

The MD4000 mesh WiFi products are designed to be installed in outdoor environments and left unattended for extended periods of time. By doing periodic maintenance, the number of equipment service calls can be greatly reduced.

Installation

Outside of the normal installation procedure found in the Installation Manual (http://www.meshdynamics.com/documents/MD4000_HWMANUAL.pdf), there is one important factor in the stability of an outdoor network. Water in the antenna connections or inside the enclosure can reduce or completely disrupt communications.

The MD4000 uses a NEMA 67 enclosure that is weather-tight when properly sealed. Water can get inside the enclosure when proper sealing of the connectors is not used. For the two Ethernet ports, it is necessary to use the two weatherproof-sealed cable connectors or connector cap at all times. If they are not used, water can enter the enclosure and cause short circuits.

Small amounts of water inside the antenna connectors can also significantly reduce signal integrity. MeshDynamics strongly recommends using a self-healing weatherproofing tape such as 3M Mastic Tape (<http://www.l-com.com/item.aspx?id=21965&cmp=ALSOS>).

Hardware

The MD4000 will often be installed in inconvenient locations such as the tops of communications towers and monopoles. The best way to assure hardware integrity is to periodically check and reseal the antenna and Ethernet connections. A good guideline for scheduling these activities is at the end of Summer, and the end of Winter. This will assure that all connections are sealed, and possible damage is detected when going into, or coming out of the seasons of extreme weather. If the MD4000 is installed in an especially harsh location, it may be necessary to monitor these connections more frequently.

The enclosure should never be opened as a part of normal maintenance procedures.

Antenna Connections

Antenna connections should be left alone as long as the weatherproofing tape is not cut or broken. If the integrity of the tape has been compromised, the antenna connections should be undone and blown out with compressed air to remove any moisture. Once the antennas are reconnected, new weatherproofing tape should be applied.

Ethernet Connections

The Ethernet connections should also be undone and the bulkhead connections should be inspected for moisture. If any moisture is seen, the connectors should be blown out with compressed air. If there appears to be rust on the connector leads, the weatherproof connector and RJ45 connector should be replaced.

Antenna Orientation

Antenna orientation can greatly affect the signal strength and connection integrity between nodes. There are many factors that can alter antenna orientation, such as birds, wind, and cable strain. When checking the connections on the node or if there are problems detected via the NMS regarding link quality, the orientation of the antennas should be checked and re-aligned if necessary.

Monitoring Link Status

Check the "Heartbeat tab" at the bottom of the Network Viewer screen to view the status of the links between the mesh nodes. Connectivity and signal strength in *both* directions should be checked.

To log the node status into a file, follow the below procedure:

- go to "NetworkViewer9.0 --> Library --> AlertScripts" folder in the Meshdynamics software
- copy the "MDNodeLogger.rb" file into the "NetworkViewer9.0 --> AlertScripts" folder.

Since the size (in Mb) of the logs will continue to grow with each Heartbeat that is logged, it may be necessary to restart the logs periodically (copy the old logs into a storage file, then delete the logs from the NMS software and start the logs over).

If it is found that the signal strengths of individual links between nodes have changed, the first thing that should be checked is that the transmit power of each radio involved in the link. The transmit power is checked under the "Interface Setting tab" on the nodes' Configuration windows.

If the transmit power has not been modified, the likely source of the change in signal strength will be hardware based. Please see the procedures for sealing antenna connections and orienting antennas.

Monitoring Heartbeat Counts

These can be seen for each node under the "Properties tab" on the left side of the Network Viewer screen. If it is seen that the Heartbeat Count for any particular node has reset, it means that the node has rebooted. Reboots of individual nodes are usually caused by a power anomaly. If consistent rebooting of a node is seen, it will be necessary to troubleshoot all of the components in the power system (cables, POE adapter, outlet). After this is done, the log can then be monitored to verify the up time of the node.

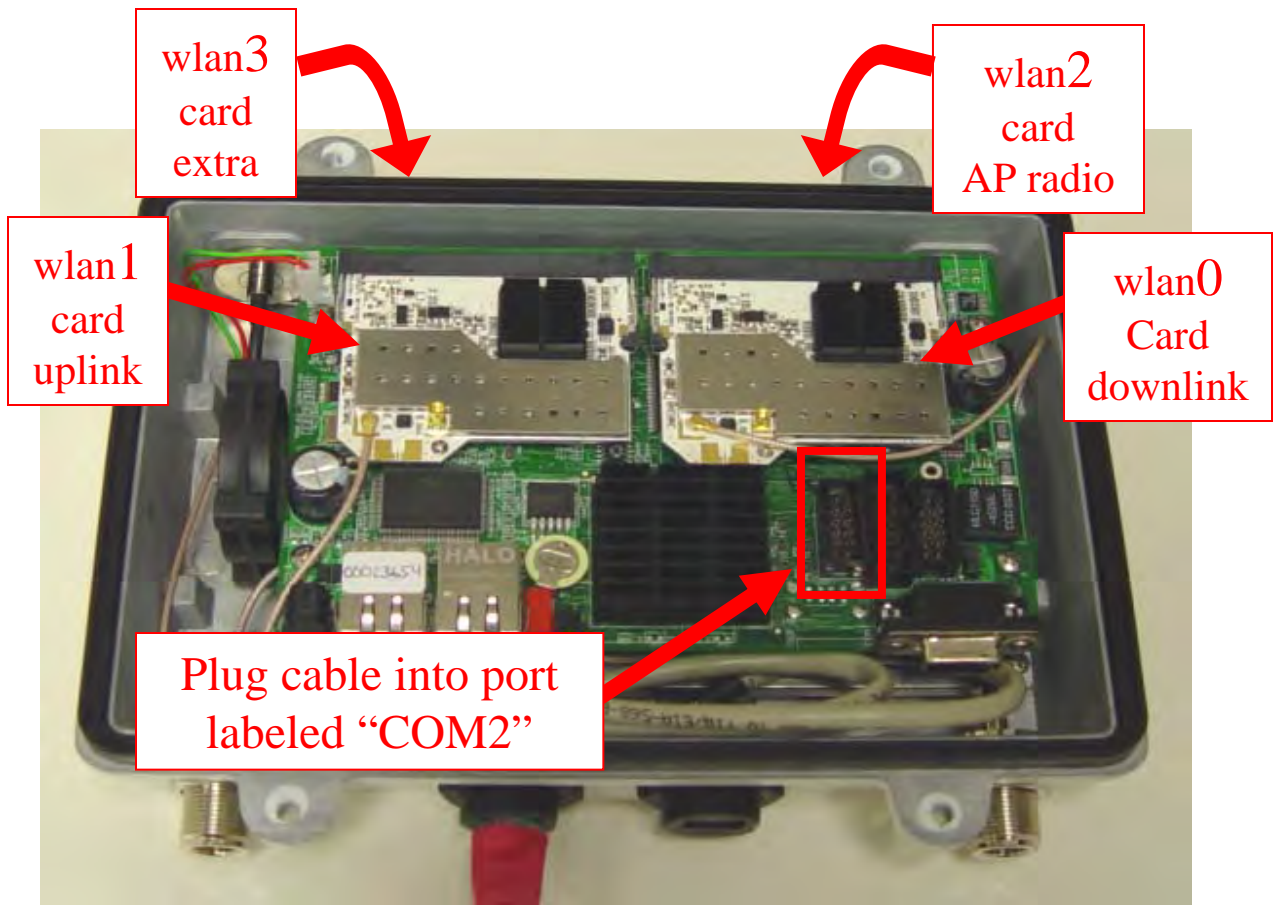
Contact MeshDynamics TechSupport

All TechSupport emails are monitored by management.

When appropriate, please send your email marked "Urgent" to TechSupport@MeshDynamics.com.

An application engineer will respond within 24 hours.

For
MESH DYNAMICS
SYSTEM INTEGRATORS
RADIO CARD DIAGNOSTICS



For this particular node, the downlink radio card (indicated as “wlan0”) was intentionally replaced with a damaged card.

It can be seen on the last page of this boot-up process that the node is seeing wlan0 as an “**unknown interface: No such device**” (this is marked by the red square). This message will be displayed whenever a particular card is damaged or dislodged.

A node will just continually reboot should either of these happen. Replace the radio card, and check the boot-up process again in the same manner.

When it is unknown what the problem may be with a mesh node, please copy and email the boot-up serial output. (see pages that follow).

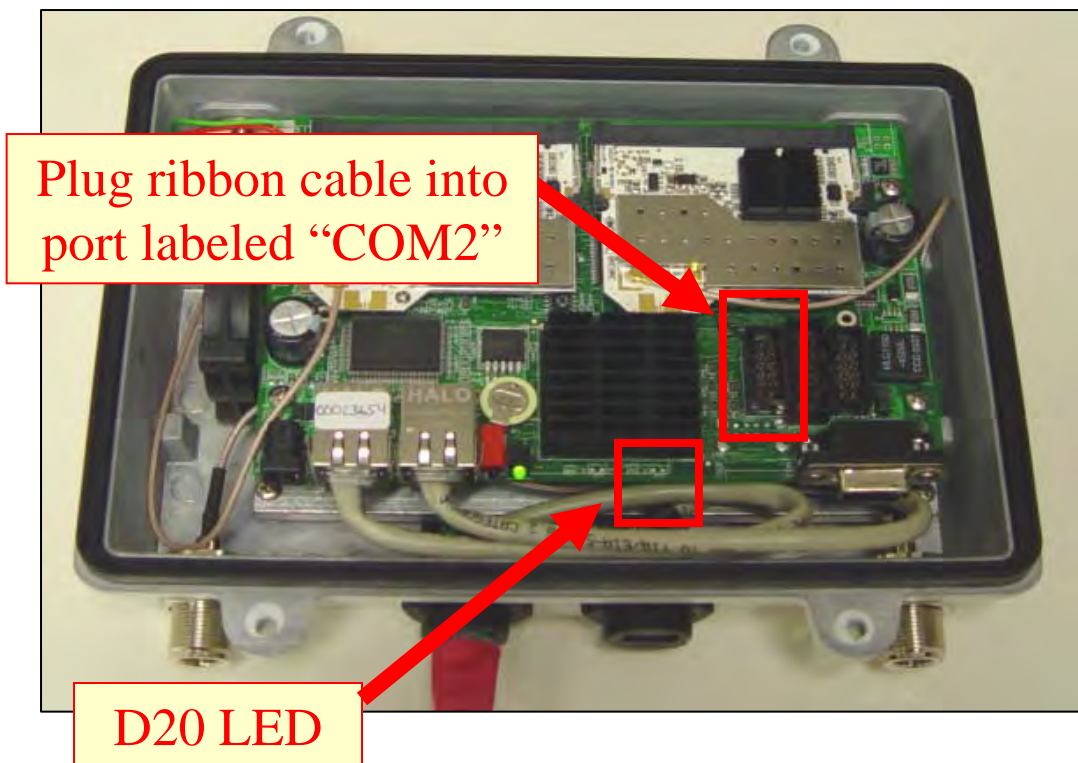
Visually inspect the node.

- Are Ethernet ports corroded?
- Are antenna ports corroded?

Take lid off and see if anything looks out-of-the ordinary.

- Internal corrosion?
- Radio cards dislodged?

Plug serial ribbon cable into COM2 port.



The following pages show the output of the boot-up process. Towards the end of the output, it shows a problem with the wlan0 radio card.

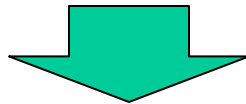
Whenever there is a problem with a radio card, the output will state:

wlanX: unknown interface: No such device

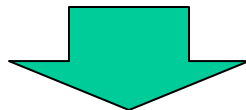
Replace the suspect radio card, and reboot the node

Monitor the output once again to see if any errors appear.

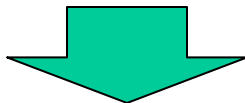
See if the node comes up on the NMS.



If there are no errors on the output, and the node is *not* showing up on the NMS, look at the LED on the motherboard marked “D20”. If this is blinking once per second after boot up, this means that the node thinks it’s a relay node. This may be the result of a bad enclosure-to-motherboard Ethernet cable. Bypass this cable by plugging the CAT5 cable from the POE *directly* into the motherboard.



If the D20 LED is still blinking once per second after boot up, this means that the Ethernet port on the motherboard is bad. A new motherboard is needed. Contact MeshDynamics for an RMA number.



Else, if the node still does not boot, and there are known-good radio cards installed, the motherboard may be bad. MeshDynamics can send you a re-flash utility and instructions on re-flashing the node at your location. If that does not work, a new board is needed. Contact MeshDynamics for an RMA Number.

MeshDynamics will re-flash using the node’s existing MAC ID (rather than using a new MAC ID). This can be gotten from the sticker on the node’s enclosure. [Our manufacturing database keeps track based on serial numbers and MAC IDs].

```
Tera Term - COM1 VT
File Edit Setup Control Window Help
Ethernet eth0: MAC address 00:02:b3:01:01:01
IP: 192.168.3.2/255.255.255.0, Gateway: 0.0.0.0
Default server: 192.168.3.1, DNS server IP: 0.0.0.0

RedBoot(tm) bootstrap and debug environment [ROM]
Red Hat certified release, version 1.92p1 - built 16:53:03, Mar 26 2004

Platform: GW2342 Development Platform (XScale)
Copyright (C) 2000, 2001, 2002, Red Hat, Inc.

RAM: 0x00000000-0x04000000, 0x0001f880-0x03fd1000 available
FLASH: 0x50000000 - 0x51000000, 128 blocks of 0x00020000 bytes each.
== Executing boot script in 3.000 seconds - enter ^C to abort
RedBoot> fis load -b 0x01600000 zImage
RedBoot> fis load -b 0x00800000 ramdisk
RedBoot> exec -c "console=ttyS1,115200 root=/dev/ram0 initrd=0x00800000,16M" 0x0
1600000
Using base address 0x00800000 and length 0x008ca000
Linux version 2.4.24-uc0 (root@shastabuild) (gcc version 3.3.3) #66 Thu Apr 6 10
:21:44 PDT 2006
CPU: XScale-IXP4xx/IXC11xx revision 1
Machine: Intel IXP425 Development Platform
alloc_bootmem_low
mentable_init
On node 0 totalpages: 16384
zone(0): 16384 pages.
zone(1): 0 pages.
zone(2): 0 pages.
Kernel command line: console=ttyS1,115200 root=/dev/ram0 initrd=0x00800000,16M
Calibrating delay loop... 266.24 BogoMIPS
Memory: 64MB = 64MB total
Memory: 46764KB available (1171K code, 242K data, 232K init)
Dentry cache hash table entries: 8192 (order: 4, 65536 bytes)
Inode cache hash table entries: 4096 (order: 3, 32768 bytes)
Mount cache hash table entries: 512 (order: 0, 4096 bytes)
Buffer cache hash table entries: 4096 (order: 2, 16384 bytes)
Page-cache hash table entries: 16384 (order: 4, 65536 bytes)
POSIX conformance testing by UNIFIX
PCI Autoconfig: Found Bus 0, Device 2, Function 0
PCI Autoconfig: BAR 0, Mem, size=0x10000, address=0x4bff0000
PCI Autoconfig: Found Bus 0, Device 3, Function 0
PCI Autoconfig: BAR 0, Mem, size=0x10000, address=0x4bfe0000
PCI Autoconfig: Found Bus 0, Device 4, Function 0
PCI Autoconfig: BAR 0, Mem, size=0x10000, address=0x4bfd0000
PCI: bus0: Fast back to back transfers enabled
Linux NET4.0 for Linux 2.4
Based upon Swansea University Computer Society NET3.039
Initializing RT netlink socket
Starting kswapd
JFFS2 version 2.1. (C) 2001 Red Hat, Inc., designed by Axis Communications AB.
pty: 256 Unix98 ptys configured
Serial driver version 5.05c (2001-07-08) with MANY_PORTS SHARE_IRQ SERIAL_PCI en
abled
ttyS00 at 0xff000003 (irq = 15) is a XScale UART
ttyS01 at 0xff001003 (irq = 13) is a XScale UART
RAMDISK driver initialized: 16 RAM disks of 20480K size 1024 blocksize
Uniform Multi-Platform E-IDE driver Revision: 7.00beta4-2.4
ide: Assuming 33MHz system bus speed for PIO modes; override with idebus=xx
cfi_cmdset_0001: Erase suspend on write enabled
Using buffer write method
Creating 11 MTD partitions on "IXP425 Flash":
0x00000000-0x00040000 : "RedBoot"
0x00040000-0x00180000 : "zImage"
0x00180000-0x00a60000 : "ramdisk"
```



```
Tera Term - COM1 VT
File Edit Setup Control Window Help
ide: Assuming 33MHz system bus speed for PIO modes; override with idebus=xx
cfi_cmdset_0001: Erase suspend on write enabled
Using buffer write method
Creating 11 MTD partitions on "IXP425 Flash":
0x00000000-0x00040000 : "RedBoot"
0x00040000-0x00180000 : "zImage"
0x00180000-0x00a60000 : "ramdisk"
0x00a60000-0x00ba0000 : "meshap"
0x00ba0000-0x00ce0000 : "bkap"
0x00ce0000-0x00d40000 : "meshconfig"
0x00d40000-0x00da0000 : "bkconfig"
0x00da0000-0x00ee0000 : "fwupdate"
0x00ee0000-0x00fc0000 : "unallocated space"
0x00fc0000-0x00fc1000 : "RedBoot config"
mtd: partition "RedBoot config" doesn't end on an erase block -- force read-only
0x00fe0000-0x01000000 : "FIS directory"
NET4: Linux TCP/IP 1.0 for NET4.0
IP Protocols: ICMP, UDP, TCP
IP: routing cache hash table of 512 buckets, 4Kbytes
TCP: Hash tables configured (established 4096 bind 8192)
NET4: Unix domain sockets 1.0/SMP for Linux NET4.0.
802.1Q VLAN Support v1.8 Ben Greear <greearb@candelatech.com>
Other stuff added by David S. Miller <davem@redhat.com>
NetWinder Floating Point Emulator V0.97 (double precision)
RAMDISK: Compressed image found at block 0
Freeing initrd memory: 16384K
UFS: Mounted root (ext2 filesystem).
Freeing init memory: 232K
./
./etc/
./etc/sysconfig/
./etc/sysconfig/network-devices/
./etc/sysconfig/network-devices/ifconfig.mip0
./etc/sysconfig/network
./etc/hosts
./etc/passwd
./etc/meshap.conf
./etc/orig.meshap.conf
./etc/dot11e.conf
./etc/acl.conf
./etc/mobility.conf
./etc/map_if_info.conf
./
./lib/
./lib/modules/
./lib/modules/2.4.24-uc0/
./lib/modules/2.4.24-uc0/kernel/
./lib/modules/2.4.24-uc0/kernel/drivers/
./lib/modules/2.4.24-uc0/kernel/drivers/net/
./lib/modules/2.4.24-uc0/kernel/drivers/net/atheros.o
./lib/modules/2.4.24-uc0/kernel/drivers/net/ath_hal.o
./lib/modules/2.4.24-uc0/kernel/drivers/net/shasta_ixp425_eth.o
./lib/modules/2.4.24-uc0/kernel/drivers/torna_hw_id.o
./lib/modules/2.4.24-uc0/kernel/drivers/meshap.o
./lib/modules/2.4.24-uc0/kernel/drivers/shasta_board_info_drv.o
./lib/libalconf.so
./root/
./root/updates/
./root/chksum
./root/configd_spawn.sh
./root/fw_update.sh
./root/fw_update_mount.sh
./root/fw_update_save.sh
./root/load_torna
```



```
./lib/modules/2.4.24-uc0/kernel/drivers/shasta_board_info_drv.o
./lib/libalconf.so
./root/
./root/updates/
./root/chksum
./root/configd_spawn.sh
./root/fw_update.sh
./root/fw_update_mount.sh
./root/fw_update_save.sh
./root/load_torna
./root/mktargz.sh
./root/post_fs_change.sh
./root/pre_fs_change.sh
./root/start_gpsd.sh
./root/startup.sh
./root/unload_torna
./root/watchd_helper.sh
./sbin/
./sbin/meshd
./sbin/configd
./sbin/meshsnmpd
./sbin/mesh_update_server
./sbin/miscd
./sbin/watchd
./sbin/iperf
./sbin/cwtxttest
./sbin/gpsd
./sbin/alconfset
./home/
./home/httpd/
./home/httpd/cgi-bin/
./home/httpd/cgi-bin/ErrorLog.cgi
./home/httpd/cgi-bin/ExecCommand.cgi
./home/httpd/cgi-bin/Interfaces.cgi
./home/httpd/cgi-bin/Login.cgi
./home/httpd/cgi-bin/LoginPasswd.cgi
./home/httpd/cgi-bin/MoveNetwork.cgi
./home/httpd/cgi-bin/RebootNode.cgi
./home/httpd/cgi-bin/RestoreDefault.cgi
./home/httpd/cgi-bin/SetPassword.cgi
./home/httpd/cgi-bin/Status.cgi
./home/httpd/cgi-bin/SysLog.cgi
./home/httpd/cgi-bin/hClients.cgi
./home/httpd/cgi-bin/hKnownaps.cgi
./home/httpd/cgi-bin/hMeshTable.cgi
./home/httpd/cgi-bin/hQueuestats.cgi
./home/httpd/cgi-bin/hbmiss.cgi
./home/httpd/cgi-bin/hchannel.cgi
./home/httpd/cgi-bin/hps-info.cgi
./home/httpd/cgi-bin/hrt-ctrl.cgi
./home/httpd/cgi-bin/hrxinfo.cgi
./home/httpd/cgi-bin/htx-intr.cgi
./home/httpd/cgi-bin/htxpool.cgi
./home/httpd/cgi-bin/kml.cgi
./home/httpd/cgi-bin/txqueue.cgi
./home/httpd/cgi-bin/version.cgi
./home/httpd/Footer.html
./home/httpd/LoginKey.gif
./home/httpd/MDlogoSmall.gif
./home/httpd/Menu.html
./home/httpd/boa.conf
./home/httpd/index.html
./home/httpd/mt-new-css.css
./home/httpd/orange-box.gif
```

```
./home/httpd/boa.conf
./home/httpd/index.html
./home/httpd/mt-new-css.css
./home/httpd/orange-box.gif
./home/httpd/spacer.gif
Verifying system integrity...[OK]
```

```
Using /lib/modules/2.4.24-uc0/kernel/drivers/torna_hw_id.o
Warning: loading torna_hw_id will taint the kernel: non-GPL license Torna Hardware I
D implementation for Shasta 2.5.74 Build 4
License - Proprietary
```

```
See http://www.tux.org/lkml/#export-tainted
for information about tainted modules
```

```
torna_hw_id: Reading Product information from EEPROM
```

```
Reading header...[OK:6 addresses]
```

```
Address[0]= 00:12:ce:00:00:36
```

```
Address[1]= 00:12:ce:00:00:37
```

```
Address[2]= 00:12:ce:00:00:38
```

```
Address[3]= 00:12:ce:00:00:39
```

```
Address[4]= 00:12:ce:00:00:3a
```

```
Address[5]= 00:12:ce:00:00:3b
```

```
Using /lib/modules/2.4.24-uc0/kernel/drivers/ixp400/ixp400.o
```

```
Warning: loading ixp400 will taint the kernel: no license
```

```
See http://www.tux.org/lkml/#export-tainted for information about tainted modu
les
```

```
Module init.
```

```
Using /lib/modules/2.4.24-uc0/kernel/drivers/shasta_board_info_drv.o
```

```
Warning: loading shasta_board_info_drv will taint the kernel: non-GPL license -
Copyright (c) 1999-2004 Advanced Cybernetics Group, Inc
```

```
See http://www.tux.org/lkml/#export-tainted for information about tainted modu
les
```

```
Using /lib/modules/2.4.24-uc0/kernel/drivers/meshap.o
```

```
Warning: loading meshap will taint the kernel: non-GPL license - Copyright (c) 1
999-2004 Advanced Cybernetics Group, Inc
```

```
See http://www.tux.org/lkml/#export-tainted for information about tainted modu
les
```

```
meshap.o version 2.5.74 Build 2 loaded
```

```
meshap_tddi: Initialized Driver-Daemon Interface (2.5.10) at Char Major 254
```

```
meshap_power_test: Initialized
```

```
meshap_core_initialize: log_mask=512
```

```
meshap_ip_device_initialize: Net device registered
```

```
md_watch : Starting
```

```
meshap_core: Stopping kernel mode access point and mesh services.
```

```
md_watch : Quitting
```

```
meshap_tddi: Uninitialized Driver-Daemon Interface at Char Major 254
```

```
meshap_ip_device_uninitialize : Unregistering Net device
```

```
meshap.o version 2.5.74 Build 2 unloaded
```

```
Welcome to Meshdynamics MD4000 Series Access Point
Powered by Meshdynamics Structured Mesh(tm) technology
```



meshap.o version 2.5.74 Build 2 unloaded

Welcome to Meshdynamics MD4000 Series Access Point
Powered by Meshdynamics Structured Mesh(tm) technology
Copyright (c) 1992-2005 Advanced Cybernetics Group, Inc & Meshdynamics, Inc

For Technical Support please contact:

Meshdynamics Inc,
2953 Bunker Hill Lane,
Suite 400,
Santa Clara, CA 95054

Phone: +1 (408) 282-3731

http://www.meshdynamics.com

mke2fs 1.25 (20-Sep-2001)
Filesystem label=
OS type: Linux
Block size=1024 (log=0)
Fragment size=1024 (log=0)
5136 inodes, 20480 blocks
1024 blocks (5%) reserved for the super user
First data block=1
3 block groups
8192 blocks per group, 8192 fragments per group
1712 inodes per group
Superblock backups stored on blocks:
8193

Writing inode tables: done
Writing superblocks and filesystem accounting information: done

This filesystem will be automatically checked every 24 mounts or
180.00 days, whichever comes first. Use tune2fs -c or -i to override.

mke2fs 1.25 (20-Sep-2001)
Filesystem label=
OS type: Linux
Block size=1024 (log=0)
Fragment size=1024 (log=0)
5136 inodes, 20480 blocks
1024 blocks (5%) reserved for the super user
First data block=1
3 block groups
8192 blocks per group, 8192 fragments per group
1712 inodes per group
Superblock backups stored on blocks:
8193

Writing inode tables: done
Writing superblocks and filesystem accounting information: done

This filesystem will be automatically checked every 28 mounts or
180.00 days, whichever comes first. Use tune2fs -c or -i to override.

gunzip: Invalid gzip magic
Checking for Firmware Updates....
No Firmware Updates found...

Loading shasta_ixp425_eth and meshap...
Using /lib/modules/2.4.24-uc0/kernel/drivers/meshap.o



```
gunzip: Invalid gzip magic
Checking for Firmware Updates....
No Firmware Updates found...

Loading shasta_ixp425_eth and meshap...
Using /lib/modules/2.4.24-uc0/kernel/drivers/meshap.o
Warning: loading meshap will taint the kernel: non-GPL license - Copyright (c) 1
999-2004 Advanced Cybernetics Group, Inc
See http://www.tux.org/lkml/#export-tainted for information about tainted modu
les

meshap.o version 2.5.74 Build 2 loaded
meshap_tddi: Initialized Driver-Daemon Interface (2.5.10) at Char Major 254
meshap_power_test: Initialized

meshap_core_initialize: log_mask=512
meshap_ip_device_initialize: Net device registered

Using /lib/modules/2.4.24-uc0/kernel/drivers/net/shasta_ixp425_eth.o
shasta_ixp425_eth:
Initializing IXP425 NPE Ethernet driver software v. 2.5.74 Build 2-1.1
shasta_ixp425_eth: CPU clock speed (approx) = 0 MHz
md_watch : Starting
shasta_ixp425_eth: ixp0 is using the PHY at address 0
shasta_ixp425_eth: ixp1 is using the PHY at address 1
meshap_power_test: Added device ixp0

meshap_power_test: Added device ixp1

ixp0: Link down
meshap_core: meshap_core_on_link_notify ignoring link notification for ixp0 (2)
ixp1: Link down
meshap_core: meshap_core_on_link_notify ignoring link notification for ixp1 (2)
Using /lib/modules/2.4.24-uc0/kernel/drivers/net/ath_hal.o
Warning: loading ath_hal will taint the kernel: non-GPL license - Proprietary
See http://www.tux.org/lkml/#export-tainted for information about tainted modu
les
ath_hal: 0.9.17.1-MD-2.5.5 (AR5210, AR5211, AR5212, RF5111, RF5112, RF2413, RF54
13, REGOPS_FUNC)

Using /lib/modules/2.4.24-uc0/kernel/drivers/net/atheros.o
Warning: loading atheros will taint the kernel: non-GPL license - Proprietary
See http://www.tux.org/lkml/#export-tainted for information about tainted modu
les

atheros: 2.5.74 Build 2
openrt-ctrl: Rate control initialized

atheros_pci: PCI device 27 PCI device 168c:001b 00:02.0
atheros: WEP,TKIP,CCMP with split MIC supported
atheros: TPC DIUR TXPL BRST FASTFR CMPR XR HR QR supported
atheros: MR Retry supported
atheros: Compression support disabled
atheros: Country code = 840 regdomain=0
wlan1: Setting channel 36 (5180 MHz) as default
atheros: PHY modes A:yes,B:yes,G:yes,Pure G:yes,cc=255
openrt-ctrl: Created instance wlan1 in uninitialized mode
atheros: Original MAC 00:0b:6b:2c:5d:7b
wlan1: mac 10.5 phy 6.1 5ghz radio 6.3
wlan1: 802.11 address:00:12:ce:00:00:38
wlan1: Use hw queue 0 for 0 traffic class
wlan1: Use hw queue 1 for 1 traffic class
wlan1: Use hw queue 2 for 2 traffic class
```



```

wlan1: mac 10.5 phy 6.1 5ghz radio 6.3
wlan1: 802.11 address:00:12:ce:00:00:38
wlan1: Use hw queue 0 for 0 traffic class
wlan1: Use hw queue 1 for 1 traffic class
wlan1: Use hw queue 2 for 2 traffic class
wlan1: Use hw queue 3 for 3 traffic class
wlan1: TXQ_FLAGS:0f SOFT_LED:0 CSZ:32
meshap_power_test: Added radio device wlan1 at index 1

wlan1: Atheros 5212: mem=0x4bff0000, irq=27

atheros_pci: PCI device 19 PCI device 168c:0013 00:03.0
atheros: WEP,TKIP,CCMP with split MIC supported
atheros: TPC DIUR TXPL BRST FASTPR CMPR XR HR QR supported
atheros: MR Retry supported
atheros: Compression support disabled
atheros: Country code = 840 regdomain=0
wlan2: Setting channel 36 (5180 MHz) as default
atheros: PHY modes A:yes,B:yes,G:yes,Pure G:yes,cc=255
openrt-ctrl: Created instance wlan2 in uninitialized mode
atheros: Original MAC 00:0b:6b:35:f2:5b
wlan2: mac 5.9 phy 4.3 5ghz radio 3.6
wlan2: 802.11 address:00:12:ce:00:00:39
wlan2: Use hw queue 0 for 0 traffic class
wlan2: Use hw queue 1 for 1 traffic class
wlan2: Use hw queue 2 for 2 traffic class
wlan2: Use hw queue 3 for 3 traffic class
wlan2: TXQ_FLAGS:0f SOFT_LED:0 CSZ:32
meshap_power_test: Added radio device wlan2 at index 2

wlan2: Atheros 5212: mem=0x4bfe0000, irq=26

atheros_pci: PCI device 19 PCI device 168c:0013 00:04.0
atheros: WEP,TKIP,CCMP with split MIC supported
atheros: TPC DIUR TXPL BRST FASTPR CMPR XR HR QR supported
atheros: MR Retry supported
atheros: Compression support disabled
atheros: Country code = 840 regdomain=0
wlan3: Setting channel 36 (5180 MHz) as default
atheros: PHY modes A:yes,B:yes,G:yes,Pure G:yes,cc=255
openrt-ctrl: Created instance wlan3 in uninitialized mode
atheros: Original MAC 00:0b:6b:37:8c:32
wlan3: mac 5.9 phy 4.3 5ghz radio 3.6
wlan3: 802.11 address:00:12:ce:00:00:3a
wlan3: Use hw queue 0 for 0 traffic class
wlan3: Use hw queue 1 for 1 traffic class
wlan3: Use hw queue 2 for 2 traffic class
wlan3: Use hw queue 3 for 3 traffic class
wlan3: TXQ_FLAGS:0f SOFT_LED:0 CSZ:32
meshap_power_test: Added radio device wlan3 at index 3

wlan3: Atheros 5212: mem=0x4bfd0000, irq=25

openrt-ctrl: Rate control thread starting

ixp0: Link up
meshap_core: meshap_core_on_link_notify ignoring link notification for ixp0 (2)
Bringing up wlan0,wlan1, wlan2 and wlan3
SIOCSIFADDR: No such device
wlan0: unknown interface: No such device
SIOCSIFNETMASK: No such device
SIOCSIFBRDADDR: No such device
wlan0: unknown interface: No such device
openrt-ctrl: Created instance wlan1 in uninitialized mode

```

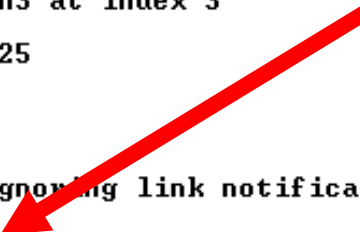


```
Tera Term - COM1 VT
File Edit Setup Control Window Help
atheros: Original MAC 00:0b:6b:37:8c:32
wlan3: mac 5.9 phy 4.3 5ghz radio 3.6
wlan3: 802.11 address:00:12:ce:00:00:3a
wlan3: Use hw queue 0 for 0 traffic class
wlan3: Use hw queue 1 for 1 traffic class
wlan3: Use hw queue 2 for 2 traffic class
wlan3: Use hw queue 3 for 3 traffic class
wlan3: TXQ_FLAGS:0f SOFT_LED:0 CSZ:32
meshap_power_test: Added radio device wlan3 at index 3

wlan3: Atheros 5212: mem=0x4bfd0000, irq=25

openrt-ctrl: Rate control thread starting

ixp0: Link up
meshap_core: meshap_core_on_link_notify ignoring link notification for ixp0 (2)
Bringing up wlan0,wlan1, wlan2 and wlan3
SIOCSIFADDR: No such device
wlan0: unknown interface: No such device
SIOCSIFNETMASK: No such device
SIOCSIFBRDADDR: No such device
wlan0: unknown interface: No such device
openrt-ctrl: Created instance wlan1 in uninitialized mode
wlan1: Initializing 802.11 Infrastructure mode...
wlan1: Done initializing 802.11 Infrastructure mode...
wlan1: Supported rates - 6 9 12 18 24 36 48 54 Mbps
wlan1: TX Power Limit 31 Max Pwr 17 Scale 0
openrt-ctrl: Created instance wlan2 in uninitialized mode
wlan2: Initializing 802.11 Infrastructure mode...
wlan2: Done initializing 802.11 Infrastructure mode...
wlan2: Supported rates - 6 9 12 18 24 36 48 54 Mbps
wlan2: TX Power Limit 31 Max Pwr 17 Scale 0
openrt-ctrl: Created instance wlan3 in uninitialized mode
wlan3: Initializing 802.11 Infrastructure mode...
wlan3: Done initializing 802.11 Infrastructure mode...
wlan3: Supported rates - 6 9 12 18 24 36 48 54 Mbps
wlan3: TX Power Limit 31 Max Pwr 17 Scale 0
Virtual configuring mesh...
meshd: vconfigure command ignored
Configuring mesh...
meshap_tddi: Accepted configuration with following settings:
    if_count=6,hbi=15,mesh_id="default" Regdomain=0
        1 ixp0 PHY=0 USE=0 CH=0
        2 wlan1 PHY=1 USE=0 CH=52
        3 wlan0 PHY=1 USE=1 CH=149
        4 wlan2 PHY=1 USE=1 CH=1
        5 wlan3 PHY=1 USE=1 CH=6
        6 ixp1 PHY=0 USE=1 CH=1
Configure mesh successful
Configuring mesh dot11e...
Configure MESH(802.11e parameters) Successful
Configuring mesh ACL...
Configure MESH(ACL parameters) Successful
Configuring mobility...
meshap_tddi: Accepted mobility configuration with 21 indices
Configure mobility Successful
Starting mesh...
meshap_core: Queing start request until all devices initialize.
torna_hw_id: Reading previous Reboot header from EEPROM...
[OK]
torna_hw_id: Writing Reboot header to EEPROM...
[OK]
Rebooting...
```



wlan0: unknown interface: No such device

Rebooting...

For
MESH DYNAMICS
SYSTEM INTEGRATORS

RADIO CONTINUOUS POWER
TRANSMISSION MODE FOR
SYSTEM TESTING/ANALYSIS

For
MESH DYNAMICS
SYSTEM INTEGRATORS

RADIO CARD REPLACEMENT

Step 1) Once the lid is removed, disconnect the uplink and downlink radio cards from their slots. To disconnect the cards, remove the clips (Fig.1) from the edge of the cards using thumbnails. Pulling the clips away from the card (Fig.2).

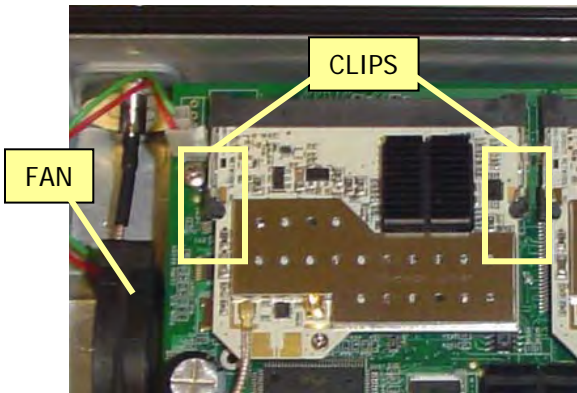


Fig.1



Fig.2

After the radio card is free from the clips, it must be pulled from the slot at an angle as seen below (Fig.3). After each radio card is removed from the slot, be sure the pigtail remains connected and set the cards next to the node (Fig.4). Avoid putting strain on the pigtail where it connects to the radio card.



Fig.3



Fig.4

Step 2) Remove the fan connector from the upper-left corner of the motherboard.

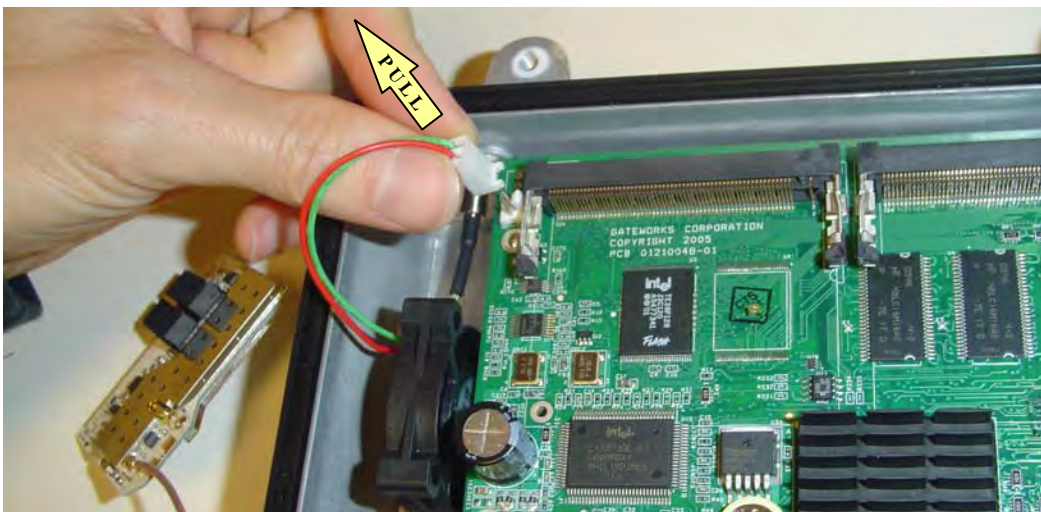


Fig.5

Step 3) Unscrew the motherboard from the node. The motherboard is connected by four screws as seen below (Fig.6).

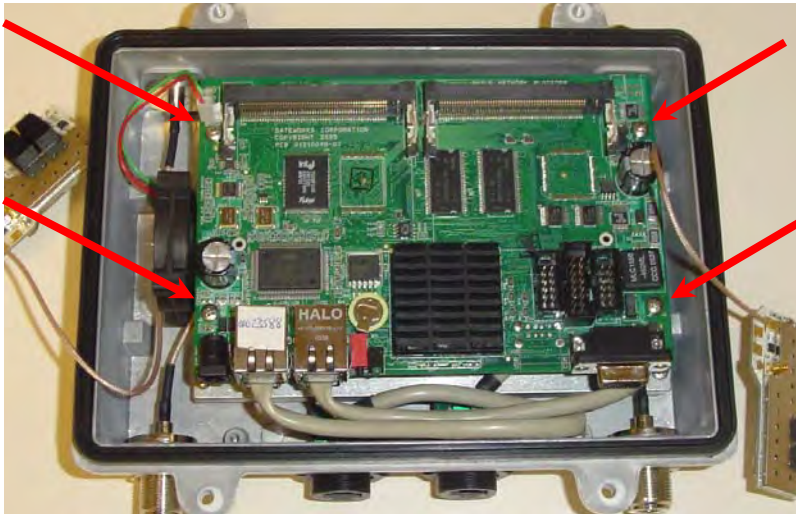


Fig.6

Step 4) Pull the motherboard up leaving the Ethernet cables connected (Fig.7).

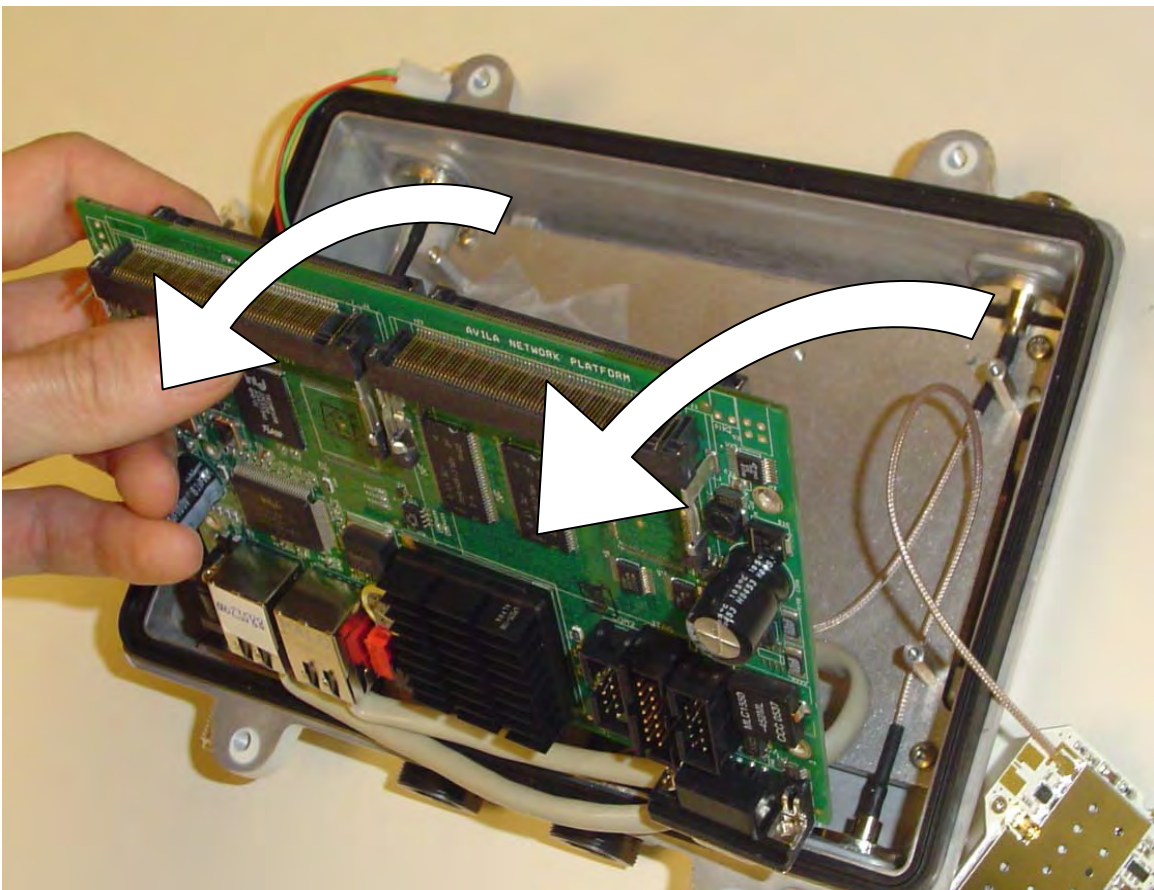


Fig.7

Step 5)

A black radio card will be on the underside of the motherboard. This radio card should be pushed all the way into the slot. If necessary, remove the card all the way from the slot (as done with the top two radio cards), then shove firmly back into the slot. The card will need to be pushed back into the slot at an angle, then pushed towards the motherboard so that the clips will "grab" and hold the card into place. Be sure the clips on the radio card have a secure grip. The clips should be half-way overlapping the gold patches on the radio card as seen in Fig.10.

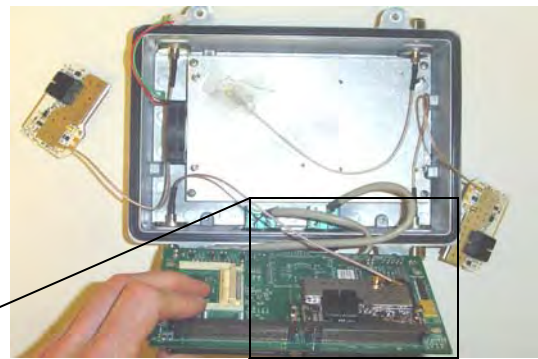


Fig.8

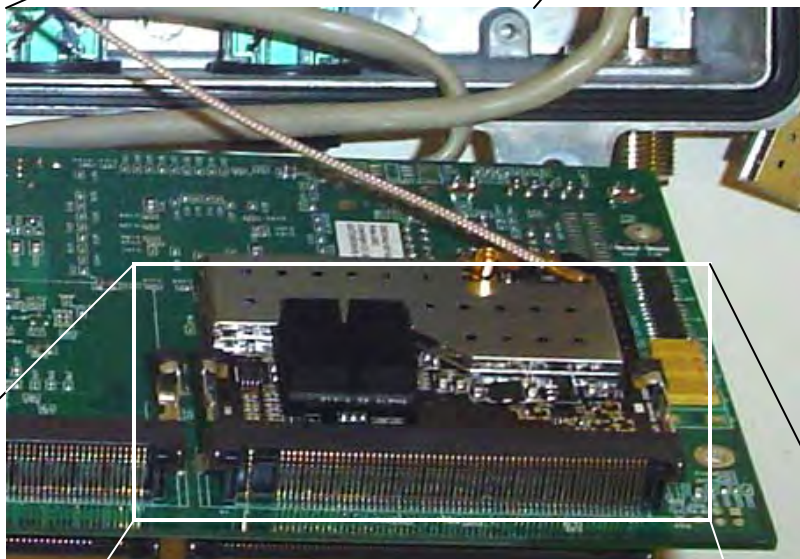


Fig.9

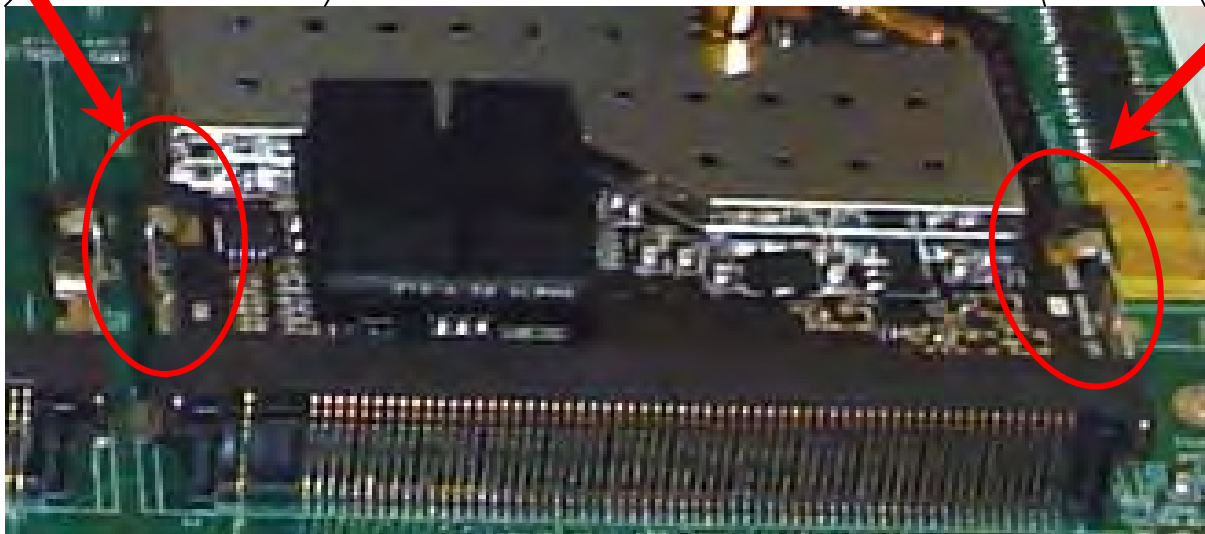
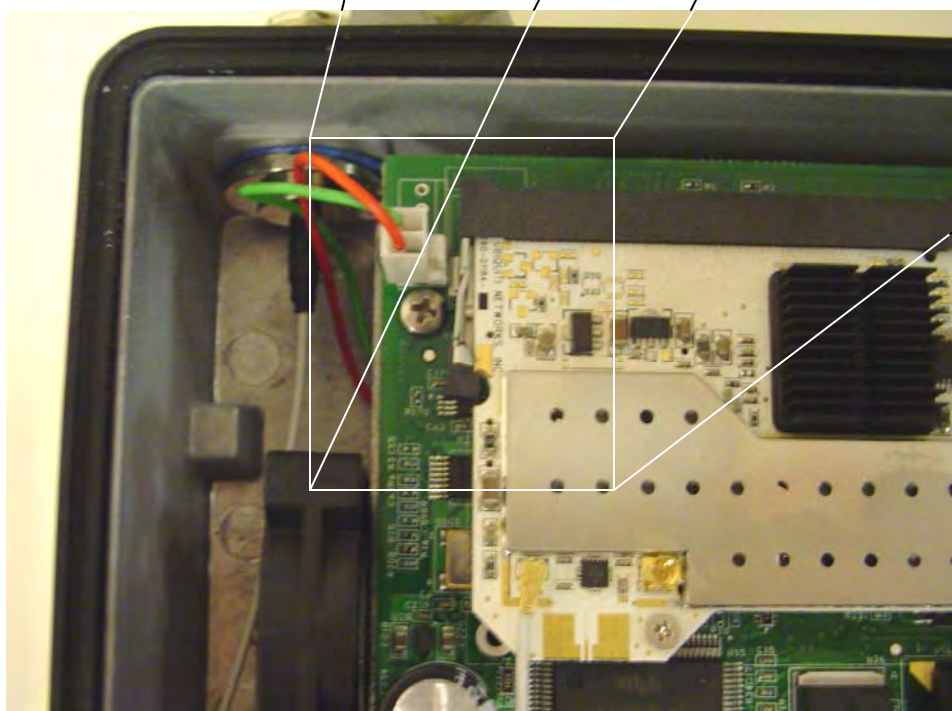
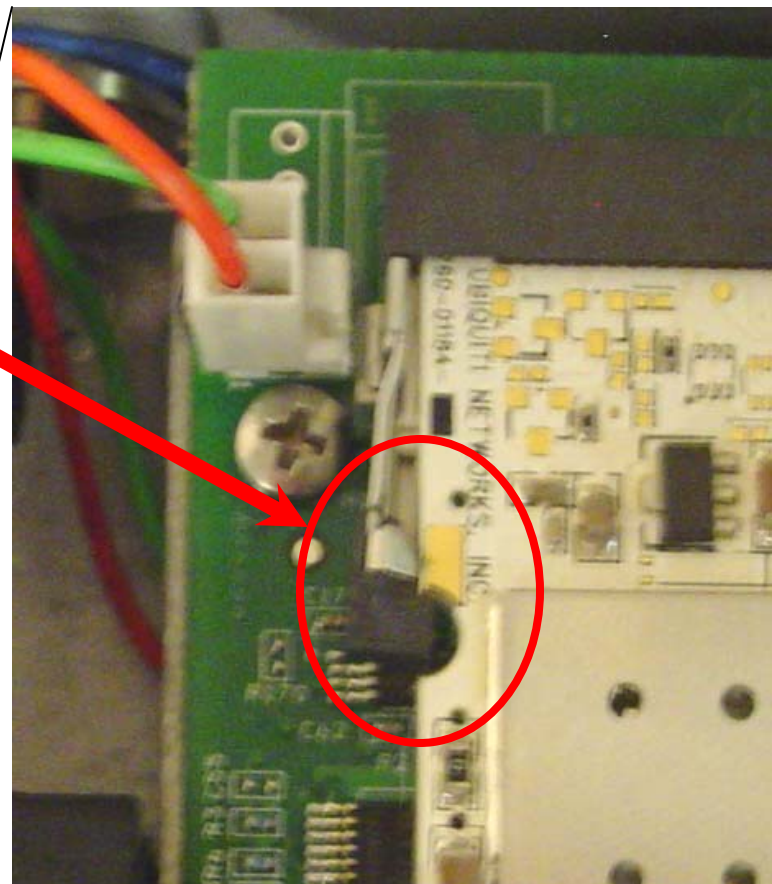


Fig.10

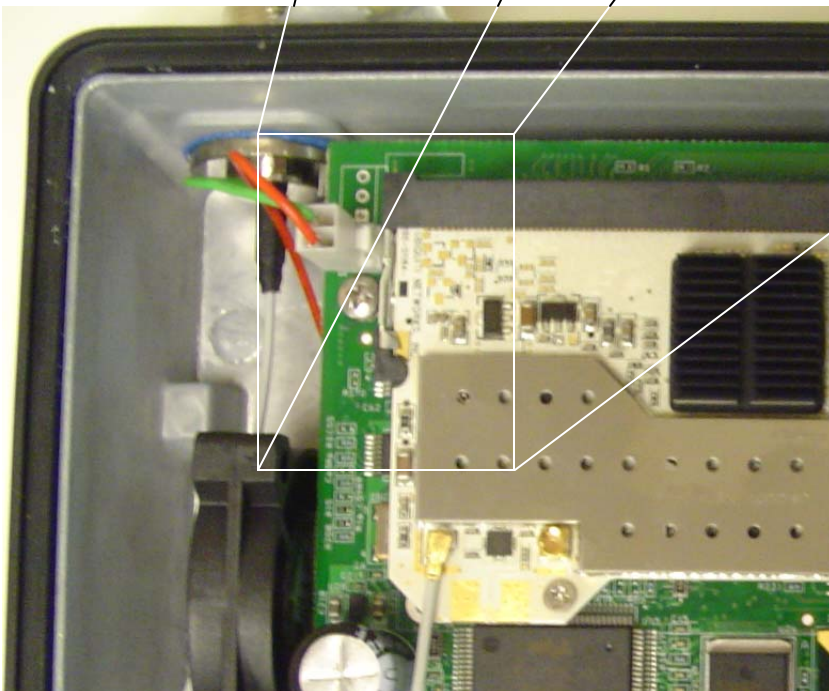
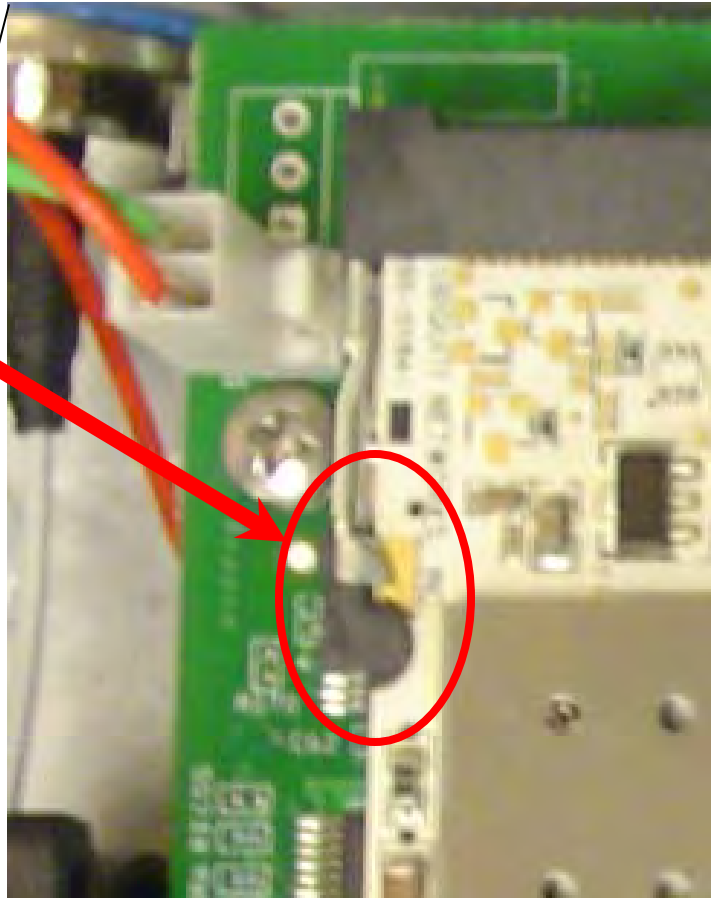
BAD

Clip is off of gold tab on radio card.
This may cause the node not to boot up.



GOOD

Clip *slightly* covers gold tab on radio card. The clips should snap into place if cards are inserted into slot and pushed down towards motherboard properly



Step 6) Bring the motherboard back to its original position and screw back into place.

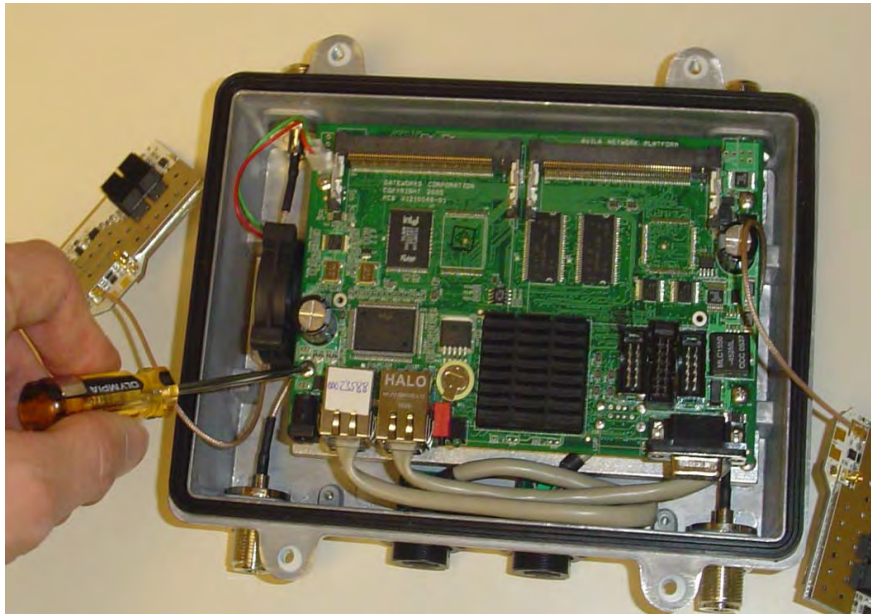


Fig.11

Step 7) Reconnect the fan connector (Fig.12). This should snap into place.



Fig.12

Step 8) Replace the uplink and downlink radio cards. ***This should be done in the same manner the cards are removed from the slots. Insert the card firmly into the slot at an angle to the motherboard (Fig.13), then push the card towards the motherboard allowing the clips to “grab” the card.

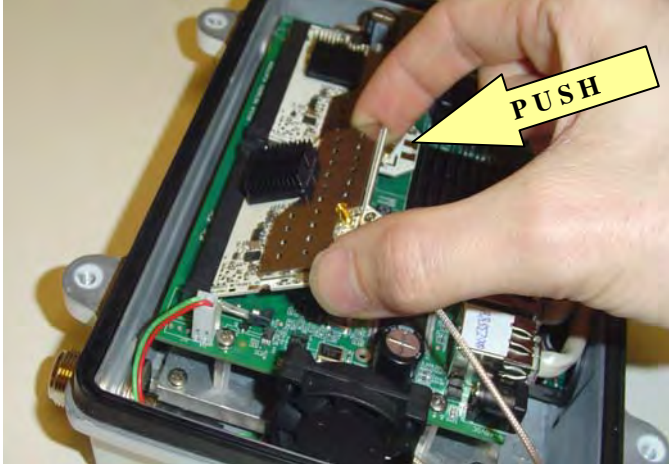


Fig.13

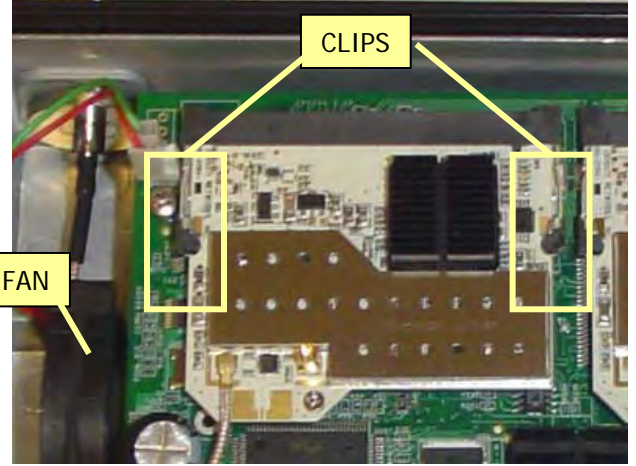


Fig.14

Step 9) Replace the lid of the mesh node. Be sure the grooves of the lid fit appropriately into the “H-shaped” cross-sectioned gasket (Fig...) before tightening the lid bolts

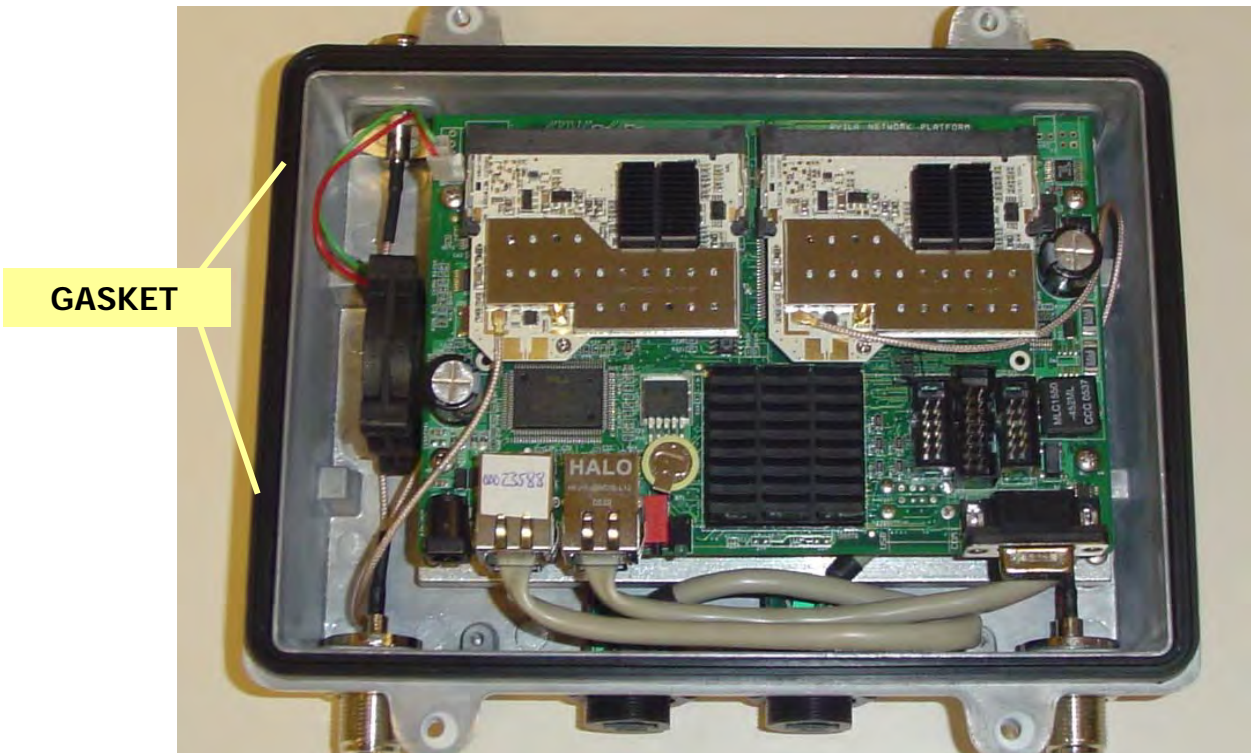
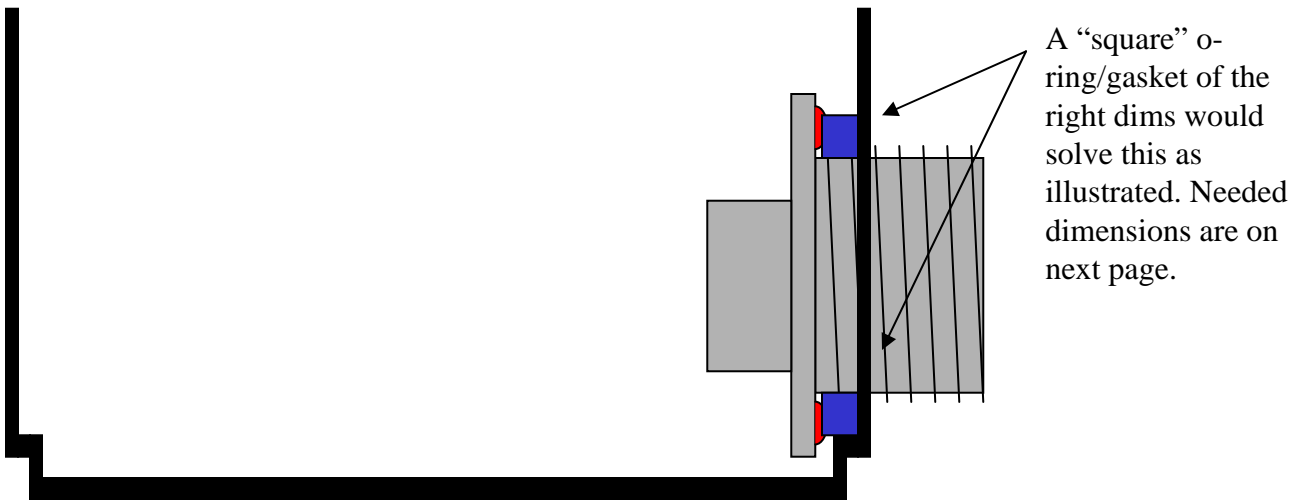
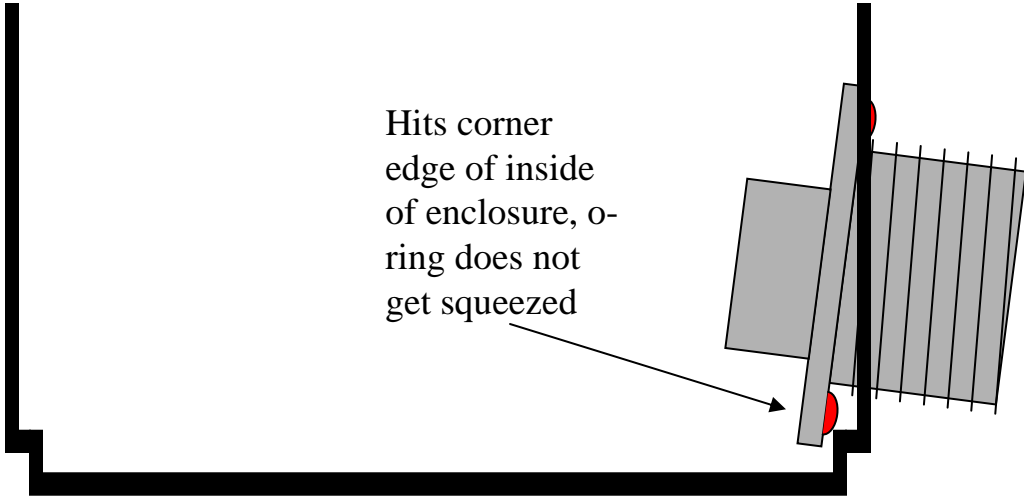
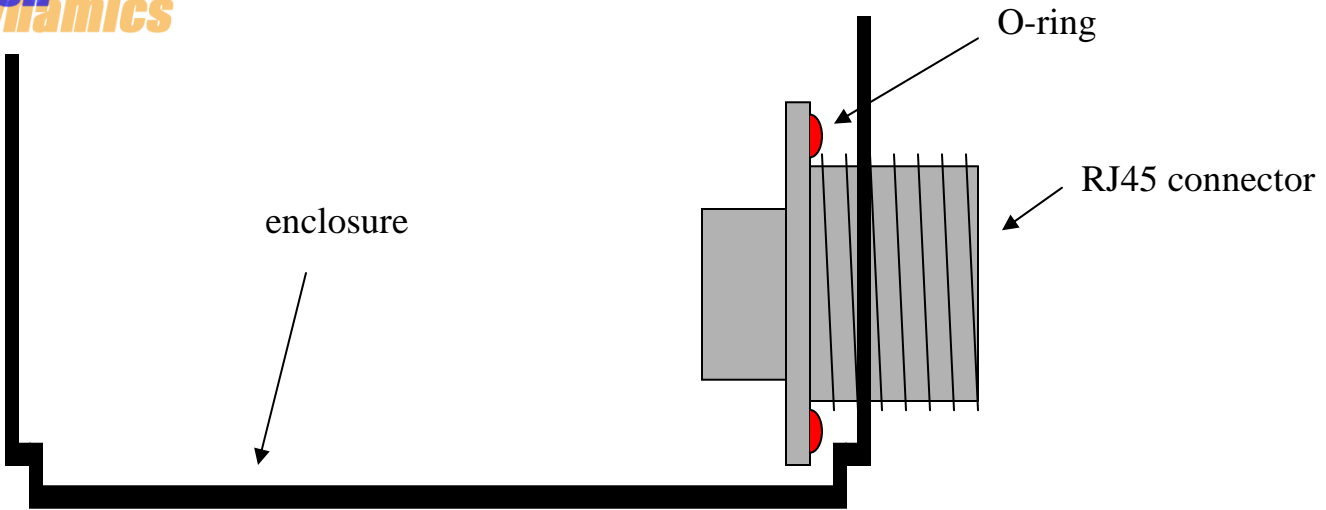
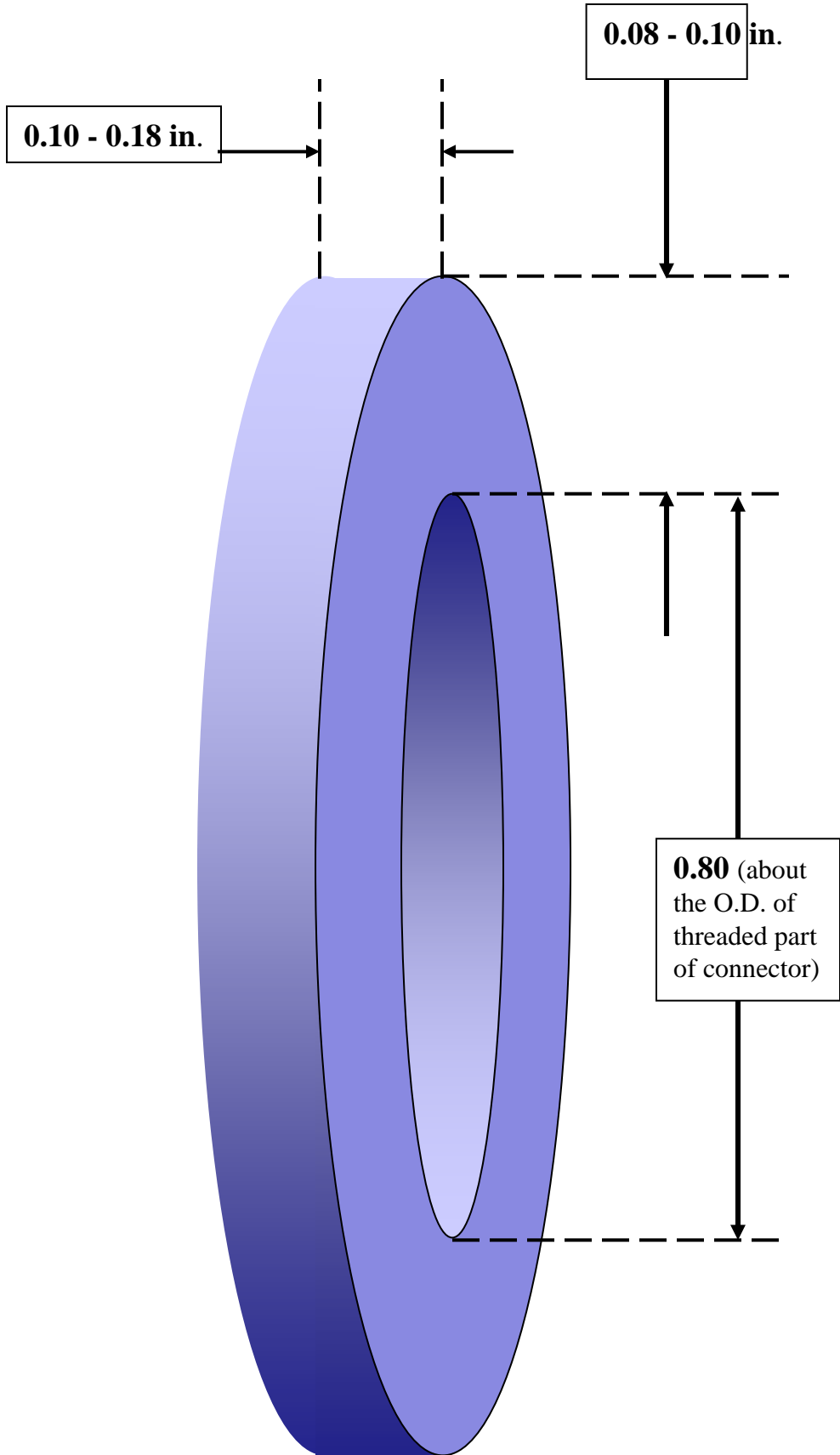


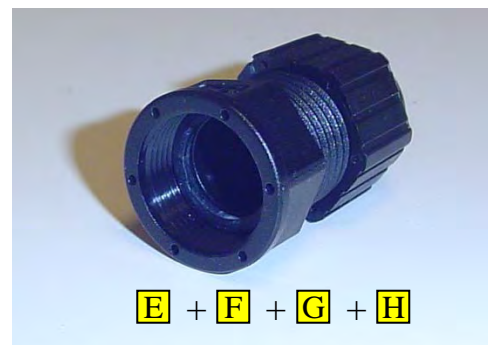
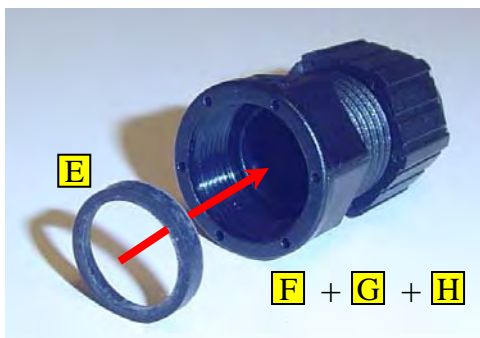
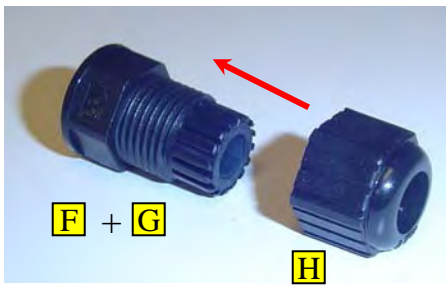
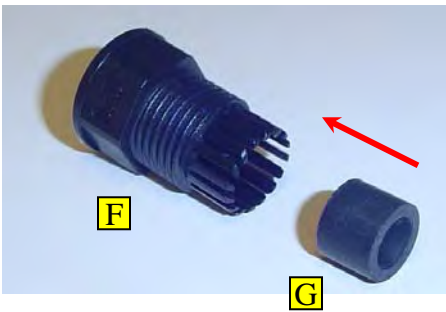
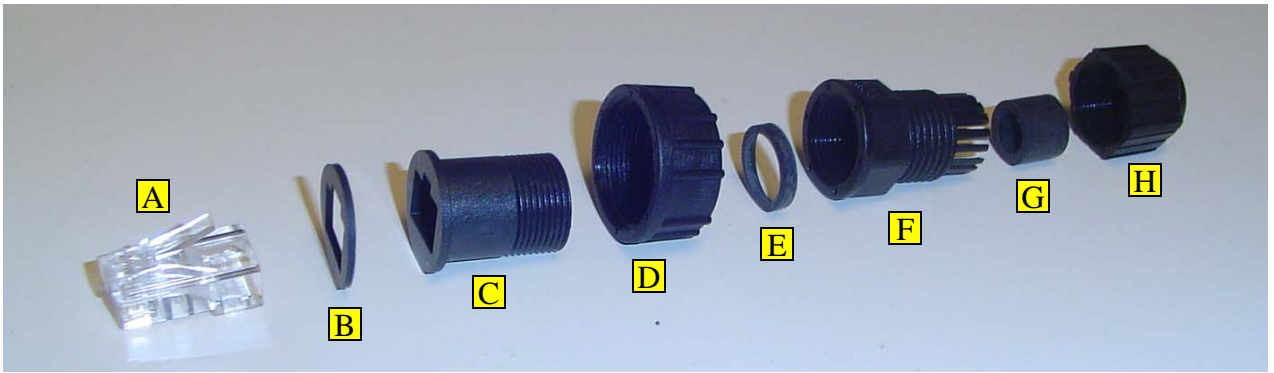
Fig.15

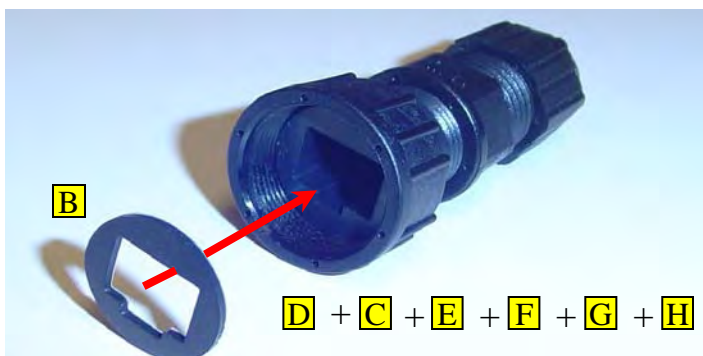
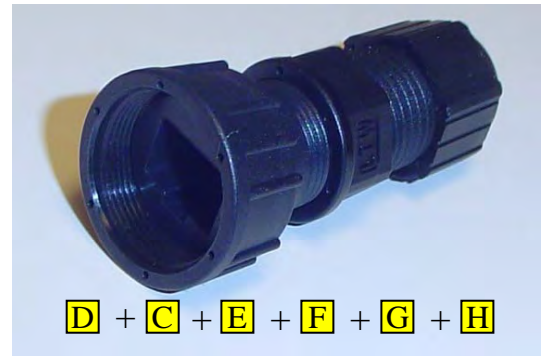
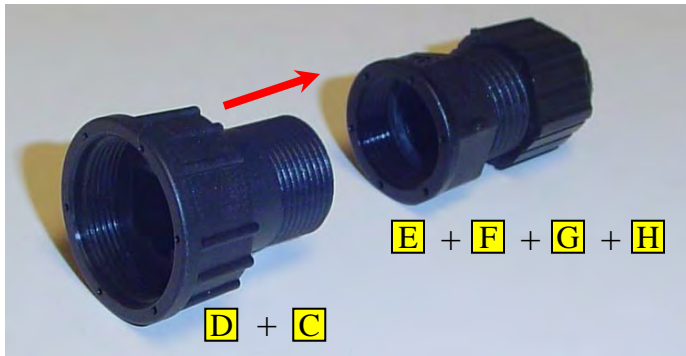
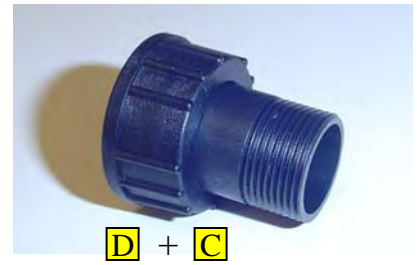
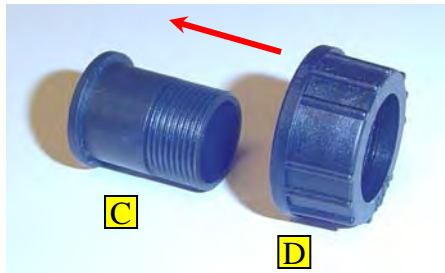
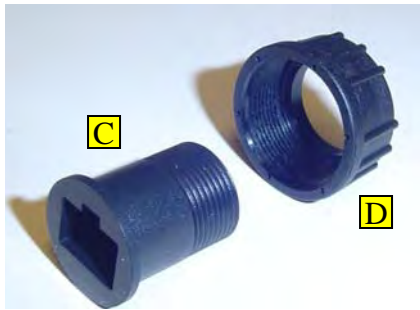
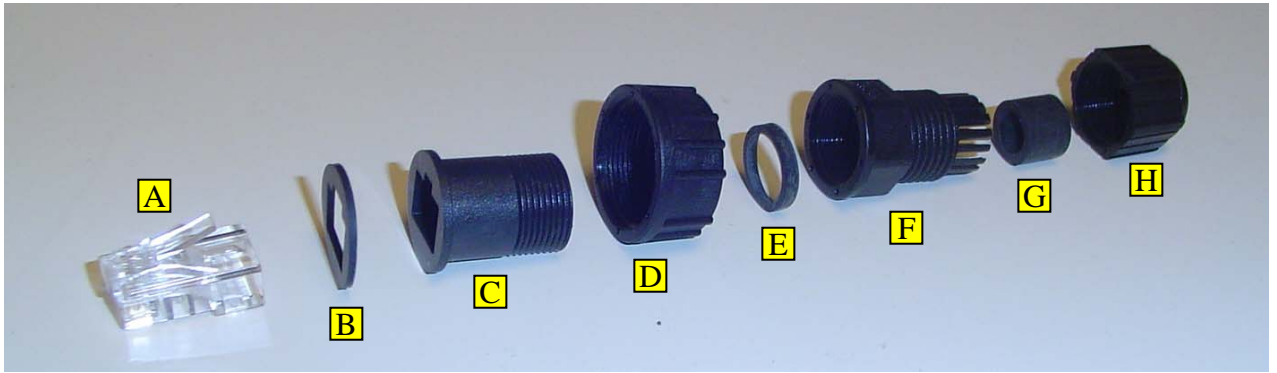
For
MESH DYNAMICS
SYSTEM INTEGRATORS

WEATHER BOOT INSTALL









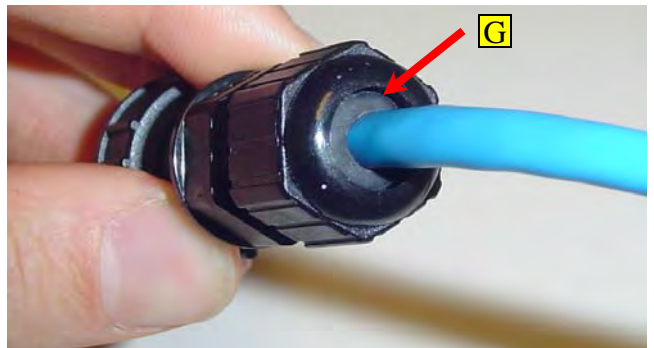
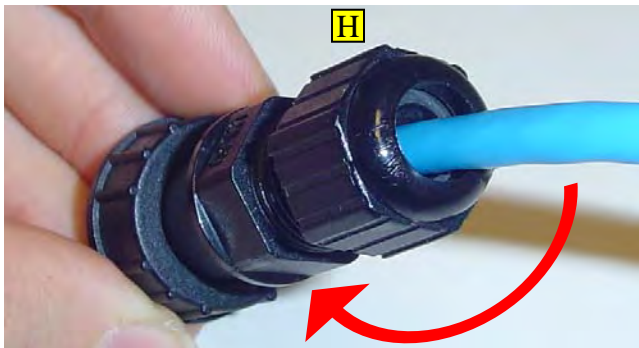
Boot assembly must be slid onto CAT5 cable before RJ45 connector is crimped on.



After RJ45 connector is crimped, slide boot assembly over the connector such that the connector clip is tucked *into* boot assembly



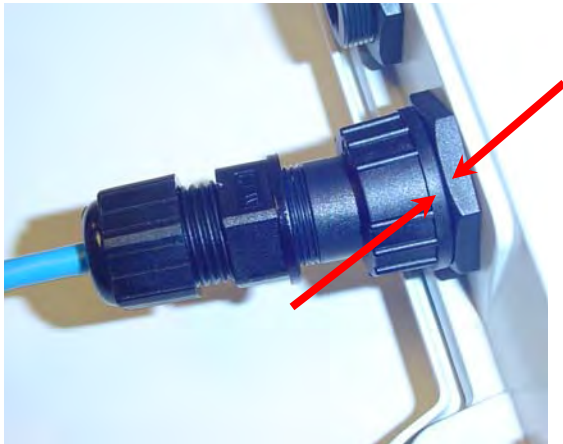
After boot assembly is in place over RJ45 connector, twist part "H" until rubber gasket (part "G") is compressed against CAT5 cable.





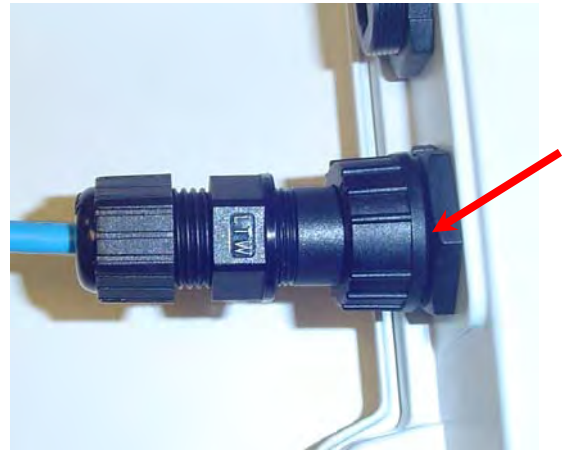
The *threads* on the RJ45 port on the mesh node are relatively close together. Make sure the boot assembly is screwed on completely straight with no cross-threading. If connected correctly, there should be **no** gap between the boot and the connector on the mesh node.

GOOD



NO GAP BETWEEN BOOT AND CONNECTOR ON MESH NODE. CONNECTION IS WATERTIGHT.

BAD



CONNECTOR IS CROSS-THREADED AND ATTACHED AT A SLANT. WATERTIGHT CONNECTION IS NOT ESTABLISHED.

For
MESH DYNAMICS
SYSTEM INTEGRATORS

PROPER GASKET SEATING

2.0 Gasket installation

a) Carefully clean the seal channels on the die-cast enclosure.

b) Make sure that the silicone rubber gasket is clean as well.

WARNING: Do not use oil or any type of solvents to clean the gasket area. Such actions might damage the integrity of the seal.

c) Place the silicone rubber gasket into the base gasket channels. The gasket forms a perfect seal only if installed like in Fig 1.1. Please note that if gasket is installed upside down, the seal will not be perfect!!!!

d) Gently place enclosure lid over gasket. Make sure the lid is aligned over base before securing it with screws.

e) Using 4 hex screws, secure the top lid to the base. Follow an X pattern when tightening the screws. (bottom-left, top-right, bottom-right and top-left). When all screws are secure and can no longer be tightened, turn back $\frac{1}{2}$ turns on each screw.



Fig 1.1 WRAP box section and gasket cross-section

2.0 Testing the seal.

If gasket is not properly installed, the seal might not be perfect. Positive and Negative pressure meters can be used to test the box seal.