

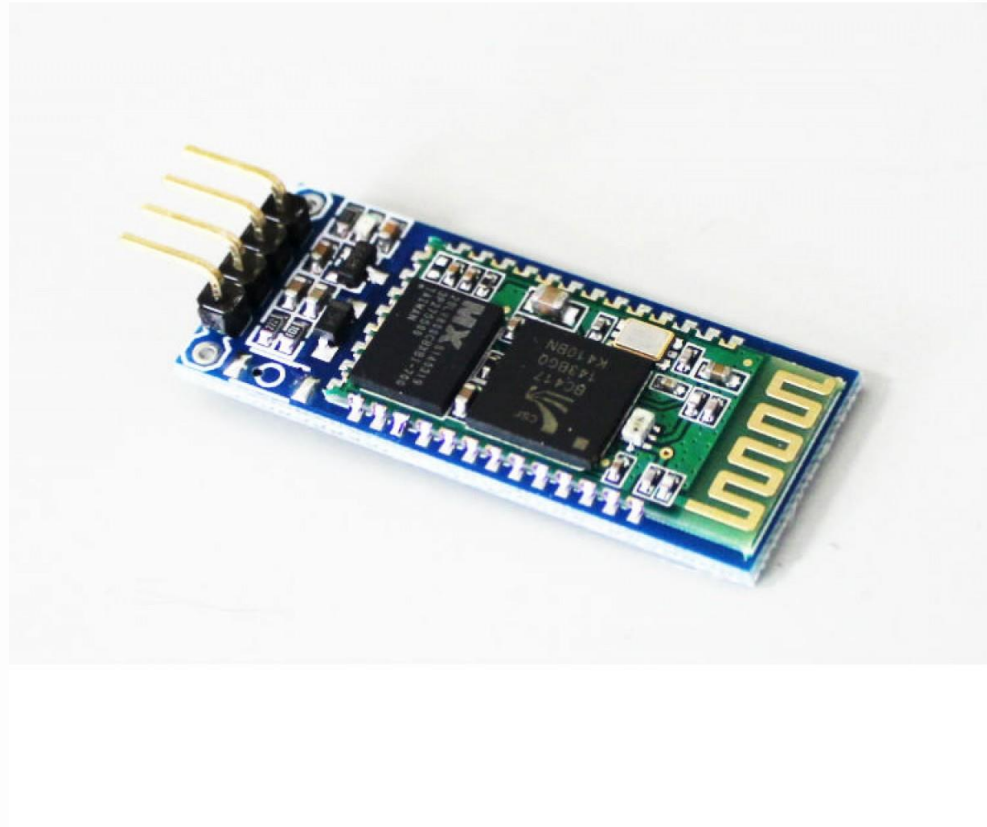
RF Components and Basic Concepts

1.4 - RF module, Transmitter, Receiver and Transceiver

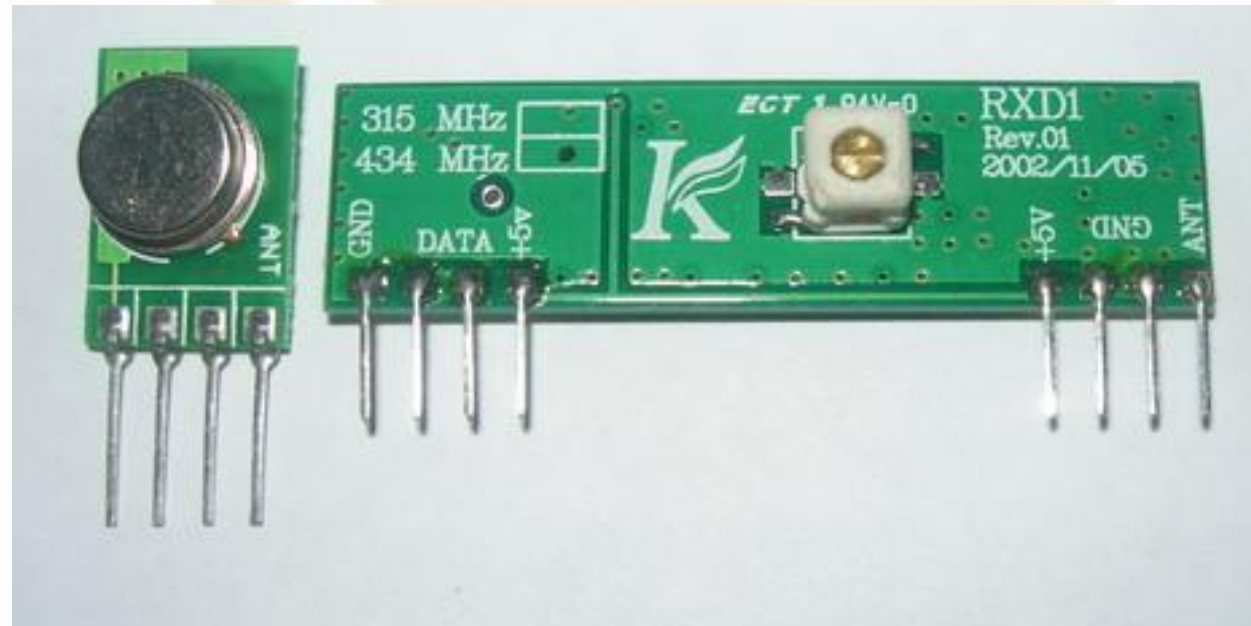
RF Module

- An RF Module is a small electronic circuit which is used to receive, transmit or transceive radio waves on one of a number of carrier frequencies.
- An RF module is a functional integration of semiconductor devices.
- 802.11/WLAN, 802.15.4/Zigbee, Bluetooth, Bluetooth Accessories
GPS, Proprietary RFID, UHF.

HC-06 BLUETOOTH RF TRANSCEIVER MODULE

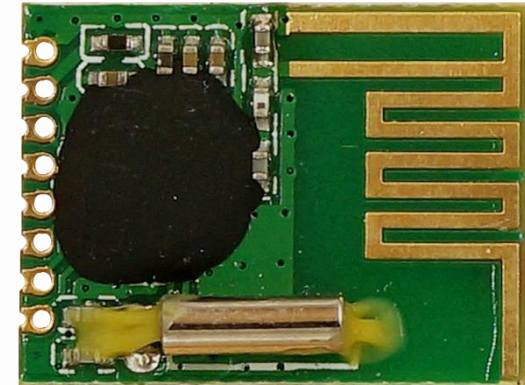
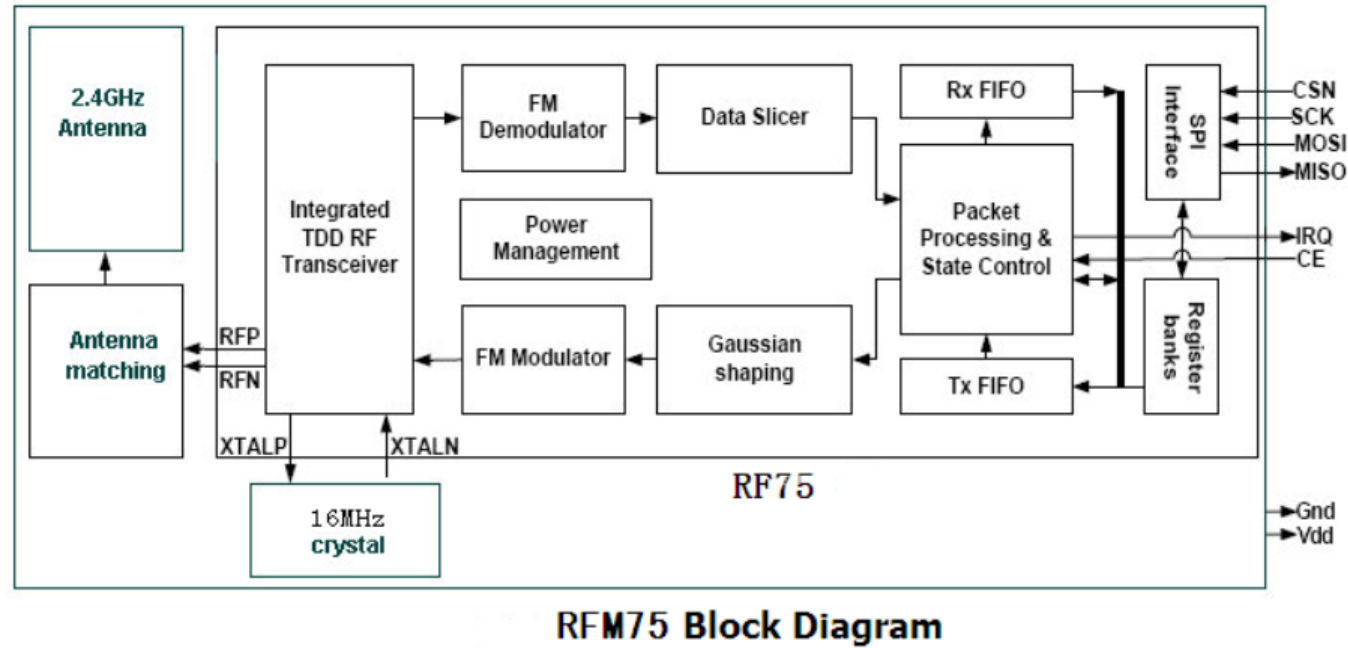


Remote control based on c8051 with 433MHz radio modules



RFM75W

2.4 GHz GFSK Transceiver

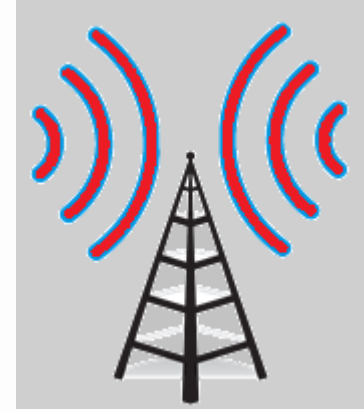


Transmitter

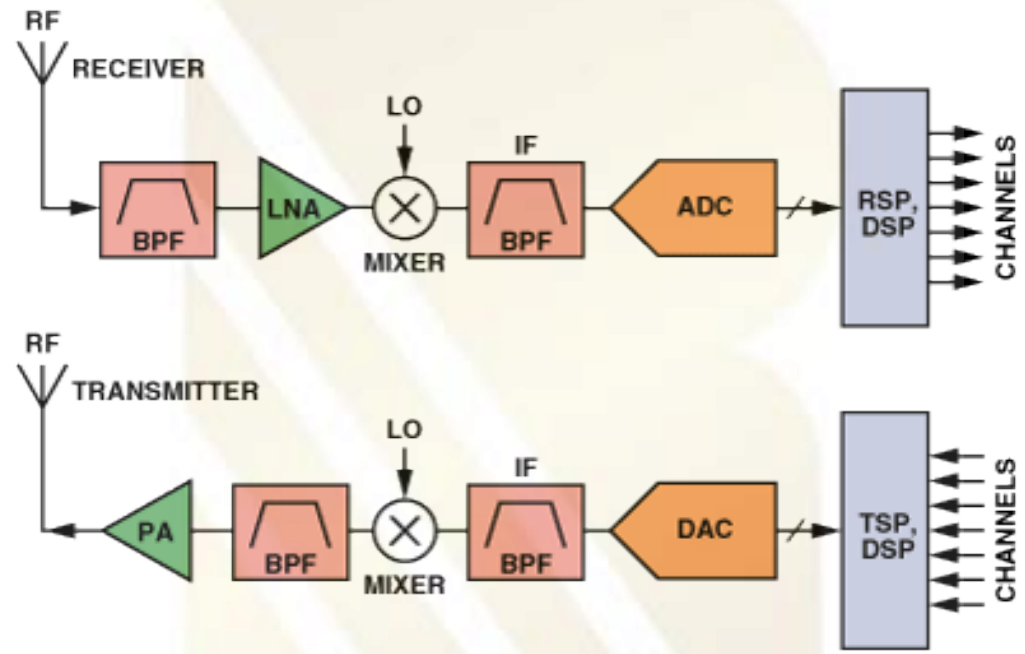


- A transmitter (or radio transmitter) is an electronic device which produces radio waves with the help of an antenna.
- A transmitter generates a radio frequency current applied to the antenna, which in turn radiates radio waves.
- A transmitter generates radio waves for communication, radar and navigational purposes.
- A transmitter can either be a separate piece of electronic equipment or an integrated circuit (IC) within another electronic device.
- This includes audio from a microphone, video from a TV camera, or a digital signal for wireless networking devices. The transmitter combines the information signal that is to be carried with the RF signal which generates the radio waves (the carrier). This is called modulation

Receiver

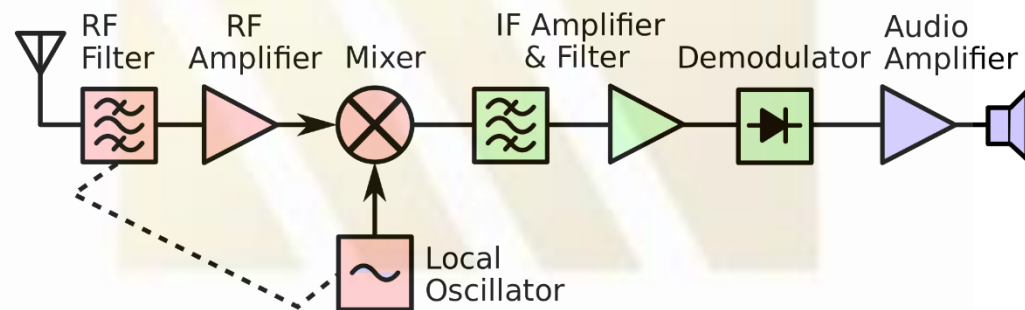


- A radio receiver is a device that receives radio waves and converts the information which is carried by them into a usable form.
- A radio receiver can be an integrated circuit (IC) within another device.
- An antenna intercepts electromagnetic radio waves and then converts them into alternating currents that are applied to the receiver.
- Future Electronics has a full selection of receiver ICs from several manufacturers that can be used for an integrated receiver circuit such as a wireless receiver IC, RF receiver IC, FM receiver IC.



Receiver Front End (FE)

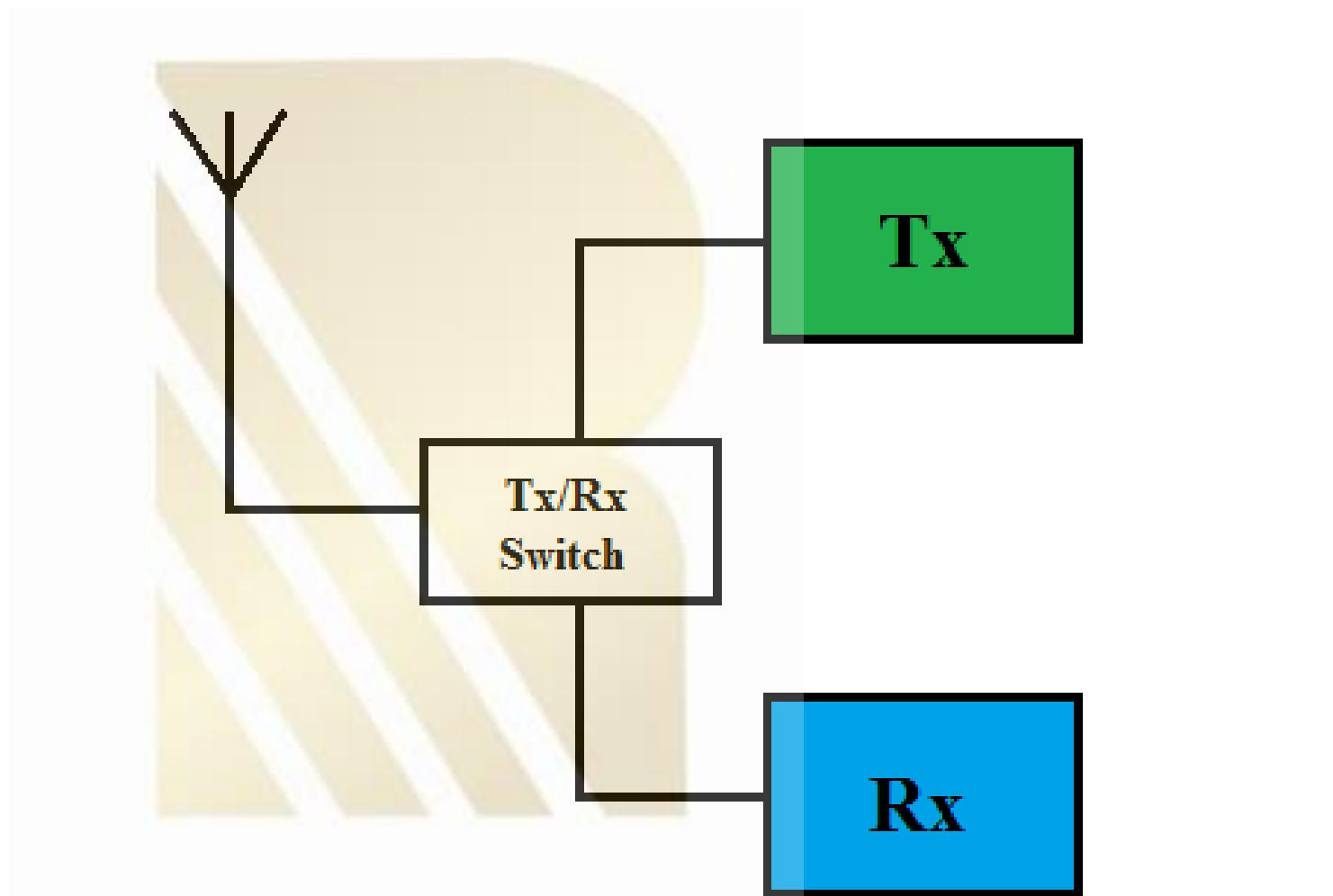
- In a radio receiver circuit, the **RF front end** is a generic term for all the circuitry between the antenna up to and including the mixer stage.
- It consists of all the components in the receiver that process the signal at the original incoming radio frequency (RF), before it is converted to a lower intermediate frequency (IF).



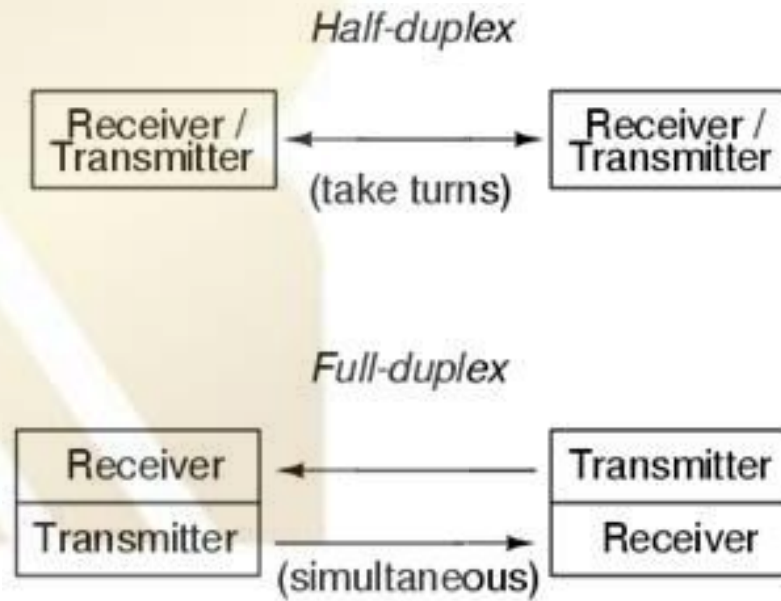
Transceiver

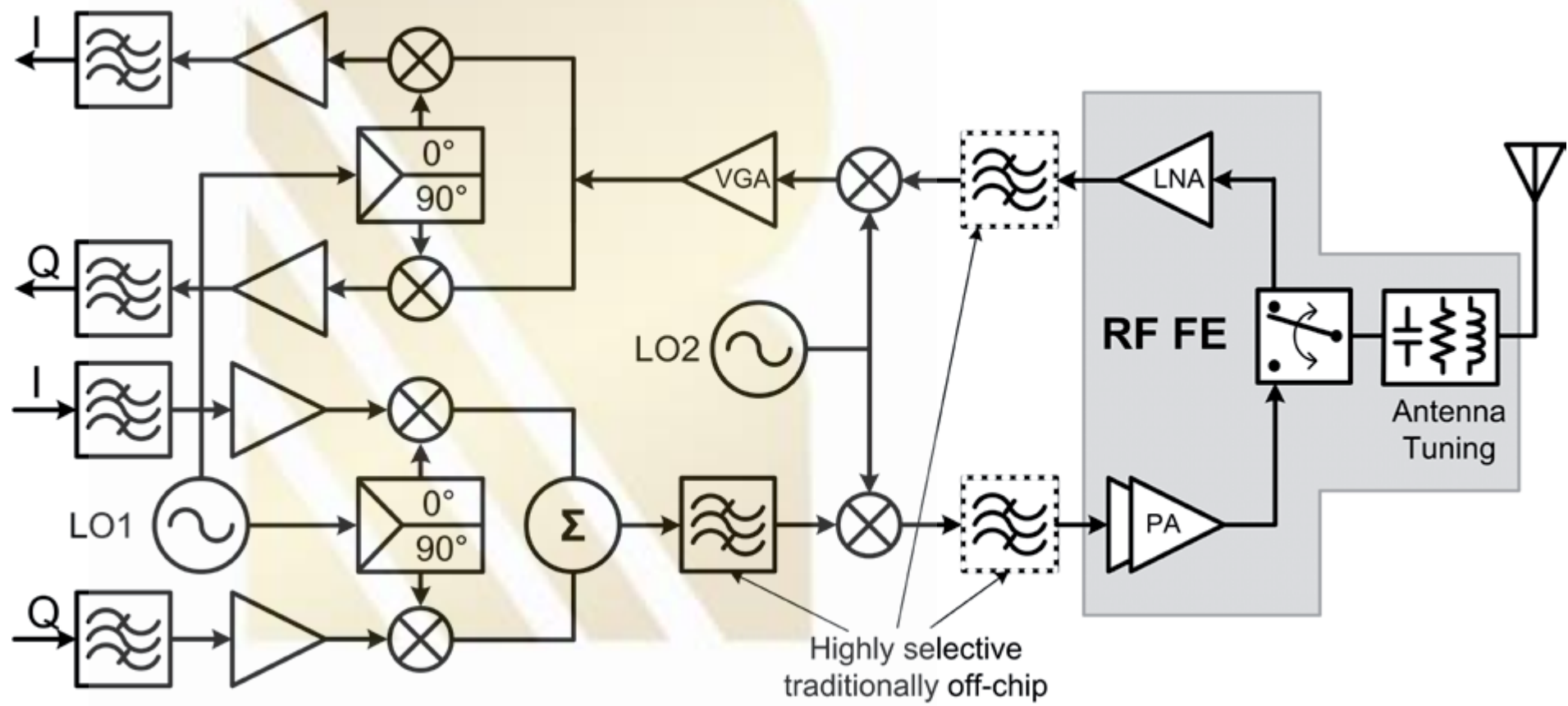


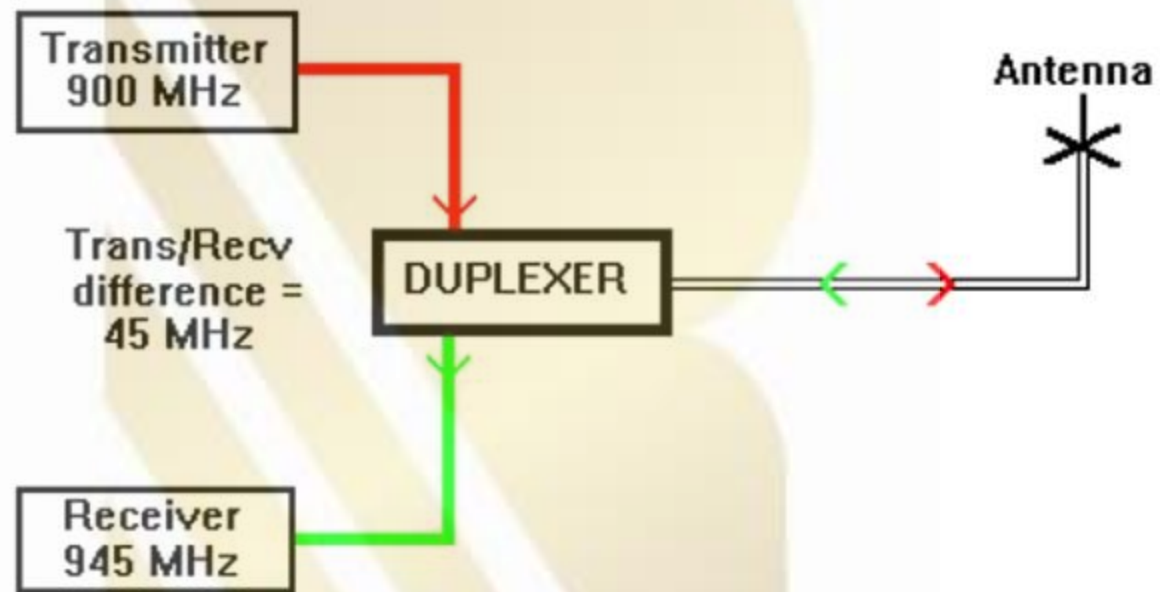
- A transceiver is a device that contains a transmitter and a receiver which are both combined and share common circuitry.
- Transceivers combine a significant amount of the transmitter and receiver handling circuitry.
- In radio communications, a transceiver is a two-way radio that **combines** a radio transmitter and a radio receiver exchanging information in half-duplex or full-duplex mode.



Half and Full Duplex

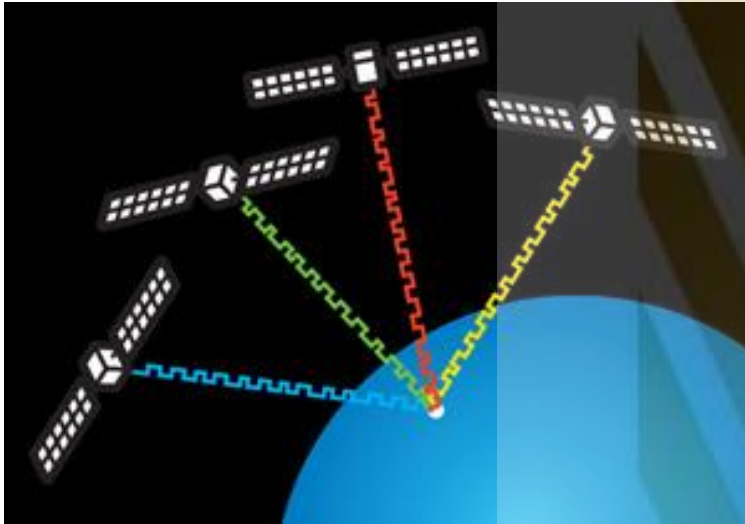






SIMULTANEOUS SIGNAL FLOW THROUGH A DUPLEXER

Tx -----> Rx



Tx & Rx

