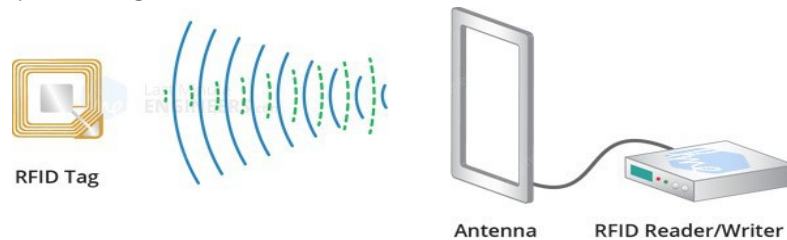


## What is RFID

In the Passive **RFID** system, the reader sends signal to the tag using an antenna. The tag receives this information and re-sends this information along with the information in its memory. The reader receives this signal and transmits to the processor for further processing.



EV3RFid is Rfid tag reader that works with Lego EV3 or NXT. You can read unique id from contact-less Rfid tags (MIFARE Classic). You can also read data stored in card advanced Eprom storage system .



## Connections

40 cm built in wire for NXT or EV3  
Can be connected to any sensor port of NXT or EV3.

## Programming Techniques for writing in I2C mode

**EV3:**  
To use capabilities of the sensor, please download EV3 blocks available at following URL:



[http://www.mindsensors.com/index.php?controller=attachment&id\\_attachment=353](http://www.mindsensors.com/index.php?controller=attachment&id_attachment=353)

Installation instructions for EV3 block are available at:  
<http://www.mindsensors.com/content/13-how-to-install-blocks-in-ev3>

Download EV3 sample program from following URL and modify it to suit your needs.  
[http://www.mindsensors.com/index.php?controller=attachment&id\\_attachment=354](http://www.mindsensors.com/index.php?controller=attachment&id_attachment=354)

## I2C Operations

Registers provide setup and read Write data

Supported commands:

Commands		Action
ASCII	Hex	
C	0x43	Clear UID Data
R	0x52	Read Block
W	0x57	Write Block

## I2C Registers:

The EV3RFid appears as I2C registers as follows:

Register	Read	Write
0x00-0x07	Firmware version - V1.02	-
0x08-0x0f	Vendor Id - <i>mndsnsrs</i>	-
0x10-017	Device ID - EV3RFid	-
0x42	-	Command
0x43	UID size	
0x44	UID (10 bytes)	
0x4E	R/W status	R/W status
0x4F	Block Address	Block Address
0x50	Data Buffer (16 byte)	Data Buffer (16 byte)

## Current Consumption

Average measured current profile is as follows:

Current Consumption	Condition
13mA	Idle mode

## I2C Bus address

**Factory Default Address: 0x22 (d34)**

### Changing the I2C Bus Address:

The I2C bus address of EV3Rfid can be changed. To set an address different from default address, send sequence of following commands on the command register:

0xA0, 0xAA, 0xA5, <new I2C address>

Note: Send these commands with no break/read operation in between. This new address is effective immediately. Please note down your address carefully for future reference.

Read the Changing I2C Address instructions at this the link below:

<http://www.mindsensors.com/blog/how-to/change-i2c-device-address>

## Advance Memory Operations

Each S50 RFID card have 1Kb EPROM, of which 720byet EPROM can be used to store any user data.

Sector	Block	Byte Number within a Block																Description
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
15	3	Key A			Access Bits				Key B									Sector Trailer 15
	2																	Data
	1																	Data
	0																	Data
14	3	Key A			Access Bits				Key B									Sector Trailer 14
	2																	Data
	1																	Data
	0																	Data
:	:																	
:	:																	
:	:																	
1	3	Key A			Access Bits				Key B									Sector Trailer 1
	2																	Data
	1																	Data
	0																	Data
0	3	Key A			Access Bits				Key B									Sector Trailer 0
	2																	Data
	1																	Data
	0	Manufacturer Data																Manufacturer Block

User can write and read this memory using advance functions.

Yellow highlighted part is what not available to user Access.

Memory block id used in writing is defined as  $\text{BlockID} = 3 * \text{Sector} + \text{block}$ .  
Trailing blocks ( blockID with 3,7,11...) are reserved and can not be written.  
Block read/write is slow operation and will take 1sec per operation,

Read/Write operation status is returned in R/W status register.

STATUS_OK	1	// Success
STATUS_ERROR	2	// Error in communication
STATUS_COLLISION	3	// Collision detected
STATUS_TIMEOUT	4	// Timeout in communication.
STATUS_NO_ROOM	5	// A buffer is not big enough.
STATUS_INTERNAL_ERROR	6	// Internal error in the code.
STATUS_INVALID	7	// Invalid argument.
STATUS_CRC_WRONG	8	// The CRC_A does not match
STATUS_MIFARE_NACK	9	//NACK received