



MiniBox M-100 User Guide

Version 3.1.0



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Read This First

Before you start operating your M-100 MiniBox, please note that the Compact Flash card should not be removed while the system is running. Removing the Compact Flash while the system is running can damage your system and will void the warranty of this system. If the Compact Flash needs to be removed for a system upgrade, please first turn off the device by executing a power off command.

About Ituner Networks Corp

Ituner Networks is a privately owned Corporation, located in Fremont, California.

Aside manufacturing streaming systems, Ituner is broadcasting Radio and TV stations from more than 20 countries, making Ituner a leader in the International Broadcast Arena.

In late 1996 Ituner was the first company to successfully deploy use splitting technologies, gathering live signal from multiple sources around the world. This method is currently used by most remote Internet broadcasts

About MiniBox

The mini-box is a small form factor general purpose computer designed to operate in environments where small size, weight and power consumptions are important. Furthermore, the M-100 has a LCD and a keypad interface that enables users to perform a wealth of operations without the need of a keyboard or monitor.

M-100 I/O Ports

The M-100 provides a rich set of I/Os such as 10/100Mbps ethernet, audio Line-in/Line-out/Mic in, VGA or TV out, keyboard and serial, parallel and GPIO ports making the M-100 an excellent candidate for embedded projects for multimedia or automation purposes.

MiniBox M-100 power consumption

The M-100 is a low power x86 operating at frequencies from 533 to 1Ghz. By using a high efficient dc-dc power converter, the power consumption of the M-100 is only 7-15Watts. For example, the M-100 can operate for as long as 12 hours from a 12V 7Ah battery.

Supported operating systems

The M-100 is running on a general purpose x86 processor. As a result, the M-100 can run on virtually any operating system. Our engineers have designed a small embedded linux distribution that includes audio and graphics drivers, LCD and keypad server as well as Apache, Busy box (a embedded linux command set) and Perl.

Quick installation

- Unpack your mini-box series computer. The system was configured for with an compact flash operating system, insert the Compact Flash into the Compact Flash reader while your machine is turned off.



Never plug or unplug the Compact Flash card into the M-100's Compact Flash reader while the system is running. This can cause severe damage to your Compact Flash card or the system's IDE bus.

- Must sure that you have RAM memory installed on the board
- Plug the 2.5mm jack from the 12V adaptor (provided with your mini-box).
- Turn on the mini-box pressing the ON/OFF button located on the upper left corner of your faceplate. The system should turn on to be followed by a short beep.

Refer the the VIA Mini-ltx board manual for operating instructions.

Refer to the following sections of iMedia embedded linux manual for further information.

CD Installation Guide

The M-100 MiniBox runs a customized version of Linux, iMedia Embedded Linux. While Linux might sound intimidating for many people, it is not as difficult as one might think. If you carefully read the installation instructions and follow each install step, you should be able to configure your box in less than 5 minutes!



The M-100 MiniBox is a fully networked device. Since all controls, with the exception of the initial setup, are executed over the network with a web browser, the M-100 MiniBox will not operate if it is not properly connected to the network.

First step:

Insert M-100 MiniBox Install CD in your CDROM and boot from CD.

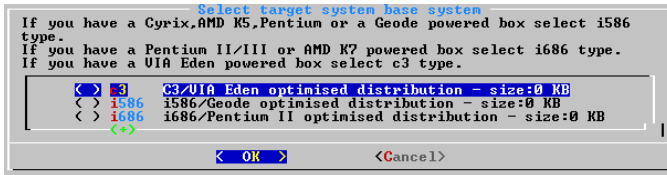


In the install process all your current data on Hard Disk or Flash drive will be lost and partitions as well.

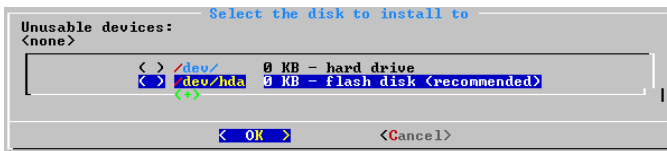
Basic Setup

On the first screen you will have to choose your target base system depending on what platform do you have:

- ***C3/Via Eden system***
- ***i586/Geode system***
- ***i686/Pentium system***



Now select the disk where iMedia will be installed



Caution! In the install process all your current data on Hard Disks or Flash drives will be lost and partitions as well.

If there is a second hard disk found it will be automatically mounted in /opt/extra.



Basic Install Complete. Press **OK** button for next setup module.

Network setup

On the main screen you will notice all available network settings:

- **IP address**
- **Subnet Mask**
- **Gateway**
- **FDQN Fully Qualified Domain Name**
- **Primary nameserver**
- **Secondary nameserver**

Network Setup

Please make your changes by pressing ENTER on the highlighted item. To activate changes press DONE.

ip address	192.168.0.13
subnet mask	255.255.255.0
gateway	192.168.0.1
fqdn	minibox.ituner.com
primary nameserver	192.168.0.1
secondary nameserver	
Done	Apply Changes

< OK > <Cancel>

IP address

Enter you IP address. In this example we will use a C-class IP.

Enter your IP address

192.168.0.2

< OK > <Cancel>

Subnet Mask

Enter valid subnet mask for given IP.



A screenshot of a dialog box titled "Enter your subnet mask". The dialog box has a light gray background and a dark gray border. At the top, the title "Enter your subnet mask" is displayed in blue text. Below the title is a text input field containing the value "255.255.255.0". At the bottom of the dialog box, there are two buttons: a blue button with the text "< OK >" and a gray button with the text "< Cancel >".

Gateway

Enter Gateway for the system. If do know this IP please contact your network administrator.



A screenshot of a dialog box titled "Enter your gateway ip address". The dialog box has a light gray background and a dark gray border. At the top, the title "Enter your gateway ip address" is displayed in blue text. Below the title is a text input field containing the value "192.168.0.1". At the bottom of the dialog box, there are two buttons: a blue button with the text "< OK >" and a gray button with the text "< Cancel >".

Fully qualified domain name

Enter here your fully qualified domain name of the machine. If do know this IP please contact your network administrator.



A screenshot of a dialog box titled "Enter your fqdn (host.domain)". The dialog box has a light gray background and a dark gray border. At the top, the title "Enter your fqdn (host.domain)" is displayed in blue text. Below the title is a text input field containing the value "minibox.ituner.com". At the bottom of the dialog box, there are two buttons: a blue button with the text "< OK >" and a gray button with the text "< Cancel >".

Primary name server

Enter your primary name server. If do know this IP please contact your network administrator.

Enter your primary nameserver IP

192.168.0.1

< OK > < Cancel >

Secondary name server

Enter your secondary nameserver. This one is optional. If do know this IP please contact your network administrator.

Enter your secondary nameserver IP

192.168.0.100

< OK > < Cancel >

After entering all this settings move cursor under Done and the press **OK** button.

Network Setup

Please make your changes by pressing ENTER on the highlighted item. To activate changes press DONE.

ip address	192.168.0.13
subnet mask	255.255.255.0
gateway	192.168.0.1
fqdn	minibox.ituner.com
primary nameserver	192.168.0.1
secondary nameserver	
Done	Apply Changes

< OK > < Cancel >

Network module setup completed. Press OK button to proceed to the next setup module.

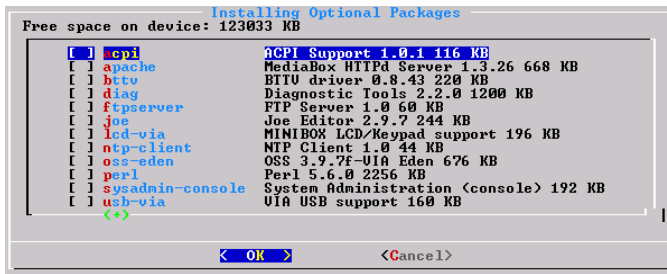


Optional packages setup

On the main screen you will have a list with all available optional packages on iMedia distribution.

For full explanation of each package see **Package Description** section.

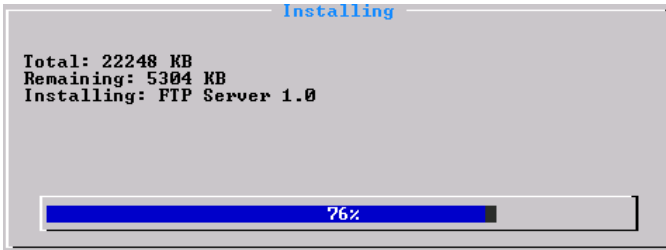
Select the packages you need and the press **OK** button to proceed with installation.



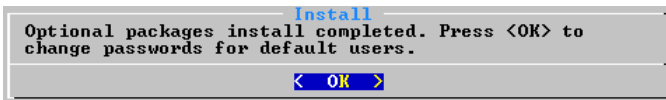
Also you can choose not to install any optional packages and remain only with basic distribution on your disk.



After hitting the **OK** button you will see a progress bar with the installation of the optional packages.



Optional packages setup module is finished. Press **OK** button to proceed to the next setup module.



Changing passwords

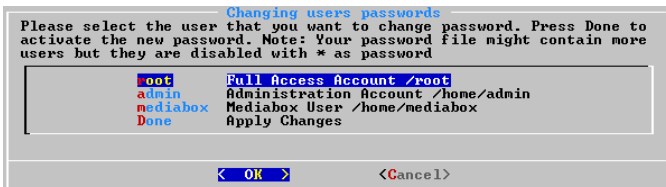
Imedia basic distribution contains only user presented in the next screen, so for them you can change passwords.

Standard iMedia users:

root – root account, for linux users

admin – admin account , for admin purposes

mediabox – minibox account for ftp transfer and telnet logins.

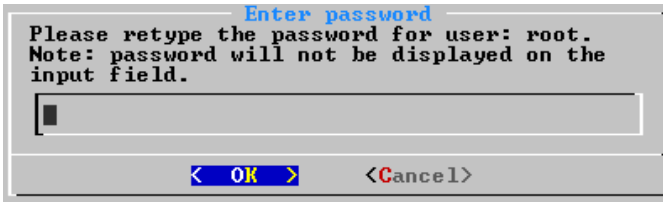


Select desired user for password changing and press **OK** button. You will be presented with a password entry box.

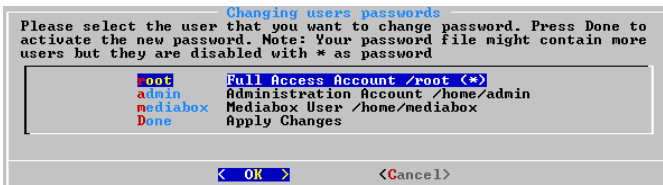
Note: Password entered here will not be displayed on the input field.



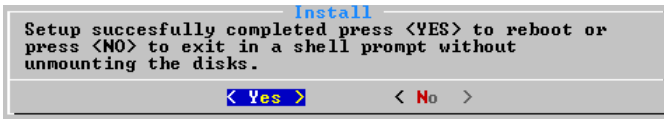
For security reason you will have to reenter the password. Make sure that the password match of else new password will not be valid.



After changing a user password you will notice a (*) on the right side for you to remember your changes.



Changing password setup module is complete.
If you plan to make changes on your disks you can choose **No** so will have a shell prompt. Otherwise choose **Yes** and you are ready to use iMedia system.



After the machine boots up, login as "root" with the password set before.

Example:

```
iMedia Embedded Linux OS release 2.4.2
```

```
minibox login: root
password: *****
```

Package Description

Packages list is in alphabetical order.

acpi

Description : ACPI support
Category : drivers

apache

Description : MiniBox HTTPd Server 1.3.26
Category : base-distribution

bttv

Description : BTTV driver 0.8.43
Category : drivers

diag

Description : Diagnostic Tools 2.2.0
Category : utils

ftpsrvr

Description : FTP Server 1.0
Category : servers

joe

Description : Joe Text Editor 2.9.7
Category : utils

lcd-via

Description : LCD/Keypad support 2.4
Category : drivers

ntp-client

Description : NTP Client 1.0
Category : utils

oss-eden

Description : OSS 3.9.7c-VIA Eden

Category : drivers

perl

Description : Perl 5.6.0

Category : base-distribution

sysadmin-console

Description : System Administration (console)

Category : administration

usb-via

Description : USB support

Category : drivers

SysAdmin console

If you need to change some settings on your system like network settings or access passwords we provide you and local sysadmin tool with graphical interface.

In order to use this tool you must have installed **sysadmin-console** package (see CD-Install section and Package Description section).

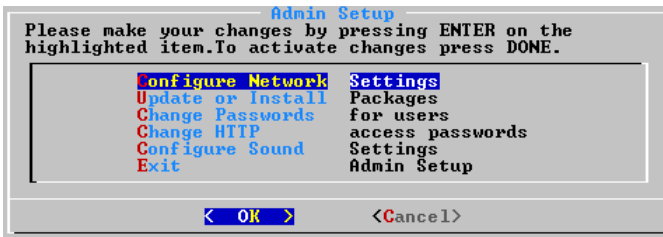
Login into machine using admin account with the password that you set on Install.

iMedia Embedded Linux OS release 2.4.2

minibox login: admin

password: *****

On the main screen you can choose what changes you want to make:



- Configure network (see **CD-Installation** section)
- Update or install (see next section **Updates**)
- Change Passwords(see **CD-Installation** section)
- Change HTTP access password
- Here you can change admin access password for web access.
- Configure sound
- If you need to make changes on your sound settings you will have here access to oss-soundconf.

```
Open Sound System - Config main menu
Intel ICH2
4Front Technologies Input Multiplexer (IMUX)
4Front Tech. Virtual Mixer Pro

Save changes and Exit
Cancel changes and Exit
Add new card/device
Remove a card/device
Reorder card list
Autodetect soundcards
Security setup
Automatic Boot setup
Manual configuration
Configuration options <README.ConfigOptions>
Audio self test
Order permanent OSS license <requires web browser>
Install license file

[Save and exit]      [Exit without saving]
```

For detailed instruction see:

OpenSound System site <http://www.opensound.com/>

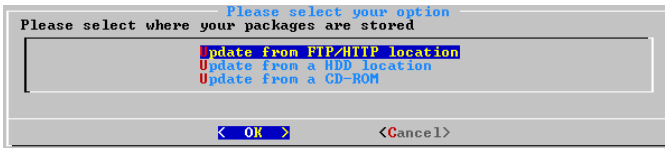
Updates

There are two different methods of updates that can be performed on a iMedia system:

- Local updates
- Internet Updates

In order to make updates you must have **sysadmin-console** package installed.

Login using admin account (see previous section) and access **Update or Install**.

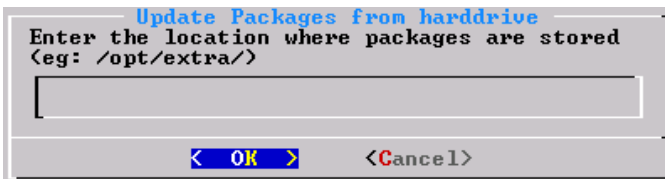


Local Updates

You can make system or packages updates from your Hard Disk or CD-ROM.

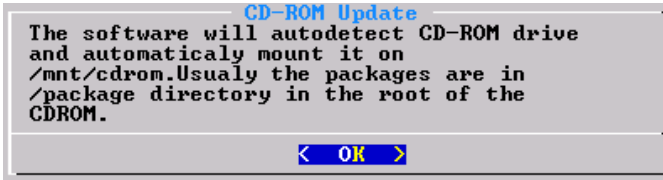
- **Hard Disk**

Enter location of the packages from which you want to Install or Update.



- **CD-ROM**

SysAdmin tool will try to find automatically onto your CD-ROM packages to update.



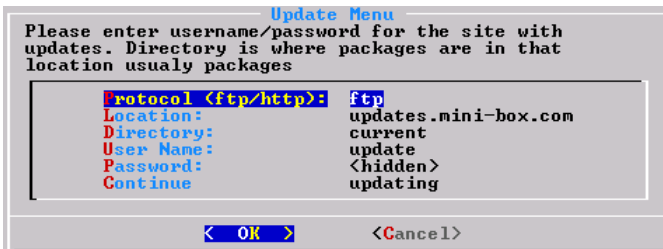
Internet Updates

You can also make updates from internet, any http/ftp location that contains iMedia packages.

In the followings we give you an example with an update made from our ftp update site.

On the main screen you can see all available options for update process:

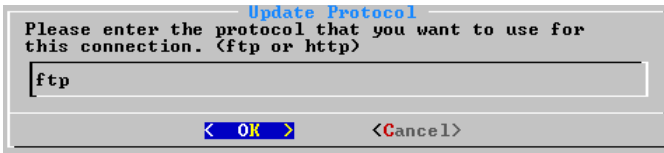
- **Protocol**
- **Location**
- **Directory**
- **Username**
- **Password**



Protocol

Enter protocol that will be used in update process http or ftp.

In our case: *ftp*



Update Protocol

Please enter the protocol that you want to use for this connection. (ftp or http)

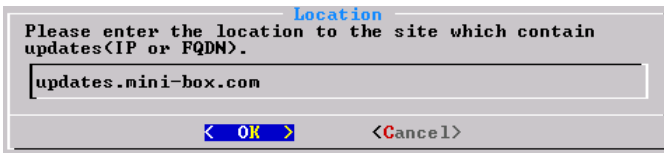
ftp

< OK > < Cancel >

Location

Enter internet location that contains packages.

In our case: *updates.mini-box.com*.



Location

Please enter the location to the site which contain updates(IP or FQDN).

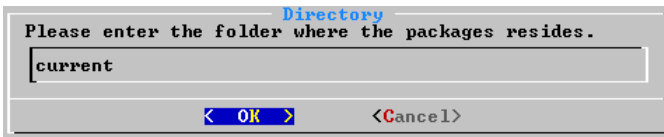
updates.mini-box.com

< OK > < Cancel >

Directory

Enter directory with the packages needed for install or update.

In our case: *current*.



Directory

Please enter the folder where the packages resides.

current

< OK > < Cancel >

Username

Enter username that will be used for authentication.
In out case: *update*.



User name

Please enter the user name site with updates.<Note: You have to enter anonymous for a anonymous access.

< OK > <Cancel>

Password

Enter username password needed for authentication.



Password

Please enter the password for the site with updates.<Note: You have to enter your email address for a anonymous access.


< OK > <Cancel>

After successfully retrieve the package list you will choose from the list the packages that you need to install or update (see **CD-Installation -> Optional Packages** section and **Packages Description** section).

iMedia File System

iMedia filesystem is consists mainly on one partition with ReiserFS on primary device that can be hard disk or flash drive. Other important partitions such as /var and /tmp are using tmpfs.

Considering these two last partitions there is a difference between hard disk and Flash Drive. On hard disk /var is only created once at first boot and /tmp is dynamically created at boot time and on the other side , on Flash Drive both partitions are dynamically created at boot time.

 **DO NOT use /var or /tmp to keep important data because at reboot all these data will be lost, because these 2 partitions are dynamically created at boot time.**

If at install process second hard rive is found it will be automatically mounted in /opt/extra.

 **Installing iMedia will result loss of all your data and repartitioning on current device (hard disk or flash drive).**

Considering the fact that iMedia was designed for embedded systems where disk space is an important issue, ReiserFS was specially modified and optimized for Flash drives and also some kernel changes were made to reflect the filesystem modifications.

ReiserFS partitions are not containing information such as access time and modification time for files to prolong life of Flash drive.



ReiserFS has fast journaling, which means that you don't spend your life waiting for fsck every time your laptop battery dies, or the UPS for your mission critical server gets its batteries disconnected accidentally by the UPS company's service crew, or your kernel was not as ready for prime time as you hoped, or the silly thing decides you mounted it too many times today.

iMedia Logging System

iMedia was design for use in embedded system with Flash Disks and thus space consideration is important.

The most important aspect is logging system. In time log files may become huge and thus problems because of free space may occur.

To solve this problem iMedia uses emlog system.

Description:

emlog is a Linux kernel module that makes it easy to access the most recent (and only the most recent) output from a process. It works just like "tail -f" on a log file, except that the storage required never grows. This is useful in iMedia system where there isn't enough memory or disk space for keeping complete log files, but the most recent debugging messages are sometimes needed (e.g., after an error is observed).

The emlog kernel module implements simple character device driver. The driver acts like a named pipe that has a finite, circular buffer. The size of the buffer is easily configurable. As more data is written into the buffer, the oldest data is discarded. A process that reads from an emlog device will first read the existing buffer, then see new text as it's written, similar to monitoring a log file using "tail -f". (Non-blocking reads are also supported, if a process needs to get the current contents of the log without blocking to wait for new data).

All log files on iMedia are emlog devices:

- system log files
- apache log files
- user space programs log files.



You can read from the log in the normal way, e.g. using `cat`. By default, reads block, just like "`tail -f`", waiting for new log data. For example:
`cat /var/log/mediabox/system.log`.



You can save the log using non-blocking utility like `nbcats`.
For example:
`nbcats /tmp/emlog-test > /tmp/saved-log-copy`.



DO NOT try to use `cp`, to copy an emlog device, it will hang (`cp` uses blocking mode to read data from file).



How can I create my own log file?

You must use **`mknod`** command to create device files that your processes can write to. The major number of the device files should be iMedia major number for emlog files 241. The minor number is used to indicate the size of the ring buffer for that device file, specified as the number of kilobytes (e.g., 1024 bytes).

For example, to create an 8K buffer called `testlog`:
`mknod /tmp/testlog c 241 8`.

You can create as many devices as you like. Internally, emlog uses the file's inode and device numbers to identify the buffer to which the file refers.

iMedia Booting Procedure

iMedia is derived from standard linux system and as explained before has some special modifications for use in embedded systems. Among these modifications stands silent booting procedure.

In a normal situation at booting time after kernel is loaded into memory and decompressed till you get a terminal, you see a lot of kernel messages and services output. iMedia blocked all these message by making some modifications in source code of kernel and also in startup script for services everything is cutoff.

Only in moment of logging modules some output may appear.

Let see exactly what is booting order and scripts that are used in this booting process:

- kernel is decompressed and loaded into memory
- init script is called: `/etc/rc.init`
- load module before anything else : `/etc/rc.modules`
- `init.d` scripts
 - Create `/var` partition
 `/etc/init.d/createvar`
 - Hardware device setup
 `/etc/init.d/setpcibus`
 - System and fs tuning
 `/etc/init.d/tunning`
- system init : `/etc/rc.sysinit`
- run system services (see system Services section)
 `/etc/rocs`

Silent Booting HOWTO

If you want the booting procedure to be complete silent , meaning that modules output to be hidden or redirected, here are the 2 things that you can do.



How to I hide modules output?

If you do not want to modules output at loading time to get a clean Silent Boot you can create a file called boot.silent under /etc directory. At booting procedure is the system detects this file all modules output will be cutoff.



Can I redirect to LCD modules output?

The answer is yes. If do not have an monitor attached and still you want to see modules output create a file called boot.lcd under /etc directory and thus all output will be redirected your LCD.

iMedia System Services

iMedia runs on customized version of kernel , based on 2.4.19 version.

Services running on iMedia are :

- crond
- httpd
- inetd
- network
- syslogd.

Let us shortly explain each service

- crond

crond is a background daemon that parses individual crontab files and executes commands on behalf of the users in question at specified time.

Script: /etc/rcS.d/60crond

Config file: /etc/crontab

- httpd

httpd is an Apache HTTP Server.

Script: /etc/rcS.d/50httpd

Config files:

/etc/httpd/conf/access.conf

HTTPD access file. In this file you control the access to your HTTPD server.

To avoid confusion, it is recommended that you put all of your Apache server directives into the httpd.conf file and leave this one essentially empty.

/etc/httpd/conf/httpd.conf

HTTPD main configuration file.

/etc/httpd/conf/srm.conf

HTTPD resource configuration file.

To avoid confusion, it is recommended that you put all of your Apache server directives into the `httpd.conf` file and leave this one essentially empty.

`/etc/httpd/access/.htaccess`

HTTPD server access control. In this file you control access to your HTTPD server

`/etc/httpd/access/.passwd`

HTTPD allowed users password file.



DO NOT write password in plain text in this file. Passwords MUST be encrypted.

Edit this file using `/usr/bin/htpasswd` utility

Web docs: `/home/httpd/mediabox/content`

HTTPD web pages location is automatically linked in `/opt/extra`.

Log files: `/etc/httpd/logs/error.log`

Mini-box HTTPD server is configured to keep only error log and it is a special log file using `emlog`. (see iMedia Logging section)



Default user and password for access your HTTP server via web browser is `admin` with password `"4admin4"` without quotes.

- **inetd**

inetd is a network super server that listens at multiple ports and when it receives a connection (for example, an incoming pop request), `inetd` performs the network negotiation and hands the network connection off to the specified program. This prevents services from running idly when they are not needed.

Script: `/etc/rcS.d/40inetd`

Config File: `/etc/inetd.conf`

The `inetd.conf` file contains the list of servers that [inetd](#) invokes when it receives an Internet request over a socket. Each server entry is composed of a single line of the form:

*service-name endpoint-type protocol wait-status uid
server-program server-arguments.*

- **network**

network is only a script used for setting up network environment such as IP addresses, routes.

Script: `/etc/rcS.d/10network`

Usage: `/etc/rcS.d/10network`

Config Files:

<code>/etc/config/ifcfg-eth0</code>	IP settings for eth0 device
<code>/etc/config/ifcfg-lo</code>	IP settings for lo device
<code>/etc/config/network</code>	network settings
<code>/etc/hosts</code>	known hosts file
<code>/etc/resolv.conf</code>	resolver settings such as nameservers, search default domain name
order,	resolving names.
user for	

- **syslogd**

Linux system logging utilities.

Config File: `/etc/syslogd.conf`.

Note: On iMedia by default all messages are redirected to `/dev/tty3` console and log files are using `emlog` system (see iMedia Logging section).


LCD Tips and Tricks

One of the key featured of iMedia is LCD support. After successfully installed such a machine does not need monitor or keyboard. LCD is the interface you need in this situation. You can change settings on your machine, monitor processes write custom messages on it.

Here is a list of the things that you can do:

- System Status
- VU Meter
 - Monitor sound input volumes
- Sensors
 - Monitor FAN1,FAN2,FAN3 rotations per minute and CPU temperature
- Processor
 - Monitor CPU usage
- Memory
 - Monitor system memory: physical memory and swap
- Uptime
 - Display system uptime
- Disk
 - Display disk usage
- Big Processes
 - Display system top memory users processes
- Time
 - Display local time
- System Maintenance
- Reboot
 - Reboots the machine
- Poweroff
 - Poweroff the machine

- Sync
 - Flush all buffers to disk.
- Network Setup
- IP
 - Set the machines IP
- Netmask
 - Set the netmask
- Gateway
 - Set the gateway
- Fully Qualified Domain Name
 - Set fqdn for machine
- DNS1
 - Set primary nameserver
- DNS2
 - Set secondary nameserver
- Activate current config
 - Activate to current changes made to network settings
- Log Files
- Tail messages
 - Watch /var/log/messages file
- Sound Options
- Sound Stop
 - Stop OSS
- Sound Restart
 - Restart OSS service
- Toggle BackLight
 - Toggles LCD BackLight ON/OFF
- GPO Functions
- GPO [n] ON/OFF
 - Activate/Deactivate GeneralPurposeOutput
 - GPO [n]


 As explained in the **Silent Booting HOWTO** section if you create under `/etc` directory a file called `boot.lcd` then all output messages will be redirected to your LCD.

 Can I change LCD boot logo ?

You can edit `/etc/lcdbootlogo.conf` file and place there your desired LCD boot Logo.

But there are some limitations that must be considered:

- boot logo will have no more than 40 characters
In this case auto wrapping will occur
- boot logo can consist of 2 lines with no more than 20 characters

 Can I write custom messages on my LCD?

Of course. You made for you a utility for this kind of requests called `lcdinit` and it can be found in `/opt/lcd/lcdinit`.

Usage: `./lcdinit [OPTIONS]`

Description: tool for customizing your LCD

Options:

`-d, --device <device-name>`

Set LCD device name(default `/dev/lcd`)

`-c, --clear`

clear the LCD

`-b, --boot-logo <logo |file>`

Sets LCD boot-logo to `<logo>` or first 40 chars from `<file>` .

NOTE: Only first 40 chars of the message or from file will be printed

- s, --show-cursor <0|1>
turn off/on the block cursor (default 0)
- p, --poll-keypad
polls LCD keypad
- k, --auto-transmit-keypresses <0|1>
auto transmit keypresses set to off/on (default off)
- r, --auto-scroll <0|1>
Disables (enables) scroll at bottom of screen.
Text will push display up one line to make room
for new line.(default 0)
- w, --auto-wrap <0|1>
Disables (enables) line wrapping (not word
wrap).(default 0)
- e, --auto-repeat <0|1>
Disables (enables) auto repeat mode
- g, --gpo-on <number>
Turns GPO <number> on. Number must be a
value between 1 and 6
- o, --gpo-off <number>
Turns GPO <number> off. Number must be a
value between 1 and 6
- t, --contrast <value>
Sets and save display contrast. Compensates
for viewing angle. Contrast is a value between 0
and 255 . Larger = darker.
- l, --backlight <0|1>
Turn off/on LCD backlight(default off)
- m, --message <message|file>
Printout on LCD <message> or read the
message from <file>.
NOTE: Only first 40 chars of the message or
from file will be printed
- h, --help This help



Can I add/remove menus on my LCD ?

You can edit the file called `menus.cfg` under `/opt/lcd/client` directory and change the menus defined there.

As you will see explained also at the beginning of file the format of this config file is as follows:

MenuName:Menu Item==xAction

Where x is

- ^ ignored
- @ load menu
- & run function
- * run sys command or script

Also there is a special item **_cancel** for action to take end Cancel (ESC) is received.

If system commands don't start with a /, will be assumed to exist in default exe path of the system.

- /bin
- /sbin
- /usr/bin/
- /usr/sbin/
- /usr/X11R6/bin
- /usr/local/bin
- /usr/local/sbin

Any action can be prepended with a General Purpose Output (GPO) directive:
`%gpo_number-[1|0]`

For example:

1. Start Encoder==%1-1*encoder

Explanation:

If selected, turn on gpo 1 and run command 'encoder'
2. Stop Audio 2==%3-0*audio stop

Explanation:

Turn off gpo 3 and run command 'audio stop'

Arguments to be passed to commands/functions can be specified with their requesting prompt in ><.

For example:

```
net_setup ip >System IP:<
```

Explanation:

This will prompt the user with "System IP:" and substitute the input into the command line.

To specify an input type other than alphanumeric, >i:System IP:<, will allow only characters valid for an ip address.

Conditional prompts or commands:

```
MenuName:{prog1?cond1}Prompt1==xAction1??  
{prog1?cond2}Prompt2==xAction2??Prompt3==xAction3
```



**In the example above command
should be on one line.**

Explanation:

Run prog1 and compare output with condition cond1, if it matches, show Prompt1 which would execute xAction1 if selected. Failing a match on prog/cond1, run prog1 and compare to cond2, if it matches.

Failing that, Prompt/Action3 has no condition, this is the fallback default.

Example:

```
Testing:{apachectl status?==1}  
Stop WebServer==%3-0*apachectl stop??
```

```
{apachectl status?>1}
Kill WebServer==%3-0*apachectl kill??
Start WebServer==%3-1*apachectl start
```



**In the example above command
should be on one line.**

Variable manipulations:

It's possible to set/display internal variables using this format anywhere the command arguments:

Example:

```
Testing:{prog status?==1}Program Off($stat$)==%3-
0*prog stop+stat=1+??{prog status?>1}Program Kill==%
3-0*prog kill??Program
```



**In the example above command
should be on one line.**

Explanation:

- \$stat\$ will be substituted with the value of 'stat'.

+stat=1+ sets the value of 'stat' to 1.

Substitutions can appear anywhere in command line (Label or action) Setting can be listed anywhere in action component, but start or end makes sense.

After you made all the changes you should restart LCD client support to view on LCD your custom menus:

```
/opt/lcd/client/stop
/opt/lcd/client/start
```

Notes



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