

ITF-204

Frequency Modulator/Demodulator Training Kit

This kit demonstrates the basic operation of an FM receiver as well as the principles of frequency modulation and demodulation using a radio detector.

Learning items:

1. Frequency modulation using a varactor diode
2. Demodulation using a ratio detector

A built-in microphone and speaker make the ITF-204 ready to use, while an external microphone jack offers extra flexibility. In addition, test points at each circuit block allow students to easily check how each one works. This training kit can also be installed in the ITF-015 rack mount.

Specifications

Input amplifier section

External microphone	500 k Ω input impedance
Gain	50 dB \pm 3 dB
Load impedance allowed	50 k Ω or more
Output maximum voltage	1 Vp-p or more
Distortion	1% or less at 1 kHz

Modulator section

Modulation	Varactor diode
Demodulation	Ratio detector
Center frequency	10.7 MHz \pm 50 kHz
Maximum voltage	110 dB μ (0.3 Vp-p) or more

Receiver section

Antenna matched impedance	75 Ω unbalanced (external antenna connection available)
Receiving frequency	75 MHz to 110 MHz
IF frequency	10.7 MHz
Practical sensitivity	Within 10 dB
Frequency characteristic	50 Hz to 15 kHz (\pm 3 dB, 0.2 W output)

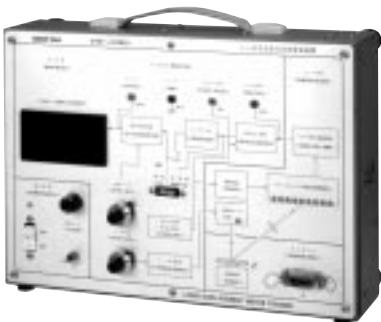
Output impedance	8 Ω (4 to 16 Ω load available)
Maximum output	Approx. 0.5 W
Power supply	DC 15 V \pm 1 V/150 mA DC (external power supply required)

Size and weight

350 (W) X 83 (H) X 250 (L) mm, approx. 3 kg

Operating temperature

0 $^{\circ}$ to 40 $^{\circ}$ C, 85% RH



ITF-205

Laser Displacement Measurement Training Kit

Learning how to perform displacement measurement using a laser diode and photodetector (i.e. a digital line sensor) is made possible with the ITF-205.

The main features of this kit are:

1. Well-defined panel layout and test terminals
2. LED indicators for the photodetector that show the current position of the moving target
3. Visible laser beam allows easy identification of the beam path
4. Target positioning device for moving the target back and forth slightly

Specifications

Meter panel

Sampling frequency	Approx. 50 times/sec. (approx. 20 ms)
Laser (semiconductor laser)	
Wavelength	670 nm
Output	1 mW (class 2)
Spot	Approx. 0.5 to 2 mm in diameter
Displacement display	4-digit decimal display
Output	
Start signal	TTL level, load signal
Video signal	Approx. 2 Vp-p
Analog data	Approx. 10 mV/10 μ m, zero displacement range approx. \pm 10 V

Sensor

Projector	
Element	Visible light laser diode (semiconductor laser)
Output	2 mW or less

Receiving light element

Element	512-bit digital line sensor
Angle	33 $^{\circ}$ triangulation measuring system
Measuring range	\pm 5 mm (45 mm center)
Resolution	Approx. 20 μ m

Positioning stage

Stroke	Approx. \pm 10 mm
Display	3-1/2 digit LED display for measurement results, LED indicators for line sensor

Power supply

AC 100/117/200/217/234 V, 50/60 Hz, approx. 15 W

Size and weight

350 (W) X 83 (H) X 250 (L) mm, 6 kg

Operating temperature

0 $^{\circ}$ to 40 $^{\circ}$ C, 85% RH