# RF Remote Operating

## 1. Sync signal transmission protocol

**Frequency : 2.433GHz**

1) Move from Remote Control to AUDIO Mode by entering key of AUDIO.
2) Enter the key that user wants function.
3) Arrange a data of relevant key to meet RF sync communications protocol below.
**(Data No.) +Frame No.+ R/C ID (L) + R/C ID (H) + sub ID**
**+ Model Name + Carrier(P) + Carrier(H) + Custom + Custom + Data + Data**

| contents | description |
|---|---|
| Data No. | Amount of sent data. |
| Frame No. | Number of frame. |
| R/C ID (L) | Remote Control ID low |
| R/C ID (H) | Remote Control ID high |
| sub ID | Device number wanted to control in toolRemote Control. |
| Model Name | Device which is selected in Remote Control, now<br>Audio 0x32<br>etc. 0x33 ~0x39 |
| Carrier(P) | Cycle of Carrier |
| Carrier(H) | high length of Carrier |
| Custom | Nec Code(custom) |
| Custom | Nec Code(custom Bar) |
| Data | Nec Code(Data) |
| Data | Nec Code(Data Bar) |

4) Send Arranged data by 2.433GHz frequency.

## 2. Asynchronous signal transmission protocol

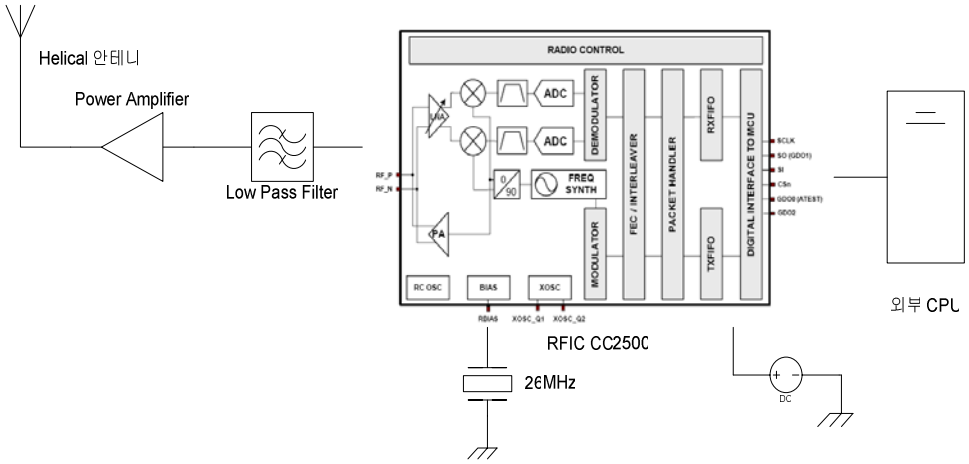
**Frequency : 2.433GHz**

1) Enter key of CD,AUX,DVD,CBL,SAT,TV,VCR Mode using Remote Control.
2) Enter the key which user wants function.
3) Arrange a data of relevant key to meet RF Asynchronous communications protocol below.
**Data No. +Frame No.+ R/C ID (L) + R/C ID (H) + sub ID + 0xBB**
**+ Carrier(P) + Carrier(H) + Time(L) + Time(H)**

| contents | description |
|---|---|
| Data No. | Amount of sent data |
| Frame No. | Number of frame |
| R/C ID (L) | Remote Control ID low |
| R/C ID (H) | Remote Control ID high |
| sub ID | Device number wanted to control in toolRemote Control |
| 0xBB | COMMAND to send data by nonsync |
| Carrier(P) | Cycle of Carrier in IR Remote Control |
| Carrier(H) | high length of Carrier in IR Remote Control |
| Time(L) | Time of Asynchronous conversion |
| Time(H) | Time of Asynchronous conversion |

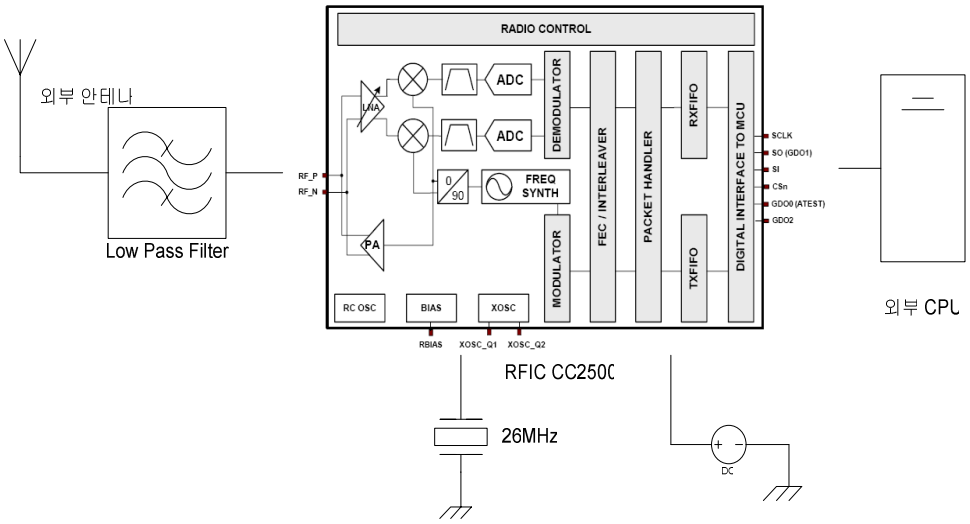
4) Send Arranged data by 2.433GHz frequency.

## 3. RF signal  transmission




1. U1 - RFIC CC2500 :
The CC2500 is a low-cost 2.4 GHz transceiver designed for very low-power wireless applications. The circuit is intended for the 2400-2483.5 MHz ISM (Industrial, Scientific and Medical) and SRD (Short Range Device) frequency band.
The main operating parameters and the 64-byte transmit/receive FIFOs of CC2500 can be controlled via an SPI interface
2. Y1 - 26MHz XOSC :
CC2500 creates wanted frequency through inner PLL using 26MHz XOSC frequency
3. C10, L3, C11 – LPF :
Signal from CC2500 send Power Amplifier after filtering through LPF .
4. U2 – Power Amplifier :
Low level signal comes through Signal of lowLPF will emit outside through antenna after amplified by approximately 10 dB
5. Procedure of transferring RF signal:
The signal transferred from CPU is stored in TXFIFO and this signal will convert to analog signal through ADC after the process of alteration,
and put on the desirable frequency by using frequency created through 26MHz XOSC.
This signal will be transferred Outisde of CC2500 through Internal PA after amplified to desirable level.
This transferred signal will emit through the antenna after filterd by LPF and amplified by outter PA

## 4. Receiving of RF Signal



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and SRD (Short Range Device) frequency band.
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can be controlled via an SPI interface

2. Y1 - 26MHz XOSC :
CC2500 create the desirable frequency through internal PLL by using 26Mhz XOSC as frequency.
3. C10, L3, C11 – LPF :
RF Signal comes from Antenna will transfer to CC2500 after removing high frequency noise by
Low Pass Filter.
4. Procedure of receiving RF signal:
Received RF signal incomes from outter antenna and this signal will transfer to CC2500 after filtering through LPF.
The signal transferred to CC2500 will be amplified through LNA and down-converted to mixer with the frequency created by 26Mhz crystal
This signal will be converted to digital signal through ADC and will transfer to CPU after demodulated and stored in RXFIFO.

* Trnsfering and receiving are possile, but only used for receiving.