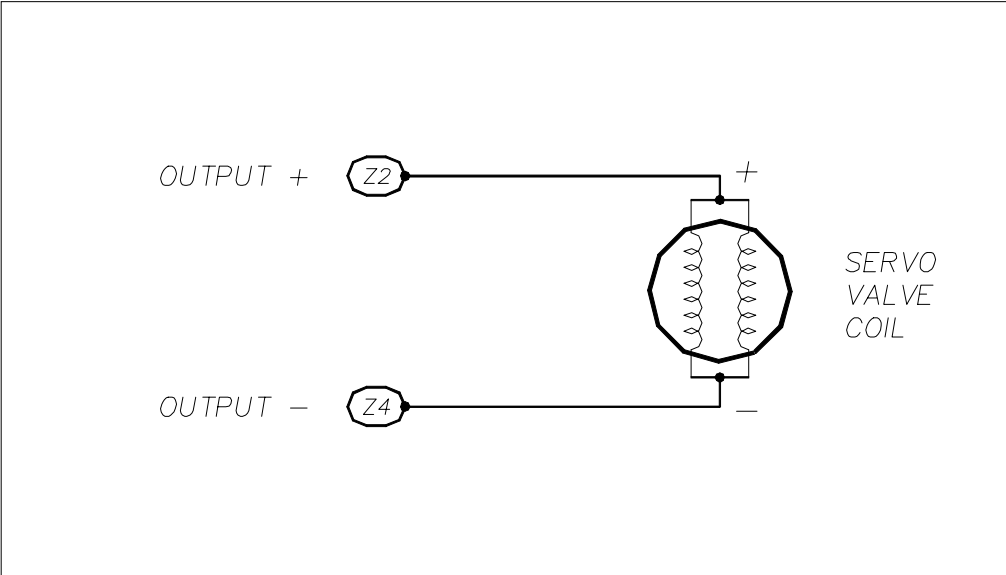
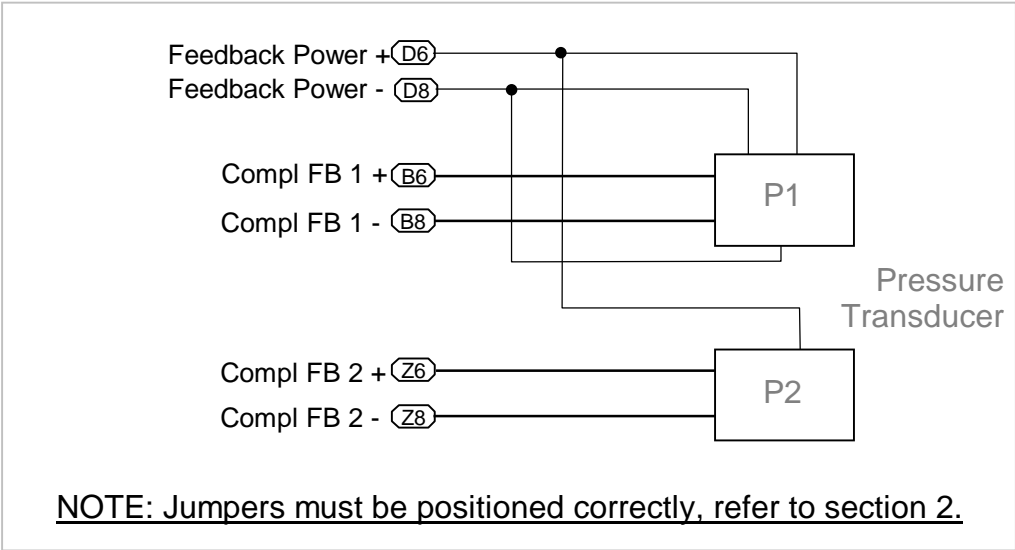


Figure 3-2f. ASM Dual Force/Pressure Feedback Compliance



Installation

### 3.3 Keying and Connector Information

Keying is optional for the field connector (P1). To utilize keying the ASM key pin(s) should be inserted at the intersection between column d & b and between rows 2 & 4.

Note: If the key pin(s) are installed in the female field connector, the ASMs male connector must have holes drilled at the appropriate places for the connectors to mate.

Figure 3-3a. ASM-4030/4020 Keying Information

Rear View, Looking at ASM-4020 Male Contacts The Key is located at the intersection between column d & b, & between row 2 & 4.					Front View, Looking at Field Connector Female Contacts The Key is located at the intersection between column d & b, & between row 2 & 4.				
d		b		z	z		b		d
	○			○		○			○
	2							2	
	●			○		○			●
	4							4	
	○			○		○			○
	6							6	
	○			○		○			○
	8							8	
	○			○		○			○
	10							10	
	○			○		○			○
	12							12	
	○			○		○			○
	14							14	
	○			○		○			○
	16							16	
	○			○		○			○
	18							18	
	○			○		○			○
	20							20	
	○			○		○			○
	22							22	
	○			○		○			○
	24							24	
	○			○		○			○
	26							26	
	○			○		○			○
	28							28	
	○			○		○			○
	30							30	
	○			○		○			○
	32							32	
Legend:		=	Contact		Legend:		=	Contact	
	●	=	Key Hole Location			●	=	Key Pin Location	
	○	=	unused position			○	=	unused position	



### 3.3.1 Open-Loop Connector Pinout

The pinout for the field connector (P1) is described in figure 3-2b. It is the same pinout for the ASM-4030 and ASM-4020, in open-loop applications. In open-loop configuration the module can have a maximum of eight channels configured. This example shows the channel/port relationship if every port is being used for open-loop configuration.

For details about the compliant modes connector pinout, refer to figure 3-2c and 3-2d.

Figure 3-3b. **ASM-4030/4020 Pinout for Open-Loop Operation**

	<b>d</b>	<b>b</b>	<b>z</b>	
Channel 0 {	2	Port 0 Feedback Power +	Port 0 Position FB +	Port 0 Output +
	4	Port 0 Feedback Power -	Port 0 Position FB -	Port 0 Output -
Channel 1 {	6	Port 1 Feedback Power +	Port 1 Position FB +	Port 1 Output +
	8	Port 1 Feedback Power -	Port 1 Position FB -	Port 1 Output -
Channel 2 {	10	Port 2 Feedback Power +	Port 2 Position FB +	Port 2 Output +
	12	Port 2 Feedback Power -	Port 2 Position FB -	Port 2 Output -
Channel 3 {	14	Port 3 Feedback Power +	Port 3 Position FB +	Port 3 Output +
	16	Port 3 Feedback Power -	Port 3 Position FB -	Port 3 Output -
Channel 4 {	18	Port 4 Feedback Power +	Port 4 Position FB +	Port 4 Output +
	20	Port 4 Feedback Power -	Port 4 Position FB -	Port 4 Output -
Channel 5 {	22	Port 5 Feedback Power +	Port 5 Position FB +	Port 5 Output +
	24	Port 5 Feedback Power -	Port 5 Position FB -	Port 5 Output -
Channel 6 {	26	Port 6 Feedback Power +	Port 6 Position FB +	Port 6 Output +
	28	Port 6 Feedback Power -	Port 6 Position FB -	Port 6 Output -
Channel 7 {	30	Port 7 Feedback Power +	Port 7 Position FB +	Port 7 Output +
	32	Port 7 Feedback Power -	Port 7 Position FB -	Port 7 Output -

Rear View, Looking at ASM-4030/4020 Male Contacts

### 3.3.2 Compliance Connector Pinout

The following diagram shows how the connections on the field connector (P1) are used when the ASM-4030/4020 is configured to compliance mode with one feedback. The pins on the Z column for the second port are not used. In the compliance modes, the module uses two ports for each channel and may have a maximum of 4 compliance channels per board. This table shows the channel/port relationship, if all channels are configured with single feedback compliance.

Figure 3-3c. Pinout for Compliance Mode with Single Feedback

	<b>d</b>	<b>b</b>	<b>z</b>	
Channel 0 {	2	Port 0 Feedback Power +	Port 0 Position FB +	Port 0 Output +
	4	Port 0 Feedback Power -	Port 0 Position FB -	Port 0 Output -
	6	Port 1 Compl FB Power +	P1 Compl FB +	Not used
	8	Port 1 Compl FB Power -	P1 Compl FB -	Not used
Channel 1 {	10	Port 2 Feedback Power +	Port 2 Position FB +	Port 2 Output +
	12	Port 2 Feedback Power -	Port 2 Position FB -	Port 2 Output -
	14	Port 3 Compl FB Power +	P3 Compl FB +	Not used
	16	Port 3 Compl FB Power -	P3 Compl FB -	Not used
Channel 2 {	18	Port 4 Feedback Power +	Port 4 Position FB +	Port 4 Output +
	20	Port 4 Feedback Power -	Port 4 Position FB -	Port 4 Output -
	22	Port 5 Compl FB Power +	P5 Compl FB +	Not used
	24	Port 5 Compl FB Power -	P5 Compl FB -	Not used
Channel 3 {	26	Port 6 Feedback Power +	Port 6 Position FB +	Port 6 Output +
	28	Port 6 Feedback Power -	Port 6 Position FB -	Port 6 Output -
	30	Port 7 Compl FB Power +	P7 Compl FB +	Not used
	32	Port 7 Compl FB Power -	P7 Compl FB -	Not used

Rear View, Looking at ASM-4030/4020 Male Contacts

### 3.3.3 Dual Unipolar Compliance Feedback Pinout

The pinout for Dual Unipolar Compliance mode may only be configured on the ASM-4030. It is described in figure 3-2d. It uses the Z pins on the connector for the Second Compliance Feedback Input. The dual channel compliance mode uses two ports for configuration and may have a maximum of 4 dual compliance channels per module. One constraint for the feedback configuration is the usage of port pairs. They are defined by the channel designation on the table below. This table shows the channel/port relationship, if all channels are used for dual feedback configuration.

Figure 3-3d. **ASM-4030 Pinout for Dual Unipolar Compliance Feedback Mode**

	<b>d</b>	<b>b</b>	<b>z</b>	
Channel 0 {	2	Port 0 Feedback Power +	Port 0 Position FB +	Port 0 Output +
	4	Port 0 Feedback Power -	Port 0 Position FB -	Port 0 Output -
	6	Port 1 Compl FB Power +	P1 Compl FB 1 +	P1 Compl FB 2 +
	8	Port 1 Compl FB Power -	P1 Compl FB 1 -	P1 Compl FB 2 -
Channel 1 {	10	Port 2 Feedback Power +	Port 2 Position FB +	Port 2 Output +
	12	Port 2 Feedback Power -	Port 2 Position FB -	Port 2 Output -
	14	Port 3 Compl FB Power +	P3 Compl FB 1 +	P3 Compl FB 2 +
	16	Port 3 Compl FB Power -	P3 Compl FB 1 -	P3 Compl FB 2 -
Channel 2 {	18	Port 4 Feedback Power +	Port 4 Position FB +	Port 4 Output +
	20	Port 4 Feedback Power -	Port 4 Position FB -	Port 4 Output -
	22	Port 5 Compl FB Power +	P5 Compl FB 1 +	P5 Compl FB 2 +
	24	Port 5 Compl FB Power -	P5 Compl FB 1 -	P5 Compl FB 2 -
Channel 3 {	26	Port 6 Feedback Power +	Port 6 Position FB +	Port 6 Output +
	28	Port 6 Feedback Power -	Port 6 Position FB -	Port 6 Output -
	30	Port 7 Compl FB Power +	P7 Compl FB 1 +	P7 Compl FB 2 +
	32	Port 7 Compl FB Power -	P7 Compl FB 1 -	P7 Compl FB 2 -

Rear View, Looking at ASM-4030/4020 Male Contacts

**NOTE: JUMPERS MUST BE SET CORRECTLY FOR COMPLIANCE MODE. FAILURE TO DO SO WILL RESULT IN DAMAGE TO THE ASM!**

There are three things to consider when configuring the Module for Dual Unipolar Compliance:

- The Compl't Select switch set correctly (Section 2.3.9).
- Refer to figure 2-5 (Feedback Power Jumper) before installing the board.
- Correct physical wiring of the power (refer to figure 3-3d).

### 3.3.4 Practical Application Pinout

The ASM unit can be used to control devices with a variety of compliance requirements. The wiring and jumper shunts are set to correctly specify which ports will be used for open loop, single feedback or dual feedback. Refer to the following table for an example of how a module might be implemented in a real application.

Figure 3-3e. Pinout for Practical Application

	<b>d</b>	<b>b</b>	<b>z</b>	
Channel 0 {	2	Port 0 Feedback Power +	Port 0 Position FB +	Port 0 Output +
	4	Port 0 Feedback Power -	Port 0 Position FB -	Port 0 Output -
Channel 1 {	6	Not Used	Not Used	Not Used
	8	Not Used	Not Used	Not Used
Channel 2 {	10	Port 2 Feedback Power +	Port 2 Position FB +	Port 2 Output +
	12	Port 2 Feedback Power -	Port 2 Position FB -	Port 2 Output -
	14	Port 3 Compl FB Power +	P3 Compl FB 1 +	P3 Compl FB 2 +
	16	Port 3 Compl FB Power -	P3 Compl FB 1 -	P3 Compl FB 2 -
Channel 3 {	18	Port 4 Feedback Power +	Port 4 Position FB +	Port 4 Output +
	20	Port 4 Feedback Power -	Port 4 Position FB -	Port 4 Output -
Channel 4 {	22	Port 5 Compl FB Power +	Port 5 Position FB +	Port 5 Output +
	24	Port 5 Compl FB Power -	Port 5 Position FB -	Port 5 Output -
Channel 5 {	26	Port 6 Feedback Power +	Port 6 Position FB +	Port 6 Output +
	28	Port 6 Feedback Power -	Port 6 Position FB -	Port 6 Output -
	30	Port 7 Compl FB Power +	P7 Compl FB +	Not Used
	32	Port 7 Compl FB Power -	P7 Compl FB -	Not Used

### 3.4 Support Tools and Part Numbers

The following connectors or equivalents may be used:

Part	Number
Din48F connector (Z-Rail mount) (Solder Tail)	Harting 09-06-248-6823
Din48F connector (Z-Rail mount) (Wire Wrap)	Harting 09-06-248-6821
Din48F connector (Z-Rail mount) (Crimp Pins required)	Harting 09-06-248-3201
(50) crimp pins (for above connector) 26-20 AWG	Harting 09-06-000-8481
(50) crimp pins (for above connector) 20-16 AWG	Harting 09-06-000-8482
Crimping tool for 26-20 AWG pins	Harting 09-99-000-0076
Crimping tool for 20-16 AWG pins	Harting 09-99-000-0077
Pin Locator (for above crimping tools)	Harting 09-99-000-0086
Crimp Pin Insertion Tool	Harting 09-99-000-0088
Crimp Pin Removal Tool	Harting 09-99-000-0087
*(2) M2.5X6 Screws	*Schroff 21100-146
Code Pin (metal key post)	Harting 09-06-000-9950
Code Pin Insertion Tool	Harting 09-99-000-0103
2AG (.177 D x .58 L) 1 AMP, 250Volt, fast blow DC-DC converter Fuse F1	LittleFuse 225001
2AG (.177 D x .58 L) 3 Amp, 250Volt, fast blow 24vdc Transducer power supply Fuse F2	LittleFuse 225003

\*Packaged in bags of 100. Only 2 screws are needed per ASM.

Rear View, Looking at ASM-4030/4020 Male Contacts

### 3.4.1 Field Connector Kit

A kit for the field connector is available from Anitech Systems which may be purchased separately. Refer to the Product Price List and/or contact ASI to order the item.

**DIN-F48C** – Contains the following items:

<u>Qty</u>	<u>Description</u>	<u>Part Number</u>
1	Din 48F Pin Connector	Harting 09-06-248-3201
50	Crimp Pins	Harting 09-06-000-8481
3	Mounting Screws	Schroff 21100-146

# 4

## Section 4 – Module Operation

This section describes the normal and fault operating conditions. It includes troubleshooting suggestions.

### 4.1 Normal Operations




- **Port LED intensity is relative to the output voltage/current.**
  - Both LEDs will be off when the output is off, or small.
  - The Red LED will be on when the output is positive.
  - The Green LED will be on when the output is negative.

### 4.2 Fault Conditions

- Transducer 24vdc Power Supply, Blown Fuse F2 (3A).
- DC-DC converter Power Supply, Blown Fuse F1 (1A).
- 24vdc Constant Power Bus off.
- 24vdc E/S Power Bus off.

### 4.3 Indicators

Figure 4-1. ASM-4030 Indicators

Indication		Description	Probable Cause	Recommended Action
0	OFF	Port Output Indicator	Normal Condition	Little, or No Output
1	ON Solid	Port Output + Indicator	Normal Condition	Positive Output
1	ON Solid	Port Output - Indicator	Normal Condition	Negative Output
	Blinking Slow	COM {Communications, Green}	Normal Condition	The ASM is Running.
	Blinking Fast	COM {Communications, Green}	Normal Condition	The ASM is Receiving Animation Data from the ICM.
0	OFF	PGM {Programming}	Normal Condition	The ASM is not in Program Mode.
1	ON Solid	PGM {Programming}	Programming	The ASM is in Program Mode.
	Blinking	PGM {Programming}	Maintenance Forces Active	The ASM has Maintenance forces Active. If necessary remove Maintenance forces.
0	OFF	COM {Communications, Green}	No Communications	The ASM is NOT running.  1) Make certain that the ASM is fully seated in its slot. 2) Make certain that the Module Rack is Powered, and Turned on 3) Make certain ICM is running, & no downloads, are occurring.
1	ON Solid	COM {Communications, Green}		



## 4.4 Troubleshooting

The following table (continued on the next page) identifies troubleshooting problems and solutions for the ASM-4030/4020.

Problem	Solution
<b>Module will not mate with the field connector.</b>	<ol style="list-style-type: none"><li data-bbox="837 453 1321 548">1. Check the orientation of the field connector. Make sure that pin 1 is at the top.</li><li data-bbox="837 575 1321 699">2. Check the field connector for proper mounting and position on the rear z-rails. Connector must mount on the front of the flange.</li><li data-bbox="837 726 1321 850">3. Check the keying of both connectors. Make sure you do not connect the ASM to a connector wired for other peripherals (damage may occur).</li><li data-bbox="837 856 1321 947">4. Check for bent pins on the male connector, or plugged sockets on the female connector.</li></ol>

<b>Problem</b>	<b>Solution</b>
<p><b>If the outputs don't seem to be changing when commanded:</b></p>	<ol style="list-style-type: none"> <li>1. Make certain that the 24vdc Constant and E-Stop bus Power is being provided to the backplane (see Module Rack manual for more information).</li> <li>2. Make certain that you are commanding the output to change. Using the ASM utility software check the D-Out (Desired Output), if the desired output is not changing, the output won't change. (see Media Pro software programming manual for more information)</li> <li>3. Check to see if the ASM card is commanding the output to change. Using the ASM utility software check the C-Out (Command Output); if the command output is not changing, the output won't change.</li> <li>4. If the command output is not changing, and the port is in servo or compliance mode, using the ASM utility software check the FB Fault {Feedback Fault}; if the Position Feedback is out of the normal operating range, it will cause the output to be 0.</li> <li>5. If the command output is not changing, and the port is in servo or compliance mode, using the ASM utility software check the F-Back (Feedback); if the Position Feedback is out of the range set by offset and stroke, the output may not change.</li> <li>6. If the port is in Compliance mode, check the Force Feedback; the larger the force feedback, the smaller the output.</li> <li>7. Check the Acceleration Maximum, Deceleration Maximum, Velocity Maximum, Proportional Gain, Velocity Gain, Integral Gain, Ease In; the smaller these settings are, the smaller the output is.</li> <li>8. Check the Integral Maximum, Linear Compliance Gain, X<sup>2</sup> Compliance Gain; the larger these settings are, the smaller the output is.</li> </ol>

Problem	Solution
<p style="text-align: center;"><b>Caution!</b></p>	<p>9. Check the Analog calibration constants, if these vary far from 100% they will affect the output.</p> <p>10. Make certain the feedback is not inverted in relation to the servo valve and cylinder.</p> <p>A way to check for item 10; using the ASM utility software, configure the output for Bipolar instead of Servo and jog the output to the negative extreme while watching the position feedback. The feedback should decrease to a low value.</p> <p>Then jog the output to the positive extreme while watching the position feedback. The feedback should increase to a high value.</p>

## 4.5 Maintenance

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Status information provided in the ASM utility.

- Position Feedback
- Force Feedback
- Command Output
- Desired Position
- Following Error

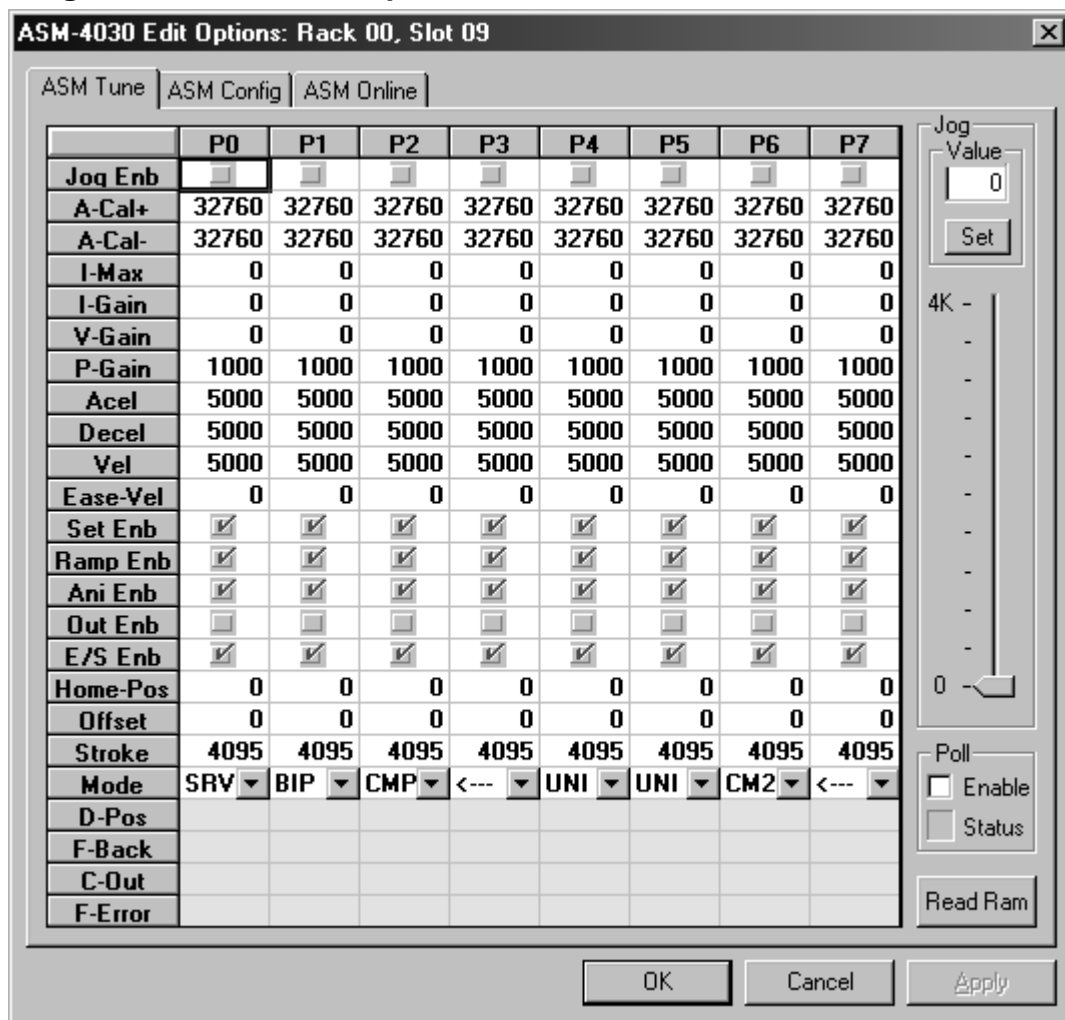
# 5 Section 5 – Programming

This section describes the programmable functions of the Analog Servo Module and how to configure the different modes. It includes a sample program and a list of the commands used with this module.

## 5.1 Module Programmable Functions

The parameters and value ranges for the different modes need to be configured correctly and then downloaded to the module in the rack. Refer to the screen shot of the ASM Edit Options Menu (figure 5-1). The definitions and explanations of the parameters follow. Enter the parameters and settings on this screen. Software operation details are described in Section 5.2, Software Configuration.

Figure 5-1. ASM Edit Options Menu



- ❖ **Mode** – Select one of the five Modes: Unipolar, Bipolar, Servo, Compliance, and Dual Compliance.
  - UNI –
    - This field selects direct output mode with uni-polar voltage at the output.
  - BIP –
    - This field selects direct output mode with bi-polar voltage at the output. The voltage is split between –10v and +10v.
  - SRV –
    - This field selects the normal operation of the port with position feedback and BI-polar error output signal.
  - CMP –
    - SINGLE BIPOLAR COMPLIANCE – this field selects the compliance mode of the operation for this port and the next higher port. Since the compliance mode requires both position and force feedback, it utilized the feedback, P-Gain, and V-Gain from the next higher port for the force feedback. This choice is only available for the even numbered ports due to the requirement that it uses a pair of ports for its operation.
  - CM2 –
    - ASM-4030 DUAL UNIPOLAR COMPLIANCE MODE – The ASM-4030 has two compliance modes. Additionally, it has dual compliance mode, which has 2 unipolar pressure feedback inputs.
  
- ❖ **Jog Enb** –
  - Jog Enable: A check mark placed in this field will enable manual tuning control. It is used in conjunction with the slider bar on the right portion of the screen to set (or jog) the value for the port.

Note: The two calibration constants (A-Cal+ and A-Cal-) are used to balance the force of hydraulic cylinder to compensate for the difference in area on the open and rod sides of the cylinder. They can also be used to compensate for the weight of the load when there is vertical component on the cylinder.

❖ **A-Cal(-) –**

- Analog Calibration (-): Range 0 to 32K. A value of 32,767 represents 100%.
  - This is the calibration constant that scales the command output for drive in the negative direction.
- CMP - Single Bipolar Compliance Feedback
  - This parameter has no effect on the second port of the port pair being used for single bipolar compliance.
- CM2 – Dual Unipolar Compliance Feedback. Range 0 to 32K.
  - This calibration constant scales the input for the drive in the negative direction (comp fb1) on the second port of the port pair being used for dual unipolar compliance.

❖ **A-Cal(+)** –

- Analog Calibration(+): Range 0 to 32K. A value of 32,767 represents 100%.
  - This is the calibration constant that scales the command output for the drive in the positive direction.
- CMP – Single Bipolar Compliance Feedback.
  - This parameter has no effect on the second port of the port pair being used for single bipolar compliance.
- CM2 – Dual Unipolar Compliance Feedback. Range 0 to 32K.
  - This calibration constant scales the input for the drive in the positive direction (comp fb2) on the second port of the port pair being used for dual unipolar compliance.

The next two parameters (**I-Max & I-Gain**) are to provide **Integral feedback for the servo operation.**

❖ **I-Max –**

- **Integral Error Maximum:** Range 0 to 32K. A value of 32,767 gives a feedback of 100% of the integral error.
  - The integral feedback provides a lag function to the servo as it uses a function of the sum of past position errors to compute this component of the servo feedback. The I-Max parameter sets a limit on how large this correction can be, as a small error over a long time has the same effect as a large error over a short time.
  - The advantage of integral control is that the servo can have a zero steady state position error with the integral term canceling any unbalance in the system. The disadvantage is that it does cause a lag into the servo, which requires the output to overshoot the desired position as it approaches a new position. This overshoot may cause some oscillation about the null position in the system.
  - The I-Max has the effect of providing a band about the null position where it is most effective as well as limiting the lag effect for large following errors.

❖ **I-Gain –**

- **Integral Error Gain:** Range 0 to 32K.
  - The I-Gain is the calibration constant that scales the integral error in the output function. Therefore, the maximum integral feedback is:  $\text{max feedback} = \text{I-Gain} * \text{I-Max}$ .

❖ **V-Gain –**

- **Velocity Feedback Gain:** Range 0 to 32K. This gain uses a value of 32,767 as 100% to maximum damping.
  - This is the gain constant that is used to provide velocity feedback to the servo.
  - It is the multiplier that is used with a velocity that is internally generated by a digital differentiation of the feedback position.
  - Velocity feedback is generally provided by a tachometer in an analog servo system and is used to dampen the response of the system.
- **CMP & CM2 Modes:** Range 0 to 32K.  $X^2$  Compliance Gain.
  - When the port is the second port of a compliant pair, this V-Gain parameter provides the multiplier for the square of the force feedback.



**❖ P-Gain –**

- **Proportional Error Gain:** Range 0 to 32K. This gain factor uses 32,767 as the maximum or 100% value of this gain.
  - This is the direct error feedback, or proportional gain multiplier.
  - It is used to multiply the difference between desired position and the feedback position.
    - Where the desired position is the command position generated by the use of the velocity and acceleration functions of the servo.
- **CMP & CM2 Modes:** Range 0 to 32K. Linear compliance Gain.
  - When the port is the second port of a compliant pair, this P-Gain provides the linear multiplier of the force feedback.

**The following three parameters (Acel, Decel, and Vel) are used to provide a smoothing of the outputs from the effects of large changes in the animation input positions.**

**❖ Acel –**

- **Acceleration Maximum:** Range 0 to 32K.
  - Acel is the rate that the velocity changes for increases of velocity. It applies to increases in magnitude and not direction of velocity.

**❖ Decel –**

- **Deceleration Maximum:** Range 0 to 32K.
  - Decel is the rate that the velocity changes for decreases of velocity. It applies to decreases in magnitude and not direction of velocity.

**❖ Vel –**

- **Velocity Maximum:** Range 0 to 32K.
  - Vel is a maximum value which velocity can have for generation of the desired position. For this process the Vel is obtained by the integration of (Acel or Decel) over time. Desired position is the result of (Vel) with respect to time.

**❖ Ease-Vel –**

- **Ease-In Rate:** Range 0 to 32K.
  - This is the ease-in velocity that is used during an E-Stop with E/S enabled, or when the Set command is issued.

The following five enables are power-on settings. The commands in the cue will override these parameters during the course of the program operation.

- ❖ **Set Enb –**
  - Set Enable - A check mark placed in this field allows set commands to be used.
- ❖ **Ramp Enb –**
  - Ramp Enable - A check mark placed in this field allows ramp commands to be used.
- ❖ **Ani Enb –**
  - Animation Enable - A check mark placed in this field allows animation data to control the unit.
- ❖ **Out Enb –**
  - Out Enable - When a check mark is placed in this field, the valve voltage/current output will change based on the desired position and servo loop. When there is no check mark in this field, the valve output will be zero voltage and zero amps (off).
- ❖ **E/S Enb –**
  - Emergency Stop Enable - A check mark placed in this field makes the unit go to the home position when an emergency stop occurs.
    - No check mark in this field enables the unit to hold its current position when an emergency stop occurs.
- ❖ **Home-Pos –**
  - Home Position: Range 0 to 4095. Position to go to in when an Emergency Stop occurs (moves at the Ease-in rate).
- ❖ **Offset –**
  - Position Feedback Offset: Range 0 to 4095. Minimum Retract (amount to scale up data from the bottom).
    - This specifies the lowest position that the servo will generate for the desired position.
  - CMP – Single Bipolar compliance Feedback: Range 0 to 2047. Decreases the compliance feedback the amount specified here.
  - CM2 – Dual Unipolar Compliance Feedback: Range 0 to 4095. Decreases the drive in the negative direction (compl fb1) by the amount specified here.

**❖ Stroke –**

- **Position Feedback Stroke**: Range 0 to 4095. Maximum Extend (amount to scale down data from top).
  - This specifies the highest position that the servo will generate for the desired position.
- **CMP** - Single Bipolar Compliance Feedback: Range 0 to 2047. Increases the compliance feedback by the amount specified here.
- **CM2** – Dual Unipolar Compliance Feedback: Range 0 to 4095. Increases the drive in the positive direction (comp fb2) by the amount specified here.

**❖ Poll –**

- **Enable** – A check mark in this field enables a poll of the ASM for the data of the following four fields.
- **Status** – Blinks when the software receives the data from the ASM.
- **D-Pos** – Desired Output.
- **F-Back** – Feedback.
- **C-Out** – Command out to Valve.
- **F-Error** – Following Error.

## 5.2 Software Configuration

Software configuration is necessary to ensure proper operation. The ASM must be configured and downloaded by the ASM utility software. There are three different pages for ASM software configuration - ASM Tune, ASM Config and ASM Online.

### 5.2.1 ASM Tune

There are eight ports on the ASM module. Each port needs parameters and limit values defined for correct operation. Enter the information for each port on this page.

Select the function for the port based on the type of device connected to it:

- SRV** = Servo Mode
- UNI** = Unipolar Mode
- BIP** = Bipolar Mode
- CMP** = Single Feedback Compliance Mode
- CM2** = Dual Feedback Compliance Mode

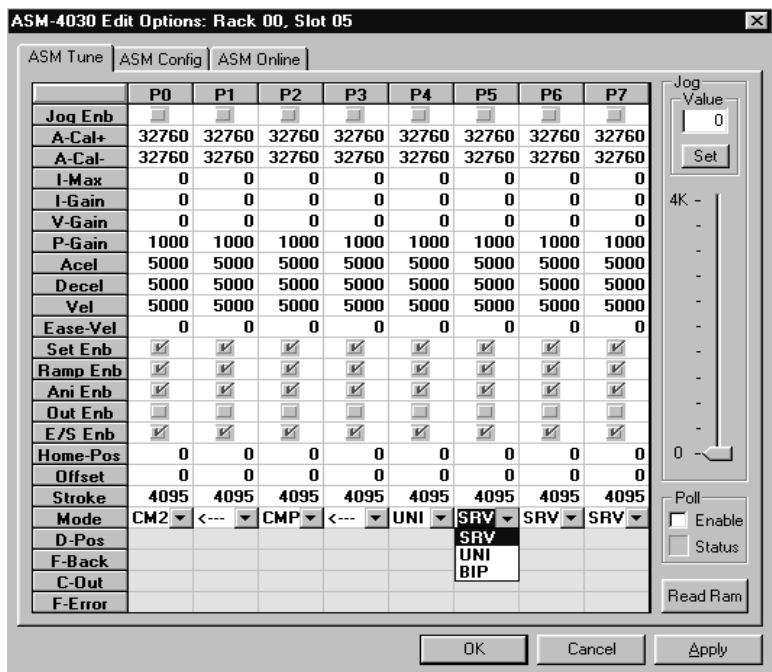
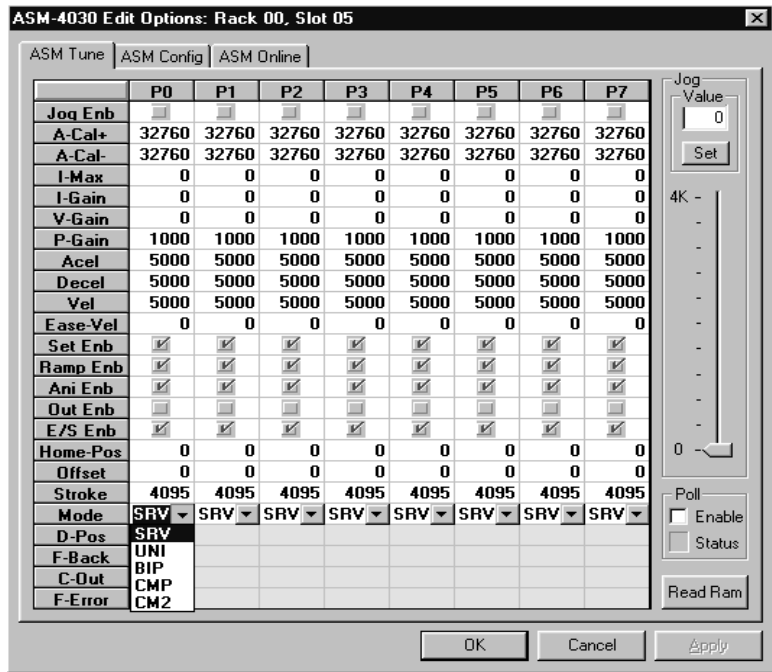
Click on the scroll arrow, the pull-down menu appears. Point to the desired mode and left click.

Only the EVEN numbered ports may be configured for the Compliance Feedback modes. The scroll bar for the ODD numbered ports do not have the option available.

To enter values, highlight the value to change, double left click to select then type in the value.

To test and manually manipulate the operation of devices from this menu, place a check mark on the jog enable. The slider bar on the right side of the screen will cause the device to move accordingly.

Also, to view the analog information during operation, place a check mark in the Poll Enable. This will display the values in the yellow portion of the menu.

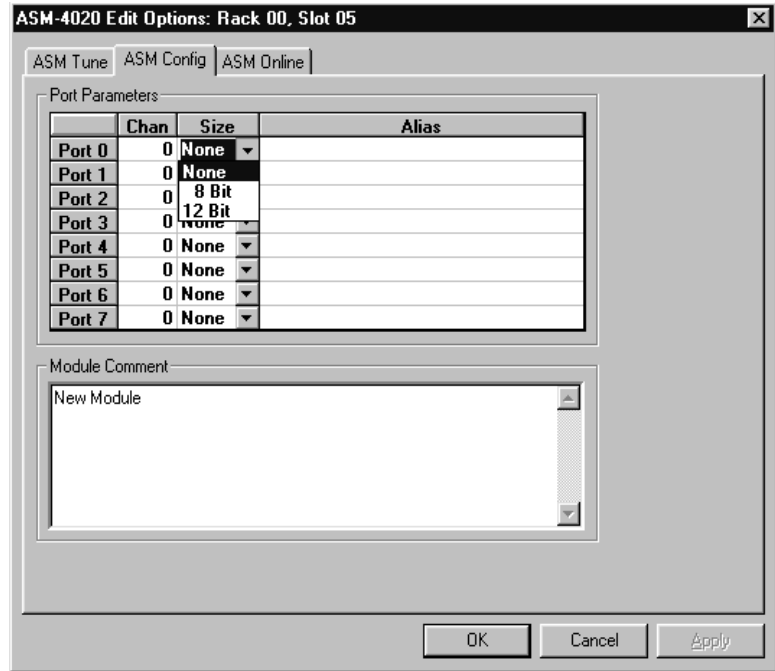


## 5.2.2 ASM Config

The ports are assigned to channels for communication to the ICM. Enter the channel number of the port assignment on this page.

The size of the port must be specified. It may have either 8 or 12 bits of information.

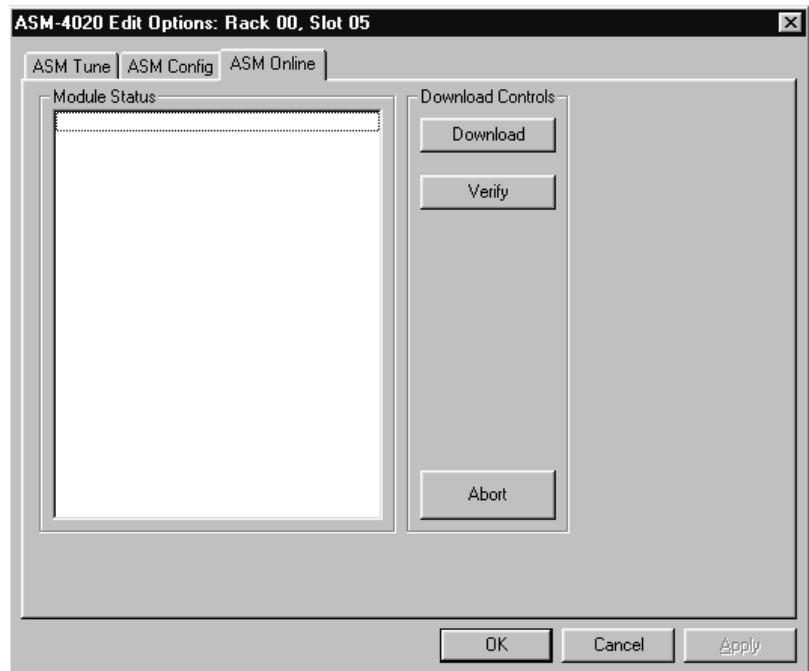
The port may have an Alias assigned to it for programming use. Enter the name of the alias next to the port.



## 5.2.3 ASM Download

When the information has been entered, send the information to the module by downloading it from the ASM online menu.

It is recommended to perform a verify after the download is complete.



### 5.3 Supported Command Formats

The following is a list of commands used with the ASM. See section 5.4 for example usage of listed commands.

Verb	RSP	Token1	Param1	Token2	Param2	Token3	Param3
Set	'Alias'	Animation	0				
Set	'Alias'	Animation	1				
Set	'Alias'	Output	0				
Set	'Alias'	Output	1				
Set	'Alias'	Set	0				
Set	'Alias'	Set	1				
Set	'Alias'	Ramp	0				
Set	'Alias'	Ramp	1				
Set	@r0,0,0	To	0				
Set	@r0,0,0	To	4095				
Set	@r0,0,7	To	@v10				
Set	@r31,16,7	To	@o500				
Set	'Alias'	To	@i900				
Ramp	@r0,0,0	To	0	In	00:00:00.29		
Ramp	@r0,0,0	To	4095	In	00:00:00.29		
Ramp	'Alias'	To	@v10	In	@v20		

## 5.4 Application Example

There are several ways to use the ASM-4030. Below are some brief examples, (refer to the MP 4000 User's Programming Manual for more information). See also, section 3.1, Typical Installation Example of this manual for additional information.

**Configure the ASM** – For the purpose of this example, the ASM will be in Rack 0, Slot 0.

- ❖ Referencing the ASM ports:
  - Specify the physical location of the ASM –
    - Port 0 on the ASM can be referenced as @r0,0,0 (Rack 0, Slot 0, Port 0).
    - Port 1 on the ASM can be referenced as @r0,0,1 (Rack 0, Slot 0, Port 1).
  - Use an Alias –
    - If Port 0 is assigned the Alias 'Analog0', then it can be referenced as 'Analog0'.
  - Specify the Logical Channel it has been assigned (on the ASM config menu) –
    - If Port 0 is assigned to output channel 10, it can be reference as @o10.
  - Assigning a port to a logical channel below 512 allows that port to be controlled by an animation data file.

**The ASM assignments allow the ports to be used in Cue scripts in several ways:**

Set @r0,0,0 to 0;                Sets Rack 0 Slot 0 Port 0 to position 0 (retracted).  
 Set @r0,0,0 to @v20;        Sets position to the value stored in Variable 20.  
 Set @r0,0,0 to @o10;        Sets position to the value in logical output channel 10.  
 Set 'Analog0' to 2048;       Sets position to 2048 (1/2 full stroke).  
 Set 'Analog0' to @v20;       Sets position to the value stored in Variable 20.  
 Set 'Analog0' to @o10;       Sets position to the value in logical output channel 10.  
 Ramp @r0,0,0 to 4095 in 00:00:00.29; Ramp to position 4095 (full extended) in 29 frames.

The following cue statements function similar to the enables on the Tune Menu of the Media Pro® 4000 software:

Set @r0,0,0 Animation 0;    Disables Animation.  
 Set @r0,0,0 Animation 1;    Enables Animation.  
 Set @r0,0,0 Output 0;        Disables Output (0 vdc).  
 Set @r0,0,0 Output 1;        Enables Output.  
 Set @r0,0,0 Set 0;            Disables Set commands.  
 Set @r0,0,0 Set 1;            Enables Set commands.  
 Set @r0,0,0 Ramp 0;         Disables Ramp commands.  
 Set @r0,0,0 Ramp 1;         Enables Ramp commands.

Once an animation file is configured in the ICM, and downloaded, playing the animation file will cause all ports with logical addresses that are defined in the animation file to change with the contents of the animation data, IF animation is *enabled* on that port.



## 5.4.1 Load Status Command Syntax

### ❖ Generic Syntax of Status Statements

#### ➤ Loading the persistent update of status is:

```
LOAD @Vvvv WITH @Rr,s,p STATUS n BYTE L-H;
LOAD @Iiii WITH @Rr,s,p STATUS n BYTE L-H;
LOAD @Oooo WITH @Rr,s,p STATUS n BYTE L-H;
LOAD @vvvv WITH @Qqqq STATUS n BYTE L-H;
LOAD @vvvv WITH @Aaaa STATUS n BYTE L-H;
LOAD 'Alias_1' WITH 'Alias_2' STATUS n BYTE L-H;
```

- Where the number 'n' selects the status-of-interest.
  - If n is a number higher than the highest status available, 0's will be returned.
- Where the range L-H specifies the first and last bytes of the range to move.
  - Where 0 is the Least Significant Byte.
  - If the range selected is larger than the value returned the upper remaining bytes will be set to 0's.
- If the range selected is larger than the destination the next object(s) will be filled also.

```
IE: Load @i123 with @Rr,s,p Status 0 Byte 0-3;
```

```
Fills @i123 with byte 0
Fills @i124 with byte 1
Fills @i125 with byte 2
Fills @i126 with byte 3
```

#### ➤ Unloading the persistent update of status is:

```
Unload @Vvvv;
Unload @Iiii;
Unload @Oooo;
Unload 'Alias';
```

## 5.4.2 Port Status Available

Port Status Available in the ASM-4020, with Firmware ASM42D04.cod, ASM42B04.cod.  
 Index Numbers for Status Available by Port.

n	Description	L-H
0	<b>Port Status Bits</b>	0-3
	Port Status has Changed bit 0	
	Port Not Configured bit 1	
	Port E-Stopped bit 2	
	Animation Disabled bit 3	
	Set Disabled bit 4	
	Ramp Disabled bit 5	
	Output Disabled bit 6	
	E-Stop Disabled bit 7	
	Unipolar Output Enabled bit 8	
	Direct Output Enabled bit 9	
	12 bit Input Enabled bit 10	
	Home Position Enabled bit 11	
	Compliance Enabled bit 12	
1	Following Error	0-1
2	Command Out	0-1
3	Feedback Position	0-1
4	Command Position	0-1
5	Animation Data	0-1
6	Velocity	0-1

Example: Load Variable 123 with the feedback position of the ASM in rack 31, slot 16, port 7.

```
LOAD @V123 WITH @R31,16,7 STATUS 3 BYTE 0-1;
```

@v123 will be filled with a value between 0 and 4095.

### 5.4.3 Board Status Available

Board Status Available in the ASM-4020, with Firmware ASM42D04.cod, ASM42B04.cod.  
 Index Numbers for Status Available by Board.

n	Description	L-H
0	<b>Board Status Bits</b>	0-3
	Board Status has Changed	bit 0
	Some Port Status has Changed	bit 1
	Board was Reset	bit 2
	Running Download Code	bit 3
	E-Stop Bus Input	bit 4
	Constant Bus Input	bit 5
	Delayed 5v Input	bit 6
	Hardware Problem	bit 7
	No Download Code	bit 8
	No Configuration in Flash	bit 9
	No Parameters in Flash	bit 10
	Board Command Error	bit 11
	Maintenance Mode	bit 12
	Program Mode	bit 13
1	Boot Version Number	0-1
2	Download Version #	0-1

Example: Load Variable 123 with the Download Version to the ASM in rack 31, slot 16

```
LOAD @V123 WITH @R31,16 STATUS 2 BYTE 0-1;
```

@v123 will be filled with a value representing the version number of the downloaded firmware.



# 6 Section 6 – Appendix

The following pages contain technical briefs relating to this module. There are additional technical briefs on the ASI website and new briefs are added on an on-going basis. Please visit the website for updated information –

<http://www.Anitech-Systems.com>

Updated manuals are placed on the Web periodically. Please check to see if a more recent revision is available on the website. Revision numbers are located in the footer of the manual pages.

Also, a glossary of terms is in this section, for terms used by ASI as well as terms used in the Show Control Industry.

## 6.1 Saving Files from a Web Page without Displaying -

This is useful for retrieving a non-formatted page that is not intended for viewing:

### From Internet Explorer® Browser

- 1 - Saving files from a Web page.
  - A) To save a file without opening it:
    - 1) **Right**-click on the link for the item you want, a pop-up menu appears,
      - (a) Select, then Left-click **Save Target As**
      - (b) Enter the desired folder and filenames and select **Save**

### From Netscape® Communicator Browser

- 1 - Saving files without displaying them.
  - A) To save a file without viewing it:
    - 1) **Right**-click on the file's link to display a pop-up menu,
      - (a) Select, then Left-click **Save Link As**
      - (b) Enter the desired folder and filename and select **Save**

## 6.2 Power Specification for Continuous *Normal* Operation

The power usage and requirements for Media Pro® modules are depicted in the following table. It is important that ***both*** of the following considerations are evaluated for proper system configuration:

- ✓ The power usage of the modules does not exceed any *individual* maximum current and wattage.
- ✓ The sum of the modules do not exceed the supply *overall* maximum wattage.

### ASM-4030, PCB 11106-B

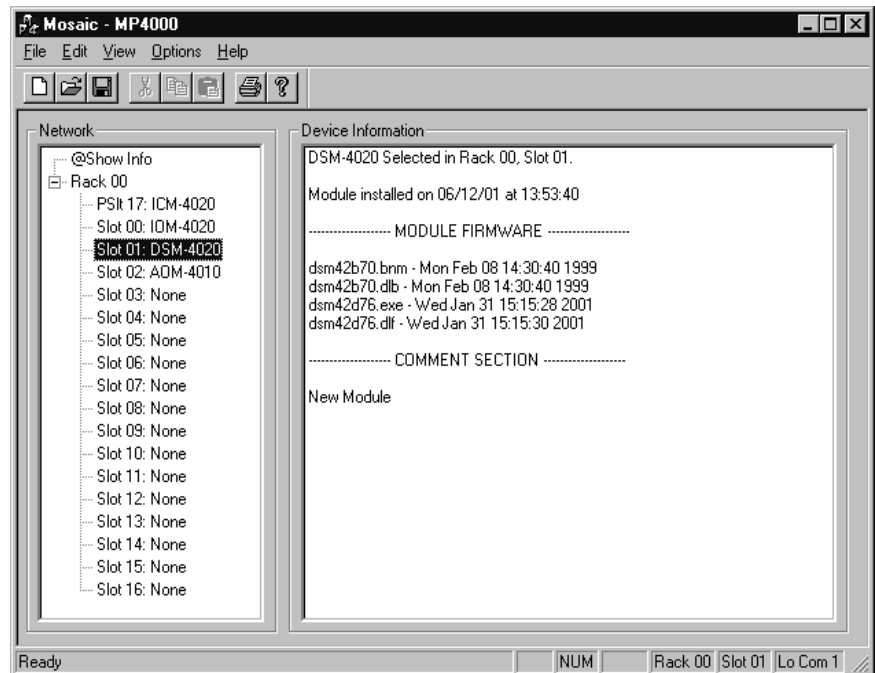
Voltage	Current Requirements (Amps)			Wattage Requirements (VA)		
	Min	Typical	Max	Min	Typical	Max
DC						
+ 5	0.200	0.250	0.300	1.00	1.25	1.5
+ 12	0.000	0.000	0.000	0.00	0.00	0.0
- 12	0.000	0.000	0.000	0.00	0.00	0.0
+ 24	0.100	0.450	4.000	2.40	10.80	96.0
				3.4	12.1	98.

## 6.3 Downloading New Version of Firmware to a Module

There may be circumstances where the firmware version of a module may need to be upgraded in the field. The information in this section will describe the process of downloading a new version of firmware from the Anitech Systems website and installing it into the module.

### Verify Current Version –

- ✓ Open the MP4000 software.
- ✓ Click on the desired module.
- ✓ Module firmware versions are displayed in the Device Information section of the screen.



### Download Firmware Code From Website –

- ❖ Visit the Anitech Systems website ([www.anitech-systems.com](http://www.anitech-systems.com)).
  - Click on the Support link.
  - Scroll to the correct module type.
  - Highlight and select the Firmware column.
    - Select the correct module version.
      - Select the appropriate sub-file, this is dependant on the module revision level. (Refer to File Name Conventions in the Media Pro® 4000 manual, section 5.2.1, for a detailed explanation of firmware file names.)
      - When the file is selected, it needs to be saved to the disk. Since browsers vary, refer to the brief, "Saving Files from a WebPage without Displaying " in Section 6.1 of this manual.
        - ◆ Enter the Directory and Filename information on the pop-up Menu and press the Save button. The file will be saved to the disk.
- ❖ Also, carefully read the most recent ReadMeMP.txt. It is found on the website at the following address:
  - <http://anitech-systems.com/MP4000/manual/briefs/ReadMeMP.txt>
  - Exit the Website.

**Return to the MP4000 Software –**

➤ **Note:** Before attempting to download the firmware to a module, place the switch on the ICM front panel to the **Test** position. This will enable the rack to download faster and with minimal interference. Placing the switch in the test position affects the racks as described below:

- **Rack 0 (master)** – Allows the Rack to concentrate on the download information. Quits the cues and animation from running and stops the broadcast over the MP Net.
- **Other Racks (slaves)** – Still receives the information, but ignores it while the download is being performed.
- **NOTE:** When downloading to a slave rack over the MPNet, turn the **Rack 0 ICM** switch to the **Test** position in order to minimize interference and enable a successful download.

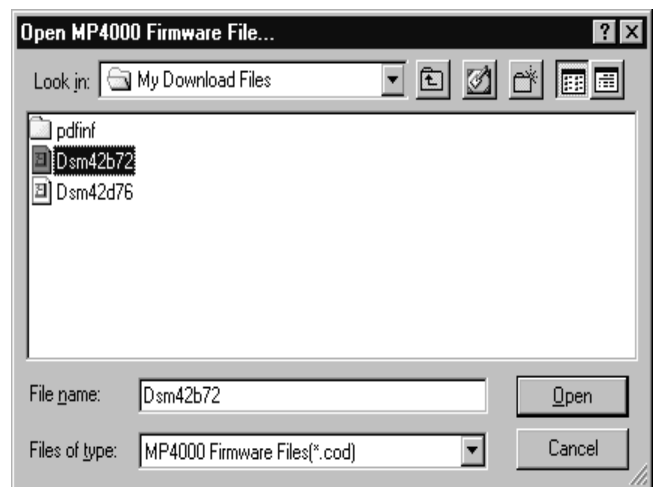
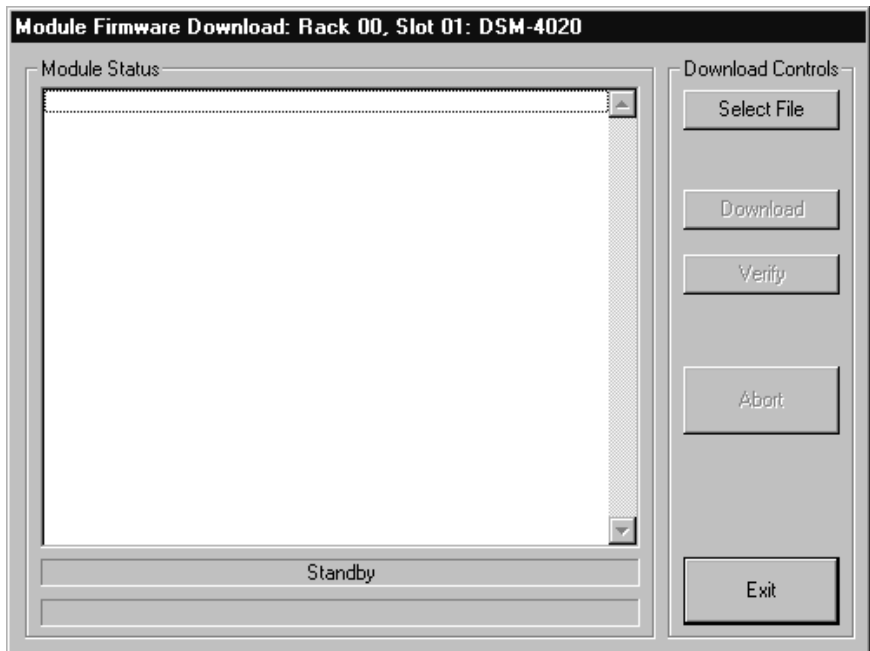
❖ Open the MP4000 software and select the **Showfile**.

❖ Highlight the module desired and left click. The module’s information is displayed in the **Device Information** section.

➤ Select **OPTIONS** from the Menu bar across the top of the MP4000 Menu screen.

- From the scroll down menu, highlight and select **MP4000 FIRMWARE**. The Download menu appears.

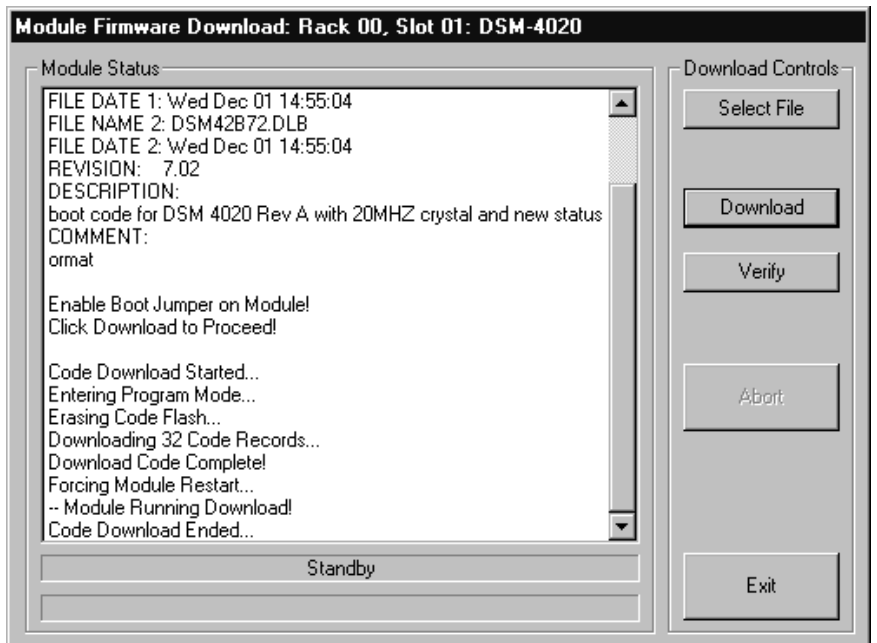
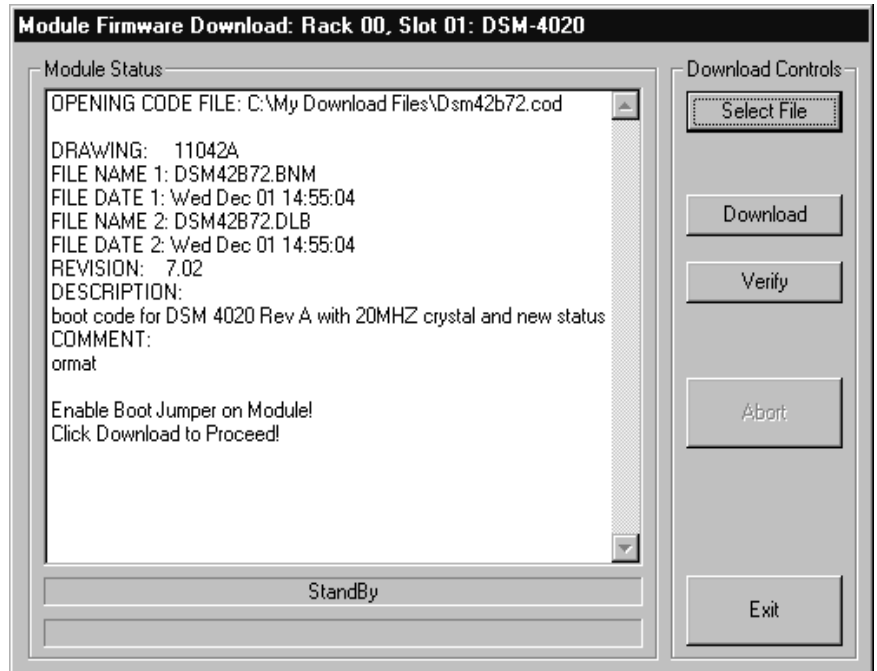
- In the **Download Controls** section of the menu, press the **Select File** button. A menu pops up for the selection of the file. Find the directory and filename, then double-click to select and open it.





## Install the firmware Code in the Module –

- ❖ The download screen reappears and displays the firmware information in the **Module Status** section of the screen.
- ❖ Be Certain to Read the **Description & Comment** sections of the firmware information for considerations and restrictions of use.
- ❖ Refer to the **ReadMeMP** file found on the Website.
- ❖ Press the **Download** button to proceed, or **Exit** to abort the operation.
  - Once the **Download** has started, messages appear on the screen to detail the process that is taking place. When it is finished, **Code Download Ended** message is displayed.
- ❖ It is recommended to run a verify after the download on modules that have the option available. Press the **Verify** button and watch for the **Code Verify Ended** Message.
  - If another download is necessary, then press the **Select File** button and repeat the download process for the next file needed.
  - Press the **Exit** button to end the download process.



The new versions of the firmware will be displayed in the **Device Information Pane** of the **MP4000** menu.

## Glossary

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<b>ALIAS</b>	English representation contained within single quotes that references an object.
<b>.ani</b>	Extension used for Animation files.
<b>ASCII</b>	A numeric code used by computers to represent characters.
<b>BIT</b>	A single logical or physical resource that can be either ON (true, 1) or OFF (false, 0).
<b>COMMENT</b>	Text following a semicolon on an event line within a cue, it is used to annotate the cue.
<b>COMPLIANCE</b>	Additional feedback applied according to the equations in the firmware and parameters supplied by the user that tends to reduce the output signal.
<b>CONST</b>	Constant
<b>CONTACT CLOSURE</b>	Completes a circuit. A voltage is applied to a reference pin of a bit's connector. When the switch is closed, the voltage is returned on another wire to the same bit, completing the circuit. When the switch is closed, the I/O pin gets voltage.
<b>CUE</b>	A list of up to 512 EVENTS containing verb, object, token, and variable items.
<b>db</b>	Decibel
<b>E/S</b>	Emergency Stop
<b>EVENT</b>	A single line of verb, object, token and parameter items contained in a CUE.
<b>FET</b>	Field Effect Transistor - an electronically controlled switch.
<b>FLASH</b>	Fast, electrically erasable, and programmable in the circuit non-volatile memory devices.
<b>FW</b>	Firmware
<b>HMR</b>	Horizontal Module Rack
<b>HW</b>	Hardware

---

<b>ICM</b>	Intelligent Controller Module
<b>I/O</b>	Input/Output
<b>IOM</b>	Input/Output Module
<b>JMP</b>	Push-on jumper, shunt - a small (approximately 1/4" x 1/8" thick) piece of plastic with a metal insert. The jumper is set by pushing it down over a pair of pins.
<b>KEY</b>	A piece of hardware that keeps a module from being plugged into a slot that is wired and keyed for a different kind of module.
<b>LABEL</b>	A name, followed by a colon on a line of a CUE, used for a forward or backward jump.
<b>LED</b>	Light Emitting Diode (indicator, light, lamp)
<b>MIDI</b>	Musical Instrument Digital Interface
<b>MPCL</b>	Media Pro® Control Language
<b>OBJECT</b>	Term used to reference a resource within the Media Pro® system.
<b>OFF</b>	False, 0, Open
<b>ON</b>	True, 1, Closed
<b>PARAMETER</b>	The item that follows a token. The list of parameters is in section 3 of the MP4000 User's Operation Manual.
<b>PLC</b>	Programmable Logic Controller
<b>PORT</b>	A resource on a module in case of the DSM. There are 2 ports.
<b>P-P</b>	Peak to Peak
<b>RACK</b>	A card cage containing Media Pro® 4000 Modules.
<b>RESOURCE</b>	A controllable device connected to or contained within the Media Pro® 4000 system.
<b>RMS</b>	Root Mean Squared
<b>SLOT</b>	A physical location in a RACK that contains a Media Pro® Module.

<b>SMPTE</b>	Refers to <b>Society of Motion Picture &amp; Television Engineers</b> , and the standard for timing signals set by this group.
<b>STRING</b>	A collection of alphanumeric characters contained in double quotes, used with the <b>DISPLAY</b> command.
<b>SW</b>	Software
<b>THD &amp; N</b>	Total harmonic distortion and noise
<b>TOKEN</b>	Reserved words for modifiers of the <b>VERBs</b> used in a cue event. The list of <b>TOKENs</b> is in section 3 of the MP4000 User's Operation Manual.
<b>TYPE</b>	The kind of <b>OBJECT</b> being referred to in a direct addressing statement. The list of <b>TYPEs</b> is in section 3 of the MP4000 User's Operation Manual.
<b>VAC</b>	Volts Alternating Current
<b>VARIABLE</b>	A 32-bit value that can contain a number used in a cue line. A variable may be assigned an <b>ALIAS</b> . There may be a maximum of 512 variables per system.
<b>VDC</b>	Volts Direct Current
<b>VERB</b>	Reserved words for the actions used in a <b>CUE EVENT</b> . The list of <b>VERBs</b> is in section 3 of the MP4000 User's Operation Manual.
<b>VMR</b>	Vertical Module Rack.
<b>.wav</b>	Extension used for <b>WAVE</b> files, contains sound data.
<b>Z-RAILS</b>	Two Z-shaped rails on the back of the rack, adjacent and parallel to the space for the I/O connectors on the Modules when the modules are inserted. The field connectors attach to the Z-rails.