# AD9850/AD9851 USER GUIDE

Introduction

AD9850/AD9851 DDS module is based on DDS IC AD9850/AD9851 produced by ATI company. It is used to make sine wave and square wave of different frequencies and you can control the module for different frequency output by either serial mode or parallel mode on board. What's more, the duty cycle of the square wave can be adjusted by an adjustable resistor - which changes the reference voltage of the comparator.
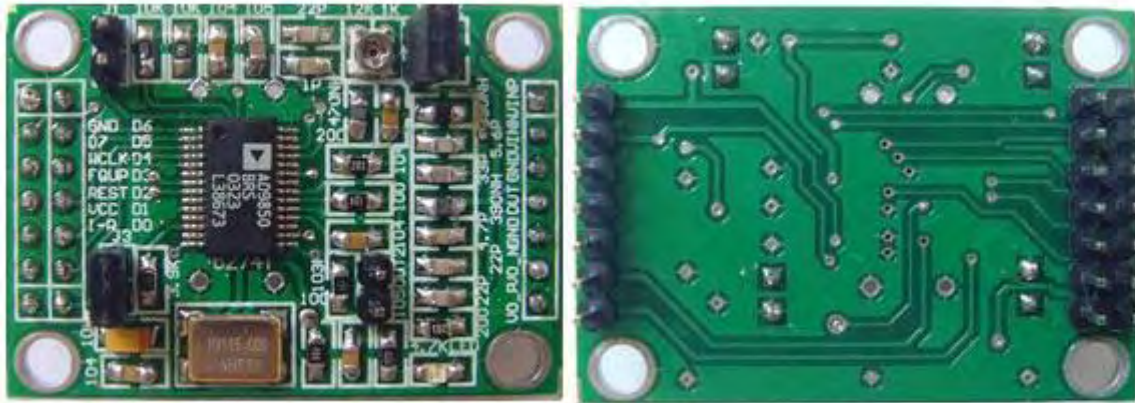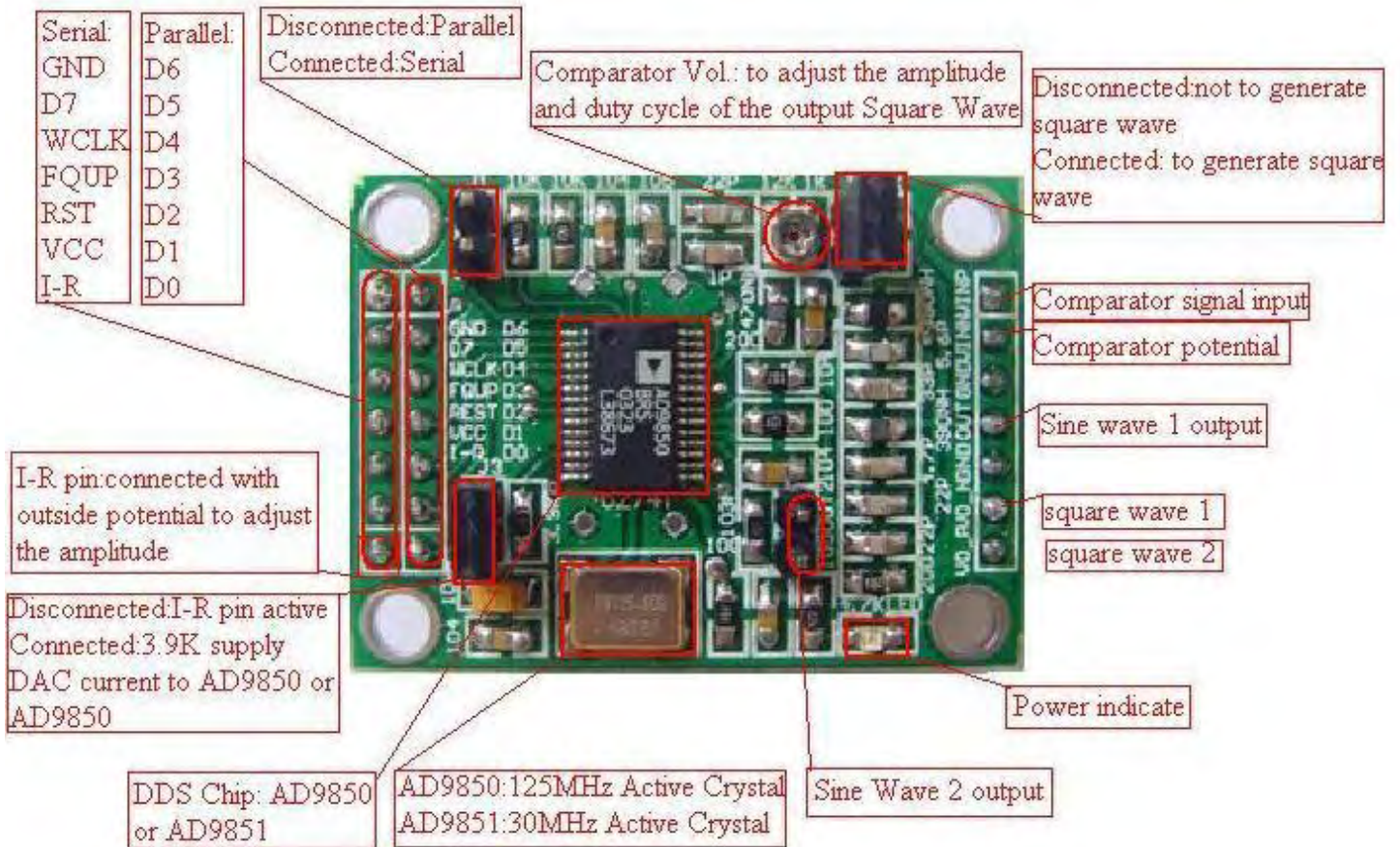

Main features

- *This module can make sine and square wave, and there are 2 sine wave outputs and 2 square-wave outputs.*
    - *AD9850: 0-40MHz*
    - *AD9851: 0-70MHz*
    - *Harmonics increases when frequency is over the 20-30MHz, and the waveform will be less and less clean.*
    - *Square Wave: 0-1MHz*
- *Use 70MHz low pass filter, which makes waveform better.*
- *Parallel and serial data input can be selected via a jumper.*
- *The pin which makes DA benchmark is leaded out, so it is convenient to adjust the magnitude and the duty cycle of the output square wave.*
- *Comparator reference input voltage generated by the variable resistor, and by this variable resistor, the duty cycle of square wave can be adjusted.*
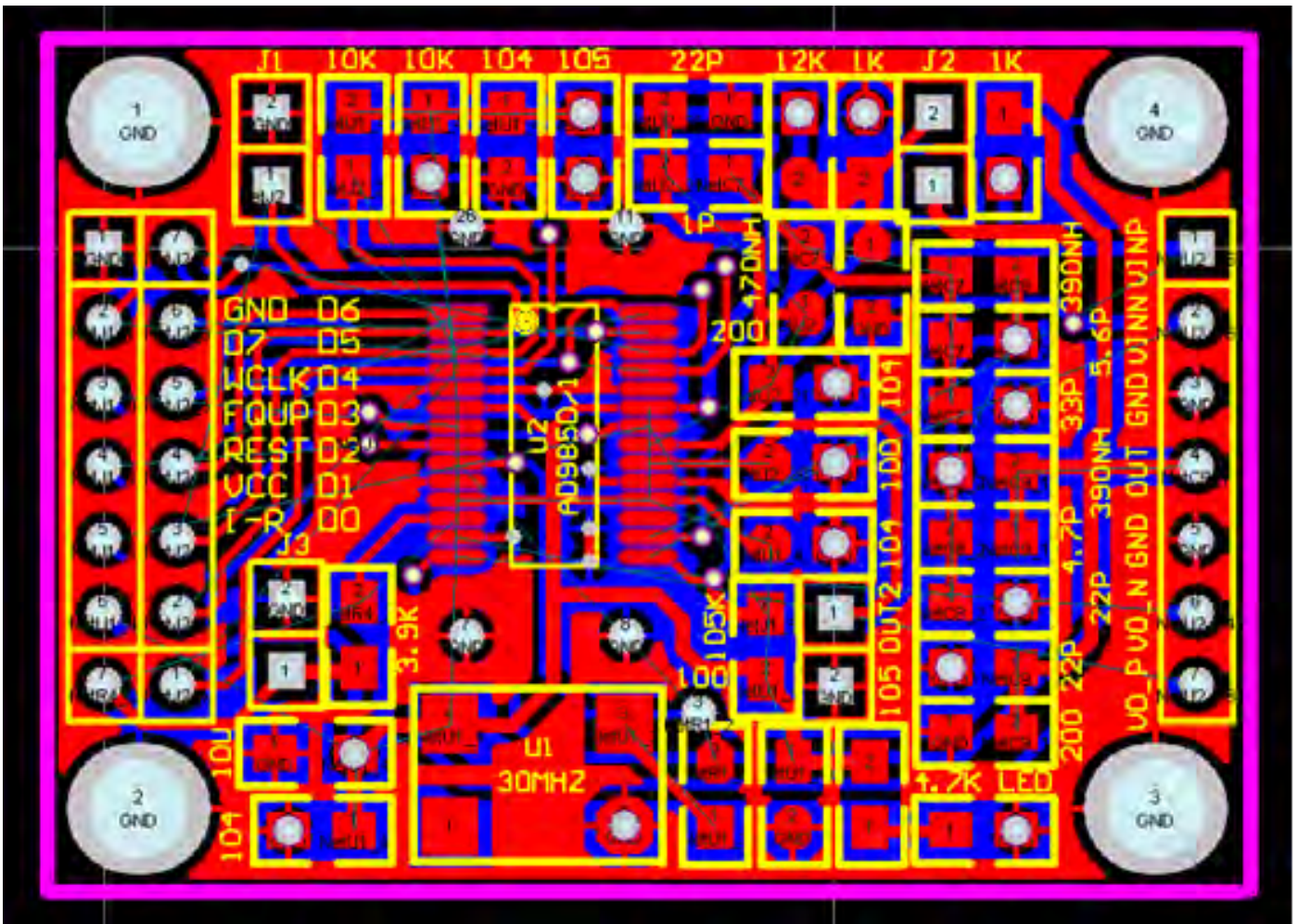- *AD9850 module uses 125MHz active crystal, while AD9851 module uses 30MHz active crystal.*

The main difference between AD9850 and AD9851

- AD9850 maximum clock frequency of 125MHz, AD9851 maximum clock frequency of 180MHz. The maximum frequency output of AD9851 is higher.
- AD9850 has no 6 octave while AD9851 has.

Function block

Serial:
GND
D7
WCLK
FQUP
RST
VCC
I-R

Parallel:
D6
D5
D4
D3
D2
D1
D0

Disconnected:Parallel
Connected:Serial

Comparator Vol.: to adjust the amplitude and duty cycle of the output Square Wave

Disconnected:not to generate square wave
Connected: to generate square wave

Comparator signal input

Comparator potential

Sine wave 1 output

I-R pin:connected with outside potential to adjust the amplitude

square wave 1

square wave 2

Disconnected:I-R pin active
Connected:3.9K supply DAC current to AD9850 or AD9850

Power indicate

DDS Chip: AD9850 or AD9851

AD9850:125MHz Active Crystal
AD9851:30MHz Active Crystal

Sine Wave 2 output

The PCB of the module

User Guide

There are two modes to configure the module to generate sine waves in different frequencies, which is the same as the way to configure IC AD9850/AD9851. In this way, you can refer to the datasheet of the IC and the schematic of the module to know how to configure it. Here we just give some simple tips about the configuration and an example of using in 51 microcontroller system.

Choosing the configuration mode

Jumper J1: Disconnected: parallel mode

        Connected: serial mode

Adjusting the output amplitude

Jumper J3: Disconnected: External potential on I-R pin to adjust the amplitude of output.

Connected: Stable amplitude output (about 1V Vpp).

Connection

No matter in which configuration mode, there are three pins you have to connect. They are wclk, fqup, reset and VCC(+5V).

When in serial mode, you just need to connect the D7 pin to configure the module. While in parallel mode, you have to connect all the D0 to D7 pins to make the configuration. And if you need to change the amplitude of the output signal, you may need to connect I-R pin to a potentiometer to make it.

Example of using in 51 microcontroller system

Choose the right configuration mode by J1, when in serial mode, you just need to make the first 4 connections in the following table. But when in parallel mode, you have to make all the connections in the table.

51 Microcontroller	AD9859/AD9851 module
P2.2	Wclk
P2.1	Fqup
P2.0	Reset
P1.7	D7
P1.6	D6
P1.5	D5
P1.4	D4
P1.3	D3
P1.2	D2
P1.1	D1
P1.0	D0

Of course, VCC should be connected with +5V, and I-R might be used or not to adjust the output amplitude.

Then download the HEX document in the according file (serial or parallel) into the 51 system and check the results. It should be 1KHz sine wave. You can also adjust the potentiometer to change the duty cycle of the output square wave.

Disclaimer and Revisions

The information in this document may change without notice.
Revision History

Rev.	Date	Author	Description
A	May. 22nd, 2011	Wilson Shen	Initial version
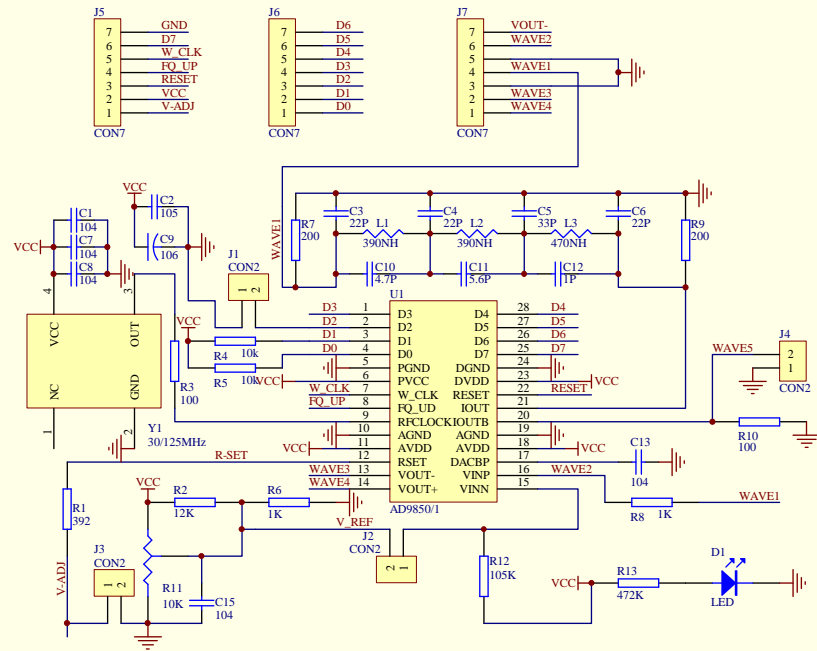
J5，J6，J7
模块预留接口

J1
断开：并行模式
短路：串行模式

J2
断开：比较器不工作，不产生方波
短路：比较器工作，产生方波。调节R11提供不同占空比方波输出。

J4
正弦波2输出

J3
断开：外接电位或接到J5的电位，可调节输出幅度。
短路：R1产生AD9850/1需要的DAC电流