

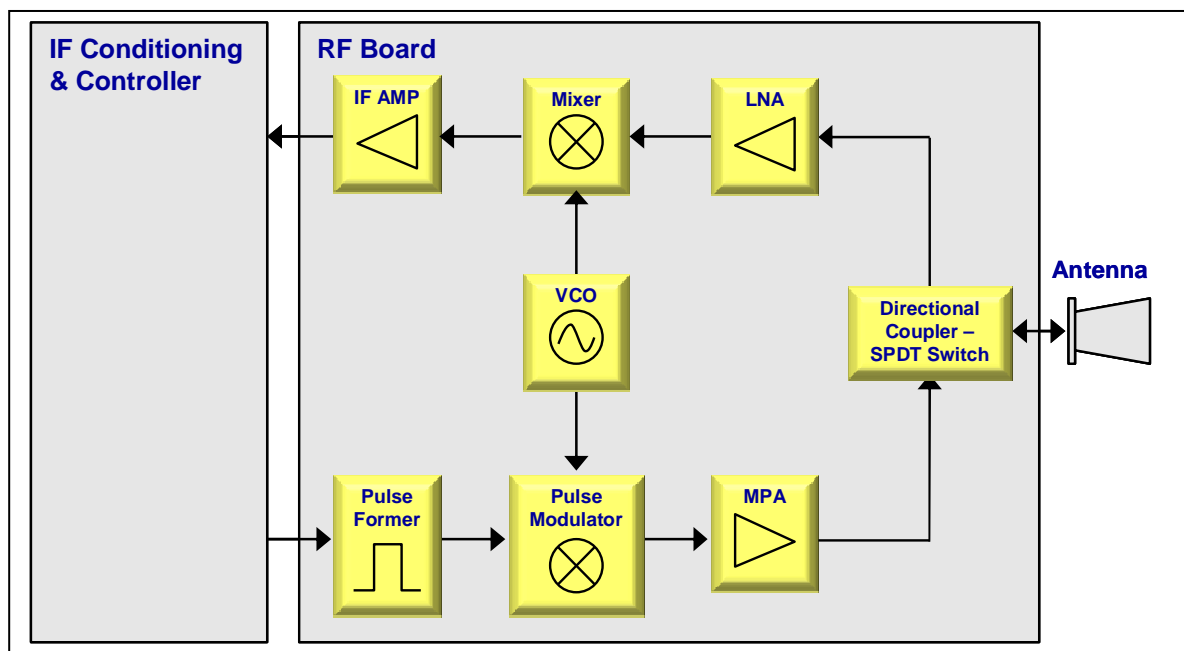
UMS MMIC solutions for Industrial Radar Sensors

United Monolithic Semiconductors is offering a complete MMIC products solution for Industrial Radar Sensors operating in the 24-26 GHz frequency range. Our products are particularly attractive for 3D positioning radar sensors, non-contact level radar sensors and automation sensors due to their low DC requirement and high level of integration as well as for security (e.g. burglar alarm) and for detection (e.g. door opener and wall wire/hose detection). Applications are various and serve chemical, pharmaceutical, food and beverage, water and wastewater management, utility, transportation, real estate, construction and consumer products industries.

Our product offering is versatile with the ability to choose between single function, multifunction or complete chipset solution. The present E-letter highlights some of our products and shows how they can be integrated in typical radar sensor architecture.

A typical architecture of level radar sensor includes amplifiers, mixers, receivers, frequency doubler, VCO and switch as detailed below:

FRONT-END ARCHITECTURES



The following are some of UMS product offering operating at 24-26 GHz adequate to this topology:

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UMS Transmit & Receive Amplifier at 24-26 GHz:

CHA2411	CHA2093/CHA2693
<p>Self biased DRIVER Gain: 24 dB; Pout up to 15 dBm Pin: -5 dBm suitable for CHM1291 mixer Low DC consumption 45 mA, 5 V Wide temperature range: -40°C to +105°C</p> <p>Assembly: 3x3 mm² plastic-molded QFN</p>	<p>Independent biased stage LNA Gain: 13 dB; Noise: 3 dB Pout up to 12 dBm Low DC consumption 30-45 mA, 4 V Fast switching capability</p> <p>Assembly: 3x3 mm² plastic-molded QFN</p>

UMS Mixer & Integrated Receiver at 24-26 GHz:

CHM1291	CHR2411
<p>Single MIXER Loss: 12 dB Plo= 5 dBm suitable for CHV2270 VCO Image rejection 15 dB Low DC consumption 50 mA, 4 V For transmit and receive</p> <p>Assembly: 4x4 mm² plastic-molded QFN</p>	<p>Self biased RECEIVER Conversion Gain: 18-22 dB; Noise: 7 dB IF from DC Very low DC consumption 60 mA, 5 V Wide temperature range: -40°C to +100°C</p> <p>Assembly: 4x4 mm² plastic-molded QFN</p>

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UMS VCO & frequency doubler at 24-26 GHz:

<p>CHV2270</p> <p>Integrated VCO 12.75 GHz Vtune: 1 V ~2.5 V for 12.25-13 GHz signal Pout: 5 dBm suitable for CHM1291 mixer PN: -100 dBc/Hz @ 100 kHz DC consumption 150 mA, 5 V Wide temperature range: -40°C to +125°C</p> <p>Assembly: 4x4 mm² plastic-molded QFN</p>	<p>CHX2090</p> <p>Frequency DOUBLER 12-24 GHz Gain: 0 dB Pin: 6 dBm suitable for CHV2270 VCO Low DC consumption 50 mA, 3.5V</p> <p>Assembly: 3x3 mm² plastic-molded QFN</p>
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UMS fully integrated receiver chip at 24-26 GHz:

With maximum integration, best noise performance and low DC consumption UMS integrated solution based on CHR3693 achieves a compact and cost effective solution reducing bill of material, assembly and operating costs.

CHR3693

Self biased RECEIVER
 Conversion Gain: 14 dB; Noise: 3 dB
 IF: 0-3.5 GHz LO: 9-14 GHz
 Plo: 2 dBm suitable for CHV2270 VCO
 Internal freq doubler: 1 chip saving
 Very low DC consumption 120 mA, 4 V

Assembly:
 4x4 mm² plastic-molded QFN

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What chipset can we provide and how does it work?

The following is a description of several chipsets for Level Radar Sensors operating with a single bias supply.

UMS propose 3 levels of integration for the receiver:

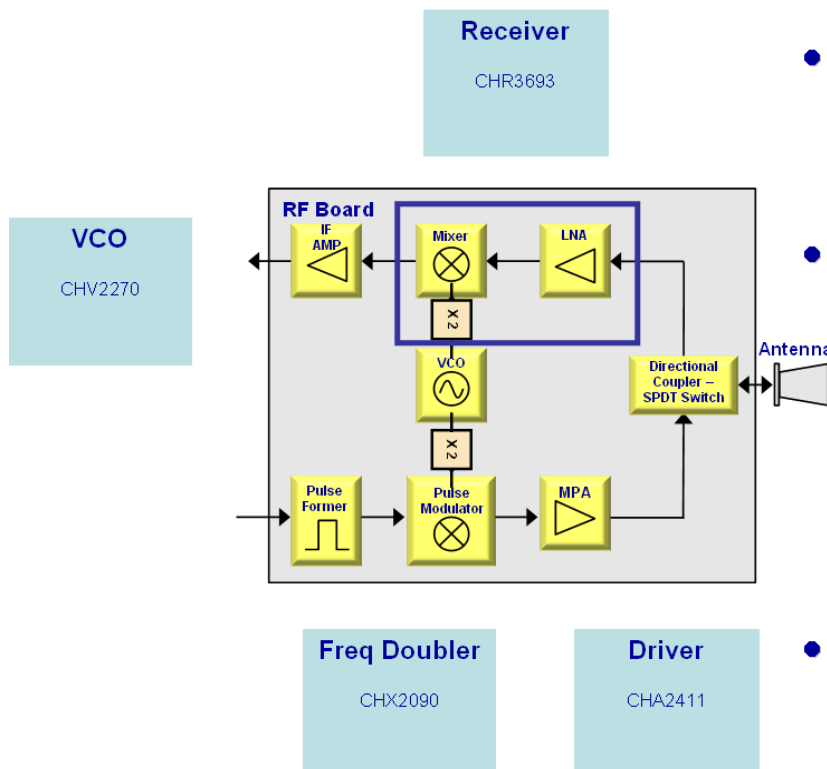
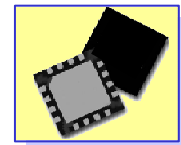
- a multiple chip solution with individual LNA, Mixer and Frequency Doubler. The same mixer CHM1291 can be used for transmit/receive. This chipset leads to 7 chips solution,
- a multifunction single chip mixer with RF amplifier. This chipset leads to 6 chips solution,

Or,

- a single chip fully integrated receiver function with adjustable gain, very low noise figure and low power consumption. This chipset leads to 5 chips solution.

Using all SMT packaging approach for the chipset, UMS MMIC gives you the benefit of fast, simple assembly and easily reproducible microwave performance over large scale production.

Highest integration MMIC chipset description:



● Application

- Level radar sensors
- **5 chips solution**

● Advantages

- RF bandwidth: 24-26 GHz
- RX **very low noise 3 dB**
- TX gain: 25 dB, Pout 13 dBm
- **Low power consumption:**
 - MAX 5V, Id current: 370 mA
 - P < 1.6 W
- 16 leads QFN 3x3 mm²
- 24 leads QFN 4x4 mm²

● Pricing (without switch)

- **Attractive pricing!**
- Request your quote

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Power consumption budget of the integrated chipset:

	Vd (V)	Id (A)	Power W
<i>RX</i>			
CHR3693	4	0.12	0.48
<i>VCO</i>			
CHV2270	4,5	0.15	0.68
<i>Freq doubler</i>			
CHX2090	3,5	0.06	0.21
<i>Driver</i>			
CHA2411	5	0.04	0.2
<i>Switch</i>			
Coming in 2010			
Total		0.37A	1.57W
Number of chips		5	

The level of integration is associated with low DC power consumption of 1.6 W with one single 5 V supply, which is advantageous for remote systems; the DC power consumption can be further reduced depending on the MMIC operation.

UMS can recommend biasing conditions to optimize the power consumption, taking in account the gain of the antenna and power budget requirements.

All UMS team looks forward to give you the benefit of our MMIC performance.

We offer catalogue products and custom designs to meet specific customer technical requirements and price.

United Monolithic Semiconductors is certified ISO9000 and ISO TS16949 for automotive production. With fully in house GaAs manufacturing and space evaluated processes, United Monolithic Semiconductors products meet highest quality standard as required by Space and Automotive productions.

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About UMS:

United Monolithic Semiconductors designs, produces and markets leading edge RF, microwave and millimetre wave components and integrated circuits (ICs) for the Telecom, Space, Defence, Automotive and ISM Industries.

The company's strategy is to position itself as a "one-stop" supplier to the wireless microwave and millimetre-wave market, offering a broad range of standard and custom designed MMICs, along with an open foundry service. It has two production facilities: in Ulm Germany and in Orsay France, where the commercial headquarters and product design and development are also based and one design centre in Lowell MA, USA.

Our products offer leading edge performance and high volume capacity; Most of our technologies are available in open foundry service mode.

The company, supported by a global network of representatives and distributors, is committed to developing partnerships with application and sector specialists who can benefit from advanced III-V technologies.

Over recent years we have gained a growing reputation as a leading supplier of proprietary MMICs for wireless communication applications, such as broadband wireless, VSAT, high data rate communications, Radio Links, Intelligent Traffic Systems, Automotive ACC and short-range sensors, and ISM Wireless.

The standard product ranges include: power amplifiers, low noise amplifiers, mixers, multipliers, dividers, phase-shifters, frequency generation and highly integrated multifunction parts.

For a complete set of datasheet and application notes please refer to our Website:
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