

# **INCA TXFH-RC**

## **WIRELESS AUDIO TRANSMITTER**

**Version 1.02**

**COMPANY CONFIDENTIAL**

## Table of contents

|          |                                                     |          |
|----------|-----------------------------------------------------|----------|
| <b>1</b> | <b>INCA TXFH-RC WIRELESS AUDIO TRANSMITTER.....</b> | <b>4</b> |
| 1.1      | Introduction.....                                   | 4        |
| 1.2      | System Concept .....                                | 5        |
| 1.2.1    | General .....                                       | 5        |
| 1.2.2    | Different settings .....                            | 5        |
| 1.2.3    | Application Note .....                              | 6        |
| 1.2.4    | Wire connection .....                               | 7        |
| 1.2.5    | Transmitter .....                                   | 7        |
| 1.2.6    | Remote Control Receiver .....                       | 7        |
| 1.2.7    | Remote Control Upcodes – TXFH-RC VHF .....          | 8        |
| 1.3      | Technical specifications .....                      | 9        |

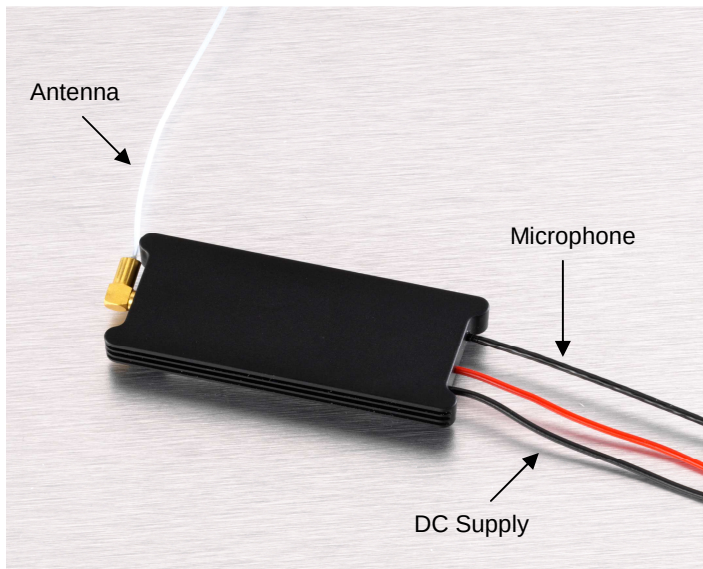
# Transmitters

# 1 INCA TXFH-RC WIRELESS AUDIO TRANSMITTER

## 1.1 Introduction

This document describes the general functions and performance of the Spectronic INCA TXFH-RC transmitter.

Information on items of a specific delivery is to be found in a separate document, stating TX frequencies and remote control address codes of the individual units.



## 1.2 System Concept

### 1.2.1 General

The INCA TXFH-RC is a series of wireless audio, remote controllable, small sized VHF transmitters intended for concealed room monitoring etc.

The TX unit comes with flying leads for the battery connection and the antenna terminal has a female MMCX-connector. The TX unit is deliverable with external microphone.

**Note:** The special functions/upcodes will only be available, if using an X-IDER 4096 TX. Please refer to Section on Remote Control Upcodes – TXFH-RC VHF.

### 1.2.2 Different settings

**Sleep mode on / off:** The transmitters can be switched into sleep-mode. In sleep-mode, the current consumption is only app. 200 uA, which maximizes the lifetime of the battery more than 1000 times.

In sleep-mode the receiver only goes on the air in app. 30 msec. for every 2.5 seconds to look for a valid code transmission

**VOX mode on / off:** At the expense of a little higher current consumption (app. 300 uA), the transmitter can be switched into VOX-mode, meaning that the transmitter will run only when the microphone hear acoustic signals like talking or music. This VOX is an advanced type of circuit that has the ability to distinguish voice from background noise and the power circuit is only switched on when a voice signal is present. Therefore, the switching operation is highly reliable in noisy environments.

**AGC on / off:** is integrated in the transmitter. The AGC action prevents over-modulation at high sound levels and makes it possible to listen to very weak conversation at the same time.

**Scrambler on / off:** The transmitter includes an audio scrambler-circuit, which can be switched on and off by the remote control.

The scrambler has been added for greater security, and to avoid listening in by unauthorized persons. It is based on simple frequency-inversion techniques due to the very low power needed for that sort of circuit.

In the scramble mode, the audio frequency response, as well as the signal to noise ratio, are somewhat minimized compared to the un-scrambled mode.

**Changing channels:** It is possible to shift between 4 channels by the remote control. The 4 channels (frequencies) are pre-programmed in the

transmitter. During operation, it is possible to shift channel in order to use the optimal channel (frequency).

### **Output Power:**

The transmitter has two power levels, which can be selected by the X-ider remote control. The output power in high mode is 1W for the VHF version. In low power mode both versions will deliver approx. 300mW into 50 ohms. The supply voltage can be varied in the range from 3.3 to 15 V DC. In the low power mode the output power will be constant in the full supply voltage range, whereas in the high power mode the output power will begin to decrease at 4.75V input voltage and will be approx. halved at 3.3V. Because of the build-in switch-mode regulator the current consumption will increase as the input voltage is lowered.

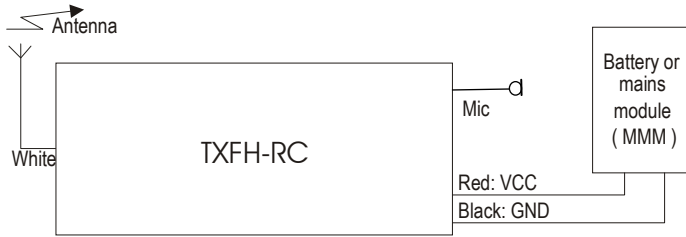
### **1.2.3 Application Note**

To achieve maximum RF range it is advisable to keep the antenna as far away from the surroundings as possible. If an antenna is in close proximity to metal surfaces or concrete walls, the efficiency of the transmitter will be minimized due to power absorption and disturbance of the antenna radiation pattern.

For maximum battery lifetime and for minimizing the risk of being found by bug detectors or scanners, the transmitter can be switched off into sleep-mode by means of the remote control. Alternatively, simply choose VOX mode, when in doubt whether persons will be present in the room being monitored. The TX will then only go "on the air" every time conversation is detected in the room. After app. 15 sec. without conversation, the TX will go to sleep again and thus saving battery power.

Please note that because the transmitter is a very small high-power device, the housing is becoming hot under normal application conditions (up to 60 degrees centigrade). Therefore don't wrap the transmitter into isolation materials and always be sure that the transmitter can get rid of its heat

### 1.2.4 Wire connection



### 1.2.5 Transmitter

During off state, the transmitter is completely switched off, and as the remote receiver does not contain a local oscillator, as would normally be the case, when using a heterodyne receiver, everything is totally quiet and nothing can be found by e.g. spectrum analyzers or scanners.

For minimum current consumption, analogue frequency modulation with an audio bandwidth of 100 - 5000 Hz (unscrambled mode) has been chosen.

### 1.2.6 Remote Control Receiver

The remote-receiver is realized by a very small and sensitive hybrid IC, intended for unlicensed low-power remote control. The carrier frequency is OOK (on off keyed) modulated and the system provides up to 4096 different address codes. The Spectronic X-IDER remote-control transmitter is used to send the different codes for setting up the TX.

The Address Code of the Remote Control is factory set, according to customer specifications, or as specified for standard frequencies by Spectronic.

### 1.2.7 Remote Control Upcodes – TXFH-RC VHF

X-IDER left-hand HEX switch

|   |                                          |
|---|------------------------------------------|
| 0 | TX on                                    |
| 1 | TX off (factory default)                 |
| 2 | AGC on (factory default)                 |
| 3 | AGC off                                  |
| 4 | TX audio scrambler on                    |
| 5 | TX audio scrambler off (factory default) |
| 6 | Channel 1 (factory default)              |
| 7 | Channel 2                                |
| 8 | Channel 3                                |
| 9 | Channel 4                                |
| A | VOX on                                   |
| B | VOX off (factory default)                |
| C | Low power                                |
| D | High power (factory default)             |
| E | NTIA Compliant on                        |
| F | NTIA Compliant off (factory default)     |

## 1.3 Technical specifications

### Technical specifications

#### Transmitter

|                                                |                                                                                                                                                                                         |
|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Output frequency range VHF                     | 150-174 MHz                                                                                                                                                                             |
| Min. channel raster 12.5 kHz                   |                                                                                                                                                                                         |
| Output power, VHF (Vbatt. = 3.3 to 15 V)       | typ. 1000 mW into 50 $\Omega$ load (high power)<br>typ. 250 mW into 50 $\Omega$ load (low power)<br>NOTE: In high-power mode the output power decreases for input voltages below 4.75 V |
| Frequency stability                            | $\pm 2.5$ ppm                                                                                                                                                                           |
| Max. deviation (FM)                            | $\pm 2.5$ kHz                                                                                                                                                                           |
| Spurious & harmonics                           | < -60 dBc non-harmonic<br>< -50 dBc harmonic                                                                                                                                            |
| Frequency response, unscrambled                | 100 Hz to 5 kHz, -3 dB                                                                                                                                                                  |
| NTIA frequency response, unscrambled           | 100 Hz to 3 kHz, -3 dB                                                                                                                                                                  |
| Frequency response, scrambled                  | 280 Hz to 4 kHz, -3 dB                                                                                                                                                                  |
| Audio amplifier AGC range                      | 45 dB                                                                                                                                                                                   |
| Supply voltage                                 | 3.3 V-15.0 V                                                                                                                                                                            |
| Battery types                                  | AA, AAA, C123 Lithium or<br>Lithium Ion rechargeable                                                                                                                                    |
| Current consumption VHF:                       |                                                                                                                                                                                         |
| Vbatt. = 4.75-15 V (output power = high power) | 435-215 mA DC                                                                                                                                                                           |
| Vbatt. = 3.3-15 V (output power = low power)   | 225-95 mA DC                                                                                                                                                                            |
| Current consumption, sleep mode                | < 200 $\mu$ A DC                                                                                                                                                                        |
| Current consumption, VOX-mode (silent room)    | < 300 $\mu$ A DC                                                                                                                                                                        |
| Operating temp. range                          | -20° C to 60° C / -4 F to 140 F                                                                                                                                                         |
| Dimensions HxWxD                               | 53x23x7.5 mm / 2.1x0.91x0.295 inches                                                                                                                                                    |

#### Remote control receiver

|                                     |            |
|-------------------------------------|------------|
| Remote control frequency (standard) | 433.92 MHz |
| Sensitivity                         | <-90 dBm   |
| Modulation                          | OOK        |
| Coding addresses                    | 4096       |

#### Required accessory for operation

The TXFH-RC transmitter requires the handheld X-IDER remote control transmitter module for maximum flexibility and functionality.