

ALPHA™ 790i Installation and Operation Manual



ADAPTIVE

© 1997 Adaptive Micro Systems
Form No. 9704-9003
8/15/97

Note: Due to continuing product innovation, specifications in this document are subject to change without notice.

Copyright © 1997 Adaptive Micro Systems, Inc. ALL RIGHTS RESERVED.

Trademarked names appear throughout this document. Rather than list the names and entities that own the product trademarks or insert a trademark symbol with each mention of the trademarked name, the publisher states that it is using the names for editorial purposes and to the benefit of the trademark owner with no intention of improperly using the trademark.

BETA-BRITE, BIG DOT, and PowerView are trademarks of Adaptive Micro Systems, Inc. registered in the United States Patent and Trademark Office.

Alec, Alpha, AlphaLert, AlphaNET, AlphaNET *plus*, AlphaNET *plus* II, ALPHAVISION, Ambassador, Automode, Director, EZ KEY II, EZ95, PagerNET, Performer, PPD, PrintPak, Producer, Smart Alec, Smartalarm+, Smartstat+, Smartcomm+, Smartcore+, SmartSDK, Solar, and TimeNet are trademarks of Adaptive Micro Systems, Inc.

Visit us at our Internet World Wide Web site at <http://www.ams-i.com>
or e-mail us at sales@ams-i.com

Table of Contents

Product description	1
Features	1
Warranty information	1
EMI compliance	2
790i Quick Reference Guide	3
Installation	4
Mounting the ALPHA 790i sign	4
Installing the rain shield	5
Connecting to a power source	5
Networking the sign	7
End-of-line termination	8
Master-slave (double-faced) installation	9
DIP switch address settings	10
Basic sign operation	12
Cooling and air flow	12
Overheat indicator	12
Using in cold climates	12
Infrared programming	13
Using the infrared keyboard	13
Service and maintenance	15
Theory of operation	15
Specifications	15
Replacement parts	16
790i wiring diagrams	17
Cleaning aluminum reflectors	21
Fan intake	21
Lamp test/replacement	22
Component removal	23
Troubleshooting	27

Product description

Features

- Simple programming with EZ KEY II and AUTOMODE. (See the **ALPHA Remote Control Programming Manual**.)
- Programmable indoors or outdoors with a hand-held Infrared keyboard.
- Compatible with the AlphaNet *plus* communications system.
- Includes temperature indicator.
- Battery-backed time-of-day clock and message memory.
- Long-life low-voltage lamps.
- Low power consumption (800 watts maximum.)
- Large 6.3" (16 cm) characters.
- Both single- and double-stroke (wide) characters, upper- and lower-case.
- 7-dot and 5-dot high characters, minimum of 15 slim or 7 fat characters displayed at one time.
- Automatic programmable time-of-day dimming for night-time operation.
- Built-in lamp test.
- Built-in overheat protection.
- Printed circuit boards coated for protection from moisture.
- All gold-plated connectors and lamp sockets.
- Easy and safe lamp replacement.
- Programmable password protection.
- Keyboard-programmable serial address.
- All stainless steel hardware and an aluminum case.

Warranty information

Adaptive Micro Systems, Inc. warrants to the original purchaser that the ALPHA 790i sign will be free of defects in workmanship and materials for a period of one year from the date of purchase.

Adaptive Micro Systems, Inc. will, without charge, repair or replace, at its option, defective product or component parts upon delivery to the factory service department accompanied by proof of the date of purchase in the form of a sales receipt.

This warranty does not apply in the event of any misuse or abuse of the product, acts of God (for example, lightning strikes, wind/storm damage, etc.), or as a result of any unauthorized repairs or alterations. This warranty does not apply if the serial number is altered, defaced or removed from the ALPHA 790i sign. Incandescent lamps which are used in incandescent products are not covered by this warranty.

Local ordinances prohibiting the use of flashing signs may exist in some locations. Compliance with local ordinances is the sole responsibility of the user.

Should your ALPHA 790i sign need servicing, return it (freight prepaid) to Adaptive Micro Systems, Inc. Please call your sales representative to receive a Return Merchandise Authorization number before sending your unit back for servicing. Do not send the unit back freight collect or COD: any CODs will be refused.

To obtain warranty coverage, this product must be registered. Please complete the enclosed warranty registration card and mail it to Adaptive Micro Systems, Inc. Thank you.

EMI compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Changes or modifications made to the ALPHA 790i not expressly approved by Adaptive Micro Systems, Inc. could void your authority to operate the ALPHA 790i.

790i Quick Reference Guide

115V (North America):	P/N 1049-1111
220V/240V (International) (Specify 220V or 240V when ordering)	P/N 1049-1121
Slave Unit 115V (North America):	P/N 1049-1211
Slave Unit 220V/240V (International): (Specify 220V or 240V when ordering)	P/N 1049-1221
Eprom Numbering Convention:	1049-xxxx
Sign Type:	Incandescent
Sign Matrix Array:	90 columns x 7 rows
Sign Matrix Dimensions:	81" x 6.3" (205.74 cm x 16 cm)
Pitch (Pixel Spacing):	0.9" (2.3 cm)

Installation

Mounting the ALPHA 790i sign

For your convenience, 12 mounting holes have been provided. Eight holes are provided for rear mounting and four holes are on the top.

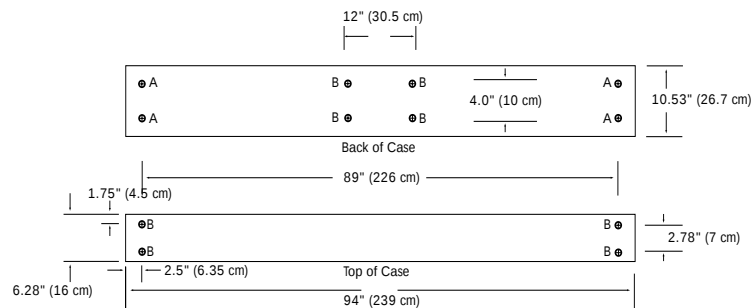
NOTES:

- The ALPHA 790i sign weighs approximately 65 lbs. (29.5 kg.) To be safe, make sure that your mounting system can support at least 130 lbs. (59 kg.) Also, be sure to always use the proper wall anchors.
- All hardware used for mounting should be protected from corrosion.
- All mounting holes are covered with round black labels. Always leave the unused mounting holes covered to avoid excess moisture accumulation in the case.

Mounting holes

A = .343" (.87 cm) clear holes acceptable with 5/16" (.79 cm) bolt for wall mounting, when used with a suitable anchor. Clear holes "A" are accessible by removing both end caps. End caps are held on by four screws, one on each surface of the sign: the top, bottom, front, and back.

B = Threaded inserts acceptable with 5/16" (.79 cm) bolts (3/4" (1.9 cm) maximum length).



NOTES:

- Do not worry about installing the end cap screw on the back surface if the unit is wall-mounted.
- Do not install the end cap screw on the top of the case if the unit is mounted at the top with little clearance between the case top and the mounting surface. This will allow easy removal of the end caps after mounting.

Installing the rain shield

Your ALPHA 790i sign comes complete with a rain shield. In order to ease shipment, the rain shield was not factory-installed. However, it must be installed before start-up.

To install the rain shield, follow these steps:

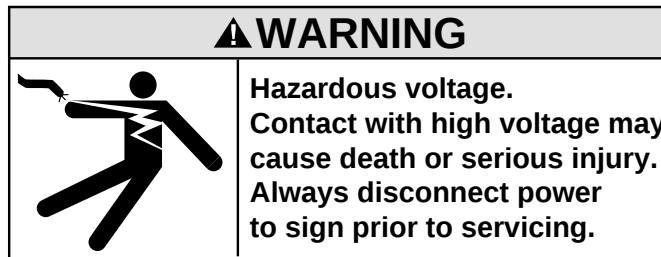
1. Remove the nine black screws and lock washers located along the top front edge of the case.
2. Position the nine holes in the rain shield over the open screw holes described in step 1.
3. Using the screws and lock washers that you removed in step 1, securely fasten the rain shield to the case.

NOTE: The 790i sign is designed to withstand rain. However, DO NOT subject the sign to horizontal or upward-directed water spray such as from a lawn sprinkler.

Connecting to a power source

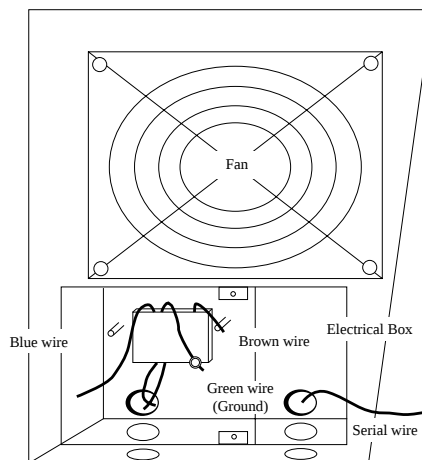
Your ALPHA 790i sign requires approximately 7 amps of 115 VAC or about 3.5 amps of 220-240 VAC, depending on the unit purchased. It is supplied with an internal line filter to protect against incoming line noise.

NOTE: To prevent damage to your sign(s) from fluctuation in power, it is recommended that a surge protector be installed. To determine the correct surge protector size, contact your sales representative.



To connect your sign to a power source, follow these steps:

1. Remove the left end cap. Depending on how your unit is mounted, the end cap is held on by as many as four screws, one on each surface of the sign: the top, bottom, front and back. If the unit is wall-mounted, the back screw attaching the end cap should not be installed.
2. Locate the fan and electrical box inside the sign. Remove the two screws securing the cover, and then remove the cover. Notice that the electrical box has two compartments. The small compartment on the right contains the wires for the serial connections, if needed. On the left is the larger compartment containing a power line filter with wires used for the termination of power wires. See the illustration following.



3. Run a conduit suitable for outdoor use from the power source to the sign. The hole in the electrical box accepts

a 3/4" (1.9 cm) conduit connector. The hole in the bottom of the case is large enough for 3/4" conduit to pass through.

4. Run the power wires through the conduit and connect the hot wire to the brown wire. Next, connect the neutral wire to the blue wire. Finally, connect the earth ground, usually a green wire, to the green wire in the electrical box. You **MUST** connect the green wire to the earth ground. Failing to connect these wires properly may result in a hazardous situation.

WARNING!

The circuit supplying power to your ALPHA 790i sign must be protected with a circuit breaker or fuse. Some outdoor installations may also require a Ground Fault Interrupter (GFI). Be sure to consult your local electrical codes before installing this sign. This sign does not have internal fusing on the supply circuit.

Networking the sign

The ALPHA 790i sign can be serially connected to work with the AlphaNet *plus* communications systems. By using an RS485 communication system, only one shielded twisted pair is needed to connect to the sign.

Sign connection

1. Remove the left end cap in order to access the electrical box and then remove the electrical box cover as in steps 1 and 2 in "Connecting to a power source". Locate the serial cable in the smaller compartment on the right.
2. Using a suitable outdoor conduit, run the conduit to the sign. The electrical box hole accepts a 1/2" (1.27 cm) conduit connector. The hole in the bottom of the case is large enough for 1/2" conduit to pass through.
3. Run the serial cable through the conduit. The cable should be shielded twisted pair (red/black) and a minimum of 22 AWG.
4. Remove the electrical tape from the serial cable. Strip back the insulation from the serial cable in the electrical box as needed. Then connect these wires with the wire just run through the conduit (step 3) as follows: red to

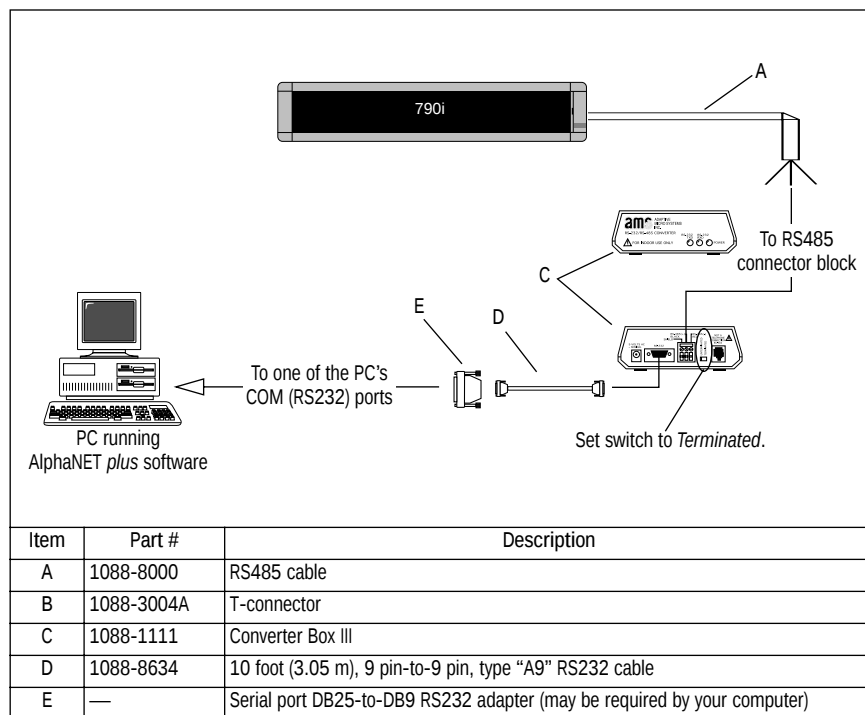
red; black to black; and shield to shield.

NOTE: Do not run the power cable and serial cable in the same conduit.

Computer connection

If you want to connect just *one* 790i sign to your PC, use the diagram following. For additional information for computer connections, please refer to AMS publication **Network Configurations**, part number 9708-8046.

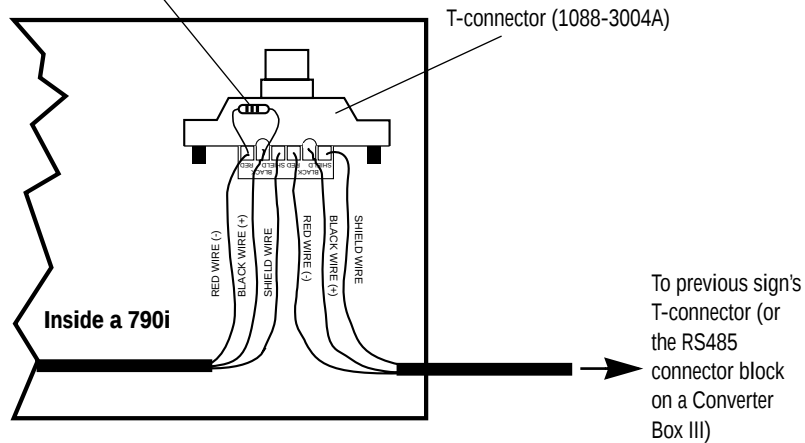
Table 1: Connecting a single ALPHA 790i sign to a PC



End-of-line termination

If a 790i sign is at the end of a network of signs, terminate the last 790i sign as shown next:

120-ohm, 1/4 watt resistor across the BLACK and RED terminals of the T-connector.



Refer to the AMS publication **Network Configurations**, part number 9708-8046, for more information on connecting signs.

Master-slave (double-faced) installation

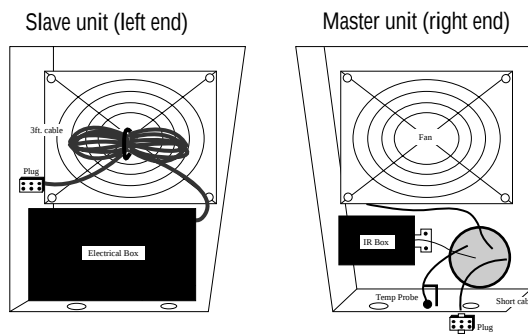
The ALPHA 790i sign can be operated with a secondary slave unit to create a double-sided sign center. Unlike the standard (master) ALPHA 790i, the ALPHA 790i slave unit contains no controller board, infrared receiver or temperature probe. The units can be installed back-to-back/hanging or by using a pole mount.

Complete the following before mounting a master-slave double-faced ALPHA 790i sign.

1. Install the rain shields on both units.
2. Remove the back screws holding the end caps if you are mounting the units back-to-back.

Connecting the units

1. Supply a power source to each unit. (Remember to install the correct size surge protector. Contact your sales representative if you are uncertain about the surge protector size.)
2. Remove the dummy plug on the connector located inside the right end of the case. Find the 3-foot (.91 m) cable and matching connector located inside the left side of the slave unit. (Illustration appears following.)
3. Punch one hole large enough for 3/4" (1.9 cm) conduit at the right end of the master unit. Then create a similar hole at the left end of the slave unit.
4. Insert the 3-foot (.91 m) cable plug from the slave unit into the plug on the standard master unit.



NOTE: When programming the ALPHA 790i sign with the IR keyboard, you MUST face the master unit, not the slave unit. See "Infrared programming" on page 13 for additional programming information.

DIP switch address settings

In order to set the serial address of the sign utilizing the DIP switches, the controller board cover must first be removed. There is an eight-position DIP switch located near the center of the controller board. All the DIP switches will be in the "OFF" position for address "00". The DIP switches collectively represent the serial address as one hexadecimal byte. Switches set in the "ON" position represent set bits. Switch eight is the least significant bit, and switch one is the most significant bit. Below is a table of examples of how the switches should be set to achieve specific addresses. '1' denotes "ON" and '0' denotes "OFF".

NOTE: The DIP switch addressing overrides the serial address that is set up via keyboard. The address

can still be changed with the keyboard, but if power is applied to the unit, the DIP switch address will overwrite the keyboard address. For additional address setting information, see the **ALPHA Remote Control Programming Manual** or the **AlphaNET *plus* Programming Manual**.

Table 2: Selected serial address values, by DIP switch numbers

Decimal Address	S 1	S 2	S 3	S 4	S 5	S 6	S 7	S 8	Decimal Address	S 1	S 2	S 3	S 4	S 5	S 6	S 7	S 8
00	0	0	0	0	0	0	0	0	23	0	0	0	1	0	1	1	1
01	0	0	0	0	0	0	0	1	24	0	0	0	1	1	0	0	0
02	0	0	0	0	0	0	1	0	25	0	0	0	1	1	0	0	1
03	0	0	0	0	0	0	1	1	26	0	0	0	1	1	0	1	0
04	0	0	0	0	0	1	0	0	27	0	0	0	1	1	0	1	1
05	0	0	0	0	0	1	0	1	28	0	0	0	1	1	1	0	0
06	0	0	0	0	0	1	1	0	29	0	0	0	1	1	1	0	1
07	0	0	0	0	0	1	1	1	30	0	0	0	1	1	1	1	0
08	0	0	0	0	1	0	0	0	31	0	0	0	1	1	1	1	1
09	0	0	0	0	1	0	0	1	32	0	0	1	0	0	0	0	0
10	0	0	0	0	1	0	1	0	33	0	0	1	0	0	0	0	1
11	0	0	0	0	1	0	1	1	34	0	0	1	0	0	0	1	0
12	0	0	0	0	1	1	0	0	35	0	0	1	0	0	0	1	1
13	0	0	0	0	1	1	0	1	36	0	0	1	0	0	1	0	0
14	0	0	0	0	1	1	1	0	37	0	0	1	0	0	1	0	1
15	0	0	0	0	1	1	1	1	38	0	0	1	0	0	1	1	0
16	0	0	0	1	0	0	0	0	39	0	0	1	0	0	1	1	1
17	0	0	0	1	0	0	0	1	40	0	0	1	0	1	0	0	0
18	0	0	0	1	0	0	1	0	41	0	0	1	0	1	0	0	1
19	0	0	0	1	0	0	1	1	42	0	0	1	0	1	0	1	0
20	0	0	0	1	0	1	0	0	43	0	0	1	0	1	0	1	1
21	0	0	0	1	0	1	0	1	44	0	0	1	0	1	1	0	0
22	0	0	0	1	0	1	1	0	45	0	0	1	0	1	1	0	1

Basic sign operation

Cooling and air flow

Due to the heat generated by the incandescent lamps and the fact that the 790i is an outdoor sign, two fans and a temperature sensing device are located inside of the enclosure to ensure that the internal temperature of the electronics is at an acceptable level. One cooling fan is located at each end of the case. The fans' air intakes are located on the bottom of the case near the ends. Air is pulled in through the bottom air intakes and blown out past the lamps through the front of the sign.

NOTE: DO NOT BLOCK the bottom air intakes and DO NOT SEAL THE FRONT OF THE SIGN. Blocking either of the air intakes or the front of the sign will cause your sign to overheat and shut down. Periodically check the fans for proper operation, and the air intakes and the screen for any blockages.

Overheat indicator

If your ALPHA 790i sign overheats, it will automatically stop running messages and two lamps will flash on the left side of the sign. Once the unit sufficiently cools, it will resume running the messages. If your sign overheats, make sure both fans are operating. Also check the front of the sign and the air intakes for possible obstructions. If one or both fans are not operating, contact your sales representative.

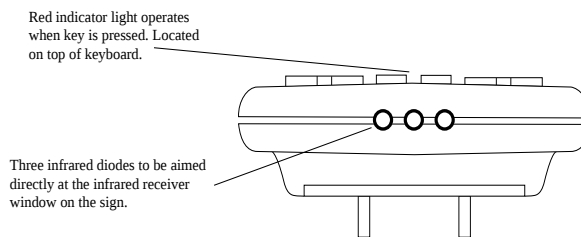
Using in cold climates

It is recommended that power to your ALPHA 790i sign not be turned off when temperatures are below 32° F (0° C.) If you don't want to display a message, it is suggested that you run a blank file. To run a blank file, press **PROGRAM SELECT** and then enter a text file name. Then press **HOLD SPACE RUN RUN**. This will keep your sign up and running without actually displaying a message. To turn your files off for a period of time, see Assigning Time Slots to Individual Text Files in the EZ KEY II Manual for more information.

Infrared programming

The infrared keyboard is a wireless programming tool used to provide a convenient way to program ALPHA 790i signs when a PC is not being used. The keyboard transmits a beam of infrared light with a special code for each key pressed. The front panel of the keyboard includes an indicator that flashes when the keyboard is operating.

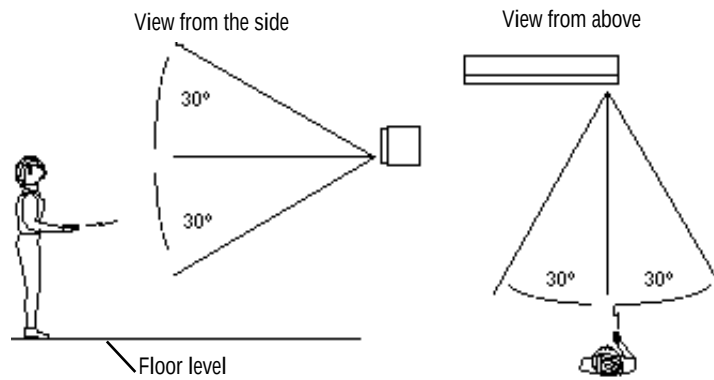
The IR receiver is located in the right end cap area. There is a small round window on the right front of the ALPHA 790i sign for receiving IR commands. Be sure that this window is not blocked.



Using the infrared keyboard

When using your infrared keyboard, keep the following points in mind:

1. The keyboard must be pointed at the infrared receiver (located at the right-hand side of the sign) whenever the keys are pressed.
2. You should have a clear view of the entire sign when programming a message, and be at least 9 feet (2.74 m) but not more than 30 feet (9.15 m) from the unit.
3. You should be standing within 30 degrees of the direct front of the infrared receiver.
4. Make sure nothing reflective is located in front of the sign. Light from the sign that is reflected back at the receiver interferes with the keyboard. Additionally, fluorescent light bulbs could interfere with the keyboard.



The person who is programming should be located so that the IR keyboard is within the angle shown and at a distance of 10" to 30" (3.05 to 9.15 m) from the sign.

If a sign is this far from the floor...	... hold an IR keyboard this far away:
10 feet (3.04 m)	from 10 to 30 feet (3.04 to 9.14 m)
15 feet (4.57 m)	from 19 to 30 feet (5.79 to 9.14 m)
20 feet (6.10 m)	from 25 to 30 feet (7.62 to 9.14 m)

Figure 1: Using a Remote Control with a sign

NOTE: When programming the ALPHA 790i sign with the IR keyboard, you **MUST** stand at least 9 feet (2.74 m) from the sign. Signals will not be properly received at ranges closer than 9 feet. The IR keyboard will function up to 30 feet (9.14 m) from the sign.

Service and maintenance

Theory of operation

The operation of the Alpha 790i is basically the same as the Alpha LED signs in that there is one micro board which serially supplies data to the driver board assemblies of the sign and also communicates to the outside world via a serial port to a computer or an IR keyboard.

The main difference between the operation of the Alpha 790i and its LED counterparts is the way in which the “dots” are actually lit up. In the LED signs, the entire sign is multiplexed. In other words, only one row of the sign is actually turned on at a time and a particular dot is lit up by selecting the row and the column that the dot is in. Consequently, the entire sign is never all on at the same time even though it appears to be. In the case of the 790i, the sign is not multiplexed but utilizes a direct drive approach. This means that each dot is turned on by its own individual source and not by selecting the row and column to which it belongs. As a result, the entire sign “seen” is actually on at the same time.

Specifications

Voltage:	120/220/240 VAC (specify when ordering)
Current Consumption:	7 amps max @ 120 VAC 3.5 amps max @ 220-240 VAC
Cabinet:	Black powder coat finish
Cabinet Material:	.080 Aluminum
Cabinet Weight:	65 lbs. (29.5 kg)
Cabinet Size:	94.0" L x 6.28" W x 10.5" H (239 cm L x 16 cm W x 26.7 cm H)
Sign Technology:	Low voltage wedge base incandescent
Sign Size:	81.0" L x 6.3" H (205 cm L x 16 cm H)

Character Per Screen: 15 characters per line (standard width)

Sign Array: 90 columns x 7 rows

Serial Interface: RS485

Other Interface: Infrared hand-held keyboard

Memory Capacity: 7000 characters

Temperature Accuracy: 5 4° F, -25° F to +120° F
(5 15° C, -4° C to +49° C)

Replacement parts

Table 3: Replacement part numbers

Part	115V	220V	240V
Transformer: (for Micro Board)	4021-1210	4021-2211	4021-2211
Driver Assembly:	1093-0111	1093-0112	1093-0112
Micro Board:	1095-0511A	Same	Same
Fan, 55 cfm:	4600-8000	4600-8001	4600-8001
IR Receiver:	1071-3212	Same	Same
IR Keyboard:	1072-1111	Same	Same
Power Line Filter:	3073-0003	Same	Same
Lamp, 10 pack:	4700-0064	Same	Same
Lamp, 100 pack:	4700-0065	Same	Same
Boots, 100 pack	1049-9011	Same	Same

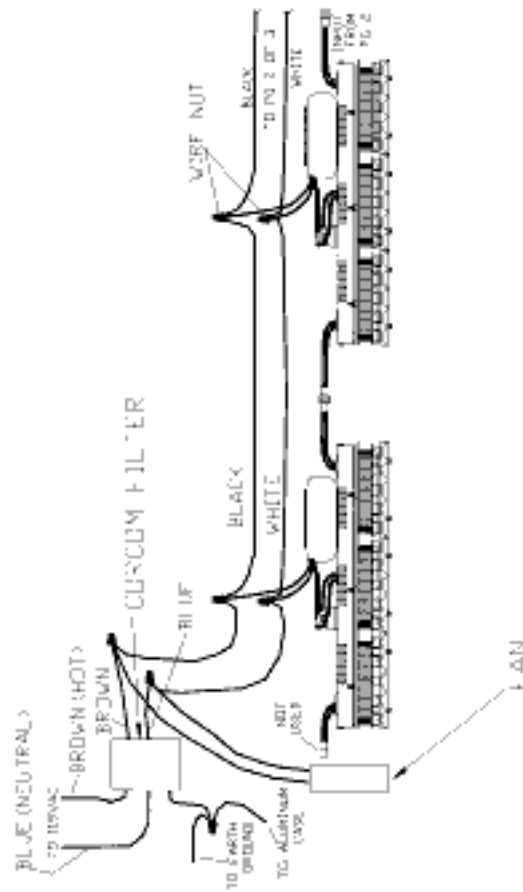


Figure 2: 790i wiring diagram assembly #1

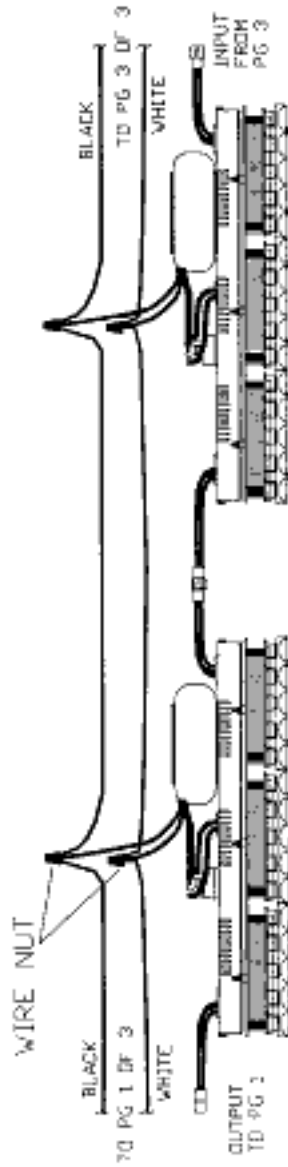


Figure 3: 790i wiring diagram assembly #2

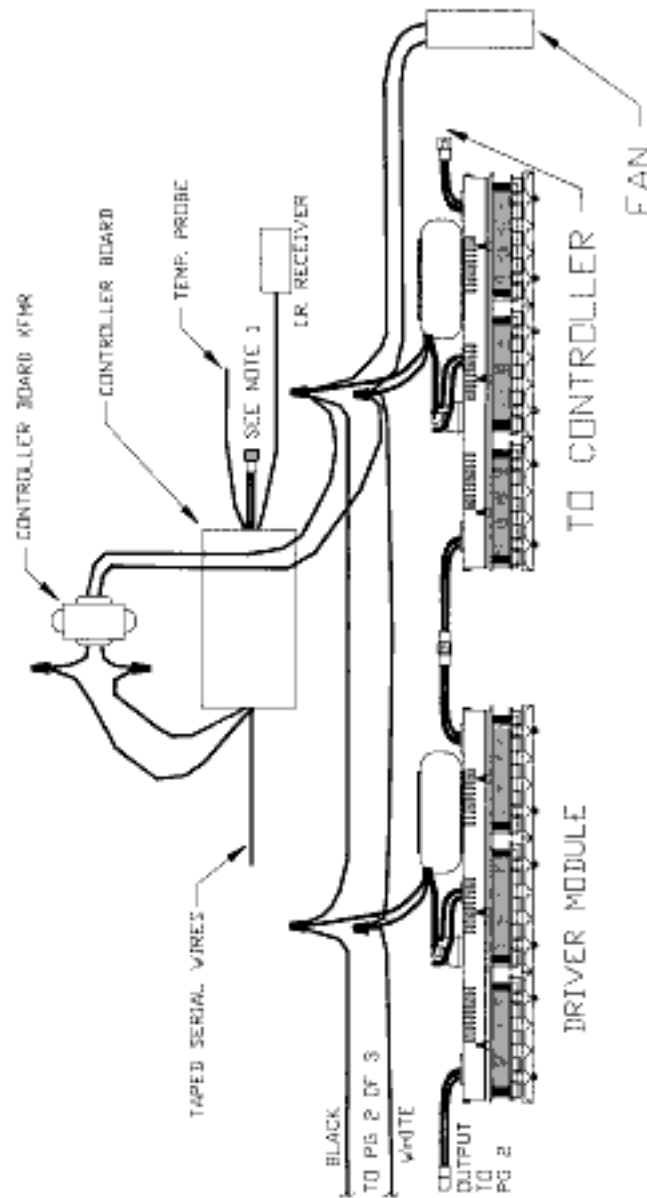


Figure 4: 790i wiring diagram assembly #3

790i wiring diagrams, continued

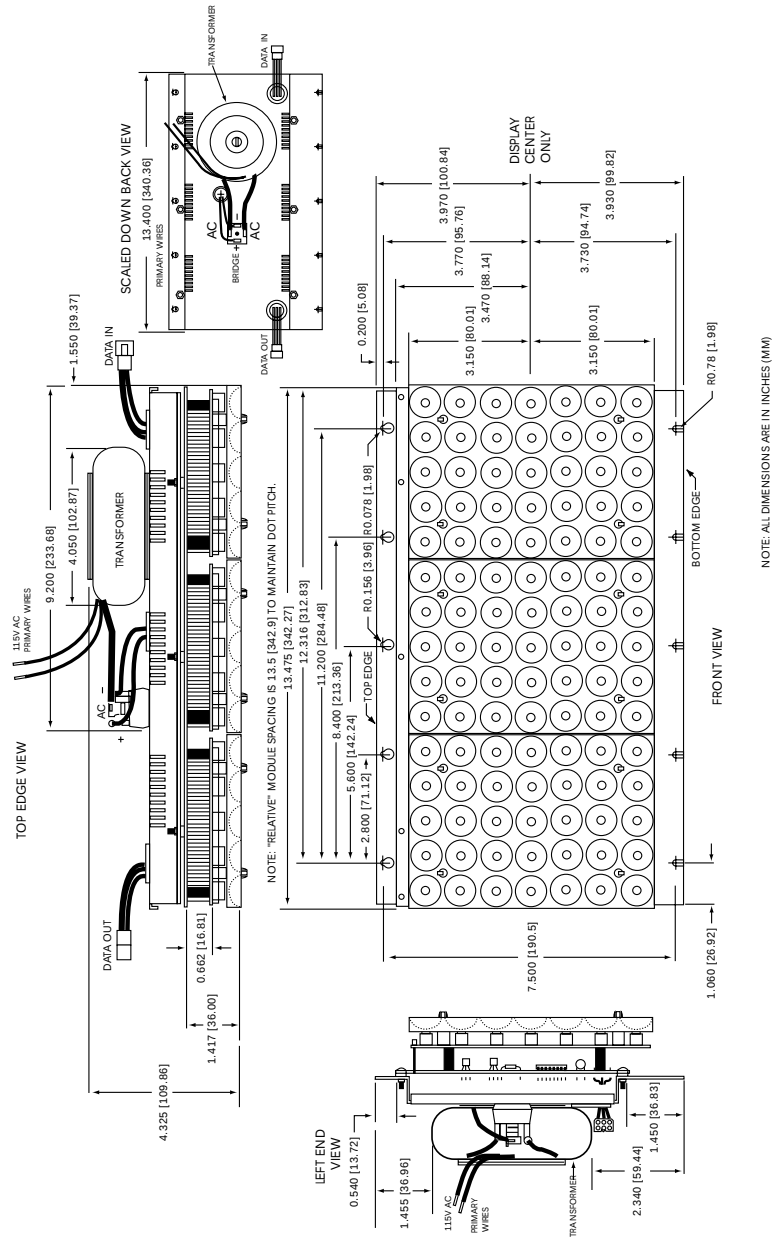
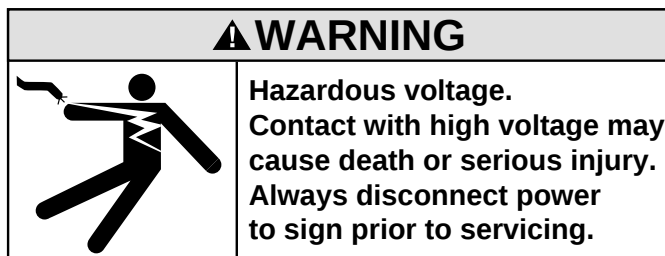


Figure 5: 790i wiring diagram assembly #4

Cleaning aluminum reflectors



The aluminum bulb reflectors require cleaning from time to time to maintain maximum reflection. Depending on the environment, dirt and/or bugs may accumulate on the reflectors and affect the overall sign brightness. To clean the reflectors, follow these steps:

1. TURN OFF THE POWER GOING TO THE SIGN!
2. Remove the reflectors. (See “Lamp test/replacement” below.)
3. Spray the reflectors with a mild detergent solution and let the solution sit for a few minutes.
4. Carefully rinse off the reflectors with clean water. If necessary, use a soft bristle brush to help remove stubborn dirt.
5. Allow the reflectors to air dry and then reinstall.

NOTE: These steps can also be used to clean the lamps if necessary. However, remember to disconnect the power first. Also, make sure the lamp board assemblies and socket contacts are completely dry before applying power to the sign.

Fan intake

Periodically, check the fan intake to make sure it is free of any obstructions or debris. In addition, the screen material over the lamp modules should be checked for damage and wear. Any blockage of these two areas will directly impact cooling efficiency and sign operation.

Lamp test/replacement

A simple lamp test can be run on the ALPHA 790i sign to help you locate burned-out bulbs. Refer to the EZ KEY II Programming Manual for more information about the Lamp Test Program. Once you have located the lamps in need of replacement, follow these steps:

1. Open the screen material located over the face of the sign. The screen is opened by turning the three turn buttons located on the top of the screen. Turn each button 90 degrees and then pull the top of the screen out.
2. On the bulbs in need of replacement, remove the aluminum reflectors. There are three aluminum reflectors on each lamp module and each is held on by four plastic locking standoffs.
3. To release the reflector locking mechanism, push in the tip of standoff with your thumb or forefinger and pull up slightly on the corner. Repeat this procedure on each corner and then remove the entire reflector.
4. Grip the lamp that needs replacement between your thumb and forefinger and pull the lamp straight out of the socket. (Note: Each lamp resides within a black “boot” that covers the lamp base and the top of the socket).
5. Insert a new lamp into the socket and push until it is firmly in place. Do not twist the lamps, just push them in or pull them out of the socket. Make sure the “boot” is well seated over the lamp base and the top of the socket.

Lamp life will vary in every application. Line voltage, types of messages displayed, ambient temperatures, shock or vibration, and sign location can have an impact on the life of a lamp. Additionally, snapping the reflector back on harshly may damage the life of lamps.

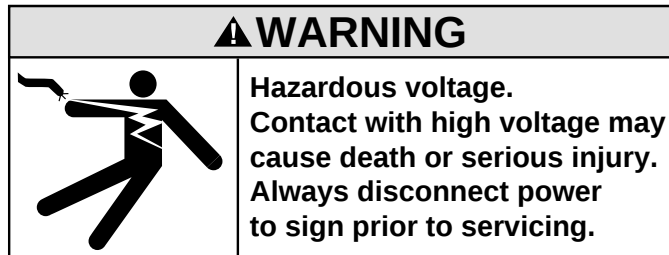
Lamps will need to be replaced at random as they burn out. However, after a period of time, you may notice a silvering of most of the lamps. This indicates that the lamps will begin to burn out more frequently. If this is the case, it is suggested that you replace all the lamps at one time in order to avoid frequent lamp replacement. (Note: When you replace lamps you must reseal the “boots” over the lamp and its socket. See “Replacement parts” on page 16.)

Component removal

Tools needed for the following procedures:

- nut driver, 1/4" (.635 cm), for #4 nuts
- nut driver, 5/16" (.79 cm), for #6 nuts
- screwdriver, Phillips head

Removing driver board assemblies



1. TURN OFF THE POWER GOING TO THE SIGN!
2. Open the screen located over the face of the sign by turning the three turn buttons located on the top of the screen by 90 degrees.
3. Each driver assembly is held in place by six #6 nuts: three on the top and three on the bottom of the assembly. Remove these nuts and the star washers between the nuts and the assembly.
4. Carefully pull the driver assembly straight off of the mounting studs.
5. Disconnect the wires going to the assembly. Two wires connect the transformer to the main wiring with wire nuts. There are also two wire assemblies connecting the driver assembly being removed with the driver assemblies on either side of it. These are a simple quick-connect type connection and can be disconnected by pulling the connections apart.
6. Remove the assembly.

Removing the micro board assembly

1. TURN OFF THE POWER GOING TO THE SIGN!
2. Remove the right end cap. The end cap is secured by up to four Phillips head screws, one on each surface of the

case: top, bottom, front, and back.

3. Remove the IR assembly. Then disconnect the temperature probe assembly located right above the case intake vents.
4. Remove the two right-most driver board assemblies from the sign by following the steps in "Removing driver board assemblies" on page 23.
5. The micro board assembly is secured by six #4 nuts. Remove these nuts and the washers associated with them.
6. Remove the micro board cover from the top of the micro board. Then remove all six of the 1" (2.54 cm) male/female spacers.
7. Disconnect the serial cable. Then disconnect the cables going to the right-most driver board and the IR receiver assemblies. These are all quick-connect type connections.
8. Disconnect the wires connecting the micro board to the transformer by removing the two wire nuts.
9. Remove the micro board assembly.

Removing the transformer for micro board

1. TURN OFF THE POWER GOING TO THE SIGN!
2. Remove the right-most driver board assembly. (See the steps for removal in "Removing driver board assemblies".)
3. Remove the micro board assembly cover.
4. Disconnect the wires connecting the transformer to the micro board and the transformer to the main wires by removing the four wire nuts.
5. Remove the two nuts securing the transformer.

Removing the fans

1. TURN OFF THE POWER GOING TO THE SIGN!
2. There are two fans located in the 790i, one on the right side of the unit and one on the left. Remove the end cap on the same side of the sign as the defective fan. The end cap is secured by up to four Phillips head screws, one on each surface of the case: top, bottom, front, and

back.

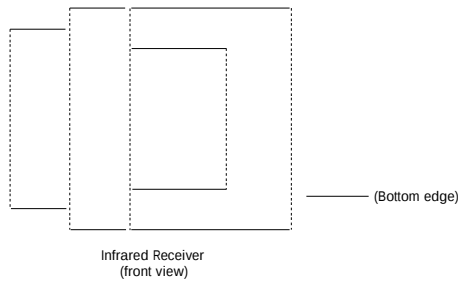
3. The fans are secured by four #6 screws and nuts. The closest driver board assembly may have to be removed to get at the fan mounting hardware. Remove the fan guards. (Note: There are two fan guards on each end: one on the inside of fan and one on the outside.) Then remove the fans.
4. Disconnect the wires to the fan by pulling the connector off. (Note: When reinstalling fans, make sure they are blowing air into the case, not out. This will ensure constant air circulation within the case.)

Removing the infrared receiver

1. TURN OFF THE POWER GOING TO THE SIGN!
2. Remove the right end cap. The end cap is secured by up to four Phillips head screws, one on each surface of the case: top, bottom, front, and back.
3. The right-most driver board must be removed in order to disconnect the cable between the IR receiver and the micro board.
4. The IR receiver is secured to the case with two #6 nuts. Remove these nuts and their associated lock washers and the IR assembly can be removed from the case.
5. Remove the IR receiver.

Aligning the infrared receiver

1. TURN OFF THE POWER GOING TO THE SIGN!
2. Remove the right end cap. The end cap is secured by up to four Phillips head screws, one on each surface of the case (top, bottom, front, and back).
3. The IR receiver is secured to the case with two #6 nuts. Loosen these nuts. The IR receiver can now be moved slightly from top to bottom and front to back.
4. Refer to the sketch below. Tilt the IR receiver up while looking through the round IR window in the sign. When you can see the bottom edge indicated in the drawing, tilt the receiver back down about 1/8" (.32 m).



5. Make sure that the receiver is pushed as far forward as possible (toward the round infrared window) and then tighten the mounting nuts.

Troubleshooting

If a problem occurs with the ALPHA 790i sign, refer to the troubleshooting section in the **ALPHA Remote Control Programming Manual** and also to the following list of possible problems for a solution. If you continue to experience difficulties with your sign, please contact your sales representative.

<u>Problem</u>	<u>Possible Solutions</u>
One or more lamps on the driver board assembly are not lighting.	1. Replace lamp(s). 2. Replace driver board assembly.
Driver board assembly is not functioning.	1. Check all cable connections to driver board assembly. 2. Replace driver board assembly. 3. Replace driver board assembly on the right side of the faulty one.
Entire sign is not functioning (no power-up message).	1. Make sure that the power to the sign is on. 2. Make sure that line voltage is adequate (100 volts minimum for standard unit). 3. Make sure that the sign is not in overheat mode. 4. Check all cable connections to the right-most driver board assembly and to the micro board assembly. 5. Replace micro board assembly. 6. Replace transformer for micro board assembly.

<u>Problem</u>	<u>Possible Solutions</u>
Keyboard is not functioning or is intermittent.	1. Refer to the ALPHA Remote Control Programming Manual (part number 9704-0002) for proper keyboard usage. 2. Install new alkaline batteries in the keyboard. 3. Check alignment of infrared receiver. 4. Check connection between IR receiver and the micro board. 5. Make sure that line voltage is adequate (100 volts minimum for standard unit) 6. Replace micro board assembly.
Sign is overheating.	1. Refer to "Overheat indicator" on page 12 of this manual.

<u>Problem</u>	<u>Possible Solutions</u>
Temperature readings are inaccurate by more than 5° F (5 2.8° C).	1. Set the temperature offset to cancel inaccuracies. (See below.) The temperature offset option allows users to increase or decrease the temperature reading of their incandescent signs. The range of this offset is -9° F (-5° C) to +9° F (+5° F). The factory default is set at 0° F (-18° C) . 2. Make sure the temperature probe is mounted directly over the right fan intake. (The right end cap must be removed to check this.) Note: A remote probe can be mounted up to 50 feet (15.3 m) away from the unit. (See solution #6 for more information about the temperature probe.) 3. Make sure the right fan is operating. 4. Make sure the right fan intake is not obstructed. 5. Replace micro board assembly. 6. Some applications may require that the temperature probe be remotely mounted for more accurate temperature reading. The length of the temperature probe can be extended up to 50 feet (15.3 m) with 18 AMG two-conductor wire. An appropriate wire splicing method should be used to insure that a low-resistance corrosion-resistant connection is obtained. Mount the probe in a location that is not exposed to direct sunlight or reflected or transmitted temperatures. (For example, do not mount the probe against metal siding.)

<u>Problem</u>	<u>Possible Solutions</u>
To set the temperature offset:	1. Press the PROGRAM key. "PROG TEXT FILE A" will be displayed. 2. Press the BACK key until "SET TEMP OFFSET" is displayed. 3. Press the ADV key. "TEMP OFFSET = 0" will be displayed. • Pressing the E key will increase the offset in increments of 1° F (.5° C) to a maximum of + 9° F (5° C). • Pressing the Q key will decrease the offset in increments of 1° F (.5° C) to a maximum of - 9° F (-5° C).