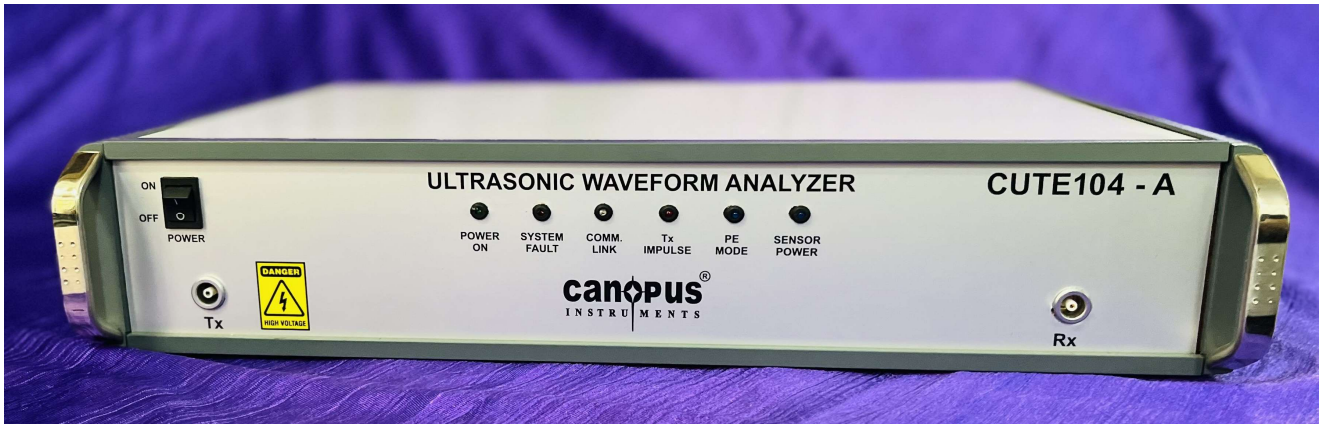
canopus® INSTRUMENTS

ULTRASONIC WAVEFORM ANALYZER
Model: CUTE104A



ULTRASONIC PULSER -RECEIVER SYSTEM WITH HIGH VOLTAGE TONE BURST CAPABILITY

MODEL: CUTE 104A

Designed for Low Frequency testing (<500KHz) NDT applications of Non-Homogeneous and other highly attenuating materials such as, Concrete, Rock, Ceramics, Graphite, Composites, etc.

COMPOSITES

CONCRETE

GRAPHITE

WOOD

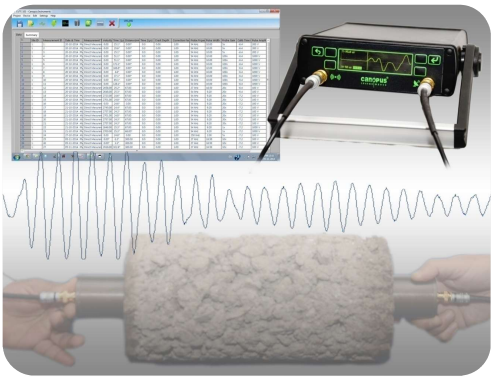
Overview

CUTE104A is a high performance, bench top system useful for Generation of Ultrasonic waves & Analysis of the received wave behaviour in Non-destructive testing (NDT) of materials. Use of CUTE104A is aimed at low frequency Ultrasonic Testing applications (<500KHz) required for testing of non-homogenous materials & layered composites. CUTE104A system supports **Transmit/Receive (T/R), Pulse/Echo (P/E), & Pitch Catch** modes commonly used for Ultrasonic testing.

High Voltage (1000V_{pp}) Tone Burst signal of set frequency can be generated to drive the Transmitting (Tx) transducer. This is extremely useful in enhancing the performance of the Tx transducer when it is pulsed at its resonance frequency.

Programmable High Gain (0 – +60dB) receiver amplifier is provided, with added option of interfacing Receiver (Rx) Transducers having **In-Built amplifier (Gain +26dB)**. Besides providing high gain, this provides advantage of reduced noise and enables use of **long receiver cables (50m)** with the use of 50 Ohm impedance matched co-axial cables.

Operation of the CUTE104A system requires connection to an external computer system, which runs the software utility **CUTE 104A-Connect** provided with the instrument system.



CUTE 104A FOR ULTRASONIC TESTING OF,

- **Large Concrete Structures (Path Length > 5m)**
- **De-lamination Testing in Layered Composite materials**
- **Non-Contact (Air-Coupled) Testing**
- **Dry Coupled/ Point Contact Testing**
- **Direct Contact/ Delayed Contact Testing**
- **Immersion/Under Water Inspection Systems**
- **Non-Linear Ultrasonic Testing**

Features

- Generation of High Voltage Square Wave Tone Burst Output

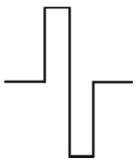
1. **Bipolar Wave: 20Vpp to 1000Vpp**
2. **Unipolar Wave: +ve or -ve wave 10V to 500V**
3. **Frequency: 25KHz to 500KHz**
4. **No. of Cycles: 1 to 16**

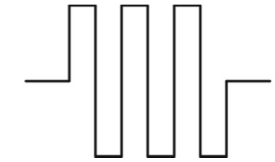
- Selectable Transmit/Receive (T/R) or Pulse/Echo (P/E) Mode
- High Gain Amplifier (0 - +60 dB)
- Interface with sensors having In-built amplifier (Additional 26dB Gain)
- Receiver Cable length up to 50m can be used without loss of signal
- Selection of High pass and Low pass filter parameters
- Software Utility CUTE104A-CONNECT available for Operational Control, Waveform display & Storage

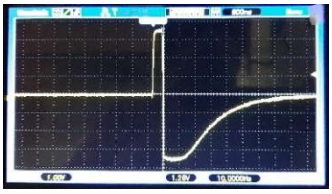
Description of CUTE 104A

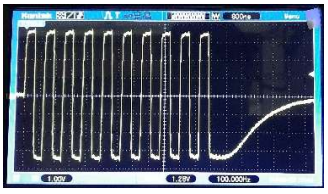
Transmitter Output Signal: 20V_{pp} - 1000V_{pp}

Single Pulse **Tone Burst – Multiple Pulses**





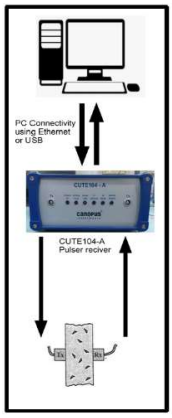


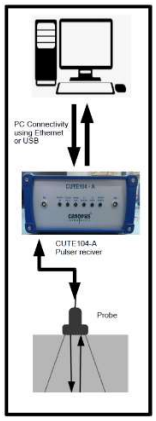


The CUTE104A system is designed to generate High Voltage Ultrasonic Pulses for excitation of Piezoelectric Transducers. Single pulse or Tone Burst Pulses (up to 1000 V_{pp}) in the frequency range of 25 to 500 KHz can be generated for providing excitation to an Ultrasonic Transducer used as Transmitter (Tx).

A High Gain Amplifier (0 – +60 dB), with user selectable High Pass & Low Pass Filters, is used to detect weak received signals from a Receiving Ultrasonic Transducer (Rx). Additional Gain of +26dB can be obtained by using Receiving Transducers having in-built low noise amplifier.

The system supports **Transmit/Receive (T/R), Pulse/Echo (P/E), & Pitch Catch** modes commonly used for Ultrasonic testing.



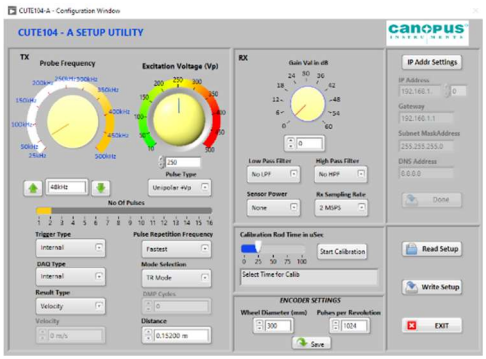


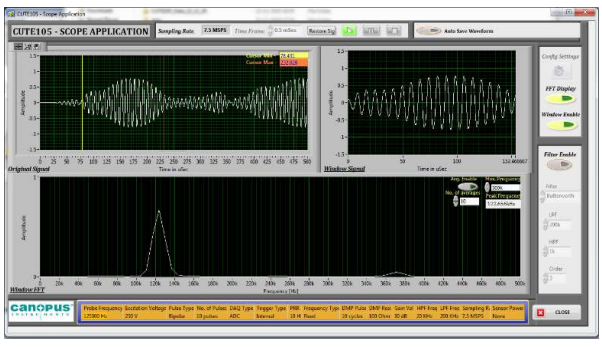
T/R Mode **P/E Mode**

In-built 16-bit Digitizer with Max. sampling rate of 7.5MSPS allows the CUTE104A system to be used without loss of resolution for testing applications up to 500KHz frequency range.

Remote parameter setting and Waveform display facility is provided using an external computer having Graphical software interface (CUTE104A-CONNECT) offered exclusively for this purpose.

SOFTWARE INTERFACE: CUTE104A-CONNECT





Configuration Utility

Data Acquisition and Waveform Analysis Utility

SPECIFICATIONS

PULSE TRANSMITTER (Single Pulse & Tone Burst Signal)

DESCIPTION	RANGE
Square Wave (Unipolar & Bipolar) Tone Burst Number of Tone Burst cycles Rise Time	Frequency Range: 25 KHz to 500 KHz Settable: 1 to 16 cycles < 200nS (10% to 90%)
Peak Pulse Voltage Output	Bipolar Output: 20 V_{pp} to 1000 V_{pp} Unipolar Output: +10 V to +500 V OR -10 V to -500 V
Output Power	100 W max.
Output Impedance	500 Ohms
Transmitter Mode	Pulse/Echo (PE) OR Transmit/Receive (TR)
Damping Resistance	500 Ohms (Enable/Disable)
TRIGGER Input	TTL 3.3V Logic
Sync Output Output Impedance	-40dB attenuated VHV output signal 50 Ohms
PROTECTION	
Output Short circuit	Continuous Short Circuit protected
Duty Cycle	1% max. (Software protected)
Over Temperature	High Voltage Generator shutdown

SPECIFICATION

SIGNAL RECEIVER (High Gain Amplifier & Filter)

DESCIPTION	RANGE
Amplifier Circuit Bandwidth	10 KHz to 1MHz
Gain Range	0 to +60 dB, Adjustable in 6dB steps
Additional Gain using Sensors with In-built amplifier Power Supply for Interface to Sensors with in-built amplifier	+26dB (Selected Frequency Sensors Available) 5VDC, 50mA
Input Impedance	10KOhms
Amplifier Output	Analog Output (±5Vmax)
Output Impedance	50 Ohms
Low Pass filters (Selectable) Slope: -60 dB/Decade	No Filter, 100KHz, 250KHz, 500KHz, 1MHz
High Pass filters (Selectable) Slope: -60 dB/Decade	No Filter, 10KHz, 20KHz, 50KHz, 80KHz

SPECIFICATION

INTERNAL DIGITIZER (Analog to Digital Converter) + USB / Ethernet Port

DESCIPTION	RANGE
ADC Resolution	16 bit
Measurement Bandwidth	2 MHz
Sampling Rate	2/5/7.5 MSPS – Selectable
Sample Length	20000 Samples in 2 and 5 MSPS 15000 Samples in 7.5 MSPS
External Computer Communication	USB / Ethernet Port (Factory Set)
Communication Software CUTE104A-CONNECT	
Parameter Setting	Yes
Waveform Display	Yes
Other Functions	Averaging, Windowing, FFT Plot Automatic Waveform Saving
Pulse Repetition Frequency (PRF) when used with CUTE104A-CONNECT software using Ethernet Communication to read data from Internal Digitizer	0.1 Hz to 10 Hz

GENERAL SPECIFICATIONS

DESCIPTION	RANGE
Power Supply Power Consumption	90-270Vac, 50/60Hz 15 Watt (Approx)
Fuse	3 Amp Slow Blow
Environmental Conditions	
Operating Temperature Range	0 – 55 °C
Relative Humidity	< 95%
Altitude	< 3000 m
Dimensions	W 250mm X H 120mm X D 250mm Table Top Mounting Case
Weight	2 Kg. Approx.

STANDARD ACCESSORIES		
CUTE104A - Main Instrument		1 No.
Ultrasonic Transducers (54 KHz)	To be used as Tx or Rx Transducer	1 Pair
Ultrasonic Receiver (Rx) Transducer with Integrated Pre-Amplifier	(Gain: 26dB, Frequency: 54 KHz	1 No.
TRANSDUCER CONNECTION WIRES	3 Meter Length	1 Pair
	5 Meter Length	1 Pair
Cables for connection of Oscilloscope and other ext. devices	2 Meter Length	2 Nos.
AC Power Supply Cable	3 Meter Length	1 No.
Acrylic Calibration Rod	Transit Time: 25µS & 100µS	1 No. Each
CUTE104A-Connect Software Utility Pack	(To be installed on a Microsoft Windows based computer system)	1 No.
CUTE104A OPERATING MANUAL		1 No.
Carry Case		1 No.

CUTE 104A – Accessories

- Ultrasonic Transducers: Frequency Range - 102KHz, 162KHz, 250KHz, 500KHz
  The following types are offered,

  a. Contact Type Transducers
  b. Receiver Transducers (Rx) with Integrated Pre-Amplifier (Gain: 26dB)
  c. Waterproof Ultrasonic Transducers for Underwater Testing Applications
  d. Customized types

- Waterproof Transducer Cables of various lengths (3m, 5m, 10m, etc.)

- Li-Ion Re-chargeable Battery Pack & Battery Charger Unit

APPLICATIONS: -

- **Testing of Composite materials for flaws and De-Laminations**
- **Non-Contact Air Coupled Ultrasonic Testing**
- **Guided wave detection (Testing of Plate, Pipe. Rail**
- **Ultrasonic research/ development/ educational testing applications**

Related Products

- ✓ Ultrasonic Pulse Velocity (UPV) Testing Equipment,
  Models: **CUTE102X0**
- ✓ Ultrasonic Testing Equipment for Non-Destructive Testing of materials.
  Model: **CUTE103A**

- ✓ Transducers Frequency Range
  : 24KHz – 500 KHz
- ✓ Immersion Transducers for Under Water Testing Applications
- ✓ NEW: Receiver Probes with In-built Pre-Amplifier (26dB Gain)

canopus® INSTRUMENTS

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Works II:
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Station Road, Vithalwadi (W),
Ulhasnagar – 421003, Dist. Thane,
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MADE IN INDIA