



SAFETY AND STANDARDS OF USE



Handle with Care

The FX778/4 is made of metal, glass and plastic and contains delicate electronic components. It may be damaged if dropped, burned, punctured, crushed or exposed to liquids.

Do not use the FX778/4 if it appears to be damaged, for example if the display glass is cracked or broken, as this may cause injury or further damage to the device.



Repair and Safe Operation

Do not open the Metropwr FX778/4 or attempt to repair it yourself. Disassembling the device may damage it and expose the user to electrical hazards. Repairs must be carried out only by qualified technical personnel. Never exceed the maximum RF power specified for the connected sensor. Do not open or disconnect the sensor while the system is operating. Install the sensor in a well-ventilated area and keep it away from heat sources. In the event of overheating, immediately stop transmitting, switch off the FX778/4 and disconnect its power supply.



Heat, Ventilation and Rear Connections

Avoid exposing the FX778/4 to high temperatures for extended periods. In the event of overheating or malfunction, immediately switch off the instrument and disconnect the power cable.

Install the device in a dry, well-ventilated area. Do not cover or obstruct the rear ventilation openings. Do not operate the instrument in environments containing flammable gases, vapours or substances.

Crossed-Out Wheeled Bin Symbol

Equipment marked with the crossed-out wheeled bin symbol must not be disposed of with unsorted household waste. This product complies with the European Union **WEEE Directive 2012/19/EU** concerning waste electrical and electronic equipment. At the end of the product's useful life, contact your local Metropwr representative or an authorised electronic-waste collection centre to arrange proper disposal and recycling in accordance with local regulations.



IMPORTANT INFORMATION Carefully read all the operating instructions, safety tips and warnings in the instruction manual. By identifying potential dangerous situations in time and observing the appropriate safety rules, accidents will be avoided. Dangerous situations to avoid to prevent all the risks that are reported above. Never use the Metropwr FX778/4 in an inappropriate manner, but only as directed in the user manual. **The Manufacturer reserves the right to update the technical data contained in this manual without notice.**

INTRODUCTION

The Metropwr FX778/4 is a digital Wattmeter with a comfortable touch screen interface and a 7 "color LCD display. It is managed entirely by 2 powerful microprocessors, of which the first 32bit, ADC which guarantee excellent performance and possibility of expansion through numerous external accessories. The strong point of the FX778/4 is the expandability with the possibility to interface the following accessories:

- 2 x ZX7 Antenna/Radio switch 1X4 posizioni
- Z3 Coupler HF/50MHz 3kW/PeP
- Z5 Coupler HF/50MHz 5kW/PeP

This feature makes it unique and guarantees excellent flexibility in use. It is designed for Amateur Radio use and has functions for the most demanding om. FX778/4 is a complete tool and offers the possibility of multiple measurement types all in a fast and precise way. Through the USB port it is possible to update the firmware and increase its functions and internal menus. The tool offers the following features:

- Measure power AVG , PeP , dBm , autoranging
- Measure parameters SWR,FWD,REF
- Operating frequency / corresponding band measurement
- Internal frequency counter
- Dual Antenna Switch management with 1X4 positions
- Double sensor HF/50MHz
- Alarm diagnostic high SWR alarms
- Interfacing to PC via USBC port / LAN
- FW User upgradeable

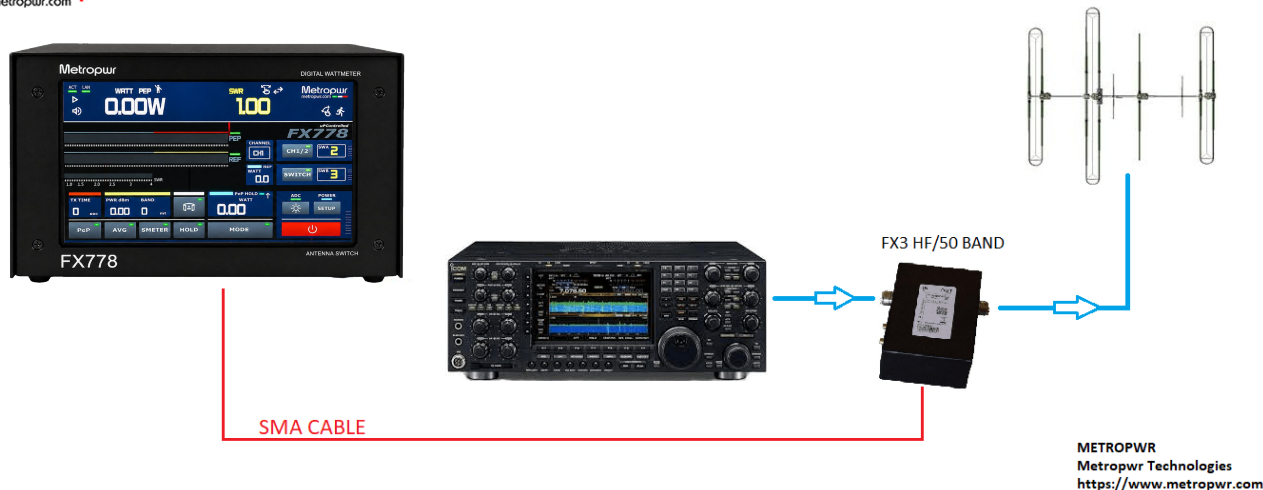
The instrument has a large 5"/ 7 "color LCD display where all the information and measurements are visible. Through convenient virtual touch keys it is possible to select naturally all the various functions and operating modes. The touch screen is capacitive and therefore very sensitive and precise. The display has a very high resolution and excellent viewing angles. The construction is sturdy and expandable.

COUPLER Z3,Z5,FX5 CONNECTION

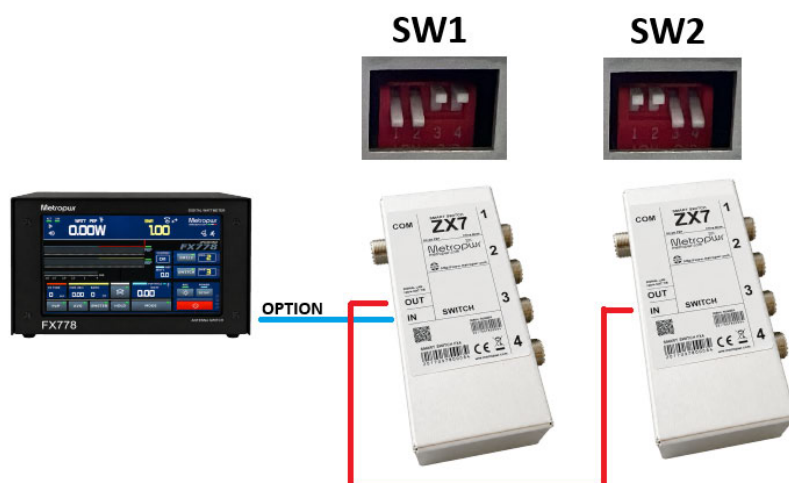
HF/50 - Z3/Z5/FX5 sensor connection: Connect the power sensor through the two SMA cables supplied, respecting the positions FWD/REF. The FX778/4 maintains compatibility with FX3/FX5 sensors



- * Do not connect a PC or router to the OPTION input, as this may damage the instrument.
- * By inserting a thin tip between the SMA FWD/REF connectors it is possible to RESET the internal LAN card



Z3/Z5 connection: basic connection for HF/50MHz band (use SMA cables).



It is possible to connect two ZX7 antenna switches to the FX778/4.

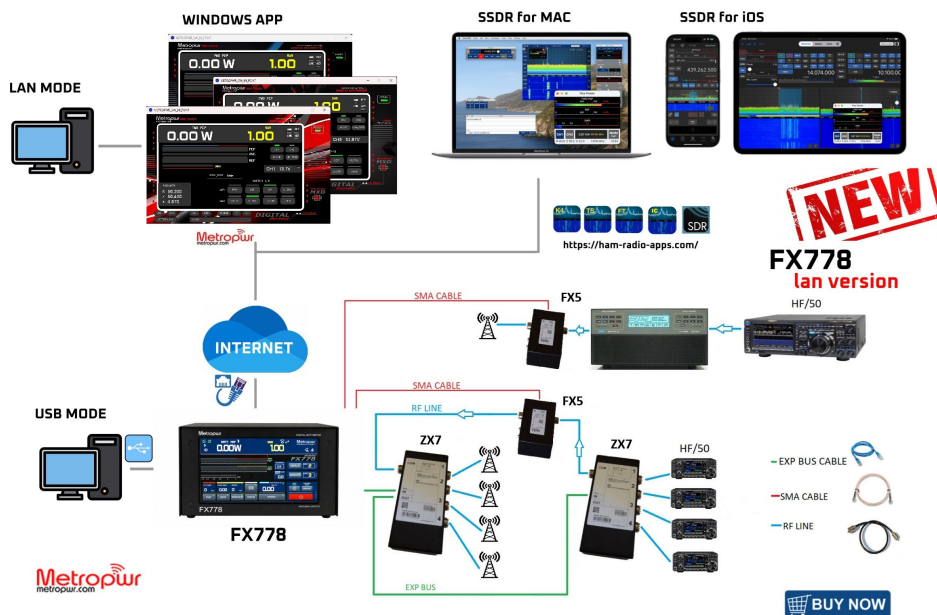
The two switches are connected using a straight-through LAN cable, as follows:

FX778/4 OPTIONAL port → ZX7 IN port → ZX7 OUT port → second ZX7 IN port

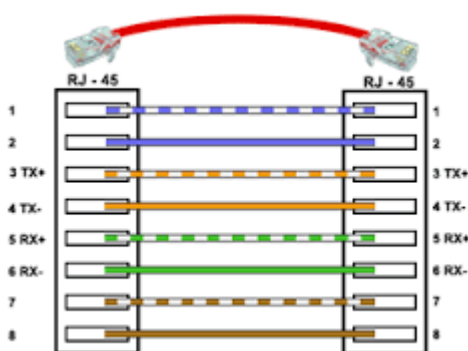
Use a high-quality RJ45 cable, at least Category 6.

ZX7 ANTENNA SWITCH CONNECTION

METROPWR FX778 "Take Your Station **Anywhere !!**"



Dual Antenna ZX7 Switch Connection: You can interface up to two ZX7 antenna switches to switch 4 radios and 4 antennas simultaneously. Through the corresponding menu on the FX774/8 wattmeter it is possible to manage them simultaneously. The ZX3 must be connected in series through the IN / OUT port of the switches and the wattmeter side ends on the rear RJ45 port. **This port is not LAN for PC but proprietary**, so do not connect any network HUB or SWITCH. The cable to interface all the options is a simple cable for RJ45 pc. The maximum length from the wattmeter to the last option can not exceed 5 meters and must be internally shielded, at least class 6 or higher.



A simple straight LAN cable can be used to connect ZX7 accessories to the FX774/8 Wattmeter. The maximum length is about 5 meters, and the scheme is the one on the left.



Attention: do not connect to the RJ45 port behind the Wattmeter FX778/4 network devices such as hubs, switches, IP phones or LAN points.

TOUCH SCREEN DISPLAY AND INTERNAL MENU

The instrument is entirely manageable through a modern touch screen user interface. Turning the instrument on from the side ON / OFF switch displays the main menu and all the information on: Antenna

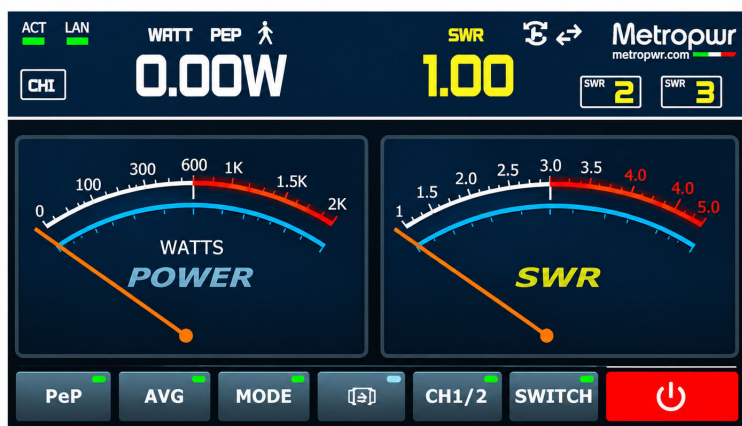


Main Menu

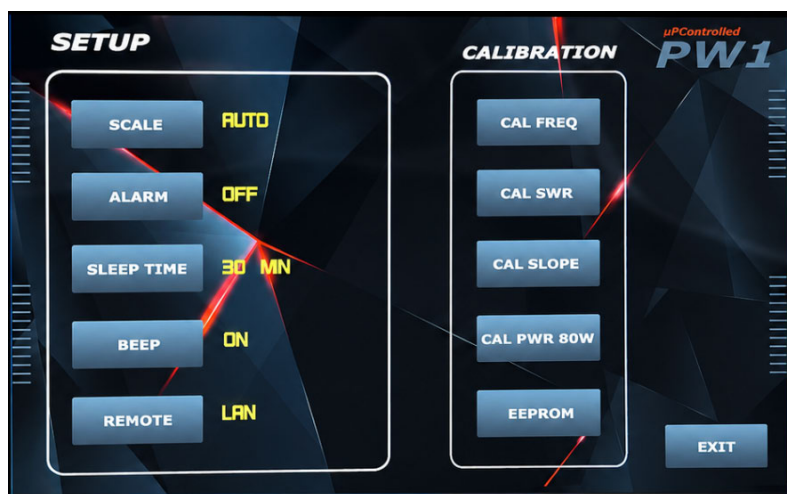
The main screen displays the primary measurements and controls of the FX778:

- Forward power, PEP, average power and reflected power
- SWR, frequency band, dBm value and transmission time
- CH1 or CH2 sensor selection
- PEP, AVG, S-Meter and HOLD modes
- Antenna-switch control with SWA and SWB position display

LAN activity, brightness, setup and power controls

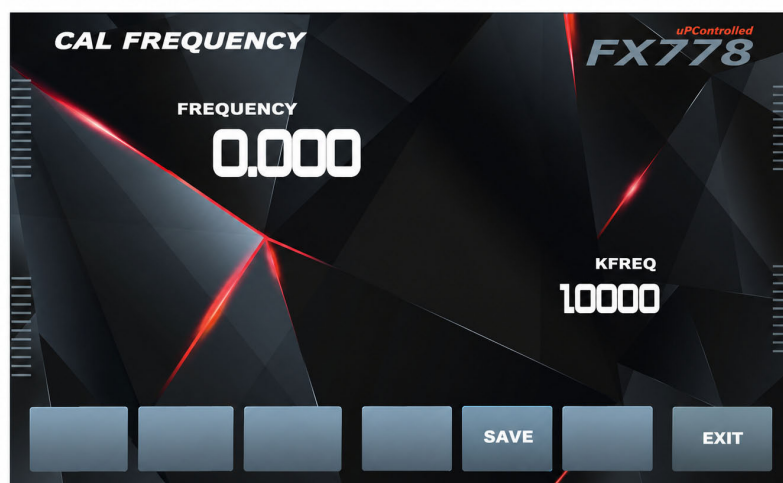


INTERNAL MENU V/U , RZXSWR , dBmMTR



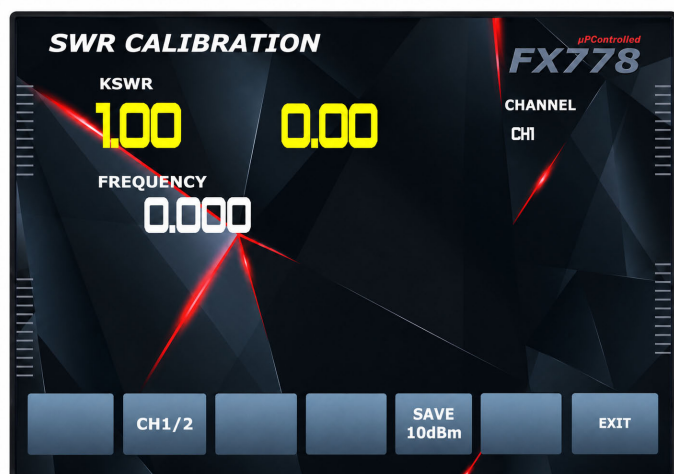
SETUP MENU

- **SCALE** – Selects the power display scale. In **AUTO** mode, the scale is automatically adjusted according to the measured power.
- **ALARM** – Enables or disables the protection alarm, for example when the SWR exceeds the preset threshold.
- **SLEEP TIME** – Sets the inactivity time before the display enters power-saving mode.
- **BEEP** – Enables or disables the audible confirmation tone.
- **REMOTE** – Selects the remote communication mode, such as **USB/LAN**.



Frequency Calibration Procedure

- 1° Set the transceiver to **10 MHz**.
- 2° Transmit a stable RF carrier.
- 3° Check that the FX778 detects the transmitted frequency.
- 4° Press **SAVE** while transmitting at 10 MHz.
- 5° The FX774/8 automatically calculates and stores the correct calibration value for the internal frequency counter.
- 6° Press **EXIT** to return to the previous menu.



SWR Calibration Procedure

This procedure calibrates the reflected-power measurement used to calculate the SWR value.

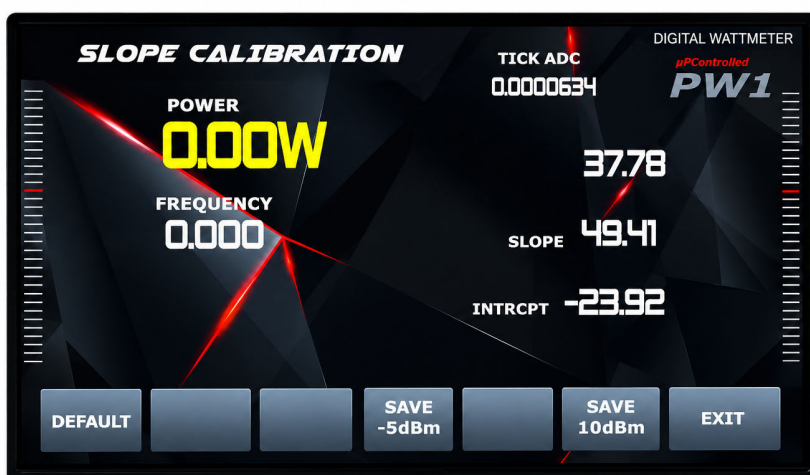
- 1° Select **CH1** using the **CH1/2** button.
- 2° Connect an external RF signal generator to the **CH1/REF (rear SMA input)**.
- 3° Set the signal generator to:
 - **Frequency:** 14 MHz
 - **Output level:** +10 dBm
- 1° Apply the signal and wait for the displayed value to stabilize.
- 2° Press **SAVE 10 dBm** to store the calibration value in the internal memory.
- 3° Press **EXIT** to return to the previous menu.

Use a calibrated RF signal generator and suitable coaxial cables to ensure accurate calibration.

SWR CAL



RF IN +10dBm



Slope Calibration Procedure

The slope calibration is performed using two reference signal levels.

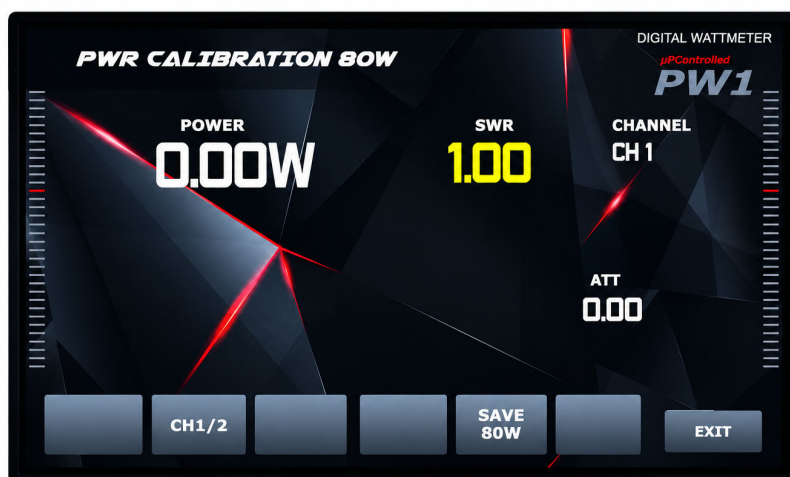
- 1° Connect a calibrated RF signal generator to the **CH1/FWD (rearSMA input)** .
- 2° Set the signal generator to 14 MHz.
- 3° Set the output level to **-5 dBm**.
- 4° Apply the signal and wait for the displayed value to stabilize.
- 5° Press **SAVE -5 dBm**.
- 6° Increase the signal generator output to **+10 dBm**.
- 7° Wait for the displayed value to stabilize.
- 8° Press **SAVE 10 dBm**.
- 9° The FX778 automatically calculates and stores the new **SLOPE** and **INTERCEPT** values.
- 10° Press **EXIT** to return to the previous menu.

The **DEFAULT** button restores the factory calibration values.

SLOPE CAL



-5dBm / +10dBm



80 W Power Calibration Menu

This procedure calibrates the FX778 power reading using an exact **80 W RF reference signal**. The calibration must be performed separately for each supported amateur band and for each measurement channel.

Supported Bands

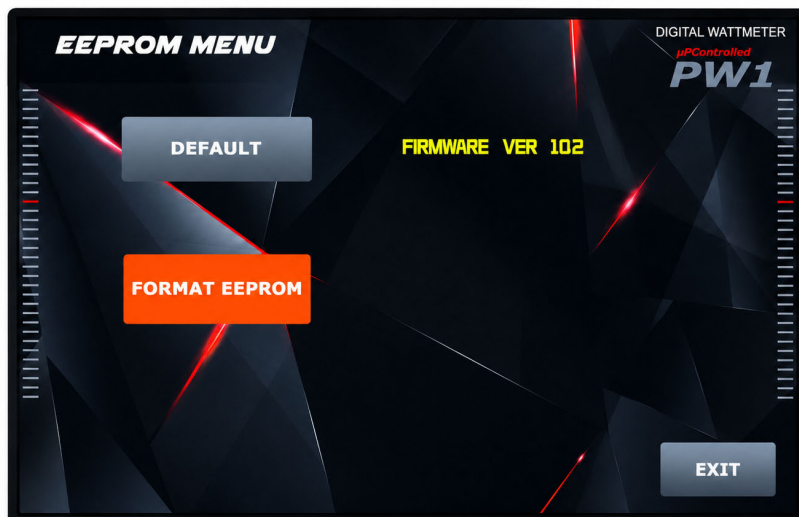
160 m – 1.8 MHz, 80 m – 3.5 MHz, 60 m – 5 MHz, 40 m – 7 MHz, 30 m – 10 MHz, 20 m – 14 MHz, 17 m – 18 MHz, 15 m – 21 MHz, 12 m – 24 MHz, 10 m – 28 MHz, 6 m – 50 MHz

Calibration Procedure

- 1° Connect the transmitter to the FX778 power sensor.
- 2° Connect the sensor output to a suitable **50 Ω dummy load** capable of handling at least 80 W.
- 3° Select **CH1** using the **CH1/2** button.
- 4° Set the transmitter to the frequency of the band to be calibrated.
- 5° Transmit a stable carrier with an accurately measured output power of exactly **80 W**.
- 6° Wait until the power and SWR readings are stable.
- 7° Press **SAVE 80W** to store the calibration value for the selected band and channel.
- 8° Repeat the procedure for all 11 supported bands.
- 9° When an optional second sensor is connected, select **CH2** and repeat the complete calibration procedure for all 11 bands.
- 10° Press **EXIT** when the calibration is complete.



The **ATT** value shown on the display indicates the correction factor stored for the selected band and channel. For accurate calibration, use a reliable reference wattmeter and a low-SWR 50 Ω dummy load.



EEPROM Menu

This menu allows the user to manage the internal EEPROM memory, which stores the FX778 configuration and calibration data.

- **DEFAULT** – Restores the factory default values.
- **FORMAT EEPROM** – Completely erases and reformats the EEPROM memory, removing all stored settings and calibration data.
- **FIRMWARE VER** – Displays the currently installed firmware version.
- **EXIT** – Closes the menu and returns to the previous screen.

Warning

Use the **FORMAT EEPROM** function with extreme caution. All stored calibration values and user settings will be permanently deleted and cannot be recovered.

After formatting the EEPROM or restoring the default values, the FX778 must be calibrated again before normal use.

ZX7 Antenna Switch Control Menu



• ZX7 Antenna Switch Control Menu

The **FX778/4** can control up to two **ZX7 antenna switches**. The switches must be connected in cascade to the **OPTIONAL** port using standard straight-through LAN cables.

To reduce the risk of RF interference, use high-quality **Category 6 or higher** LAN cables and keep each cable as short as possible, with a recommended maximum length of **5 metres**.

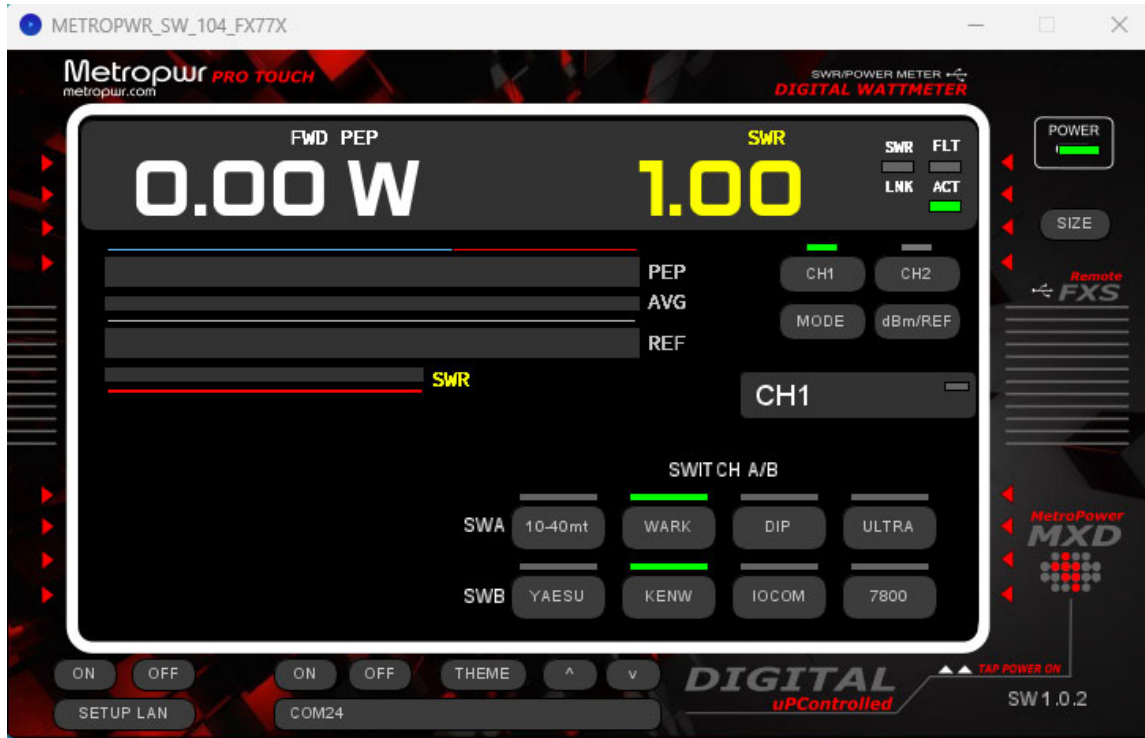
This menu allows direct control of both antenna switches:

- **SWITCH A** – Selects one of the four available ports on the first ZX7.
- **SWITCH B** – Selects one of the four available ports on the second ZX7.
- The selected port number is shown on the right side of the display.
- The system can be configured to switch **four radios to four antennas**, or to support other connection combinations according to the station setup.
- All unused ZX7 ports are automatically connected to ground.
- The **back arrow** returns to the previous screen.

Important Safety Note

Always switch antennas with the transceivers in receive mode and never change ports while transmitting. After selecting the required connection, it is recommended to switch off any radios that are not in use.

FX774 / FX778 PC Software



FX774 / FX778 PC Software

The PC software allows remote control and real-time monitoring of the FX774 and FX778 via **USB** or **LAN**.

It displays forward and reflected power, PEP and average power, SWR, frequency, R/Z/X values, the selected channel and the connection or alarm status.

- **USB ON/OFF** – Enables or disables communication through the selected COM port.
- **LAN ON/OFF** – Enables or disables network communication with the wattmeter.
- **COM selector** – Selects the USB serial port.
- **SETUP LAN** – Opens the network settings used to enter the IP address and communication parameters.
- **CH1 / CH2** – Selects the measurement channel.
- **MODE** – Changes the measurement mode.
- **dBm/REF** – Selects the secondary displayed value.
- **SWA / SWB** – Controls two connected antenna switches.
- **THEME** – Changes the software graphic theme.

METROPWR_SW_103_RESIZE

IP CONFIGURATION

metropwr.ddns.com

IP

255.255.255.0

NETMASK

8.8.8.8

DNS

192.168.0.1

GATEWAY

7120

PORT

SAVE BACK

Network Configuration Menu

This menu configures the LAN connection between the PC software and the FX774/FX778.

- **IP** – Enter the wattmeter IP address, hostname or DDNS address, for example metropwr.ddns.com.
- **NETMASK** – Enter the network subnet mask, normally 255.255.255.0.
- **DNS** – Enter the DNS server address, for example 8.8.8.8.
- **GATEWAY** – Enter the router IP address, normally something like 192.168.0.1.
- **PORT** – Enter the communication port used by the wattmeter, normally 7120.
- **SAVE** – Saves the network settings.
- **BACK** – Returns to the previous screen without continuing.

Make sure all values match the network configuration programmed in the FX774/FX778.

Web Interface Access

• Web Interface Access

To access the FX774/8 interface via a browser, enter its **default IP address 192.168.0.7**
A **login window** will appear:

- **Username:** admin
- **Password:** admin

Configure the serial port settings as show in picture:

serial port parameters (115200 / 8 / 1) or the **Work Mode** (TCP Server).

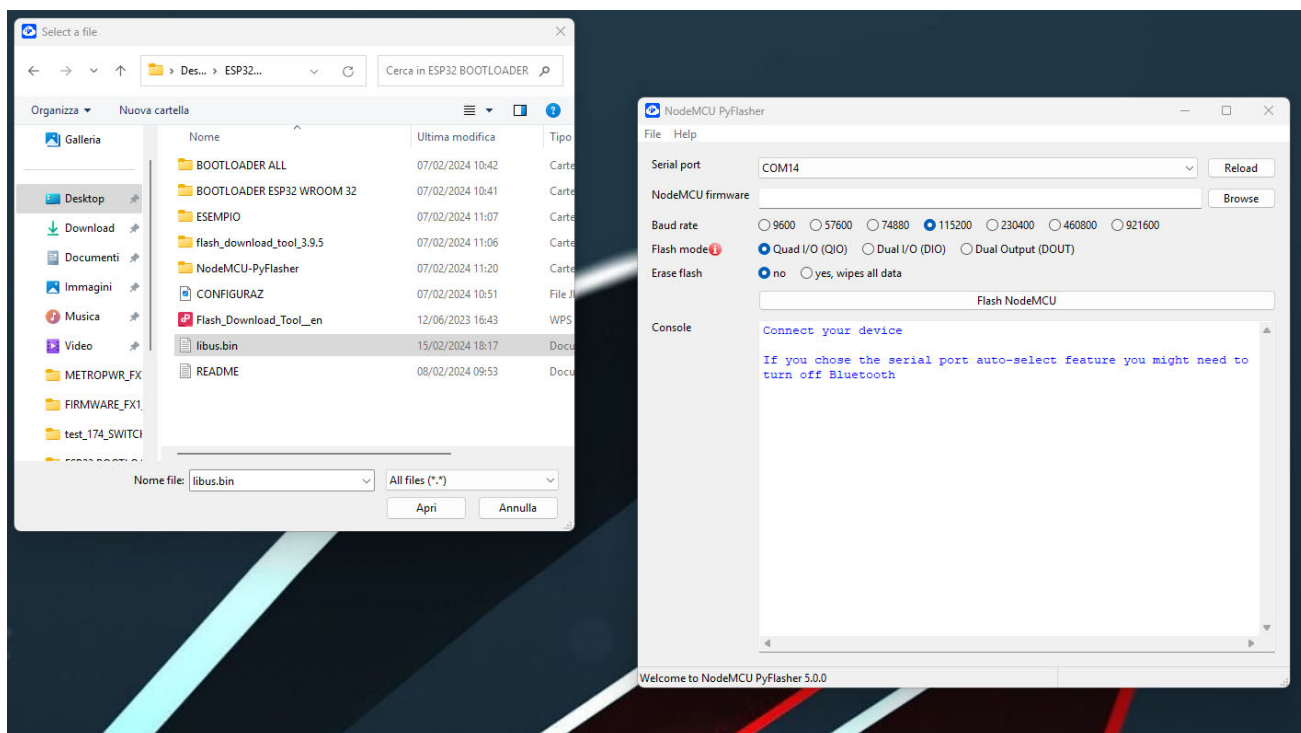
If necessary, only modify the **Remote Port Number**, which defaults to **7121**.

Current Status	parameter IP type: Static IP ▼ Static IP: 192 . 168 . 0 . 7 Submask: 255 . 255 . 255 . 0 Gateway: 192 . 168 . 0 . 1 DNS Server: 8 . 8 . 8 . 8 Save Cancel
Local IP Config	
Serial Port	
Expand Function	
Misc Config	
Reboot	

Current Status	parameter Baud Rate: 115200 bps Data Size: 8 bit Parity: None Stop Bits: 1 bit Local Port Number: 7121 (0~65535) Remote Port Number: 8234 (1~65535) Work Mode: TCP Server Remote Server Addr: 192.168.0.201 [192.168.0.201] RESET: ☐ LINK: ☐ INDEX: ☐ Similar RFC2217: ☒ Save Cancel
Local IP Config	
Serial Port	
Expand Function	
Misc Config	
Reboot	

NOTE:

Firmware upgrade



Firmware Upgrade

To upgrade the FX778/4 firmware, follow these steps:

- 1° Set **Baudrate** to **115200**
- 2° Set **Flash mode** to **Quad I/O**
- 3° Set **Erase Flash** to **No**
- 4° Select your **Serial Port**
- 5° Browse and select the ***.BIN** firmware file
- 6° Click the **Flash NodeMCU** button
- 7° **Reboot** the RT1 interface

ACCESSORI & OPTIONAL



Fx7 Antenna/Radio Switch

- Coverage 1.8/55 MHz 160/6mt
- Power 1kW PeP
- 1X4 Positions So259
- Flatness 0.1 dB
- In/out EXP Bus (Easy Lan Conector)
- Max Distance to Wattmeter 5mt
- No need ext. supply



FX3 HF/50MHz Coupler

- Coverage 1.8/55 MHz 160/6mt
- Power 500mW/3kW PeP
- Directivity 30dB
- Flatness 0.1 dB
- Connector so259 + SMA



FX5 HF/50MHz Coupler

- Coverage 1.8/55 MHz 160/6mt
- Power 500mW/5kW PeP
- Directivity 30dB
- Flatness 0.1 dB
- Connector so259 + SMA



TECHNICAL FEATURES - METROPWR FX778/4

- Coverage 1.8/54 MHz 160/6mt
- HF/54MHz Measure Power AVG, PeP, dBm, SWR, Band Frequency
- Wide Autoranging Power range 3/5 kWatt
- HF/50MHz Optional Couplers 3kW (ZX3) , 5kW (ZX5)
- Accuracy SWR <5%
- Directivity Coupler 30dB
- Accuracy Power better 5%
- Operating voltage 13.8V
- FX778 dimensions 205X130X110 mm
- FX774 dimensions 150X100X110 mm
- Weight FX774 600gr / FX778 800gr

FUNCTIONAL CHARACTERISTICS

- Display TFT 7",5" 16 K color Capacitive Touch screen
- uP 32bit + display coprocessor
- PC USBC port
- 10/100MBps LAN port
- ADC resolution 16bit
- Fast EXP Port
- Updating Firmware through USBC

