레이더 모듈
제품소개

2018

CRAECA

1. 24GHz 레이더 모듈

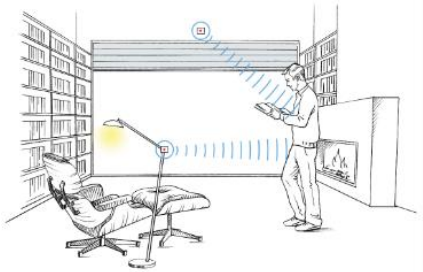
2. IR-UWB 레이더 IC/ 모듈

3. 소형 레이더 개발

당사는 레이더 모듈.시스템 판매 와 개발을 하고 있습니다.
레이더에 대하여 활용하시기 위해 필요한 사항을 다각도로 검토가 가능합니다.

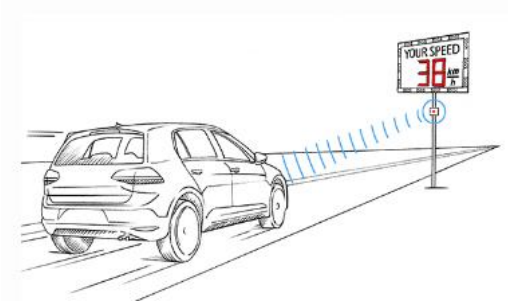
연락처: sales@craeca.com , www.rndsuper.com
010-3379-7889, 070-8807-1889

레이더 활용분야

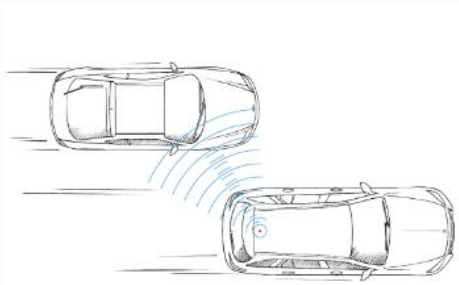


Indoor Automation

Security

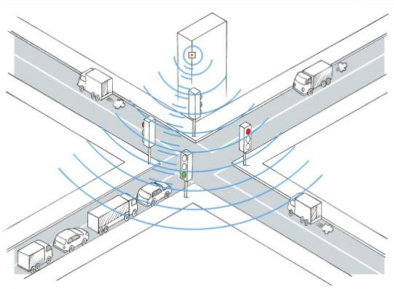


Speed Measurement



Blind Spot Detection

Door open



Cross Section Surveillance

Street Light

Etc….

K-Band Radar module Line-Up

Modules	Parameters								
	Supply Voltage [V]	Channels	Opening Angle [Deg]	Detection Range Person [m]	Detection Range Car [m]	Frequency Band [GHz]	VCO	Size [mm]	Integrated Signal Processing
K-LC1a	5	1	80×34	12	30	24	✓	25×25×6	
K-LC1a_V2	5	1	80×34	12	30	24		25×25×6	
K-LC1a_V4	3.3	1	80×34	12	30	24	✓	25×25×6	
K-LC1a_V5	3.3	1	80×34	12	30	24		25×25×6	
K-LC2	5	2	80×34	12	30	24	✓	25×25×6	
K-LC3	5	1	138×132	7	15	24		25×25×6	
K-LC3_V2	3.3	1	138×132	7	15	24		25×25×6	
K-LC5	5	2	80×34	25	25	24	✓	25×25×6	
K-LC5_V2	5	2	80×34	25	60	24		25×25×6	
K-LC5_V3	3.3	2	80×34	25	60	24	✓	25×25×6	
K-LC6	5	2	80×12	35	80	24	✓	65×25×6	
K-LC6_V2	5	2	80×12	35	80	24	✓	65×25×6	
K-LD2	3.3/5	2	80×34	20	60	24		25×25×6	✓
K-MC1	5	2	25×12	60	150	24	✓	65×65×7	
K-MC1_LP	3.3/5	2	25×12	60	150	24		65×65×7	
K-MC3	5	2	25×7	70	180	24	✓	105×85×7	
K-MC4	5	2	30×12	40	100	24	✓	78×78×7	
K-MC5_LP	3.3/5	2	6×5	40	100	24		187×144×10	
K-MD1	12	4	30×12	80	250	24	✓	120×72×16	✓
K-MD2	12	6	30×21	80	250	24	✓	120×72×16	✓
K-HC1	24	2	25×12	400	1000	24		110×77×19	
K-XC1	24	2	25×12	8	15	24	✓	89×77×19	✓
Spirit (MR2001)	12	6	11×11	50	300	77	✓	91×73×30	✓
Eagle (MR3003)	12	4	24×11	30	200	77	✓	76×44×35	✓
RFA1	12	1	80×34	12	30	24		44×44×10	✓
K-TS1	24	–	30×30	–	–	24	✓	103×76×11	
K-DT1	5	–	30×30	–	–	24		125×70×24	
K-FT1	12	–	30×30	–	–	24		200×200×50	✓

Selection by application

There is no general rule for sensor selection.
Each application has its own requirements.
Please contact RFbeam to discuss the optimal solution for your specific needs.

Typical Applications

Product Family	Indoor Automation	Intrusion-Alarm	Movement Detector	Speed Measurement	Vital Sign Monitoring	Blind spot detection	Cross section surveillance	Door opening	Street light	Others
Evaluation and starter kits	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RSPx Radar Signal Processors	✓	(✓)	✓	✓				✓	(✓)	✓
K-LCx Low complexity sensors	✓	✓	✓	✓	✓			✓	(✓)	✓
K-MCx Medium complexity sensors		✓		✓		✓			✓	✓
K-HCx High complexity sensors		✓		✓					✓	✓
Digital Radars K-XC1, K-MDx		✓	✓	✓		✓	✓		✓	✓
Test systems K-TS1, K-DT1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Development tools

ST100 Starterkit vs ST200 Evaluation Kit vs RSP1 Evaluation Kit

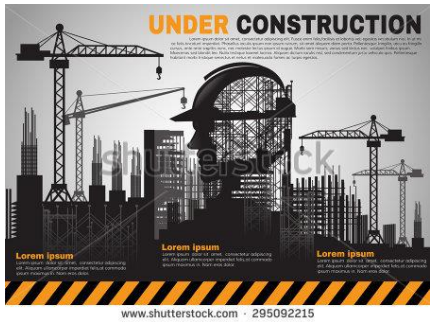
These kits allow learning radar basics and evaluating radar technology for your specific application. STxxx kits can save a lot of initial time and money in order to get first radar experience. While ST100 and ST200 allow signal analysis in more detail, RSP1 Evaluation Kit is oriented on practical implementation of movement sensors.

Purpose	ST100	ST200	RSP1	Comments
Learning Doppler basics	✓	✓	✓	
Developing movement sensors	✓	✓	✓	
Analyzing Doppler frequency spectra	✓	✓	✓	
Working with complex FFT and I/Q sensors		✓	✓	Important for separating multiple objects, suppressing interferences …
Recording and playback of Doppler signals	✓	✓		
Analog output of recorded Doppler signals	✓			Very helpful for analyzing real world signals in the laboratory
Exploring FSK ranging		✓		Ranging of moving objects
Exploring FMCW ranging		✓		Ranging of moving and stationary objects
Exploring Monopulse principle		✓		Detect direction angle of moving objects

고정밀 레이더 활용 분야

적설량 측정, 얼음두께 측정

Baby monitoring



충돌방지, 위험 감지알림

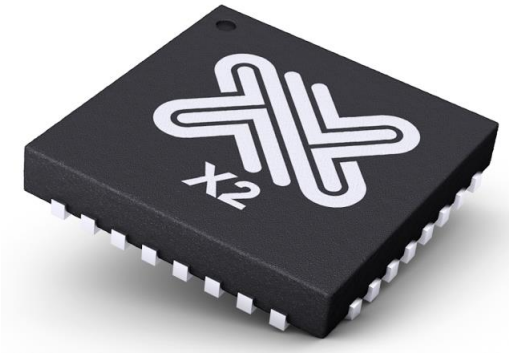
수면 모니터링
호흡. 심박 감지

붕괴현장 인명 감지

싱크홀 감지

근접거리 고정밀 감지 활용 가능

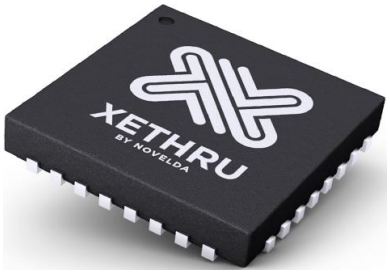
◆ X-2 Impulse Radar Transceiver IC



Key Features

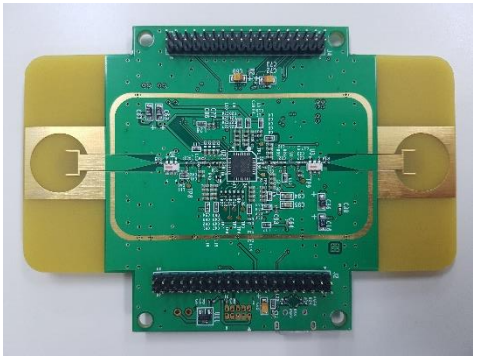
- Single-chip impulse radar transceiver.
- Sub-mm accuracy.
- Low power consumption, typically < 120 mW.
- Industrial operating temperature range, -40 °C - 85 °C.
- Short startup time, < 1 ms.
- Single-ended RF terminals.
- Low power transmitter, with highly configurable output frequency band.
- Extensive hardware support for advanced timing measurement.
- Serial Peripheral Interface.
- QFN32 5x5 mm, plastic leadless package.

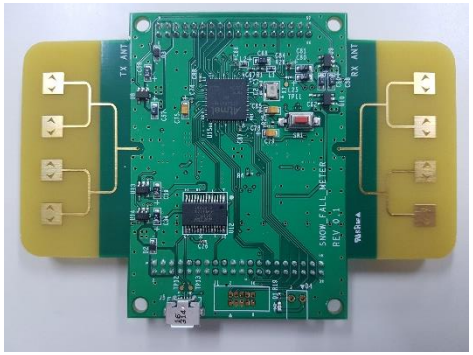
◆ X-4 Impulse Radar Transceiver IC



- Low power consumption System On Chip(SoC).
- Industrial operating temperature range, -40℃ - 85 ℃.
- Requires few external components enabling small systems with low BOM cost.
- Advanced power management enabling low power duty cycle controlled operation.
- Differential RF terminals for low noise and distortion yielding high sensitivity in both static and dynamic applications
- Low power transmitter designed to operate in the worldwide markets
- Bi-phase coding of transmitted pulses for spectrum spreading
- Master/Slave Serial Peripheral Interface (SPI)
- Quad SPI mode for higher data rates
- Digital down conversion and filtering support for efficient signal processing and data rate reduction
- Small footprint Chip Scale Packaging for high density integration

◆ UWB Radar module





1.주파수 대역: 7G~ 10GHz

2.Impulse 방식

3.interface: SPI interface

4.MCU:bulilt in MCU(ATSAM4S4BA-MU cortex-M4)

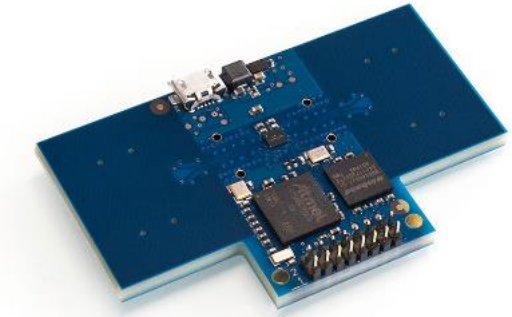
5.Sub board: LTE, BLE, WIFI 활용 가능

◆ **Module & development Kit**

X2 개발키트

X2 레이더 모듈

X4M03 개발키트



X4M300 감지센서
X4M200 호흡센서

◆ 경쟁 기술

Dimension	Ultra-sound	Laser	Infra-red	X-Ray	Novelda Impulse Radar
Penetration	partly	no	no	yes	yes
Non invasive	no	yes	yes	yes	yes
Range	short	long	short	short	short/ medium
Frame-rate	N/A	high	N/A	low	high
Dirty environment	no	no	no	yes	yes
LOW POWER	no	yes	yes	no	yes

9. 차량충돌방지용 레이더	24.25-26.65GHz	-41.3dBm/MHz	차량충돌방지용 신호기	무선설비규칙 98조
	76-77GHz	10mW		
10.도로정보감지레이더	34.275-34.875GHz	8dBm/MHz		
11. UWB, 용도미지정, 고정점대점	**3.1-4.8GHz, 7.2-10.2GHz**	**평균 -41.3dBm/MHz**	초광대역(UWB) 기술 적용한 것만	무선설비규칙 101조
	24~26.5GHz	100mW 이하		
	57-66GHz (용도 미지정 무선기기)	100mW (무지향성 안테나 사용)		
	71-76GHz, 81-86GHz	3mW		
13. 물체감지센서용	10.5-10.55GHz (옥내 사용에 한함)	25mW	자동문 개폐, 차량속도감지기	무선설비규칙 103조
	24.05-24.25GHz	100mW		