Users Guide
Integrated, Intelligent (I²) Servo Systems
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Model Numbers:
34i08-37   34i15-37
34i30-37   34i30-75

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1. Description:

This guide is intended to as a reference to familiarize users with the basic functions of the I² Motor servosystem.

2. Warnings, Cautions and Notes:

Please read all equipment labels and manuals before attempting to use the I² Motor servo system. All documentation for the I² Motor product line can be found at: http://www.specialtymotors.com

<table>
<thead>
<tr>
<th>WARNING:</th>
<th>Do not use this product in wash-down or other application where it is not sufficiently protected from the environment, water or other fluids.</th>
</tr>
</thead>
<tbody>
<tr>
<td>![WARNING]</td>
<td>Always use this product in accordance with relevant electrical codes and always follow good electrical safety practices.</td>
</tr>
<tr>
<td>![WARNING]</td>
<td>This product is capable of producing high speed and torque, always follow safe practices when connecting shaft to equipment or operating near personnel.</td>
</tr>
<tr>
<td>![CAUTION]</td>
<td>Never apply more than 24 V DC to any of the inputs or outputs of this system.</td>
</tr>
<tr>
<td>![CAUTION]</td>
<td>Read I² Motor Installation manual prior to installing this product in any equipment.</td>
</tr>
</tbody>
</table>
3. Installing the I² Wizard:

The I² Wizard is a free I² Servosystem host program for Windows PCs. With the program downloaded to your PC you can accomplish all functions to setup, program and manage the saving and loading of settings of the I² Motor.

The Wizard can be downloaded free from Specialty Motors’ website at [www.specialtymotors.com](http://www.specialtymotors.com). When downloaded the Wizard consists of two files, an executable and data file. We recommended that you put these two files in their own directories on a host PC hard drive. The Wizard can save the programs and parameters for the I² Motor with (.i2m) extension. The (.i2m) files can be managed and moved like any other file in windows.

To download the Wizard onto your computer follow Download instructions from the Specialty Motors web site at: [www.specialtymotors.com](http://www.specialtymotors.com)
4. Quick Start of the I² Motor:

To ensure the I² Motor system is functioning properly first connect and run the system in the Demo mode of operation. We recommend that every new system run in Demo mode prior to setup and programming of the system. This will check and verify the basic connections and functionality of the Wizard and the I² Motor system.

- The I² Motor system comes complete with a power cord, a USB cord and the I² servo motor, as well as this manual. First, remove and inventory all items from the box.
- **Without power applied** connect the power cord into the Power Connector P1 (The default power receptacle is for 115VAC 50/60 Hz).

*Note: The I² Motor will operate automatically on any line power from 90VAC to 230VAC at 50 or 60 Hz. The only requirement to run the motor anywhere in the world is the proper power receptacle*

- Connect USB cord from your computer to the USB Communication P3 receptacle on the back of I² Motor.
• **Do Not** connect any load to the motor at this time. Let the shaft run free of load.

• With the USB and power cords connected, start the Wizard by double clicking on the Wizard icon, or Shortcut if you made one.

• The main screen of the Wizard will appear with the upper status bar showing no motor connected.

• Plug the motor power cord into a suitable power source. Once power has been applied, the status light on the rear of the I² Motor will begin flashing red and green alternately.

  *Note:* *This indicates that the motor is in the disabled mode of operation. It is possible with certain setup configuration other than the default configuration with which the motor is shipped for the motor to power up enabled in which case the status light would be solid green. The defaults will have to be restored once the system has established communication with the Wizard software.*

• The I² Wizard will immediately begin polling for a motor and uploading the parameters from the motor. A green status bar will appear indicating the status of the parameter upload.

  *Note:* *This operation does not always occur. If the I² Motor has been powered off or disconnected with no changes to the setup, the Wizard can recognize this condition and may skip the polling process.*
• It will take about 20 seconds for the polling process to be completed. Once that has occurred the status bar will state, “Connected to 34iXX-XX listing the I² Motor model number.

• You will now be able to use the Wizard to demonstrate, test and modify the I² Motor system settings.
4.1. Using the Main Screen:

The Main Screen allows you to navigate between sections and screens used to program and test the system. The system will be in “Hardware Control” mode once the $I^2$ Wizard recognizes the motor configuration. This means that hard wired I/O connections are controlling the $I^2$ Motor. The system will have to be changed to “PC Control” mode when programming is loaded or changed in the servo system. It will also have to be in “PC Control” mode when the system is being enabled and activated by the host PC.
To enter the DEMO mode
Click on PC Control Button
Click on the DEMO Button
4.2. Demo Mode: “Test Motor Screen”:
The DEMO Screen will appear titled Test Motor

**Test Motor: (Screen 2)**

This screen allows you to quickly DEMO the motor in four different modes and observe motor response to input commands.
Smooth Position will cause a slow acceleration response to a position command input when the motor is enabled.

Smooth Speed will cause a slow acceleration response to a velocity command input when the motor is enabled.

Fast Position will cause a fast acceleration response to a position command input when the motor is enabled.

Fast Speed will cause fast acceleration response to a velocity command input when the motor is enabled.

To run the motor in DEMO Mode:

- Enable the motor by clicking on the Enable icon (See #2 in Screen2 above). It will light a green border when activated.

- Left Click and hold down your mouse on the blue command bar of the servo command ICON to move the slider up or down to command a position or speed. Moving the command bar up or down past the mid-
point of the command icon will also change direction of rotation. (See #3 in Screen2).

- You may also left click and release in the white area of the Servo Command bar to move the command bar to a desired position.
- When selecting different servo modes, the Wizard will automatically disable the motor as indicated by a lit red border around the Disable icon. You can also manually click on the Disable icon anytime to stop the motor.

![Command Mode](image)

- The Test Screen also (See #5 on Screen 2) has a graphic display to show the relationship between commanded input and motor response. Commanded speed or position inputs are shown on the green trace, motor response in speed or position are shown on the red trace motor current is shown on the blue trace.
- As you command speed or position changes you can also observe the motor shaft tracking with the Red Trace.
• Return to the Application Setup screen by clicking: “Back to Main Page” button. (See # 4 on the Test Motor screen) The I2 Motor will automatically go to the disabled mode.
5. Setup Up Application:

Once you have returned to the **Main Screen** you are ready to begin programming the I² Motor. The first step is to click on the **Set Up Application** icon shown on the Main Screen below.

*Main Screen (Screen 1b)*
The Setup Motor screen will appear.

Setup Motor (Screen 3)

Note: When entering the Setup Motor screen the \( i^2 \) Motor can be in Hardware Control or PC Control modes. It is best practice to be in PC Control mode when in this section; otherwise no changes to the system will be allowed by the \( i^2 \) Motor until the system is put into the PC Control mode.
The first step on this screen is to select appropriate **Units for Position** and/or **Units for Velocity** (See #1 and #2 in Screen3) via the pull down menus. These units will carry through all of the programming and displays.

![Units for Position and Velocity](image)

Other functions on this screen include:

- **Restore as Connected** allows you to reload the last program that was in the I² Motor unit when it was last powered up. (See #3 in Screen 3)
- **Restore Defaults** allows a reload of the default settings that came with the I² Motor when originally shipped. (See #4 in Screen 3)

*Note: When either of the Restore as Connected or Restore Defaults are selected in the Motor Setup screen, these functions will restore all of the setup parameters, when used in other screens these buttons only affect the setup parameters controlled by that screen.*

- **Reverse Direction** is a check box that can be selected which will reverse the direction of the motor in all programed functions. With this box UNCHECKED, all positive directions are clockwise when looking at the shaft face of the I² Motor. (See #5 in Screen 3)

![Reverse Motor Direction](image)
Activate Changes loads all changes into the \( I^2 \) Motor system. The \( I^2 \) Motor must be disabled for this operation to function. (See #7 in Screen 3)

- **Cancel Changes** will stop and remove all changes since the last set of changes was loaded to the \( I^2 \) Motor. (See #8 in Screen 3)

**Note:** Activate or Cancel Changes buttons are available on any of the setup pages and will activate or Cancel changes on all setup screens.

**Motor Setup** also has a number of additional screens from which all of the system settings are accessed by clicking on buttons arranged vertically on the left side (Screen 3, item #8). The buttons are labeled with the general categories of the settings they control.
5.1. Input Interface:

The I\textsuperscript{2} Motor servo system has the ability to interface to most types of digital inputs or switches. The Input Interface screen allows you to select sinking or sourcing, logic levels and the active state of each desired input.

To access Screen 4 and set up input interfaces:

- Click on the Input Interface button and choose from the following options:

![Input Interfaces (Screen 4)](image_url)
Select Input allows the selection of a single input for settings or all inputs as a group (Screen 4, item #1).

Input Logic Option performs the setting of the input logic (Screen 4, item #2).

Input State Option sets the active logical state of the inputs (Screen 4, item #3).

All Input States Are set with either a pull-up to 24 Volts or a pull-down to ground (Screen 4, item #4).

Setting up the system inputs:

- Select the desired input (Screen 4, item #1).
- Select the logic Operation (Screen 4, item #2)
- Select Input State Options (Screen 4, item #3)
- Select Pull-down to Gnd or 24 Volt Pull-up options (Screen 4, item#4)
- When all inputs are programmed, select click Activate Changes.
- When input interfaces are programmed, you can then enter Output interfaces by clicking on the Output Interface button. The Output Interface Screen will then appear (Screen 5).
5.2. Output Interfaces:

This screen allows the electrical interface settings of all of the output signals. The outputs can be set individually or as a group on this screen.

To access Screen 5 and set up output interfaces:
- Click the Output Interface button and choose from the following options:

![Output Interfaces (Screen 5)]
Select Output allows the selection of a single output for settings or all outputs as a group (Screen 5, item #1).

Output Logic Option performs the setting of the output logic (Screen 5, item #2).

Output State Option sets the active logical state of the output (Screen 5, item #3).

To set up system outputs:

- Select Desired Output (Screen 5, item #1)
- Select desired logic options (Screen 8, item #2) these options and their definitions include found in the I2 Motor Installation Manual.
- Select desired output state options (Screen8, item #3)
- When desired values are programmed, select Activate Changes
- When the output interfaces have been programmed click on Output Interfaces button to move to the Setup Motor screen.
### 5.3. Indexing Functions:

**Indexing Functions** are programmed on Screen 6 by entering desired parameters in the numbered rows of the indexing table. (#3 in Screen 6) Each row contains all of the necessary setup information needed to complete a motion command. The values shown in the indexing table are set at the factory and may be used to test or operate the system but they may also be erased or overwritten when actual programming begins.

To begin programming motion commands:

- Click the **Indexing Functions** button to access (Screen 6).
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- Click your mouse on the first desired index (Idx) (See #3 in Screen #6) and highlight the row.

- Select the desired **Index Mode of Operation** for position or velocity control from the pull down menu. The row will automatically be filled with the default values for velocity, acceleration and deceleration for the selected motion.
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There are 8 selectable modes in the Index Mode Table pull down:

- **No action**: No index is required for this Index ID.
- **Analog Position Command**: Allows one Index to be assigned as a position index based on an analog signal level. Only one Analog Position Command or Analog Velocity Command can be set in the index table at one time.
- **Go to Set Position Absolute**: Allows entry of a position variable that is referenced to the system zero position.
- **Go to Set Position Relative**: Allows entry of a position variable as a function of the current position.
- **Analog Velocity Command**: Allows an Index to be assigned as a velocity index based on an analog signal level. Only one Analog Velocity Command or Analog Position Command can be set in the index table at one time.
- **Go to Set Velocity**: Allows the entry of a velocity in already scaled units.
- **Home Find- Select Function**: This index function commands the system to follow the routine set into the Home Find function. (Home Find defined subsequently.)
- **Set Position to Zero**: This index function will cause the present position to be set to the value set in the position column of the row.
The motion table has two major functions selected with check boxes that affect the way in which motions are initiated and completed (Screen #6, item #1).

- Select the way in which motions are initiated and completed by choosing the desired check boxes on the Set up screen. (See #1 in Screen #6).

  - **Must Complete Before Next Move** selection will require that a move be completed before another move is allowed to begin. In the case of continuous velocity motion, the set velocity must be achieved before another motion will begin.
  - **Valid Only on Trigger Input** selection enables the selected change to activate when the trigger transitions from a false to a true state.

*Note:* As a rule of thumb, if your indexes are velocity profiles, you will want to initiate a new velocity without waiting for a trigger. If your indexes are position moves, you will probably want to wait for current move to complete and allow the new move to execute on a trigger command.

- Enter desired values for position, velocity, acceleration and deceleration to accomplish the position move or velocity profile. Units for these values will be those previously selected on the Set Up Screen. If you choose a velocity profile the word “Velocity” will appear in the position column to indicate this parameter is not used.

*Note:* Position and velocity scaling was done on the initial setup screen, so if you enter 1000 in the acceleration and deceleration columns, units of measure reference that scaling. EG: If your velocity scaling is in RPM, the acceleration and deceleration is 1000 RPM per second. Or if it is in RPS, the acceleration and deceleration is 1000 RPS per second.
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- If another move is desired after completion of the present move enter the row number defining the next move in the “Next” column. If no further moves are desired enter “End”.
- A delay can be set after the move is completed and before another move starts by entering a value in the “Time” column. The times are programmed in milliseconds.

To set up system indexing functions:
- Select Desired Indexing Row (Screen 6, item #3)
- Select desired indexing mode of operation (Screen 6, item #2).
- Enter motion values as required, position, speed, acceleration, deceleration, next and delay time (Screen 6, item #3)
- If desired select motion must complete before next move option (Screen 6, item #1)
- If desired select trigger option (Screen 6, item #1)
- When desired values are programmed, select Activate Changes
- When the output interfaces have been programed click on Indexing Functions button to move to the Setup Motor screen.
5.4. Output Functions:

The output function screen allows the setting of the output functions. Each of the 6 digital outputs can be set to activate based on various system functions selected from a pull-down list.

To access Screen 7 and set up output functions:
- Click the Output Function button to access (Screen 7).

![Output Functions (Screen 7)](image-url)
Outputs selection table is used to list with associated function and select an output to be setup (Screen 7, item #1). **Output Function** is a drop down list used to select and a function for the particular output selected in the Outputs table. (Screen 7, item #2).

- **Inactive:** Not assigned.
- **Motor Enabled:** Is active when motor is enabled.
- **Soft Current Limit:** Is active when soft current limit is reached. This value is set with performance adjustments.
- **Hard Current Limit:** Is active when hard current limit is reached. This value is set with performance adjustments.
- **Temperature Alarm:** Is active when predefined controller temperature is exceeded.
- **Temperature Shutdown:** Is active when a controller temperature of 95°C shutdown occurs.
- **Motor Temperature Shutdown:** Is active when the motor thermal switch activates.
- **In Position Range 1, 2, 3:** Three separate positions windows active when the motor shaft is within the set window.
- **Over Velocity Alarm:** Is active when the shaft speed exceeds the set value.
• **Under Velocity Alarm:** Is active when the shaft speed is under the set value.

• **Drive Voltage Limit Alarm:** Is active when the controls rail voltage is approaching an over voltage limit.

• **Over Voltage Alarm:** Is active when the controls rail voltage has been exceeded.

• **Over Voltage Shutdown:** Is active when the controls have shut down due to an over voltage condition.

• **Under Voltage Shutdown:** Is active when the controls have shut down due to a low voltage condition.

• **Cam Position Range 1, 2, 3:** Is active when the shaft is within a position window within a single revolution, and occurs every revolution of the shaft.

**Output Related Settings** this section will change to allow the settings of parameters associated with particular functions. (Screen 7, item #3).

**Setting Output Functions:**

- Select the output you want to define (Screen 7, item #1)
- Select the desired output function from the pull down menu (Screen 7, item #2)
- Set any required values in the settings (Screen 7, item #1).

*Note:* Some output functions will require you to enter variables associated with the function. When this is required, the output related setting window will open on the screen. Enter data in the appropriate block.

- When desired values are programmed, select **Activate Changes**
- When the output interfaces have been programed click on **Output Functions** button to move to the **Setup Motor** screen.
5.5. **Home Find:**

The Home Find is used to set the I² servo system to a position reference typically referred to as “Home”. This position is a reference from which all other motion can be defined. This function is called from the index table and can have 4 basic modes of operation. It can be set using only one mode no matter how many times it is called.

To set the position:

- Click the **Home Find** button to access (Screen 8).

*Home Find (Screen 8)*
Select a Home Find Mode pull down menu is to select the mode of operation for Home Find. (Screen 8, item #1).

- **Jam to Factory Key Position**: The motor shaft will rotate to a factory set zero position with the keyway of the shaft up.
- **Jam to Preset Position Plus Home Find Offset**: The motor shaft will move to the factor preset position plus the amount defined in the Home Find Settings Window.
- **Seek Stop by Current Rise**: This mode is used to find a position based on a mechanical hard stop. The current value set the amount of torque the system will use to find the hard stop position.
- **Seek Stop by Switch Input**: This mode is used to sets home base on a switch or digital input. Digital input 3 us for this mode and can be used for no other purpose if this mode is set.

Home Find Mode Settings a window used for setting values necessary for various Home Find functions, such as, speed and offset distance. (Screen 8, item #2).

Setting Home Find Function:
- Use the pull-down menu to select the mode of Home Find desired (Screen 8, item #1).
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- Set the mode settings associated with the function in the window (Screen 8, item #2).
- When desired values are programmed, select **Activate Changes**
- When the output interfaces have been programed click on **Home Find** button to move to the **Setup Motor** screen.
5.6. Analog Settings:

This screen allows you to setup the functions and range associated with the analog input and output signals. This screen is accessed from the Setup Motor screen by clicking on the “Analog Settings” button. The Analog Input portion of this screen is only active when an Analog Input function is present on the index table.

To program analog settings:

- Click the Analog Settings button to access (Screen 9).

**Analog Settings (Screen 9)**
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Analog Input Mode is a pull-down menu used to select the type of analog input to be used (Screen 9, item #1).

Analog Message Box displays warnings if incorrect or unusable information is entered into the analog settings (Screen 9, item #2).

Analog Input Settings Box is used to enter information needed to set the analog values and scale factors required (Screen 9, item #3).

Set Input Options button is used to calculate the analog input scale, the motor output scale values and ensure no errors occur and list exact digital values of the settings (Screen 9, item #4).

Analog Output Mode is a pull-down menu used to select the type of analog output to be used (Screen 9, item #5).

Analog Output Selection is a pull-down menu used to select the type of analog information used to generate the output signal (Screen 9, item #6).

Analog Output Settings Box is used to enter information needed to set the analog values and scale factors required to setup the output signal (Screen 9, item #7).

Set Output Options button is used to calculate the exact values used after the digital conversion (Screen 9, item #8).

Setting-up the Analog Settings

- Set or ensure one of the Index function on the Index Setup page is set with an analog function.
- Set the Signal Input values and the Motor Output values desired (Screen 9, item #3).
- Click on Set Input Options and ensure exact values in blue are acceptable (Screen 9, item #4).
- Select Analog Output Mode desired (Screen 9, item #6).
- Select type of analog output signal (Screen 9, item #5).

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• Enter Motor Output and Signal Output values (Screen 9, item #7).
• Click Set Output Options and ensure exact values in blue are acceptable (Screen 9, item #8)
• When desired values are programmed, select **Activate Changes**
• When the output interfaces have been programed click on **Analog Settings** button to move to the **Setup Motor** screen.
5.7. **Motor Performance Adjustments:**

This screen allows the adjustment of motor performance parameters Velocity Limit, and Current Limit. It also contains servo tuning parameters Proportional, Integral, and Rate Feedback gain. In most cases these values should not need to be adjusted, but may be needed in the case of high inertia or compliant loads.

The values on this page are global parameters and will affect all moves performed by the servo system.

To set tuning parameters:
- Click the Performance Adjustments button to access (Screen 10).

*Performance Adjustments (Screen 10)*
6. Testing Programmed Motions:

After motions have entered into the index table the move can be checked with the Motor I/O Emulation screen

To run the motor with new settings:

- Click on Test/ Monitor button.

**Main Screen (Screen 1b)**
The Motor I/O Emulation Screen will appear.

**Motor I/O Emulation (Screen 11)**

This screen allows the simulation of inputs, enabling the system and the monitoring of the I² Motor functions. **Emulated Inputs** are selected with the buttons on the upper portion of screen, Enable, Trigger, D-0, D-1, D-2 and D-3. (See #1 in Screen 5) Buttons D-0 through D-3 are used to select the programmed row in the indexing table. They correspond to hardwired inputs to the motor and reflect the row number in binary digits. A quick reference Bit Index table is shown below.
Commanded Index monitor indicates the index row selected from the index table and the index mode. (See #2 in Screen 5)

State Information lists the state of the motor; Motor Position in the selected units, Motor Velocity in the selected units, Motor Current, Motor Temperature, the Analog Command (analog input) value, Analog Response (analog output) and any reasons why the system may be disabled. (See #3 in Screen 5)

<table>
<thead>
<tr>
<th>Index Number (Idx)</th>
<th>D-0</th>
<th>D-1</th>
<th>D-2</th>
<th>D-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
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<tr>
<td>1</td>
<td>X</td>
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<tr>
<td>15</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Running $I^2$ Motor in Test Mode

- Ensure the motor shaft is free to move.
- Click on the Enable button.
- Select desired index value as shown on the Bit Index Table.
- Click on the Trigger button, if the Valid Only on Trigger Input option is selected.
- The motor will perform the motion selected by the index row.
- Observe the State Information changing as the motor shaft moves.
7. Managing Configuration Files (.i2m):

$I^2$ Motor Configuration Files can be saved and stored in the host computers memory then retrieved for later use or programming of a new $I^2$ Motor control configuration. The Configuration File stores all the motion parameters and system values in a file with a (.i2m) file suffix. These files can be stored and moved like any standard PC file.

This section has two important functions for the $I^2$ Motor. The first is to facilitate saving and management of (.i2m) configuration files within the PC. Second is to manage configurations in the $I^2$ Motor, by controlling the uploading and downloading process between the $I^2$ Motor and PC and also storing configuration files to nonvolatile memory within the $I^2$ Motor.

*Note: All files saved and retrieved must be used with the same model number unit. Files Saved for one model cannot be retrieved and used on a different model number.*

File Pull Down Menu (Screen 12)
7.1. Opening a Configuration from a PC File:

Saved (.i2m) configuration files can be opened modified and downloaded into the I² Motor system.

To open an existing (.i2m) file:
- Select File from the I² Wizard Toolbar
- Select Open Motor Configuration From File.
- A standard Windows, ‘File Selection Window’ will appear that will allow navigation and selection of the stored (.i2m) file desired.
- Once the file is selected the values will be accessible in the Wizard program, the new program values will not move to the I² Motor system until the configuration is downloaded to the I² Motor.

*Note:* A Download Config to Motor action must occur before any file retrieved from the computer host memory can function in the I² Motor.

*Note:* An Activate Changes operation may appear to have moved changes to the I² Motor but it is not valid with a retrieved Configuration until after the Download Config to Motor action has occurred.
7.2. Saving a Configuration File:

To save an existing configuration file while it is being worked on:

- Click on File in the Toolbar of the I²Wizard
- A pull-down menu will appear.
- Select and click **Save Motor Configuration To File**, this will cause the configuration to be saved under the present file name being used.

*Save Motor Configuration to File (Screen 12b)*
7.3. Saving a Configuration File with a New Name:

To save (.i2m) files with a new name:

- Select File from the I²Wizard Toolbar
- A pull-down menu will appear with a familiar Windows look.
- Select *Save Motor Configuration As...* and a standard ‘*Windows File Save As*’ window will appear and allow the file to be saved with whatever name and in whatever location is chosen.

*Save Motor Configuration As... (Screen 12c)*
7.4. Download Configuration to Motor:

The *Download Config to Motor* action is very important when using files that have been opened and retrieved from the host computer’s memory. *This action must occur before any of the retrieved configuration information is moved the I² Motor.* This function transfers retrieved information from Wizard on the host computer to the I² Motor system using the USB interconnection.

To perform the Download Config to Motor action:

- Select File from the I² Wizard toolbar
- Select Download Config to Motor from the menu.
- Once this action has occurred a green status bar will appear on the I² Wizard Main Screen indicating the status of the information transfer. When the status bar has disappeared the operation is complete.

*Download Config to Motor (Screen 12d)*
7.5. Flash Changes in Motor:

Changes to the motor file that have been Downloaded or made from the Wizard must be stored in the I² Motor nonvolatile memory or they will be lost when power is removed from the system. Storing the changes is accomplished by the Flash Changes in Motor.

To flash changes in the system to the I² Motor non-volatile memory:

- Select PC Control mode as indicated by the PC control button
- Select File menu on the Wizard toolbar
- Select Flash Changes in Motor, a status bar will appear indicating the progress of the Flashing action. The status bar will disappear once the Flashing action is completed.

Flash Changes in Motor (Screen 12e)
7.6. Retrieving a Configuration from the I² Motor:

The configuration information can be retrieved from an I² Motor unit and moved to the PC with the Get Config from Motor action. In most situations the Wizard and the I² Motor will have the same information but in some situations this may not be the case.

To get the Wizard to match the motor settings:

- Select the File on the Wizard Toolbar
- Select Get Config from Motor from the pull-down menu
- The information from the motor will be loaded into the Wizard and be displayed.
8. Interconnection and Optional Components:

All control connections to the I2 Motor are made through the rear interface connector which is a 25 pin D-sub connector. Two optional components are available to help test or interface the I2 Motor to physical control connections. A picture of the connector and the interconnections is shown following.

*Rear I/O Connector (J2)*
**I/O Connector Pin-Out and Descriptions (J2)**

### 24V dc: (dc Supply)

- **Pin:** 1
- **Current:** 40 ma max

### Dout#: (Digital Output)

- **Pin:** 9,10,12,13,23,24
- **Mode:**
  - Open Collector: 25ma max
  - Source Only 3.3-24V: 10ma max
  - Logic Level 3.3-24V: sink 25ma/source 10ma

### Din#: (Digital Input)

- **Pins:** 6,7,17,18,20,21
- **Mode:**
  - Open Collector Source: 50 ohm
  - Logic Level 3.3-24V: 50 ohm

### AinH: (Analog Input High)

- **Pin:** 2
- **Voltage:** 0-10V
- **Current:** 4-20ma

### AinL: (Analog Input Low)

- **Pin:** 15
- **Voltage:** 0-10V

### VoutH: (Voltage Output High)

- **Pin:** 3
- **Voltage:** 0-10V
- **Current:** 4-20ma

### VoutL: (Voltage Output Low)

- **Pin:** 4
- **Voltage:** 0-10V
8.1. Integration/Test Board:

The Integration Board is an optional piece of equipment used to perform hardware simulation with actual switches and LED’s to simulate equipment. It is frequently useful in debugging of programs and setups. It mirrors the Output, Trigger and D-0 through D-3 functions on the Emulation screen only with physical connections to the systems interconnections.

$I^2$ Integration/Test Board
8.2. Interconnection Board:

The Interconnect Board is used to facilitate easy connections to the I/O Connector (J2) connecting to the pin connections of the jack.

\[ I^2 \text{ Interconnection Board} \]
9. Monitoring $I^2$ Motor System Status:

The status of the inputs, outputs and servo can be monitored by the $I^2$ Wizard software when connected to an $I^2$ Motor in Hardware Control mode. To accomplish the monitor function:

- Click on the Test/Monitor button.

*Main Screen (Screen 1d)*

- This displays a screen very similar to the Test screen (Screen 13) without the capability of controlling the system.
To enter the Motor Monitor screen Click the Test/Monitor button with the system in Hardware control mode.

**Motor Monitor (Screen 13)**

- The Motor Monitor screen consisting of three main sections that indicate $I^2$ Motor status will appear.
Discrete Digital Inputs are displayed in red when they are not active and green when they are active or true. In the example shown the Enable Input is active or True and all others are inactive. (screen 13 item #1),

Discrete Digital Outputs are green when the setup condition is true and red when false or inactive. In the example Motor Enabled, In Position Range 1, and CAM Position Range 1 are true or active, all others are false. (screen 13 item #2)

System Status is displayed in this small table which lists important telemetry from the system. (screen 13 item #3)

Note: The Discrete Digital Inputs and Outputs are displayed in red or green to indicate a true or false condition as interpreted by the system.