Datasheet BBoard 5G 28 GHz

MYTEK

BB-BOARD-BPB0B-28

The 5G era has dawned. Massive deployments are expected in 2021-2025 worldwide. IMT-2020 defines eMBB, URLLC and mMTC which are keys to successful 5G communications. TMYTEK has developed an educational kit to support our teaching fellows and partners. It is an even smaller compact development tool that can help our customers in moving onto 5G beamforming developments and tests with ease. We call it the BBoard. It is part of the B series, next in line to BBox[™] One and BBox[™] Lite. It consists of 4 RF channels and API/GUI software control through ethernet interface.

Similar to our B series products, our BBoard can also control the phase and the amplitude of each channel independently. It is most suitable for educational purposes. Light weight and easy to get started on beamforming. Please find more details below.

Features

- Operating Frequency: 26.5 to 29.5 GHz
- Designed for 5G n257 band (including n261 band)
- Up to 4 controllable RF channels
- Each channel provides:
 - 360° phase shifter coverage with 5.625° per step
 - RMS phase error: 4° (typical)
 - 15 dB gain control range
 - RMS attenuation error: 0.4 dB (typical)
- T/R half duplex operation
- 2 ms T/R mode switching time (typical)
- 2 ms phase/gain switch time (typical) *¹
- PC software control via RJ-45 Ethernet interface



Figure 1. BBoard 5G 28 GHz



Figure 2. 5G Beamformer System Diagram (4 channels)

*1 The time here is dependent on the CPU speed of the PC in which the control interface (UI or API) is running on.

Single Channel RF Specifications

Tested conditions: 4 channels, f_{RF} = 28 GHz, Z_{Sys} = 50 Ω and T_{AMB} = 25 $^\circ\!\mathrm{C}$

Parameter	Conditions	Unit	Min.	Тур.	Max.
Operating Frequency Range	Without antenna	GHz	26.5	28	29.5
Mauimum Opin	Tx Mode	dB	15	18	
	Rx Mode	dB	11	14	
Noise Figure	Rx Mode	dB		14	17
OP1dB	Tx Mode	dBm	8	10	12
IP1dB	Rx Mode	dBm	-23	-21	-19
Phase Shifting Range	Phase Shifting Range			360	
Phase Shifting Step		deg		5.625	
RMS Phase Error		deg		4	8
Gain Control Range		dB		15	
Gain Control Resolution	Common Gain	dB		1	
	Channel Gain	dB		0.5	
RMS Attenuation Error		dB		0.4	
Return Loss	RF Port (Tx)	dB		10	
	RF Port (Rx)	dB		10	
	COM Port	dB		7	
Channel to Channel Indiation	Maximum gain setting-Tx	dB		25	
Channel-to-Channel Isolation	Maximum gain setting-Rx	dB		30	

DC and Control Specifications

Parameter	Conditions		Min.	Тур.	Max.
Power Consumption	Tx Mode	W			4.5
	Rx Mode	W			3
Supply Voltage		Vdc		5	
T/R Switching Time	Between Tx and Rx modes	ms		2	
Phase/Gain Switch Time*1	Dependent on CPU speed	ms		2	

AC Specifications

Parameter	Conditions	Unit	Min.	Тур.	Max.
Adapter Input Voltage		Vac	100		240
Adapter Input Current Consumption		А			1

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Software Control Interface

The BBoard software interface offers both UI and API control which are completely designed in house by our software team. The module can be controlled by RJ-45 ethernet cable. Both the UI and API are available for our customers to access and download from the Web. Our developed GUI interface shows the 4-channel phase and gain control as depicted below. To control the parameters, users can turn ON/OFF each channel, control the phase and the gain by using the up/down arrows, or turn ON/OFF the temperature compensation functions.

тмутек		- 0
Scan Local Device 🗸	BBoard D2104L013-28	
	Common Mode 📧 🕒 All CH (ON/OFF) 💿 Load Table 🕂 Frequency 28 GHz 🗸	
	Gain/phase control	
	Switch Mode 1	
	CH 1 power Ott CH 1 stemustion step 040 CH 2 power Ott CH 2 stemustion step 040 CH 3 power Ott CH 2 stemustion step 040 CH 3 power Ott CH 4 stemustion step 040 CH 3 power Ott CH 4 stemustion step 040 CH 4 power Ott CH 4	
	NF IC Temperature Temperature Compensation Control Update ADC Value 31 Cet advanced auto temperature compensation, please contact TAY LER. do	

Figure 3. Software GUI for controlling BBoard

Connector Specifications

Parameter	Location	Type and Function			
RF1, RF2, RF3, RF4	Front Panel	4 channel RF ports with 2.92 mm (K) Jack connectors			
RJ-45 Ethernet	Back Panel	Control port (including UI and API control)			
DC IN	Back Panel	Type-C DC input (DC 5V/3A max. adapter included)			
RF COM	Back Panel	RF common port with 2.92 mm (K) Jack connector			
Switch Button	Back Panel	ON/OFF Switch			



Package

TMYTEK's compact connectorized packaging:

Parameter	Condition	Unit	Min	Тур	Max
	Length mr		105.6	107.6	109.6
Dimension	Width	mm	98.0	100.0	102.0
	Height	mm	37.0	39.0	41.0
Weight		g		250	









Figure 4. BBaord Dimension Drawing