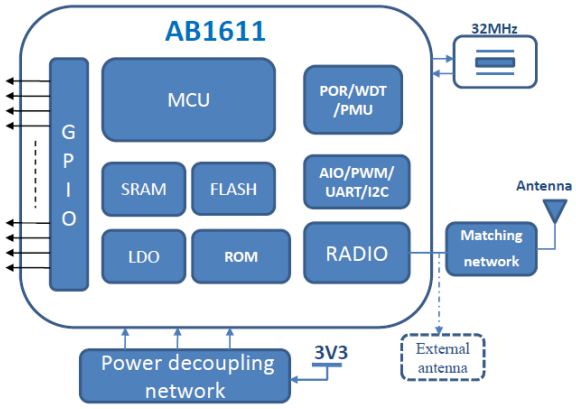
HET-BA1611 Specifications

Summary

HET-BA1611 is a Bluetooth Low energy module, using BA1611 as the main chip, the chip is embedded with 32-bit MCU . AB1611 can be run independently Bluetooth 5.0 protocol stack and application profile. HET-BA1611 has 64KB SRAM and embedded 512KB FLASH, and has a rich peripheral interfaces to meet different application.

HET-BA1611 is an open platform, users can implement their own applications based on the Bluetooth protocol stack. We also support a MESH firmware and one of the most typical application firmware: UART relay. Users can use this firmware to the shortest development cycle to integrate existing programs or products to the fastest speed to market.

Type	Function
Through firmware	UART/BLE conversion with Clife protocol.
	UART/BLE conversion.
SDK	Product development based on clife protocol.
	Product development based on AB1611 4 source Codes with GAT ,GATT and GAP.



Applications

- Health Care
- Smart Home Application
- Motion Measurement
- Auto Electronics
- Leisure Toys
- Instruments
- Logistics tracking

Content

1. Brief Introduction

HET-BA1611 Bluetooth low energy module, using BA1611 as the core processor. This module follows Bluetooth 5.0 protocol, Runs in 2.4 GHz ISM band, GFSK modulation(Gaussian Frequency Shift Keying), 40 channel 2 MHz channel gap, three fixed radio channel, 37 automatic adaptive frequency hopping data channel, 2 MHz gap better prevent adjacent channel interference. The internal PA can deliver a maximum of 9.5dBm, Receive sensitivity is typically -90dBm.

This module is designed to quickly connect electronic products and smart mobile devices, there is a demand can be widely used in various electronic devices, such as instrumentation, logistics tracking, healthcare, smart home, motion measurement, automotive electronics, toys and other leisure. Users can use this module, the shortest development cycle to integrate existing programs or products to the fastest speed to market

2. Product Features

■Power supply: 3.3V

■Power Dissipation

- Transmit Mode 28mA (9.5dBm Transmit Power Setting)
- Receive Mode 12mA (-90dBm Sensitivity)
- Sleeping Mode 4uA

■Peripherals:

- 15 x GPIOs
- 9 x AIOs
- 2 x UARTs
- 12bit ADC
- 1 x I2C
- 8 x PWM modules
- Debug UART

■Emission Power 9dBm(Max.)

■Receiver Sensitivity -90dBm

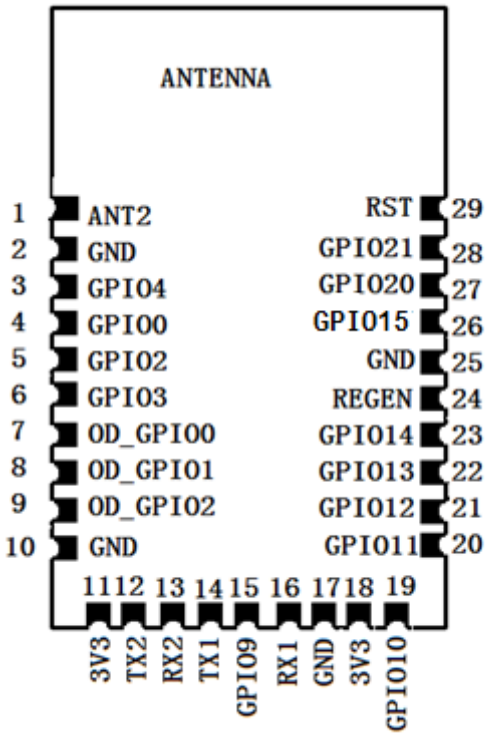
■Working Frequency 2400～2483.5MHz

■Working Environment Temperature -20～85℃

■Transmission Distance > 20m

3. Interface Definition

3. 1Pin Assignments



3. 2Pin Description

PIN No.	PIN NAME	PIN TYPE	DESCRIPTION
1	ANT2	External antenna	Antenna port for Bluetooth(reserved)
2	GND	Ground	Connect to GND
3	GPIO4	GPIO	General digital programmable I/O
4	GPIO0	GPIO	General digital programmable I/O
5	GPIO2	GPIO	General digital programmable I/O
6	GPIO3	GPIO	General digital programmable I/O
7	OD_GPIO0	GPIO	General digital programmable I/O, open drain
8	OD_GPIO1	GPIO	General digital programmable I/O, open drain
9	OD_GPIO2	GPIO	General digital programmable I/O, open drain
10	GND	Ground	Connect to GND

11	3V3	VCC	Power supply for module
12	UART_ TX2	UART_TXD	UART_TXD for user
13	UART_ RX2	UART_RXD	UART_RXD for user
14	UART_TX1	UART_RX	Debug /download UART
15	GPIO9	GPIO	General digital programmable I/O
16	UART_RX1	UART_TX	Debug /download UART
17	GND	Ground	Connect to GND
18	3V3	VCC	Power supply for module
19	GPIO10	GPIO	General digital programmable I/O
20	GPIO11	GPIO	General digital programmable I/O
21	GPIO12	GPIO	General digital programmable I/O
22	GPIO13	GPIO	General digital programmable I/O
23	GPIO14	GPIO	General digital programmable I/O
24	REGEN	INPUT	POWER CONTROL
25	GND	Ground	Connect to GND
26	GPIO15	GPIO	General digital programmable I/O
27	GPIO20	GPIO	General digital programmable I/O
28	GPIO21	GPIO	General digital programmable I/O
29	RST	RESET	RESET INPUT

4. Electrical Parameters

4.1 Maximum Rating Parameter

Pressure beyond the "maximum evaluation value" data will cause permanent damage to the device unrecoverable. The following assessment is limited to the pressure, to go beyond the operations specifications paragraph indicated functional operation will not apply to the following data. Under absolute maximum evaluation value status will have an impact on long - term use of equipment performance reliability.

Item	Min	Type	Max	Unit
Storage temperature	-40	-	150	℃
I/O supply voltage(VCCIO)	-0.3	-	3.6	V
Analog/RF supply voltage	-0.3	-	32.0	V
RF input Level			20	dBm

4.2 Recommended Operation Conditions.

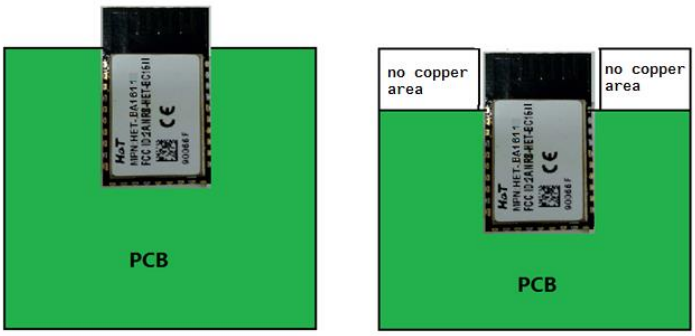
Item	Min	Type	Max	Unit
Operating temperature range	-20	25	85	℃
Power supply	2.0	3.0	3.6	V
I/O supply voltage (VCCIO	1.8	3.0	3.6	V

4.3 Typical current consumption

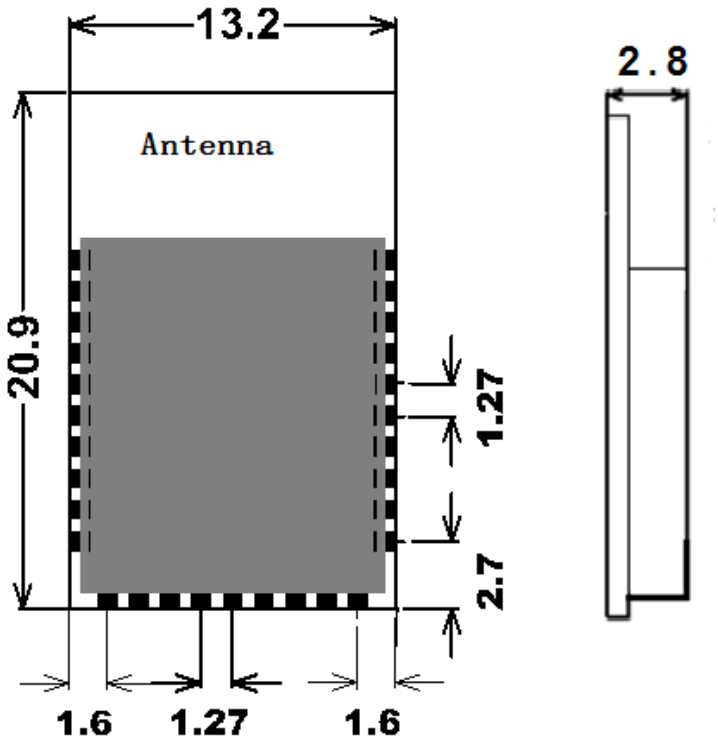
Parameter	Current(avg. 3V input)	Units
Tx current@9.5dBm	28	mA
Rx current@1Mbps(9.5dBm)	12	mA
Sleep	4	uA
Deep-sleep	0.6	uA

5. Antenna

PCB IFA antenna is implemented for this Bluetooth module, when place this module on the carrier board, please make sure there are enough clearance between the antenna trace and the other PCB copper or components.



6. Product Structure Size



7. HET UART pass through Firmware functions Operating Instructions

7.1 Transparent Mode and Command Mode

Module can operate in transparent mode and command mode. After the module automatically

broadcasts started, open a specific APP phone will be scanned and docking, after a successful agreement can be monitored by BLE.

Pass through mode: In this mode, users do not concern complex Bluetooth protocol application, you can complete the development of products in a short time BLE. MCU specific meaning users can be two - way communication, user data through a common serial and mobile equipment module is defined by the upper application on their own. Mobile devices can be APP module write operation, the written data will be sent to the user's CPU via the serial port. After the module receives data packets from the user CPU serial port, it will be automatically forwarded to the mobile device. The development of this mode, the user must be responsible for the main MCU code design, and intelligent mobile device side APP code design.

Command Mode: In this mode, the user can through specific serial AT commands, for some communication parameters module management control. For detail please refer "**H&T BLE Modules Programming Guide**"

7.2 Switch between two modes

Module in command mode, to ensure IO9 is low, when IO9 is set high, the module works in transparent mode.

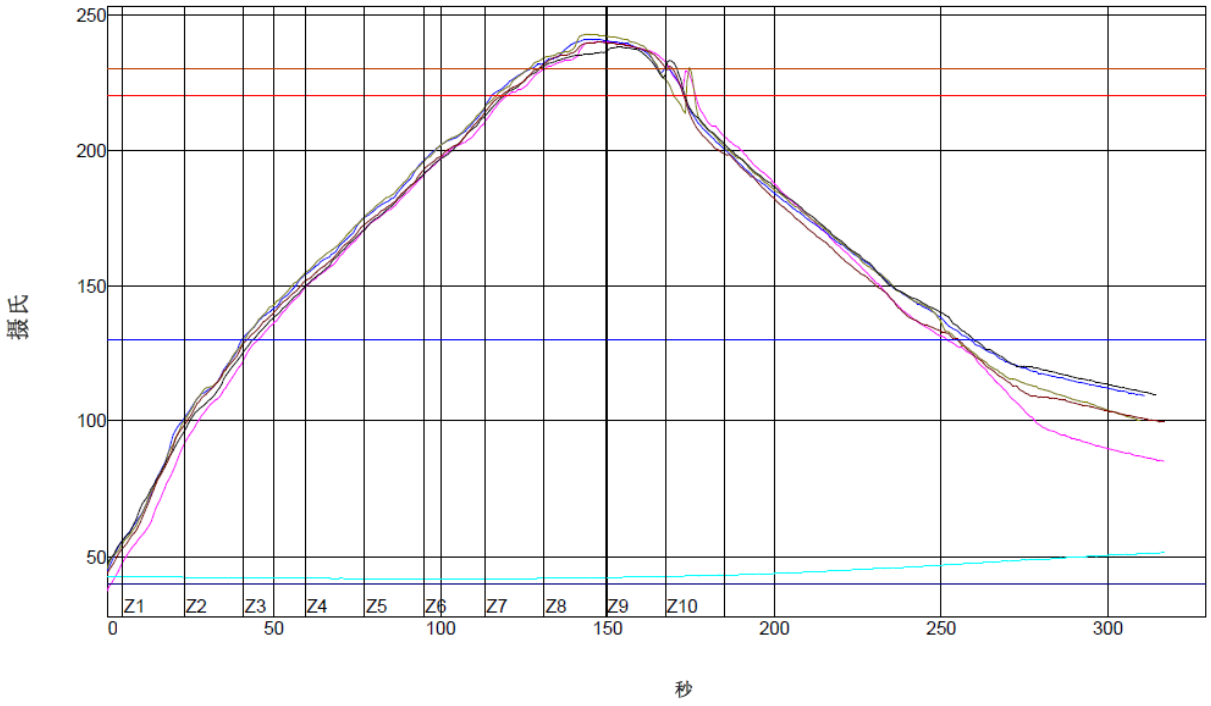
7.3 Sleep and Wake

MCU before sending serial data to the module must first be pulled down IO3 pin to wake up module. When the user MCU monitors the module PIO21be pulled down, the confirmation module has been successfully woken up, than the data can be sent at this time. MCU during data transmission, IO3 must remain low, after data transmission is completed need to IO3 pin pulled up, it goes to sleep again, and reduce power consumption.

Once the module receives data from another end BLE device before will be automatically forwarded to the MCU IO15 pin is pulled low to inform the MCU receive data. During data transmission IO15 pin remains low. After all serial data transmission is completed, IO15 pin will be pulled up.

8. Furnace temperature of re-reflow

Setpoints (摄氏)										
温区	1	2	3	4	5	6	7	8	9	10
上温区	140	160	180	190	210	235	265	270	245	140
下温区	140	160	180	190	210	235	265	270	245	
Conveyor Speed (公分/分):	85.00									



秒

PWI= 83%	最高上升斜率		最高下降斜率		预热 40至130C		恒温时间130至220C		回流时间 /220C		最高温度		总共 时间 /230C	
7200	2.24	24%	-1.54	73%	44.07	-67%	74.52	-68%	56.60	-48%	240.17	2%	37.26	56%
6913	2.19	19%	-1.47	76%	39.73	-83%	74.84	-67%	57.76	-43%	241.01	10%	39.39	68%
7301	2.16	16%	-1.66	67%	40.39	-80%	75.61	-65%	55.55	-53%	242.89	29%	40.06	72%
6922	1.99	-1%	-1.52	74%	43.27	-70%	74.98	-67%	54.50	-58%	238.11	-19%	38.42	62%
6113	2.20	20%	-1.59	71%	41.33	-77%	76.19	-64%	54.68	-57%	239.99	-0%	39.84	71%
温差	0.25		0.19		4.34		1.67		3.27		4.78		2.79	

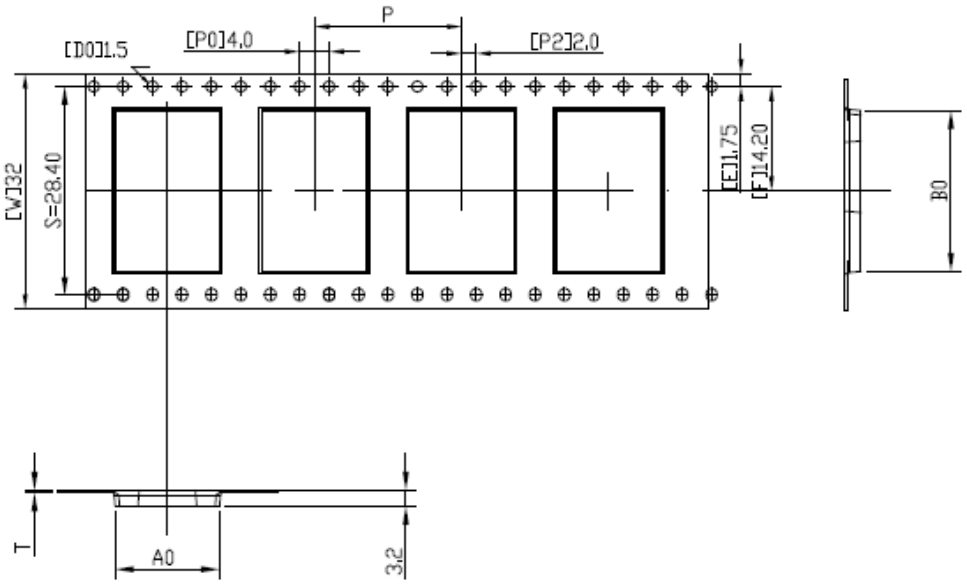
制程界限:

统计数名称	最低界限	最高界限	单位
最高温度上升斜率 (目标=2.0) (计算斜率的时间距离= 30 秒)	1.0	3.0	度/秒
最高温度下降斜率 (计算斜率的时间距离= 30 秒)	-5.0	-1.0	度/秒
预热时间 40-130摄氏度	35	90	秒
恒温时间130-220摄氏度	60	150	秒
回流以上时间 - 220摄氏度	45	90	秒
最高温度	230	250	度 摄氏
在230摄氏度以上时间	10	45	秒

9. Module Package Information

This module can be packaged with tape or tray after production, since this is ESD sensitive device, precautions should be used when handling the device in order to prevent permanent damage.

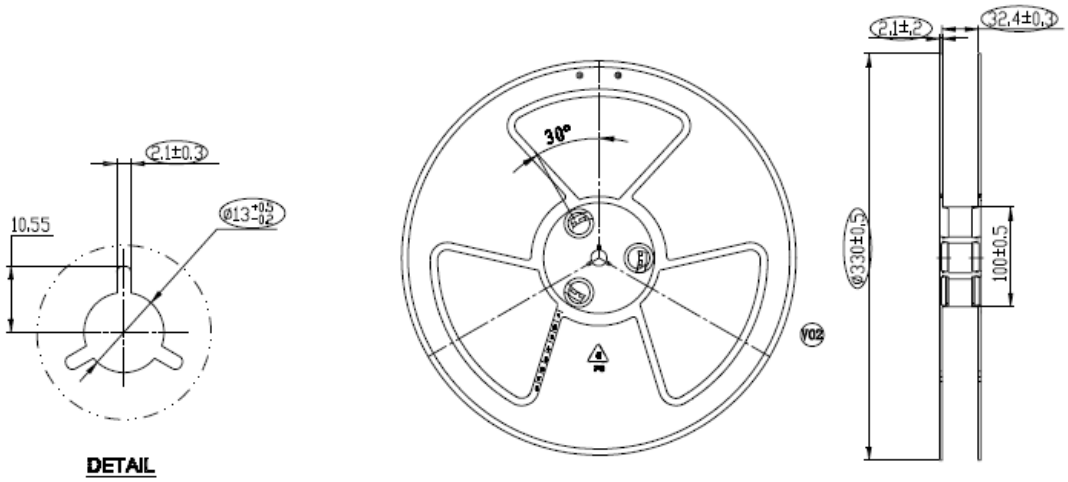
Below is the dimension of the packaging tape and reel:



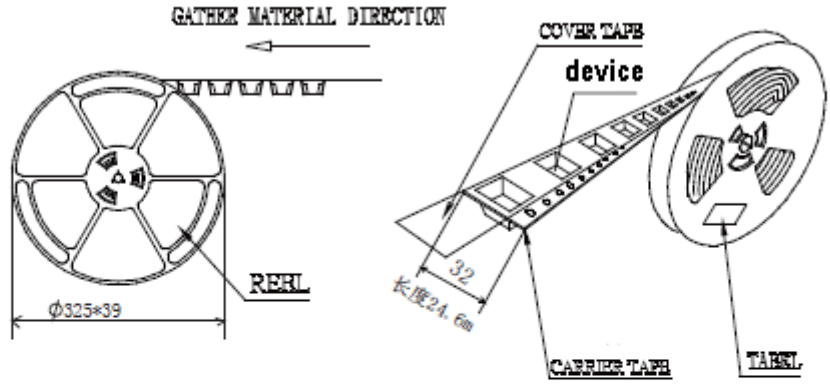
Remayk:

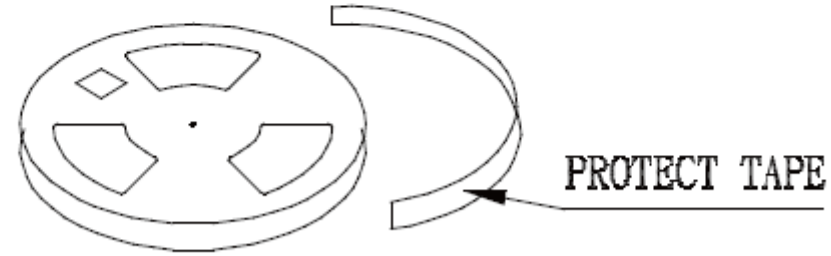
1. 10 sprocket hole pitch cuaulative tolerance +/-0.2mm
2. Carrier camber is within 100 in 100mm
3. All Dimensions neet EIA-481-B requirements
4. Material: Conductive BIack PS, Thickness: 0.30+/-0.05mm
5. Reel:13″ Meter:21M Racking Qty:1000PCS , Voidance 30PCS

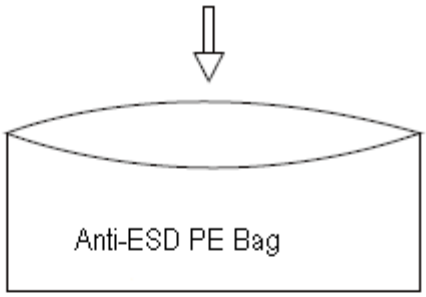
W	32.00 $^{+0.30}_{-0.30}$	T	0.30±0.05	Po	4.00±0.10	Ao	13.80±0.1	A1	
		F	14.2±0.10	P2	2.00±0.10	Bo	21.50±0.1	B1	
E	1.75±0.10	P	20.00±0.10	D0	ø1.50 $^{+0.10}_{0}$	Ko	3.20±0.10	K1	

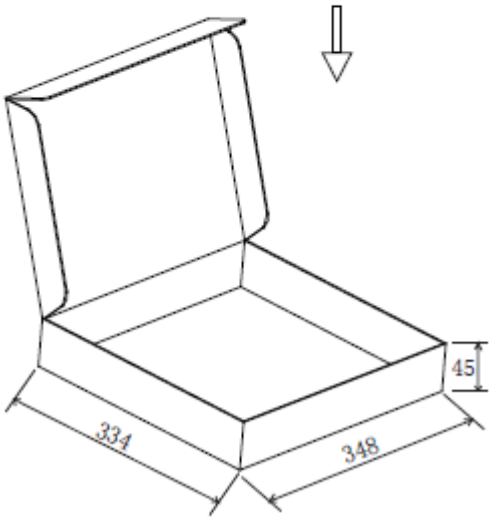


Below is the tape packaging process:









1200pcs/ Reel

1Reel/Box

FCC Warning

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

1. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

2. This equipment complies with RF radiation exposure limits set forth for an uncontrolled environment.

3. This equipment should be installed and operated with minimum distance 20cm from your body.

Host product manufacturers that they need to provide a physical or e-label stating, “Contains FCC ID:2ANR8-HET-BA1611” with their finished product.

Only those antennas with same type and lesser gain filed under this FCC ID can be used with this device.

The host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

The final host integrator must ensure there is no instruction provided in the user manual or customer documentation indicating how to install or remove the transmitter module except such device has implemented two-ways authentication between module and the host system.

The final host manual shall include the following regulatory statement:This equipment has been tested and found to comply with the limits for a This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.