

Erriez Oregon THN128 433MHz temperature sensor library for Arduino
1.0.1

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Chapter 1

Oregon THN128 433MHz temperature sensor transmit/receive library for Arduino

This is a transmit/receive library Arduino library with the Oregon THN128 433MHz wireless protocol.

Transmit / receive hardware

This library is optimized for low-power ATmega328 microcontroller (AVR architecture). This microcontroller is available on Arduino UNO and `Pro Mini 3.3V 8MHz` boards. Other targets are not tested.

Temperature transmitter on the left breadboard:

- Pro-Mini 3V3 8MHz.
- Genuine DS18B20 temperature sensor.
- STX802 low-power 433MHz transmitter.

Receiver on the right breadboard:

- SRX882 low-power 433MHz receiver.
- SSD1306 I2C 128x64 OLED display.
- Pro-Mini 3V3 8MHz.

Hardware notes

Supported hardware:

- AVR designed for low-power
- ESP8266
- ESP32
- For low-power transmitters, a `Pro Mini 3V3 8MHz` bare board with ATmega328 microcontroller is highly recommended. The board has no serial interface chip which reduces continuous power consumption. An external FTDI232 - USB serial interface should be connected for serial console / programming. (See red PCB on the picture) The SMD power LED should be desoldered from the Pro Mini to reduce continuous power consumption.
- A transmitter with (protected) 1500mA 18650 battery can operate for at least 6 months with `LowPower.h` functionality implemented. (By sending the temperature every 30 seconds)
- Changing the BOD (Brown Out Detection) fuse to 1.8V allows operation between 1.8 and 4.2V 18650 battery. (Explanation beyond the scope of this project)
- 1 to 3 temperature transmitters are supported, similar to the original Oregon THN128 temperature transmitters.
- Check [list of counterfeit DS18B20 chips](#), because this makes a huge difference in accuracy and read errors at 3.3V. Many DS18B20 chips from Aliexpress are counterfeit and won't work reliable at voltages below 3.3V.
- [NiceRF Wireless Technology Co., Ltd.](#) sells high quality 433MHz transmit (STX802) and receiver modules (STX882) with a good range.
- A 18650 battery (with protection circuit) should be connected directly to the VCC pin (not VIN).
- The voltage regulator can be desoldered from the pro-micro board when not used for more power reduction.

Oregon Protocol

A packet is sent twice:

Data (see header file [ErriezOregonTHN128Receive.h](#)):

- Byte 0:
 - Bit 0..3: Rolling address (Random value after power cycle)
 - Bit 6..7: Channel: (0 = channel 1 .. 2 = channel 3)
- Byte 1:
 - Bit 0..3: TH3
 - Bit 4..7: TH2
- Byte 2:
 - Bit 0..3: TH1
 - Bit 5: Sign
 - Bit 7: Low battery
- Byte 3:
 - Bit 0..7: CRC

Example low power receive

```
{c++}
#include <LowPower.h>
#include <ErriezOregonTHN128Receive.h>
// Connect RF receive to Arduino pin 2 (INT0) or pin 3 (INT1)
#define RF_RX_PIN 2
void printReceivedData(OregonTHN128Data_t *data)
{
    bool negativeTemperature = false;
    static uint32_t rxCount = 0;
    int16_t tempAbs;
    char msg[80];
    // Convert to absolute temperature
    tempAbs = data->temperature;
    if (tempAbs < 0) {
        negativeTemperature = true;
        tempAbs *= -1;
    }
    snprintf_P(msg, sizeof(msg),
        PSTR("RX %lu: Rol: %d, Channel %d, Temp: %s%d.%d, Low batt: %d (0x%08lx)"),
        rxCount++,
        data->rollingAddress, data->channel,
        (negativeTemperature ? "-" : ""), (tempAbs / 10), (tempAbs % 10), data->lowBattery,
        data->rawData);
    Serial.println(msg);
}
void setup()
{
    // Initialize serial port
    Serial.begin(115200);
    Serial.println(F("Oregon THN128 433MHz temperature receive"));
    // Turn LED on
    pinMode(LED_BUILTIN, OUTPUT);
    digitalWrite(LED_BUILTIN, HIGH);
    // Initialize receiver
    OregonTHN128_RxBegin(RF_RX_PIN);
}
void loop()
{
    OregonTHN128Data_t data;
    // Check temperature received
    if (OregonTHN128_Available()) {
        digitalWrite(LED_BUILTIN, LOW);

        // Read temperature
        OregonTHN128_Read(&data);
        // Print received data
        printReceivedData(&data);
        // Wait ~30 seconds before receiving next temperature
        Serial.flush();
        LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
        LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
        LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
        LowPower.powerDown(SLEEP_2S, ADC_OFF, BOD_OFF);
        digitalWrite(LED_BUILTIN, HIGH);
        // Enable receive
        OregonTHN128_RxEnable();
    }
}
```

Example low power transmit

```
{c++}
#include <LowPower.h>
#include <ErriezOregonTHN128Transmit.h>
// Pin defines (Any DIGITAL pin)
#define RF_TX_PIN 3
OregonTHN128Data_t data = {
    .rawData = 0,           // Raw data filled in by library
    .rollingAddress = 5,    // Rolling address 0..7
    .channel = 1,           // Channel 1, 2 or 3
    .temperature = 0,       // Temperature -99.9 .. 99.9 multiplied by 10
    .lowBattery = false,    // Low battery true or false
};
#ifdef __cplusplus
extern "C" {
#endif
// Function is called from library
void delay100ms()
{
    // Blink LED within 100ms space between two packets
    digitalWrite(LED_BUILTIN, HIGH);
}
```

```
    LowPower.powerDown(SLEEP_15MS, ADC_OFF, BOD_OFF);
    digitalWrite(LED_BUILTIN, LOW);
    LowPower.powerDown(SLEEP_60MS, ADC_OFF, BOD_OFF);
    LowPower.powerDown(SLEEP_15MS, ADC_OFF, BOD_OFF);
}
#ifdef __cplusplus
}
#endif
void setup()
{
    // Initialize built-in LED
    pinMode(LED_BUILTIN, OUTPUT);
    digitalWrite(LED_BUILTIN, LOW);
    // Initialize pins
    OregonTHN128_TxBegin(RF_TX_PIN);
}
void loop()
{
    // Set temperature
    data.temperature = 123; //12.3`C
    // Send temperature
    OregonTHN128_Transmit(&data);
    // Wait ~30 seconds before sending next temperature
    LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
    LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
    LowPower.powerDown(SLEEP_8S, ADC_OFF, BOD_OFF);
    LowPower.powerDown(SLEEP_4S, ADC_OFF, BOD_OFF);
}
```


Chapter 2

Module Index

2.1 Modules

Here is a list of all modules:

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------------------------	----

Chapter 3

Class Index

3.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

OregonTHN128Data_t	
Data structure	15

Chapter 4

File Index

4.1 File List

Here is a list of all documented files with brief descriptions:

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src/ ErriezOregonTHN128.h	??
src/ ErriezOregonTHN128Receive.c	
Oregon THN128 433MHz temperature transmit/receive library for Arduino	20
src/ ErriezOregonTHN128Receive.h	
Oregon THN128 433MHz temperature receive library for Arduino	22
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Chapter 5

Module Documentation

5.1 data macro's

Macros

- #define SET_ROL_ADDR(x) (((x) & 0x07) << 0)
- #define GET_ROL_ADDR(x) (((x) & 0x07) << 0)
- #define SET_CHANNEL(x) (((x) - 1) & 0x03) << 6)
- #define GET_CHANNEL(x) (((x) >> 6) & 0x03) + 1)
- #define SET_TEMP(x)
- #define GET_TEMP(x)
- #define SIGN_BIT (1UL << 21)
- #define LOW_BAT_BIT (1UL << 23)
- #define SET_CRC(x) ((uint32_t)(x) << 24)
- #define GET_CRC(x) ((x) >> 24)

5.1.1 Detailed Description

5.1.2 Macro Definition Documentation

5.1.2.1 GET_CHANNEL

```
#define GET_CHANNEL(  
    x ) (((x) >> 6) & 0x03) + 1)
```

Get channel

Definition at line 49 of file ErriezOregonTHN128.c.

5.1.2.2 GET_CRC

```
#define GET_CRC(  
    x ) ((x) >> 24)
```

Get CRC

Definition at line 69 of file ErriezOregonTHN128.c.

5.1.2.3 GET_ROL_ADDR

```
#define GET_ROL_ADDR(  
    x ) (((x) & 0x07) << 0)
```

Get rolling address

Definition at line 44 of file ErriezOregonTHN128.c.

5.1.2.4 GET_TEMP

```
#define GET_TEMP(  
    x )
```

Value:

```
(((((x) >> 16) & 0x0f) * 100) + \  
(((x) >> 12) & 0x0f) * 10) + \  
(((x) >> 8) & 0x0f))
```

Get temperature

Definition at line 56 of file ErriezOregonTHN128.c.

5.1.2.5 LOW_BAT_BIT

```
#define LOW_BAT_BIT (1UL << 23)
```

Low battery bit

Definition at line 64 of file ErriezOregonTHN128.c.

5.1.2.6 SET_CHANNEL

```
#define SET_CHANNEL(  
    x ) (((x) - 1) & 0x03) << 6)
```

Set channel

Definition at line 47 of file ErriezOregonTHN128.c.

5.1.2.7 SET_CRC

```
#define SET_CRC(  
    x ) ((uint32_t)(x) << 24)
```

Set CRC

Definition at line 67 of file ErriezOregonTHN128.c.

5.1.2.8 SET_ROL_ADDR

```
#define SET_ROL_ADDR(  
    x ) ((x) & 0x07) << 0)
```

Set rolling address

Definition at line 42 of file ErriezOregonTHN128.c.

5.1.2.9 SET_TEMP

```
#define SET_TEMP(  
    x )
```

Value:

```
(((((uint32_t)(x) / 100) % 10)) << 16) | \  
(((uint32_t)(x) / 10) % 10) << 12) | \  
((x) % 10) << 8)
```

Set temperature

Definition at line 52 of file ErriezOregonTHN128.c.

5.1.2.10 SIGN_BIT

```
#define SIGN_BIT (1UL << 21)
```

Sign bit

Definition at line 61 of file ErriezOregonTHN128.c.

Chapter 6

Class Documentation

6.1 OregonTHN128Data_t Struct Reference

Data structure.

```
#include <ErriezOregonTHN128.h>
```

Public Attributes

- uint32_t [rawData](#)
- uint8_t [rollingAddress](#)
- uint8_t [channel](#)
- int16_t [temperature](#)
- bool [lowBattery](#)

6.1.1 Detailed Description

Data structure.

Definition at line 63 of file ErriezOregonTHN128.h.

6.1.2 Member Data Documentation

6.1.2.1 channel

```
uint8_t OregonTHN128Data_t::channel
```

Channel

Definition at line 66 of file ErriezOregonTHN128.h.

6.1.2.2 lowBattery

```
bool OregonTHN128Data_t::lowBattery
```

Low battery indication

Definition at line 68 of file ErriezOregonTHN128.h.

6.1.2.3 rawData

```
uint32_t OregonTHN128Data_t::rawData
```

Raw data

Definition at line 64 of file ErriezOregonTHN128.h.

6.1.2.4 rollingAddress

```
uint8_t OregonTHN128Data_t::rollingAddress
```

Rolling address

Definition at line 65 of file ErriezOregonTHN128.h.

6.1.2.5 temperature

```
int16_t OregonTHN128Data_t::temperature
```

Temperature

Definition at line 67 of file ErriezOregonTHN128.h.

The documentation for this struct was generated from the following file:

- src/ErriezOregonTHN128.h

Chapter 7

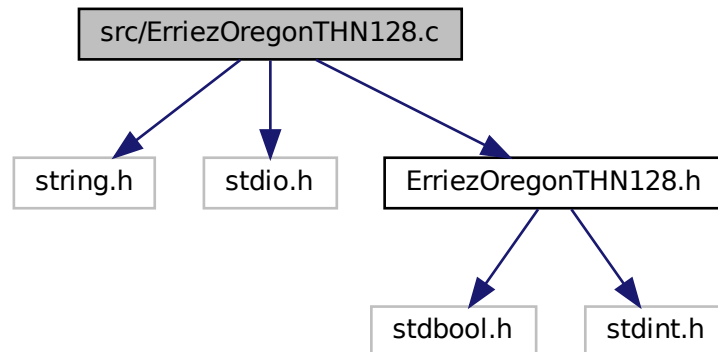
File Documentation

7.1 src/ErriezOregonTHN128.c File Reference

Oregon THN128 433MHz temperature transmit/receive library for Arduino.

```
#include <string.h>
#include <stdio.h>
#include "ErriezOregonTHN128.h"
```

Include dependency graph for ErriezOregonTHN128.c:



Macros

- `#define SET_ROL_ADDR(x) (((x) & 0x07) << 0)`
- `#define GET_ROL_ADDR(x) (((x) & 0x07) << 0)`
- `#define SET_CHANNEL(x) (((x) - 1) & 0x03) << 6)`
- `#define GET_CHANNEL(x) (((x) >> 6) & 0x03) + 1)`
- `#define SET_TEMP(x)`
- `#define GET_TEMP(x)`
- `#define SIGN_BIT (1UL << 21)`
- `#define LOW_BAT_BIT (1UL << 23)`
- `#define SET_CRC(x) ((uint32_t)(x) << 24)`
- `#define GET_CRC(x) ((x) >> 24)`

Functions

- bool [OregonTHN128_CheckCRC](#) (uint32_t rawData)
Verify checksum.
- void [OregonTHN128_TempToString](#) (char *temperatureStr, uint8_t temperatureStrLen, int16_t temperature)
Convert temperature to string.
- uint32_t [OregonTHN128_DataToRaw](#) ([OregonTHN128Data_t](#) *data)
Convert data structure to 32-bit raw data.
- bool [OregonTHN128_RawToData](#) (uint32_t rawData, [OregonTHN128Data_t](#) *data)
Convert 32-bit raw data to [OregonTHN128Data_t](#) structure.

7.1.1 Detailed Description

Oregon THN128 433MHz temperature transmit/receive library for Arduino.

Source: <https://github.com/Erriez/ErriezOregonTHN128> Documentation: <https://erriez.github.io/ErriezOregonTHN128>

7.1.2 Function Documentation

7.1.2.1 OregonTHN128_CheckCRC()

```
bool OregonTHN128_CheckCRC (
    uint32_t rawData )
```

Verify checksum.

Parameters

<i>rawData</i>	32-bit raw data input
----------------	-----------------------

Returns

true: Success, false: error

Definition at line 101 of file ErriezOregonTHN128.c.

7.1.2.2 OregonTHN128_DataToRaw()

```
uint32_t OregonTHN128_DataToRaw (
    OregonTHN128Data_t * data )
```

Convert data structure to 32-bit raw data.

Parameters

<i>data</i>	Input
-------------	-------

Returns

Output

Definition at line 141 of file ErriezOregonTHN128.c.

7.1.2.3 OregonTHN128_RawToData()

```
bool OregonTHN128_RawToData (
    uint32_t rawData,
    OregonTHN128Data_t * data )
```

Convert 32-bit raw data to [OregonTHN128Data_t](#) structure.

Parameters

<i>rawData</i>	32-bit input
<i>data</i>	output

Returns

CRC true: Success, false: error

Definition at line 180 of file ErriezOregonTHN128.c.

7.1.2.4 OregonTHN128_TempToString()

```
void OregonTHN128_TempToString (
    char * temperatureStr,
    uint8_t temperatureStrLen,
    int16_t temperature )
```

Convert temperature to string.

Parameters

<i>temperatureStr</i>	Character buffer
<i>temperatureStrLen</i>	Size of character buffer
<i>temperature</i>	Input temperature

Definition at line 118 of file ErriezOregonTHN128.c.

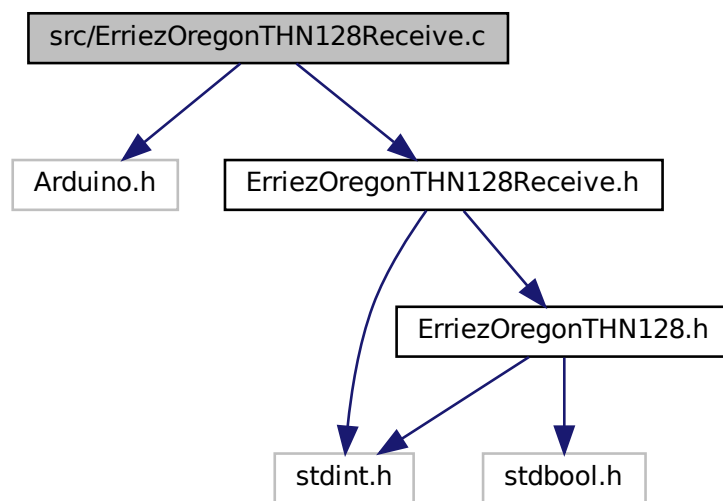
7.2 src/ErriezOregonTHN128Receive.c File Reference

Oregon THN128 433MHz temperature transmit/receive library for Arduino.

```
#include <Arduino.h>
```

```
#include "ErriezOregonTHN128Receive.h"
```

Include dependency graph for ErriezOregonTHN128Receive.c:



Enumerations

- enum `RxState_t` {
`StateSearchSync` = 0 , `StateMid0` = 1 , `StateMid1` = 2 , `StateEnd` = 3 ,
`StateRxComplete` = 4 }

Receive state.

Functions

- void `rfPinChange` (void)
RF pin level change.
- void `OregonTHN128_RxBegin` (uint8_t extIntPin)
Initialize receiver pin.
- void `OregonTHN128_RxEnable` ()
Receive enable.
- void `OregonTHN128_RxDisable` ()
Receive disable.
- bool `OregonTHN128_Available` ()
Check if data received.
- bool `OregonTHN128_Read` (OregonTHN128Data_t *data)
Read data.

7.2.1 Detailed Description

Oregon THN128 433MHz temperature transmit/receive library for Arduino.

Source: <https://github.com/Erriez/ErriezOregonTHN128> Documentation: <https://erriez.github.io/ErriezOregonTHN128>

7.2.2 Enumeration Type Documentation

7.2.2.1 RxState_t

enum `RxState_t`

Receive state.

Enumerator

<code>StateSearchSync</code>	Search for sync
<code>StateMid0</code>	Sample at the middle of a pulse part 1
<code>StateMid1</code>	Sample at the middle of a pulse part 2
<code>StateEnd</code>	Sample at the end of a pulse to store bit
<code>StateRxComplete</code>	Receive complete

Definition at line 44 of file `ErriezOregonTHN128Receive.c`.

7.2.3 Function Documentation

7.2.3.1 OregonTHN128_Available()

```
bool OregonTHN128_Available (  
    void )
```

Check if data received.

Return values

<code>true</code>	Data received
<code>false</code>	No data available

Definition at line 316 of file `ErriezOregonTHN128Receive.c`.

7.2.3.2 OregonTHN128_Read()

```
bool OregonTHN128_Read (
    OregonTHN128Data_t * data )
```

Read data.

Parameters

<i>data</i>	Structure OregonTHN128Data_t output
-------------	---

Return values

<i>true</i>	Data received
<i>false</i>	No data available

Definition at line 331 of file `ErriezOregonTHN128Receive.c`.

7.2.3.3 OregonTHN128_RxBegin()

```
void OregonTHN128_RxBegin (
    uint8_t extIntPin )
```

Initialize receiver pin.

Connect RX pin to an external interrupt pin such as INT0 (D2) or INT1 (D3)

Parameters

<i>extIntPin</i>	
------------------	--

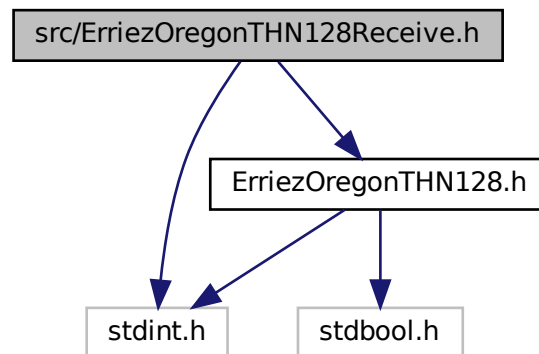
Definition at line 279 of file `ErriezOregonTHN128Receive.c`.

7.3 src/ErriezOregonTHN128Receive.h File Reference

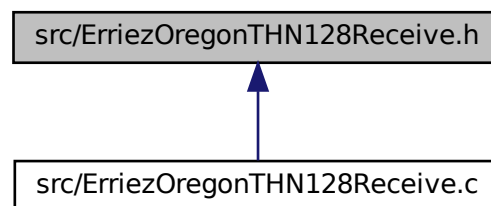
Oregon THN128 433MHz temperature receive library for Arduino.

```
#include <stdint.h>
#include "ErriezOregonTHN128.h"
```

Include dependency graph for ErriezOregonTHN128Receive.h:



This graph shows which files directly or indirectly include this file:



Functions

- void `OregonTHN128_RxBegin` (uint8_t extIntPin)
Initialize receiver pin.
- void `OregonTHN128_RxEnable` ()
Receive enable.
- void `OregonTHN128_RxDisable` ()
Receive disable.
- bool `OregonTHN128_Available` (void)
Check if data received.
- bool `OregonTHN128_Read` (OregonTHN128Data_t *data)
Read data.

7.3.1 Detailed Description

Oregon THN128 433MHz temperature receive library for Arduino.

Source: <https://github.com/Erriez/ErriezOregonTHN128> Documentation: <https://erriez.github.io/ErriezOregonTHN128>

Protocol:

Transmit temperature twice every 30 seconds:

Bit: 0 7 0 7 0 7 0 7 +-----+-----+-----+-----+ +-----+-----+ | PREA | SYNC | Byte 0 | Byte 1 | Byte 2 | Byte 3 |
 | PREA | SYNC | Byte 0 | ... +-----+-----+-----+-----+ /-----+-----+ | <----- 144ms -----
 --> | <- 100ms -> | 30 sec

Logic '0': Logic '1': +-----+ +-----+ | | +-----+ +-----+ 1400 1500 1500 1400 (us)

PREA: Preamble 12x logic '1', 3000us low

SYNC: +-----+ | |

- +-----+ 5500us 5500us

Byte 0:

- Bit 0..3: Rolling address (Random value after power cycle)
- Bit 6..7: Channel: (0 = channel 1 .. 2 = channel 3)

Byte 1:

- Bit 0..3: TH3
- Bit 4..7: TH2

Byte 2:

- Bit 0..3: TH1
- Bit 5: Sign
- Bit 7: Low battery

Byte 3:

- Bit 0..7: CRC

Example: Rolling address = 5, channel = 1, temperature = 27.8 `C, low battery = false TH1 = 2, TH2 = 7, TH3 = 8:
 Byte 0: 0x05 Byte 1: 0x78 Byte 2: 0x02 Byte 3: 0x7f

Bits in time: PRE=1 S B0=0x05 B1=0x78 B2=0x02 B3=0x7f 111111111111 S 10100000 00011110 01000000
 11111110

7.3.2 Function Documentation

7.3.2.1 OregonTHN128_Available()

```
bool OregonTHN128_Available (
    void )
```

Check if data received.

Return values

<i>true</i>	Data received
<i>false</i>	No data available

Definition at line 316 of file ErriezOregonTHN128Receive.c.

7.3.2.2 OregonTHN128_Read()

```
bool OregonTHN128_Read (
    OregonTHN128Data_t * data )
```

Read data.

Parameters

<i>data</i>	Structure OregonTHN128Data_t output
-------------	---

Return values

<i>true</i>	Data received
<i>false</i>	No data available

Definition at line 331 of file ErriezOregonTHN128Receive.c.

7.3.2.3 OregonTHN128_RxBegin()

```
void OregonTHN128_RxBegin (
    uint8_t extIntPin )
```

Initialize receiver pin.

Connect RX pin to an external interrupt pin such as INT0 (D2) or INT1 (D3)

Parameters

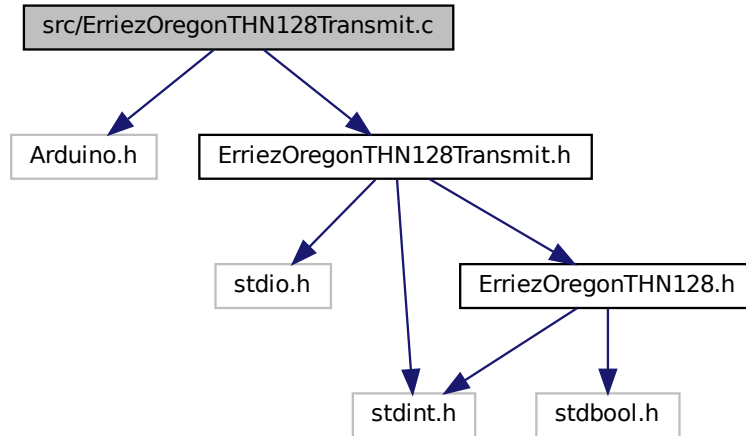
<i>extIntPin</i>	
------------------	--

Definition at line 279 of file ErriezOregonTHN128Receive.c.

7.4 src/ErriezOregonTHN128Transmit.c File Reference

Oregon THN128 433MHz temperature transmit library for Arduino.

```
#include <Arduino.h>
#include "ErriezOregonTHN128Transmit.h"
Include dependency graph for ErriezOregonTHN128Transmit.c:
```



Functions

- void [OregonTHN128_TxBegin](#) (uint8_t rTxPin)
Transmit begin.
- void [OregonTHN128_TxEnd](#) (void)
Disable transmit.
- void [OregonTHN128_TxRawData](#) (uint32_t rawData)
Transmit data.
- void [OregonTHN128_Transmit](#) ([OregonTHN128Data_t](#) *data)
Transmit Transmit data.

7.4.1 Detailed Description

Oregon THN128 433MHz temperature transmit library for Arduino.

Source: <https://github.com/Erriez/ErriezOregonTHN128> Documentation: <https://erriez.github.io/ErriezOregonTHN128>

7.4.2 Function Documentation

7.4.2.1 OregonTHN128_Transmit()

```
void OregonTHN128_Transmit (
    OregonTHN128Data_t * data )
```

Transmit Transmit data.

Parameters

<i>data</i>	Oregon THN128 input structure
-------------	-------------------------------

Definition at line 305 of file ErriezOregonTHN128Transmit.c.

7.4.2.2 OregonTHN128_TxBegin()

```
void OregonTHN128_TxBegin (  
    uint8_t rfTxPin )
```

Transmit begin.

Connect rfTxPin to any DIGITAL pin

Parameters

<i>rfTxPin</i>	Arduino transmit pin
----------------	----------------------

Definition at line 248 of file ErriezOregonTHN128Transmit.c.

7.4.2.3 OregonTHN128_TxEnd()

```
void OregonTHN128_TxEnd (  
    void )
```

Disable transmit.

Set transmit pin to input

Definition at line 259 of file ErriezOregonTHN128Transmit.c.

7.4.2.4 OregonTHN128_TxRawData()

```
void OregonTHN128_TxRawData (  
    uint32_t rawData )
```

Transmit data.

Parameters

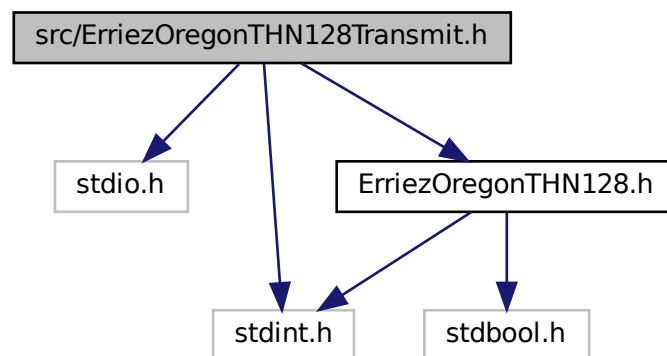
<i>rawData</i>	32-bit raw data input
----------------	-----------------------

Definition at line 270 of file ErriezOregonTHN128Transmit.c.

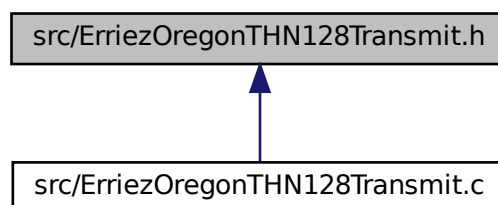
7.5 src/ErriezOregonTHN128Transmit.h File Reference

Oregon THN128 433MHz temperature transmit library for Arduino.

```
#include <stdio.h>
#include <stdint.h>
#include "ErriezOregonTHN128.h"
Include dependency graph for ErriezOregonTHN128Transmit.h:
```



This graph shows which files directly or indirectly include this file:



Functions

- void `OregonTHN128_TxBegin` (uint8_t rTxPin)
Transmit begin.
- void `OregonTHN128_TxRawData` (uint32_t rawData)
Transmit data.
- void `OregonTHN128_Transmit` (OregonTHN128Data_t *data)
Transmit Transmit data.

7.5.1 Detailed Description

Oregon THN128 433MHz temperature transmit library for Arduino.

Source: <https://github.com/Erriez/ErriezOregonTHN128> Documentation: <https://erriez.github.io/ErriezOregonTHN128>

7.5.2 Function Documentation

7.5.2.1 OregonTHN128_Transmit()

```
void OregonTHN128_Transmit (
    OregonTHN128Data_t * data )
```

Transmit Transmit data.

Parameters

<i>data</i>	Oregon THN128 input structure
-------------	-------------------------------

Definition at line 305 of file ErriezOregonTHN128Transmit.c.

7.5.2.2 OregonTHN128_TxBegin()

```
void OregonTHN128_TxBegin (
    uint8_t rFTxPin )
```

Transmit begin.

Connect rFTxPin to any DIGITAL pin

Parameters

<i>rFTxPin</i>	Arduino transmit pin
----------------	----------------------

Definition at line 248 of file ErriezOregonTHN128Transmit.c.

7.5.2.3 OregonTHN128_TxRawData()

```
void OregonTHN128_TxRawData (
    uint32_t rawData )
```

Transmit data.

Parameters

<i>rawData</i>	32-bit raw data input
----------------	-----------------------

Definition at line 270 of file ErriezOregonTHN128Transmit.c.

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