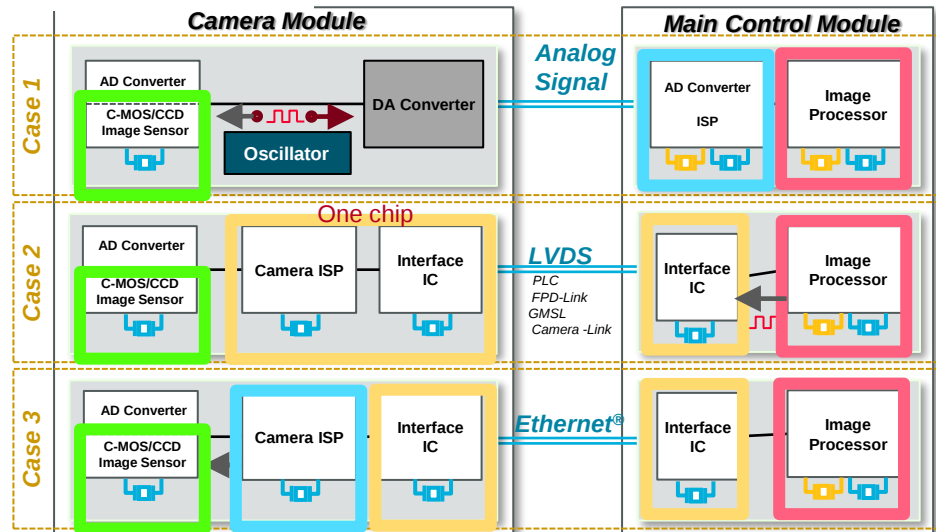
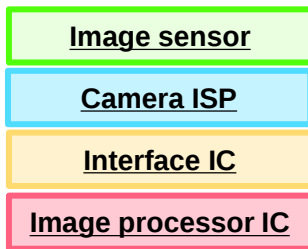




<u>ADAS</u> <u>(Camera)</u>	<u>ADAS</u> <u>(Radar)</u>	<u>TPMS</u>	<u>Remote</u> <u>Keyless</u> <u>Entry (RKE)</u>	<u>Ethernet®</u>
<u>Wireless</u> <u>Charger</u>	<u>NFC (Key)</u>	<u>Instrument</u> <u>Cluster</u> <u>(General)</u>	<u>Instrument</u> <u>Cluster</u> <u>(Digital)</u>	<u>Parking</u> <u>Assist</u> <u>System</u>
<u>Surround</u> <u>View Camera</u> <u>System</u>	<u>Drive</u> <u>Recorder</u>	<u>EV/HEV</u>		



Block Diagram for ADAS Camera



Appearance	Device	Series P/N		SPEC
	Ceramic Resonator	CSTNR-G-C series (4MHz to 7.99MHz) CSTNE-G-C series (8MHz to 13.99MHz) CSTNE-V-C series (14MHz to 20MHz) CSTNE-V-T series (16MHz, 20MHz, 24MHz)	Image Processor	Frequency Tolerance : +/-2700ppm (C series) +/-2300ppm (T series)
	Crystal Unit	XRCGB24M000F3A00R0 XRCGB27M000F3A00R0 XRCGB25M000F3A00R0 XRCGB30M000F5A00R0	Image sensor , Camera ISP Image processor Interface IC , Image Processor Image sensor , Camera ISP	Frequency Tolerance : +/-85ppm, +/-135ppm



Murata proposal parts list for ADAS Camera



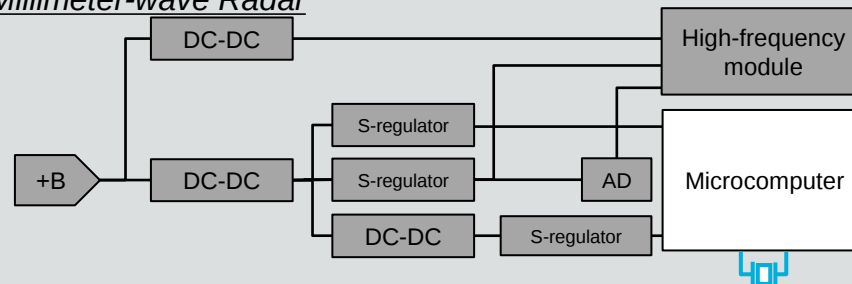
IC information			Murata product information		
IC Function	IC Maker	IC Part Number	Crystal unit Part Number	Frequency [MHz]	Size [mm]
IS (Image sensor)	Pixelpius	PC7080D PCB030K PV3109K	XRCGB27M000F3A00R0	27.0000	2.0 x 1.6 x 0.7
ISP (Image Signal Processor) ISP+IS	OVT OmniVision Technologies	OV495	XRCGB24M000F3A00R0	24.0000	2.0 x 1.6 x 0.7
	Fullhan Microelectronics	FH8310	XRCGE27M000F2A1AR0	27.0000	2.0 x 1.6 x 0.7
	ON Semiconductor	AP0202AT	XRCGB27M000F3A00R0	27.0000	2.0 x 1.6 x 0.7
	Pixelpius	PI6008K	XRCGB27M000F3A00R0	27.0000	2.0 x 1.6 x 0.7
	GEO Semiconductor	GW4100	XRCGB27M000F3A00R0	27.0000	2.0 x 1.6 x 0.7
	Ambarella	CV25	XRCGB24M000F3A00R0	24.0000	2.0 x 1.6 x 0.7
	Sony	ISX016	XRCGB27M000F3A00R0	27.0000	2.0 x 1.6 x 0.7
Interface/FPD link III/ Deserializer	Texas Instruments	DS90UB954	XRCGB25M000F3A00R0	25.0000	2.0 x 1.6 x 0.7
Interface/GMSL2	Maxim Integrated	MAX9295 MAX9296 MAX96716 MAX96717	XRCGB25M000F3A01R0	25.0000	2.0 x 1.6 x 0.7
Interface/Ethernet®	Link to Ethernet® page				
Image Processor	Horizon Robotics	Journey2	XRCGB24M000F2A01R0	24.0000	2.0 x 1.6 x 0.7



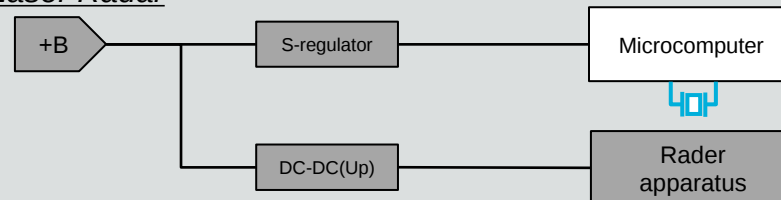
Block Diagram for Millimeter-wave Radar & Laser Radar



Millimeter-wave Radar



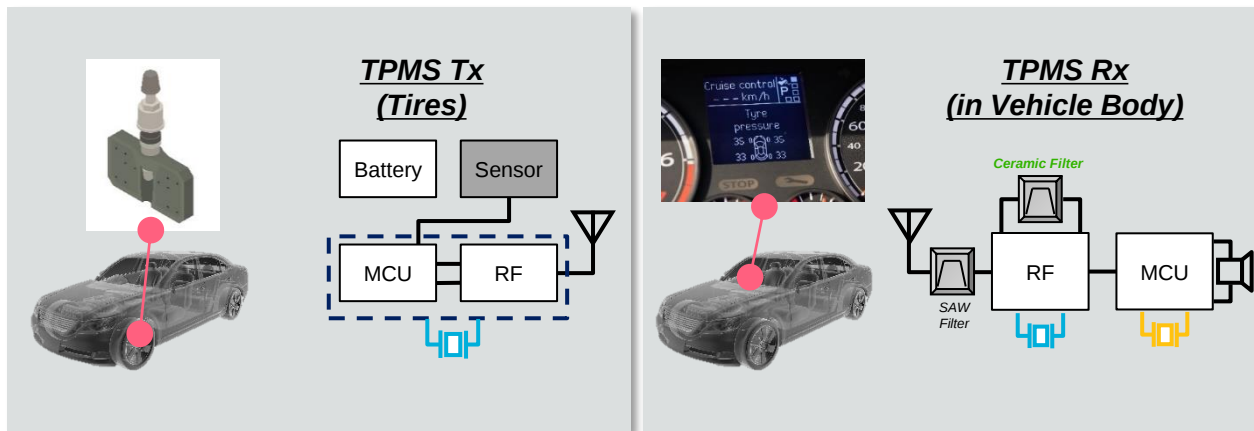
Laser Radar



Appearance	Device	Series P/N	SPEC
	Crystal Unit	Representative P/N <u>XRCGB30M000F5A00R0</u> (for MCU) <u>XRCGB40M000F5A00R0</u> (for MCU)	Frequency Tolerance : +/-135ppm



Block Diagram for TPMS



Appearance	Device	Series P/N	SPEC
 	Ceramic Resonator	<u>CSTNR-G-C</u> series (4MHz to 7.99MHz) <u>CSTNE-G-C</u> series (8MHz to 13.99MHz) <u>CSTNE-V-C</u> series (14MHz to 20MHz) <u>CSTNE-V-T</u> series (16MHz, 20MHz, 24MHz)	Frequency Tolerance : +/-2700ppm (C series) +/-2300ppm (T series)
 	Crystal Unit	<u>Representative P/N</u> <u>XRCGB26M000F3A00R0</u> (for TPMS_Tx/Rx)	Frequency Tolerance : +/-85ppm
	Battery	<u>CR Heat-resistant (W)</u> series	Operating Temperature Range : -40°C to 125°C



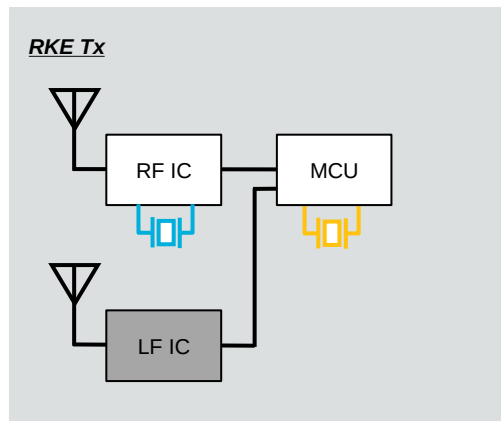
Murata proposal parts list for TPMS



IC information		Murata product information		
IC Maker	IC Part Number	Crystal unit Part Number	Frequency [MHz]	Size [mm]
Infineon Technologies	SP40 SP47	<u>XRCGE26M000FBA2AR0</u>	26.0000	2.0 x 1.6 x 0.7
NXP Semiconductors	FXTH87xxx	<u>XRCGB26M000F3A00R0</u>	26.0000	2.0 x 1.6 x 0.7
Melexis	MLX91804	<u>XRCGB26M000F3A00R0</u>	26.0000	2.0 x 1.6 x 0.7
Senasic	SNP601 SNP701 SNP705H SNP729 SNP739	<u>XRCGB24M000F3A00R0</u>	24.0000	2.0 x 1.6 x 0.7
AutoChips	AC5111 AC51xx	<u>XRCGE26M000FBA1BR0</u>	26.0000	2.0 x 1.6 x 0.7



Block Diagram for Remote Keyless Entry Tx



Appearance	Device	Series P/N	SPEC
 	Ceramic Resonator	CSTNR-G-C series (4MHz to 7.99MHz) CSTNE-G-C series (8MHz to 13.99MHz) CSTNE-V-C series (14MHz to 20MHz) CSTNE-V-T series (16MHz, 20MHz, 24MHz)	Frequency Tolerance : +/-2700ppm (C series) +/-2300ppm (T series)
 	Crystal Unit	Representative P/N XRCGB27M600F2C00R0 (for RF control)	Frequency Tolerance : +/-60ppm (-30 to 85 °C)



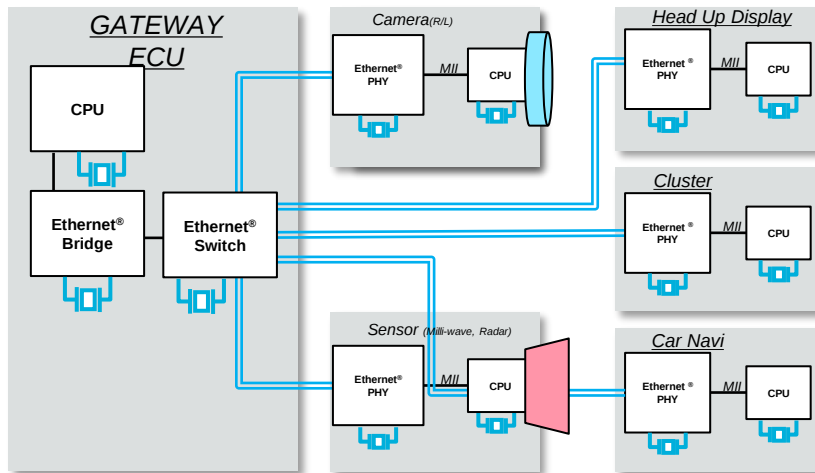
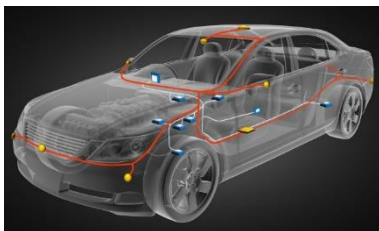
Murata proposal parts list for RKE



IC information		Murata product information		
IC Maker	IC Part Number	Crystal unit Part Number	Frequency [MHz]	Size [mm]
NXP Semiconductors	NCF2961	<u>XRCGE27M600FBA1AR0</u>	27.6000	2.0 x 1.6 x 0.7
Microchip Technology	ATA5835	<u>XRCGB24M305F3A12R0</u>	24.3050	2.0 x 1.6 x 0.7



Block Diagram for Ethernet®



Appearance	Device	Series P/N	SPEC
 	Crystal Unit	<u>XRCGB25M000F3A00R0</u> (for Ethernet® PHY) <u>XRCGB-F-A series</u> (24MHz to 48MHz, for CPU)	Frequency Tolerance : +/-85ppm



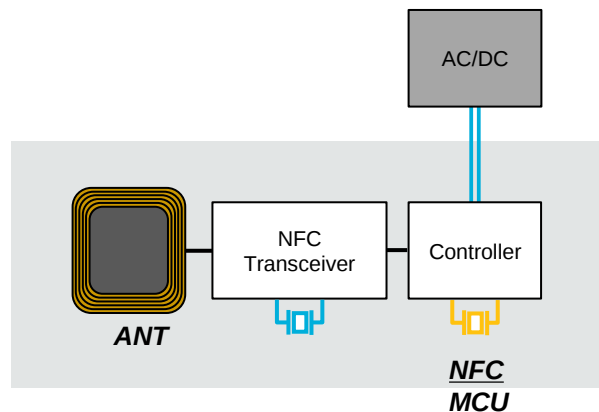
Murata proposal parts list for Ethernet®



IC information			Murata product information		
IC Function	IC Maker	IC Part Number	Crystal Part number	Frequency [MHz]	Size [mm]
PHY	Marvell Semiconductor	88Q1010 88Q2110 88Q2112	XRCGB25M000F3A00R0	25.0000	2.0 x 1.6 x 0.7
	Microchip Technology	KSZ8061 LAN8770 LAN8672	XRCGB25M000F3A00R0	25.0000	2.0 x 1.6 x 0.7
	Broadcom	BCM89083 BCM89103 BCM89107	XRCGB25M000F3A16R0	25.0000	2.0 x 1.6 x 0.7
	NXP Semiconductors	TJA1100 TJA1102	XRCGB25M000F3A01R0	25.0000	2.0 x 1.6 x 0.7
	Realtek	RTL9000A	XRCGB25M000F3A1AR0	25.0000	2.0 x 1.6 x 0.7
	Texas Instruments	DP83TC811	XRCGB25M000F3A00R0	25.0000	2.0 x 1.6 x 0.7
SWITCH	Marvell Semiconductor	88Q5050 88Q5054 88Q5040 88Q5072 88Q6113	XRCGB25M000F3A00R0	25.0000	2.0 x 1.6 x 0.7
	NXP Semiconductors	SJA1105	XRCGB25M000F3A01R0	25.0000	2.0 x 1.6 x 0.7
Ethernet® BRIDGE	Toshiba Electronic Devices & Storage Corporation	TC9560	XRCGE20M000F3A1BR0	20.0000	2.0 x 1.6 x 0.7
		TC9562	XRCGB25M000F3A00R0	25.0000	2.0 x 1.6 x 0.7



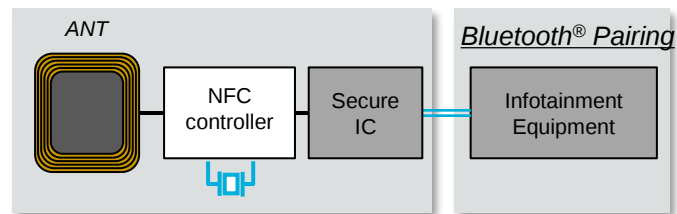
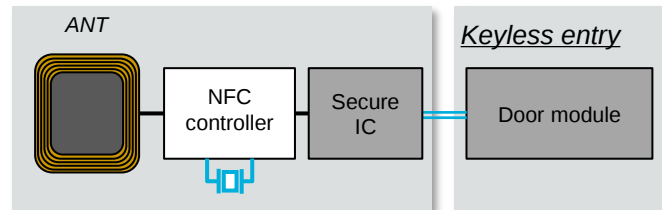
Block Diagram for Wireless charger



Appearance	Device	Series P/N	SPEC
	Ceramic Resonator	CSTNE8M00G55A000R0	Frequency Tolerance : +/-8000ppm
	Crystal Unit	Representative P/N XRCGB27M120F3A00R0 (for NFC Transceiver)	Frequency Tolerance : +/-85ppm



Block Diagram for NFC pairing



Appearance	Device	Series P/N	SPEC
	Crystal Unit	<u>XRCGB27M120F3A00R0</u>	Frequency Tolerance : +/-85ppm



Murata proposal parts list for NFC/Wireless charger

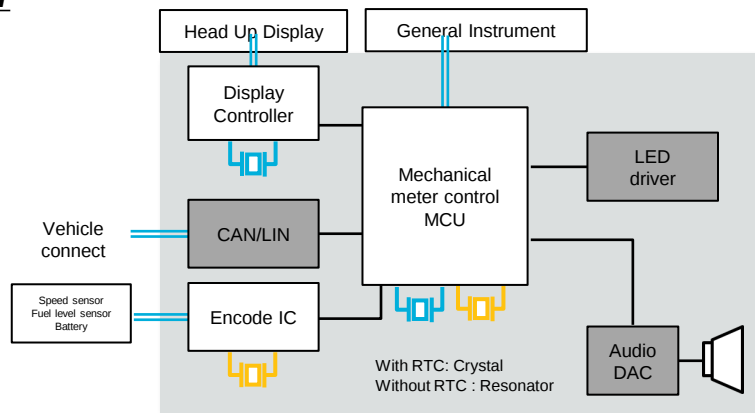


IC information		Murata product information		
IC Maker	IC Part Number	Crystal unit Part Number	Frequency [MHz]	Size [mm]
NXP Semiconductors	MCF3340	<u>XRCGB27M120F3A00R0</u>	27.1200	2.0 x 1.6 x 0.7



Block Diagram for General Instrument Cluster

General Instrument Cluster

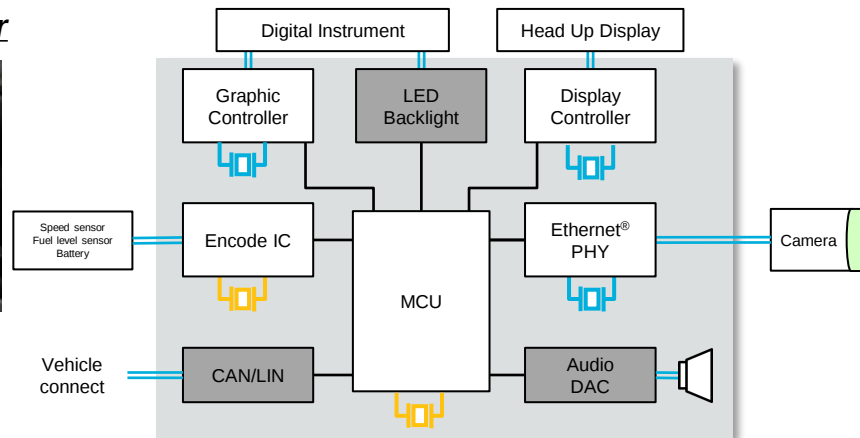


Appearance	Device	Series P/N	SPEC
	Ceramic Resonator	CSTNR-G-C series (4MHz to 7.99MHz) CSTNE-G-C series (8MHz to 13.99MHz) CSTNE-V-C series (14MHz to 20MHz) CSTNE-V-T series (16MHz, 20MHz, 24MHz)	Frequency Tolerance : +/-2700ppm (C series) +/-2300ppm (T series)
	Crystal Unit	XRCGB-F-A series (24MHz to 48MHz)	Frequency Tolerance : +/-85ppm, +/-135ppm
	Piezoelectric Sounders	PKLCS1212E24A0-R1 PKLCS1212E40A1-R1	SPL 80dB(Typ.) @10cm, ±1.5Vo-p square wave SPL 84dB(Typ.) @10cm, ±1.5Vo-p square wave
	Piezoelectric Sounders	PKMCS1818E20A0-R1	SPL 100dB(Typ.) @10cm, +12Vo-p square wave



Block Diagram for Digital Instrument Cluster

Digital Instrument Cluster



Appearance	Device	Series P/N	SPEC
 	Ceramic Resonator	<u>CSTNR-G-C</u> series (4MHz to 7.99MHz) <u>CSTNE-G-C</u> series (8MHz to 13.99MHz) <u>CSTNE-V-C</u> series (14MHz to 20MHz) <u>CSTNE-V-T</u> series (16MHz, 20MHz, 24MHz)	Frequency Tolerance : +/-2700ppm (C series) +/-2300ppm (T series)
 	Crystal Unit	<u>XRCGB-F-A</u> series (24MHz to 48MHz)	Frequency Tolerance : +/-85ppm, +/-135ppm
 	Piezoelectric Sounders	<u>PKLCS1212E24A0-R1</u> <u>PKLCS1212E40A1-R1</u>	SPL 80dB(Typ.) @10cm, ±1.5Vo-p square wave SPL 84dB(Typ.) @10cm, ±1.5Vo-p square wave
 	Piezoelectric Sounders	<u>PKMCS1818E20A0-R1</u>	SPL 100dB(Typ.) @10cm, +12Vo-p square wave



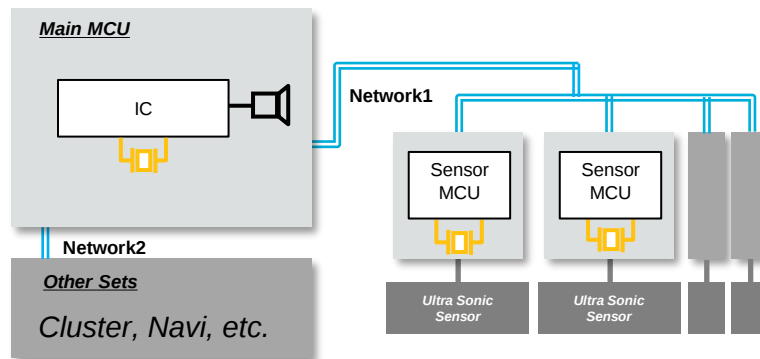
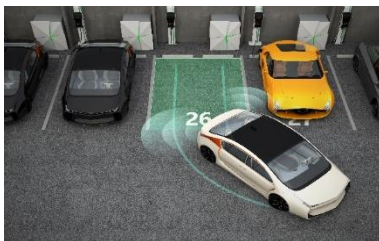
Murata proposal parts list for Digital Instrument Cluster



IC information		Murata product information		
IC Maker	IC Part Number	Crystal unit Part Number	Frequency [MHz]	Size [mm]
NXP Semiconductors	i.MX8QXP8QM	<u>XRCGB24M000F3A00R0</u>	24.0000	2.0 x 1.6 x 0.7



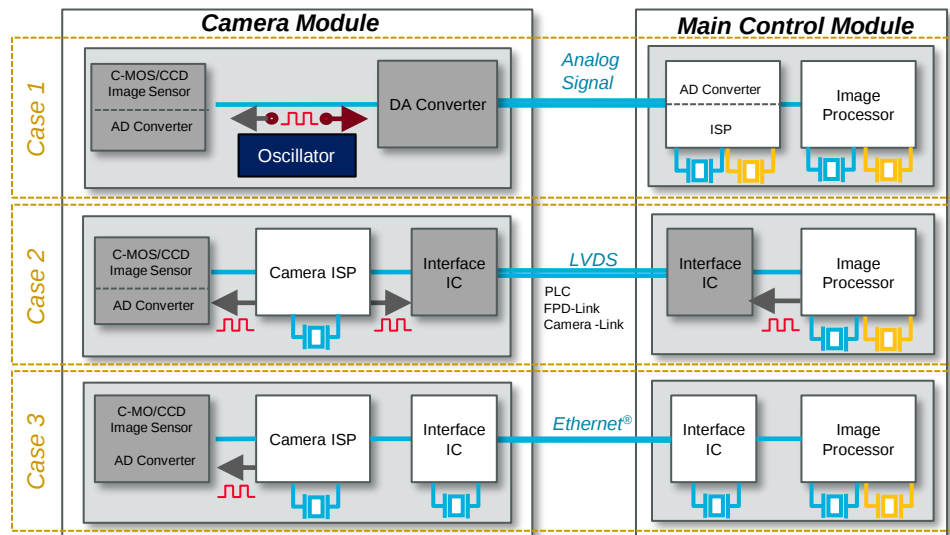
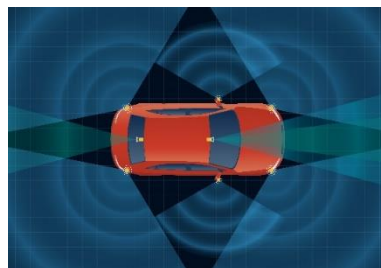
Block Diagram for Parking Assist System



Appearance	Device	Series P/N	SPEC
	Ceramic Resonator (Standard Tol.)	<u>CSTCR-G-B</u> series (4MHz to 7.99MHz) <u>CSTNE-G-A</u> series (8MHz to 13.99MHz) <u>CSTNE-V-C</u> series (14MHz to 20MHz)	Frequency Tolerance : +/-8000ppm
	Ceramic Resonator (Tight Tol.)	<u>CSTNR-G-C</u> series (4MHz to 7.99MHz) <u>CSTNE-G-C</u> series (8MHz to 13.99MHz) <u>CSTNE-V-C</u> series (14MHz to 20MHz) <u>CSTNE-V-T</u> series (16MHz, 20MHz, 24MHz)	Frequency Tolerance : +/-2700ppm (C series) +/-2300ppm (T series)



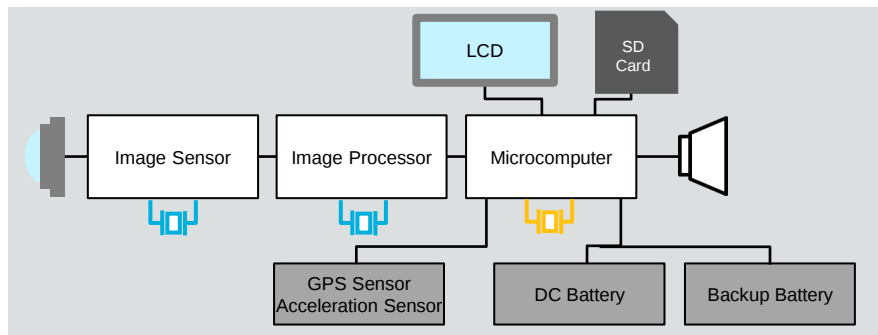
Block Diagram for Surround View Camera System



Appearance	Device	Series P/N	SPEC
	Ceramic Resonator	<u>CSTNR-G-C</u> series (4MHz to 7.99MHz) <u>CSTNE-G-C</u> series (8MHz to 13.99MHz) <u>CSTNE-V-C</u> series (14MHz to 20MHz) <u>CSTNE-V-T</u> series (16MHz, 20MHz, 24MHz)	Frequency Tolerance : +/-2700ppm (C series) +/-2300ppm (T series)
	Crystal Unit	Representative P/N <u>XRCGB25M000F3A00R0</u> (for Ethernet®) <u>XRCGB27M000F3A00R0</u> (for Camera ISP)	Frequency Tolerance : +/-85ppm



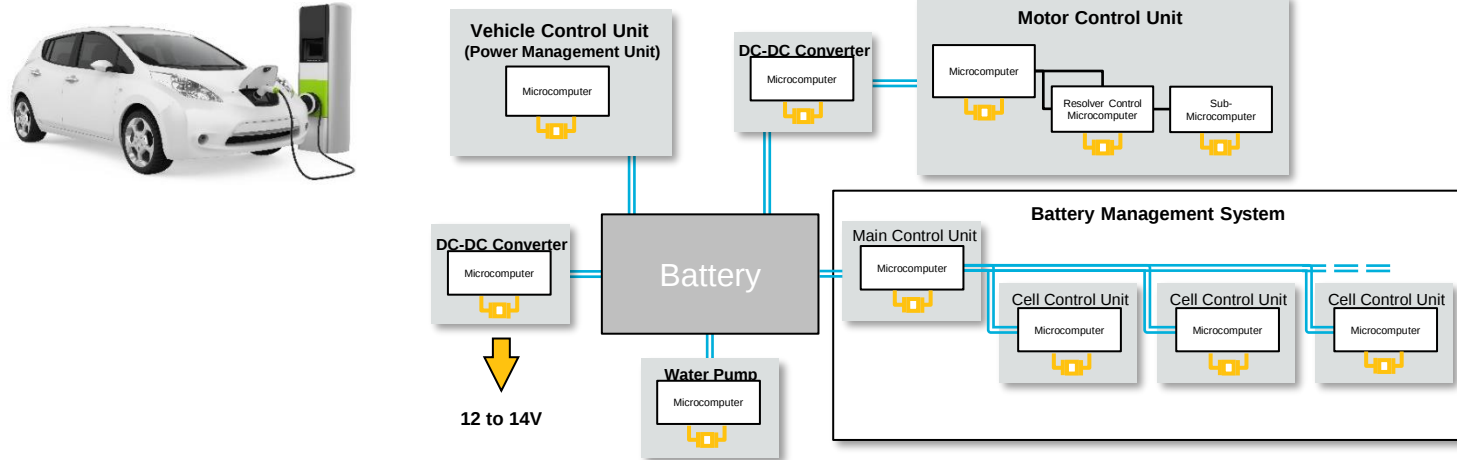
Block Diagram for Drive Recorder



Appearance	Device	Series P/N	SPEC
 	Ceramic Resonator	<u>CSTNR-G-C</u> series (4MHz to 7.99MHz) <u>CSTNE-G-C</u> series (8MHz to 13.99MHz) <u>CSTNE-V-C</u> series (14MHz to 20MHz) <u>CSTNE-V-T</u> series (16MHz, 20MHz, 24MHz)	Frequency Tolerance : +/-2700ppm (C series) +/-2300ppm (T series)
 	Crystal Unit	<i>Representative P/N</i> <u>XRCGB24M000F3A00R0</u> <u>XRCGB27M000F3A00R0</u> (for Image Sensor/Processor)	Frequency Tolerance : +/-85ppm
 	Piezoelectric Sounders	<u>PKLCS1212E24A0-R1</u> <u>PKLCS1212E40A1-R1</u>	SPL 80dB(Typ.) @10cm, ±1.5Vo-p square wave SPL 84dB(Typ.) @10cm, ±1.5Vo-p square wave
 	Piezoelectric Sounders	<u>PKMCS1818E20A0-R1</u>	SPL 100dB(Typ.) @10cm, +12Vo-p square wave



Block Diagram for EV/HEV



Appearance	Device	Series P/N	SPEC
	Ceramic Resonator	<u>CSTNR-G-C</u> series (4MHz to 7.99MHz) <u>CSTNE-G-C</u> series (8MHz to 13.99MHz) <u>CSTNE-V-C</u> series (14MHz to 20MHz) <u>CSTNE-V-T</u> series (16MHz, 20MHz, 24MHz)	Frequency Tolerance : +/-2700ppm (C series) +/-2300ppm (T series)