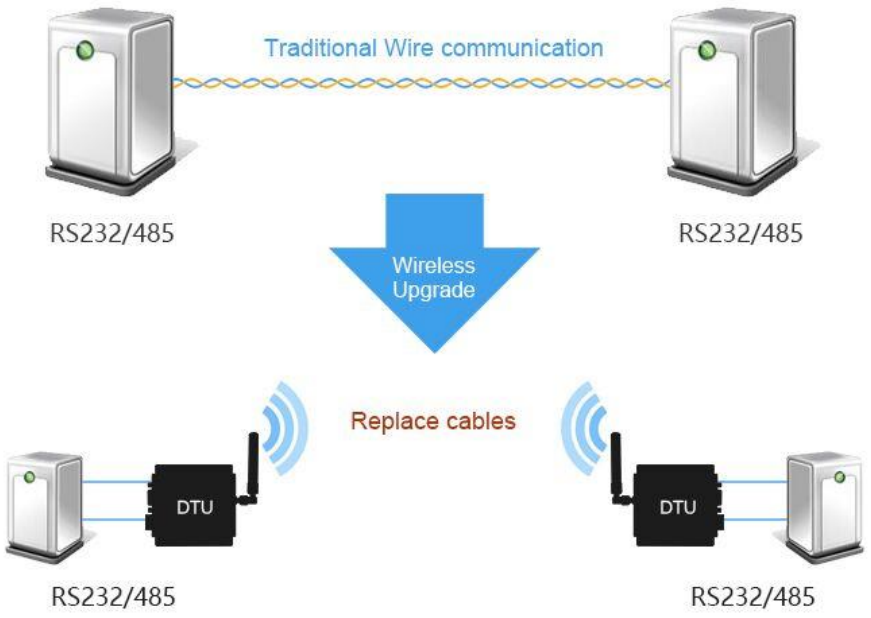
成都亿佰特电子科技有限公司
Chengdu Ebyte Electronic Technology Co.,Ltd.

E34-DTU-100 Datasheet v1.0



1. Introduction E34-DTU-100

1.1 Features E34-DTU-100

E34-DTU-100 is a 100mW wireless data transceiver (DTU) with RS232 & RS485 interface, 8~28V, operating at 2.4~2.518GHz. Utilizing serial port to send & receive data and it is half-duplex, hence lower the threshold for wireless application. The outstanding advantages of this DTU is concentrated power densities, long transmission range, it features automatic frequency hopping, strong anti-interference ability, high speed and short delay.

Automatic frequency hopping is to ensure communication secrecy and anti-interference ability. Compared with fixed frequency communication, frequency hopping communication is more obscure and difficult to be intercepted. Frequency hopping communication also has a good anti-interference ability, even if there are some frequency points being interfered, it still can communicate on the undisturbed frequency point.

The DTU has the function of data encryption & compression. The data transmitted over the air features randomness. And with the rigorous encryption & decryption, data interception becomes pointless. The function of data compression can decrease the transmission time & probability of being interference, while improving the reliability & transmission efficiency.

No.	Features	Description
1	Automatic frequency hopping	Compared with fixed frequency communication, frequency hopping communication is more obscure and difficult to be intercepted. Frequency hopping communication also has a good anti-interference ability, even if there are some frequency interference, it still can communicate on the undisturbed frequency point.
2	Fixed transmission	Master can transmit data to other DTUs in different channels or addresses, easy for networking and repeater, etc. For example: DTU A transmits AA BB CC to DTU B (address: 0x00 01, channel: 0x80), HEX format is 00 01 80 AA BB CC (00 01 refers to the address of DTU B, 80 refers to the channel of DTU B), then DTU B receives AA BB CC (only DTU B).
3	High-speed communication	With a high air data rate, it has fast transmitting speed, little delay and high data throughput; Specially suited for applications that require little delay and high data throughput, such as real time remote control.
4	Watchdog	With a built-in watchdog and precise time configuration, once an exception occurs the DTU will restart within 0.107 second and continue to work on previous parameter settings.
5	Applicable environment	2.4G is for free. User can apply to use it directly ; Due to high frequency and short wave, distance will be shortened when there are obstacles. It is applicable in open and clear air.
See more details in related manual		

1.2 Electrical parameter E34-DTU-100

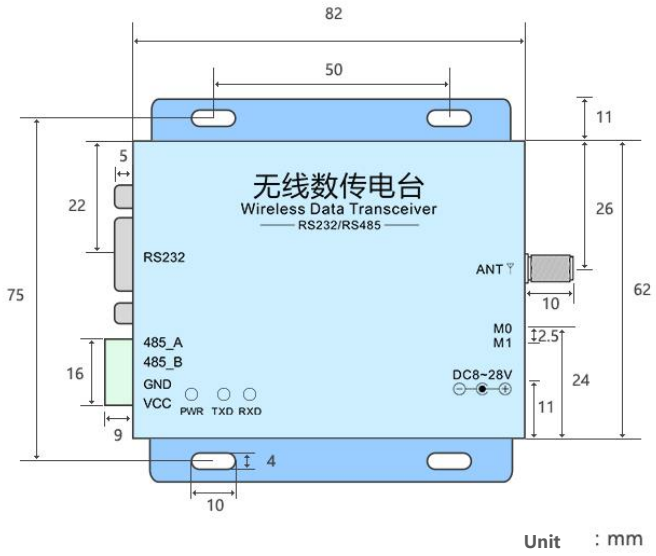
No.	Item	Parameter details	Description
1	Size	82 * 84 *24mm	Without antenna
2	Weight	133g	Without antenna
3	Frequency band	Default: 2400MHz	2400~2518MHz，Channel:12
4	Housing	Aluminum alloy	Black
5	Connector	RS485:1*4*3.81 mm RS232：DB9	Screwing Standard DB9，hole
6	Supply voltage	8 ~ 28V DC	Note：the voltage higher than 28V is forbidden
7	Communication level	RS232/RS485	Available for RS232 and RS485
8	Operation range	2500m	Test condition：clear and open area & 20dBm, antenna gain: 5dBi, height:> 2m, air data rate: 250kbps
9	Transmitting power	Maximum 20dBm	About 100mW , can be configured to 20, 14, 8, 2dBm
10	Receiving sensitivity	-102dBm@250kbps	Sensitivity has nothing to do with baud rate and timing
11	Air data rate	250kbps	Can be configured to 250k, 1M, 2Mbps
12	Standby current	14mA	Mode 3 (power supply : 12V)
13	Transmitting current	126mA@20dBm	≥300mA (recommended)
14	Receiving current	36mA	12V
15	Communication interface	RS232/RS485	8N1, 8E1, 8O1, Eight kinds of UART baud rate, from 1200 to 115200 bps (default: 9600)
16	Driving mode	RS232/RS485	Can be configured to push-pull/high pull, open-drain
17	Transmitting length	256 bytes buffer	27 bytes per package
18	Receiving length	256 bytes buffer	27 bytes per package
19	Address	65536 configurable addresses	Support fixed transmission (can not broadcast))
20	RSSI support	Built-in intelligent processing	-
21	Antenna type	SMA-K	External thread hole, 50Ω impedance
22	Operating temperature	-40 ~ +85℃	Industrial grade
23	Operating humidity	10% ~ 90%	Relative humidity, no condensation
24	Storage temperature	-40 ~ +125℃	Industrial grade

1.3 E34 series E34-DTU-100

Model	Interface	Frequency (Hz)	Power (dBm)	Operation range (km)	Air data rate (bps)	Feature
E34-DTU-100	RS232/RS485	2.4G	20	2.5	250k~2M	Automatic frequency hopping & strong anti-interference
E34-DTU-100 can be compatible with other E34 series						

2. Functional description E34-DTU-100

2.1 Pin definition E34-DTU-100



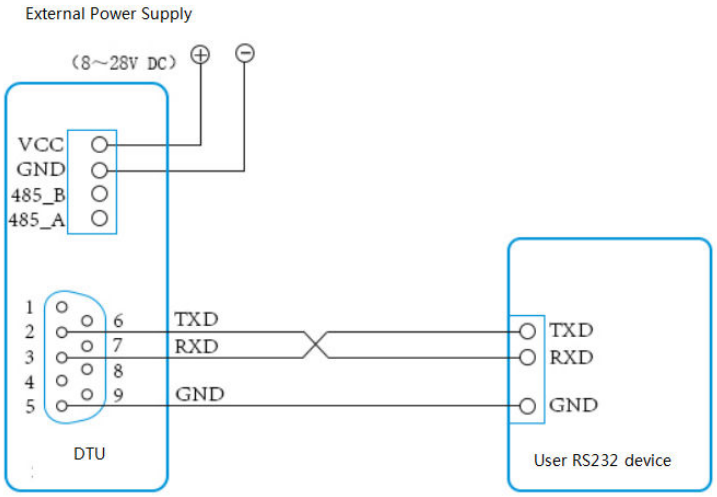
No.	Pin item	Application
1	RS232	Standard DB9, hole
2	485_A	Connect to end A of other RS485 devices
3	485_B	Connect to end B of other RS485 devices
4	GND	Ground
5	VCC	Power supply ,default: 8~28V(5V version can be customized), (DTU will select the higher voltage of power supply between 5 and 6)
6	DC8~28V	DC power connector (5.5*2.5) for DC8~28V (5V version can be customized)
7	ANT	Antenna (SMA-K : External thread hole, 50Ω characteristic impedance)
8	PWR	Power indicator
9	TXD	Transmitting indicator
10	RXD	Receiving indicator
11	M0	Dip switch (control operating mode)
12	M1	Dip switch (control operating mode)

★ Any E34-DTU-100 can be compatible with other E34 series ★

2.2 Connection type E34-DTU-100

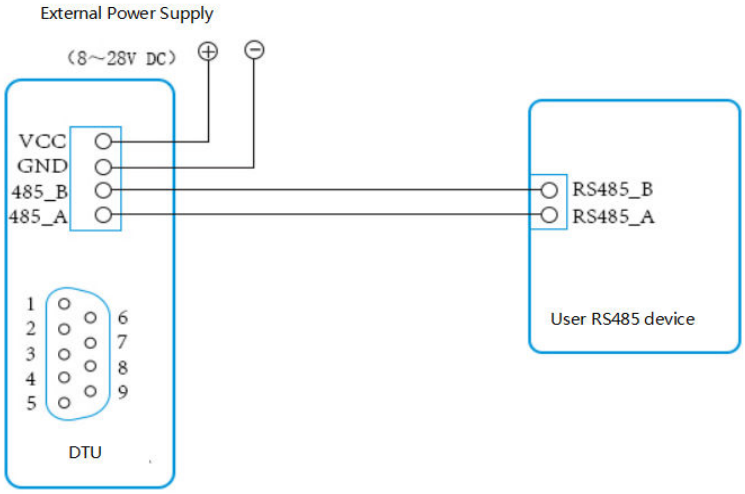
- RS232 Connection

RS232 Wiring Diagram



- RS485 Connection

RS485 Wiring Diagram



3. Operating mode E34-DTU-100

	Mode	M1	M0	Description
M0	Fixed frequency mode	On	On	Open UART and RF and transparent transmission is on
M1	Frequency hopping mode	On	Off	The frequency will change in sending & receiving process. It has a specific spread sequence. (hopping must be carried out at the same time for both parties)
M2	Reservation mode	Off	On	-
M3	Sleep mode	Off	Off	Parameter setting

4. Instruction format E34-DTU-100

In sleep mode (mode 3 : M1=off, M0=off) , it supports below instructions on list.

(**Only support 9600 and 8N1 format when setting**) :

No.	Format	Description
1	C0+working parameter	C0 + 5 bytes working parameters are sent in hexadecimal format. 6 bytes (in total) must be sent in succession. (Save the parameters when power-down)
2	C1+C1+C1	Three C1 are sent in hexadecimal format. The DTU returns to the saved parameters and they must be sent in succession.
3	C2+working parameter	C2 + 5 bytes working parameters are sent in hexadecimal format. 6 bytes (in total) must be sent in succession. (Do not save the parameters when power-down)
4	C3+C3+C3	Three C3 are sent in hexadecimal format. The DTU returns to the version information and they must be sent in succession.
5	C4+C4+C4	Three C4 are sent in hexadecimal format. The DTU will reset for one time and they must be sent in succession.

4.1 Factory default parameter E34-DTU-100

Model	Factory default parameter: C0 00 00 18 00 40						
DTU	Frequency	Address	Channel	Air data rate	Baud rate	UART format	Transmitting power

E34-DTU-100	2.4GHz	0x0000	0x00	250kbps	9600	8N1	20dBm

4.2 Parameter setting instruction E34-DTU-100

C0 and C2 are operating parameters. The difference between C0 command and C2 command is that C0 command will write parameters into the internal flash memory and can be saved when power- down, while C2 command can not be saved when power- down, because C2 command is temporarily mend instruction. C2 is recommended for the occasion that need to change the operating parameters frequently, such as C2 00 00 18 00 40.

No.	Item	Description	Notes
0	HEAD	Fix 0xC0 or 0xC2, it means this frame data is control instruction	● Must be 0xC0 or 0xC2 C0: Save the parameters when power-down C2: Do not save the parameters when power- down
1	ADDH	7 , 6 , 5 , 4: Resend times (only valid in M0, M2) ---------- 3 , 2 , 1 , 0 : High address of 4 bytes (the default F0H)	15 times (default: F). Packet drop times. Conflict may happen when there are several receivers at the same address. It is recommended to set 0. ---------- Default: 0
2	ADDL	Low address byte of module (the default 00H)	00H-FFH
3	SPED	Rate parameter, including UART baud rate and air data rate 7 , 6 UART parity bit 00 : 8N1 (default) 01 : 8O1 10 : 8E1 11 : 8N1 (equal to 00) ---------- 5 , 4 , 3 TTL UART baud rate (bps) 000 : 1200bps 001 : 2400bps 010 : 4800bps 011 : 9600bps (default) 100 : 19200bps 101 : 38400bps 110 : 57600bps 111 : 115200bps ----------	● UART mode can be different between communication parties. ---------- ● UART baud rate can be different between communication parties. ● The UART baud rate has nothing to do with wireless transmission parameters & won' t affect the wireless transmit / receive features. ----------

		2，N/A ---------- 1，0 Air data rate（bps） 00：250Kbs（default） 01：1MKbs 10：2MKbs 11：2MKbs(equal to 10)	● 0 (recommended) ---------- ● The lower the air data rate, the longer the transmitting distance, the better anti-interference performance and the longer transmitting time. ● The air data rate must keep the same for both communication parties. ● The air data rate of 10 and 11 are both 2Mkbs.
4	CHAN	7，6，5，4： N/A ---------- 3，2，1，0：Channel CHAN（default 0） ● Fixed frequency mode（Mode 0） 0-5 Communication frequency：2400M + CHAN * 2M 6-11 Communication frequency：2508M + (CHAN-6) * 2M ● Frequency hopping mode（Mode 1） 0-11 Communication frequency：2412M + CHAN * 2M	● 0 (recommended) ---------- 0H-0BH，Totally 12 channels
5	OPTION	7， Fixed transmission（similar to MODBUS） 0：Transparent transmission mode（default） 1： Fixed transmission mode ---------- 6 IO drive mode(the default 1) 1 :TXD and AUX push-pull outputs, RXD pull-up inputs 0：TXD、AUX open-collector outputs, RXD open-collector inputs	● In M1, the first three bytes of each user's data frame can be used as high/low address and channel. The module changes its address and channel when transmit. And it will revert to original setting after complete the process. ---------- ● This bit is used to the module internal pull-up resistor. It also increases the level’s adaptability in case of open drain. But in some cases, it may need external pull-up resistor.

		---------- 5，4，3， 2 N/A 1,0 transmitted power(approximation) 00： 20dBm (default) 01： 14dBm 10： 8dBm 11： 2dBm	---------- ● 0 (recommended). ● The peak value of the transmitting current is the current of the data transmission. ● The external power must make sure the ability of current output more than 300mA and ensure the power supply ripple within 100mV. (it is not recommended to reduce power)

For example: The meaning of No.3 "SPED" byte:

The binary bit of the byte	7	6	5	4	3	2	1	0
The specific value (configured by user)	0	0	0	1	1	0	0	0
Meaning	UART parity bit 8N1		UART baud rate is 9600			Air data rate is 250k		
Corresponding hexadecimal	1				8			

4.3 Reading operating parameter E34-DTU-100

Instruction format	Description
C1+C1+C1	In sleep mode，user gives the DTU instruction (HEX format): C1 C1 C1, It returns to the present configuration parameters. For example, C0 00 00 18 00 40.

4.4 Reading version number E34-DTU-100

Instruction format	Description
C3+C3+C3	In sleep mode, user gives the DTU instruction (HEX format): C3 C3 C3, It returns to its present version number, for example C3 34 xx yy. 34 here means the DTU model (E34 series); xx is the version number and yy refers to other features.

4.5 Reset instruction E34-DTU-100

Instruction format	Description
C4+C4+C4	In sleep mode, user gives the DTU instruction (HEX format): C4 C4 C4, it resets for one time. During the reset process, the DTU will conduct self-check, AUX outputs low level. After reset is completed, the AUX outputs high level, then it starts to work regularly, then the working mode can be switched or be given another instruction.

5. Parameter setting E34-DTU-100

Configure the DTU to sleep mode. Switch the dip switch to M3 (as shown in the picture)	

6. About us E34-DTU-100

Chengdu Ebyte Electronic Technology Co., Ltd., a high-tech company focusing on application of Internet of Things, owns a number of independently researched and developed products and obtains unanimous approvals from customers. With a powerful R&D team, perfect after-sales system, our company provides perfect solutions and technical assistance, shortens R&D period, reduces R&D cost and provides a strong platform for brand new ideas about product R&D.

Our products have been widely applied in various fields, such as consumer electronics, industrial control, healthcare, security alarm, field acquisition, smart home, expressway, property management, water and electricity meter reading, power monitoring, etc.

EBYTE 成都亿佰特电子科技有限公司
Chengdu Ebyte Electronic Technology Co.,Ltd.

【Website】：www.cdebyte.com
【Technical support】：support@cdebyte.com
【eBay】：stores.ebay.com/cdebyte
【Alibaba】：cdebyte.en.alibaba.com
【Address】: Innovation Center D347, 4#XI-XIN road, High-tech district (West), Chengdu, Sichuan, China