

# AREDN Setup

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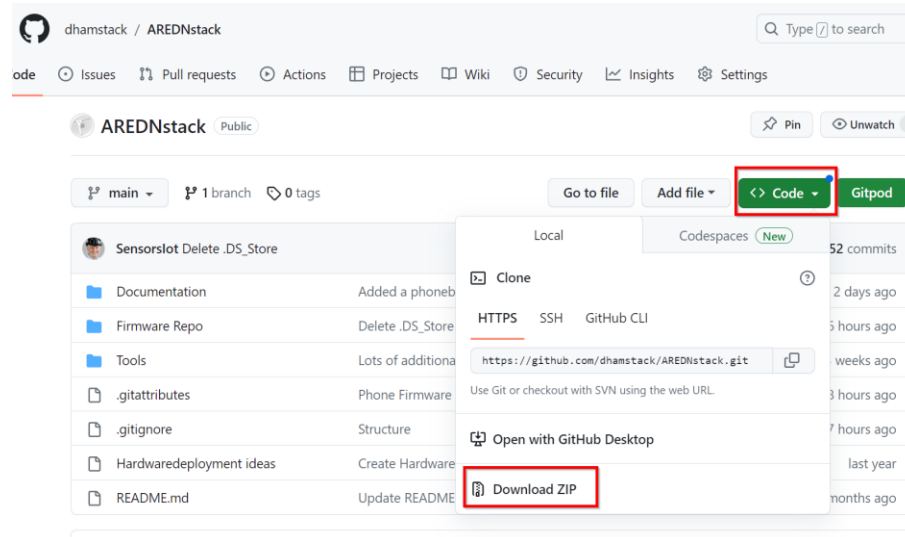
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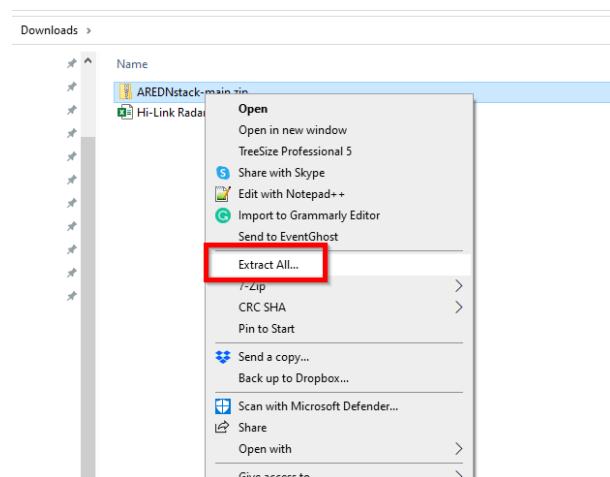
## Preparation

You can find all relevant files on GitHub (<https://github.com/dhamstack/AREDNstack>)

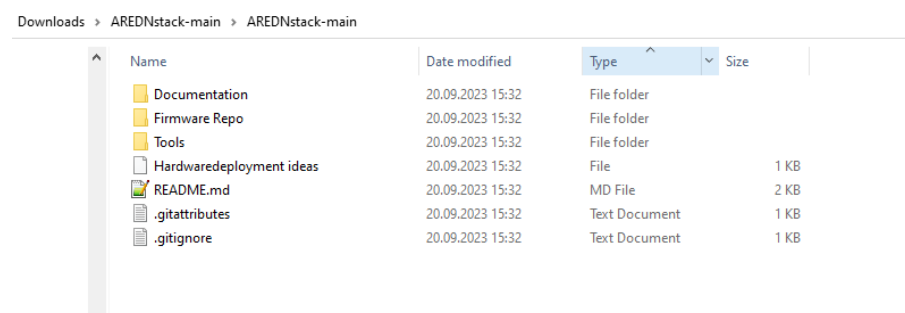
Press "code" and "Download ZIP". The file is quite big (>500M):






Extract the ZIP file:












Now you should have all needed files in your Downloads/AREDNstack-main/ folder:



In the Firmware Repo folder, you will find files for two versions of AREDN: The current and the last:

Name	Date modified	Type
 3.23.4.0	20.09.2023 15:32	File folder
 3.23.8.0	20.09.2023 15:32	File folder
 Yealink phones Firmware	20.09.2023 15:32	File folder

You also find firmware for our typical phones to flash with "free" firmware (not connected to a provider).

Name	Date modified	Type
 ConfigManager 2.0.0.17(V86)	20.09.2023 15:32	File folder
 T41P	20.09.2023 15:32	File folder
 T41S	20.09.2023 15:32	File folder
 T42	20.09.2023 15:32	File folder
 T46G	20.09.2023 15:32	File folder
 T46S	20.09.2023 15:32	File folder
 T48G	20.09.2023 15:32	File folder
 T48S	20.09.2023 15:32	File folder
 T58A	20.09.2023 15:32	File folder

# Yealink Phones

## Flash the Phone

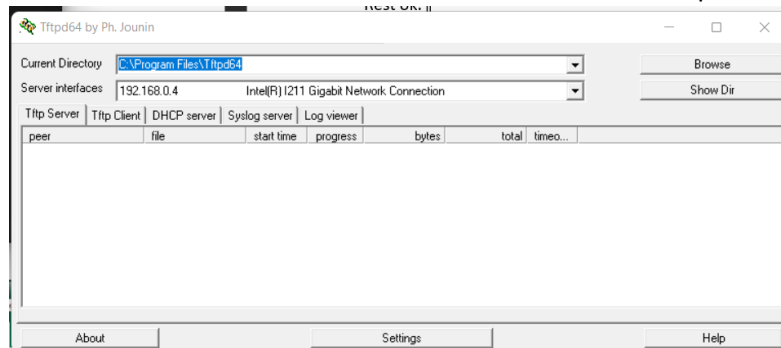
1. Download and unzip tftpd64.464.zip (the "run", not the setup version)  
(<https://bitbucket.org/phjounin/tftpd64/downloads/> )
2. Disconnect your computer from Wi-Fi and Ethernet and set a fixed IP address (e.g., 192.168.0.4)
3. Start tftpd64.exe
4. Click the browse button to locate the TFTP root directory

AREDNstack-main > AREDNstack-main > Firmware Repo > Yealink phones Firmware > T46G

Name	Date modified	Type	Size
T46.bin	20.09.2023 15:32	BIN File	1'710 KB
T46.rfs	20.09.2023 15:32	RFS File	8'192 KB
T46.rom	20.09.2023 15:32	ROM File	23'065 KB
T46G.cfg	20.09.2023 15:32	CFG File	2 KB

You should be able to see the files your phone will request during flashing.

5. Select the local IP address from the "Server Interface" drop-down menu.



If you do not find your fixed IP, something is wrong, and you must start over.

6. Power the Yealink with the speaker button pressed until you see a selection(TFTP or USB) or the below screen. Press 1 for TFTP if presented.
7. Fill in the fields as shown. Make sure you use a free IP address for the telephone (e.g., 192.168.0.230 ):

IP Addr: 192.168.0.230
Netmask: 255.255.255.0
Gateway: 192.168.0.1
TFTP IP: 192.168.0.4

8. Hit enter and wait. You should see in the tftpd64 window that the phone fetches files from your computer. After boot, you should have a "free" Yealink.
9. Now, you must hold the OK button for 10 seconds to factory reset your phone.
10. Connect the phone to your hap router (port 2-4). After boot, you go to Menu→Info) to find its IP address.

Now, you are ready for the next step.

## Phone Setup

With the firmware for your phone, you also find a file with the extension .CFG.

AREDNstack-main > AREDNstack-main > Firmware Repo > Yealink phones Firmware > T46G

Name	Date modified	Type	Size
T46.bin	20.09.2023 15:32	BIN File	1'710 KB
T46.rfs	20.09.2023 15:32	RFS File	8'192 KB
T46.rom	20.09.2023 15:32	ROM File	23'065 KB
T46G.cfg	20.09.2023 15:32	CFG File	2 KB

Edit this file and replace XXXXXX with the phone number you want for your phone. You can change the language by placing the # in the right place.

```
#!/version:1.0.0.1

### This file is the exported MAC-all.cfg.

### For security, the following parameters with password haven't been display in this file.
account.1.password = admin
account.1.enable = 1
account.1.label = SOP
account.1.display_name = Test
account.1.user_name = XXXXXX
account.1.auth_name = XXXXXX
account.1.sip_server.1.address = localnode.local.mesh
features.remote_phonebook.flash_time = 3600
features.remote_phonebook.enable = 1
features.relog_offtime = 999
lang.gui = German
#lang.gui = French
#lang.gui = English
account.1.codec.pcmu.priority = 3
account.1.codec.pcma.priority = 4
account.1.codec.g729.priority = 1
account.1.codec.g722.priority = 2
local_time.time_zone = +1
local_time.time_zone_name = Germany(Berlin)
local_time.ntp_server1 = ch.pool.ntp.org
local_time.dhcp_time = 1
local_time.date_format = 1
local_time.manual_ntp_srv_prior = 1
### Static Configuration ###
static.auto_provision.power_on = 0
static.auto_provision.pnp_enable = 0
static.auto_provision.dhcp_option_enable = 0
static.network.dhcp_host_name = XXXXXX
remote_phonebook.data.1.url = http://localnode.local.mesh/arednstack/phonebook_generic_direct.xml
remote_phonebook.display_name = AREDN
remote_phonebook.data.1.name = Direct
remote_phonebook.data.2.url = http://localnode.local.mesh/arednstack/phonebook_generic_pbx.xml
remote_phonebook.data.2.name = PBX
features.remote_phonebook.enable = 1
features.direct_ip_call_enable = 1
#directory_setting.url = http://localnode.local.mesh/arednstack/favorite_setting.xml
#super_search.url = http://localnode.local.mesh/arednstack/super_search.xml
#super_search.recent_call = 1
#security.var_enable = 1
#web_item_level.url = http://localnode.local.mesh/AREDNstack/WebItemsLevel.cfg
```

Replace the display.name if you want. Save it. SOP means Swiss Official Phonebook, BTW.

Go to a browser, type the IP address of your phone into the address, and login using admin/admin.

**Login** Gigabit Color IP Phone SIP-T46G

Username

Password

Change your password if you want.

Now go to Settings → Configuration.

**Yealink** | T46G Log Out

⚠ Default password is in use. Please change! English(English)

**Status** **Account** **Network** **Dsskey** **Features** **Settings** **Directory** **Security**

**Preference**  
**Time&Date**  
**Call Display**  
**Upgrade**  
**Auto Provision**  
**Configuration**  
**Dial Plan**  
**Voice**  
**Ring**  
**Tones**  
**Softkey Layout**  
**TR069**  
**Voice Monitoring**  
**SIP**  
**Power Saving**

**Export or Import Configuration**  
 No selected file

**Export CFG Configuration File**  
 Static Settings

**Import CFG Configuration File**  
 No selected file

**Pcap Type**  
 Enhanced

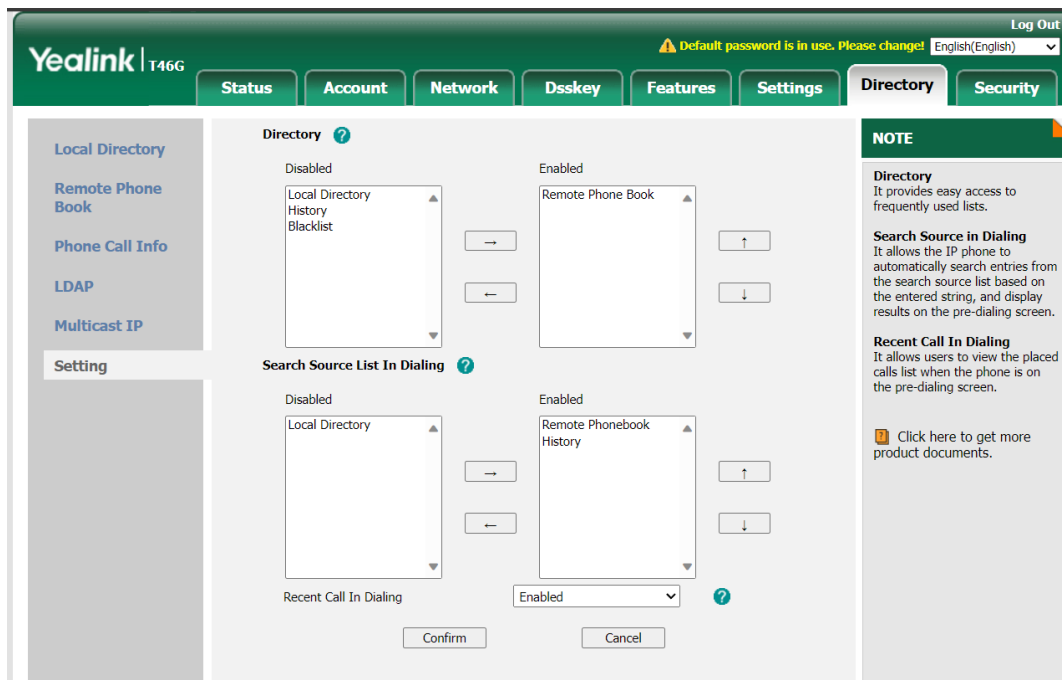
**Local Log**  
 Enable Local Log: Enabled  
 Local Log Level: 3  
 Max Log File Size (256-2048KB): 1024  
 Export Local Log:

**Syslog**  
 Enable Syslog: Disabled  
 Syslog Server:  Port: 514

**NOTE**  
**Configuration**  
 IP phones can provide feedback in a variety of forms such as log files, packets, status indicators and so on, which can help an administrator more easily find the system problem and fix it.  
 · Log Files  
 · Capturing Packets  
 · Configuration File (\*.cfg/\*.bin)  
 Click here to get more product documents.

Go to "Import CFG configuration file and browse to the Txx.cfg file you edited before. Hit "Import" and wait till the phone rebooted.

After reboot, go to Directory → Setting and fill the fields like that:



Confirm

Now, you should see a small phone in your phone's display that shows it is ready for the AREDN network. You should also see a "direct" and "PBX" folder if you press the "Directory" button on your phone.

If your Mikrotik router already works with AREDN, you can skip the next step and install the phonebook and SIPserver. If not, continue with the next chapter.



Mikrotik hap Router

Flash

Setup

## Phonebook

This project aims to create a common Swiss AREDN telephone directory and distribute it to all participating AREDN phones in Switzerland. By storing its latest version on each router, we can make sure that, during an emergency, we have no single point of failure. Each phone can call all reachable phones without a (central) PBX.

### Principle of operation

You can skip this chapter and go to "Installation" if you are not interested in how the telephone book works.

The "Official" Swiss AREDN phonebook (SOP) is on Google:

[https://docs.google.com/spreadsheets/d/1g33BHSXMC8T4Cmfz\\_Zq-XxtPP17dtEBexF2i4KKe\\_Mc/edit?usp=sharing](https://docs.google.com/spreadsheets/d/1g33BHSXMC8T4Cmfz_Zq-XxtPP17dtEBexF2i4KKe_Mc/edit?usp=sharing)

You can create a comment to add or change something or notify one of the administrators to do it for you.

Currently, we support Yealink telephones, and Cisco phones are in the test.

The telephones used for AREDN offer local phonebooks that can be automatically loaded from a remote location. The file format used for that process is XML.

AREDN is a mesh network, and we do not want to create a single point of failure. This is why the telephones get their phonebook files from the hap router they are connected to. So, a phone gets its phonebook as long as its router works.

We use direct calling instead of a PBX to avoid a single point of failure for communication, reduce the latency time, and reduce the overload of single mesh segments. The address used for this case is an FQDN like [178230@178230.local.mesh](#). If you want or need to operate a PBX, the address is just a phone number like 178230. In Switzerland, we use the "Postleitzahl" of the city of the HAM plus a two-digit number in the range of 30-70. Lower numbers are reserved for official use.

To support direct calling and PBX, our phones get two phone books ("Direct" and "PBX").

How is the information transferred from the Google Sheets to your hap router? The first step is to copy the .csv version of the sheet to a web server in the AREDN mesh. If Google is down, we could still edit this .csv file manually. This transfer is done every hour. An example job is in the repository.

### Installation

On our router, we must install three packages ( A library, SIPserver, and the phonebook itself). This can be done in the "Setup→Administration Tab of the AREDN GUI:

Node Status Basic Setup Port Forwarding, DHCP, and Services Tunnel Server Tunnel Client **Administration** Advanced Configuration

Help Reboot

### Firmware Update

Current Version: 3.23.4.0 Hardware Type: (ipq40xx/mikrotik) mikrotik (hap-ac3)

Keep Existing Configuration Settings ☒

Upload Firmware  No file chosen

Download Firmware

Load Local Firmware  /tmp/web/local\_firmware.bin

### Package Management

Upload Package  libstdcpp6\_11.2.0-4\_mips\_24kc.ipk

Download Package

Remove Package

### Authorized SSH Keys

Upload Key  No file chosen

Remove Key

### Support Data

You choose a file:

Downloads > AREDNstack-main > AREDNstack-main > Firmware Repo > **3.23.8.0** > Phonebook

Name	Date modified	Type	Size
hap ac3	20.09.2023 15:32	File folder	
<b>hap Lite</b>	20.09.2023 15:32	File folder	
X86	20.09.2023 15:32	File folder	

These packages are different for each AREDN release and each router (they have different chips inside). No nightly builds are supported (it still might run, but at your own risk).

**Important:** If you re-flash or upgrade your router, all three packages are erased and must be installed again.

Start with the libstdcpp6 package and continue with the rest:

AREDNstack-main > AREDNstack-main > Firmware Repo > 3.23.8.0 > Phonebook > hap Lite

Name	Date modified	Type	Size
<b>libstdcpp6_11.2.0-4_mips_24kc.ipk</b>	20.09.2023 15:32	IPK File	426 KB
phonebook_1.0.1-21_mips_24kc.ipk	20.09.2023 15:32	IPK File	2'157 KB
sipserver_2023-08-18-144b7e41-1_mips_2...	20.09.2023 15:32	IPK File	59 KB

Your router will confirm that it installed the packages.

Now reboot the router, and the little phone on your Yealink should become green. Success.

You also should find an AREDN directory in the Directory tab. It most probably will be empty. After about one hour, it should be populated.

If you are in a hurry, you have to log in to your router and issue these two commands:

```
/etc/cron.hourly/fetch_phonebook  
/etc/cron.hourly/update_phonebook
```

Now your phonebooks should be populated. The names with an Asterisk are phones that are currently connected to the network. The ones without one are not connected. These asterisks are automatically downloaded to your phone every hour. You can press the "update" button to get a newer version (the check runs every 15 minutes).

The phonebooks are stored on your router, and your phone gets them also when it is powered off for a while (during power-up).

Now, reboot your router. Your small phone in the display should now turn green (your phone is registered), and you can call a fellow HAM for a test using the "direct" phonebook. You should see an "HD" sign in the display showing that your phones use the best available quality.

If you want to use a PBX, you must add a second account with the respective information given to you by the PBX operator.