

Unit Configuration

There are five main steps to the configuration process for each LibraPlus unit; configuration of the wireless interface, configuration of the Ethernet interface, configuration of the bridge, assignment of the interfaces to the bridge and saving the configuration. Once this is completed perform a simple ping test between each station (CPE) and Access Point (AP).

Show Interfaces

Use the **show interfaces** command to see the configurations of all the interfaces on the LibraPlus. This command is useful for troubleshooting during the configuration process.

When the unit is first turned on the configuration should appear as shown in the example below. Initially, the wireless interface is down, and is not associated with an Access Point.

NOTE:

For clarity, the CLI examples in this guide are shown with the user entered commands in bold text and nested commands have been indented.

```
EION: show interfaces
Wireless 0 is down, link state is down
  Hardware address: 0015.6d54.9d3c VLAN: none
  Internet address: 0.0.0.0 mask 0.0.0.0
                    broadcast: 0.0.0.0, MTU: 1500
  Type: station, SSID: "", Mode: 802.11a (auto)
  Speed: 0 Mb/s (auto), Access point: Not associated
  Channel: 0, Frequency: 0 MHz, Tx-power: 60 dBm
  RTS: off, Distance: 52200, WDS: off, FastFrame: off
  Burst: on, Compression: off, WMM: on, Beacon: 0, DFS: on
  Antenna: auto, ATPC: off
FastEthernet 0 is up, link state is up
  Hardware address: 0001.0000.116b VLAN: none
  Internet address: 192.168.0.5 mask 255.255.255.0
                    broadcast: 192.168.0.255, MTU: 1500
FastEthernet 1 is up, link state is down
  Hardware address: 0001.0000.116b VLAN: none
  Internet address: 0.0.0.0 mask 0.0.0.0
                    broadcast: 0.0.0.0, MTU: 1500
```

Configure Wireless Interface (Step 1)

Use the command **'interface Wireless 0'** to access the wireless interface configuration and configure the unit as shown in the following example. The center frequency (channel) is set in units of MHz. The distance is set in units of meters and must be a multiple of 300. Assign the distance on the AP unit the value of the farthest CPE. The distance on each CPE should be equal to or greater than the distance from the AP. Start with a common configuration for the wireless interface on the CPE and AP: The user can copy the entire command bloc below and paste it at once to SSH or Serial interface of the LibraPlus.

```
interface Wireless 0
  ssid Eion
  mode a
  speed auto
```

```
channel 5805
tx-power 26
no rts
distance 3000
wds-mode
fast-frame
no burst
no wmm
no dfs
polling
no shutdown
exit
```

Second, for the AP, in addition to the above wireless interface configuration we need to add more parameters. Continue the Access Point configuration as shown below:

```
interface Wireless 0
shutdown
beacon 100
polling-max-station 2
no shutdown
exit
```

At this point wireless interfaces on the AP and CPEs are configured.

Configure Ethernet Interface (Step 2)

An IP address must be assigned to each FastEthernet 0 of the LibraPlus unit in the network. You will require the IP address assigned by your system network administrator to your LibraPlus unit for this procedure.

```
interface FastEthernet 0
ip address 192.168.0.5 mask 255.255.255.0
exit
```

FastEthernet 1 must be turned off and here is the procedure:

```
interface FastEthernet 1 shutdown
```

Configure Bridge Settings (Step 3)

If the bridge does not exist, the command `'interface bridge 0'` will create it.

```
EION: interface bridge 0
Bridge 0 has been created.
```

Once the bridge is created, enter the command `'interface bridge 0'` again to access the bridge configuration. The bridge **must** be configured with the same IP address and Subnet Mask as the Ethernet interface, otherwise the connection to the radio through the Ethernet port will be lost. When this is done, enable the bridge interface and exit the bridge configuration.

```
interface bridge 0
ip address 192.168.0.5/24
no shutdown
exit
```

Assign Interfaces (Step 4)

When the interfaces and bridge have been configured, the interfaces must be associated with the bridge.

```
interface Wireless 0
bridge-group 0
exit

interface FastEthernet 0
bridge-group 0
exit
```

When the LibraPlus is configured, and the interfaces are associated with the bridge, the **'show interfaces'** command should appear similar to the example below. Assuming you have properly configured your Access Point (Base Station) the Station (CPE) will show it is **Associated** with the wireless MAC address of the Access Point.

```
EION: show interfaces
Bridge 0 is up
  Hardware address: 0003.47df.32a9
  Internet address: 192.168.0.5 mask 255.255.255.0
                    broadcast: 192.168.0.255, MTU: 1500
Wireless 0 is up
  Hardware address: 0015.6d63.0606
  Internet address: 0.0.0.0 mask 0.0.0.0
                    broadcast: 0.0.0.0, MTU: 1500
  Type: station, SSID: "Eion", Mode: 802.11a
  Speed: 54 Mb/s, Access point: Associated
  Channel: 161, Frequency: 5805 MHz, Tx-power: 26 dBm
  RTS: off, Distance: 3000, WDS: on, FastFrame: off
  Burst: off, Compression: off, WMM: off, Beacon: 0
  Antenna: auto, IEEE 802.11g Protection: off
FastEthernet 0 is up, link state is up
  Hardware address: 0001.0000.116b VLAN: none
  Internet address: 192.168.0.5 mask 255.255.255.0
                    broadcast: 192.168.0.255, MTU: 1500
FastEthernet 1 is down, link state is down
  Hardware address: 0001.0000.116b VLAN: none
  Internet address: 0.0.0.0 mask 0.0.0.0
                    broadcast: 0.0.0.0, MTU: 1500
```

In addition to show interfaces **'show running-config'** will provide the admin user with more parameters related to the radio setup especially on the AP side as in the example below:

```
EION: show running-config
interface Bridge 0
interface Bridge 0
  ip
  address 192.168.0.2 255.255.255.0
  no shutdown
!
interface Wireless 0
  polling
  polling-rxtimeslot 40
  polling-txtimeslot 40
  polling-max-station 2
  polling-scheduler linear
  polling-skipslope 2
  ssid eion
  bridge-group 0
  type ap
  wds-mode
  no dfs
  distance 3000
  mode a
```

```

speed 54
tx-power 26
no shutdown
channel 5805
!
interface FastEthernet 0
bridge-group 0
no shutdown
!
interface FastEthernet 1
shutdown
!

```

Save Configuration (Step 5)

Save a copy of the running configuration to the startup configuration file.

```

EION: copy running-config startup-config
Running-config has been copied.
EION: reboot

```

Reset the Radio to Factory Default

Save a copy of the default configuration to the startup configuration file and reboot the LibraPlus.

```

EION: copy default-config startup-config
Default-config has been copied.
EION: reboot

```

Antenna Alignment - Beeper

The LibraPlus has an audible tone (beeper) and an integrated signal strength indicator (watch) to aid in antenna alignment.

The procedure for using the audible tone is the same for the AP and CPE. Use the 'beeper' command to activate the audible tone. The LibraPlus unit will produce a series of beeps when it detects a signal. As the signal strength increases, the frequency of the beeping will increase. Use the '**beeper**' command as shown below to activate the audible tone for a chosen interface.

```

EION: interface Wireless 0 beeper
Beeper is turned on.

```

Use the *no-form* of the '**beeper**' command to deactivate the audible tone:

```

EION: interface Wireless 0 no beeper
Beeper is turned off

```

Antenna Alignment – Watch

The watch command shows the signal strength and noise levels for radios in the same bridge group. The advantage of using the '**watch**' command is that it gives real time signal variation while adjusting your antenna.

AP antenna alignment using the 'watch' command:

```

EION: show interface Wireless 0 associated watch
Client MAC      Id      Speed RSSI  Signal Inactive TX      RX      Caps  Flags

```

```
0015.6d63.4df8 1 54 60 -35 120 2 56576 Ecs F
0015.6d63.641a 2 54 59 -36 120 2 37456 Ecs F
```

CPE antenna alignment using the 'watch' command:

```
EION: show interface Wireless 0 signal watch
Link Quality=54/94 Signal level=-41 dBm Noise level=-95 dBm
```

In both AP and CPE you need press the return key to exit the watch mode.

Association test

To see all CPEs associated with an AP, use the '**show interface Wireless 0 associated**' command. The MAC address for every wireless interface associated with the AP will be displayed along with the signal characteristics:

```
EION: show interface Wireless 0 associated
Client MAC Id Speed RSSI Signal Inactive TX RX Caps Flags
0015.6d63.4df8 1 54 60 -35 120 2 56576 Ecs F
0015.6d63.641a 2 54 59 -36 120 2 37456 Ecs F
```

Ping test

Once your CPEs are associated a ping test should be performed to confirm the compatibility of the chosen modulation. If you are not sure, set the speed on the wireless interface to '**auto**' and the modulation will be determined automatically.

```
EION: utilities ping <IP address of remote radio>
PING 192.168.0.1 (192.168.0.1): 56 data bytes
64 bytes from 192.168.0.1: icmp_seq=0 ttl=64 time=11.8 ms
64 bytes from 192.168.0.1: icmp_seq=1 ttl=64 time=0.9 ms
64 bytes from 192.168.0.1: icmp_seq=2 ttl=64 time=0.9 ms
64 bytes from 192.168.0.1: icmp_seq=3 ttl=64 time=0.9 ms
64 bytes from 192.168.0.1: icmp_seq=4 ttl=64 time=0.9 ms
64 bytes from 192.168.0.1: icmp_seq=5 ttl=64 time=0.9 ms
64 bytes from 192.168.0.1: icmp_seq=6 ttl=64 time=0.9 ms
64 bytes from 192.168.0.1: icmp_seq=7 ttl=64 time=0.9 ms
64 bytes from 192.168.0.1: icmp_seq=8 ttl=64 time=0.8 ms
```

In both AP and CPE you need press the return key to exit the ping.

Signal Characteristics

On the CPE side type '**show interface Wireless 0 signal**' in order to obtain the link quality as well as the SNR as shown in the example below:

```
EION: show interface Wireless 0 signal
Link Quality=62/94 Signal level=-33 dBm Noise level=-95 dBm
```

Password Reset

To change or reset the system password the system '**password**' command is used. It requires specifying both old and new passwords.

```
EION: system password old-password new-password
Password changed.
```

Display the available channels (frequencies)

The available channels can be displayed using the following command:

```
show interface Wireless 0 channel-list
```

Switching from 20 MHz to 40 MHz channel size

In order to operate in a 40 MHz channel size to reach high throughput of 45 mbps two changes need to be completed:

1. Choose one of the available **static** channels or ‘frequencies’ on both sides of the radio link.
2. Set the wireless interface mode to ‘**sturboa**’ on both sides of the radio link.

On both AP and the CPE side:

```
interface wireless 0 channel 5800  
interface wireless 0 mode Sturboa
```

Switching from 40 MHz to 20 MHz channel size

In order to return to the normal mode operating at 20 MHz channel size two changes need to be completed:

1. Choose one of the non-static available frequencies from the channel list.
2. Set the wireless interface mode to ‘**a**’ that represents 802.11a on both sides of the radio link.

On both AP and the CPE side:

```
interface wireless 0 channel 5805  
interface wireless 0 mode a
```

Note: Please note that after any changes you need to save your configuration. Refer to save configuration step 5.