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Manual PB-2149-510 Revision A August 3, 2006

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1.0 Getting Started

Thank you for your purchase of an AMERICAN LED-gible[®] product. We take pride in the equipment we build, and we appreciate your support. We will do everything we can to keep you happy with your purchase for many years to come. Please review this manual carefully, and if you have any questions, call, e-mail, or fax us and we will be glad to help you. American LED-gible support can be reached at:

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1.1 Product Description

The Ethernet to Serial Bridge (ESB) is an optional add on kit for American LED-gible equipment with serial (RS-232 or RS-422 or RS-485) communications. Once the ESB is installed and configured, the controlling device must initiate a TCP connection to the ESB and then send commands over this TCP connection to control the equipment. The ESB forwards the commands to the equipment via a full duplex RS-232 communications link, or a simplex RS-485/422 communications link. In the case of the full duplex RS-232 link, any responses from the equipment are returned to the controlling device via the TCP connection.

NOTE : The ESB supports standard raw TCP and Telnet connections as United described in the States Department of Defense (DOD) Specifications Protocol RFC-854 *RFC-793 Transmission* Control and Telnet Protocol Specification. DOD RFC specifications are fully open and completely define the communications protocols that underly the Internet and the World Wide Web.

The ESB does not support proprietary application layer protocols typically used by PLCs such as EthernetIP® or CIP®. If you intend to use the ESB with a PLC, make sure that the PLC supports sending arbitrary character streams through a raw TCP connection, or through a Telnet connection to an arbitrary TCP port number.

1.2 Unpacking the Equipment

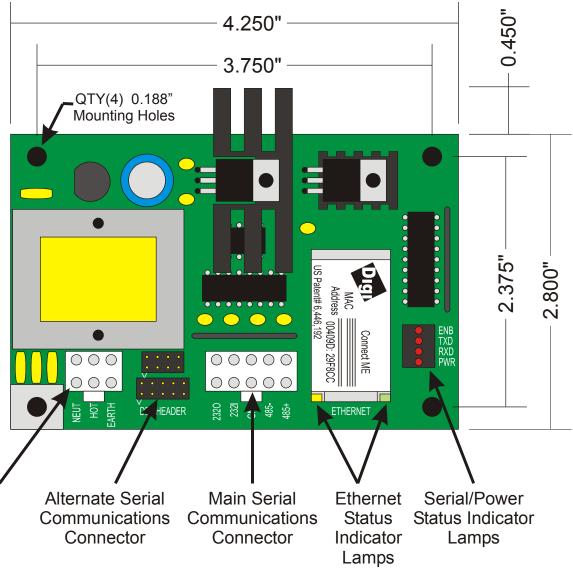
Every ESB is carefully tested, both mechanically and electrically, before shipment. Inspect the unit for damage, which may have occurred in transit. If there is evidence of damage, file a claim with the shipper and notify American LED-gible.[®] Save the shipping materials for inspection.

If there are no signs of damage, carefully remove the ESB from the shipping carton.



1.3 Introduction to the ESB Circuit Board

The ESB uses an AB-2751-006 circuit board, which is pictured below.



The ESB is constructed by integrating a Digi Connect ME Ethernet module with a 120VAC linear power supply and RS-232/485 serial communications transceiver.

The CD provided with the ESB provides copies of the Digi Connect ME documentation, and a Windows utility program (DigiDeviceSetupWizard) which may be used to configure the TCP/IP and SERIAL communications parameters of the ESB.

The 120VAC power connector is a Molex MiniFit Jr vertical PCB header, Molex part number 39-28-8060.

The serial communications connector is a Molex MiniFit Jr vertical PCB header, Molex part number 39-28-8100

The maximum power draw of the ESB is 6W (120VAC @ 0.05 Amps)



1.4 120VAC Power Installation

It is highly likely that ALI has already completed 120VAC power installation for your ESB. However if you ordered the ESB as a stand alone unit, it may be your responsibility to connect 120VAC power to the ESB circuit board.

The power connector is a Molex MiniFit Jr vertical PCB header, Molex part number 39-28-8060. You may purchase mating connector pieces from Molex, or you may purchase a mating 6" pigtail cable from American LED-gible, ALI part number CB-2813-110

US Patent# 6,446,192 Address 00409D: 29F8CC Connect ME 'XD \bigcirc \bigcirc 00000 \bigcirc \bigcirc \bigcirc 00000 \bigcirc FARTH GND 485-NEUT HOT 232 185+ DB9 HEADER **ETHERNET** NEUT EART P 120VAC Power

The ESB requires 120VAC power at 0.05 Amps of current.

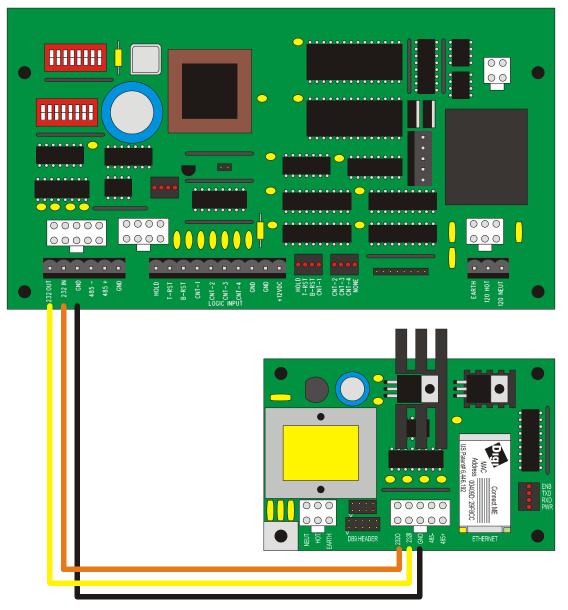


1.5 Serial Communications Installation

It is highly likely that ALI has already completed serial communications installation for your ESB. However if you ordered the ESB as a stand alone unit, it may be your responsibility to connect the ESB serial port, to the serial port of the equipment.

The serial connector is a Molex MiniFit Jr vertical PCB header, Molex part number 39-28-8100. You may purchase mating connector pieces from Molex, or you may purchase a mating 6" pigtail cable from American LED-gible, ALI part number CB-2813-111

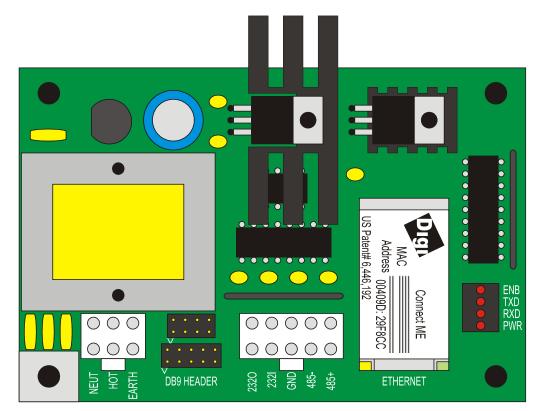
Consult the manual that came with the marquee to locate the six screw terminal serial communications connector. The drawing below illustrates a typical RS-232 connection between the ESB and the AF-2720-100 Production Pace Timer.

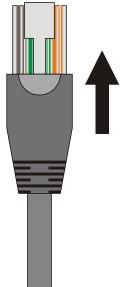




1.6 Ethernet Installation

The ESB provides an RJ45 10/100BT Ethernet connector. Simply connect the ESB to your Ethernet network with standard CAT-5 or better Ethernet cable.







2.0 Configuring the ESB

Configuring embedded TCP/IP equipment generally involves solving a "chicken or the egg" kind of problem. The tools used to adjust the equipment's TCP/IP configuration, require a TCP/IP connection to the equipment.

Stated more directly. Suppose you have an ESB and a PC connected to an Ethernet network, and the ESB's TCP/IP configuration is incompatible with the PC's TCP/IP configuration. The PC will not be able to establish the TCP/IP connection to the ESB required to change the ESB's TCP/IP configuration. This problem is common to all embedded TCP/IP devices that do not have a direct method of entering TCP/IP configuration such as a keyboard and monitor.

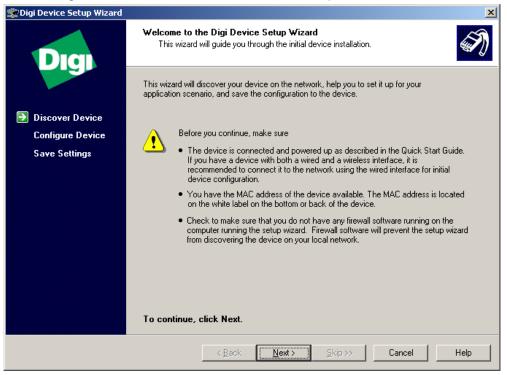
The most common way to solve the "chicken or the egg" TCP/IP configuration problem is DHCP (Dynamic Host Configuration Protocol), but there are others such as APIPA (Auto Private IP Addressing, a.k.a. AutoIP).

When the ESB is powered up, it transmits a DHCP request on the network. If you have a DHCP server on your network, the server will choose an IP address and assign it to the ESB. If you do not have a DHCP server on your network, the ESB will fall back to APIPA and assign itself an IP address in the 169.254.xxx.xxx range.

As long at the ESB and the PC are both using DHCP, or are both using APIPA for IP configuration, the "chicken or the egg" problem should be solved. However if the PC has a static IP configuration, it is likely that the PC and the ESB will have incompatible TCP/IP configurations making it impossible for the PC to configure the ESB. The usual solution to this problem is to temporarily reconfigure the PC to use DHCP (if you have a DHCP server) or APIPA (if you don't). Then use the ESB setup tools to assign a compatible static IP address to the ESB. Then restore the PC back to it's original static IP configuration.

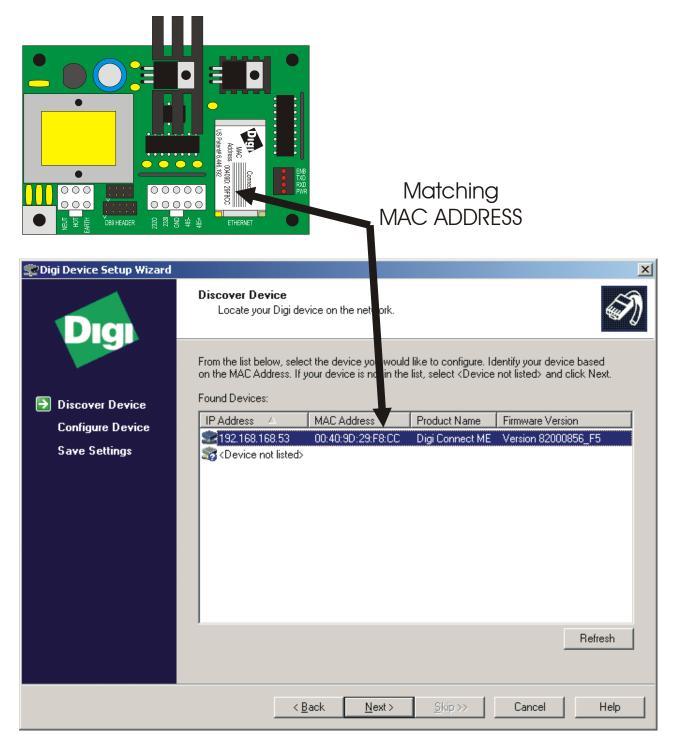
2.1 Using the Digi Device Setup Wizard

On the CD that came with this manual, there is a **Digi Device Setup Wizard** Windows utility program that can be used to locate and configure ESBs on the network. Launch the setup wizard, and then click **NEXT** to continue.





The Digi Device Setup Wizard uses IP Multicast to search for all Digi Devices connected to the network. If you have more than one ESB, you can identify the correct unit in the list by finding the MAC address shown in the list that matches the MAC address printed on the ESB. Select the ESB you are configuring, then click **NEXT** to continue.





Consult with your network administrator to determine what IP address should be assigned to the ESB, and the method used to assign IP configuration on your network. Some of the more common IP Configuration scenarios are:

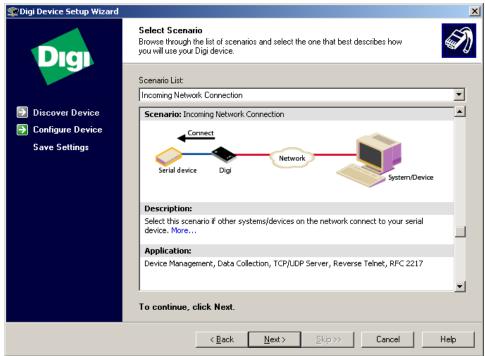
- Configure the ESB to get IP configuration via DHCP, and configure your DHCP server to issue a fixed IP address to the ESB by programming a MAC Address to IP Address reservation into the DHCP server.
- Configure the ESB to get IP configuration via DHCP, and configure your DHCP server to forward the assigned IP address of the ESB to your dynamic DNS server.
- Configure the ESB to get IP configuration via DHCP, and configure your BOOTP server to respond to the request. (DHCP is reverse compatible with BOOTP).
- Configure the ESB to get IP configuration via DHCP even though you don't have a DHCP server on your network. The ESB will fall back to APIPA to assign an IP Address derived from the units MAC address.
- Configure the ESB for static IP addressing by selecting **USE THE FOLLOWING IP SETTINGS** and then entering the IP Address / Subnet Mask / Default Gateway settings given to you by your network administrator.

😨 Digi Device Setup Wizard		×
Dici	Configure Network Settings Enter the following settings to configure the Digi Connect ME for your network.	S)
	The network settings can be assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate network settings.	
Discover Device		
Configure Device	Obtain IP settings automatically using DHCP	
Save Settings	C Use the following IP settings	
	IP Address:	
	Subnet Mask:	
	Default Gateway:	
	DNS Server:	
	Domain:	
	Host Name:	
	To continue, click Next.	
	< <u>B</u> ack <u>N</u> ext > <u>S</u> kip >> Cancel	Help

After consulting with your network administrator, pick your IP Configuration settings and then click **NEXT** to continue.



Scroll down though the list of scenarios and select the **INCOMMING NETWORK CONNECTION** scenario. Then click **NEXT** to continue.



Then select the INCOMMING TCP CONNECTION scenario and click **NEXT** to continue.

😤 Digi Device Setup Wizard		×
Digi	Select Incoming Network Scenario Browse through the list of incoming network scenarios and select the one that best describes how you will use your Digi device.	S)
	Scenario List:	
	Incoming TCP Connection	•
Discover Device	Scenario: Incoming TCP Connection	
Configure Device	Data	
Save Settings	Serial device Digi	
	Description:	
	Select this scenario if other systems/devices connect to your serial device over the network using the TCP protocol. More	
	Application:	
	Device Management, TCP Server	T
	To continue, click Next.	
	< <u>B</u> ack Next > Skip >> Cancel	Help



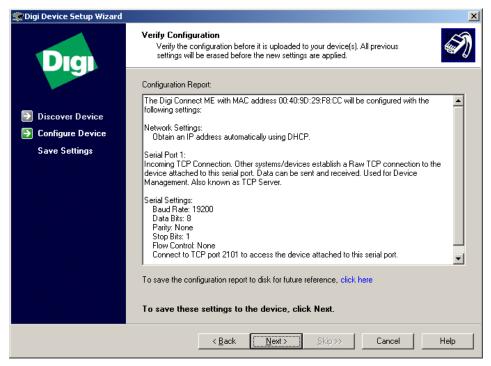
The ESB serial port must be configured to operate at the same baud rate, data bits, parity, stop bits, and flow control of the equipment it is connected to. All American LED-gible devices use 8 data bits, no parity, 1 stop bit, and no flow control. Only the baud rate setting is variable. Consult the manual that came with the equipment to determine the baud rate it is configured for, and configure the ESB to match. American LED-gible equipment typically is configured to operate at 19200 baud.

Set the ESB serial port configuration, and then click **NEXT** to continue.

🛫 Digi Device Setup Wizard	
Digi	Configure Serial Settings Configure the port settings of the Digi Connect ME to match the port settings of your serial device.
 Discover Device Configure Device Save Settings 	Baud Rate: 1920 Data Bits: 8 Parity: None Stop Bits: 1 To continue, click Next.
	< <u>B</u> ack <u>N</u> ext > <u>Skip</u> >> Cancel Help



The setup wizard will display a configuration summary, click **NEXT** to program the selected configuration into the ESB.





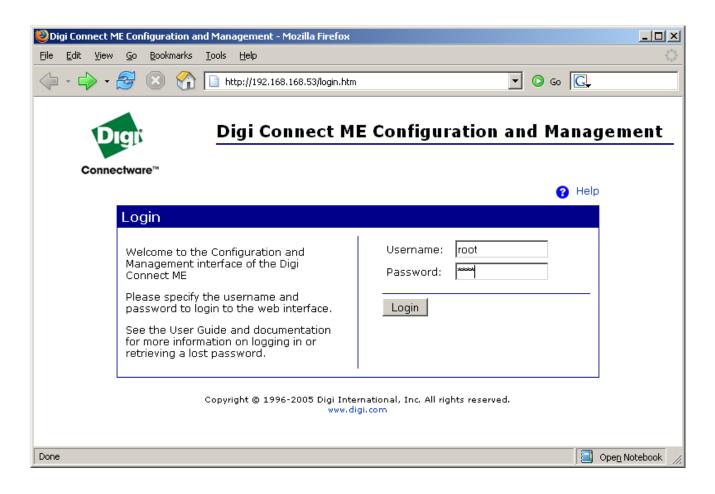


After the setup wizard has successfully saved the configuration into the ESB, check the LOG ON TO WEB USER INTERFACE OF DEVICE option and then click FINISH to continue.

😤 Digi Device Setup Wizard		×
Digi	Congratulations! You have successfully completed the Digi Device Setup Wizard.	S)
 Discover Device Configure Device Save Settings 	Saved configuration successfully. You can use the web interface to manage and monitor the Digi Connect ME. To access the web interface, check the "Log on to web interface" checkbox below and click Finish, or go to http://192.168.168.53. Additional information such as cabling and configuration information as well as troubleshooting tips may be found in the User's Guide. Next steps: Register my Digi Connect ME on the Digi website Log on to web user interface of device Log on to command line interface of device Configure another device	
	To close this wizard, click Finish.	
	< Back Finish Skip >> Cancel	Help



The ESB has a built in web server that can be used to do advanced ESB configuration. The setup wizard will launch your default web browser and tell it to connect to the ESB. The default user name it **root** and the default password is **dbps**. Enter root, and dbps, then click the **LOGIN** button.





The www interface provides a a far more fine grained set of configuration options, but is considerably more complex to use.

The setup wizard configured the ESB to accept TCP connections on port 2101, but the default port for American LED-gible equipment is 3001. In order to make the ESB configuration consistent with other American LED-gible equipment we will now reconfigure the ESB to accept connections on port 3001 instead.

Click on **SERIAL PORTS** to continue.

Digi Connect ME Configuration an ile Edit View Go Bookmarks	Tools Help	
🗧 • 🗇 • 🔁 🙁 🟠	http://192.168.168.53/home.htm	
Connectware™	Digi Connect ME Configuration and Manageme	
Home	Home) Hel
Configuration	Getting Started	
Network Serial Ports GPIO	Tutorial Not sure what to do next? This Tutorial can help.	
Alarms	System Summary	
System Remote Management Users	Model: Digi Connect ME IP Address: 192.168.168.53	
Management	MAC Address: 00:40:9D:29:F8:CC	
Serial Ports Connections	Description: None	
Administration File Management	Contact: None Location: None	
Backup/Restore Update Firmware Factory Default Settings	Device ID: 00000000-0000000-00409DFF-FF29F8CC	
System Information	User Interface	
Reboot	Web Interface (Default): Enabled	
Logout	Custom Interface: Launch Set as Default	
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Change the **RAW TCP ACCESS PORT** to **3001**, and enable **TCP KEEP-ALIVE** for the port. Then click on **APPLY** to save the change, and then click on **LOGOUT** to logout of the ESB.

🥹 Digi Connect ME Configuration and Management - Mozilla Firefox				
Eile Edit View Go Bookmarks Iools Help				
🗢 • 🔶 • 🥰 😣 😭 🗖	http://192.168.168.53/config/ports/port_config_profile.htm?1			
Diak	Digi Connect ME Configuration and Management			
UTG1.				
Connectware™				
Home	Help			
	Serial Port Configuration			
Configuration Network	▼ Port Profile Settings			
Serial Ports GPIO	Current Port Profile: TCP Sockets Change Profile The TCP Sockets Profile allows a serial device to communicate over a TCP network.			
Alarms System	TCP Server Settings			
Remote Management Users	Connect directly to the serial device using the following TCP ports on the network.			
Management	Enable Telnet access using TCP Port: 2001 Enable TCP Keep-Alive			
Serial Ports Connections	Enable Raw TCP access using TCP Port: 3001 Enable TCP Keep-Alive			
Administration	Enable Secure Socket access using TCP Port: 2601 Enable TCP Keep-Alive			
File Management				
Backup/Restore Update Firmware	TCP Client Settings			
Factory Default Settings System Information Reboot	Automatically establish bi-directional TCP connections between the serial device and a server or other networked device.			
Logout	Automatically establish TCP connections Establish connection under one of the following conditions:			
	Always connect and maintain connection			
	Connect when data is present on the serial line			
	Match string:			
	Strip string before sending			
	Connect when DCD (Data Carrier Detect) line goes high			
	Connect when DSR (Data Set Ready) line goes high			
	Establish connection to the following network service:			
	IP Address: 0.0.0			
	Service: Raw TCP			
	Enable TCP Keep-Alive			
	Apply	•		
Done	📃 Ope <u>n</u> Notebook	_/_		



3.0 In Case of Difficulties

Before contacting ALI for technical support, please review the manual sections covering installation.

If the TSB does not operate, check the power indicator lamp. The power indicator. is connected directly to the 5VDC power supply. If it does not illuminate, then the 120VAC power wiring is probably incorrect.

If the power indicator lamp is illuminated, please double check wiring and switch settings before contacting American LED-gible technical support.

3.1 Contacting American LED-gible[®] Inc.

If you need technical assistance, contact us by phone or fax and please have the model number, serial number, and a description of the problem available.

The serial number and model number of the marquee can be located on the right side of the unit imprinted on a SILVER ID TAG.

American LED-gible Inc.	
(614) 851-1100	
July 2006	
Model # SO-7932-001	
Serial # SO-7932-101	

American LED-gible[®] technical support may be reached at:

American LED-gible[®] Inc. 1776 Lone Eagle St. Columbus, OH 43228 (614) 851-1100 Phone (614) 851-1121 Fax www.ledgible.com www ledgible@ledgible.com e-mail



4.0 Product Specifications

GENERAL:

Line Voltage Power Consumption Operating Temperature Operating Humidity Dimensions Weight Enclosure Mounting

120VAC 60Hz or 50Hz 1/4 Amp typical, 3 1/2 Amp Maximum if AC Relays are Used 0° F to 135° F (-17° C to +50° C) 35% to 80% 5.25" Wide, 5.25" Tall, 3.5" Deep (depending on installed options) 1 Pound (depending on installed options) NEMA-1 ABS Plastic Box Wall Mount Holes in Back of Box

LOGIC INPUTS:

INPUIS:	
Quantity	7, IN0 to IN6 (IN4, IN5 and IN6 are reserved for future expansion)
Logic Level	9VDC, Activated by Dry Contact or NPN Output
Maximum Input Current	30mA per Input
Leakage Current Tolerance	3mA Maximum
Minimum Detectable Pulse	0.050 Seconds Minimum On Time, 0.050 Seconds Minimum Off Time.

COMMUNICATIONS:

Signaling Baud Rate Character Format

RELAY OUTPUTS:

Quantity AC Relay Rating Half Duplex RS-485 19200bps Eight Data Bits, No Parity, One Stop Bit

(6) 120VAC Silicon Relays (OUT0 to OUT5) 120VAC at 1/2 Amp Resistive Load



5.0 Limited Warranty

We warrant to you that your AMERICAN LED-gible[®] BRAND MARQUEE, when purchased by you, will be free from defects in material and workmanship, under normal use, for one year from date of delivery. If your LED-GIBLE[®] BRAND MARQUEE should prove to be defective within the warranty period, we will repair it (or, if we think necessary, replace it) without charge to you.

To obtain service, please call our Customer Service Department at 1-614-851-1100 or write to:

AMERICAN LED-gible[®] Inc. 1776 LONE EAGLE STREET COLUMBUS, OHIO 43228

We will furnish you with shipping instructions. This warranty covers merchandise returned to American LED-gible[®] (shipped prepaid) for repair, not in plant repairs. Should you need an in plant repair at your facility, American LED-gible[®] will schedule a trip. Rates are per diem, plus travel expenses.

ALI shall have the right of final determination as to the existence and cause of the defect. This warranty expressly excludes any defects or damages caused by accessories, replacement parts, or repair service, other than those which have been authorized by ALI. This warranty does not cover any damage caused by accident, misuse, shipment, or other than ordinary use.

This warranty excludes all incidental or consequential damages. Some states do not allow the exclusion of, or limitation of, incidental or consequential damages, so the foregoing exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state. This warranty is in lieu of any other warranty, express, written, implied, or statutory, and no agreement extending or modifying it will be binding upon ALI, unless in writing and signed by duly authorized officer.

If your AMERICAN LED-gible® MARQUEE is outside the warranty period, please call our Customer Service Department as above. After you return the unit to American LED-gible®, we will estimate the repair charges, and contact you so a purchase order can be issued. Again, should you require in-house repair of your marquees, ALI rates are per diem, plus travel expenses. Please make sure to call, so a trip can be scheduled if this option is preferred.

LIMITATION OF LIABILITY:

If this product is not in good working order as warranted above, your sole remedy shall be repair or replacement as provided above. In no event will ALI be liable for special, indirect, or consequential damages, or any damages whatsoever resulting from loss of use, data, or profits arising out of, or in connection with this contract or the use or performance of ALI products, whether in an action of contract or tort, including negligence. ALI's liability for damage to property shall be limited to the cost of the product sold to the buyer.



6.0 ASCII Chart

ASCII CHARACTER	Hexadecimal Code	Decimal Code
CTRL-A	01h	1
CTRL-B	02h	2
CTRL-C	03h	3
CTRL-D	04h	4
CTRL-E	05h	5
CTRL-F	06h	6
CTRL-G	07h	7
CTRL-H	08h	8
CTRL-I	09h	9
CTRL-J	0Ah	10
CTRL-K	0Bh	11
CTRL-L	0Ch	12
CTRL-M	0 Dh	13
CTRL-N	0Eh	14
CTRL-O	0Fh	15
CTRL-P	10h	16
CTRL-Q	11h	17
CTRL-R	12h	18
CTRL-S	13h	19
CTRL-T	14h	20
CTRL-U	15h	21
CTRL-V	16h	22
CTRL-W	17h	23
CTRL-X	18h	24
CTRL-Y	19h	25
CTRL-Z	1Ah	26
CTRL-[1Bh	27
CTRL-\	1Ch	28
CTRL-]	1Dh	29
CTRL-^	1Eh	30
CTRL	1Fh	31
SPACE	20h	32

ASCII CHARACTER	Hexadecimal Code	Decimal Code
!	21h	33
"	22h	34
#	23h	35
\$	24h	36
%	25h	37
á	26h	38
'	27h	39
(28h	40
)	29h	41
*	2Ah	42
+	2Bh	43
,	2Ch	44
-	2Dh	45
	2Eh	46
/	2Fh	47
0	30h	48
1	31h	49
2	32h	50
3	33h	51
4	34h	52
5	35h	53
6	36h	54
7	37h	55
8	38h	56
9	39h	57
:	3Ah	58
;	3Bh	59
<	3Ch	60
=	3Dh	61
>	3Eh	62
?	3Fh	63
Q	40h	64



ASCII CHARACTER	Hexadecimal Code	Decimal Code
A	41h	65
В	42h	66
С	43h	67
D	44h	68
E	45h	69
F	46h	70
G	47h	71
Н	48h	72
I	49h	73
J	4Ah	74
K	4Bh	75
L	4Ch	76
М	4Dh	77
N	4Eh	78
0	4Fh	79
Р	50h	80
Q	51h	81
R	52h	82
S	53h	83
Т	54h	84
U	55h	85
V	56h	86
W	57h	87
Х	58h	88
Y	59h	89
Z	5Ah	90
]	5Bh	91
\	5Ch	92
]	5Dh	93
^	5Eh	94
_	5Fh	95
T	60h	96

ASCII CHARACTER	Hexadecimal Code	Decimal Code
a	61h	97
b	62h	98
С	63h	99
d	64h	100
е	65h	101
f	66h	102
g	67h	103
h	68h	104
i	69h	105
j	6Ah	106
k	6Bh	107
1	6Ch	108
m	6Dh	109
n	6Eh	110
0	6Fh	111
р	70h	112
q	71h	113
r	72h	114
S	73h	115
t	74h	116
u	75h	117
v	76h	118
W	77h	119
x	78h	120
У	79h	121
Z	7Ah	122
{	7Bh	123
	7Ch	124
}	7Dh	125
~	7Eh	126
DELETE	7Fh	127



7.0 Operator Notes

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