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Method Of Measuring Projections Multi Function Using The Quick And Accurate Oscilloscope Cathode Ray (Cro) In Kim Lipi Serpong Tangerang District.

Sutarman[1], Sarmidi[2], Yonata Herdian[3]
Prodi Teknik Informatika STMIK Triguna Utama [1], STMIK DCI[2], Budhi Dharma Univercity[3]
Jl.Kimas Laeng no.25 Komplek Sudirman Indah Tigaraksa Kab.Tangerang

Abstract *ray oscilloscope cathode (cathode ray oscilloscope), hereinafter referred CRO is a measuring instrument electronics are functioning projecting the form of electrical signals that can be seen and studied, oscilloscope equipped with a cathode ray tube while the appliance is emitting electrons projecting a beam of electrons to screen cathode-ray tube, the electron beam imprint on the screen, a special circuit in the oscilloscope causes repetitive spotlight moves from left to right, this repetition produces the form of a continuous signal oscilloscopes to measure the phase difference of the wave is typically used to observe the exact wave shape of an electrical signal. In addition to the amplitude of the signal, the oscilloscope can show distortion, the time between the two events and relative timing of two related signals. Osiloscope work based on a sample of data, therefore, the oscilloscope is an electronic measuring instrument that is powerful to have a sample rate of 10 Ks / s (10 kilo sample / second = 10,000 data per second), is able to read as many as 10,000 / sec, in measuring a wave with a frequency of 2500Hz each sample contains data that is displayed in the fourth wave screen xy graph scale.*

Keywords: *Projection Methods, Measurement Multi punction, Oscilloskope*

I. Introduction

Cathode ray oscilloscope (cathode ray oscilloscop), called the CRO is a laboratory instrument that is very useful and reliable functioning for the measurement and analysis of waveforms and other symptoms in the circuits of electronics, CRO as a maker of graphics (plotter) XY highly fast and accurate in demonstrating an input signal to other signals and time, Pena graph "plotter stylus" is a moving light spots on the surface of the screen in responding to a voltage-input voltage. The X-axis or the input horizontal axis is the voltage pose "ramp voltage" linear raised internally, at the time base periodically moving the light spots from left to right through the surface of the monitor screen, the voltage to be inspected is inserted into the Y-axis or input vertical CRO, moving spots up and down according to the instantaneous value of the input voltage. Furthermore, these spots generate trace files display the image showing the input voltage variation as a function of time. When the input voltage repeatedly at a rate fast enough, the image will appear as a pattern that is silent on the screen. Thus completing the pattern observation CRO voltage results in a change with respect to time.CRO can also be a visual overview of the various fonemena dynamic through the use of a transducer which converts the flow, pressure, strain, temperature, temperature, acceleration, and a lot of physical quantities other into a voltage, CRO can be used to investigate the waveforms, transient events and the extent of other changes the time pattern of low frequency to high frequency, it could be done by a special camera attached to a CRO to measure the quantitative interpretation. Can also be used for a variety of measurements of physical quantities. Electrical quantities that can be measured using CRO include direct voltage, alternating voltage, direct current, alternating current, time, phase angle, frequency, and various assessment activities waveform time arises, the down time, the amount nirlistrik, pressure, tensile strength, temperature, and velocity can be measured using the transducer as a modifier to the amount of voltage

II. Formulation of the problem

1. What is the definition of the oscilloscope?
2. Any puncture and oscilloscope usability is good and right?
3. How where How formulation and calculation oscilloscope?

III. Objectives Writing oscilloscope

1. Want to know more and will understand everything pengetahuaan contained in osciloscop
2. Utilizing measuring instruments and calibration laboratories available in both government and private diinstasi

IV. Discussion

understanding osiclloscope

Oscilloskop is a measuring tool that is used to map reading electrical signals and frequency. Oscilloscope used in the measurement of electronic circuits such as radio stations, TV, utility monitoring, observing and analyzing the frequency electronics such as in hospitals and oscilloscope functions among others to gauge the power supply voltage and its relationship to time. measuring the frequency of the signal that berosilasim check intermediate signal on an electrical circuit distinguishes AC current to DC current to know the noise on an electrical circuit, the following pictures of the time graph x-axis and y-axis voltage.

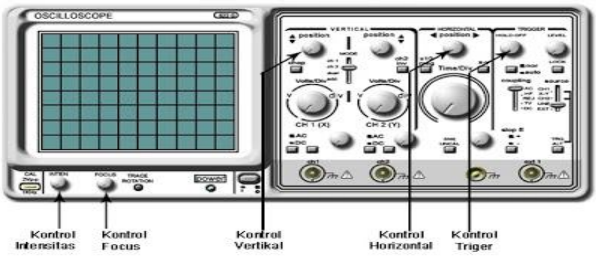

Figure 1.Oscilloscope cathode rays

Display

Display on the Oscilloscope display serves as a test signal. On the Oscilloscope Display are transverse stripes vertically and horizontally to form boxes called div. Horizontal axis represents time and the vertical axis represents voltage.

Panel-Control

The control panel contains buttons that can be used to adjust the on-screen display. The buttons on the oscilloscope panel include:

1. Focus: Used to adjust focus
2. Intensity: To adjust the brightness of the lines displayed on the screen
3. Trace rotation: Set the slope of the axis Y = 0 on the screen
4. Volt / div: Set the value of the voltage represented by a div on the screen
5. Time / div: Set the value of time is represented by a div on the screen
6. Position: To adjust the position of the X-axis normal (when the input signal is zero)
7. AC / DC: Set the function of terminal input coupling capacitor in the oscilloscope. If the button on the position of the AC input terminal by coupling capacitors so that just missed the AC component of the input signal. But if a button is placed on the DC position, the signal will be measured by its DC component dikutsertakan.
8. Ground: Used to view the location of the ground position on the screen.
9. Channel 1/2: Select the channel / channels are used.

In general, the oscilloscope consists of two channels (Dual Trace) that can be used to view two different signals, for example, channel one installed to view the input signal and channel two to see the output signal.

Fungsi dari Osciloscope

1. Can large measure electrical voltage and relation to time.
2. Measure the frequency of the oscillating signal.
3. Check the course of a signal on an electrical circuit.
4. Distinguishing AC current to DC current.
5. Knowing the noise in an electrical circuit.
6. Knowing the time graph x-axis and y-axis voltage
7. Can measure electronic circuits in radio stations, TV, or the usefulness of monitoring electronic frequencies for example in hospitals as well as for other uses.

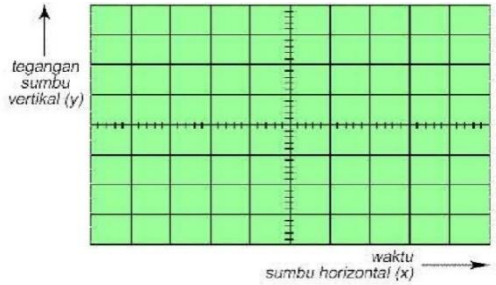

Figure 2. Scale X-axis and Y Oscilloscope

Important parts of the osciloscope: Position

1. BAL
2. Input
3. AC, GND, DC.
4. Volt/Div
5. Variable
6. Mode (CH1, CH2, Dual, Add, Sub)
7. Led Pilot Lamp
8. Illumi
9. Intensity
10. Focus
11. ASTIG
12. EXT-TRIG
13. SOURCE
14. SYNC
15. Level
16. Pull Auto
17. Cal IV PP
18. Ac Voltage Selector
19. Int Mod

How to use the oscilloscope

1. Ensure that the ON-OFF button to OFF
2. Attain all buttons have three positions at the center position.
3. Turn the INTENSITY knob at the center position.
4. Press PULL 5X MAG in order to obtain a normal position.
5. Press the button triggering the position AUTO LEVEL
6. Connect the power line back and forth to the plug ACV
7. Turn the ON-OFF switch to the ON position. Approximately 20 seconds later the line path will be imaged on a CRT screen. If this line is not visible, turn the INTENSITY knob clockwise.
8. Adjust FOCUS and INTENSITY to clarify the line path
9. Reset the vertical and horizontal positions according to need.
10. Connect the probes to the input-channel A / channel -A (CH-A) or to input channel B / -B channel (CH-B) as needed.
11. Connect the probes to the terminal to obtain calibration 0,5Vp CAL-p.
12. Position the vertical attenuator (vertical attenuator), switch VOLTS / DIV at position 10 mV, then rotate the VARIABLE knob clockwise. Play triggering SOURCE to CH-A, a rectangular (square-wave) will appear on the screen.
13. If you see a rectangular less than perfect, then set the trimmer located on the probe so that the waveform will look real.
14. Move the probe from the terminal 0,5Vp CAL-p. Oscilloscopes can already be used.
15. Osilokop Type Dual Trace

Vertical Input is an input terminal for channel A channel A.2. AC-GND-DC: Liaison vertical input to channel A.

1. If the AC button on the position, the input signal containing a DC component would be arrested / be blocked by a capacitor.
2. If the key at the position GND, input terminal will open, inputs sourced from internal reinforcement in the Oscilloscope will be grounded.
3. If the key at the position DC input terminal will be connected directly to the amplifier is in the Oscilloscope and the entire input signal is displayed on the monitor screen.

Model

1. CH-A: the waveform display-channel A / channel A.
2. CH-B: the waveform display channel-B / channel B.
3. DUAL: the measuring limit (range) between 0.5 sec / DIV - 1 msec (milli second) / DIV, both the frequency of both channels (CH-A and CH-B) will intersect at a frequency of about 200k Hz. At the limit measure (range) between 0.5 msec / DIV - 0.2 μ sec / DIV switch reach the second measuring channel (channel / CH) are used interchangeably.
4. ADD: CH-A and CH-B are summed. By pressing the button will invert obtained PULL

Sub Model:

Volt / Div variable for the channel (channel) /CH-A.A-VOLTS/DIV vertical attenuator (vertical attenuator) for the channel (channel) / CH-A.

1. If the "VARIABLE" is rotated to the right (clockwise), the screen will be reflected reflected voltage per "DIV". Picks per "DIV" is available from 5 mV / DIV - 20V / DIV.
2. Regulatory vertical position for the channel (channel) / CH-A.
3. Regulatory horizontal position.
4. SWEEP TIME / DIV. SWEEP TIME / DIV VARIABLE.
5. EXT.TRIG to trigger input signal from the outside.
6. CAL for calibrating the voltage at 0.5 V p-p (peak to peak) or voltage from peak to peak.
7. COMP.TEST switch to change the function of Oscilloscope as the test component (component tester). To test the components, buttons SWEEP TIME / DIV in the "set" in the position of CH-B for X-Y mode. button AC-GND-DC to the GND position.
8. triggering LEVEL
9. INDICATOR LIGHT.
10. SLOPE (+), (-) customizer slope polarity (waveform).
11. SYNC for mode selection switch in the position; AC, HF REJ, and TV.
12. GND terminal ground / earth / ground.

Sources:

Election customizers signal (syncronize signal selector). If the SOURCE button on the position

1. INT: signal of channel A (CH-A) and channel B (CH-B) for the purposes of an pen-trigger / ignition mutual summed,
2. CH-A: pen-trigger signal for late only from CH-A,
3. CH-B: signal for pen-trigger's only from CH-B,
4. AC: AC waveform will be in accordance with the AC signal source itself,
5. EXT: the incoming signal to the EXT TRIG deflected / bent adapted to the signal source.

Power Focus:

Used to produce the optimum waveform display. INTENSITY brightness control waveform display so you can easily use utuk dilihat.TRACE rotator position to see lines on the screen in order to remainare in the horizontal position. tools required to play this rotator trace.CH-B POSITION key regulator for the use of CH-B / channel (channel) B.Volt / Div Vertical attenuator for CH-B

1. Variable.
2. Vertical Input vertical input to CH-B.
3. AC-GND-DC to CH-B uses the same as the explanation contained in
4. number 2.
5. Components Test In terminal for the components to be tested.

During the process of using an oscilloscope is also worth noting some of the following:

1. Ensure tool is measured and the oscilloscope on the ground (digroundkan), in addition to security, it is also to reduce noise from radio frequency or meshes.
2. Ensure probe is in good condition.
3. Calibrate the display can be done with the control panel in the oscilloscope.
4. Determine the scale of the Y axis (voltage) by adjusting the position switch Volt / Div at a particular position. If the input signal is assumed to be large, use a scale of Volt / Div great. If is difficult to estimate the magnitude of the input voltage, use an attenuator 10 x (damper signal) on the probe or scale Volt / Div mounted in most positions.
5. Determine the scale of Time / Div to adjust the display frequency of the input signal.
6. Use the Trigger button or hold-off to obtain a stable output signal.
7. Use the focus ring if the picture is less focused.
8. Use the key regulator of intensity if the picture is very / underexposed.

Working Principle Oscilloscope

The working principle of the oscilloscope screen yaitumenggunakan cathode, the oscilloscope there is a long tube called a cathode ray tube or Cathode Ray Tube / CRT. In principle it works, there are two types of oscilloscopes, the analog type ART (analog real time oscilloscope) and type digitalDSO (digital storage oscilloscope), each has its advantages and limitations. Users, Laboratory Division, technicians and practitioners

working in the measuremnent / measurement needs to know and observe the character of each order to select exactly the oscilloscope which should be used in the measurement process.

Digital oscilloscope

Digital oscilloscope samples the waveform being measured and using ADC (Analog to Digital Converter) to change the amount of voltage that is sampled into a digital scale.

In a digital oscilloscope, waveform is displayed first sampled (sampled) and digitized. Oscilloscope then stores the values of this voltage together with the time scale of the waves in memory. In principle, a digital oscilloscope capture an image and save only so much value and then stop. He repeats this process again and again until terminated. Some DSO allows to choose the amount of footage that is stored in the memory per acquisition (removal) of the waves to be measured. Digital oscilloscopes provide extensive capabilities, ease tasks waveform acquisition and measurement. Storage wave of users for laboratories and technicians to capture and analyze the activity of an important signal. If the high pemicuannya engineering capabilities to efficiently find their peculiarities or specific conditions of the waveform being measured.
electronic clothes are being examined or tested performance**.**

Analog oscilloscope

Analog oscilloscopes in principle have advantages such as; the price is relatively cheaper than a digital oscilloscope, it is realtime and settings are easy to do because there is no delay between the waveform that is being viewed with a demonstration on the screen, and be able meragakan better shape as I had expected to see the waves of the complex, for example, signal video on TV and amplitude modulated RF signal, Keterbatasanya are not able to capture part of the wave before the occurrence of the trigger event and the presence of flicker (flicker) on the screen for waveform whose frequency is relatively low (10-20 Hz).

Working Principle Analog Oscilloscope

1. When we connect the probe (which ends by the connecting cable clamp) to a circuit, the voltage signal flows from the probe toward vertical arrangement of an oscilloscope system (Vertical System), an input voltage signal weakens attenuatorakan while the amplifier will amplify the input voltage signal. These settings are determined by us when moving the knob "Volt / div" on the oscilloscope user interface.
2. The voltage out of the system and then forwarded to the vertical deflection plates vertically on a CRT (Catode Ray Tube), a voltage signal that is inserted into this plate will be used by CRT to move files electron field only vertically (up or under).
3. Up to this point we can conclude that the system is vertical on analog oscilloscope function to manage the visibility of the amplitude of the signal being observed.
4. Furthermore, the signal into the vertical deflection plates. Voltage signals which are applied here causes the electrons move files. Resulting in a positive voltage electron beam moving upwards, while a negative voltage causes the electrons to be pushed down.
5. The signal coming out of the vertical system was also directed to trigger the system to trigger the sweep generator in creating what he called "Horizontal Sweep" is the movement of electrons in a sweep - swept to the left and to the right - the horizontal dimension, or in other words is a expression for the action that causes the electrons to move very quickly across the screen in a certain time interval. The movement of the electrons very fast (can reach 500,000 times per second) that causes the electrons appear as lines on the screen (such as leaf fan on the fan that looks like a circle only when rotating).
6. Setting the number of times the electron moving across the screen is what can we think of as the setting Period / frequency appears on the screen, concrete form is when we move the knob Time / Div at Oscilloscope.
7. Setting up of vertical and horizontal field together finally be able to present a voltage signal that is observed in the form of graphs that can be seen on a CRT screen.

How to use :

1. Ensure that the ON-OFF button to OFF
2. Attain all buttons have three positions at the center position.
3. Turn the INTENSITY knob at the center position.
4. Press PULL 5X MAG in order to obtain a normal position.
5. Press the button triggering the position AUTO LEVEL
6. Connect the power line back and forth to the plug ACV
7. Turn the ON-OFF switch to the ON position. Approximately 20 seconds later the line path will be imaged on a CRT screen. If this line is not visible, turn the INTENSITY knob clockwise.

8. Adjust FOCUS and INTENSITY to clarify the line path
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13. If you see a rectangular less than perfect, then set the trimmer located on the probe so that the waveform will look real.
14. Move the probe from the terminal 0,5Vp CAL-p. Oscilloscopes can already be used.

Method and Calculation Process oscilloscope:

How to calculate the Frequency Oscilloscope, and for the calculation of the frequency of the oscilloscope is as follows:

F = 1 / T

T = 1 Period (gel.penuh) x time / div

T record must be in the form of second unitso to calculate the frequency, we need to know how many periods div and time / div appointed by matter / oscilloscope.

For T unit itself will be adjusted to units of time / div. second, milli-second, or micro second. The following is the second conversion ratio:1milisecond = microsecond

The process of measuring the real one using the time period is 5 div / div 2 micro second / div so.

T = 5 x 2 microseconds / div

= 10 microsecond

= second

= second

F = 1 / T = = hz = 100 hz

So its frequency is 100 Hz

Stages Analog Oscilloscope Calibration

1. Adjust the input voltage of the AC power source 220 is behind the oscilloscope before the included AC power cord to the electrical power outlet.
2. Turn on the oscilloscope by pressing the power button.
3. Set the channel CH1 button.
4. Set the Auto mode.
5. Adjust the intensity, not too bright on the button
6. Adjust the position of the light beam horizontally and vertically to set the button called horizontal and vertical.
7. Set the level mode in the middle of (-) and (+).
8. Set button voltage (volt / div) marked V at 2 V, matching the estimate of the input voltage.
9. Install probepada one channel (eg CH1) with the toggle button AC / DC on AC position.
10. Set the switch / switch on the handle probedengan position 1x multiplier.
11. Attach the probe tip to the calibration point.
12. Set Time / Div at 1ms position so pixelated lines are quite clear.
13. After stage 11, an oscilloscope ready to be used to measure the voltage.

Data sample oscilloscope

To measure the phase difference of the wave oscilloscope works based on sample data, the higher the sample data, the more accurate the data dikurnya, Oscilloscope, generally also have a data sample is very high, if an oscilloscope has a sample rate of 10 Ks / s (10 kilo sample / second = 10,000 data per second), the oscilloscope will perform a reading of 10,000 / sec, which is measured is a wave with a frequency of 2500Hz, then each sample will contain data 1/4 of a full wave that can be monitored with XY graph scale.

Table 1. Data frequency time

Frekuensi Time	Unit	Hertz Second	(Hz)
f	-	-	1
T	-	-	1
T	-	-	1

F	-	-	1
M	(1.000.000) mega	1 MHz	µS
K	(1.000.000) kilo	1 KHz	mS
m	(1/1000) mili	1 KHz	**s**
µ	(1/1000.000) mikro	1/1.000.000	µ

Frequency is a measure of the number of rounds per event within a given time interval, to calculate the frequency should set the interval, the number of occurrences of events, and dividing the count with a long interval, the final result is expressed in hertz (Hz). Being able to measure the time between two events / periods of the frequency (f) as a result of the period (T), as seen below:

Frekuensi $f = \frac{1}{T}$,

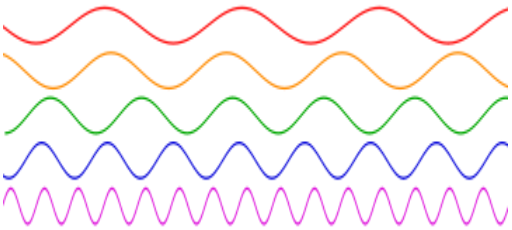

Figure 3. Wave sinusoid

Measure the voltage and the time period

On the oscilloscope screen is a voltage versus time graph. This graph form determined by the nature of the input signal. In addition to properties labeled on the graph, there is frequency which is the number of cycles per second, the diagram shows a sine wave but properties apply to any signal with a constant shape.

Amplitude is the maximum voltage reached by sinyal.Dalam it is measured in volts, V. Peak voltage / Peak voltage is another name for amplitude. Peak voltage / peak voltage is twice the peak voltage (amplitude). When reading an oscilloscope to measure the peak to

peak voltage.

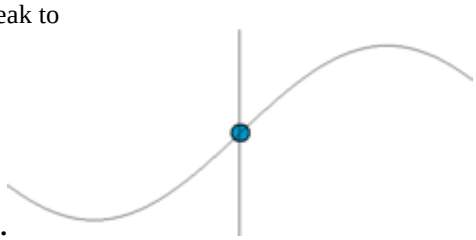

Figure 4. Time periode

Time periode

is the time it takes for the signal to complete one cycle. which is measured in seconds (s), a short duration of milliseconds (ms) and microseconds (衣s) 0.000001s. 1ms = 0.001s and 1衣s =. Frequency is measured in hertz (Hz), but the high frequency so that the kilo hertz (kHz) and megahertz (MHz) is often used 1000000Hz. 1kHz = 1000Hz and 1MHz = 1,000,000 Hz. frequency = 1 and the time period = period frequency waktufrequency

Volt / voltage, shown on the vertical axis and the y-scale is determined by the Y AMPLIFIER, (volt / div) control. BiasanyaTegangan peaks can be read correctly even though the position of 0V is unknown. a m p l it u d o is half of the peak voltage, peak voltage = distance in cm × volts / divContoh: voltage peaks = 4.2cm × 2V / div = 8.4Vamplitudo (voltage peak) = ½ × voltage peaks = 4.2V.

CONCLUSION.

1. In general, the function of the oscilloscope is to analyze the behavior of magnitude varies with time Yag displayed on the screen / display to see the form of electrical signals which we observe.
2. There are several types of voltage waveform on the oscilloscope which contained a sinusoidal wave, the wave block, sawtooth wave and triangle wave.

3. How to use an oscilloscope which starts the calibration and then adjust the focus, and the intensity, slope, x position and y position, after the probe is calibrated, then by attaching a probe to the reference voltage terminal and will appear on the monitor screen square voltages.
4. The oscilloscope screen is divided in 8 large-scale vertical section and 10 boxes in a horizontal direction.

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About the Author :

[1]. Sutarman Born in Bandung, May 10, 1964 to take the Graduate Education Medium S3 Islam Nusantara University, Master of Management STIMA IMMI S2, S1 and S1 Indutri Ahmad Yani Univercity, Information Engineering STMIK Triguna Utama, Lecturer STIE ISM Master of Management and S1 STMIK Triguna Utama

[2]. Sarmidi Lahir di Grobogan, 8 Mei 1972, Pendidikan sedang menempuh S3 di Uninus Bandung, S2 Magister Komputer STMIK Eresha Jakarta, S1 S.Kom STMIK Muhammadaiyah Jakarta. Dosen di STMIK DCI Tasikmalaya.

[3]. Yonata Herdian Born in Tangerang, 20 October 1980, Education Background S1 STAB Dharma Widiya, S2 Education of Magister an Magister Manajemen Pamulang Univercity, Lecturer Budi Dharma Univercity, STIE Bisma, STIM Primagraha, STAB Dharma Widiya