

Operating Manual and datasheet

GENERAL DESCRIPTION

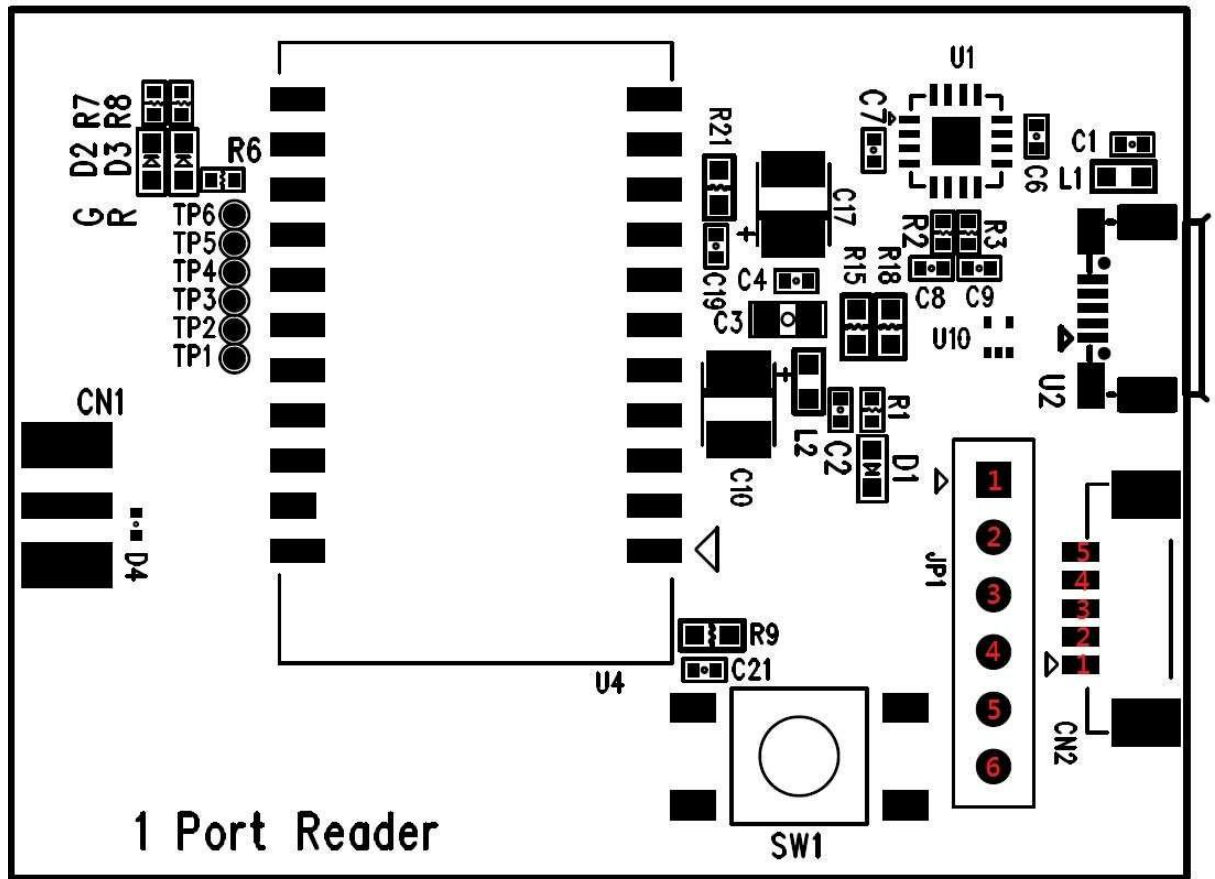
CT-E300T2 is designed as 3rd reader Board, usually applied to Smart phone(OTG), Tablet PC(OTG) and notebook . Our advance technology delivers small, reliable, easy to de- sign and cost-effective EPC G2 UHF reader solution. This reader is not only support RFID supply chain system but also support RFID life system, especially Anti-counter- feiting and Home automation system.

FEATURES

- UHF EPC G2 reader module
 - Compatible with ISO-18000-6C
 - Low cost
 - Support USB_(default)/UART_(option) Interface
 - Best choice for 3 meter Read Range
 - AVG power consumption: under 280mA at 3.5V
 - RF output MAX=26dBm



UART Interface

Pin Define(UART Interface)_{option}

JP1 and CN2 UART interface (option) (remove R15 and R18)

Pin No.	Name	Direction	Description
1	VIN	P	5V DC input
2	GND	P	Ground
3	TXD	O	UART output
4	RXD	I	UART Input
5	EN	I	Enable Module(Active High)
6	T_SW	I	External tact switch input (Active LOW)

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Conditions
Max storage temperature	T _{STOREmax}	+120°C
Min storage temperature	T _{STOREmin}	-60°C
Power supply voltage	V _{IN}	-0.1V to +5.5V
Electrostatic discharge	V _{ESD}	1KV

Recommend Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power Supply voltage	V _{IN}	3.6	5	5.5	V
Operating Temperature	T _a	0	-	+50	°C
Storage Temperature	T _s	-40		+85	°C

ELECTRICAL CHARACTERISTICS

AC Electrical Characteristics (T_a = 25°C, V_{IN} = 5V, V_{SS} = 0V)

Parameter	Symbol	Min.	Typ.	Max.	Unit
RF Output Frequency	F _c	860		960	Mhz
RF port output Power	P _{out}		26		dbm
Interrogator Transmit Spurious Emissions, In-Band	In accordance with local regulations				-
Interrogator Transmit Spurious Emissions, Out of-Band	In accordance with local regulations				-
RF Bandwidth	In accordance with local regulations				-
Transmit data rate	T _{Rate}	-	26K	-	bps
Modulation	ASK				
Modulation depth	90% normally				
Data Coding	PIE				
Demodulation	ASK				
Download data rate	D _{Rate}	-	40K	-	bps
Data encoding	FM0				

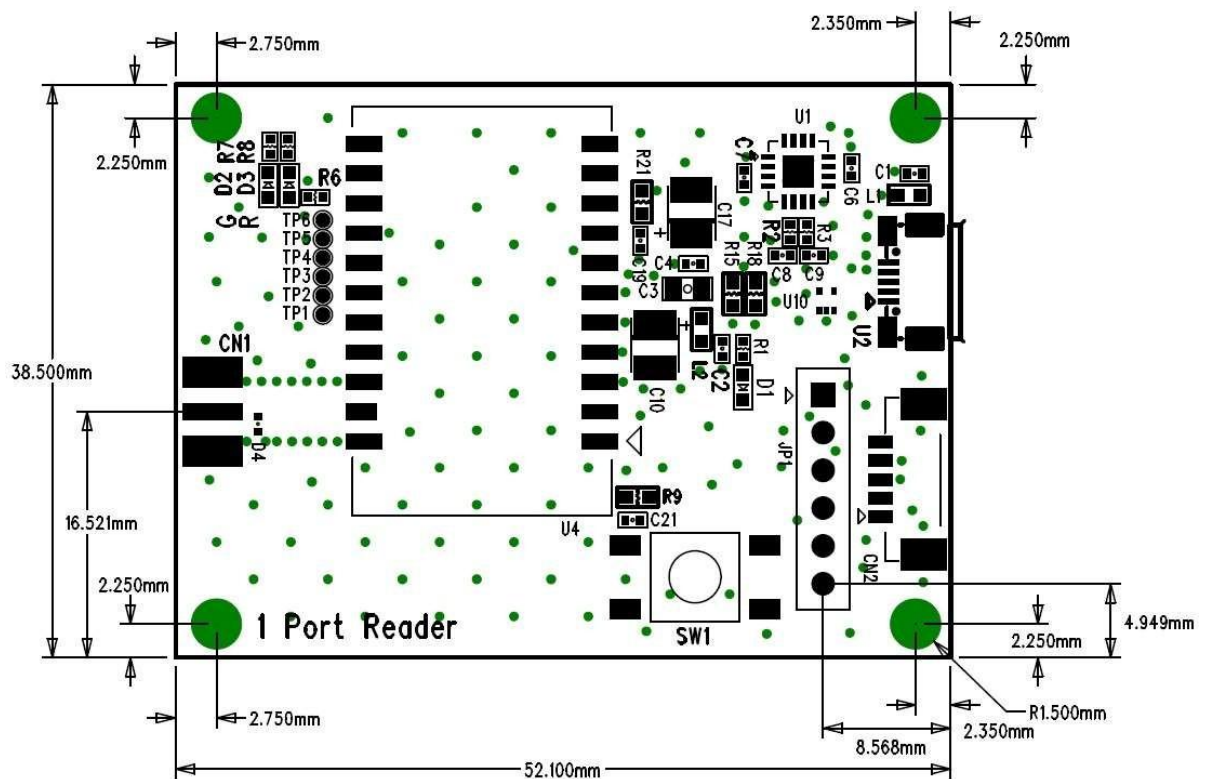
DC Electrical Characteristics (VIN = 5V, VSS = 0V)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Average operating current	I_{oc}	-	280	-	mA
Standby current	I_{sb}	-	-	10	mA
Peak current	I_{peak}	-	300		mA

System Characteristics

Parameter	Description
Interface	USB 2.0
RFID protocol	ISO-18000-6C/ EPC class1 gen2
Operation range	Around 3meter depend on ANT type
RF regulations	FCC, NCC, CE, SRRC(option)

Dimension



ASCII PROTOCOL COMMANDS

Command and return message is transmitted as **ASCII** format. All command is start with a command character and arguments (if any, in **hexadecimal** units) and stop with a <CR>(0x0D hex), and return message is start with a <LF>(0x0A hex) , command first character and stop with a <CR><LF>.

If command is none match, return message will be <LF>X<CR><LF>.

Ex.

PC or Host: S<CR>

Reader return message: <LF>S01234567<CR><LF>

→ RFID Command Overview

Command*	Return Message**	Description
V	Vxxyy,<message> xx: major version number yy: minor version number <message>: other info.	display reader firmware version
S	S01234567 01234567 is reader ID	display reader ID
Q	Q<none or EPC> <none or EPC> none: no tag in RF field EPC: PC+EPC+CRC16	display tag EPC ID
R<bank>,<address>,<length> <bank> memory bank 0: reserved 1: EPC 2: TID 3: USER <address> start address 0 ~ 3FFF <length> read word length 1 ~ 20	R<none or read data> or <error code> <none or read data> none: no tag in RF field <Error code> 0: other error 3: memory overrun 4: memory locked B: Insufficient power F: Non-specific error	read tag memory data
W<bank>,<address>,<length>,<data> <bank> memory bank 0: reserved	W<none or <OK>> or <error code> <none or <OK>> none: no tag in RF field	write data to tag memory

1: EPC 2: TID 3: USER <address> start address 0 ~ 3FFF <length> write words length 1 ~ 20	<OK>: written ok <error code> 0: other error 3: memory overrun 4: memory locked B: Insufficient power F: Non-specific error Z00~Z1F: words write 3Z00~3Z1F: error code and words write	
K<password>,<recom> <password> kill password 00000000~FFFFFFFF <recom> recommissioning 0~7	K<none or <OK>> or <error code> <none or <OK>> none: no tag in RF field <OK>: kill ok <error code> 0: other error 3: memory overrun 4: memory locked B: Insufficient power F: Non-specific error	kill tag
L<mask>,<action> <mask> lock mask 000~3FF <action> lock action 000~3FF	L<none or <OK>> or <error code> <none or <OK>> none: no tag in RF field <OK>: lock ok <error code> 0: other error 3: memory overrun 4: memory locked B: Insufficient power F: Non-specific error	lock memory
P<password> <password> access password 00000000~FFFFFFFF	P	set access password for R W L command, one time use
U	U<none or EPC> <none or EPC>	Multi-TAG read EPC

	none: no tag in RF field EPC: PC+EPC+CRC16	
G1 G0 G2	G1 G0 G2	Start command logging End command logging Run logging commands For external TACT switch function
T<bank>,<bit address>,<bit length>,<bit data> <bank> memory bank 0: reserved 1: EPC 2: TID 3: USER <bit address> start bit address 0~3FFF <bit length> select bit length 1~60 <bit data> select bit mask data	T	Select matching tag
N0,00 read RFID Reader power N1, <value> set RFID Reader power (-2~25dBm) <value> 00~1B	N<value> <NULL>	Read/Set RFID Reader power level
N4,00 read Regulation N5, <value> set Regulation <value> 01~05 01: US 902~928 02: TW 922~928 03: CN 920~925	N<value> <NULL>	Read/Set Frequency Range

04: CN2 840~845		
05: EU 865~868		

*command is start with <LF> stop with <CR>

**Return Message is start with <LF> stop with <CR><LF>

Example:

1. Read TID memory bank, start address at 0, read 4 words length, TID data is 0x1234567890

Host send: <LF>R2,0,4<CR>

Hex format: 0A 52 32 2C 30 2C 34 0D

Reader message: <LF>R123456789ABCDEF0<CR><LF>

Hex format: 0A 52 31 32 33 34 35 36 37 38 39 41 42 43 44 45 46 30 0D 0A

2. Write USER memory bank, start address at 12, write 2 word length, write data is 0xAAAABBBB

Host send: <LF>W3,C,2,AAAABBBB<CR>

Hex format: 0A 57 33 2C 43 2C 32 2C 41 41 41 41 42 42 42 42 0D

Reader message: <LF>W<OK><CR><LF>

Hex format: 0A 57 3C 4F 4B 3E 0D 0A

The information in this data sheet is believed to be accurate and reliable. We reserves the right to make changes without prior notice to any specifications of this product. This device is not intended to be used for systems that support or sustain life or for systems where failure may cause personal injury. The customers use this product at their own risk.

The host product must be labeled in a visible area with the following statement:
Contains FCC ID: WD6CTE300T2

FCC ID : WD6CTE300T2

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.

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

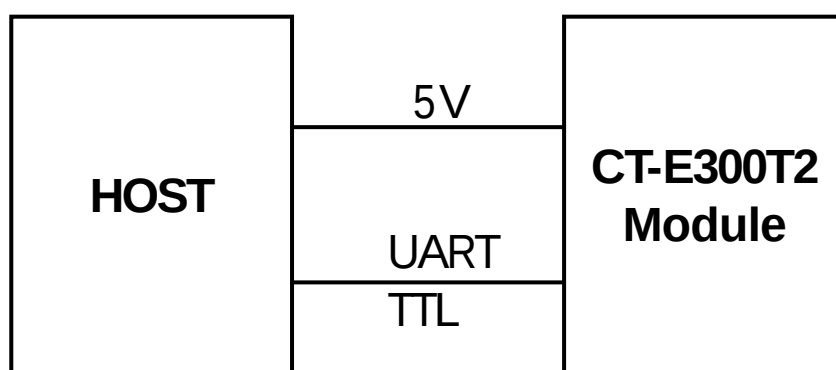
FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

NCC 低功率射頻器材技術規範警語

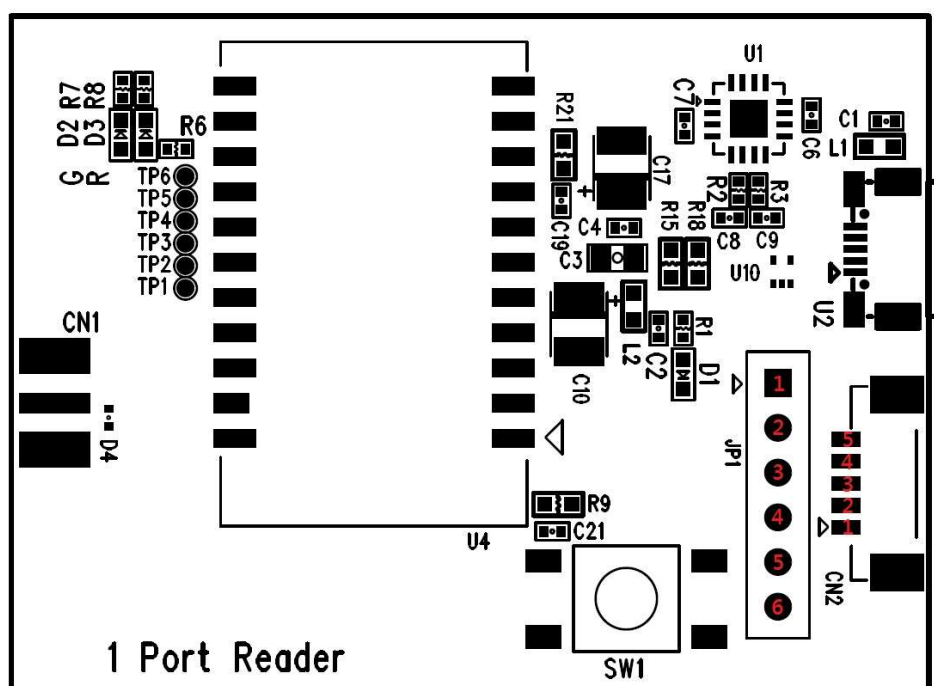
取得審驗證明之低功率射頻器材，非經核准，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。低功率射頻器材之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前述合法通信，指依電信管理法規定作業之無線電通信。低功率射頻器材須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

Hardware User Manual



1. CN2 Use Molex PicoBlade1.25 Rec Hsg 5P Cable to link the Device
2. CN2 UART interface

Pin No.	Name	Direction	Description
1	VIN	P	5V DC input
2	GND	P	Ground
3	TXD	O	UART output
4	RXD	I	UART Input
5	EN	I	Enable Module(Active High)

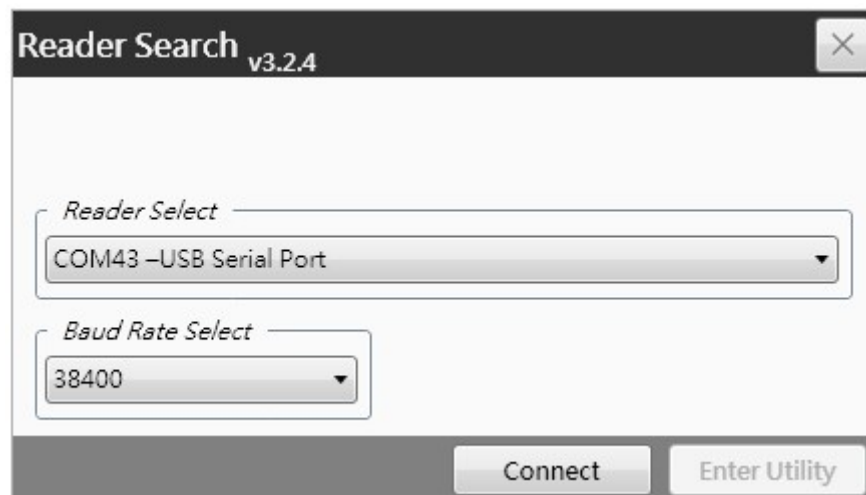


PC software User Manual

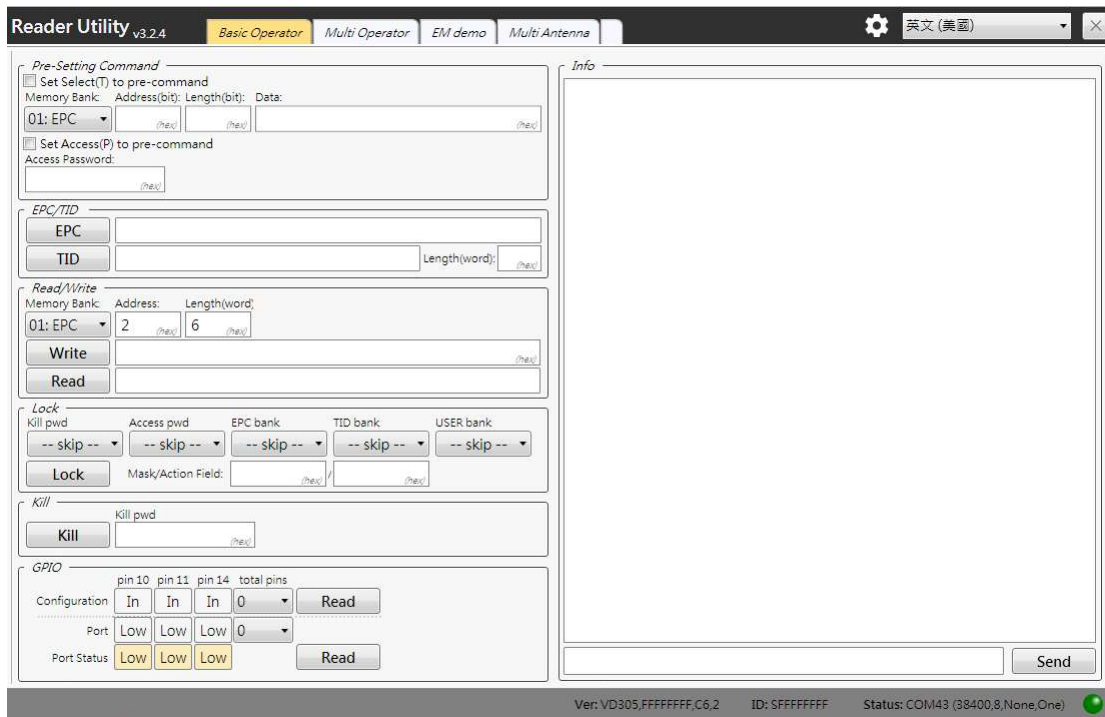
PC system: Windows

- USB to UART driver
- Above Net_Framework_4.0
- FAVEPC Reader Utility software

1. First install 【CDM v2.12.00 WHQL Certified】 file. The file download Web side refer to the below
<http://www.ftdichip.com/Drivers/VCP.htm>
2. Install the above Net_Framework_4.0 file , The file download Web side refer to the below
<https://www.microsoft.com/zh-tw/download/details.aspx?id=17718>
3. USB Reader plug to PC USB port and Run Reader Utility software , refer to the below:



Check the box 【Connect】 and 【Enter Reader】 and Enter the operating window.



Operating command refers to the below:

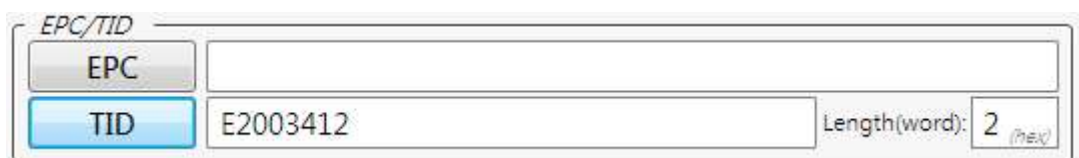
1.1 Q command :

Read EPC data from single TAG. Check the box【EPC(Q)】. It can read TAG EPC data.

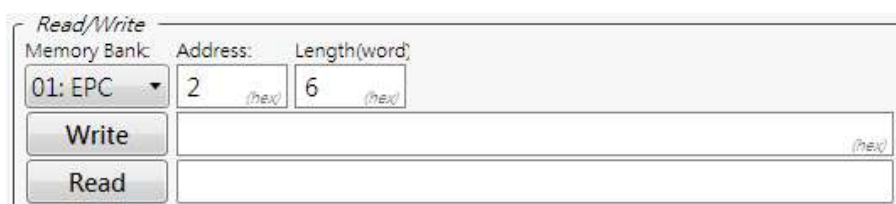


1.2 【TID】 button

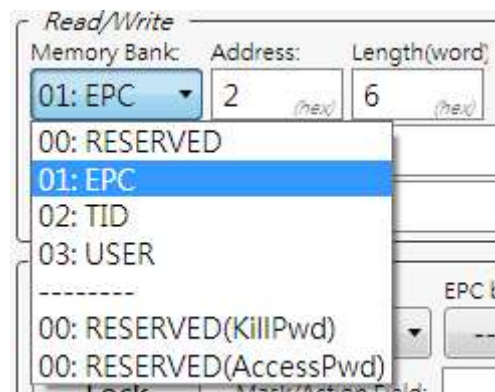
Real command is <LF>R2,0,4<CR>. It can see the real command in Info windows at lower right corner. The 【TID】 button is used to read single TAG.



1.3 R command (Read operation) :



- 1.3.1 First select the **【Memory Bank】**, Drop-down menu: **【00:RESERVED】**
【01:EPC】**【02:TID】****【03:USER】****【00:RESERVED KillPwd】****【00:RESERVED**
AccessPwd】



- 1.3.2 Enter number in **【Address】** and **【Length(word)】**
- 1.3.3 Check the Box **【Read】** to get the data.

Read/Write		
Memory Bank:	Address:	Length(word):
01: EPC	2 (hex)	6 (hex)
Write		(hex)
Read		12345687381302242470180F

1.4 W command (Write operation) :

- 1.4.1 First select the **【Memory Bank】**
- 1.4.2 Enter number in **【Address】** and **【Length(word)】**
- 1.4.3 Enter the HEX data to the write windows
- 1.4.4 Check the box **【Write】**. The result show in Info windows at lower right corner. If it is right, it show the <LF>W<OK><CR><LF>.
- 1.4.5 Check the box **【Read】** . It can get the data if it writes data to the TAG.

Read/Write		
Memory Bank:	Address:	Length(word):
01: EPC	2 (hex)	2 (hex)
Write		12345687 ✓
Read		12345687

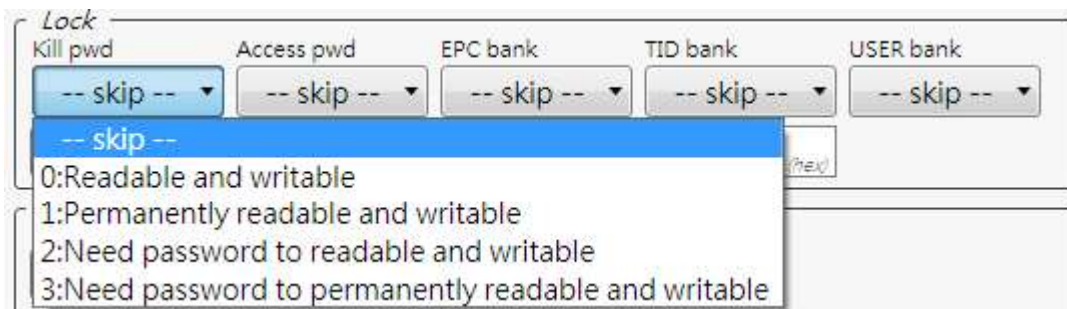
1.5 Lock operation

- 1.5.1 Check the box from Kill pwd options. It can select four items.
 - 1.5.1.1 **【skip】**: not change
 - 1.5.1.2 **【Readable and writable】**: TAG can be Readable and writable
 - 1.5.1.3 **【Permanently Readable and writable】**: TAG can be Permanently

Readable and writable. It can't be change the status after the setting.

1.5.1.4 **【 Need password to readable and writable 】** : TAG need password to readable and writable

1.5.1.5 **【 Need password to permanently readable and writable 】** : TAG need password to permanently readable and writable. It can't be change the status after the setting.



1.5.2 Check the box from Access pwd options. It can select four items.

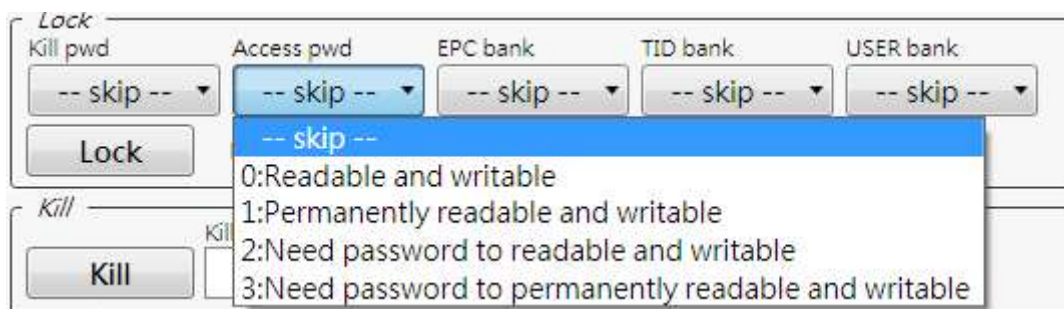
1.5.2.1 **【 skip 】** : not change

1.5.2.2 **【 Readable and writable 】** : TAG can be Readable and writable

1.5.2.3 **【 Permanently Readable and writable 】** : TAG can be Permanently Readable and writable. It can't be change the status after the setting.

1.5.2.4 **【 Need password to readable and writable 】** : TAG need password to readable and writable

1.5.2.5 **【 Need password to permanently readable and writable 】** : TAG need password to permanently readable and writable. It can't be change the status after the setting.



1.5.3 Check the box from EPC bank options. It can select four items.

*EPC data always can be read.

1.5.3.1 **【 skip 】** : not change

1.5.3.2 **【 Writable 】** : TAG can be writable

1.5.3.3 **【 Permanently writable 】** : TAG can be permanently writable. It can't be change the status after the setting.

- 1.5.3.4 **【Need password to writable】** : TAG need password to writable
- 1.5.3.5 **【Need password to permanently writable】** : TAG need password to permanently writable. It can't be change the status after the setting.

The screenshot shows a software interface with two main sections: 'Lock' and 'Kill'. In the 'Lock' section, there are five dropdown menus labeled 'Kill pwd', 'Access pwd', 'EPC bank', 'TID bank', and 'USER bank'. All are currently set to '-- skip --'. Below these is a 'Lock' button and a 'Mask/Action Field:' label. In the 'Kill' section, there is a 'Kill' button and a 'Kill pwd' input field. A dropdown menu is open for the 'EPC bank' field, showing four options: '0:Writable', '1:Permanently writable', '2:Need password to writable', and '3:Need password to permanently writable'.

1.5.4 Check the box from TID bank options. It can select four items.

*TID data always can be read. Normal TAG TID can't be written. It need refer to the TAG IC specification.

- 1.5.4.1 **【skip】** : not change
- 1.5.4.2 **【Writable】** : TAG can be writable
- 1.5.4.3 **【Permanently writable】** : TAG can be permanently writable. It can't be change the status after the setting.
- 1.5.4.4 **【Need password to writable】** : TAG need password to writable
- 1.5.4.5 **【Need password to permanently writable】** : TAG need password to permanently writable. It can't be change the status after the setting.

This screenshot is similar to the previous one, but the dropdown menu is open for the 'TID bank' field. The options are the same: '0:Writable', '1:Permanently writable', '2:Need password to writable', and '3:Need password to permanently writable'. The 'Mask/Action Field:' label now has '(hex)' next to it. The 'Kill pwd' input field also has '(hex)' next to it.

1.5.5 Check the box from USER bank options. It can select four items.

*USER bank data always can be read.

- 1.5.5.1 **【skip】** : not change
- 1.5.5.2 **【Writable】** : TAG can be writable
- 1.5.5.3 **【Permanently writable】** : TAG can be permanently writable. It can't be change the status after the setting.
- 1.5.5.4 **【Need password to writable】** : TAG need password to writable
- 1.5.5.5 **【Need password to permanently writable】** : TAG need password to permanently writable. It can't be change the status after the setting

Lock

Kill pwd: -- skip -- Access pwd: -- skip -- EPC bank: -- skip -- TID bank: -- skip -- USER bank: -- skip --

Mask/Action Field: (hex) / (hex)

Lock

Kill

Kill pwd: (hex)

0:Writable
1:Permanently writable
2:Need password to writable
3:Need password to permanently writable

- 1.5.6 For example. We will select (Need password to readable and writable) option at all item. Check the box **Lock** . The result show in Info windows at lower right corner. If it is right, it show the <LF>L<OK><CR><LF>.

Lock

Kill pwd: 2:Need pas Access pwd: 2:Need pas EPC bank: 2:Need pas TID bank: 2:Need pas USER bank: 2:Need pas

Mask/Action Field: 2AA ✓ / 2AA ✓

Lock

1.6 Kill Password Setting

- 1.6.1 At **Memory Bank** of Read/Write operation item , Drop-down menu select **00:RESERVED KillPwd** item.

Read/Write

Memory Bank: Address: Length(word)

00: RESEF 0 (hex) 2 (hex)

00: RESERVED
01: EPC
02: TID
03: USER

00: RESERVED(KillPwd)
00: RESERVED(AccessPwd)

EPC b: 2:Ne
Mask/Action Field: 2AA

- 1.6.2 Check the box **Read** , Default value is 00000000
- 1.6.3 For example. Write password is 12345678 , check the Box**Write**. The result show in Info windows at lower right corner. If it is right, it show the <LF>W<OK><CR><LF>

Read/Write

Memory Bank: Address: Length(word)

00: RESEF 0 (hex) 2 (hex)

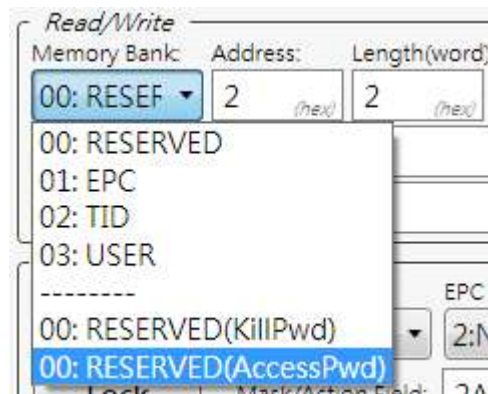
Write 12345678 ✓

Read 00000000

1.7 Access Password Setting

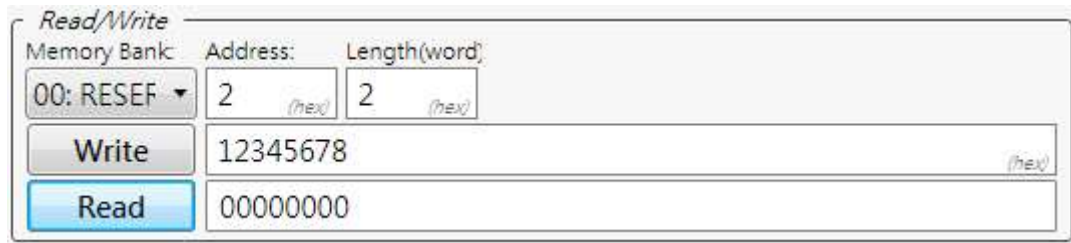
- 1.7.1 At **Memory Bank** of Read/Write operation item , Drop-down menu

select 【00:RESERVED AccessPwd】



1.7.2 Check the box 【Read】 , Default value is 00000000

1.7.3 For example. Write password is 12345678 , check the Box【Write】. The result show in Info windows at lower right corner. If it is right, it show the <LF>W<OK><CR><LF>

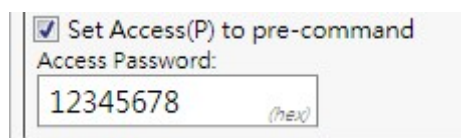


1.8 P command:

1.8.1 The all operations are be locked the password. So we need use P command before the other command operates.

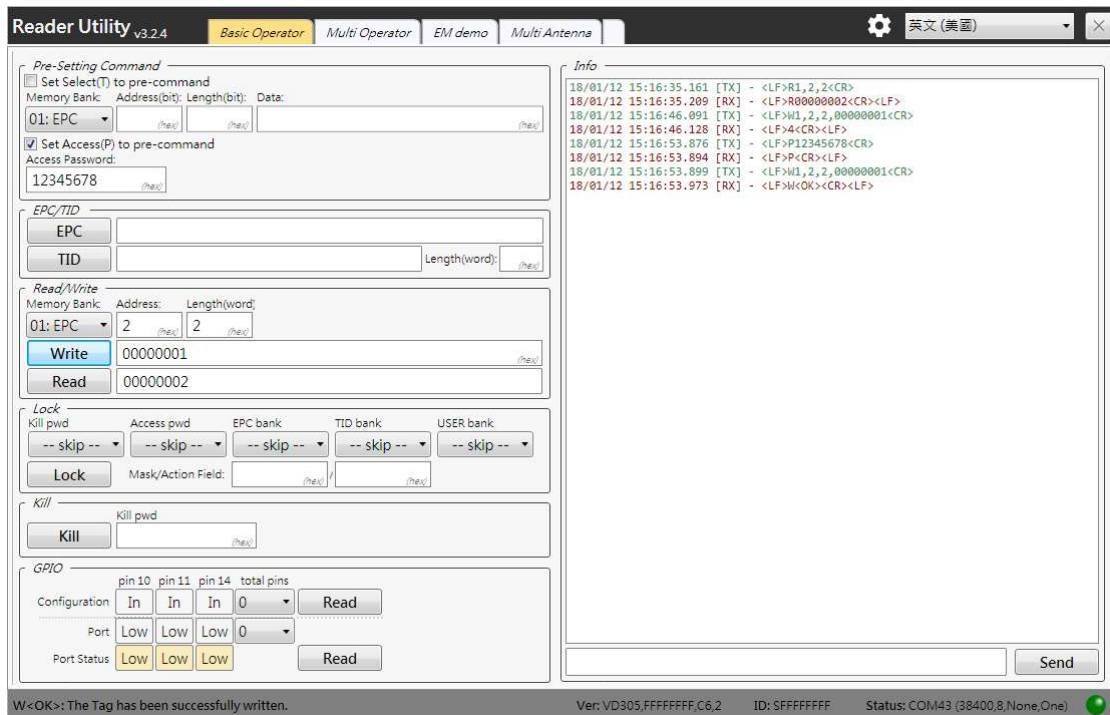
1.8.2 Write the password (12345678) at Access Password item

1.8.3 Check the box 【Set access to pre-command】



1.8.4 We can read TAG to get the EPC data.

1.8.5 We can see the information in Info windows at lower right corner. The R command. It isn't need the password to read EPC data. Because the EPC data always can be read. But we need write the ECP data. If it doesn't run the P command, it will resend the error code (4). It means the memory is locked. So we run the P command first and immediately run W command. It can write data to EPC bank memory.



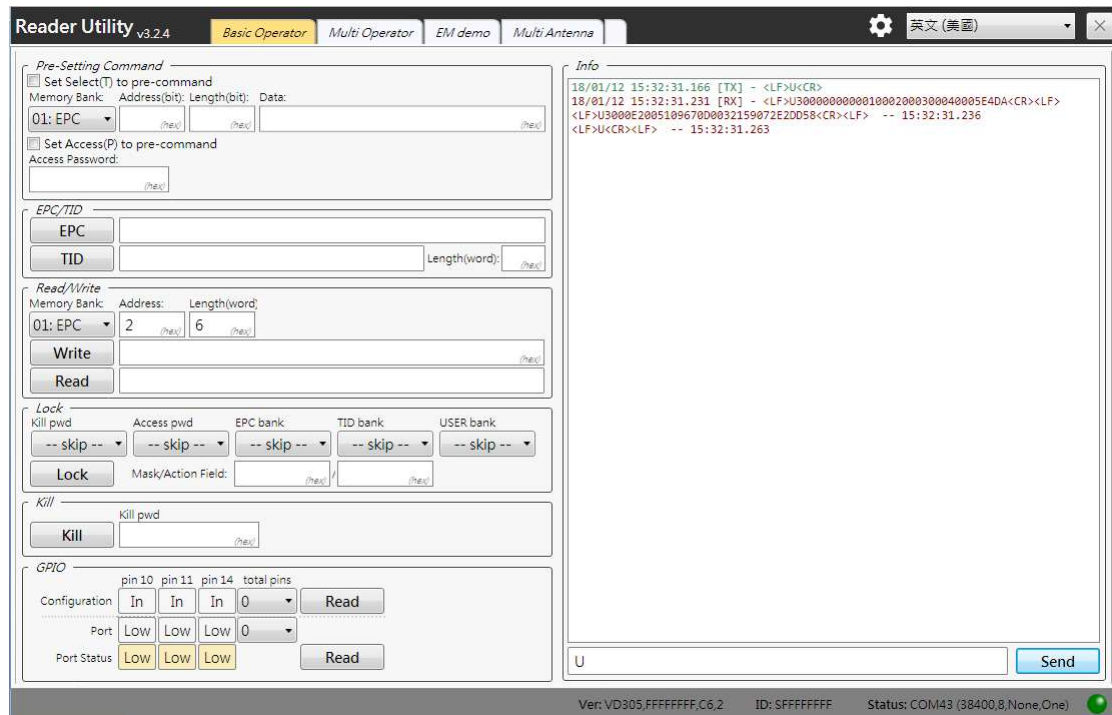
1.9 Kill command

- 1.9.1 Enter kill password 12345678 at Kill pwd item
- 1.9.2 Check the box **【Kill】** . The TAG will be kill and can't be used again.



1.10 T command ---Select TAG operation

- 1.10.1 It need select one TAG operation at Multi-TAG. It need use the T Command to select specific TAG.
- 1.10.2 Check the box **【Multi】** first and check the box **【EPC(U)】**
- 1.10.3 It show the Multi-TAG data at Top right of the window



1.10.4 At Pre-setting item

1.10.4.1 Check the box 【Set select to pre-command】

1.10.4.2 Select 【01:EPC】 at Memory Bank

1.10.4.3 Enter number(70) at Address(bit) *Warning : Address unit is bit, the value is HEX. So $\text{HEX}(7 \times 16) = \text{HEX}(112) = 70 \text{ hex}$

1.10.4.4 Enter number (10) at Length(bit) * Warning : Length unit is bit, the value is HEX. So $\text{HEX}(1 \times 16) = \text{HEX}(16) = 10 \text{ hex}$

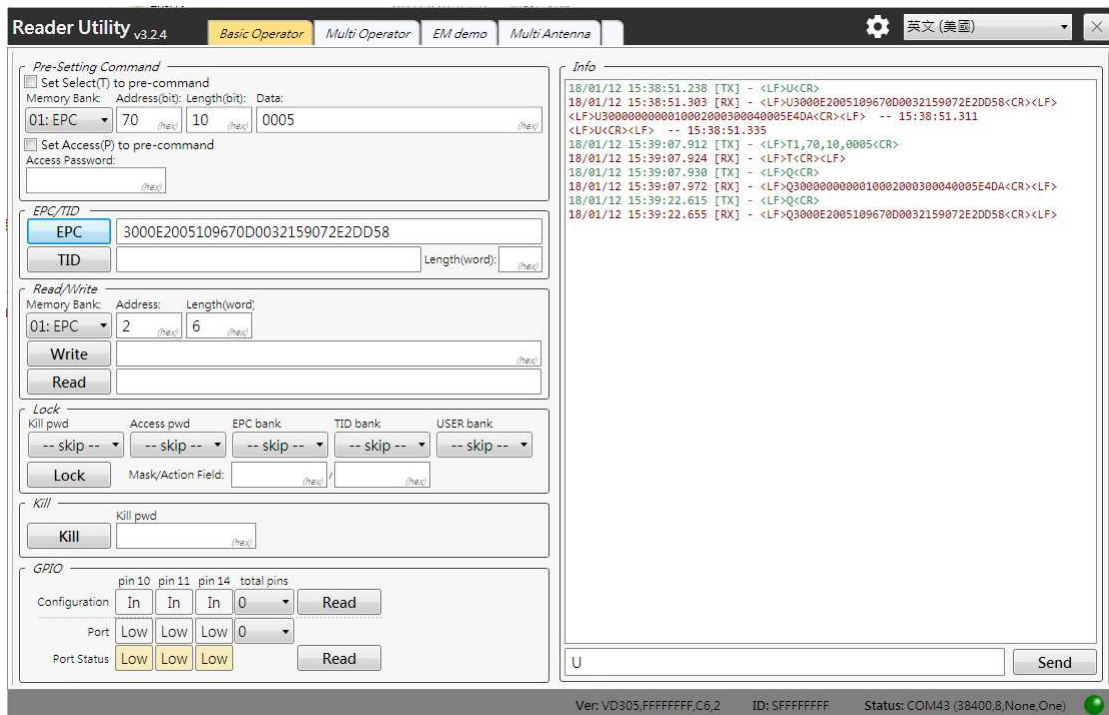
1.10.4.5 Enter last four numbers of EPC at Data item. For example. The number is 8DE0 or 8DDF.

1.10.5 At Read/Write item

1.10.5.1 Select 【01:EPC】 at Memory Bank

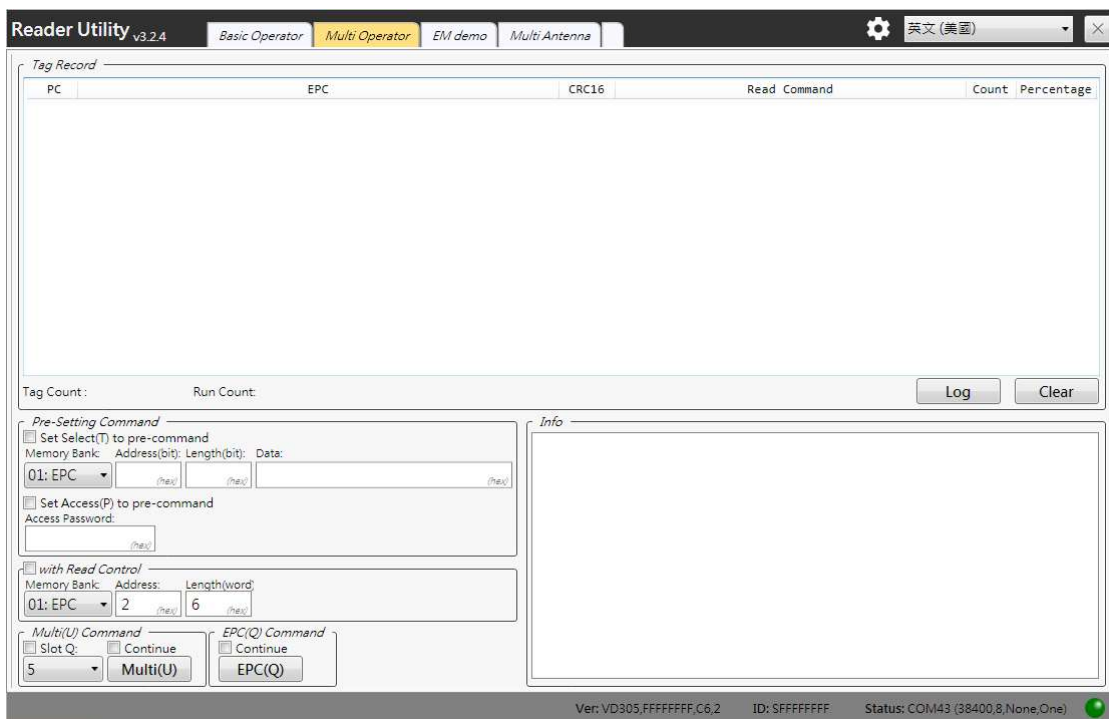
1.10.5.2 Check the box【 Read】. We can get the EPC data by selected TAG

1.10.6 It shows the command process in Info windows at lower right corner.



1.12 U command – Multi-TAG read

1.12.1 Check the 【Multi Operator】 box to change the screen

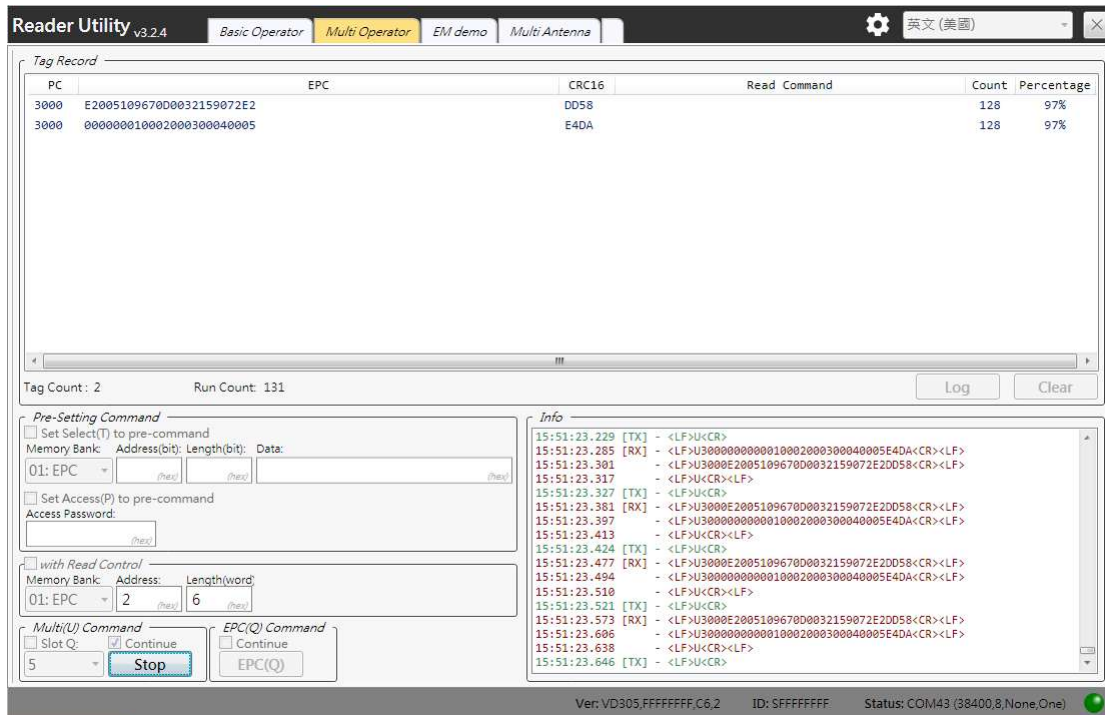


1.12.1 Check the 【Multi(U)】 box to read ECP of multi-tag.

1.12.2 Continue to read multi-tag. First check 【Continue】 box and check 【Multi(U)】 box



1.12.3 If it want stop to run, check 【STOP】 box



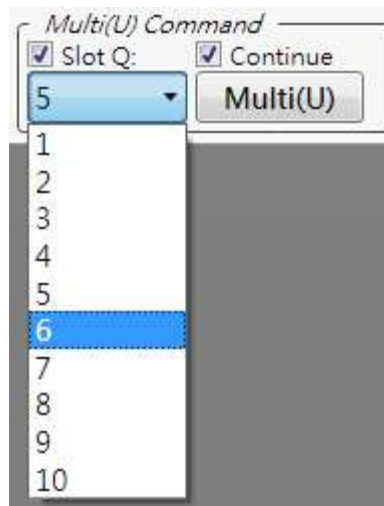
1.13 UR command --- Multi-Band data read with EPC for multi-Tag read

1.13.1 Check the 【Multi Operator】 box to change the screen

1.13.2 Check 【Slot Q:】 item and Drop-down menu select 【2 to the power of n】

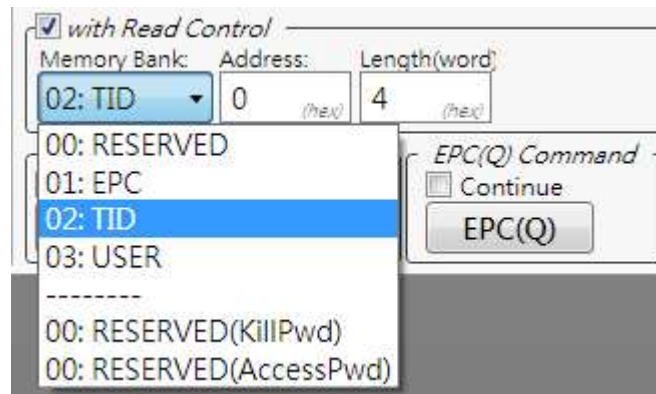
1.13.3 Check the 【MultiRead】 box to read Multi-TAG EPC

1.13.4 If it need continue to read Multi-TAG. First check the box 【Continue】 and check 【MultiRead】 box



1.13.5 If it need read EPC and TAG memory data, please check 【Read Control】 and select 【Memory Bank】. Drop-down menu: 【00:RESERVED】

【01:EPC】【02:TID】【03:USER】【00:RESERVED KillPwd】【00:RESERVED
AccessPwd】 and check 【MultiRead】 box



1.13.6 The data messing show the info. and Tag Record

Reader Utility v3.2.4 Basic Operator Multi Operator EM demo Multi-Antenna 英文(美国)

Tag Record

PC	EPC	CRC16	Read Command	Count	Percentage
3000	E2005109670D0032159072E2	DD58	RE2003412016EFE00	8	100%
3000	000000010002000300040005	E4DA	RE2003412012DF600	6	75%

Tag Count: 2 Run Count: 8 Log Clear

Pre-Setting Command

☐ Set Select(T) to pre-command

Memory Bank: Address(bit): Length(bit): Data:

01: EPC

☐ Set Access(P) to pre-command

Access Password:

☐ with Read Control

Memory Bank: Address: Length(word)

02: TID 0 4

Multi(U) Command

☒ Slot Q: 4 ☒ Continue Multi(U)

EPC(Q) Command

☐ Continue EPC(Q)

Info

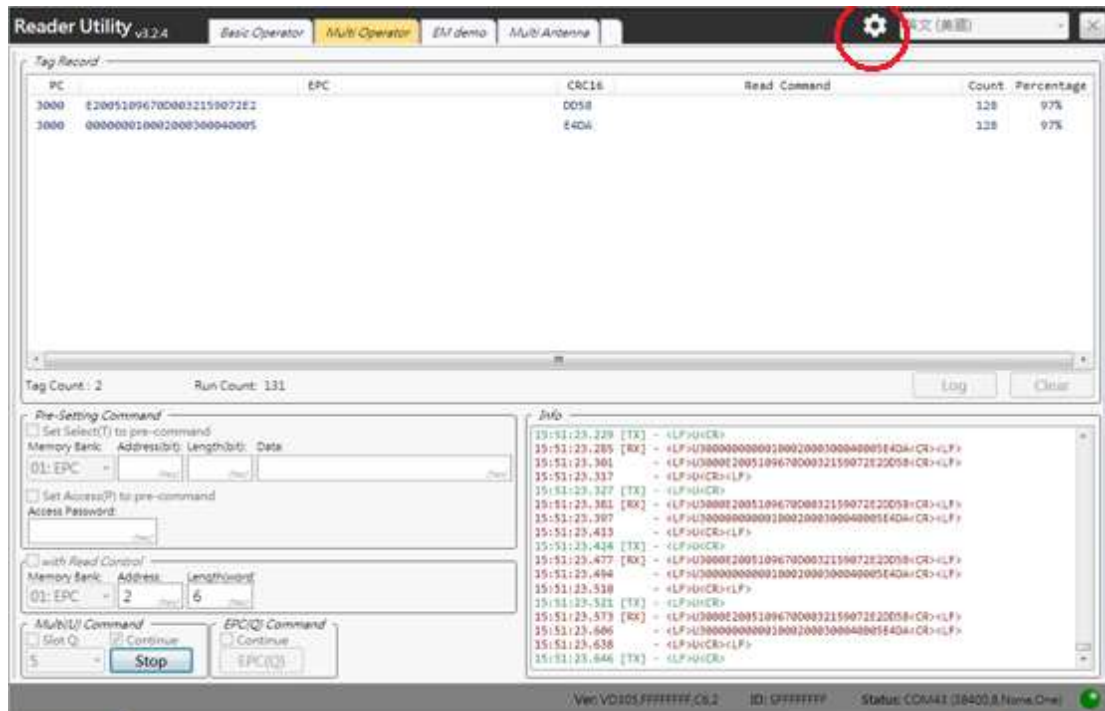
```

16:00:16.603 [TX] - <LF>U4,R2,0,4<CR>
16:00:16.723 [RX] - <LF>U3000E2005109670D0032159072E2D058,RE2003412016EFE00<CR><LF>
16:00:16.730 [RX] - <LF>U3000000000010002000300040005E4DA,RE2003412012DF600<CR><LF>
16:00:16.803 [TX] - <LF>U4,R2,0,4<CR>
16:00:16.810 [TX] - <LF>U4,R2,0,4<CR>
16:00:16.899 [RX] - <LF>U3000E2005109670D0032159072E2D058,RE2003412016EFE00<CR><LF>
16:00:16.963 [RX] - <LF>U3000000000010002000300040005E4DA,RE2003412012DF600<CR><LF>
16:00:17.059 [TX] - <LF>U4,R2,0,4<CR>
16:00:17.070 [TX] - <LF>U4,R2,0,4<CR>
16:00:17.186 [RX] - <LF>U3000000000010002000300040005E4DA,RE2003412012DF600<CR><LF>
16:00:17.193 [RX] - <LF>U3000E2005109670D0032159072E2D058,RE2003412016EFE00<CR><LF>
16:00:17.266 [TX] - <LF>U4,R2,0,4<CR>
16:00:17.273 [TX] - <LF>U4,R2,0,4<CR>
16:00:17.393 [RX] - <LF>U3000E2005109670D0032159072E2D058,RE2003412016EFE00<CR><LF>
16:00:17.401 [RX] - <LF>U3000000000010002000300040005E4DA,RE2003412012DF600<CR><LF>
16:00:17.474 [TX] - <LF>U4,R2,0,4<CR>
  
```

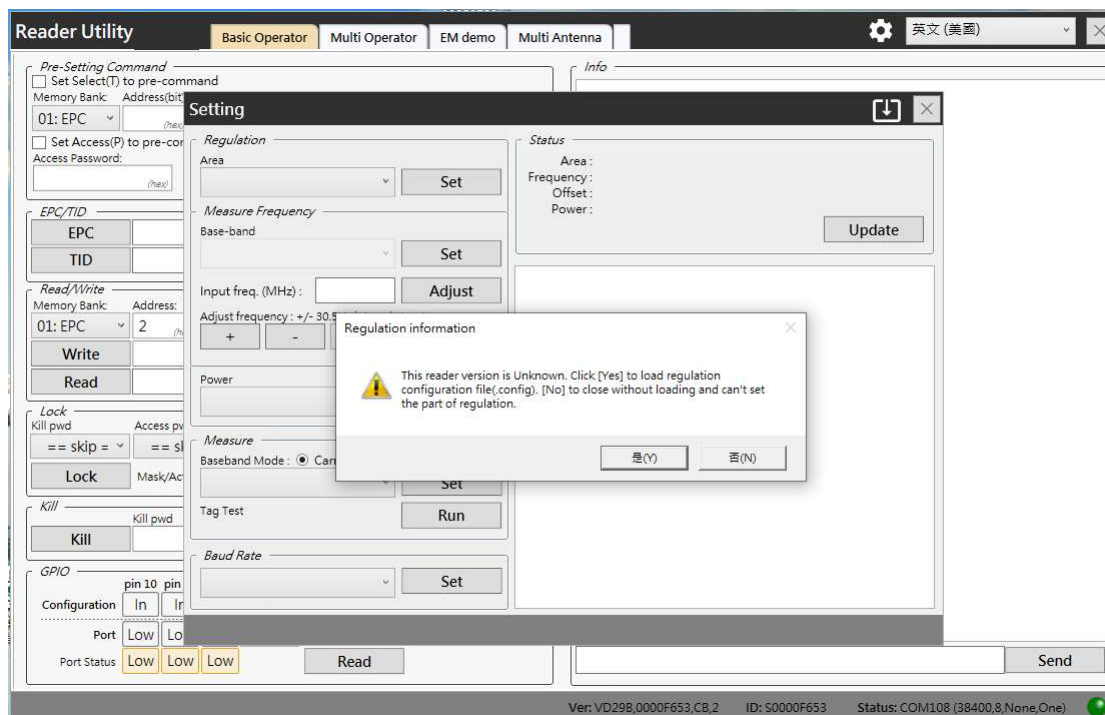
Ver: VD305,FFFFFFFF,C6.2 ID: SFFFFFFFF Status: COM43 (38400,8,None,One)

1.14 N1 command --- Setting RF output Power

1.14.1 select “tools” symbol.



1.14.2 select “YES”

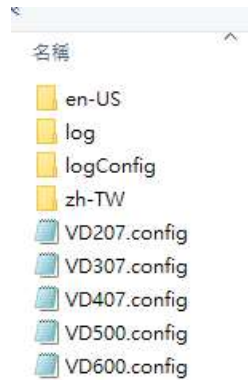


1.14.3 choose which model you used

VD207→FI-R300T module,which max RF power is 25dBm

VD307→FI-R300S module,which max RF power is 27dBm

VD407→FI-R300V module,which max RF power is 29dBm



1.14.4 choose what you want to RF output power and click the “set”

