

Keyfob Transmitter

2-to-6 button remote control for gates and alarms — transmitter mode
— 433.92 MHz with EETX433A

Application guide for the most common use of the EETX433A: a handheld keyfob remote of 2 to 6 buttons for gates, barriers and alarm panels, with a unique code and ultra-low power.

FREQUENCY

433.92 MHz

RF POWER

13 dBm

BUTTONS

2 to 6

BATTERY

CR2032

VERSION

v1.0

BASED ON IC

EETX433A

DEVELOPED BY

Engeletron Engenharia

DATE

2026-07-04

• Introduction

This application note describes the most common use of the **EETX433A**: a **keyfob transmitter** — the handheld 2-to-6 button remote used to operate **gates, barriers and alarm panels**. The IC works in transmitter mode (Mode 0): each button sends a unique RF code that the gate or alarm receiver recognizes and acts upon.

The EETX433A integrates a 433.92 MHz PLL oscillator, OOK/ASK modulator, power amplifier and the encoding and power-management logic in a single SOP-8 package. So the remote needs only the IC, a few passives, the antenna loop, the buttons and a coin cell (CR2032). The **800 nA** standby current gives years of battery life.

Being 433.92 MHz RF (not infrared), it works **without line of sight**, through walls and doors and at a distance. The IC electrical details (pinout, absolute ratings, operating conditions, frame format and code mapping) are given in the EETX433A datasheet and referenced throughout this document.

• Operating Principle (Mode 0)

Mode 0 (transmitter) is selected automatically: pins CFG1, CFG2 and CFG3 are left **open** at power-up (no tie to VDD/GND). In this mode those pins also act as direct key inputs (KEY1–KEY3) and the SENIN/KEYx pin participates in a matrix for keys 4 to 6.

Pressing a button momentarily ties the corresponding key input to VDD (logic 1): this wakes the IC, which reads which key was pressed, encodes the corresponding 4-bit value and transmits. Up to **3 buttons** connect directly (one per CFG pin); buttons **4, 5 and 6** are added through the KEYx pin matrix (see the schematics).

Transmission continues **while the button is held**, with a minimum of **864 ms** (16 packets) and a maximum of **5,400 ms** (100 packets). If the user releases before 864 ms, the IC still completes the minimum. The LED blinks during transmission. With no button pressed, the IC is in ultra-low-power standby (800 nA) — the coin cell lasts for years.

• **Button Configurations**

The EETX433A covers 2 to 6 buttons on the same pinout. Up to 3 buttons connect directly (one per CFG1/CFG2/CFG3 pin); buttons 4, 5 and 6 are added by a simple matrix using the KEYx pin. The four reference schematics below (2, 3, 4 and 6 buttons) share the same RF core — 433.92 MHz loop antenna, matching capacitors, indicator LED and the CR2032 battery — changing only the number and wiring of the buttons.

Direct buttons (1–3)

Each button ties its CFG pin (CFG1/CFG2/CFG3) to VDD when pressed. It is the simplest wiring, enough for most 1-to-3-function gate keyfobs.

Matrix buttons (4–6)

The extra buttons share the KEYx pin (SENIN/KEYx) in a matrix with the CFG pins, reaching 6 keys with no extra pins. Each key still transmits a unique 4-bit value.

• Button Configurations

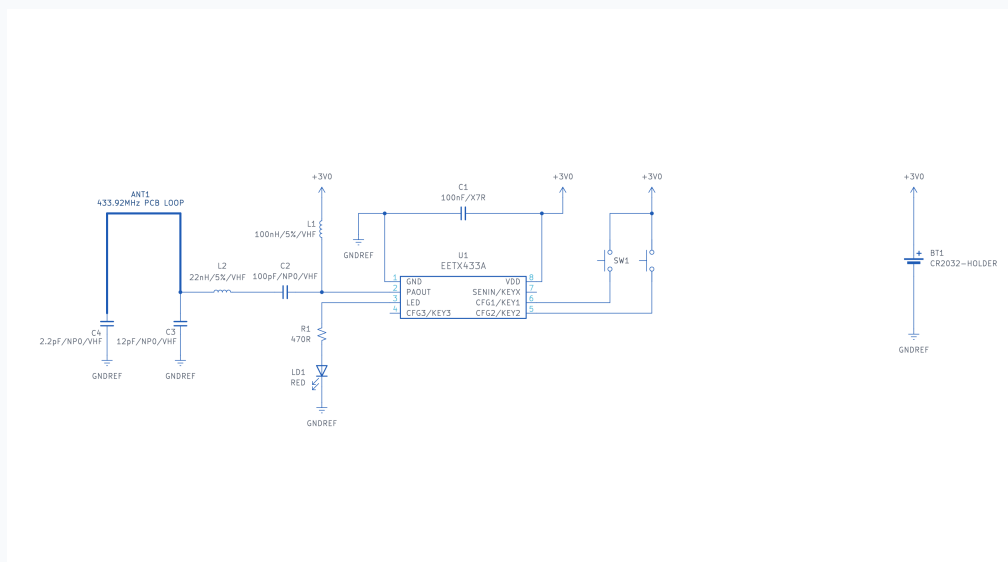


Figure 1: 2-button remote — KEY1 and KEY2 direct to the EETX433A

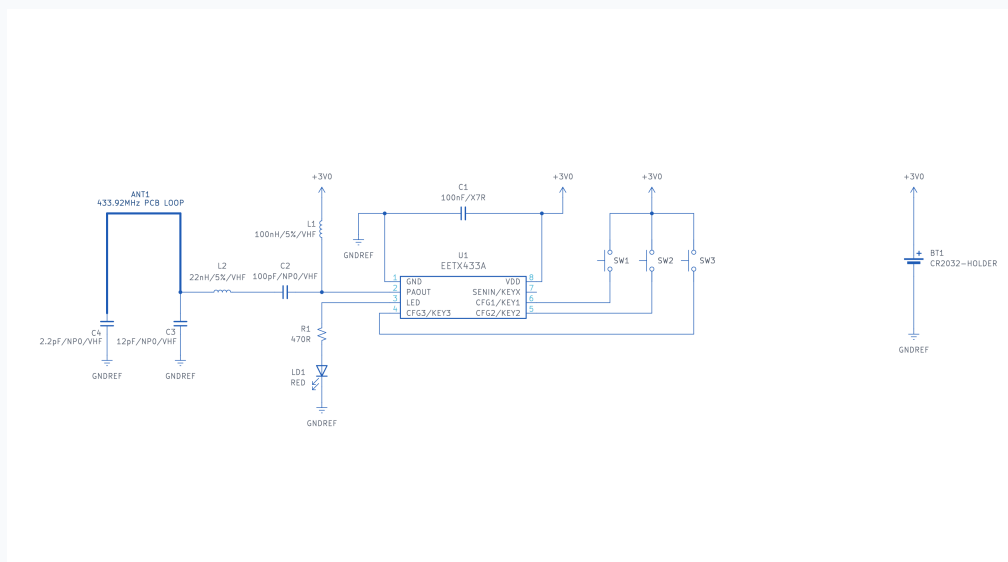


Figure 2: 3-button remote — KEY1, KEY2 and KEY3 direct

• Button Configurations

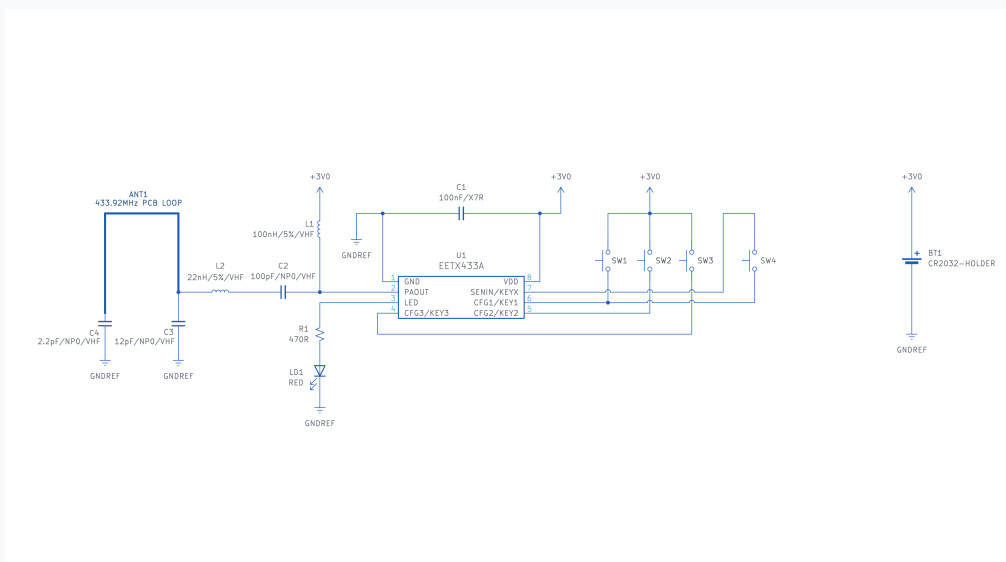


Figure 3: 4-button remote — 3 direct + 1 through the KEYx matrix

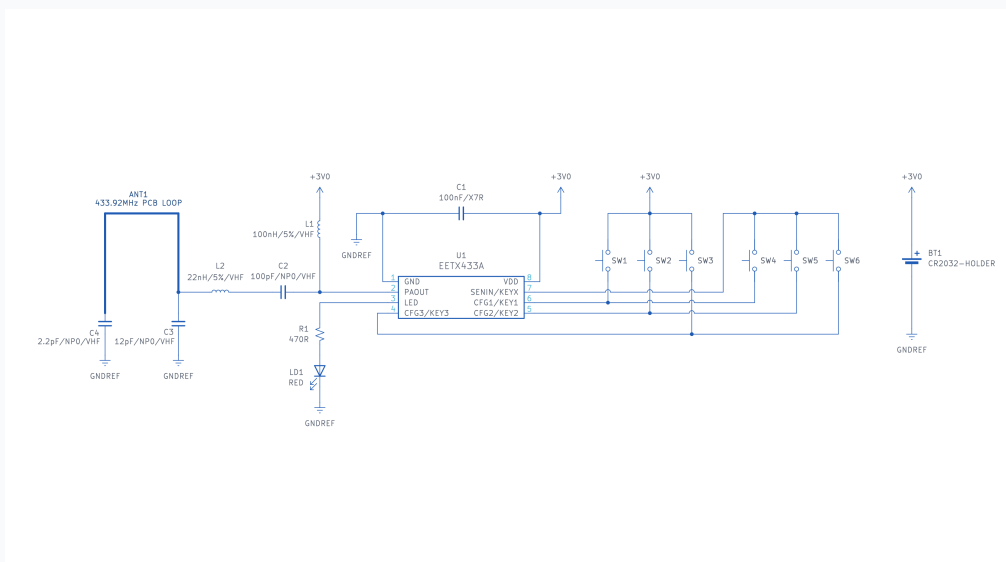


Figure 4: 6-button remote — 3 direct + 3 through the KEYx matrix

• Key Mapping

Each button transmits a fixed 4-bit value (D3D2D1D0) in the data field. The receiver identifies the pressed button from this value:

Key	D3	D2	D1	D0	Decimal
KEY1	0	0	0	1	1
KEY2	0	0	1	0	2
KEY3	0	0	1	1	3
KEY4	0	1	0	0	4
KEY5	0	1	0	1	5
KEY6	0	1	1	0	6

The 4-bit value identifies the key; the unique 20-bit address (factory-programmed) identifies the remote. Thus several remotes with identical buttons are distinguished by address at the receiver.

• Operating Sequence

Transmission starts when a button is pressed and lasts while the button is held, within the firmware time limits. The LED indicates each stage.

Phase	Condition	Behavior	LED
Idle	No button pressed	Ultra-low-power standby (800 nA) — battery lasts years	Off
Trigger	Press a button	Wake-up ~50 ms + PLL ~0.2 ms; key read	On
Transmission	Button held	Sends the key code; minimum 864 ms (16 packets)	Blinks on transmit
Maximum duration	Button held for a long time	Transmission ends at 5,400 ms (100 packets)	Blinks to the end
Early release	Release before 864 ms	The IC still completes the minimum time (864 ms)	—

GUARANTEED MINIMUM TIME

Even a quick tap guarantees the minimum transmission of 864 ms (16 packets), enough for the receiver to safely decode the command. Holding the button extends transmission up to a maximum of 5,400 ms.

• Transmitted RF Signal

Transmission follows the EETX433A packet format: pulse-width OOK encoding at 433.92 MHz, basic time unit $\lambda = 500 \mu\text{s}$ (each bit takes $3\lambda = 1.5 \text{ ms}$). Each packet carries pilot, start, 20 bits of programmable address (factory-unique), 4 bits of data (the key) and 4 bits of fixed anti-code, totaling $108\lambda \approx 54 \text{ ms}$, repeated 16 to 100 times depending on how long the button is held.

The 20-bit address uniquely identifies the remote and the 4-bit field identifies the key (see Key Mapping). The fixed anti-code improves decoding robustness at the receiver. See the EETX433A datasheet for the full frame structure and code mapping.

• Technical Characteristics

Values for the complete remote (EETX433A IC + buttons + battery), in transmitter mode. All RF and timing parameters follow the EETX433A datasheet.

Parameter	Value
Operating frequency	433.92 MHz
Channels	1
Modulation	OOK / ASK
RF power (typ.)	13 dBm
Buttons supported	2 to 6
Supply voltage	2.0–3.6 V (typ. 3.0 V)
Typical battery	1× CR2032 (3 V)
Standby current	800 nA
Transmit current	12 mA
Minimum transmission	864 ms (16 packets)
Maximum transmission	5,400 ms (100 packets)
Wake-up time	50 ms typ / 100 ms max
Code per key	4 bits (1–6)
Address	20 bits, factory-unique
IC package	SOP-8

Battery life is dominated by standby (800 nA) and usage frequency; with normal use a CR2032 lasts years. Transmit current at 13 dBm per the EETX433A datasheet.

• Soldering and Reflow

Excess temperature can damage the EETX433A, causing thermal deformation of the package and a shift of the 433.92 MHz frequency. Therefore, use **low-temperature solder-paste alloys** and limit the peak to **≤ 210 °C for ≤ 10 s**.

The lead-free alloy **SnBi — Sn42Bi57Ag1** (180 °C peak, RoHS) is recommended. The **SnPb — Sn63Pb37** alloy (210 °C peak) is only the **absolute maximum limit** reference — never exceed 210 °C.

CRITICAL TEMPERATURE LIMIT

NEVER exceed a **210 °C** peak or **10 s** at peak. Above 210 °C the SOP-8 suffers thermal deformation and frequency drift. Always prefer the low-temperature alloy (SnBi).

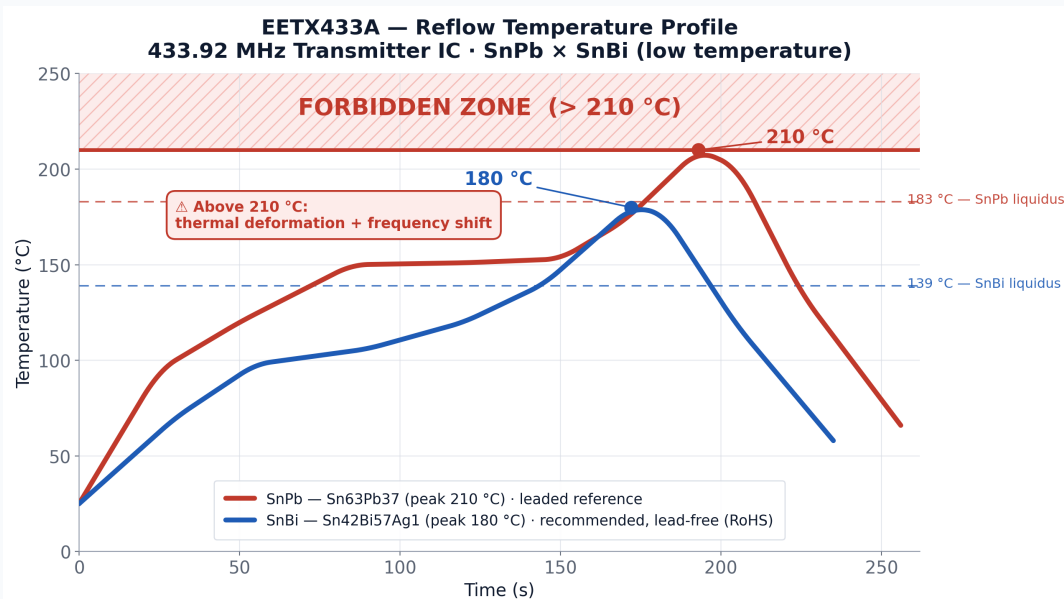


Figure: Reflow temperature profile — SnBi (recommended) × SnPb (max. limit 210 °C)

• Soldering and Reflow

Phase	SnPb · t (s)	SnPb · T (°C)	SnBi · t (s)	SnBi · T (°C)
Ramp-up	0-90	25→150	0-60	25→100
Preheat (soak)	90-150	~150	60-120	100→120
Ramp to peak	150-190	150→210	120-170	120→180
Peak (reflow)	190-200	210 (≤10 s)	170-180	180
Cooling	200-255	210→70	180-235	180→60

SnBi (Sn42Bi57Ag1, lead-free, RoHS) — recommended. SnPb (Sn63Pb37) is the leaded reference; 210 °C is the absolute maximum limit. Ramp-up ~1.2-1.4 °C/s · cooling ≤ 3-4 °C/s · max. 2 reflow cycles. Hand soldering (samples): tip ≤ 300 °C, contact ≤ 5 s.

• Application Guidelines

- **Battery:** use a CR2032 cell (3 V) with a holder; the ultra-low standby (800 nA) gives years of life. There is no need to switch the remote off.
- **Buttons:** for 2–3 keys, wire each button directly to its CFG pin. For 4–6 keys, follow the KEYx matrix schematic (Figures 3 and 4). Use good-quality tactile buttons for durability.
- **Receiver learning:** each remote has a unique address; enroll it into the gate/alarm receiver using the learn procedure (receiver "learn" button + one press of the remote). Several remotes can be enrolled into the same receiver.
- **Antenna:** use the printed 433.92 MHz loop antenna per the reference schematic; keep the matching capacitors (C2/C3/C4) near the output pin and avoid ground plane and metal over the antenna.
- **Range:** position the antenna away from the user's hand and from batteries/metal; a vertical loop orientation usually gives the best range.
- **Layout:** keep the RF traces short and the ground plane continuous under the digital section, following the layout guidelines in the EETX433A datasheet.

To learn more about the EETX433A and obtain the full datasheet, visit: engeletron.com.br

Legal Notice

The information in this application note is provided in good faith and believed to be accurate at the time of publication. Engeltron Engenharia reserves the right to modify specifications without notice. The circuits and values shown are reference examples; it is the integrator's responsibility to validate performance in the final application. We accept no liability for consequences arising from the use of this information.