

Introduction

This document describes how to unzip, configure and build OpenWRT in SDK 2.0 release.

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1 Unzip SDK 2.0 Release

To unzip SDK 2.0 release, follow these instructions:

```
bunzip2 ubicom-linux-dist-2.0.tar.bz2
tar -xvf ubicom-linux-dist-2.0.tar
```

This will create an ubicom-linux-dist-2.0 directory that contains the toolchain, the source code and the documentation.

2 Setting Up a Linux PC for SDK 2.0 Compilation

In order to configure, compile and build successfully SDK 2.0 on a Linux PC, some packages must be installed on the PC.

On a fresh installation of Ubuntu 9.10, the following packages are needed to configure, compile and build SDK 2.0:

- build-essential.
- sharutils
- exuberant-ctags
- zlib1g
- zlib1g-dev
- libncurses5
- libncurses5-dev
- libgcc1
- gcc
- gcc++

- gdb
- gawk
- bison
- flex
- subversion
- autoconf
- expect

To install those packages, follow these steps:

```
sudo apt-get update
sudo apt-get install build-essential sharutils exuberant-ctags zlib1g zlib1g-
dev libncurses5 libncurses5-dev libgcc1 gcc gcc++ gdb gawk bison flex
subversion autoconf expect
```

3 Configuring OpenWRT in SDK 2.0

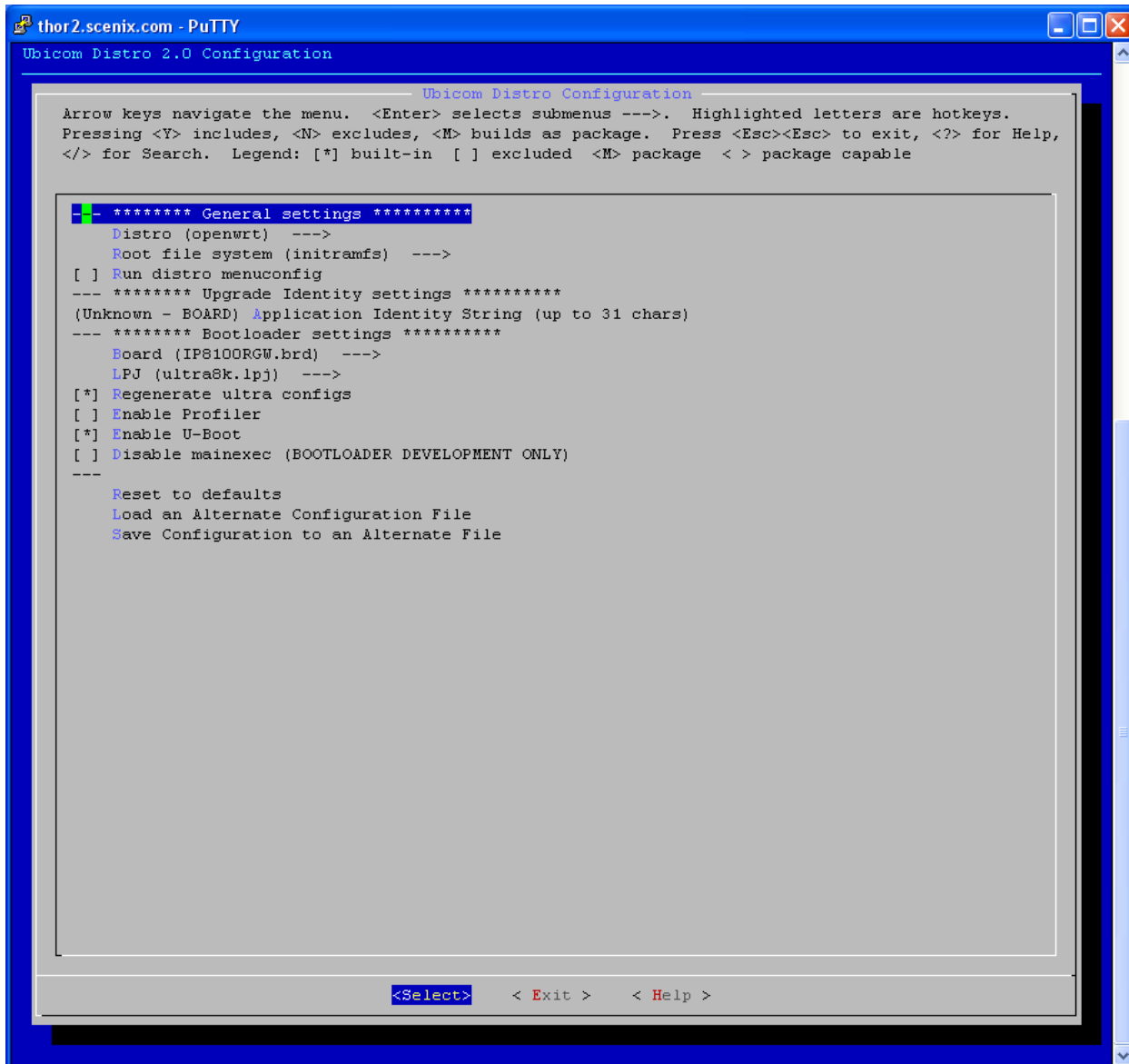
To configure OpenWRT in SDK 2.0, type **make menuconfig** from the workspace root. `ubicom-linux-dist-2.0` is the workspace root directory.

All options needed are configured by default. This section illustrates the process of configuration for learning purposes.

The pictures below illustrate the step-by-step process of configuring openWRT.

3.1 Main Menu

Upon starting `make menuconfig`, the menu below will be shown. In order to change any configuration in OpenWRT, select “**Run distro menuconfig**” as show in figure 3.



```

thor2.scenix.com - PuTTY
Ubicom Distro 2.0 Configuration

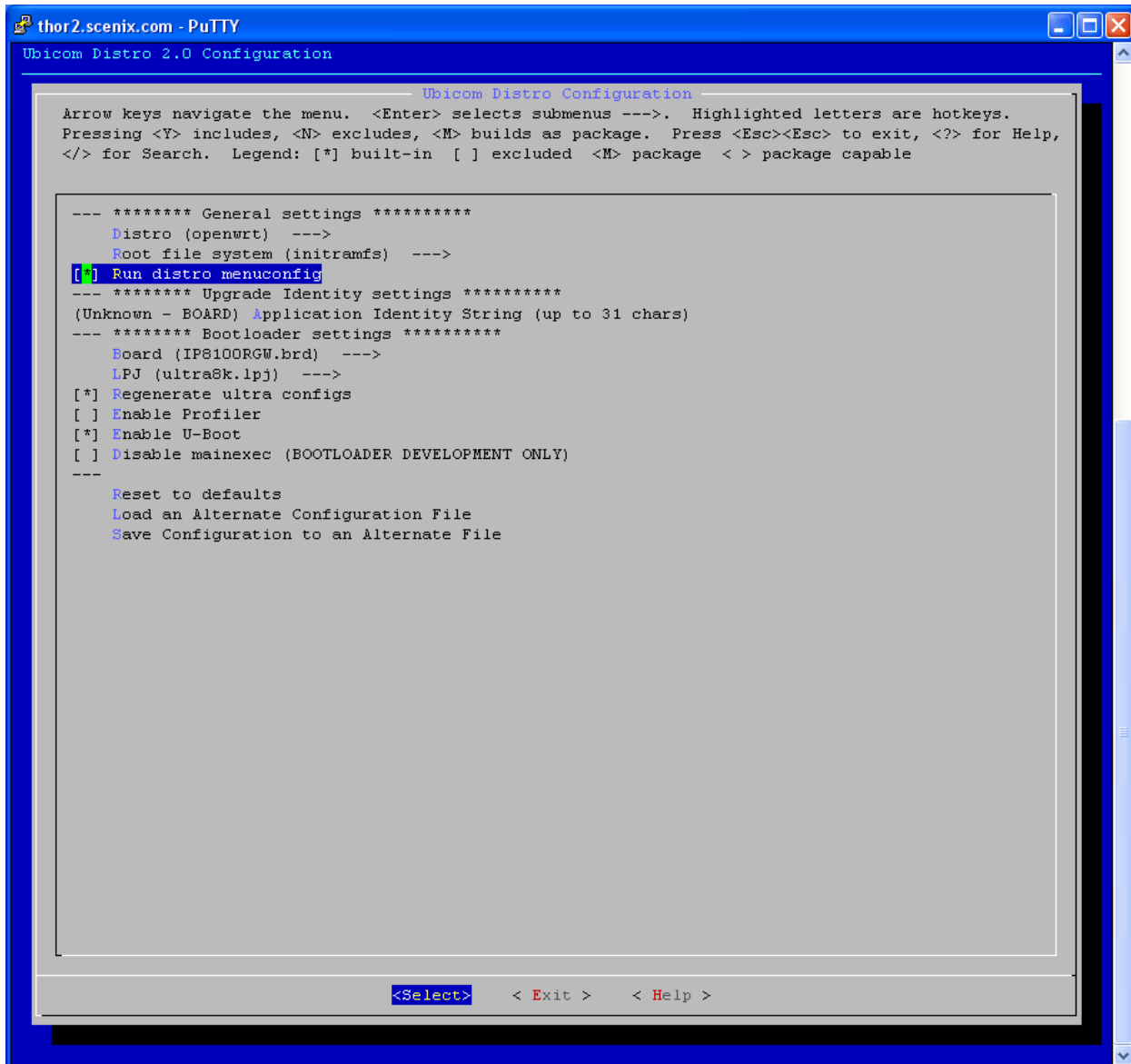
----- Ubicom Distro Configuration -----
Arrow keys navigate the menu.  <Enter> selects submenus --->.  Highlighted letters are hotkeys.
Pressing <Y> includes, <N> excludes, <M> builds as package.  Press <Esc><Esc> to exit, <?> for Help,
</> for Search.  Legend: [*] built-in  [ ] excluded  <M> package  < > package capable

-- ***** General settings ***** --
Distro (openwrt)  --->
Root file system (initramfs)  --->
[ ] Run distro menuconfig
-- ***** Upgrade Identity settings ***** --
(Unknown - BOARD) Application Identity String (up to 31 chars)
-- ***** Bootloader settings ***** --
Board (IP8100RGW.brd)  --->
LPJ (ultra8k.lpj)  --->
[*] Regenerate ultra configs
[ ] Enable Profiler
[*] Enable U-Boot
[ ] Disable mainexec (BOOTLOADER DEVELOPMENT ONLY)
---
Reset to defaults
Load an Alternate Configuration File
Save Configuration to an Alternate File

<Select>  < Exit >  < Help >
    
```

Figure 1. Main make menuconfig Menu

Selecting **Run distro menuconfig**



```
thor2.scenix.com - PuTTY
Ubicom Distro 2.0 Configuration

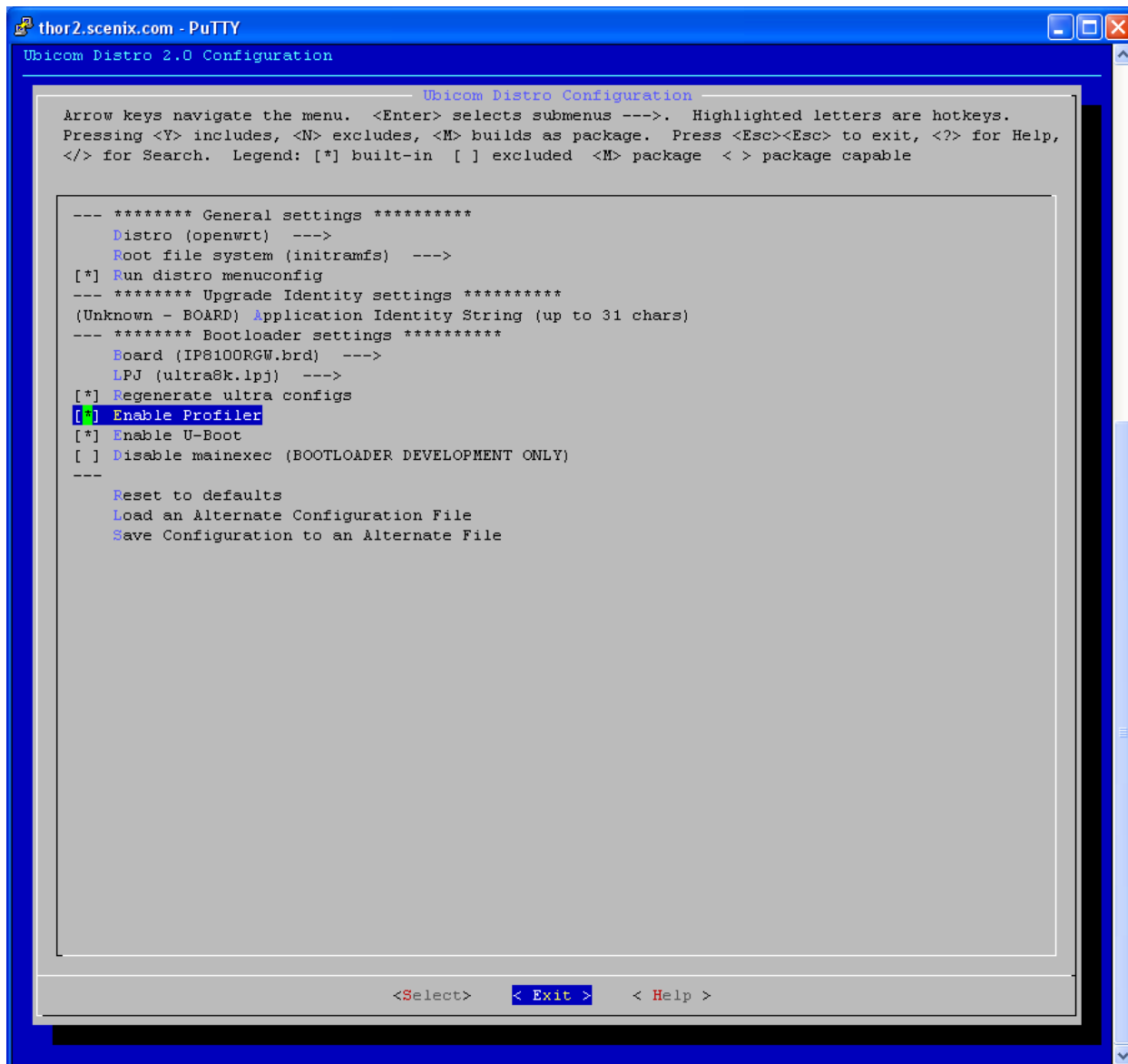
----- Ubicom Distro Configuration -----
Arrow keys navigate the menu.  <Enter> selects submenus --->.  Highlighted letters are hotkeys.
Pressing <Y> includes, <N> excludes, <M> builds as package.  Press <Esc><Esc> to exit, <?> for Help,
</> for Search.  Legend: [*] built-in  [ ] excluded  <M> package  < > package capable

--- ***** General settings *****
Distro (openwrt)  --->
Root file system (initramfs)  --->
[*] Run distro menuconfig
--- ***** Upgrade Identity settings *****
(Unknown - BOARD) Application Identity String (up to 31 chars)
--- ***** Bootloader settings *****
Board (IP8100RGW.brd)  --->
LPJ (ultra8k.lpj)  --->
[*] Regenerate ultra configs
[ ] Enable Profiler
[*] Enable U-Boot
[ ] Disable mainexec (BOOTLOADER DEVELOPMENT ONLY)
---
Reset to defaults
Load an Alternate Configuration File
Save Configuration to an Alternate File

<Select>  < Exit >  < Help >
```

Figure 2. Run distro menuconfig selected

The profiler can be enabled by selecting **Enable Profiler**



```
thor2.scenix.com - PuTTY
Ubicom Distro 2.0 Configuration

----- Ubicom Distro Configuration -----
Arrow keys navigate the menu.  <Enter> selects submenus --->.  Highlighted letters are hotkeys.
Pressing <Y> includes, <N> excludes, <M> builds as package.  Press <Esc><Esc> to exit, <?> for Help,
</> for Search.  Legend: [*] built-in  [ ] excluded  <M> package  < > package capable

--- ***** General settings *****
Distro (openwrt)  --->
Root file system (initramfs)  --->
[*] Run distro menuconfig
--- ***** Upgrade Identity settings *****
(Unknown - BOARD) Application Identity String (up to 31 chars)
--- ***** Bootloader settings *****
Board (IP8100RGW.brd)  --->
LPJ (ultra8k.lpj)  --->
[*] Regenerate ultra configs
[*] Enable Profiler
[*] Enable U-Boot
[ ] Disable mainexec (BOOTLOADER DEVELOPMENT ONLY)
---
Reset to defaults
Load an Alternate Configuration File
Save Configuration to an Alternate File

<Select>  < Exit >  < Help >
```

Figure 3. Profiler enabled

The configuration can be saved by selecting Yes.

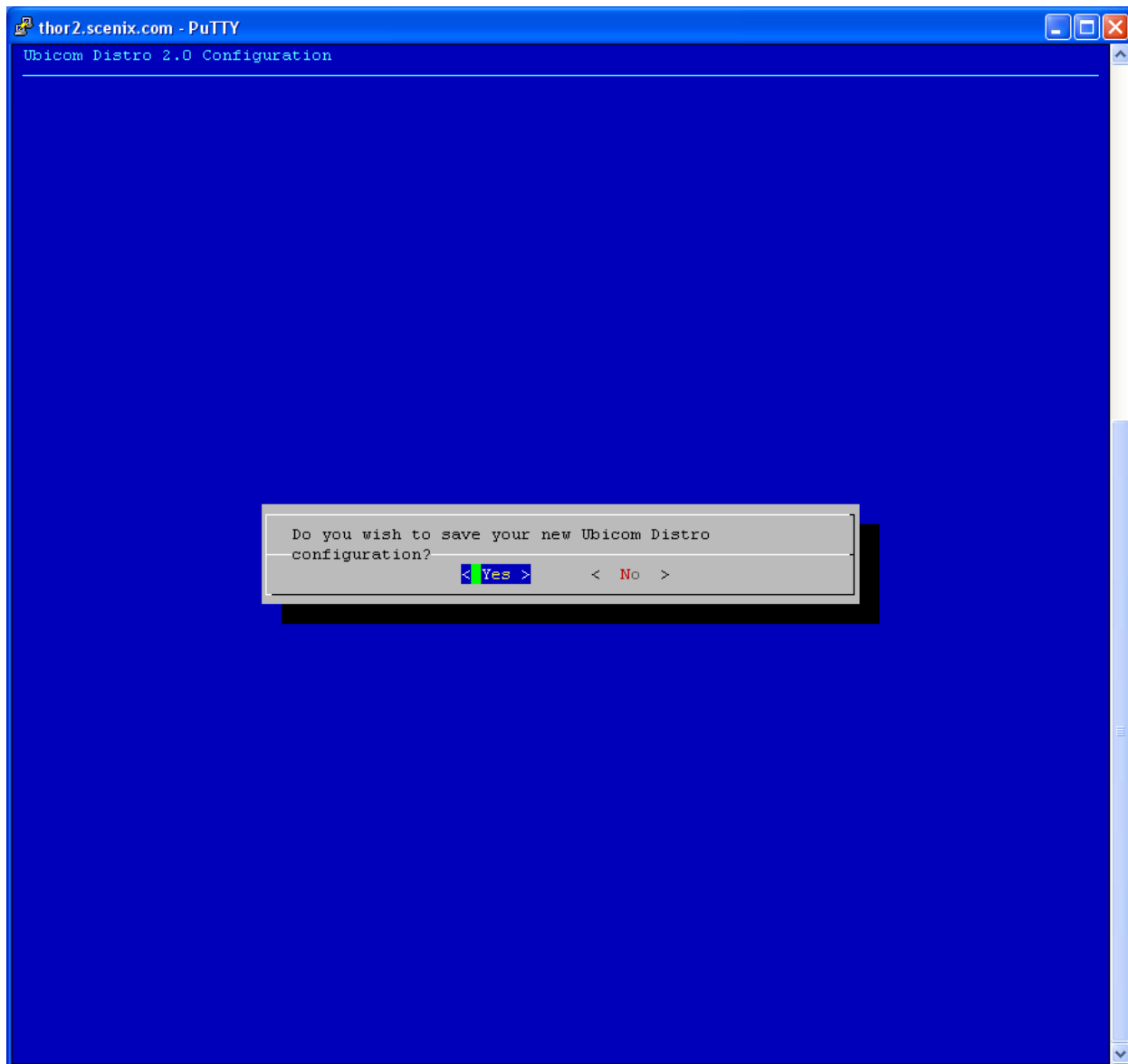


Figure 4. Saving configuration

3.2 OpenWRT Configuration

The menu below shows the openWRT configuration. Ensure that the subtarget selected is IP8100RGW as show in the picture below. Additional OpenWRT configurations can be selected or modified from this menu.

Upon exiting this menu, ensure that the selections are saved by selecting Yes to the save prompt.

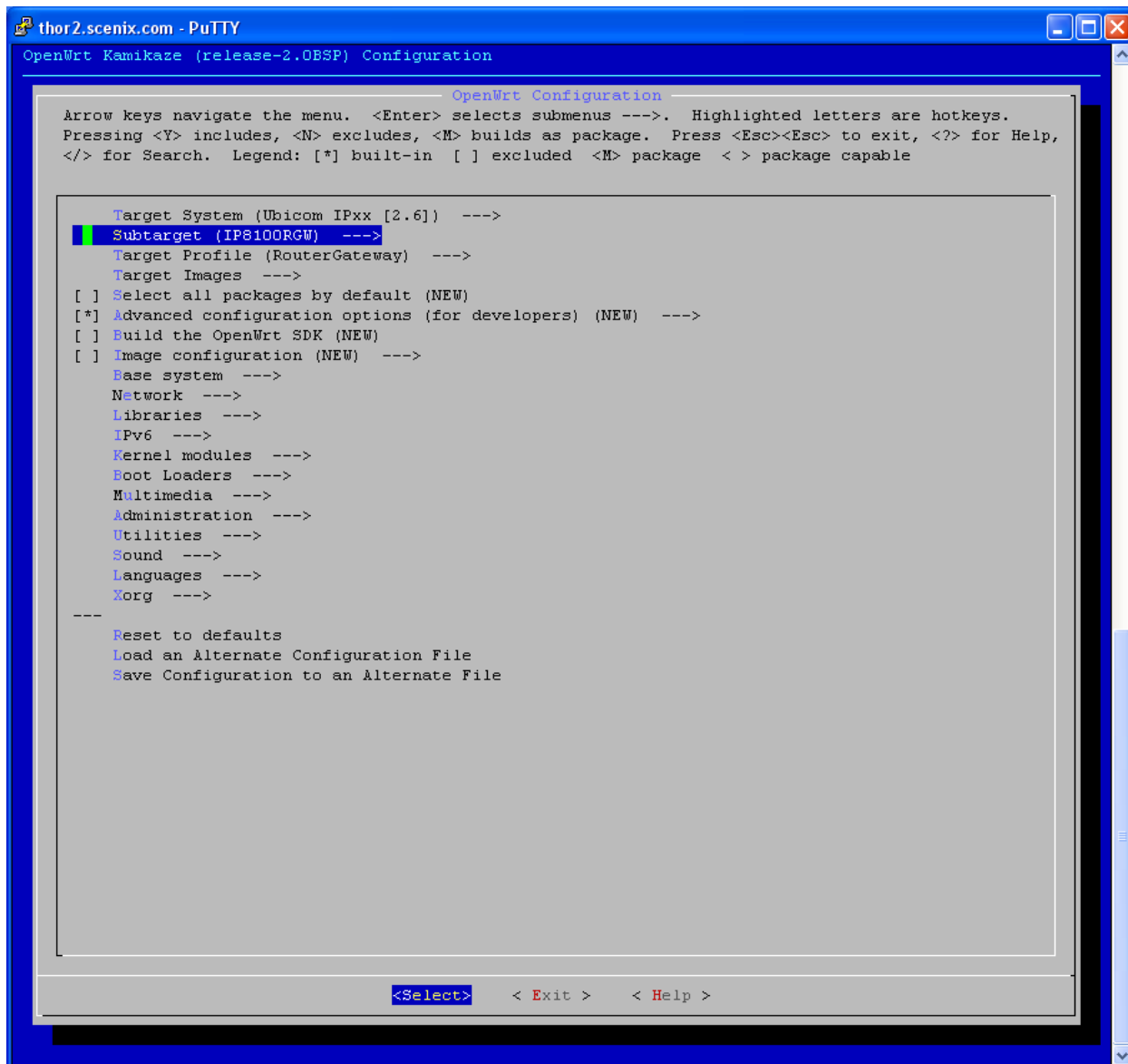


Figure 5. Subtarget selection

4 Building OpenWRT

To build OpenWRT, run **make** from the workspace root as show below:

```
make
```

To enable the highest verbose level, run:

```
make v=99
```

To redirect the output to a file and to standard out:

```
make V=99 2>&1 | tee make.log
```

5 Loading the Firmware to the IP8K Board

5.1 Adding the Wi-Fi Radio Module

To connect the Wi-Fi radio module, connect both antennas and insert it in the Mini-PCIe slot as shown in Figure 6.

5.2 Connecting Ubicom Dongle to IP8K Board

Connect the dongle to the Debug connector on the IP8K RGW board, ensuring that the marked cable in the ribbon corresponds to pin 1 of the debug header on the IP8K board as shown in the picture below.

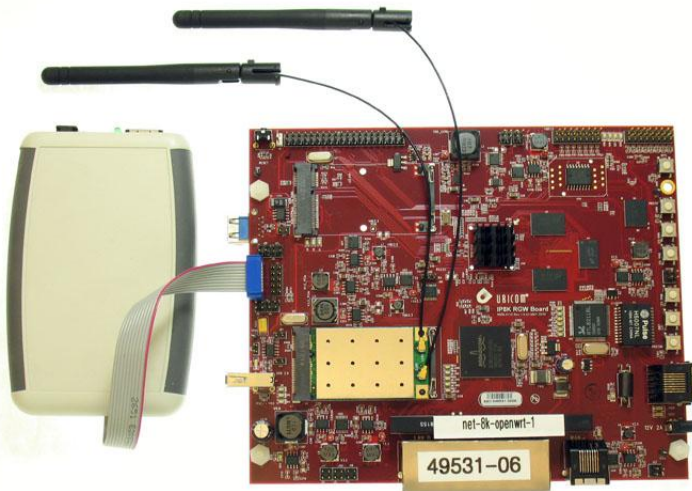


Figure 6. IP8K RGW board with programming dongle and Wi-Fi module

Connect the dongle Ethernet interface to a network with a DHCP server. To find out the IP address of the dongle, you can run from the workspace root `ubicom-linux-dist-2.0` the following command:

```
ultra/tools/bin/linux/udm4linux
```

Below is a sample output:


```
ubicom-linux-dist-2.0$ ultra/tools/bin/linux/udm4linux
No argument passed, setting Scanning mode
Ubicom Device Scanning . . .

Type       : Ubicom Ubipod dongle.
Name       : Programming Dongle
HWAddr     : 00:03:64:00:05:00
UseDHCP    : 1
IP         : 10.10.30.127
Exiting . . .
ubicom-linux-dist-2.0$
```

5.3 Setting Up the Environment for the Firmware Download

To download the firmware on the board, set UBICOM_DONGLE environment variable to the dongle IP address and port 5010. The example below shows this process for the dongle with IP address 10.10.30.127:

```
export UBICOM_DONGLE=10.10.30.127:5010
```

5.4 Installing the Firmware to the IP8K Board

To install the firmware to the board, type the following from the workspace root directory:

```
make install_all
```



195 Baypointe Parkway
San Jose, CA 94134

Tel 408.433.3300
Fax 408.433.3339

Email sales@ubicom.com
Web www.ubicom.com

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