

HI-FI MONO/ STEREO FM EXCITERS



FM-800 / FM-850



**INSTRUCTION MANUAL
(USA version)**

(In conformity with FCC Part 73 regulation)

(VERIFICATION)

9902-800/850

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SECTION 1
GENERAL INFORMATIONS

A) **Introduction**

Thank you for purchasing one of the fine products made by **DECADE** transmitters. Your new **FM-800** or **FM-850 HI-FI STEREO FM EXCITER** is a very high performance and high reliability piece of equipment. Before using it, please read this manual carefully in order to obtain the best possible results from your FM exciter. The manual contains installation, operation and programming procedures for **DECADE FM-800** (1.8 Watts) Hi-Fi mono and **FM-850** (1.8 Watts) of Hi-Fi Stereo FM exciters.

B) **Description**

FM-800 and **FM-850** exciters include a high precision crystal controlled VCO, a digital stereo generator (FM-850 only), an RF power amplifier and a spurious filter. They accept left and right audio signals on two types of input connectors:

- XLR3: 600 Ohms balanced inputs, with signal levels of -4dBm min.
- 1/4": 6 to 10K Ohms unbalanced inputs, with signal levels of -10dBm min.

Input level can be adjusted from the **INPUT LEVEL** control on the front panel, in order to get the optimum modulation level. That useful feature makes **DECADE** FM exciters very versatile, allowing them to accept audio signals from many sources.

C) **Warranty**

FM-800 and **FM-850** FM exciters come with a two (2) years warranty that covers parts replacement and labor required to repair any defects resulting from the manufacturing process. All claims must be authorized by **DECADE** prior to shipment of a faulty unit for repairs and a copy of the invoice must be included in the shipment. Shipping fees are assumed by the client and **DECADE** will pay for the return of the repaired unit.

D) **Warning**

DECADE FM exciters operate on the 87.9 MHz - 107.9 MHz commercial FM broadcast band, so signals transmitted by them can be received on any standard FM receiver. Thus, some care should be taken in the use made out of these transmitters.

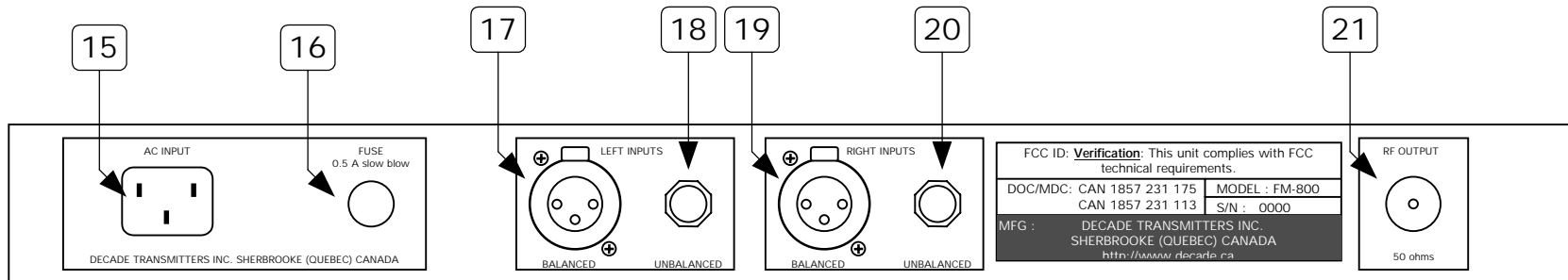
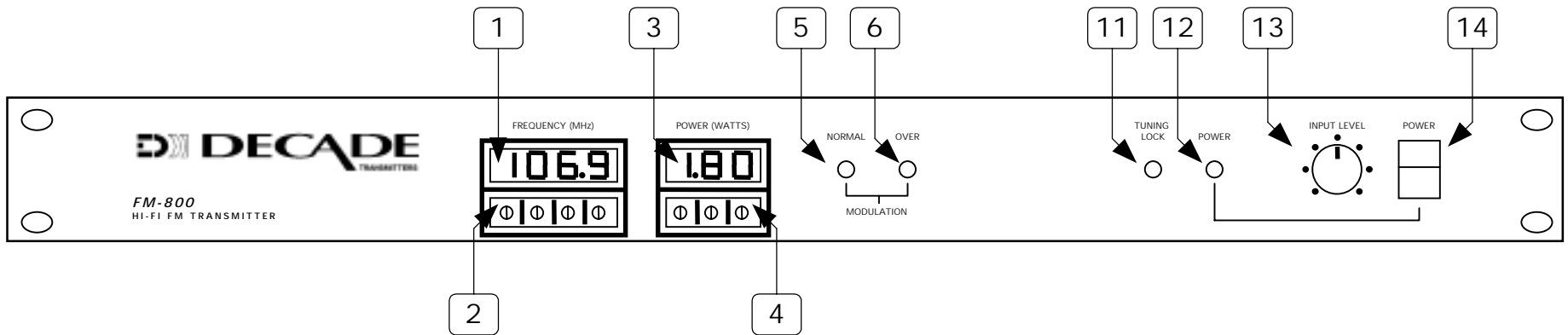
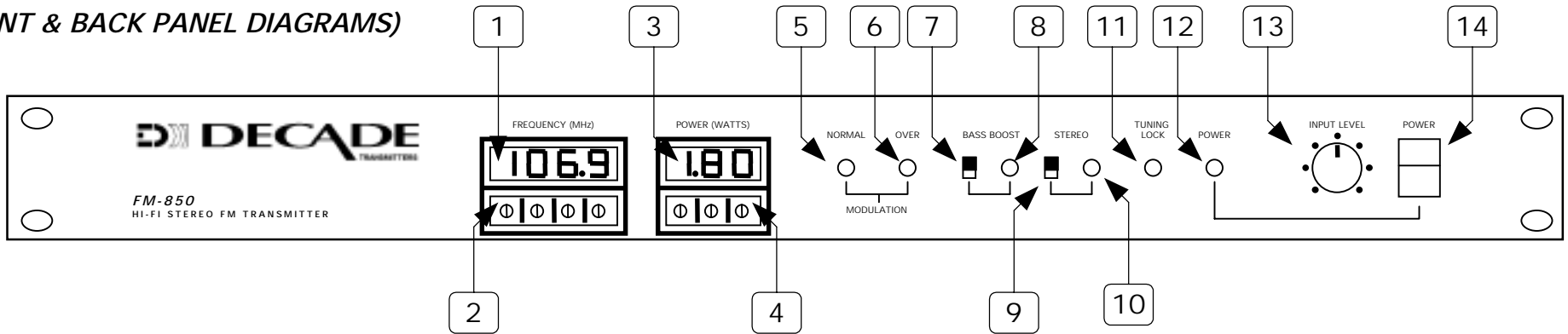
DECADE transmitters inc. is not responsible for any loss of profit or laws violation during the utilisation of their transmitters.

The FCC (Federal communication Commission) legislate the use of FM transmitters/exciters. A licence is required for operation of such FM transmitters/exciters in USA.

E) **Technical specifications**

Refer to annexes, Technical specifications of **FM-800** and **FM-850**.

(FRONT & BACK PANEL DIAGRAMS)



FRONT & BACK PANEL DESCRIPTION

- 1** **Frequency display:** Displays the programmed FM frequency (87.9 -107.9MHz)
- 2** **Frequency programming switches:** Directly dial the FM frequency.
- 3** **Power display:** Displays the programmed RF power in Watts.
- 4** **Power programming switches:** Directly dial the RF power extension
- 5** **6** **Modulation LEDs :** Indicates the status of audio signal being modulated. Green led (5) indicates normal modulation(100% and less). Red led (6) indicates over modulation(100% and more) .
- 7** **Bass boost switch:** When activated, the bass boost switch enable a circuitry that will produce a 6dB gain from 20Hz to 150Hz .
- 8** **Bass boost LED:** Indicates that the bass boost is activated.
- 9** **Stereo switch:** When activated, the stereo switch enable a digital circuitry that will produce stereo broadcasting.
- 10** **Stereo LED:** Indicates that the stereo mode is activated.
- 11** **Tuning lock LED:** Indicates that the transmitter's parameters have been stabilized and that the RF output section has been activated. An intentional delay of 4 seconds will occur .
- 12** **Power LED:** Indicates that the AC power has been activated.
- 13** **Input level:** Controls the audio level that is applied to the transmitter's audio section.
- 14** **Power switch:** Controls the AC power to the transmitter.
- 15** **AC input:** This is where you plug the AC (furnished with the transmitter).
- 16** **Fuse outlet:** Main AC input fuse holder.
- 17** **19** **Balanced inputs:** Accept a low impedance, balanced (600 Ohms), line level audio signal.
Note: The left & right inputs are electronically mixed to produce a mono signal (FM-800).
- 18** **20** **Unbalanced inputs:** Accept a high impedance unbalanced (10K Ohms), line level audio signal.
Note: The left & right inputs are electronically mixed to produce a mono signal (FM-800).
- 21** **RF output:** This is where you plug your coax cable that will reach your RF Power amp input (S0239 connector type, 50 Ohms impedance).
Note: It is recommended to use the best coax cable quality and as short as possible, in a manner to avoid RF power loss.

SECTION 3 INSTALLATION

A) Introduction

Installation of a **DECADE** FM exciter includes the following steps: 1) receiving inspection; 2) mounting in a rack or on a shelf; 3) connection of the AC supply and audio source; location, installation and connection of the unit to an RF power amp.

B) Receiving inspection

Check the FM exciter packaging for any damage that could have occurred in the shipping. If you find any damage on the exciter, keep the packaging for claiming purposes with the freight company. Any damage should be noted on the receiving slip at the time of delivery and the freight company advised within 5 workable days following the delivery of damaged units.

C) Connections

After installation of the exciter in a rack or on a shelf, plug the AC cable in the AC receptacle on the back panel, and connect to a 120 V, 60 Hz grounded AC socket. As with any grounded electric equipment, it is not recommended to use a **DECADE** FM exciter without a grounded AC socket, or removing the grounding pin on the cable, since that may result in shock hazards for the staff in contact with it.

D) Location of the FM exciter

DECADE transmitters are designed for indoor or outdoor use in a dry environment, in temperatures ranging from -50 to 50 °C. In order to obtain optimum performances, it is recommended to place them far from any electromagnetic noise source (transformers, motors, etc.).

The FM exciter should be located in a manner to comply with FCC regulation.

SECTION 4 OPERATION

A) Controls and indicators

FM-800 and FM-850: Input level is controlled by a stereo (FM-850) potentiometer, labeled **INPUT LEVEL** and located on the front panel. Two LEDs indicate the modulation level: **NORMAL** (green), which lights up when the modulation level is equal to 50% to 100%, which indicates a normal modulation state that is required for an undistorted signal at the receiving end. **OVER** (red), which lights up when the modulation level is equal or greater than 101%, which indicates an **overmodulation** state and could result in distortion at the receiving end. The **OVER** indicator shall never or rarely light, in order to avoid distortion. To allow a better perception of this indicator, its holding time has been lengthened, because of its importance.

The **FM-850** FM exciter can be switched from mono to stereo mode, in order to let you use the best mode for your particular application. The stereo selector is located on the front panel (**STEREO**). When in stereo mode, the **STEREO** indicator lights up. In mono mode, both inputs are active (balanced or unbalanced).

Tuning lock: This indicator (front panel for FM-800 & FM-850 models) will light up to show that your chosen FM frequency has been validated and that the RF output is active. A delay of 3 to 4 seconds is necessary before the system stabilizes itself. This delay is mandatory in a manner to avoid frequency scrambling while it is in the stabilization process.

Bass Boost: This control (FM-850 only) when activated, will produce a bass boost of 6dB from 0Hz to 100Hz. This feature will enhance the bass response of any type of FM receivers, especially those that are not equipped with a bass boost function.

B) Input and output connectors

FM-800 and FM-850 FM exciters come with two sets of inputs: **RIGHT** and **LEFT XLR3** balanced inputs and **RIGHT** and **LEFT 1/4"** unbalanced inputs, which are the two most popular types of input connectors.

The RF output has a female UHF (SO-239) connector and typical load impedance is 50 Ohms. The coax cable (RG-8 or RG-58) should not exceed 10 feet in length for RG-8 and 50 feet for RG-58, in order to minimize the power loss in the cable.

C) **Optimal input level**

Optimal input level is reached when the **OVER** modulation indicator remains off at all time. Adjust the input level control to meet that condition. To obtain this result it is mandatory to compress the audio input signal (between your audio source output and the inputs of the FM exciter inputs. The over modulation LED on the front panel shall never or rarely lit up. The level has to be adjusted in a maner to avoid over modulation.

**SECTION 5
MAINTENANCE AND PROGRAMMATION**

A) **Maintenance**

No maintenance is required to keep the FM exciter in top operating condition. If an external cleaning appears necessary, use a soft, damp cloth and mild soap only.

B) **Frequency programming**

The transmitting frequency is user programmable via a set of 4 decimal rotary switches (below the **FREQUENCY** digital readout) on the front panel (FM-800 & FM-850).

- 1) While the FM exciter is off (Power switch is off), determine the frequency of your choice and compose in a squential fashion(from far left switch to right), the number of your choosen FM frequency.
Ex: 102.3 MHz: First switch(far left)= 1, Second switch= 0 ,Third switch = 2 and Fourth switch = 3. Basicaly,what you are doing,is that you directly write the frequency number in Mega Hertz.

Notice: While it is possible to select and read an FM frequency below and above the restricted frequency range (Ex: 80.1MHz or 195.9MHz),the system will always validate the lowest or the highest permissible FM frequency instead.The lowest being 87.9MHz and the highest being 107.9MHz.It is also applicable for a selected even frequency (Ex: 88.2MHz),where the system will validate the nearest odd frequency instead (88.3MHz).

CAUTION: Never perform a frequency programming while the unit is powered (power switch on).

- 2) Activate the power switch (front panel) to ON position.A delay of 3 to 4 seconds is required for stabilisation.The **Tuning Lock** indicator (front panel) shall lite up and activate

the output section as soon as the stabilisation delay is over. You are now ready to broadcast.

C) RF power level programming

The transmitting RF power is user programmable in the range of 0 Watt to 1.8Watts, in increments of 50 milliWatts, via a set of 3 decimal rotary switches (below the **POWER** digital readout) on the front panel (FM-800 & FM-850).

- 1) determine the RF power of your choice and compose in a sequential fashion (from far left switch to right), the number of your chosen RF power.

Ex: 500 milliWatts: First switch (far left) = 0, Second switch = 5 and Third switch = 0. Basically, what you are doing, is that you directly write the RF power number in Watts (500 milliWatts = 0.50 Watts).

Notice: While it is possible to select and read an RF power above the restricted frequency range (Ex: 1.95 Watts), the system will always validate the highest permissible RF power instead. The highest being 1.8 Watts.

NOTICE: It is possible to select a new RF power while the unit is powered (power switch on).

SECTION 6 APPLICATIONS

The FM-800 and FM-850 models can be used as an exciter for driving an RF power amplifier of 100 Watts minimum and can be used as a stand-alone unit, provided that the end user was granted with a non-commercial educational FM broadcast license before the year of 1978.

IMPORTANT NOTICE: Since the minimum FCC allowed RF power is 100Watts ERP, these units cannot be operated (and will not be allowed to be operated by the FCC) as a stand-alone open air broadcast station. These units have to be hard wired to an external RF amplifier capable of producing 100Watts ERP minimum.

An experimental license for RF power below 100Watts can be granted by the FCC. Please contact your nearest FCC bureau for in-depth details and procedures.

TECHNICAL SPECIFICATIONS

FM-800

RADIO SECTION:

MODULATION: FM, deviation of 75kHz
FREQUENCY RANGE: from 87.9 to 107.9 MHz (programmable)
FREQUENCY PRECISION: 0.0008% or better
HARMONICS REJECTION: 55 dB min., 60 dB typ.
OUTPUT POWER: 50 mWatts to 1.8Watts, programmable in increments of 50 miliWatts.
LOAD IMPEDANCE: 50 Ohms typ.
RF OUTPUT CONNECTOR: UHF-F (SO-239)
NOTIFICATION STANDARD: FCC Part 73 (Verification)
CONTROLS & INDICATORS: Frequency selection and readout, Power selection and readout,
Tuning lock status.

AUDIO SECTION:

MODE: mono (HI-FI)
FREQUENCY RESPONSE: 20 Hz - 20 000 Hz, @-1dB
TOTAL HARMONIC DISTORTION: 0.05% max.
SIGNAL TO NOISE RATIO: 70 dB min.
DYNAMIC RANGE: 80 dB min.
INPUT IMPEDANCE: 600 Ohms balanced (XLR), 10K Ohms unbalanced (1/4")
CONNECTORS: 2 X XLR3 and 2 X 1/4" female jacks
INPUT SENSITIVITY: balanced: 0dBm min.. unbalanced: -6 dBm min.(both inputs in use)
INDICATORS: Normal and over modulation, power.
CONTROL: input level, power switch

MISCELLANEOUS:

POWER REQUIREMENTS: 120 V, 60 Hz, 40 VA
AC PROTECTION: grounded AC plug and 500 mA slow blow, 120 V fuse
DIMENSIONS: 19" x 11" x 1.75" (48 cm x 28 cm x 4.5 cm), 1 rackmount space
WEIGHT: 12 lb (5.45kg)

DECADE Transmitters reserves the right to make changes or improvements in manufacturing or design of its products, wich may affect specifications.

TECHNICAL SPECIFICATIONS

FM-850

RADIO SECTION:

MODULATION: FM, deviation of 75kHz

FREQUENCY RANGE: from 87.9 to 107.9 MHz (programmable)

FREQUENCY PRECISION: 0.0008% or better

HARMONICS REJECTION: 55 dB min., 60 dB typ.

OUTPUT POWER: 50 mWatts to 1.8WattS, programmable in increments of 50 miliWatts.

LOAD IMPEDANCE: 50 Ohms typ.

RF OUTPUT CONNECTOR: UHF-F (SO-239)

NOTIFICATION STANDARD: FCC Part 73 (Verification)

CONTROLS & INDICATORS: Frequency selection and readout, Power selection and readout,
Tuning lock status indicator.

AUDIO SECTION:

MODE: stereo/mono (HI-FI)(selectable)

FREQUENCY RESPONSE: 20 Hz - 15 000 Hz, @-1dB *

TOTAL HARMONIC DISTORTION: 0.05% max.

SIGNAL TO NOISE RATIO: 65 dB min.

DYNAMIC RANGE: 80 dB min.

STEREO SEPARATION: 40 dB min., 45 dB typ. **

INPUT IMPEDANCE: 600 Ohms balanced (XLR), 10K Ohms unbalanced (¼")

CONNECTORS: 2 x XLR3 and 2 x ¼"

INPUT LEVEL: balanced: -4dBm min.. unbalanced: -10 dBm min

INDICATORS: Normal and over modulation indicators , stereo and bass boost indicators

CONTROLS: input level , mono/stereo selector, bass boost selector

* Broadcast standard

** The minimum required separation for FM transmitters is 25 dB. The best receivers have a separation of 40dB, so the effective separation is more a matter of the quality of the receiver.

MISCELLANEOUS:

POWER REQUIREMENTS: 120 V, 60 Hz, 40VA

AC PROTECTION: grounded AC plug and 500 mA slow blow, 120 V fuse

DIMENSIONS: 19" x 11" x 1.75" (48 cm x 28 cm x 4.5 cm), 1 rackmount space

WEIGHT: 12 lb (5.45kg)

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