WIRELESS ACCESS POINT
AP-490

DEVELOPER MANUAL

By

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1. INTRODUCTION

The manual basically explains how ap490 is produced by COSS developers. The development is divided into two main parts: ap400 embedded Linux changes and LCD module development.
The aim of the manual is to help later developers to continue the project or improve the project based on the current status of the project.

2. DEVELOPMENT PROCESS

2.1 CHANGES ON AP-400

First of all serial console on AP-400 module has been disabled. The reason for this change is echo property of console of embedded Linux. Every data coming from serial is directly transferred to AP-400's Linux console. In addition, every data written on console is also directly transferred to serial communication lines. For a clear communication, the decision that is deactivating of console of embedded Linux is made. In order to disable the serial console, the value of arcs_cmdline in the file "src/kernels/mips-linux-2.4.25/arch/mips/ar531x/ar531xprom.c" was changed.

For Serial Communication between Ap-400 and driver board we use the "ser.c" code. This code always waits in order to read data from serial port. The "ser" executable file is initialized when AP-400 is started up. It is most likely a kernel module of embedded Linux. This is accomplished by adding ser executable file path into the InitAll script in etc/scripts/ directory.

The ser file sends connected PC MACs to PIC module upon retrieving "m" from serial port by executing "m" file in /bin folder. "m" script saves MAC addresses in mac.txt file under the /temp folder. Ser executable creates macs file in the same folder as mac.txt and, sends all the data in the file through serial port. Sequence is, first the number of MAC addresses, then the MAC addresses one after the other. Finally to send the finish of sequence, ";" (semi comma) is sent.

Also the "ser" file checks for "n" character. When the "n" retrieved, it changes the AP-490's mode from access point to repeater. Then it executes one of the basic commands which check the networks at that time. After the search finishes, the collected data is read from files in /tmp/ directory, then sent back via serial port. The network protocol is similar to MAC's. First a special character, "$" is sent which informs PIC module that the network related data will be sent. The next character is the number of the networks, and then networks names with ending character "=" (equal). In this way PIC module can parse the names which have different lengths. The last character is the same as MACs.

2.2 PACKAGE INSTALLATION OF AP-490

To install the changes that made on source of AP-400 we should recompile the source every time. The first compile process takes some time. But the other compilations are not takes much time, since only the changed sources compiled.

After the compilation process, there are some actions that must be taken in order to make the source fully ready. Than by using a TFTP server the packages is installed. The software which makes setting is RedBoot, something like bios on PCs. It installs Linux kernel on specified locations on Read Only Memory (ROM).

2.3 PRINTED CIRCUIT BOARD – PCB

The circuit design is prepared by using Altium Designer. Board contains mainly four parts. First one is processor which drives LCD, buttons and serial sommunication. We used PIC16F877A for processor. Buttons, the second part, are linked to Port B of processor. Processor is also set to use PortB4-7 interrupts for activating buttons functionalities. It also uses internal PullUps for this interrupt. Serial communication, the third part, is linked to another chip that regulates the serial link voltage. Since AP-400 use a different inner voltage, we must convert one to other. We used MAX3378 for this purpose. LCD is the fourth part that visualizes the data coming from AP-490.

Before the circuit board created, we run many simulations on Proteus by using virtual circuitry. After the certain conditions met, we began to print operation of circuit.
Below there are two images, first one is virtual design of circuit prepared by using Proteus and second one is prepared for printing by using Altium Designer.