Digital Logic Trainer board
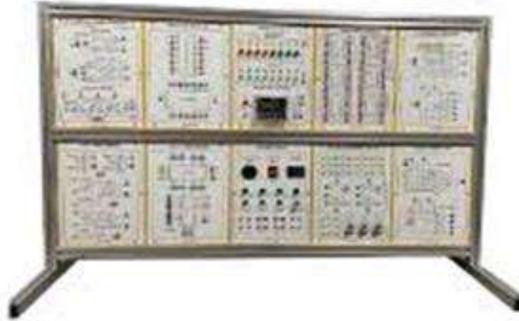Model: LT-609
Brand: L-TEK
Country of origin China
Assembly by LabTech

Description:

The Digital Logic Trainer board should consist of below:

The whole trainer is fully designed by FPGA/CPLD logic circuit. Buffer circuits have enhanced protection for each module which is powered by main unit through power socket, avoiding wrong input power source during the experiment. Covers different levels of logic circuit experiments, ranging from combinational logic, sequential logic as well as the logic circuit interfacing with microcontroller and practical application circuit for daily use. Includes various types of ADC & DAC circuits to learn different interfacing circuits between analog and digital signal. Built-in 8- channel multiplexer in main unit to measure multiple digital signals in real time. Multiple operation modes from 4-digit 7-segment display (a) scanning display mode, (b) individual digit display mode, (c) frequency counter mode for measurement of internal and external clock. Individual keep case for all modules for easy storing and carrying.

Main Unit:

DC Power Supply

Fixed DC power supply: +5V/2A, -5V/0.5A, +12V/2A With

overload protection

Clock Generator

Signal amplitude output: 3.3V

With adjustable output frequency: square wave, 1Hz ~

1MHz, 6 range

Frequency display :4-digit, 7-segment LED

Logic Level Switch: Toggle switches x 8, 3.3V output Data Level

Switch: 8-bit DIP switch x 2, 3.3V output Pulse Signal Generator

Address-1: No.360 Changshou Rd, Putuo district, Shanghai, China
E-Mail: info@labtech-engineering.com, www.labtech-engineering.com

Address-2: 246, West monipur, Mirpur (60 Feet Road), Dhaka-1216
E-Mail: way2labtech@gmail.com, www.labtech-engineering.com

2 sets of toggle switch with independent control output, Each set with Q, Q' output Pulse

width > 5ms, each with Denounce circuit

Logic Level Indicator

16-bit LED with driver and protection circuit Input

Impedance: > 100K ohms

8 Channel Logic Signal Tracer

8 logic signal input: input impedance: ≥ 100K ohms, 3.3V input Fixed DC

level shift for each channel

Input signal attenuation ratio: 1/8 Output

signal: BNC or 2mm plug

Oscilloscope SYNC. select: ALT/CHOP and scan-frequency adjustment The

function can be used only with analog oscilloscope

7-segment LED display & frequency measurement DIP

switches select the function:

00: Scanning display mode

Common anode for the control of 7-segments a ~ g Scanning

cathode for the control of 4-digit S0 ~ S3 Independent

display mode

Input 4-digit of data individually and decode the data at

7-segment display separately

Independent binary input and hexadecimal output 10:

Frequency counter for internal clock

Display the frequency of clock generator from main unit Frequency range:

0.001KHz ~ 999.9KHz

11: Frequency counter for external clock

Display the frequency of clock signal from external unit Frequency range:

0.001KHz ~ 999.9KHz

Rotary Encoder Rotary encoder output: PA, PB and GND signal, 3.3V output Standard Signal

Generator 5 sets of frequency:

20MHz, 1MHz, 10KHz, 100Hz, 1Hz

Experiment Modules

All built-in DC power socket module supply DC power from the main unit.

Each module includes a CPLD chip to implement all digital circuits shown on module panel. 2mm

sockets, bridge plugs, and cables are used throughout all modules so that students can easily create the

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circuits and compare different results in short time.

With comprehensive experiment manual.

List of Modules

Combinational Logic Circuit Experiment

Arithmetical Logic/Tri-state & Code Converter Experiment Encoder,

Decoder & Multiplexer Logic Circuit Experiment Flip-flop &

Sequential Logic & Counter Circuit Experiment Oscillator/Pulser; Load;

Up/Down Counter Circuit Experiment

Memory; Matrix LED; DAC/ADC & MCU Interface Circuit Experiment Digital &

Analog Timer, Pulse Generator Circuit Experiment

Ramp-compare/SAR/Dual-slope ADC Experiment Keyboard &

Display for Stepping Motor Position Control Precise Digital Clock

Timer

Universal CPLD & Breadboard Experiment List of Experiments

Combinational Logic Circuit Experiment

NOR gate circuit NAND gate

circuit XOR gate circuit

Constructing XOR gate with NAND gate The

combination with basic gates

AND-OR-INVERTER (A-O-I) gate circuit Comparator

circuit

Comparator constructed with basic logic gates

Comparator constructed with TTL IC

Schmitt gate circuit

Open-collector gate circuit High

voltage/current circuit

Constructing an AND gate with open collector gate

Half-adder and full-adder circuit Construct HA with basic logic gates

Half-sub tractor and full-sub tractor circuit Subtract or circuit constructed with basic logic gates Bit

parity generator circuit Bit parity generator constructed with XOR gates

Constructing a 4-to-10 decoder with TTL IC

The switch characteristics of TTL level conversion circuit Arithmetical

Logic/Tri-state & Code Converter Experiment CMOS FET tractate gate

circuit

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Truth table measurements

Constructing an AND gate with tractate gate

Bidirectional transmission circuit

Half-adder and full-adder circuit Full-adder

circuit with IC

High-speed adder carry generator circuit

BCD code adder circuit

Half-sub tractor and full-sub tractor circuit Full adder and inverter circuit Arithmetic

Logic Unit (ALU) circuit

Bit parity generator circuit Bit parity generator IC Hex to

Dec/Dec to Hex digital conversion

8-digit Dec-to-Hex conversion 8-bit Hex-

to-Dec conversion

Encoder, Decoder & Multiplexer Logic Circuit Experiment Encoder

circuit

Constructing a 4-to-2 encoder with basic gates Constructing

a 9-to-4 encoder with TTL IC Decoder circuit

Constructing a 2-to-4 decoder with basic gates BCD-to-

7-segment decoder

DE multiplexer circuit Constructing a 2-output DE multiplexer with

basic logic gates

Digitally controlled analog multiplexer/ DE multiplexer circuit The

switch characteristics of CMOS level conversion circuit Flip-flop &

Sequential Logic & Counter Circuit Experiment Flip-flop circuits

Construct R-S flip-flop with basic logic gates Construct

D flip-flop with R-S flip-flops

Construct noise elimination circuit with R-S flip-flops Construct J-

K flip-flop with D flip-flops

The J-K flip-flop of delay and differential

Construct master-slave J-K flip-flops with dual R-S flip-flops Construct

shift register with D flip-flops

Preset left/right shift register J-K flip-

flop counters

Asynchronous binary up counter Asynchronous

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binary down counter Asynchronous decade up

counter Synchronous binary counter Synchronous

binary up counter Synchronous binary up/down

counter Johnson counter

Ring counter

Oscillator/Pulsar; Load; Up/Down Counter Circuit Experiment

Constructing Random Access Memory (RAM) with D flip-flop 64-bit

Random Access Memory (RAM) circuit

Erasable Programmable Read Only Memory (EPROM) circuit

Asynchronous four-bit binary up counter (use of 7493 IC) Presentable

binary up/down counter

Presentable decimal up/down counter

Construct non-retrigger able circuit with the specialized CMOS IC Construct

retrigger able circuit with CMOS IC

Construct a variable duty cycle oscillator circuit with dual constable multivibrators Memory,

Matrix LED & DAC/ADC & MCU Interface Circuit Experiment Electronic EPROM

(EEPROM) circuit

DAC0800 unipolar conversion circuit experiments Bipolar

output conversion circuit

ADC0804 8-bit SAC analog-to-digital converter experiment Constructing

dynamic scanning counter with single Chip microprocessor

Digital & Analog Timer, Pulse Generator Circuit Experiment

Constructing oscillator circuit with basic logic gates Resistor-

capacitor multivibrator

Resistor-capacitor crystal multi vibrator Constructing

oscillator circuit with Schmitt gate Resistor-capacitor

oscillator

Variable duty cycle resistor-capacitor oscillator 555 IC

oscillator circuit

555 oscillator circuit

Voltage controlled oscillator circuit Mon

stable multi vibrator circuits

Low-speed monostable multivibrator circuits Mon

stable ON/OFF delay circuit Mono stable ON/OFF

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timer circuit

Construct mono stable multi vibrator circuit with 555 IC

Numerically-Controlled Oscillator (NCO) signal generator Precise-

frequency function generator

Variable-duty-cycle NCO signal generator

Variable-ON/OFF delay and difference control experiments Precise

15-bit symmetric/asymmetric PWM generator Ramp-

compare/SAR/Dual-slope ADC Experiment

Simple R-2R unipolar output D/A converter experiments 8-bit

digital-ramp A/D converter experiment

8-bit successive-approximation A/D converter experiment 8-bit

dual-slope A/D converter experiment

Keyboard & Display for Stepping Motor Position Control Stepper

motor position/speed control experiment

Precise Digital Clock Timer Clock

experiment

Timer experiment

Universal CPLD & Breadboard Experiment Create block

diagram/schematic file in QUARTUS 16-bit Hex counter

16-bit decimal counter

16-bit presetable decimal up/down counter

16-bit scanning controller for 7-segment display

16-bit up/down counter and its indication by a 7-segment display

Electronic music box

The traffic light with animation and time indication Equipment

Required

Hand-held Digital Multi meter

Digital Storage Oscilloscope (DSO) : 100MHz bandwidth, 1GS/s sampling rate and FFT function or

better.

Accessories: Connecting Wire: 2 set, User Manual: 2 Nos, Standard Accessories

Warranty: 1 (One) year with services

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