DV-Box · Software 3.3.12

Installation Guide

Converting a DV4Home with factory software to the DV-Box software – step by step via SSH

⚠️ ONLY for DV4Home 2!
Do not install on a DV4Home 1 or 3 – it will make the device unusable.



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Overview

> ⚠️ **ONLY for DV4Home 2! Do not install on a DV4Home 1 or 3 – it will make the device unusable.** The DV4Home 1 and 3 have different hardware.

> **Note:** The DV-Box display, web interface and installer are still in German – an English version is in the works. Until then, German texts are explained in brackets.

This guide describes how to convert a DV4Home 2 running the original factory software to the DV-Box software. Afterwards the device works with two independent channels, A and B, for DMR BrandMeister, DMR+, D-Star, C4FM/Fusion and the FM-Funknetz, and is conveniently operated in the browser.

The conversion is done entirely over the network via SSH, using the device's factory login (user `user`, password `user`). You need neither a monitor nor a keyboard on the device, and the device does not have to be opened.

Duration: about 15 minutes, a few of which are pure installation time.

Good to know:

- The installation package is **neutral**. It contains no callsigns, DMR IDs, passwords or other settings of other stations. After the installation you enter your own details in the browser.
- The factory software is **not deleted**, only switched off. It can be reactivated at any time (see Back to the factory software).
- All required programs are included in the package. No packages are downloaded from the internet, and the operating system remains unchanged.
- Later updates arrive automatically. You only need this guide once.

> Enter the commands in this guide exactly as printed. The easiest way is to copy them from the PDF file and paste them into the SSH window with a right-click. Only replace the example address `192.168.1.50` with the address of your device.

What you need

Item	Requirement
Device	⚠️ **ONLY for DV4Home 2! Do not install on a DV4Home 1 or 3 – it will make the device unusable.** DV4Home 2 with the factory software (Armbian/Ubuntu 16.04), microphone and loudspeaker connected
Network	Network cable to the router; internet access for the device (for option A in step 3 and for later radio operation)
Computer	Windows 10/11, macOS or Linux on the same home network
SSH program	Windows 10/11: the built-in `ssh` in *Command Prompt*, *PowerShell* or *Windows Terminal*. Alternatively PuTTY. macOS/Linux: *Terminal*
Optional	WinSCP (Windows), only if you want to transfer the package from the computer (option B)
Your details	Callsign, DMR ID (7 digits, or 9-digit hotspot ID); for BrandMeister your hotspot security password, optionally an API key; for the FM-Funknetz the access key

Factory login of the device:

User	Password	Rights
`user`	`user`	Administrator via `sudo` (same password)

Step 1: Find the IP address

Connect the device to the router with a network cable and switch it on. Wait about a minute until it has booted.

You will find the IP address in your router's device list, on a FRITZ!Box for example under *Home Network → Network → Network Connections*. Look for the entry that appeared when you switched the device on.

This guide uses `192.168.1.50` as an example.

> **Tip:** Set up a fixed IP address for the device in your router (on a FRITZ!Box: "Always assign this network device the same IPv4 address"). Then the address of the web interface always stays the same.

Step 2: Log in via SSH

Windows 10/11, macOS, Linux: Open Command Prompt, PowerShell or the Terminal and enter:

```
ssh user@192.168.1.50
```

On the first connection the program asks whether you trust the device:

```
Are you sure you want to continue connecting (yes/no)?
```

Answer with `yes` and then enter the password `user`. **No characters** appear on screen while you type – that is normal. Finish the entry with the Enter key.

PuTTY: Enter the IP address under *Host Name*, *Port* 22, *Connection type* SSH, then “Open”. Confirm the security prompt with “Accept”, enter the user `user` at `login as:` and then the password `user`.

After a successful login you will see a command line that looks roughly like this:

```
user@dv4home:~$
```

Enter all following commands in this window.

Step 3: Download the installation package

The installation package `dv4update.tar.gz` is on the update server at `https://df6ax.de/dv4update/`. Choose one of the two options.

Option A: download directly on the device (recommended)

The device downloads the package from the internet itself. Enter in the SSH window:

```
cd /tmp
wget -O dv4update.tar.gz https://df6ax.de/dv4update/dv4update.tar.gz
wget -O version.json https://df6ax.de/dv4update/version.json
```

Check the package: The following command compares the checksum of the downloaded package with the value on the server:

```
python3 -c "import json;print(json.load(open('version.json'))['sha256']+'  dv4update.tar.gz')" | sha256
sum -c
```

The answer must be:

```
dv4update.tar.gz: OK
```

If it says `FAILED`, the download is damaged. Download the package again in that case.

Option B: transfer from the computer

Use this option if the device does not have internet access (yet).

1. Download the file with the computer's browser:

   `https://df6ax.de/dv4update/dv4update.tar.gz`

2. Transfer the file to the `/tmp` directory of the device. To do this, open a second Command Prompt or Terminal window on the computer, change to the download folder and enter:

   ```
   cd %USERPROFILE%\Downloads
   scp dv4update.tar.gz user@192.168.1.50:/tmp/
   ```

   On macOS and Linux the first line is `cd ~/Downloads`. The password is again `user`.

   With WinSCP: New session with file protocol SCP, host name = IP address, user name `user`, password `user`. On the right-hand side (device) change to the `/tmp` directory and drag the file from left to right.

3. Check in the SSH window that the file has arrived:

   ```
   ls -l /tmp/dv4update.tar.gz
   ```

   The file is about 8 MB in size.

Step 4: Install

Unpack the package and start the installation:

```
rm -rf /tmp/dv4inst && mkdir /tmp/dv4inst
tar -xzf /tmp/dv4update.tar.gz -C /tmp/dv4inst
sudo bash /tmp/dv4inst/install.sh
```

`sudo` asks for your password:

```
[sudo] password for user:
```

Enter `user` (again without anything being displayed) and confirm with the Enter key.

The installation now runs on its own in eight phases and reports every step:

Phase	What happens
Pre-check	Device type (DV4Home 2 only, otherwise immediate abort without any change), free space (at least 150 MB), AMBE server, web server
1	Install missing program libraries from the package
2	Back up any existing installation to `/home/dv4/backup-<date>`
3	Copy program files to `/opt/dv4home`
4	Create an empty default configuration
5	Generate a certificate for the encrypted web connection
6	Set up the web server and permissions
7	Switch off the factory software, set up the DV-Box services, time zone Europe/Berlin
8	Start the DV-Box software

At the end, this message must appear:

```
[dv4home] dv4core bereit - Version 3.3.12
```

(“bereit” means ready; the version number may be higher.) The display now shows “Einrichtung erforderlich” (set-up required) and the address for the browser, as pictured on the title page.

If the installation aborts with a line `FEHLER: …` (error), you will find the cause in the Troubleshooting section. The installation can safely be repeated as often as you like.

Step 5: Restart and check

Restart the device once. This checks that everything starts up again on its own after a power cut:

```
sudo reboot
```

The SSH connection is closed in the process. After about a minute the display shows “Einrichtung erforderlich” again.

Optional, to check via SSH: Log in again (step 2) and enter:

```
systemctl is-active dv4core dv4ambe1 dv4ambe2 nginx
```

All four lines must read `active`.

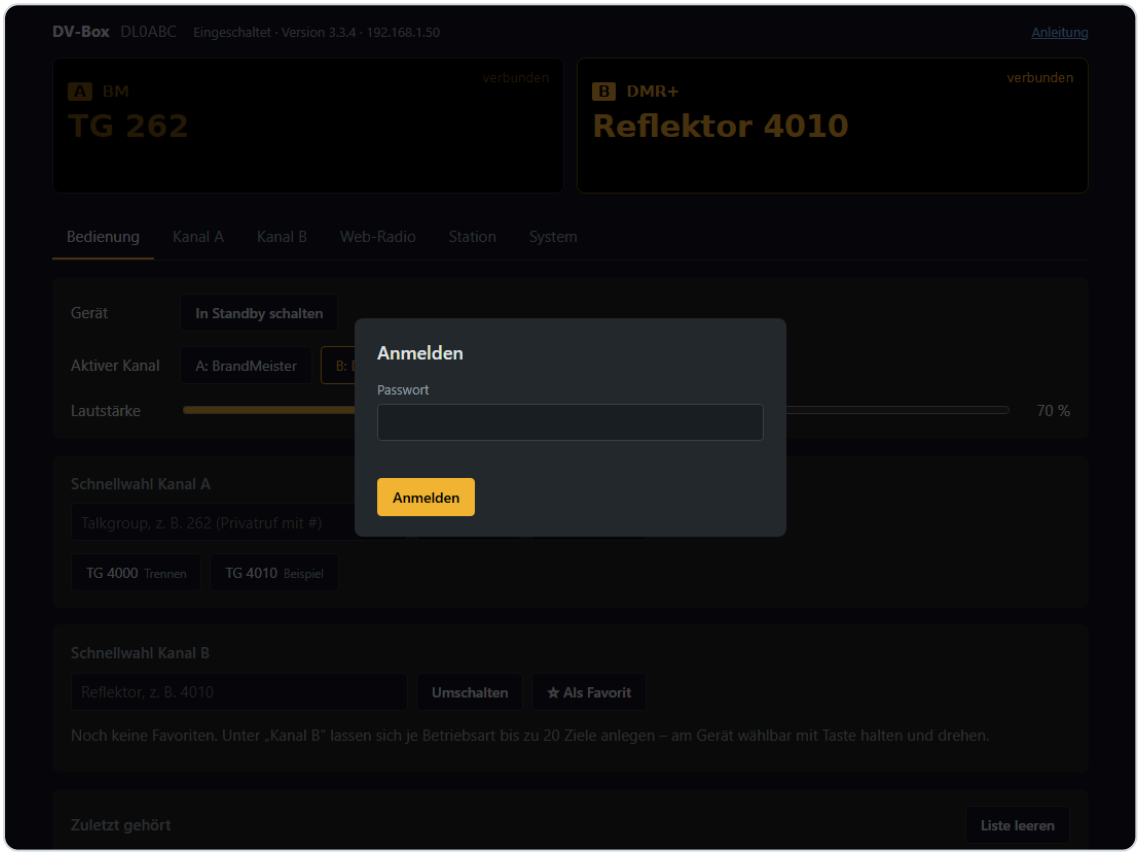
Step 6: Set-up in the browser

1. Open the address shown on the display in your browser:

   https://192.168.1.50

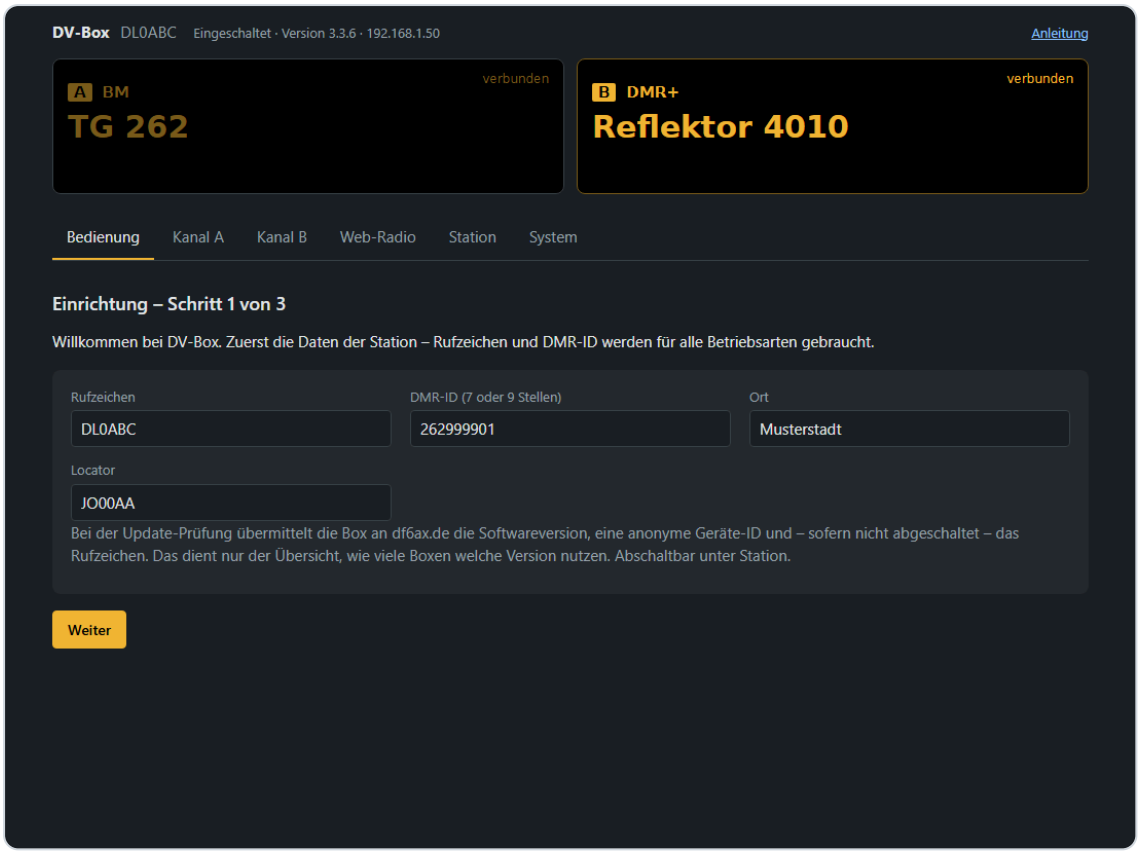
2. **Security warning:** The device encrypts the connection with a self-signed certificate. The browser therefore warns you on the first visit (“Your connection is not private”). This is normal for devices on a home network.
   - **Chrome / Edge:** “Advanced” → “Proceed to 192.168.1.50 (unsafe)”
   - **Firefox:** “Advanced…” → “Accept the Risk and Continue”
   - **Safari:** “Show Details” → “visit this website”

3. **Log in** with the initial password **dv4**. You then set your own password. Until then, no settings can be changed.



The login dialogue („Anmelden“ = log in). The web interface is in German.

4. **Set-up wizard:** In three steps you enter your station (callsign, DMR ID, location, locator) and the mode and target for channel A and channel B.



Set-up wizard, step 1 of 3 („Einrichtung – Schritt 1 von 3“)

5. With „Einrichtung abschließen“ (finish set-up) the device connects. For BrandMeister you then enter your hotspot security password under *Kanal A* or *Kanal B* (channel A/B), for the FM-Funknetz the access key.

All further settings and operation on the device are described in the **user manual**. It can be opened at any time in the web interface via the „Anleitung“ (manual) link.

Step 7: Change the SSH password

The factory login `user` / `user` is the same on every device and widely known. You should therefore change the password, especially if the device can be reached from the internet:

```
passwd
```

First enter the current password `user`, then the new one twice. The new password then also applies to `sudo`.

> Write down the new password. SSH is not needed for normal operation or for updates, but it is for any later troubleshooting. The web password is independent of it.

What the installation changes

For transparency, here are all changes made to the device:

Item	Change
`/opt/dv4home`	DV-Box program (new)
`/etc/dv4home/config.json`	Your settings (new, initially empty). Never overwritten by updates
`/var/lib/dv4home`	Call list, operating state, DMR ID database (new)
Services	new: `dv4core`, `dv4ambe1`, `dv4ambe2`, `dv4-update`, `dv4-userdb.timer` plus the gateway services `dv4-mmdvm@`, `dv4-ab@`, `dv4-ysfgw@`, `dv4-ircddb`, `dv4-svx@`
Factory software	Services `dv4` (control program `control`) and `dv4mini` switched off, not deleted. `/home/dv4/dv4svr` is kept in full
`dv_data`	Factory service remains active. It supplies the DMR ID database for the name display; if it fails, the box downloads the list itself from radioid.net
Web server	nginx now serves the DV-Box interface (HTTPS). The original web page in `/var/www/html` is kept but no longer included
`/etc/sudoers.d/dv4home`	The web interface may restart and shut down the device and trigger updates
Time zone	Set to Europe/Berlin if it was previously set to UTC
Log	`/var/log/dv4install.log`

Updates

The DV-Box software automatically checks df6ax.de for a new version every time it starts. If there is one, it is downloaded, checked for integrity and installed. Your settings are retained.

In the web interface under *System* you can see the installed version and check yourself at any time with „Nach Update suchen“ (check for updates).

Troubleshooting

Connection and login

Message / observation	Cause and remedy
`Connection refused` or `Connection timed out`	Wrong IP address, or the device has not finished booting. Check the IP address in the router, wait a minute
`Permission denied, please try again.`	Wrong password. User `user`, password `user`; mind upper and lower case
`WARNING: REMOTE HOST IDENTIFICATION HAS CHANGED!`	A different device was previously known under this IP address. Delete the old entry with `ssh-keygen -R 192.168.1.50`, then connect again
`ssh` not found on Windows	Add the "OpenSSH Client" under *Settings* → *Apps* → *Optional features*, or use PuTTY
`wget: unable to resolve host address`	The device has no internet access. Check the network or use option B
`Sorry, try again.` after `sudo`	Wrong password; enter `user` again

Installation messages

The installer reports in German: `ABBRUCH` means abort, `FEHLER` means error.

Message	Cause and remedy
`ABBRUCH: Kein DV4Home 2` (not a DV4Home 2)	The device is not a DV4Home 2 (the DV4Home 1 and 3 have different hardware). The installation has changed nothing. Please do not try again – the software is not suitable for this device
`FEHLER: Falsche Architektur` (wrong architecture)	The package is intended for the DV4Home only. It was started on a different device
`FEHLER: Zu wenig Platz` (not enough space)	At least 150 MB of free space required. Check with `df -h /`
`FEHLER: AMBE-Server … fehlt` (AMBE server missing)	The factory software is incomplete (`/home/dv4/dv4svr/DV4AMBE` is missing). The device does not have the original software
`FEHLER: nginx fehlt` / `php7.0-fpm fehlt` (missing)	As above, parts of the factory software are missing
`FEHLER: Python-Modul … fehlt` (Python module missing)	Package damaged. Download the package again (step 3) and check the checksum
`FEHLER: AMBE-Server startet nicht` (AMBE server does not start)	Restart the device (`sudo reboot`) and repeat the installation
`FEHLER: dv4core meldet nicht bereit` (dv4core does not report ready)	Restart the device and repeat the installation. If the error persists, send the logs (see below)

`tar: Unexpected EOF in archive`	Package transferred incompletely. Download the package again

After the installation

Observation	Cause and remedy
Browser cannot reach the device	Enter the address with `https://`. Device and computer must be on the same network
Display stays dark	Briefly press the rotary knob (display dimmed or in standby)
Channel shows „Einrichtung im Web“ (set up in the web interface)	Login details for this channel are missing, e.g. the BrandMeister password
No names for DMR IDs	The DMR ID database is built in the background after the first start. This can take a few minutes. Its status is shown in the web interface under *System*; if it says „fehlt“ (missing) or shows an error, the box needs internet access to radioid.net. „ID-Datenbank aktualisieren“ (update ID database) starts a new attempt

Logs for a support request

If you need support, please send the output of these two commands:

```
sudo tail -n 60 /var/log/dv4install.log
sudo journalctl -u dv4core -n 80 --no-pager
```

In the web interface you will also find the logs of the running software under *System*.

Back to the factory software

The factory software is only switched off and can be reactivated with a few commands. Log in via SSH and enter:

```
sudo systemctl disable --now dv4core dv4-update dv4-userdb.timer dv4ambe1 dv4ambe2
sudo rm -f /etc/nginx/sites-enabled/dv4home
sudo ln -sf /etc/nginx/sites-available/default /etc/nginx/sites-enabled/default
sudo systemctl reload nginx
sudo systemctl enable dv4 dv4mini
sudo reboot
```

After the restart the device works with the factory software again. The DV-Box software and your settings are kept in `/opt/dv4home` and `/etc/dv4home`. Reinstalling as described in steps 3 and 4 reactivates it with your previous settings.

All commands at a glance

For experienced users: all steps at a glance (option A, device with internet access).

```
ssh user@192.168.1.50                      # password: user

cd /tmp
wget -O dv4update.tar.gz https://df6ax.de/dv4update/dv4update.tar.gz
wget -O version.json https://df6ax.de/dv4update/version.json
python3 -c "import json;print(json.load(open('version.json'))['sha256']+'  dv4update.tar.gz')" | sha256
sum -c

rm -rf /tmp/dv4inst && mkdir /tmp/dv4inst
tar -xzf /tmp/dv4update.tar.gz -C /tmp/dv4inst
sudo bash /tmp/dv4inst/install.sh          # password: user
sudo reboot
```

Then open `https://<IP address>` in the browser, log in with **dv4**, set your own password and go through the set-up wizard. Finally, change the factory password via SSH with `passwd`.