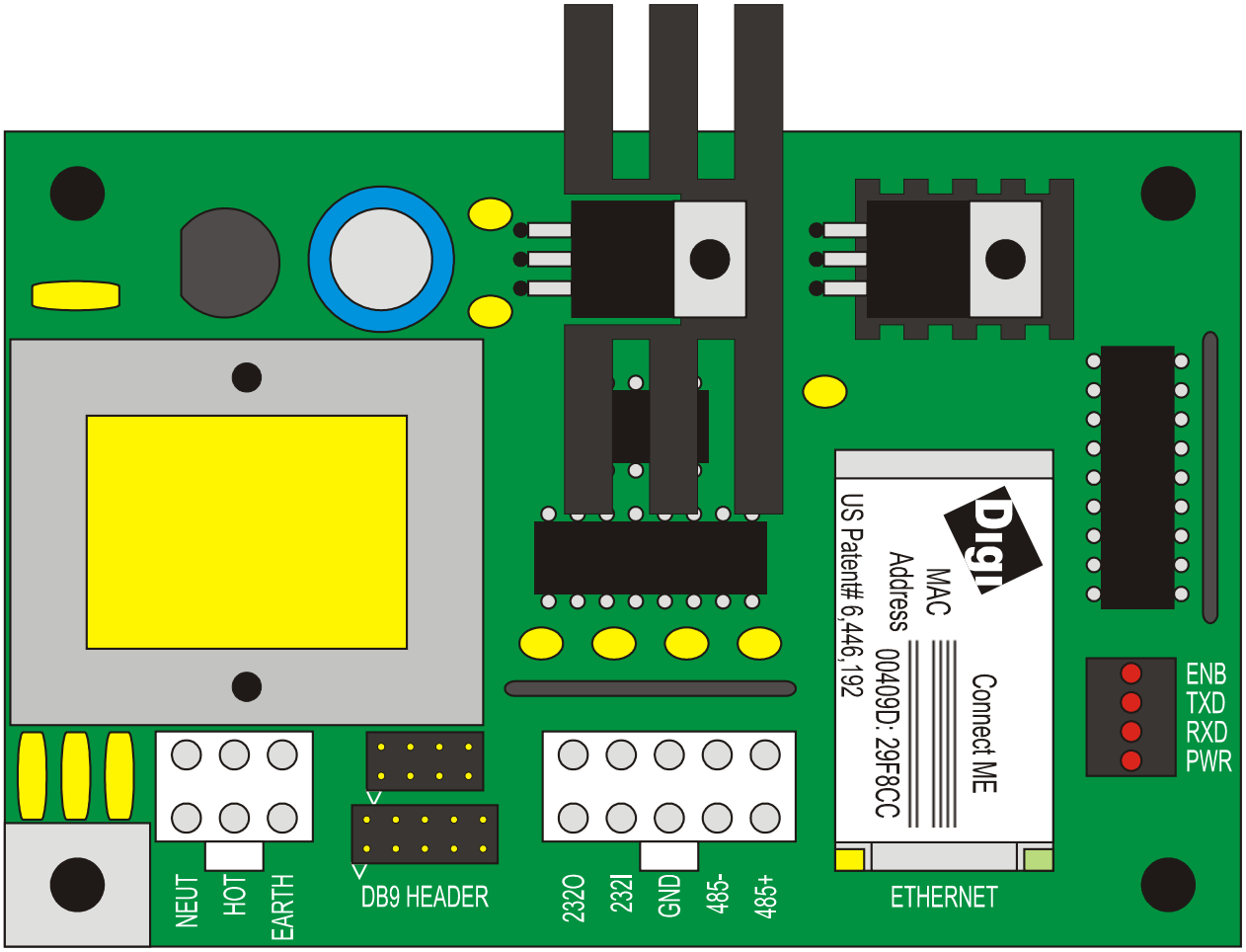
American LED-gible®

Reducing Downtime Across the Nation!

Ethernet to Serial Bridge

Owners Manual

Circuit Board: AB-2552-006 Converter: Digi Connect ME



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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 described in the United States Department of Defense (DOD) Specifications *RFC-793 Transmission Control Protocol* and *RFC-854 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.

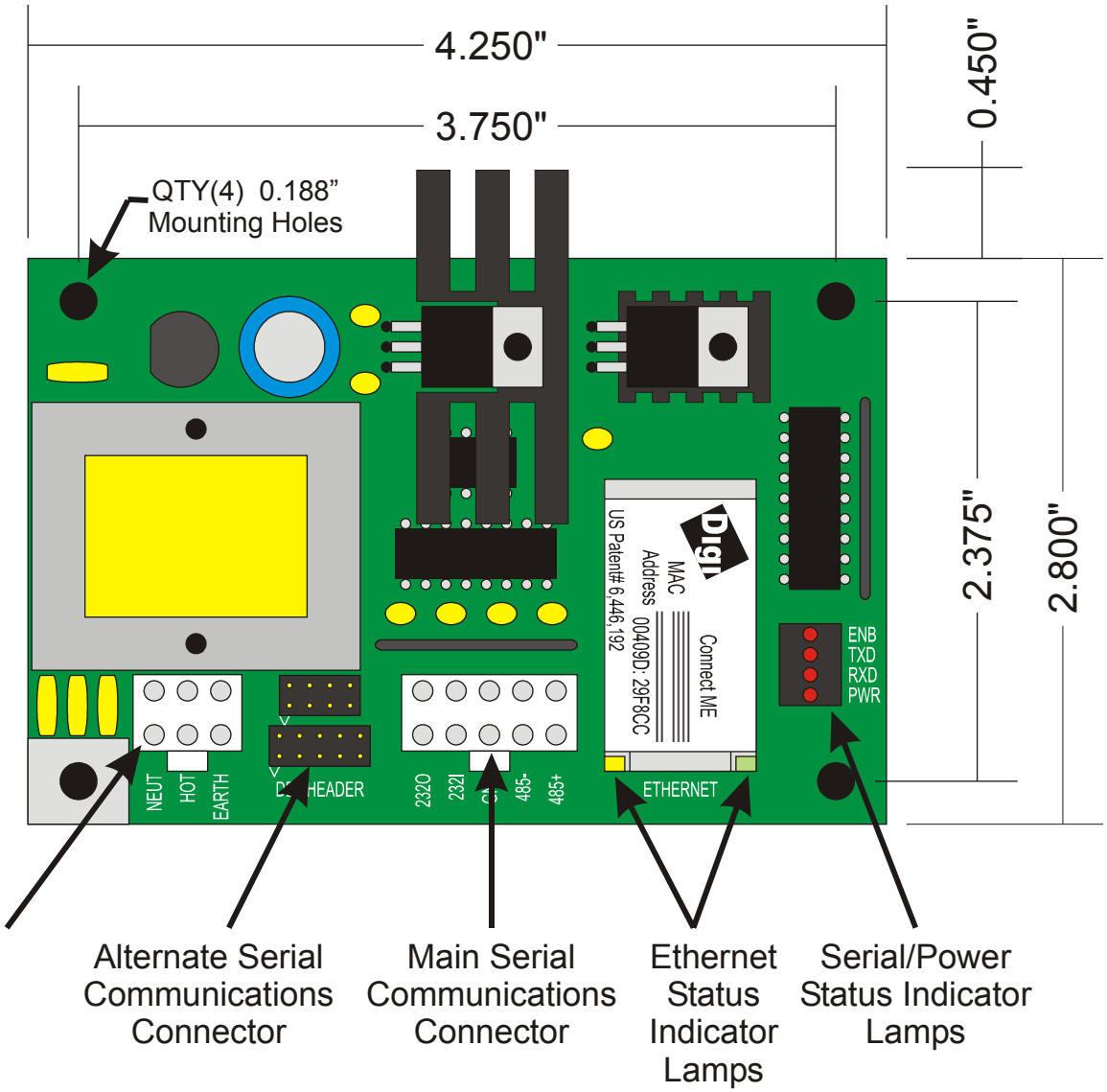
1.2 Unpacking the Equipment

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

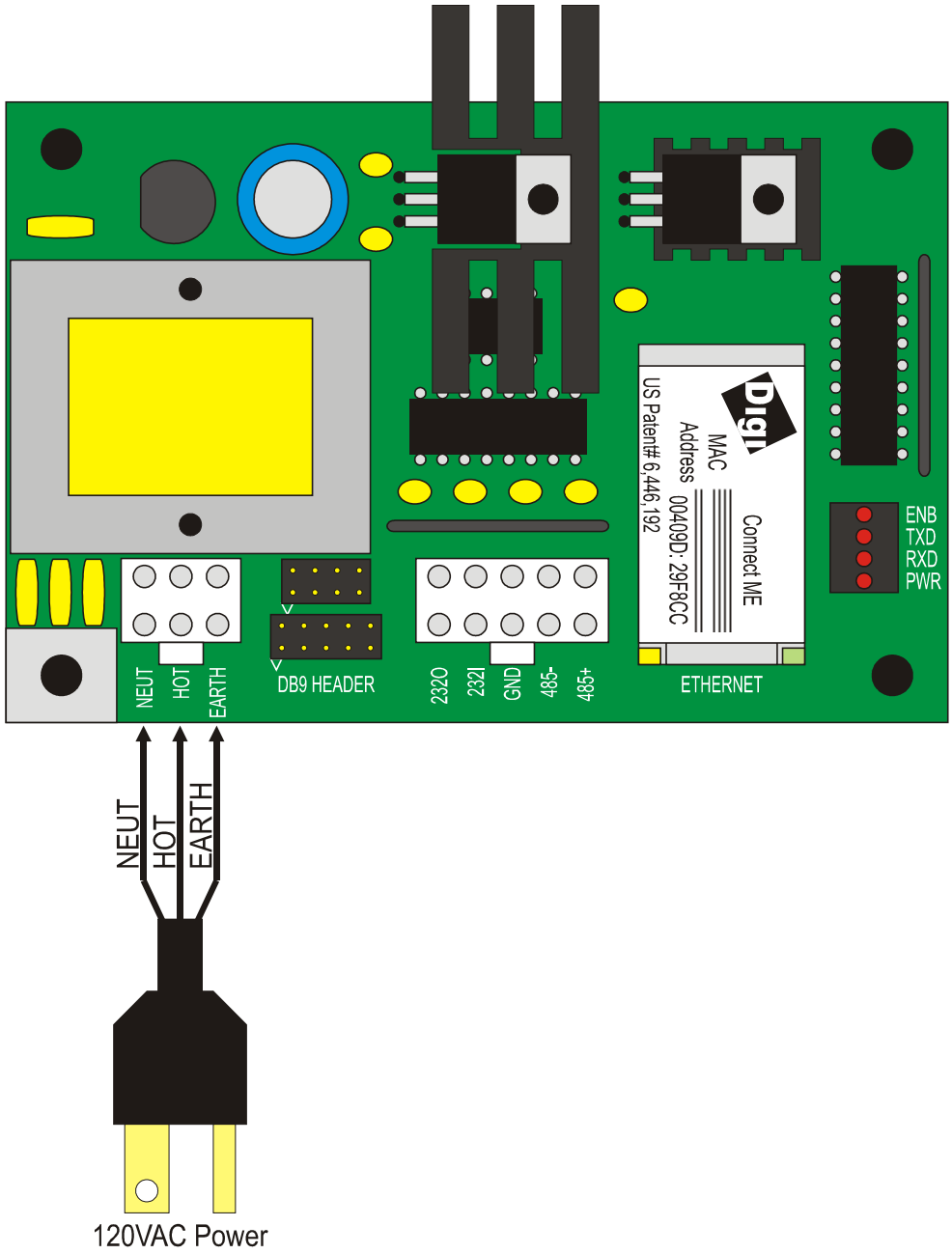
The maximum power draw of the ESB is 6W (120VAC @ 0.05 Amps)

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

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

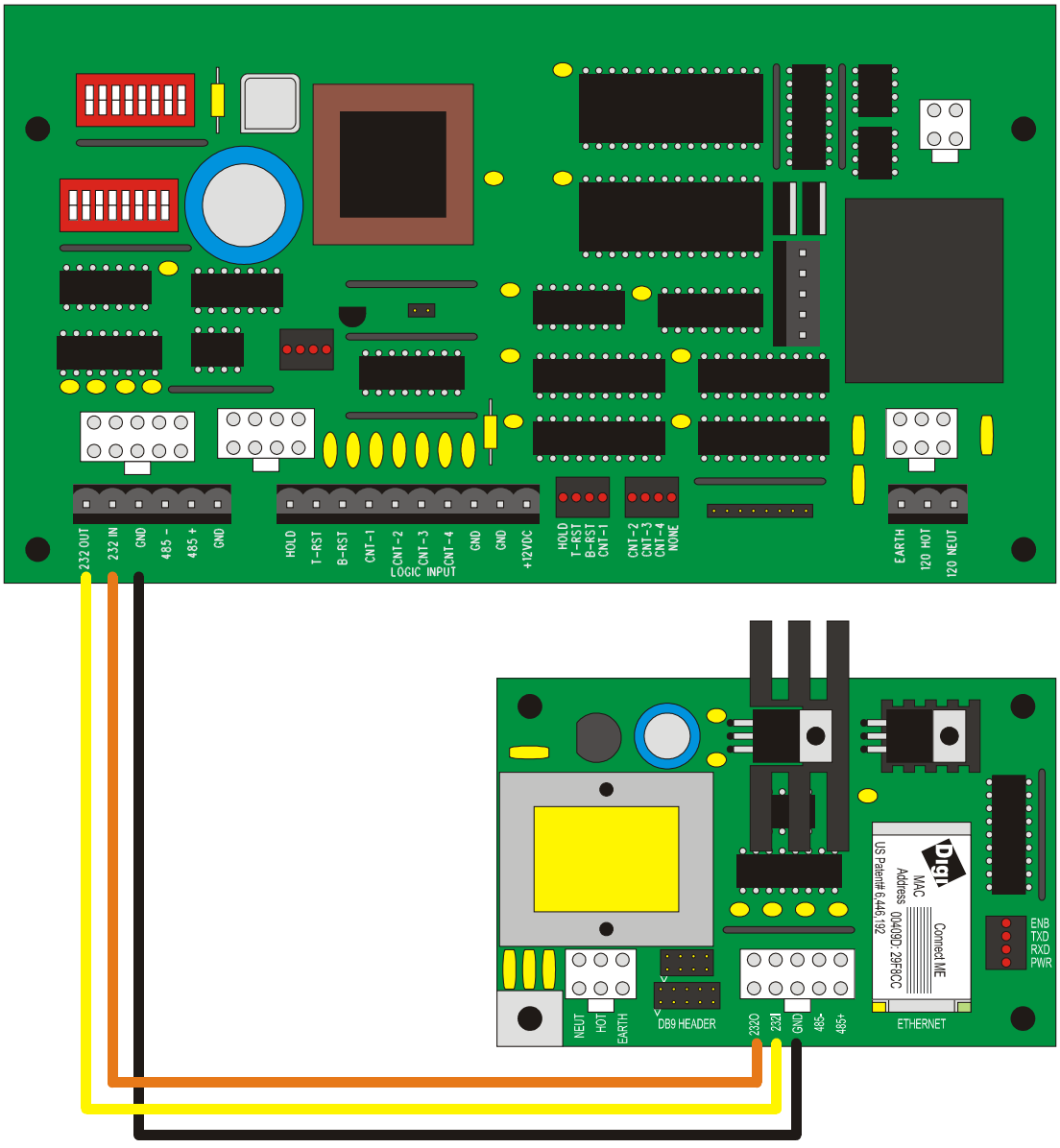


1.5 Serial Communications Installation

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.

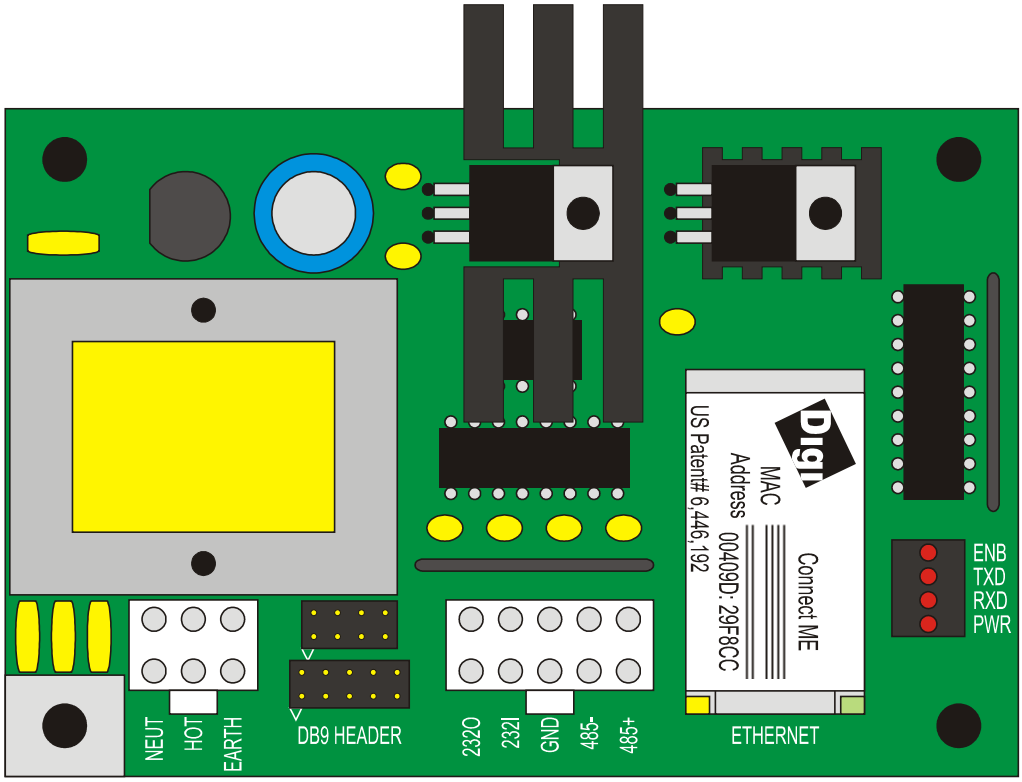
The serial connector is a Molex MiniFit Jr vertical PCB header, Molex part number 39-28-8100. You may purchase mating connector pieces from Molex, or you may purchase a mating 6" pigtail cable from American LED-gible, ALI part number CB-2813-111

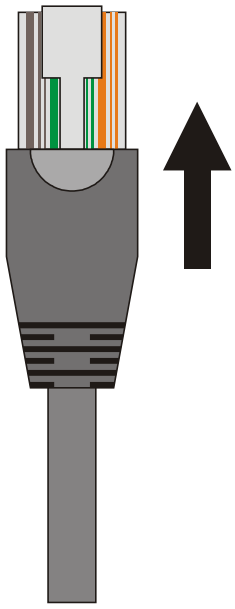
Consult the manual that came with the marquee to locate the six screw terminal serial communications connector. The drawing below illustrates a typical RS-232 connection between the ESB and the AF-2720-100 Production Pace Timer.



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.

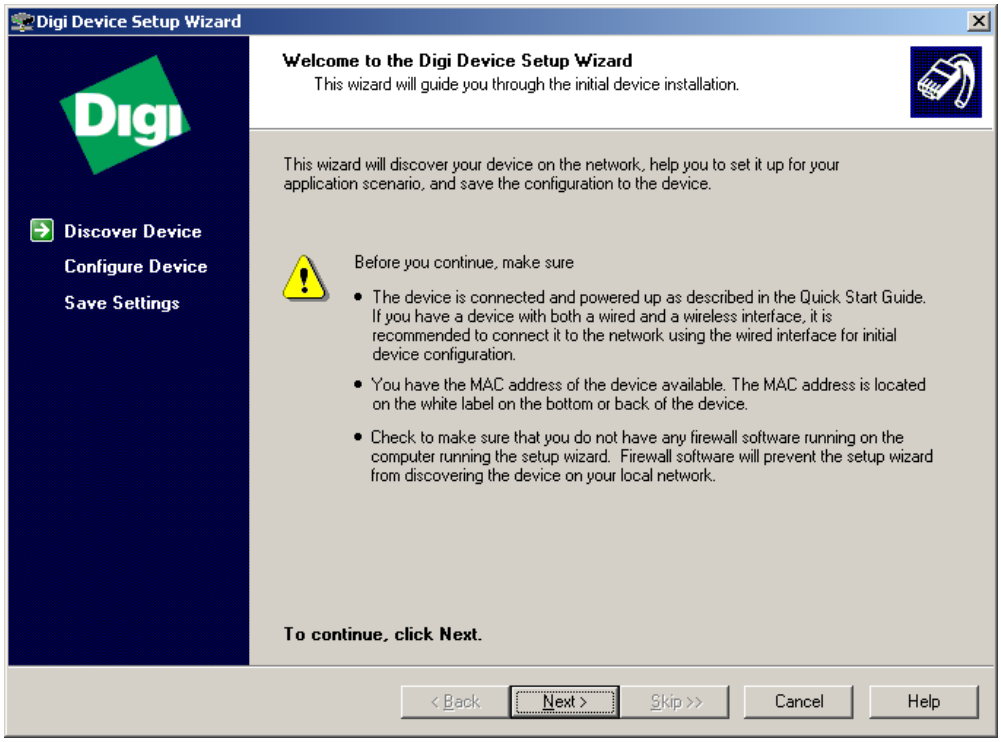
The most common way to solve the “chicken or the egg” TCP/IP configuration problem is DHCP (Dynamic Host Configuration Protocol), but there are others such as APIPA (Auto Private IP Addressing, a.k.a. AutoIP).

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.

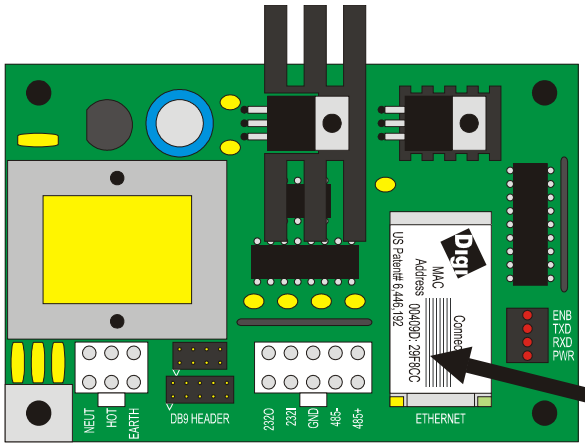
As long at the ESB and the PC are both using DHCP, or are both using APIPA for IP configuration, the “chicken or the egg” problem should be solved. However if the PC has a static IP configuration, it is likely that the PC and the ESB will have incompatible TCP/IP configurations making it impossible for 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

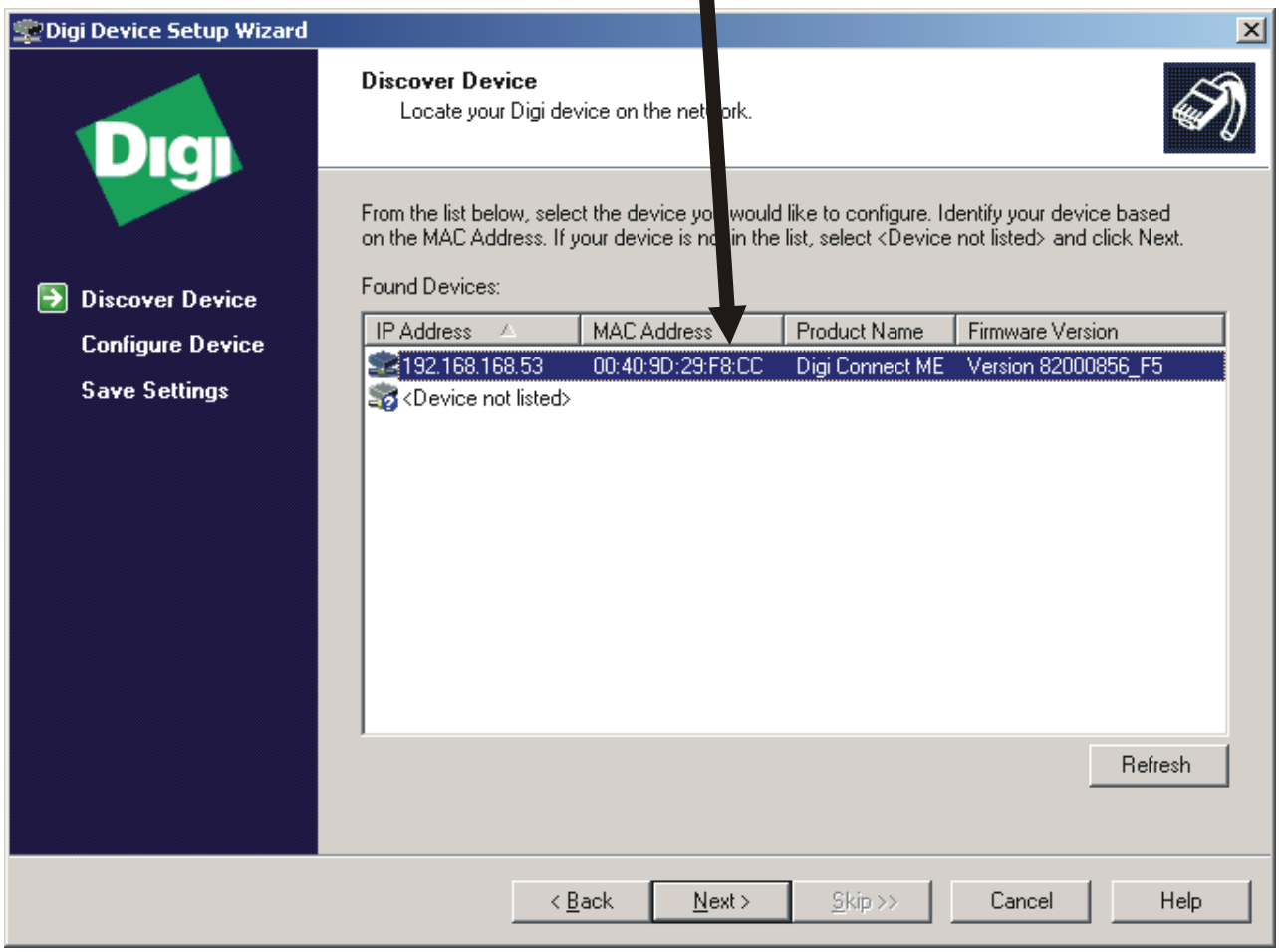
On the CD that came with this manual, there is a **Digi Device Setup Wizard** Windows utility program that can be used to locate and configure ESBs on the network. Launch the setup wizard, and then click **NEXT** to continue.



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.

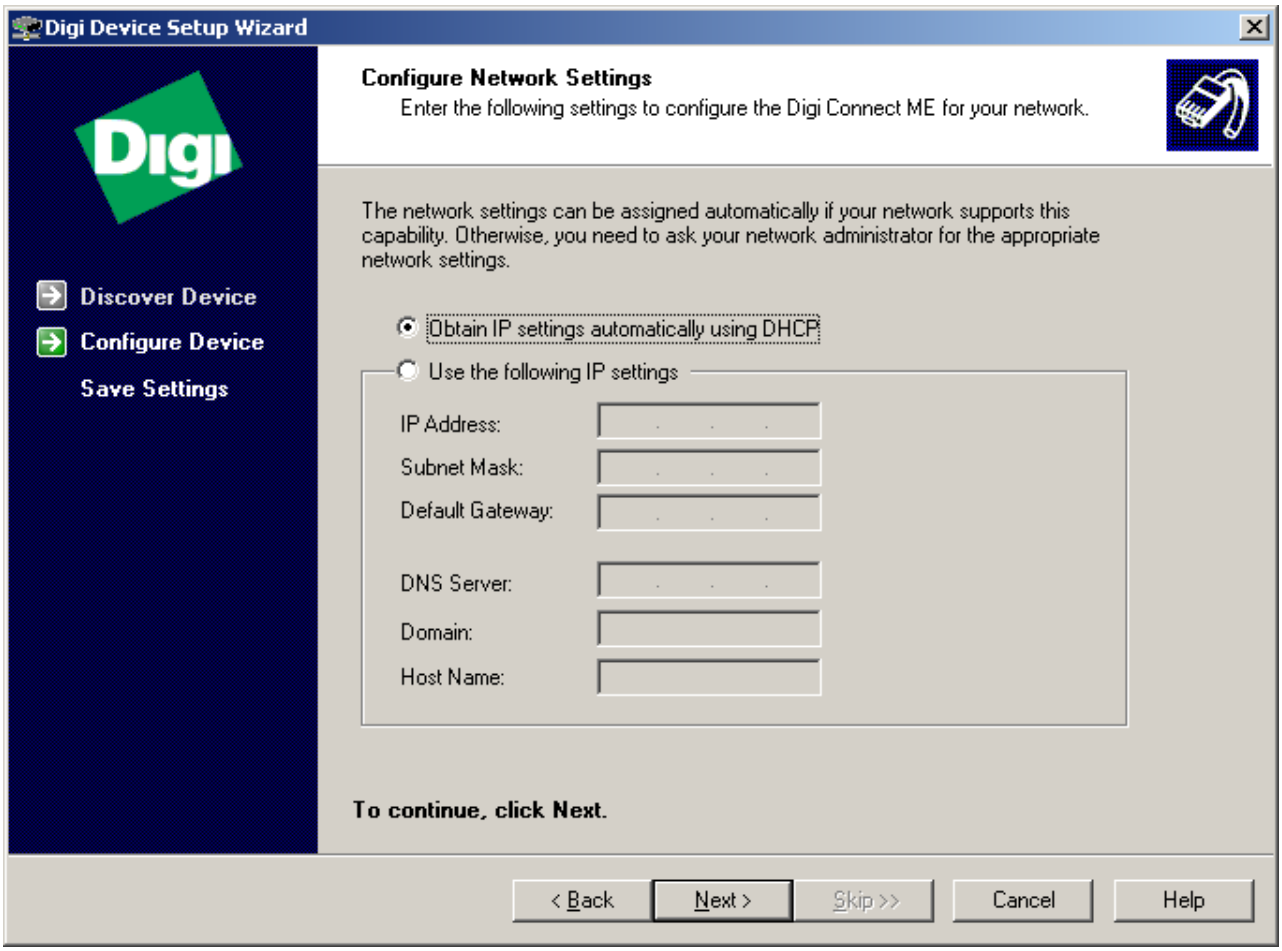


Matching
MAC ADDRESS



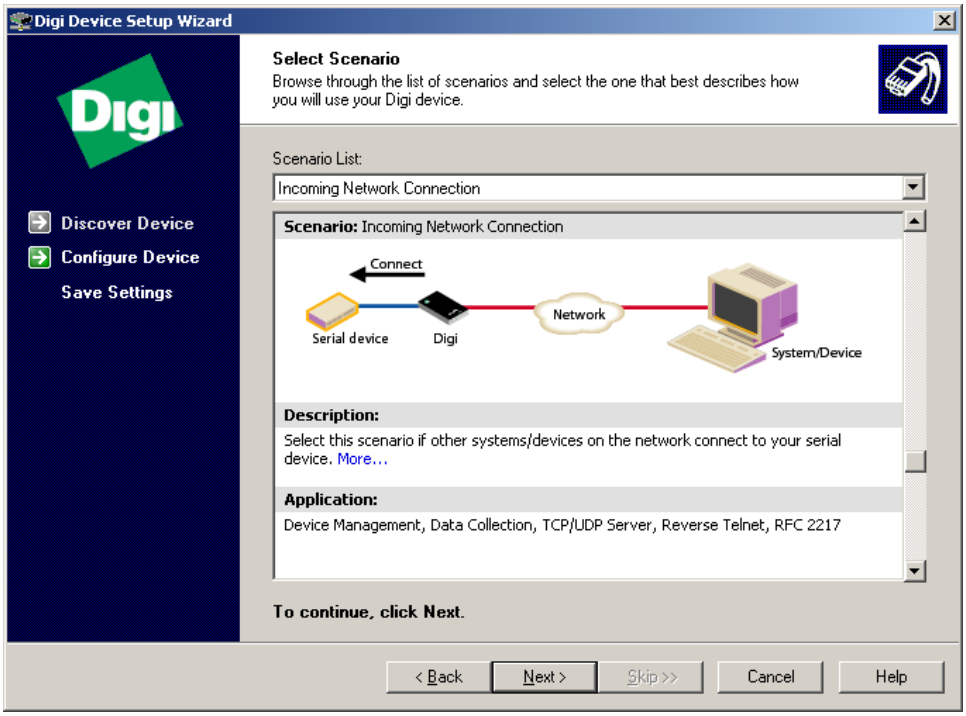
Consult with your network administrator to determine what IP address should be assigned to the ESB, and the method used to assign IP configuration on your network. Some of the more common IP Configuration scenarios are:

- 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.

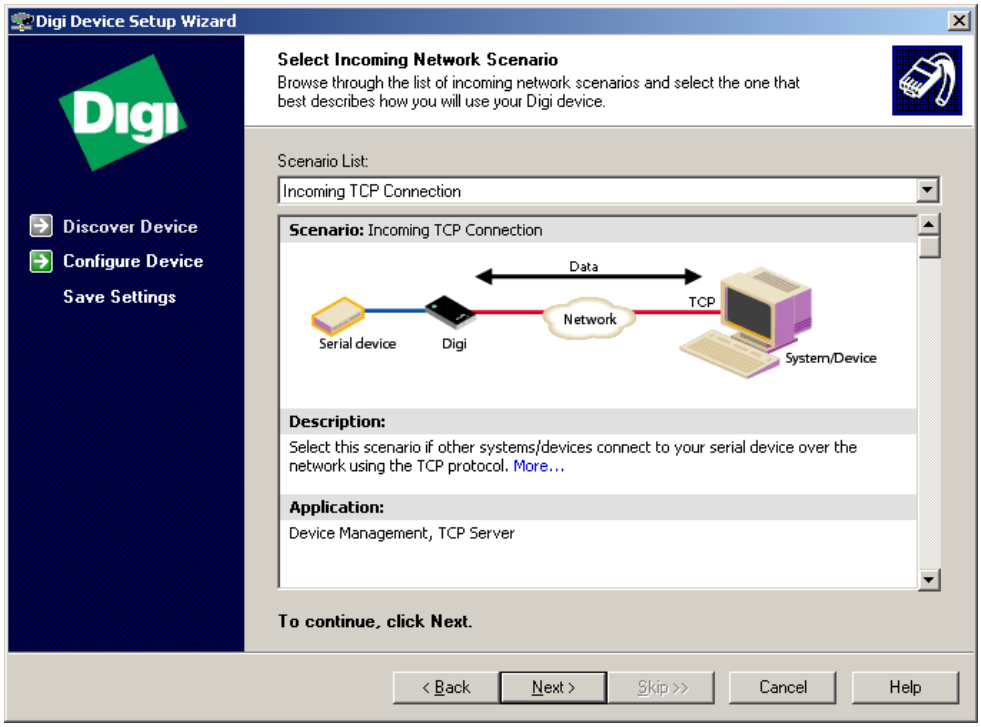


After consulting with your network administrator, pick your IP Configuration settings and then click **NEXT** to continue.

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

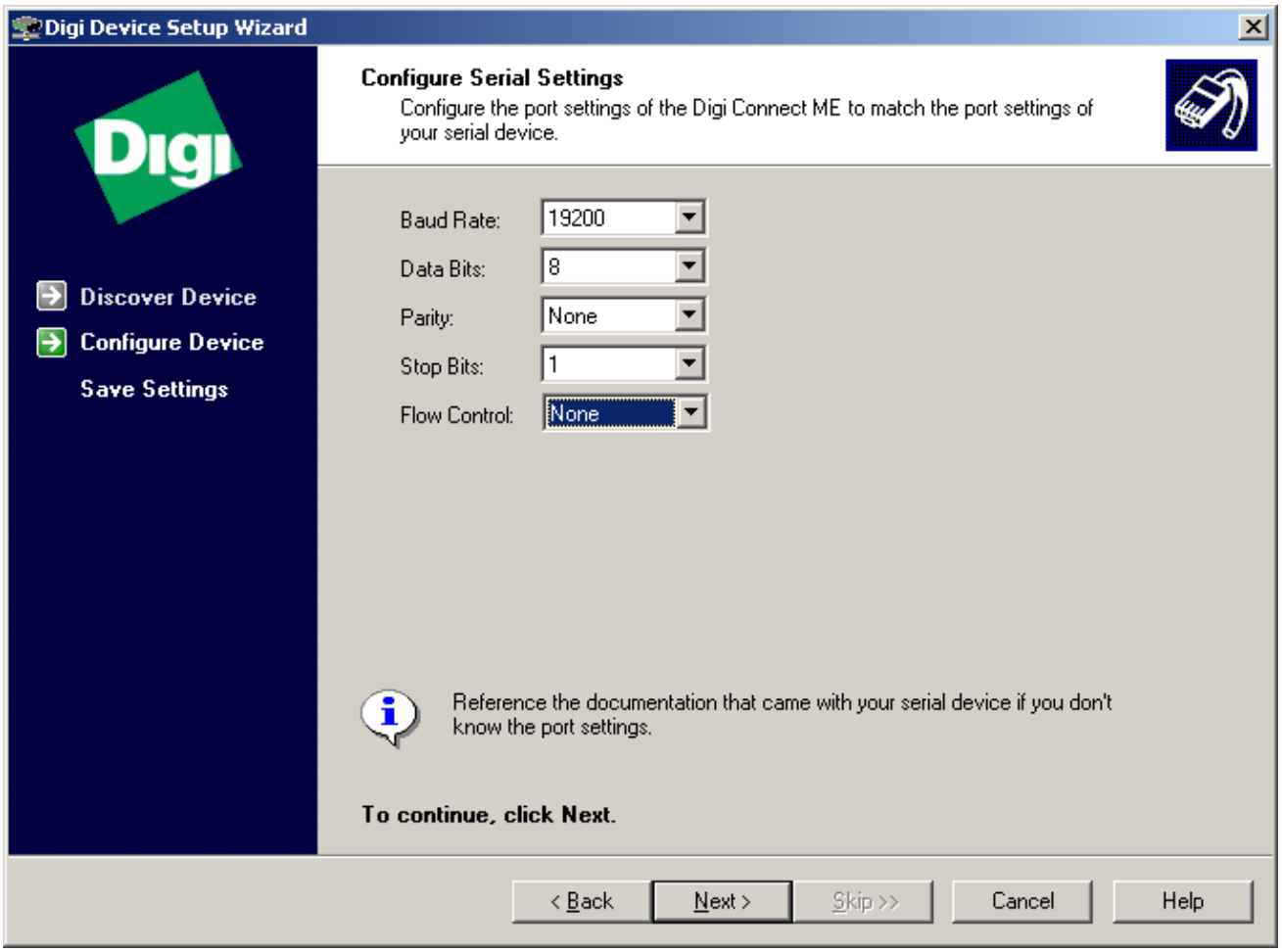


Then select the INCOMMING TCP CONNECTION scenario and click **NEXT** to continue.

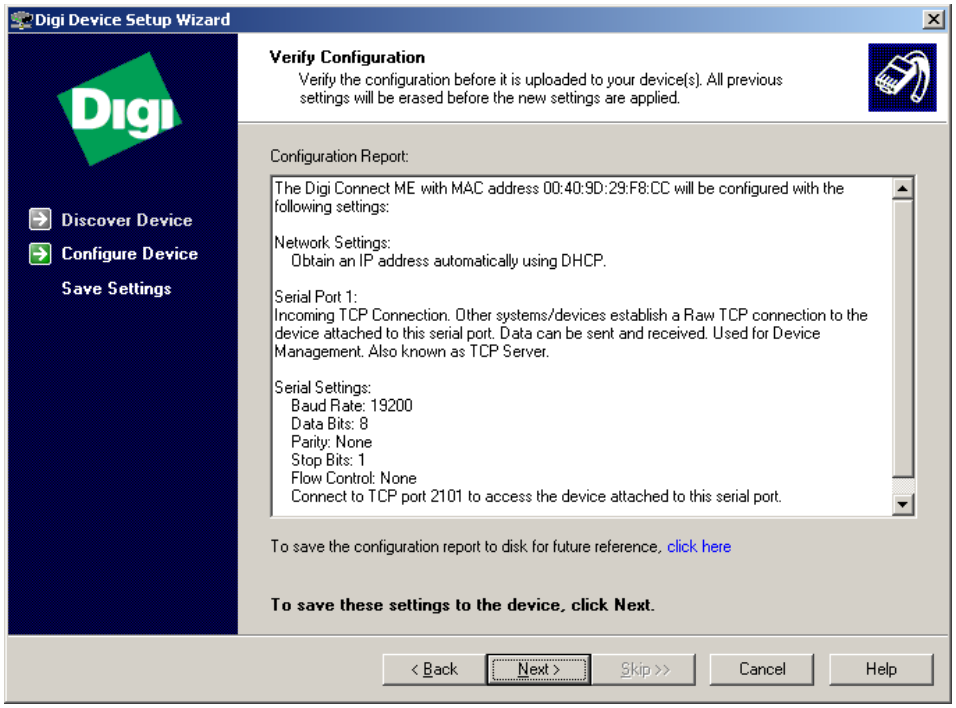


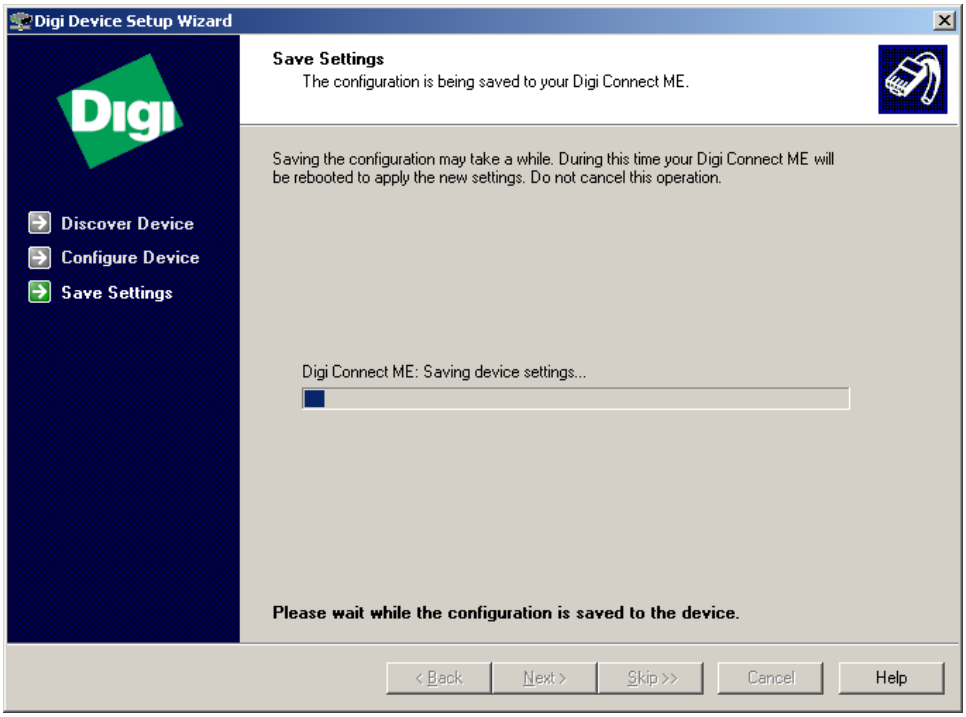
The ESB serial port must be configured to operate at the same baud rate, data bits, parity, stop bits, and flow control of the equipment it is connected to. All American LED-gible devices use 8 data bits, no parity, 1 stop bit, and no flow control. Only the baud rate setting is variable. Consult the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

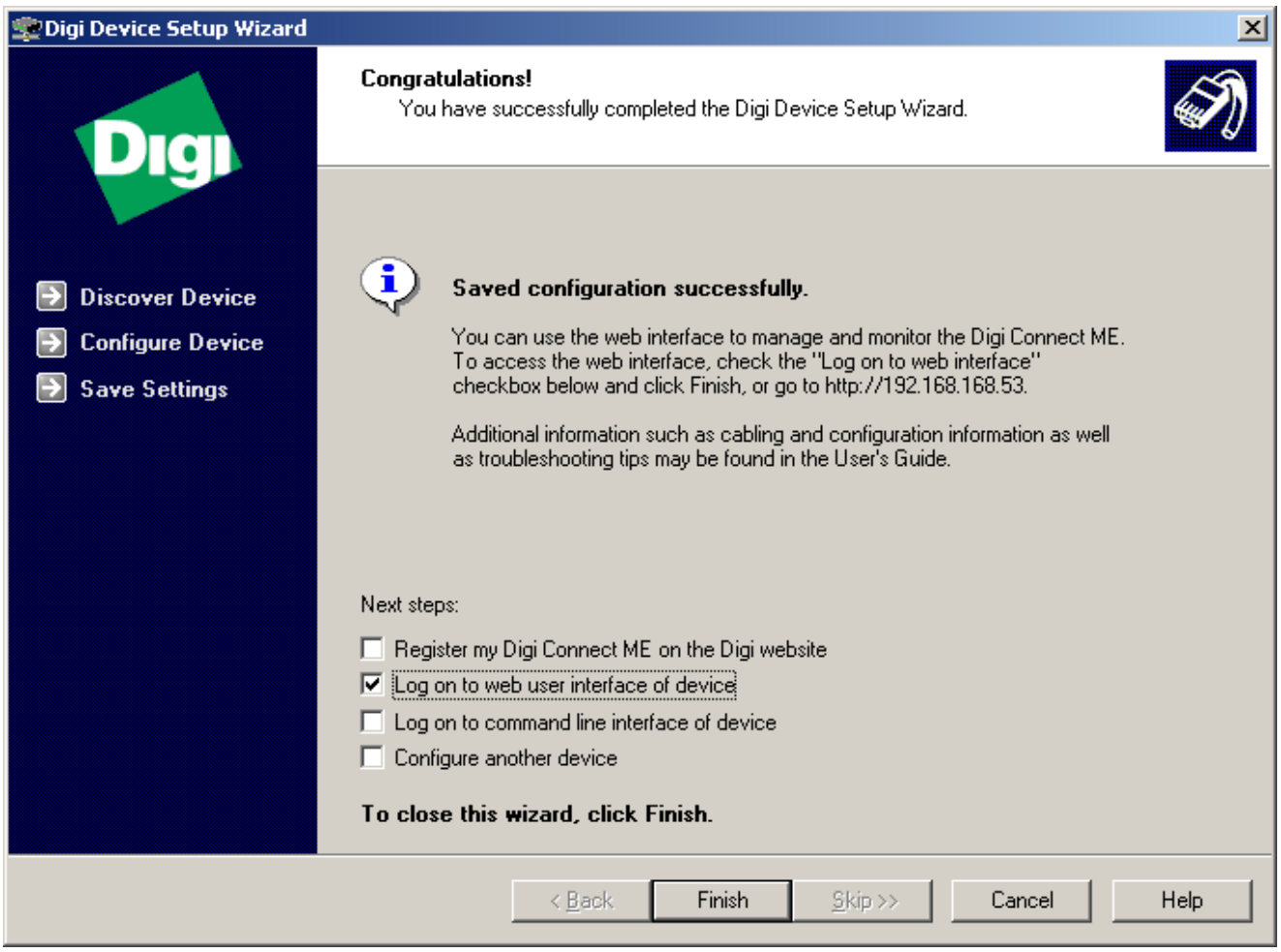


The setup wizard will display a configuration summary, click **NEXT** to program the selected configuration into the ESB.

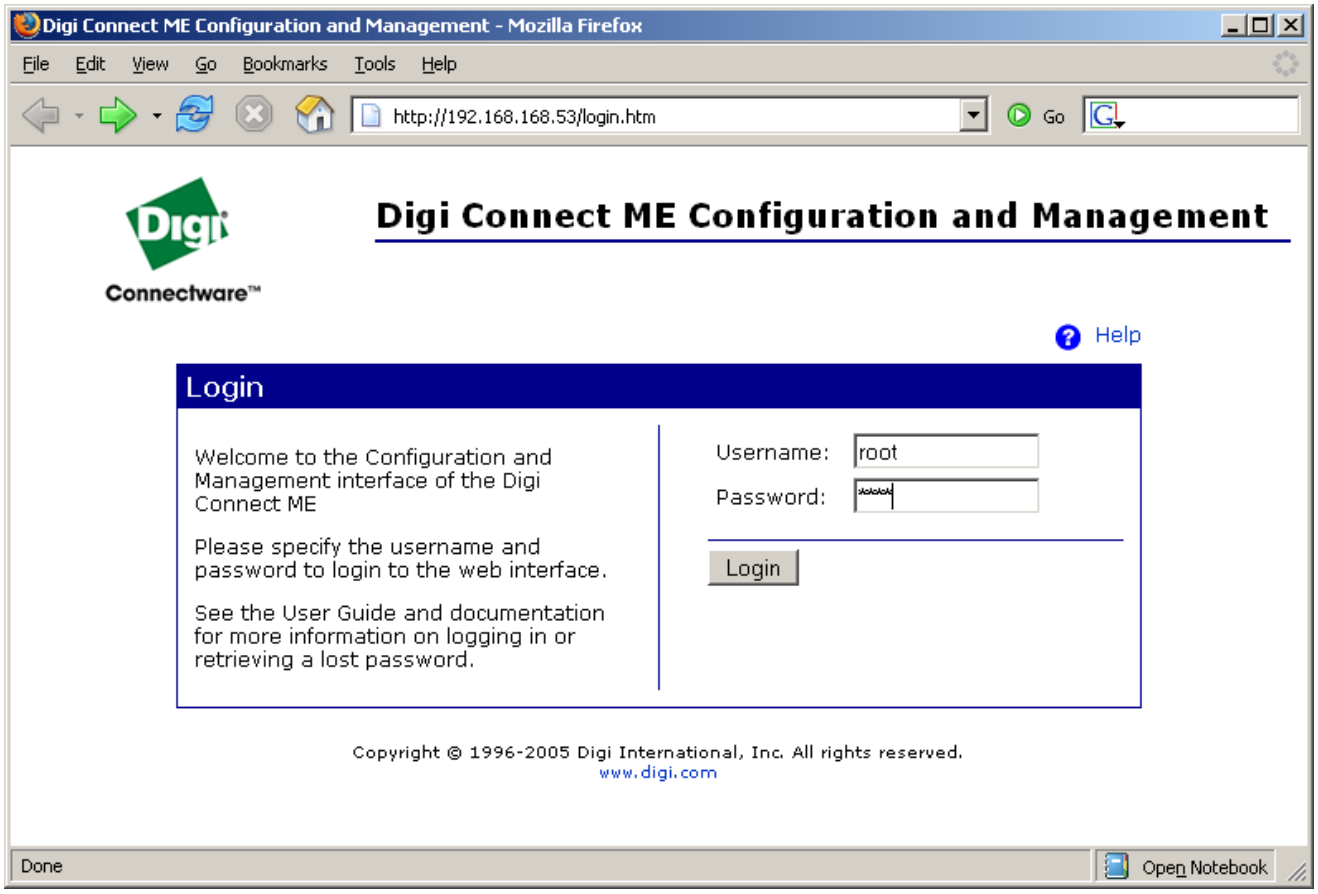




After the setup wizard has successfully saved the configuration into the ESB, check the **LOG ON TO WEB USER INTERFACE OF DEVICE** option and then click **FINISH** to continue.



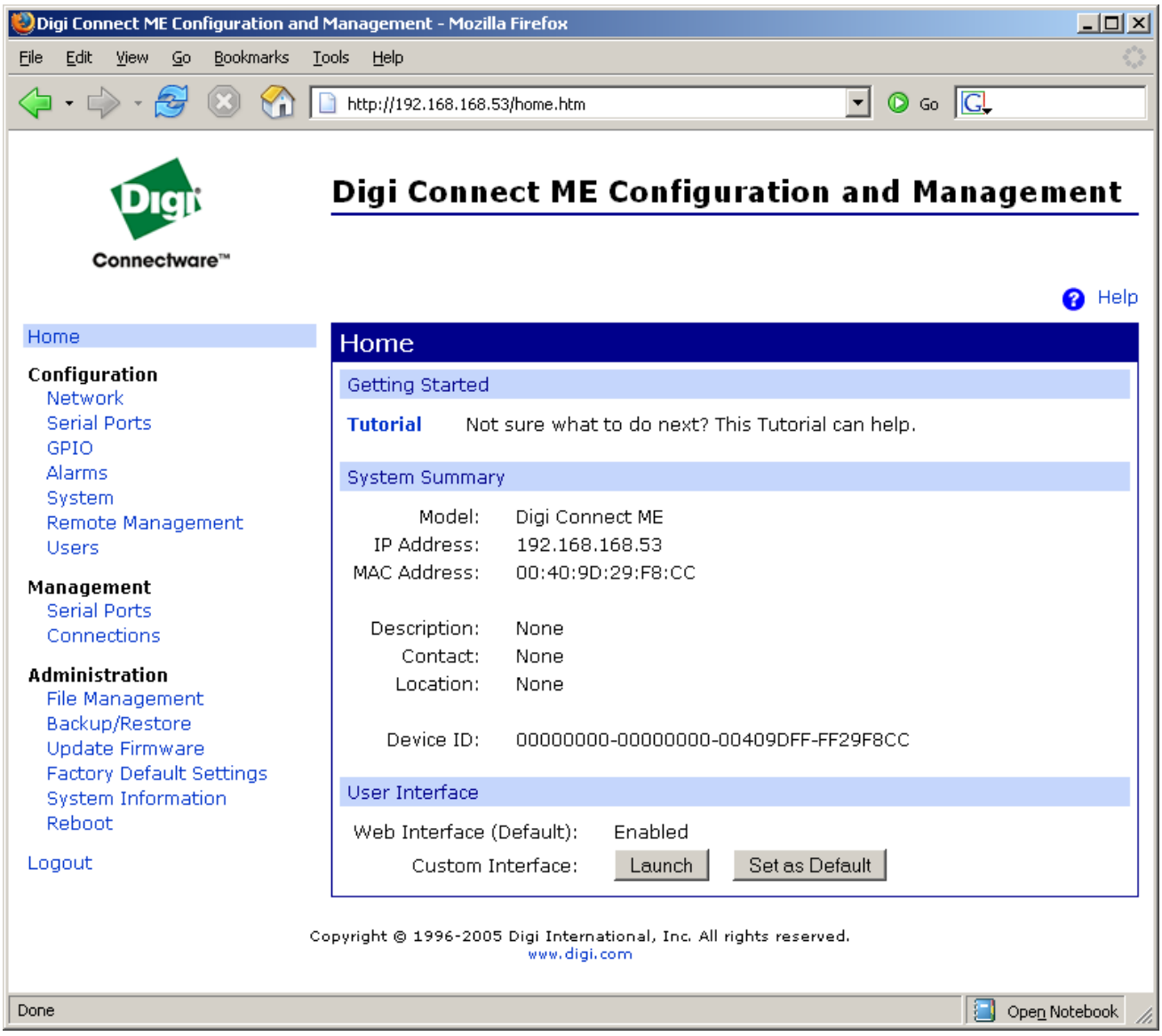
The ESB has a built in web server that can be used to do advanced ESB configuration. The setup wizard will launch your default web browser and tell it to connect to the ESB. The default user name it **root** and the default password is **dbps**. Enter root, and dbps, then click the **LOGIN** button.



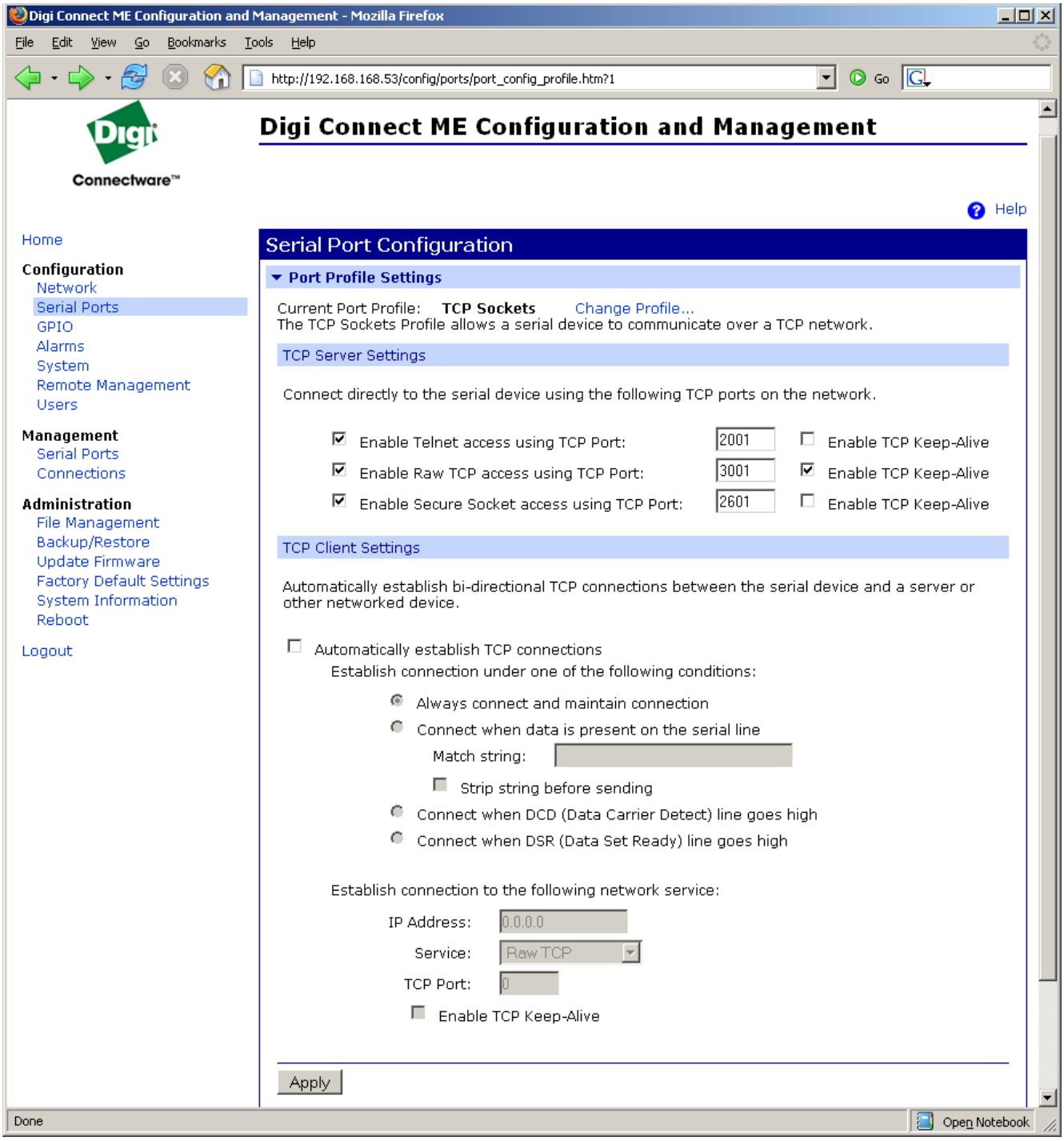
The www interface provides a a far more fine grained set of configuration options, but is considerably more complex to use.

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.



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.



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	120VAC 60Hz or 50Hz
Power Consumption	¼ Amp typical, 3 ½ Amp Maximum if AC Relays are Used
Operating Temperature	0° F to 135° F (-17° C to +50° C)
Operating Humidity	35% to 80%
Dimensions	5.25" Wide, 5.25" Tall, 3.5" Deep (depending on installed options)
Weight	1 Pound (depending on installed options)
Enclosure	NEMA-1 ABS Plastic Box
Mounting	Wall Mount Holes in Back of Box

LOGIC INPUTS:

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	Half Duplex RS-485
Baud Rate	19200bps
Character Format	Eight Data Bits, No Parity, One Stop Bit

RELAY OUTPUTS:

Quantity	(6) 120VAC Silicon Relays (OUT0 to OUT5)
AC Relay Rating	120VAC at ½ 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	0Dh	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
&	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
@	40h	64

ASCII CHARACTER	Hexadecimal Code	Decimal Code
A	41h	65
B	42h	66
C	43h	67
D	44h	68
E	45h	69
F	46h	70
G	47h	71
H	48h	72
I	49h	73
J	4Ah	74
K	4Bh	75
L	4Ch	76
M	4Dh	77
N	4Eh	78
O	4Fh	79
P	50h	80
Q	51h	81
R	52h	82
S	53h	83
T	54h	84
U	55h	85
V	56h	86
W	57h	87
X	58h	88
Y	59h	89
Z	5Ah	90
[	5Bh	91
\	5Ch	92
]	5Dh	93
^	5Eh	94
_	5Fh	95
'	60h	96

ASCII CHARACTER	Hexadecimal Code	Decimal Code
a	61h	97
b	62h	98
c	63h	99
d	64h	100
e	65h	101
f	66h	102
g	67h	103
h	68h	104
i	69h	105
j	6Ah	106
k	6Bh	107
l	6Ch	108
m	6Dh	109
n	6Eh	110
o	6Fh	111
p	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
y	79h	121
z	7Ah	122
{	7Bh	123
|	7Ch	124
}	7Dh	125
~	7Eh	126
DELETE	7Fh	127

7.0 Operator Notes