

Avionics communication protocol control system

AVIONICS PROTOCOL SYSTEM



Equipment for Avionics Protocol Practice

Equipment for Aeronautical Data Practice

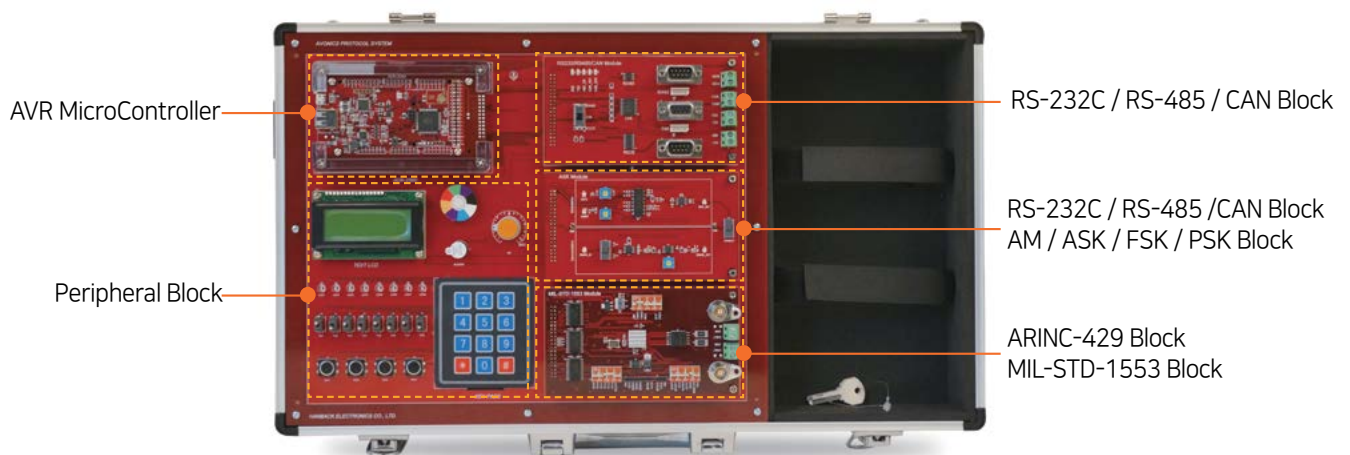


AVIONICS PROTOCOL SYSTEM

Product Features

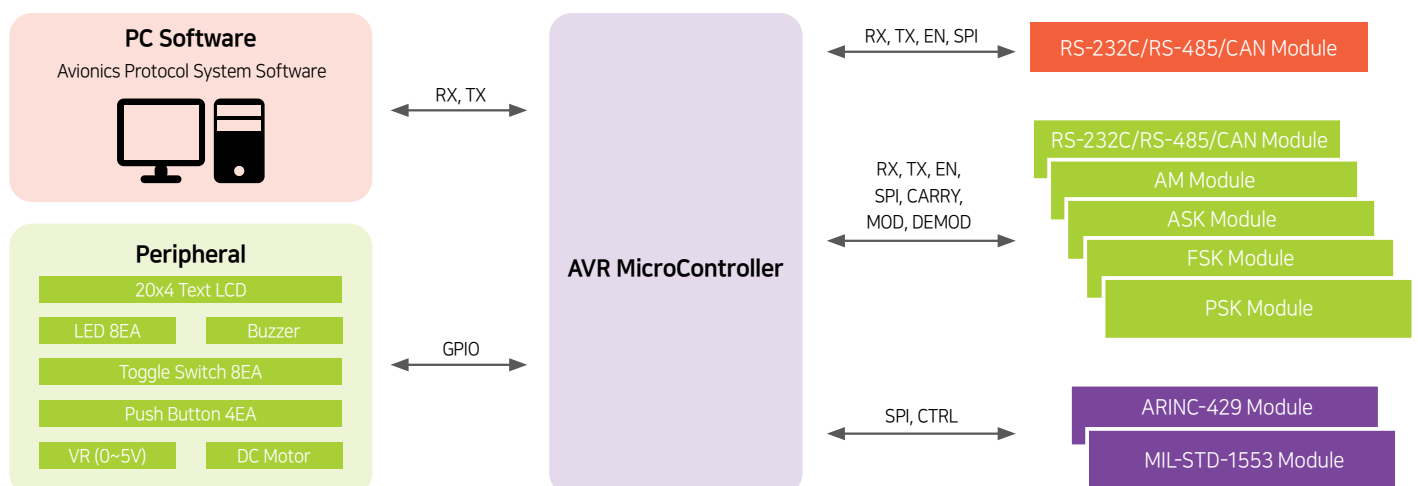
- Aeronautical data communication training equipment configured for avionics experiment
- Configured as one board with devices used in wired communication
- Check the characteristics of communication protocol data using software running on PC
- AM, ASK, FSK, PSK blocks for basic communication
- RS-232C, RS-485, CAN as default communication blocks
- ARINC 429, MIL_STD-1553 blocks for aviation and marine communication
- Arduino for basic laboratory exercises
- 2 set of RS-232C / RS-485 / CAN modules for communication experiment

Product Configuration and Each Name of Part



[HBE-Avionics Protocol System]

Block Diagram



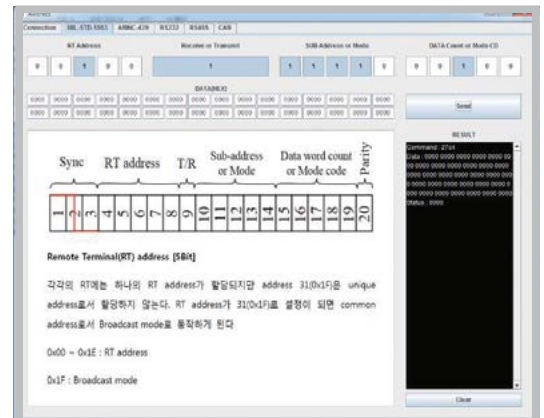
Hardware Specification

Main Controller	
Main Controller	- Flash Memory : 256KByte (8KB used by bootloader) - Clock Speed : 16MHz - USB Controller : ATmega8U2 16MHz - USB Host Controller : MAX3421E USB 2.0 - GPIO Socket : 2x18 Socket(1EA), 1x10 Socket(1EA), 1 x 8 Socket(5EA) - Operating Voltage : 7~12V - Dimension : 122 x 76(mm)
Base Peripheral	
Text LCD	- Display format : 20 characters x 4 line - Interface Input Data : 4 bits interface - Dots : 5 x 8
LED	5pi RED LED, 8EA
Toggle Switch	ON/OFF Toggle Switch, 8EA
Push Button	ON/OFF Push Button Switch, 4EA
DC Motor	Forward / Reverse Rotation DC Motor
VR	Variable Resistor using 0~5V Control
Buzzer	Make the sound of "Beep"
Key PAD	3 x 4 Key pad - Metal Dome type of switch, embossing process 0 ~9, *, #
Power Block	Create DC +5V, -5V, +12V, -12V using AC 220V/60Hz power
RS-232C / RS-485 / CAN	
- RS-232C, RS-485, CAN blocks as one block 2 modules on one board - Communication is decided by selection switch	
RS-232C	- Chip for signal conversion - Communication Speed : Max 120kbps - TxD, RxD Interface - DB9 Port, Terminal Block

RS-485	- Serial RS-485 converter using MAX 485 - Communication Range : Max 1.2km - Transmission Method : Half Duplex - Communication Speed : Max 10Mb/s - TxD, RxD, EN Interface - DB9 Port, Terminal Block
CAN	- CAN 2.0B - Communication Speed : Max 1Mb/s - Data Field : 0~8 bytes - SPI Interface - DB9 Port, Terminal Block
AM	
Sine Wave Converter, Modulation Block, Demodulation Block (Diode, Product)	
ASK	
Modulation Block, Demodulation Block	
FSK	
Modulation block, Demodulation Block	
PSK	
Modulation block, Demodulation Block	
ARINC-429	
Port	2 Receive Port, 1 Transmit Port
Interface	10MHz, four-wire Serial Peripheral Interface (SPI)
Controller	- Programmable label recognition for 256 labels 32 x 32 Receive FIFOs and Priority-Label buffers - Independent data rate for Transmit and Receive
MIL-STD-1553	
Port	2 MIL-STD-1553 BUS Port
Interface	40MHz, four-wire Serial Peripheral Interface(SPI)
Controller	- Multi-terminal operation for one to three MIL-STD-1553B functions : BC, MT, RT 8k x 17bit words internal static RAM with Parity - Fully Programmable Bus Controller with 28 op code instruction Set. 64 Word interrupt Log Buffer queues the most recent 32 interrupt

Software Specification

Category	Items	Specification
Main Controller	FF/W IDE	Arduino 1.6.x
	Communication	USB Serial Port
	Function	Avionics & Electronics Communication Module Control
IDE	Communication Practice	- RS-232C, RS-485, CAN, ARINC-429, MIL-STD-1553 - Learn and practice protocol using GUI
	UI Platform	HBE-Avionics Protocol Graphic User Interface v 1.7.8



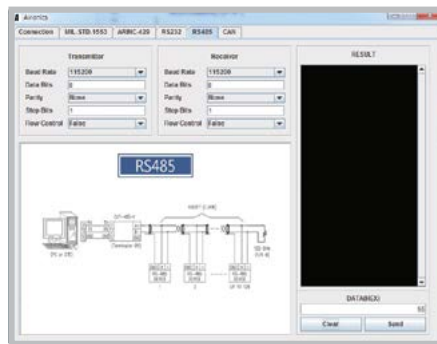
Education Contents

- Overview of HBE-Avionics Protocol System Equipment
 - Product Features / Equipment Components
- AVR Micro Controller
 - AVR Micro Controller / ATMEGA2560
- Development Environment
 - About Arduino / Development Environment Installation/ Driver Installation / IDE Setup / Avionics App Installation
- Avionics
 - Communication System / Navigation System / Monitoring System / Navigation Assisting System
- ASK
 - Modulation Overview / Demodulation Overview / Experiment
- FSK
 - Modulation Overview / Demodulation Overview / Experiment
- PSK
 - Modulation Overview / Demodulation Overview / Experiment
- AM
 - Modulation Overview / Demodulation Overview / Experiment
- RS-232C
 - UART & RS-232C Overview / Communication Practice
- RS-485
 - RS-485 Communication Overview / Communication Practice
- CAN
 - CAN Communication Overview / Communication Practice
- ARINC-429
 - ARINC-429 Overview / ARINC Communication Practice
- MIL-STD-1553
 - MIL-STD-1553 Communication Overview / Communication Practice
- Peripheral Control Using Arduino
 - Arduino Program Structure / Variable / Function / Timer & Counter Peripheral Control Practice

Experiment Examples



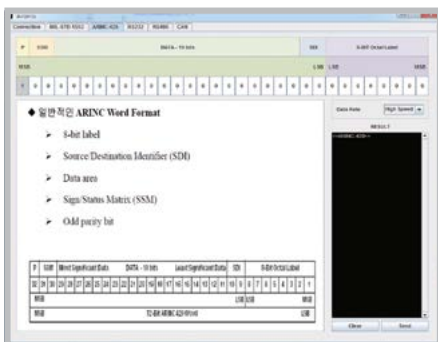
RS-232C Communication Experiment



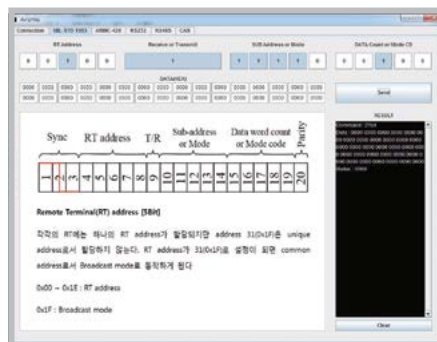
RS-485 Communication Experiment



CAN Communication Experiment



ARINC-429 Communication Experiment



MIL-STD-1553 Communication Experiment



ASK Modulation / Demodulation Experiment