



MP01 Administrator Manual

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Contact ATCOM

The Introduction of ATCOM

Founded in 1998, ATCOM technology has been always endeavoring in the R&D and manufacturing of the internet communication terminals. The product line of ATCOM includes IP Phone, USB Phone, IP PBX, VoIP gateway, Asterisk Card and WiFi Mesh ATA.

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MP01 Administrator Manual

This document describes detailed information for the MP01, and it will guide you through the installation for setting up telephony system and providing Internet access with MP01.

1. Introduction

The MP01 is a WiFi mesh VoIP ATA (analog terminal adapter) operating in the license-exempt 2.4GHz ISM band. The MP01 is the first WiFi mesh ATA in the market, using a wireless mesh network as backhaul to interconnect phones and host LAN/WAN access to computers connected to its Ethernet port. MP01 WiFi mesh ATA helps you to build the wireless VoIP communication system with open hardware design and open source firmware. It provides affordable voice and data services for people.

1.1 Mesh networking

Mesh networking is a type of networking wherein each node in the network may act as an independent router, regardless of whether it is connected to another network or not. It allows for continuous connections and reconfiguration around broken or blocked paths by “hopping” from node to node until the destination is reached. A mesh network whose nodes are all connected to each other is a fully connected network. Mesh networks differ from other networks. Mesh networks can be seen as one type of ad hoc network.

Mesh networks are self-healing: the network can still operate when one node breaks down or a connection goes bad. As a result, the network may typically be very reliable, as there is often more than one path between a source and a destination in the network.

1.2 The client-MP01

MP01 is an 802.11b/g mesh router with a single FXS port and one 10/100Mbit Ethernet port. The Mesh Potato hardware and software is open. The power, Ethernet and FXS ports are robust in order to deal with developing-world conditions like static electricity, lightning, bad power and accidental abuse. It comes in a weatherproof box for outdoor mounting and costs about the same as any other Wi-Fi router.

An analogue phone connects to the MP01 via the FXS port. FXS (Foreign eXchange Station) is a telephone interface that supplies power, dial tone and generates ringing voltage. The mesh network can be augmented via backbone links and connected to the rest of the world using VoIP trunks.

1.3 Server

Only one computer is required to provide the services for the Telco system. This computer, called the VT Server, could be anything from a standard laptop to a high-end server for better redundancy. The services on this computer are made up of several elements including Afrimesh, A2Billing and A3Glue. The server part consists of several software elements.

Afrimesh

Afrimesh provides a simple management dashboard helping network operators create and sustain resilient communications networks with a minimum of fuss.

Featuring

- Powerful mesh network routing with B.A.T.M.A.N.
- Dynamic GIS visualization of your mesh on OpenStreetMap maps.
- Plan your network using the terrain elevation map.
- Visualize live health&traffic information for any mesh node.
- Keep inventory of your network devices.
- Monitor the health&usage of your Internet gateway.
- Monitor live network accounting information from pmacct.
- View network status & log messages in realtime.
- Customer management interface featuring FreeRADIUS support.
- Customer authentication featuring coova-chilli support.
- Online help and live chat support.
- Intelligent configuration assistance.
- Build and manage mesh networks even without an Internet connection.

A2Billing

A2Billing combined with Asterisk is a full featured telecom platform and softswitch providing converged services, with self contained billing (pre or post-paid), reporting and statistics for IP and TDM based voice networks and can be configured to supply a wide range of services, rate calls, prepare and send out invoices, as well as accept payments via a number of payment service providers.

The A2Billing solution comprises of the following components:

- Server: The computer to run the system.
- Line Interface Cards: The ATCOM telephony cards hardware (optional) to connect to the TDM network (PRI, BRI, Analogue)
- Linux: The base operating system
- Asterisk: The telephony engine
- Apache: The web server
- MySQL/Postgresql: The back end database
- A2Billing: The Billing engine handling Authentication, Authorization and

Accounting.

A3Glue

This is the glue, making Afrimesh, A2billing and the Mesh network work together. It gathers data from the network, provisioning the MP01 and make sure everything runs smoothly.

2. Scenarios and Installation Guide

2.1 Scenarios

Stand-alone installation

MP01s can be deployed from two units and you can make calls between them. You can then add more units to the network one at a time. You will be able to make calls and can have a closed network between the units. For the installation guide, please refer to [ATCOM MP01 Quick Start Guide V1.0.pdf](#).

Telephony installation

Deploy the MP01 for telephony and add a SIP Provider or PSTN connection to the A2Billing server. This will allow for free calls between the units and cheaper international calls.

Internet Installations

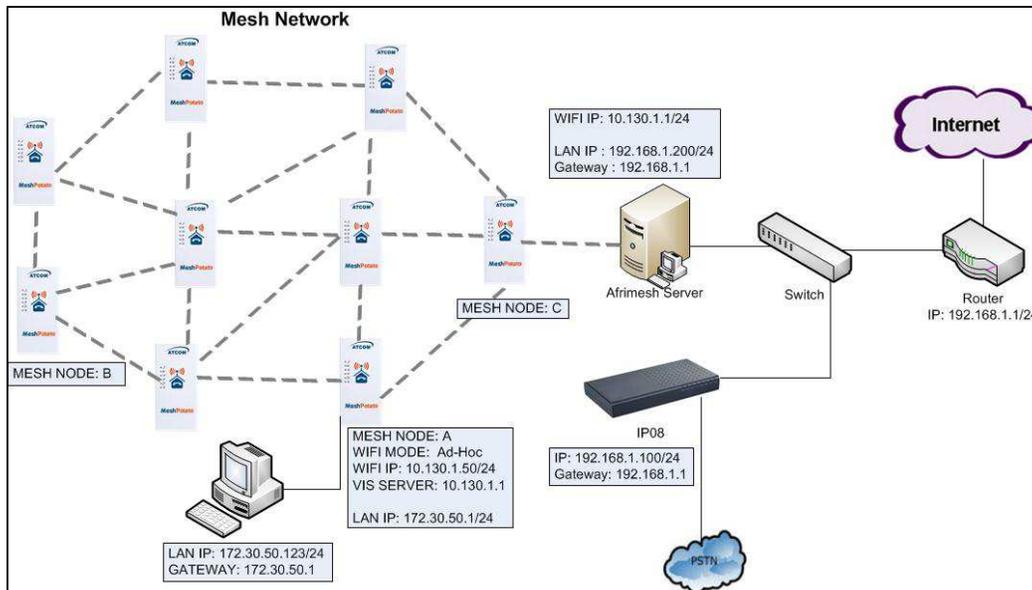
Using the MP01s to provide Internet connection. The Internet traffic goes out through a common gateway. The community needs to pay for an Internet connection through an Internet Service Provider and share the costs between its members.

Combined Internet and Telephony installation

Deploy MP01s and use it both for Internet and telephony. You connect an Internet gateway for shared broadband for the users and telephony connection to call international.

2.2 Installation Guide

The network topology is shown as below. We are going to deploy a system like this.



In this network topology, all the MP01 is an extension and act as mesh node also. And VT Server is installed Afrimesh and act as a visualization server. We use IP08 as Asterisk server, and all the MP01 are registered to IP08.

The feature of this system is:

- Every MP01 has a WiFi IP and a phone number, the phone number is the same as the last digit of the WiFi IP, for example, the Mesh node A has a WiFi IP 10.130.1.50 and a phone number 50.
- Every MP01 can be a reply for other MP01. It means even MP01 B can't reach MP01 C directly, it can be still possible to reach MP01 C via MP01 A.
- MP01 can not only make internal calls, but international calls through IP08.
- It is very convenient to manage the mesh network on the VT Server.
- Any computer on the network should be able to talk to any other computer on the network. For example a computer connected to mesh node A should be able to download content from a web server connected to mesh node C.
- Computers connected to the MP01 by Ethernet port can access the Internet.

The following steps will show you the configurations.

2.2.1 Afrimesh Server Setup

This installation assumes that you have installed Ubuntu 10.04 LTS on your server and have since updated and upgraded your packages. It also assumes you have a wireless driver that works in ad-hoc mode. And all the MP01s are running version rv233.

This has been testing on the computer with the following hardware:

CPU: Pentium Dual-Core E5200 2.5GHz

Memory: 2GB

HDD: 40GB

Wireless Adapter: DrayTek Vigor N61 802.11n

1) Add the Afrimesh repository

```
sudo apt-add-repository ppa:afrimesh/ppa  
sudo apt-get update
```

2) Install supporting packages

```
sudo apt-get install batmand polipo villagetelco-dashboard
```

3) Install the batman visualisation server

```
wget http://download.villagetelco.org/vte/afrimesh/954/vis-i386-lucid  
sudo mv vis-i386-lucid /usr/local/sbin/
```

4) Configure pmacct

Edit /etc/pmacctd/pmacctd.conf to reflect the following:

```
!aggregate: src_host,dst_host  
aggregate: dst_host,dst_mac  
!pcap_filter: net 127.0.0.0/8  
pcap_filter: net 10.130.1.0/24  
interface: wlan0 # eth0 on VM
```

Restart pmacct

```
service pmacct restart
```

5) Configure snmpd

Edit /etc/default/snmpd to reflect the following:

```
SNMPDOPTS='-Lsd -Lf /dev/null -u snmp -g snmp -I -smux -p  
/var/run/snmpd.pid'  
/etc/snmp/snmpd.conf  
#com2sec paranoid default public  
com2sec readonly default public
```

Restart snmpd

```
sudo /etc/init.d/snmpd restart
```

Test with:

```
snmpwalk -v 2c -c public 10.130.1.1 .1.3.6.1.2.1.2.2.1.2
```

6) Configure rsyslogd Edit /etc/default/rsyslog to reflect the following:

```
#RSYSLOGD_OPTIONS="-c4"  
RSYSLOGD_OPTIONS="-c2 -r"
```

Restart rsyslogd

```
sudo service rsyslog restart
```

2.2.2 MP01 configuration for Afrimesh

Make sure that you have configured all the MP01s to have different WIFI IP like 10.130.1.X (X stands for 2-254). For the configuration guide, please refer to [ATCOM MP01 Quick Start Guide V1.0.pdf](#).

1) Get the Afrimesh packages for the MP01 on Afrimesh Server

```
wget  
http://download.villagetelco.org/vte/afrimesh/954/netcat_0.7.1-1_mips.ipk  
wget  
http://download.villagetelco.org/vte/afrimesh/954/villagetelco-device_1.0pre-  
r954-1_mips.ipk
```

If you haven't already set the password on the MP01, do that now by telneting to 192.168.1.20 and issuing the 'passwd' command. This will enable ssh and you will be able to continue with the following.

2) Copy the packages to the MP01.

```
scp *ipk root@192.168.1.20:/root
```

3) Login into the MP01

```
ssh root@192.168.1.20
```

4) Install and configure the packages on MP01 (Answer 'Y' when asked to replace /etc/config/afrimesh)

```
opkg install netcat_0.7.1-1_mips.ipk
opkg install villagetelco-device_1.0pre-r954-1_mips.ipk
/etc/init.d/provision enable
chmod -R a+rw /etc/config
uci set batmand.general.routing_class=1
uci set afrimesh.settings.root=10.130.1.1
uci set batmand.general.visualisation_srv=10.130.1.1
uci set system.@system[0].log_ip=10.130.1.1
uci commit
reboot
```

5) Configure DNS for MP01

Edit /etc/resolv.conf to reflect the following:

```
nameserver 141.1.1.1
```

2.2.3 Start up the Afrimesh Dashboard

You may be able to make this all work with the Network Manager but I ran into problems and disabled it. So, first kill the network-manager and stop any versions of batmand that might be running. You may wish to paste the below into a script for convenience. The commands should be run as root.

stop network-manager

```
killall NetworkManager
killall batmand
```

Then start your wireless interface. Replace wlan0 if necessary with whatever your wireless device.

```
ifconfig wlan0 down
iwconfig wlan0 mode ad-hoc
ifconfig wlan0 up
ifconfig wlan0 10.130.1.1/24
iwconfig wlan0 essid potato
iwconfig wlan0 channel 1
iwconfig wlan0 ap 01:CA:FF:EE:BA:BE
```

Assuming your wired Ethernet port is connected, you can set up that connectivity as well. If your Ethernet port is not eth0, adjust as appropriate.

```
iptables --flush
iptables --table nat --flush
```

```
iptables --table nat --append POSTROUTING --out-interface eth0 -j MASQUERADE
```

```
iptables --append FORWARD --in-interface wlan0 -j ACCEPT
echo 1 > /proc/sys/net/ipv4/ip_forward
```

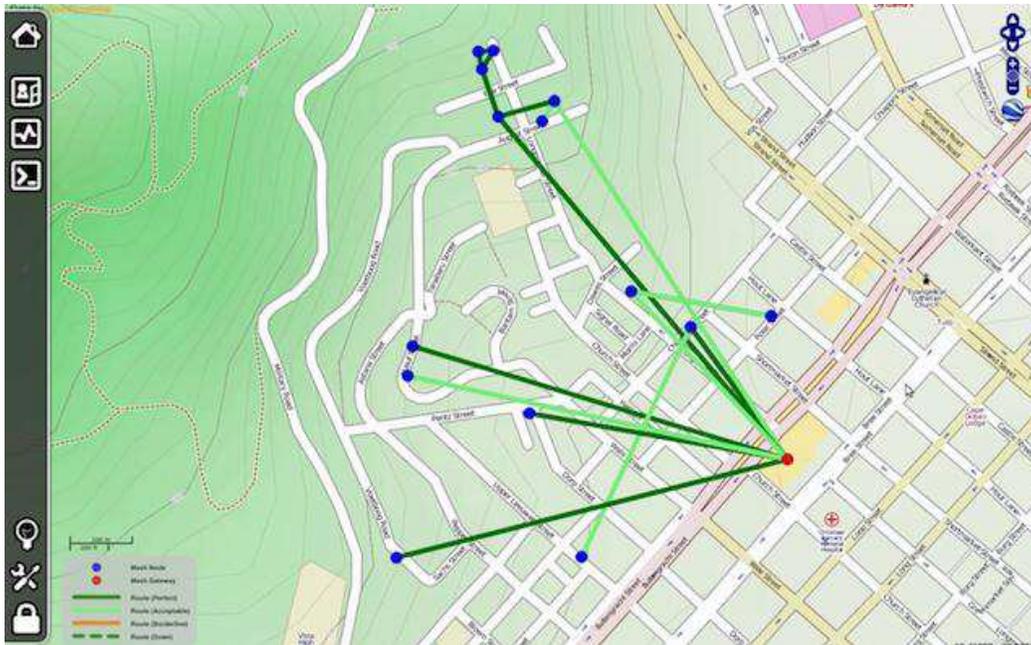
Now start the visualisation server. Initially, it is worth doing this in a separate terminal window so that you can monitor the server. Substitute your wireless device if not wlan0.

```
/usr/local/sbin/vis-i386-lucid -d1 -j wlan0
```

Finally start the batman server. Once again, substitute your wireless device if not wlan0.

```
batmand -d1 -s 10.130.1.1 -g 100mbit -a 192.168.1.0/24 wlan0
```

You're now ready to use Afrimesh. Launch Firefox and point your browser at <http://localhost/afrimesh>, you will see the Afrimesh page as below:



Note: Before plugging in any MP01s, don't forget to go to the settings page and set the longitude and latitude for your location.

Now you can plug in your MP01 and wait for the bouncing blue ball to appear and the MP01's phone to ring.

If you want to clear Afrimesh's database and start again, execute the following:

```
redis-cli flushdb
```

After finishing these, you should be able to manage the mesh network on Afrimesh Dashboard.

2.2.4 Configure the MP01 to make international calls

Before configuring the MP01, make sure that you can use IP phone which is registered to the IP08 to make international calls.

Assume that you have assigned a SIP account 6015 for MP01.

1) On MP01, edit `/etc/asterisk/sip.conf` and add some lines as below:

```
[general]
register=6015:6015@192.168.1.100
```

```
[6015]
host=192.168.1.100
secret=6015
username=6015
insecure=very
type=friend
disallow=all
allow=gsm,ulaw,alaw
dtmfmode=rfc2833
qualify=yes
canreinvite=no
nat=yes
context=default
```

- 2) On MP01, edit /etc/asterisk/extension.conf and add some lines as below:

```
[default]
exten => _9.,1,Dial(SIP/6015/${EXTEN:1})
```

- 3) Assume that the outgoing calling rules on IP08 is '88+phone number', then you can use MP01 to make international calls by dialing '988+phone number'.

2.2.5 Configure the MP01 to let the computers connected to it by Ethernet port can access the Internet

- 1) Paste the below into a script named meshclientgw.sh and save it to /bin on MP01.

```
#!/bin/sh
# This script has been tested with the ash shell from BusyBox.
# Written by Elektra

OLD_WIFIO_IP=`uci show network.wifi0.ipaddr | cut -d = -f 2`

if [ -z $OLD_WIFIO_IP ]
then
echo "You need to set a IP address for the wifi0 interface
before running this script."
exit 1
fi

/etc/init.d/batmand /etc/rc.d/S90batmand

OCTET_A=`uci show network.wifi0.ipaddr | cut -d = -f2 | cut -d . -f1`
```

```
OCTET_B=`uci show network.wifi0.ipaddr | cut -d = -f2 | cut -d . -f2`
OCTET_C=`uci show network.wifi0.ipaddr | cut -d = -f2 | cut -d . -f3`
OCTET_D=`uci show network.wifi0.ipaddr | cut -d = -f2 | cut -d . -f4`

cp /etc/config-mesh/* /etc/config/

uci set network.wifi0.ipaddr=${OCTET_A}.${OCTET_B}.${OCTET_C}.${OCTET_D}
uci set network.lan.ipaddr=172.30.${OCTET_D}.1
uci set network.lan.netmask=255.255.255.0
uci set network.lan.dns=172.30.${OCTET_D}.1
uci set network.lan.gateway=172.30.${OCTET_D}.1
uci set batmand.general.announce=172.30.${OCTET_D}.0/24
uci set batmand.general.disable_client_nat=true
uci set batmand.general.routing_class=1
uci set batmand.general.gateway_class=0
uci set
batmand.general.visualisation_srv=${OCTET_A}.${OCTET_B}.${OCTET_C}.1
uci commit
uci show

killall udhcpd
killall udhcpd

sleep 3

echo "Generating /etc/udhcpd.conf"

echo "start          172.30.${OCTET_D}.100" > /etc/udhcpd.conf
echo "end            172.30.${OCTET_D}.200" >> /etc/udhcpd.conf
echo "interface      eth0" >> /etc/udhcpd.conf
echo "max_leases     100" >> /etc/udhcpd.conf
echo "opt   dns       141.1.1.1" >> /etc/udhcpd.conf
echo "option subnet  255.255.255.0" >> /etc/udhcpd.conf
echo "opt   router   172.30.${OCTET_D}.1" >> /etc/udhcpd.conf
echo "option dns     141.1.1.1" >> /etc/udhcpd.conf
echo "option domain local" >> /etc/udhcpd.conf
echo "option lease   864000" >> /etc/udhcpd.conf

sleep 1

rm /etc/rc.d/S99udhcpd
echo "mkdir /var/run/udhcpd.leases" > /etc/init.d/udhcpd
echo "udhcpd -f /etc/udhcpd.conf &" >> /etc/init.d/udhcpd
chmod +x /etc/init.d/udhcpd
```

```

In -s /etc/init.d/udhcpd /etc/rc.d/S99udhcpd
In -s /etc/init.d/batmand /etc/rc.d/S90batmand
In -s /etc/init.d/create-batman-status-page.sh
/etc/rc.d/S99create-batman-status-page.sh
echo "meshclientgw" > /etc/app-profile

echo "Done. Rebooting now."
reboot

```

2) Make this script executable.

```
chmod +x meshclientgw.sh
```

3) Run the script.

```
/bin/meshclientgw.sh
```

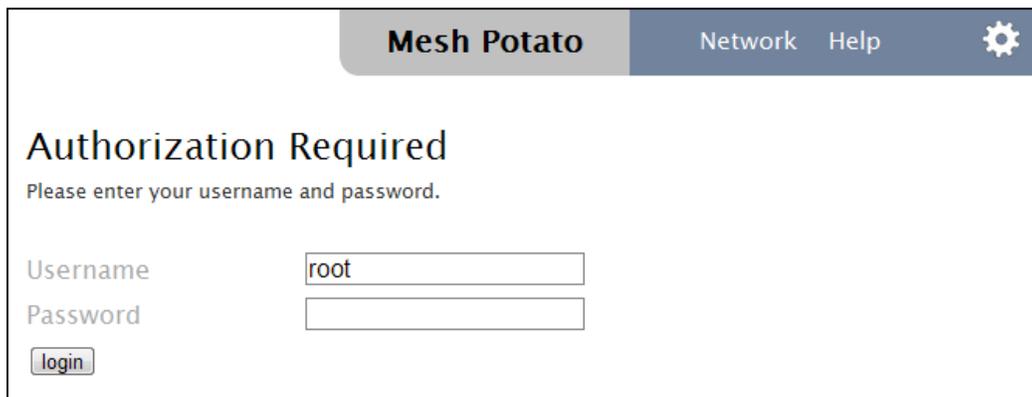
4) The MP01 will reboot after running the script. Connect your computer to MP01 through Ethernet port and set computer to DHCP. After the computer obtains a IP address from MP01, it should be able to access the Internet through MP01.

3. Configure MP01 by Web GUI

This section describes each web page of the utility and each page's key functions. You can access the utility via web browser on a computer connected to the MP01. The web-based utility has these main tabs: Overview, Status, System, Services and Network. Additional tabs will be available after you click one of the main tabs.

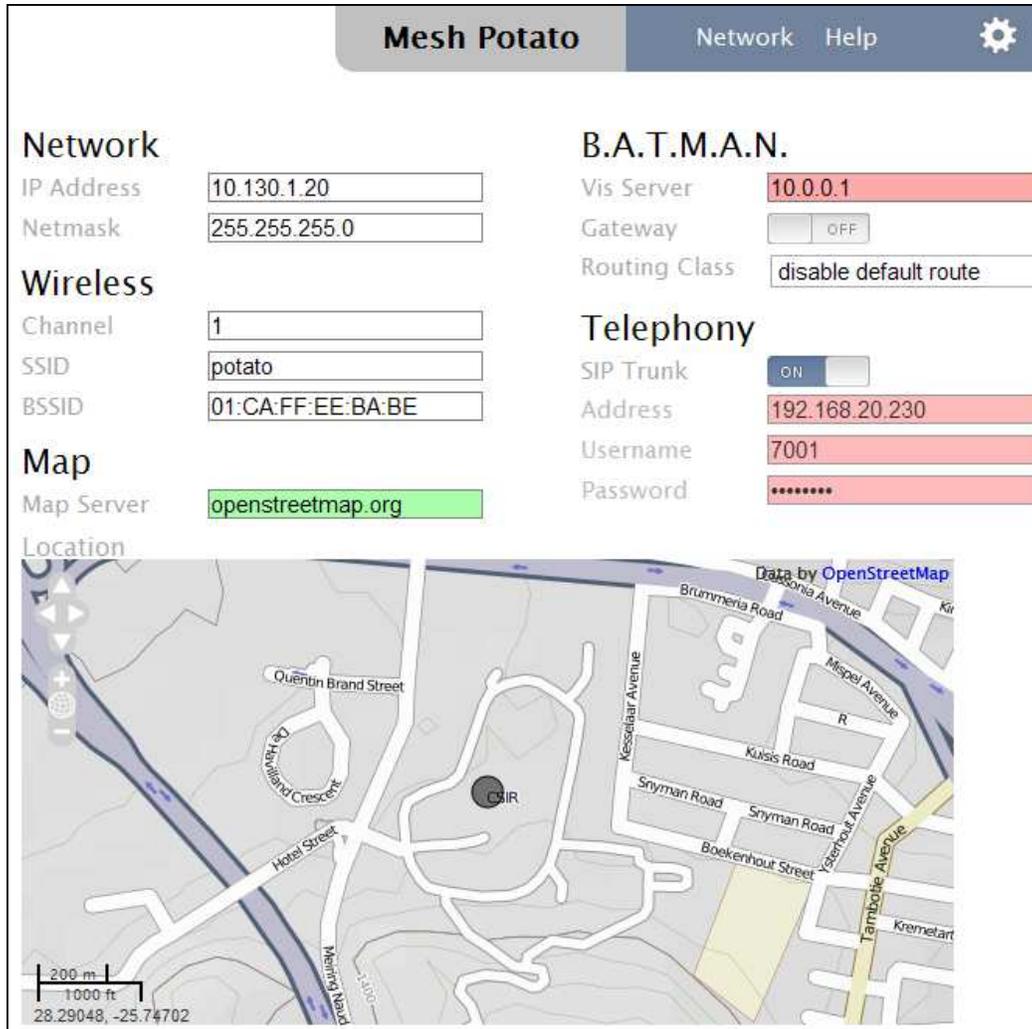
3.1 How to access the Web-Based Utility

To access the web-based utility, launch the web browser on your computer, and enter the MP01's default IP address **192.168.1.20** in the Address field. Then, press Enter. You will see a login screen as below. Leave the Password field blank. (You can set a new password from the System => Admin Password screen.) Click Login to continue.



Login screen

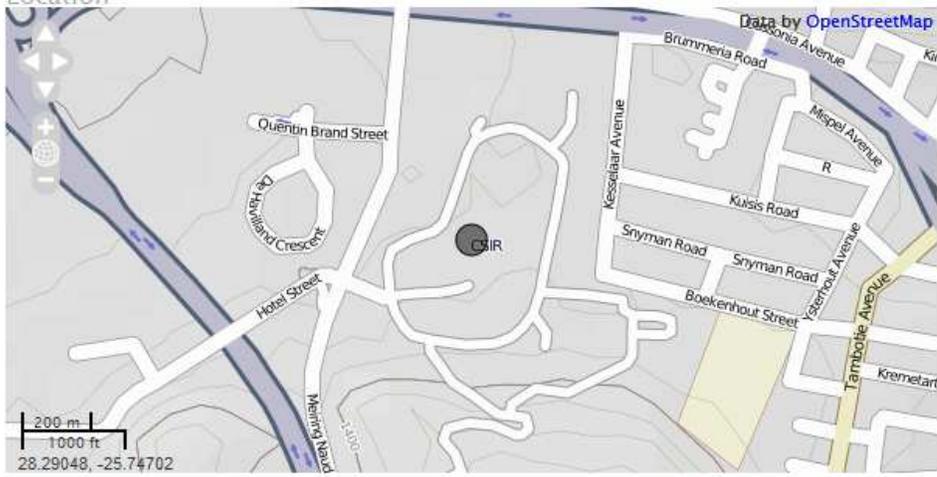
The first screen that appears is the Mesh Potato GUI (shown as below). You can preview the MP01 settings and set up the WiFi network, wireless, B.A.T.M.A.N., and telephony settings here. You should notice that version r238 doesn't have Mesh Potato GUI, so it will appear LUCI interface directly.



Mesh Potato Network Help 

Network
 IP Address: 10.130.1.20
 Netmask: 255.255.255.0

Wireless
 Channel: 1
 SSID: potato
 BSSID: 01:CA:FF:EE:BA:BE

Map
 Map Server: openstreetmap.org
 Location: 

B.A.T.M.A.N.
 Vis Server: 10.0.0.1
 Gateway: OFF
 Routing Class: disable default route

Telephony
 SIP Trunk: ON
 Address: 192.168.20.230
 Username: 7001
 Password: *****

Mesh Potato GUI

NOTE: If you forget the MP01 IP address you have set up, you can use fallback IP: 172.31.255.254/30. You should set up the IP Address of your PC as: 172.31.255.253 and Subnet Mask: 255.255.255.252.

3.2 LuCI configuration

Move your mouse to the gear icon shown on Mesh Potato GUI, you will see LUCI option. Click LUCI to enter OpenWrt main interface.

OpenWrt

Wireless Freedom

OpenWrt Firmware
Kamikaze (r233)
Load: 0.64 0.29 0.20
Hostname: OpenWrt

Overview Status System Services Network Changes: 0 **Administration**

Hello!

This is the administration area of [LuCI](#).

[LuCI](#) is a free, flexible, and user friendly graphical interface for configuring OpenWrt Kamikaze.

On the following pages you can adjust all important settings of your router.

Notice: In [LuCI](#) changes have to be confirmed by clicking Changes - Save & Apply before being applied.

As we always want to improve this interface we are looking forward to your feedback and suggestions.

And now have fun with your router!

[The LuCI Team](#)

Powered by LuCI 0.8 Branch (v0.8+svn5662)

OpenWrt GUI

Overview => User Interface

You can customize the settings and the functionality of LuCI on User Interface.

Web UI

Here you can customize the settings and the functionality of LuCI.

General

Language	auto
Design	OpenWrt

Files to be kept when flashing a new firmware

When flashing a new firmware with LuCI these files will be added to the new firmware installation.

uploads	/lib/uci/upload/
openvpn	/etc/openvpn/
uci	/etc/config/
dropbear	/etc/dropbear/
firewall	/etc/firewall.user
passwd	/etc/passwd
opkg	/etc/opkg.conf
<input type="text"/>	<input type="button" value="Add"/>

User Interface

Overview => LuCI Components

The LuCI Components screen shows the package list. Here you can download and install package, and find packages using the filter as well.

System

Software

Status:

Package lists updated: OK

- [Edit package lists and installation targets](#)
- [Update package lists](#)

Download and install package:

Filter:

Package name	Version	Install	Delete	Description
luci-admin-core	0.8+svn5662-1	installed	<input type="checkbox"/>	
luci-admin-full	0.8+svn5662-1	installed	<input type="checkbox"/>	
luci-admin-rpc	0.8+svn5662-1	installed	<input type="checkbox"/>	
luci-cbi	0.8+svn5662-1	installed	<input type="checkbox"/>	
luci-core	0.8+svn5662-1	installed	<input type="checkbox"/>	
luci-http	0.8+svn5662-1	installed	<input type="checkbox"/>	
luci-i18n-english	0.8+svn5662-1	installed	<input type="checkbox"/>	
luci-ipkg	0.8+svn5662-1	installed	<input type="checkbox"/>	
luci-json	0.8+svn5662-1	installed	<input type="checkbox"/>	
luci-sgi-cgi	0.8+svn5662-1	installed	<input type="checkbox"/>	
luci-sys	0.8+svn5662-1	installed	<input type="checkbox"/>	
luci-theme-base	0.8+svn5662-1	installed	<input type="checkbox"/>	
luci-theme-openwrt	0.8+svn5662-1	installed	<input type="checkbox"/>	
luci-uci	0.8+svn5662-1	installed	<input type="checkbox"/>	
luci-uvl	0.8+svn5662-1	installed	<input type="checkbox"/>	
luci-web	0.8+svn5662-1	installed	<input type="checkbox"/>	
olsrd-luci	0.5.6-r4+edc947c1a5bc+luci1-2	<input type="checkbox"/>	<input type="checkbox"/>	not installed
olsrd-luci-mod-arprefresh	0.5.6-r4+edc947c1a5bc+luci1-2	<input type="checkbox"/>	<input type="checkbox"/>	not installed
olsrd-luci-mod-bmf	0.5.6-r4+edc947c1a5bc+luci1-2	<input type="checkbox"/>	<input type="checkbox"/>	not installed
olsrd-luci-mod-dot-draw	0.5.6-r4+edc947c1a5bc+luci1-2	<input type="checkbox"/>	<input type="checkbox"/>	not installed

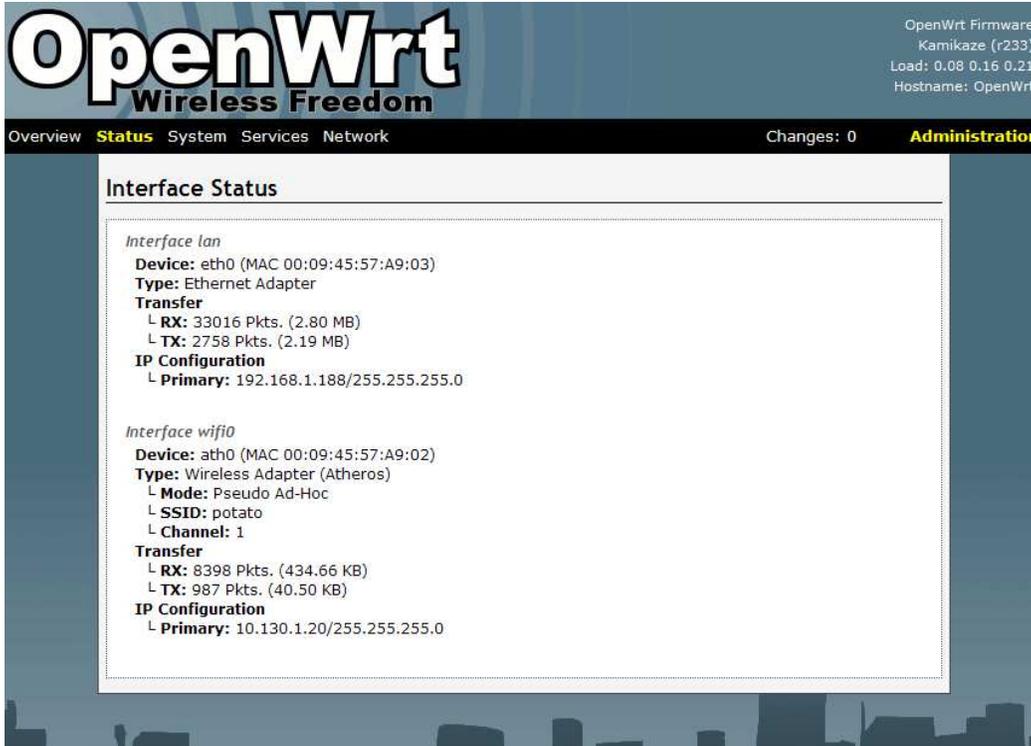
LuCI Components

Overview => Logout

Logout OpenWrt GUI.

Status => Interfaces

The Interfaces screen displays the interface status, such as Device, Type, Transfer, IP Connection etc.



OpenWrt
Wireless Freedom

OpenWrt Firmware
Kamikaze (r233)
Load: 0.08 0.16 0.21
Hostname: OpenWrt

Overview **Status** System Services Network Changes: 0 **Administration**

Interface Status

```

Interface lan
Device: eth0 (MAC 00:09:45:57:A9:03)
Type: Ethernet Adapter
Transfer
  RX: 33016 Pkts. (2.80 MB)
  TX: 2758 Pkts. (2.19 MB)
IP Configuration
  Primary: 192.168.1.188/255.255.255.0

Interface wifi0
Device: ath0 (MAC 00:09:45:57:A9:02)
Type: Wireless Adapter (Atheros)
  Mode: Pseudo Ad-Hoc
  SSID: potato
  Channel: 1
Transfer
  RX: 8398 Pkts. (434.66 KB)
  TX: 987 Pkts. (40.50 KB)
IP Configuration
  Primary: 10.130.1.20/255.255.255.0
  
```

Interfaces

Status => Firewall

The Firewall screen shows the firewall configurations. Every rules you have set up for firewall will be shown here. You could set up firewall by command line after accessing MP01 using SSH or Telnet. **This feature is only available with version r238, and it is for advanced users.**

Firewall Status

Actions

- [Reset Counters](#)
- [Restart Firewall](#)

Table: Filter

Chain INPUT (Policy: ACCEPT, Packets: 34310, Traffic: 1.64 MB)

#	Packets	Traffic	Target	Prot.	Flags	In	Out	Source	Destination	Options
1	0	0.00 B	ACCEPT	tcp	--	*	*	0.0.0.0/0	0.0.0.0/0	tcp dpt:22

Table: NAT

No chains in this table

Table: Mangle

No chains in this table

Firewall

Status => Active Connections

The Active Connections page gives an overview over currently active network connections.

Active Connections

This page gives an overview over currently active network connections.

ARP

IPv4-Address	MAC-Address	Interface
172.16.1.185	00:22:68:56:bc:b2	eth0

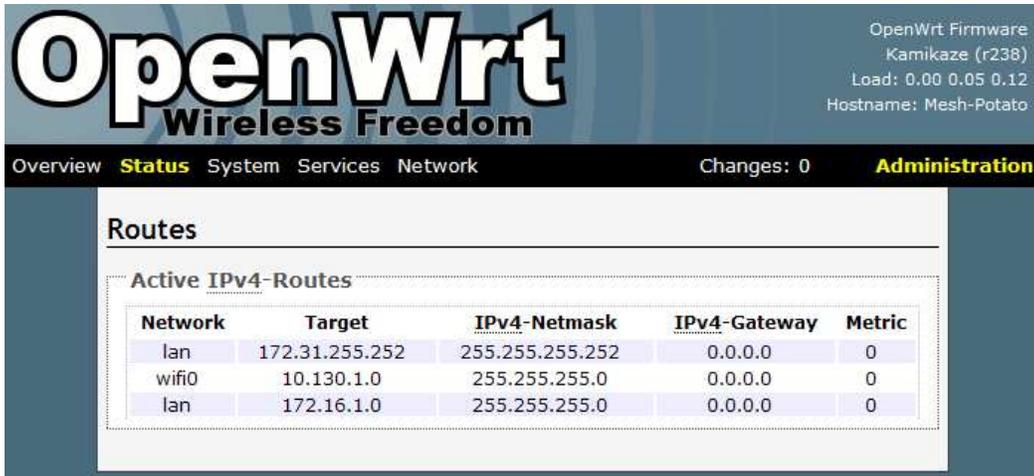
Active Connections

Network	Protocol	Source	Destination
IPV4	UDP	10.130.1.21:4305	10.130.1.255:4305
IPV4	UNKNOWN	192.168.1.1:*	224.0.0.1:*
IPV4	TCP	172.16.1.185:50352	172.16.1.30:23
IPV4	TCP	172.16.1.185:50461	172.16.1.30:80
IPV4	UDP	10.130.1.20:4305	10.130.1.255:4305
IPV4	UNKNOWN	192.168.10.1:*	224.0.0.1:*

Active Connectios

Status => Routes

This page shows the active routes.



OpenWrt Firmware
Kamikaze (r238)
Load: 0.00 0.05 0.12
Hostname: Mesh-Potato

Overview **Status** System Services Network Changes: 0 Administration

Routes

Active IPv4-Routes

Network	Target	IPv4-Netmask	IPv4-Gateway	Metric
lan	172.31.255.252	255.255.255.252	0.0.0.0	0
wifi0	10.130.1.0	255.255.255.0	0.0.0.0	0
lan	172.16.1.0	255.255.255.0	0.0.0.0	0

Routes

Status => System Log

This page shows the system logs.

System Log

```
Apr 8 14:26:00 OpenWrt syslog.info syslogd started: BusyBox v1.14.4
Apr 8 14:26:00 OpenWrt user.notice kernel: klogd started: BusyBox v1.14.4 (2010-01-13 18:15
Apr 8 14:26:00 OpenWrt user.notice kernel: Linux version 2.6.26.3 (elektra@eee) (gcc versio
Apr 8 14:26:00 OpenWrt user.info kernel: CPU revision is: 00019064 (MIPS 4KEc)
Apr 8 14:26:00 OpenWrt user.warn kernel: Determined physical RAM map:
Apr 8 14:26:00 OpenWrt user.warn kernel: memory: 01000000 @ 00000000 (usable)
Apr 8 14:26:00 OpenWrt user.debug kernel: Entering add_active_range(0, 0, 4096) 0 entries o
Apr 8 14:26:00 OpenWrt user.info kernel: Initrd not found or empty - disabling initrd
Apr 8 14:26:00 OpenWrt user.warn kernel: Zone PFN ranges:
Apr 8 14:26:00 OpenWrt user.warn kernel: Normal 0 -> 4096
Apr 8 14:26:00 OpenWrt user.warn kernel: Movable zone start PFN for each node
Apr 8 14:26:00 OpenWrt user.warn kernel: early_node_map[1] active PFN ranges
Apr 8 14:26:00 OpenWrt user.warn kernel: 0: 0 -> 4096
Apr 8 14:26:00 OpenWrt user.debug kernel: On node 0 totalpages: 4096
Apr 8 14:26:00 OpenWrt user.debug kernel: Normal zone: 32 pages used for memmap
Apr 8 14:26:00 OpenWrt user.debug kernel: Normal zone: 0 pages reserved
Apr 8 14:26:00 OpenWrt user.debug kernel: Normal zone: 4064 pages, LIFO batch:0
Apr 8 14:26:00 OpenWrt user.debug kernel: Movable zone: 0 pages used for memmap
Apr 8 14:26:00 OpenWrt user.debug kernel: Built 1 zonelists in Zone order, mobility grouping off. Total pages: 4064
```

System Log

Status => Kernel Log

This page shows the kernel logs.

Kernel Log

```
Linux version 2.6.26.3 (elektra@eee) (gcc version 4.1.2) #52 Thu Apr 8 16:32:42 CEST 2010
CPU revision is: 00019064 (MIPS 4KEc)
Determined physical RAM map:
memory: 01000000 @ 00000000 (usable)
Entering add_active_range(0, 0, 4096) 0 entries of 256 used
Initrd not found or empty - disabling initrd
Zone PFN ranges:
Normal 0 -> 4096
Movable zone start PFN for each node
early_node_map[1] active PFN ranges
0: 0 -> 4096
On node 0 totalpages: 4096
Normal zone: 32 pages used for memmap
Normal zone: 0 pages reserved
Normal zone: 4064 pages, LIFO batch:0
Movable zone: 0 pages used for memmap
Built 1 zonelists in Zone order, mobility grouping off. Total pages: 4064
```

Kernel Log

System => System

Here you can configure the basic aspects of MP01 like its hostname, timezone, system log buffer size, external system log server, log output level and cronloglevel.

System

Here you can configure the basic aspects of your device like its hostname or the timezone.

System	Atheros AR2317
Processor	MIPS 4KEc V6.4
Load	3.27, 1.40, 0.61
Memory	13.58 MB (16% cached, 1% buffered, 5% free)
Local Time	Thu Apr 8 17:15:13 2010
Uptime	02h 49min 26s
Hostname	<input type="text" value="OpenWrt"/>
Timezone	<input type="text" value="UTC"/>
-- Additional Field --	<input type="text"/> <input type="button" value="Add"/>

System

System => Software

This page will show you the softwares you have installed or not installed. You can download and install the package here.

System

Software

- [Edit package lists and installation targets](#)
- [Update package lists](#)

Download and install package:

Filter:

Package name	Version	Install	Delete	Description
afirmesh-potato	r635-0.4alpha-1	installed	<input type="checkbox"/>	
asterisk14	1.4.11-1	installed	<input type="checkbox"/>	
asterisk14-sounds	1.4.11-1	installed	<input type="checkbox"/>	
base-files-atheros	13-r233	installed	<input type="checkbox"/>	
batmand	r1483-1	installed	<input type="checkbox"/>	
busybox	1.14.4-1	installed	<input type="checkbox"/>	
dropbear	0.51-2	installed	<input type="checkbox"/>	
haserl	0.9.24-1	installed	<input type="checkbox"/>	
hotplug2	0.9+r102-2	installed	<input type="checkbox"/>	
ip	2.6.25-1	installed	<input type="checkbox"/>	
kernel	2.6.26.3-atheros-1	installed	<input type="checkbox"/>	

Software

System => Admin Password

You can change the password of the system administrator here.



The screenshot shows the OpenWrt administration interface. At the top, it says "OpenWrt Wireless Freedom". On the right, it displays system information: "OpenWrt Firmware Kamikaze (r233)", "Load: 0.47 0.26 0.19", and "Hostname: OpenWrt". Below this is a navigation bar with "Overview", "Status", "System" (highlighted), "Services", and "Network". On the right of the navigation bar, it says "Changes: 0" and "Administration". The main content area is titled "Admin Password" and contains the instruction: "Change the password of the system administrator (User root)". There are two input fields: "Password" and "Confirmation", both with masked characters (dots). At the bottom right of the form are "Reset" and "Submit" buttons.

Admin Password

System => SSH-Keys

You can paste public SSH-Keys for SSH public-key authentication. Then you don't need to enter a password anymore, you will be automatically authenticated.



The screenshot shows the OpenWrt administration interface. At the top, it says "OpenWrt Wireless Freedom". On the right, it displays system information: "OpenWrt Firmware Kamikaze (r233)", "Load: 0.09 0.21 0.18", and "Hostname: OpenWrt". Below this is a navigation bar with "Overview", "Status", "System" (highlighted), "Services", and "Network". On the right of the navigation bar, it says "Changes: 0" and "Administration". The main content area is titled "SSH-Keys" and contains the instruction: "Here you can paste public SSH-Keys (one per line) for SSH public-key authentication." There is a large text area containing a sample SSH key:


```
ssh-rsa
AAAAB3NzaC1yc2EAAAABJQAAAIEAgj2Gf7nKegxFXqVZXmm6gbNU5hYFgWD4vPT2Ei
6CwTi+u5y9/92dTCry5dS7waDvuJNkjAZXZeYyf8P01CRXUeI8t1pOso8/oIgC3W+g
jb54zcBinRh7/5ejLFxyoguaUXyaVS+72hNHpErEARKxvOWF+nnrq51p0LQbxAHE1I
k= rsa-key-20100907
```

 At the bottom right of the form are "Reset" and "Submit" buttons.

SSH-Keys

System => Processes

This page gives an overview over currently running system processes and their status. You can hang up, terminate or kill the process here.

Processes

This list gives an overview over currently running system processes and their status.

PID	Owner	Command	CPU usage (%)	Memory usage (%)	Hang Up	Terminate	Kill
1	root	init	0%	14%			
2	root	[kthreadd]	0%	0%			
3	root	[ksoftirqd/0]	0%	0%			
4	root	[events/0]	0%	0%			
5	root	[khelper]	0%	0%			
23	root	[kblockd/0]	0%	0%			
44	root	[pdflush]	0%	0%			
45	root	[pdflush]	0%	0%			
46	root	[kswapd0]	0%	0%			
47	root	[aio/0]	0%	0%			
58	root	[mtdblockd]	0%	0%			
254	root	[jffs2_gcd_mtd2]	0%	0%			
265	root	logger -s -p 6 -t	0%	14%			
277	root	syslogd -C16 -L -R 192.168.1.185	0%	14%			
279	root	klogd	0%	14%			
291	root	/sbin/hotplug2 --override --persisten	0%	8%			
501	root	asterisk	0%	143%			
502	root	asterisk	0%	143%			
506	root	asterisk	0%	143%			
509	root	asterisk	0%	143%			
513	root	/usr/sbin/dropbear -p 22	0%	14%			
518	root	/usr/sbin/httpd -p 80 -h /www -r Open	0%	14%			
522	root	telnetd -l /bin/login	0%	14%			

Processes

System => Mount Points

This page displays the mounted file systems, mount points and swap device. Mount points define at which point a memory device will be attached to the filesystem. If your physical memory is insufficient unused data can be temporarily swapped to a swap-device resulting in a higher amount of usable RAM. Be aware that swapping data is a very slow process as the swap-device cannot be accessed with the high datarates of the RAM.

Mount Points

Mounted file systems

Filesystem	Mount Point	Available	Used
/dev/root	/rom	0.00 B / 3.94 MB	100% (3.94 MB)
tmpfs	/tmp	6.55 MB / 6.79 MB	4% (252.00 KB)
tmpfs	/dev	512.00 KB / 512.00 KB	0% (0.00 B)
/dev/mtdblock2	/jffs	2.73 MB / 3.00 MB	9% (276.00 KB)
mini_fo:/jffs	/	0.00 B / 3.94 MB	100% (3.94 MB)

Mount Points

Mount Points define at which point a memory device will be attached to the filesystem

enable	Device	Mount Point	Filesystem	Options
<input type="checkbox"/>	The device file of the memory or partition (e.g. /dev/sda1)		The filesystem that was used to format the memory (e.g. ext3)	see 'mount' manpage
<input type="checkbox"/>	/dev/sda1	/home	ext3	rw, sync

SWAP

If your physical memory is insufficient unused data can be temporarily swapped to a swap-device resulting in a higher amount of usable RAM. Be aware that swapping data is a very slow process as the swap-device cannot be accessed with the high datarates of the RAM.

enable	Device
<input type="checkbox"/>	The device file of the memory or partition (e.g. /dev/sda1)
<input type="checkbox"/>	/dev/sda2

Mount Points

System => LED Configuration

You can customize the behavior of the device LEDs if possible. Just add an entry, choose the LED device and its trigger, then the LED will twinkle according to the trigger.

LED Configuration

Customizes the behaviour of the device LEDs if possible.

Applying changes

- Reloading system...

LED Name	<input type="text" value="test"/>	<input type="button" value="Remove entry"/>
LED Device	<input type="text" value="gpio2"/>	
Default state	<input type="checkbox"/> <input checked="" type="radio"/> ticked = on	
Trigger	<input type="text" value="Timer"/>	
On-State Delay	<input type="text" value="200"/>	<input checked="" type="radio"/> Time (in ms) the LED is on
Off-State Delay	<input type="text" value="200"/>	<input checked="" type="radio"/> Time (in ms) the LED is off

LED Configuration

LED Name: Enter the LED name you like

LED Device: Choose which LED you want to twinkle

Default state: The default state of the specified LED, ticked=on

Trigger: On what conditions the specified LED will twinkle. It has 5 options:
None, Timer(The LED will twinkle according to the timer you set),
Heartbeat(LEDs will twinkle according to load average), Default On,
Network Device(LEDs will twinkle according to the network status).

System => Backup / Restore

On Backup/Restore page, you can create/restore backup or reset router to factory default.



OpenWrt Firmware
Kamikaze (r233)
Load: 0.08 0.20 0.18
Hostname: OpenWrt

Overview Status **System** Services Network Changes: 0 Administration

System

Backup / Restore

Here you can backup and restore your router configuration and - if possible - reset the router to the default settings.

- [Create backup](#)
- [Reset router to defaults](#)

Backup Archive:
 No file chosen

Backup / Restore

System => Flash Firmware

This feature allows you to upload an OpenWrt image file to reflash the device.



OpenWrt Firmware
Kamikaze (r233)
Load: 0.03 0.17 0.17
Hostname: OpenWrt

Overview Status **System** Services Network Changes: 0 Administration

System

Flash Firmware

Upload an OpenWrt image file to reflash the device.

Firmware image:
 No file chosen
 Keep configuration files

Flash Firmware

System => Reboot

Reboot the operating system here.



OpenWrt Firmware
Kamikaze (r233)
Load: 0.52 0.21 0.14
Hostname: OpenWrt

Overview Status **System** Services Network Changes: 0 Administration

System

[Reboot](#)

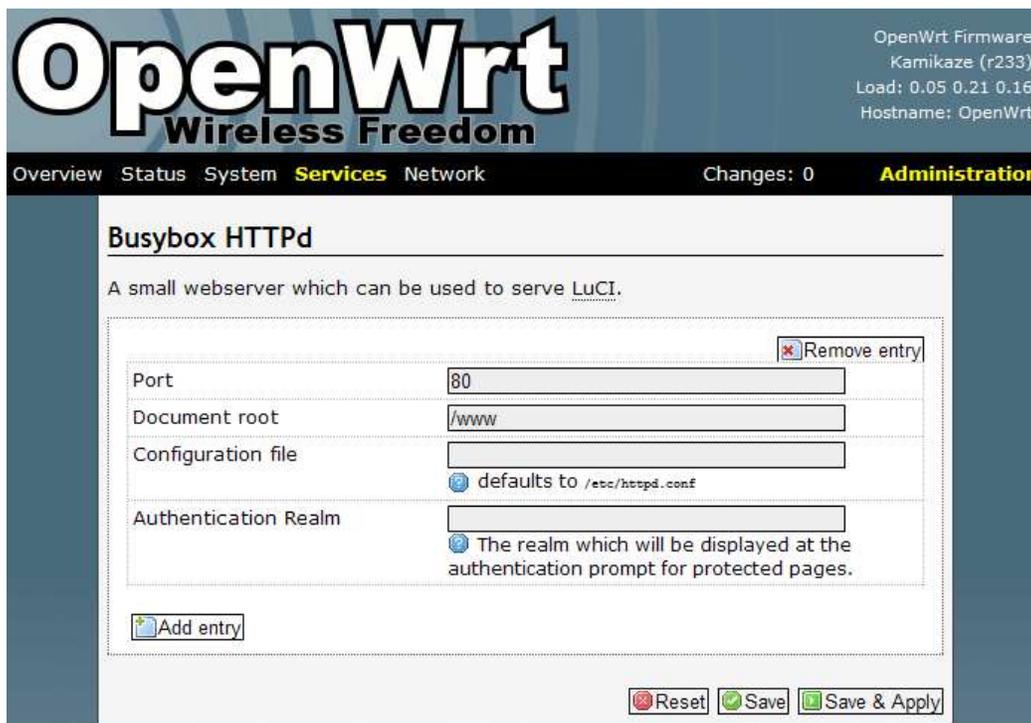
Reboots the operating system of your device.

[Perform reboot](#)

Reboot

Services => Busybox HTTPd

It is a small web server which can be used to serve LuCI. You can configure the server port and document root.



OpenWrt Firmware
Kamikaze (r233)
Load: 0.05 0.21 0.16
Hostname: OpenWrt

Overview Status System **Services** Network Changes: 0 Administration

Busybox HTTPd

A small webserver which can be used to serve [LuCI](#).

Port	<input type="text" value="80"/>	<input type="button" value="Remove entry"/>
Document root	<input type="text" value="/www"/>	
Configuration file	<input type="text"/>	<input checked="" type="radio"/> defaults to <code>/etc/httpd.conf</code>
Authentication Realm	<input type="text"/>	<input checked="" type="radio"/> The realm which will be displayed at the authentication prompt for protected pages.

Busybox HTTPd

Services => Dropbear SSHd

Dropbear offers SSH network shell access and an integrated SCP server.



Dropbear SSHd

Services => Dnsmasq

Dnsmasq is a lightweight, easy to configure DNS forwarder and DHCP server. It is designed to provide DNS and, optionally, DHCP, to a small network. It can serve the names of local machines which are not in the global DNS. The DHCP server integrates with the DNS server and allows machines with DHCP-allocated addresses to appear in the DNS with names configured either in each host or in a central configuration file. **In order to use Dnsmasq, you need to install the package. It is for advanced users.**

Dnsmasq

With DHCP network members can automatically receive their network settings (IP-address, netmask, DNS-server, ...).

Settings

Dnsmasq is a combined DHCP-Server and DNS-Forwarder for NAT firewalls

Domain required	<input checked="" type="checkbox"/> <input type="radio"/> Don't forward DNS-Requests without DNS-Name
Authoritative	<input checked="" type="checkbox"/> <input type="radio"/> This is the only DHCP in the local network
Filter private	<input checked="" type="checkbox"/> <input type="radio"/> Don't forward reverse lookups for local networks
Filter useless	<input type="checkbox"/> <input type="radio"/> filter useless DNS-queries of Windows-systems
Localise queries	<input checked="" type="checkbox"/> <input type="radio"/> localises the hostname depending on its subnet
Local Server	<input type="text" value="/lan/"/>
Local Domain	<input type="text" value="lan"/>
Expand Hosts	<input checked="" type="checkbox"/> <input type="radio"/> adds domain names to hostentries in the resolv file
don't cache unknown	<input type="checkbox"/> <input type="radio"/> prevents caching of negative DNS-replies
Use /etc/ethers	<input checked="" type="checkbox"/> <input type="radio"/> Read /etc/ethers to configure the DHCP-Server
Leasefile	<input type="text" value="/tmp/dhcp.leases"/> <input type="radio"/> file where given DHCP-leases will be stored
Resolvfile	<input type="text" value="/tmp/resolv.conf.auto"/> <input type="radio"/> local DNS file
	<input type="text" value=""/> <input type="button" value="Add"/>

Dnsmasq

Services => Scheduled Tasks

This is the system crontab in which scheduled tasks can be defined. You can edit the configuration file of the cron daemon via Luci. It is for advanced users.

Scheduled Tasks

This is the system crontab in which scheduled tasks can be defined.

Scheduled Tasks

Network => Interfaces => WIFIO / LAN

On this page you can configure the network interfaces. You can bridge several interfaces by ticking the "bridge interfaces" field and enter the names of several network interfaces separated by spaces. You need to install "ppp-mod-pppoe" for PPPoE, or "pptp" for PPTP support.

Interfaces

On this page you can configure the network interfaces. You can bridge several interfaces by ticking the "bridge interfaces" field and enter the names of several network interfaces separated by spaces. You can also use VLAN notation `INTERFACE.VLANNR` (e.g.: `eth0.1`).

wifi0

Remove entry

Overview

Protocol	static	
<small> You need to install "comgt" for UMTS/GPRS, "ppp-mod-pppoe" for PPPoE, "ppp-mod-pppoe" for PPPoA or "pptp" for PPTP support</small>		
Bridge interfaces	<input type="checkbox"/>	<small> creates a bridge over specified interface(s)</small>
Interface	ath0	
IPv4-Address	10.130.1.20	
IPv4-Netmask	255.255.255.0	
IPv4-Gateway		
<input type="text" value="-- Additional Field --"/> Add		

Aliases

This section contains no values yet

Add entry

Reset Save Save & Apply

Interfaces => WIFI0

Interfaces

On this page you can configure the network interfaces. You can bridge several interfaces by ticking the "bridge interfaces" field and enter the names of several network interfaces separated by spaces. You can also use VLAN notation `INTERFACE.VLANNR` (e.g.: `eth0.1`).

lan

 Remove entry

Overview

Protocol	static
 You need to install "comgt" for UMTS/GPRS, "ppp-mod-pppoe" for PPPoE, "ppp-mod-pppoe" for PPPoE, "ppp-mod-pppoe" for PPPoA or "pptp" for PPTP support	
Bridge interfaces	<input type="checkbox"/>  creates a bridge over specified interface(s)
Interface	eth0
IPv4-Address	192.168.1.188
IPv4-Netmask	255.255.255.0
IPv4-Gateway	192.168.1.1
DNS-Server	192.168.1.1
-- Additional Field --	 Add

Aliases

This section contains no values yet

 Add entry

 Reset  Save  Save & Apply

Interfaces => LAN

Network => Wifi

Here you can scan the WiFi networks in your local environment. The following screen shows the WiFi networks in my local environment.

Wifi

Networks

Link	ESSID	BSSID	Channel	Protocol	Mode	Encr.	Power	Scan
65/70	potato	01:CA:FF:EE:BA:BE	1		adhemo		17 dBm	

WLAN-Scan

Wifi networks in your local environment

Link	ESSID	BSSID	Mode	Channel	Encr.	Signal	Noise
35/70	TP-LINK	00:14:78:FC:21:4C	Master	2.437 GHz (Channel 6)	on	-60 dBm	-95 dBm
25/70	ATCOM-OFFICE	00:50:7F:A1:89:D8	Master	2.457 GHz (Channel 10)	on	-70 dBm	-95 dBm
30/70	Acrosser	00:1A:70:70:4F:2F	Master	2.437 GHz (Channel 6)	on	-65 dBm	-95 dBm

Create Network

Device

Wifi

Network => Wifi => WIFI0

You can run several wifi networks with one device. Be aware that there are certain hardware and driverspecific restrictions. Normally you can operate 1 Ad-Hoc or up to 3 Master-Mode and 1 Client-Mode network simultaneously.

Networks

You can run several wifi networks with one device. Be aware that there are certain hardware and driverspecific restrictions. Normally you can operate 1 Ad-Hoc or up to 3 Master-Mode and 1 Client-Mode network simultaneously.

Device wifi0

Overview	+
enable	<input checked="" type="checkbox"/>
Type	atheros
Channel	1 (2.412 GHz)
Transmit Power	<input type="text"/>
	<input checked="" type="radio"/> dBm
Mode	auto
Diversity	<input type="checkbox"/>
-- Additional Field -- <input type="button" value="Add"/>	

Interfaces

<input type="button" value="Remove entry"/>	
ESSID	potato
Network	<input type="text"/>
	<input checked="" type="radio"/> Add the Wifi network to physical network
Mode	Pseudo Ad-Hoc (ahdemo)
BSSID	01:CA:FF:EE:BA:BE
Background Scan	<input type="checkbox"/>
Frame Bursting	<input type="checkbox"/>
Turbo Mode	<input type="checkbox"/>
Encryption	No Encryption

Wifi => WIFIO

Enable: To make WiFi available or not.

Channel: It has 11 WiFi channels to choose.

Mode: MP01 supports 802.11b/g

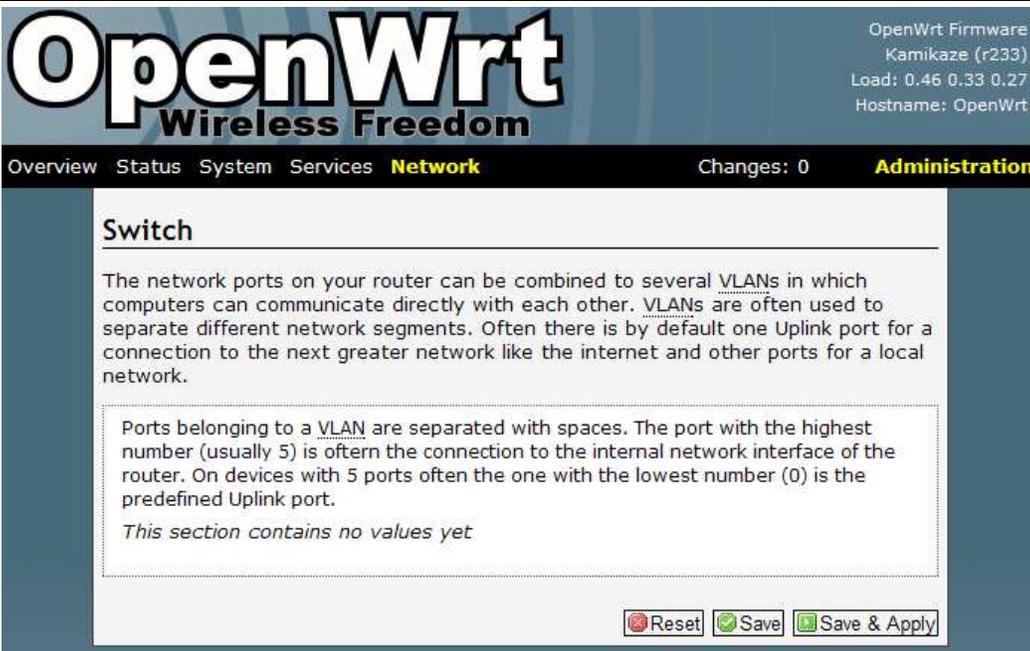
ESSID/BSSID: WLAN ID for wireless network

Mode: It can work as Access Point, Ad-Hoc, Client, Pseudo Ad-Hoc(ahdemo) and Monitor

Encryption: It supports only WEP in version r233.

Network => Switch

You can set up VLAN settings in this menu. This is yet another option for advanced users. Since the MP01 doesn't have multiple Ethernet ports, this menu is of very limited use.



OpenWrt
Wireless Freedom

OpenWrt Firmware
Kamikaze (r233)
Load: 0.46 0.33 0.27
Hostname: OpenWrt

Overview Status System Services **Network** Changes: 0 Administration

Switch

The network ports on your router can be combined to several VLANs in which computers can communicate directly with each other. VLANs are often used to separate different network segments. Often there is by default one Uplink port for a connection to the next greater network like the internet and other ports for a local network.

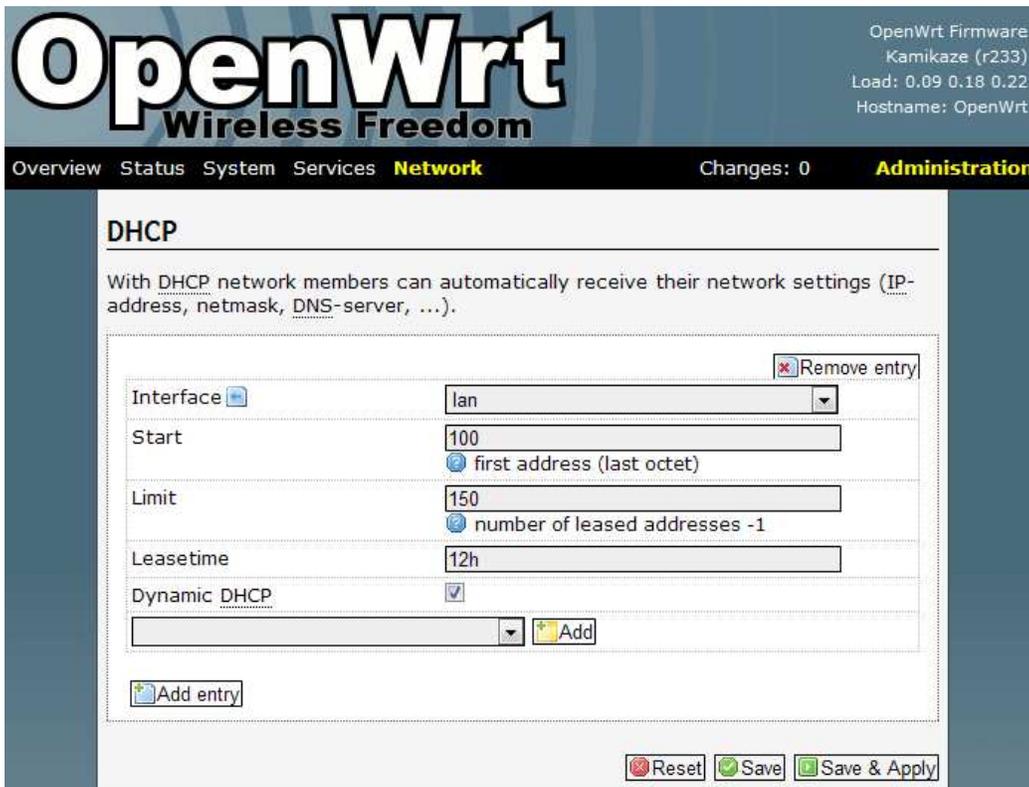
Ports belonging to a VLAN are separated with spaces. The port with the highest number (usually 5) is often the connection to the internal network interface of the router. On devices with 5 ports often the one with the lowest number (0) is the predefined Uplink port.

This section contains no values yet

Switch

Network => DHCP

You need to install the dnsmasq package before using it. You can configure the DHCP options such as assigned range, lease time and so on.



OpenWrt
Wireless Freedom

OpenWrt Firmware
Kamikaze (r233)
Load: 0.09 0.18 0.22
Hostname: OpenWrt

Overview Status System Services **Network** Changes: 0 Administration

DHCP

With DHCP network members can automatically receive their network settings (IP-address, netmask, DNS-server, ...).

Interface	lan	<input type="button" value="Remove entry"/>
Start	100 <small>first address (last octet)</small>	
Limit	150 <small>number of leased addresses -1</small>	
Leasetime	12h	
Dynamic DHCP	<input checked="" type="checkbox"/>	
	<input type="text"/> <input type="button" value="Add"/>	

DHCP

Interface: The device to assign IP addresses

Start: The first IP address it will assign

Limit: The last IP address it will assign

Leasetime: The amount of time a network user will be allowed to connect to the MP01 with their current dynamic IP address.

Network => Hostnames

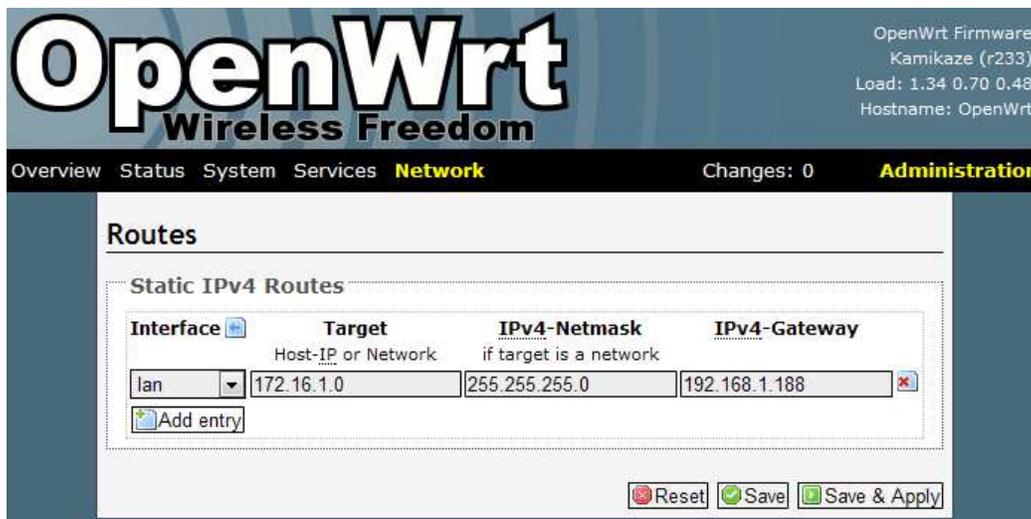
You can add hostname entries here.



Hostnames

Network => Static Routes

A static route is a pre-determined pathway that network information must travel to reach a specific host or network.



Static Routes

Interface: Select the appropriate interface.

Target: Target network where you want to assign a static route

Netmask: This determines which portion of a target IP address is the network portion, and which portion is the host portion.

Gateway: It is the IP address that allows for contact between the MP01 and the remote network or host.

4. Troubleshooting

4.1 What to do if you can't connect to the MP anymore - using the Fallback-IP

This can easily happen if you are messing around with the IP settings of the MP. Luckily the MP has a additional IP subnet at the Ethernet port that can not be changed or disabled from a web interface.

On your PC configure the Ethernet port to use **172.31.255.253/30** (netmask 255.255.255.252). You can add multiple IP addresses to each interface, so you don't have to reconfigure it if you need other addresses as well.

After finishing the configuration you should be able to access the MP01 using IP **172.31.255.254**.

4.2 My MP01 can't make calls

You have set up you MP01 IPs but can't make calls. Here are some basic tests:

1. Can you hear dial tone in a phone connected to the MP? If not please reboot it and try again. Some of the modules have come loose while shipping.
2. Check you mesh network. Telnet/ssh into your MP and:

```
batmand -cbd1
```

You should see the IP of the other MP(s) on your mesh. If you see no IPs then check your WiFi settings are identical except for the IP. These can be checked in /etc/config/wireless or via the GUI. Also compare "iwconfig ath0" on both MPs and "ifconfig ath0".

3. Try pinging one MP from the other.
4. On each MP, dial 4001. This performs an echo test. Can you hear your own voice coming back to you?
5. Start an Asterisk CLI and see what happens when you dial an IP:

```
root@OpenWrt:~# asterisk -r
OpenWrt*CLI> set verbose 3
```

Note: The 'set verbose' command is deprecated, please use 'core set verbose' instead.

Now dial the IP of another MP. You should see something like:

```
-- event_offhook
-- AST_STATE_DOWN:
-- start mp_new
-- event_dtmf 1
-- event_dtmf 4
-- event_dtmf 2
-- event_digit_timer
-- extension exists, starting PBX 142
-- Executing [142@default:1] Dial("MP/1", "SIP/4000@10.130.1.142")
in new stack
```

```
-- Called 4000@10.130.1.142
-- event_onhook
-- default: hangup sound_on = 1
== Spawn extension (default, 142, 1) exited non-zero on 'MP/1'
-- start mp_hangup
```

4.3 Choppy sound

This is most likely caused by a poor wireless link. Check that you have line of sight to other MP01. It is also possible to install another MP01 on a nearby building or tower to relay the signals.

4.4 The MP01 is flashed with AP51

The AP51 flash tool re-arranges the disk lay-out. If the MP01 has been updated with the AP51, you CAN NOT upgrade it remotely through wireless. Then you need to do a MP01 Disaster Recovery BEFORE deploying it in the field to be able to remotely upgrade it in the future.

CORRECT FORMAT:

```
root@OpenWrt:~# cat /proc/mtd
dev: size erasesize name
mtd0: 00030000 00010000 "RedBoot"
mtd1: 000b0000 00010000 "vmlinux.bin.l7"
mtd2: 006f0000 00010000 "rootfs"
mtd3: 00410000 00010000 "rootfs_data"
mtd4: 0000f000 00010000 "FIS directory"
mtd5: 00001000 00010000 "RedBoot config"
mtd6: 00020000 00010000 "boardconfig"
root@OpenWrt:~#
```

The ap51-utility swaps the position of kernel and rootfs. The kernel needs to be in the second logical block and the rootfs in the third. After flashing with ap51-flash this order is reversed and any flashing attempt from OpenWRT will fail.

Before flashing with ap51-flash:

```
root@OpenWrt:/# cat /proc/mtd
dev: size erasesize name
mtd0: 00030000 00010000 "RedBoot"
mtd1: 000b0000 00010000 "vmlinux.bin.l7"
mtd2: 006f0000 00010000 "rootfs"
mtd3: 00410000 00010000 "rootfs_data"
mtd4: 0000f000 00010000 "FIS directory"
mtd5: 00001000 00010000 "RedBoot config"
mtd6: 00020000 00010000 "boardconfig"
```

After flashing with ap51-flash:

```
RedBoot> fis list
Name FLASH addr Mem addr Length Entry point
```

```

RedBoot 0xA8000000 0xA8000000 0x00030000 0x00000000
rootfs 0xA8030000 0xA8030000 0x006F0000 0x00000000
vmlinux.bin.l7 0xA8720000 0x80041000 0x000B0000 0x80041000
FIS directory 0xA87D0000 0xA87D0000 0x0000F000 0x00000000
RedBoot config 0xA87DF000 0xA87DF000 0x00001000 0x00000000

```

The fix is to flash the system via Redboot with the correct layout and follow the instructions here:

[http://wiki.villagetelco.org/index.php?title=Mesh_Potato_HOWTOs#Reflash the firmware from RedBoot.](http://wiki.villagetelco.org/index.php?title=Mesh_Potato_HOWTOs#Reflash_the_firmware_from_RedBoot)

5. Appendix

5.1 Appendix A - MP01 Features

Feature	Benefit
Integrated WiFi and ATA in a single box	Low power consumption, ease of setup, fewer cables, fewer points of failure, and low cost.
Mesh, Client or AP mode WiFi	Can be a component in Mesh WiFi networks or connect to existing WiFi networks
One-IP configuration	Set one IP and the device is ready to make a receive phone calls. Quickly build voice and IP networks and roll out a Wireless PBX in minutes.
Web GUI or Phone UI	Configure via a web interface or telephone IVR menu. With Phone UI no laptop is required for on-site installation.
UV-resistant, weather-proof enclosure	Long life outdoors, no need to purchase a separate enclosure for outdoor use.
Built in mounting points	Simple and low cost outdoor installation.
Rugged design	Withstands abuse that would destroy other products such as power surges, brownouts, reverse DC, over-voltage DC, and static electricity.
Power supply	Runs on 24VDC voltage, or any AC voltage from 110 to 250VAC via wall-plug type power supply. A solar panel can be directly connected – saving money on a solar regulator.
Power efficient	Consumes just 3W (DC). Can run on a 10W solar panel.
Power over	Just one cable run for both power and telephone. PoTL

Telephone Line (PoTL)	injectors included.
Open Hardware Design	No vendor lock-in. Open to improvement by anyone.
Open Source firmware	Linux, OpenWRT, B.A.T.M.A.N., and Asterisk. Stable, reliable community developed software. Open to improvement, adaptation, and innovation.
Asterisk	Extremely configurable, add IVR menus, connect IP Phones and billing systems

5.2 Appendix B - MP01 Specifications

Hardware Specifications

- Atheros AR2317 system on a Chip (SoC)
- MIPS 4k processor 180 MHz
- 8 MByte Serial Flash EEPROM
- 16 MByte RAM

Wireless LAN

- IEEE 802.11b/g
- Frequency Band: 2400 to 2483.5MHz
- Antenna Type: Internal Omnidirectional PCB Antenna with I-PEX connector
- Maximum Gain: 2 dBi
- Transmit EIRP power: 1-24 Mbit 20dBm or 36-54 Mbit 17dBm

Interfaces/Ports

- LAN Port : 1 x RJ-45 (configuration)
- FXS Port : 1 x RJ-11

Firmware

- Linux kernel 2.26.3
- OpenWrt Kamikaze (customised version)
- B.A.T.M.A.N. mesh routing daemon Version 0.4
- Asterisk 1.4.11

Environmental

- Operating Humidity: 5 to 95% Condensing
- Operating Temperature: -10°C to +45°C

Electrical

- Power Options: AC adaptor, PoTL (Power over Telephone Line)
- PoTL Wire Requirement: standard 4/6 core telephone cable
- Input Power: 24VDC 300mA
- Power Consumption: 3Watt
- PoTL Effective Distance: 0-50 meters
- Protected Ports: DC, RJ11 phone, RJ45 (configuration)
- Protection: overvoltage, reverse DC, nearby lightning, static electricity

Physical

- Casing: UV-protected, weatherproof outdoor enclosure
- Mounting: Pole Mount/Wall Mount
- Enclosure Size: 228 X 106 X 55 mm
- Weight : 0.3 Kg

Regulatory/Compliance Information

- RoHS Compliance

6. Acronyms

- B.A.T.M.A.N – Better Approach To Mesh Ad-hoc Network
- dBi: decibel isotropic, the antenna gain relative to an isotropic radiator (an antenna which radiates energy perfectly equal in all directions).
- LAN – Local Area Connection (configure)
- WLAN – Wireless Local Area Network

7. Reference

<http://wiki.villagetelco.org/>

<http://www.atcom.cn/>

<http://www.villagetelco.org/about/mesh-potato/>

FCC Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

FCC Caution

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.