

M87P4 Module Evaluation Kit User Manual V1.0

1. Initial setup

1.1 Powering the Reader

Plug the **power cable** in, with the **indicator light** on & reader is ready. As illustrated below:



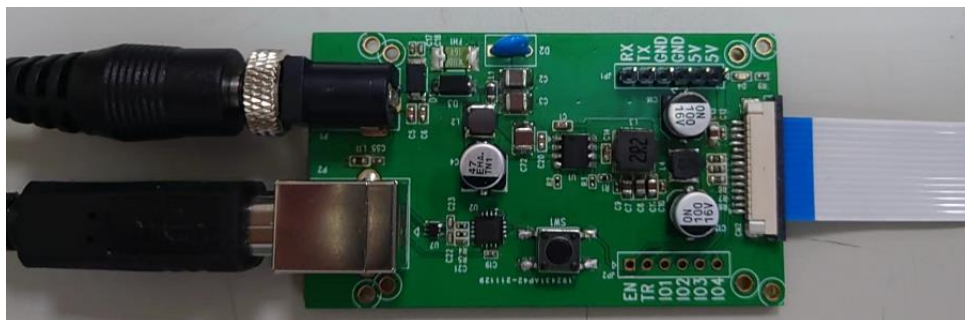
1.2 Connecting Antenna to Reader

Connect the antenna with the antenna MMCX port as illustrated below:



1.3 Connecting Data Line to Reader

You can connect the reader to your PC via B type USB, as illustrated below:

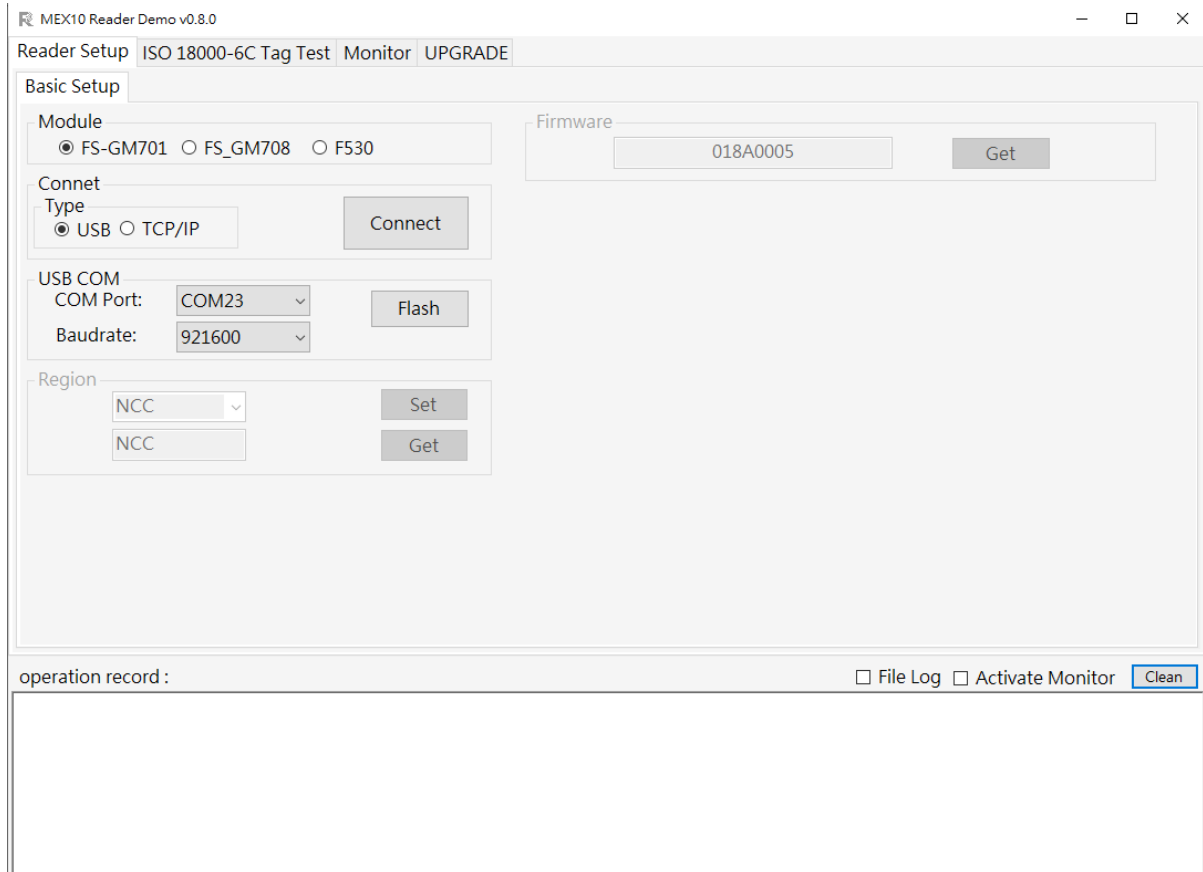


2. Connect DEMO SW

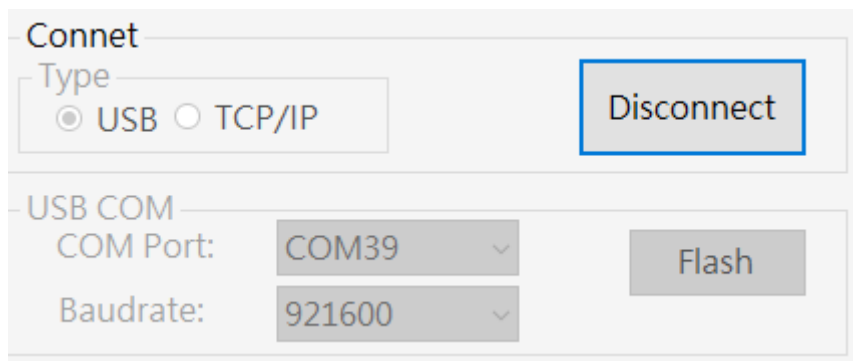
Double-click **EagleDemo.exe** to run the software.

2.1 Connect

2.1.1 Open the software and it will shows as below:



2.1.2. Please select **USB** as **Connection**, Choose the corresponding **Serial Port** and **Baud Rate** (default baud rate is 921600). As illustrated below:



2.1.3. Click **Connect**, if it is connected successfully, the **FW version** will display as below:

operation record : ☐ File Log ☐ Activate Monitor

2023-07-03 02:06:06.934 Connect COM39@921600
2023-07-03 02:06:06.939 GetFirmwareVersion
2023-07-03 02:06:06.971 00 01 40 00 02

2.1.4. Text communication with the reader:

Click on **Get** in Firmware Version or in Reader Region, the following screen displays:

Firmware

01400002

Read

Region

FCC

Set

Get

3. Run Inventory function

After connecting the reader with PC, we can start go Inventory Run function. Please select **ISO 18000-6C tag test** as illustrated below:

Reader Setup **ISO 18000-6C Tag Test** Monitor UPGRADE

Inventory

Operation

Inventory

Abort

Inventory Type

☐ LoopAntenna

☒ Custom

Inventory Stop Condition

☒ Loop Times: 1 ☐ continuous

☐ Conti-Inventory Time: 1000 ms

☐ Warning Occur ☐ 2ndSetting

Antenna

☒ 1

power

3000

inventory time

1000

inventory run

0

Select CFG

RF mode: ULTRA FAST MODE 103

☒ RF_Channel ☒ RSSI ☒ TimeStamp

☒ ANT ID ☐ Phase

Data

Inventory Quantity

21

Peak Speed(Tag/s)

0

Max Speed(Tag/s)

267

AVG Speed(Tag/s)

190

Command Duration(ms)

0

Total Inventory Duration

0 00:00:01.256

Result

Total Tag Count : 239

Min RSSI: -62.60dBm

Max RSSI: -38.73dBm

Refresh

Save Tag

#	Coun	PC	EPC	Freq(khz)	Rssi(dBm)	ANT1	Timestamp
1	8	30 00	EE EE 00 00 00 00 00 00 00 00 02	925250	-5301	8	620874
2	9	30 00	EE EE 00 00 00 00 00 00 00 00 09	925750	-5395	9	428920
3	12	30 00	EE EE 00 00 00 00 00 00 00 00 0D	926750	-4831	12	211546
4	11	30 00	E2 00 00 1D 97 08 00 55 23 10 1C DF	926750	-5175	11	175870
5	12	30 00	00 00 00 00 00 00 00 00 00 00 00	926750	-5001	12	219103
6	10	30 00	E2 80 69 95 00 00 50 02 FD 98 DA 3C	926750	-5099	10	167488
7	9	1C 00	53 45 00 00 07 69	926750	-5457	9	169213
8	13	30 00	EE EE 00 00 00 00 00 00 00 00 04	926750	-5508	13	209209
9	10	30 00	EE EE 00 00 00 00 00 00 00 00 0A	926750	-4987	10	175040
10	6	30 00	E2 00 00 1D 97 08 01 94 23 10 AB C1	925750	-5724	6	426414

3.1 Setp1: Enable ANT 1

Check mark the ANT1.

Antenna	☒ 1
power	3000
inventory time	1000
inventory run	0

3.2 Setp2: Setting RF Output Power

RF Output Power is the strength of RF output signal from antenna port whose unit is dBm.

Antenna	☒ 1
power	3000
inventory time	1000
inventory run	0

The output power range is 0 - 33dBm. Default RF output power is 30dBm .

3.3 Setp2: Setting Inventory time & Run

Setting Inventory time is mean the running time when start inventory command.

Setting Inventory Run is mean the running once when start inventory command.

Inventory stop if which time or run up to the setting value

Antenna	☒ 1
power	3000
inventory time	1000
inventory run	0

The default inventory time is 1000ms.

The default inventory run is 0, which mean “don’t care”.

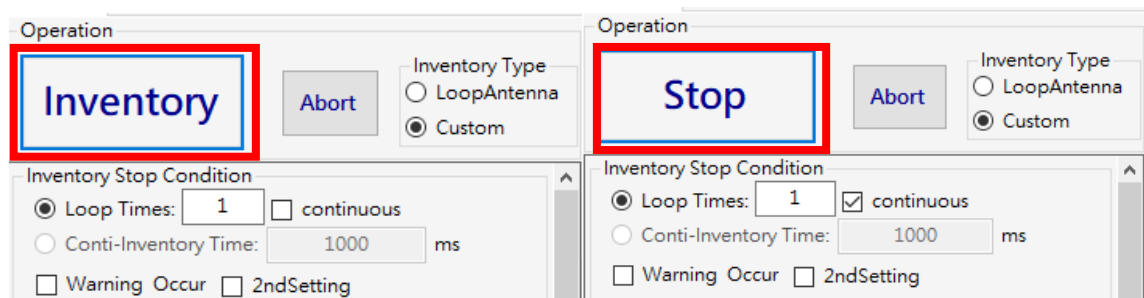
3.4 Setp3: Setting RF-link mode

There is different read speed & sensitivity in different RF-link mode. To more detail, please check the **RF-link profile** of datasheet.

Select CFG	
RF mode:	ULTRA FAST MODE 103
default RF	ULTRA FAST MODE 103
default Inven	FAST MODE 302
	FAST MODE 120
	FAST MODE 323
☒ RF_Chann	NORMAL MODE 345
☒ TimeStam	NORMAL MODE 223
	NORMAL MODE 222
	DRM MODE 241
	DRM MODE 244
	ULTRA Sensitivity MODE 285

3.5 Setp4: Run/Stop Inventory

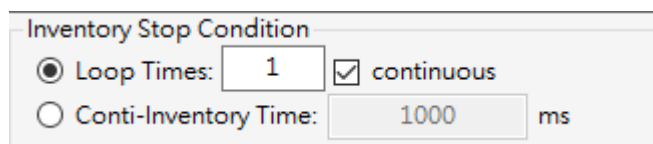
click **Inventory** button to Run Inventory function. click **Stop** button enforce to stop Inventory function.



3.6 Parameter of AUTO Stop Inventory

Loop time	Inventory stop when reach the setting of command count.
Conti-Inventory	Inventory stop when reach the setting of Inventory period.

* it will no stop if tick **continuous**



3.7 The parameter of Running Inventory

There are 13 parameters when run inventory as shown as following.

Inventoried Quantity	Total number of inventory tags since click Inventory .
Peak Speed	Read Speed of Tag for last one inventory command, unit: Tag/s
Max speed	MAX Read Speed of Tag for total inventory period, unit: Tag/s
AVG speed	AVG Read Speed of Tag for total inventory period, unit: Tag/s
Command Duration	Time between Inventory Command to command, unit: ms
Total Inventory Duration	Total inventory period when click Inventory , unit: ms.
Total Tag Count	Total tags when start Inventory period.
Count	Tag count
EPC	EPC data of tag.
PC	PC data
CRC	CRC data
RSSI	The Tag signal strength at the last inventory command.
Carrier Frequency	Carrier Frequency of tag at the last time.

4. Error Display

◆ ANT error:

operation record : File Log Activate Monitor Clean

2023-09-08 01:37:17.751 Interval Count1: RFMode:103 ANT1 Set
 2023-09-08 01:37:18.456 Stop
 2023-09-08 01:37:24.966 Interval Count1: RFMode:103 ANT1 Set
 2023-09-08 01:37:25.461 Stop
 2023-09-08 01:37:28.121 Interval Count1: RFMode:103 ANT1 Set
 2023-09-08 01:37:28.134 CMD 0x6D Status Error:62 01 ERR_OP_STATUS
 2023-09-08 01:37:28.135 Stop

Reason:

1. ANT is Disconnection to ANT port of module
2. VSWR is too large of ANT, it should be lower than 1.3
3. Reflection RF power too large, please check is there some Metal around ANT.

◆ Receiver data time out:

operation record : File Log Activate Monitor

2023-07-03 02:39:54.639 Stop
 2023-07-03 02:40:03.688 Interval Count1: RFMode:103 ANT1 Set
 2023-07-03 02:40:08.885 Interval Count2: RFMode:103 ANT1 Set
 2023-07-03 02:40:14.066 Interval Count3: RFMode:103 ANT1 Set
 2023-07-03 02:40:19.265 Interval Count4: RFMode:103 ANT1 Set
 2023-07-03 02:40:24.451 Interval Count5: RFMode:103 ANT1 Set
 2023-07-03 02:40:32.463 MEX10.SerialReader, message is Receiver TimeOut 3s

Reason:

1. Software CRASH
2. Interface CRASH

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 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.

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.

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.

IMPORTANT NOTE: 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. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following "Contains TX FCC ID: 2BEYTM87P1 ". The FCC part 15.19 statement below has to also be available on the label: This device complies with Part 15 of 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.

Validity of using the module certification:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization for this module in combination with the host equipment is no longer considered valid and the FCC ID of the module cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

Custom design antennas may be used, however the OEM installer must follow the FCC 15.21 requirements and verify if new FCC approval will be necessary.

Information that must be placed in the end user manual:

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as shown in this manual.

Co-location warning:

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

OEM integration instructions:

This device is intended only for OEM integrators under the following conditions:

The antenna must be installed such that 20 cm is maintained between the antenna and users, and the transmitter module may not be co-located with any other transmitter or antenna. The module shall be only used with the external antenna(s) that has been originally tested and certified with this module.

For all products marketed in US, OEM has to limit the operation channels in Channel 1 to Channel 11 or 3-9 as specified above by the supplied firmware programming tool. OEM shall not supply any tool or info to the end-user regarding to Regulatory Domain change.

As long as 3 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

Important Notes:

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as shown in this manual.