A group of RFID Training System

YRFID-13.56 / YRFID-EPC / YRFID/USN-6000
YRFID-3000 / YRFID-5000

These equipments provide instructions on basic concept,
protocol, programming and hardware of RFID,
as well as practical techniques used in RFID applied
shopping system and administration of physical distribution.

RFID applied administration of physical distribution

YRFID-5000

RFID/USN theory & programming, Middleware application

YRFID/USN-6000

RFID applied shopping system

YRFID-3000

Equipment for experiment on RFID-EPC Global

YRFID-EPC

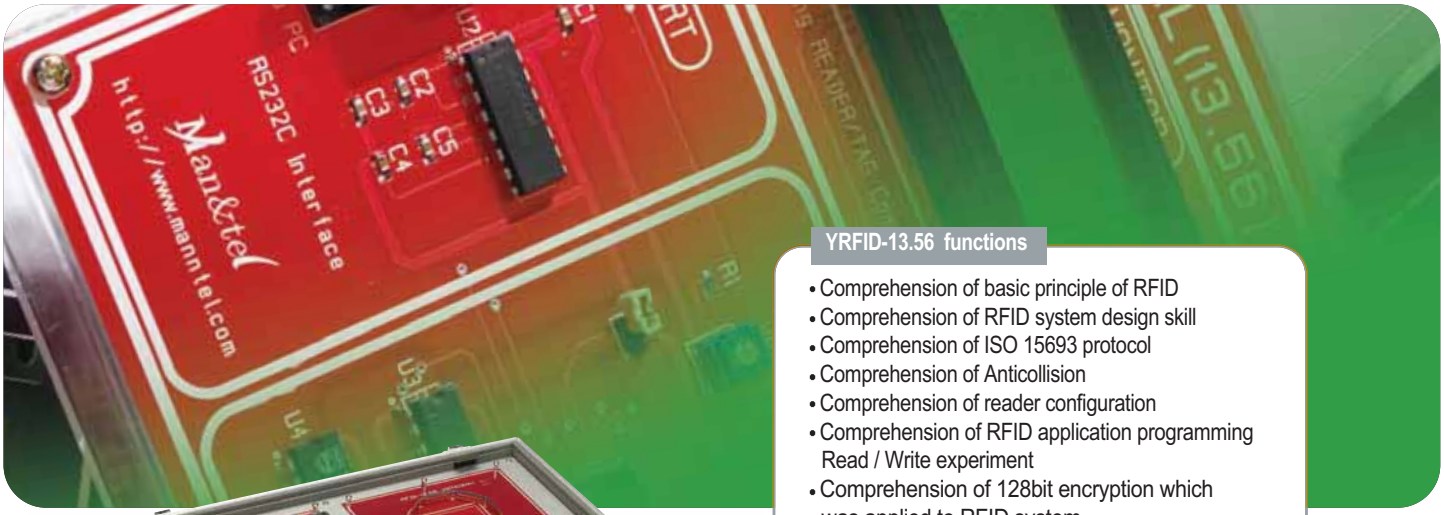
Equipment for RFID basic training

YRFID-13.56

RFID Trainer

Model: YRFID-13.56

Helps to comprehend configuration and process of the RFID system and enables hardware manufacturing and programming experiment.



YRFID-13.56 functions

- Comprehension of basic principle of RFID
- Comprehension of RFID system design skill
- Comprehension of ISO 15693 protocol
- Comprehension of Anticollision
- Comprehension of reader configuration
- Comprehension of RFID application programming Read / Write experiment
- Comprehension of 128bit encryption which was applied to RFID system

YRFID-13.56 training contents

Part1. Introduce of RFID
Chapter 1 RFID Theory
Chapter 2 Hardware Setup and Operation
Chapter 3 Hardware Configuration and Exercise
Part2. RFID Protocol
Chapter 4 Packet Structure
Chapter 5 Anticollision
Chapter 6 CRC Algorithm
Chapter 7 Demo Program Operation Exercise
Chapter 8 RFID Command Operation Exercise
Chapter 9 RFID Command Programming Exercise
Chapter10 RFID Packet Monitoring Programming Exercise
Chapter11 RFID Packet Emulation Programming Exercise
Part3. API Application Programming
Chapter12 Understanding of API
Chapter13 Example Programming Exercise
Chapter14 API Application Programming Exercise
Chapter15 RFID application practice Demo
Chapter16 Demo program for RFID application practice
Chapter17 RFID application demo programming

YRFID-13.56 Specifications

Frequency	13.56 MHz(Module1)
Protocol	ISO 15693(13.56 MHz only)
Transpond Type	Vicinity Card(13.56 MHz)
Field Range	3Cm(13.56 MHz)
PC Interface	RS-232C

YRFID-13.56 Components

Items	name	specification	number	remark
13.56 MHz	Reader	13.56 MHz	1EA	
	Tag	Vicinity Card	3EA	more than 3 is option
	PC Interface	RS-232C	1EA	
	Antenna cable	RFcable	1EA	
	Adaptor	9V DC	1EA	
	Antenna of Reader	13.56 MHz	1EA	
	Textbook		1EA	
	Carring bag	Aluminum	1EA	
	Program CD		1EA	

YRFID-13.56 Features

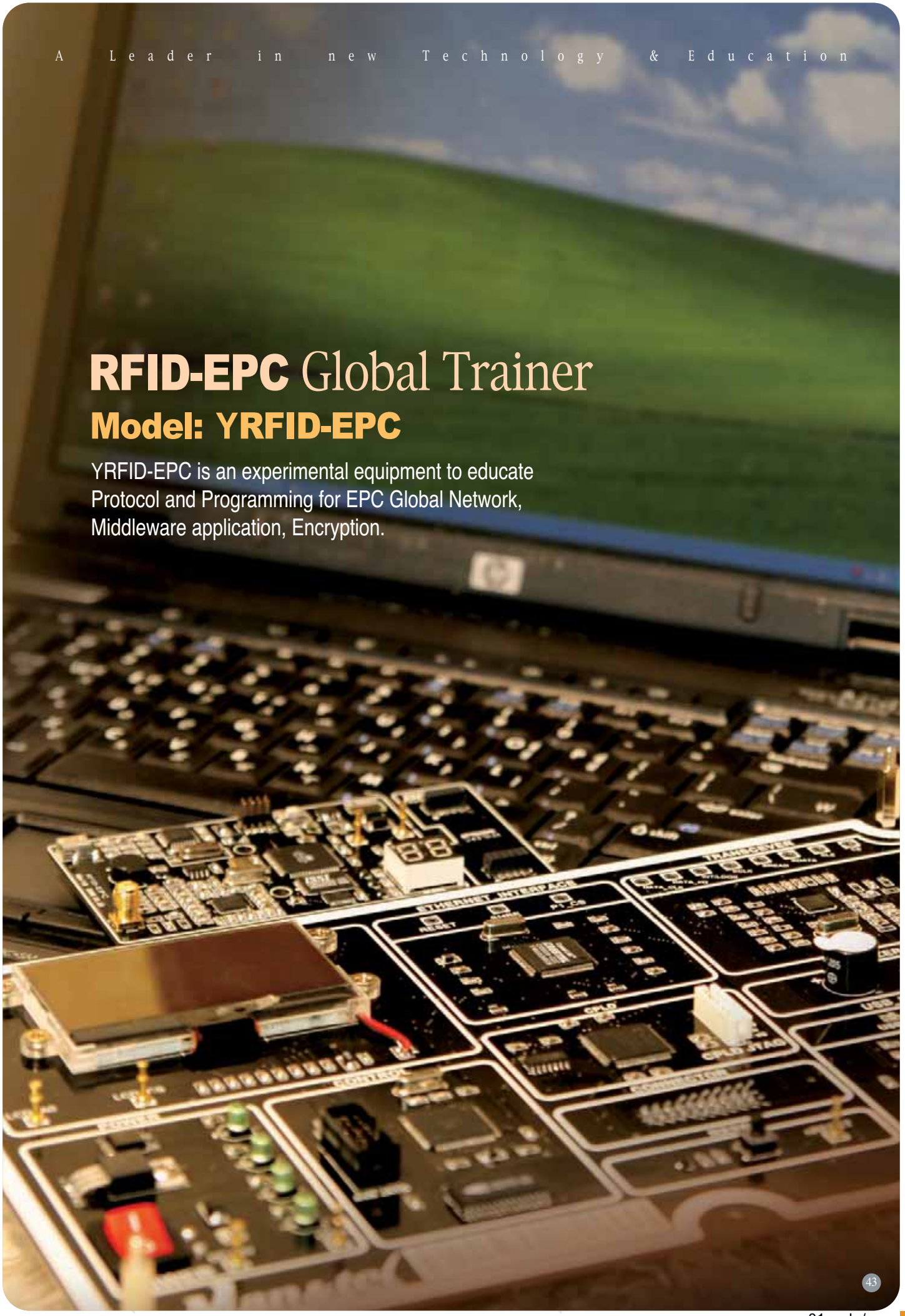
1) Student can learn RFID system design skill more effectively, since RFID hardware operation can be observed through experiment.
2) Not firmware but PC based programming trainer.
3) Air Protocol can be programmed by using C, C++.
4) Air Protocol analysis is possible.
5) Student can experiment and comprehend transmission protocols such as Anticollision and ISO15693,

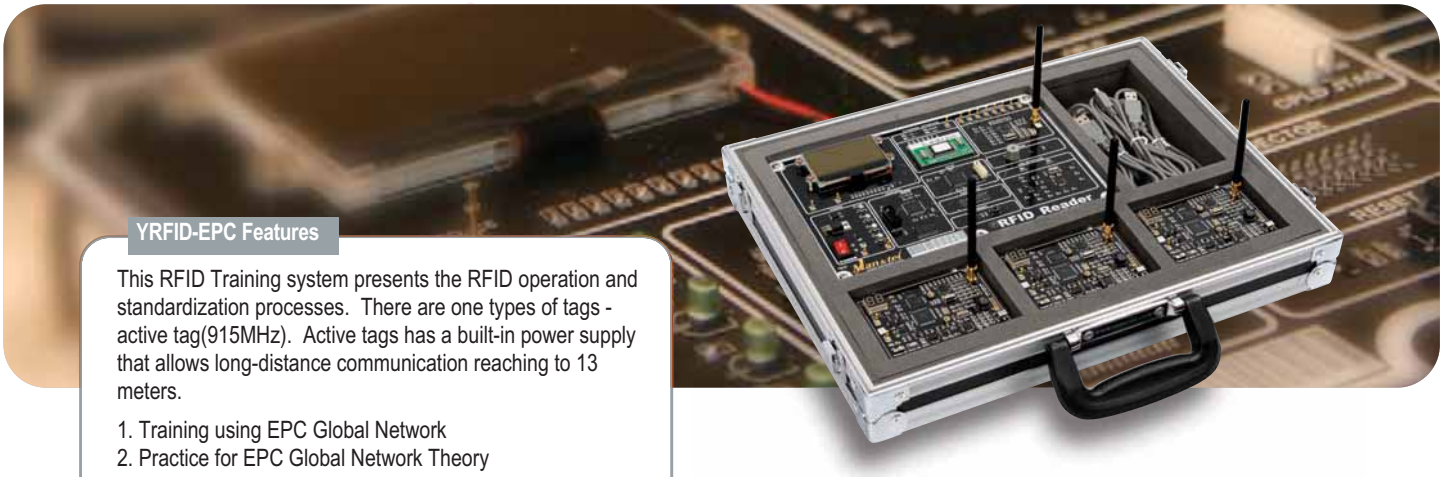
13.56MHz Reader and Passive tag

RFID-EPC Global Trainer

Model: YRFID-EPC

YRFID-EPC is an experimental equipment to educate Protocol and Programming for EPC Global Network, Middleware application, Encryption.





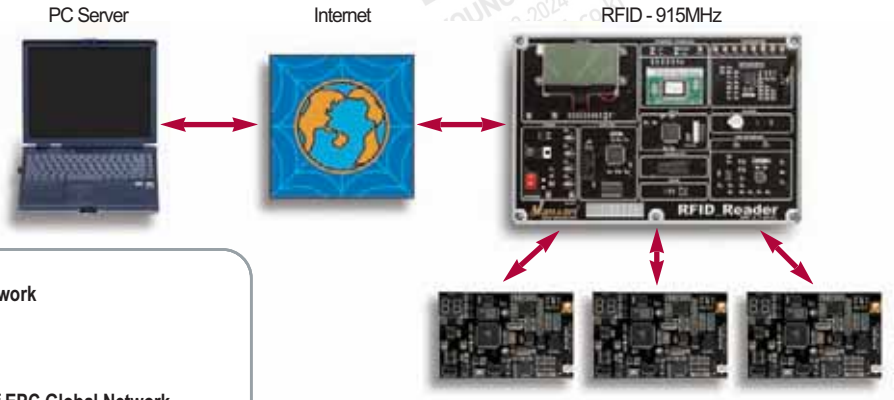
YRFID-EPC Features

This RFID Training system presents the RFID operation and standardization processes. There are one types of tags - active tag(915MHz). Active tags has a built-in power supply that allows long-distance communication reaching to 13 meters.

1. Training using EPC Global Network
2. Practice for EPC Global Network Theory
   - Protocol Exercise between Reader and Tag
   - Middleware Programming
3. Practice for Tag Data read/write
4. Mapping Tag Data to real product
5. Internet Connection between Reader and Server.
6. Database Construction coinciding Tag Data with Real Product.
7. Middleware Application.

YRFID-EPC Functions

- Embedded System Training of Active Tag on EPC Global Network
  - Read/Write Practice for Tag data
  - Embedded Programming at Tag using JTAG
  - Programming Exercise to Protocol Processing between Reader and Tag
  - Programming for Tag Data Processing Techniques



YRFID-EPC Training contents

Part 1. Introduction to EPC Global Network
- Chapter 1 EPC Global Network Theory
- Chapter 2 Packet Structure
- Chapter 3 EPC Tag Structure

Part 2. System Setup and Operation of EPC Global Network
- Chapter 4 Hardware Setup and Operation
- Chapter 5 Software Installation and Operation

Part 3. Practice for Embedded EPC Reader Programming
- Chapter 6 EPC System Demo Operation
- Chapter 7 Demo Operation of Reader and Tag
- Chapter 8 Packet Transmission Programming
- Chapter 9 Packet Receiving Programming
- Chapter 10 Internet Interface Programming
- Chapter 11 Reader Programming

Part 4. Middleware Application and Programming
- Chapter 12 Data Transfer Programming between Reader and Server
- Chapter 13 Reading Programming for EPC Tag Data
- Chapter 14 Writing Programming for EPC Tag Data
- Chapter 15 Middleware Programming for EPC Data Processing

Part 5.Practice for Encryption Application
- Chapter 16 Data Encryption

YFID-EPC Components

Div	Items	Spec	Q 'ty
915Mhz	Reader	915MHz	1EA
	PC Interface	USB	1EA
	Adaptor	9V DC	1EA
	Antenna	915MHz	4EA
	AA Battery(1.5V Battery, 3EA)		3Set
	USB Cable (mini USB TO USB A)		4EA
	Textbook		1EA
	Carrying bag		1EA
	Program CD		1EA
	USB Cable	USB A TO B	1EA
	LAN Cable		1EA
	Adaptor	DC 5V mini	3EA
	JTAG		1EA

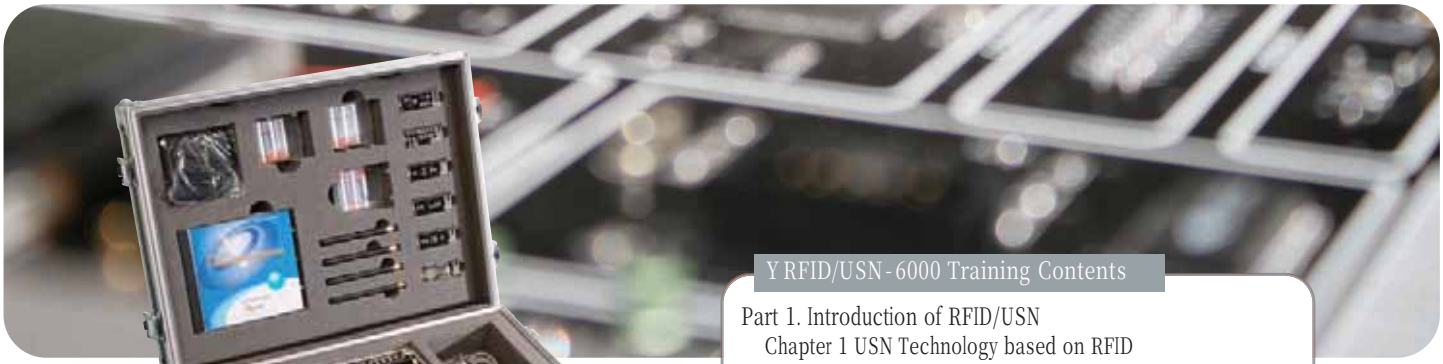
YRFID-EPC Specifications

1) General	- Operating Voltage	Reader	5.0V ±5%
		Tag	3.3V
	- state monitor	Reader	128*64 Graphic LCD
		Tag	16*2 char LCD
	- tag type		Active tag(915MHz)
2) Active type (915 MHz)	(1) Reader Machine		
	- RFID Chip		ADF7020
	- Power jack A		9V, Radial
	- Switch 1		2 Pin Switch (Rocker Switch)
	- Switch 2		4 Pin, Radial (Tact Switch)
	- USB Connector		5 Pin
	- SMA Connector		5 Pin, Female, Streight
	- PE12864		Graphic LCD (128 *64)
	- Header		5 * 2 Pin
	- SND3620SR		FND, 10 Pin, DIP
	- PCB		255*170, FR4, 1.6T
	(2) Tag		
	- LED		Chip LED, red
	- ADF7020		400M / 900M FSK / ASK Transceiver
	· Switch 1		6 Pin, SMD
	· Switch 2		2 Pin SMB (Tact Switch)
	· PCB		100 * 70, FR4, 1.6T
	· Battery Socket		AA Size 3 EA
	· Bolt		Flat Head screw, 3 pie
	· Nut		3 pie
3) Anrenna	- type		Mono-pole Antenna, 915MHz, 100mm
	- effective distance		3 ~ 5m, 10m (two steps adjustable)

RFID/USN Training System

Model: YRFID/USN-6000

Y RFID/USN - 6000 is an experimental equipment to educate EPC Global Network, RFID/USN theory & Programming, Middleware application and Sensor data conversion.



Y RFID/USN-6000 Training Contents

Part 1. Introduction of RFID/USN
- Chapter 1 USN Technology based on RFID
- Chapter 2 Hardware Structure and Setup
- Chapter 3 Software Installation and Practice

Part 2. Packet Structure for RFID/USN Implementation
- Chapter 4 Packet Structure of Class 1 Gen. 2 Air Interface
- Chapter 5 Middleware Packet Structure

Part 3. Embedded USN Tag Programming
- Chapter 6 Loading and Debugging
- Chapter 7 Demo Program Operation
- Chapter 8 Attachment
- Chapter 9 Embedded Tag Programming
- Chapter 10 Tag Data Writing Programming
- Chapter 11 Tag Sensing Data Reading Programming at Tag

Part 4. Middleware Application Programming
- Chapter 12 Middleware Server Programming
- Chapter 13 Tag Sensing Data Reading Programming at Server
- Chapter 14 Tag Data Processing Programming

Part 5. Encryption Application
- Chapter 15 Tag Data Demo Operation

Y RFID/USN-6000 Functions

1) Low Power Processor
   - Reader : Atmega128L 16MHz Operating Voltage 5V
   - TAG : Atmega128L 8MHz Operating Voltage 3.3V
2) Project Developing Function by using various Sensor Modules
3) Monitoring by using USB 2.0
4) Programming using JTAG
5) External Connection available using Ethernet
6) 128*64 Dots Graphic LCD
7) Alarm by Buzzer

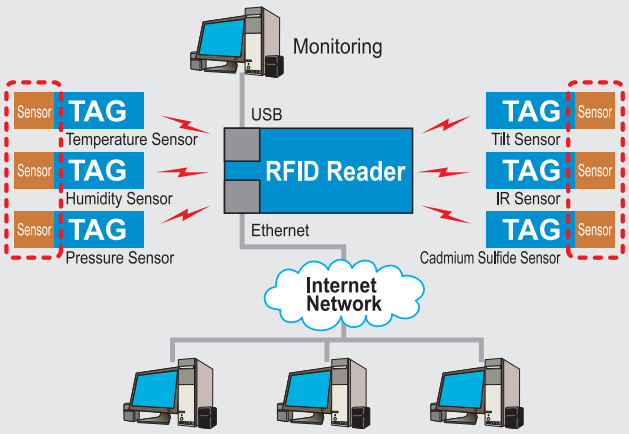
Y RFID/USN-6000 Features

1. RFID/USN by EPC Global Network
   - Understanding RFID/USN Theory.
   - Sensor Data Processing Technology using RFID/USN.

2. Active Tag / Embedded System Programming
   - Embedded Programming Education of Sensor Data Processing using RFID/USN based on AVR Environment.

3. Encryption of Data which is transmitted/received between Tag and Reader
   - Encryption Technique of Sensor Data, and its Algorithm Processing Technology.

YRFID/USN System configuration



Y RFID/USN-6000 Specifications

Div			Spec
Board Size			255(W) X 170(L)
DC Adapter		Reader	DC 9V / 1A / 100V or 220V AC
		TAG	USB, or AA Battery (1.5V Battery, 3ea)
Communication		Monitoring	USB 2.0
		Ethernet	1 Port 10Base-T
Graphic LCD		Reader	128*64 Dots, LED Navy Blue Back Light
Reader	Microcontroller		ATMEGA 128-16AL(16MIPS)
			Advanced RISC Architecture
			Nonvolatile Program and Data Memories
			JTAG (IEEE std. 1149.1 Compliant) Interface
			Operating Voltages : 4.5-5.5V for ATmega128
	SRAM		32Kbyte
	User Interface		Buzzer
	RFID	Frequency	900MHz Band
Tag	Microcontroller		ATMEGA 128-8AL(8MIPS)
			Operating Voltage : 3.3V
	User Interface		Speaker
	Monitoring		FND

Y RFID/USN-6000 Components

Div	Items	Q'ty
Basic	RFID Reader	1EA
	RFID Tag	3EA
Module	Temperature Sensor	1EA
	Humidity Sensor	1EA
	Tilt Sensor	1EA
	Pressure Sensor	1EA
	IR Sensor	1EA
	Cadmium Sulfide Sensor	1EA
Accessories	USB Cable(USB A-USB B)	1EA
	USB Cable(USB A-mini USB)	3EA
	JTAG	1EA
	Antenna(915 MHz)	4EA
	Ethernet Cable	1EA
	Adaptor (DC 9V)	1EA
	Program CD	1EA
	Textbook	2EA
	Battery (1.5V, AA)	9EA
	Adaptor (DC 5V mini)	3EA

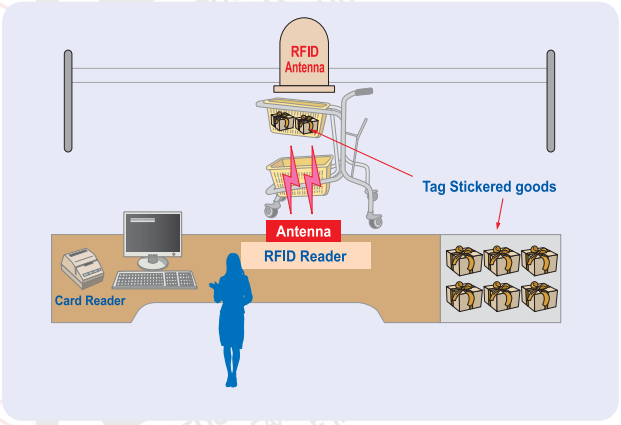
RFID Shopping System
Model: YRFID-3000

YRFID-3000 Features

RFID Shopping System, which could replace the Bar-code system, can be actually applied to commercial products as well as educational use. RFID Shoppiong System is not the system identifing each product's price one by one like bar-code system but the system identifing the whole items at short time through its technology.
That is, Reader identifies every goods' price at one time through Tags which are attached to every goods.

Total amount of prices loaded in one shopping cart identified by Reader is automatically calculated and the information is transmitted to PC.

More detailed explaination is as below ;
1) put the goods with tag into shopping cart.
2) if the shopping cart passed the counter, RFID Antenna identify the UID information from every goods through the Tag and the information is transimitted to PC server.
3) every goods information and its prices are displayed on PC monitor calculating total amount of prices and identifing the list of items.
4) if user present RFID Tag(card) to Card Reader, the purchased amount is counted.

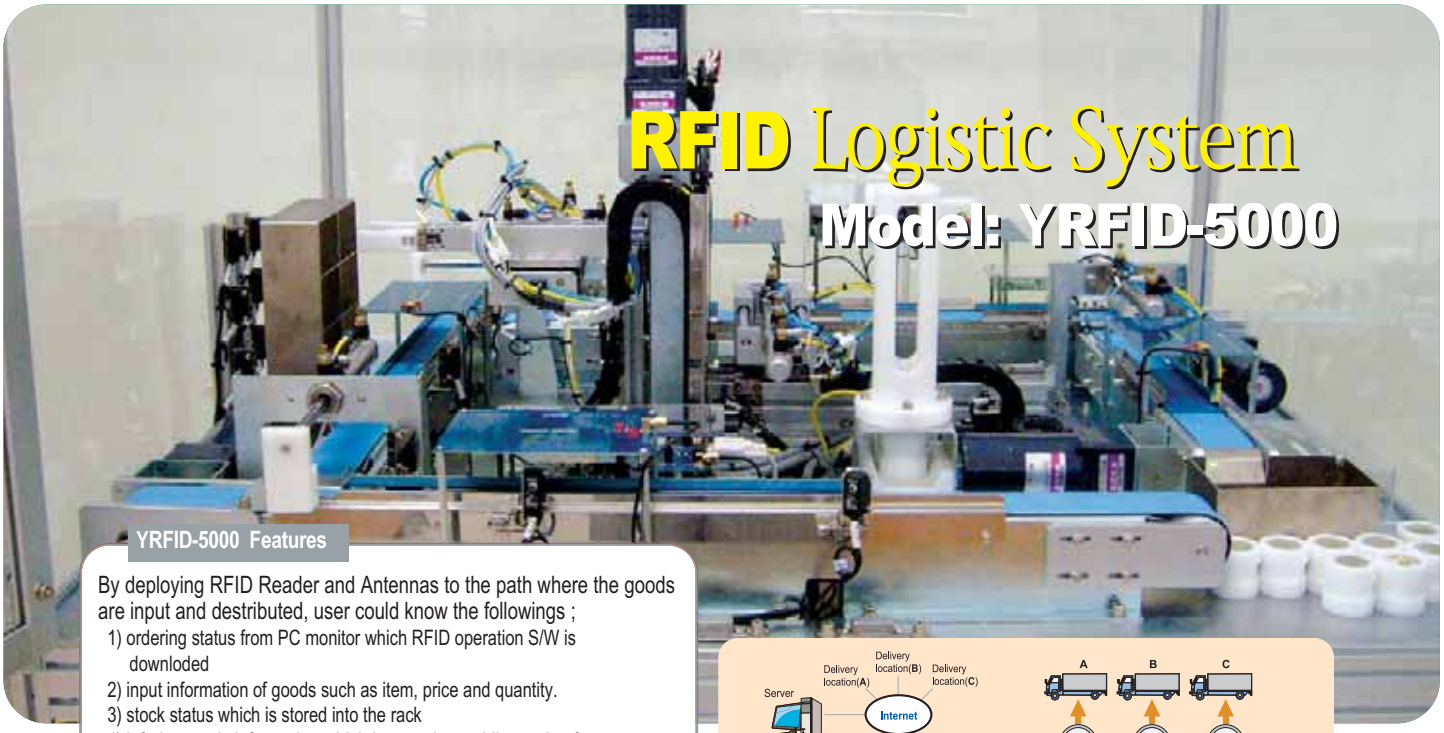


RFID Shopping System(YRFID-3000)

YRFID-3000 Specifications

RFID Shopping System

Main system	Frequency	902.75 MHz ~ 927.25 MHz
	Protocol	EPC Global Class 0, 0+, 1, Gen2 Class 1
	sensing range	MAX 6~7m
	Communication	RS - 232C(DB - 9 F), LAN TCP/IP(RJ - 45)
	Antennas	2EA(maximum 4EA connecting)
	TAG type	Passive
Counting system	Frequency	13.56MHz
	Protocol	ISO 15693
	detecting distance	3Cm~5Cm
	Communication	RS - 232C
	Modulation	ASK/FSK
	TAG type	Passive



RFID Logistic System

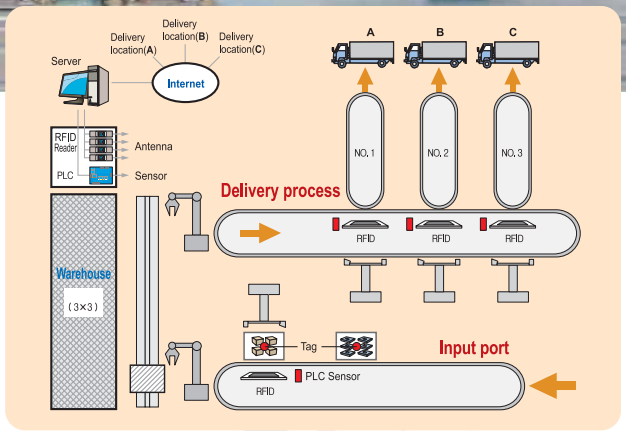
Model: YRFID-5000

YRFID-5000 Features

By deploying RFID Reader and Antennas to the path where the goods are input and destributed, user could know the followings ;

1) ordering status from PC monitor which RFID operation S/W is downloded
2) input information of goods such as item, price and quantity.
3) stock status which is stored into the rack
4) inferior goods information which is sorted out while moving from input conveyor belt to rack.
5) delivery order information
6) distributing goods information after transporting to ordered place

As above process information is acquired by tag sticked on every goods. That is, if the good is passed over one place to another the good's information is identified by Reader, Antenna and Tag.
The information is transmitted to PC and its trace counted by RFID Logistic System. In conclusion, user can learn how to deploy and test RFID systems under real-world conditions to increase efficiency and cut costs & etc.



RFID Logistic System(YRFID-5000)

YRFID-5000 Specifications

RFID Logistic System

Warehousing of goods Storing rack	Magazine Unit	Cylindrical type ¢30
	Structure	Storing goods by rack type (3layer 2line,open type)
	Size	106L×47W×294H mm
	Loading q'ty	6EA
	Sensor	type : MICRO SWITCH
		type : light sensing - ON , NPN Type Open - Collector
Shifting devices for storage	right and left transport	cylinder shifting (X - AXIS) - TCDMF20 - 50
	front and rear transport	cylinder shifting (Y - AXIS) - TGQM - 16 - 50
	up and down transport	MOTOR use (Z - AXIS)
		rated voltage : 1Φ 220V 50/60Hz 6W
		rotating speed : [1250/1550][RPM] (1/5 decelerating gear)
Goods delivery devices	structure	rack type
	size	60L X 50W X 80H mm
Control Box	structure	tower type
	size	520L X 170W X 400H mm
	input switch	type : Φ12, Non - Lock, Normal Open(N.O) Type / red color
	output switch	type : Φ12, Non - Lock, Normal Open(N.O) Type / green color
	reset ordering switch	type : Φ12, Non - Lock, Normal Open(N.O) Type / red color
	emergency switch	type : Φ16, Lock, Normal Open(N.O) Type / red color
Sensor	structure	optical fiber sensor
	maximum detecting distance	120mm(variable type)
	minimum detecting size	¢0.03
	type	light sensing - ON , NPN Type Open - Collector
Conveyor	type	BELT CONVEYOR type
	rated voltage	1Φ 220V 50/60Hz 6W
	rotating speed	[1250/1550][RPM] (1/30 decelerating gear)
PLC Unit	CPU	programming : IL,LD, SFC
		memory : 68Kbyte
	Power	DC24V/ AC220V/ 1A
	INPUT	DC 24V input 16point
	OUTPUT	OUTPUT relay 16point
RFID devices	structure	fixed type
	Frequency	13.56MHz
	protocol	ISO 15693
	detecting distance	3Cm~5Cm
	Communication	RS - 232C
	modulation	ASK/FSK
	TAG type	Passive