MIFARE Ultralight® EV1 80B. Setting a password

1. Set configuration pages (https://www.nxp.com/docs/en/data-sheet/MF0ULX1.pdf?pspll=1)

8.5 Memory organization

The EEPROM memory is organized in pages with 4 bytes per page. The MF0UL11 variant has 20d pages and the MF0UL21 variant has 41d pages in total. The memory organization can be seen in Figure 5 and Figure 6, the functionality of the different memory sections is described in the following sections.

Page Adr		Byte number within a page				
Dec	Hex	0	1	2	3	Description
0	0h	serial number				Manufacturer data and lock bytes
1	1h	serial number				
2	2h	serial number	internal	lock bytes		
3	3h	OTP	OTP	OTP	OTP	One Time Programmable
4	4h	user memory				User memory pages
5	5h					
...	...					
14	Eh					
15	Fh					
16	10h	CFG0				Configuration pages
17	11h	CFG1				
18	12h	PWD				
19	13h	PACK		RFUI		
		One-Way counters [1]				Counter pages

aaa-006275

1. counter pages are only accessible with READ_CNT and INCR_CNT commands

Figure 5. Memory organization MF0UL11

Table 5. Configuration Pages

	Page Address		Byte number			
	Dec	Hex	0	1	2	3
CFG0	16/37	10h/25h	MOD	RFUI	RFUI	AUTH0
CFG1	17/38	11h/26h	ACCESS	VCTID	RFUI	RFUI
PWD	18/39	12h/27h	PWD			
PACK|RFUI	19/40	13h/28h	PACK		RFUI	RFUI

1. page address for MF0UL11/MF0UL21

Values have to be changed in the Ultralight EV1 tag:

Page 16 (dec)	MOD	RFUI	RFUI	AUTHO
	0x00	0x00	0x00	0x00

MOD = 0x00 means “strong modulation mode disabled”
AUTH0 = 0x00 means “protect all pages from address 0x00 (tag memory)”

Page 17 (dec)	ACCESS	VCTID	RFUI	RFUI
	0x80	0x05	0x00	0x00

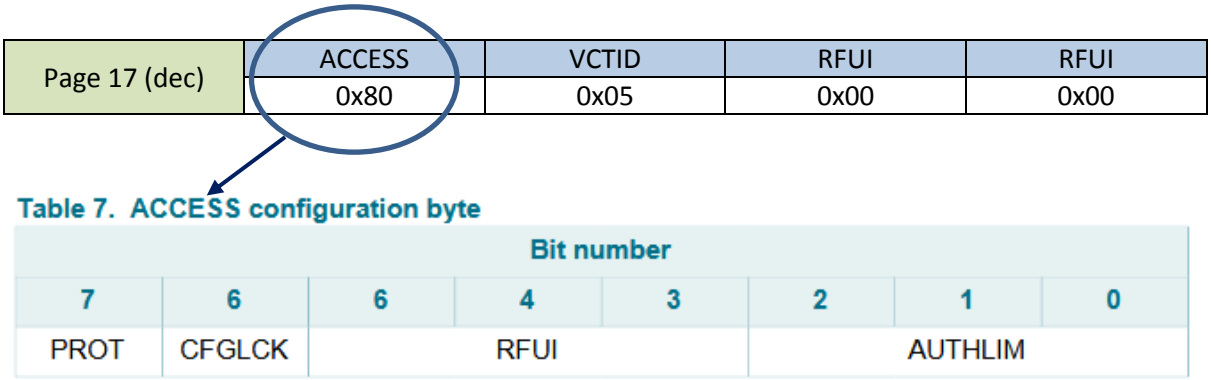


Table 7. ACCESS configuration byte

Bit number							
7	6	6	4	3	2	1	0
PROT	CFGLCK	RFUI			AUTHLIM		

PROT = 1 means “read and write is protected by the password verification”
CFGLCK = 0 means “user configuration open to write access”. Set this bit to 1 if you want to permanently locked against write access
AUTHLIM = 000b means “limiting of negative password verification attempts disabled”

ACCESS byte should be: 10000000b = 0x80

VCTID = 0x05 (by default)

Page 18 (dec)	PASSWORD			
	0xAA	0xBB	0xCC	0xDD

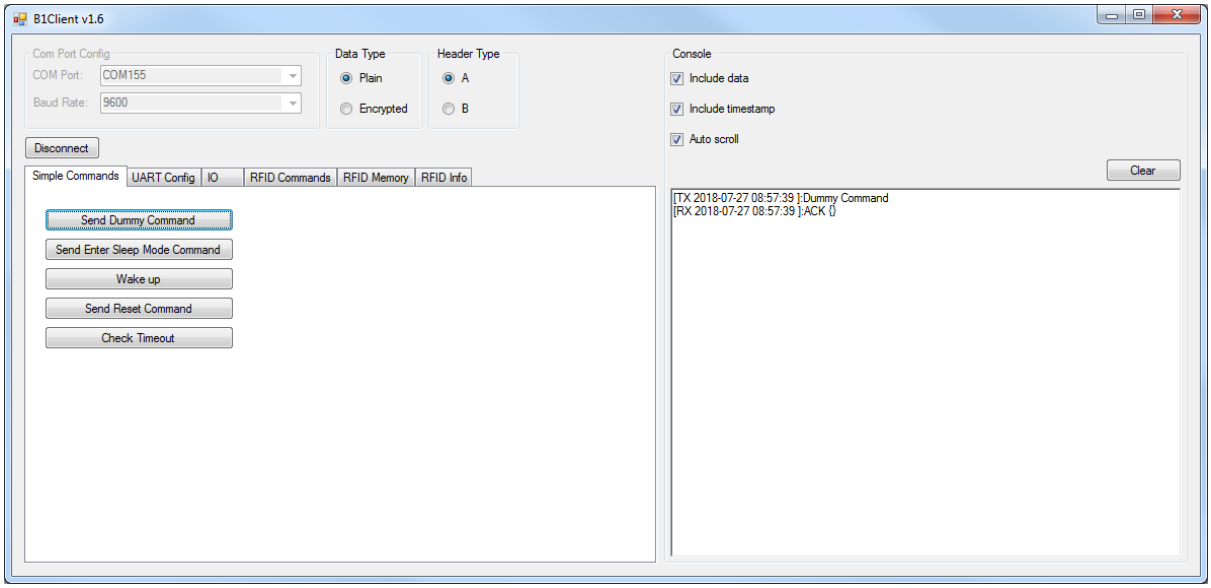
Example password: 0xAABBCCDD

Page 18 (dec)	PACK		RFUI	RFUI
	0x12	0x34	0x00	0x00

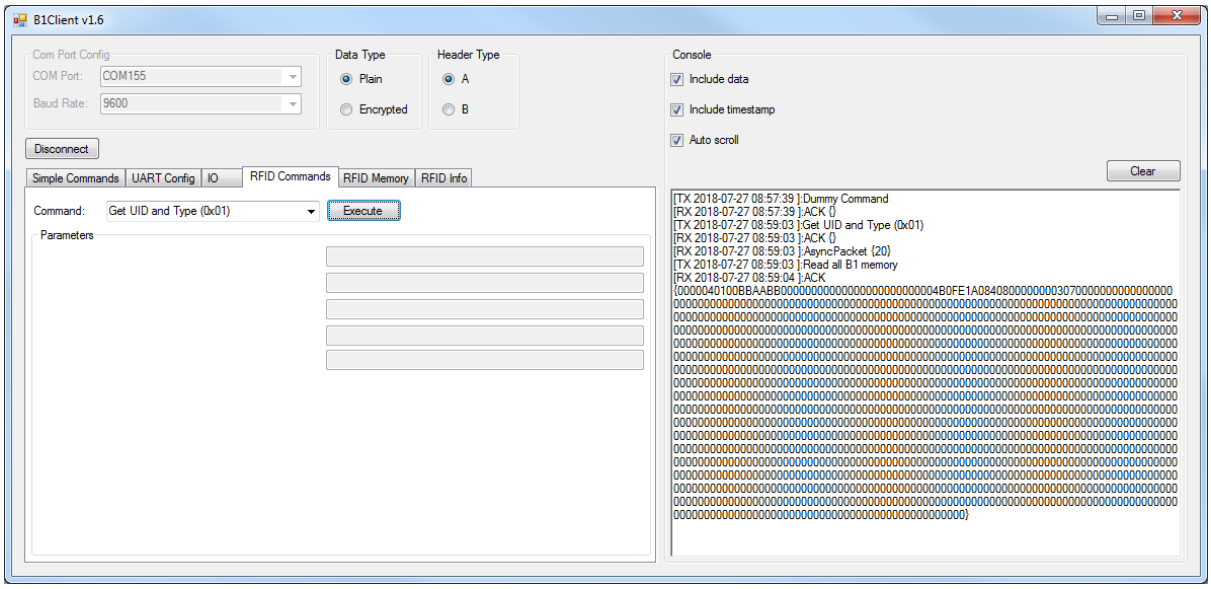
PACK (Password ack) = 0x1234

2. Using B1-Client

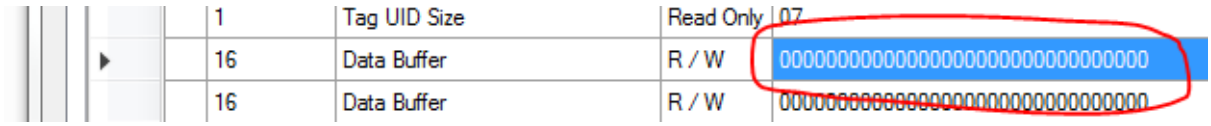
a) Connect with the module and send Dummy Command:



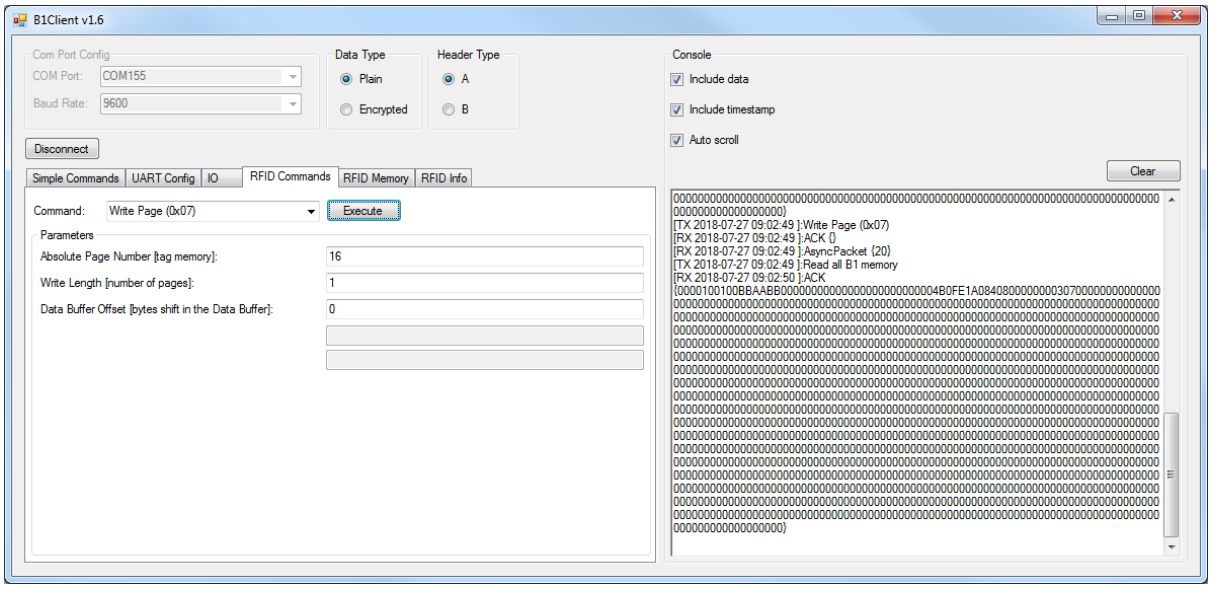
b) Send Get UID ant Type (0x01) command (MIFARE Ultralight EV1 80B is in the antenna field):



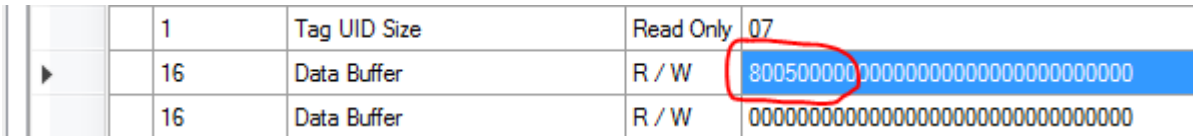
c) Set configuration. Set Data Buffer offset 0 to zeros in the RFID Memory tab:



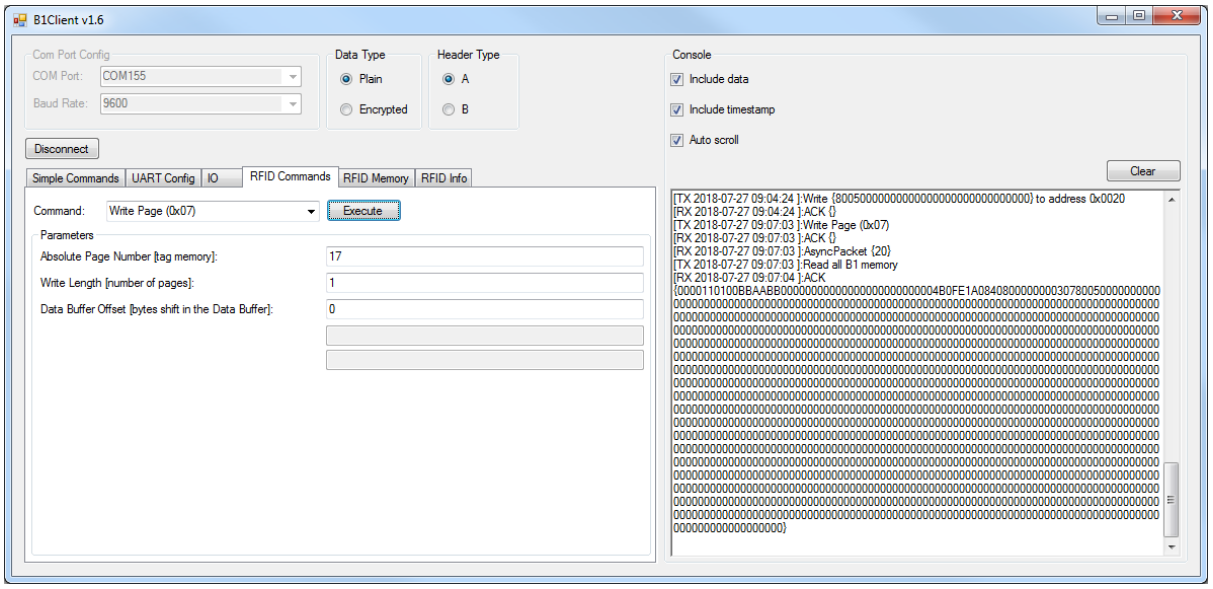
d) Write Page (command 0x07). Write zeros to Page 16 (dec) – CFG0



e) Set Data Buffer offset 0 to 0x800500 in the RFID Memory tab:

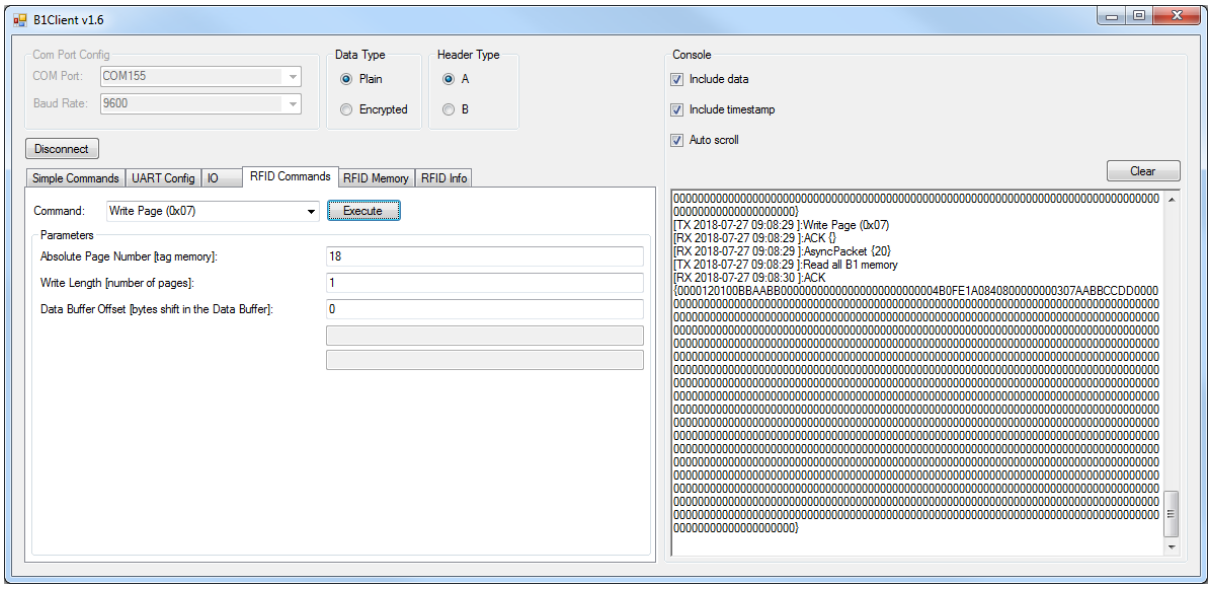


f) Write Page(command 0x07). Write 0x800500 to Page 17 (dec) – CFG1.

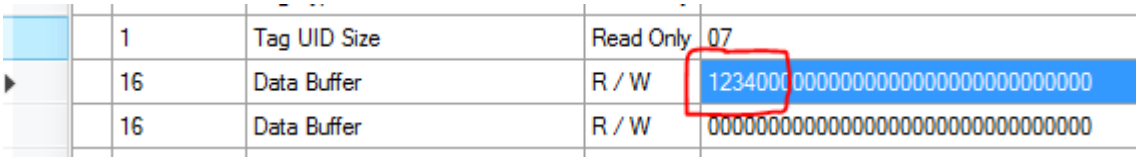


g) Set Data Buffer offset 0 to 0xAABBCCDD in the RFID Memory tab:

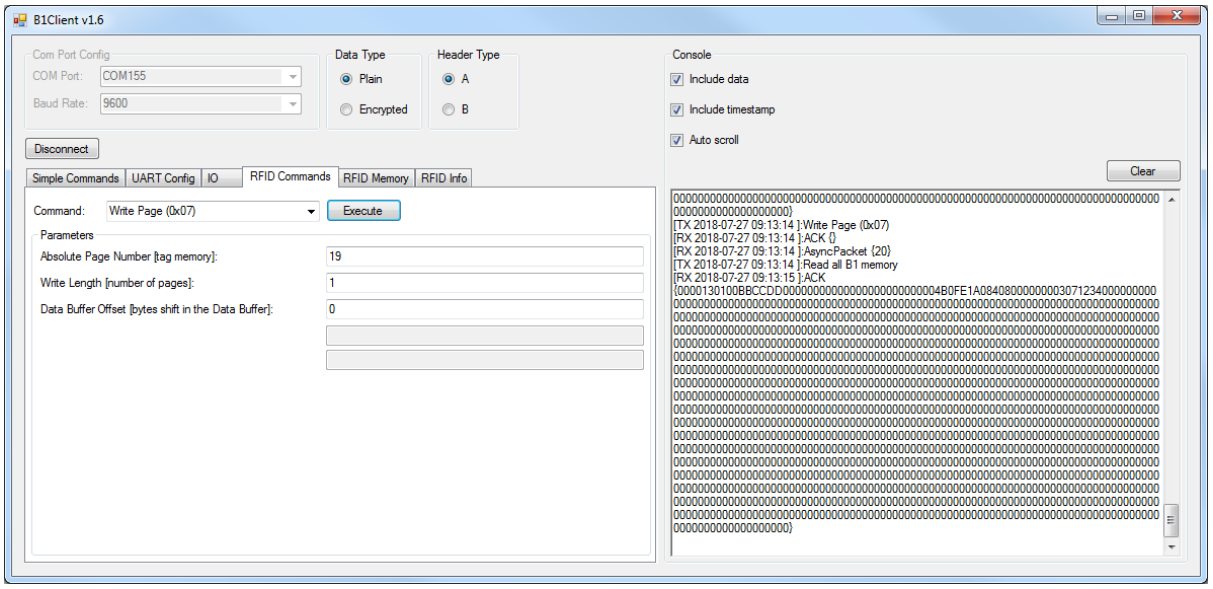
h) Write Page(command 0x07). Write 0xAABBCCDD to the Page 18 (dec) – PWD.



i) Set Data Buffer offset to 0x1234 in the RFID Memory tab:

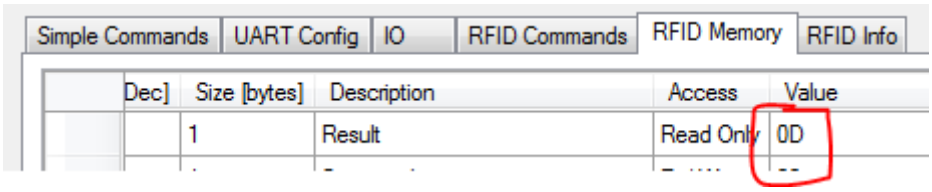


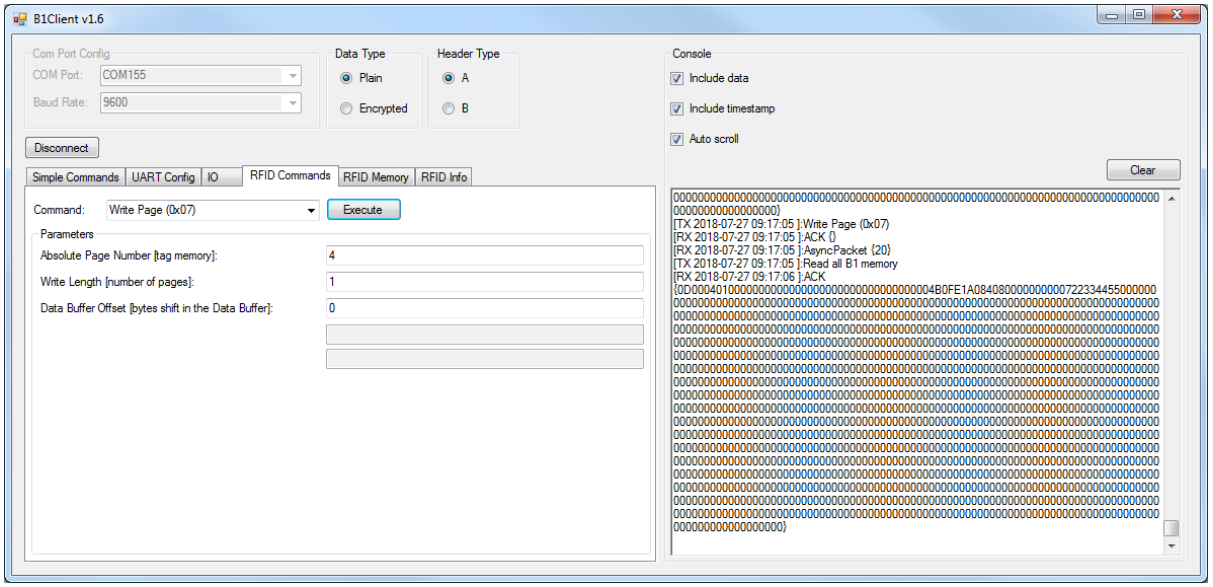
j) Write Page(command 0x07). Write 0x12340000 to Page 19 (dec) – PACK.



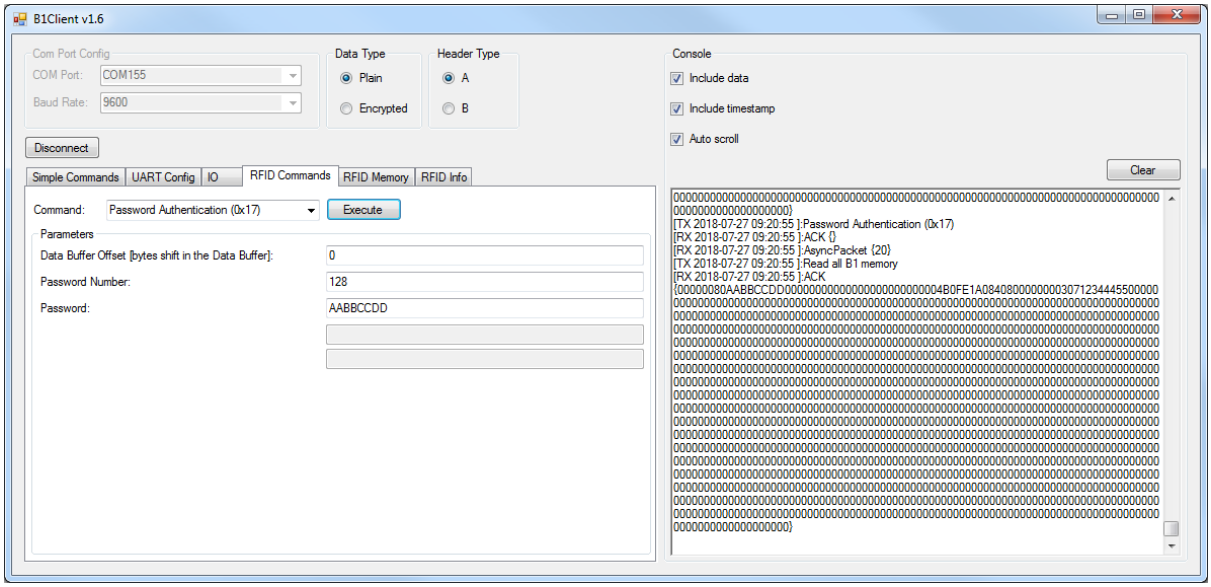
The Ultralight EV1 80B is now password protected.

Remove the tag from the antenna field, send the Reset to Defaults (0x1E) command. Then put the tag in the antenna field, send Get UID and Type to power it and try to write to a page, i.e. page 4. You should receive a Tag Communication error. 0x0D in the Result Register.

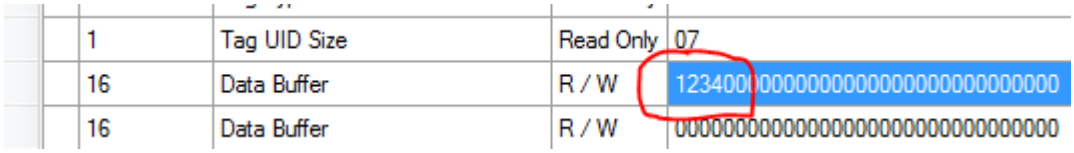




To access the tag memory, send the Password Authentication (0x17) command. If you receive 0x08 (No tag in the field) in the Result Register, please send again the Get UID and Type command and then the Password Authentication command.



You will receive the PACK value in the Data Buffer offset 0 to confirm your password is correct.



Now you can write your data to the tag memory. Memory is password protected unless you change the configuration pages.

To get more information about these commands, please refer to the RFID User Manual: https://eccel.co.uk/wp-content/downloads/RFID-B1-User-Manual.pdf