Last update: January 3, 2007

MC33696MODxxx KIT
Operational Description

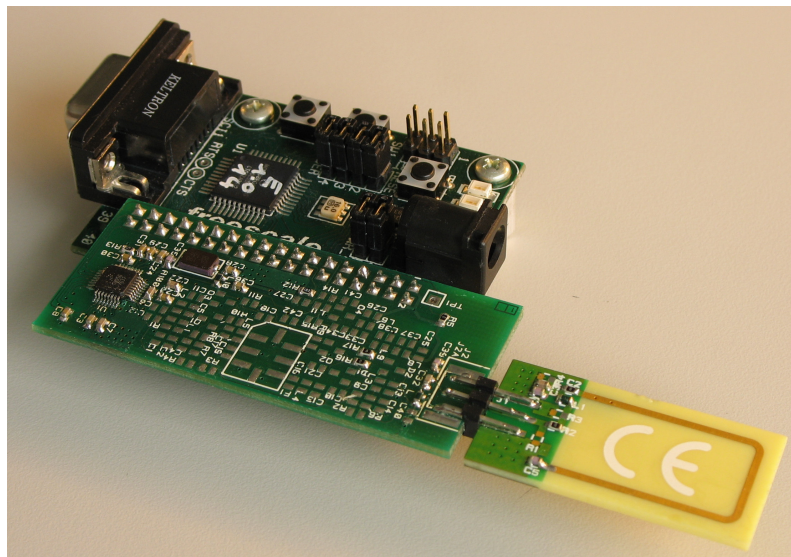This document provides informations on MC33696 tools.

Last update:
V1.0: first release
V1.1: add frame duration in chapter 3.1

1   OVERVIEW

MC33696MODxxx tools are designed for customer evaluation of MC33696 integrated circuit.

MC33496MODxxx tool can be used to send or receive an RF signal. Some configuration files ("script") are provided to allow one frame transmission or reception to make a link between two MC33696MODxxx kits. Each transmission or reception is under user control.

MC33696MODxxx operation requires:
- An MC33696MODxxx RF Module : it contains all RF components including MC33696 IC, crystal, and a printed antenna
- A DEMO9S08RG60 MCU board : it contains MCU, a power supply regulator to provide a 3V voltage from the 9V battery and an RS232 connector
- An RS232 cable
- A PC with RS232 port, CD player and Hyper Terminal.
- A 9V Battery
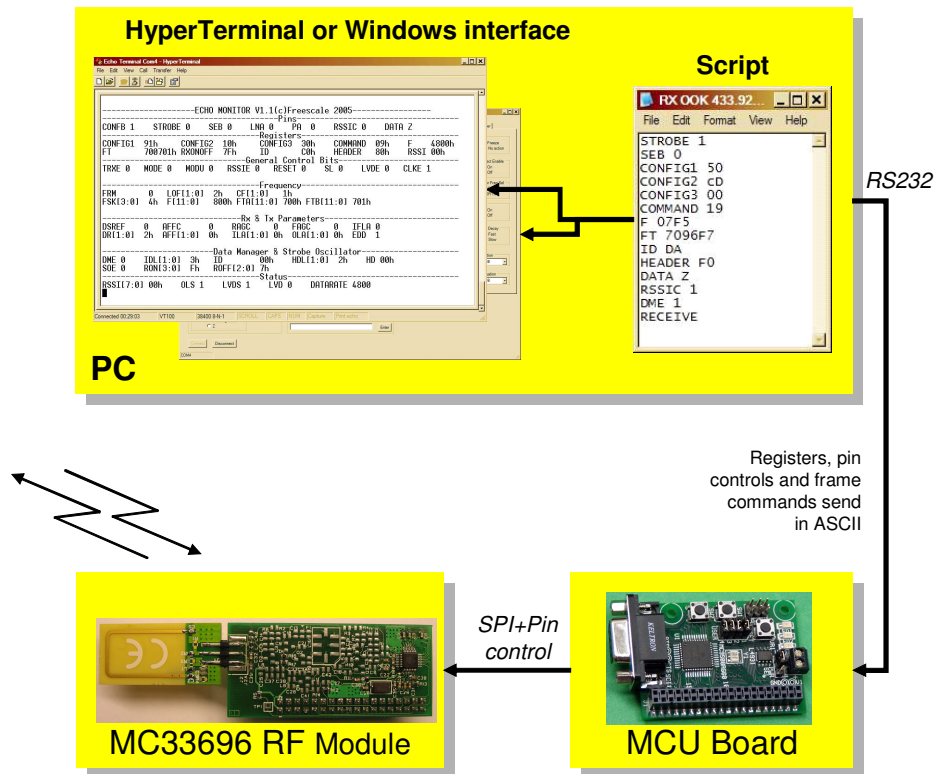
The operation of MC33696 is done by sending with Hyper Terminal a script to the MCU board that will configure MC33696 in a defined configuration.

2 MC33696 PRESENTATION

2.1 Main Features

MC33696 is a highly integrated RF transceiver designed for low voltage application using half duplex communication in the UHF ISM bands[1]. It includes a programmable PLL for multichannel application, a RSSI circuit that provides both analog and digital results, a Strobe Oscillator that wakes up periodically the receiver while a Data Manager checks the content of incoming message to reduces CPU load and system consumption.

Receiver:
Frequency: 304MHz, 315MHz, 433MHz, 868MHz and 915MHz bands
Sensitivity: -104dBm to -72dBm typ in 4 steps at 4.8kbps
Modulation: OOK and FSK
Data rate: up to 19.2kbps with Data Manager
Data Manager with clock recovery for Manchester coded signals
RSSI range: 72dB digital and 42dB analog
Receiver bandwidth: 380kHz
Current consumption: 9.5mA typ

Transmitter:
Frequency: 315 to 915MHz
Output power: +5dBm to -19dBm in 4 steps at 434MHz

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[1] ISM bands : Industrial, Scientific and Medical bands. Transmission is allowed on those bands without any license.

Modulation: OOK and FSK
Data rate: up to 19.2kbps
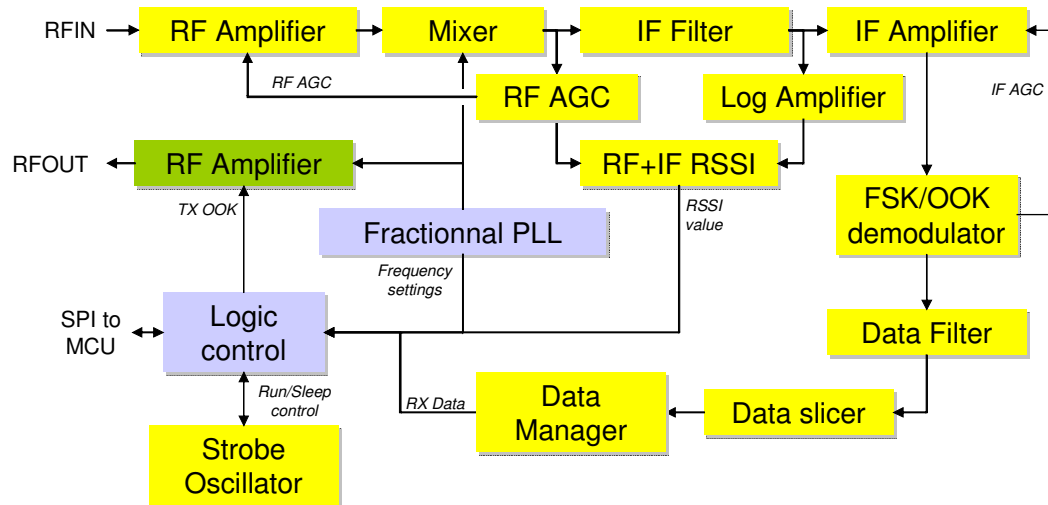FSK frequency deviation: programmable from 6kHz to 192kHz
Current consumption: 12.5mA typ

Other:
Package: LQFP32 and LQFN32
Temperature range: -40 to+85°C
Supply voltage: 2.1V-3.6V

3 LAUNCHING THE KIT

- Plug the RF Module on the MCU board
- Connect the MCU board to the PC using the RS232 cable
- Launch HyperTerminal using the proper xxx.ht file according to available COM port
- Connect the 9V battery
- Screen on HyperTerminal receives status of MC33696 Registers and Pin levels
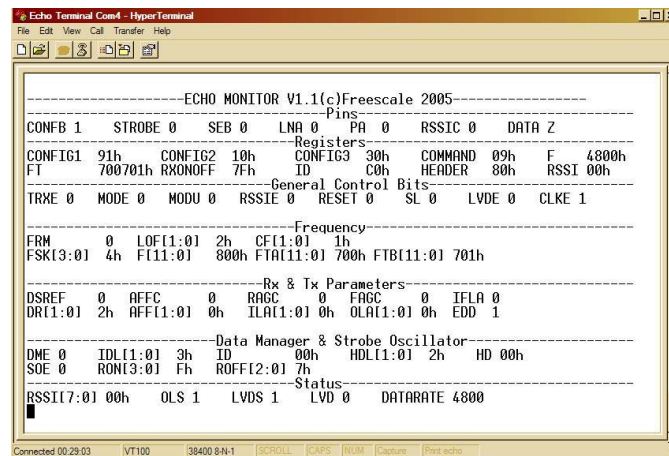
- With the mouse, click on "Transfer/Send text file"
- Select the xxx.txt Script file corresponding to the wanted configuration

- For exemple :"RX OOK 433.92MHz IDHD00.txt" will configure the kit in receive mode at 433.92MHz to receive any RF signal with following paramaters : :
  - 433.92MHz, OOK
  - Receive with Data Manager
  - ID=00h, ID length=2 bits
  - HD=00h, HD length=1 bit

- At the end : "Receive Mode Active" indicates that the kit is waiting for datas.
- If a frame is received, it is printed on the screen :

3.1 Configuration in Transmit mode

- With the mouse, click on "Transfer/Send text file"

- Select the xxx.txt Script file corresponding to the wanted configuration
- For exemple :"TX OOK 433.92MHz Frame.txt" will configure the kit in Transmit mode at 433.92MHz to send a 28 bits frame at 4800bps (5.8ms frame duration):

```
Echo Terminal Com5 - HyperTerminal                          _ □ ×
File  Edit  View  Call  Transfer  Help

--------------------ECHO MONITOR V1.1(c)Freescale 2005----------------
----------------------------Pins-------------------------------------
CONFB 1    STROBE 1    SEB 0    LNA 0    PA  0    RSSIC 0    DATA 0
----------------------------Registers--------------------------------
CONFIG1  50h    CONFIG2  CDh    CONFIG3  00h    COMMAND  39h    F    07F5h
FT    7006F7h RXONOFF  7Fh    ID    C0h    HEADER  80h    RSSI 00h
----------------------General Control Bits---------------------------
TRXE 1    MODE 1    MODU 0    RSSIE 1    RESET 0    SL 0    LVDE 0    CLKE 0

----------------------------Frequency--------------------------------
FRM      1    LOF[1:0]  1h    CF[1:0]    1h
FSK[3:0]  0h  F[11:0]    7F5h FTA[11:0] 700h FTB[11:0] 6F7h

--------------------------Rx & Tx Parameters-------------------------
DSREF    1    AFFC     0    RAGC    0    FAGC    0    IFLA 0
DR[1:0]  1h  AFF[1:0]  0h    ILA[1:0] 0h OLA[1:0] 0h  EDD  1

----------------------Data Manager & Strobe Oscillator---------------
DME 0    IDL[1:0]  3h    ID        00h    HDL[1:0]  2h    HD 00h
SOE 1    RON[3:0]  Fh    ROFF[2:0] 7h
----------------------------Status-----------------------------------
RSSI[7:0] 00h    OLS 0    LVDS 0    LVD 0    DATARATE 4800
OK
SEND 1111111101101011000001100110E█

Connected 07:08:55    VT100    38400 8-N-1    SCROLL  CAPS  NUM  Capture  Print echo
```

- At the end : OK indicates that transmission is finished, MC33696 goes back in sleep mode.