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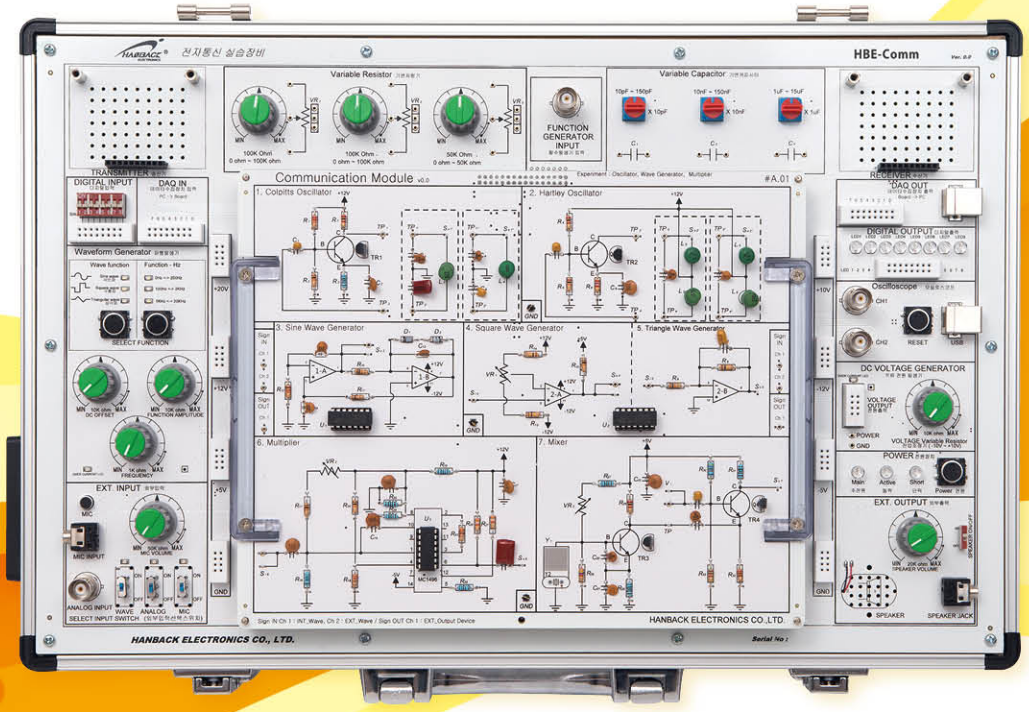
Module-Type Basic Communication Training Equipment

HBE-Comm



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Since 1984

Homepage

Hardware Specifications

Main Board		
Name	Characteristics	Description
Variable Voltage Generator	Voltage	+10V ~ −10V
	Current	〈 750mA
Variable Resistance	50KOhm	1EA
	100KOhm	2EA
Variable Capacitor	10pF ~ 150pF	1EA
	10nF ~ 150nF	1EA
	1uF ~ 15uF	1EA
Analog Input	MIC	input power: 1mW
	stereo jack	input power: 1mW
	analog input	input power: 1mW
	select method	push switch
	Display	LED 3EA
Analog Output	Built-in Speaker	input power: 0.7mW | impedande : 8 ohm
	stereo output	stereo jack
	volume	Control by VR
	on/off	slide switch 1EA
Digital Input	dip SW	8EA
Digital Output	LED	8EA
Waveform Generator	Signal Type	Triangular wave, Sine wave, Square wave
	Signal Size	−5V ~ +5V
	Biax	−5V ~ +5V
	Frequency	0~200Hz, 100Hz~2kHz, 1k~20kHz
Current Limiter	Display	50kHz ~ 3MHz
	Current Limiting Method	Current monitoring by processor Shutdown control using relay
Terminal for Carrier Input	BNC	1EA
Extension Port	pin header	10pin 2EA
Theme Board Connector	box header	16X2 1EA
Breadboard	bread board	167.1 x 146.0 x 15.2mm

Oscilloscope, DAQ, Power Supply		
Name	Characteristics	Description
Oscilloscope	Channel	2EA
	Input Voltage	−16 ~ +16VDC
	Sampling	500KHz
	Connection	USB
DAQ	Input Channel	8EA
	Output Channel	8EA
	Response Speed	Min. 1mSec
	Connection	USB
Power Supply	Voltage	+20VDC, +10VDC, ±12VDC, ±5VDC
	Current	〈 1.1A
	Protection Circuit	Current Sensing Type using Processor
	Ripple	〈 20mV

Training Contents

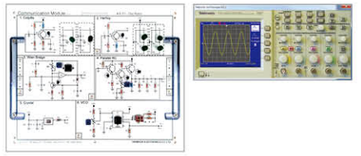
Learning HBE-Comm Practice basic communication

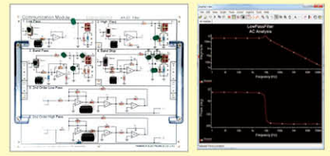
1st week. Oscillator
2nd week. Filter
3rd week. Amplitude Modulation
4th week. DSB-SC / SSB
5th week. Frequency Modulation
6th week. Multiplexing
7th week. AD/ DA Conversion
8th week. Pulse Code Modulation / Delta Modulation
9th week. Pulse Width Modulation
10th week. Amplitude Shift Keying
11th week. Phase Shift Keying
12th week. Frequency Shift Keying
13th week. Line Coding
14th week. PLL Frequency Synthesizer

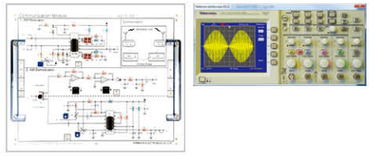
Theme Module

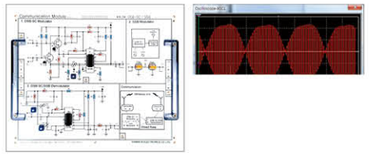
Analog

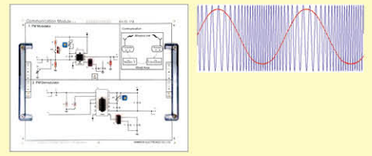
A-1 : Oscillators
A-2 : Filters
A-3 : AM
A-4 : DSB-SC / SSB
A-5 : FM
A-6 : Multiplexing

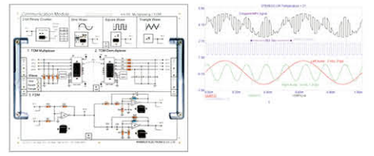

A-1 : Oscillators


A-2 : Filters


A-3 : AM

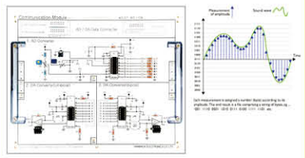

A-4 : DSB-SC / SSB

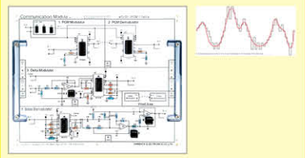

A-5 : FM

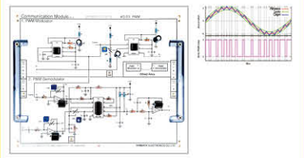

A-6 : Multiplexing

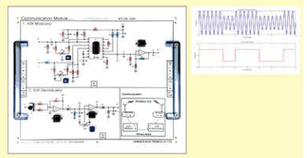
Digital

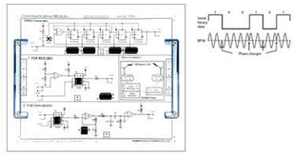
D-1 : AD / DA Converter
D-2 : PCM / Delta
D-3 : PWM
D-4 : ASK
D-5 : PSK
D-6 : FSK
D-7 : Line Coding
D-8 : PLL Frequency Synthesizer

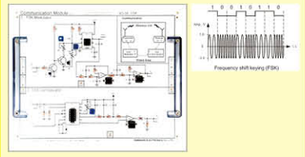

D-1 : AD / DA Converter

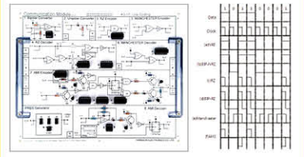

D-2 : PCM / Delta

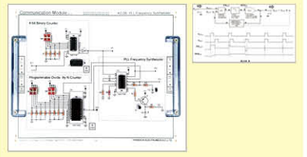

D-3 : PWM


D-4 : ASK


D-5 : PSK

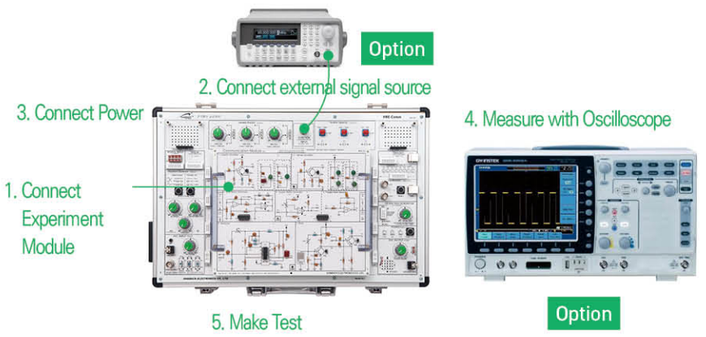

D-6 : FSK


D-7 : Line Coding


D-8 : PLL Frequency Synthesizer

Experiment Example

Experiments illustrate oscilloscope and waveform generator

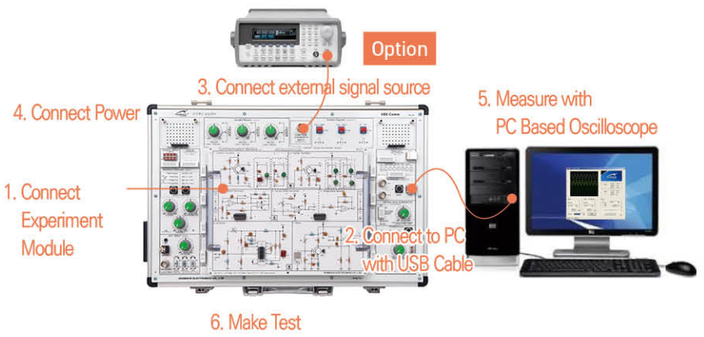


Experiment Process

1. Install the practice module.
2. Connect output terminal of signal generator and external signal input terminal of HBE-Comm with BNC cable.
3. Supply the power.
4. Measure appropriate signal using oscilloscope according to theory for each module.
5. Write a result report using data obtained in the process of practice based on basic theory.

* Advanced experiment is possible through external oscilloscope and waveform generator(Option)

Experiments with PC oscilloscope and waveform generator example



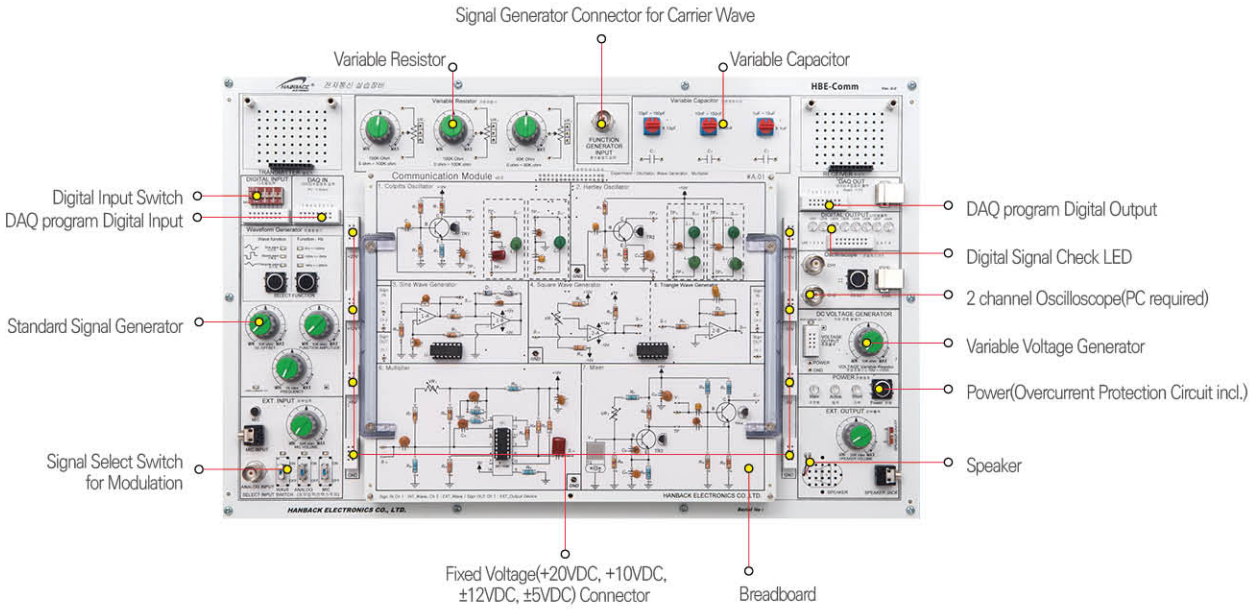
Experiment Process

1. Install the practice module.
2. Connect oscilloscope and USB terminal of HBE-Comm to PC using USB A-B cable.
3. Connect output terminal of signal generator to external signal input terminal of HBE-Comm with BNC cable.
4. Supply the power.
5. Measure appropriate signal using oscilloscope according to theory for each module.
6. Write a result report using data obtained in the process of practice based on basic theory.

* Advanced experiment is possible through PC oscilloscope and waveform generator (Option)

Testing For easy understanding of Basic Communication Engineering

For basic communication, we can understand Signal Generator, Frequency Multiplier, and Filter and then we can know the basic circuit of Analog Communication and Digital Communication. This is the basic Education Theme of Communication Engineering used in Educational Field for a long time. HBE-Comm arranges the basic circuit as drawn on Circuit Diagram to understand it easily, and this uses generates Carrier Signal with Waveform Generator and inputs it to the circuit and also uses Oscilloscope to see
the waveform of main parts. Then, we can know how to use Waveform Generator and Oscilloscope. For Education Course, basic communication equipment includes Basic Circuit, Analog Communication, Digital Communication and Application Communication and each communication has own Module. So we can start Test immediately after mounting Module to the equipment. Application Circuits of AM receiver and FM receiver are added in order to understand how the public airwaves is received. This provides BreadBoard and Ext. Power so we can make other communication circuit with it.



Features

Test uses Measuring Equipment so it is possible to understand how to use Measuring Equipment.
Module by Themes are provided from Basic Circuit to Application Circuit for communication.
2 channel Digital Oscilloscope and PC programs are provided basically.
8 channel DAQ is provided as Hardware and PC software is provided in order to design digital data for circuit and check data from circuit.
Test Point is provided for easy contact of Probe to a part for measurement.
It is possible to provide Standard Waveform, Microphone and Line-in selectively to communication circuit.
We can listen to received signal with one of Head Phone and embedded speaker.

Block Diagram

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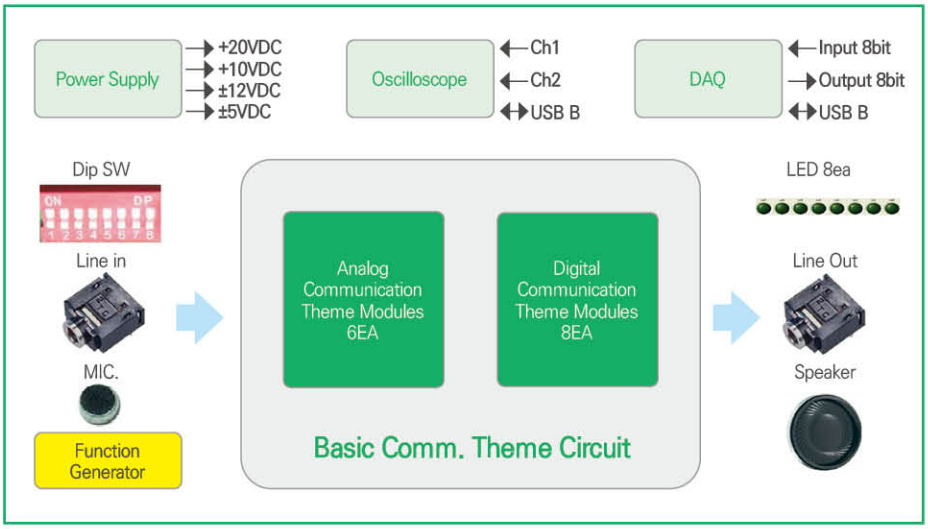
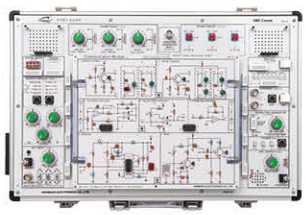


Components



HBE-Comm

Experiment Board : 14EA

USB Cable (A to B Type)

Scope Probe 2EA

Manual & Platform USB

BNC Cable 1EA

Power Cable (AC 220V Cable) 1EA

Jumper Cable 1EA