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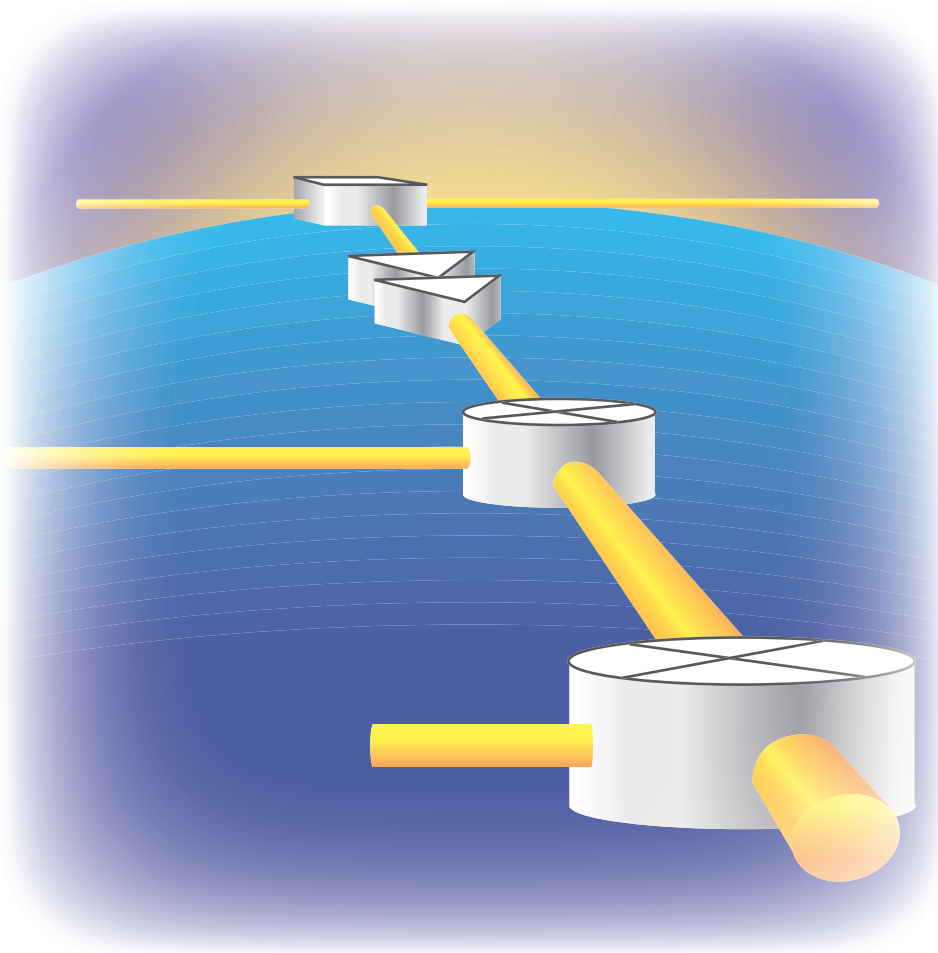
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RF AND MICROWAVE DEVICES SYSTEM BLOCK DIAGRAMS



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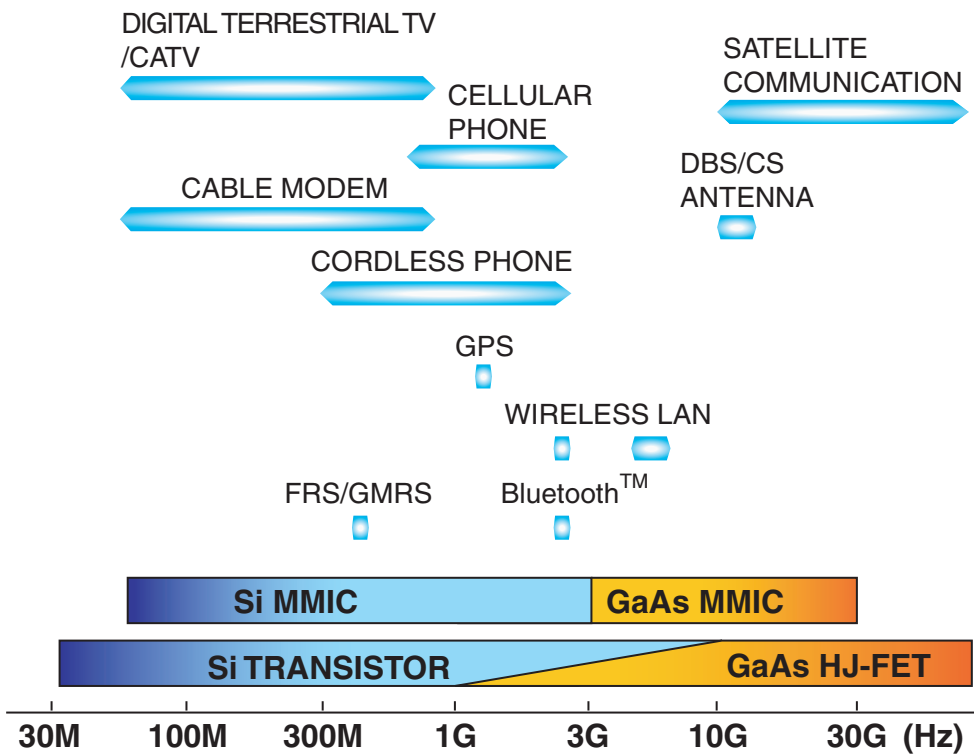
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1. INTRODUCTION

The Microwave Devices are used for each system as shown in Figure 1. This catalog explains the Microwave devices by each Microwave block diagram for the application system.

The basic block diagram is indicated to Figure 2.

Figure 1 Example of the Microwave application systems



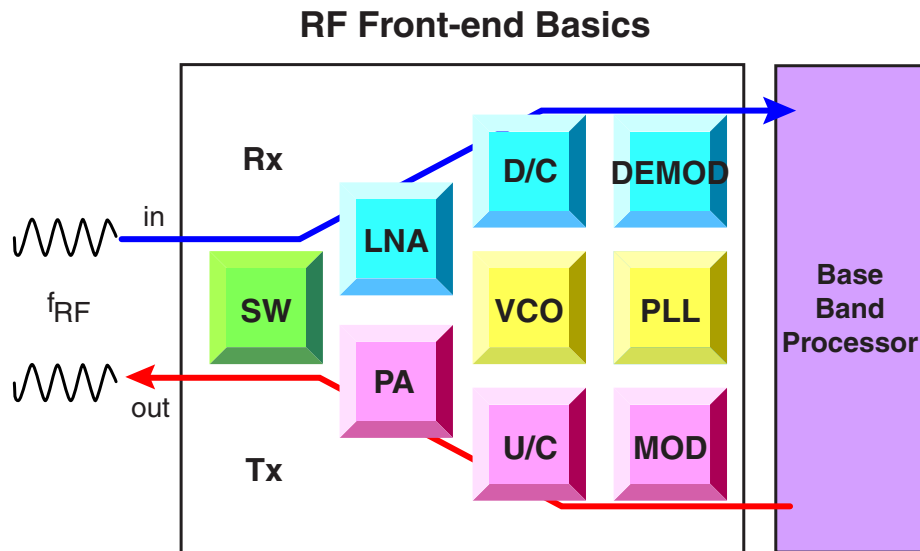
The mark <R> shows major revised points.

The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

1-1. Basic RF Blocks

The basic RF block consists of nine function blocks as shown in the next figure.

Figure 2 Microwave Basic Blocks



1. SW (Switch)
2. LNA (Low Noise Amplifier)
3. PA (Power Amplifier)
4. D/C (Down-converter)
5. VCO (Voltage Controlled Oscillator)
6. U/C (Up-converter)
7. DEMOD (Demodulator)
8. PLL (Phase Locked Loop)
9. MOD (Modulator)

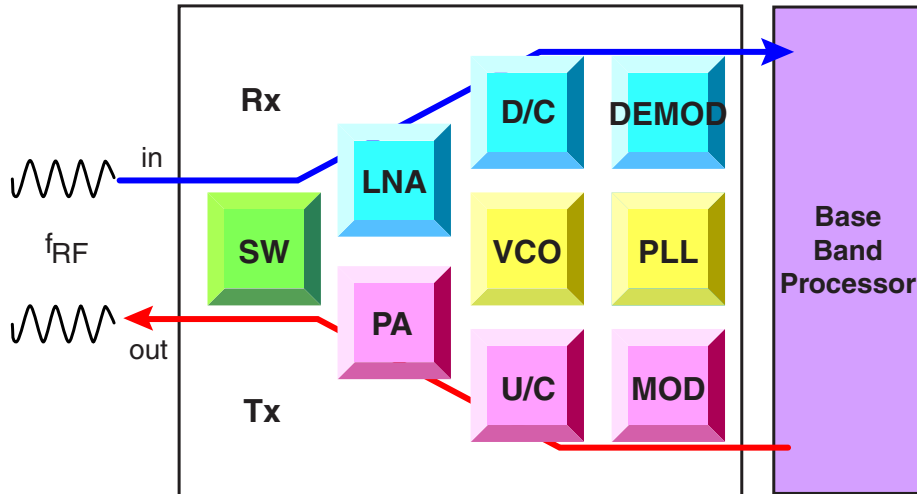
The application circuits and their parameters are for reference only and are not intended for use in actual design-ins.

2. EXPLANATION OF THE RF AND MICROWAVE DEVICES

Explain the devices by the microwave block diagram for following application systems.

2-1. Mobile Communication System Digital Cellular Phone

RF Front-end Basics



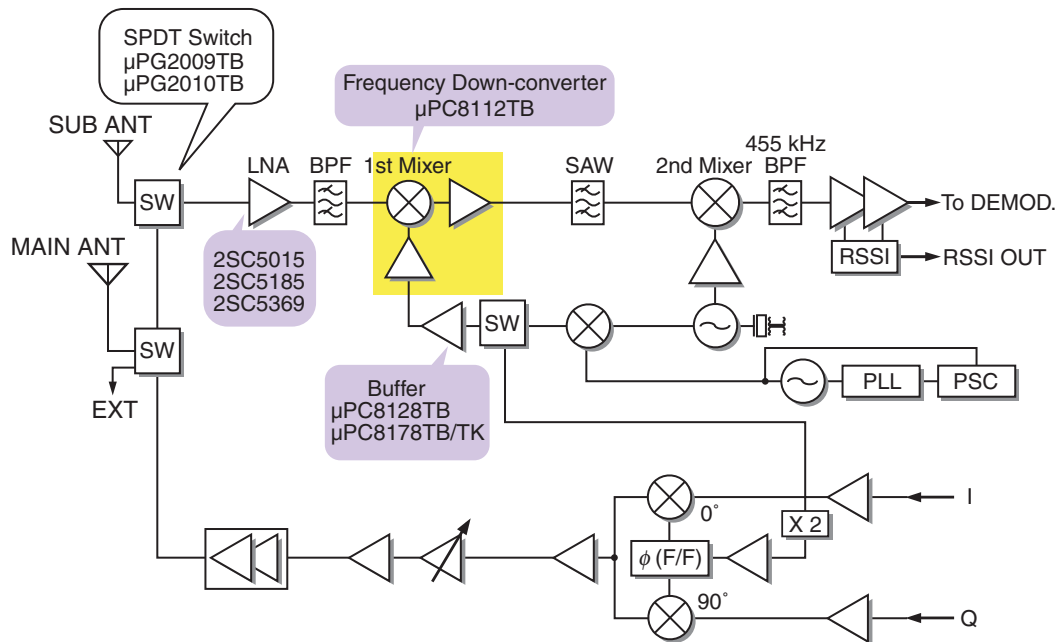
Recommended device list

Block	Function	Type Name	Feature
LNA	Discrete Tr.	2SC5015(NE68518)	Si Bipolar Tr. ($f_T = 12$ GHz)
		2SC5185(NE68718) etc.	Si Bipolar Tr. ($f_T = 15.5$ GHz)
		2SC5369(NE696M01)	Si Bipolar Tr. ($f_T = 14$ GHz)
D/C	Down-converter	μ PC8112TB	6-pin Super Minimold
DEMOD	2nd Mixer + RSSI	-	-
PLL	Dual PLL	-	-
VCO	Oscillator + Buffer	μ PA8xx Series	Twin Tr.
	Buffer	μ PC8128TB μ PC8178TB/TK	Low Current Consumption
U/C + MOD	I/Q Modulator	-	-
SW	SPDT SW	μ PG2009TB	GaAs SW IC, 6-pin Super Minimold
		μ PG2010TB	

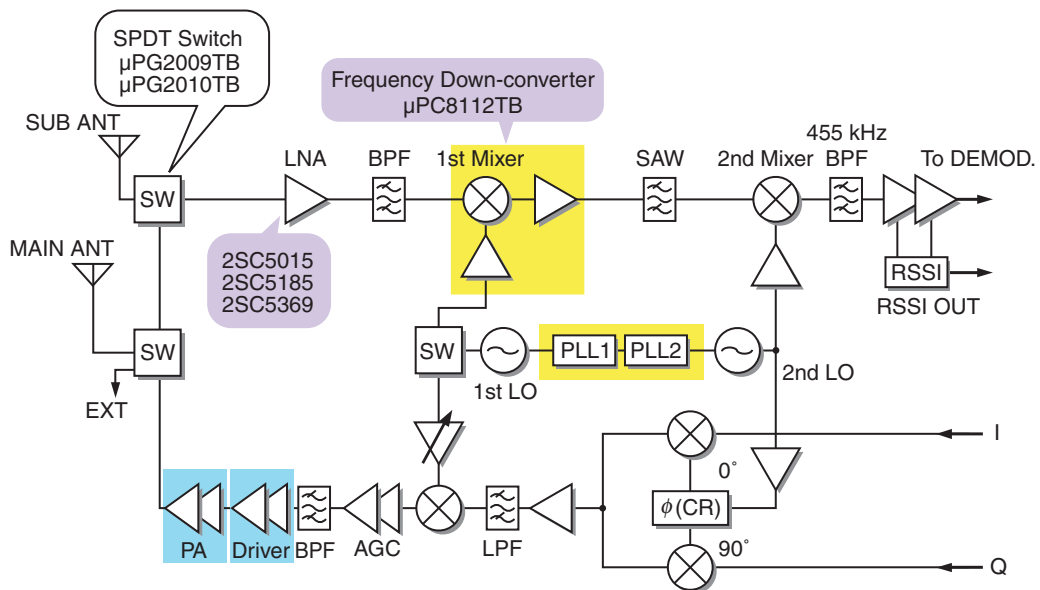
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Remark The devices listed in the above table are merely examples. The product recommendation may change depending on the requirements of each system's design.

System configuration example 1
Digital Cellular Phone
(RF Modulation System)

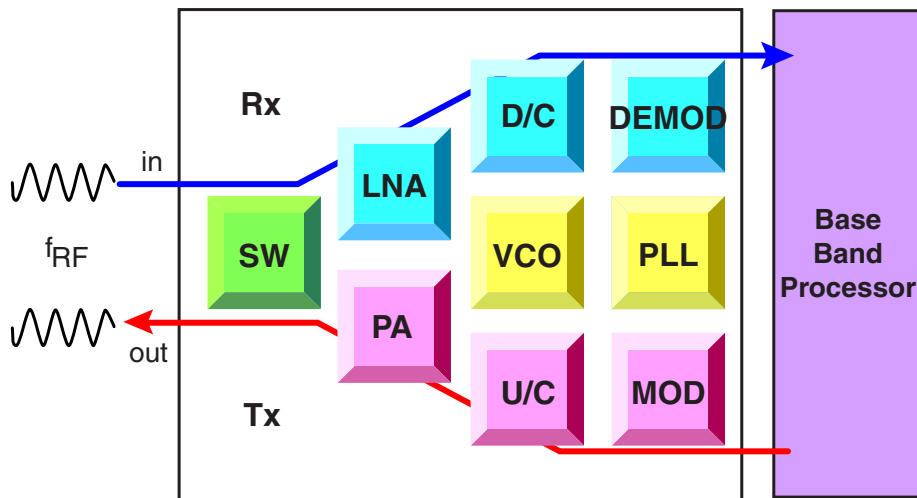


System configuration example 2
Digital Cellular Phone
(IF Modulation System)



W-CDMA

RF Front-end Basics



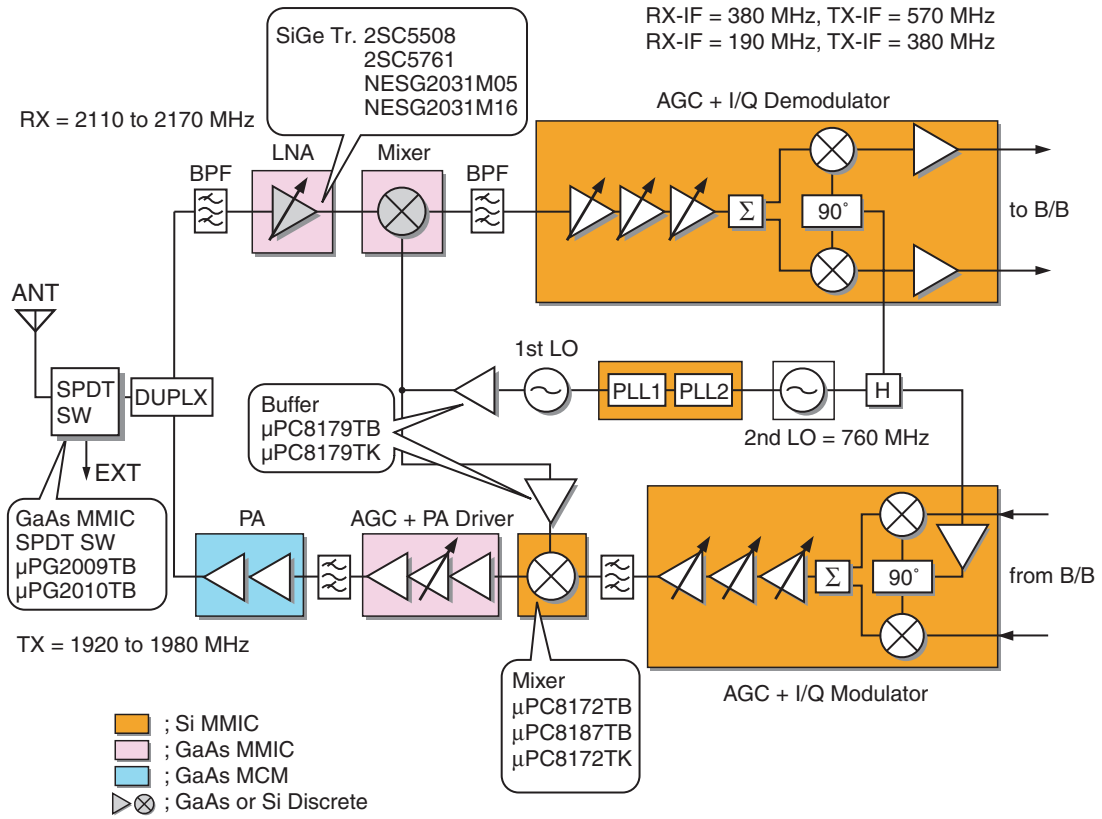
Recommended device list

Block	Function	Type Name	Feature
LNA	Discrete Tr.	2SC5508(NE662M04)	Si Bipolar Tr. ($f_T = 25$ GHz)
		2SC5761(NESG2030M04)	SiGe HBT
		NESG2031M05	
		NESG2031M16	
D/C	Down-converter	-	-
DEMOD	IF AGC + I/Q Demodulator	-	-
PLL	Dual PLL	-	-
VCO	Oscillator + Buffer	μ PA8xx Series	Twin Tr.
	Buffer	μ PC8179TB μ PC8179TK	-
U/C	Up-converter	μ PC8172TB μ PC8187TB	6-pin Super Minimold
		μ PC8172TK	6-pin Lead-less Minimold (1511)
		-	-
MOD	IF AGC + I/Q Modulator	-	-
SW	SPDT SW	μ PG2009TB, μ PG2010TB	GaAs SW IC, 6-pin Super Minimold

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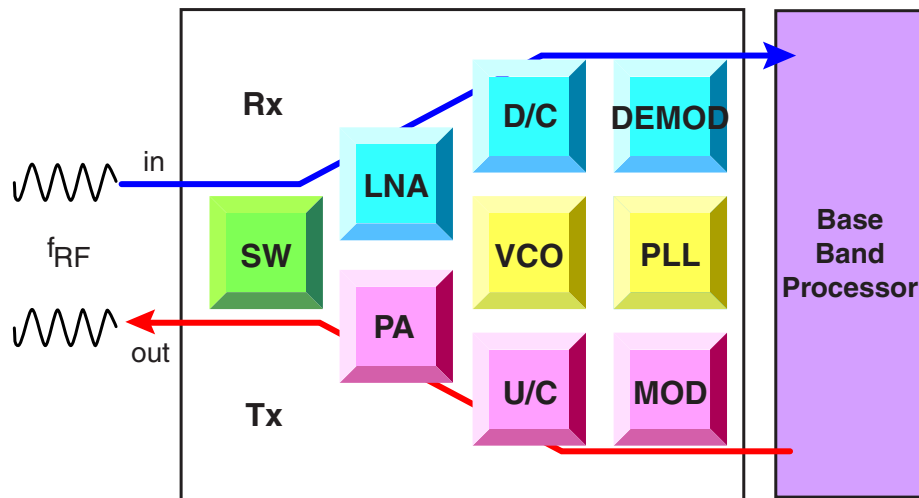
Remark The devices listed in the above table are merely examples. The product recommendation may change depending on the requirements of each system's design.

System configuration example
W-CDMA transceiver



N-CDMA

RF Front-end Basics



Recommended device list

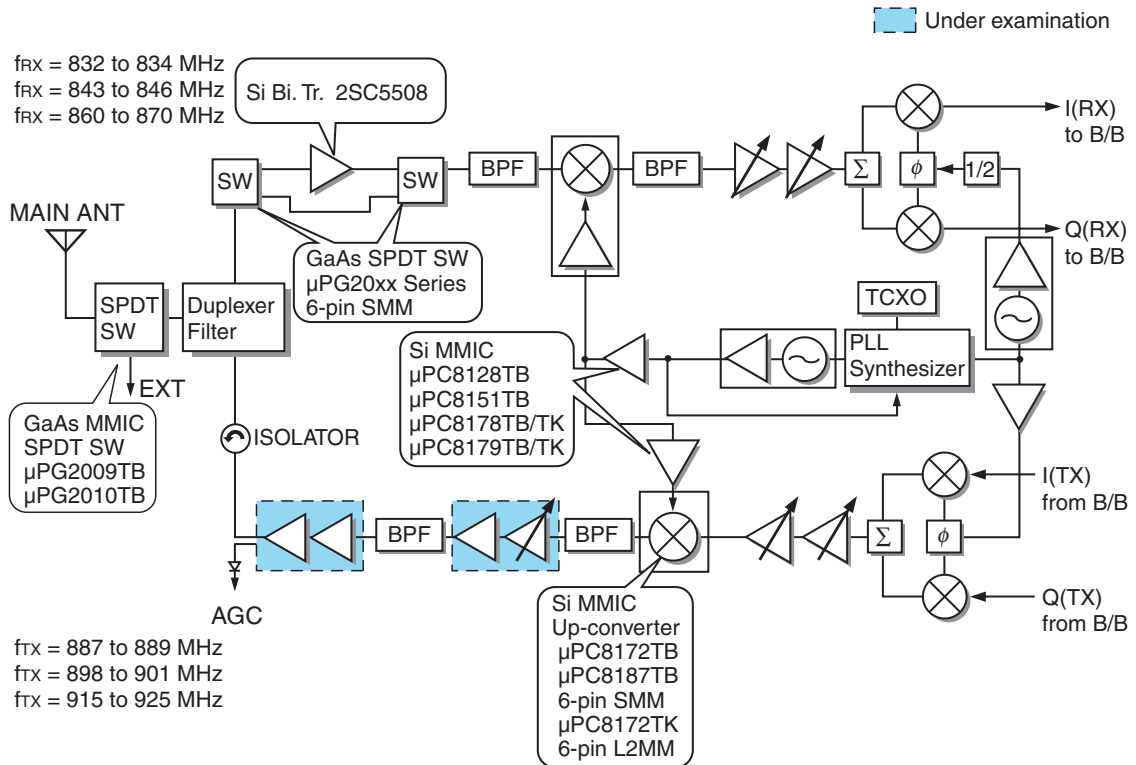
Block	Function	Type Name	Feature
LNA	Discrete Tr.	2SC5508(NE662M04)	Si Bipolar Tr. ($f_T = 25$ GHz)
D/C	Down-converter	-	-
DEMOD	IF AGC + I/Q Demodulator	-	-
PLL	Dual PLL	-	-
VCO	Oscillator + Buffer	μ PA8xx Series	Twin Tr.
	Buffer	μ PC8128TB μ PC8151TB μ PC8178TB/TK μ PC8179TB/TK	-
U/C + MOD	Up-converter	μ PC8172TB μ PC8187TB	6-pin Super Minimold
		μ PC8172TK	6-pin Lead-less Minimold (1511)
PA	-	-	-
SW	SPDT SW	μ PG2009TB μ PG2010TB	GaAs SW IC
	SP3T SW	μ PG2031TQ μ PG2404T6Q	GaAs SW IC

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Remark The devices listed in the above table are merely examples. The product recommendation may change depending on the requirements of each system's design.

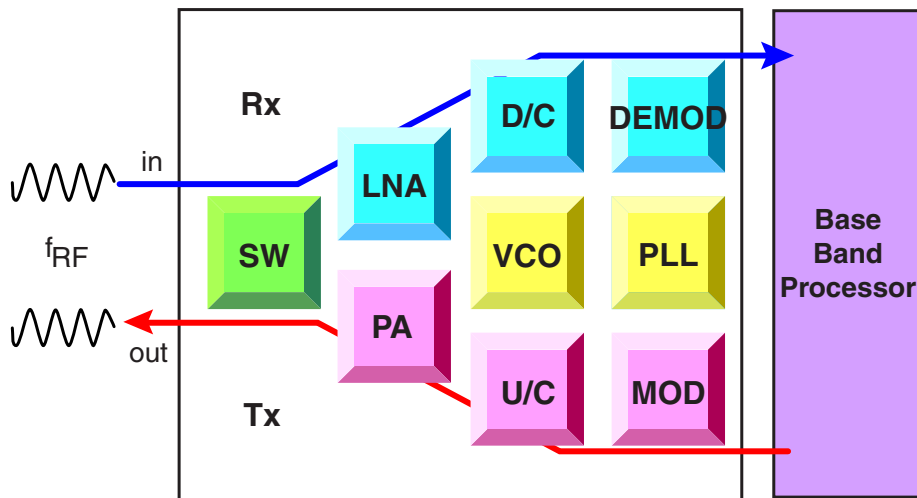
System configuration example N-CDMA transceiver

Li-ion Battery Pack 1cell: 3.6 V(TYP.)



PHS (Digital Cordless Phone)

RF Front-end Basics



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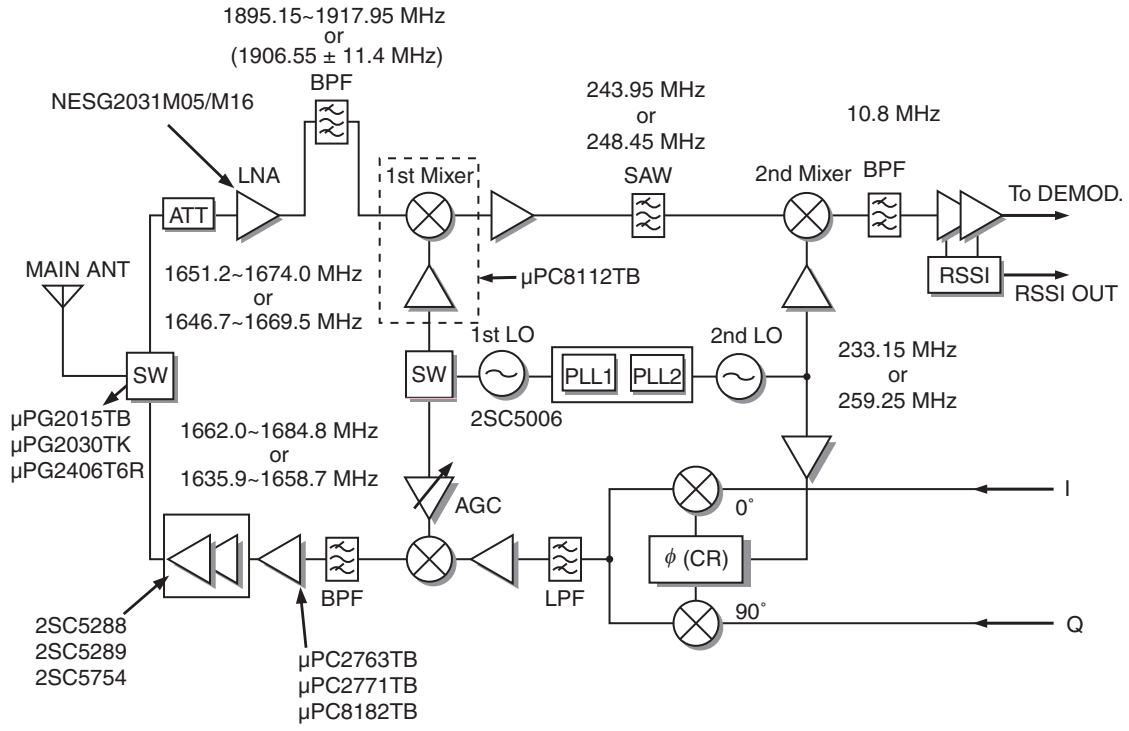
Recommended device list

Block	Function	Type Name	Feature
LNA	SiGe HBT	NESG2031M05/M16	High Gain, Low Noise
D/C	Down-converter	μ PC8112TB	6-pin Super Minimold
LNA + D/C	LNA + Down-converter	-	-
DEMOD	IF D/C + RSSI	-	-
PLL	Dual PLL Synthesizer	-	-
VCO	Oscillator + Buffer	μ PA8xx Series	Twin Tr.
MOD + U/C	I/Q Modulator + Up-converter	-	-
U/C	Up-converter	μ PC8106TB	6-pin Super Minimold
PA	Discrete Tr.	2SC5288(NE68939) 2SC5289(NE69039) 2SC5754(NE644M04)	Medium Output Power Use Tr.
SW	SPDT SW	μ PG2015TB μ PG2030TK μ PG2406T6R	GaAs SW IC, 6-pin Super Minimold GaAs SW IC, 6-pin Lead-less Minimold (1511) GaAs SW IC, 6-pin TSSON (1010)

Remark The devices listed in the above table are merely examples. The product recommendation may change depending on the requirements of each system's design.

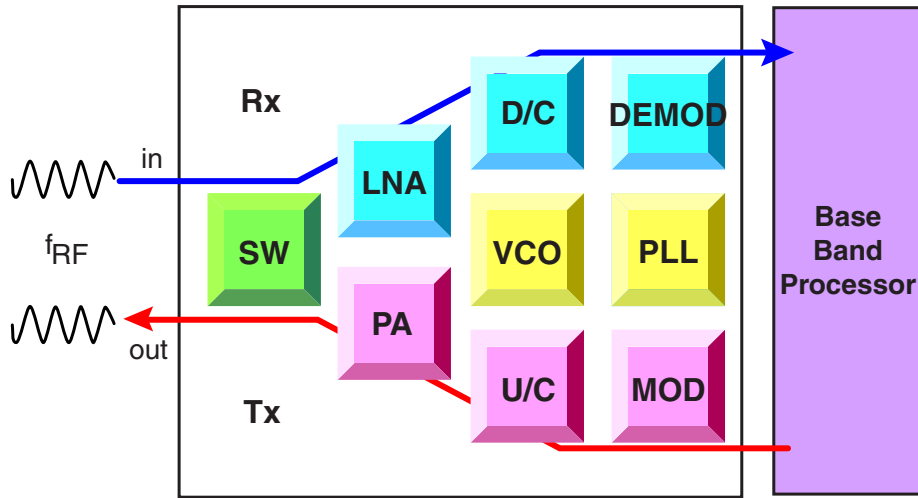
**System configuration example
PHS (Digital Cordless Phone)**

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DECT (Digital Cordless Phone)

RF Front-end Basics



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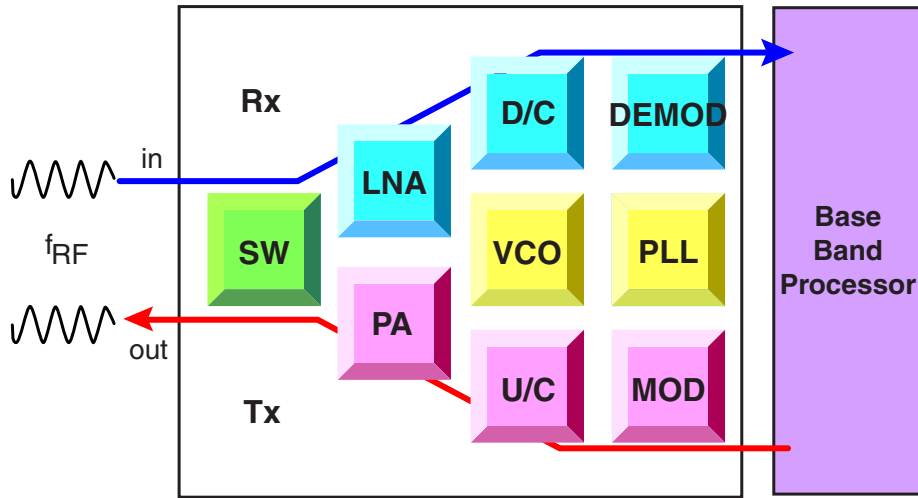
Recommended device list

Block	Function	Type Name	Feature
LNA	Discrete Tr.	2SC5369(NE696M01)	High fr, Low Noise
	HJ-FET	NE3509M04	Low Noise GaAs FET
D/C	Down-converter	μ PC2756TB	6-pin Super Minimold
		μ PC2757TB	
		μ PC2758TB	
		μ PC8112TB	
DEMOD	IF D/C + RSSI	-	-
PLL	Dual PLL Synthesizer	-	-
VCO	Oscillator + Buffer	μ PA8xx Series	Twin Tr.
MOD (OSC)	Oscillator + Buffer	μ PA8xx Series	Twin Tr.
U/C	Up-converter	μ PC8106TB	6-pin Super Minimold
PA	Discrete Tr.	2SC5288(NE68939)	Medium Output Power Use Tr.
		2SC5289(NE69039)	
		2SC5754(NE664M04)	
SW	SPDT SW	μ PG2179TB	GaAs SW IC, 6-pin Super Minimold
		μ PG2030TK	GaAs SW IC, 6-pin Lead-less Minimold (1511)
		μ PG2406T6R	GaAs SW IC, 6-pin TSSON (1010)

Remark The devices listed in the above table are merely examples. The product recommendation may change depending on the requirements of each system's design.

CT-2 (Digital Cordless Phone)

RF Front-end Basics



Recommended device list

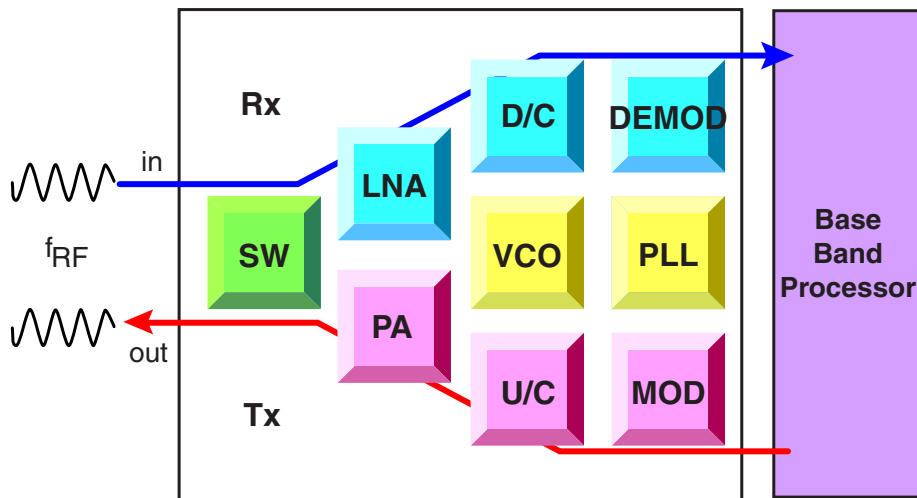
Block	Function	Type Name	Feature
LNA	Discrete Tr.	2SC5369(NE696M01)	High fr, Low Noise
	Low Noise Amplifier	μ PC2749TB	Low Noise
D/C	Down-converter	μ PC8112TB	6-pin Super Minimold
DEMOD	-	-	-
PLL	PLL	-	-
VCO	Oscillator + Buffer	μ PA8xx Series	Twin Tr.
	Buffer	μ PC8151TB μ PC8179TB	Low Current Consumption
MOD	I/Q Modulator	-	-
U/C	Up-converter	μ PC8106TB	6-pin Super Minimold
PA	Medium Output Power Amplifier	μ PC2762TB	6-pin Super Minimold
		μ PC2763TB	
		μ PC2771TB	
		μ PC8182TB	
SW	SPDT SW	μ PG2009TB	GaAs SW IC, 6-pin Super Minimold
		μ PG2010TB	

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Remark The devices listed in the above table are merely examples. The product recommendation may change depending on the requirements of each system's design.

GSM (Digital Cellular Phone)

RF Front-end Basics



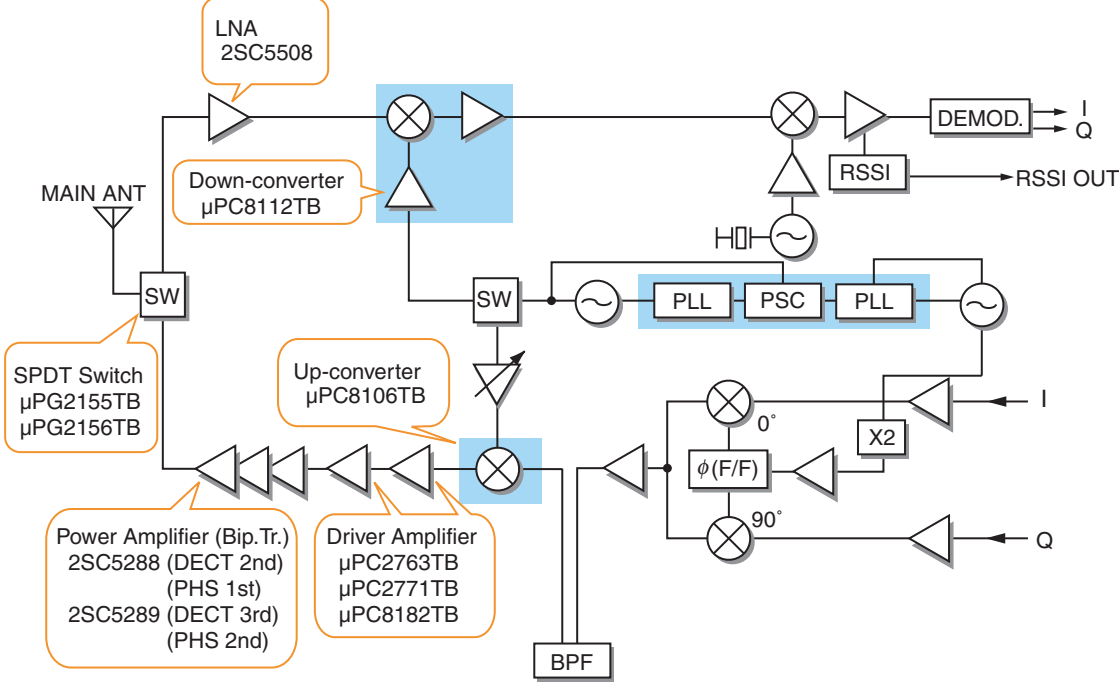
Recommended device list

Block	Function	Type Name	Feature
LNA	Discrete Tr.	2SC5508(NE662M04)	$f_r = 25$ GHz Tr.
D/C	Down-converter	μ PC8112TB	6-pin Super Minimold
DEMOD	I/Q Demodulator	-	-
PLL	Dual PLL	-	-
VCO	Oscillator + Buffer	μ PA8xx Series	Twin Tr.
MOD + U/C	I/Q Modulator	-	-
U/C	Up-converter	μ PC8106TB	6-pin Super Minimold
PA	Driver Amplifier	μ PC2763TB μ PC2771TB μ PC8182TB	6-pin Super Minimold
	Discrete Tr.	2SC5288(NE68939) 2SC5289(NE69039) NE5510279A NE5520379A	Medium Output Power Use Tr.
SW	SPDT SW	μ PG2155TB μ PG2156TB	6-pin Super Minimold

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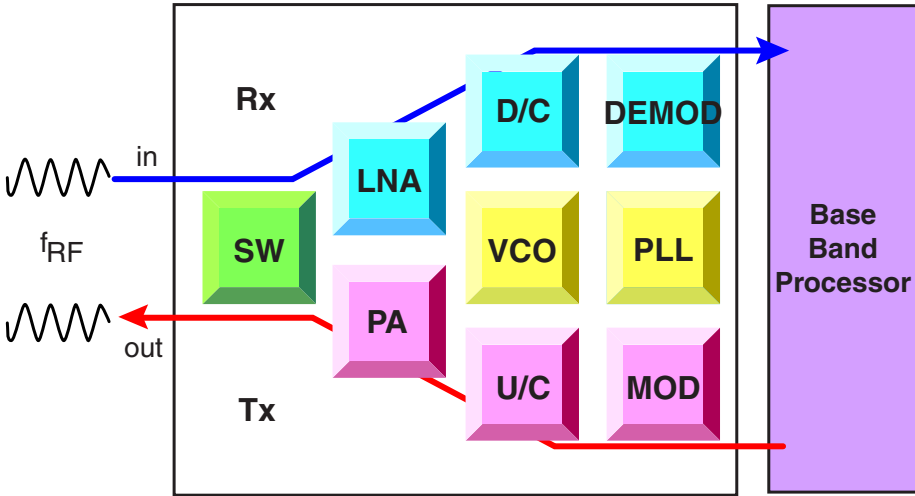
Remark The devices listed in the above table are merely examples. The product recommendation may change depending on the requirements of each system's design.

System configuration example
GSM (Digital Cellular Phone)
(IF Modulation System)



5.8 GHz Digital Cordless Phone

RF Front-end Basics



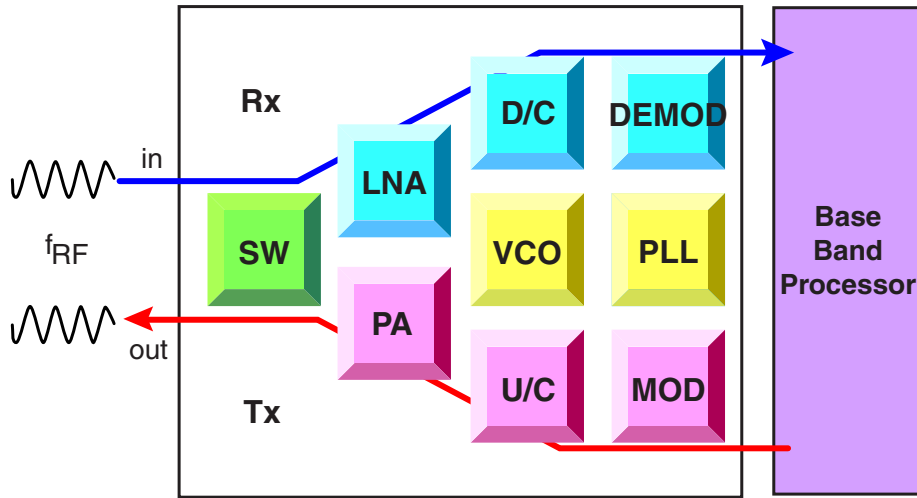
Recommended device list

Block	Function	Type Name	Feature
LNA	Discrete Tr.	2SC5507	Si Bipolar Tr. ($f_T = 25$ GHz)
		2SC5508	
		NESG2021M05/M16	SiGe HBT
		NESG2031M05/M16	
NESG3031M05/M14			
NESG4030M14			
PA	Discrete Tr.	NESG2101M05/M16	SiGe HBT
	PA + Driver	μ PA901TU	SiGe HBT

Remark The devices listed in the above table are merely examples. The product recommendation may change depending on the requirements of each system's design.

900 MHz Cordless Phone (Analog Cordless Phone)

RF Front-end Basics



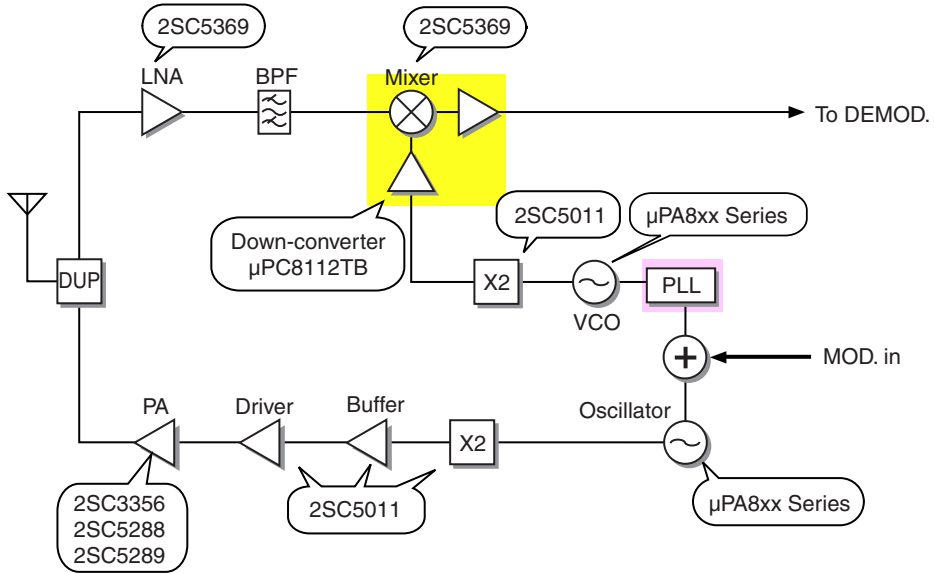
Recommended device list

Block	Function	Type Name	Feature
LNA	Discrete Tr.	2SC4095(NE68039E) 2SC5369(NE696M01) 2SC5507(NE661M04)	High fr, Low Noise
<R>	Down-converter	μ PC8112TB	6-pin Super Minimold
	Discrete Tr.	μ PA8xx Series	Twin Tr. with Different Dice
	PLL	–	–
<R>	Oscillator + Buffer	μ PA8xx Series	Twin Tr. with Different Dice
	Discrete Tr. (Doubler)	2SC5011(NE85618) etc.	$f_r = 7$ GHz
	Buffer	μ PC8151TB μ PC8179TB	Low Current Consumption
<R>	Oscillator	μ PA8xx Series	Twin Tr. with Different Dice
	Discrete Tr. (Doubler)	2SC5011(NE85618) etc.	$f_r = 7$ GHz
	Discrete Tr.	2SC3356(NE85633) etc. 2SC5288(NE68939) 2SC5289(NE69039)	$f_r = 7$ GHz Medium Output Power Use Tr.
<R>		μ PA8xx Series	Twin Tr. with Different Dice
SW	Duplexer	–	–

Remark The devices listed in the above table are merely examples. The product recommendation may change depending on the requirements of each system's design.

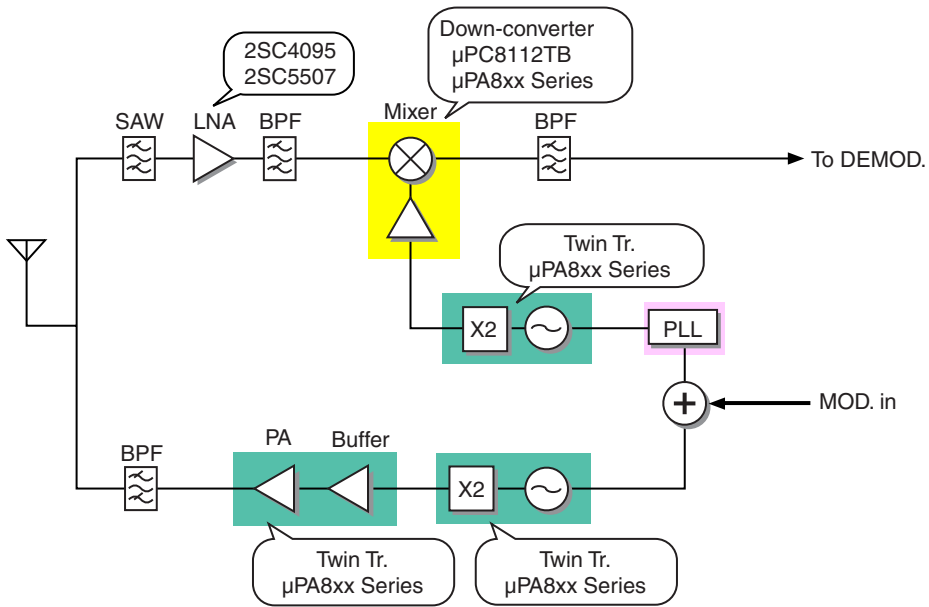
System configuration example 1
900 MHz Cordless Phone (Analog Cordless Phone)

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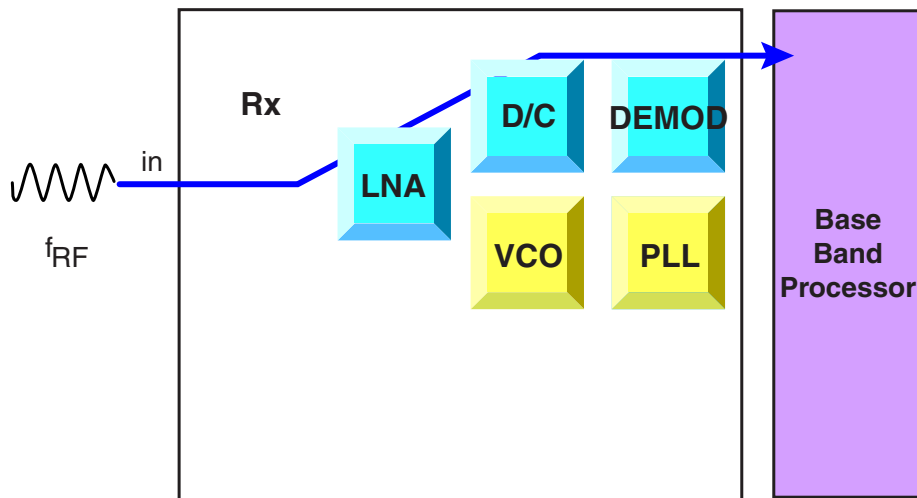
System configuration example 2
900 MHz Cordless Phone (Analog Cordless Phone)

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2-2. Multimedia System Digital TV Tuner / Digital CATV Set-top-box

RF Front-end Basics



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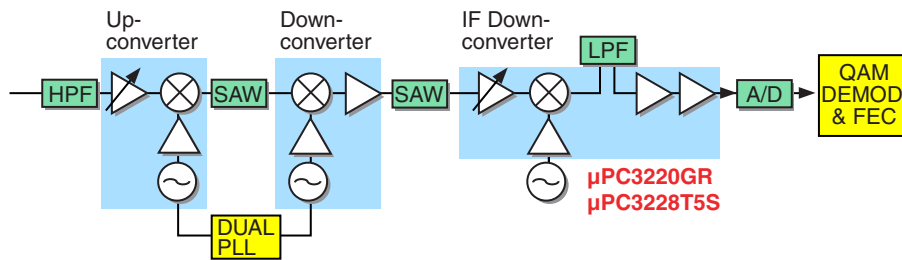
Recommended device list

Block	Function	Type Name	Feature
LNA	Discrete Tr.	2SC3357(NE85634)	Si Tr. Suitable for more than 5-6 V operation Low Distortion, Low Noise
		2SC4536(NE46134)	
		2SC4703(NE46234)	
		2SC5336(NE856M02)	
		2SC5337(NE461M02)	
		2SC5338(NE462M02)	
	MMIC	2SC5754(NE664M04)	Si Tr. Suitable for less than 5-6 V operation Low Distortion, Low Noise
		NESG2101M05/M16	SiGe HBT Suitable for less than 5-6 V operation Low Distortion, Low Noise
		NESG210719	
		NESG210833	
NESG220033/34			
DEMOD	AGC Amplifier + Video Amplifier	μPC2748TB	Si MMIC, Low Noise
		μPC3237TK	SiGe MMIC, Low Noise
		μPD5740T6N	MMIC with pass-through function, Low Noise
D/C + AGC	IF Down-converter	μPC3217GV	Middle-gain Type
		μPC3218GV	High-gain Type
		μPC3219GV, μPC3221GV	Low-gain, High-linearity Type
		μPC3231GV	
D/C + AGC	IF Down-converter	μPC3234GV	High-gain, Low Noise Type
		μPC3220GR	High-gain
		μPC3228T5S	Low Distortion

Remark The devices listed in the above table are merely examples. The product recommendation may change depending on the requirements of each system's design.

System configuration example 1

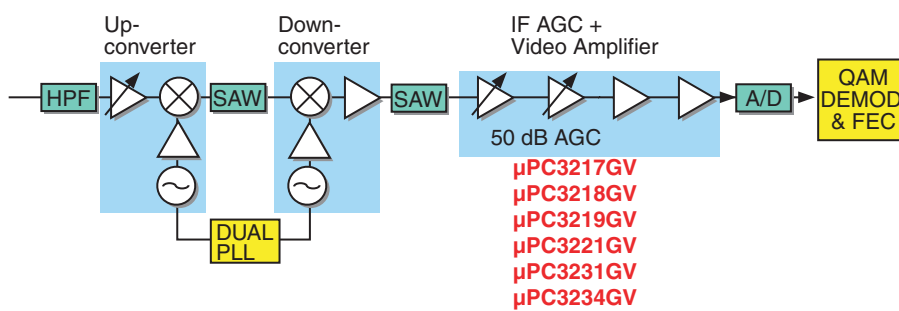
Example of receiver block for digital CATV Set-top-box



System configuration example 2

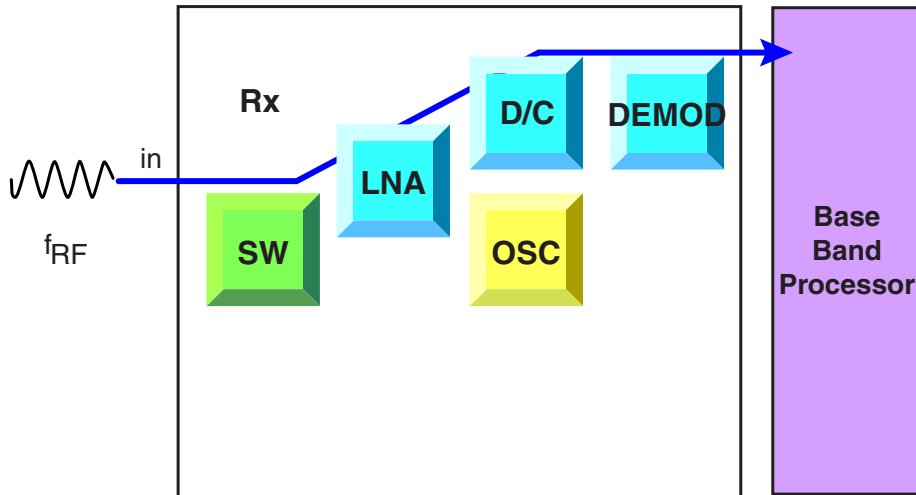
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Example of receiver block for digital CATV Set-top-box



Digital DBS (Satellite Broadcasting)

RF Front-end Basics

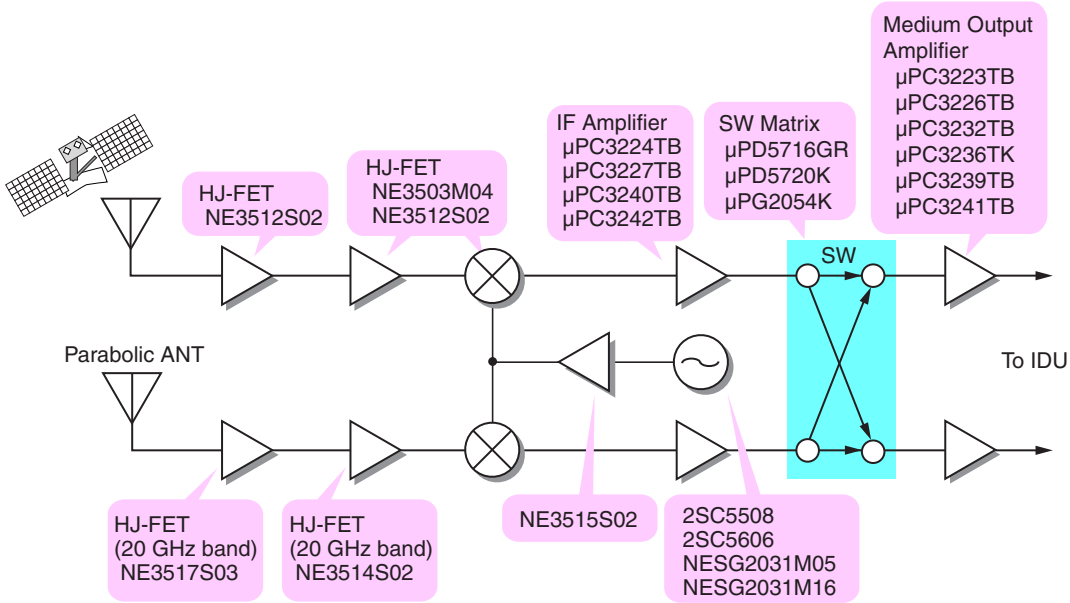


Recommended device list

Block	Function	Type Name	Feature
LNA	LNA	HJ-FET Series	GaAs HJ-FET Series for X, Ku-band, 20 GHz band
	IF Amplifier	μ PC3224TB	$G_P = 21.5 \text{ dB}$, $P_{O(1 \text{ dB})} = -5.5 \text{ dBm}$
		μ PC3227TB	$G_P = 22.0 \text{ dB}$, $P_{O(1 \text{ dB})} = -8.0 \text{ dBm}$
		μ PC3240TB	$G_P = 25.0 \text{ dB}$, $P_{O(1 \text{ dB})} = -4.0 \text{ dBm}$ (3.3 V)
		μ PC3242TB	$G_P = 22.0 \text{ dB}$, $P_{O(1 \text{ dB})} = -9.5 \text{ dBm}$ (3.3 V)
	Medium Output Power Amplifier	μ PC3223TB	$G_P = 23.0 \text{ dB}$, $P_{O(1 \text{ dB})} = +5.0 \text{ dBm}$
		μ PC3226TB	$G_P = 26.0 \text{ dB}$, $P_{O(1 \text{ dB})} = +5.7 \text{ dBm}$
		μ PC3232TB	$G_P = 33.5 \text{ dB}$, $P_{O(1 \text{ dB})} = +8.5 \text{ dBm}$
		μ PC3236TK	$G_P = 38.0 \text{ dB}$, $P_{O(1 \text{ dB})} = +7.5 \text{ dBm}$
		μ PC3239TB	$G_P = 25.0 \text{ dB}$, $P_{O(1 \text{ dB})} = +8.0 \text{ dBm}$ (3.3 V)
μ PC3241TB		$G_P = 24.0 \text{ dB}$, $P_{O(1 \text{ dB})} = +6.0 \text{ dBm}$ (3.3 V)	
OSC	DRO	2SC5508(NE662M04) 2SC5606(NE66219) NESG2031M05/M16	Low Phase Noise
	Buffer	NE3515S02	$P_{O(1 \text{ dB})} = +14 \text{ dBm}$
SW	Switch Matrix	μ PD5716GR	ISL D/U Ratio = 29 dB
		μ PD5720K	ISL D/U Ratio = 34 dB
		μ PG2054K	ISL D/U Ratio = 40 dB

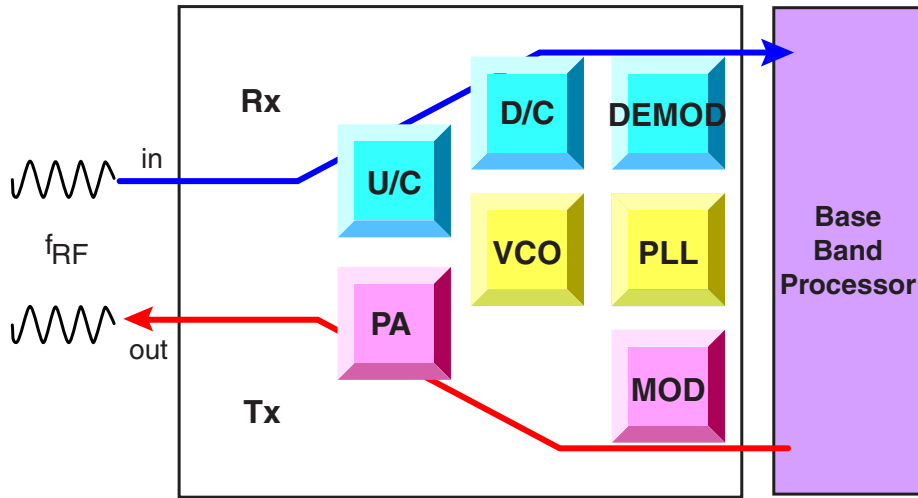
Remark The devices listed in the above table are merely examples. The product recommendation may change depending on the requirements of each system's design.

**System configuration example
Digital DBS (Satellite Broadcasting)**



Cable Modem

RF Front-end Basics



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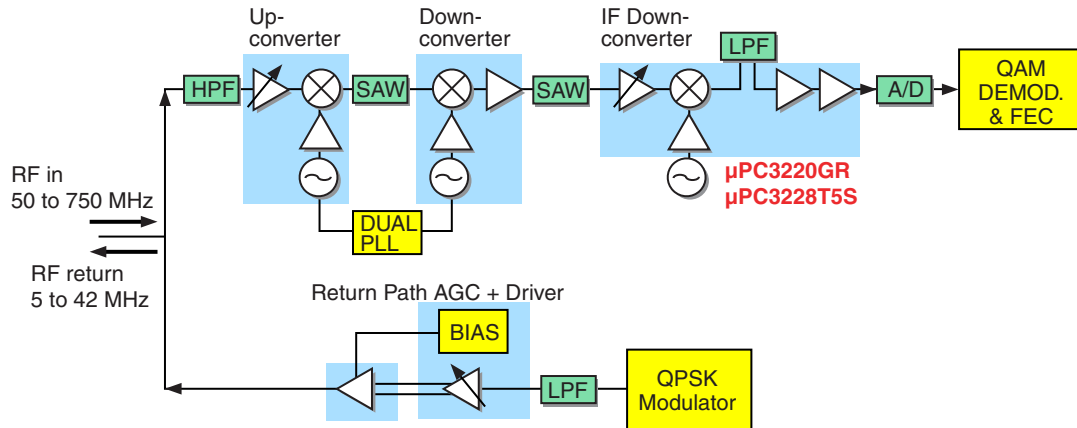
Recommended device list

Block	Function	Type Name	Feature
U/C + VCO	U/C + VCO	-	-
D/C + VCO	D/C + VCO	-	-
DEMOD	AGC Amplifier + Video Amplifier	μ PC3217GV	Middle-gain Type
		μ PC3218GV	High-gain Type
		μ PC3219GV	Low-gain, High-linearity Type
		μ PC3221GV	
		μ PC3231GV	High-gain, Low Noise Type
D/C + AGC	IF Down-converter	μ PC3220GR	High-gain
		μ PC3228T5S	Low Distortion
PLL	PLL	-	-
VCO	-	-	-
MOD	-	-	-
PA	Discrete Tr.	2SC5338(NE462M02)	Power Minimold

Remark The devices listed in the above table are merely examples. The product recommendation may change depending on the requirements of each system's design.

System configuration example 1

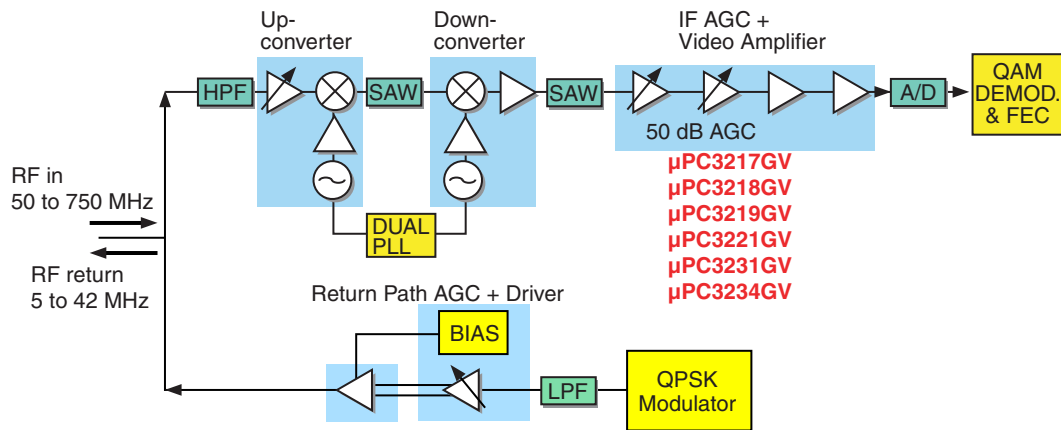
Example of transceiver block for Cable Modem Set-top-box



System configuration example 2

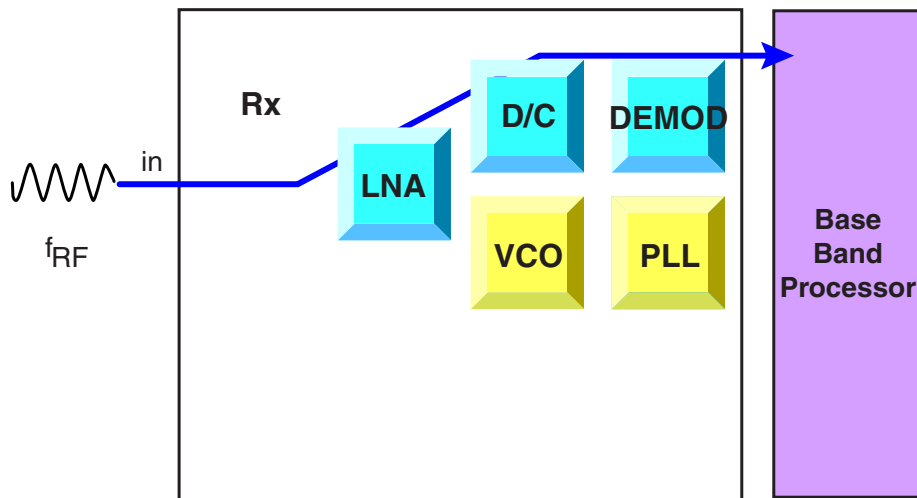
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Example of transceiver block for Cable Modem Set-top-box



2-3. Others
GPS

RF Front-end Basics

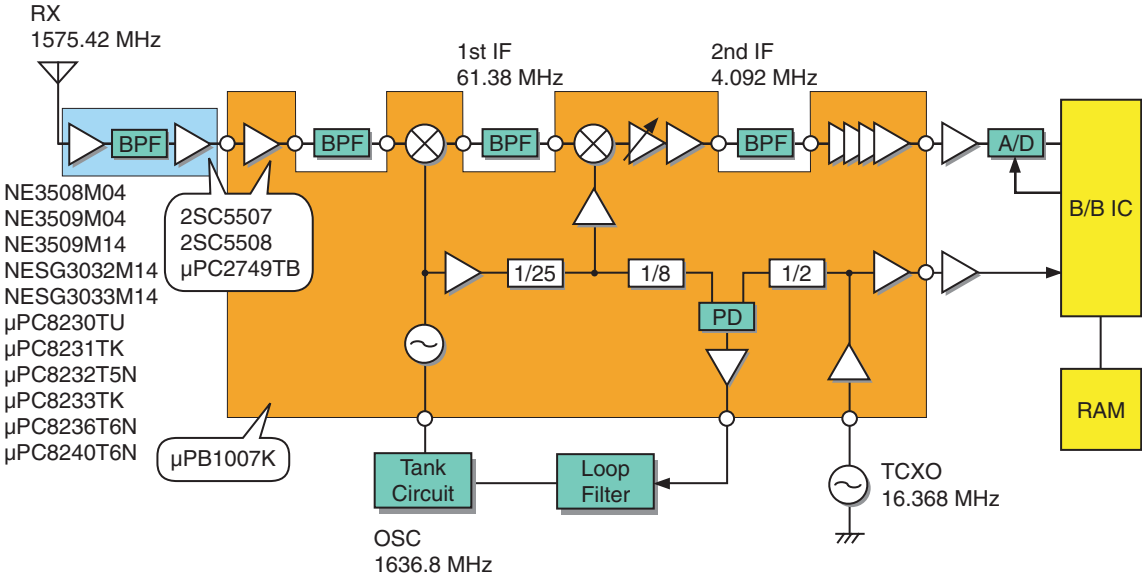


Recommended device list

Block	Function	Type Name	Feature
LNA	1st stage	NE3508M04 NE3509M04 NE3509M14	GaAs HJ-FET
		NESG3032M14 NESG3033M14	SiGe Tr.
		μ PC8230TU μ PC8231TK μ PC8232T5N μ PC8233TK μ PC8236T6N μ PC8240T6N	SiGe:C MMIC
	2nd stage or later	μ PC2749TB	Low Noise, Si MMIC
	Discrete Tr.	2SC5507(NE661M04) 2SC5508(NE662M04)	Si Bipolar Tr. ($f_T = 25$ GHz)
RF SINGLE CHIP	Pre-Amplifier + 1st Down-converter + 2nd Down-converter + OP Amplifier + PLL + Oscillator + Buffer	μ PB1007K	Low Current Consumption, Built-in Power Saving Function

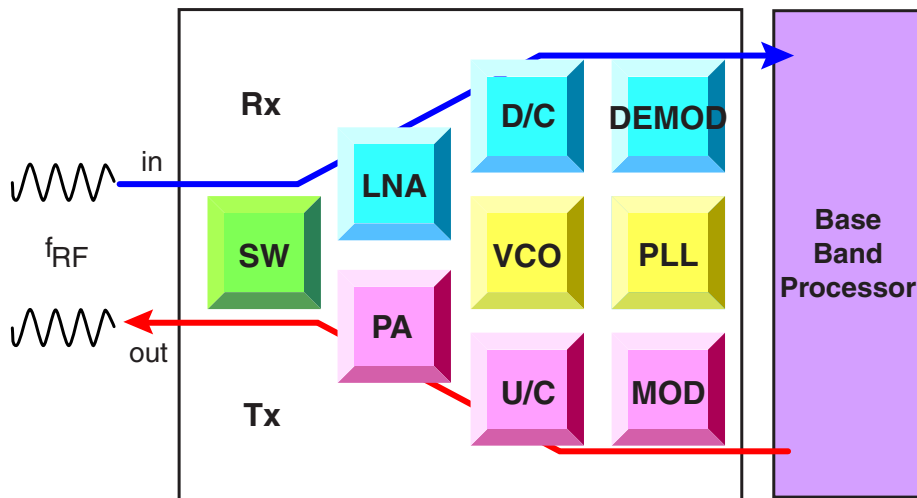
Remark The devices listed in the above table are merely examples. The product recommendation may change depending on the requirements of each system's design.

System configuration example
GPS



FRS (Family Radio Service) / GMRS (General Mobile Radio Service)

RF Front-end Basics

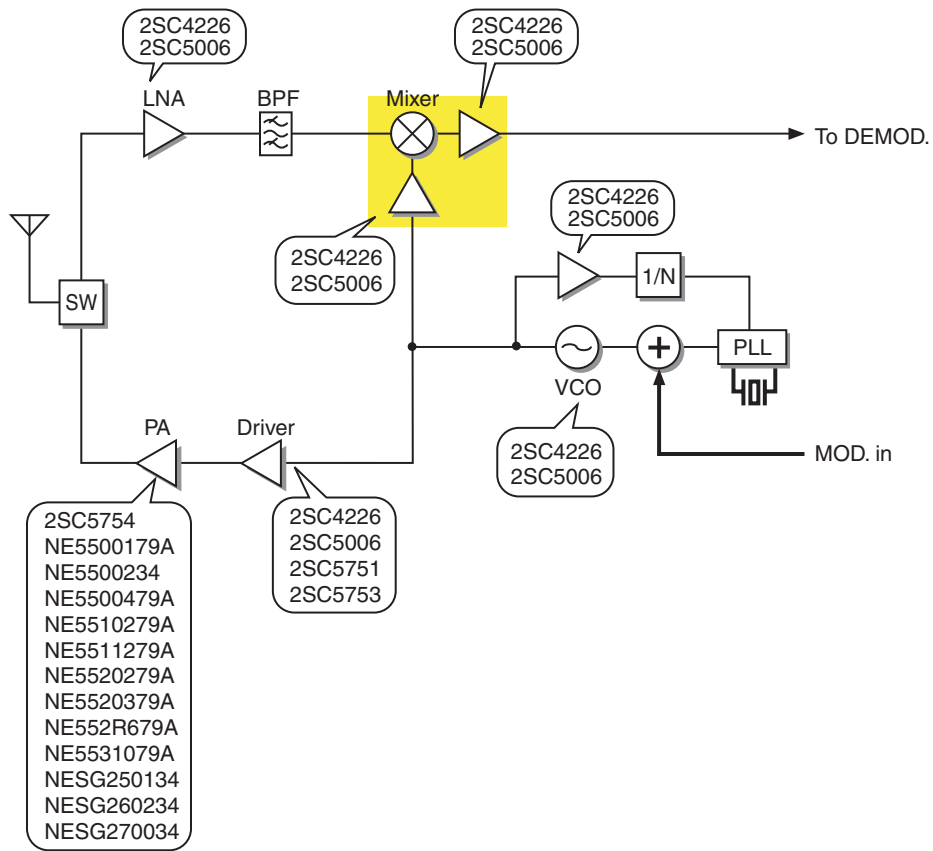


Recommended device list

Block	Function	Type Name	Feature	
LNA	Discrete Tr.	2SC4226(NE85630) 2SC5006(NE85619)	Low Noise, High Gain	
D/C	Discrete Tr.	2SC4226(NE85630) 2SC5006(NE85619)	Low Noise, High Gain	
DEMOD	-	-	-	
PLL	PLL	-	-	
VCO	Discrete Tr.	2SC4226(NE85630) 2SC5006(NE85619)	Low Current Consumption	
MOD	-	-	-	
U/C	-	-	-	
PA	Discrete Tr.	2SC4226(NE85630)	Driver Use Tr.	
		2SC5006(NE85619)		
		2SC5751(NE677M04)		
		2SC5753(NE678M04)		
		2SC5754(NE664M04)		Output: 100 mW class
		NESG250134		Output: 800 mW class
		NESG260234		Output: 1 W class
	NESG270034	Output: 2 W class		
Si LDMOS		NE5500179A, NE552R679A	Output: 500 mW class	
		NE5500234, NE5500479A NE5510279A, NE5511279A NE5520279A, NE5520379A NE5531079A	Output: 2 W class or higher	
SW	-	-	-	

Remark The devices listed in the above table are merely examples. The product recommendation may change depending on the requirements of each system's design.

System configuration example
460 MHz FRS

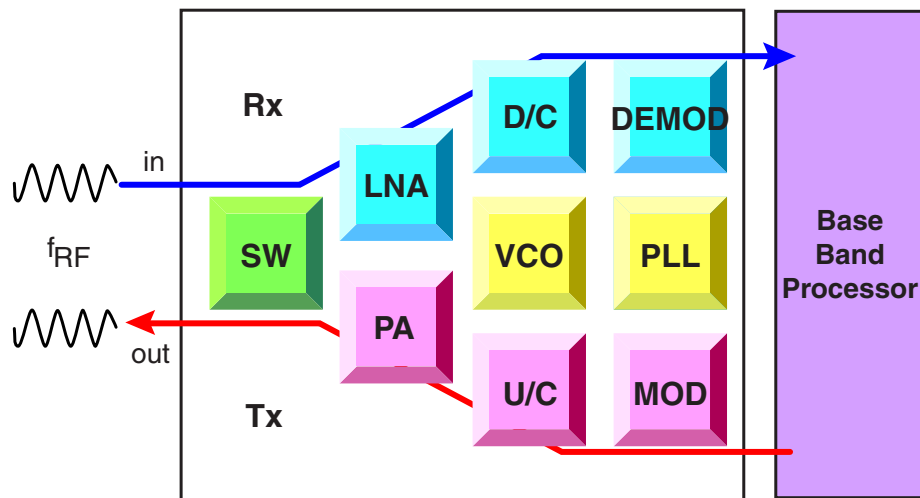


PA Selection Map

GMRS MURS	5 W (37 dBm)			NE5511279A NE5531079A
	3 W (34.8 dBm)	NE5520279A NE5520379A	NE5500234 NE5510279A NE5520379A	NE5500479A NESG270034
	2 W (33 dBm)			
FRS PMR	1 W (30 dBm)		NE5500179A NESG260234	
	0.5 W (27 dBm)	NE552R679A NESG250134		
LPD	0.1 W (20 dBm)	2SC5754		
		3 to 3.2 V	4.5 to 4.8 V	6 V

Bluetooth

RF Front-end Basics

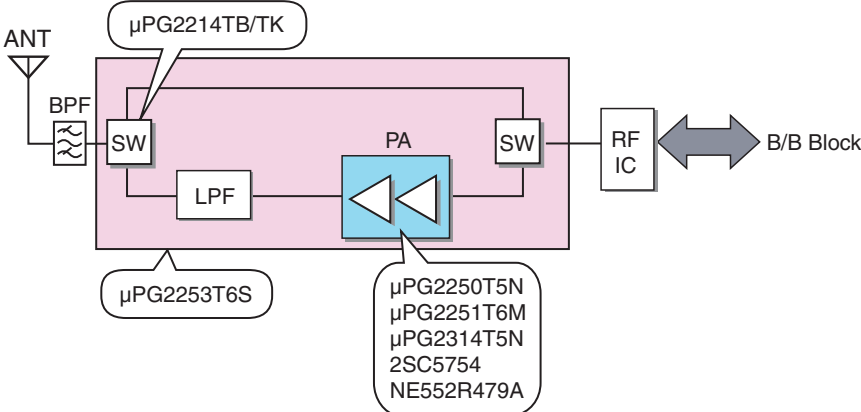


Recommended device list

Block	Function	Type Name	Feature
LNA	-	-	-
D/C	-	-	-
DEMOD	-	-	-
PLL	-	-	-
VCO	-	-	-
MOD	-	-	-
U/C	-	-	-
PA	-	μ PG2250T5N μ PG2251T6M μ PG2314T5N	GaAs MMIC
		2SC5754(NE664M04)	Si Tr.
		NE552R479A	Si LDMOS FET
FEIC	PA + SW + Filter	μ PG2253T6S	GaAs MMIC
SW	SPDT SW	μ PG2214TB	GaAs SW IC, 6-pin Super Minimold
		μ PG2214TK	GaAs SW IC, 6-pin Lead-less Minimold (1511)

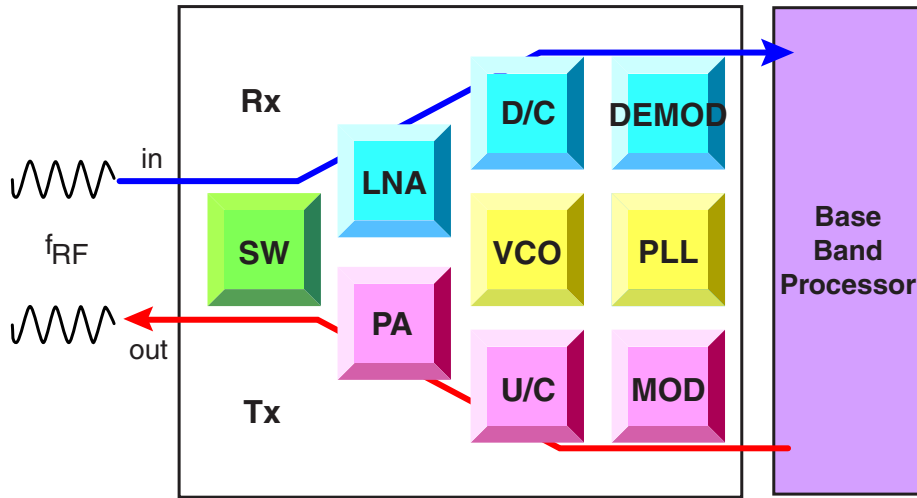
Remark The devices listed in the above table are merely examples. The product recommendation may change depending on the requirements of each system's design.

System configuration example
Bluetooth



2.4 GHz Wireless LAN

RF Front-end Basics



<R>

Recommended device list

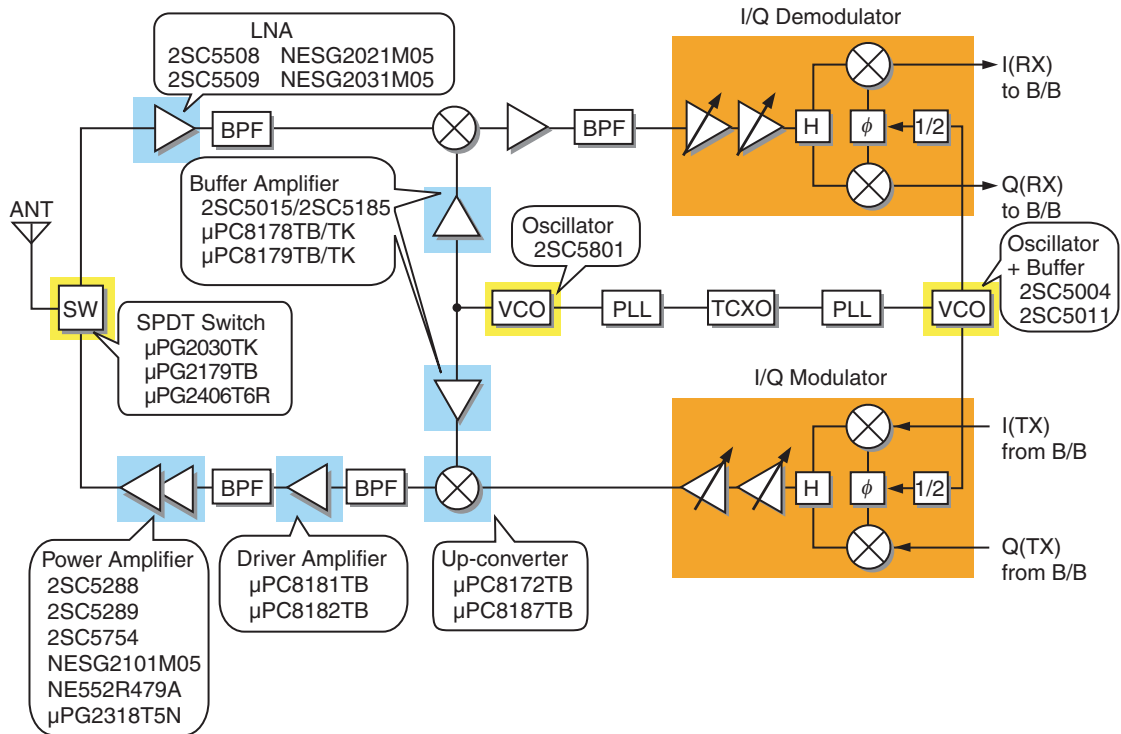
Block	Function	Type Name	Feature
LNA	Discrete Tr.	2SC5508(NE662M04)	Si Bipolar Tr. ($f_T = 25$ GHz)
		2SC5509(NE663M04)	Si Bipolar Tr. ($f_T = 17$ GHz)
		NESG2021M05, NESG2031M05	SiGe HBT
D/C	Down-converter	-	-
DEMOD	-	-	-
PLL	PLL	-	-
VCO	Oscillator + Buffer	2SC5004(NE58219), 2SC5011(NE85618) 2SC5801(NE851M13)	-
	Buffer	2SC5015(NE68518), 2SC5185(NE68718) μ PC8178TB/TK, μ PC8179TB/TK	Low Current Consumption
MOD	I/Q Modulator	-	-
U/C	Up-converter	μ PC8172TB, μ PC8187TB	6-pin Super Minimold
PA	-	μ PG2318T5N	GaAs MMIC
		2SC5288(NE68939), 2SC5289(NE69039) 2SC5754(NE664M04) NESG2101M05	Medium Output Power Use Tr.
		NE552R479A	Medium Output Power (0.4 W) Si LDMOS FET
		-	-
SW	SPDT SW	μ PG2179TB	6-pin Super Minimold
		μ PG2030TK	6-pin Lead-less Minimold (1511)
		μ PG2406T6R	6-pin TSSON

Remark The devices listed in the above table are merely examples. The product recommendation may change depending on the requirements of each system's design.

System configuration example (IF Modulation System)

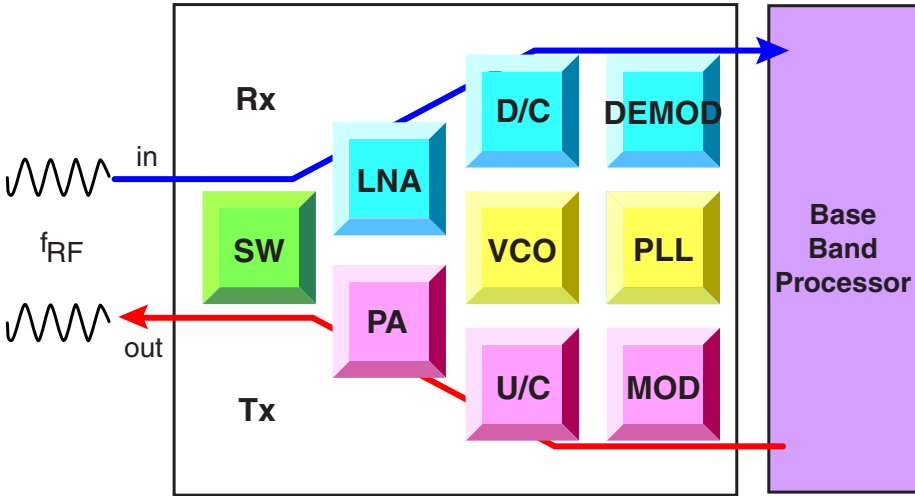
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2.4 GHz Wireless LAN



5 GHz Wireless LAN

RF Front-end Basics

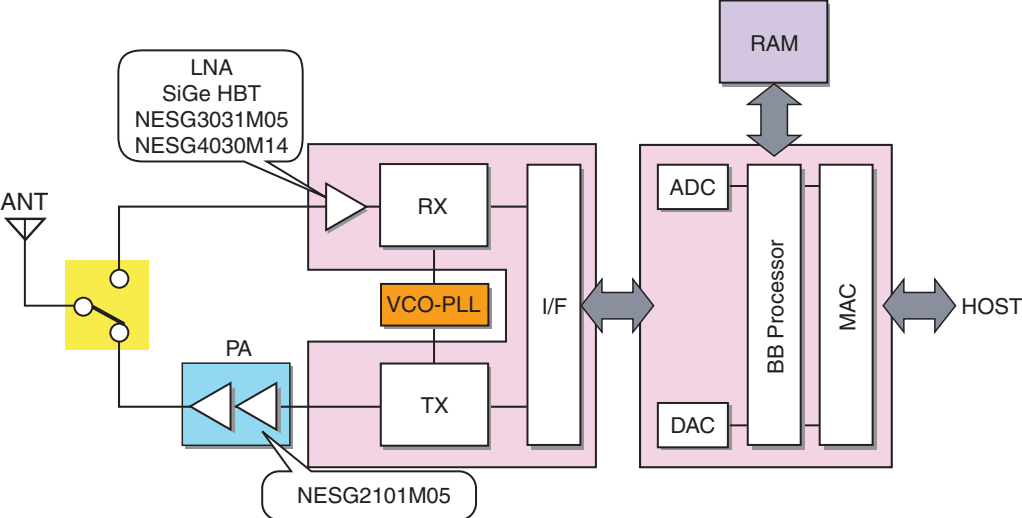


Recommended device list

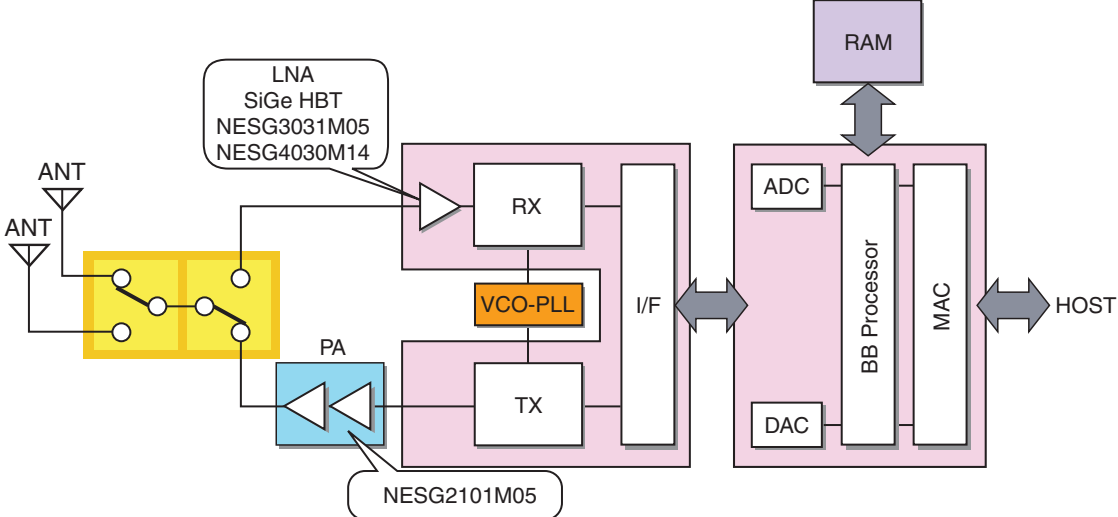
Block	Function	Type Name	Feature
LNA	Discrete Tr.	NESG3031M05 NESG4030M14	SiGe HBT
PA	Discrete Tr.	NESG2101M05	SiGe HBT

Remark The devices listed in the above table are merely examples. The product recommendation may change depending on the requirements of each system's design.

System configuration example 1
5 GHz Wireless LAN

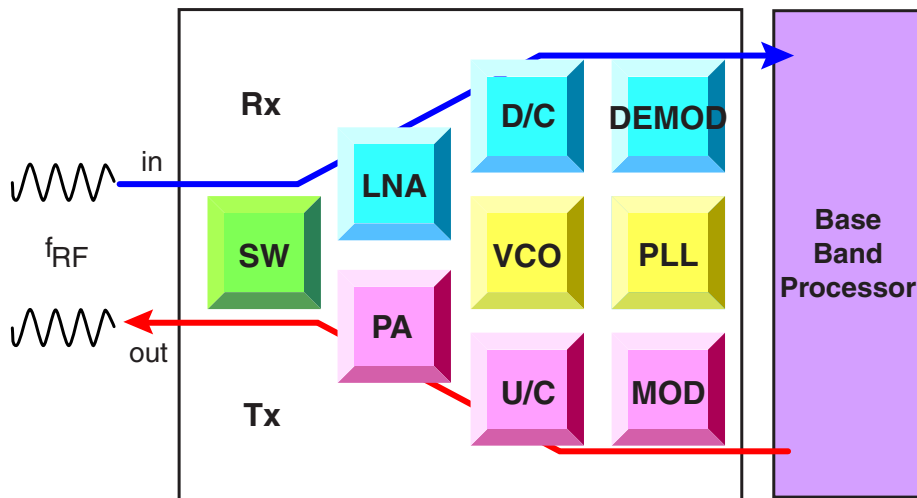


System configuration example 2
5 GHz Wireless LAN
(Antenna Diversity)



2.4 GHz & 5 GHz Dualband Wireless LAN

RF Front-end Basics



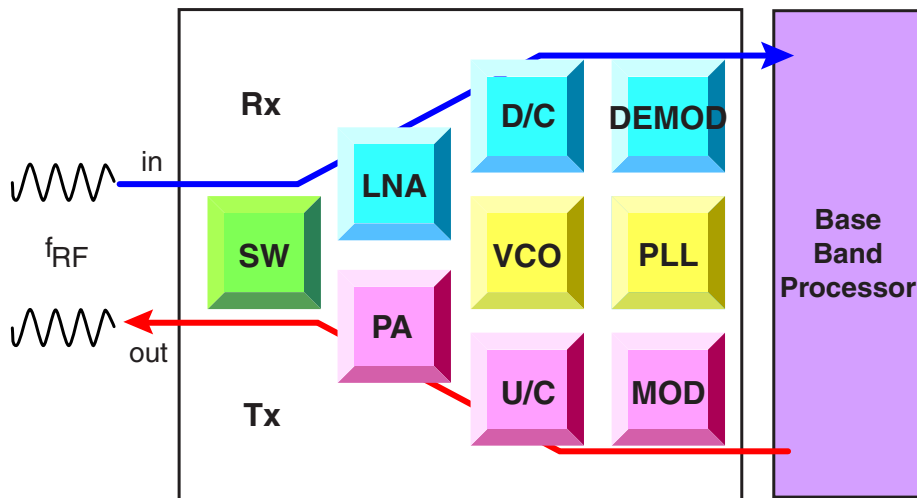
Recommended device list

Block	Function	Type Name	Feature
LNA	Discrete Tr.	NESG3031M05 NESG3031M14 NESG4030M14	SiGe HBT
SW	SPDT SW	μ PG2163T5N	GaAs SW IC, Low Insertion Loss, High Isolation, 6-pin TSON
		μ PG2185T6R	GaAs SW IC, 6-pin TSSON (1.0 × 1.0 × 0.37 mm, Small and Thin Package)
	DPDT SW	μ PG2162T5N	GaAs SW IC, High Isolation, 6-pin TSON
		μ PG2164T5N	GaAs SW IC, Low Insertion Loss, 6-pin TSON

Remark The devices listed in the above table are merely examples. The product recommendation may change depending on the requirements of each system's design.

N-CDMA, GSM Cellular Phone Base Station (900 MHz Band)

RF Front-end Basics



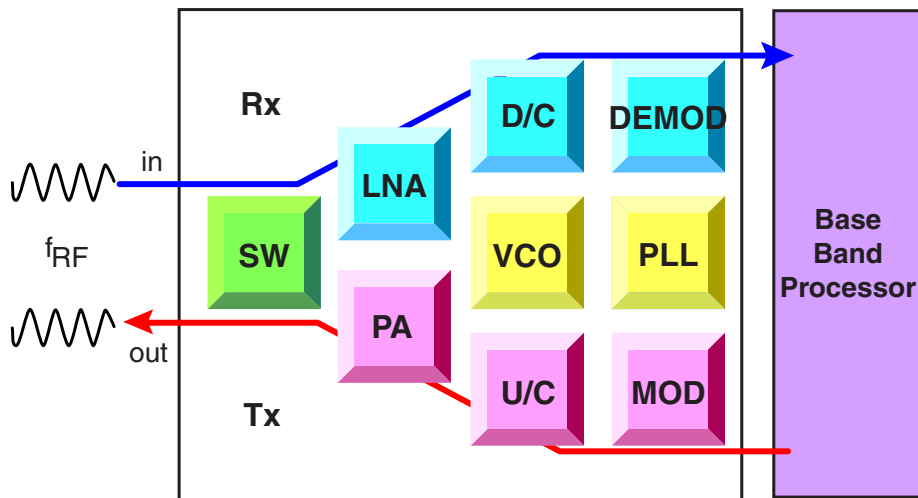
Recommended device list

Block	Function	Type Name	Feature
LNA	Discrete Tr.	2SC5508(NE662M04)	Si Bipolar Tr. ($f_T = 25$ GHz)
		NESG2031M05	SiGe HBT
		NESG2031M16	
PA	PA Driver	NE55410GR	2 W + 10 W Driver
	High Power LDMOS FET	NEM090303M-28	Single-end Type, Low Distortion, High Output Power
		NEM090603M-28	
		NEM090853P-28	
		NEM091203P-28	
	NEM091803S-28	Push-pull Type, Low Distortion, High Output Power	

Remark The devices listed in the above table are merely examples. The product recommendation may change depending on the requirements of each system's design.

W-CDMA Cellular Phone Base Station

RF Front-end Basics



<R>

Recommended device list

Block	Function	Type Name	Feature
LNA	Discrete Tr.	2SC5508(NE662M04)	Si Bipolar Tr. ($f_T = 25$ GHz)
		NESG2031M05	SiGe HBT
		NESG2031M16	
PA	PA Driver	NE55410GR	2 W + 10 W Driver Si LDMOS FET

Remark The devices listed in the above table are merely examples. The product recommendation may change depending on the requirements of each system's design.

<R> **3. WEB SITE INFORMATION**

The RF and Microwave Devices homepage has many documents available for viewing or downloaded. Please see our web site. The our web site address is as follows;

RF and Microwave Devices

<http://www2.renesas.com/microwave/en/index.html>

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Revisions History

Rev.	Date	Description	
		Page	Summary
1.00	2010.4	Throughout	μPA86x Series -> μPA8xx Series
		pp.11-13, 32, 33	Deletion of μPG2158T5K
		pp. 20, 21, 24, 25	Deletion of μPC3218T5Y
		p.38	Deletion of NES1823M-45, NES1823M-180, NES1823M-240, NES1823S-45, NES1823S-90
		p.39	Modification of 3. WEB SITE INFORMATION

This document covers “Silicon Microwave Transistors”, “Silicon Microwave Monolithic ICs” and “Microwave GaAs Devices”.

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