

Practical 1

Introduction of CRO and FUNCTION GENERATOR

AIM :- To study about various function of CRO and Function Generator

APPARATUS:-

1. CRO
2. BNC Probe
3. Power Supply
4. Crocodile Pin Probe
5. Function Generator

THEORY:-

The Cathode Ray Oscilloscope is probably the most versatile tool for deployment of electronic

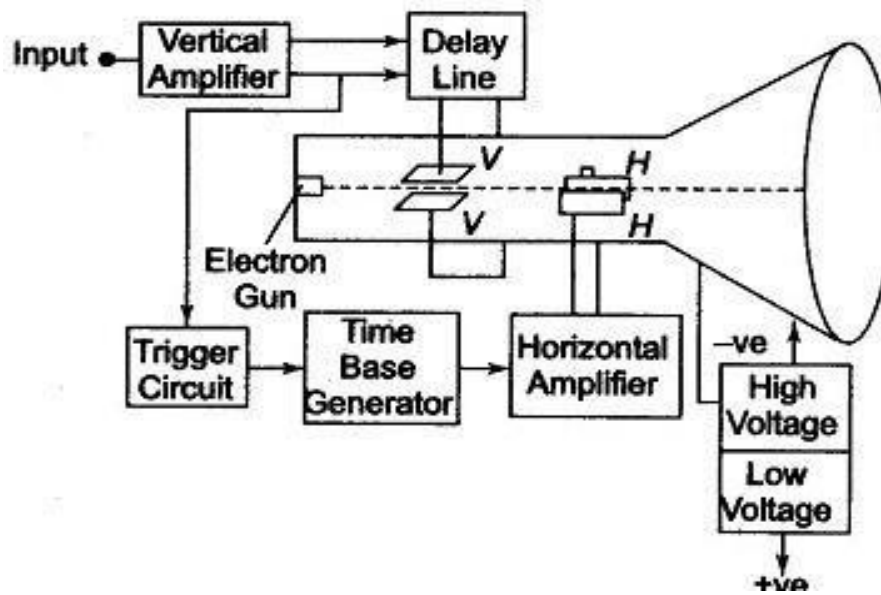
circuit and system. The CRO allow the amplitude of the electronic signals where they are voltage,

current or power to be displayed as a function of time. The CRO depends on the moments of an

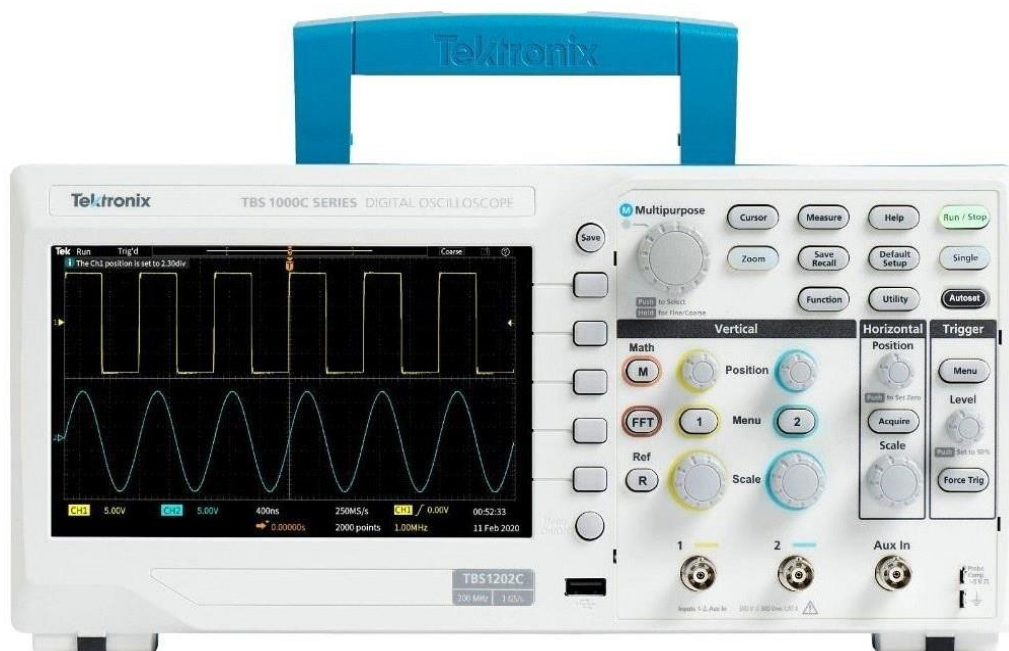
electron beam which is being bombarded (impinged) on a screen coated with a fluorescent

produce a visual spot. If the electron is being deflected along the conventional axes, i.e. x-axis &

y-axis, two different displays are produced.



Block Diagram of CRO



Digital Oscilloscope

The Digital Storage Oscilloscope Series provides you with affordable performance in a

compact design. Packed with standard features - including USB connectivity, 34 automated

measurements, limit testing, data logging, frequency counter.

Key performance specifications

- ❑ 200MHz, 150 MHz, 100 MHz, 70 MHz, 50 MHz, and 30 MHz1 bandwidth models
- ❑ 2-channel models
- ❑ Up to 2 GS/s sample rate on all channels
- ❑ 2.5k point record length on all channels
- ❑ Advanced triggers including pulse and line-selectable video triggers

Key features:

- 🕒 7 inch WVGA (800X480) Active TFT Color Display
- 🕒 34 automated measurements
- 🕒 Dual window FFT, simultaneously monitors both the time and frequency domains
- 🕒 Built-in waveform limit and TrendPlot™ testing
- 🕒 Dual channel frequency counter
- 🕒 Zoom Function
- 🕒 Automated, extended data logging feature
- 🕒 Autoset and auto-ranging functions
- 🕒 Built-in context-sensitive help
- 🕒 Multiple-language user interface

⌚ Small footprint and lightweight - Only 4.9 in. (124 mm) deep and 4.4 lb. (2 kg)

Connectivity:

⌚ USB 2.0 host port on the front panel for quick and easy data storage

⌚ USB 2.0 device port on rear panel for easy connection to a PC

Critical tools for troubleshooting your device:

The TBS1000B oscilloscope comes standard with a variety of advanced triggers used to debug

today's complex circuitry. Flexible options for utilizing rising or falling edges, pulse widths and

video trigger set-ups enable users to quickly isolate their signals of interest.

The pulse trigger function can easily capture critical events.

Once signals are captured, the TBS1000B offers advanced math and measurement capabilities

making it easy to evaluate signal quality. Users can add, subtract and multiply waveforms or

use any one of 34 automated measurements to quickly and reliably calculate important signal

characteristics such as frequency, rise time or overshoot.



Function Generator

The Arbitrary Function Generator provides a waveform generation tool with the best price

performance ratio. It includes two models with dual channels, up to 60 MHz bandwidth and up

to 10 V_p-output amplitude. The four run modes, 50 built-in frequently-used waveforms and the

built-in 200 MHz frequency counter cover most waveform generation needs in your experiment

and test jobs. The 3.95-inch TFT LCD, short-cut buttons, USB interface and PC software

provide the most intuitive ways to configure the instrument.

Key performance specifications:

⌚ Dual-channel, 25 MHz or 60 MHz sine waveforms, 12.5 MHz or 30 MHz square

waveforms

⌚ 14 bits, 125 MS/s or 300 MS/s arbitrary waveforms with 8 k points or 1 M points record

length

⌚ Amplitude 1 mVp-p to 10 Vp-p into 50 Ω loads.

Key features:

⌚ Continuous, sweeping, burst, and modulation modes (AM, FM, PM, ASK, FSK, PSK,

PWM) covers most requirements for students and other users to get the experiments/test

job done

⌚ 64-MByte internal non-volatile memory for arbitrary waveform storage

⌚ Built-in 200 MHz counter with 6-digit resolution offers an easy and precise way of

frequency/period/pulse width/duty cycle measurement

⌚ Standard USB host/device for memory expansion and remote control

⌚ Free Arb Express makes user defined waveforms editing extremely easy through an

external USB memory stick

⌚ Compatible with Tek Smart Lab™ for easy teaching and learning

⌚ Standard 5-year warranty

Applications:

⌚ Electric and electronics experiments

⌚ Communications experiments

⌚ Sensor simulation

🕒 Functional test

Software and solutions:

The user-defined arbitrary waveforms generated by the free ArbExpress software can easily be

loaded on the

AFG1000 with a USB memory stick.

Observation Table:-

Set values		Manual testing								Cursor Method			
Amplitude	freq.	V div	V/div	V	T div	T/div	F _s %	Error		V	F	Error	
								V	F			V	F
1) 500mVpp	3 KHz	1.0	500mV/div	500mV	0.12	260ns	3KHz	-	-	500mV	3.3	-	-0.3 KHz
2) 5 Vpp	10 KHz	1.0	5V/div	5V	0.2	50ns	10KHz	-	-	5V	10KHz	-	-
3) 12Vpp	15 KHz	2.4	5V/div	12V	0.26	250ns	15.38 KHz	-	0.38	12V	15KHz	-	-

Conclusion:-

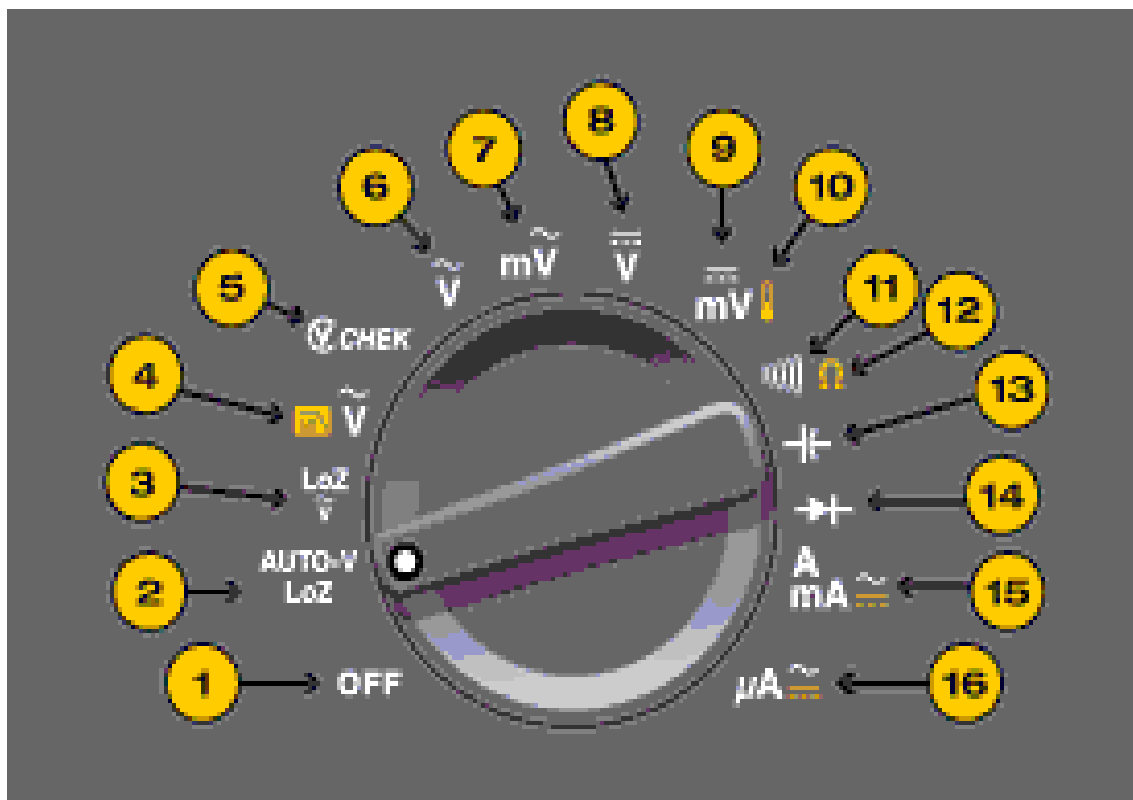
- The oscilloscope let us actually see the signal going through our set up and allow us to measure values.



Digital Multimeter

A digital multimeter is a test tool used to measure two or more electrical values—principally voltage (volts), current (amps) and resistance (ohms). It is a standard diagnostic tool for technicians in the electrical/electronic industries. Modern multimeters are often digital due to their accuracy, durability and extra features. In a digital multimeter the signal under test is converted to a voltage and an amplifier with electronically controlled gain preconditions the signal. A digital multimeter displays the quantity measured as a number, which eliminates parallax errors.

A multimeter can use many different test probes to connect to the circuit or device under test. Crocodile clips, retractable hook clips, and pointed probes are the three most common types. Tweezer probes are used for closely spaced test points, as for instance surface-mount devices. The connectors are attached to flexible, well insulated leads terminated with connectors appropriate for the meter. Probes are connected to portable meters typically by shrouded or recessed banana jacks, while benchtop meters may use banana jacks or BNC connectors. 2 mm plugs and binding posts have also been used at times, but are less commonly used today. Indeed, safety ratings now require shrouded banana jacks.



1) ON/OFF switch.

2) AUTO-V/LoZ: Prevents readings due to ghost voltage; found on the Fluke 114.

- 3)AC voltage/LoZ: uses low-input impedance ;Unit Volts.
- 4)AC voltage with low-pass filter.
- 5)VCHekTM: Permits simultaneous testing for voltage or continuity;
found on the Fluke 113.
- 6)AC voltage
- 7)AC millivolts
- 8)DC voltage
- 9)DC millivolts
- 10)Temperature: Unit Celsius or Fahrenheit.
- 11)Continuity: When combined with sound button.
- 12)Resistance: Unit Ohms.
- 13)Capacitance Unit Farads.
- 14)Diode test
- 15)AC, DC amps and milliamps
- 16)AC, DC microamps

Design1-1 - Multisim - [Design1 *]

File Edit View Place MCU Simulate Transfer Tools Reports Options Window Help

Design Toolbox

- Design1-1
 - Design1

XFG1

XSC1

Ext Trig

A

B

Aayush Gajjar
CS3
Experiment 1.1

Design1-1: Simulating... Tran: 3.311 s

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