Peter's electronic projects

RF circuit diagrams

RF circuits are not easy to build. The purpose of this page is to make the circuit diagrams available for educational purposes. I won't be able to help you contructing them or give more info than what is written on this page.

If you want more RF schematics, please check projects from Nabeel Irfan

27-100 MHz

- 27MHz superregenerative receiver for RC model remote control
- superregenerative receiver built by GE labs - sent by Trevor M0MUG
- toy car receiver L4=9 turns, .15mm wire on 4.5mm diameter tunable ferrite coil former
- toy car transmitter L1=same as L4, L2=15 turns, .5mm wire, 5mm diameter, L3=3.5 turns, .5mm wire, 5mm diameter
- RC model receivers

analog modulation

- 500MHz video signal transmitter
  Ut=12/9VDC, L1=18T, L2=7T .2mm wire on 3mm diameter ferrite, L4=4T .8mm wire 4mm diameter
- wireless microphone transmitter
- 98-108MHz FM audio transmitter
- VHF transmitter
- 49MHz walkie-talkie schematic

434 MHz ASK/OOK AM transmitter/receiver

- Automicro RX3302 superregenerative receiver module schematic
- Automicro RX3302 receiver module photo
- Automicro RX3304 receiver module schematic
- Automicro TM02 high power transmitter module schematic
- X10 RF daughter board - receiver
- 434MHz short-range communications - article in Elektor 1998/5
- SP-Elektroniikka superregenerative receiver and SAW-based transmitter
- SAW-based 434MHz transmitter schematic with RO2101 (from appnote below)
- SAW-based transmitter design appnote from RFM
- SAWR-based transmitters, EPCOS appnote#1

ISM digital radio modules

manufacturer	name	frequency (MHz)	modulation	transmitter receiver transceiver	chip	remarks
Abacom Technologies	AM-TXHP-433 ATX-433-IA	434	ASK	TX	SAW-based discrete	
	AM-RT4 AM-RT5	315, 418, 434	ASK	TX	SAW-based discrete	same as Telecontrolli?
	AM-MT1	434, 915	ASK	TX	SAW-based discrete	

RTFQ1 RTFQ2	434, 868	FSK	TX	TDA5100 crystal-based	same as Telecontrolli?
FM9TX	915	FSK	TX		
AM-RRQ3-433	434	ASK	RX	TDA5210 superheterodyne	same as Telecontrolli?
ATR2-916	915	ASK	RX	TDA5210 superheterodyne	
AM-HRR3 AM-HRR6	418, 434	ASK	RX	superregenerative discrete	same as Telecontrolli?
ATR2-916	915	ASK	RX	TDA5210 superheterodyne	
FM9RX-914.5	915	FSK	RX		
ARX-433-ULC	434	ASK	RX		
RX-9H50	915	ASK	RX		
RFRQ2	434, 868	FSK	RX	TDA5210 superheterodyne	same as Telecontrolli?
RRF1-433	434	FSK	RX	TDA5210 superheterodyne	same as Telecontrolli?
RX-DFM-5V	434	FSK	RX		
RTL-DATA-SAW RTF-DATA-SAW	434	ASK	TRX	discrete	
AM-RTD-315	315	ASK	TRX		
[Aurel](#)	BC-NBK AC-RX AC-RX2 RX-4M30RR01SF RX-4M50RR30SF RX-AM4SF RX-AM8SF RX-4MM5 RX MID 3V	434	ASK	RX	
	RX-4M50FM60SF RX-4MF1 RX-8L50FM70SF	434	FSK	RX	
	TX-4MDIL TX-4MSIL TX-SAW MID 3V TX-SAW 433 TX-4M10HA	434	ASK	TX	
	TX-8LAVSA05 TX-8L25IA	868	ASK	TX	
	TX-FM-MID TX-8L50PF06	434, 868	FSK	TX	

	RTF-DATA-SAW RTX-RT LP 434 RTX MID 3V	434	ASK	TRX		
	XTR-434 XTR-434L WIZ2-434--RS	434	FSK	TRX		
	XTR-869	868	FSK	TRX		
[Automicro](…)	DT01 DT01L	315, 434, 868	ASK	TX	TDA5100 crystal-based	
	DT01S DT01SL	315, 434, 868	ASK	TX	SAW-based discrete	
	DT01F DT01FL	315, 434, 868	FSK	TX	TDA5100 crystal-based	
	RX-3302 RX-3304	304, 418, 434	ASK	RX	superregenerative discrete	
	RX-4303 RX-4304	304, 418, 434	ASK	RX		
	DTR01 DTR01W	434, 868	ASK	TRX		
	DTR01F DTR01FW	434, 868	FSK	TRX		
[HopeRF](…)	RFM01	315, 434, 868, 915	FSK	RX	IA4320/Si4320 zero-IF	The chip is interfaced to a CPU and is programmed/setup through SPI. It is not advised to use in the place of dummy 3-pin modules without reading through the datasheet. The chip is the same on the modules, only the antenna matching components are tuned to the specified module frequency
	RFM02	434, 868, 915	FSK	TX	IA4220/Si4020	
	RFM12	315, 434, 868, 915	FSK	TRX	IA4420/Si4420 zero-IF	
	RFM12B	434, 868, 915	FSK	TRX	IA4420/Si4420 zero-IF	
	RFM22B RFM23B	434, 868, 915	ASK FSK GFSK	TRX	Si4430/1/2 zero-IF	
	RFM42B RFM43B	434, 868, 915	ASK FSK GFSK	TX	Si4030/1/2	
	RFM64W RFM64BW	300-510	OOK, FSK	TRX	SX1212 (RF64W)	
	RFM65W RFM65CW	315, 434, 868, 915	OOK FSK GFSK MSK GMSK	RX	SX1239 QFN24 (RF65W QFN28 with NC pins at pin 7, 14, 21, 28)	
	RFM67B	315, 434, 868, 915	OOK GMSK FSK GFSK	TX	SX1230 (RF67W)	
	RFM68B RFM68CW	315, 434, 868, 915	OOK FSK	TX	SX1243 (RF68W)	
	RFM69W RFM68CW	315, 434, 868, 915	OOK FSK	TRX	SX1231 (RF69W)	

	RFM69HW RFM69HCW		MSK GFSK GMSK		
	RAM01	434, 868, 915	ASK	RX	
	HM-T	315, 434, 868, 915	FSK	TX	IA4220/Si4020	The chip is automatically setup through SPI connected to a PIC microcontroller included on the PCB. This module can be used as a drop-in for 3-pin dummy modules
	HM-R	434, 868, 915	FSK	RX	IA4320/Si4320	
	RFM83 RFM83C RFM83L RFM83CL	315, 434	ASK	RX	SYN470R (RF83, RF83L), SYN480R (RF83C, RF83CL) superheterodyne	L types are low voltage parts (2.1-3.6V), others are standard (3.6-5.5V) operating voltage parts
	RFM84	315, 434	ASK	RX	superregenerative discrete	
[Laipac](#)	TLP315A TLP418A TLP434A TLP868A	315, 418, 434, 868	ASK	TX	SAW-based discrete	
	TLP868F	868	FSK	TX		
	RLP315 RLP315A RLP418 RLP418A RLP434 RLP434A RLP868A RLP916A	315, 418, 434, 868, 915	ASK	RX		
	RLP868F	868	FSK	RX		
	RLP916F	915	FSK	RX		
[Linx Technologies](#)	TXM-315-LC TXM-315-LR	315	ASK	TX		
	TXM-418-LC TXM-418-LR	418	ASK	TX		
	TXM-433-LC TXM-433-LR	434	ASK	TX		
	TXM-869-ES	868	FSK	TX		
	TXM-916-ES	915	FSK	TX		
	TXM-900-HP3	902-928	FSK	TX		
	RXM-315-LR RXM-418-LR RXM-433-LR	315, 418, 434	ASK	RX		
	RXM-869-ES	868	FSK	RX		
	RXM-916-ES	915	FSK	RX		
	RXM-900-HP3	902-928	FSK	RX		
	TRM-315-LT	315	ASK	TRX		
	TRM-418-LT	418	ASK	TRX		
	TRM-433-LT	434	ASK	TRX		
[Low Power Radio](#)	AM2000 XR 433	434		RX		

Solutions (LPRS)	LM-RXAM2433				
	LQ-TX433 LQ-TX418 LPRS MicroTX	418, 434	ASK	TX		
OKW Electronics	AMRT4 AMRT5 AMRT14 AMRTQ4	315, 418, 434	ASK	TX	SAW-based discrete	same as Telecontrolli?
	AMHRR3 AMHRR6 AMHRR8 AMHRR30	315, 418, 434	ASK	RX	superregenerative discrete	same as Telecontrolli?
	AMRRQ3	315, 434	ASK	RX	TDA5210 superheterodyne	same as Telecontrolli?
	FMRTFQ1	315, 434	FSK	TX	TDA5100 crystal-based	same as Telecontrolli?
	FMRRQ1	315, 434	FSK	RX	TDA5210 superheterodyne	same as Telecontrolli?
	T5 T6	315, 434	FSK	TX	TDA5100 crystal-based	same as Radiometrix?
	R5 R6	315, 434	FSK	RX	TDA5210 superheterodyne	same as Radiometrix?
	FMRXQ1	434	FSK	TRX		same as Telecontrolli?
Quasar UK	QAM-TX1 QAM-TX3	315, 434	ASK	TX	SAW-based discrete	
	QAM-RX2	315, 434	ASK	RX	superregenerative discrete	
	QAM-RX4	315, 434	ASK	RX	RX3400	
	QFM-TX1-433	434	FSK	TX	TDA5100 crystal-based	
	QFM-RX1-433	434	FSK	RX	TDA5210 superheterodyne	
	QFM-TRX1-2400	2400	FSK	TRX	CC2500	
	ALPHA-TX433S	434	FSK	TX	IA4220	same as HopeRF The chip is interfaced to a CPU and is programmed/setup through SPI. It is not advised to use in the place of dummy 3-pin modules without reading through the datasheet. The chip is the same on the modules, only the antenna matching components are tuned to the specified module frequency
	ALPHA-RX433S	434	FSK	RX	IA4320 zero-IF	
	ALPHA-RX915S	915	FSK	RX	IA4320 zero-IF	
	ALPHA-TRX433S	434	FSK	TRX	IA4420 zero-IF	
	ALPHA-TRX915S	915	FSK	TRX	IA4420 zero-IF	
Radiometrix						
RF solutions	AM-HRR4-418	418	ASK	RX	superregenerative discrete	same as Telecontrolli
	FM-TX2-433-3V	434	FSK	TX		same as Radiometrix

R5LC-418-5-20	418	FSK	RX		
AM-RT4 AM-RT5 AM-RT14 AM-RTQ4 QAM-TX3-434	315, 418, 434,	ASK	TX	SAW-based discrete	same as Telecontrolli?
AM-HRR3 AM-HRR6 AM-HRR11 AM-HRR30-433	315, 418, 434	ASK	RX	superregenerative discrete	same as Telecontrolli?
AM-RRQ3 QAM-RX4	315, 418, 434, 868	ASK	RX	TDA5210 superheterodyne	same as Telecontrolli?
FM-RTFQ1 FM-RTFQ2	315, 434, 868	FSK	TX	TDA5100 crystal-based	same as Telecontrolli?
FM-RRFQ1 FM-RRFQ2	315, 434, 868	FSK	RX	TDA5210 superheterodyne	same as Telecontrolli?
T5	434	FSK	TX		same as Radiometrix?
R5	434	FSK	RX		same as Radiometrix?
QFM-TX1-434	434	FSK	TX	TDA5100 crystal-based	
QFM-RX1-434	434	FSK	RX	TDA5210 superheterodyne	
RFM	TX5000	434	ASK	TX	
	TX5001	315	ASK	TX	
	TX5002	418	ASK	TX	
	TX5003	303	ASK	TX	
	TX6000 TX6004	915	ASK	TX	
	TX6001	868	ASK	TX	
	TXC100 TXC101 TXC102	303, 315, 403, 418, 434, 868, 915	FSK	TX	
	RX5000 RX5005H RX5500	434	ASK	RX	
	RX5001	315	ASK	RX	
	RX5002	418	ASK	RX	
	RX5003 RX5501	303	ASK	RX	
	RX6000 RX6004	915	ASK	RX	
	RX6001 RX6501	868	ASK	RX	
	RXC101	303, 315, 403, 418, 434, 868, 915	FSK	RX	

TR1000 TR1004 TR1100 TR8000 TR8100	915	ASK	TRX		
TR1001 TR8001	868	ASK	TRX		
TR3000 TR3100 TR7000	434	ASK	TRX		
TR3001 TR7001	315	ASK	TRX		
DR3000 DR3300 DR4000 DR5000 DR8000 DR8100	915	ASK	TRX		
DR3001 DR4001 DR5001 DR8001	868	ASK	TRX		
DR3100 DR4100 DR5100 DR7000	434	ASK	TRX		
DR3101 DR4101 DR5101 DR7001	315	ASK	TRX		
Telecontrolli	RR3 RR4 RR6 RR8 RR10 RR11 RR18 RR19 RR30 RR80	315, 418, 434	ASK	RX	superregenerative discrete
	RRQ3 RRQ4 RRQ5 RRQ6 RRQ7	315, 434, 868	ASK	RX	TDA5210 superheterodyne
	RRFQ1 RRFQ2 RRFQ3 RRFQ5	315, 434, 868	FSK	RX	TDA5210 superheterodyne
	RT4 RT5 RT6 RT11 RT14	315, 418, 434	ASK	TX	SAW-based discrete
	RT8-868 RT13-868	868	ASK	TX	SAW-based discrete
	RTQ1 RTQ4 RTQ6	315, 434, 868	ASK	TX	TDA5100 crystal- based
	RTFQ1 RTFQ2 RTFQ4 RTFQ6	315, 434, 868	FSK	TX	TDA5100 crystal- based
	RXQ1-433.9 TRXQ1-433.9	434	FSK	TRX	

RXQ2	434, 868, 915	GFSK	TRX		
RXQ4	434, 868, 915		TRX	CC1101	The chip is interfaced to a CPU and is programmed/setup/modulated through SPI. It is not possible to use in the place of dummy 3-pin modules. Please check the datasheet. The chip is the same on the modules, only the antenna matching components are tuned to the specified module frequency

Single-chip RF transmitter/receiver integrated circuits

- Atmel T5754 434MHz UHF ASK/FSK transmitter
- Atmel U2741 300-450MHz UHF ASK/FSK transmitter (ATA8401, ATA8402, ATA8403, ATA8404, ATA8405)
- Atmel U3741 300-450MHz UHF ASK receiver (ATA8201, ATA8202, ATA8203, ATA8204, ATA8205)
- Atmel AT86RF211 400-950MHz programmable UHF FSK transceiver (SmartRF), (ATA5428, ATA8510, ATA8515)
- HopeRF RF01 FSK receiver IC, RF02 FSK transmitter IC, RF12, RF12B, RF22 FSK transceiver IC (Same as Silicon Labs EZRadio series)
- HopeRF RF67 OOK/FSK/GFSK/GMSK transmitter IC (Same as Semtech SX1230)
- HopeRF RF83, RF83C superheterodyne ASK receiver (same as Synoxo SYN470R, SYN480R)
- Infineon TDA5100 434/868MHz ASK/FSK transmitter
- Infineon TDA5200/5210/5220 ASK/FSK receiver
- MAX1470 315MHz Low-Power, +3V superheterodyne receiver
- MAX1472 300-450MHz ASK transmitter
- MAX1473 315/433MHz ASK superheterodyne receiver
- Melexis TH71101 315/433MHz FSK/FM/ASK, Single-Conversion Superhet
  TH71102 315/433MHz FSK/FM/ASK, Double-Conversion Superhet
  TH7122, TH71221 27-930MHz, FSK/FM/ASK transceiver
  TH72011 434MHz FSK transmitter
  TH72012 434MHz ASK transmitter
  (MLX71120, MLX71121, MLX71122 receiver, MLX72013, TH72001, TH72002, TH72005, TH72006, TH72015, TH72016, TH72031, TH72032, TH72035, TH72036 transmitter)
- Micrel MICRF113 (MICRF112, MICRF405, MICRF102) ASK transmitter (QwikRadio)
  MICRF001, MICRF011, MICRF002, MICRF022 (Same as Synoxo SYN470R, SYN480R), MICRF007, MICRF008, MICRF009, MICRF010, MICRF221, MICRF220, MICRF219, MICRF219A, MICRF218, MICRF213, MICRF211 ASK receiver
  MICRF505, MICRF505L, MIRCRF506, MICRF507 FSK transceiver
- Microchip rfRXD0420 434MHz ASK/FSK superheterodyne receiver (same as Melexis TH71101)
- Microchip rfPIC12F675 434MHz ASK/FSK transmitter with flash microcontroller
- Microchip PIC12F529T39A, PIC12LF1840T39A, PIC16LF1824T39A (RF part same as Semtech SX1240) OOK/FSK transmitter with flash microcontroller
- Microchip PIC12F529T48A, PIC12LF1840T48A (RF part same as Semtech SX1243) OOK/FSK transmitter with flash microcontroller
- Microchip MRF49XA (Same as Silabs Si4420 Si4421), MRF89XA transceivers
- NXP (Philips) UAA3201T 150-450MHz ASK receiver, UAA3220TS ASK/FSK receiver
- Nordic nRF905, nRF9E5 433/868/915 MHz transceiver (nRF903, nRF403, nRF401)
- PTC (Princeton Technology Corp.)
  PT4450 SAW-based ASK transmitter (PT4452, PT4455, PT4456, TX4915 PLL-based)
  RX3310A LC-based, PT4317 SAW-based, PT4301, PT4302, PT4304, PT4305, PT4312, PT4330 PLL-based receiver
  PT4501 FSK transceiver IC
- *PTC* (Himark) RX3310A, RX3400 low power (2mA) UHF ASK receiver
- RFMD RF2915 433/868/915 MHz FSK/ASK/OOK transceiver
- RFMD RF2510 433/915MHz UHF FM/FSK transmitter
- Semtech SX1240, SX1243 ASK/FSK, SX1242 OOK, SX1223 2FSK, SX1230 OOK/FSK/GFSK transmitters
  SX1210, SX1213, SX1239 receivers
  SX1276, SX1272, SX1232, SX1236,SX1235, SX1231J, SX1231H, SX1231, SX1233, SX1211, SX1212, SX1257, SX1282, XE1209 transceivers
- Semtech (Xemics) XE1201A 300-500MHz FSK transceiver
  XE1205 433/868/915MHz multi-channel FSK transceiver

- Silicon Labs (Integration Associates)
  IA4220, IA4221, IA4230, Si4020, Si4021, Si4022, Si4030, Si4031, Si4032 315,434,868,915MHz programmable no-parts FSK transmitter (EZRadio, EZRadio PRO)
- Silicon Labs (Integration Associates)
  IA4320, IA4322, IA4330, Si4320, Si4322, Si4330 315,434,868,915MHz programmable no-parts zero-IF FSK receiver (EZRadio, EZRadio PRO)
- Silicon Labs (Integration Associates)
  IA4420, IA4421, IA4430, IA4431, Si4420, Si4421, Si4431, Si4432 FSK transceiver (EZRadio, EZRadio PRO)
- Synoxo SYN470R, SYN480R superheterodyne receiver (same as HopeRF RF83, RF83C, Micrel MICRF002, MICRF022)
- TI TRF1400 200-450MHZ ASK receiver, obsolete
- TI TRF4400 434MHz ASK transmitter
- TI (Chipcon) CC1000, CC1100, CC1101 300-1000MHz programmable UHF FSK transceiver (SmartRF)