Kit Assembly Instructions

C4736 8 NOTE TUNABLE ELECTRONIC ORGAN KIT

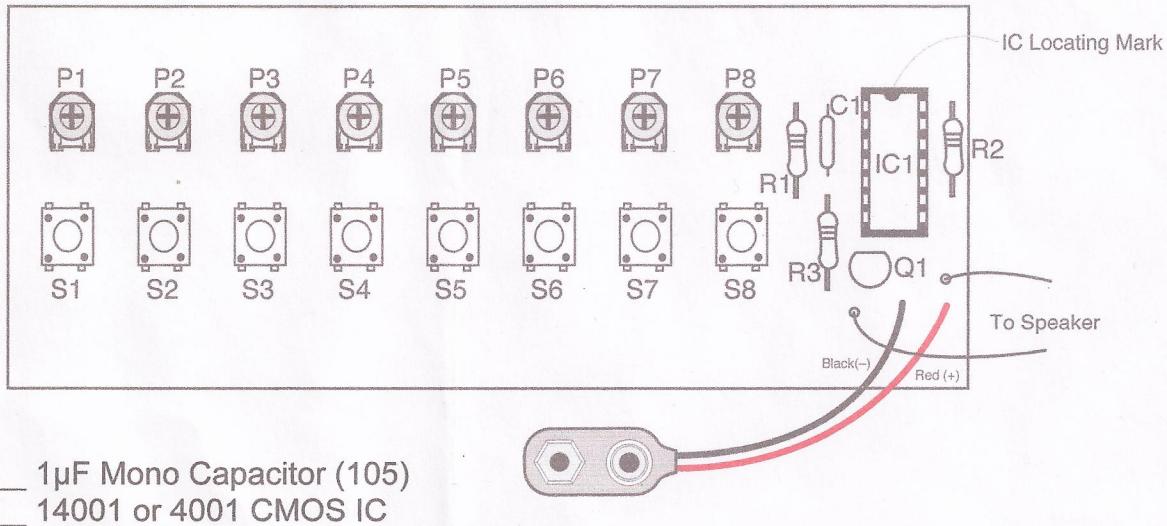
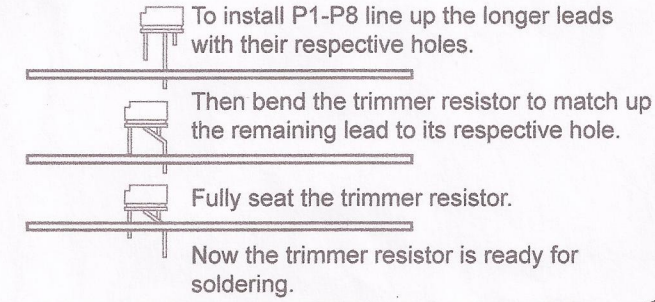


Figure 1
Parts Layout

PARTS LIST

C1	_____	1µF Mono Capacitor (105)
IC1	_____	14001 or 4001 CMOS IC
P1 - P8	_____	100KΩ Trimmer Resistor (104)
Q1	_____	MPSA13 Transistor
R1	_____	330Ω Resistor
R2	_____	82Ω Resistor
R3	_____	51Ω Resistor
S1 - S8	_____	Pushbutton Switch
Misc.	_____	9V Snap, 14 Pin IC Socket,
	_____	Speaker, PC Board



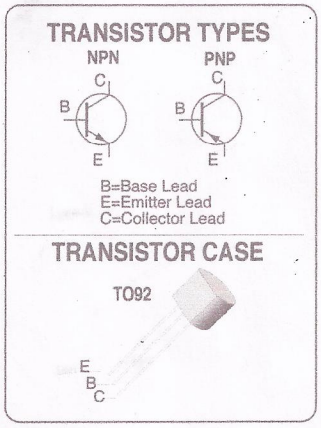


Figure 6
Transistor Information

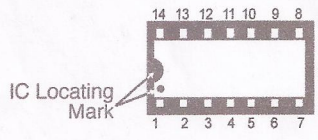
RESISTOR COLOR CODE

SEE (*) BELOW

BAND COLOR	1st DIGIT	2nd DIGIT	MULTIPLIER
BLACK	0	0	1
BROWN	1	1	10
RED	2	2	100
ORANGE	3	3	1,000 (K)
YELLOW	4	4	10,000
GREEN	5	5	100,000
BLUE	6	6	1,000,000 (M)
VIOLET	7	7	10,000,000
GREY	8	8	100,000,000
WHITE	9	9	1,000,000,000

*TOLERANCE: NO COLOR 20%; SILVER 10%; GOLD 5%

Figure 5
Resistor Color Code



There are two different types of IC locating marks in common use. One is a dot in the lower left corner and the other is a small notch in the left center of the IC. Either mark is correct and some manufacturers even use both. Study the IC that is included with this kit to determine what mark is in use.

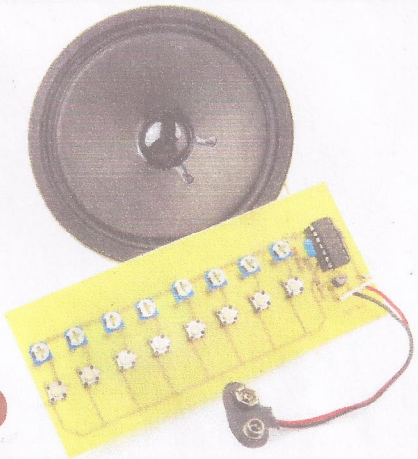
Figure 4
IC Locating Marks

CHANEY electronics

8 NOTE TUNABLE ELECTRONIC ORGAN

* C 4 7 3 6 *

Electronic Project KIT **SKILL LEVEL 1**



C4736

CAUTIONS

The electronic components in this kit are solder plated. Solder contains lead and therefore do not put components in your mouth. Always wash your hands after working with the components. Students under the age of 13 should not build this kit.

Made in the U.S.A.

Rev 09/06/13LW

Assembly Instructions

C4736 8 NOTE TUNABLE ELECTRONIC ORGAN KIT

Tools Needed for Assembly:

- Small Pencil type soldering iron (40 watts rating or less)
- Pair of wire cutters, a screwdriver & needle nose pliers
- Pair of safety goggles or safety eyeglasses
- Damp sponge
- Fresh Rosin or Resin Core Tin/Lead solder

ASSEMBLY INSTRUCTIONS

1. Assemble per Parts Layout (Figure 1), Parts List and Schematic (Figure 2) using fresh resin or rosin core solder only.
2. Install all resistors per Resistor Color Code (Figure 5). Install capacitor C1. Next, install IC socket. Install Q1 observing flat side location. Connect speaker to PC board using wire provided.
3. Install all trimmer resistors by bending leads as shown. Install all pushbutton switches. Install the battery snap observing polarity. Finally, install IC1 into socket observing locating mark for correct placement.
4. After assembly, connect a fresh 9V alkaline battery, or for longer battery life, try using 2 to 6 "D" size alkaline batteries connected in series. (This kit operates at anywhere between 3-9VDC).
5. Adjust P1 to P8 to correspond to music scale (use instrument, piano or organ to tune).

THEORY OF OPERATION

The C4736 8 Note Tunable Organ Kit can produce 8 different notes by using an IC and a darlington transistor. The IC is a 4001 CMOS Quad NOR gate, which is configured as an oscillator. The circuit only uses 2 of the 4 NOR gates, and as you can see from the schematic (Figure 2), the feedback from the second gate by way of C1 goes through 8 separate selectable trimmer resistors. These trimmer resistors set the pitch of the oscillator. By selecting the particular trimmer resistor and pressing the corresponding switch, an organ note is played. The output of the second NOR gate is coupled to a limiting resistor and the base lead of darlington transistor Q1. This transistor has a very high gain and is able to drive a small speaker directly. Resistor R2 limits the current flowing to IC1 to a safe level for CMOS IC operation.

FOIL PATTERN OF PC BOARD

Figure 3
Foil Pattern

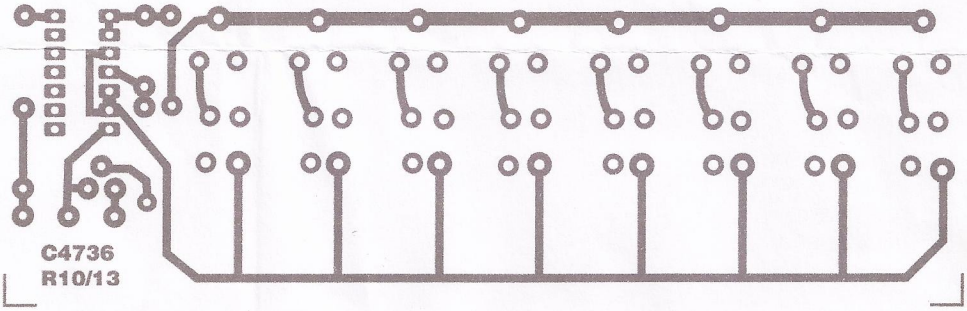
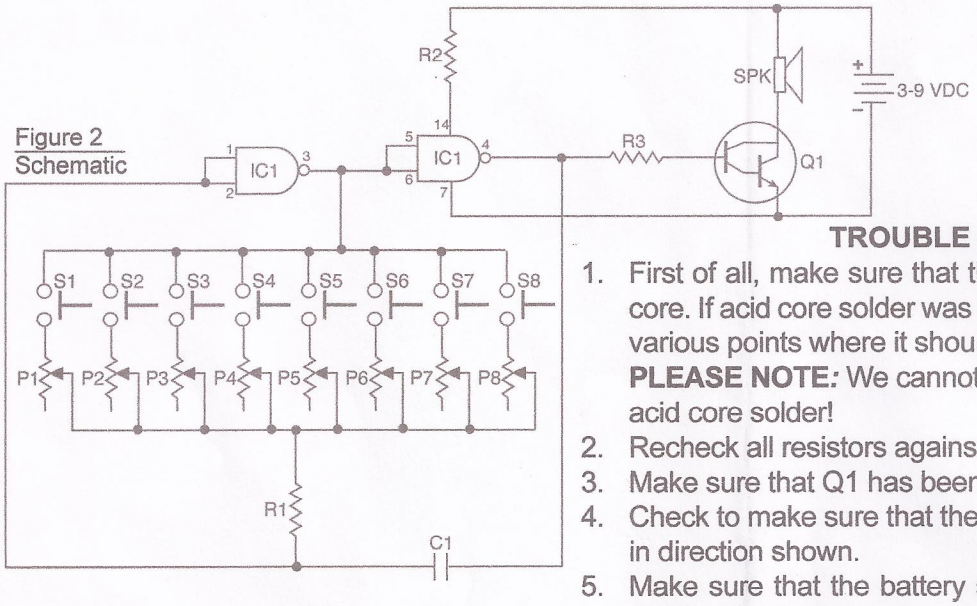


Figure 2
Schematic



TROUBLE SHOOTING HINTS

1. First of all, make sure that the solder used to build the kit was rosin core. If acid core solder was used, the kit will be conducting voltage to various points where it should not and the kit will be **DESTROYED**. **PLEASE NOTE:** We cannot repair any kit that was assembled using acid core solder!
2. Recheck all resistors against Resistor Color Code and Parts Layout.
3. Make sure that Q1 has been installed with flat side as shown.
4. Check to make sure that the IC has been installed with locating mark in direction shown.
5. Make sure that the battery snap has been installed with polarity as shown. Is your battery good?
6. Check for cold solder joints and reheat, adding solder to any suspect connections.