

# ***LPSIB***

## **QUICK-START GUIDE**

**REVISION 0.1**

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EMAC, Inc.

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## 2 Getting Started

This guide will provide an overview of the operation and configuration of the EMAC Low Power Server in a Box (LPSIB). It will briefly cover the steps of powering up, logging in, and using the menu system to configure the LPSIB as well as describe the location of important software and documentation on the included CD-ROM.

### 2.1 Powering Up

Before plugging in your LPSIB, several connections should be made. First, connect a serial cable to the female host serial port located directly to the left of the Ethernet port on the LPSIB. This should be a standard serial cable and not a null modem cable. This serial port is configured as a standard serial terminal by default. The other end of the serial cable should be connected to a PC or ASCII terminal for the initial configuration of the board. A network connection may be established by connecting the LPSIB's Ethernet jack to a standard 10/100 base-T network. If the jack is connected directly to a PC, a crossover cable should be used. If the board is connected to a router, switch, or wall jack, standard CAT5 straight-through patch cable should be used.

Unless your network provides DHCP service and you have some way of dynamically locating the board on the network, you will need to establish a serial connection to communicate with the board initially. Any terminal program can be used for this (such as Hyperterminal or Minicom).

The following settings should be used for connection:

```
BAUD: 115200
BITS: 8
PARITY: None
STOP BITS: 1
LINE FEEDS: Off
(115200 8N1)
```

Supply power to the LPSIB by connecting the power cord to the LPSIB using the connector, and plugging the power supply into a standard wall jack or power strip. At this point, the LPSIB should power up and boot automatically. You should be able to see text scrolling through the terminal program display as the OS loads and boots. When booting has finished, you should see a login prompt. The default login setup is user: `root`, password: `emac_inc`.

If for any reason you need to restore the system to its default settings, this may be done by powering-down the LPSIB, opening the enclosure and removing the SoM from its socket for a few seconds then replacing it. Be sure to backup any necessary files before doing this.

### 2.2 Menu System and Configuration

Once you have logged in, the LPSIB main configuration menu should be displayed automatically. The display should be as follows:

## Low Power Server in a Box -- main configuration menu

```
1 ) Serial settings
2 ) Ethernet settings
3 ) Routing tables
4 ) Host name
5 ) Internet name resolution

M ) Shell prompt
A ) Activate Changes
T ) Set time and date
C ) Change root password
S ) Shutdown SIB
Q ) Quit
```

-----  
Selection:

To operate the menu system, type the letter or number corresponding to the option that you would like to execute, and press enter (the menu is case insensitive, i.e. 'a' is the same as 'A'). For security purposes, the root password should be changed before any other changes are made. To do this, enter 'C', which will bring up a prompt to change the password. Answering 'Y' at the first prompt will initiate the password changing program and prompt you for a new password twice. This change is valid immediately.

### 2.3 Main menu operation

Typing 'M' will bring up a shell prompt, leaving the menu system running. Here, you can execute any shell commands or programs that are installed on the LPSIB. Type "exit" to return to the menu system. Alternatively, 'Q' will also bring up a shell prompt, but will exit the menu system altogether. The main menu will be invoked again on the next login or reboot, or by typing "/lpsibconfig/LPconfig" at the shell prompt.

Selecting 'S' will allow you to reboot or completely shutdown the system (halt). After halting, the system will wait to be powered down. If the watchdog is running, it will reset the system after a timeout period. For this reason, the system should be disconnected from the power after a halt unless you wish for it to restart.

Entering 'T' will allow the time and date to be set. The clock will need to be set initially, but will maintain time via the battery backup despite any loss of power. The clock runs on a 24-hour system and does not store time zone information. Enter the time and date in the form `mmddhhmmYYYY` (<month><day><hour><minute><year>) to set the clock. The updated time will be displayed, and control will be returned to the main menu.

Many of the settings on the LPSIB are stored in scripts that are run at startup. For this reason, not all changes will be activated immediately, although the changes have been saved. The majority of these scripts can be run on demand through the "Activate changes" option on the main menu. Typing 'A' will prompt for you to verify that you want to activate the changes you have made. Following this, the system will ask if any changes have been made to the network configuration. This determines whether the network scripts are run, and is important to prevent connection problems. If a network change has been made from static addressing to DHCP or from DHCP to static addressing, restarting the network is

safe (answer 'Y'). If no changes have been made to the Ethernet configuration, answer 'N' to avoid restarting the network interfaces.

Sub-menus on the LPSIB will operate in the same way as the main menu. *Be careful!* Providing invalid settings for the configuration could easily cause errors when changes are activated or on the next boot, possibly making it difficult to access the LPSIB via the network or a serial terminal.

## 2.4 Serial settings menu

Selecting the “Serial settings” menu from the main menu will allow configuration of the serial ports on the LPSIB. Ports may be configured as Serial Line IP (SLIP), terminal servers, or dial-in terminals. Selecting the appropriate option from the Serial settings sub-menu will prompt for the necessary settings and save the changes. The current settings of the serial ports may be viewed through the Serial settings menu also. Entering 'B' from any sub-menu, such as the Serial settings menu, will cause the sub-menu to exit and return to the main menu.

## 2.5 Ethernet settings menu

Selecting the “Ethernet settings” menu from the will allow you to configure the Ethernet settings on the LPSIB. The first option allows you to change the settings of an interface by specifying DHCP for dynamic addressing, or setting a static IP address, network mask, and broadcast address for a given interface (interfaces are specified as `eth0`, `eth1...`).

When the LPSIB boots, it uses information written by this menu to attempt configuration. If these settings fail, the interfaces will be brought up with the settings stored in `/etc/lpsibconfig/ethdefaults`. The default IP address is set to 10.0.2.41, with a network mask of 255.255.255.0, and a broadcast of 10.0.2.255. These values should be modified to reflect the settings of the network that the LPSIB will be running in.

## 2.6 Routing tables menu

Selecting the “Routing tables” menu will allow you to set specific routes and view the current routes. This information is stored in the static routing table that is used by the LPSIB to determine which network device to use when trying to communicate with a specific host. This menu allows you to add and delete from the routing entries that are run on startup.

You may also configure the default gateway, which is where the LPSIB will send network packets when the destination has not been explicitly listed in the static routing table. This is generally your LAN's router or other forwarding device. Note that a standard host routing entry must be made for the default gateway prior to the specification of the gateway, or the LPSIB will not know how to reach it. Selecting the final menu option will display the routing commands that will be run on startup.

## 2.7 Host name option

Selecting “Host name” from the main menu will display the current host name of the LPSIB (set to “`lpsib`” by default). You will then be asked if you wish to change the host name, and prompted for the new host name if you answer 'Y'. A static host entry must also be added through the “Internet name resolution” menu in order for the LPSIB to be able to resolve its own host name into its IP address.

## 2.8 Internet name resolution menu

This menu allows you to add and delete static hosts entries and name servers (DNS) to be used by the LPSIB. Adding static hosts will allow the LPSIB to associate a host name with an IP address without having to contact the name server. Before adding or deleting a static host, you will be shown the current contents of the hosts file, and prompted for the required information to create a new host entry or delete an old host entry.

Similarly, before adding or deleting a name server, the current resolver information will be displayed followed by a prompt for the information needed to create or delete an entry. Selecting the final option will display the information stored for both the static hosts and the name server configuration.

## 2.9 Shell operation hints

The operating system of the LPSIB is a Linux distribution for embedded systems called uClinux, and contains versions of many of the standard commands that are available on a modern Linux distribution. An application called **Busybox** is used to implement many of these commands, which can be listed by typing “help” at the shell prompt.

The text editor on the system is an elementary version of vi, which is implemented through **Busybox** as well. A vi commands list will be helpful when making simple changes to text files on the LPSIB.

Other important commands have also been included on the LPSIB, including **ifconfig**, **route**, **slattach**, **setserial**, **agetty**, and others. Furthermore, the HTTP server running on the LPSIB is **Boa**, and TELNET and FTP servers are also started at boot by default. These can be accessed and configured from the shell.

## 3 Further Information

The CD included with your LPSIB contains important documentation, development tools, and software to help you make use of the full potential of your LPSIB. The CD contains several directories corresponding to different EMAC products. Enter the directory titled “SoM.”

The “Toolchain” directory under the “SoM” directory contains the Windows executable for the “EMAC Open Tools-R2.exe” (or similar) -- the software development kit used for the LPSIB. This will allow you to develop and compile applications in Microsoft Windows using Eclipse to be run on your LPSIB. Follow the instructions in the “INSTALL.txt” file to install and use the Software Development Kit.

The “SoM-5282EM” directory contains the majority of the important files for the LPSIB, as the LPSIB is built on the System on Module (SoM) 5282. In the “SoM-5282EM” directory, you will find the manual for the SoM-5282, containing the hardware specifics of the system. The “FAQ” file contains answers to frequently asked questions regarding the SoM-5282, and the “README.html” file describes the contents of the directory. This README file also contains a link to the EMAC [SoM ftp site](#), which contains complete uClinux distributions that are available for use on the SoM-5282. The “Tools” directory contains Open Source tools for compiling, debugging, and flashing the LPSIB. These tools are

intended to be used under Linux / UNIX, and are described in the “README.tools” file. The Linux version of the Software Development Kit is also located in this directory.

***If you have any questions or problems with your LPSIB contact [support@emacinc.com](mailto:support@emacinc.com) with the subject heading “LPSIB support”.***