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3.2 Configuration of the Adept MV Controller

The Adept MV controller must be configured with the correct amount of memory (DRAM) on the System Processor module for the application being performed. If you are installing additional MI6 modules on an existing system, you must make sure there are the correct number of 030 or 040 modules to perform the application. If you are uncertain of these requirements, please contact Adept Customer Service. See section 3.6 on page 32 and the *Adept MV Controller User's Guide* for general information on controller installation and setup.

3.3 Switches, Jumpers and Resistor-Packs on the MI6 Module

This module may be configured using switch, jumpers and moveable/replaceable Resistor-packs. Check the settings in this section to see that they are configured correctly for your application. The default settings from the factory will work for most situations, but you may need to change something depending on your application and the type of hardware you are using.



CAUTION: If you are not familiar with removing and installing VME modules in the Adept MV controller, refer to the *Adept MV Controller User's Guide*. You must turn off power to the controller before removing or installing modules. Also, observe proper precautions against damage from static electricity.

VMEbus Address Settings

Each motion interface module must have a unique VMEbus address. The information in Table 3-1 shows how to set the address. The address is set at DIP Switch SW1 on the MI3/MI6 PC board. To operate the switch, use a small insulated instrument, such as the point of a pen. Each switch position is a miniature slide switch. To open a switch, slide the switch to the side marked open (some switches may be marked On; On = Closed). See Figure 3-1 for the location of SW1.

NOTE: If you have multiple motion interface modules, refer to the *Adept MV Controller User's Guide*

Table 3-1. VMEbus Address Switch Settings for MI6 Module

MI6 Module Number	Switch Position on Switch SW1			
	1	2	3	4
1	Closed	Closed	Closed	Closed
2	Closed	Closed	Closed	Open
3	Closed	Closed	Open	Closed
4	Closed	Closed	Open	Open
5	Closed	Open	Closed	Closed
6	Closed	Open	Closed	Open

Drive Fault Block Delay Time

The jumper locations shown in the table below control the delay time on responding to an amplifier fault immediately after the amplifier has been enabled with a Drive Enable signal. This delay allows a period of time for the drives to stabilize electrically. Each axis is controlled by one jumper – the delay time for an axis can be either 0.5 sec (the default) or 1.0 sec. The default setting should be sufficient in almost all cases. See Table 3-2 for the settings for the delay time durations. See Figure 3-1 for the location of the jumpers on the MI6 board.

Table 3-2. Delay Time Settings for MI6

Encoder Channel	**1**	**2**	**3**	**4[a]**	**5**	**6**
Jumper Number	**JP6**	**JP8**	**JP10**	**JP12**	**JP13**	**JP15**
0.5 seconds (default)	On	On	On	On	On	On
1.0 seconds	Off	Off	Off	Off	Off	Off

[a] Channels 4, 5, and 6 are not supported on the MI3 module.

Encoder Input Configuration (Differential vs. Single-Ended)

The MI6 board is shipped from the factory with the encoder circuitry set for differential encoder input. Adept strongly recommends using encoders with differential outputs for maximum noise immunity, and to support the "broken-wire"/encoder fault detection circuit on the MI6. However, AdeptMotion VME can be configured for use with single-ended encoders. See Table 3-3 for configuration details. See also Figure 3-1 for resistor pack locations, and Figure 3-10 on page 48 for encoder circuit schematic.



WARNING: Installing the resistor pack in the position for "Single-ended Output" will automatically disable the "broken-wire"/encoder fault detection. This will override the software setting described in the section "Encoder Broken-Wire Detection" on page 106. (The broken-wire detection feature is not compatible with single-ended encoders.) If your encoder fails, and the detection feature is disabled, damage or injury could result.

Table 3-3. Encoder Input Settings for MI6 Board

Encoder Channel	**1**	**2**	**3**	**4[a]**	**5**	**6**
Differential Output – Default, 470 ¾ SIP in these RP sockets → (signal failure detection enabled)	RP3	RP6	RP9	RP12	RP15	RP18
Single-ended Output – move SIPs from above to these RP sockets → (signal failure detection disabled)	RP2	RP5	RP8	RP11	RP14	RP17

[a] Channels 4, 5, and 6 are not supported on the MI3 module.

Encoder Terminating Resistors

The MI6 board is shipped from the factory with 330¾ encoder input terminating resistors installed to suit RS-422 style encoders; see Table 3-3. The resistors are socketed, 6-pin SIP packages. In rare cases, if you are using encoders with non-RS-422 output, you can replace the 330¾ resistor with a different value (the value chosen would depend on the specific encoder type).

Table 3-4. Location of Encoder Terminating Resistors on MI6 Board

Encoder Channel	1	2	3	4[a]	5	6
Line terminating resistor, default 330¾, to suit RS-422 encoders, can be changed for non-RS-422 encoders.	RP1	RP4	RP7	RP10	RP13	RP16

[a] Channels 4, 5, and 6 are not supported on the MI3 module.

Encoder Configuration (Software Parameters)

In addition to the hardware-configured encoder options, certain additional encoder-configuration features are specified by software parameters. See “Encoder Configuration: Zero-Index, Error Reporting, and Filtering” on page 105.

Encoder Filtering

If your encoders are excessively noisy, or you have electrical interference to the encoder power supply or wiring, you should first see “Proper Wiring and Electrical Design Practices” on page 26. If, after reviewing your electrical installation, you need to filter out noise on your encoder lines, you can use the Encoder Configuration value to select additional hardware digital-filtering, as described on page 107. This will reduce the maximum encoder count rate to 1 MHz.

MI6 Logic Voltage Configuration for Digital Input Signals

The MI6 can be configured to operate with either a 5V (min 3.0V, max 5.7V) or a 12/24V (min 8.75V, max 27.5V) logic interface. *You must configure the MI6 voltage option, and then install the MP6 Machine and Servo panels accordingly.* The MI6 is normally shipped configured for 12V input, and must be reconfigured if you decide to operate at 5V. (Alternative resistors, for 5V operation, are included in the MP6 kit.)

The *input* voltage is determined by the value of a 6-pin resistor pack. See Table 3-5 for configuration details and Figure 3-1 for resistor pack locations.

The *output* voltage is not affected by this setting. All MI6 outputs will function from 5V to 24V without configuration. (See page 39 and page 42.)

Table 3-5. MI6 Voltage Configuration Resistor Values for 12V or 5V Operation

Channel (Home, Overtravel, Drive Fault)	**1**	**2**	**3**	**4[a]**	**5**	**6**
12V and 24V Logic (min 8.75V, max 27.5V)	RP19 = 2.7K Ω	RP20 = 2.7K Ω	RP21 = 2.7K Ω	RP22 = 2.7K Ω	RP23 = 2.7K Ω	RP31 = 2.7K Ω
5V Logic (min 3.0V, max 5.7V)	RP19 = 470 Ω	RP20 = 470 Ω	RP21 = 470 Ω	RP22 = 470 Ω	RP23 = 470 Ω	RP31 = 470 Ω

[a] Channels 4, 5, and 6 are not supported on the MI3 module.

Analog Power Source Selection

The MI6 has six ±10V analog command outputs which are used to command the motor drive amplifiers. The analog commands are generated by six Digital-to-Analog-Converters (DAC). The DAC's require +12V, –12V, and Power Return (ground). The MI6 may be configured to draw this ±12V dc supply from *either* the controller internal power supply, *or* an external user-supplied voltage source.

In most installations you can use the factory-default setting, internal power. However, using the external power option may be necessary if your Drive Amplifiers do not have a floating, differential, analog Command Drive input. (Some drive amplifiers reference their analog input to their own internal power supply. This can cause a voltage conflict or else a ground loop when the Adept controller and the amplifier are connected.)

When using the external power option, the analog circuits on the MI6 (the DAC's and the analog output drivers) are fully optically-isolated from the digital circuits on the MI6. This may also help to improve noise immunity when the Adept controller is being operated in an electrically-noisy environment.

The MI6 is normally shipped from the factory configured for Internal Analog Power. The user should verify this setting, and can change it using jumpers JP1, JP2, JP3, and JP19. When the MI6 is set to external power, the user must provide ±12V dc power using the +12VDC, -12VDC, and RTN connections on the MP6-S. (When the MI6 is set to internal power, the user does not have to provide Analog Power to the MP6-S.)

Jumpers JP1, JP2, and JP3 each consist of a 3-pin header, and a jumper that can be used to link either pins 1 and 2 (internal power) or pins 2 and 3 (external power). Jumper JP1 controls the +12V source for all six channels of the MI6. Jumper JP2 controls the –12V source for all six channels, and jumper JP3 controls the power return (ground reference) for all six channels. Jumper JP19 connects the analog ground to the chassis ground. See Table 3-6 for the jumper settings and Figure 3-1 for jumper locations.



WARNING: Jumpers JP1/2/3 *must* be changed together. You must either set all three jumpers for internal power, or all three for external power. You must not mix the settings, as this could cause unpredictable robot motion.

Table 3-6. Analog Power Source Jumper Settings

JP1	JP2	JP3	JP19	Description
1 – 2	1 – 2	1 – 2	On	±12V power to analog section supplied by MP6 module (default). Analog ground connected to Chassis ground.
2 – 3	2 – 3	2 – 3	Off	User-supplied ±12V power to analog section. Analog ground not connected to Chassis ground.

Other Required Jumper Settings

The following jumper should be set as indicated below.

Table 3-7. Additional MI6 Jumper Settings

Jumper Number	Required Setting
JP4	Jumper installed

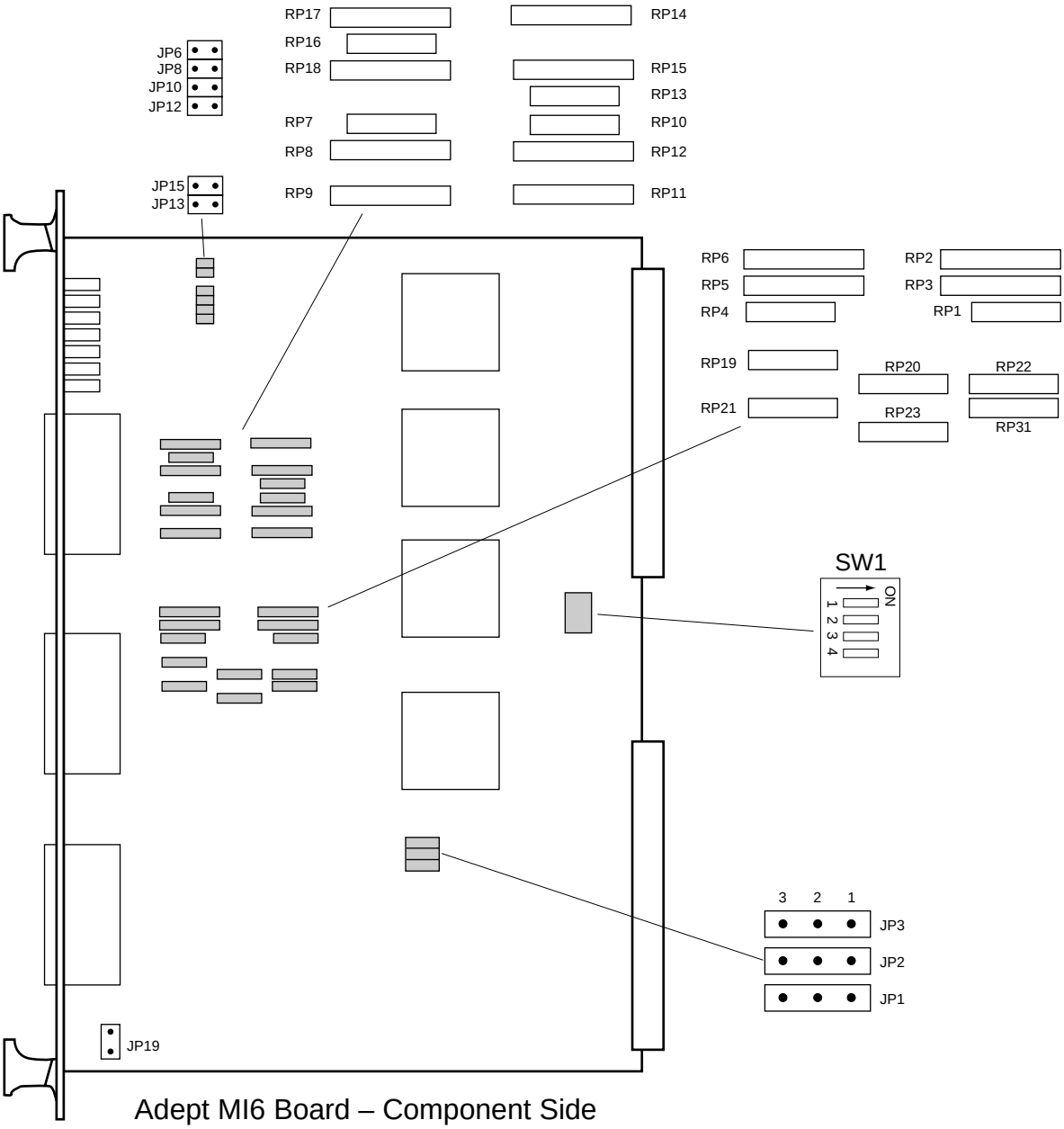


Figure 3-1. Switch, Jumper and Resistor-pack Locations on the MI6 Boards

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