

DX-888 High Sensitivity TEF6686 Radio
Product Manual V1.1 (Based on Megatron Mod17 firmware)

1. Product Introduction

DX-888 is a high-sensitivity radio developed by ARESQ based on NXP's high-performance automotive-grade TEF6686 chip, featuring excellent selectivity and ultra-high sensitivity. As an automotive DSP tuner, it integrates a wide range of functions and advanced algorithms (CEQ, EMS, iMS, PACS, noise canceller, etc.), along with SDR (software-defined radio) signal processing. It offers significant advantages in handling multipath interference, adjacent frequency interference, weak signals, and noise cancellation.

Built on PE5PVB's open-source project TEF6686_ESP32, the DP-666 supports abundant advanced features beyond basic radio listening, including:

- Almost all RDS (Radio Data System) data display (requires local radio support)
- Automatic/manual station scanning
- Squelch function
- Battery voltage display
- Changeable themes and multilingual support
- Station presets

Redesigned with reference to mature TEF6686 front-end receiving circuits, the DX-888 is equipped with a 2.8-inch resistive touch LCD color screen, ensuring portability while displaying rich RDS information. A numeric keypad is added for quick frequency input, and a large-capacity 1000mAh battery enables longer standby time.

> Note: The firmware is still under development with new features to be added. This manual may contain omissions and errors; your understanding is appreciated.

> PE5PVB Open-Source Project: https://othub.com/PE5PVB/TEF6686_ESP32

2. Basic Parameters

2.1 Core Components

Component	Specification
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Radio Chip	NXP TEF6686HN/V102 (Chip Model F8602)
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Main Control Chip	ESP32-WROOM-32U, 4MB Flash, Wi-Fi + Bluetooth dual-core module
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Display Technology	2.8-inch LCD screen, 320x240 resolution, IPS full-viewing angle, resistive touch
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Control Method	Default: knob tuning; Supports third-party 9341 touch screen firmware
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2.2 Frequency Range

Band	Frequency Range	Applicable Regions/Scenarios	Step Size
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FM	65-108MHz	Russia/Eastern Europe	OIRT default: 30kHz; FM optional: 50/100/200kHz (default 100kHz)
	76-95MHz	Japan	
	76-108MHz	Campus broadcasting	
	87-108MHz	Europe/Oceania/Africa/Asia	
	87.5-108MHz	China/United States	
SW	1700-27000kHz	-	Default: 5kHz
MW	522-1791kHz	-	Default: 9kHz/10kHz
LW	144-513kHz	-	Default: 9kHz

> Note: DX-888 does not support the AIR band. The AIR band in the firmware requires an external downconverter (sold separately) for use.

2.3 Receiving Indicators

Band	Telescopic Antenna Receiving Sensitivity	Selectivity
FM	$\leq 0.5\mu\text{V}$ (S/N=30dB) $\geq 60\text{dB}$ ($\pm 150\text{kHz}$)	
SW	$\leq 10\mu\text{V}$ (S/N=20dB) $\geq 60\text{dB}$ (BW=3kHz/ $\pm 5\text{kHz}$)	
MW	$\leq 10\mu\text{V}$ (S/N=20dB) $\geq 60\text{dB}$ (BW=3kHz/ $\pm 9\text{kHz}$)	
LW	$\leq 10\mu\text{V}$ (S/N=20dB) $\geq 60\text{dB}$ (BW=3kHz/ $\pm 9\text{kHz}$)	

2.4 Audio & Interface

Feature	Specification
Antenna Interface	Full-band external antenna, standard SMA female connector
Speaker Output	TPA6211A1 amplifier chip, 45x45mm sound cavity, 4 Ω /3W, low noise & distortion
Headphone Output	HT97220 amplifier chip, 3.5mm standard interface, independent dual amplifier design
Communication Interface	Built-in CH340 USB-to-serial chip, TYPE-C port

2.5 Power & Dimensions

- Battery: 3.7V/1000mAh
- Current Consumption: Approximately 3.7V/120mA, usage time about 10 hours
- Dimensions: 50*82*20mm (excluding antenna connector and antenna)
- Weight: 103g (body only)

3. How to Operate

3.1 Basic Operations

Control	Function	Operation Details

| TUNING Knob | Frequency adjustment & step switching | Rotate: Adjust frequency; Short press: Switch steps; Long press: Lock/unlock. |

| VOLUME Knob | Volume adjustment | Rotate to adjust volume. |

| SQL Gear | Squelch level adjustment | Refer to "Menu Description" for details. |

| BW Button | Bandwidth selection & shortcut page | FM mode: Short press to switch stereo/mono; AM mode: Short press to switch bandwidth (3/4/6/8kHz); Long press: Open shortcut page (short press to exit). |

| MODE Button | Tuning mode & menu | Short press: Switch MAN (manual)/AUTO (auto search)/MEM (store); Long press: Open menu (short press to exit). |

| BAND Button | Band selection & screen keypad | Short press: Switch LW/MW/SW/FML(OIRT)/FM; Long press: Open screen keypad (short press to exit); Press & hold 3s+: Sleep/turn off screen. |

3.2 How to Store a Station

1. Tune to the target station.
2. Toggle the MODE button until "MEM" is highlighted.
3. Press the TUNING Knob; "MEM" turns red.
4. Select the desired memory channel (red = frequency stored; green = no frequency stored).
5. Press the TUNING Knob again to confirm storage.

3.3 Advanced Operations

| Function | Operation |

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| Change 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 + TUNING Knob when powering on. |

| Select standard/optical encoder | Press and hold the TUNING Knob when powering on. |

| Expanded Keyboard | Number keys 0-9: Input frequency; DX button: Quick save/delete (long press to scan); Enter key: Toggle step/confirm input. |

4. Main Interface and Icon Meanings

4.1 Interface Overview

The main interface displays: Frequency, tuning mode (MAN/AUTO/MEM), band (FM/LW/MW/SW), bandwidth (AUTO BW), signal strength, RDS information (PTY/PS/PI/RT), battery voltage, time/date, and squelch status.

4.2 Key Icons & Touch Operations

| Icon/Display Item | Meaning | Touch Operation |

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| Frequency deviation status | Indicate frequency deviation | Enter/exit still screen mode |

| Stereo/mono indicator | 2 circles = stereo; 1 circle = mono | Switch stereo/mono mode |

| Mute indicator | Highlight = muted | Enter/exit mute mode |

| RDS icon | Bright = RDS demodulation successful | Enter/exit advanced RDS view |

AUTO BW	Demodulation bandwidth setting	Turn auto bandwidth on/off
WIFI icon	WIFI function status (under development)	-
Battery voltage/percentage	Battery status	Enter/exit screensaver mode
Signal strength value (e.g., 43.3)	Current signal strength	Left half: Open shortcut page; Right half: Open menu page
SQ: OFF	Squelch level (OFF = disabled)	Touch to activate adjustment (label turns green)
Sleep mode indicator	Sleep mode status	Turn sleep mode on/off
C/N (e.g., 32dB)	Carrier-to-noise ratio	-
PTY: Light Classical	RDS Programme Type	-
PS	RDS Programme Service Name	Left half: Turn down; Right half: Turn up
PI	RDS Programme Identification	Switch display: PI/time/date+time
RT	RDS Radio Text	Switch display: RT/debug information

5. Menu Description

5.1 Menu Operation

- Open: Long press the MODE button
- Exit & Save: Short press the MODE button or click the yellow font area
- Select: Rotate the TUNING Knob or click the menu item directly
- Confirm: Short press the TUNING Knob

> Note: Black font = Simple mode menu; Red font = Advanced mode additional menu.

5.2 Menu Categories & Settings

5.2.1 Main Settings

- Model selector: Portable touch/Base/Portable
- Set FM band: FM/FML/None
- Set AM band: LW/MW/SW/AIR/None (multiple combinations)
- Screensaver time: Off/3 Sec/10 Sec/30 Sec/60 Sec
- Screensaver options: Screen off/1% brightness/25% brightness/50% brightness
- System usage mode: Simple mode/Advanced mode
- Set first page: Main page/Open menu/Digital keypad/Shortcut page/Advanced RDS/AF Screen
- Power Off timer: Off/1-480 minutes (adjustable)
- Dynamic SPI speed: Default 55MHz (5-70MHz adjustable/Auto)
- Auto still screen: Off/On
- Still screen timer: 0-120 seconds (adjustable)
- Power off: BW key to reopen

5.2.2 Audio Settings

- Set volume: -60dB to +24dB (TEF6686 internal DAC, default 0dB)
- Beep at band edge: Off/On
- Audio output: Stereo/MPX
- Stereo threshold: Off/30-60dBuV (adjustable)

- High cut corner: 1500-7000Hz (adjustable)
- High cut threshold: Off/20-60dBuV (adjustable)
- FM deemphasis: 50us/75us/Off
- Use squelch: On/Off/Auto

5.2.3 Display Settings

- Language: English/简体中文
- Set contrast: 1%-100% (continuously adjustable)
- Signal meter: On/Off
- Signal refresh interval: 30-1000ms (adjustable)
- Signal meter unit: dBuV/dBf/dBm
- Battery options: Show voltage/Show percentage/Off
- Battery correction offset: Adjust voltage display offset
- Modulation meter: On/Off
- Theme:

Essence/Cyan/Crimson/Monochrome/Volcano/Dendro/Sakura/Whiteout/Tangerine/Ocean/Indigo/Maroon/Chinese Red/Retro/GoldBrite

- Frequency font: Aura2/Comic/Modern/Classic/Roubenstil/Motoya
- Flip screen display: Click to flip
- Invert screen color: Click to invert
- Set UI round: Modify menu display style
- Color bar display mode: New/Classic
- Show system clock: On/Off
- Clock display mode: Time only/Date + Time
- Time display format: 24 Hour/12 Hour
- Show debug info: Off/On

5.2.4 RDS Settings

- Show RDS errors: Small/Large/All/Off
- Region: Europe/USA(DB)/USA/Canada
- RDS Show underscore: Off/On
- RDS filter: On/Off
- Show PI errors: Off/On
- Use AF: Off/On/REG On/On/REG Off
- RT buffering: On/Off
- Auto sort AF: On/Off
- Fast PS: Initial/Always/Off
- Show RDS clock: On/Off
- Show long PS: On/Off
- Disable all RDS: Off/On

5.2.5 FM/AM Settings

FM Settings

- Set converter offset: MHz (adjustable)

- Set low band edge: Minimum 65MHz
- Set high band edge: Maximum 108MHz
- Set level offset: -25 to +15dB (adjustable)
- Set low level threshold: -15 to 30dBuV (adjustable)
- Softmute FM: Off/On
- FM Noise blanker: Off/50%-150% (adjustable)
- FM default step size: 100kHz/200kHz/50kHz
- FM AGC: 92-84dBuV (adjustable)
- FMSI stereo improve: Off (only for 6687/6689 chips)
- Set FML band: 65-74MHz/76-87MHz

AM Settings

- Soft mute AM: On/Off
- AM RF Level Offset: -50 to +15dB (adjustable)
- Show SW wavelength: On/Off
- CoChannel Detector sensitivity: Off/50%-150% (adjustable)
- CoChannel Detector counter: 1-15 (adjustable)
- AM ATT: Off/6dB/12dB/18dB/24dB/30dB/36dB
- AM AGC: 94-102dBuV (adjustable)
- MW default step size: 9kHz/10kHz
- AIR band Conversion: 81-135MHz (programmable)
- AIR start frequency: 118MHz/108MHz

5.2.6 Connectivity Settings

- USB mode: XDRGTK/RDS Spy
- Wi-Fi active: Off/On
- Configure Wi-Fi: Connect to radio hotspot for setup
- Stationlist client IP: Customizable
- Stationlist ID: 1-10 (adjustable)
- Screen off on XDRGTK: Off
- Wi-Fi auto disconnect: Disable/1-1440 minutes (adjustable)
- Bluetooth active: Off

5.2.7 Frequency Scanning & Auto Search

Frequency Scanning

- Start DX scanning: Click to start
- Scanning band: FM/LW/MW/SW/AIR/Default/FML
- Begin/End channels: Customizable
- Wait time: Set scan interval
- Scanning method: Exclude/Only
- Auto cancel mode: Signal/Off/Correct PI
- Cancel scan mode: Stay/Break
- Mute while scanning: On/Off
- Screen off while scan: On/Off

Auto Search

- Start Auto search: Click to start
- Search & save mode: Overwrite/Append
- Search band: FM/LW/MW/SW/AIR/FML
- FM sampling times: 1-30 (adjustable)
- FM multipath limit: Configurable
- FM scan sensitivity: 1-15 (adjustable)
- AM sampling times: 1-30 (adjustable)
- AM sampling hold: 10-1000ms (adjustable)
- AM scan sensitivity: 1-20 (adjustable)
- Judgement mode: Quality priority/Quantity priority
- Save bandwidth: Default/Current
- Mute while search: Off/On
- Screen off while search: Off/On
- Save begin channel: 1-99 (adjustable)
- SW search start/stop: 1800-27000kHz (adjustable)
- Arrange stations: Defrag and sort/Only defrag
- Delete stations: Click to delete

5.2.8 Operation Settings

- Menu display style: New(Vertical)/New(Horizontal)/Classic
- Quickly switch menu: On/Off
- Touch Type: Int33/Int27/Off/Poling
- Touch calibration: Click to start
- Touch interval: Default 300ms (adjustable)
- How to use rotary: Classic/New
- Rotary adjust squelch: On/Off (use TUNING knob to adjust threshold when on)
- Screen off rotating: On/Off
- Reverse rotary: Click to change direction
- Variable rotary speed: Fast/Off/Medium
- Long press Rotary key: Lock&Unlock/Original operation/Open menu/Digital keypad/Shortcut page/Advanced RDS/AF Screen
- Long press BW key: Shortcut page/Advanced RDS/AF Screen/Lock&Unlock/Original operation/Open menu/Digital keypad
- Long press Mode key: Original operation/Open menu/Digital keypad/Shortcut page/Advanced RDS/AF Screen/Lock&Unlock
- Keep BAND key 3 sec: Power off

5.2.9 Other Settings

- Set date/time: Configure year/month/day/hours/minutes/seconds
- Set local time zone: Adjust time zone offset
- NTP time sync: On/Off
- RDS time sync: Off/On

- Delete RDS dictionary: Click to delete
- System information: Display memory usage
- Restore Defaults: Factory reset
- Firmware Version: Show current version

5.2.10 My Settings

- My ATS scheme: Edit/search custom ATS schemes
- Using ATS scheme: Select scheme for search
- My Scan scheme: Edit/search custom Scan schemes
- Using Scan scheme: Select scheme for scanning
- My favorite theme: Set 4 themes for automatic change
- My receive plan: Edit/custom receive plans
- Using receive plan: On/Off
- My Shortcut icon: Customize shortcut icons
- Save my settings: Click to save
- Restore my settings: Click to restore

6. Charging Instructions

- Charging Port: TYPE-C
- Charging Requirements: 5V voltage, 1A+ current charging head (maximum 5W power; fast charging not supported)
- Recommended Operation: Charge with the device turned off
- Charging LED Indication: Red = Charging; Change = Fully charged

7. Package List

1. Host ×1 (with 3.7V/1000mAh lithium battery installed)
2. High-quality telescopic antenna (SMA connector) ×1

8. Firmware Upgrade

1. Connect the radio to a computer using the included TYPE-C data cable; a new COM port will appear in the computer's Device Manager.
2. turn on the radio.
3. Download the latest firmware
4. Follow the firmware upgrade guide to complete the update.