

DP-666 High Sensitivity Color Screen Radio

Product Manual V2.0 (Based on PE5PVB 2.20firmware)



Product Introduction:

DP-666 is a high-sensitivity radio based on NXP's high-performance automotive-grade TEF6686 chip, which has excellent selectivity and ultra-high sensitivity. This automotive DSP tuner has a wide range of functions and advanced algorithms (CEQ, EMS, iMS and PACS, noise canceller...), SDR(software-defined radio) signal processing, especially for improvement of multipath, adjacent frequency interference, weak signals There are significant advantages in processing and noise cancellation.

DP-666 is a radio built on PE5PVB's open source project TEF6686_ESP32. In addition to listening to radio stations, the project also supports a wealth of advanced features, such as: almost all RDS (Radio Data System) data display, automatic/manual station scanning, squelch function, battery voltage display, changeable themes, multilingual, station presets, and more.

We redesigned the circuit board with reference to the mature TEF6686 front-end receiving circuit, and equipped the DP-666 with a 2.8-inch LCD color screen with resistive touch based on the open source project. While ensuring the portability of the machine, it can display rich RDS information (RDS information requires local radio support); a numeric keypad is added to facilitate users to quickly input frequencies; and a large-capacity 5000mAH battery supports longer standby time.

In short, I hope you will be satisfied with this portable high-sensitivity travel radio!

As the firmware is still under development and new features will be introduced, this manual is bound to have omissions and errors. Please understand.

PE5PVB project : https://github.com/PE5PVB/TEF6686_ESP32

DP-666 project : https://github.com/flyoob/TEF6686_ESP32

Basic Parameters:

Main control chip: ESP32-WROOM-32U, Flash 4MB, Wi-Fi + Bluetooth dual-core module

Display technology: 2.8-inch 320x240 resolution, IPS full-viewing angle LCD screen with resistive touch

Control method: Default numeric keyboard input and knob tuning, also supports third-party touch screen firmware

Frequency range:

| | | |
|----|---|---|
| FM | 65-108MHz | Suitable for Russia/Eastern Europe |
| | 76-95MHz | Suitable for Japan |
| | 76-108MHz | Suitable for campus broadcasting |
| | 87-108MHz | Suitable for Europe/Oceania/Africa/Asia |
| | 87.5-108MHz | Suitable for China/United States |
| | OIRT default stepping is 30kHz, FM stepping is 50/100/200kHz, default is 100kHz | |
| SW | 1700-27000kHz | Default stepping 5kHz |
| MW | 522-1791kHz | Default stepping 9kHz |
| | 520-1720kHz | Default stepping 10kHz |
| LW | 144-513kHz | Default stepping 9kHz |

Receiving indicators:

| | | |
|----|--|--------------------------|
| | Telescopic antenna receiving sensitivity | Selectivity |
| FM | FM(S/N=30dB) ≤ 0.5uV | FM ≥ 60dB(±150kHz) |
| SW | SW(S/N=20dB) ≤ 10uV | SW ≥ 60dB(BW=3kHz/±5kHz) |
| MW | MW(S/N=20dB) ≤ 10uV | MW ≥ 60dB(BW=3kHz/±9kHz) |
| LW | LW(S/N=20dB) ≤ 10uV | LW ≥ 60dB(BW=3kHz/±9kHz) |

Antenna interface: Full-band external antenna, standard SMA female connector

Speaker output: Using TI audio amplifier chip TPA6211A1, driving 82x43mm dual diaphragm large cavity speaker, power 4Ω/3W, lower output noise and less distortion.

Headphone output: Using AD headphone amplifier chip MAX97220, standard 3.5mm audio connector output, independent dual amplifier design for speakers and headphones, optimized separately without affecting each other.

Battery: 3.7V/5000mAh, 18.5Wh, lithium battery size 65x54x9.5mm(955465)

Current consumption: About 3.7V/350mA, use time about 15 hours

Communication interface: Built-in CH340 USB to serial port chip, through TYPE-C interface

Dimensions and weight: 88*130*30mm (Bare machine size), body weight 280g

How to Operate:

Basic Operations:

Main Switch: The main switch of the unit, the OFF position disconnects the battery, and the ON position connects the battery.

Please turn this switch OFF when the unit is not used for a long time to prevent the power from being turned on by mistake.

POWER: Power button, short press to switch the unit between on and off state.

TUNING Knob: Rotate to adjust the frequency, short press to switch the steps.

VOLUME Knob: Volume adjustment

SQL Gear : Squelch level adjustment

BW: Bandwidth selection

In FM mode, long press: Stereo/mono switch

In FM mode, short press: Bandwidth switch, Switch between 56/64/72/84/97/114/133/151/168/184/200/217/236/254/287/311kHz/AUTO, or use the TUNING knob to select.

In AM mode, short press: Bandwidth switch, switch between 3/4/6/8kHz.

MODE: Tuning Mode

Short press: MAN (Manual frequency tuning), AUTO (Automatic search), MEM (Store operation)

Long press: Open the menu page

BAND: Band Selection

Short press: Band switch, switch between LW/MW/SW/OIRT/FM

long press: Open Advanced RDS view / Alternative Frequency view

Press and hold for more than 5 seconds: Sleep or turn off the screen, Rotate the TUNING knob to exit sleep mode

How to store a station:

(1) Tune to the station you want to store in a preset.

(2) Toggle the MODE button until you see "MEM" highlighted.

(3) Press the TUNING Knob button and "MEM" will turn red.

(4) Select the desired memory channel.

You will see colors on the preset numbers: red means there are frequencies stored on this preset, green means there are no frequencies stored on this preset.

(5) Press the TUNING Knob button again to store the preset.

Advanced Operations:

Change the encoder direction: Press and hold the BW button when powering on.

Rotate the screen: Press and hold the MODE button when powering on.

Restore default settings: Press and hold the BW and TUNING Knob button when powering on.

Expanded keyboard:

Number keys 0-9: Input the corresponding frequency value

DX button: Start/Stop FMDX Scan

Enter key: Confirm Input

Main Interface and Icon Meanings:

The main interface of the machine is as follows:



| | |
|--|--|
| | Frequency deviation status display |
| | Current stereo mode indication. 2 circles represent stereo mode, 1 circle represents mono mode. |
| | Squelch status indicator. Highlight means the squelch is activated. |
| | The RDS icon is displayed, and a bright icon indicates that the RDS information is successfully demodulated. |
| | Current demodulation bandwidth indication. |
| | WIFI status indication (WIFI function is under development) |
| | Battery voltage/charge percentage indicator. |
| | Current tuning mode: MAN (Manual frequency tuning) AUTO (Automatic search) MEM (Store operation) |
| | Current working mode, LW/MW/SW/ORIT/FM |
| | Current frequency, the small horizontal bar above the frequency number highlights the corresponding step value; All off means using the default step. |

| | |
|--|--|
| | Demodulation bandwidth setting, manually select bandwidth or automatically adjust bandwidth. |
| | FM Improved Multipath Suppression |
| | FM Channel Equalization |
| | Current signal strength meter |
| | Current modulation level |
| | Current signal strength value |
| | Displays the squelch level. OFF means squelch is off. |
| | Carrier-to-noise ratio |
| | RDS Information, Programme Type |
| | RDS Information, Programme Service Name |
| | RDS Information, Programme Identification |
| | RDS Information, Radio Text |

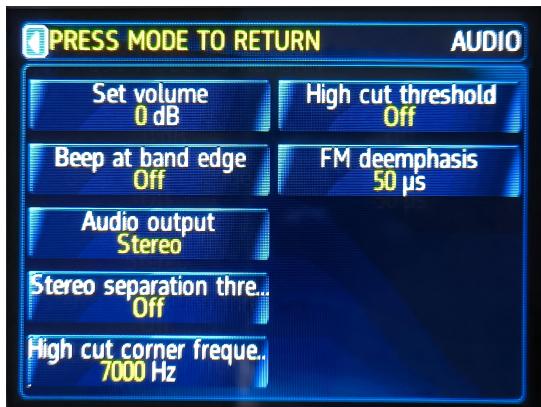
Menu Description:

Open the menu page: Long press the MODE button
 Exit the menu page: Short press the MODE button Select
 menu content: Turn the TUNING knob
 Confirm menu content: Short press the TUNING knob

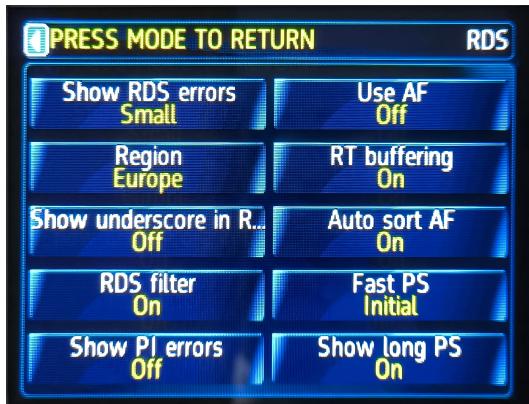
Menu page



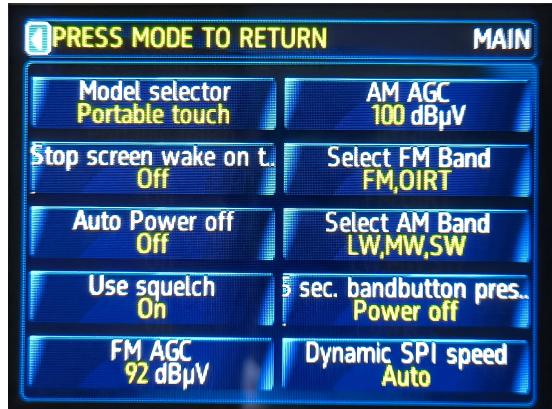
AUDIO



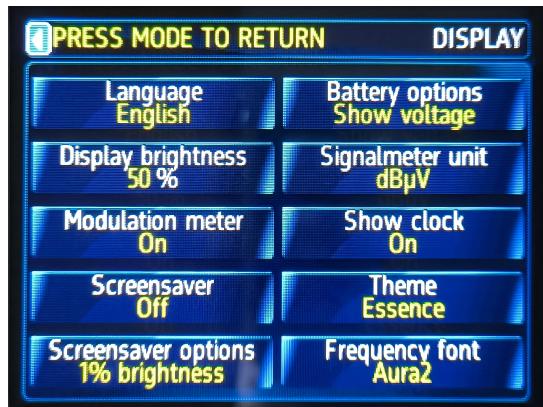
RDS



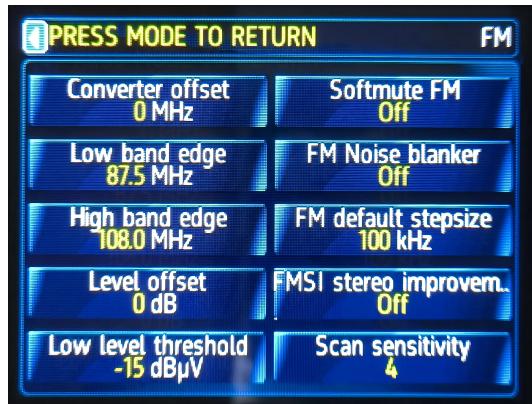
MAIN



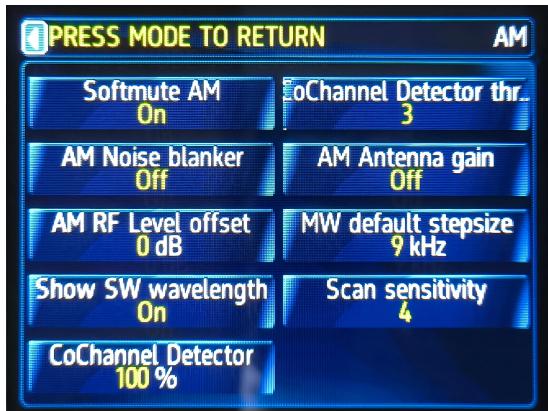
DISPLAY



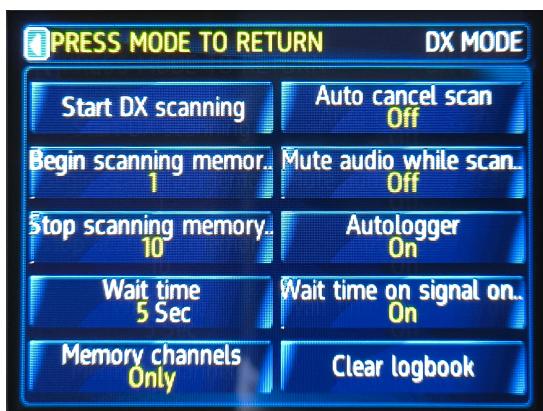
FM



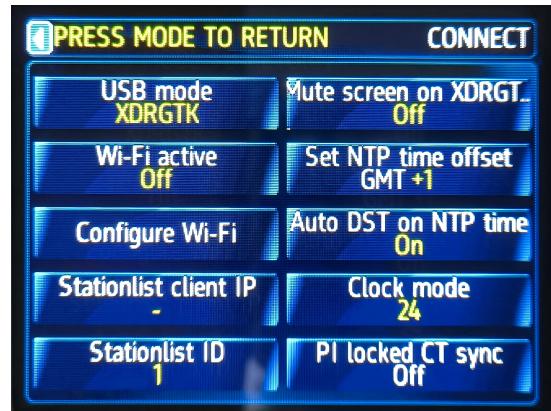
AM



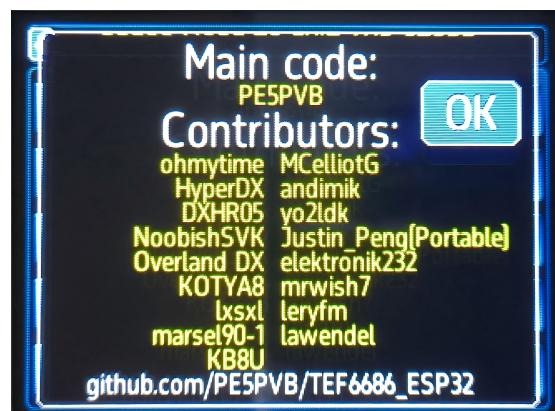
DX MODE



CONNECT



Firmware info



Charging Instructions:

This machine is charged via a TYPE-C port, and there is a charging LED above the TYPE-C port. Please use a charging head with a voltage of 5V and a current of 1A or above to charge the machine. The maximum charging power is 5W and fast charging is not supported. It is recommended to charge with the device turned off. The charging LED turns red  when charging and turns green  when fully charged.

Packing List:

1. Host *1 (with 3.7V/5000mAh lithium battery installed)
2. High quality telescopic antenna with SMA connector *1
3. USB-A to TYPE-C 1 meter data cable *1
4. Storage bag *1

Packaged weight 400g, packaged size: 16*12*4CM

Firmware Upgrade:

1. Upgrade via the TYPE-C port. Use the included data cable to connect the radio to the computer. A new COM port will appear on the computer.
2. Place the main switch in the ON state, press and hold the ESP32 BOOT button, then press the POWER button to turn on the device and enter the upgrade mode.

For firmware download, please visit: https://github.com/SDRRADIO001/TEF6686_DP666