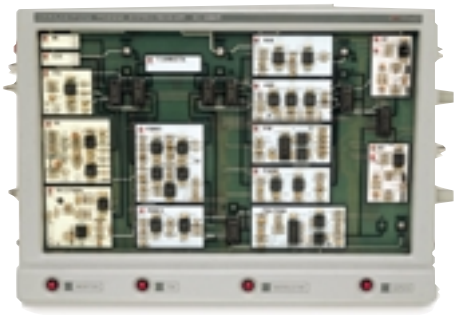
ANALOGUE COMMUNICATIONS TRAINING SYSTEM

EC-696



The analogue communications training system **EC-696** has several types of emitters, transmission channels, receivers, modulators and demodulators, in order to shape a transmission system easily. For instance, it permits to compare the advantages of several transmission systems to others, including those fibre-optics based, or to analyse interference phenomena.

Easy to use and the capability to measure the electrical signals throughout the equipment has been taken into account by means of a series of test points. To this end, circuitry is located into a desk-like cabinet, with a transparent fold-down cover for a complete access. The equipment is composed of one Emitter set and one Receiver set, to be linked during training, by the selected transmission method.

EMITTER MODULE EC-696/E

The **EC-696/E** emitting system is provided with several inputs where generators or microphones can be connected. A set of sequential controls allows the equipment to be configured quickly, by selecting the input, modulation (AM, FM, PWM) or transmission modes through five different channels: twin cable, coaxial, fibre-optic, infrared or radio.

EMITER MODULE

Signal inputs

CO1 and CO2	Input from a generator
Maximum level	± 3 V
Bandwidth	DC to 20 kHz
Input impedance	≥ 20 kΩ (1 kHz)
MIC1 and MIC2	Microphone inputs
Sensitivity	6 mVpp, adjustable
Input impedance	≥ 20 kΩ (1 kHz)

Modulators

AM Modulator	Voltage-controlled gain amplifier
Carrier frequency	100 kHz
Modulation index	0 to 100%
Bandwidth	DC to 20 kHz
FM Modulator	Voltage-controlled oscillator
Carrier frequency	100 kHz
Frequency deviation	± 50 kHz
Bandwidth	DC to 20 kHz
Pulse Modulator (PWM)	
Carrier frequency	100 kHz
Duty cycle	40 to 70%
Bandwidth	DC to 20 kHz
FDM/FM Modulator	Voltage-controlled oscillator
Carrier frequency	300 kHz or 100 kHz, selectable
Channel bandwidth	DC to 20 kHz

Emitters

Bifilar cable transmitter	Output through operational amplifier
Maximum level	± 3 V
Coaxial cable transmitter	Output through operational amplifier
Maximum level	± 3 V
Fibre optic transmitter	
Emission	By LED Photodetector
Emitting band	650 nm (red colour)
Infrared ray transmitter	
Emission	By LED Photodetector
Emitting band	950 nm
27 MHz Emitter	
Output level	0 dBm
Modulation index	50 %
Antenna	1.5 m cable Monopole

RECEIVER MODULE EC-696/R

Signals processed by the **EC-696/E** can be received and demodulated by the **EC-696/R**. This system is configured by four pushbuttons and a logic control, the same way as in the emitter.
The demodulated and separate signals received can be displayed on the screen of an oscilloscope or monitored by means of earphones.

RECEIVER MODULE

Receivers

Bifilar cable receiver	Direct, without processing
Coaxial cable receiver	Direct, without processing
Fibre optics receiver	
Type	(PIN) type Photodiode
Receiving band	400 to 1100 nm (90% efficiency)
Infrared receiver	
Type	PIN type photodiode
Receiving band	800 to 1000 nm (50% efficiency)
Radio receiver	
Peak detector	
Receiving band	27 MHz
Antenna	1.5 m Cable

Demodulator specifications

AM Demodulator	Fast detector
Bandwidth	DC to 20 kHz (bifilar and coaxial) 300 Hz to 20 kHz (fibre, infrared and radio)
FM Demodulator	DPLL type
Carrier frequency	100 kHz
Bandwidth	DC to 20 kHz (bifilar and coaxial)
Pulse demodulator (PWM)	Integrator type
Carrier frequency	100 kHz
Bandwidth	DC to 20 kHz (bifilar and coaxial) 300 Hz to 20 kHz (fibre, infrared and radio)
FDM/FM Demodulator	DPLL type
Carrier frequency	300 or 100 kHz selectable
Multiplex bandwidth	DC to 20 kHz (bifilar and coaxial) 300 Hz to 20 kHz (fibre, infrared and radio)

Output specifications

Earphone output	
Output stage	AB Class
Volume control	Independent for left and right channels
Output power	200 mW over 32 Ω (3 Vpp in C)
Oscilloscope S1 and S2 outputs	
Output level	≥ 400 m Vpp (3 Vpp in A)