

# Sinewave Inverter

Written by Administrator

Tuesday, 07 September 2010 09:56 - Last Updated Wednesday, 24 August 2011 09:10

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Medi Microcontroller based sinewave UPS/Inverter with charger

## Introduction

MEDI has developed a new micro-controller based digital sine wave inverter using DSP (Digital Signal Processor) with full bridge configuration topology MOSFET switches. This is a modified version of our 2008 Model with added features like:

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Isolated sensing of Mains: This will ensure that even if Phase-Neutral connection is reversed at the input side there will not be any electric shock on the PCB or battery.

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Cycle-Cycle current Limiting: This is an enhanced protection method for the short circuit / heavy load condition.

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Low cost driver: The costly driver with TLP250 is replaced with discrete components on the PCB

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LED/7-segment/LCD display: The PCB is designed with provision for LED, 7-segment display or LCD display.

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This inverter is best suited for manufacturing for domestic applications as it is simple and easy. It consists only few components which are easily available, have only 3 smd components and with a single sided pcb. There are no windings which can possibly cause any error such as DC-CT or EE-16 transformers. Mounting of heatsink along with mosfets and soldering few components will complete this board. It consists of a LCD which will display all the parameters of the system and indicates any error during the functioning of the inverter. A low cost 16 character single line LCD will be of scrolling type, showing the status of the inverter such as batt voltage, mains voltage, inverter output voltage, inverter standby on/off, charger on/off, mains/ solar charging and many more. It is very simple to handle and very easy to set the values in the menu driven set-up mode.

This inverter is a very robust design which will not fail in any extreme conditions.

1.

If 440V is applied to the AC input, it will not fail. It will indicate high voltage cut-off and restart when voltage is normal.

2.

If AC mains is given to the inverter output, it will not fail. It will indicate phase input output reverse and continue to work after it is rectified.

3.

It has fold-back current limiting for short circuit and heavy loads. At short circuit or heavy loads, current limiting action will take place instead of tripping which will lead to more reliability.

## Features

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LCD display for indicating various status of the system like inverter voltage, mains voltage, battery voltage, % of load, overload/short circuit status, battery low status, charger status etc.

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LCD based Menu driven setup of various parameters like battery full charge voltage, battery low voltage, load condition, Inverter output voltage, charging current etc.

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Protections against: Overload, short circuit, battery deep discharge, battery over charge, mains over voltage, reverse connection of phase in – phase out, reverse connection of phase and neutral of mains input. In all these error conditions will be shown in the LCD display.

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Priority solar charging facility: When solar charger is connected mains charger will be in stand-by and priority will be for solar charger.

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Delayed inverter cutoff for conditions like battery low, overload, short circuit etc. The system will automatically restart from cutoff after a few second buzzer beeps. The system will go to permanent cutoff if the error condition exists even after 4 restart.

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Bill of materials: Main PCB 850VA – Rs. 750/- or less, Transformer 850VA – Rs. 2000/-

1. LCD will display –

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Battery voltage

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Inverter output voltage

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Percentage of load

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Mains voltage

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Charger on/off

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Solar charging /mains charging

-

Inverter standby on/off

-

UPS mode / inverter mode

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Phase input output reverse : whether mains is connected to inverter output

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Neutral and phase reverse : whether neutral and phase is connected reverse

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Overload : if load is above 100% and below 300%

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Heavy : if load is above 300%

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Short circuit

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Overload trip

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Heavy load trip

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Short circuit trip

2. Menu driven set-up. There is no preset, the parameters such as battery low, charging current, inverter output voltage, load etc can be set by scrolling up and down keys and press enter.

3. Priority solar charging

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4. Inverter/UPS selection switch, micro switch or ordinary switch selectable.
  
5. Inbuilt SMPS type constant current charging with full charge cut-off.
  
6. 20KHz operating frequency while inverter and charging, absolutely no sound.
  
7. Pure sine wave output
  
8. DSP based very low component cost design
  
9. Single sided pcb, easy to assemble without any smd components
  
10. Ideal for Mixed load application

### Specification

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Battery Input voltage : 12V DC – 48V DC

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Mains Input voltage : 230V AC, 50Hz.

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Mains input range : 0V – 440V, 45Hz-65Hz

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AC Output (Inverter) : 230V +/- 3%, 50Hz

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Inverter topology : Bridge type center aligned switching. MOSFET based.

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Inverter output power : 300VA - 3000VA

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Battery charging : Constant current SMPS charging with full charge cutoff

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Charging current : Settable upto 15A

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Charger working range : 120V – 270V AC Mains input

Highlights

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1.

Full bridge configuration based on power MOSFETs

2.

DSP based intelligent control

3.

LCD based display for user-friendly display of parameters and status

4.

Protection against 440V mains input

5.

Protection against reverse polarity

6.

Dynamic short circuit protection with fold-back current limiting.

7.

Protections against all possible errors like battery low, over load, heavy load, short circuit etc.

8.

Early warning for battery low and overload conditions. System continue normally if the error is corrected.

9.

Cutoff and auto restart with permanent cut after 5 consecutive cutoff.



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10.

SMPS type constant current charger with full charge cutoff.

11.

Pure sinewave output resulting in silent operation of motor and fans. Safe to all kind of loads.

12.

Ideal for Mixed load application

13.

Indigenous design with proven technology.

14.

Auto detect of LCD and LED. Can change between LED / LCD while the system is powered.

15.

Protection against accidental output feedback disconnection.