



User Manual

FMTX250

With Integrated Stereo
Audio Processor and RDS



WARNING!

This Transmitter is capable of generating high RF potential. Touching internal parts, or the connected antenna system, will cause serious RF burns. Antenna systems should be installed such that exposure by any person to RF fields cannot exceed safe limits. The permitted limits vary from country to country. Expert advice should be sought about the safe installation of this transmission system.



RISK OF FIRE!

RF (Radio Frequency) energy could cause ignition of combustible surfaces during fault conditions. Installation should be left to qualified personnel. RF can cause burns to skin. Ensure antenna systems and feeder cables are not situated near, or could fall onto, any combustible surface.



WARNING!

Never operate this device without a suitable 50 ohm load connected to the RF OUTPUT socket, or without a suitably installed and matched antenna system connected. Although the output of this transmitter is protected against antenna load faults, MIS-OPERATION MAY RESULT IN DAMAGE NOT COVERED BY ANY WARRANTY.



IMPORTANT!

Correct operation of the cooling fans in this product is vital to reliable continuous operation. Schedule bi-annual maintenance checks. We strongly advise the use of a standby transmitter system for use during maintenance events or fault conditions, to prevent prolonged breaks in transmission.



IMPORTANT!

When cycling the power off, then on, ensure that the transmitter is off for at least 10 seconds before re-applying power, to allow the internal circuits time to fully reset. Failure to do so may result in no RF output (PLL failsafe mode).

Consideration should be given to fitting a suitably rated UPS if power interruptions are likely. Similarly, telemetry reset of power may be advisable for transmitters in remote areas, or having restricted access arrangements.



IMPORTANT!

Always reduce the RF Output power to minimum before changing the transmission frequency. Once the new frequency is active, slowly increase the RF output power control to provide the required power output level. Re-calibration of the audio modulation level should also be performed.

Introduction

The FMTX250 has an integrated multi-band audio processor, stereo encoder and RDS encoder. A digital AES/EBU audio input option is also available.

The product is tested for compliance to UKCA and CE standards, and meet the requirements of broadcast regulators.

Lucoro Broadcast's reliable range of transmitters are used by broadcasters worldwide, and benefit from 25 years of engineers' design experience.

At the heart of the FMTX-series is a high quality PLL modulator, and the RF Power Amplifier uses the latest high-gain Enhancement Mode MOSFET device, achieving new levels of efficiency and reliability.

TTL remote monitoring and switching allows easily integration into systems with automated back-up.

This all-in-one complete stereo broadcast solution also has TCP/IP control and monitoring, plus dynamic RDS RadioTEXT features. An audio silence alarm, plus remote RDS TA control are also provided.

The audio processor provides intelligent slow gain-riding (AGC), multi-band compressor/limiters, plus clipping and FIR 15KHz filtering. It also includes a high-quality Stereo Encoder section.

Being standalone, a dedicated computer or data feed for the RDS functions is not required. Instead, periodic content updates are easily performed via the transmitter's USB port, using a Windows™ Laptop or PC. Free software is available at <https://lucorobroadcast.com/support>. For applications where dynamic updates to the RDS content is required, this option can be implemented via the unit's RS232 connection.

All functions are controlled via RISC microcontrollers, rather than embedded processors, increasing reliability and minimizing boot-time.

Before operating

These instructions should be read in full before the transmitter is operated.

The safety and operating instructions should be retained for future reference.

All warnings on the transmitter and in the operating instructions should be adhered to.

All operation and user instructions should be followed.

Use of this device into a radiating antenna requires a valid licence from a Spectrum Management Authority in most countries.

Use of this device as part of a transmission system, or combined transmission system not specified by the manufacturer, may require further testing to ensure that it remains compliant with the essential requirements and other relevant provisions of current EU Low Voltage, EMC and Radio Equipment Directives. Approval and clearance from the Spectrum Management Authority may also be required.

Installation must adhere to safety regulations and the requirements of the relevant authorities. We recommend that at least two people are present during installation. Keep a file containing installation instructions and plans, including details of the transmission system (antennas, feeders, filters, etc) and operating instructions for all equipment at the transmission site at all times. Display posters detailing first aid treatment and treatment for electrical shock, along with telephone numbers for contacting the emergency services in the event of personal injury.

Ensure antenna system lightning strike protection is in place.

To reduce the risk of electrical shock, do not remove the cover, or any screws. There are no user serviceable parts inside; refer servicing to qualified personnel.

Do not expose this appliance to rain or moisture. The transmitter should not be used near water. Care should be taken so that objects do not fall - and liquids are not spilled - into the enclosure through openings.

To reduce the risk of fire, always replace fuses with the same type and rating.

The transmitter should be mounted into a well-ventilated standard 19 inch equipment rack, using slide supports. It should be situated so that its location or position does not interfere with its proper ventilation.

The transmitter should be situated away from heat sources.

The transmitter should be connected to a power supply only of the type described in the operating instructions or as marked on the unit. Precautions should be taken so that the grounding or polarisation of this appliance is not defeated.

The unit should be cleaned only as recommended by the manufacturer.

The transmitter should be serviced by qualified service personnel if it does not appear to operate normally, exhibits a marked change in performance, has been subjected to shock, damage, moisture, or if foreign objects have ingressed.

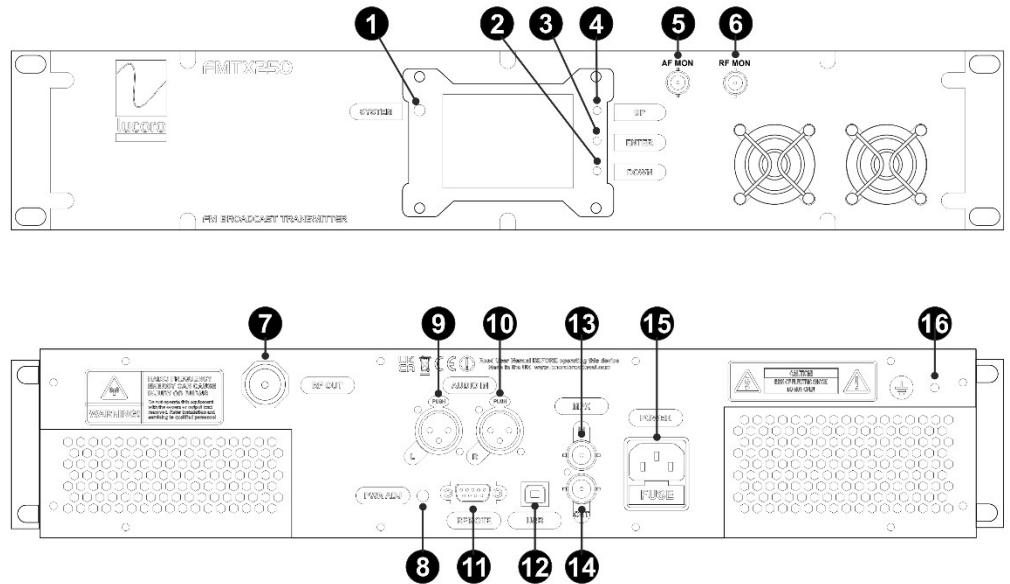
The user should not attempt to service the transmitter beyond that which is described in the Operating Instructions. All other servicing should be referred to qualified service personnel.

This appliance may become warm under normal operating conditions.

Recycle according to WEEE regulations.

Controls and Connectors

1. Front and Rear Panels...



1. **SYSTEM** Status LED. Green indicates correct operation, red indicates a system error requiring urgent further investigation.
2. **DOWN** Push-button. Press this control to navigate the LCD menu.
3. **ENTER** Push-button. Press this control to navigate the LCD menu.
4. **UP** Push-button. Press this control to navigate the LCD menu.
5. **AF MON** BNC connector for monitoring of the input to the modulator (baseband MPX spectrum).
6. **RF MON** BNC connector for monitoring of the RF output. Output level will be the RF output level attenuated by approximately 40dB. Not to be used for measurement of harmonics.
7. **RF OUT 'N'** Socket. Connect a matched, pre-tested antenna system with a return loss of $>14\text{dB}$ to this socket. Ensure all parts of the feeder and antenna system are rated for 200W or above.
8. **LAN** Ethernet TCP/IP socket (RJ45 type) for web control and monitoring.

9. **AUDIO IN (LEFT)** XLR Socket. Connect a +6dB 600ohm balanced audio feed to this socket. Note this is **SPDIF IN** on digital audio input models.

10. **AUDIO IN (RIGHT)** XLR Socket. Connect a +6dB 600ohm balanced audio feed to this socket. Note this is **AES/EBU IN** on digital audio input models.

11. **REMOTE** 9-pin D-sub Female. Remote control and monitor inputs and outputs are available on this connector:

Pin 1. Reflected Power Alarm. TTL logic low during normal operation. Floats high to indicate a high level of reflected power (critical antenna mis-match) has been detected.

Pin 2. Forward Power alarm. TTL logic low during normal operation. Floats high to indicate RF output has failed.

Pin 3. Audio failure alarm. TTL logic low during normal operation. Floats high to indicate more than one minute (approx) of no signal detected on the XLR or digital audio inputs.

Pin 4. Temperature alarm. TTL logic low during normal operation. Floats high to indicate over-temperature condition has occurred.

Pin 5. RDS TA Control. Supplying between 5 and 12V this pin to (with reference to chassis ground potential) will activate the RDS TA (Traffic Announcement).

Pin 6. RS232 data input for dynamic RDS RadioTEXT (pin 7 or pin 8 should be used for RS232 GND connection)

Pin 9. RF Mute Control. Supplying between 5 and 12V this pin to (with reference to chassis ground potential) will mute the RF output. Primarily used in automated changeover systems.

Pins 7 and 8. GND connection, at chassis earth potential.

The above 'Open Collector' outputs are capable of operation up to 50V and sinking a current of 75mA maximum. The normally high, (ie. 'pull low' upon alarm condition) provides inherent 'power failure' or 'cable connection failure' signalling.

12. **USB Socket.** RDS content main content update. Connect a Windows™ PC (running the manufacturer's free software application) to this port. Use a high-quality USB cable, of 1 metre or less in length.

13. **MPX IN.** If using an external processor and RDS encoder, or a baseband MPX Studio-Transmitter Link, connect to this BNC. Adjust the output level of the external equipment to provide the correct modulation level (requires test equipment).

14. **MPX OUT.** To broadcast audio connected to the transmitter, with the internal audio processing and RDS data applied, connect the supplied patch lead between this 'MPX OUT' socket and the 'MPX IN' BNC socket.

15. **POWER.** Connect a power lead with an IEC C13 connector (and a 5 amp fuse in the plug or at the distribution panel) to this socket. Two T2 amp (time delay) fuses are fitted within this connector's Fuse carrier.

16. **EARTH.** Grounding connection point (M4 stud and bolt).

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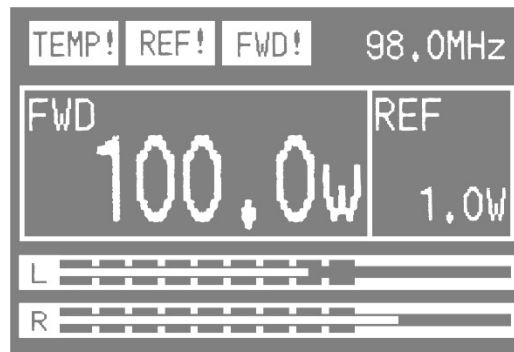
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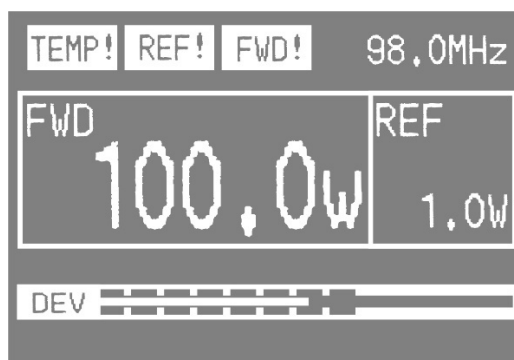
Display & Menu



The front panel LCD shows the transmission frequency, forward power and reflected power, plus audio input levels. If an alarm status is present, this will be displayed.

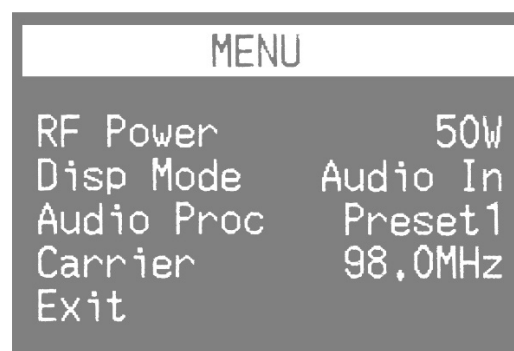
To cancel any alarm icons, press the **UP** and **DOWN** buttons together.

If the FMTX250 is in MPX input display mode, a deviation level will be shown in place of the left and right audio input displays.



To enter the menu, press **ENTER**.

Use the **UP** and **DOWN** buttons to choose the setting to be adjusted. Once selected, press **ENTER** and the corresponding setting will now be highlighted. Press the **UP** and **DOWN** buttons to selected the desired setting and then press **ENTER** to store it.



RF Power. This option allows setting of the RF output level.

Disp Mode. This option selects either the stereo audio input level displays, if the transmitter is being used normally (with its internal Audio Processor and RDS functions active), or a deviation level display for use when the transmitter is used to broadcast a multiplex Baseband feed connected to the **MPX IN** connection on the rear panel.

Audio Proc. This allows selection of three Audio Processing style pre-sets:

Preset 1	Light Processing	Classical Music or Talk Show formats
Preset 2	Medium processing	MOR music formats
Preset 3	Heavy processing	CHR, Hip-Hop, Dance, etc formats

Carrier. Select this option to change the broadcast frequency to any frequency between 87.5 and 108MHz. The carrier modulation level may need re-optimising if the carrier frequency is changed.

Installation

IMPORTANT! Connect a suitable rated RF test load to the RF OUPUT socket before connecting the unit to mains power. FAILURE TO DO SO MAY RESULT IN DAMAGE NOT COVERED BY WARRANTY.

To begin, set the operation mode (MPX input or Audio input) for the transmitter. If using the transmitter in audio input mode, as supplied, then skip this step.

The internal Audio Processor and RDS circuitry can be bypassed and the transmitter can be used with an MPX baseband source instead.

The internally generated audio and RDS multiplex is delivered to the **MPX OUTPUT** BNC connector on the unit's rear panel. This is then 'looped' directly into the **MPX INPUT** using a BNC to BNC patch lead.

However, an internal jumper setting is provided, to save the need to use a loop-through cable. This jumper will have been set by the factory to short Pins 2 & 3. If use of a rear panel loop-through connection cable is preferred – or if an MPX input is required – this jumper will need to be changed, to Pin position 1 & 2.

For MPX input operation, the audio input versions of the transmitter can display deviation, in place of Left & Right audio input levels.

First, connect a suitably rated test load to the RF OUT socket on the transmitter's rear panel.

Power-up the unit. Once the PLL modulator has locked to its frequency (red LED changes to green) press **ENTER** for the menu display. Select **RF Power** and, using the **DOWN** button, set to RF output power the lowest level. Press **ENTER** to store the new setting.

Then select **Carrier**. Using the **UP** or **DOWN** buttons, set the required frequency. Press **ENTER** to store the new setting. The transmitter will now restart, and begin operating on the new frequency. Whenever the carrier frequency is updated, it is strongly advised that the audio modulation (deviation) level is checked and increased, or decreased as necessary.

The deviation level is changed internally, as follows...

ELECTRIC SHOCK AND RF BURN HAZARD! DISCONNECT THE POWER BEFORE REMOVING ANY COVERS.

To adjust the deviation level, locate the trimmer adjustment potentiometer "DEV" on the internal main circuit board and use a suitable tool to carefully adjust the multi-turn control. This is the overall level input to the modulator.

The factory will have set the deviation, RDS and pilot injection levels. They should need no further adjustment. However, if absolutely necessary, these can be changed as follows (NOT recommended):

ELECTRIC SHOCK AND RF BURN HAZARD! DISCONNECT THE POWER BEFORE REMOVING ANY COVERS.

To adjust the RDS injection level, locate the trimmer adjustment potentiometer "RDS" on the internal main circuit board and use a suitable tool to carefully adjust the multi-turn control.

To adjust the 19kHz Pilot injection level, locate the trimmer adjustment potentiometer "DEV" on the internal main circuit board and use a suitable tool to carefully adjust the multi-turn control.

Take GREAT CARE not to adjust any other circuit trimmer controls. Even the slightest adjustment WILL degrade performance and may cause non-compliance with broadcast regulations.

Connect Left and Right Audio to the rear panel XLR connectors, and adjust the source level so that maximum audio peaks register just below the peak section of the front panel audio level bar graph display. Use ordinary programme material, rather than test tones.

Once all settings are correct, power down the unit. Disconnect the test load and connect the antenna. Power up the unit and repeat the power setting procedure above, to set the RF power output to the required level.

Set-up is now complete and the transmitter can be used for broadcasting.

Operation

The transmitter is designed for continuous reliable transmission, however the fans must be periodically checked for correct operation and free airflow.

Correct operation is confirmed by a front panel green STATUS LED. Should this turn red, the transmission system may shut down its RF output and will, in any case, require URGENT attention.

The following are LCD display fault indicators and their meaning:

TEMP! The system is running too hot and has shut down the RF output as a safety precaution. Check the fans for correct operation. Also check the antenna system, including all cabling (and/or filters and/or combiners where fitted) for correct operation. The FWD! indicator (see below) will also show and the standby transmission system (where used) will have activated (TTL control).

REF! The system has detected a fault in the antenna system and has shut down the RF output as a safety precaution. Check the antenna system, including all cabling (and/or filters and/or combiners where fitted) for correct operation. The FWD! indicator (see below) will also show and the standby transmission system (where used) will have activated (TTL control).

FWD! The system has detected there is no forward power. This may be due to one or both of the above symptoms, due to a PLL failure, or due to excessive power setting. The standby transmission system (where used) will have activated (TTL control).

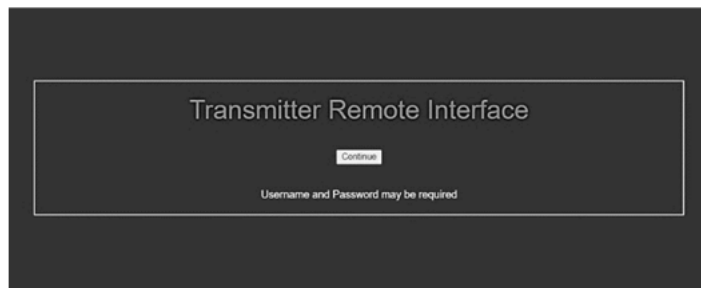
Ensure air vents and internal air tunnels are kept free from dust during operation.

The cooling fans should be replaced after 80,000 hours of cumulative operation. This life rating is for guidance only and is subject to ideal environmental operating conditions. Replace any fan that fails or becomes slow or noisy, immediately. It is recommended that replacement work must be carried out by the manufacturer or an approved agent.

Network Connection

The FMTX250 will be supplied with a notification of its factory-set IP address, username and password. KEEP THESE DETAILS SAFE. Whilst the transmitter's network configuration can be changed, the username and password are fixed. Enter the factory-set IP address in the address bar of an internet browser.

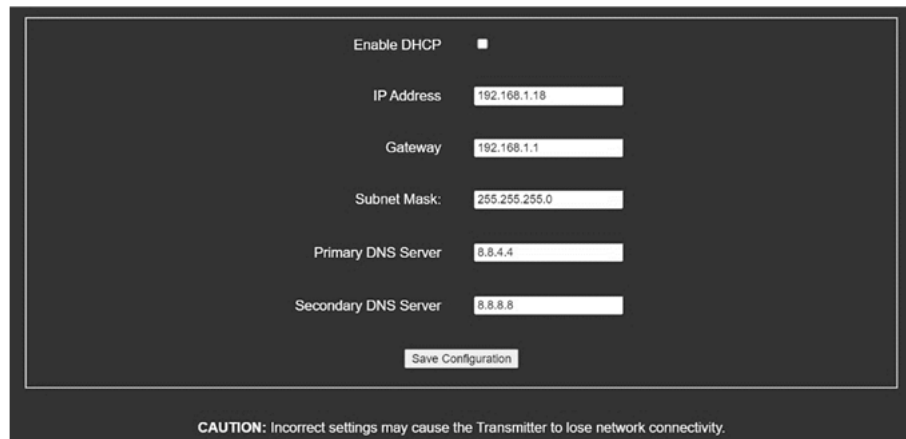
IMPORTANT: Accessing the transmitter's front panel menu will enter the FMTX250 into 'local mode', where front panel settings take precedence over the ethernet connection. The network readings and settings will not be available until the local menu has been exited, and the main screen is displayed on the LCD.



Select 'Continue'. Upon successful log-in, the FMTX250's status page will appear.



The IP address and associated network configurations can be changed by selecting the settings ('gear') icon:



Enable DHCP

IP Address

Gateway

Subnet Mask:

Primary DNS Server

Secondary DNS Server

CAUTION: Incorrect settings may cause the Transmitter to lose network connectivity.

DCHP can be set, or a new IP address entered. Include the Gateway address of the local Router, and the desired Primary and Secondary DNS server addresses, if different.

New browser sessions will prompt for a Username and Password. When continuing within the current browser session there will be no prompt to enter a Username or Password.

Like most ethernet enabled devices, the client web browser may flag the internet connection as 'Not secure'. This can be ignored, because hardware devices don't usually serve 'https' (secure) pages to clients.

However, general network security is VERY IMPORTANT. It is up to the user to ensure adequate overall security for the internet connection. Like all computers, on all networks, the transmitter's network port will be continually subject to external hack and 'Ping of Death' attacks. Connect the transmitter's network port to the Internet via a Router with port forwarding configured in such a way as to ensure maximum local network security. Schedule regular checks, on an on-going basis, to ensure that the Router is running the very latest manufacturer's firmware.

Lucoro Broadcast take no liability whatsoever for damage or losses caused by a successful network attack.

Audio Processor

The high-quality integrated audio processor is more than an audio limiter found on most transmitters. It has all of the features of expensive broadcast processors, including:

Slow gain-riding section (AGC). This will optimise all sources for equal volume over time. So if one studio operator drives the mixing desk louder or quieter than others, the level will compensate accordingly.

Multiband Compressor Limiters. Bass, mid and high frequencies of programme material are split and processed differently. This avoids the 'pumping' associated with single-band limiters, where higher frequency sounds are affected by bass powerful content.

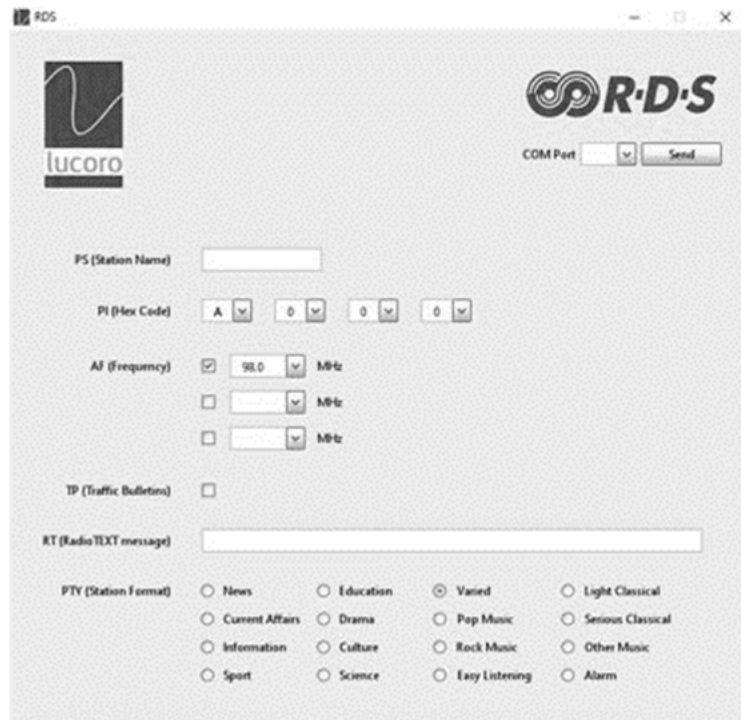
Final HF limiting and distortion-cancelled composite clipping ensures that deviation can be optimised, without 'overshoot' to above 75kHz.

DSP FIR 15kHz audio filtering maintains audio high frequencies up to 15kHz, but preserves the Pilot signal at 19kHz, and the RDS sub-carrier at 57kHz.

The menu includes the ability to select from 3 pre-sets, so that broadcasters can choose the audio style that best suits their station.

RDS

When setting-up the transmitter for the first time, the 'fixed' RDS content must be programmed via the USB interface, using a Windows™ PC or Laptop running the free software available at lucorobroadcast.com/support.



1. Connect a USB cable to the USB port on the rear of the transmitter. If the transmitter is not in service apply power. REMEMBER: Never operate a transmitter without a test load ('dummy load') or matched antenna system connected to the RF Output.

2. Ascertain the COM Port assigned for the USB connection: Go to Windows® Device Manager and expand (Ports COM & LPT) branch.

Make a note of the COM port number designated to the transmitter. Avoid using COM ports above 9. If necessary, override the COM port number assigned by Windows under 'Advanced Settings'.

3. Download (<https://lucorobroadcast.com/support>) and open the RDS Programming Application.

4. Select the relevant COM Port from the drop-down box, then fill in the remaining fields, as required.

- PS (Station Name): Maximum 8 characters including punctuation and spaces. Enter the station name, as you would like it to appear on RDS displays (eg. "Hits FM").
- PI (Hex Code): Issued by the broadcast regulator, this is a 4 digit Hexadecimal code unique to your station (eg. C495).
- AF(Frequency): Using the drop-down box, select the transmission frequency.
If there are additional frequencies to add (relay transmitters, or transmitters in neighbouring areas carrying the same content), enter their frequencies too (up to 4), and tick the corresponding tick box.
- TP (Traffic Program): Select this option ONLY if your station broadcasts regular traffic and travel bulletins.
- RadioTEXT: Maximum 64 characters including punctuation and spaces. Enter a message, as you would like it to appear on receivers showing RadioTEXT (eg. "Music, news and information 24 hours a day on Hits FM") Can include phone-in numbers, a website address, etc).
- PTY (Program Type): Select the category which will best categorises your station's main programme content.

Once all of the information is entered correctly, press SEND.
After a few seconds, the transmitter will now be transmitting the updated RDS content.

If desired, the dynamic RDS RadioTEXT feature can be used.

It is recommended that a default generic RadioTEXT message (eg. station slogan and contact details) be included in the above USB programming. After a power re-set, this generic message will appear until dynamic updates are sent via RS232.

The FMTX250 uses a transparent ASCII protocol, to suit a number of radio playout systems with the minimum of additional data processing or interfacing requirements.

IMPORTANT! The 9-way D-Sub connector on the rear of the transmitter is used for a number of control and monitoring functions. The RS232 input for the RDS dynamic RadioTEXT feature shares this connector, therefore pin connections are not the same as a standard RS232 port. Take care NOT to connect an ordinary RS232 cable with standard wiring to this connector. Damage to – or malfunction of – the transmitter’s circuits may result.

RS232	9-pin 'D'-sub connection
Computer:	3 (TX), 5 (GND)
FMTX250:	6 (RX) 7 (GND)

The RS232 port provided on streaming studio-transmitter links can be used to send 'Now Playing...' data to the transmitter. Alternatively, transparent 'RS232 over TCP/IP ethernet' converters are widely available for internet or network connectivity.

Using RS232, simply send a sequence of ASCII characters (up to 64 characters in total length), followed by the ASCII Form Feed character 0x0C (equal to CTRL+'L' on a keyboard) . This Form Feed character commands the RDS encoder to write empty spaces over unused characters in the remaining RadioTEXT field, then return to the start position of the 64-character register, ready for the next update.

RS232 Data Format:

9600bps	8	N	1
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Most ASCII characters in the range (32 to 122 inclusive) are supported by the encoder. However, it should be noted that many radio receivers, especially older models, can only decode basic characters from this range. Use of characters other than A to Z or 0 to 9 may not appear – or cause unexpected results – on some radio displays.

For TA switching during traffic and travel bulletins, the ASCII characters below can be used. A Form Feed Character is NOT required, and a full 64 character text field is available immediately after sending these control characters.

RDS TA On	124	0x7C	
RDS TA Off	126	0x7E	~

Remember to send the RDS TA Off character immediately after each travel bulletin. Misuse of the RDS Traffic Announcement feature will result in sanctions by the broadcasting authority. RDS TA can also be activated and deactivated via the transmitter's 9-way 'D'-sub connector.

Broadcasters planning to use the RDS TA feature, either via RS232 or via the 9-way 'D'-sub connector, MUST ensure that the 'TP' option is set (ticked) when programming the fixed RDS content via USB.

NOTE: RS232 dynamic RadioTEXT control is only available on Lucoro Broadcast V3 FM transmitter models with an integrated RDS encoder, and with a serial number higher than 0322000.

Technical Specifications

RF:

Frequency range	87.5 to 108.0MHz
Frequency stability	Better than $\pm 200\text{Hz}$
Output power	30 - 250W
Harmonic & spurious output	-75dBc typical
AM Noise	$<0.5\%$ @ $\pm 40\text{kHz}$ deviation
THD	$<0.15\%$ @ $\pm 75\text{kHz}$ deviation
RF output connector	'N' type (F)

Monitoring:

RF (front panel)	BNC (F) -40dB 50 ohms (NOT to be used for measuring harmonic or spurious emissions)
MPX (front panel)	BNC (F) 1V P-P 10K ohms

Audio & MPX:

Audio input Level	+6dBu for $\pm 75\text{kHz}$ deviation
Audio input Impedance	600 Ohms
Audio input connectors	XLR (F)
Digital Audio option versions	SPDIF and AES/EBU: XLR (F)
MPX output	Approx 1V p-p 10K ohms
MPX input	Approx 1V p-p (adjustable)

Power Supply:

Input AC	100V to 250V (50/60 Hz)
Consumption (at maximum RF output)	220W (max at 230V AC)

Mechanical:

Size (mm)	2U 88 (H) x 482 (W) x 290 (D)
Weight	Approx 5kg
Temperature	0°C to +42°C
Humidity	95% (relative non-condensing)

We reserve the right to alter specifications without notice. E&OE.

EC Declaration of Conformity to R&TTE Directive 1999/5/EC

We, Lucoro Broadcast
Clay Pit Lane
Roecliffe
York
YO51 9FS

hereby take sole responsibility to confirm that the product:

FMTX250
(and versions thereof with M and RBRX suffix)

which this declaration refers to, conforms to all applicable requirements of EU Directive 2014/53/EU and is CE marked accordingly:

Low Voltage Directive 2014/35/EU:

IEC 60950-1:2005/A2:2013
Safety Requirements for equipment < 600V

EMC Directive 2014/30/EU:

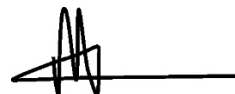
ETSI EN301 489-53 v1.1.0 (ETSI EN301 489-1 v2.1.1
ERM/EMC for Radio Equipment
Specific Conditions for FM Transmitters (Part 11)

Radio Equipment Directive 2014/53/EU:

ETSI EN302018-2 v2.1.1
Transmitting Equipment for FM Radio Broadcasting service

The following operation conditions and installation arrangements have to be presumed:

- (i) According to Operating Instruction Manual
- (ii) Connected lead lengths of 2 metres or less



M. O'Rorke, Director
September 2020



WEEE - Waste Electrical and Electronic Equipment

The equipment that you bought has required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment.

In order to avoid the dissemination of those substances in our environment and to diminish the pressure on the natural resources, we encourage you to use the appropriate take-back systems. Those systems will reuse or recycle most of the materials of your end life equipment in a sound way.

The crossed-out wheeled bin symbol invites you to use those systems.

If you need more information on the collection, reuse and recycling systems, please contact your local or regional waste administration.

IMPORTANT!

NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE WITH RESPECT TO THIS PRODUCT. Do not misconstrue any information as our recommendation to use any product, process, or equipment in conflict with any regulatory authority or patent.

Ensure compliance with all applicable safety requirements when installing or using this equipment, and operate in accordance with local laws governing the use of radio transmission equipment.

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