MICROWAVE ACTIVE CIRCUIT DESIGN TRAINER

Model Number : GOTT-MAC-157

DESCRIPTION

- Design and implementation of microwave front end receiver module.
- Design and implementation of microwave front end transmitter module.
- Design and implementation of voltage controlled oscillator and phase locked loop.
- Design and implementation of IQ modulator and demodulator.
- Design and implementation of digital wireless transceiver module.

FEATURES

- Training for wireless communication technicians and engineers.
- To understand the applications and measurements of communication instrument XZs and products.
- Design and implementation ability training for microwave module circuit.
- To shorten the gap between academic and industrial circles.
- 2mm connect leads are used throughout the test point.
- 4mm connect leads are used throughout the DCV point.
- Each module can interlink together with U-link 4mm for 12v + 12v ground.
- 4mm LED indicator for each supply DCV + 12 v and -12v or + 5v and 5v.

PRODUCT MODULES

DESIGN AND MEASUREMENT OF MICROSTRIP LINE MATCHING CIRCUIT

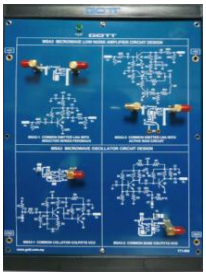
CODE 157-161

Design and Measurement of Microstrip Line Matching Circuit

- Experiment 1: Measurement ofλ / 4 Impedance Transformer Matchig Network (Operation Frequency: 2400 MHz; S_{11} < -10 dB)
- Experiment 2: Measurement of Single and Balanced Short Stubs Matching Network (Operation Frequency: 2400 MHz; S_{11} < -10 dB)
- Experiment 3: Measurement of Single, Balanced and Radio Open Stubs Matching Network (Operation Frequency: 2400 MHz; S_{11} < -10 dB)
- Experiment 4: Measurement of and Open Stubs Matching Network (Operation Frequency: 2400 MHz; S_{11} < -10 dB)

DESIGN AND MEASUREMENT OF LOW NOISE AMPLIFIER & VOLTAGE CONTROLLED OSCILLATOR

CODE 157-162



Design and Measurement of Low Noise Amplifier (LNA)

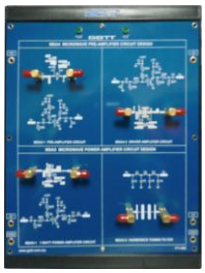
- Experiment 1: Measurement of Frequency Responses (Operation Frequency: 2350 ~ 2450 MHz; S_{11} < -10 dB, S_{22} < -10 dB, S_{21} > -10 dB)
- Experiment 2: Measurement of Noise Figure (Operation Frequency: 2350 ~ 2450 MHz; NF < 1.8 dB)
- Experiment 3: Measurement of 1 dB Compression Point (Operation Frequency: 2400 MHz; S_{1dB} > -15 dBm)

Design and Measurement of Voltage Controlled Oscillator

- Experiment 1: Measurement of Oscillation Frequency and Output Power (Oscillation Frequency: 2350~2450 MHz; Output Power: > -5 dBm)
- Experiment 2: Measurement of Phase Noise (Phase Noise: -90 ~ -100 dBc/Hz @ 100 kHz)
- Experiment 3: Measurement of Gain Factor and Tunable Bandwidth (Gain Factor: 10 ~20 MHz/Volt; Tunable Bandwidth: 60 ~ 70 MHz)
- Experiment 4: Measurement of Pushing Figure (Pushing Figure: 8 MHz/Volt)

DESIGN AND MEASUREMENT OF PRE-AMPLIFIER POWER AMPLIFIER

CODE 157-163



Design and Measurement of Pre-amplifier

- Experiment 1: Measurement of Frequency Responses (Operation Frequency: 2350 ~ 2450 MHz; S11 < -10 dB, S22 < -10 dB, S21 > -10 dB)
- Experiment 2: Measurement of 1 dB Compression Point (Operation Frequency: 2400 MHz; S1dB > 5 dBm)
- Experiment 3: Measurement of 3rd Order Intercept Point (Operation Frequency: 2400 MHz; OIP3 > 25 dBm

Design and Measurement of Power Amplifier

- Experiment 1: Measurement of Gain Flatness (Operation Frequency: 2350 ~ 2450 MHz; Gain Flatness: ±1.5 dB)
- Experiment 2: Measurement of 1 dB Compression Point (Operation Frequency: 2400 MHz; S1dB > 23 dBm)
- Experiment 3: Measurement of 3rd Order Output Intercept Point (Operation Frequency: 2400 MHz; OIP3 > 40 dBm)
- Experiment 4: Measurement of the Ratio of Fundamental and Harmonics (Operation Frequency: 2400 MHz)

MICROWAVE ACTIVE CIRCUIT DESIGN TRAINER

Model Number : GOTT-MAC-157

DESIGN AND MEASUREMENT OF PHASE LOCKED LOOP CONTROLLER & PHASE LOCKED LOOP

CODE 157-164

Design and Measurement of Phase Locked Loop Controller

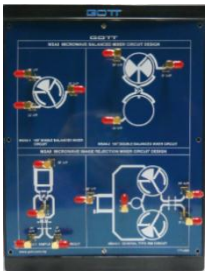
- Experiment 1: LCD and Keypad Testing (Locked Frequency Display: Locked Status Detection)
- Experiment 2: MB 15E07 Control Signal Testing (Locked Frequency: 2250 ~2350 MHz; Stepped Frequency: 1 MHz, 10 MHz)

Design and Measurement of Phase Locked Loop

- Experiment 1: Measurement of Frequency Responses for Loop Filter (3-dB Frequency: 12.5 kHz)
- Experiment 2: Measurement of PLL and Phase Noise (Phase Noise < -100 dBc/Hz @ 100 kHz)
- Experiment 3: Measurement of PLL Locked Time (Locked Time < 5 ms)

DESIGN AND MEASUREMENT OF BALANCED MIXER & IMAGE-REJECTION MIXER

CODE 157-165



Design and Measurement of Balanced Mixer

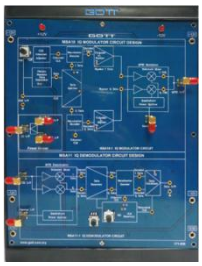
- Experiment 1: Measurement of Conversion Loss vs. LO Power (RF: 2420 MHz, LO: 2350 MHz; Conversion Loss: < 15 dB)
- Experiment 2: Measurement of Conversion Loss vs. RF Power (RF: 2420 MHz, LO: 2350 MHz; Conversion Loss: < 15 dB, S_{1dB} > 0 dBm)
- Experiment 3: Measurement of 3rd Order Intercept Point (RF: 2420 MHz, LO: 2350 MHz; OIP3 > 10 dBm)
- Experiment 4: Measurement of IF bandwidth (RF: 2360 ~ 2450 MHz, LO: 2350 MHz; IF bandwidth: > 100 MHz)
- Experiment 5: Measurement of Isolation (Operation Frequency: 2350 ~ 2450 MHz; Isolation: > 20 dB)

Design and Measurement of Image-rejection Mixer

- Experiment 1: Measurement of Conversion Loss vs. LO Power (RF: 2420 MHz; LO: 2350 MHz; Conversion Loss: < 15 dB)
- Experiment 2: Measurement of Conversion Loss vs. RF Power (RF: 2420 MHz; LO: 2350 MHz; Conversion Loss: < 15 dB, S_{1dB} > 5 dBm)
- Experiment 3: Measurement of 3rd Order Intercept Point (RF: 2420 MHz; LO: 2350 MHz; OIP3 > 15 dBm)
- Experiment 4: Measurement of Isolation (Operation Frequency: 2350 ~ 2450 MHz; Isolation: > 30 dB)
- Experiment 5: Measurement of Image-rejection level (RF: 2250 ~ 2350 MHz; LO: 2350 MHz; Image-rejection level: > 30 dB)

DESIGN AND MEASUREMENT OF IQ MODULATOR & IQ DEMODULATOR

CODE 157-166



Design and Measurement of IQ Modulator

- Experiment 1: Measurement of PSK Modulator (Operation Frequency: 70.7 MHz; Data Rate: >100 kbps)
- Experiment 2: Measurement of QPSK Modulator (Operation Frequency: 70.7 MHz; Data Rate: >100 kbps)

Design and Measurement of IQ Demodulator

- Experiment 1: Measurement of PSK Demodulator (Operation Frequency: 70.7 MHz; Data Rate: >100 kbps)
- Experiment 2: Measurement of QPSK Demodulator (Operation Frequency: 70.7 MHz; Data Rate: >100 kbps)

DESIGN AND IMPLEMENTATION OF DIGITAL WIRELESS TRANSMITTER

CODE 157-167

Design and Implementation of Digital Wireless Transmitter

- Experiment 1: Measurement of Output Power(Operation Frequency: 2400 MHz; Pout > 10 dBm)
- Experiment 2: Measurement of Harmonics' Output Power(Operation Frequency: 2400 MHz; Pout < -45 dBm)
- Experiment 3: Measurement of Modulation Signal (Operation Frequency: 2400 MHz; Type of Modulation: FSK)

MICROWAVE ACTIVE CIRCUIT DESIGN TRAINER

Model Number : GOTT-MAC-157

DESIGN AND IMPLEMENTATION OF DIGITAL WIRELESS RECEIVER

CODE 157-168

Design and Implementation of Digital Wireless Receiver

- Experiment 1: Measurement of Sensitivity (Operation Frequency: 2400 MHz; Receiver Sensitivity: > -80 dBm)
- Experiment 2: Measurement of Demodulation Signal (Operation Frequency: 2400 MHz; Type of Demodulator: FSK)
- Experiment 3: Measurement of Image-rejection Ability (Operation Frequency: 2400 MHz; Image-rejection level: > 30 dB)

DC POWER SUPPLY & FUNCTION GENERATOR (OPTIONAL ITEM)

CODE 500-107

DC Power Supply

- Tripple Bipolar Voltage Outputs
  - DC 0 – +/-15V
  - DC +/-5V
  - DC +/-12V
- Constant & variable Voltage Operation
- Low Ripple and Noise

Function Generator

- Two Signals Output Ports
- Frequency Range :

FG (I): 0 – 10Hz	FG (II): 0 – 100Hz
0 – 100kHz	0 – 1kHz
0 – 1kHz	0 – 10kHz
0 – 10kHz	0 – 100kHz
0 – 100kHz	0 – 1MHz

- Waveform: Sine, Triangle, Square, TTL Pulse
- Amplitude: 10Vpp
- Built-in-6-Digit Frequency Counter
- Two Large 0.5" LED Display
- Overload Protection

Manuals:

(1) All manuals are written in English
(2) Model Answer
(3) Teaching Manuals

General Terms:

(1) Accessories will be provided where applicable.
(2) Manuals & Training will be provided where applicable.
(3) Designs & Specifications are subject to change without notice.
(4) We reserve the right to discontinue the manufacturing of any product.

Warranty:

2 Years

ORDERING INFORMATION :

ITEM	MODEL NUMBER	CODE
MICROWAVE ACTIVE CIRCUIT DESIGN TRAINER	GOTT-MAC-157	157-160
DC POWER SUPPLY & FUNCTION GENERATOR	GOTT-DC POWER SUPPLY & FUNCTION GENERATOR	500-107

* Proposed design only, subject to changes without any notice.