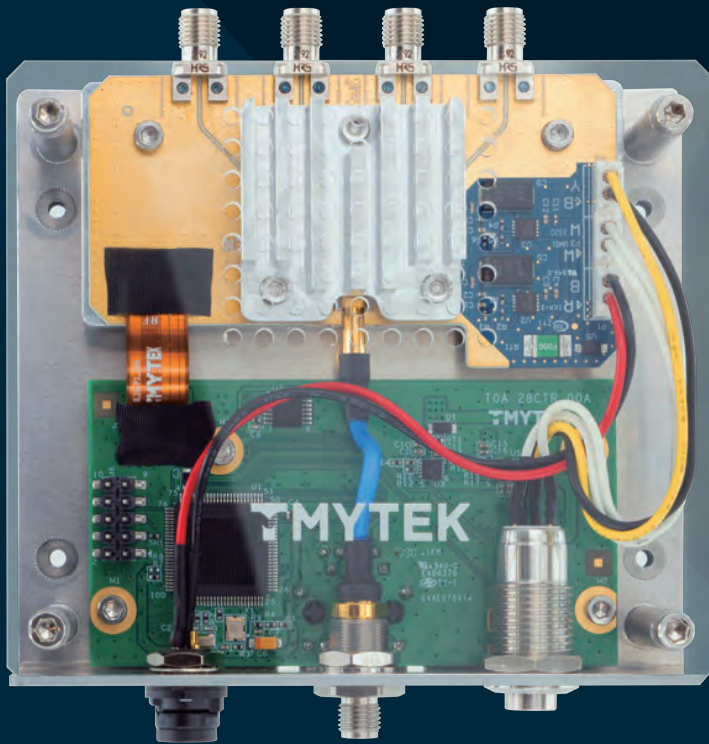




BBoard

5G/B5G Beamforming Educational Kit

Highlights

TMYTEK BBoard 28/39 is a true 5G NR FR2 beamformer

- Keeps engineering students updated with the cutting-edge communication technology
- Helps university professors save time and efforts in courseware preparation
- Offers excellent flexibility in school lab, product prototyping, and academic research
- Provides software to control phase shifters, PAs, and LNAs in four independent RF channels

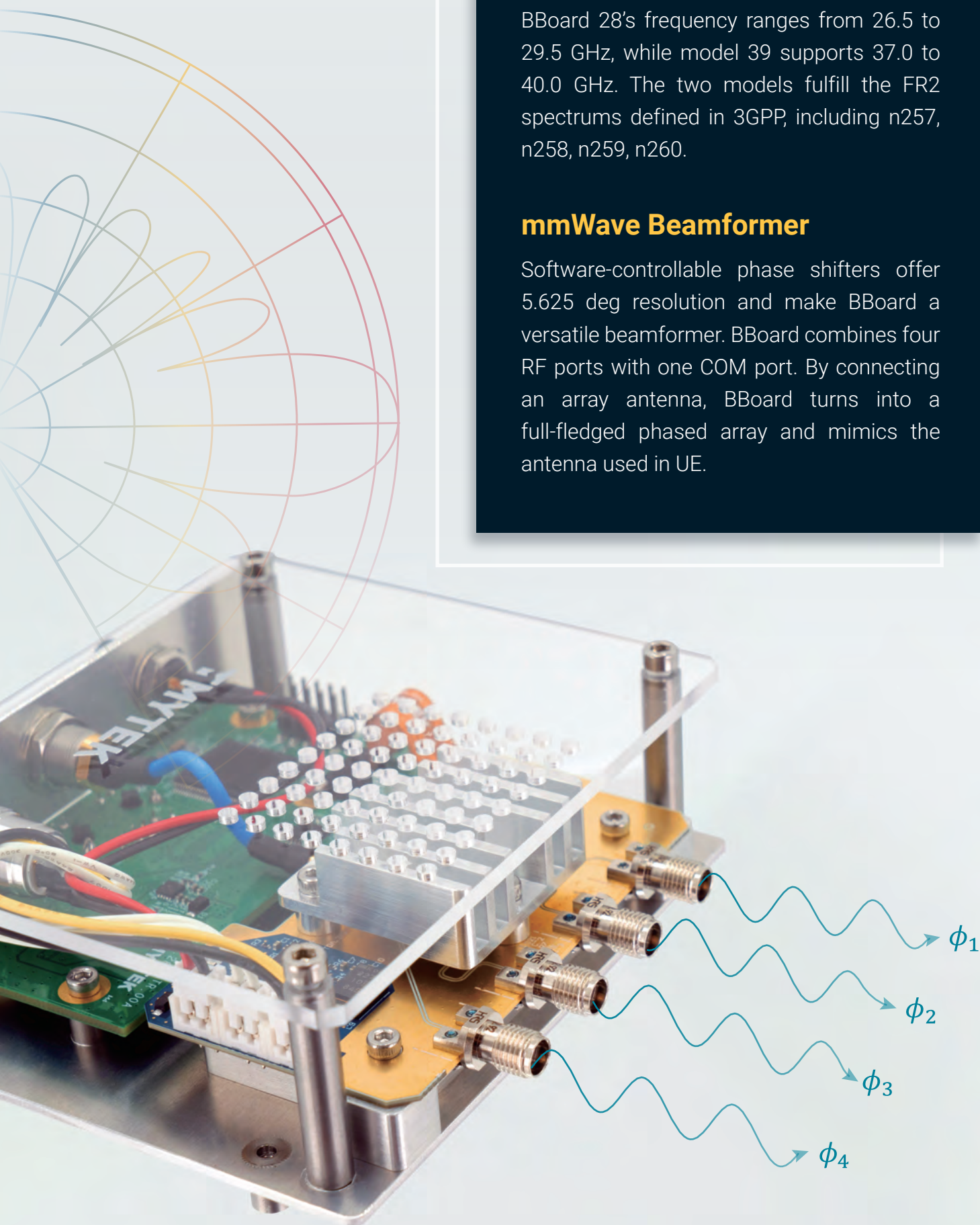


Support 5G NR FR2

BBoard 28's frequency ranges from 26.5 to 29.5 GHz, while model 39 supports 37.0 to 40.0 GHz. The two models fulfill the FR2 spectrums defined in 3GPP, including n257, n258, n259, n260.

mmWave Beamformer

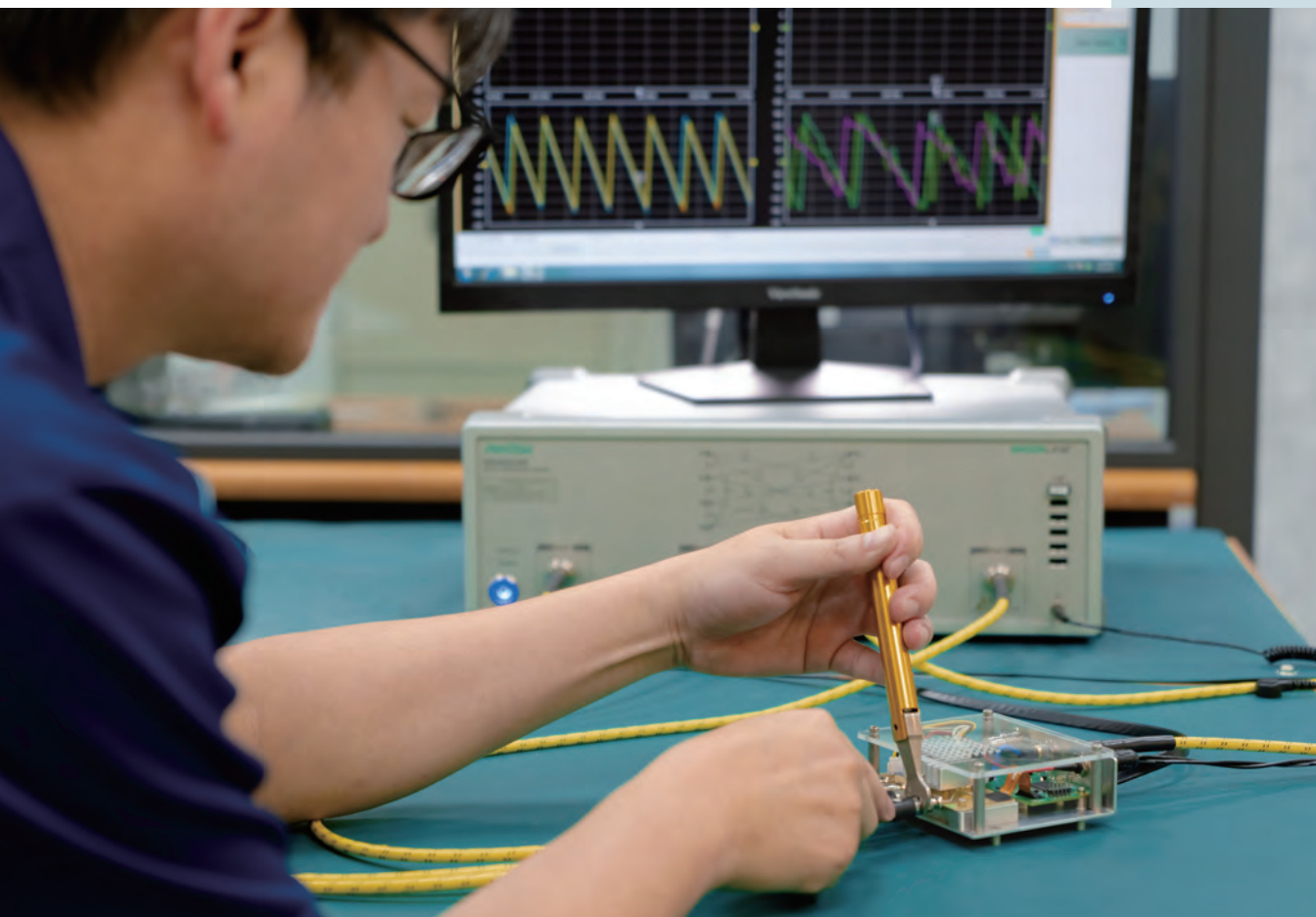
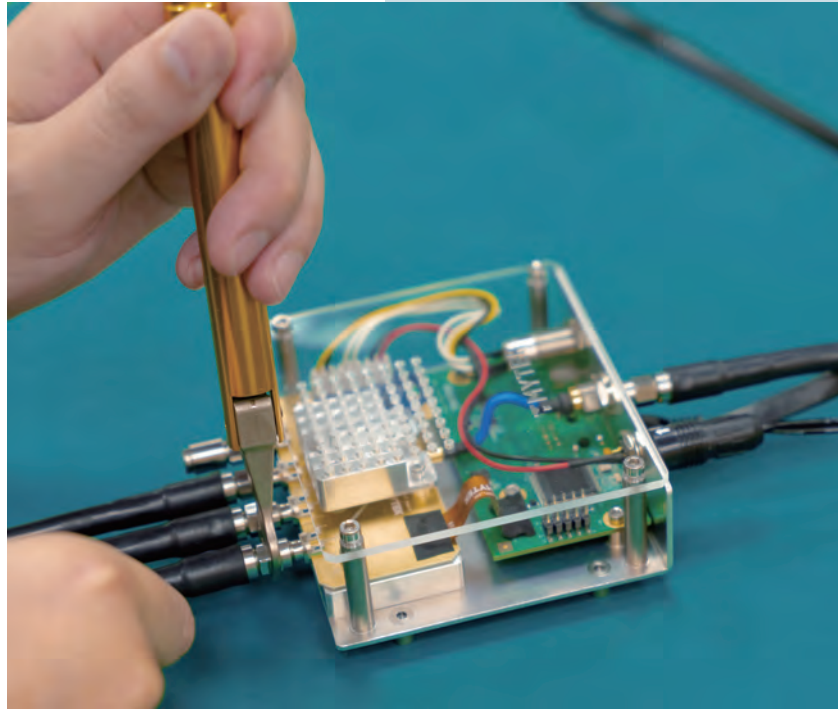
Software-controllable phase shifters offer 5.625 deg resolution and make BBoard a versatile beamformer. BBoard combines four RF ports with one COM port. By connecting an array antenna, BBoard turns into a full-fledged phased array and mimics the antenna used in UE.



Education & Research

BBoard offers student a hands-on tool to gain a solid foundation on beamforming theory and implementation for 5G NR. By adjusting the phase and the gain of each RF channels and observing the result on instrumentation, students can establish the connection between the theory and the real-world.

TMYTEK builds a versatile BBoard that is beneficial not only school students but also to engineers in the industry. The antenna engineers utilize BBoard to verify their designs; communication developers demonstrate the protocol and beam management algorithm via true mmWave beamformer.

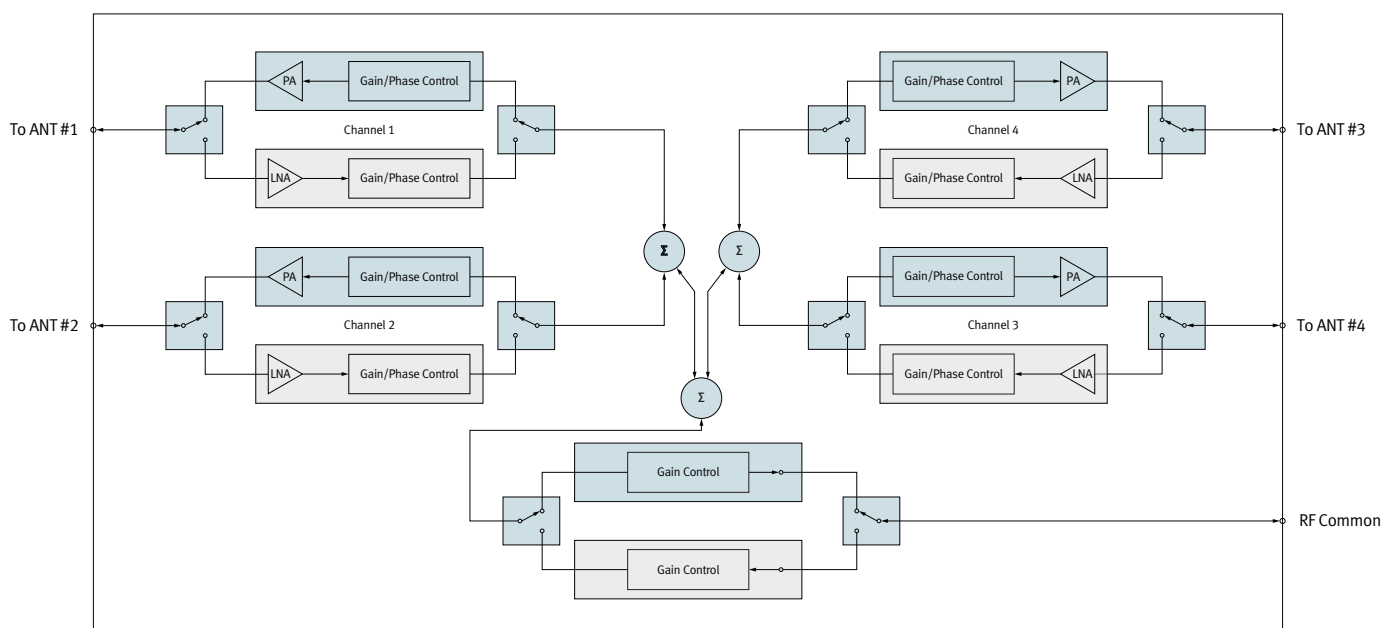




Software Control Interface

Provides GUI to control phase shifters, PAs, and LNAs in four independent RF channels.

5G Beamformer System Diagram (4 channels)



Single Channel RF Specifications

Parameter	Conditions	Unit	Min.	Typ.	Max.
Operating Frequency Range	Without antenna	GHz	26.5	28	29.5
Maximum Gain	Tx Mode	dB	16	18	20
	Rx Mode	dB	12	14	16
Noise Figure	Rx Mode	dB	—	14	16
OP1dB	Tx Mode	dBm	9	10.5	12
IP1dB	Rx Mode	dBm	-22.5	-21	-19.5
Phase Shifting Range		deg	—	360	—
Phase Shifting Step		deg	—	5	—
RMS Phase Error		deg	—	4	—

Tested conditions: 4 channels, $f_{RF} = 28$ GHz, $Z_S = Z_L = 50 \Omega$ and $T_{AMB} = 25^\circ\text{C}$

Parameter	Conditions	Unit	Min.	Typ.	Max.
Attenuator Range	Tx Mode	dB	—	15	—
	Rx Mode	dB	—	15	—
Attenuator Step		dB	—	0.5	—
RMS Attenuation Error		dB	—	0.35	—
Return Loss	Antenna Port (Tx)	dB	—	10	—
	Antenna Port (Rx)	dB	—	10	—
	COM Port	dB	—	7	—
Channel-to-Channel Isolation	Maximum gain setting-Tx	dB	—	25	—
	Maximum gain setting-Rx	dB	—	30	—

Comparison of TMYTEK beamformer

Parameter		BBox One	BBox Lite	BBoard
Frequency (GHz)	Series 28	26.5 - 29.5	26.5 - 29.5	26.5 - 29.5
	Series 39	37.0 - 40.0	37.0 - 40.0	37.0 - 40.0
RF Channels		4 x 4	1 x 4	1 x 4
Dimensions (mm)		156x62x62	125x102x110	74.5x46x46
Antenna kit		•	•	Optional ^[1]
Thermal Design		•	•	
Phase Calibration		•	•	Optional ^[2]
Gain Calibration		•	•	Optional ^[2]
Linearity		•	•	•
Aluminum Housing		•	•	
Advanced GUI		•	•	

[1] A 1x4 serial patch array antenna with 15 dB gain is available. Please contact sales@tmytek.com for more details.

[2] TMYTEK provides calibration services for both phase and gain. Please contact sales@tmytek.com for more details.

