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Product Specifications

Terminus

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Product Description

Terminus

UART based
Testbench generator

The logo graphic for Terminus consists of three interlocking hexagons in shades of blue and green, positioned to the right of the main title.

Terminus is a standalone digital equipment that can generate a large numbers of digital test signals for educational or research & development purposes. All the signals and related parameters are user defined. A computer is required to access and modify all the features and parameters of the Terminus respectively. The user can control and configure the Terminus and all the signal generators and the tools via a PC. Terminus can generate signals that cannot be generated by the "Analog Digital Trainer Boards" that are commonly used in the university lab and only expensive DDS Function Generators and other expensive equipment can generate some of the functions of Terminus. Furthermore, Terminus combines multiple digital equipment like Oscillator, Pattern Generator and Frequency Sweep Generator in one product. This device is designed completely from scratch in Bangladesh and is not another poor clone of any foreign product.

A vast majority of these signals can only be generated with expensive equipment and are used in high end electronics laboratories. Expensive tools are not suited at the hands of entry level students. Terminus combines a large number of these tools in a single package with reduced capability than its expensive counterpart. As capability is reduced, university don't need to spend a large sum of money and worry about the students breaking the expensive equipment. This way, the students can get to know the basics of handling and operating expensive digital equipment before entering the industry. Terminus uses extremely easy command line interface to communicate between the device and the PC.

More than 30 different experiments are included with the device itself but the educators/instructors can design any other experiments by themselves. The experiments are designed to accommodate 3 month semester and accompanying syllabus of Bangladeshi universities. The intention of the experiments are not to try to do the impossible and expect the students to be a master of digital electronics in 3 months. Rather it will teach the students about the basics of Digital Electronics using practical settings so that they can learn first hand and find the joy and motivation to pursue the topic further. Once the fundamentals are mastered, more advanced topics like VLSI becomes relatively easy

Features

- **Suitable for Academic Training**
- **Performs better than old digital trainer boards**
- **Optional attachments, tailor made for training in digital electronics**
- **Buffered Inputs & Outputs**
- **Usable for teaching Engineering students, in industrial R&D Labs or as a personal testbench Generator**
- **Easily fixable in case of any technical malfunction**
- **No vendor Lock in (from all aspect)**
- **Reverse input voltage protection for power input**
- **Current limiter in case of short circuit**
- **Fully configurable using only Personal Computer**
- **OS Independent**
- **Small, compact and rugged design**
- **Terminus includes 12 different signal generation tools.**
- **Inputs and output signals compatible with 5v TTL Standard**
- **Industry Standard RS-232 Protocol**
- **Reverse input voltage protection for power input**
- **Current limiter in case of short circuit**

Functions

- **Oscillator**
- **Pattern Generator**
- **Manual Byte Generator**
- **Random Byte Generator**
- **Finite Pulse Generator**
- **Morse Code Generator**
- **Sweep Generator**
- **Servo Motor Test Signal Generator**
- **Stepper Motor Test Signal Generator**
- **DC Motor Test Signal Generator**
- **SPI Test Signal Generator**
- **Seven Segment Display Test Generator**

Functional Specifications

This section shows the specifications of Terminus in tabulated form. First the general electrical Specifications are shown. Next specifications of all the individual functions are presented. Please note that all specifications presented in this section are the absolute maximum limit of Terminus. Exceeding any of this specification may cause the device to malfunction, or in the worse case, be permanently damaged.

Electrical Specifications					
Command Group		Parameter		Value / Type	
Input Voltage		5 Volts (maximum)			
I/O Voltage	Signal Input				
	Signal Output				
Input Current		100 mA (maximum)			
Short Circuit Current		500 mA (maximum)	<i>Current limit as per USB 2.0 standard</i>		
I/O Standard		Transistor Transistor Logic (TTL)		HIGH (1)	2.4 V or Greater
				LOW (0)	0.4 V or lower
				Metastable	0.4 V to 2.4 V
Serial Communication Standard		RS-232	DB-9 Port	HIGH (1)	-10 V to +10V
				LOW (0)	-10 V to +10V
			Serial COM	HIGH (1)	2.4 V or Greater
				LOW (0)	0.4 V or lower
Protection		Short Circuit		Yes (protected by Polyswitch, 500mA limit)	
		Reverse Input Voltage		Reverse Diode Protection up to 20v	
		I/O (Digital & Analog)		All Digital & Analog inputs are buffered (except SPI)	

Specifications – Digital Pattern and Signal Based Functions

Command Group	Parameter	Value / Type
Oscillator	Frequency	1 Hz to 100 KHz (1 Hz step)
	Duty Cycle	1% to 99%
Pattern Generator	Memory	1024 Bytes
	No of Pattern	128 sets (maximum)
	Pattern Width	8-bit
	Delay between Pattern	1 mS to 4000mS *
	Triggering	Auto , Manual
	Trigger Source	Internal , External
Byte Generator	Pattern Width	8-bit
	Triggering	Manual Only
Random Byte Generator	Pattern Width	8-bit
	Triggering	Auto , Manual
	Trigger Source	Internal , External
Finite Pulse Generator	Number of Pulses	100 (maximum)
	Duty Cycle	50% (not modifiable)
	Delay between pulses	1 mS to 4000 mS
Sweep Generator	Signal Shape	Square
	Frequency	1Hz to 100KHz
	Duty	50% (not modifiable)
	Interval/Step Size	1Hz to 100KHz **

Specifications – Motor Drive Signal Based Functions

Command Group	Parameter	Value / Type
Servo Motor Tester	Frequency (manual)	1 Hz to 100 KHz (1 Hz step)
	Duty Cycle (manual)	1% to 99%
	Duty Step Size	1% (fixed)
	Sweep Duty Cycle (Auto)	1% to 99%
	Sweep Interval Step size (Auto)	1% minimum
	Triggering	Auto , Manual
	Trigger Source	Internal , External
Stepper Motor Tester	Motor Type	Unipolar
	Motor Direction	Clockwise, Anti-clockwise
	Logic Sequence	Wave drive
		Half Step
Full Step		
DC Motor Tester	Frequency	1 Hz to 100 KHz (1 Hz step)
	Duty Cycle	1% to 99%

Specifications – Bus Generator and Other Functions

Command Group	Parameter	Value / Type	
Morse Code Generator	Character Set	ASCII (only alphabets)	
	Memory (Persistence mode)	32 Characters (maximum)	
SPI Bus Generator	Data Bits	8-bits	
	Initial Clock Phase	User defined	
	Initial Clock Polarity	User defined	
	Initial Data bit	User defined LSB/MSB	
	Clock Speed	125	KHz
		250	
		500	
		1	MHz
		2	
		4	
8			
Tx Data	User Defined, Self-generated		
Memory (Persistence mode)	32 Characters		
7 Segment Tester	Character Set	Predefined Alphanumerical	
	Drive Signal	DC	
	Segment Type	LED only (LCD/AC signal not supported)	
	Driver Voltage	5v (fixed)	
	Supplied current	10mA per pin (maximum)	
	Display data	User defined (alphabets & other symbols)	

Electrical and Mechanical Parameters

Input / Operating Voltage	5V
Current Consumption	≈15mA (idle) to ≈100mA (fully loaded)
Load capacity (signal)	≈5V, ≈100mA (max)
Load capacity (Power Rails)*	≈5V, ≈500mA (max)
Short Circuit Protection	5V, ≈500mA (max)
Communication Protocol	Industry standard RS-232
On-board Data converter*	MAX232 UART to RS-232 converter
Communication device	PC on user's end with Serial Terminal software
Power Supply	USB 2.0 compatible source
Operating humidity**	80% (recommended but not the maximum)
Operating temperature**	40°C (recommended but not the maximum)
PCB material	FR-4
Dimensions (L x W)	150 x 82 (mm)

* RS232 to USB bridge is not noted as they are not mounted on-board the PCB and is separately provided

** Recommended means "Maximum Recommended Operating Parameter"

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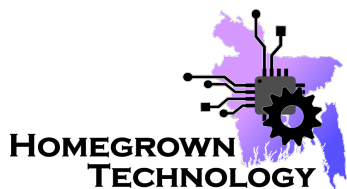
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