

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *Newport 860-C2* at our website: ***Click HERE***

860-C2 2-Axis Motion Controller System

Newport

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

860-C2 2-Axis Motion Controller System

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Warranty

Newport Corporation warrants this product to be free from defects in material and workmanship for a period of 1 year from date of shipment. If found to be defective during the warranty period, the product will either be repaired or replaced at Newport's option.

To exercise this warranty, write or call your local Newport office or representative, or contact Newport headquarters in Irvine, California. You will be given prompt assistance and return instructions. Send the instrument, transportation prepaid, to the indicated service facility. Repairs will be made and the instrument returned, transportation prepaid. Repaired products are warranted for the balance of the original warranty period, or at least 90 days.

This warranty does not apply to defects resulting from modification or misuse of any product or part. This warranty also does not apply to fuses.

This warranty is in lieu of all other warranties, expressed or implied, including any implied warranty of merchantability or fitness for a particular use. Newport Corporation shall not be liable for any indirect, special, or consequential damages.

First Printing (July) 1989

Copyrighted 1989 by Newport Corporation, Irvine, CA. All rights reserved. No part of this manual may be reproduced or copied without the prior written approval of Newport Corporation.

This manual has been provided for information only and product specifications are subject to change without notice. Any changes will be reflected in future printings.

IBM is a registered trademark of International Business Machines, Inc.

© 1997 Newport Corporation
1791 Deere Avenue
Irvine, CA 92606
(949) 863-3144

P/N 16336-01, Rev. C
IN-09891(01/01)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table of Contents

Page

Warranty ii

List of Figures iv

About this Manual iv

Features v

Safety Precautions vi

Specifications viii

Section 1 – Introduction

1.1 System Overview 1

1.2 Scope of the Manual 1

1.3 Unpacking and Inspection 1

1.4 System Accessories 1

Section 2 – System Operation

2.1 Overview of 860-C2 Operation 2

2.2 Front Panel Description 2

2.3 Preparing the Controller for Operation 3

2.3.1 Rear Panel Connections 3

2.3.2 Power-Up Sequence 4

2.4 RUN Mode of Operation 4

2.5 JOG Mode of Operation 5

2.6 Alternate Input Methods 5

2.6.1 Operation With the Joystick 5

2.6.2 Computer Interface 6

2.6.3 External Velocity Control 7

2.6.4 Operation with Laboratory Automation Software 7

Section 3 – Theory of Operation

Section 4 – Troubleshooting and Adjustment

4.1 Troubleshooting Guide 9

4.2 Output Offset Adjustment 10

Section 5 – Service

5.1 Introduction 12

5.2 Obtaining Service 12

5.3 Service Form 13

Section 6 – Reference Data

6.1 Computer Interface Pinouts 15

6.2 Sample Computer Interface Program Code 16

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

List of Figures

Figure	Title	Page
2-1	Front Panel Keyboard	2
2-2	Controller Rear Panel	3
2-3	Joystick Operation	6
2-4	Velocity Port Pin Assignments	7
3-1	860-C2 Block Diagram	8
4-1	860-C2 Motherboard	11

About This Manual

This operator's manual contains all the necessary information for the proper installation and operation of the Newport Corporation 860-C2 2-Axis Motion Controller System.

The manual has been divided into the following sections:

Section 1 gives a brief overview of the 860-C2, including instructions for unpacking and available options for upgrading the system.

Section 2 describes the controls and connectors of the system, and provides you with operating procedures. A Quick Start sub-section is included to guide you through routine operation.

Section 3 provides an overall theory of operation for the system.

Section 4 provides troubleshooting and adjustment procedures.

Section 5 instructs you on the proper way to obtain service for your 860-C2.

Section 6 provides you with Reference data that may help you in interfacing a computer to the controller.

This manual uses the following conventions:

- Brackets refer to a particular key on the keyboard. For example: [ENTER] or [STOP].
- **Boldface** indicates information that you enter, as opposed to system prompts or messages.
- System prompts and messages appear in italics. For example: *Press Exit to Escape.*

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Features:

- Controls 860A Series motorized actuators and RSX/RSA rotation stages
- Simultaneous control of two motorized actuators/stages
- Connections for 4 motorized actuators/stages
- 30 Watt, 90-132/180-250V, 47-63Hz international power supply
- Built-in keyboard
- Built-in joystick and computer control interface ports
- Controller automatically senses type of motorized drive used
- Stall (limit) detection/protection
- Velocity up to 667 µm/sec for standard actuators
- Velocity servo for speed control independent of loads up to 25 pounds

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Safety Precautions

The following safety precautions should be observed prior to operation of the 860-C2 2-Axis Motion Controller System.

This instrument is intended for use by qualified personnel who recognize shock hazards and are familiar with safety precautions required to avoid possible injury. Read the manual carefully before operating the instrument and heed all written warnings.

For your own safety and that of your equipment, always take the following precautions.

Disconnect the power plug under the following circumstances:

- If the power cord or any attached cables are frayed or damaged in any way
- If the power plug is damaged in any way
- If the unit is exposed to rain, excessive moisture, or liquids are spilled on the unit
- If the unit has been dropped or the case is damaged
- If you suspect service or repair is required
- Whenever you clean the case

To protect the unit from damage, be sure to:

- Keep all air vents free of dirt and dust
- Keep all liquids away from the unit
- Do not expose the unit to excessive moisture

  (>90% humidity)
- Read the manual before using the unit for the first time

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

WARNING

All attachment plug receptacles in the vicinity of this unit are to be of the grounding type and properly polarized. Contact your electrician to check your receptacles.

WARNING

This product is equipped with a 3 wire grounding type plug. Any interruption of the grounding connection can create an electric shock hazard. If you are unable to insert the plug into your wall plug receptacle, contact your electrician to perform the necessary alterations to assure that the green (green-yellow) wire is attached to earth ground.

WARNING

This product operates with voltages that can be lethal. Pushing objects of any kind into cabinet slots or holes, or spilling any liquid on the product, may touch hazardous voltage points or short out parts.

WARNING

Opening or removing covers will expose you to hazardous voltages. Refer all servicing internal to this instrument enclosure to qualified service personnel who should observe the following precautions before proceeding:

- **Turn OFF power and unplug the unit from its power source**
- **Disconnect all cables**
- **Remove any jewelry from hands and wrist**
- **Use only insulated hand tools**
- **Maintain grounding by wearing a wrist strap attached to instrument chassis**

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Specifications

PARAMETER	SPECIFICATION
Physical:	
Dimensions	10" x 8" x 4"
Weight	4 pounds
Power Requirements:	
Input Voltage	90-132/180-250V 47-63Hz
Input Surge Current Limit	15-30A (115VAC) 30-60A (220VAC)
Ground Impedance Leakage Current	< 0.1Ω <500µA
Environmental Limits:	
Ambient Operating Temperature	15-40°C
Relative Humidity	40-90%
Storage Temperature	80°C max
Chemical Solvent Resistance	Resists repeated use of mild alkaline cleaning solution or isopropyl alcohol
Outputs:	
Motor Drive Connectors	0-13VDC Maximum 1/8" phone jacks
Inputs:	
Ext. Velocity Control Connector	0-1.2VDC DB-9P (male)
Computer Interface	Standard Parallel Port
Connector	DB-25P (male)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Section 1
Introduction

1.1 System Overview

The 860-C2 is a 2-axis motion controller designed to drive both the 860A-1616 series low speed actuators (860A-025, 05, 05MM, 1, 2, and 4), as well as the 860A-1624 series high speed actuators (860A-1HS and 2HS). The 860-C2 will also drive the RSX and RSA motorized rotary stages. Two axes may be controlled simultaneously, in either RUN or JOG mode.

1.2 Scope of the Manual

The purpose of this manual is to document the operation and adjustment of the Newport Corporation 860-C2 2-Axis Motion Controller for use with the 860-1616 series and 860-1624 series actuators. Every effort has been made to include complete information required to maintain the system. The information in this manual is current as of the date of publication.

1.3 Unpacking and Inspection

The 860-C2 was thoroughly tested and inspected before shipping. Prior to unpacking the equipment, carefully inspect the outer containers for signs of damage. If you find any damage, immediately notify the shipping company and contact Newport Corporation for further instructions.

NOTE

Retain the original packing materials. They will be necessary if reshipment of the product is in order. They can also be useful for transporting the equipment to other locations.

The following table lists the components that you should have received with your order.

Model Number	Quantity	Description	Part Number
860-C2	1	Controller Unit	16025
	1	Power Cable	04583-00
	1	Manual	16336-01
	1	Floppy Disk	16639-01

1.4 System Accessories

The following accessories, designed to enhance the functionality of the 860-C2, may be ordered separately.

Model #	Description
PMC200-J	IBM PC-Compatible Joystick
860-C2-CIC	DB-25P to DB-25P (Male-to-Male) Computer Interface Cable
860-C2-VPC	DB-9P to DB-9P (Male-to-Male) Velocity Port Cable

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Section 2
System Operation

2.1 Overview of 860-C2 Operation

The controller keyboard is the primary input device on the 860-C2. A joystick or computer interface may also be used. Two axes may be controlled simultaneously. These may be #1 and #3, #1 and #4, #2 and #3, or #2 and #4. Axes #1 and #2, or #3 and #4 cannot be operated at the same time. You may, however, stop axis #l and start axis #2.

Two modes of operation are possible, RUN and JOG mode. In RUN mode, the actuator moves in the direction selected via the [FORWARD] or [REVERSE] switches, until it is stopped or a limit is reached. In JOG mode, actuator movement is controlled by holding down the [FORWARD] or [REVERSE] switch. The actuator will continue to move until the switch is released or a limit is reached. All limits are current-sensed in the controller and all velocities are controlled with the [VELOCITY/STEP SIZE] potentiometer.

2.2 Front Panel Description

The 860-C2 controller front panel (refer to Figure 2-1) consists of an ON/OFF switch, two sets of axis control switches (each set controls two axes), and two velocity potentiometers (1 for each pair of axes).

The left-most switch specifies which axis per set is currently being controlled. For example, when the green LED below #3 is lit, #3 is activated. The LEDs on the RUN/JOG switches function in the same manner. When the LED below JOG is lit, the specified axis is in JOG mode.

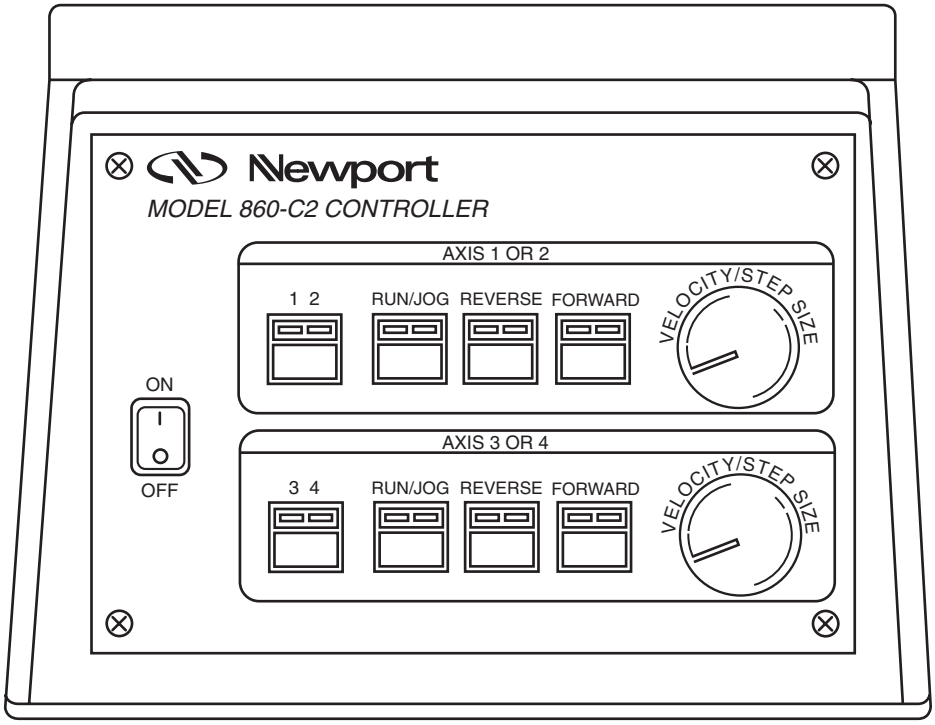


Figure 2-1. Front Panel Keyboard

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

The FORWARD and REVERSE switches each have a green and a red LED. The green LED tells the user in which direction the actuator will move. Either the FORWARD or REVERSE green LED will be lit at any given time. The red LED informs the operator that the controller has sensed a current limit and actuator motion has stopped.

Each set of two axes has a VELOCITY/STEP SIZE potentiometer. This adjusts the voltage applied to the motor from zero to a maximum of 13 volts.

2.3 Preparing the Controller for Operation

Prior to operating the 860-C2, there are a few preliminary steps to be followed to set up the controller.

2.3.1 Rear Panel Connections

On the controller rear panel (refer to Figure 2-2), you will find a power cord plug, four 1/8" mini phone jacks for the motors, and three additional D connectors for the joystick, velocity, and interface cables. Refer to Section 2.6 for a discussion of the latter three connectors.

The 860-C2 is preset at the factory for 110VAC line voltage. if your voltage is different, you must change the voltage selection before proceeding. Failure to do this will result in permanent damage to the controller.

1. If required, change the AC voltage selection to match your AC Line Voltage. This is done at the power cord connector on the rear panel. To change the setting (i.e., to 240VAC):
   a. Insert a flat-head screwdriver into the notch at the top of the power cord connector and pry open the panel.
   b. Rotate the drum until the desired voltage setting (i.e., 240) shows through the window when the panel is closed.
   c. If you need to replace a fuse, insert a screwdriver under the fuse pulls tabs and gently slide the fuse holders straight out. Replace the fuses only with the same type and rating of fuse.
   d. Gently press the panel shut.
2. Attach the power cord to the controller rear panel and to the power source selected in step 1.
3. Actuators may be attached to the rear panel connectors any time prior to operation.

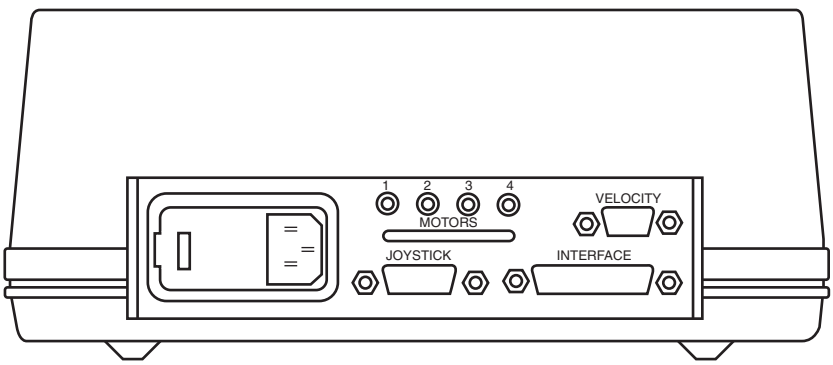


Figure 2-2. Controller Rear Panel

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.3.2 Power-Up Sequence

Upon power-up, the system goes into standby RUN mode, with actuators #1 and #3 activated. The 860-C2 automatically senses what type of actuators are attached to the rear panel when motion begins. To introduce a new type of actuator to your setup, you must stop motion on all axes, install the new actuator, and restart motion. The controller will automatically sense the type of actuator being used.

NOTE:

Do not connect or disconnect actuators from the rear panel while an actuator is running. Failure to stop all actuators before connecting (or disconnecting) an actuator will result in damage to the actuator.

2.4 RUN Mode of Operation

RUN is the default (power-up) mode of the 860-C2 controller. The [RUN/JOG] switch toggles between modes at any time.

In the RUN mode, an actuator is set in motion by pressing either the [FORWARD] or [REVERSE] switch. That actuator will then continue to move at a speed set by the [VELOCITY/STEP SIZE] potentiometer. The actuator is stopped when it reaches its limit of travel, or when the direction switch is pressed a second time. When a limit is reached, the red LED on the direction switch will light, an audible signal will sound, and motion will stop.

The following is an example of operation in the RUN mode.

1. Connect an actuator to axes 1, 2 (optional), 3, and 4 (optional).
2. Turn the controller power switch ON.
3. Upon completion of the power up sequence, the two RUN mode LEDs, the axis #1 LED, and the axis #3 LED will be ON.
4. Press [FORWARD] on the top row to start the axis #l actuator moving forward (out of the piston).
5. Slowly turn the **VELOCITY/STEP SIZE** pot clockwise to increase the run speed.
6. Press **[REVERSE]** to change the direction of motion.
7. Press **[FORWARD]** on the bottom row to start the axis #3 actuator.
8. If an actuator is connected to axis 4, press the **[FORWARD]** switch (bottom row) again to stop actuator #3. Press the switch labeled **[3 4]** (bottom row) so that the LED below #4 is lit.
9. At the top set of switches, press **[REVERSE]** again to stop actuator #1.
10. Press **[1 2]** to light up the LED below #2.
11. If an actuator is connected to axis #2, repeat Steps 4 through 6 to exercise that actuator.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.5 JOG Mode of Operation

In JOG mode, the controller allows you to manually jog the actuator in the direction specified by the [FORWARD] or [REVERSE] switches. The size of the step is determined by the amount of time you hold down the [FORWARD] or [REVERSE] switch. You may also control the speed at which the jog occurs with the VELOCITY/STEP SIZE potentiometer.

Following is an example of operation in JOG mode:

1. Press the switch labeled **[1 2]** to activate axis #1.
2. Press **[RUN/JOG]** so that the LED below JOG is lit.
3. Closely observing the actuator piston, press and release the **[FORWARD]** switch. The actuator should move once slightly.
4. Now press and hold **[FORWARD]**. The actuator will begin moving.
5. Turn the **VELOCITY/STEP SIZE** pot to increase the velocity of this stepping motion.
6. Release the **[FORWARD]** switch. The motion will cease.

2.6 Alternate Input Methods

The 860-C2 may be upgraded with the purchase of a joystick and/or a computer interface cable. The latter may include external velocity control, but a digital/analog converter board must be installed in the computer.

2.6.1 Operation With the Joystick

The joystick may also be used as an input device of the 860-C2. To use the joystick:

1. Plug the l5-pin joystick cable connector into the connector labeled JOYSTICK in the controller rear panel.
2. Stop the movement of the axis or axes to be controlled by the joystick.
3. Using the [1 2] and [3 4] switches, select the two motors to be controlled.
4. Press either the button on the top of the stick or the left button at the base, to enable the joystick.

NOTE

Operation of input devices on the 860-C2 system function in a FIFO (First In, First OUT) manner. When the joystick is enabled, the keyboard and computer interface are disabled. When motion controlled by the joystick is stopped and the keyboard is used again, the joystick and interface are disabled.

5. To control axis 1 or 2 (whichever one is selected), push the joystick forward and back while pressing the button (refer to Figure 2-3). Pressing the joystick forward is equivalent to pressing the [FORWARD] switch on the keyboard. Pressing the joystick backwards is equivalent to pressing the [REVERSE] switch.
6. To control axis 3 or 4 (whichever one is selected), push the joystick to the left and right while pressing the button. Pressing it to the left is equivalent to pressing the [FORWARD] switch on the keyboard. Pressing the joystick to the right is equivalent to pressing the [REVERSE] switch.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

7. If an axis reaches a limit, the alarm will sound and motion will cease. Release the button to reset the alarm.

NOTE

The joystick may be set to use its Self-Centering feature by engaging two spring release knobs on the base. In this mode, the joystick may have to be adjusted (nulled) usingthe two knobs on the bottom to prevent the motors from running when the joystick is released (centered).

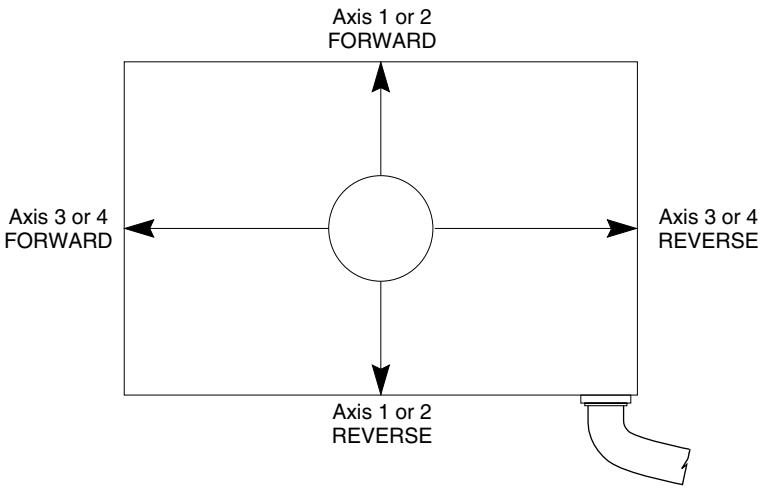


Figure 2-3. Joystick Operation

2.6.2 Computer Interface

The 860-C2 may be controlled via an IBM-compatible computer through the Computer Interface Port on the rear panel. A standard parallel port DB-25P connector cable is required (refer to Section 1.4). Other computers equipped with TTL I/O ports may also be used to control the 860-C2. The IBM-compatible computer interface allows you to select which motors are activated, motor direction, RUN/JOG mode, and set velocity.

The program supplied with your controller is written in QuickBASIC® and demonstrates these motor control functions. Appendix A includes a sample program to perform simple motorized drive motions.

Use the following procedure to operate the 860-C2 through the computer interface:

1. Connect one end of the interface cable (DB-25P connectors) to the parallel printer port on your computer rear panel (i.e., LPT1, LPT2, or LPT3).
2. Connect the other end of the cable to the rear panel connector of the 860-C2 controller, labeled “INTERFACE”.
3. Turn the 860-C2 controller power switch ON.
4. Boot your computer and place the software diskette supplied with the controller into drive A. type **A: <CR>** to select the diskette drive. You may also copy the diskette to your hard drive (type **copy A:*.* C:**\directory).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

5. To run the program, type **860-C2 <CR>.**

6. Menu selections **A** through **J** are used to select and/or control a single motor. By typing the desired letter, the controller will perform that function until another command is given. For example:

   A (move axis 1 or 2 forward) - Motor 1 moves forward.

   B (move axis 1 or 2 reverse) - Motor 1 reverses direction.

   Note that menu selections **D** and **E** are used to select motor 1 or motor 2 respectively, when issuing commands for Axis 1 or 2. Menu selections **I** and **J** likewise select the proper motor for Axis 3 or 4 commands.

7. To exit the program, type **X**

2.6.3 External Velocity Control

If your computer is equiped with a digital/analog converter (DAC) board, you can also control velocity from the computer. External Velocity Control requires the computer interface option described in Section 2.6.2. A Velocity Interface cable (DB-9P to DB-9P) connects the DAC in the computer to the 860-C2 Velocity Port. With this setup, you may also control velocity via the computer and interface program instead of using front panel VELOCITY/STEP SIZE potentiometers. Figure 2-4 shows the pin assignments and voltage range for the External Velocity port.

Signal Name	Input Range	Pin Number
Axis 1/2 Velocity	0 to 1.2VDC	1
Axis 3/4 Velocity	0 to 1.2VDC	2
Ground	0	3

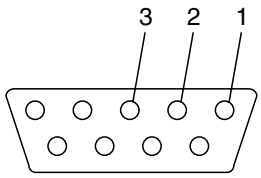


Figure 2-4. Velocity Port Pin Assignments

2.6.4 Operation with Laboratory Automation Software

Newport will provide - free upon request - instrument driver software for control of the 860-C2 with National Instruments' LabVIEW and LabWindows. Call Newport for information.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Section 3
Theory of Operation

The 2 axis 860-C2 controller is designed to drive up to four 860A Series actuators and RSX/RSA Series Motorized Rotation Stages. The servos driving each actuator are configured as Howland amplifiers using both positive and negative feedback principles. Upon command to move, the servo samples the output stage to determine the type of actuator that is connected. Once the output impedance is known, the appropriate feedback resistor is set in place and the actuator will begin to move forward or reverse depending upon the command. Since the overall gain of the servo will change depending upon the actuator impedance, once the motor is in motion a change in channel is locked out from the front panel switches until the actuator is stopped. It is therefore recommended to the user who is writing their own software over the parallel port to take this into account in their software.

Limit detection in the 860-C2 controller is achieved by measuring the current flow through each actuator while the motor is in motion. A major drawback to this scheme is if the actuator is commanded to change directions instantly, such as going directly from forward to reverse or vice versa, large amounts of current will flow through the actuator due to the expanding field in the motor. From the front panel control this has been taken into account in the digital state machine which gives commands to the servo by going through stop for 50 milliseconds to collapse the field. From the users point of view it appears as an immediate change in direction. Again, it is recommended to the user who will be writing their own software commands over the parallel port to pass through stop for at least 50 milliseconds when attempting to change direction immediately.

Figure 3-1 is the Logical Block diagram for the 860-C2 controller.

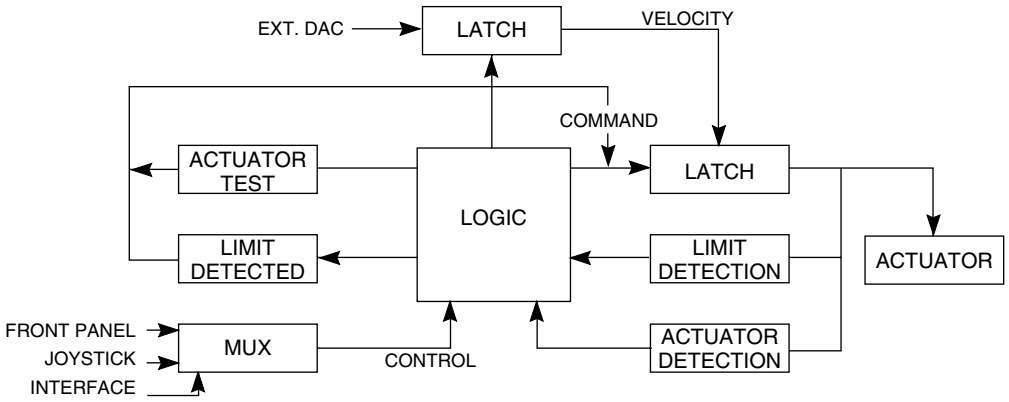


Figure 3-1. 860-C2 Block Diagram

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Section 4
Troubleshooting and Adjustment

This section lists problems that you may encounter and suggests a method to correct the problem or directs you to a procedure located in another section of this manual. Basic adjustment procedures are provided which will ensure continued, trouble-free operation.

The case of the 860-C2 should only be opened by qualified service personnel, familiar with precautions necessary when hazardous voltages are present.

4.1 Troubleshooting Guide

Problem: **The unit will not power-up.**

Action:

1. Check the power cord connections.
2. Verify the input voltage (refer to Section 2.3.1).
3. Check the power supply LEDs.
   a. Remove the 4 screws on the bottom of the unit.
   b. Lift the top cover and slide it to the side.
   c. Locate LEDl, LED2, and LED3 on the motherboard (refer to Figure 4-1).
   d. Turn on the main power switch. If LED 1, 2, or 3 does not light up, the power supply is defective and needs tobe replaced.
4. Check the power supply fuse. (Refer to Section 2.3.1)
   a. Locate the power supply fuse.
   b. Remove and check the fuse.
   c. If the fuse is burned out, replace it.

Problem: **The unit powers up, but the unit does not function.**

Action:

1. Check all connections, both at the unit rear panel and at the motors.
2. Check the program download LED.
   a. Remove the 4 screws on the bottom of the unit.
   b. Lift the top cover and slide it to the side.
   c. Locate LED4 on the motherboard (refer to Figure 4-1). This LED signals when the program is downloaded from the chip into a memory array.
   d. Turn on the main power switch. LED4 should go on and off (it stays lit for 100 milli-seconds). If LED4 does not light up, contact Newport Corporation for further instructions.
   e. If all of the above suggestions check out, verify that the actuators are functioning

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Problem: **Upon power up, the unit does not come up in correct mode, i.e., in RUN mode with channels 1 and 3 activated.**

Action:
1. Turn the power switch off.
2. Wait about 3 seconds.
3. Turn power switch back on. The system should function normally.

Problem: **When the unit first powers up, actuators are moving even though no motion has been specified at the controller.**

Action:
1. The output offset requires adjustment. Refer to Section 4.2.
2. Joystick requires null adjustment when in Self-Centering mode. Adjust knobs on the bottom of the joystick until motion stops.

4.2 Output Offset Adjustment

After several months of use, it may become necessary to adjust the output offset. If upon power-up you notice that the actuators are moving even though you have not set them into motion with the controller, you probably need to adjust the offset.

1. Remove the 4 screws on the bottom of the unit.
2. Lift the top cover and slide it to the side.
3. Using Figure 4-1, locate test points TP9 and TP10, and potentiometers R46 and R88.
4. Turn on the main power switch.
5. Using a voltmeter set to 1 volt full scale, test the voltage between TP9 and Ground. The voltage should read zero (0). If it does not, adjust R46 with a screwdriver to 0±l0mV.
6. Next, test the voltage between TP10 and Ground. Again, the voltage should have a reading of zero. If it is not, adjust R88 to 0±l0mV.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

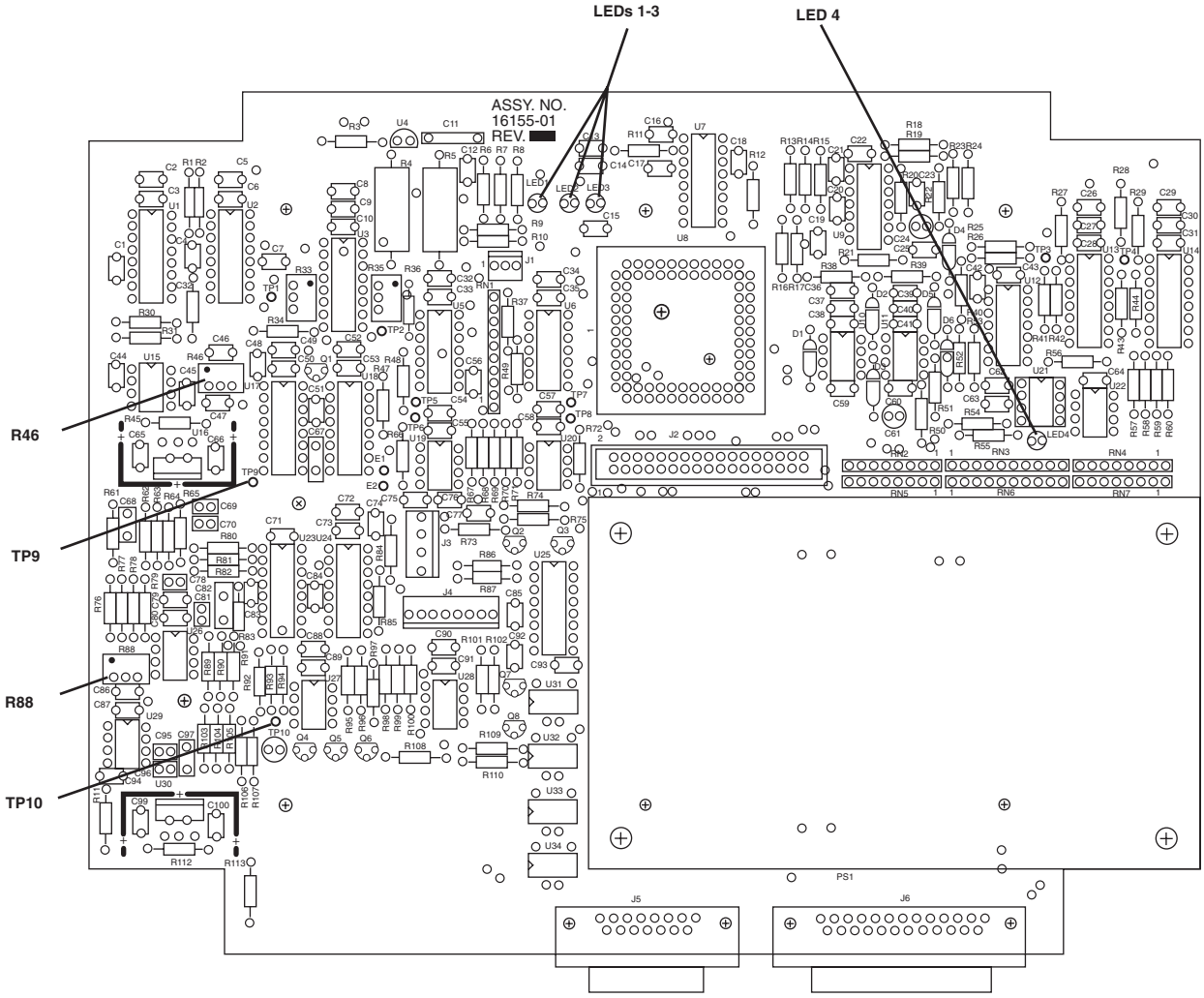


Figure 4-1. 860-C2 Motherboard

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Section 5
Service

5.1 Introduction

In the event that typical troubleshooting practices fail to resolve any problems you may encounter with the 860-C2, contact Newport Corporation or your Newport representative immediately.

5.2 Obtaining Service

To obtain information concerning factory service, contact the factory or your Newport representative. Have the following information available:

1. Instrument Model Number
2. Instrument Serial Number
3. Description of the problem

When returning the 860-C2 to Newport, please complete the service form provided, and return it with the instrument.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

5.3 Service Form

Newport Corporation
U.S.A. Office: 949/863-3144
FAX: 949/253-1800

Name _____ RETURN AUTHORIZATION # _____

Company _____ (Please obtain prior to return of item)

Address _____

Country _____ Date _____

P.O. Number _____ Phone Number _____

Item(s) Being Returned:

Model # _____ Serial # _____

Description: _____

Reason for return of goods (please list any specific problems) _____

_____

Please complete the below, as appropriate.

List all control settings and describe problem: _____

_____

_____

_____ (Attach additional sheets as necessary).

Show a block diagram of your measurement system including all instruments connected (whether power is turned on or not). Describe signal source. If source is a laser, describe ouput mode, peak power, pulse width, repetition rate and energy density.

Where is the measurement being performed?

(factory, controlled laboratory, out-of-doors, etc.) _____

What power line voltage is used? _____ Variation? _____

Frequency? _____ Ambient Temperature? _____

Variation? _____ Rel. Humidity? _____ Other? _____

Any additional information. (If special modifications have been made by the user, please describe below).

_____

_____

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Section 6
Reference Data

6.1 Computer Interface Pinout

Signal Name	Function	From/To	860 Pin
Acknowledge	Fwd Limit Axis 1 or 2 Limit : 1 No Limit : 0	Controller/Computer	10
Paper End	Rev Limit Axis 1 or 2 Limit : 1 No Limit : 0	Controller/Computer	12
Select	Fwd Limit Axis 3 or 4 Limit : 1 No Limit : 0	Controller/Computer	13
Error	Rev Limit Axis 3 o1 4 Limit : 1 No Limit : 0	Controller/Computer	15
Strobe	Latch All Incoming Data Latch : Rising Edge No Latch : 0	Computer/Controller	1
Busy	Front Panel or Joystick Mode Busy : 1 Not Busy : 0	Controller/Computer	11
Initialize	Clear All Limits Don't Clear : 1 Clear : 0	Computer/Controller	16
Data Bit 0	Fwd/Rev Axis 1 or 2 Rev : 0 Fwd : 1	Computer/Controller	2
Data Bit 1	Stop Axis 1 or 2 Stop : 0 Motion : 1	Computer/Controller	3
Data Bit 2	Fwd/Rev Axis 3 or 4 Rev : 0 Fwd : 1	Computer/Controller	4
Data Bit 3	Stop Axis 3 or 4 Stop : 0 Motion : 1	Computer/Controller	5
Data Bit 4	Select/Reject Velocity Port D/A : 1 Panel : 0	Computer/Controller	6
Data Bit 5	Computer Control Computer : 1 Panel/Joystick : 0	Computer/Controller	7
Data Bit 6	Axis 1 or 2 Select Axis 2 : 1 Axis 1 : 0	Computer/Controller	8
Data Bit 7	Axis 3 or 4 Select Axis 4 : 1 Axis 3 : 0	Computer/Controller	9

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

6.2 Sample Computer Interface Program Code

```
'  ____________________________________________________________________
' File: 860-C2.BAS                                          Revision 1.0
'  ____________________________________________________________________
' This file contains the Basic language program for communicating with the
' 860 controller via an IBM PC Parallel Port.
'  ____________________________________________________________________
'|                Declare FUNCTION and SUBROUTINE procedures,                |
'|                     the number and type of arguments.                     |
'|  ____________________________________________________________________    |
'|                Reset the default data type from single precision to integer |
'|  ____________________________________________________________________    |
DEFINT A-Z
DECLARE SUB PRINTMENU ()
DECLARE SUB UPDATESTATUS (PORT, BYTE, STATUS, LASTSTATUS,
CURROW%, CURCOL%)
DECLARE SUB DELAY ()
DECLARE SUB COMMAND860 (command, PORT, BYTE, STATUS)
'  ____________________________________________________________________
'|                Quick Basic Library used by the program                    |
'|                     for calling INT86OLD function                         |
'|  ____________________________________________________________________    |
'$INCLUDE: 'QB.BI'
'  ____________________________________________________________________
'|                                MAIN PROGRAM                               |
'|  ____________________________________________________________________    |
'|                        Display the Selection Choices                      |
'|  ____________________________________________________________________    |
CLS                     '|          Clear the Screen                         |
PRINTMENU               '|          Print Menu                               |
'  ____________________________________________________________________
'|          Save the cursor location for the last row ( STATUS ) displayed.  |
'|  ____________________________________________________________________    |
CURROW% = CSRLIN
CURCOL% = POS(0)
'  ____________________________________________________________________
'|                            Initialize variables                           |
'|  ____________________________________________________________________    |
Ch$ = " "               '|          Keeps track of keyboard inputs           |
PORT = 0                '|          Keeps track of current LPT selected      |
BYTE = 0                '|          Keeps track of the latest byte           |
                        '|          transmitted to the 860 cntlr             |
STATUS = 0              '|          Keeps track of the status byte           |
                        '|          received from the 860 cntlr              |
LASTSTATUS = 0          '|          Keeps a copy of the status byte          |
                        '|          received from 860 cntlr when there       |
                        '|          was a change in 860 cntlr status         |
'  ____________________________________________________________________
'|                Wait for Keyboard input. Also update the display           |
'|  ____________________________________________________________________    |
WHILE (Ch$ <> "X")
'  ____________________________________________________________________
'|                                Get valid key                              |
'|  ____________________________________________________________________    |
'|                returns 0 if CH$ is not in the string "A-P"                |
'|  ____________________________________________________________________    |
    WHILE (INSTR("ABCDEFGHIJKLMNOPX", Ch$) = 0)
```


Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

```
'
'| ____________________________________________________________________ |
'|                          Call update display                         |
'| ____________________________________________________________________ |
        UPDATESTATUS PORT, BYTE, STATUS, LASTSTATUS, CURROW%, CURCOL%
'
'| ____________________________________________________________________ |
'|                  Input a single character from the standard          |
'|                        input device = Keyboard                       |
'| ____________________________________________________________________ |
                Ch$ = " "
                Ch$ = INKEY$
'
'| ____________________________________________________________________ |
'|                  Convert the character into Upper case               |
'| ____________________________________________________________________ |
            Ch$ = UCASE$(Ch$)
        WEND
'
'| ____________________________________________________________________ |
'|                          Take action based on key                    |
'| ____________________________________________________________________ |
        SELECT CASE Ch$
'
'| ____________________________________________________________________ |
'|                          Channel A Forward                           |
'| ____________________________________________________________________ |
            CASE IS = "A"
            COMMAND860 1, PORT, BYTE, STATUS
'
'| ____________________________________________________________________ |
'|                          Channel A Reverse                           |
'| ____________________________________________________________________ |
            CASE IS = "B"
            COMMAND860 2, PORT, BYTE, STATUS
'
'| ____________________________________________________________________ |
'|                            Channel A Stop                            |
'| ____________________________________________________________________ |
            CASE IS = "C"
            COMMAND860 3, PORT, BYTE, STATUS
'
'| ____________________________________________________________________ |
'|                      Channel A controls motor 1                      |
'| ____________________________________________________________________ |

            CASE IS = "D"
            COMMAND860 4, PORT, BYTE, STATUS
'
'| ____________________________________________________________________ |
'|                      Channel A controls motor 2                      |
'| ____________________________________________________________________ |
            CASE IS = "E"
            COMMAND860 5, PORT, BYTE, STATUS
'
'| ____________________________________________________________________ |
'|                          Channel B Forward                           |
'| ____________________________________________________________________ |
            CASE IS = "F'
            COMMAND860 6, PORT, BYTE, STATUS
'
'| ____________________________________________________________________ |
'|                          Channel B Reverse                           |
'| ____________________________________________________________________ |
            CASE IS = "G"
            COMMAND860 7, PORT, BYTE, STATUS
'
'| ____________________________________________________________________ |
'|                            Channel B Stop                            |
'| ____________________________________________________________________ |
            CASE IS = "H"
            COMMAND860 8, PORT, BYTE, STATUS
```


Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

```
‘ ____________________________________________________________________
‘|                        Channel B controls motor 3                    |
‘| ____________________________________________________________________ |
        CASE IS = “I”
        COMMAND860 9, PORT, BYTE, STATUS
‘ ____________________________________________________________________
‘|                        Channel B controls motor 4                    |
‘| ____________________________________________________________________ |
        CASE IS = “J”
        COMMAND860 10, PORT, BYTE, STATUS
‘ ____________________________________________________________________
‘|                           Clear All Limits                           |
‘| ____________________________________________________________________ |
        CASE IS = “K”
        COMMAND860 11, PORT, BYTE, STATUS
‘ ____________________________________________________________________
‘|                    Velocity controlled by front panel                |
‘| ____________________________________________________________________ |
        CASE IS = “L”
        COMMAND860 12, PORT, BYTE, STATUS
‘ ____________________________________________________________________
‘|                  Velocity controlled by external D to A              |
‘| ____________________________________________________________________ |
        CASE IS = “M”
        COMMAND860 13, PORT, BYTE, STATUS
‘ ____________________________________________________________________
‘|                              Use LPTI                                |
‘| ____________________________________________________________________ |
        CASE IS = “N”
        COMMAND860 14, PORT, BYTE, STATUS
‘ ____________________________________________________________________
‘|                              Use LPT2                                |
‘| ____________________________________________________________________ |
        CASE IS = “O”
        COMMAND860 15, PORT, BYTE, STATUS
‘ ____________________________________________________________________
‘|                              Use LPT3                                |
‘| ____________________________________________________________________ |
        CASE IS = “P”
        COMMAND860 16, PORT, BYTE, STATUS
‘ ____________________________________________________________________
‘|                                 Quit                                 |
‘| ____________________________________________________________________ |
        CASE IS = “X”
        GOTO PROGRAMEND
        CASE ELSE
    END SELECT
    Ch$ = “”
‘ ____________________________________________________________________
‘|                          Update the display                          |
‘| ____________________________________________________________________ |
    UPDATESTATUS PORT, BYTE, STATUS, LASTSTATUS, CURROW%,
CURCOL%
WEND
‘ ____________________________________________________________________
`|                                 Exit                                 |
‘| ____________________________________________________________________ |
PROGRAMEND:
CLS
END
```


Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

```
'  ____________________________________________________________________
'| This routine performs the requested command on the                 |
'| parallel port. The command passed is a byte with                   |
'| the value passed determining what command to execute.              |
'| The current status is returned with every call.                    |
'| Command O is provided so that the user may request                 |
'| the status without performing any function.                        |
'| ___________________________________________________________________|
SUB COMMAND860 (command, PORT, BYTE, STATUS) STATIC
'  ____________________________________________________________________
'|                    Commands:                                       |
'|          0 :    Return status from 860. Bit mapped value:          |
'|                 B15:  0 = Remote Locked out, 1 - Remote allowed    |
'|                 B14:  0 = Channel A Forward limit, 1 = no limit    |
'|                 B13:  1 = Channel A Reverse limit, 0 = no limit    |
'|                 B12:  0 = Channel B Forward limit, 1 = no limit    |
'|                 B11:  1 = Channel B Reverse limit, 0 = no limit    |
'|                 B10:  not used                                     |
'|                 B09:  not used                                     |
'|                 B08:  not used                                     |
'| ___________________________________________________________________|
'  ____________________________________________________________________
'|                  1 :  Move Channel A Forward.                      |
'|                  2 :  Move Channel A Reverse.                      |
'|                  3 :  Stop Channel A.                              |
'|                  4 :  Channel A controls motor 1.                  |
'|                  5 :  Channel A controls motor 2.                  |
'|                  6 :  Move Channel B Forward.                      |
'|                  7 :  Move Channel B Reverse.                      |
'|                  8 :  Stop Channel B.                              |
'|                  9 :  Channel B controls motor 3.                  |
'|                 10 :  Channel B controls motor 4.                  |
'|                 11:  Clear all Limits.                             |
'|                 12:  Velocity Controlled by Front Panel.           |
'|                 13:  Velocity Controlled by External D/A Input.    |
'|                 14:  Use LPT 1.                                    |
'|                 15:  Use LPT 2.                                    |
'|                 16:  Use LPT 3.                                    |
'| ___________________________________________________________________|
'|                 When issuing the DOS level function call INT86OLD  |
'| ___________________________________________________________________|
'|                 - Type: 17 Hex=>     To parallel port.             |
'|                 - Register AH= 0     -Send data byte over the parallel port
'|                                 = 1  -  Initialize the parallel port
'|                                 = 2  -  Get parallel port status. The status
'|                                         is passed via Register AH.
'|                 - Register AL       =>  Data byte to be xmitted over
'|                                         the parallel port.
'|                 - Register DX=>     0 - LPT1; 1 - LPT2; 2 - LPT3   |
'| ___________________________________________________________________|
'|                Define the input and output arrays for INT86OLD     |
'|                          function used later on.                   |
'| ___________________________________________________________________|
DIM INARY%(7), OUTARY%(7)
'  ____________________________________________________________________
'|                Define register-array indices to make program       |
'|                          easier to understand.                     |
'| ___________________________________________________________________|
CONST ax = 0, bx = 1, cx = 2, dx = 3, bp = 4, si = 5, di = 6, fl = 7
```


Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

```
‘ ____________________________________________________________________
‘|                  If the printer port is busy ( Remote Locked out)                  |
‘|                              then just return.                                     |
‘|                  Note: Command - 0: 860 Status; 14 - 16                            |
‘|                              are LPT1-3 selection.                                 |
‘| ____________________________________________________________________ |
IF ((0 < command) AND (command < 14)) THEN
        INARY%(ax) = &H200
        INARY%(dx) = PORT
        CALL INT86OLD(&H17, INARY%(), OUTARY%())
        IF (OUTARY%(ax) >= 0) THEN
              STATUS = OUTARY%(ax) AND &HFF00
                 GOTO COMMAND860CMPLT
        END IF
END IF
‘ ____________________________________________________________________
‘|                        Otherwise execute the command                           |
‘| ____________________________________________________________________ |
IF (command < 17) THEN
        SELECT CASE command
‘ ____________________________________________________________________
‘|                              Return 860 status                                   |
‘| ____________________________________________________________________ |
              CASE O
‘ ____________________________________________________________________
‘|                            Channel A Forward                                     |
‘| ____________________________________________________________________ |
        CASE 1                                          ‘ ____________________
        BYTE = BYTE AND &HFD                            ‘|  Stop the motor,  |
        INARY%(ax) = BYTE                               ‘|  move forward      |
        INARY%(dx) = PORT                               ‘|  and lockout       |
        CALL INT86OLD(&H17, INARY%(),                   ‘|  front panel.      |
        OUTARY%())                                      ‘| ___________________ |
        DELAY
        BYTE = BYTE OR &H23
‘ ____________________________________________________________________
‘|                           Channel A Reverse                                      |
‘| ____________________________________________________________________ |
        CASE 2                                          ‘ ____________________
        BYTE = BYTE AND &HFD                            ‘|  Stop the motor,  |
        INARY%(ax) = BYTE                               ‘|  move reverse      |
        INARY%(dx) = PORT                               ‘|  and lockout       |
        CALL INT86OLD(&H17, INARY%(),                   ‘|  front panel.      |
        OUTARY%())                                      ‘| ___________________ |
        DELAY
        BYTE = (BYTE AND &HFE) OR &H22
‘ ____________________________________________________________________
‘|                            Channel A Stop                                        |
‘| ____________________________________________________________________ |
             CASE 3
             BYTE = BYTE AND &HFD
‘ ____________________________________________________________________
‘|                       Channel A controls motor 1                                 |
‘| ____________________________________________________________________ |
        CASE 4                                          ‘ ____________________
        IF ((BYTE AND &H2) = 0) THEN                    ‘|  Check if         |
            INARY%(ax) = BYTE                           ‘|  stopped,          |
            INARY%(dx) = PORT                           ‘|  then switch       |
            CALL INT86OLD(&H17, INARY%(),               ‘|  to motor 1        |
        OUTARY%())                                      ‘| ___________________ |
            BYTE = (BYTE AND &HBF) OR &H20
        END IF
```


Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

```
'
'|_____________________________________________________________________|
'|                    Channel A controls motor 2                       |
'|_____________________________________________________________________|
        CASE 5                                  '
            IF ((BYTE AND &H2) = 0) THEN        '|  Check if          |
            INARY%(ax) = BYTE                   '|  stopped,          |
            INARY%(dx) = PORT                   '|  then switch       |
            CALL INT86OLD(&H17, INARY%(),       '|  to motor 2        |
        OUTARY%())                              '|____________________|
            BYTE = BYTE OR &H60
'_____________________________________________________________________
        END IF
'
'|_____________________________________________________________________|
'|                    Channel B Forward                                |
'|_____________________________________________________________________|
        CASE 6                                  '
        BYTE = BYTE AND &HF7                    '|  Stop the motor,   |
        INARY%(ax) = BYTE                       '|  move forward      |
        INARY%(dx) = PORT                       '|  and lockout       |
        CALL INT86OLD(&H17, INARY%(),           '|  front panel       |
        OUTARY%())                              '|____________________|
        DELAY
        BYTE = BYTE OR &H2C
'_____________________________________________________________________
'|                    Channel B Reverse                                |
'|_____________________________________________________________________|
        CASE 7                                  '
        BYTE = BYTE AND &HF7                    '|  Stop the motor,   |
        INARY%(ax) = BYTE                       '|  move reverse      |
        INARY%(dx) = PORT                       '|  and lockout       |
        CALL INT86OLD(&H17, INARY%(),           '|  front panel       |
        OUTARY%())                              '|____________________|
        DELAY
        BYTE = (BYTE AND &HFB) OR &H28
'_____________________________________________________________________
'|                    Channel B Stop                                   |
'|_____________________________________________________________________|
        CASE 8
        BYTE = BYTE AND &HF7
'_____________________________________________________________________
'|                    Channel B controls motor 3                       |
'|_____________________________________________________________________|
        CASE 9                                  '
        IF ((BYTE AND &H8) = 0) THEN            '|  Check if          |
            INARY%(ax) = BYTE                   '|  stopped,          |
            INARY%(dx) = PORT                   '|  then switch       |
            CALL INT86OLD(&H17, INARY%(),       '|  to motor 3        |
            OUTARY%())                          '|____________________|
            BYTE = (BYTE AND &H7F) OR &H20
        END IF
'_____________________________________________________________________
'|                    Channel B controls motor 4                       |
'|_____________________________________________________________________|
        CASE 10                                 '
        IF ((BYTE AND &H8) = 0) THEN            '|  Check if          |
            INARY%(ax) = BYTE                   '|  stopped,          |
            INARY%(dx) = PORT                   '|  then switch       |
            CALL INT86OLD(&H17, INARY%(),       '|  to motor 4        |
            OUTARY%())                          '|____________________|
            BYTE = BYTE OR &HA0
        END IF
```


Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

```
'
'| ____________________________________________________________________ |
'|                          Clear all limits                            |
'| ____________________________________________________________________ |
        CASE 11
        INARY%(ax) = &H100
        INARY%(dx) = PORT
        CALL INT86OLD(&H17, INARY%(), OUTARY%())
'
'| ____________________________________________________________________ |
'|                  Velocity controlled by front panel                  |
'| ____________________________________________________________________ |
            CASE 12
            BYTE = BYTE AND &HEF
'
'| ____________________________________________________________________ |
'|                  Velocity controlled by external D to A              |
'| ____________________________________________________________________ |
            CASE 13
            BYTE = BYTE OR &H10
'
'| ____________________________________________________________________ |
'|                              Use LPTI                                |
'| ____________________________________________________________________ |
            CASE 14
            PORT = 0
'
'| ____________________________________________________________________ |
'|                              Use LPT2                                |
'| ____________________________________________________________________ |
            CASE 15
            PORT = I
'
'| ____________________________________________________________________ |
'|                              Use LPT3                                |
'| ____________________________________________________________________ |
            CASE 16
            PORT = 2
            CASE ELSE
        END SELECT
END IF
'
'| ____________________________________________________________________ |
'|              Transfer the calculated Command byte over               |
'|                        to the 860 Controller.                        |
'| ____________________________________________________________________ |
IF ((0 < command) AND (command < 14)) THEN
        INARY%(ax) = BYTE
        INARY%(dx) = PORT
        CALL INT86OLD(&H17, INARY%(), OUTARY%())
'
'| ____________________________________________________________________ |
'|          If both axes are stopped, then return to local mode         |
'| ____________________________________________________________________ |
        IF (((BYTE AND &H2) = 0) AND ((BYTE AND &H8) = 0)) THEN
                BYTE = BYTE AND &HDF
                INARY%(ax) = BYTE
                INARY%(dx) = PORT
                CALL INT86OLD(&H17, INARY%(), OUTARY%())
        END IF
END IF
'
'| ____________________________________________________________________ |
'|              Get the Status from the 860 every time this             |
'|                        function is called.                           |
'| ____________________________________________________________________ |
INARY%(ax) = &H200
INARY%(dx) = PORT
CALL INT86OLD(&H17, INARY%(), OUTARY%())
STATUS = OUTARY%(ax) AND &HFF00
COMMAND860CMPLT:
```


Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

```
END SUB
'  ____________________________________________________________________
'|                  This routine generates a l00ms delay                |
'|  ____________________________________________________________________|
'|                First read the system time, saving the time. Then      |
'|                continue asking the system what time it is, until      |
'|                the difference is about 100 ms.                       |
'|  ____________________________________________________________________|
SUB DELAY
DIM INARY%(7), OUTARY(7)
CONST ax = 0, cx = 2, dx = 3
'  ____________________________________________________________________
'|                DOS level function call to get system time.           |
'|                The time is left in Register DX.                      |
'|  ____________________________________________________________________|
INARY%(ax) = &H2C00
CALL INT86OLD(&H21, INARY%(), OUTARY%())
TEMPI = OUTARY%(dx)
TEMP2 = TEMPI
WHILE (TEMP2 < (TEMP1))
        INARY%(ax) = &H2C00
        CALL INT86OLD(&H21, INARY%(), OUTARY%())
        TEMP2 = OUTARY%(dx)
WEND
END SUB
'  ____________________________________________________________________
'|                  This routine prints the menu to the crt             |
'|  ____________________________________________________________________|
'|                Default type integer, display the possible selections |
'|  ____________________________________________________________________|
SUB PRINTMENU STATIC
PRINT " "
PRINT " "——————————Axis 1 or 2 ——————————   ——————————Axis 3 or 4 ——————————"
PRINT " A.              Forward              F.          Forward"
PRINT " B.              Reverse              G.          Reverse"
PRINT " C.              Stop                 H.          Stop"
PRINT " D.              Motor I              I.          Motor 3"
PRINT " E.              Motor 2              J.          Motor 4"
PRINT " "
PRINT " K. Clear all Limits.
PRINT " "
PRINT " L. Velocity controlled by front panel. (default) "
PRINT " M. Velocity controlled by external D/A input."
PRINT " "
PRINT " N. Use LPT 1 (default)"
PRINT " O. Use LPT 2"
PRINT " P. Use LPT 3"
PRINT " "
PRINT " X. Exit Program"
PRINT " "
PRINT " Enter Option A-P:"
PRINT " "
PRINT " "
PRINT " —————————— Axis 1 or 2 ——————————  ————————— Axis 3 or 4 ——————————
PRINT "Remote Lockout   Forward Limit   Reverse Limit   Forward Limit Reverse Limit"
END SUB
'  ____________________________________________________________________
'|                  This routine reads the Status byte from the 860     |
'|                controller and updates the display.                   |
'|  ____________________________________________________________________|
SUB UPDATESTATUS (PORT, BYTE, STATUS, LASTSTATUS, CURROW%,
```


Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

```
CURCOL%) STATIC
COMMAND860 0, PORT, BYTE, STATUS
‘ ____________________________________________________________________________
‘|                                Display the status                          |
‘| ___________________________________________________________________________|
IF (STATUS = LASTSTATUS) THEN          ‘ ____________________________________
  GOTO UPDATEEND                       ‘|  If same as before, return.        |
ELSE                                   ‘|                                     |
  LASTSTATUS = STATUS                  ‘|  Copy the changed status.           |
  LOCATE CURROW%, CURCOL%              ‘|  Position the cursor.               |
  IF (STATUS < 0) THEN                 ‘|  Remote Lockout or not.             |
        TEMP = CLNG(STATUS)            ‘|  Convert the 2’s                    |
        TEMP = (TEMP+32768)            ‘|  complement number                  |
        TEMP = TEMP/256                ‘|  into an equivalent                 |
        TEMP = CINT(TEMP)              ‘|  positive number.                   |
        TEMP = TEMP*256                ‘| ____________________________________|
        PRINT “      NO      “;        ‘|                                     |
ELSE                                   ‘|  ; Prints on the same line          |
        TEMP = STATUS                  ‘| ____________________________________|
        PRINT “       YES        “;
   END IF
‘ ____________________________________________________________________________
‘|                        Channel A Forward Limit Status update               |
‘| ___________________________________________________________________________|
  IF (TEMP >= 16384) THEN
        PRINT “        NO        “;
        TEMP = (TEMP-16384)
  ELSE
        PRINT “       YES        “;
  END IF
‘ ____________________________________________________________________________
‘|                        Channel A Reverse Limit Status update               |
‘| ___________________________________________________________________________|
  IF (TEMP >= 8192) THEN
        PRINT “       YES        “;
        TEMP = (TEMP-8192)
  ELSE
        PRINT “       NO         “;
  END IF
‘ ____________________________________________________________________________
‘|                        Channel B Forward Limit Status update               |
‘| ___________________________________________________________________________|
  IF (TEMP >= 4096) THEN
        PRINT “       YES “;
        TEMP = (TEMP-4096)
  ELSE
        PRINT “       NO “;
  END IF
‘ ____________________________________________________________________________
‘|                        Channel B Reverse Limit Status update               |
‘| ___________________________________________________________________________|
  IF (TEMP >= 2048) THEN
        PRINT “       NO “;
        TEMP = (TEMP-2048)
  ELSE
        PRINT “       YES”;
  END IF
END IF
UPDATEEND:
END SUB
```


Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Newport Corporation
Worldwide Headquarters

1791 Deere Avenue
Irvine, CA 92606

(In U.S.): 800-222-6440
Tel: 949-863-3144
Fax: 949-253-1680

Internet: sales@newport.com

Newport®

Visit Newport Online at: **http://www.newport.com**

ISO 9001
FM 27207

Newport Corporation, Irvine, California, has been certified compliant with ISO 9001 by the British Standards Institution.

P/N 16336-01, Rev. C
IN-09891 (01/01)
Printed in the USA

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP