

TINALab II Specification

SYNTHESIZED FUNCTION GENERATOR

WAVEFORM OUTPUT	
Amplitude	$\pm 10V, \pm 5V$ (into 50 Ohm)
Nominal Impedance	50 Ohm
Protection	Short circuit protection in range of $\pm 15V$
Waveform	Square, Ramp, Triangle, DC, Arbitrary
Bandwidth	50MHz
Frequency range	
Sine	4MHz
Square, Triangle	500kHz
Arbitrary	depends on waveform
Synch Output (indicates 0V crossing)	5V CMOS level

D/A CONVERTER	
Resolution	10 [12] bits ($< 0.1\%$ of full scale), monotonic
Update Rate	40 MSPS

WAVEFORM MEMORY	
Type	Fast static RAM
Capacity	Min. 65,536 * 16bits

DIGITAL OUTPUTS

# of Lines	16
Connection	all 16 bits wired to a shrouded male connector 8 least significant bits wired to 2mm sockets
Compatibility	5V tolerant devices (5V TTL/CMOS, 3.3V LVCMOS)
Protection	Short circuit protection in range of $\pm 15V$

ANALOG INPUTS

# of Channels	2
Input Configurations	Single ended
Full Scale Input Range	$\pm 80V$
Nominal Impedance	1 MOhm / 25pF

A/D CONVERSION	
Resolution	10 [12] bit (no missing codes)
Sample Rate (non-repetitive signal)	20 MSPS/channel
Equivalent Sample Rate (repetitive signal)	4 GSPS/channel

SYSTEM CHARRACTERISTIC	
Bandwidth (-3dB)	dc .. 50MHz DC-coupled 2Hz .. 50MHz AC-coupled

FRAME MEMORY / CHANNEL	
Type	Fast static RAM
Capacity	min. 65536 * 16 bit
Input mode	Digitized analog and/or digital

VERTICAL MEASUREMENT RANGES	
Scale Factor	5mV/div .. 20 V/div
Attenuation Factors	x1, x2, x5

HORIZONTAL MEASURE RANGES	
Scale Factor	10 s/div .. 2us/div
Scale Factor (repetitive signal)	10 s/div .. 10ns/div
Attenuation Factors	x1, x2, x5

TRIGGER SOURCE	
Analog	Channels A, B, external
Digital	16 * 8 bits trigger pattern

TRIGGER RESPONSE (WAVEFORM GENERATING)	
Free Run	[Internal] trigger then go
Single	One waveform then stop
Continuous	One waveform then wait for a trigger

DIGITAL INPUT

# of Lines	16
Connection	all 16 bits wired to a shrouded male connector 8 least significant bits wired to 2mm sockets
Compatibility	3.3V CMOS/TTL, 5V CMOS/TTL
Overvoltage Protection	min. $\pm 15V$

MULTIMETER

A/D CONVERSION	
Resolution	12 bit

AC VOLTAGE	
Measurement Range	10mV .. 100V RMS
Range Factors	x1, x2, x5
Input Impedance	10 MOhm
Bandwidth	20kHz

DC VOLTAGE	
Measurement Range	10mV .. 100V
Range Factors	x1, x2, x5
Input Impedance	10 MOhm

AC CURRENT	
Measurement Range	1mA .. 1A RMS
Range Factors	x1, x2, x5

DC CURRENT	
Measurement Range	1mA .. 1A
Range Factors	x1, x2, x5

RESISTANCE	
Measurement Range	10Ohm .. 1MOhm
Range Factors	x1, x2, x5

INTERFACE

USB 1.1	full speed
RS-232	115200 baud, full-duplex, 8, N, 1

DC POWER SUPPLY

Fixed DC output	
+5V	0.4A
-5V	0.1A
Variable DC output	
+15V	0.1A
-15V	0.2A

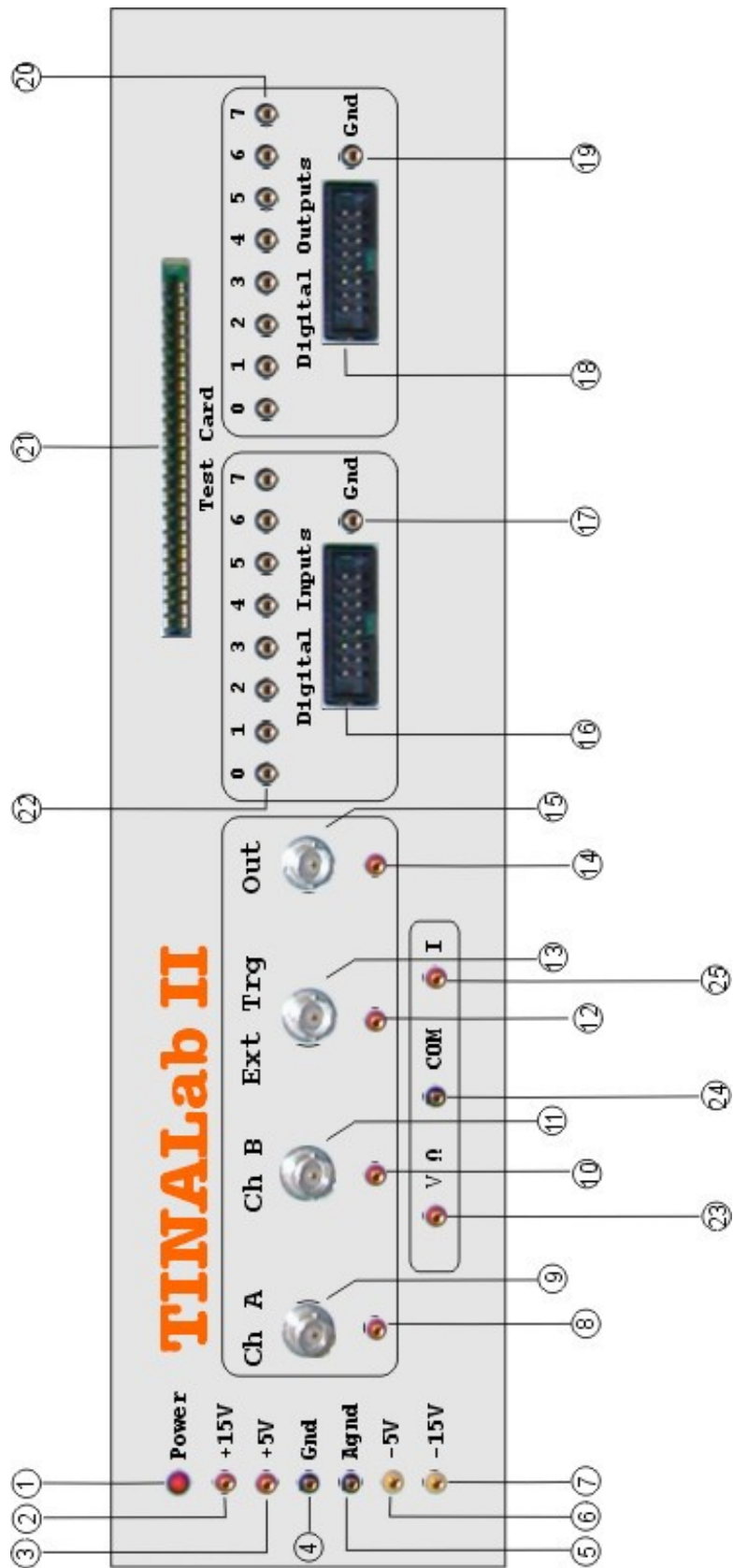
EXTERNAL POWER SUPPLY

Type	switching, external
Input	100 .. 240VAC, 47 .. 63Hz
Output	+5V/3A, +15V/0.8A, -15V/0.8A

GENERAL

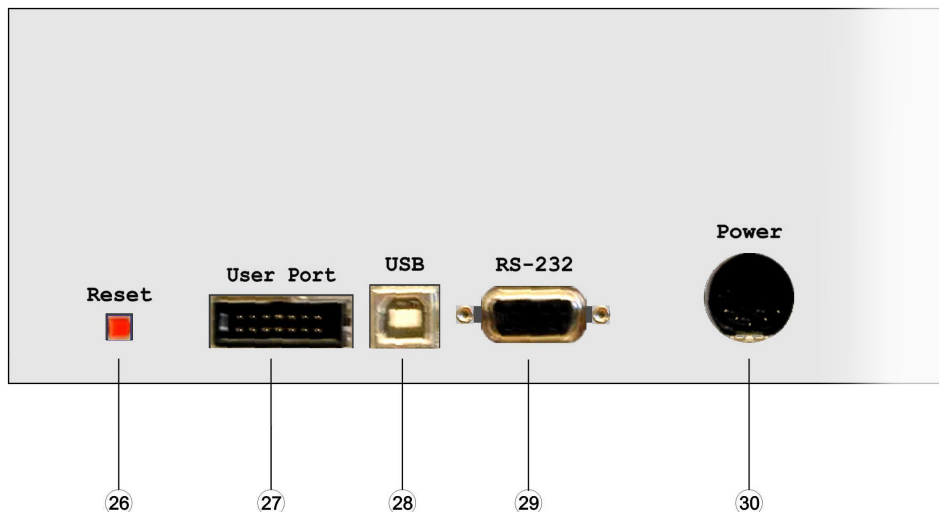
Weight	ca. 1kg
Color	Light gray
Dimensions (W x H x D)	291 x 75 x 199 mm

Panel elements of TINALab II



1. Power On LED
2. +15V programmable power supply output **Attention! For the time being, the supply delivers only fixed +15V.**
3. +5V fixed power supply output
4. Digital ground
5. Analog ground
6. -5V fixed power supply output
7. -15V programmable power supply output **Attention! For the time being , the supply delivers only fixed -15V.**
8. Ch A Input (2mm socket connector) This is the signal input for channel A.
9. Ch A Input (BNC connector) This is the signal input for channel A. The outer (ground) connection is galvanically connected to the instrument ground and consequently to the safety earth contact of the line/mains plug.
10. Ch B Input (2mm socket connector) This is the signal input for channel B.
11. Ch B Input (BNC connector) This is the signal input for channel B. The outer (ground) connection is galvanically connected to the instrument ground and consequently to the safety earth contact of the line/mains plug.
12. Ext Trg Input (2mm socket connector) This serves as external trigger signal input, if external triggering is selected.
13. Ext Trg Input (BNC connector) This serves as external trigger signal input, if external triggering is selected. The outer (ground) connection is galvanically connected to the instrument ground and consequently to the safety earth contact of the line/mains plug.
14. 50 Ω Output (2mm socket connector) Short-circuit-protected signal output of the function generator.
15. 50 Ω Output (BNC connector) Short-circuit-protected signal output of the function generator. The output impedance is 50 Ω , and the maximum output amplitude is 20Vpp (open circuit) or 10Vpp when terminated with 50 Ω .
16. Digital Inputs (shrouded male connector) Signal inputs of the Logical Analyzer. The inputs are protected against external DC voltages up to max. $\pm 15V$.
17. Digital ground
18. Digital Outputs (shrouded male connector) Signal outputs of the Digital Signal Generator. The outputs are protected against external DC voltages up to max. $\pm 15V$.
19. Digital ground
20. Digital Outputs (2mm socket connector) Signal outputs of the Digital Signal Generator. The outputs are protected against external DC voltages up to max. $\pm 15V$.

21. Test Card (50 contact card edge) Slot for test cards. Test cards are ready-to-use circuits for measurement experiments manufactured by DesignSoft, Inc.
22. Digital Inputs (2mm socket connector) Signal inputs of the Logical Analyzer. The inputs are protected against external DC voltages up to max. $\pm 15V$.
23. V Ω (2mm socket connector) Input terminal to measure voltage and resistance with the multimeter. **Attention! This input does not work unless a TINALab II Multimeter Card is installed.**
24. COM (2mm socket connector) Common ground of the multimeter measuring V, Ω , I. This ground is independent of all the other ground connections of the instrument (Gnd, Agnd).
25. I (2mm socket connector) Input terminal to measure current with the multimeter. **Attention! This input does not work unless a TINALab II Multimeter Card is installed.**



26. Reset button
27. User Port (shrouded male connector) Reserved for further development.
28. USB interface **Attention! All terminals of the USB interface are galvanically connected with the instrument and subsequently with protective (safety) earth potential.**
29. RS-232 serial interface **Attention! All terminals of the RS-232 interface are galvanically connected with the instrument and subsequently with protective (safety) earth potential.**
30. Power source connector

Accessories supplied

1. TINALab II Install CD (TINALab Basic)
2. TINALab II User Manual
3. External Power Supply (Fortron/Source, Model No: FSA30P32-S)
4. AC Power Cord (optional)
5. USB A-B Cable, 1.8m
6. RS-232 Cable, 2m (optional)

The cable contains 4 screened lines connected 1:1. TINALab II RS-232 connection (9 pole D SUB female) is determined as follows:

Pin	Description
1	TXD (data from TINALab II to PC)
3	RXD (data from PC to TINALab II)
5	Ground (reference potential - connected via the power cord with protective earth)
7	CTS (clear to send)
8	RTS (request to send)

7. 2 Oscilloscope Probe Kits (K&H, LF-101)
8. BNC Test Lead (K&H, LF-56)
9. Breadboard (K&H, RH-21)
10. Test Leads, 15cm, Standard color (K&H, KLG-0.65-2)
11. Test Leads, 30cm, Standard color (K&H, KLG-0.65-2)
12. Small wire set, 14 length/each 5pcs (K&H, SWS-03)
13. Test kit

200Ohm, 0.6W, Metal film, 1%
10nF, 400V, Foil capacitor, 10%
8.2mH, 0.1A, Inductor coil, 10%

Note: Subject to change without notice

TINALab II Specification REV. E	DesignSoft Inc. www.designsoftware.com
------------------------------------	---