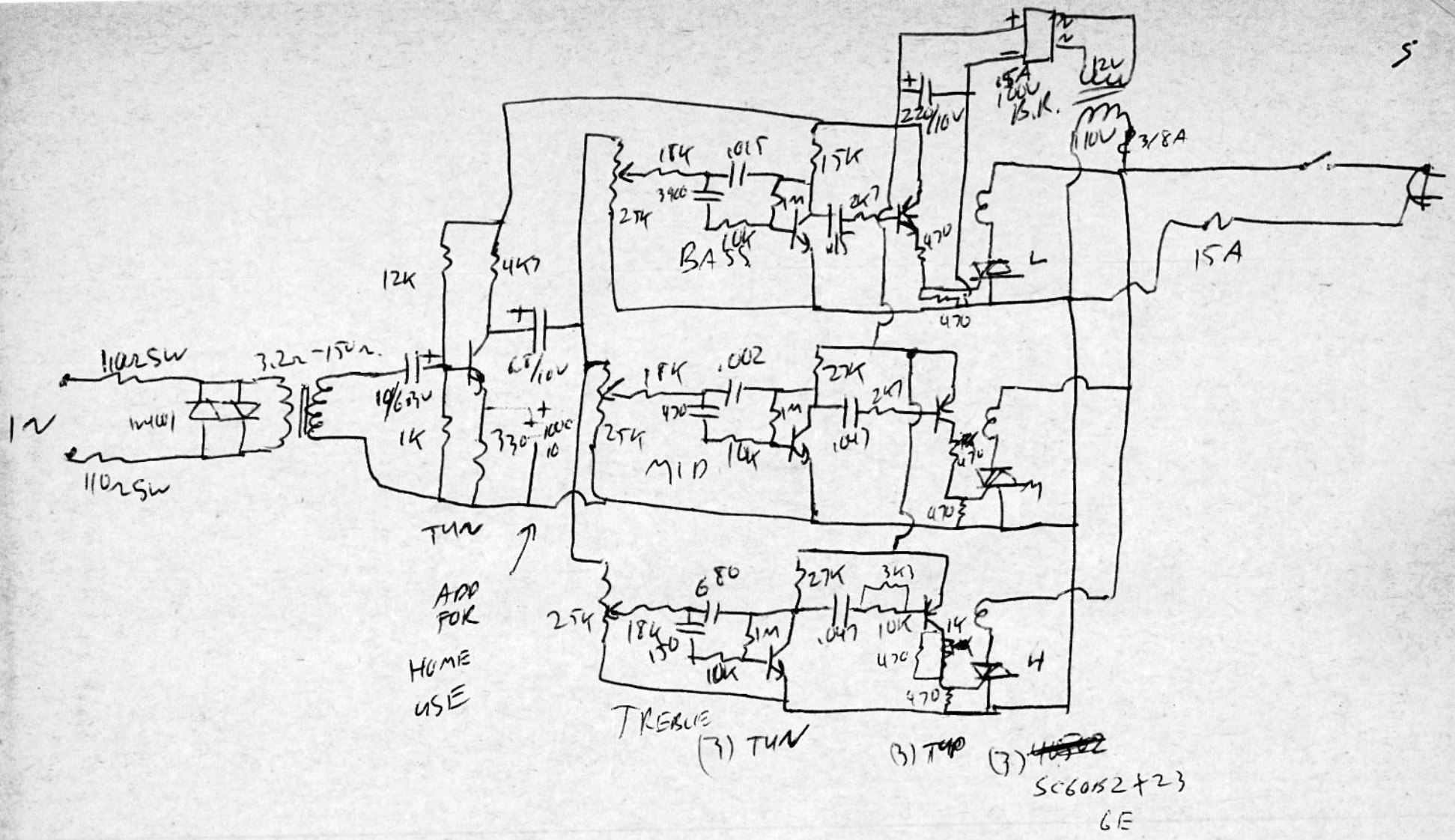


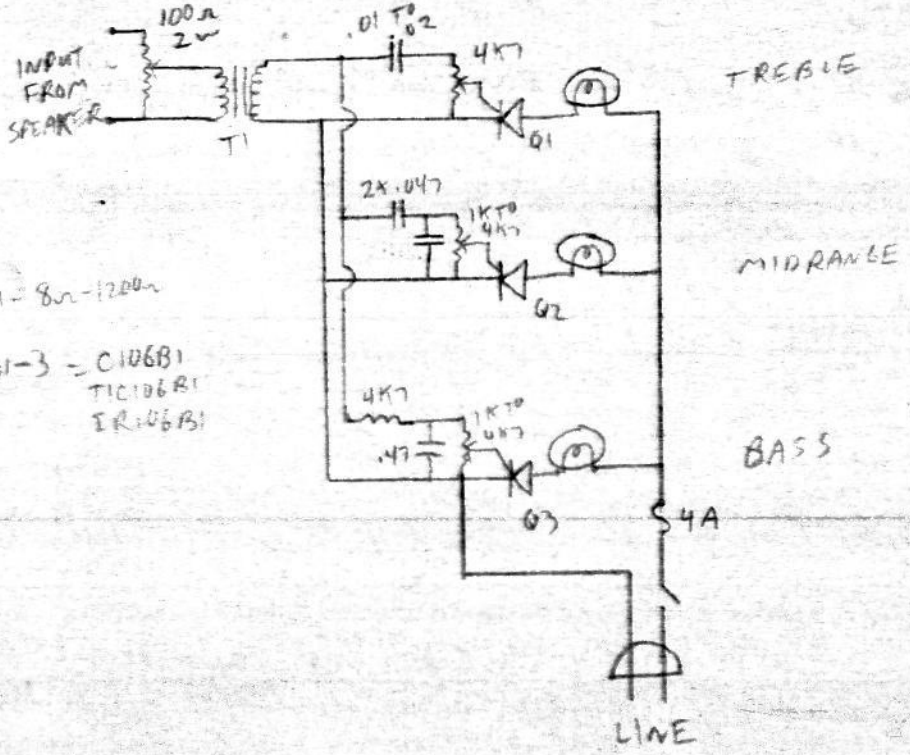
Modified Apr 11/77

Apr 6/15

Built for
E. Sutherland.
but never
picked up.

3 CHANNEL S/L UNIT

MAXIMUM 200W LAMP LOAD PER CHANNEL



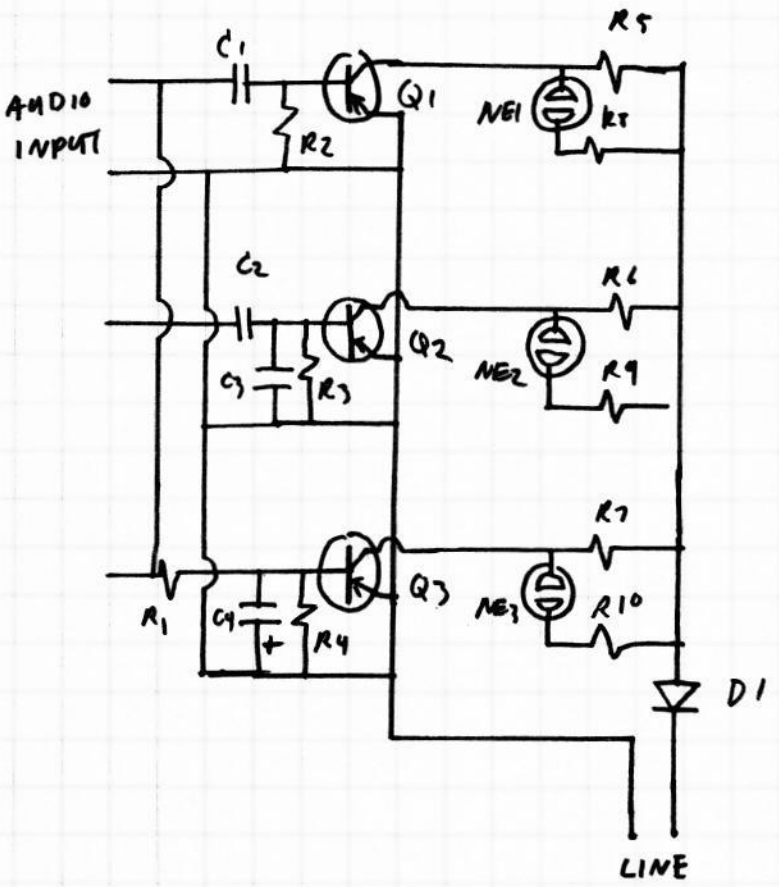
T1 - 8Ω - 120Ω

Q1-3 - C106B1
TIC106B1
IR106B1

DEVELOPED
October 1971
D. Fraser

DRAWN
Aug. 24/77

MINI COLOR ORGAN



ALL ¼W

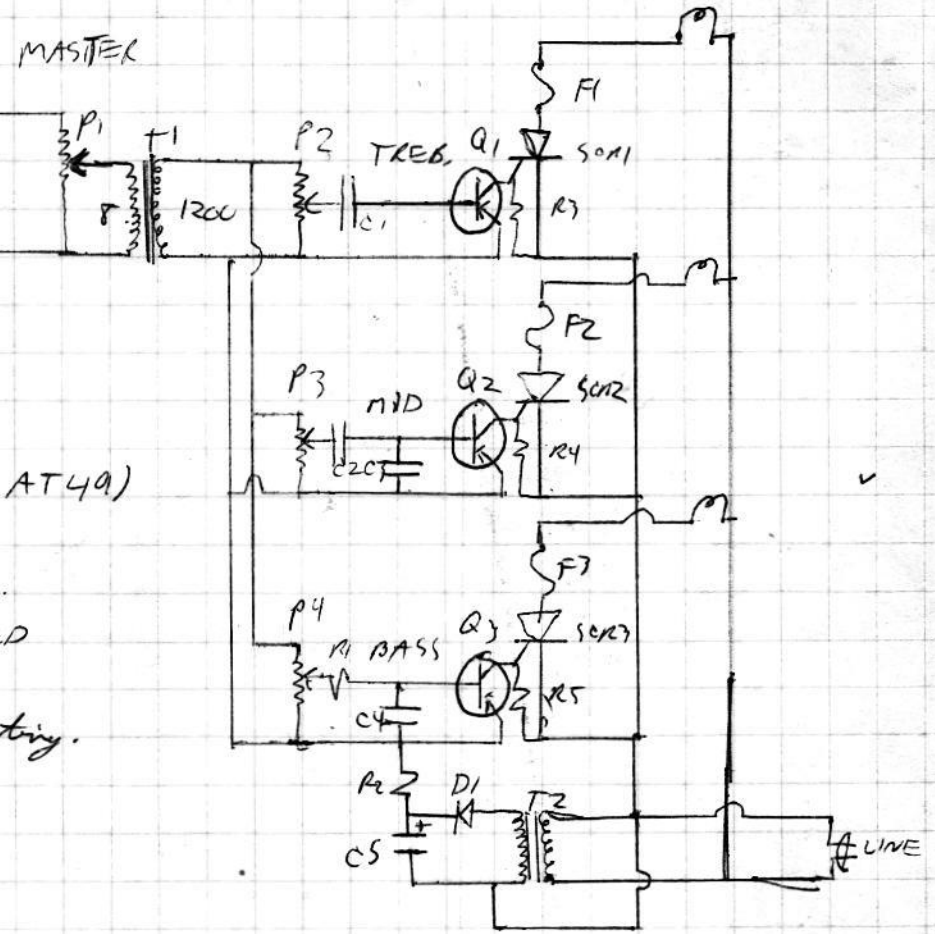
R1 - 18K
R2 - 4.3K
R3 - 620
R4 - 18K
R5,6,7 - 220K
R8,9,10 - 47K
C1 - .01
C2,3 - .05
C4 - 5mF6V

Q1,2,3 - 2N398
NE1,2,3 - NE-2
D1 - 200PIV -100MA

THE RESISTORS - R1 → R4 are critical and depends on the characteristics of individual transistors. - This criticality can be removed if a 2.5 to 10K trimpot is placed in the input of each channel.

1000 WATT PER CHANNEL or more.
COLOR ORGAN

P1 - 100Ω R2, P3, P4 1K to 5K
K1 - 4.7K R2 - 220Ω
R3, R4, R5 - 47K
Q1, Q2, Q3 - PNP Germanium (2N404)
C1 - .01
C2, C3 - .05
C4 - .47 C5 - 100mF 10V.
D1 - 50 PIV - 100mA.
T1 - 8Ω to 1200Ω (Armaco AT49)
T2 - 117V TO 6.3V 50mA.
SCR1, 2, 3 - 200PIV - 7A.
IF A LARGER SCR IS USED
CHANGE R2 TO 100Ω
F1, 2, 3 - Equal to SCR rating.



Theoretical maximums.

SCR -	W/CH	WT
7A	1400	4200
16A	3200	9600
20A	4000	12000

THIS IS A PROVEN CIRCUIT

A Report

on

Color Organs

Prepared for

Mr. W. Burgess

Northern Alberta Institute of Technology

by

Daniel M. Fraser

November 9, 1970

Edmonton, Alberta

November 5, 1970

Mr. W. Burgess

English Instructor

Northern Alberta Institute of Technology

Dear Mr. Burgess

The color organ is a new item on the electronics market. It was unknown except as a mood generator for bands three years ago. These mood generators cost from three hundred to eight hundred dollars. Today with mass production as improved solid state devices the prices have dropped drastically.

The report deals with the operation and costs of color organs. There has been no evaluation of the effect produced by a color organ given. This is because people have different opinions of color organs. The highest degree of popularity is among younger people but many older people enjoy them also.

I have developed my own color organ circuit and the diagrams given with the report are those that I developed with the exception of the photographs.

Thank you.

Very truly yours,

Daniel M. Fraser.

Good

Daniel M. Fraser

Student

Electronics Department

Table of Contents

Table of Figures

Abstract

The information presented shows the technical aspects of the color organ. All stages in the operation of a color organ are included. Along with the operation the report includes cost of color organs and the schematics of a typical circuit. The report indicates the practicallity of the circuit while including enough information for the average technician to duplicate the device.

This is not an abstract.
An abstract summarizes the main concepts in a report, but it is a separate entity which does not refer to the report at any time

improper heading use - see p. 189 Text

The Use of the Color Organ

This device is used to generate a pulsing light display which pulses in rhythm with an audio signal fed into it. There are usually three channels which respond to the low, medium and high frequencies in the input signal.

General Circuit Description

All color organs have three basic sections:

1. The filter section.
2. The thyristor.
3. The lamps.

The higher quality units also have an amplifier stage between the filter and thyristor. The cheaper ones that do not have this stage are insensitive and require a high input signal to operate. These are suitable for use with bands where high power is commonly used.

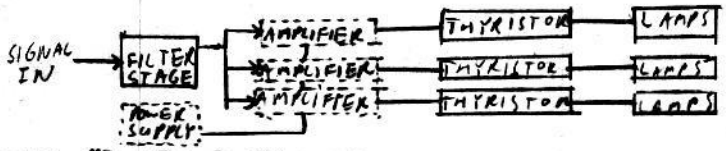


Figure #1-Block Diagram

Much too cramped use a border around?

General Operation of Color Organs

The signal enters the filter and is divided into as many parts as desired, usually three. The divided signals may now be amplified for increased sensitivity. The next step is to apply the signals to the gate of the thyristor. This controls the current flow to the lamps and causes them to pulse in rhythm to the input signal .

The Filter Unit

The filter unit operates due to the fact that the impedance of a capacitor decreases as the frequency of the signal applied to it increases.

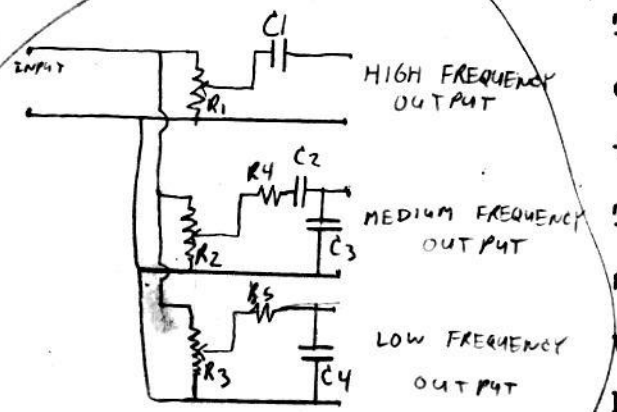


Diagram #2
Typical Filter Unit

Typical Values
R1,R2,R3-1 K ohms
R4,R5-10 ohms C2,C3-.033 mfd.
C1-.1 mfd. C4-1 mfd.

much too cramped! Don't you own a ruler?

To separate the high frequencies, the capacitor in series with the input blocks the lower frequencies.

To separate the middle frequencies, the series capacitor blocks the low frequencies, while the parallel capacitor shorts the high frequencies to ground.

To seperate the low frequencies, the parallel capacitor shorts the higher frequencies to ground.

The potentiometers are sensitivity controls to adjust the input to give a pleasing output pulsing.

The Amplifier Stage

This stage is found on the more expensive color organs and allows it to be driven by a transistor radio if desired. There are as many amplifiers as there are outputs from the filter.

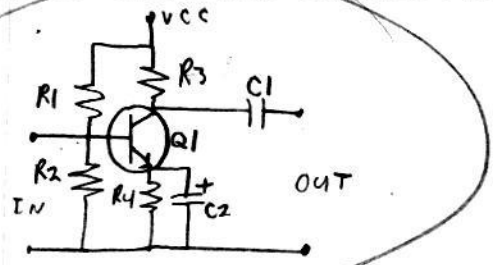


Diagram #3-Typical Amplifier Stage

Typical Values
RL-15 K ohms C1-.5 mfd.
R2-1.5 K ohms C2-30 mfd. 6 DCWV
R3-470 ohms Q1-2N497 NPN Silicon
R4-47 ohms

This is a simple common emitter amplifier using a transistor with an hfe of about fifty to one hundred The voltage gain is about twenty and it has a low output impedance. This is to match the low input impedance of the thyristor.

The Power Supply

The amplifier stage requires about twelve to twenty volts DC to operate. This may be obtained two ways as shown below.

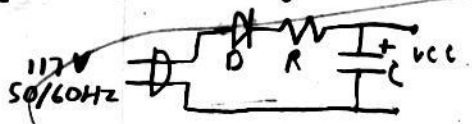


Figure #4-Resistor Power Supply

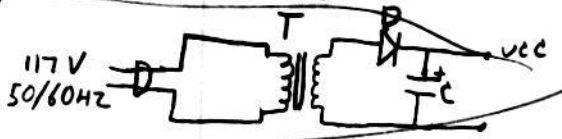


Figure #5-Transformer Power Supply

Typical Values D-200 PIV-.2A
C-1000 mfd-20V
R-800 ohms-10W

D-30 PIV-.2A
C-1000 mfd-20V
T-12 V-.2A secondary
117 V-60 Hz. primary

The type with the transformer is the more disireable because it runs cooler but the resistor type is usually used because of lower cost.

The Thyristor

The thyristor is basically an electronic switch which switches the power to the lamp on and off in rhythm it the signal applied to it. The thyristor used may be either a triac or SCR (silicon controlled rectifier). The only visible difference in the effect between using the two is that the triac gives a brighter display compared to the SCR. The SCR is the most commonly used as it costs less.

Figure #6-The Thyristor Circuit

The thyristor used has a 200 PIV rating and a current rating anywhere from .5A to 20A with 5A as typical.

The Lamps

The lamps used are usually incadescent but may be neon..Other types are not suitable due to slow turn on time.

The lamps usually used are wall mounted flood lamps or regular bulbs placed in a box resembling a speaker enclosure with a diffused plastic front.

Costs

A three channel color organ in a two foot by four foot lamp display box costs $175. A single channel circuit housed in a two foot square box costs $66.95. Units without built in lamp displays and a power handling capacity of five hundred watts per channel are $99.95 for three channels and $24.95 for one channel with no filter. A kit with no amplifier stage and a power handling capacity of only two hundred watts per channel, but with three channels can be bought for as little as $14.95. The most economical way to get a color organ is to build one. The author has designed the one shown on the previous pages and built it for a cost of $13.78. The author's unit has three channels, a transformer power supply and a power handling capacity of twelve hundred watts per channel.

The Last Word

While not being necessary to enjoy music, the color organ adds a new dimension to popular music. The effect is heightened when a different colored lamp is used on each channel.

Figure #7-Single and Three Channel Color Organs without Lights

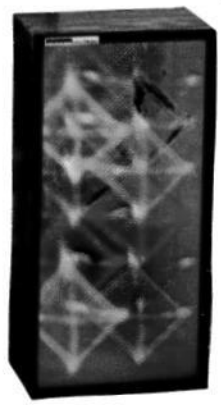


Figure #8-Three Channel Color Organ with Display Box

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Sams, Thomas W. "Transistor Specifications Manual-Third Edition". Indianapolis, Indiana: The Bobbs-Merrill Co., Inc., 1968.

Where are the footnotes?