

# HI-FI MONO/ STEREO FM TRANSMITTERS

**FM-800 / FM-850**

## INSTRUCTION MANUAL

**Canadian version**

(Certified under Industry Canada BETS 6 & RSS-123 regulations)

**USA version**

(Certified under FCC Part 73 regulations)

1002-800/850

**DECADE**

## **TABLE OF CONTENT**

	<b>PAGE</b>
<b>SECTION 1: GENERAL INFORMATIONS</b> .....	2
A) Introduction .....	2
B) Description .....	2
C) Warranty .....	2
D) Warning .....	3
E) Technical specifications .....	3
<b>SECTION 2: FRONT &amp; BACK PANEL DIAGRAMS</b> .....	4
A) Front & back panel diagrams .....	4
B) Front & back panel description .....	5
<b>SECTION 3: INSTALLATION</b> .....	6
A) Introduction .....	6
B) Receiving inspection .....	6
C) Connections .....	6
D) Location of the transmitter and antenna .....	6
<b>SECTION 4: OPERATION</b> .....	7
A) Controls and indicators .....	7
B) Input and output connectors .....	7
C) Optimal input level .....	8
<b>SECTION 5: MAINTENANCE AND PROGRAMMING</b> .....	8
A) Maintenance .....	8
B) Frequency programming .....	8
C) RF power level programming .....	9
<b>SECTION 6: APPLICATIONS</b> .....	9
<b>APPENDICES</b> ■ FM-800 technical specifications .....	11
■ FM-850 technical specification .....	12

## **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 TRANSMITTER** 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 transmitter. 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 Transmitters.

#### **B) Description**

**FM-800** and **FM-850** transmitters 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 -10 dBm min. This input is located in the XLR3 center connector.

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** transmitters very versatile, allowing them to accept audio signals from many sources.

#### **C) Warranty**

**FM-800** and **FM-850** transmitters 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** transmitters 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 utilization of their transmitters.**

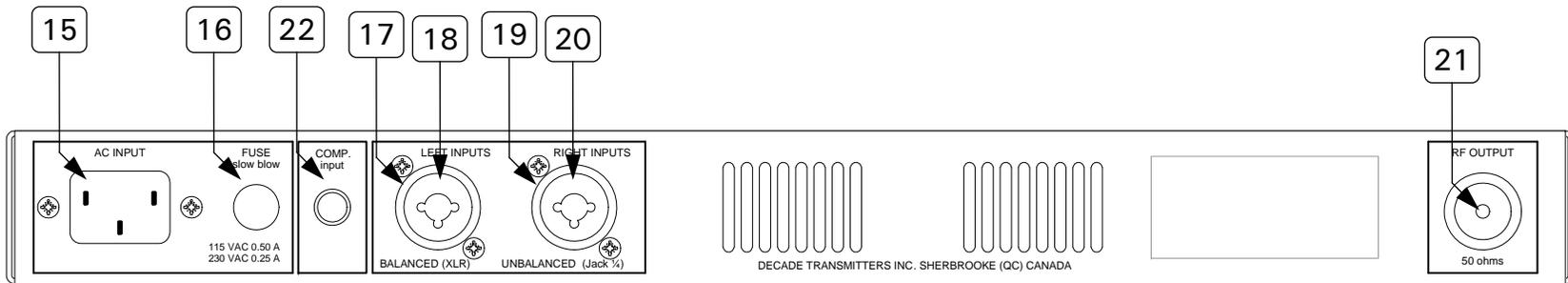
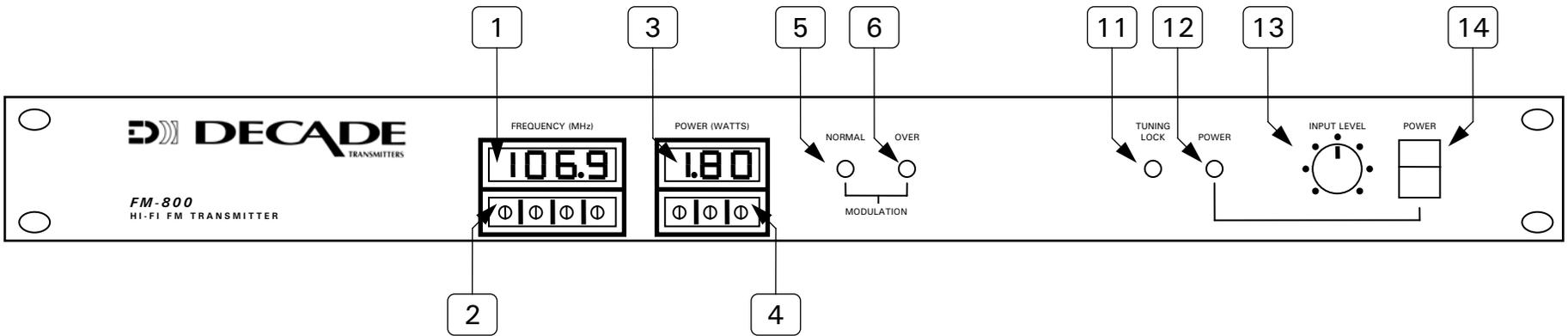
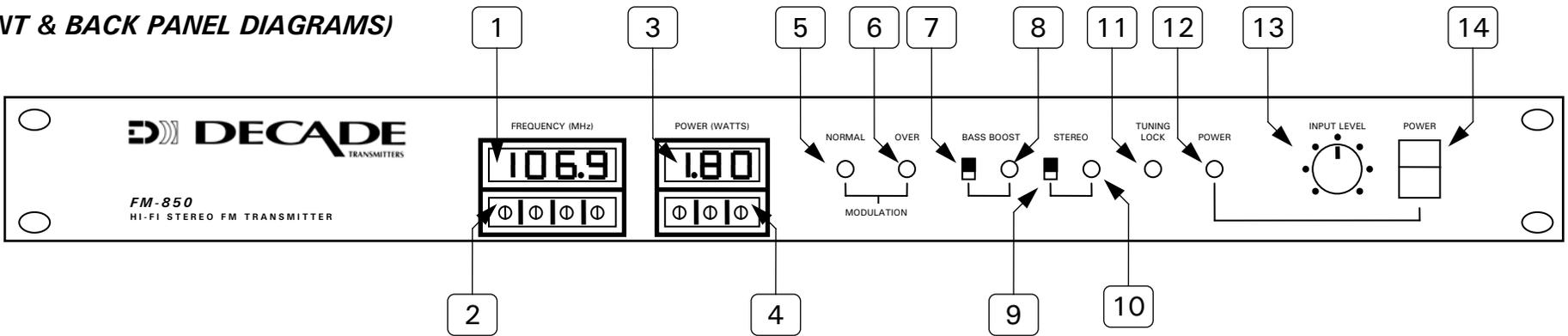
Industry Canada legislate the use of FM transmitters in Canada.

The FCC legislate the use of FM transmitters in USA.

E) **Technical specifications**

Refer to appendices, 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 enables 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 enables 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 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 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 transmitting antenna (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.
- 22 **Comp Input:** Optional (Not included)

### **SECTION 3 INSTALLATION**

#### **A) Introduction**

Installation of a **DECADE** FM transmitter 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 antenna (optional).

#### **B) Receiving inspection**

Check the transmitter packaging for any damage that could have occurred in the shipping. If you find any damage on the transmitter, 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 transmitter 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** transmitter 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 transmitter and antenna**

**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.).

Antenna should be located in a manner to comply with FCC regulations in USA and with Industry Canada regulations in Canada.

## **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), witch lights up when the modulation level is equal of 50% to 100%, witch indicates a normal modulation state that is required for an undistorted signal at the receiving end. **OVER** (red), witch lights up when the modulation level is equal or greater than 101%, witch indicates an **over modulation** 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** transmitter 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 lite 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 stabilize 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, specially those that are not equipped with a bass boost function.

### **B) Input and output connectors**

**FM-800 and FM-850** transmitters come with two sets of inputs: **RIGHT** and **LEFT XLR3** balanced inputs and **RIGHT** and **LEFT 1/4"** unbalanced inputs, witch 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. Antenna cable (RG-8 or RG-58) should not exceed 100 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 transmitter inputs. The over modulation LED on the front panel shall never or rarely lit up. The level has to be adjusted in a manner to avoid over modulation.

**SECTION 5  
MAINTENANCE AND PROGRAMMING**

A) **Maintenance**

No maintenance is required to keep the transmitter 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 transmitter is off (Power switch is off), determine the frequency of your choice and compose in a sequential fashion (from far left switch to right), the number of your chosen FM frequency. Ex: 102.3 MHz: First switch (far left) = 1, Second switch = 0, Third switch = 2 and Fourth switch = 3. Basically, 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 stabilization. The **Tuning Lock** indicator (front panel) shall lite up and activate the output section as soon as the stabilization 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 miliWatts, 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 miliWatts: 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 miliWatts = .050 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**

Applications for **DECADE** transmitters are almost unlimited, but here are a few very popular ones. With **DECADE** transmitters, a whole new world opens up for hearing impaired people, and most of all for people demanding the best sound reproduction possible, regardless of the environment.

In Canada: Please contact your nearest office Industry Canada to obtain information concerning the need to hold a permit or license based on your particular application.

In USA: Please contact your nearest office FCC to obtain information concerning the need to hold a permit or license based on your particular application.

**CHURCHES:** Connected to the church sound system, the transmitter broadcasts the oral and musical content of the celebrations

to the attendants, hearing impaired or not, and let them benefit from a perfect listening.

**CINEMAS:** Connected to the Dolby cinema processor or projector preamplifier, the transmitter allows the attendants to enjoy the full stereo spectrum and all the details of the soundtrack of the movie. A truly unique experience everyone must try.

**THEATRES:** With two microphones installed on the stage and fed to the transmitter through a mixing board, you will have the sensation of being seated right next to the actors, even if you are actually seating in the last row.

**CONFERENCE HALLS:** Many transmitters can be used as part of a simultaneous translation scheme, where attendants can listen to the conference in the language of their choice. A single transmitter can also be used as an aid for hearing impaired persons.

## **TECHNICAL SPECIFICATIONS FM-800**

### **RADIO SECTION:**

**MODULATION:** FM, deviation of 75 kHz

**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:** 0 mWatt to 1.8Watts, programmable in increments of 50 miliWatts.

**LOAD IMPEDANCE:** 50 Ohms typ.

**ANTENNA CONNECTOR:** UHF-F (SO-239)

**CERTIFICATION STANDARD:** Industry Canada BETS-6 & RSS-123 (Certification), FCC Part 73 regulations in USA

**CERTIFICATION ID NUMBER:** **1857 231 175** (RSS 153), **1857 231 113** (RSS 123), **MCHF-800** (FCC PART 73)

**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 (¼")

**CONNECTORS:** 2 X XLR3 and 2 X ¼" female jacks (located in the XLR3 center connector).

**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 rack mount space

**WEIGHT:** 19 lb (8.63 5kg)

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

## **TECHNICAL SPECIFICATIONS FM-850**

### **RADIO SECTION:**

**MODULATION:** FM, deviation of 75 kHz

**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:** 0 mWatt to 1.8WattS, programmable in increments of 50 miliWatts.

**LOAD IMPEDANCE:** 50 Ohms typ.

**ANTENNA CONNECTOR:** UHF-F (SO-239)

**CERTIFICATION STANDARD:** Industry Canada BETS-6 & RSS-123 (Certification), FCC Part 73 regulations in USA

**CERTIFICATION ID NUMBER:** 1857 231 175 (RSS 153), 1857 231 113 (RSS 123), MCHF-800 (FCC PART 73)

**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" (located in the XLR3 center connector).

**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 rack mount space

**WEIGHT:** 19 lb (8.63 kg)

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