

无线收发芯片和模块选择、设计指南

一、应用场合

应用范围:

呼叫器、汽车防盗器、无线门铃、遥控器、保全系统、玩具、无线键盘、无线摇杆、无线鼠标、单/双向对讲机、亲子机、免持听筒、卫星接收器、手机等。

二、无线收发芯片

• 锁相回路系列(PLL)

Product	V(V)	I(mA)	Freq(MHz)	Function	Sensitivity	PKG	Application
FS8107E	1, 3	0.4	100	PLL	-10dBm	TSSOP16	Pager, Mouse, Multi-Channel system
FS8108	1, 3	0.4	180	PLL	-10dBm	TSSOP16	Pager, Mouse, Multi-Channel system
FS8308	3	0.8	500	PLL	-10dBm	TSSOP16	FRS, Pager, Multi-Channel system
FS8160	2.7~3.6	4	100~1100	Dual PLL	-10dBm	TSSOP16	900MHz Cordless Phone, Multi-Channel
FS8170	2.4~3.6	3	300~2800	PLL	-10dBm	SSOP16	WLAN, Video sender, Multi-Channel sys

• 接收器系列(Receiver)

IF ICs

Product	V(V)	I(mA)	Freq(MHz)	Mod	Function	Data Rate	Sensitivity	PKG	Application
RX3140	1.1~3.5	1.1	10~50	FSK	RX	1.2kbps	16dBuVemf	TSSOP20	Mouse, Pager,
RX3141	1.1~3.5	1.1	10~50	FSK	RX	1.2kbps	16dBuVemf	TSSOP20	Mouse, Pager,

ASK ICs

Product	V(V)	I(mA)	Freq(MHz)	Mod	Function	Data Rate	Sensitivity	PKG	Applica
RX3310	2~6	2.5@3.0V	250~450	ASK	RX	19.6Kbps	-105dBm	SOP18/SSOP20	Wireless
RX3310A	2~6	2.5@3.0V	250~450	ASK	RX	19.6Kbps	-105dBm	SOP18/SSOP20	Wireless
RX3400	4.75~7.0	2.4@5.0V	290~460	ASK	RX	4.8Kbps	-103dBm	SSOP24	Car alarm Sender R

FSK ICs

Product	V(V)	I(mA)	Freq(MHz)	Mod	Function	Data Rate	Sensitivity	PKG	Application
RX3930	2.7~5.0	9@3.3V	300~1000	FSK	RX	64Kbps	-100dBm	LQFP32	ISM Band Remot

• 发射器系列(Transmitter)

ASK ICs

Product	V(V)	I(mA)	Freq(MHz)	Mod	Function	Data Rate	O/P Power	PKG	Applicati
TX4915	2.2~3.6	10@3.0V	100~960	ASK	TX	100Kbps	6dBm	SSOP16	Car Alarm

FSK ICs

Product	V(V)	I(mA)	Freq(MHz)	Mod	Function	Data Rate	O/P Power	PKG	Ap
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TX4930	2.7~5.0	12@3.3V	300~1000	FSK	TX	64Kbps	-3dBm	SSOP16	ISM
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- 收发器系列(Transceiver)

Product	V(V)	I(mA)	Freq(MHz)	Mod	Function	Data Rate	Sensitivity	PKG	Application
KD701	2.5~3.3	RX:12 TX:10	15~150	FM	TX/RX	3KHz	-100dBm	TQFP32	Walkie-Talkie, har

- 宽频放大器系列(Gain Block)

Product	V(V)	I(mA)	Freq(MHz)	Function	O/P Power	PKG	Application
DA1300	3.3	35	DC~3GHz	Gain Block	11dBm	SOT25	SONET, Cable MMDS
DA1800	3.9	80	DC~8GHz	Gain Block	17dBm	SOT89	SONET, Cable MMDS

Product	V(V)	I(mA)	Freq(MHz)	Gain	Function	P1dB(dBm)	I/P Return Loss	O/P
DA2709	5	25	0.1~2.5GHz	23	Gain Block	7@1GHz	10dB	11.5
DA2712	4.8	12	DC~3GHz	20@1GHz 19@2GHz 17@3GHz	Gain Block	-3@1GHz	10dB	
DA2719	4.8	33	DC~3GHz	35@1GHz 34@2GHz 31@3GHz	Gain Block	7@1GHz 5.5@2GHz	10dB	

- 功率放大器系列(PA)

Product	V(V)	I(A)	Freq(GHz)	Function	O/P Power(dBm)	PKG	Application
PA2100	2.7~4.8	1/1.8	1.8/0.9	PA	32/35	LCC16	DCS/GSM
PA2110	2.9~4.8	1/1/1.8	1.8/1.9/0.9	PA	32.5/32.5/35	LCC16	DCS/PCS/EGSM
PA2500	3.0~4.2	0.080	1.9	PA	28	LCC6	CDMA

- 模块系列(Module)

Product	V(V)	I(mA)	Freq(MHz)	Mod	Function	Data Rate	O/P Power	Application
RXA1	5	4.5	315/433	ASK	RX Module	3Kbps	-100dBm	Wireless door bell, D

* 全系列高频 IC 简述

1 RX3310A(150MHz~450MHz)Single Chip Receiver IC

产品简述:

为一颗接收 ASK(Amplitude-Shift-Keying)调变无线数字讯号传输的单芯片集成电路,一般低功率的无线控制系统皆属于其应用的范围。在目前最广受应用的 250MHz~450MHz 频段范围中, RX3310 只需更改外部电容与电感的共振线路,即可适用于不同的操作频率。在三伏的工作模式下, RX3310 所消耗的电流仅为 2.6 毫安,而设于 Disable 状态时所消耗的电流仅为 25 微安培。

产品特色:

应用频率宽:150MHz~450MHz

灵敏度高

功率消耗低

适用范围广

外部组件少且无特殊昂贵之组件

适用产品:无线遥控系统、汽车警报系统、防丢器、无线门铃、玩具

2 KD-701 无线收发器

产品简述:

KD-701 是一颗低功率 FM 调变无线讯号发射接收的单芯片集成电路,从天线接收到之 RF 讯号经由外部之滤波器变为差动讯号送达集成电路中,集成电路经过放大和降频后送至外部之滤波器,经过滤波后之讯号再送回集成电路中,经放大和解调后把声音讯号送出,再经由放大器放大后由喇叭输出。此集成电路中有静音线路,可把较弱之讯号停止输出,此线路由 RSSI 之电流透过外部电阻来控制。

在发射部份,麦克风接收声音讯号后,输入集成电路中之 mic-amp 中,经放大和频率调变后由振荡器输出讯号,集成电路之输出讯号经由一颗外加之功率晶体放大后,经由天线送出。

KD-701 的频率范围由 15MHz~150MHz 其选择频率方法是由外部组件值来决定。其外部组件主要有发射和接收振荡器中之 crystal、455KHz 之滤波器、中周解调器等。

产品特色:

整合发射和接收为同一颗集成电路

全双工之收发集成电路

适用温度范围广

32PIN QFP 包装

适用产品:行动电话免持听筒、无线收发机、婴儿监听器免持听筒、

3 KD-801 无线收发器

产品简述:

KD-801 是一颗低功率 FM 调变无线讯号发射接收的单芯片集成电路,从天线接收到之 RF 讯号经由外部之滤波器变为差动讯号送达集成电路中,集成电路经过放大和降频后送至外部之滤波器,经过滤波后之讯号再送回集成电路中,经放大和解调后把声音讯号送出,再经由放大器放大后由喇叭输出。此集成电路中有静音线路,可把较弱之讯号停止输出,此线路由 RSSI 之电流透过外部电阻来控制。

在发射部份,麦克风接收声音讯号后,输入集成电路中之 mic-amp 中,经放大和频率调变后由振荡器输出讯号,集成电路之输出讯号经由一颗外加之功率晶体放大后,经由天线送出。

KD-801 的频率范围由 15MHz~150MHz 其选择频率方法是由外部组件值来决定。其外部组件主要有发射和

接收振荡器中之 crystal、455KHz 之滤波器、中周解调器等。

产品特点:

整合发射和接收为同一颗集成电路

全双功之收发集成电路

适用温度范围广

32PIN SOP 包装

适用产品: 无线电对讲机、老人 / 婴儿监听器

电气特性

	<u>nRF401</u>	<u>nRF402</u>	<u>nRF903</u>
工作频段	433MHz	433MHz	433/868/915MHz
信道数	2	2	170
功能	发射/接收	发射	发射/接收
稳频方式	PLL	PLL	PLL
调制方式	FSK	FSK	FSK/GMSK
最大输出功率	+10dBm	+10dBm	+10dBm
灵敏度	-105dBm		-100dBm
最大工作速率	20Kbit/s	20Kbit/s	76.8Kbit/s
工作电压	2.7--5.2V	2.7--3.3V	2.7--3.3V
封装	20SOIC	14SOIC	TQFP32

Wireless Communication Components > 433MHz > U2745B Transmitter

DESCRIPTION

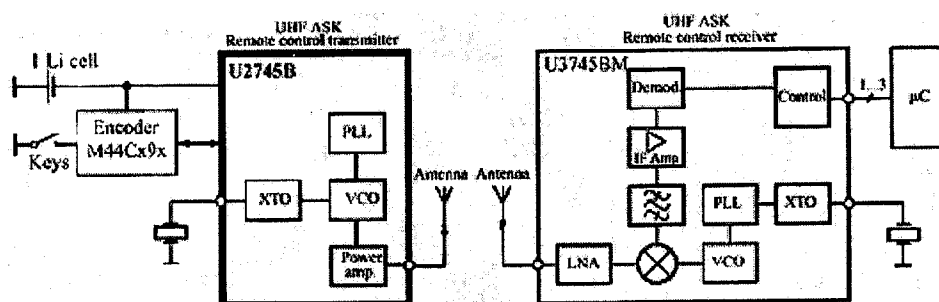
The U2745B is a PLL transmitter IC which has been specially developed for the demands of RF low-cost data transmission systems at data rates up to 20KBaud.

The transmitting frequency range is 310 MHz to 400 MHz. It can be used in ASK systems. The main applications of the U2745B are in the areas of outside temperature metering, socket control, garage door opener, consumption metering, light / fan or air-conditioning control jalousies, wireless keyboard and various other consumer market applications.

FEATURES

- Supply voltage 2.2V to 4.0V in the temperature range -40°C to 85°C
- One-chip solution with minimum external circuitry
- Low cost than the usual discrete solutions using SAW and transistors
- Very small SSO16 package, pitch 0.635, 150 mil
- "Single-Ended Open-Collector" output (same antennas can be used in discrete solutions, simpler adaptation of magnetic loop antennas)
- XTO output for clocking the μ C, thereby together with M44C090 or M44C890 the optimum system cost-effectiveness
- Very high transmitting frequency accuracy compared to SAW solutions. This enables receivers at lower bandwidth than is possible with SAW resonators.
- ESD protection according to MIL-STD.883 (4KV HBM) except Pins XTO1/2, ANT and LF.

SYSTEM BLOCK DIAGRAM



ELECTRIC CHARACTERISTICS

ORDER INFORMATION

Extended Type Number	Package	Remarks
U2745B-MFB	SSO16	Tube
U2745B-MFBG3	SSO16	Taped and reeled

Wireless Communications Components > TX / RX Chipset > 3745BM Receiver

DESCRIPTION

The U3745BM is a multi-chip PLL receiver device supplied in an SO20 package. It has been specially developed for the demands of RF low-cost data transmission systems with low data rates from 1 KBaud to 10KBaud in Manchester or Bi-phase code. The receiver is well suited to operate with the TEMIC PLL RF transmitter U2745B. It can be used in the frequency receiving range of $f_0 = 310$ MHz to 440 MHz for ASK data transmission.

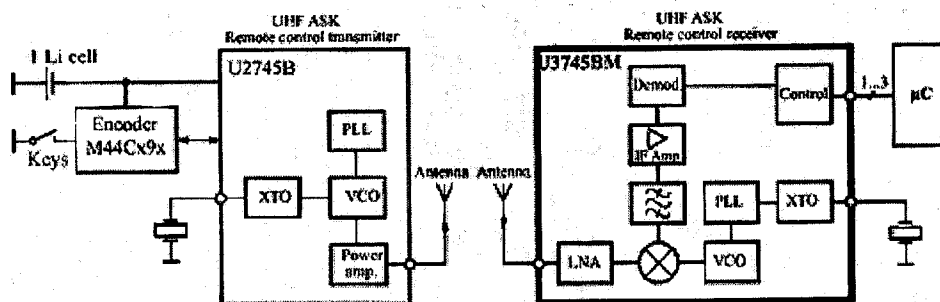
All the statements made below refer to 433.92 MHz and 315 MHz applications.

The main applications of the U3745BM are in the area of outside temperature metering, socket control, garage door opener, consumption metering, light / fan or air-condition control, jalousies, wireless keyboard and various other consumer market applications.

FEATURES

- Supply voltage 4.5V to 5.5V, operating at temperature range 0°C to 70°C
- Minimal external circuitry requirements, no RF components on the PC board except adaptation to the receiver antenna
- High sensitivity, especially at low data rates
- Sensitivity reduction possible even while receiving
- Full integrated VCO
- Single-ended RF input for easy adaptation to $\lambda/4$ antenna or printed antenna on PCB
- Low-cost solution due to high integration level
- ESD protection according to MIL-STD.883 (4KV HBM) except Pins POUT (2KV HBM)
- High image frequency suppression due to 1MHz IF in conjunction with a SAW front-end filter. Up to 40dB is thereby achievable with newer SAWs.
- Programmable output port for sensitivity selection or for controlling external periphery
- Communication to μC possible via a single, bi-directional data line
- Power management (polling) is also possible by means of a separate pin via the μC

SYSTEM BLOCK DIAGRAM



ELECTRICAL CHARACTERISTICS

Wireless Communication Components > 900MHz > T5760 / 5761 Receiver

DESCRIPTION

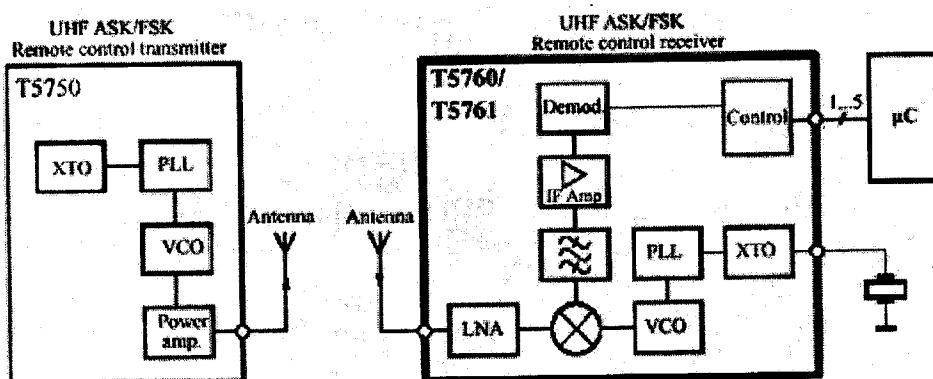
The T5760 / T5761 is a multi-chip PLL receiver device supplied in an SO20 package. It has been specially developed for the demands of RF low-cost data transmission systems with data rates from 1 Kbaud to 10 Kbaud in Manchester or Bi-phase code. The receiver is well suited to operate with the 'Atmel Wireless & Microcontrollers' PLL RF transmitter T5750.

Its main applications are in the areas of telemetry, security technology and keyless-entry systems. It can be used in the frequency receiving range of $f_0 = 868$ to 870 MHz or $f_0 = 902$ to 928 MHz for ASK or FSK data transmission. All the statements made below refer to 868.3 MHz and 915.0 MHz applications.

FEATURES

- Fully integrated LC-VCO and PLL loop filter
- Very high sensitivity with power matched LNA
- 30 dB image rejection
- High system IIP3 (-16 dBm), system 1-dB compression point (-25dBm)
- High large-signal capability at GSM band (blocking -30 dBm @ +20 MHz, IIP3 = -12 dBm @ +20 MHz)
- 5V to 20V automotive compatible data interface
- Data clock available for Manchester- and Bi- phase coded signals
- Programmable digital noise suppression
- Receiving bandwidth B_{IF} = 600 KHz for low cost 90-ppm crystals
- Low power consumption due to configurable polling
- Temperature range -40°C to 105°C
- ESD protection 2 KV HBM, 200 V MM
- Communication to μ C possible via a single bi-directional data line
- Low-cost solution due to high integration level with minimum external circuitry requirements

SYSTEM BLOCK DIAGRAM



ELECTRICAL CHARACTERISTICS

ORDERING INFORMATION

Extended Type Number	Package	Remarks
T5760-TG	SO20	Tube, for 868 MHz ISM band
T5760-TGQ	SO20	Taped and reeled, for 868 MHz ISM band
T5761-TG	SO20	Tube, for 915 MHz ISM band
T5761-TGQ	SO20	Taped and reeled, for 915 MHz ISM band

Wireless Communication Components > SE6100 Transceiver

DESCRIPTION

The SE6100 is a single chip ASK (Amplitude Shift Key) transceiver IC.

It is designed to operate in low power μ C-controlled and stand alone applications with half duplex data transmission.

The unsymmetrical antenna input and output are separated for applications with apart transmission and receiving antenna.

The SE6100 is suitable for European or North American ISM band applications.

Integrated functions as stand by mode, low bat control, RSSI output, level detector, locked loop detection, and clock output for μ C offer features for universal applications.

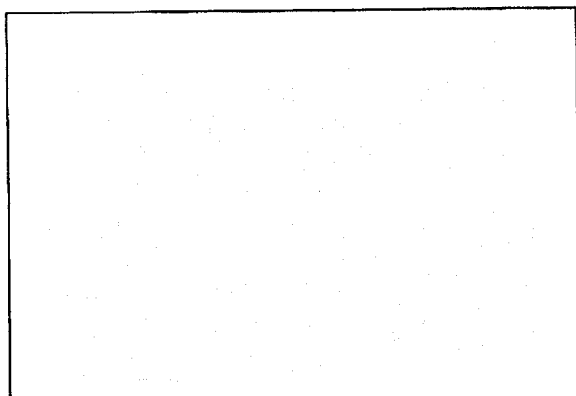
FEATURES

- Single chip ASK Transceiver
- Wide frequency range (200 ~ 500 MHz)
- Low voltage operation (2.3 ~ 3.6 V)
- Low power consumption
- PLL (25 /50 KHz channel space, 64 / 32 channels available)
- Adjustable output power
- High sensitivity
- Data rates up to 9600 bps
- Stand alone application available
- Automotive temperature range
- TQFP32 Package and Die

APPLICATION

- Intelligent keyless entry
- Security systems
- Remote control systems
- Communication systems
- Medical applications

FUNCTIONAL BLOCK DIAGRAM



Please click to enlarge.

ELECTRICAL CHARACTERISTICS

INQUIRY

Wireless Communication Components > CC400 Transceiver

DESCRIPTION

CC400 is a single-chip high performance half-duplex, UHF transceiver designed for low-power and low-voltage wireless applications. The circuit is mainly intended for the ISM (Industrial, Scientific and Medical) and SRD (Short Range Device) frequency bands at 418MHz and 433MHz, but can easily be programmed for operation at other frequency bands in the 300 - 500 MHz range.

The main operating parameters of CC400 can be programmed via a serial interface, thus making CC400 a very flexible and easy to use transceiver. In a typical system, CC400 will be used together with a micro-controller and a few external passive components

FEATURES

- Single chip UHF RF transceiver
- Ideal for low cost short range communication
- Frequency range 300 - 500MHz
- Programmable output power up to 25mW
- High sensitivity: -112dBm
- Small size (SSOP-28 package)
- Low supply voltage: 2.7 to 3.3V
- Very few external components required
- Data rate up to 9.6Kbit/s
- Suitable for both narrow and wide band systems
- Suitable for frequency hopping protocols
- Frequency -lock indicator
- Development kit available
- Easy-to-use software for generating the CC400 configuration data

APPLICATIONS

- UHF wireless data transmitters and receivers
- Wireless alarm and security systems
- 418 and 433MHz ISM/SRD band systems
- Keyless entry with acknowledgement
- Remote control systems
- Home Security and automation
- Low power telemetry
- Remote metering
- Environmental control

BLOCK DIAGRAM

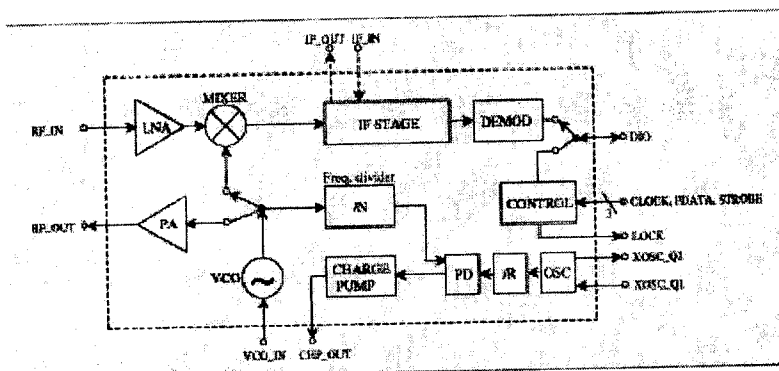


Figure 1. Simplified block diagram of the CC900.

ELECTRICAL SPECIFICATIONS

Wireless Communication Components > CC900 Transceiver

DESCRIPTION

CC900 is a single-chip high performance UHF transceiver designed for low-power and low-voltage wireless applications. The circuit is mainly intended for the ISM (Industrial, Scientific and Medical) and SRD (Short Range Device) frequency bands at 868MHz and 915MHz, but can easily be programmed for operation at other frequency bands in the 800 - 1,000 MHz range.

The main operating parameters of CC900 can be programmed via a serial interface, thus making CC900 a very flexible and easy to use transceiver. In a typical system, CC900 will be used together with a micro-controller and a few external passive components.

KEY FEATURES

- Single chip UHF RF transceiver
- Frequency range 800 - 1,000MHz
- Programmable output power up to 4dBm
- High sensitivity: -110dBm
- Comply with EN 300 220
- Small size (SSOP-28 package)
- Low supply voltage: 2.7 to 3.3V
- Very few external components required
- No external RF switch required
- No external IF filter required
- Single port antenna connection
- FSK modulation with data-rate up to 9.6Kbit/s
- Suitable for both narrow and wide band systems
- Suitable for frequency hopping protocols
- Radio frequency (RF) programmable in steps of 250Hz makes crystal temperature drift compensation possible
- Development kit available
- Easy-to-use software for generating the CC900 configuration data

APPLICATIONS

- UHF wireless data transmitters and receivers
- Wireless alarm and security systems

- 868 and 915MHz ISM/SRD band systems
- Keyless entry with acknowledgement
- Remote control systems
- Home Security and automation
- Low power telemetry
- Remote metering
- Environmental control

BLOCK DIAGRAM

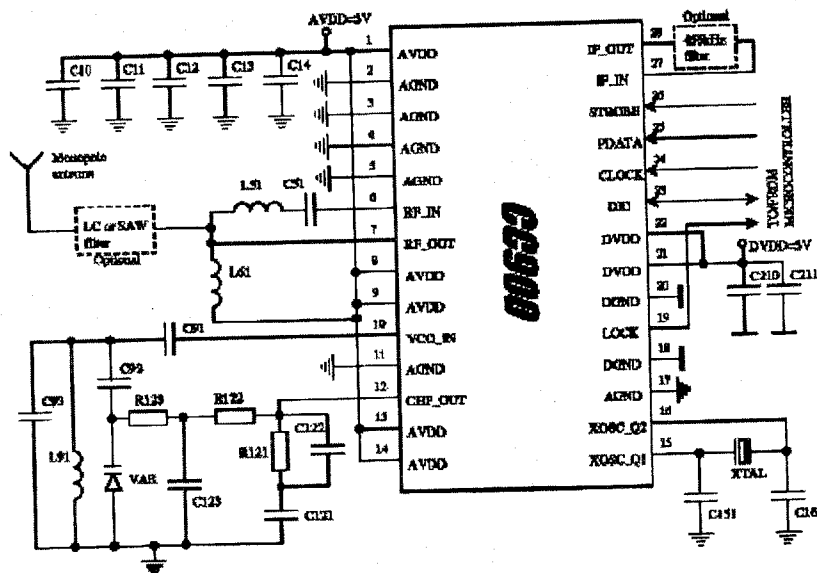


Figure 7.
Typical CC900 application for 868.000 MHz operation

ELECTRICAL SPECIFICATIONS

INQUIRY

Wireless Communication Components > α4100 Receiver

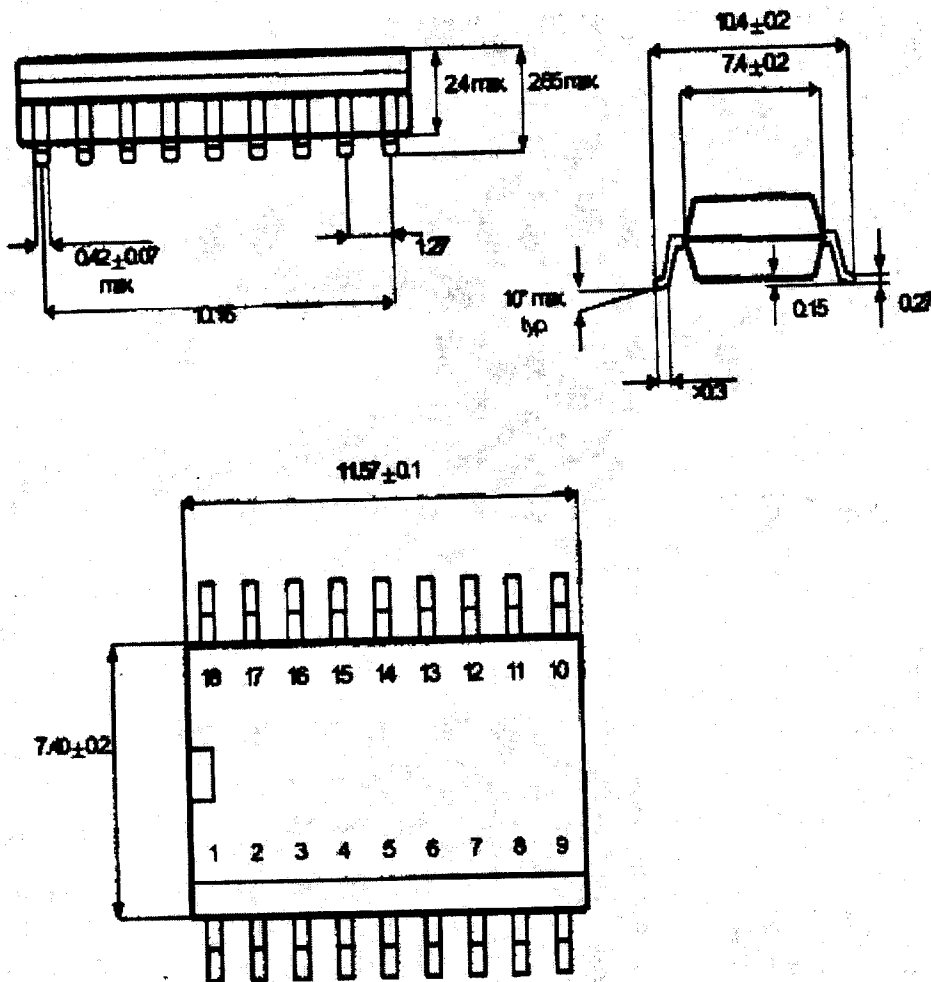
DESCRIPTION

The α4100 is an integrated ASK receiver circuit for wireless heart rate meter (pulse meter). It is designed for battery applications with high input sensitivity.

KEY FEATURES

- Single chip ASK receiver
- Supply voltage range 2.3V to 3.6V
- Temperature range -5°C to 50°C
- High input sensitivity
- Very low power consumption
- Power down mode
- Frequency range 4KHz to 7KHz

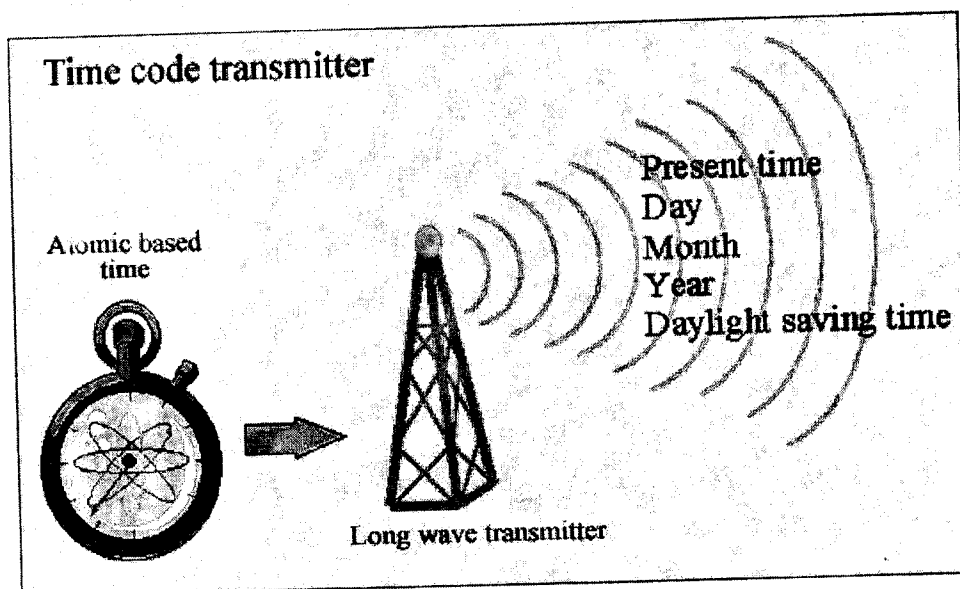




Radio-Controlled Technology (RCT)

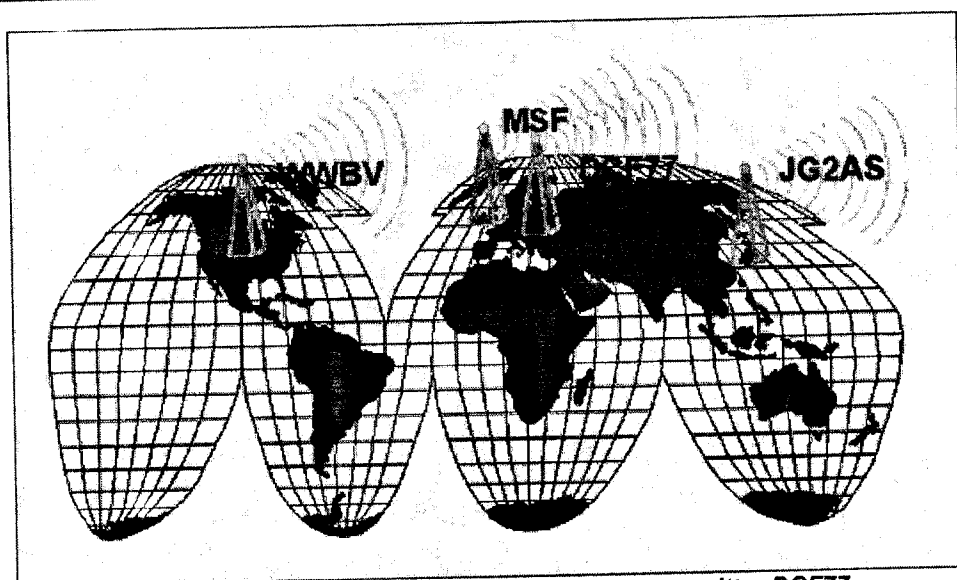
BACKGROUND OF TIME CODE RECEPTION

Time code transmitter is different from audio or TV broadcasting. It provides information of the present time such as day, month, year and the relevant Daylight saving time. The information is transmitted via a long wave transmitter in the frequency range of 40 to 80 KHz, which consumed less power in the receiver. As the transmitters are amplitude modulated, a pulse is transmitted in every second and the information transferred is in a minute time frame.



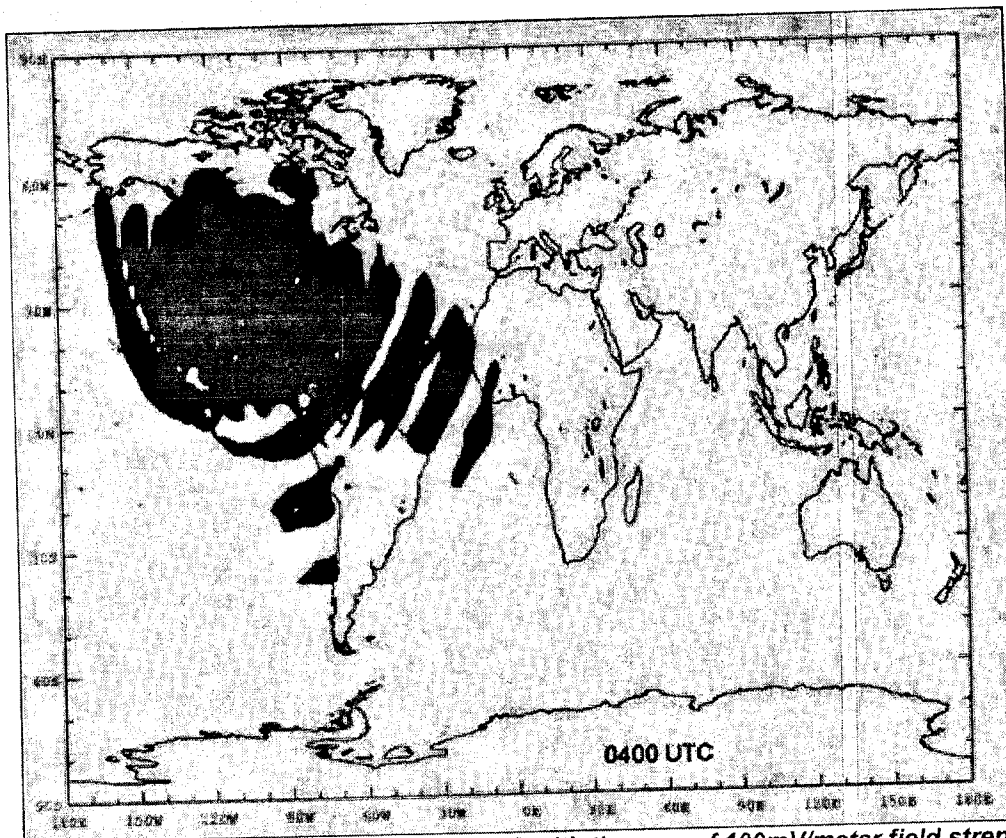
LOCATIONS OF MAJOR TRANSMITTERS :

Name:	Location:	Frequency:	Power:
DCF77	Frankfurt / Germany	77.5 KHz	50 KW
JJY	Sanwa / Japan	40.0 KHz	10 KW
MSF	Teddington / UK	60.0 KHz	50 KW
WWVB	Fort Collins / USA	60.0 KHz	50 KW

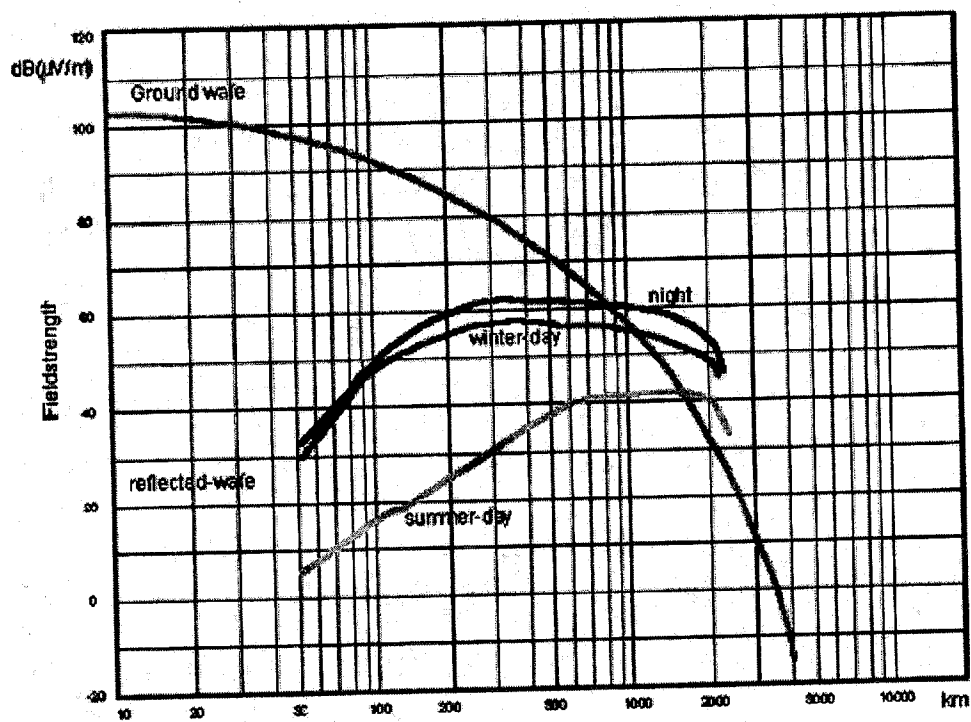


Example for the propagation of the signal from the transmitter DCF77

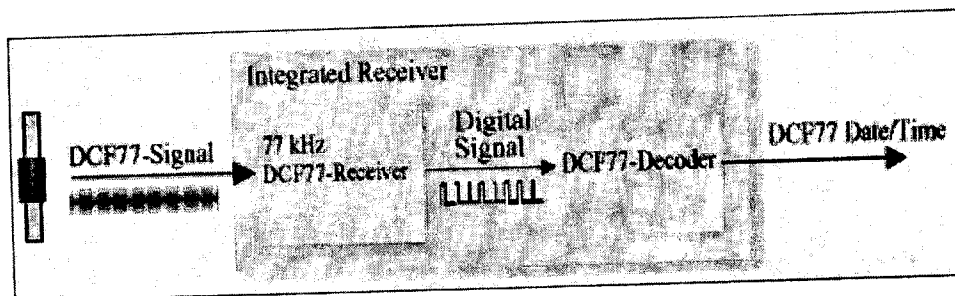
Two kinds of field strength are commonly found, they are ground wave and space wave. Space-wave is theoretically reflected by ionosphere. The interference between ground wave and space wave causes reception loss for minutes of time. For long distance transmitter, the best field strength is expected at night.



The distribution of the actual signal in US with the area of 100mV/meter field strength



A ferrite antenna, RF receiver (can be T4223 / T4227) and signal decoder are used to display time code.



二、无线发射、接收模块

AP-485/A 无线射频收发模块

产品简介:

AP-485/A 无线射频收发信模块,利用微电脑技术和先进的 SMT 制造工艺,将 MCU 和射频模块有机结合,为用户提供高性能、价格低的 VHF/UHF 频段内的双向音频信号传输。它内部包括接收单元和 CPU 控制单元,独立的收发 VCO 和数字锁相环,保证了频率稳定、传输可靠。

AP-485/A 无线射频模块系列产品,分为 AP-485/CX 接收机, AP-485/CT 发射机和 AP-4851/XT 收发一体机。AP-485/C 用户接口简单、外接置频器,置频方便,实用性很强,可直接同各种无线 Modem 组合,构成和具特色的无线数传电台,广泛应用于寻呼机链路放大、油田气象、水利、电力、工业自动化等领域

特点:

- 数字锁相环,工作频率稳定。
- 双 VCO 结构,工作频带宽,覆盖 20MHz。
- 外置置频器,频率设置方便。
- MCU 控制,可存储 4 个信道,拨位开关选择。
- SMT 制造工艺,体积小、重量轻、可嵌入各种设备中。
- 金属外壳封装,抗干扰能力强。

综合指针:

频率范围 :VHF/UHF
信道间隔 :25KHz
调制方式 :FM
频段宽度 :20MHz
信道数 :4 个
调制音频范围 :300Hz~340Hz
工作电压 :9~15V (典型 13.8V)
相对温度 :95%RH 无冷凝
环境温度 : -20~+60°C
体积 :106mmX54mmX8mm
重量 :150g

接收机指针:

灵敏度 : $\leq 0.25 \mu v$
互调抑制比 : $\geq 60dB$
信道选择 : $\geq 65dB$
音频输出 : $240mV \pm 20mV$
音频失真 : $\leq 3\%$
接收机守候电流 : $\leq 50mA$

发射机指针:

调制灵敏度 : $100\text{mV} \pm 10\text{mV}$
频率稳定度 : $\leq 5\text{ppm}$
发射启动时间 : $\leq 50\text{ms}$
发射电流 : $\leq 1.5\text{A}$ (5W)
发射功率 : 5W

AP-301/C 中功率无线数传模块

产品简介:

AP-3001/C 无线专收台是一种模块式结构的小型双向数传电台,内置高性能单片、信号调制解调器、VHF/UHF 频段射频模块及标准通讯接口。由接口输入的资料进行调制,经射频模块高频后发射出去;接收端射频模块接收到射频信号后,经过接收机数定信号处理还原资料回送给用户系统,以此完成两个用户系统之间的双向资料无线传输。

AP-301/C 的许多工作参数由用户现场编程设定。为便于用户应用开发,特别提供了能保证资料可靠传输软件编程接口。AP-301/C 具备选址、通用、透明三种通讯传输协议模式,可实现点到点、点对多点数据传输、广播发送信息、组网灵活方便,最大可寻址达 4096 个用户,广泛应用于遥感、遥测、遥控诸多领域。

特点:

- 数字锁相环及 VCO 双设计,收发转换速度快,工作频率稳定。
- 覆盖 20MHz 带宽,工作频点通过计算机设置。
- 用户可存贮 16 个收发信道,用户能 随意使用,编程切换工作信道。
- RSSI 输出,可直观测量场强大小。
- FFSK(MSK)调制,调制方式先进,数据传输可靠。
- 可调信道间隔 12.5KHz/25KHz,充分利用频率资源。
- 采用数字编码技术,可进行多址数据传输,组网灵活方便。
- 通讯接口为标准 RS-232,可直接挂接计算机,资料控发,编程方便。
- 采用 SMT 制造工艺,体积小,可以自由地嵌入各种设备中。

综合指针:

频率范围 : VHF/UHF
频率稳定度 : 5ppm
信道数 : 16 个
信道间隔 : 25KHz/12.5KHz
资料调制方式 : FFSK (MSK)
空中传输速率 : 1200/2400bps
接口传输速率 : 1200bps~9600bps
资料组结构 : 每组 8 位,起始 1 位,校验位
传输距离 : $\leq 10\text{Km}$ (开阔无遮挡)
开线阻抗 : 50
环境温度 : $-20^{\circ}\text{C} \sim +60^{\circ}\text{C}$
湿度 : 95%RH, 无冷凝
工作电压 : 9~15V (典型值 13.8V)
体积 : 106mmX54mmX34mm

发射机指针:

射频输出功率 : 2W/5W
邻道抑制比 : $\geq 65\text{dB}$
音频失真度 : $\leq 3\%$
发射机启动时间 : 50ms
发射电流 : $\leq 2\text{A}$ (5W 时)

接收机指针:

接收灵敏度 : $\leq 0.25\mu\text{V}$ (12dB SINAD)
音频失真度 : $\leq 3\%$
邻道选择性 : $\geq 65\text{dB}$
杂波及镜像抗扰性 : $\geq 65\text{dB}$
互调抑制比 : $\geq 65\text{dB}$
接收机守候电流 : $\leq 50\text{mA}$

AP-301/E 微功率无线数传模块

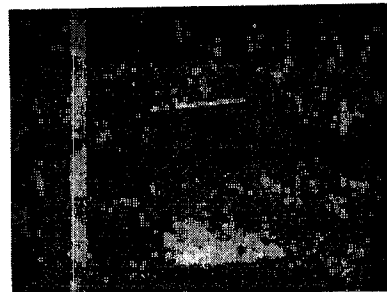
产品简介:

AP-301/E 数传模块是具有较小射频发射功率和较小体积的模块式双向数传电台.采用先进的无线射频技术、数字技术和基带处理技术,选用高质量的元器件组织生产,保证其长期稳定可靠运行。它有通用、选址和透明三种通讯协议传输模式,其可寻址能力为 4096 个点,可实现点对点、点对多点数据传输,组网灵活方便.它的资料接口为标准的 RS-232 和 RS-485 接口,可以与任何具有 RS-232 和 RS-485 的终端设备相连,如计算机、RTU、PLC 及用户自行开发的单片机系统等。

AP-301/E 数传模块与本公司的其它数传电台混合组网,可广泛应用于电力抄表、衡器、工业自动化等领域,尤其在交通智能化、智能仪表、小区安防等行业具有广阔的应用前景。

特点:

- 数字锁相环,收、发转换速度快,频率稳定.
- 覆盖 12MHz 带宽,工作频点可通过计算机随意设置.
- 可存贮 16 个收发信道,用户可根据情况选择使用.
- FFSK 调制方式.
- 采用标准的 RS-232 和 RS-485 接口.
- 数字编码技术.
- 三种通讯协议模式,组网方便灵活.
- 内置软件和硬件看门狗,保证长期可靠运行.
- 模块采用全 SMT 组装,制作工艺先进,集成度高.
- 体积小,重量轻,可以自由地嵌入各种设备中.



综合指针:

频率范围 : 223MHz~235MHz
信道间隔 : 25KHz/12.5KHz
频率稳定度 : 5ppm
调制方式 : FFSK (MSK)
天线阻抗 : 50
信道数 : 16 个
空中传输速率 : 1200bps
接口速率 : 1200bps~9600bps
资料组结构 : 1 位起始位、8 位资料位、校验位、1 位停止位
工作电压 : 5V
环境温度 : -20°C ~ $+60^{\circ}\text{C}$
湿度 : 95%RH, 无冷凝
体积 : 72mmX46mmX14mm
重量 : 140g

发射机指针:

射频输出功率：50mW~500mW
邻道抑制比：≥60dB
音频失真度：≤3%
发射机启动时间：≤50ms
发射电流：≤400mA（500mW时）

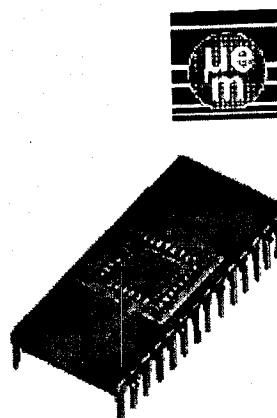
接收机指针:

接收灵敏度： $\leq 0.25 \mu v$
音频失真度： $\leq 3\%$
邻道选择性： $\geq 60dB$
杂波及镜像抗扰性： $\geq 60dB$
互调抑制比： $\geq 60dB$
接收机守候电流： $\leq 50mA$

收发集成电路

RF Identification Circuits

功能	P4092, P4095, P4056
用途	读写器
位率	≤8 千波特
读取模式调制	ASK
读取模式编码	Manchester, Miller Biphase, ISO FDX-B
写入模式调制	ASK
最低场效频率	100kHz
最高场效频率	150kHz
操作时温度范围	-40to+85□
封装	SO14



射频卡集成电路

[illegible]

用户定义的读取保护							□		
片上电压限幅器	□	□	□	□	□	□	□	□	□
谐振电容		50pF	170pF	74pF	94.5pF	74pF	170pF	200pF	110pF
最低场效频率	50kHz	50kHz	0.1/2MHz	100kHz	10MHz	100kHz	100kHz	100kHz	125kHz
最高场效频率	400kHz	400kHz	0.4/5MHz	150kHz	15MHz	150kHz	150kHz	150kHz	2.5GHz
ISO 标准的依从				11784/785					
操作时的温度范围	-40to+85□	-40to+85□	-40to+85□	-40to+85□	-40to+85□	-40to+85□	-40to+85□	-40to+85□	-40to+85□
封装	CID PACK, Chip,PCB	CID PACK, Chip,PCB	Chip,PCB	Chip,PCB	CID PACK, Chip,PCB	CID PACK, Chip,PCB	CID PACK, Chip,PCB	CID PACK, Chip,PCB	CID PACK, Chip

PTR2000 系列超小型无线数传模块

产品特性

接收发射合一

工作频率为国际通用的数传频段 433MHz

FSK 调制，抗干扰能力强，特别适合工业控制场合

采用 DDS+PLL 频率合成技术，频率稳定性极好。

灵敏度高，达到-105dBm

发射功率最大+10dBm

低工作电压（2.7V），功耗小，接收待机状态仅为 8uA.

具有两个频道，特别满足需要多信道工作的特殊场合

工作速率最高可达 20Kbit/s（也可在较低速率下工作如 9600bps）

超小体积约 40mmx27mmx5mm

可直接接 CPU 串口使用如 8031，也可以接计算机 RS232 接口，软件编程非常方便

由于采用了低发射功率、高接收灵敏度的设计，使用无需申请许可证

标准 DIP 引脚间距，更适合嵌入式设备

应用领域：

车辆监控、遥控、遥测、小型无线网络、无线抄表、门禁系统、小区传呼、工业数据采集系统、无线标签、身份识别、非接触 RF 智能卡、小型无线数据终端、安全防火系统、无线遥控系统、生物信号采集、水文气象监控、机器人控制、无线 232 数据通信、无线 485/422 数据通信、数字音频、数字图像传输等

CML 通信专用集成电路

• 无线数据通信集成电路 (Wireless Modem)

品 名	应 用
FX/MX469	1200/2400BPS 无线数据通信专用调制解调电路 A
CMX469A	1200/2400/4800BPS 无线数据通信专用调制解调电路 A
FX/MX589	4k-80kBPs 全双工高速无线数据通信专用 GMSK 调制解调电路
CMX589A	4k-200kBPs 全双工高速无线数据通信专用 GMSK 调制解调电路
FX/MX909A	19.2kBPs 高速无线数据包通信专用 GMSK 调制解调电路
FX/MX919B	4.8k-19.2kBPs 高速无线数据包通信专用四电平 FSK 调制解调电路
FX/MX929B	4.8k-19.2kBPs 高速 RD-LAP 用四电平 FSK 调制解调电路

• 集群通信专用芯片 (Trunked Radio)

品 名	应 用
FX/MX429A	MPT1327 全双工 1200/2400BPs 无线数据通信调制解调电路
FX809	MPT1327 半双工 1200BPs 无线数据通信调制解调电路
FX829	MPT1327 多功能信号处理器
CMX980A	Tetra 全数字集群通信信号处理器

• 有线数据通信集成电路 (Wireline Modem)

品 名	应 用
FX604	V.23 低功耗有线数据通信调制解调集成电路
FX614	Bell202 低功耗有线数据通信调制解调集成电路
CMX624	V.23 低功耗有线数据通信调制解调集成电路 (具有 DTMF 编码, 进程音检测功能)
CMX644A	V.22 低功耗有线数据通信调制解调集成电路 (具有 DTMF 编码, 进程音检测功能)
CMX654	V.23 低功耗有线数据通信调制解调集成电路

• 亚音频编解码电路 (CTCSS Encoder/Decoder)

品 名	应 用
FX465	47 音亚音频编解码电路
FX808A	程控 CTCSS 编解码电路
FX818	程控 CTCSS 编解码电路
FX828	程控 CTCSS 编解码电路

• 进程音检测电路 (Call Progress Detector)

品 名	应 用
FX613	低功耗通用进程音检测电路
FX663	低功耗进程音检测电路

• CVDS 编解码电路 (CVDS Codec)

品 名	应 用
FX609	CVSD 编解码电路
FX619	军用 CVSD 编解码电路

• 倒频式语音保密电路 (Frequency Inverter)

品 名	应 用
FX118/128	单倒频式 语音保密电路
FX214/224	多倒频式 语音保密电路

• 单音编解码芯片 (Tone Encoder and Decoder)

品 名	应 用
FX803	单双音编解码芯片
FX828	单音编解码芯片
FX105A	单音编解码芯片

• 射频发射接收电路

品 名	应 用
CMX017	ISM 频段发射电路
CMX018	ISM 频段接收电路

• 12/16KHz 计费信号检测芯片

品 名	应 用
FX631	单路 12/16KHz 计费信号检测芯片
FX641	双路 12/16KHz 计费信号检测芯片
CMX631	单路 12/16KHz 计费信号检测芯片

• 专用仿真板 (Evaluation Kit)

品 名	应 用
EV1050	FX105A 仿真板
EV6000	CMX602A/FX604/614 仿真板
EV6021	CMX602 仿真板
EV6040	FX604 仿真板
EV6240	CMX624/644A 仿真板
EV9000	FX909A/919B/929B 仿真板
EV9800	CMX980 仿真板

The below is for the exhibition show

- 无线数据通信集成电路 (Wireless Modem)
- MPT1327 和 Tetra 集群通信专用芯片 (Trunked Radio)
- 低功耗的 CCITT V.22, V.23 有线数据通信集成电路 (Wireline Modem)
- 进程音检测电路 (Call Progress Detector)
- 亚音频编解码电路 (CTCSS Codec)
- CVSD 编解码电路 (CVSD Codec)
- 倒频式语音保密电路 (Frequency Inverter)
- 单音编解码芯片 (Tone Encoder and Decoder)
- 射频发射接收电路 (UHF FM/FSK Transmitter/Receiver)
- 易于二次开发的专用仿真板 (Evaluation Kit)

2. 特殊应用标准芯片

电话芯片

PCM 编码解码芯片

型号	概述	电源 (VDD)	功耗 (mW)	封装	附
MSM6932B	μ -Law	± 5	65	16DIP/24SOP	
MSM6933B	A-Law	± 5	65	16DIP/24SOP	
MSM6996H	A-Law	± 5	65	16DIP/24SOP	
MSM6996V	A-Law	± 5	65	16DIP/24SOP	
MSM6997H	μ -Law	± 5	65	16DIP/24SOP	
MSM6997V	μ -Law	± 5	70	16DIP/24SOP	
MSM6998	A-Law	± 5	70	16DIP/24SOP	
MSM6999	μ -Law	± 5	70	16DIP/24SOP	
MSM7507	μ /A-Law	+5	20	24SOP/20SSOP	片脚与MSM7543兼容
MSM7717	μ /A-Law	+2.7~+3.8	20	24SOP/20SSOP	片脚与MSM7507兼容
MSM7508B	μ -Law	+5	17.5	16DIP/24SOP/28QFP	
MSM7509B	A-Law	+5	17.5	16DIP/24SOP/28QFP	
MSM7541	μ -Law	+3.3	20	20SDIP/24SOP/26TSOP (II)	
MSM7542	A-Law	+3.3	20	20SDIP/24SOP/26TSOP (II)	
MSM7543	μ -Law	+5	20	20SDIP/24SOP/26TSOP (II)	
MSM7544	A-Law	+5	20	20SDIP/24SOP/26TSOP (II)	
MSM6895	μ -Law	+5	20	80QFP	
MSM6896	A-Law	+5	20	80QFP	
MSM7502	μ /A-Law	+5	20	80QFP	
MSM7503	μ /A-Law	+5	50	80QFP	
MSM7566	μ -Law	+3	15	20SDIP/24SOP/26TSOP (II)	片脚与MSM7541兼容
MSM7567	A-Law	+3	15	20SDIP/24SOP/26TSOP (II)	片脚与MSM7542兼容
MSM7575	μ /A-Law/Linear	+3	70	64QFP	
MSM7533H	μ -Law	+5	70	20SDIP/24SOP/26TSOP (II)	
MSM7533V	μ /A-Law	+5	70	20SDIP/24SOP/26TSOP (II)	
MSM7534	A-Law	+5	70	20SDIP/24SOP/26TSOP (II)	
MSM7578H	μ -Law	+5	25	16DIP/24SOP/20SSOP	
MSM7578V	μ /A-Law	+5	25	16DIP/24SOP/20SSOP	
MSM7579	A-Law	+5	25	16DIP/24SOP/20SSOP	
MSM7702	μ /A-Law	+2.7~+3.8	15	24SOP/20SSOP	MSM7578/79的3V版本
MSM7704	μ /A-Law	+2.7~+3.8	30	20SDIP/24SOP	MSM7533/34的3V版本
MSM7705	μ /A-Law	+5	70	44QFP	
MSM7716	linear	+2.7~+3.8	24	32TSOP/30SSOP	
MSM7728	linear	+2.5~+3.6	34	30SSOP	

ADPCM 编解码器

型号	概述	电源 (V _{DD})	功耗 (mW)	封装
MSM7540	G.721 ADPCM转换器+G.711/G.714编解码器 (A-Law)	+5	60	28SOP
MSM7540L		+3	18	28SOP
MSM7560	G.721 ADPCM转换器+G.711/G.714编解码器 (u-Law)	+5	60	28SOP
MSM7560L		+3	18	28SOP/32TSOP (I)
MSM7570	G.721/G.723/G.726 ADPCM 转换器 + 多功能编解码器 (u/A-Law)	+5	60	32TSOP (I)
MSM7570L		+3	21	32TSOP (I)
MSM7708	G.721 ADPCM转换器 + 多功能编解码器 (串行寄存器)	+3	18	64TQFP
MSM7580	G.721 ADPCM转换器 + 独立的两通道转换器	+5	12.5	28SOP
MSM7581		+2.7~+5.5	26	100TQFP

$\pi/4$ Shift QPSK 调制解调器

型号	概述	电源 (V _{DD})	封装
MSM7582	$\pi/4$ Shift QPSK 调制解调器, 应用: PHS系统个人位置 (PS) 及	+3	32TSOP (I)
MSM7582B	单元位置 (CS)	+3	32TSOP (I)
MSM7583	$\pi/4$ Shift QPSK 调制解调器, 应用: PHS系统单元位置 (CS)	+5	64QFP

ADPCM Codec + $\pi/4$ Shift QPSK 调制解调器

型号	概述	电源 (V _{DD})	功耗 (mW)	封装
MSM7584D	32Kbps ADPCM 编解码器 (u/A-Law) + $\pi/4$ Shift QPSK 调制解调器 + 串行寄存器 I/F + RSSI A/D	+3	20	80TQFP
MSM7586	32Kbps ADPCM 编解码器 (u/A-Law) + $\pi/4$ Shift QPSK 调制解调器	+3	20	100TQFP

回音抵消器

型号	概述	电源 (V _{DD})	功耗 (mW)	封装
MSM7602	回音抵消器, 回音抵消级别: 30dB, 回音延迟时间: 27ms	+2.7~+5.5	66 (3.3V typ) 150 (5V typ)	28SSOP/56QFP
MSM7603	回音抵消器, 回音抵消级别: 30dB, 回音延迟时间: 59ms	+2.7~+5.5	99 (3.3V typ) 200 (5V typ)	28SSOP
MSM7603B	回音抵消器, 回音抵消级别: 30dB, 回音延迟时间: 59ms 可选 u/A-Law	+2.7~+5.5	99 (3.3V typ) 200 (5V typ)	28SSOP
MSM7617	双回音抵消器, ITU-TG.164/165, 回音抵消级别: 30dB, 回音延迟时间: 59ms	+4.5~+5.5	400 (5V typ)	64QFP

ADPCM 编解码器 + 回音抵消器

型号	概述	电源 (V _{DD})	功耗 (mW)	封装
MSM7718	32Kbps ADPCM 编解码器 + 回音抵消器, 应用: PHS系统基站	+2.7~+3.6	72	100QFP/100TQFP

调制解调器应用

型号	概述	电源 (V _{DD})	功耗 (mW)	封装
MSM6926	FSK 调制解调器, 300bps全双工, ITU-TV.21调制器, 解调器, 滤波器	+5+12	90	28DIP/44QFP
MSM7510	滤波器	+2.7~+5.5	18	16DIP/24SOP
MSM6927	FSK 调制解调器, 1200bps半双工, ITU-TV.23 调制器, 解调器, 滤波器	+5+12	90	28DIP/44QFP
MSM7512B	FSK 调制解调器, 1200bps半双工, ITU-TV.23 调制器 (1200bps+75bps), 解调器 (1200bps)	+2.7~+5.5	18	16DIP/24SOP
MSM6946	FSK 调制解调器, 300bps全双工, BELL103调制器, 解调器, 滤波器	+5+12	90	28DIP/44QFP
MSM6947	FSK 调制解调器, 1200bps半双工, BELL202 调制器, 解调器, 滤波器	+5+12	90	28DIP/44QFP
MSM7564	14.4Kbps传真及数字调制解调器ITU-T V.21/V.22/V.22bis/V.33bis, BELL 103/212A, ITU-T V.17/V.29/V.27ter/V.21ch.2	+5	500	144QFP/84QFP
MSC2121A	14.4Kbps传真及数字调制解调器 (MSM66507+MSM7564-01) ITU-T V.21/V.22/V.22bis/V.33bis, BELL 103/212A, ITU-T V.17/V.27ter/V.21, AT command, 传真class 1 Command, MNP Class4/5, ITU-T V.42/V.42bis	+5	900	144QFP/144QFP

电话应用

型号	概述	电源 (V _{DD})	功耗 (mW)	封装
MSM6234	语音拨号, 与MK5089兼容, 与MCU接口方便	+2.5~+8.5	25 (MAX)	16DIP
MSM6920	程控交换机的DTMF解码器, 接收信号级别: -5~-32dBm	+5.0~+12.0	80	28DIP/44QFP
MSM6945B	终端设备的DTMF解码器, 接收信号级别: -5~-48dBm	+5.0~+12.0	80	28DIP/44QFP
MSM6843	终端设备的DTMF解码器, 接收信号级别: -5~-45dBm	+5.0~+12.0	80	28DIP/44QFP
MSM7524	DTMF转换器, CPT发生器/检测器, FAX信号检测 (1300Hz)	+5	40	32SSOP
MSM7547	衰减器, +15dB~-4dB, 8级	+5	15	16SOP
MSM7577		+2.7~+5.25	4	16SOP

无线系统应用

型号	概述	电源 (V _{DD})	功耗 (mW)	封装
MSM6882	MSK调制解调器, 2400bps, 调制器, 解调器, 过滤器及数字PLL	+5/+3.6	30/20	22DIP/24SOP
MSM6948	MSK调制解调器, 1200bps, 调制器, 解调器, 过滤器及数字PLL	+5/+3.6	15/10	18DIP/24SOP
MSM7545	加密 (语音扰频器和防扰频器)	+3~+5	11 (3.6V)	16SOP
MSM7546	MSK调制解调器, 1200bps, 加密, 语音过滤器	+2.8~+5.5	15	32SSOP
MSM7556		+2.8~+5.5	15	32SSOP
MSM7555	MSK调制解调器, 2400bps, 加密, 语音过滤器, 压缩扩展器	+2.7~+5.5	32	56QFP (S)
MSM7557	MSK调制解调器, 2400bps, 语音过滤器, 压缩扩展器	+2.7~+5.5	32	56QFP (S)
MSM7532	MSK调制解调器, 2400bps, 语音过滤器, 压缩扩展器 + 预放大	+1.8~+5.5	24	56QFP (S)

程控交换机应用

型号	概述	电源 (V _{DD})	功耗 (mW)	封装
MSA409A	电池供电, SLIC2W/4W转换器	-24/-48	100/200	30SDIP

遥测遥控应用

型号	概述	电源 (V _{DD})	功耗 (mW)	封装
MSM6888B	遥测遥控IC, DTMF转换器, V.21调制解调器	+5	30	42DIP/56QFP (L)
MSM6889		+5	30	42DIP/56QFP (L)
MSM7516	遥测遥控IC, DTMF转换器, V.23调制解调器	+5	30	42DIP/56QFP (L)
MSM7515		+5	30	42DIP/56QFP (L)
MSM7514	遥测遥控IC, DTMF转换器, V.23调制解调器, C.P. 语音检测	+5	30	42DIP/56QFP (L)
MSM7515	遥测遥控IC, DTMF转换器, V.21调制解调器	+2.5~+3.6	10	44QFP
MSM7523	遥测遥控IC, DTMF转换器, V.21调制解调器, 两个模拟输入	+5	30	42DIP/56QFP (L)

无线局域网基带控制器

型号	概述	电源 (V _{DD})	功耗 (mW)	封装	附
MSM7712	IEEE802.11无线局域网基带控制器	5V and 3.3V	166mW	144LQFP	1Mbps
MSM7730		5V and 3.3V	TBD	144LQFP	1M~2Mbps Pin Compatible with M7712

无铃声芯片

型号	概述	电源 (V _{DD})	功耗 (mW)	封装
MSA4739	无铃声芯片, 模拟前端	3V/5V	0	32SOP

开发中

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