

4.6-5.8GHz/5Watt/Module

Model Number: KNTR5200M37A

The model KNTR5200M37A is a high power amplifier operating between 4.6 GHz and 5.8 GHz and offering a wide dynamic Range with 5 Watts typical saturated power. The employment of advanced high-power devices in manufacturing ensures this module exceptional power performance, long term reliability and high efficiency. It is ideal for high-power RF applications.

FEATURES:

- Narrowband & High power
- High Efficiency
- Small Size & Light Weight

ELECTRICAL SPECIFICATIONS @ +28.0VDC, 25°C, 50Ω

	Parameter	Symbol	Min	Typ	Max	Units
TX	Operating Frequency	BW	4.6		5.8	GHz
	RF Output Power@Pin=-10dBm, QPSK SRRC beta = 0.3	P _{out}	37			dBm
	Power Gain @ 0dB Attenuation	G _p	47			dB
	Power Gain Flatness	ΔG _p		±1	±1.5	dB
	ACPR@0.2MHz to 40MHz,PAPR of QPSK =4.3dB	ACPR			-35	dBc
	Input Return Loss	S ₁₁			-15	dB
	Harmonics 2 nd ,3 rd @Psat	H			-80	dBc
	Coupler @ Psat	C			-10	dB
RX	Operating Frequency	BW	4.6		5.23	GHz
			5.17		5.8	GHz
	Gain@ 0dB Attenuation	G		20		dB
	Gain Flatness	ΔG		±1		dB
	Output @in=-10dBm,ATT 10dB	P _{out}			0	dBm
	Passband suppression@4.42GHz, 5.407GHz,4.936GHz,6.03GHz				-54	dBc
	Noise Figure	NF			4	dB
	Input Return Loss	S ₁₁			-15	dB
Attenuator Range		ATT		20		dB
Attenuator step		ATT _{STEP}		0.5		dB
T/R Switching Time@1kHz TTL		Ton/off			12	us
Spurious Signals		Spur			-60	dBc
In/Output Impedance		Impedance		50		Ω
Operating Voltage		V _{DC}	9	28	32	Volt
DC Current @Psat		I _{DD}		2		Amp

The LNA part's passband should be divided into following sub-bands:

- 4.6 – 5.23 GHz, Filter shape factor ≤ 1.5
- 5.17 – 5.8 GHz, Filter shape factor ≤ 1.7

Also, for filters at frequencies 4.42 GHz, 5.407 GHz, 4.936 GHz, 6.03 GHz suppression should be ≤ -54 dB.

MECHANICAL SPECIFICATIONS

Parameter	Value	Units	Notes
Dimensions	94x72x19 [3.70x2.83x0.74]	mm [inch]	Maximum

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Weight	0.2[0.44]	kg [lbs]	Maximum
RF Connectors	SMA, Female		
DC Interface Connector	S07B-PACK-2		
Cooling	External Heat sink Required (Not Supplied)		

ENVIRONMENTAL CHARACTERISTICS (Design to Meet)

Parameter	Minimum	Typical	Maximum	Units	Notes
Operating Temperature	-40		80	°C	
Non-operating Temperature	-45		85	°C	Storage
Relative Humidity			95	%	

ABSOLUTE MAXIMUM RATING

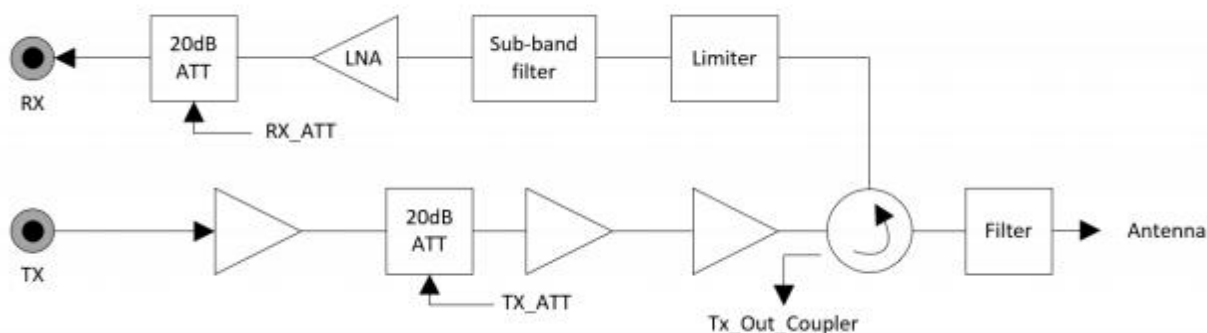
Input RF drive level without damage	+10 dBm (Max)
Load VSWR @ POUT =3W	∞ @ all load phase & amplitude for duration of 1 minute; 3:1 @ all load phase & amplitude continuous
Over Temperature	85°C @ heatsink

DC INTERFACE CONNECTOR

Pin #	Description	Specifications
1	VDD	28VDC
2	VDD	28VDC
3	GND	Ground
4	CAN-TX	CAN-TX
5	CAN-RX	CAN-RX
6	GND	Ground
7	TR_SWITCH	Amplifier Enable: TTL Logic High (3.3V) (Internally Pulled-Low)

For amplifier under development should be support ability to configure PA/LNA CAN IDs addresses via CAN bus.

FUNCTIONAL DIAGRAM



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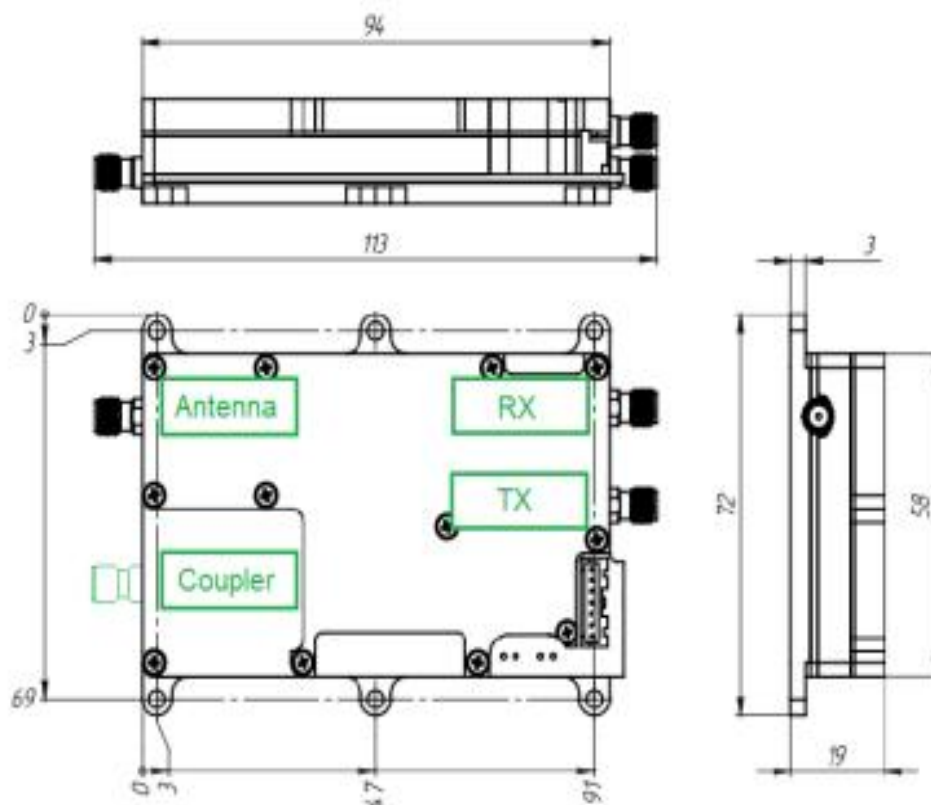
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OUTLINE DRAWING (All dimensions in mm [inch])

**Note:** Adequate heatsink required.*Focus on Your Application****Chengdu KeyLink Wireless Technology Co., Ltd.***

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Common Control Protocol

1 Overview

This document describes the interface protocol between the host computer and the power amplifier device, and between devices. The system selects control commands for reporting based on actual application requirements

2 Main control protocol

Tx – transmission, Rx – receiving

CAN frames format: Extended frame format.

CAN extended ID (Figure 1):

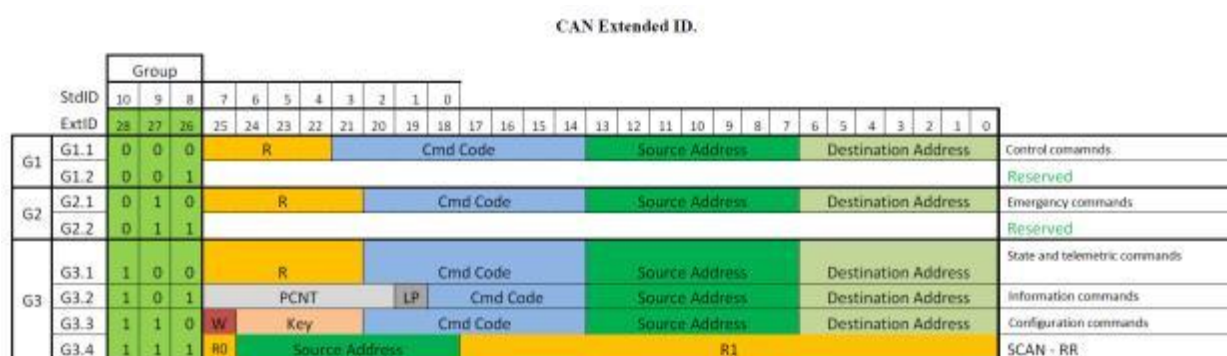


Figure 1. CAN extended ID

Constants (command's ID):

1. Broadcast Address = 0
2. Bootloader Address = 125
3. Master Address = 126

These IDs **should not be assigned** as the PA LNA's ID. Available range: 1 – 124.

2.1 Control Tx/Rx mode changingm

Control mode changing via CAN bus and EN signal by follow commands:

Command Name	Command ID	Description	Argument
Priority	31	Mode control selection Tx/Rx: discrete input control (GPIO) or CAN bus	0 – EN (default) 1 – CAN bus 0 - EN 1 - CAN
txrxn	28	Mode selection Tx/Rx in CAN bus	0 – Rx (default) 1 – Tx 0 - Rx

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The algorithm for controlling TX/RX mode via CAN bus or EN signal is shown in Figure 2.

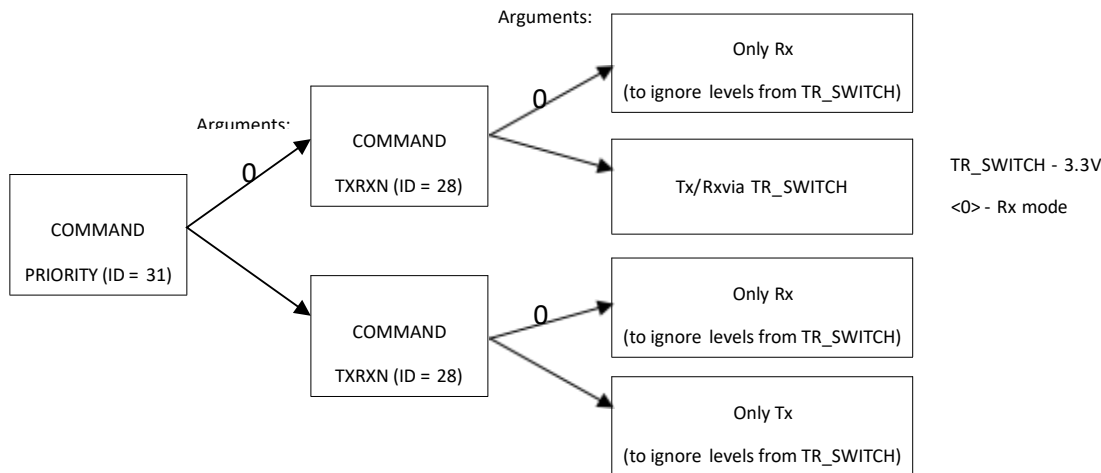


Figure 2. Algorithm for TX/RX mode

More about algorithm logic:

priority <arg> (ID = 31)

<0> - changing Rx/Tx mode via TR_SWITCH pin (TTL Logic) and partly via txrxn command

<1> - control Rx/Tx mode via CAN bus

txrxn <arg> (ID = 28)

<0> - Rx mode (ignore levels from TR_SWITCH)

<1> - Tx mode if priority <1>, Tx/Rx mode if priority <0>

Attention:

When the VDD supply voltage is applied, the transceiver should be transit in «Rx» mode. It remains in «Rx» mode regardless of discrete input state and CAN bus commands. When the power PA is on, the transceiver should be transit in «Rx» or «Tx» mode depending on control mode, input state «Rx»/«Tx», CAN bus commands.

Also, Rx and Tx settings should be saved when module is switching from Rx to Tx mode and Tx to Rx mode.

2.2 CAN commands for changing parameters

List of CAN commands for changing parameters

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Command Name	Command ID	Remote Request	Description	Argument
Control commands (high priority) (Group G1.1 = b000; R = b0101)				
ATT	2	0	Attenuation setup (step is 0.5 dB) for Tx	attenuation values
ATT_RX	3	0	Attenuation setup (step is 0.5 dB) for Rx	attenuation value
getAtt	2	1	Requesting an attenuator value. Response is in the form of command ATT, source – slave, destination – Master	-
getAttRx	3	1	Requesting a Rx attenuator value. Response is in the form of command ATT, source – slave, destination – Master	-
setPower	6	0	On/off power	-
getPower	6	1	Requesting a power state. Response is in the form of command setPower, source – slave, destination – master	-
POWER	10	0	Changing PA voltage supply	0 – power is off 1 – voltage is 24V 2 – voltage is 28V 3 – voltage is 32V

Emergency commands (mid priority) (Group G2.1 = b010; R = b00000)				
OVERHEAT	0	0	Temperature above maximum allowable value	temperature value
NO_ANTENNA	5	0	VSWR above maximum allowable value	vswr value
POWER_OVERLOAD	6	0	Power above maximum allowable value	power overload value
State and telemetric commands (low priority) (Group G3.1 = b100; R = b11111)				
SCAN_ANSWER	0	0	Response to the scan command* . Contain the device title (name)	device title
TEMPERATURE	1	1	Requesting a temperature value by master	-

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TEMPERATURE	1	0	Return a temperature value at the request of the master (Command for requesting temperature value by host computer (direction host -> PA LNA). There no need value in parameter field. But PA LNA should recognize this command and sent PA LNA's temperature value)	temperature value
VOLTAGE	2	1	Requesting a voltage supply value by master	-
VOLTAGE	2	0	Return a voltage supply value at the request of the master (Command for requesting voltage supply value by host computer (direction host -> PA LNA). There no need value in parameter field. But PA LNA should recognize this command and sent PA LNA's voltage supply value)	voltage value
CURRENT	3	1	Requesting a current consumption value by master	-
CURRENT	3	0	Return a current consumption value at the request of the master (Command for requesting current consumption value by host computer (direction host -> PA LNA). There no need value in parameter field. But PA LNA should recognize this command and sent PA LNA's current consumption value)	current value
Configuration commands (Group G3.3 = b110; Key = b0101; W = 1 for saving to nonvolatile memory)				
CFG_INT	0	0	Initializing configuration parameters (restore to factory settings = states after writing the nonvolatile memory)	-
CFG_SAVE	1	0	Save changed values to the nonvolatile memory	-

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CFG_ADDRESS	2	0	Changing device address (run command CFG_SAVE for saving new value to nonvolatile memory)	address
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* Command SCAN_ANSWER (group G3.1) is the response to SCAN command. PA LNA's ID is contained in the data field of SCAN_ANSWER command.

SCAN command (Group G3.4 = b111), having Remote Request format without parameter:

In response to this command, the device should send a Data frame with status command ID (command cmd – scan_answer) and its name in the data section.

Fields: R0 = b1; R1 = b000000000000000000.

Thresholds for emergency commands:

1. Temperature: 80 °C
2. Power consumption: 55W
3. VSWR: 3

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