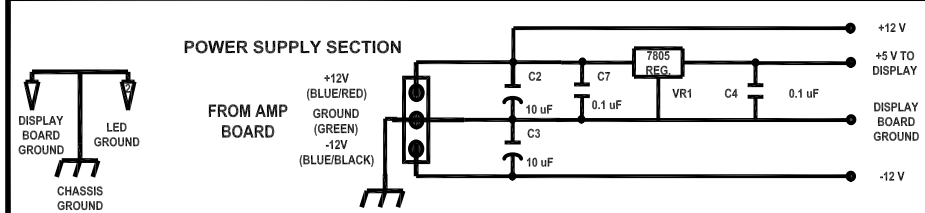


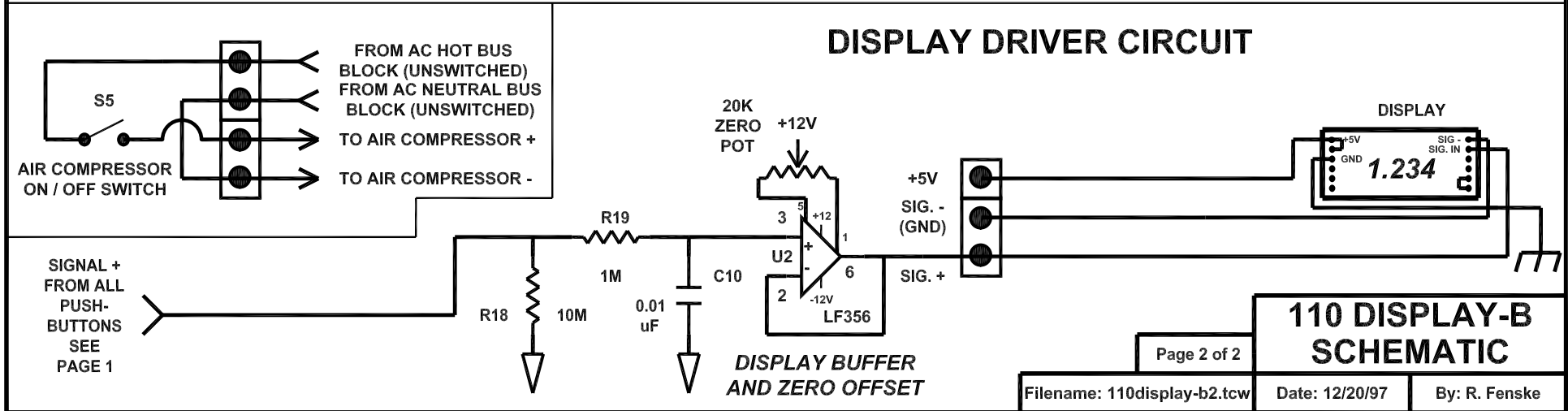
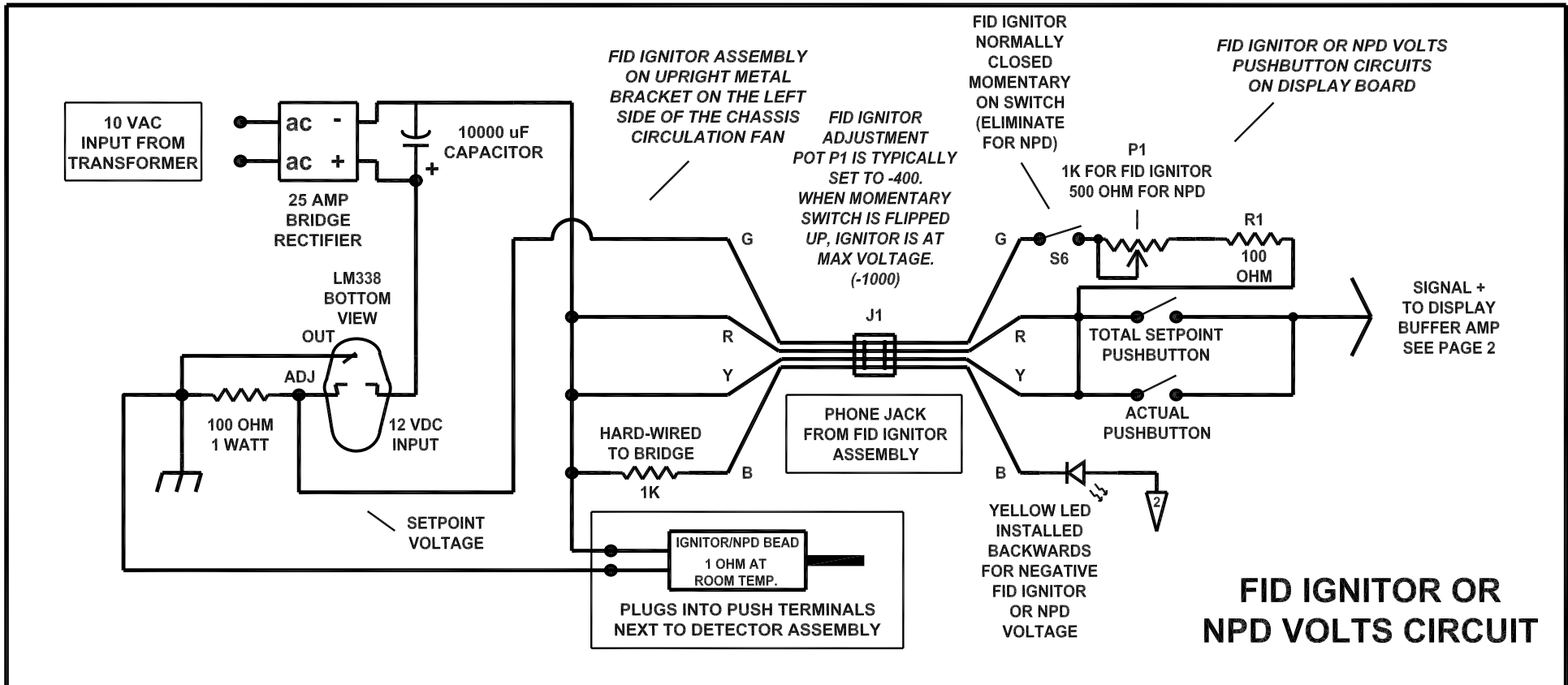
**CHART**

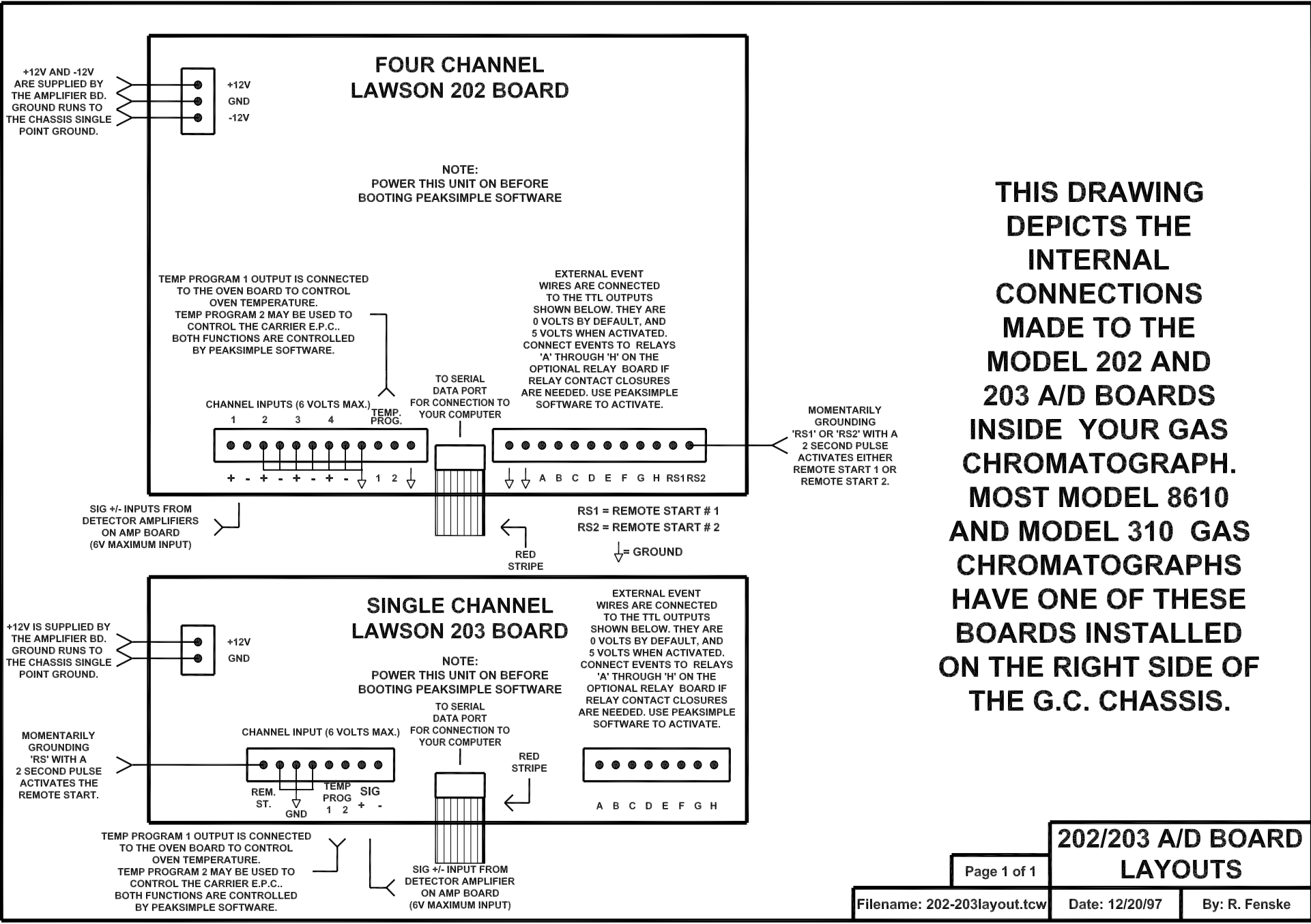
| CIRCUIT      | R1 VALUE | LED    |
|--------------|----------|--------|
| HYDROGEN 1   | 220K     | GREEN  |
| AIR 1        | 1M       | GREEN  |
| FID IGNITOR  | 100      | YELLOW |
| PID CURRENT  | 40.2K    | YELLOW |
| FPD VOLTS    | 20K      | YELLOW |
| ECD CURRENT  | 4.02K    | YELLOW |
| DELCD REACT. | 60.4K    | YELLOW |
| FID BLOCK    | 40.2K    | ORANGE |
| DELCD BLOCK  | 40.2K    | ORANGE |
| PID BLOCK    | 75K      | ORANGE |
| ECD BLOCK    | 44.2K    | ORANGE |
| TCD BLOCK    | 120K     | ORANGE |

# DISPLAY BOARD PUSHBUTTON CIRCUITS



THE LM324's ON THIS BOARD OPERATE USING +12V ON PIN 4 AND GROUND ON PIN 11.





**FOUR CHANNEL  
LAWSON 202 BOARD**

**NOTE:**  
POWER THIS UNIT ON BEFORE  
BOOTING PEAKSIMPLE SOFTWARE

TEMP PROGRAM 1 OUTPUT IS CONNECTED  
TO THE OVEN BOARD TO CONTROL  
OVEN TEMPERATURE.  
TEMP PROGRAM 2 MAY BE USED TO  
CONTROL THE CARRIER E.P.C..  
BOTH FUNCTIONS ARE CONTROLLED  
BY PEAKSIMPLE SOFTWARE.

EXTERNAL EVENT  
WIRES ARE CONNECTED  
TO THE TTL OUTPUTS  
SHOWN BELOW. THEY ARE  
0 VOLTS BY DEFAULT, AND  
5 VOLTS WHEN ACTIVATED.  
CONNECT EVENTS TO RELAYS  
'A' THROUGH 'H' ON THE  
OPTIONAL RELAY BOARD IF  
RELAY CONTACT CLOSURES  
ARE NEEDED. USE PEAKSIMPLE  
SOFTWARE TO ACTIVATE.

MOMENTARILY  
GROUNDING  
'RS1' OR 'RS2' WITH A  
2 SECOND PULSE  
ACTIVATES EITHER  
REMOTE START 1 OR  
REMOTE START 2.

**SINGLE CHANNEL  
LAWSON 203 BOARD**

**NOTE:**  
POWER THIS UNIT ON BEFORE  
BOOTING PEAKSIMPLE SOFTWARE

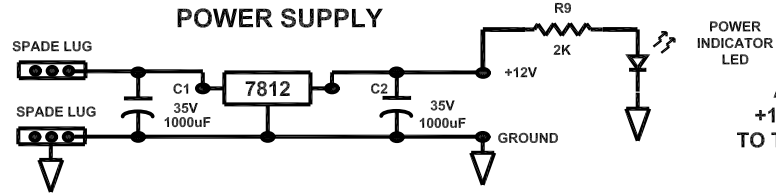
TEMP PROGRAM 1 OUTPUT IS CONNECTED  
TO THE OVEN BOARD TO CONTROL  
OVEN TEMPERATURE.  
TEMP PROGRAM 2 MAY BE USED TO  
CONTROL THE CARRIER E.P.C..  
BOTH FUNCTIONS ARE CONTROLLED  
BY PEAKSIMPLE SOFTWARE.

EXTERNAL EVENT  
WIRES ARE CONNECTED  
TO THE TTL OUTPUTS  
SHOWN BELOW. THEY ARE  
0 VOLTS BY DEFAULT, AND  
5 VOLTS WHEN ACTIVATED.  
CONNECT EVENTS TO RELAYS  
'A' THROUGH 'H' ON THE  
OPTIONAL RELAY BOARD IF  
RELAY CONTACT CLOSURES  
ARE NEEDED. USE PEAKSIMPLE  
SOFTWARE TO ACTIVATE.

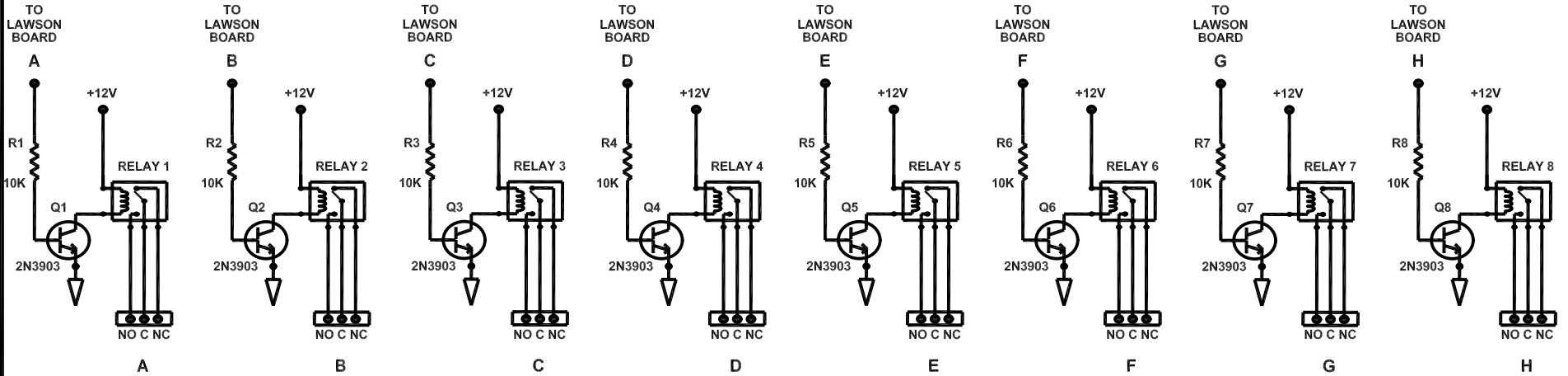
**THIS DRAWING  
DEPICTS THE  
INTERNAL  
CONNECTIONS  
MADE TO THE  
MODEL 202 AND  
203 A/D BOARDS  
INSIDE YOUR GAS  
CHROMATOGRAPH.  
MOST MODEL 8610  
AND MODEL 310 GAS  
CHROMATOGRAPHS  
HAVE ONE OF THESE  
BOARDS INSTALLED  
ON THE RIGHT SIDE OF  
THE G.C. CHASSIS.**

**202/203 A/D BOARD  
LAYOUTS**

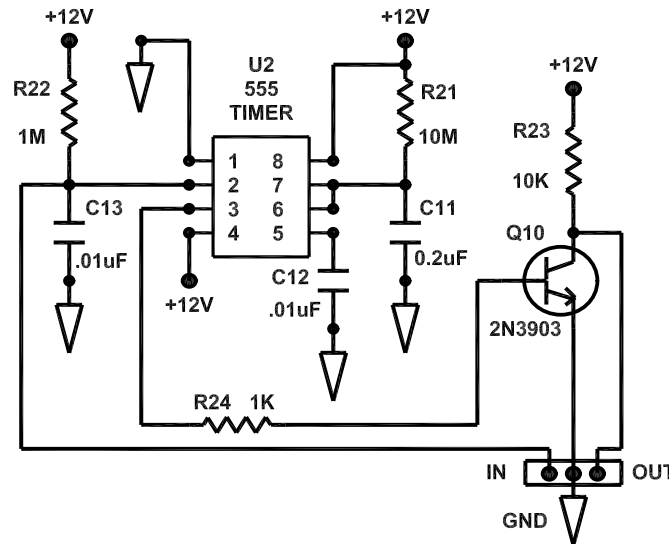
15 - 24 Vdc INPUT FROM  
WALL TRANSFORMER



ALSO SUPPLIES  
+12 V AND GROUND  
TO THE 203 A/D BOARD



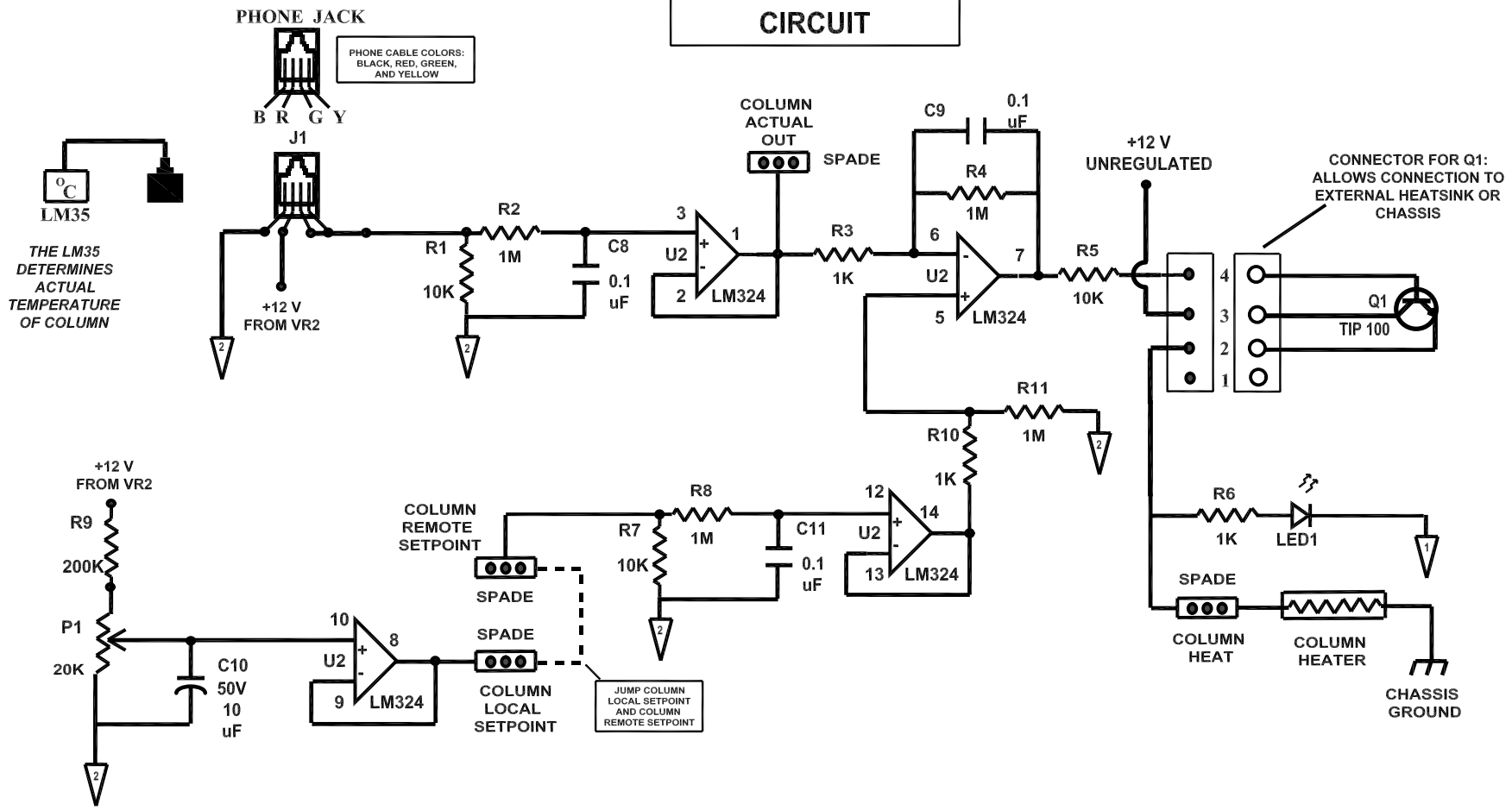
**REMOTE START CIRCUIT**  
(MOMENTARY GROUNDING OF THE INPUT  
PRODUCES A 2 SECOND NEGATIVE GOING PULSE  
ON THE OUTPUT WHICH TRIGGERS THE  
203 A/D BOARD REMOTE START FUNCTION.)



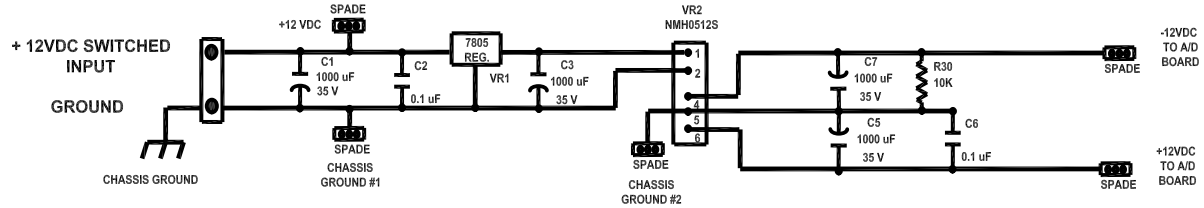
OPTIONAL RELAY CIRCUITS:  
USED WHEN A CONTACT CLOSURE  
IS NEEDED FOR ACTIVATION  
OF EXTERNAL DEVICES.



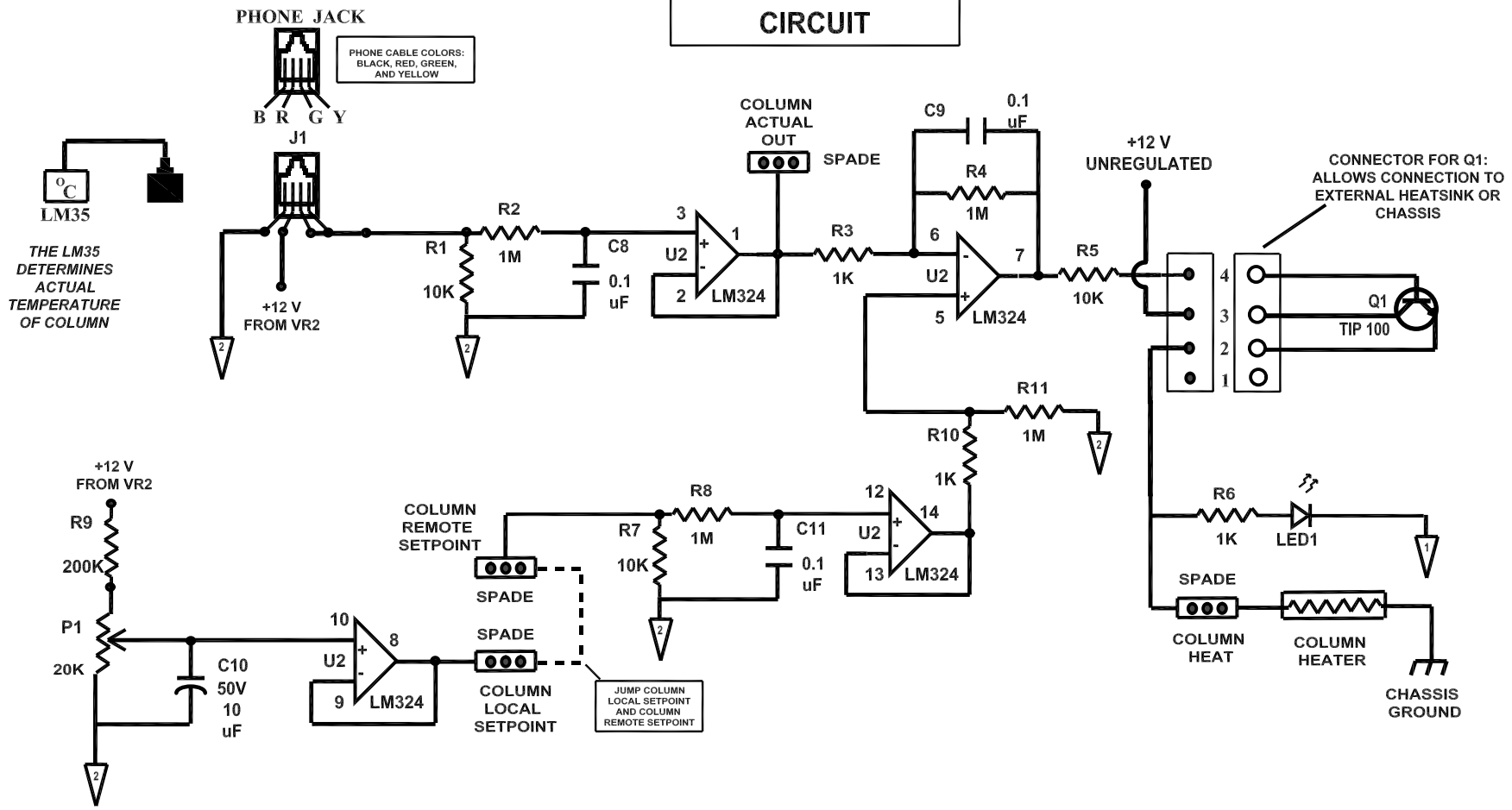
# COLUMN HEAT CIRCUIT



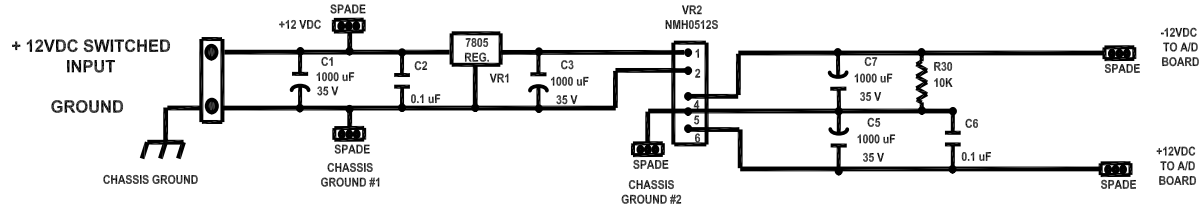
## POWER SUPPLY SECTION



# COLUMN HEAT CIRCUIT



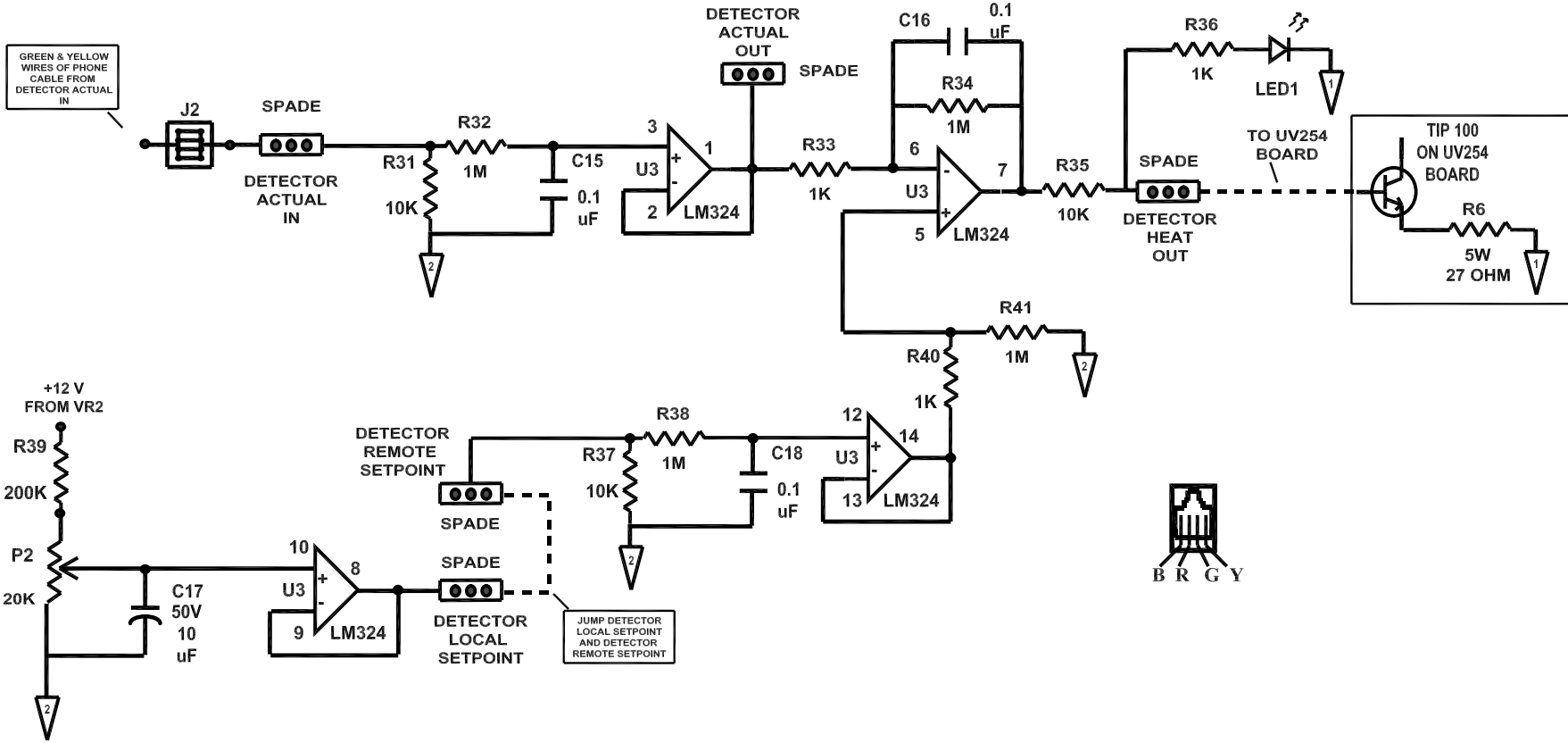
## POWER SUPPLY SECTION



210Dps - B. PCB SCHEMATIC

# DETECTOR HEAT CIRCUIT

GREEN & YELLOW  
WIRES OF PHONE  
CABLE FROM  
DETECTOR ACTUAL  
IN



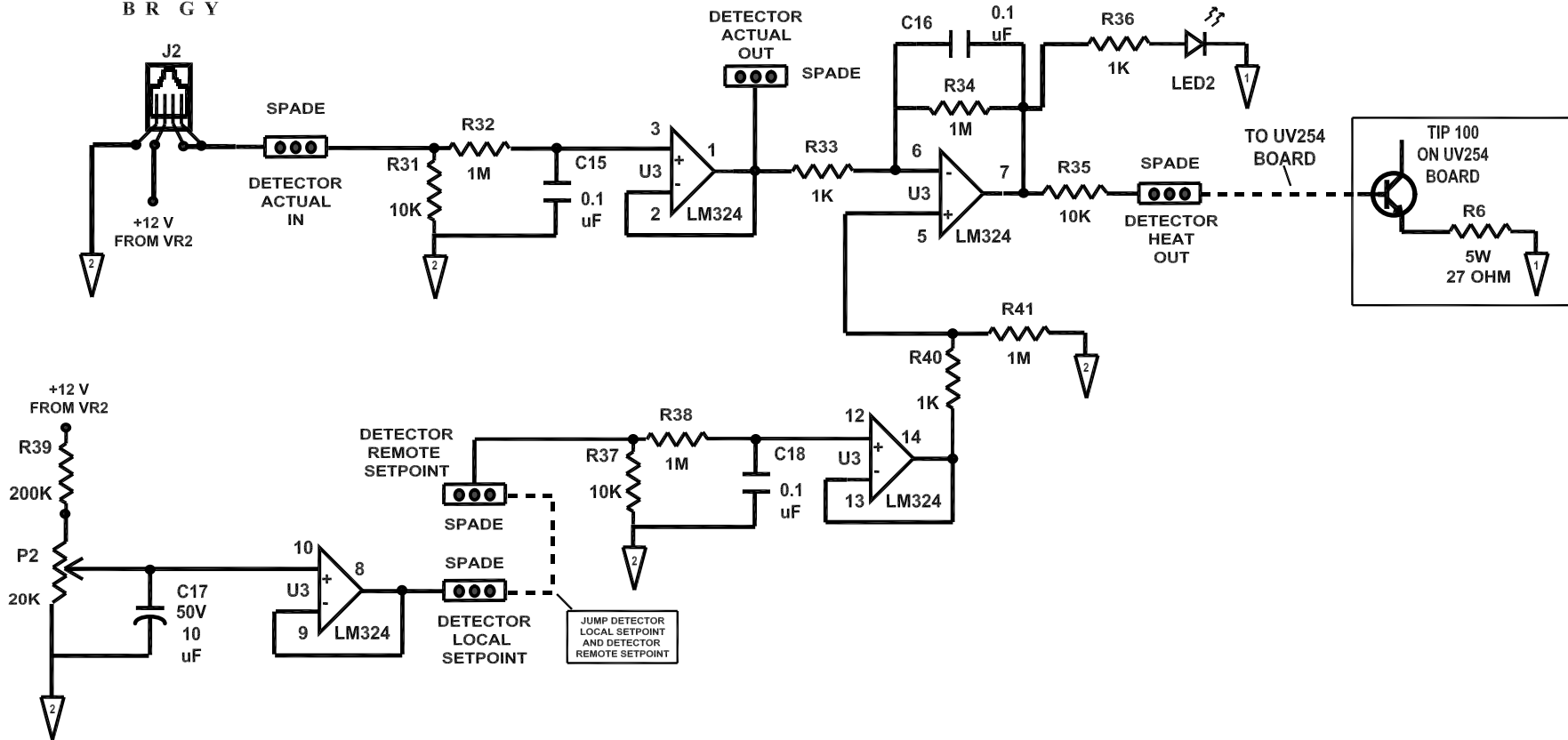


# DETECTOR HEAT CIRCUIT

## PHONE JACK



PHONE CABLE COLORS:  
BLACK, RED, GREEN,  
AND YELLOW

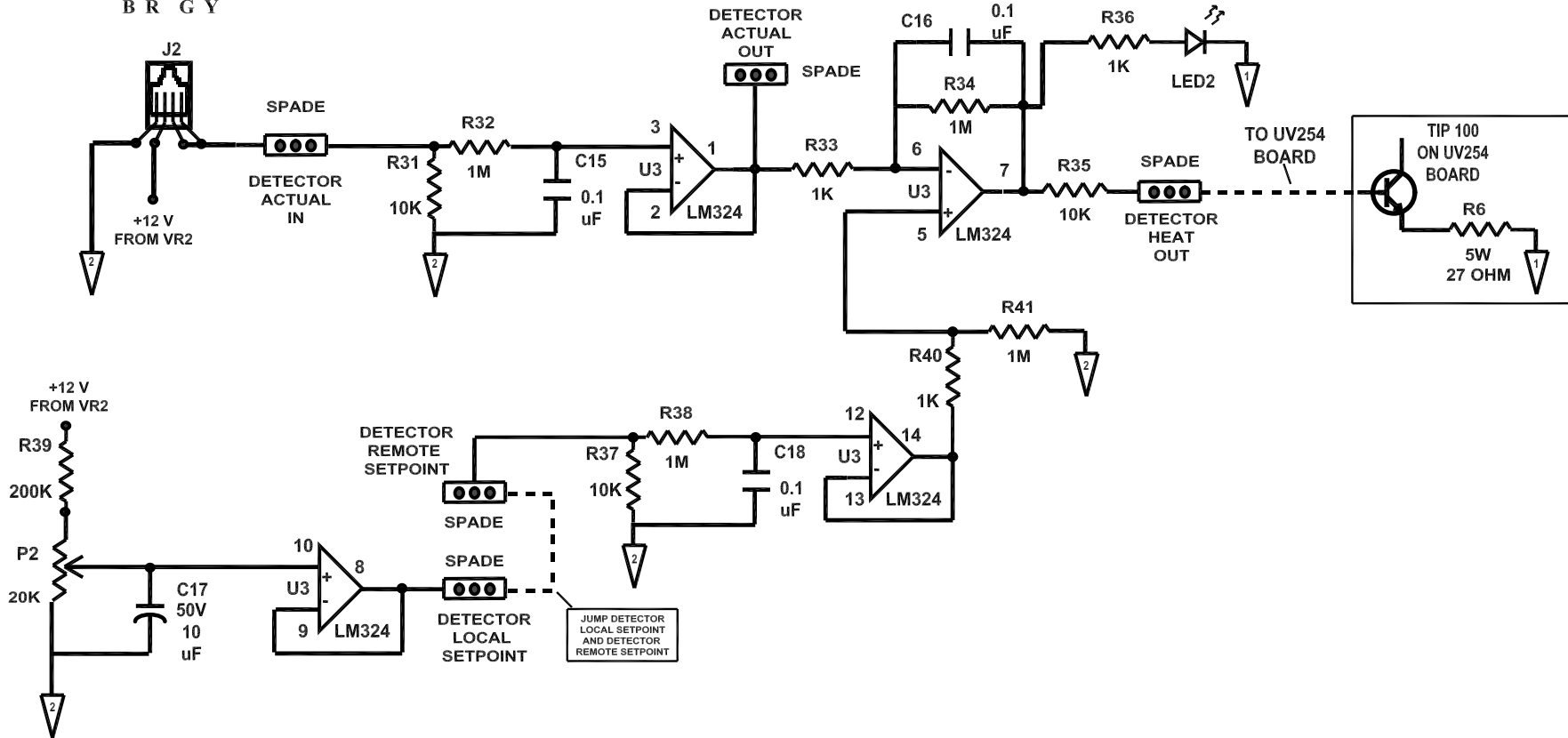


# DETECTOR HEAT CIRCUIT

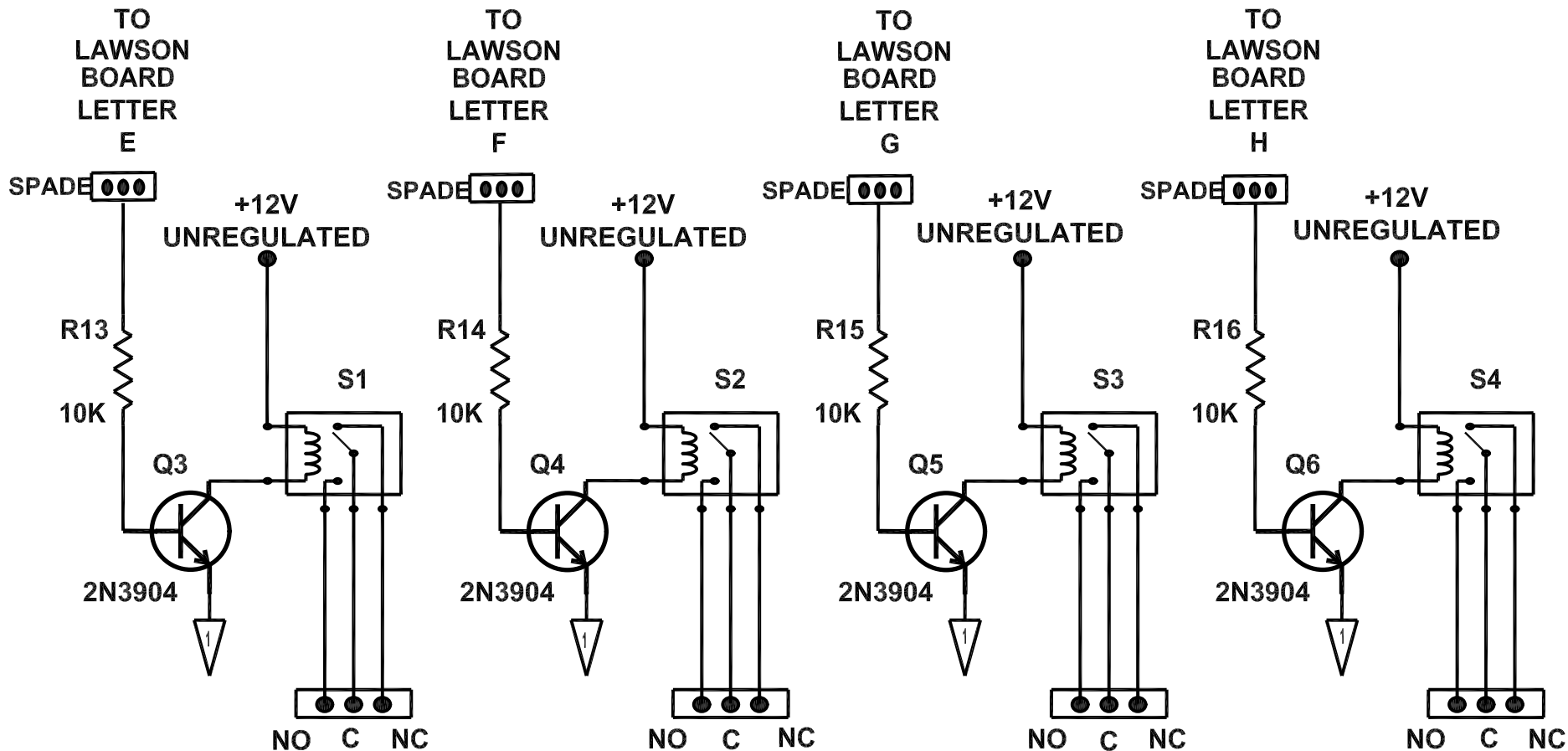
PHONE JACK



PHONE CABLE COLORS:  
BLACK, RED, GREEN,  
AND YELLOW

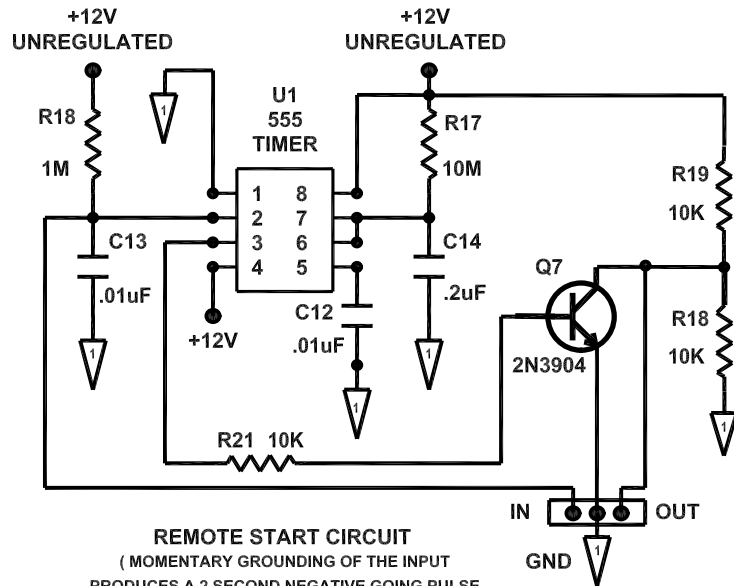


ACCESSORY RELAY  
CIRCUIT



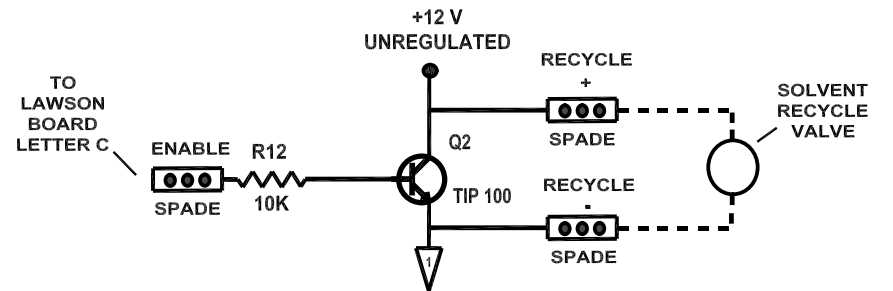
# REMOTE START & SOLVENT RECYCLE VALVE CIRCUITS

## REMOTE START PULSE STRETCHER



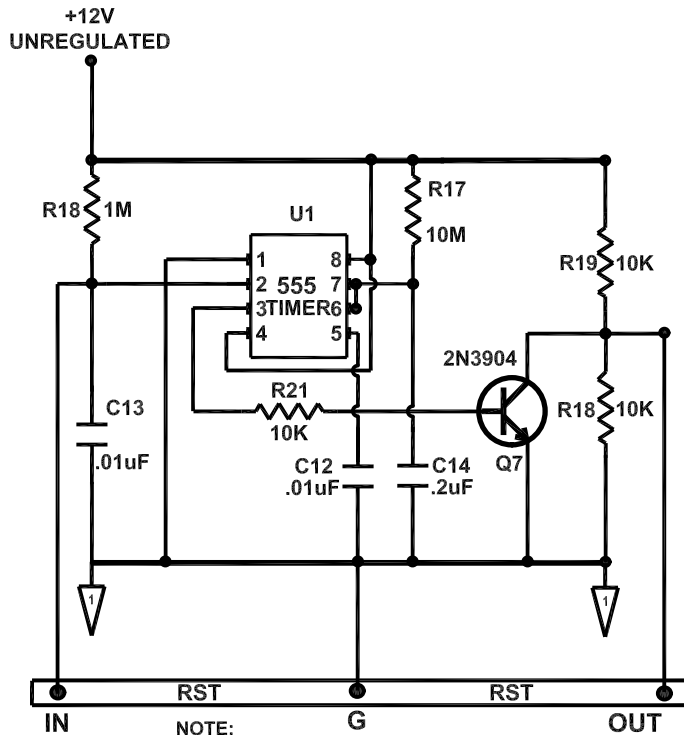
**REMOTE START CIRCUIT**  
 (MOMENTARY GROUNDING OF THE INPUT  
 PRODUCES A 2 SECOND NEGATIVE GOING PULSE  
 ON THE OUTPUT WHICH TRIGGERS THE  
 LAWSON BOARD REMOTE START FUNCTION.)

## SOLVENT RECYCLE VALVE



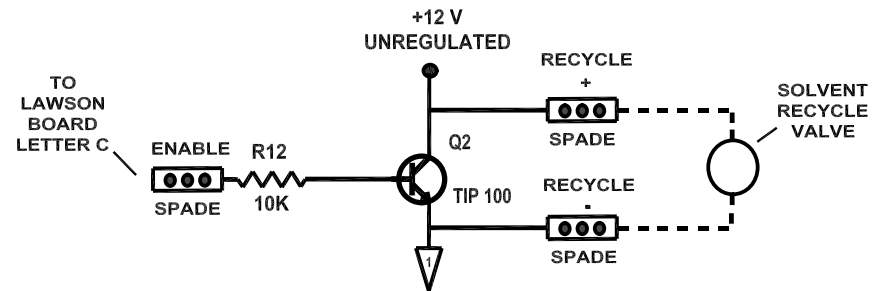
## REMOTE START & SOLVENT RECYCLE VALVE CIRCUITS

### REMOTE START-PULSE STRETCHER CIRCUIT



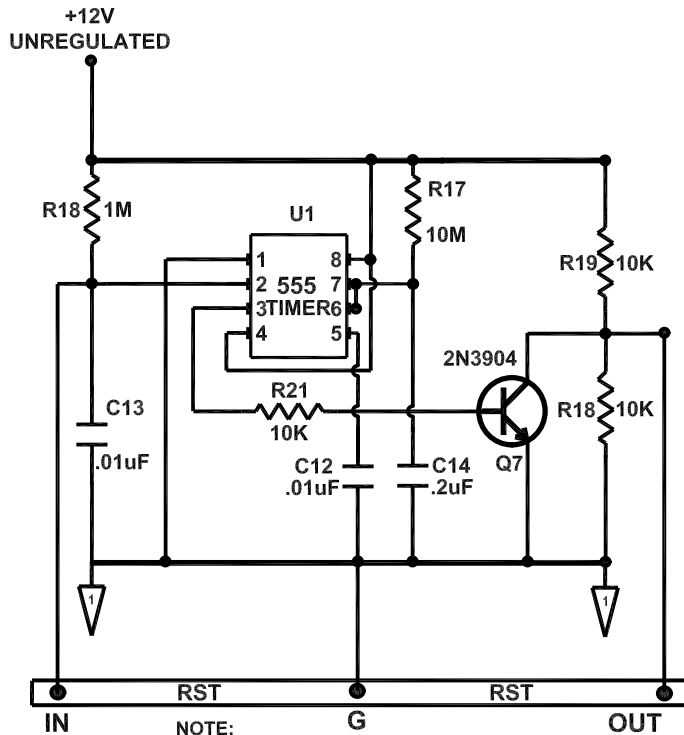
NOTE:  
 "REMOTE START" TERMINAL (RST)  
 MOMENTARY SHORTING OF "IN" TO  
 "G" (GROUND) CAUSES "OUT" TERMINAL  
 TO DROP FROM +6 VDC TO GROUND  
 FOR 2.2 SECONDS TRIGGERING  
 LAWSON BOARD REMOTE START

### SOLVENT RECYCLE VALVE



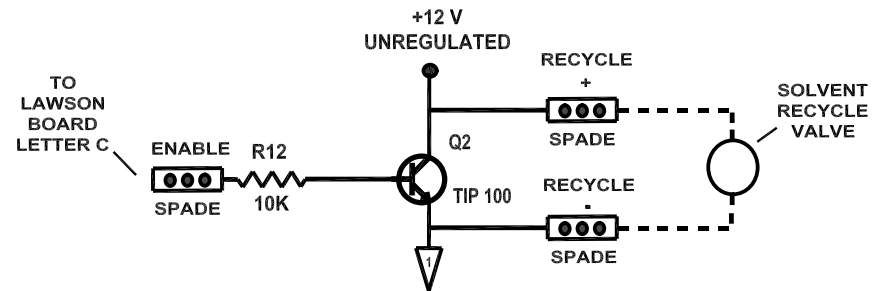
## REMOTE START & SOLVENT RECYCLE VALVE CIRCUITS

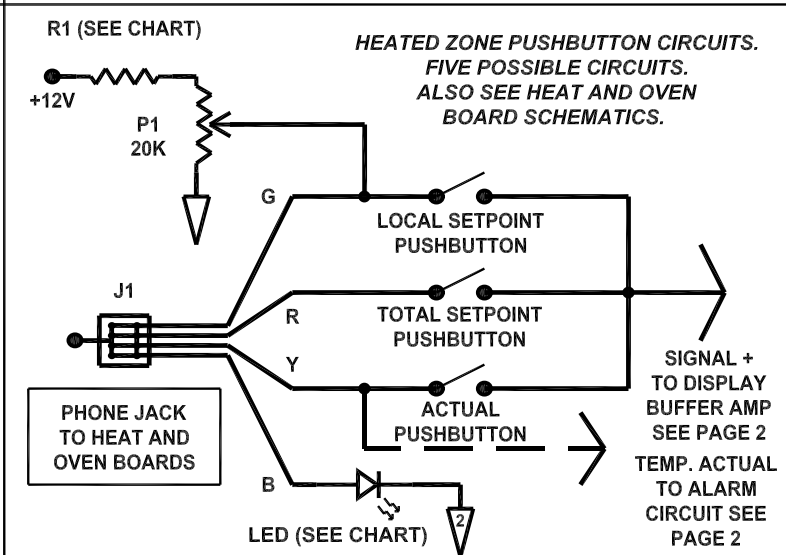
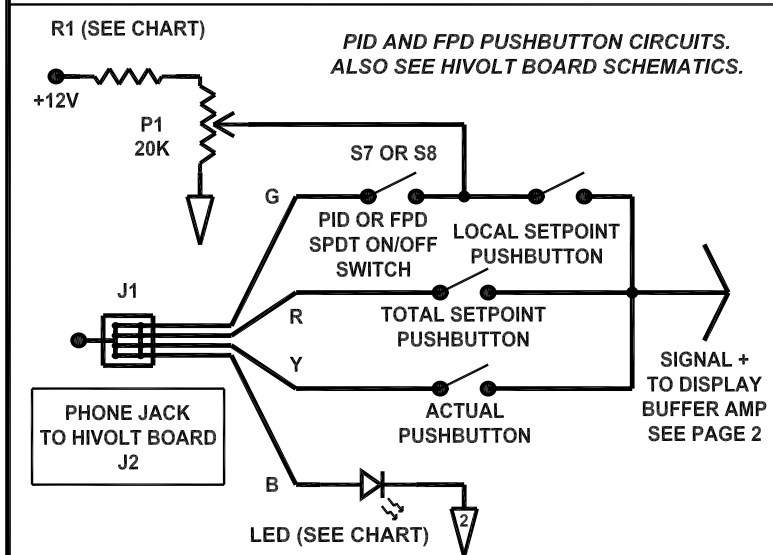
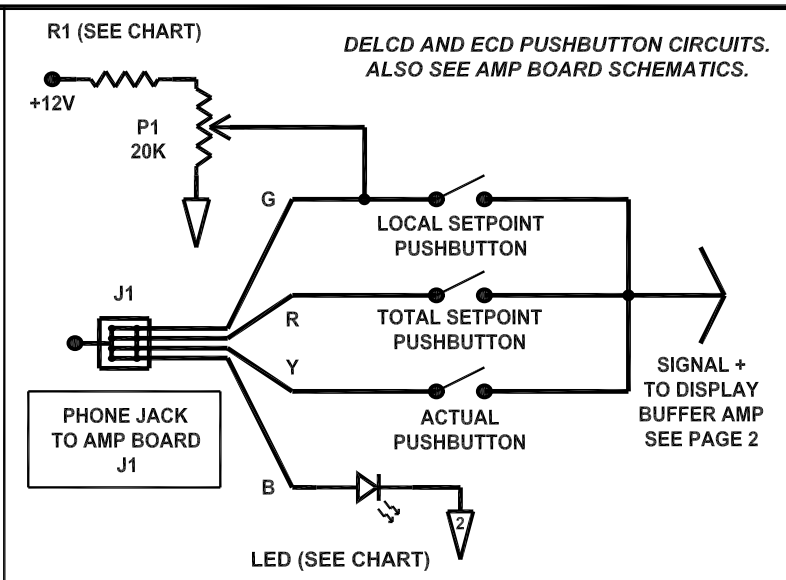
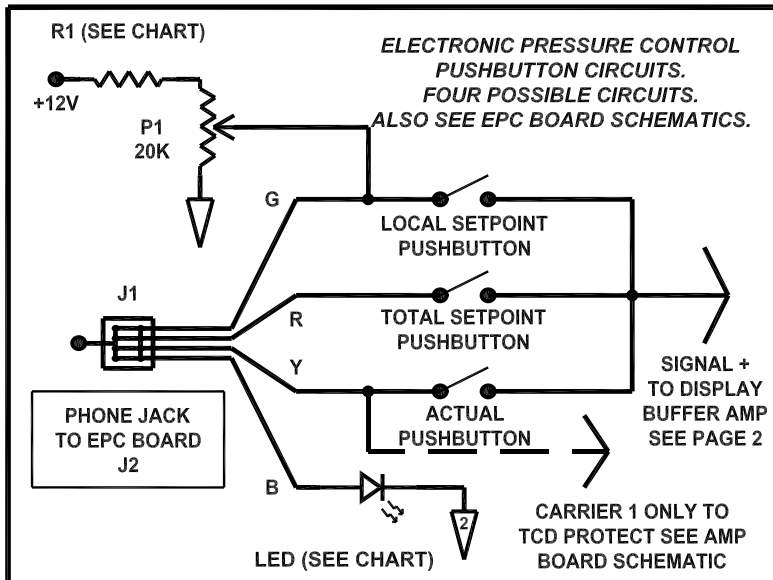
### REMOTE START-PULSE STRETCHER CIRCUIT



NOTE:  
 "REMOTE START" TERMINAL (RST)  
 MOMENTARY SHORTING OF "IN" TO  
 "G" (GROUND) CAUSES "OUT" TERMINAL  
 TO DROP FROM +6 VDC TO GROUND  
 FOR 2.2 SECONDS TRIGGERING  
 LAWSON BOARD REMOTE START

### SOLVENT RECYCLE VALVE

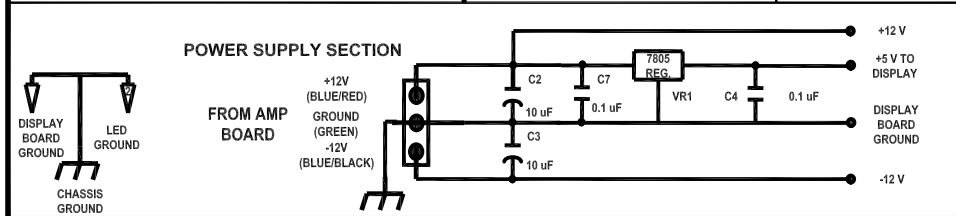




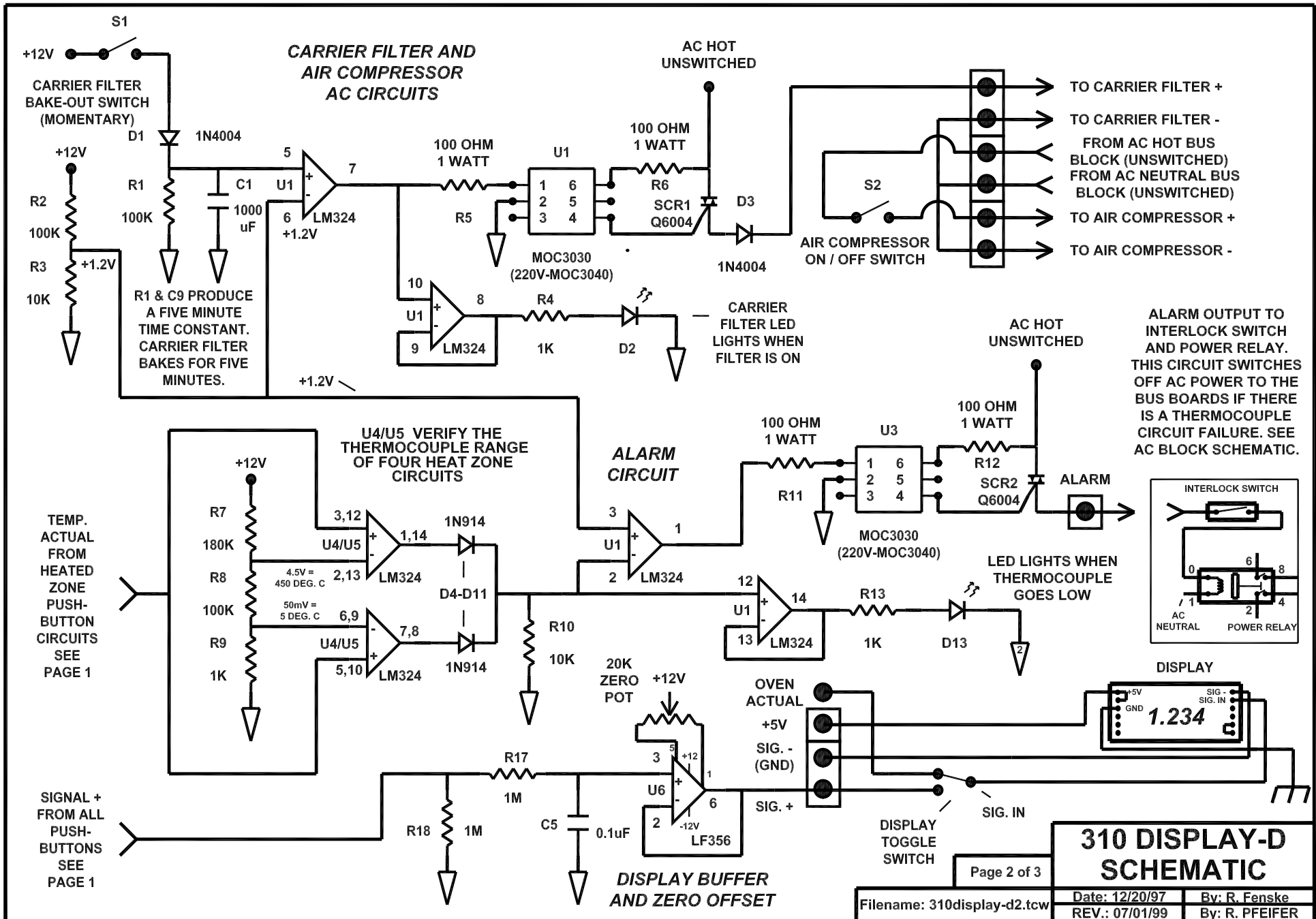
**CHART**

| CIRCUIT       | R1 VALUE | LED    |
|---------------|----------|--------|
| CARRIER 1     | 220K     | GREEN  |
| HYDROGEN 1    | 220K     | GREEN  |
| AIR 1         | 1M       | GREEN  |
| AUXILIARY     | 220K     | GREEN  |
| TCD PROTECT   | 453K     | RED    |
| FID IGNITOR   | 100      | YELLOW |
| PID CURRENT   | 40.2K    | YELLOW |
| FPD VOLTS     | 20K      | YELLOW |
| ECD CURRENT   | 4.02K    | YELLOW |
| DELCD REACT.  | 60.4K    | YELLOW |
| HEATED INJ. 1 | 60.4K    | ORANGE |
| FID BLOCK     | 40.2K    | ORANGE |
| DELCD BLOCK   | 40.2K    | ORANGE |
| PID BLOCK     | 75K      | ORANGE |
| ECD BLOCK     | 44.2K    | ORANGE |
| TCD BLOCK     | 120K     | ORANGE |
| COL. OVEN 1   | 40.2K    | ORANGE |
| CHASSIS       | 383K     | GREEN  |

# DISPLAY BOARD PUSHBUTTON CIRCUITS



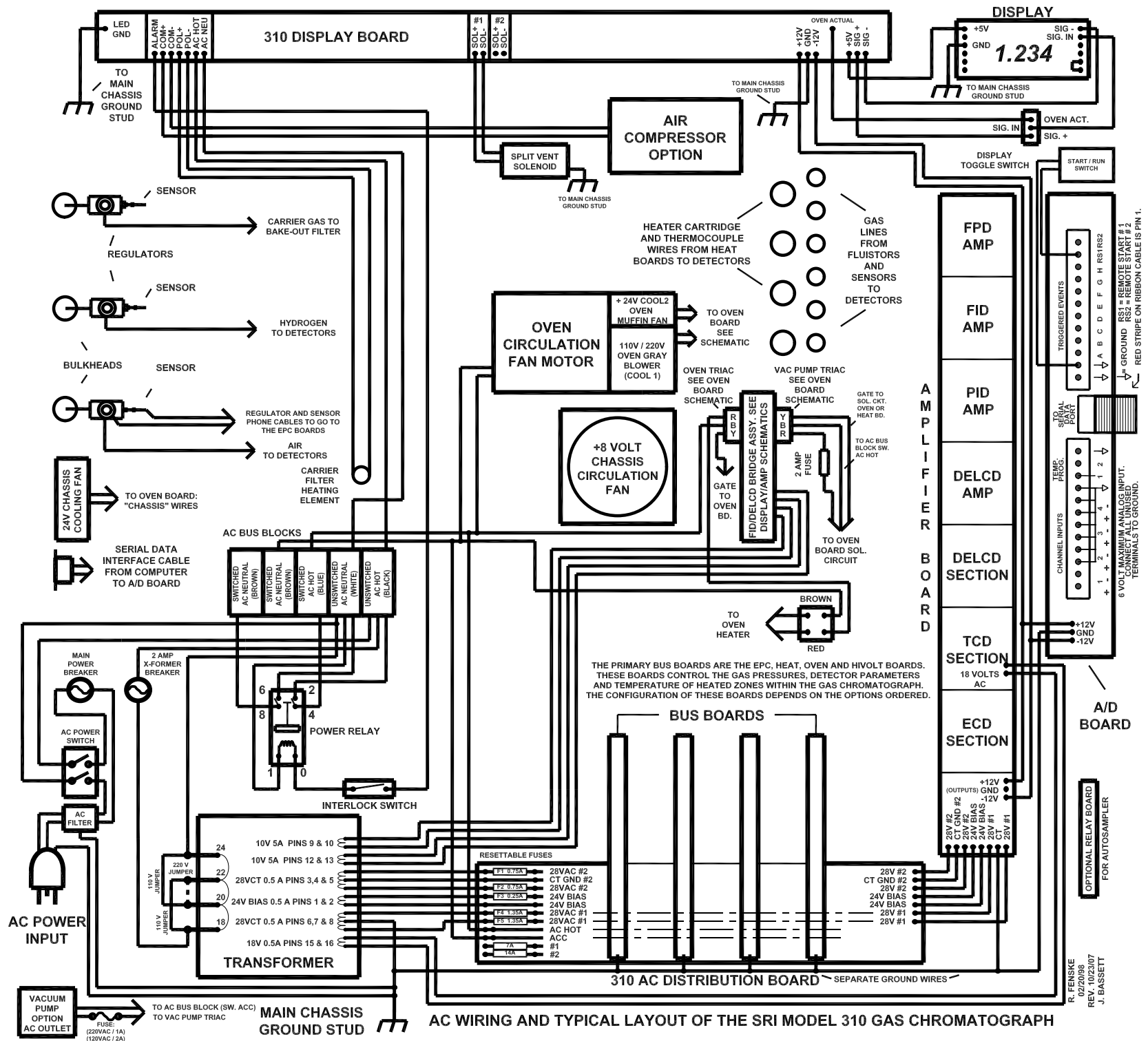
THE LM324's ON THIS BOARD OPERATE USING +12V ON PIN 4 AND GROUND ON PIN 11.











AC WIRING AND TYPICAL LAYOUT OF THE SRI MODEL 310 GAS CHROMATOGRAPH

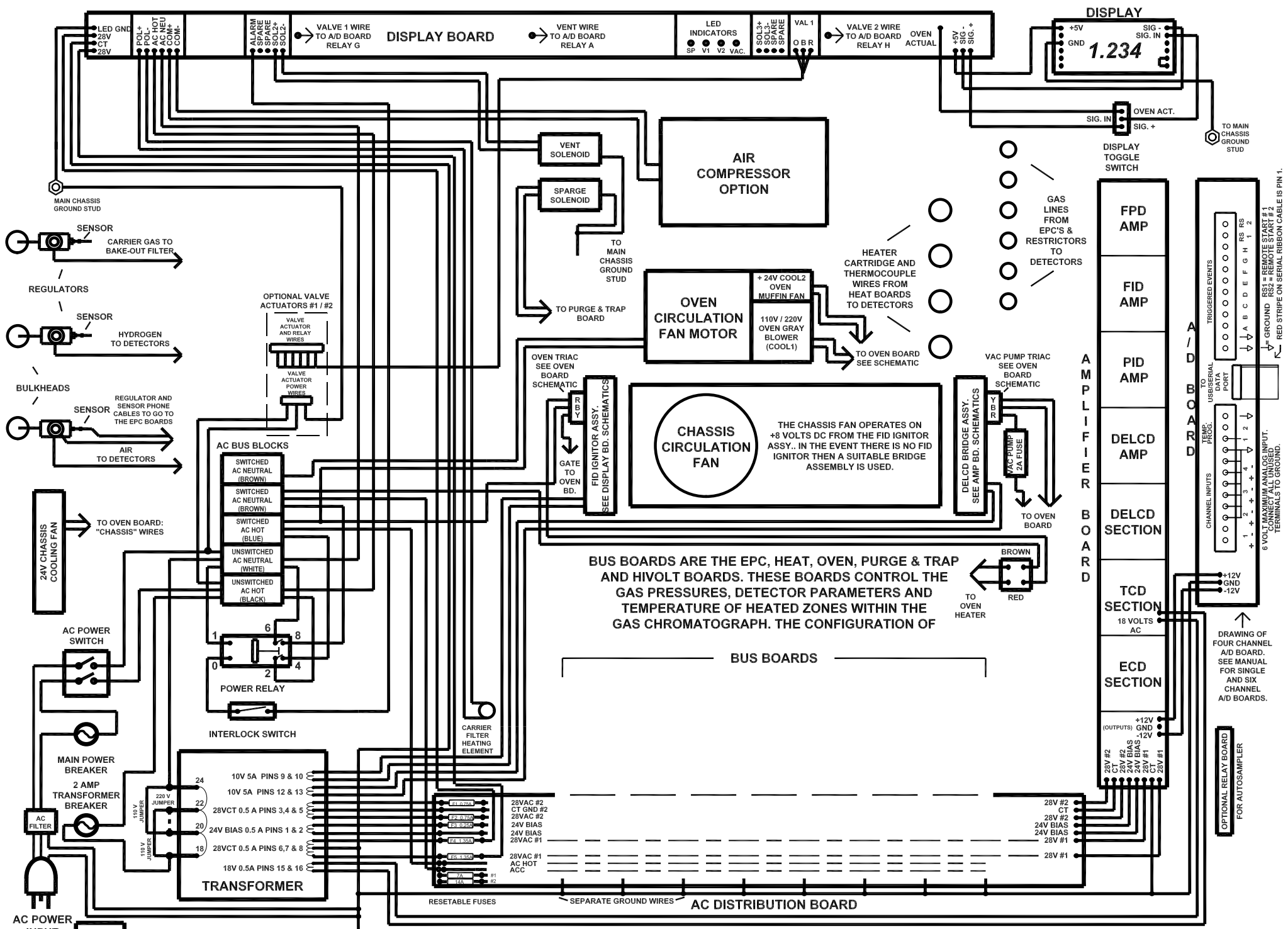
R. FENSKIE  
REV. 10/23/07  
J. BASSETT











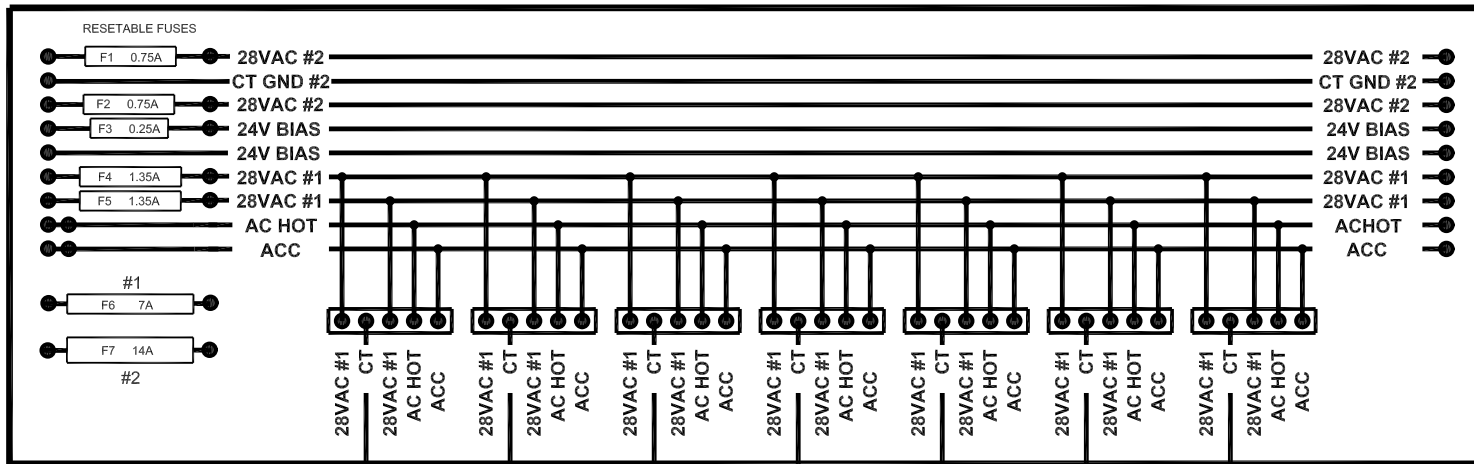
AC WIRING AND TYPICAL LAYOUT OF THE SRI 8610-C GAS CHROMATOGRAPH



## 8610 AC DISTRIBUTION BOARD

**INPUT  
FROM  
X-FORMER  
AND  
INTERLOCK  
SWITCH**

NOTE: F7 (14A FUSE)  
IS USED FOR THE DELCDB  
BRIDGE



**OUTPUT  
TO  
AMP  
BOARD**

MAIN CHASSIS  
GROUND STUD

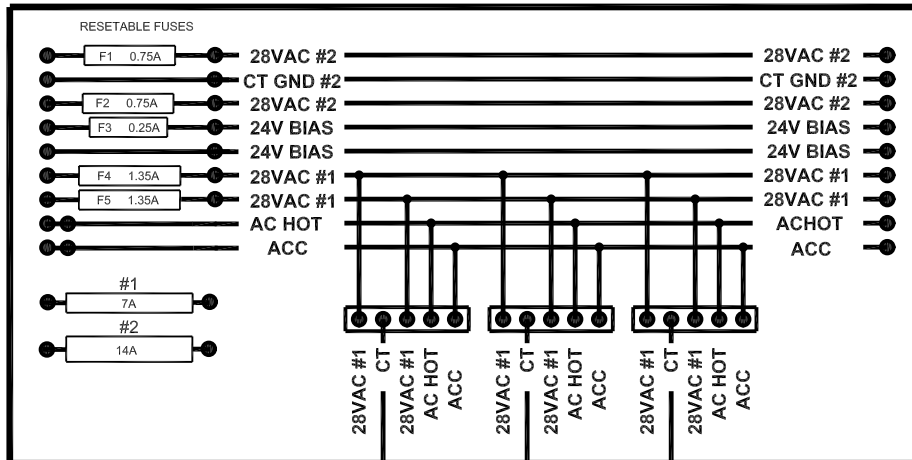
SEPARATE GROUND WIRES

USED IN THE MODEL 8610  
GAS CHROMATOGRAPH

## 310 AC DISTRIBUTION BOARD

**INPUT  
FROM  
X-FORMER  
AND  
INTERLOCK  
SWITCH**

NOTE: #2 (14A FUSE)  
IS USED FOR THE DELCDB  
BRIDGE



**OUTPUT  
TO  
AMP  
BOARD**

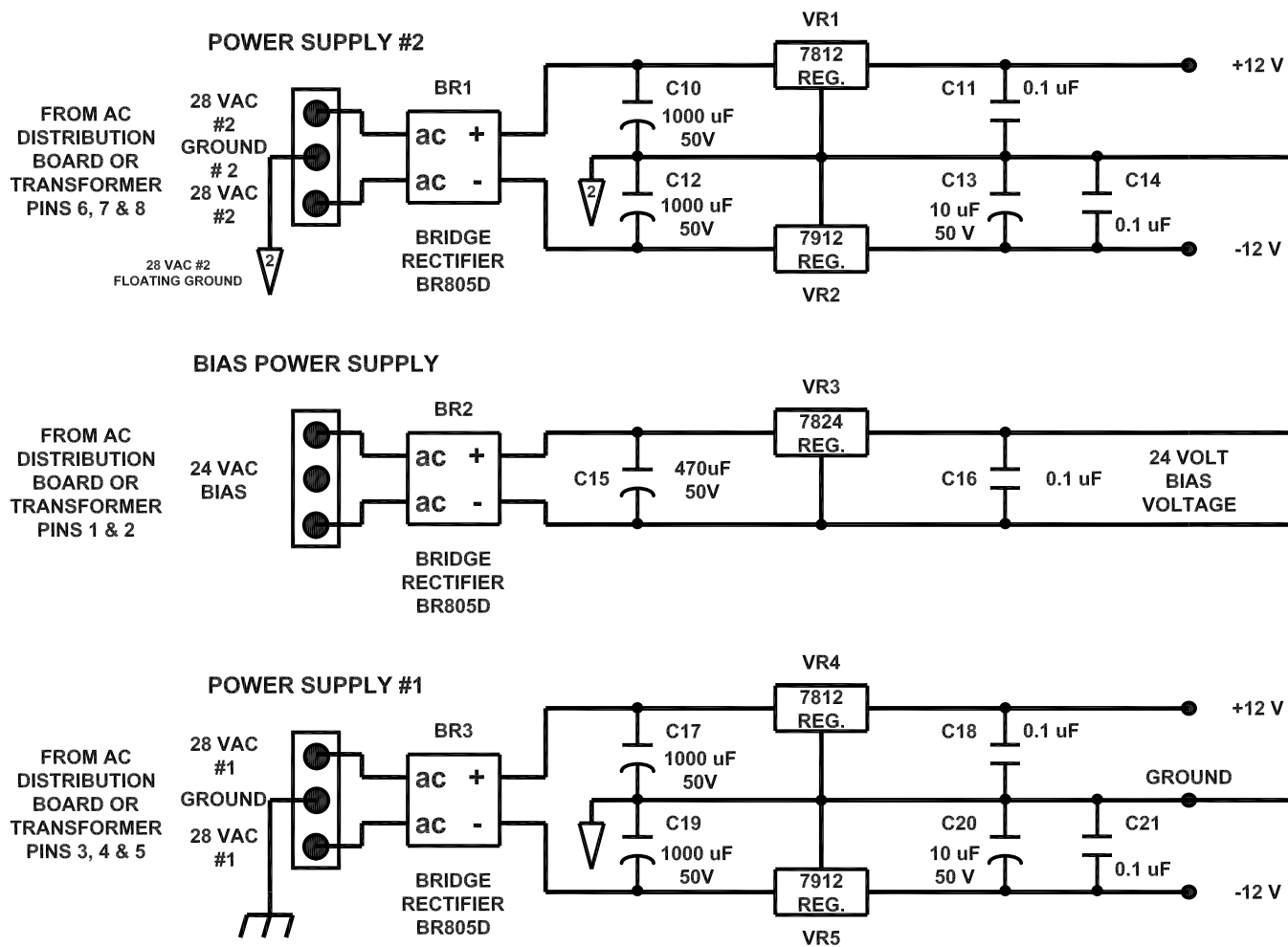
MAIN CHASSIS  
GROUND STUD

SEPARATE GROUND WIRES

USED IN THE MODEL 310  
GAS CHROMATOGRAPH

|                         |                     |                                      |  |
|-------------------------|---------------------|--------------------------------------|--|
| Page 1 of 1             | Bd. REV.            | <b>AC DISTRIBUTION<br/>SCHEMATIC</b> |  |
|                         | 8610 - D<br>310 - B |                                      |  |
| Filename: ACDIST-ca.tcw | Date: 12/20/97      | By: R. Fenske                        |  |
|                         | REV. Date: 5/13/02  | By: M. Watts                         |  |

### POWER SUPPLY SECTION OF AMP BOARD

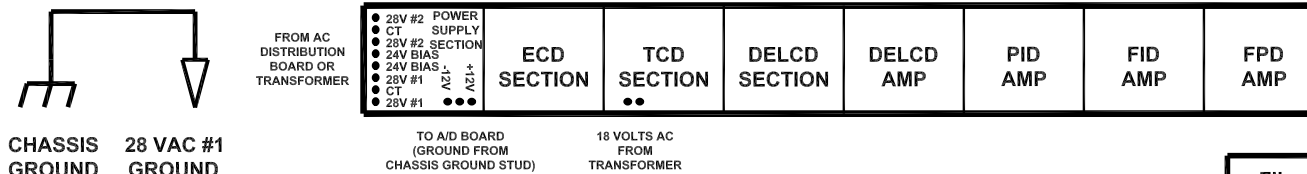


POWER SUPPLY #2 IS A +12 V AND -12 V SUPPLY BIASED 24 VOLTS ABOVE GROUND POTENTIAL BY VR3 OF THE BIAS POWER SUPPLY. THIS SUPPLY IS USED BY THE FID, PID, DELCD AND FPD DETECTOR AMPLIFIERS.

THE BIAS POWER SUPPLY MAINTAINS A 24 VOLT DC POTENTIAL BETWEEN GROUND #1 AND GROUND #2.

POWER SUPPLY #1 IS THE PRIMARY POWER SOURCE FOR ALL FUNCTIONS OF THE AMP BOARD AND ALSO PROVIDES +12 V AND -12 V TO THE A/D BOARD. ONLY THE TCD CIRCUIT REQUIRES AN ADDITIONAL AC VOLTAGE INPUT. SEE PAGE 2.

### AMPLIFIER BOARD LAYOUT

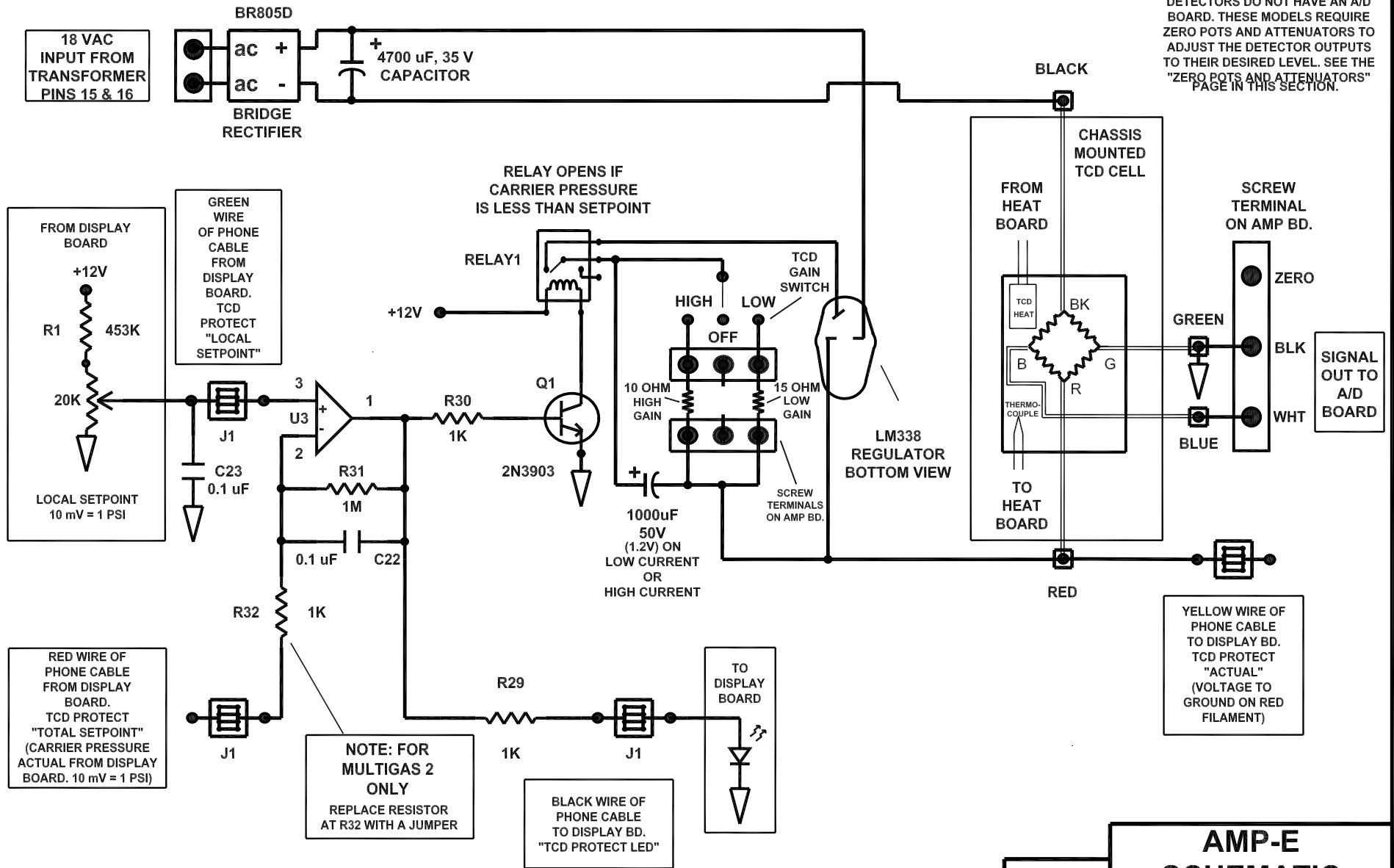


CHASSIS GROUND 28 VAC #1 GROUND

## AMP-E SCHEMATIC

### TCD SECTION OF AMPLIFIER BOARD

NOTE: MODEL 310 STUDENT TCD G.C.s AND MODEL 110 STANDALONE DETECTORS DO NOT HAVE AN A/D BOARD. THESE MODELS REQUIRE ZERO POTS AND ATTENUATORS TO ADJUST THE DETECTOR OUTPUTS TO THEIR DESIRED LEVEL. SEE THE "ZERO POTS AND ATTENUATORS" PAGE IN THIS SECTION.





### DELCD POWER SECTION OF AMP BOARD

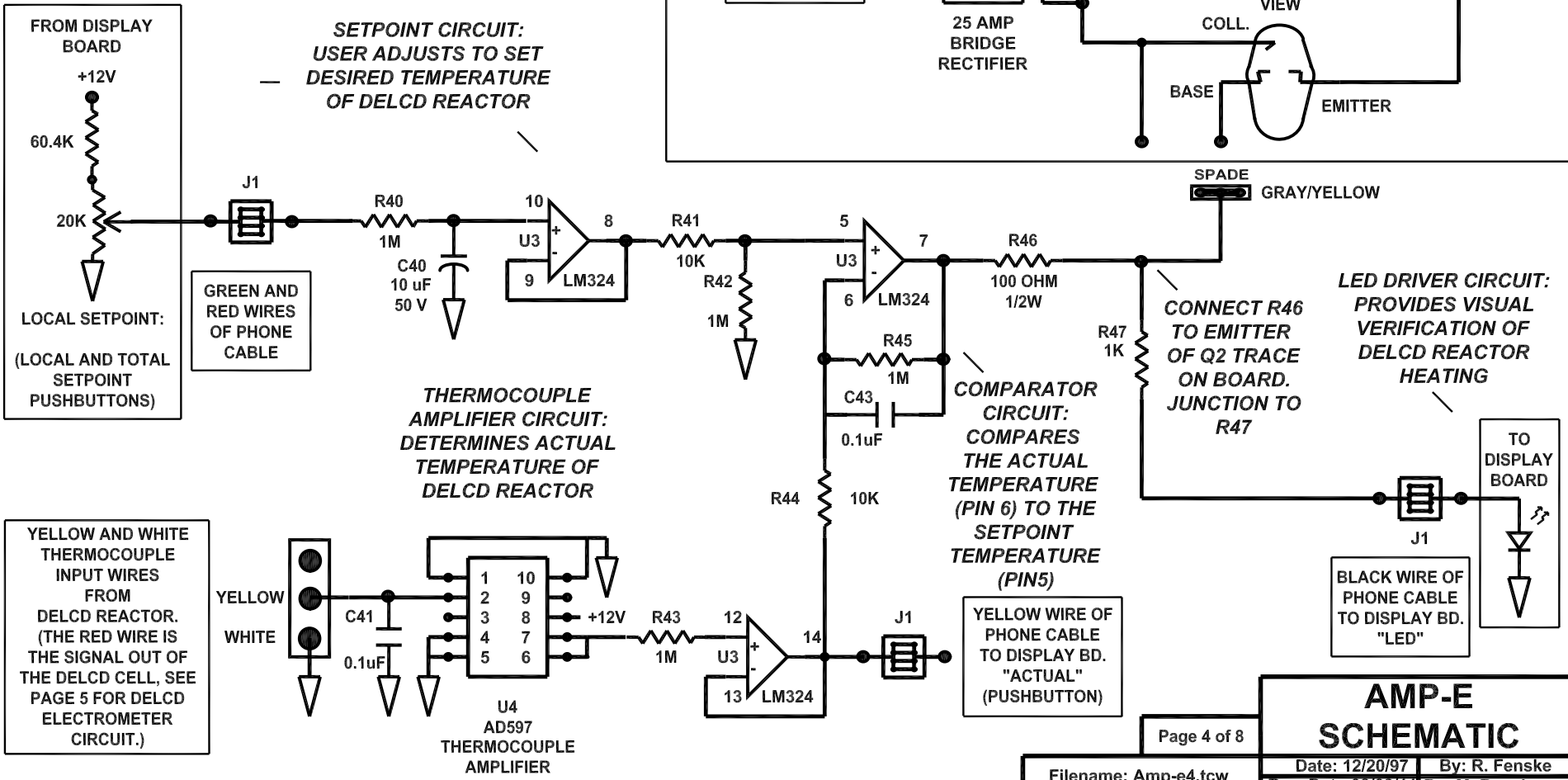
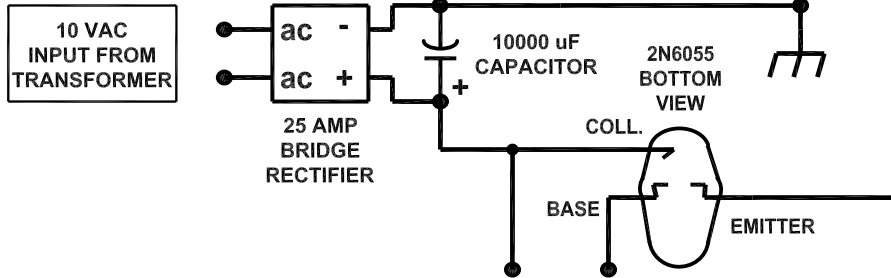
THIS CIRCUITRY CONTROLS THE TEMPERATURE OF THE DELCD REACTOR. SEE PAGE 5 FOR THE DELCD ELECTROMETER SCHEMATIC. THE DELCD REACTOR IS LOCATED ON THE RIGHT SIDE OF THE COLUMN OVEN.

DELCD BRIDGE ASSEMBLY ON UPRIGHT METAL BRACKET ON THE RIGHT SIDE OF THE CHASSIS CIRCULATION FAN (OUTPUT OF 25 AMP BRIDGE POWERS THE 12 V MINI-FAN ON FRONT OF G.C. RED LID)

RED, WHITE & YELLOW WIRES TO T-COUPLE AMP & ELECTROMETER

DELCD REACTOR HEATER WIRES PLUG INTO PUSH TERMINALS NEXT TO DETECTOR ASSEMBLY

**DELCD REACTOR**  
1 OHM AT ROOM TEMP.



FROM DISPLAY BOARD  
+12V  
60.4K  
20K  
LOCAL SETPOINT:  
(LOCAL AND TOTAL SETPOINT PUSHBUTTONS)

SETPOINT CIRCUIT:  
USER ADJUSTS TO SET  
DESIRED TEMPERATURE  
OF DELCD REACTOR

GREEN AND RED WIRES OF PHONE CABLE

THERMOCOUPLE AMPLIFIER CIRCUIT:  
DETERMINES ACTUAL TEMPERATURE OF DELCD REACTOR

YELLOW AND WHITE THERMOCOUPLE INPUT WIRES FROM DELCD REACTOR. (THE RED WIRE IS THE SIGNAL OUT OF THE DELCD CELL, SEE PAGE 5 FOR DELCD ELECTROMETER CIRCUIT.)

COMPARATOR CIRCUIT:  
COMPARES THE ACTUAL TEMPERATURE (PIN 6) TO THE SETPOINT TEMPERATURE (PIN 5)

YELLOW WIRE OF PHONE CABLE TO DISPLAY BD. "ACTUAL" (PUSHBUTTON)

CONNECT R46 TO EMITTER OF Q2 TRACE ON BOARD. JUNCTION TO R47

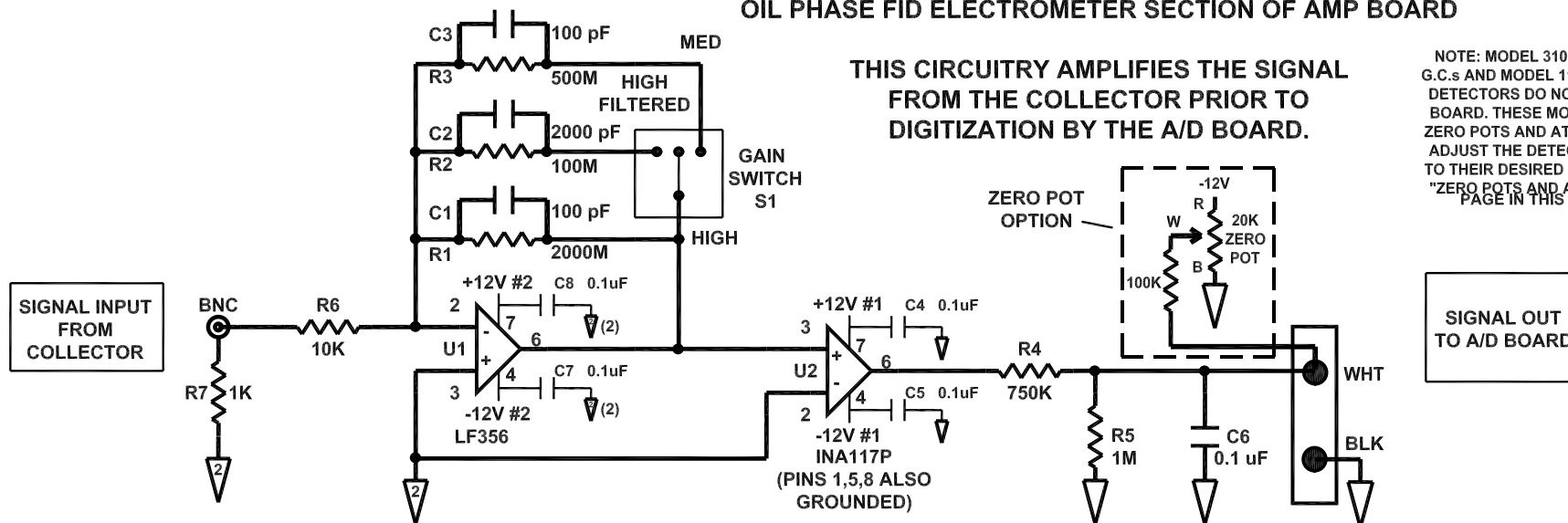
LED DRIVER CIRCUIT:  
PROVIDES VISUAL VERIFICATION OF DELCD REACTOR HEATING

BLACK WIRE OF PHONE CABLE TO DISPLAY BD. "LED"

### OIL PHASE FID ELECTROMETER SECTION OF AMP BOARD

THIS CIRCUITRY AMPLIFIES THE SIGNAL FROM THE COLLECTOR PRIOR TO DIGITIZATION BY THE A/D BOARD.

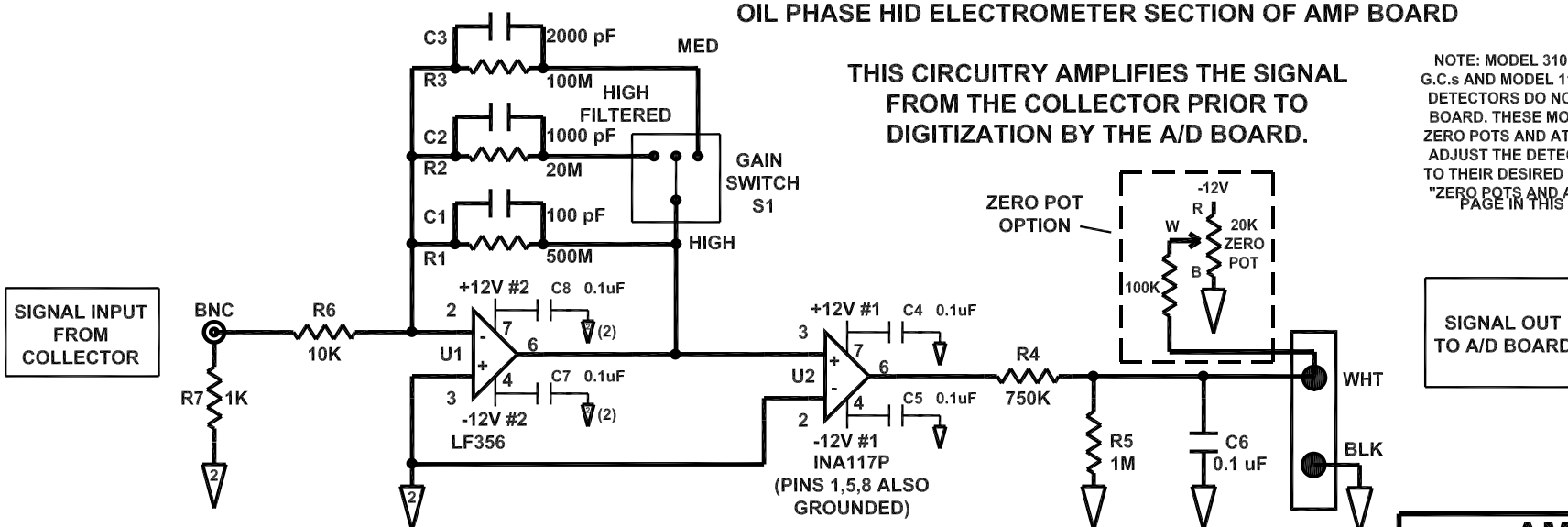
NOTE: MODEL 310 STUDENT TCD G.C.s AND MODEL 110 STANDALONE DETECTORS DO NOT HAVE AN A/D BOARD. THESE MODELS REQUIRE ZERO POTS AND ATTENUATORS TO ADJUST THE DETECTOR OUTPUTS TO THEIR DESIRED LEVEL. SEE THE "ZERO POTS AND ATTENUATORS" PAGE IN THIS SECTION.



### OIL PHASE HID ELECTROMETER SECTION OF AMP BOARD

THIS CIRCUITRY AMPLIFIES THE SIGNAL FROM THE COLLECTOR PRIOR TO DIGITIZATION BY THE A/D BOARD.

NOTE: MODEL 310 STUDENT TCD G.C.s AND MODEL 110 STANDALONE DETECTORS DO NOT HAVE AN A/D BOARD. THESE MODELS REQUIRE ZERO POTS AND ATTENUATORS TO ADJUST THE DETECTOR OUTPUTS TO THEIR DESIRED LEVEL. SEE THE "ZERO POTS AND ATTENUATORS" PAGE IN THIS SECTION.

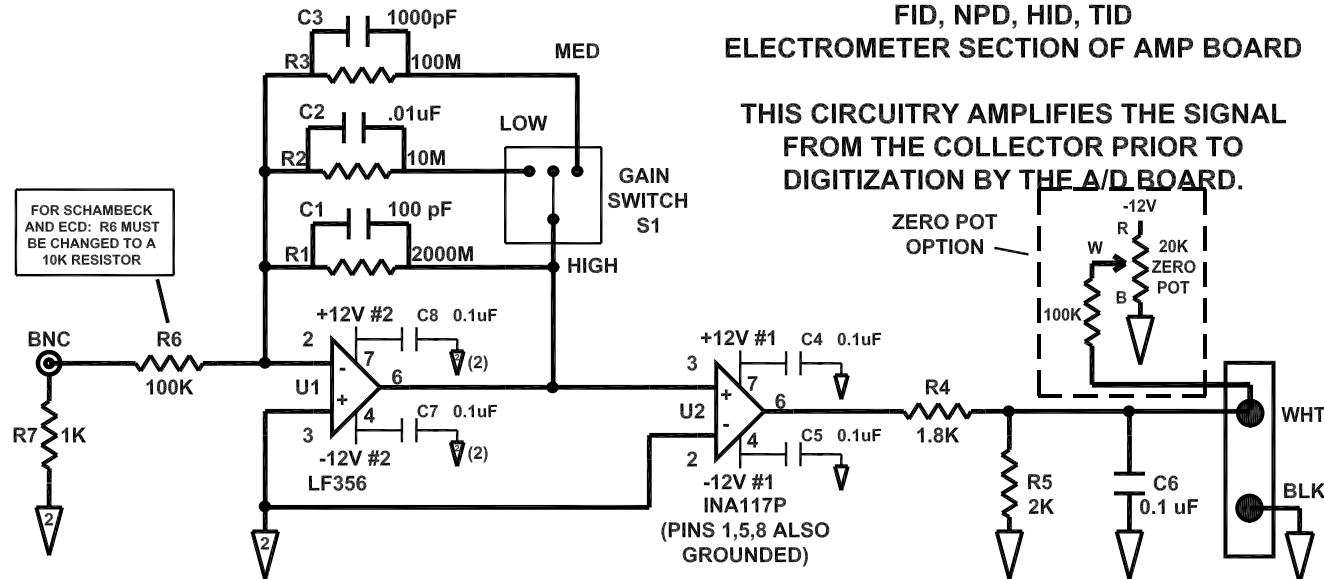


FID, NPD, HID, TID  
ELECTROMETER SECTION OF AMP BOARD

THIS CIRCUITRY AMPLIFIES THE SIGNAL FROM THE COLLECTOR PRIOR TO DIGITIZATION BY THE A/D BOARD.

NOTE: MODEL 310 STUDENT TCD G.C.s AND MODEL 110 STANDALONE DETECTORS DO NOT HAVE AN A/D BOARD. THESE MODELS REQUIRE ZERO POTS AND ATTENUATORS TO ADJUST THE DETECTOR OUTPUTS TO THEIR DESIRED LEVEL. SEE THE "ZERO POTS AND ATTENUATORS" PAGE IN THIS SECTION.

SIGNAL INPUT FROM COLLECTOR



FOR SCHAMBECK AND ECD: R6 MUST BE CHANGED TO A 10K RESISTOR

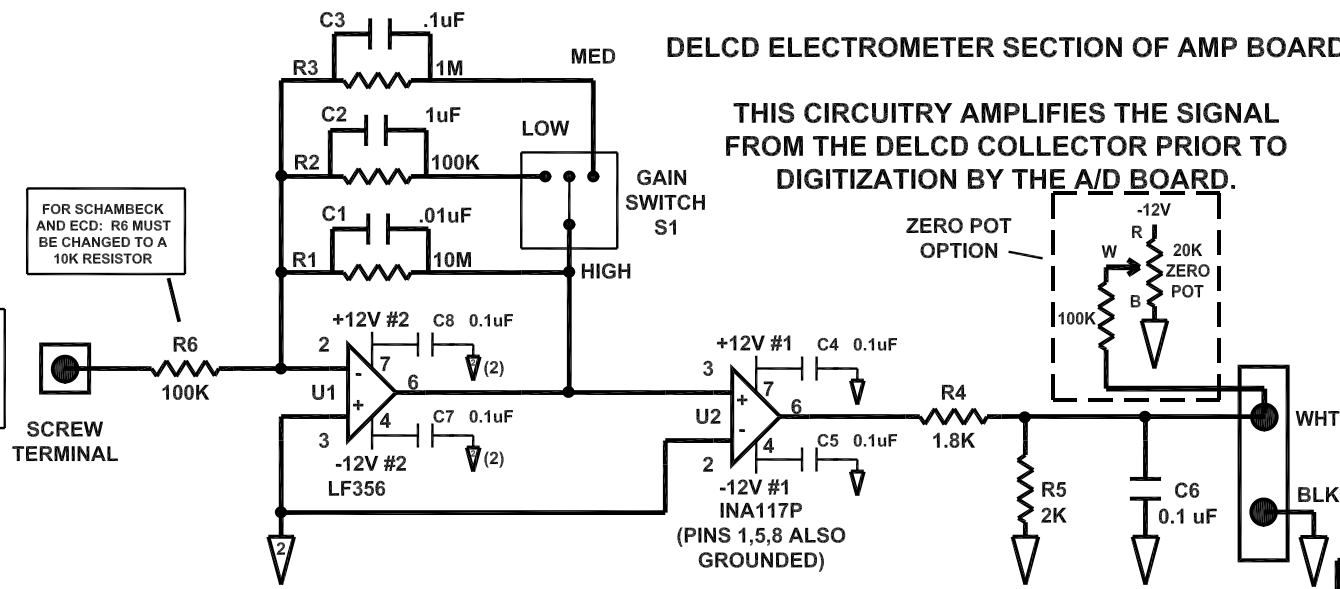
SIGNAL OUT TO A/D BOARD

DELCD ELECTROMETER SECTION OF AMP BOARD

THIS CIRCUITRY AMPLIFIES THE SIGNAL FROM THE DELCD COLLECTOR PRIOR TO DIGITIZATION BY THE A/D BOARD.

NOTE: MODEL 310 STUDENT TCD G.C.s AND MODEL 110 STANDALONE DETECTORS DO NOT HAVE AN A/D BOARD. THESE MODELS REQUIRE ZERO POTS AND ATTENUATORS TO ADJUST THE DETECTOR OUTPUTS TO THEIR DESIRED LEVEL. SEE THE "ZERO POTS AND ATTENUATORS" PAGE IN THIS SECTION.

SIGNAL INPUT FROM DELCD COLLECTOR (RED WIRE)



FOR SCHAMBECK AND ECD: R6 MUST BE CHANGED TO A 10K RESISTOR

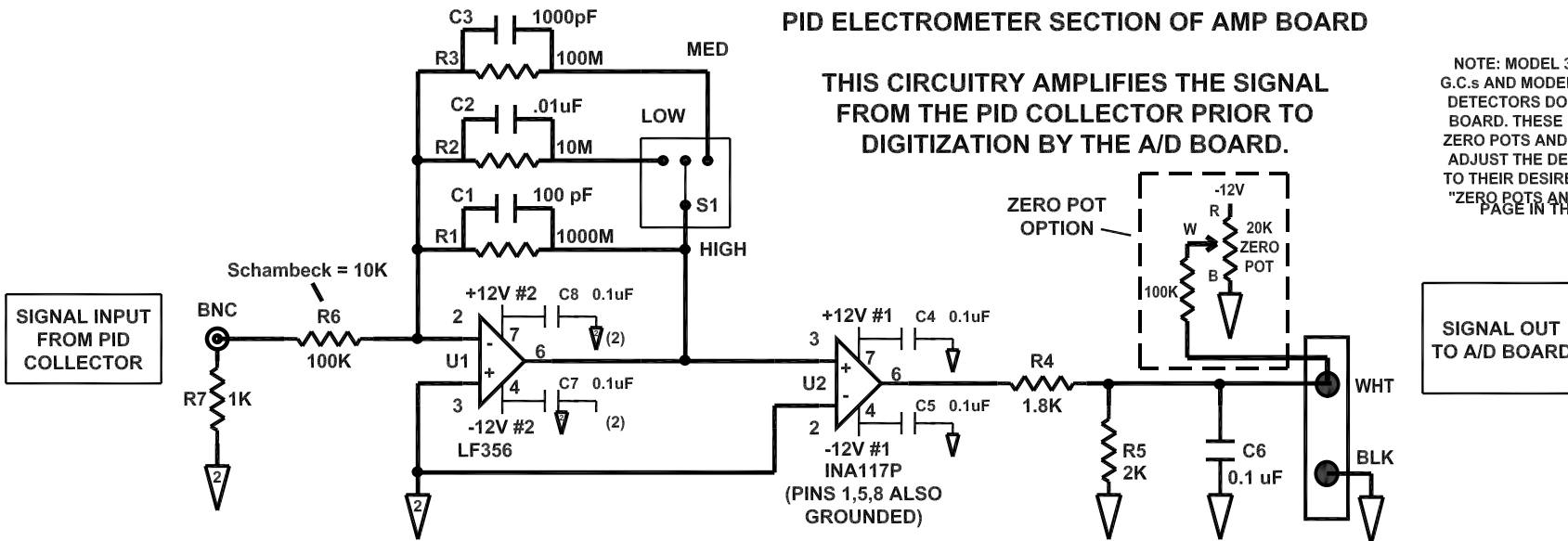
SIGNAL OUT TO A/D BOARD

AMP-E  
SCHEMATIC

### PID ELECTROMETER SECTION OF AMP BOARD

THIS CIRCUITRY AMPLIFIES THE SIGNAL FROM THE PID COLLECTOR PRIOR TO DIGITIZATION BY THE A/D BOARD.

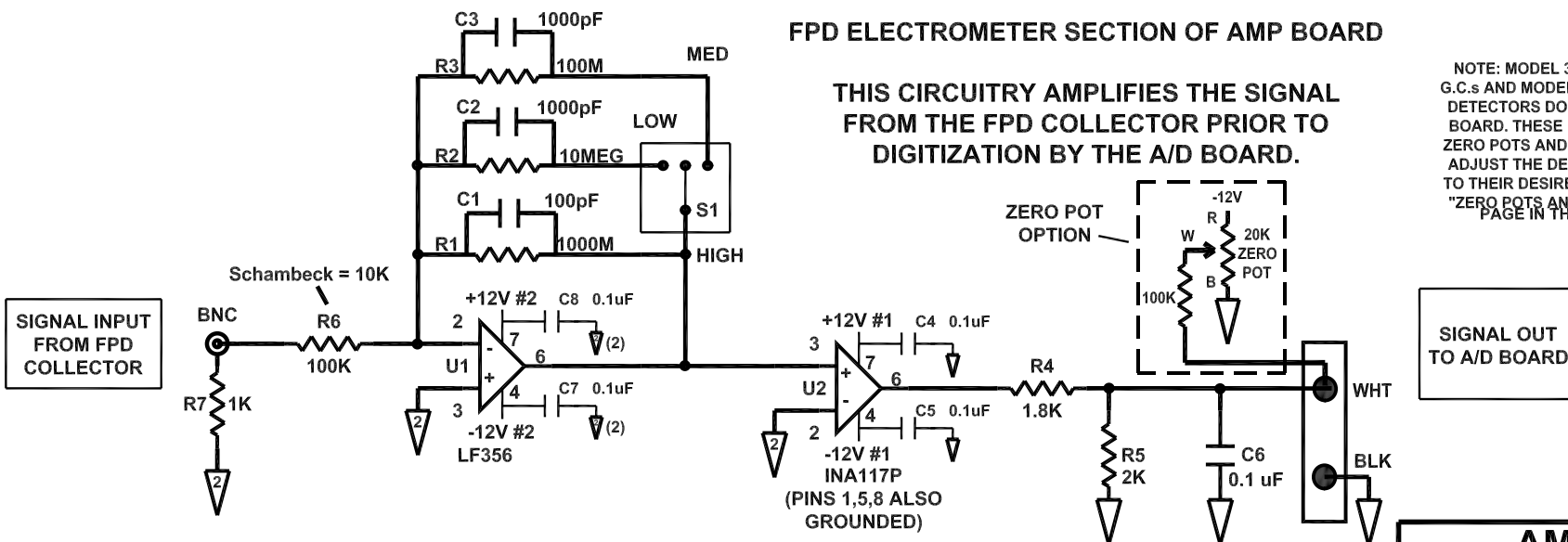
NOTE: MODEL 310 STUDENT TCD G.C.s AND MODEL 110 STANDALONE DETECTORS DO NOT HAVE AN A/D BOARD. THESE MODELS REQUIRE ZERO POTS AND ATTENUATORS TO ADJUST THE DETECTOR OUTPUTS TO THEIR DESIRED LEVEL. SEE THE "ZERO POTS AND ATTENUATORS" PAGE IN THIS SECTION.



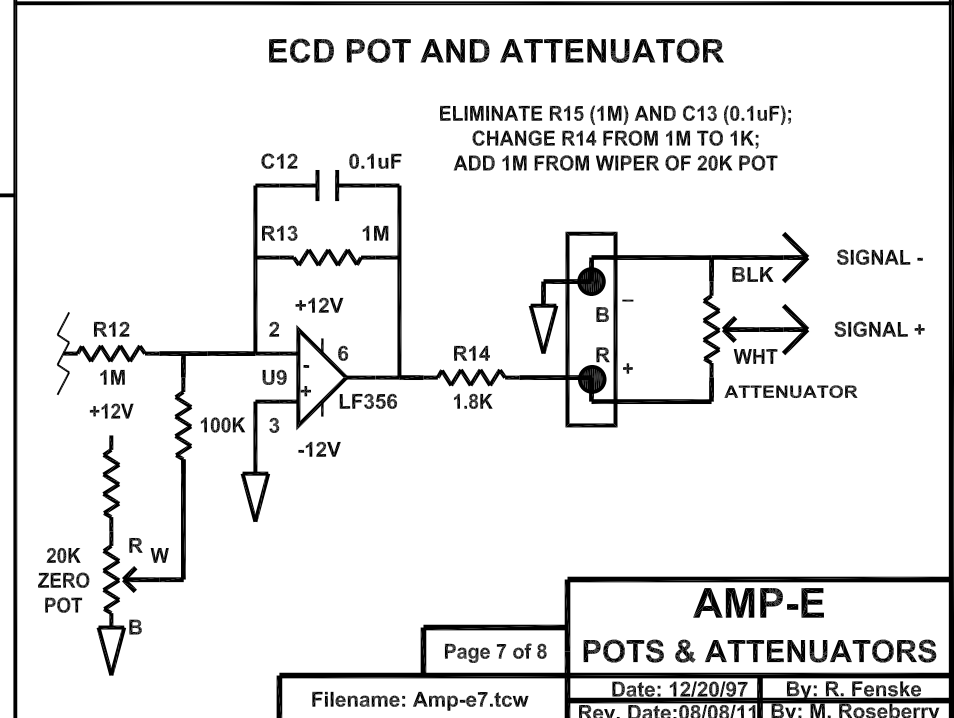
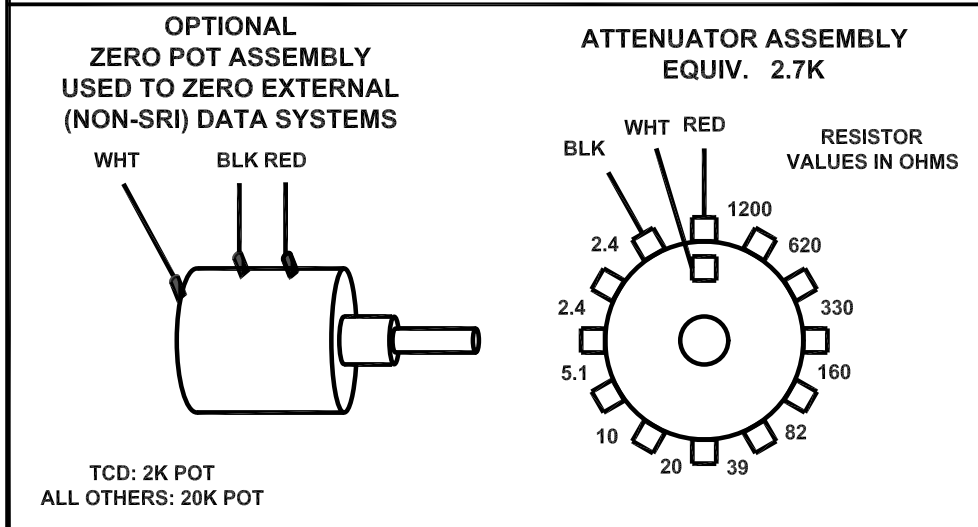
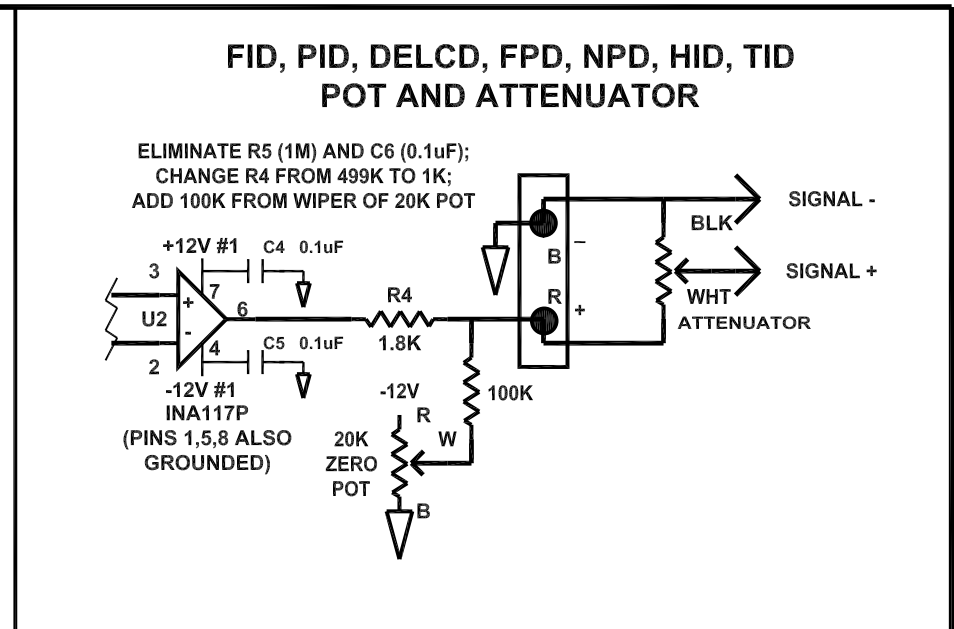
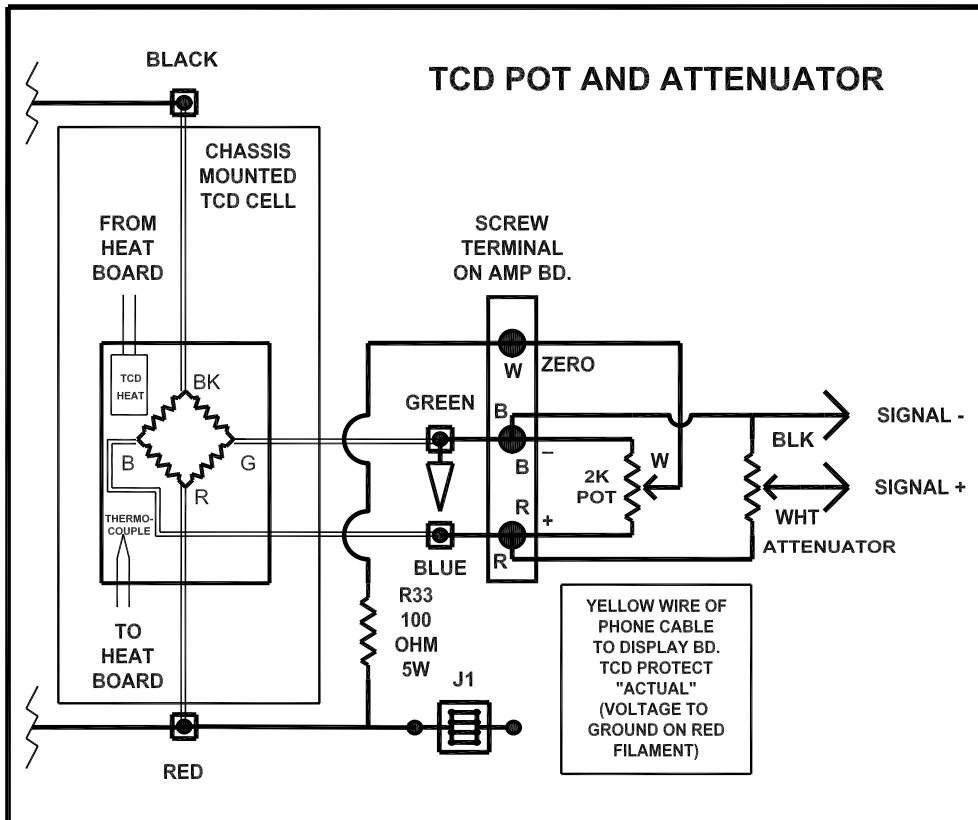
### FPD ELECTROMETER SECTION OF AMP BOARD

THIS CIRCUITRY AMPLIFIES THE SIGNAL FROM THE FPD COLLECTOR PRIOR TO DIGITIZATION BY THE A/D BOARD.

NOTE: MODEL 310 STUDENT TCD G.C.s AND MODEL 110 STANDALONE DETECTORS DO NOT HAVE AN A/D BOARD. THESE MODELS REQUIRE ZERO POTS AND ATTENUATORS TO ADJUST THE DETECTOR OUTPUTS TO THEIR DESIRED LEVEL. SEE THE "ZERO POTS AND ATTENUATORS" PAGE IN THIS SECTION.

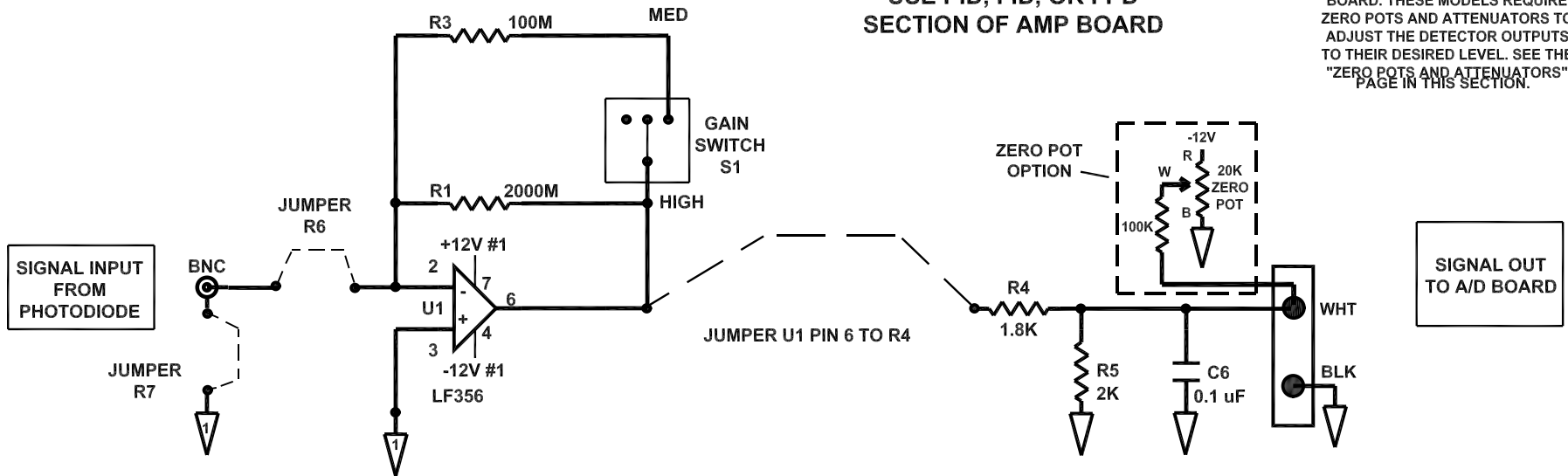






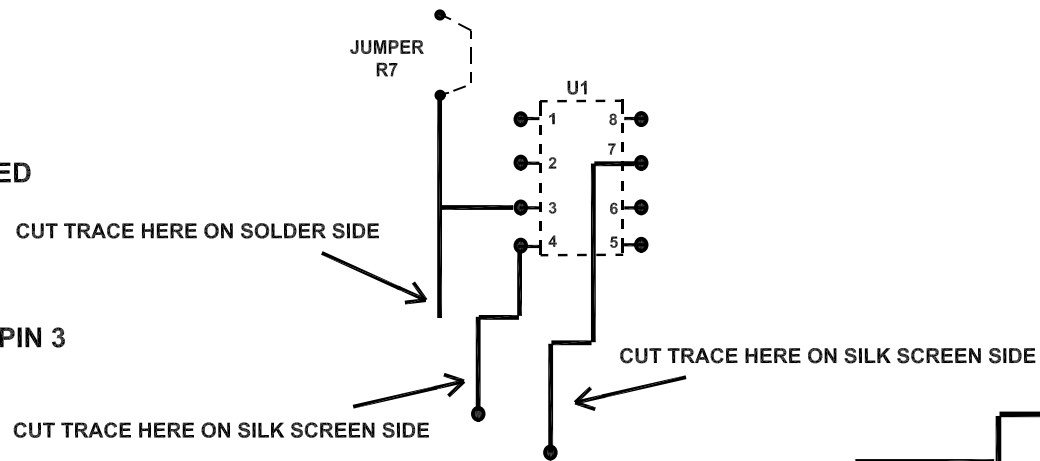
**RGD OPTION  
USE PID, FID, OR FPD  
SECTION OF AMP BOARD**

NOTE: MODEL 310 STUDENT TCD G.C.s AND MODEL 110 STANDALONE DETECTORS DO NOT HAVE AN A/D BOARD. THESE MODELS REQUIRE ZERO POTS AND ATTENUATORS TO ADJUST THE DETECTOR OUTPUTS TO THEIR DESIRED LEVEL. SEE THE "ZERO POTS AND ATTENUATORS" PAGE IN THIS SECTION.

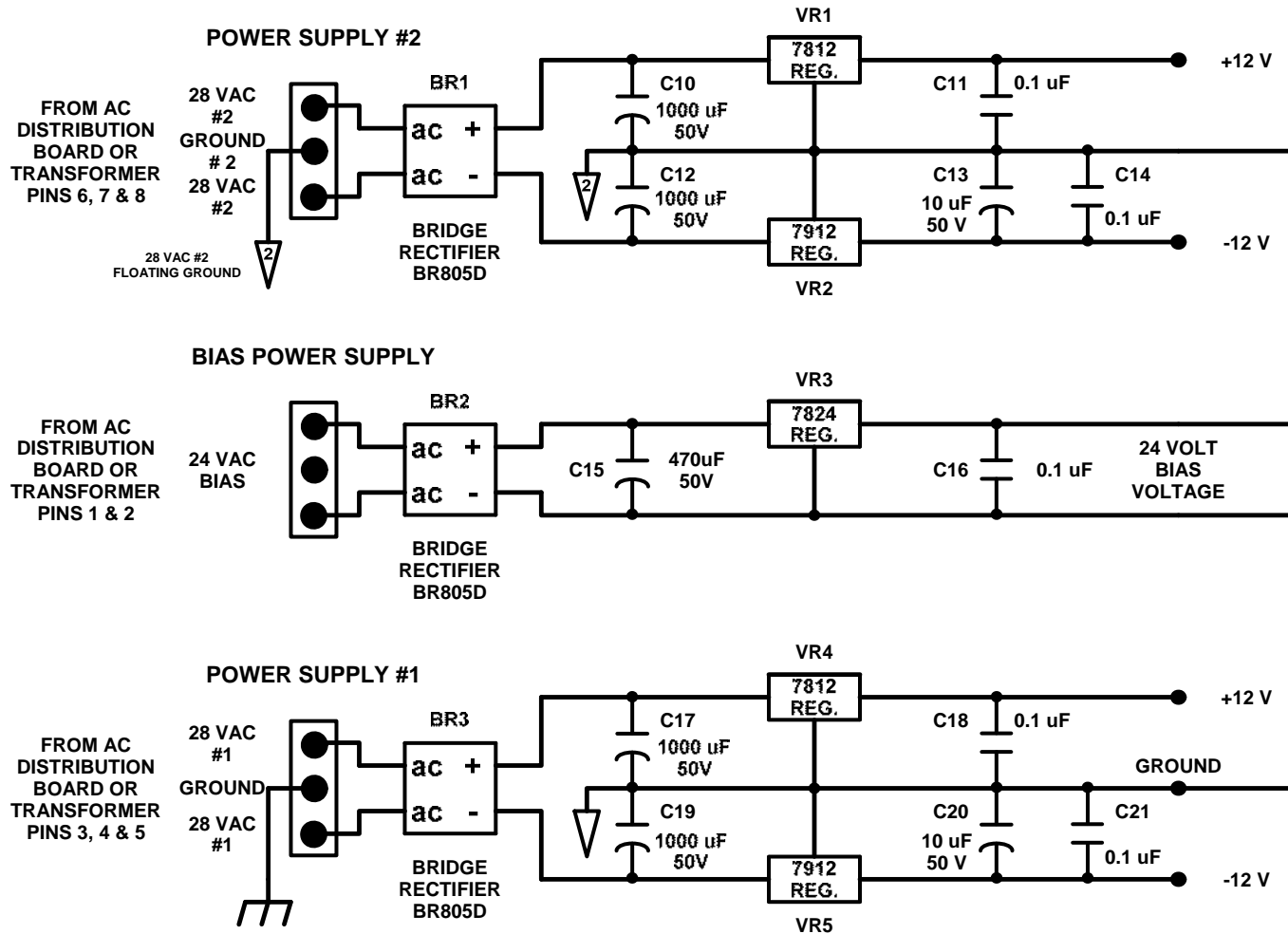


REMOVE THE 24V BIAS ON THE AMP BOARD BY CUTTING THREE TRACES TO THE SECTION TO BE USED  
 CUT THE TRACE TO U1 PIN 3  
 CUT THE TRACE TO U1 PIN 4  
 CUT THE TRACE TO U1 PIN 7

JUMP GND #1 TO TRACE GOING TO U1 PIN 3  
 JUMP -12VDC #1 TO U1 PIN 4  
 JUMP +12VDC #1 TO U1 PIN 7



### POWER SUPPLY SECTION OF AMP BOARD

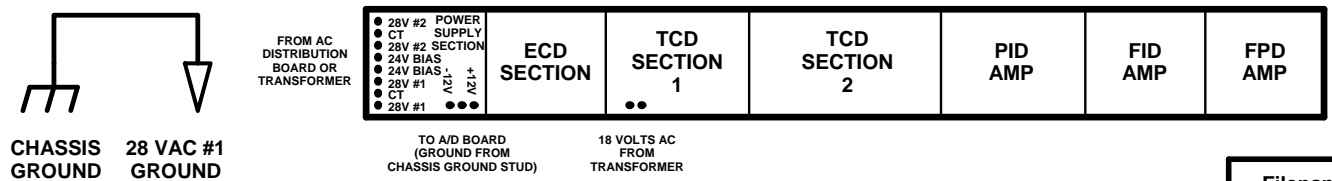


POWER SUPPLY #2 IS A +12 V AND -12 V SUPPLY BIASED 24 VOLTS ABOVE GROUND POTENTIAL BY VR3 OF THE BIAS POWER SUPPLY. THIS SUPPLY IS USED BY THE FID, PID, AND FPD DETECTOR AMPLIFIERS.

THE BIAS POWER SUPPLY MAINTAINS A 24 VOLT DC POTENTIAL BETWEEN GROUND #1 AND GROUND #2.

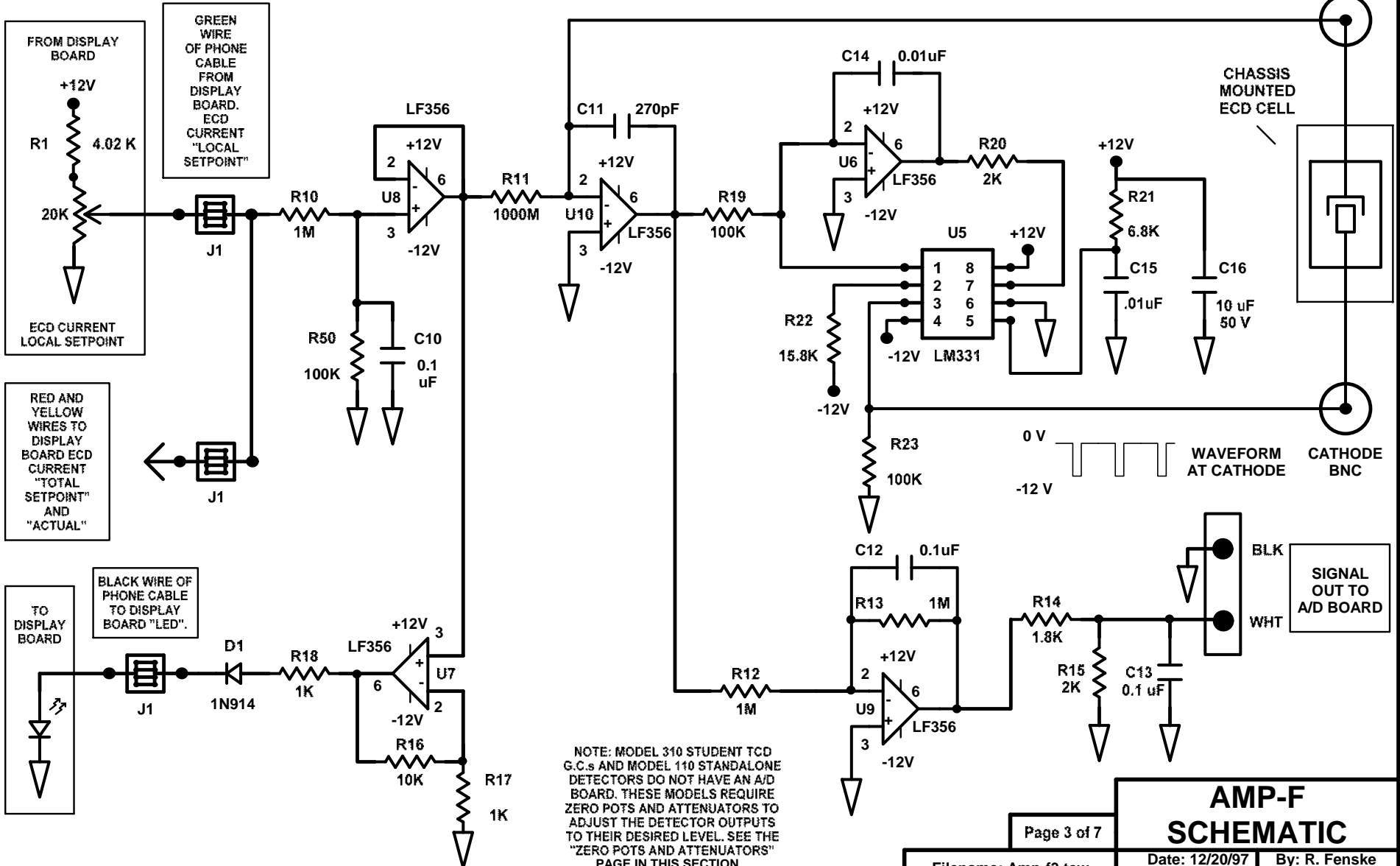
POWER SUPPLY #1 IS THE PRIMARY POWER SOURCE FOR ALL FUNCTIONS OF THE AMP BOARD AND ALSO PROVIDES +12 V AND -12 V TO THE A/D BOARD. ONLY THE TCD CIRCUIT REQUIRES AN ADDITIONAL AC VOLTAGE INPUT. SEE PAGE 2.

### AMPLIFIER BOARD LAYOUT





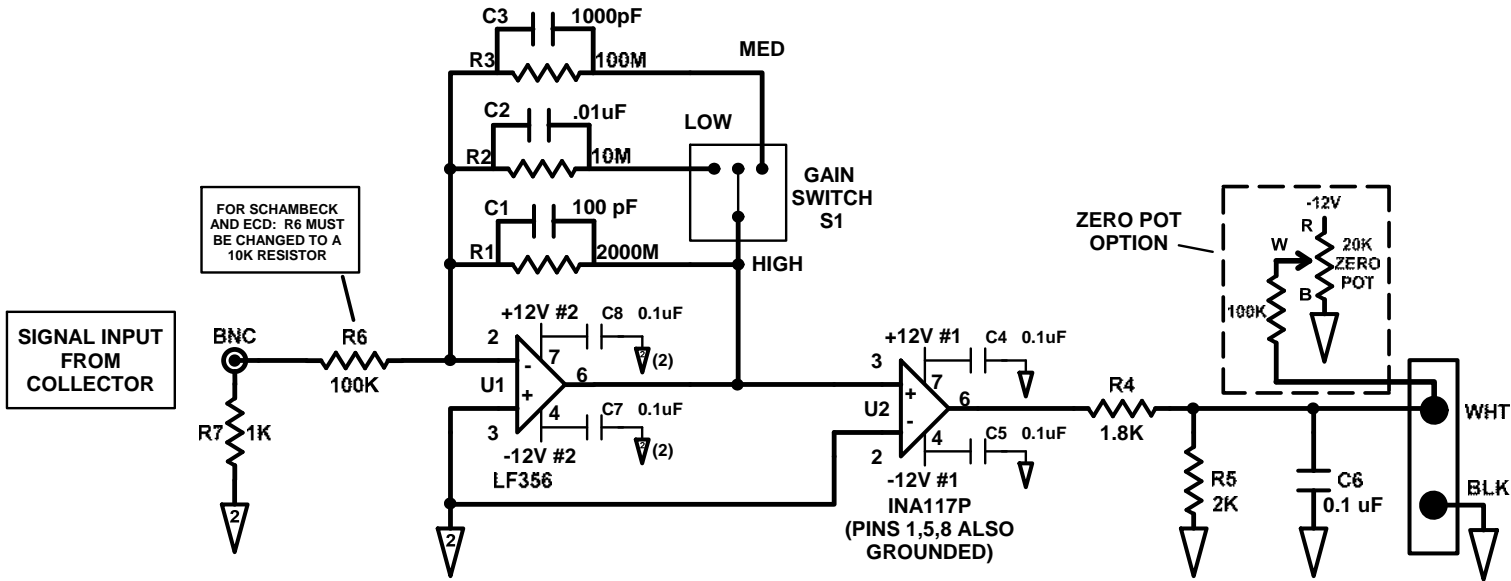
# ECD CURRENT SECTION OF AMP BOARD



NOTE: MODEL 310 STUDENT TCD G.C.s AND MODEL 110 STANDALONE DETECTORS DO NOT HAVE AN A/D BOARD. THESE MODELS REQUIRE ZERO POTS AND ATTENUATORS TO ADJUST THE DETECTOR OUTPUTS TO THEIR DESIRED LEVEL. SEE THE "ZERO POTS AND ATTENUATORS" PAGE IN THIS SECTION.

FID, NPD, HID, TID  
ELECTROMETER SECTION OF AMP BOARD

THIS CIRCUITRY AMPLIFIES THE SIGNAL  
FROM THE COLLECTOR PRIOR TO  
DIGITIZATION BY THE A/D BOARD.



FOR SCHAMBECK  
AND ECD: R6 MUST  
BE CHANGED TO A  
10K RESISTOR

SIGNAL INPUT  
FROM  
COLLECTOR

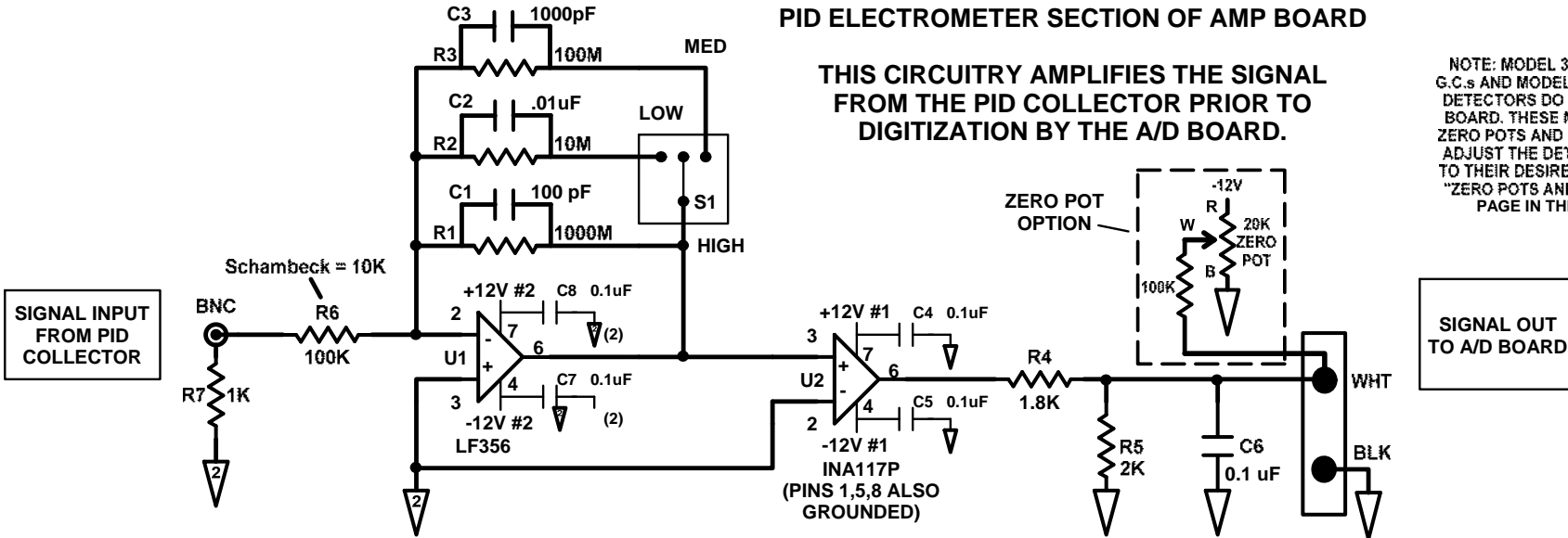
NOTE: MODEL 310 STUDENT TCD  
G.C.s AND MODEL 110 STANDALONE  
DETECTORS DO NOT HAVE AN A/D  
BOARD. THESE MODELS REQUIRE  
ZERO POTS AND ATTENUATORS TO  
ADJUST THE DETECTOR OUTPUTS  
TO THEIR DESIRED LEVEL. SEE THE  
"ZERO POTS AND ATTENUATORS"  
PAGE IN THIS SECTION.

SIGNAL OUT  
TO A/D BOARD

### PID ELECTROMETER SECTION OF AMP BOARD

THIS CIRCUITRY AMPLIFIES THE SIGNAL FROM THE PID COLLECTOR PRIOR TO DIGITIZATION BY THE A/D BOARD.

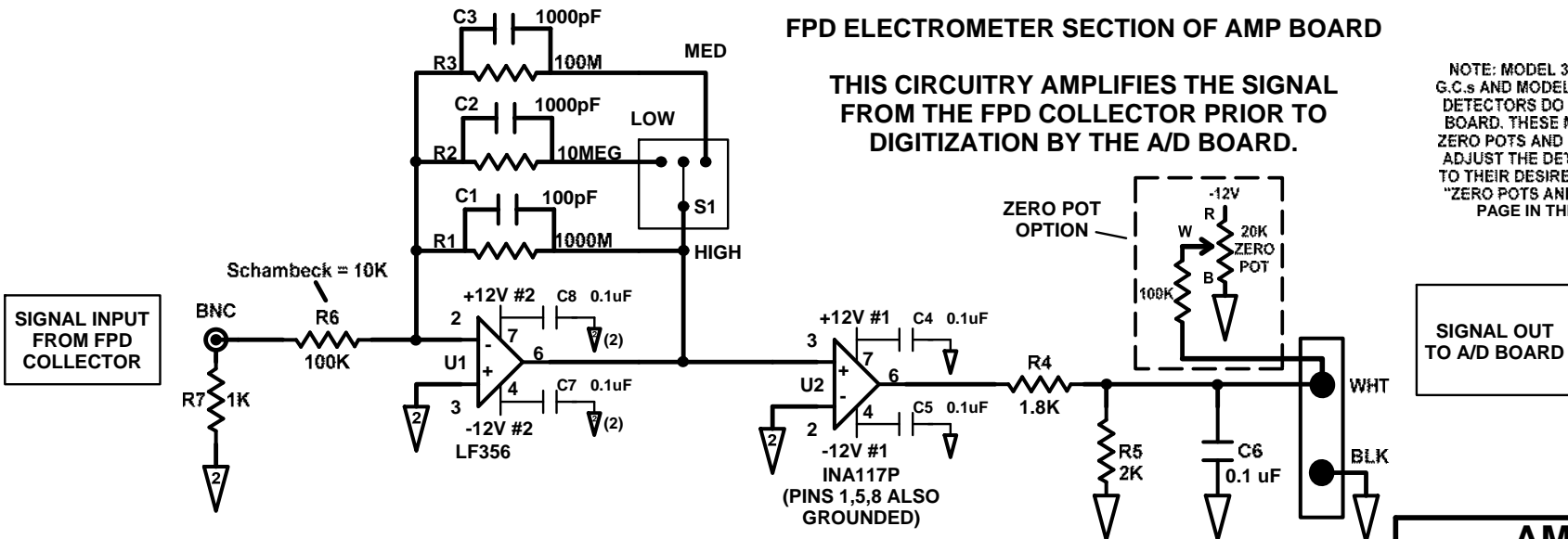
NOTE: MODEL 310 STUDENT TCD G.C.s AND MODEL 110 STANDALONE DETECTORS DO NOT HAVE AN A/D BOARD. THESE MODELS REQUIRE ZERO POTS AND ATTENUATORS TO ADJUST THE DETECTOR OUTPUTS TO THEIR DESIRED LEVEL. SEE THE "ZERO POTS AND ATTENUATORS" PAGE IN THIS SECTION.

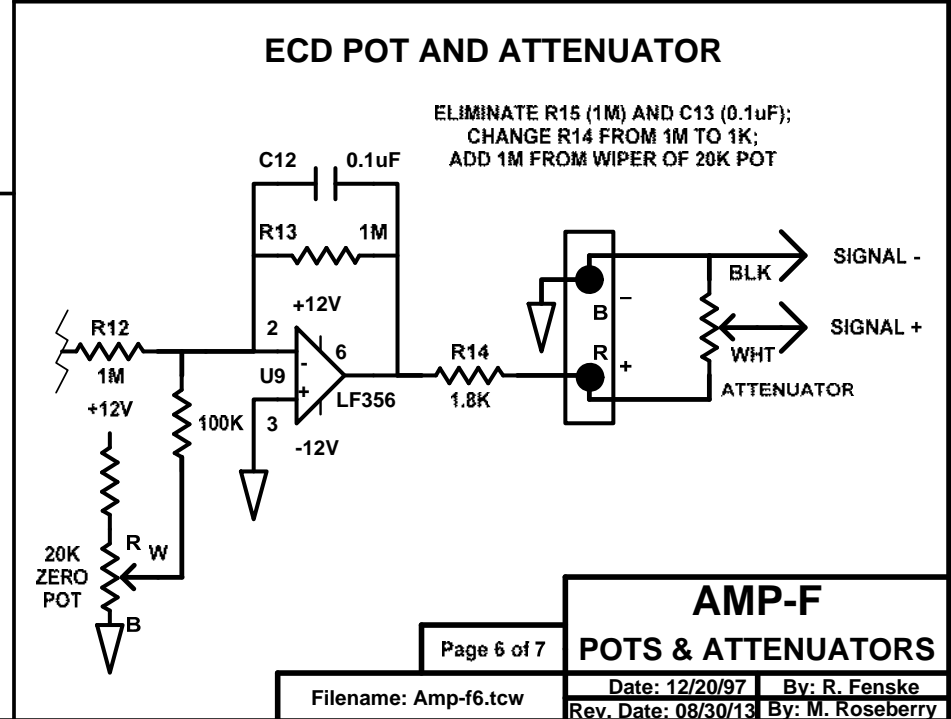
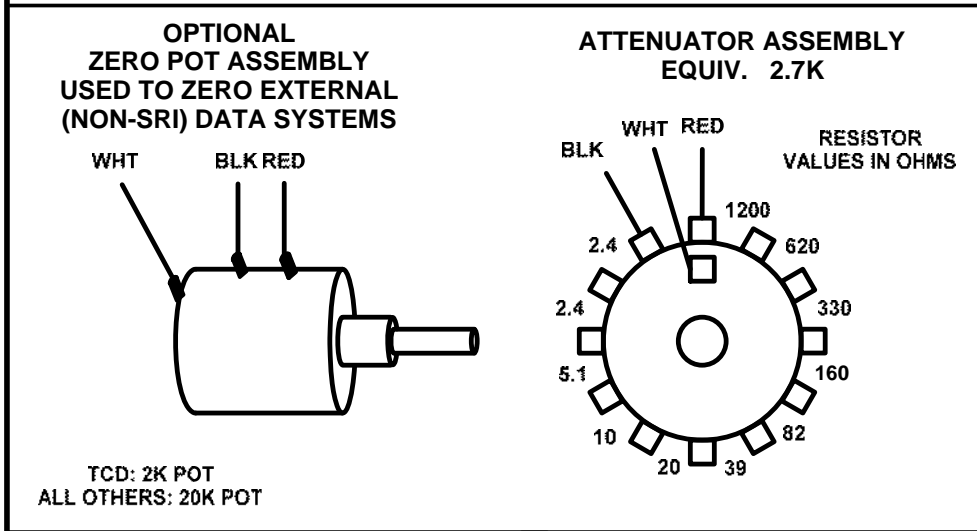
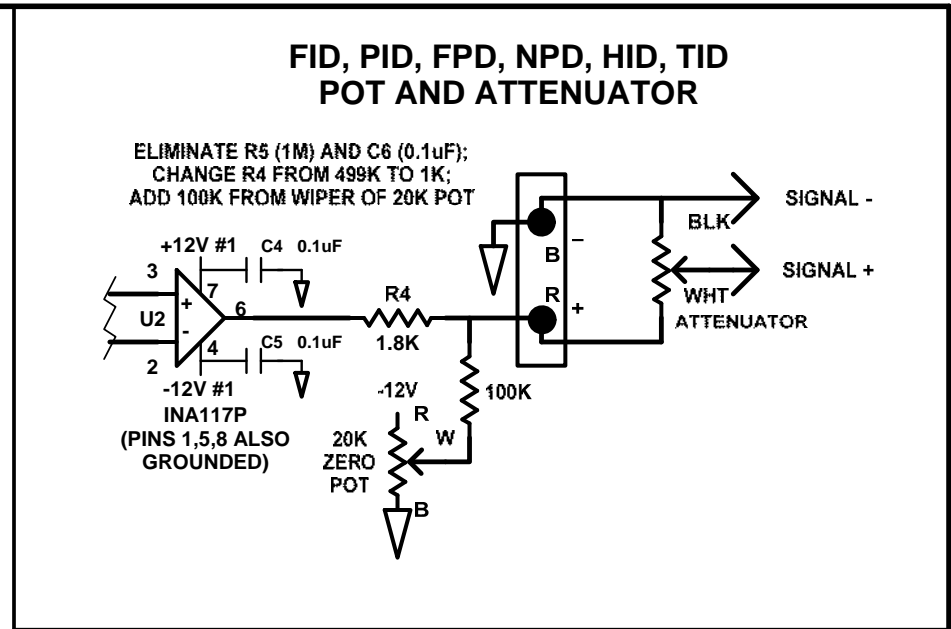
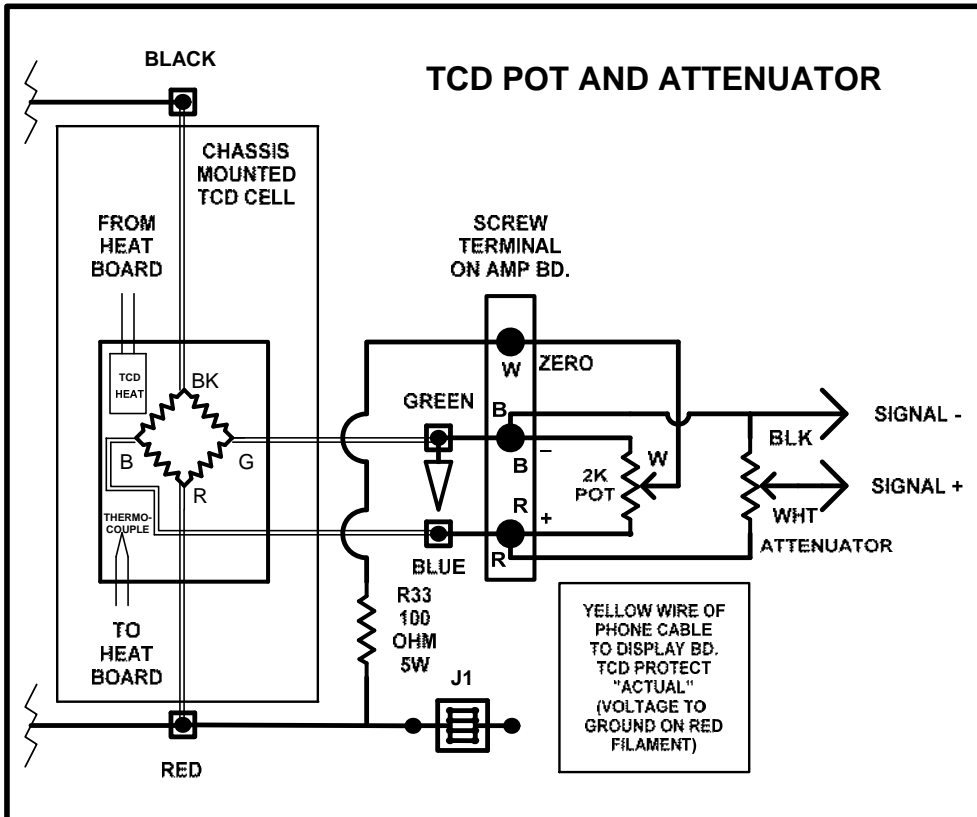


### FPD ELECTROMETER SECTION OF AMP BOARD

THIS CIRCUITRY AMPLIFIES THE SIGNAL FROM THE FPD COLLECTOR PRIOR TO DIGITIZATION BY THE A/D BOARD.

NOTE: MODEL 310 STUDENT TCD G.C.s AND MODEL 110 STANDALONE DETECTORS DO NOT HAVE AN A/D BOARD. THESE MODELS REQUIRE ZERO POTS AND ATTENUATORS TO ADJUST THE DETECTOR OUTPUTS TO THEIR DESIRED LEVEL. SEE THE "ZERO POTS AND ATTENUATORS" PAGE IN THIS SECTION.

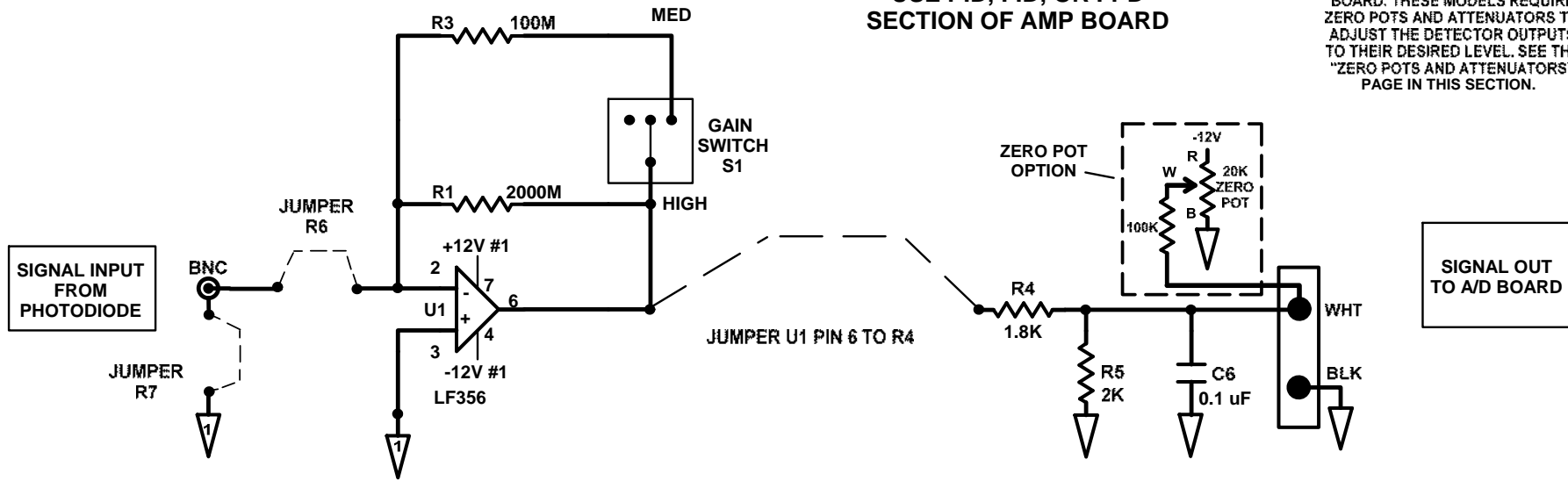






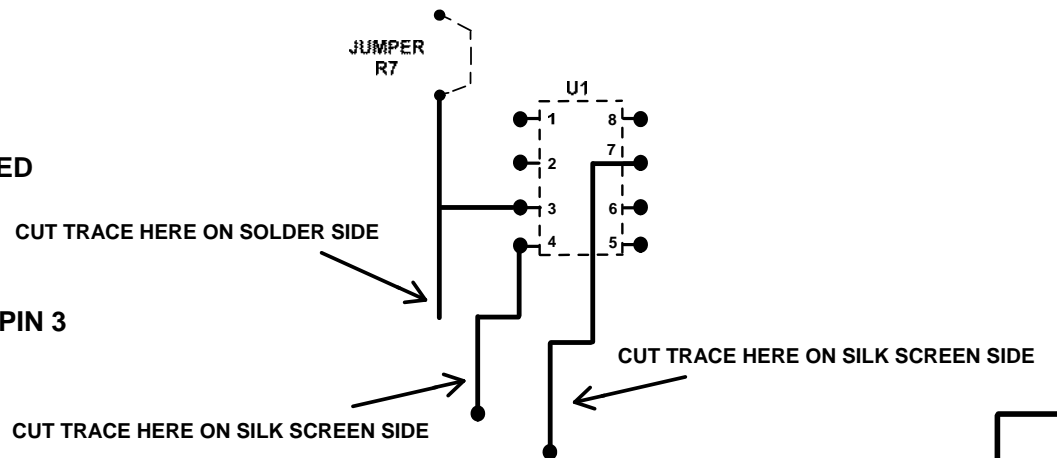
**RGD OPTION  
USE PID, FID, OR FPD  
SECTION OF AMP BOARD**

NOTE: MODEL 310 STUDENT TCD G.C.s AND MODEL 110 STANDALONE DETECTORS DO NOT HAVE AN A/D BOARD. THESE MODELS REQUIRE ZERO POTS AND ATTENUATORS TO ADJUST THE DETECTOR OUTPUTS TO THEIR DESIRED LEVEL. SEE THE "ZERO POTS AND ATTENUATORS" PAGE IN THIS SECTION.



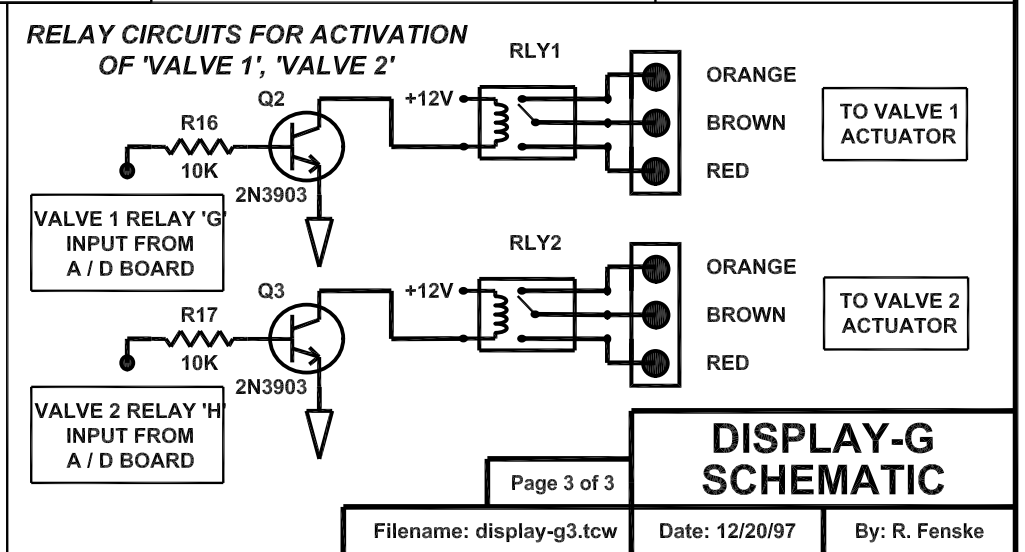
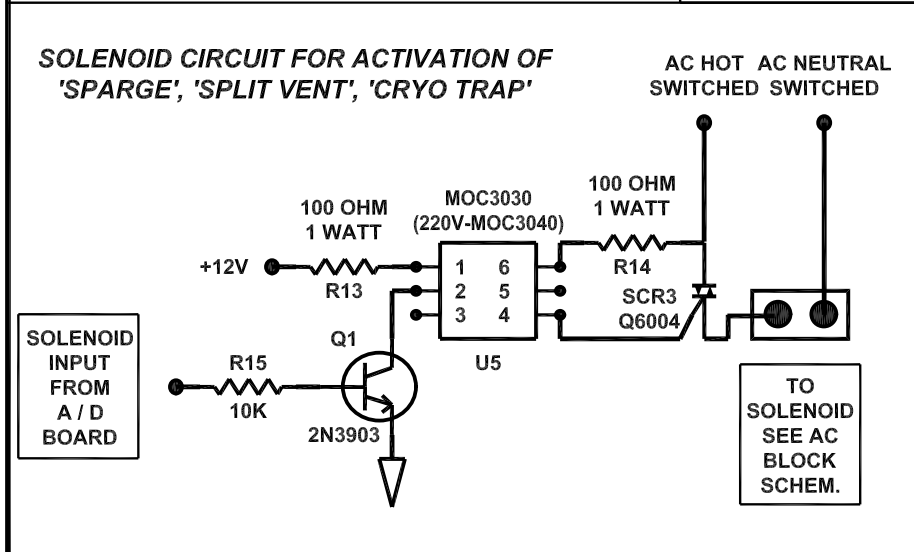
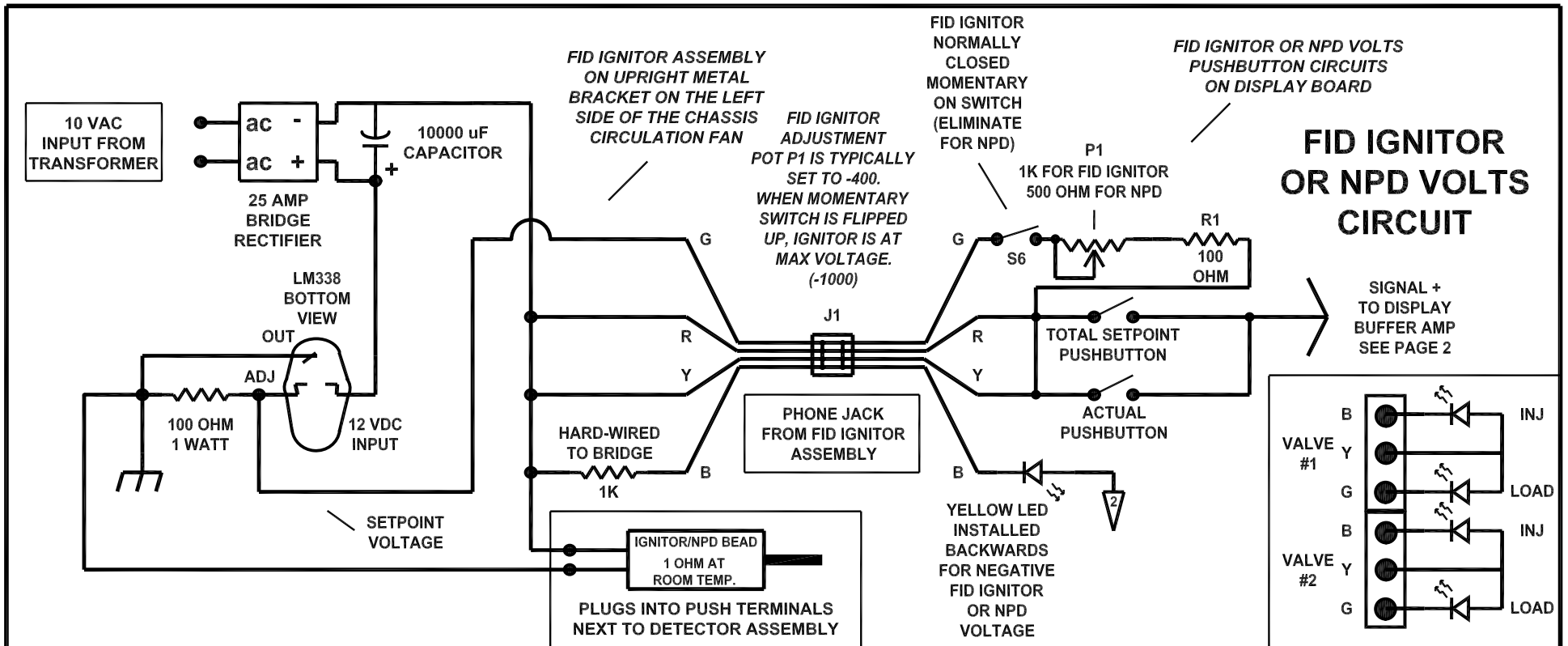
REMOVE THE 24V BIAS ON THE AMP BOARD BY CUTTING THREE TRACES TO THE SECTION TO BE USED  
 CUT THE TRACE TO U1 PIN 3  
 CUT THE TRACE TO U1 PIN 4  
 CUT THE TRACE TO U1 PIN 7

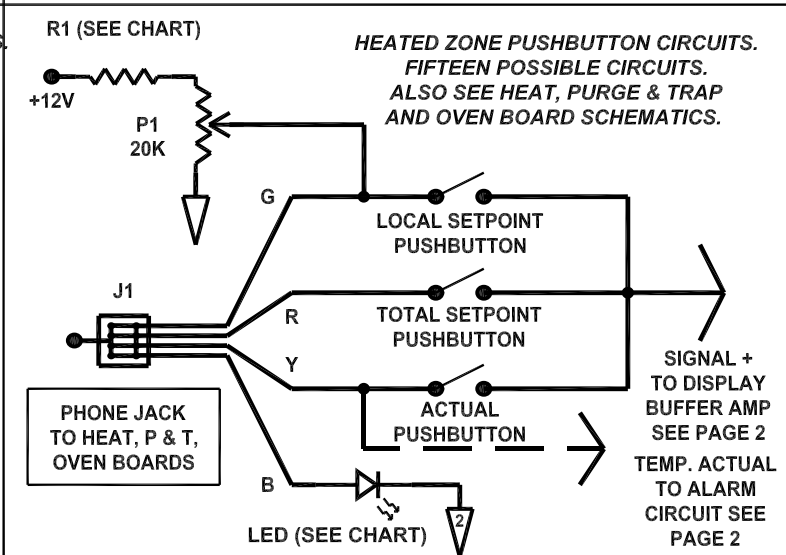
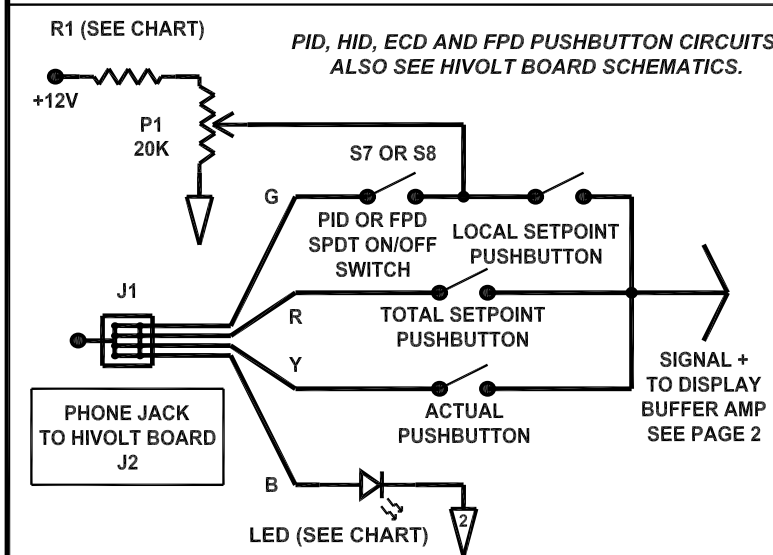
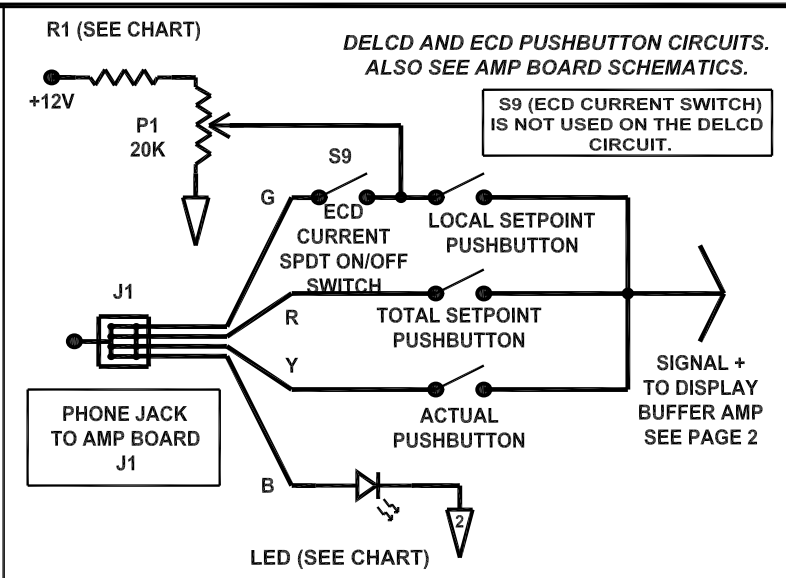
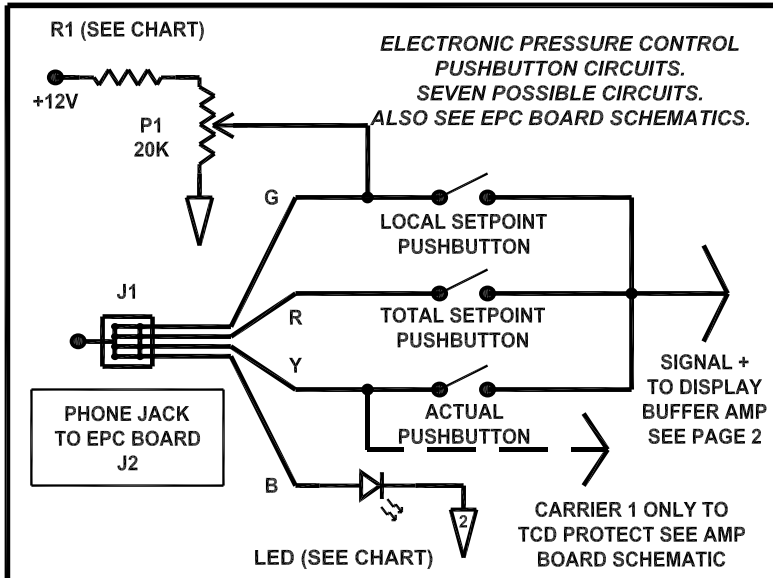
JUMP GND #1 TO TRACE GOING TO U1 PIN 3  
 JUMP -12VDC #1 TO U1 PIN 4  
 JUMP +12VDC #1 TO U1 PIN 7



**AMP-F  
SCHEMATIC**



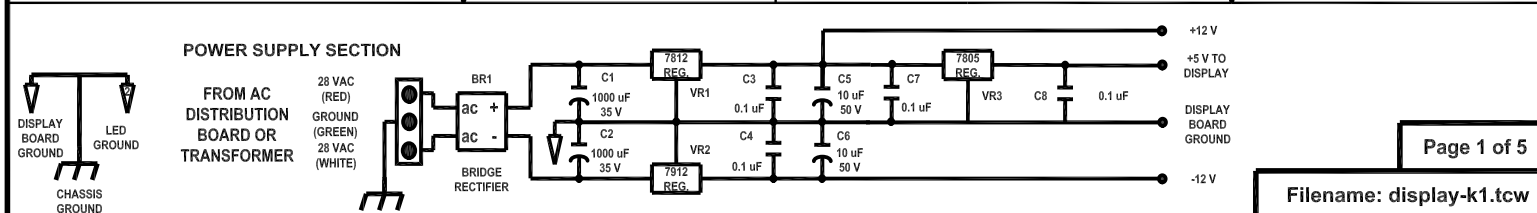




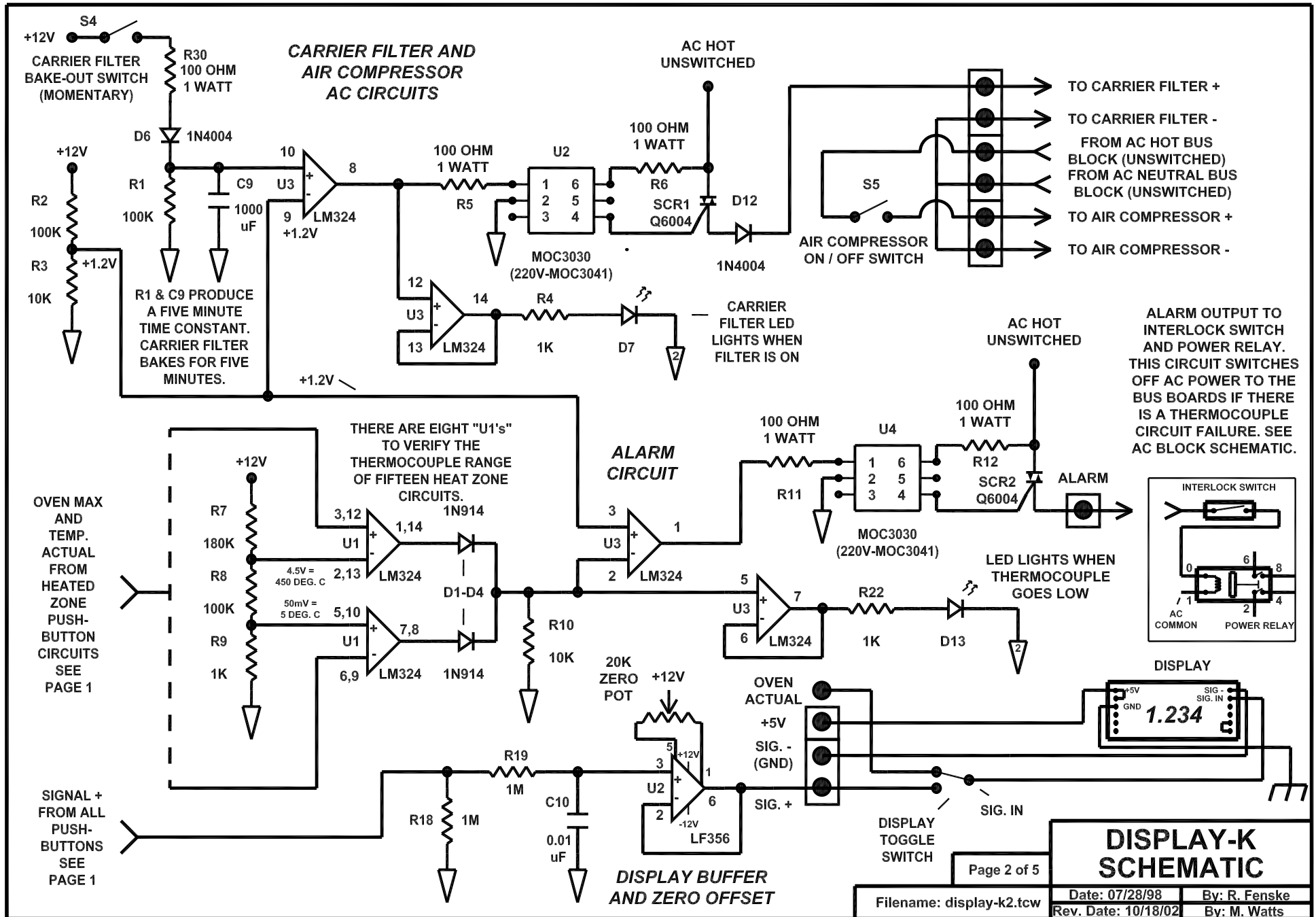
**CHART**

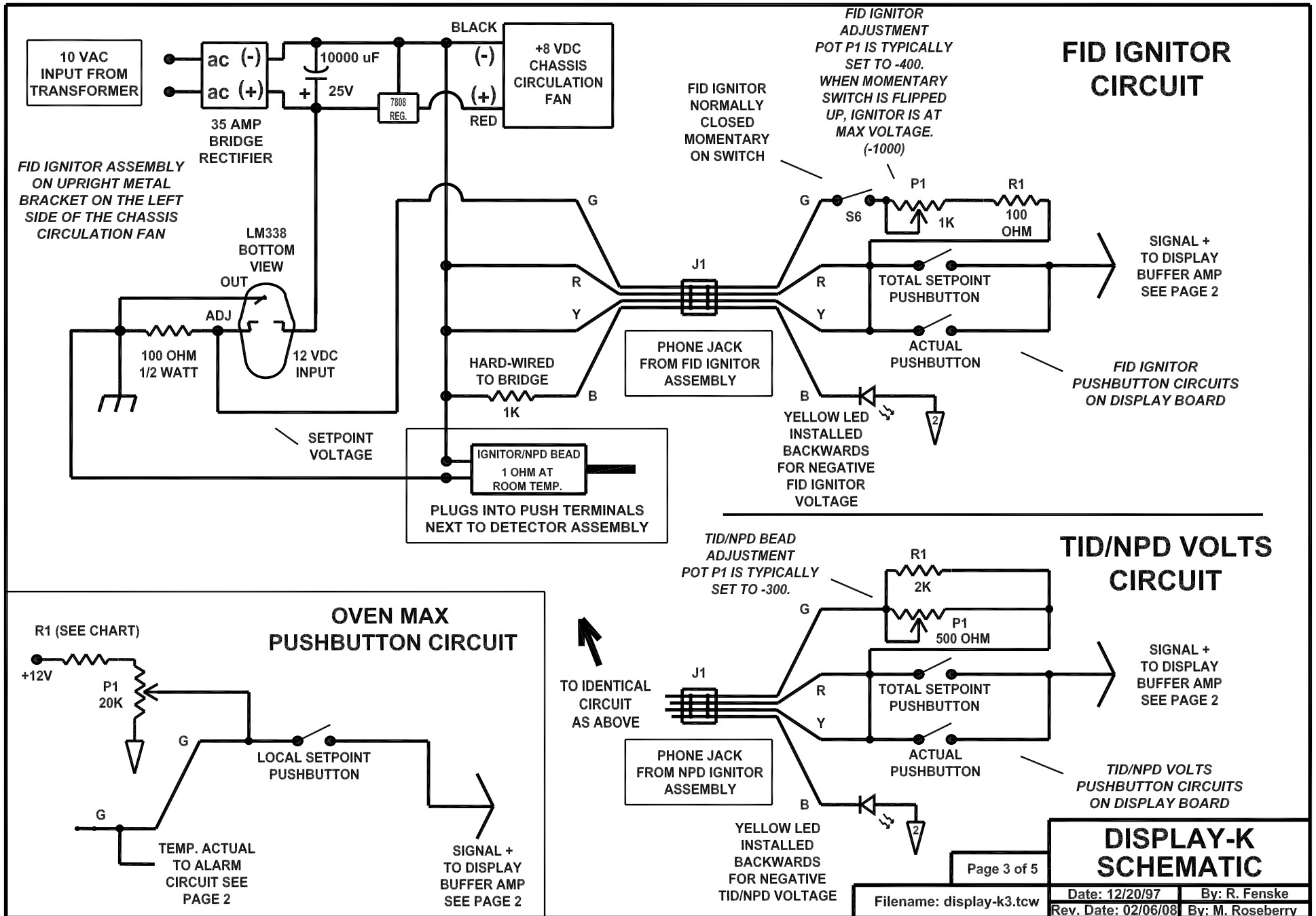
| CIRCUIT          | R1 VALUE | LED    |
|------------------|----------|--------|
| CARRIER 1        | 220K     | GREEN  |
| CARRIER 2        | 220K     | GREEN  |
| PURGE            | 2.2M     | GREEN  |
| VIAL PRESSURE    | 220K     | GREEN  |
| HYDROGEN 1       | 220K     | GREEN  |
| HYDROGEN 2       | 220K     | GREEN  |
| AIR 1            | 1M       | GREEN  |
| AIR 2            | 1M       | GREEN  |
| BEAD VOLTS       | 620      | YELLOW |
| REACTOR TEMP     | 48.7K    | YELLOW |
| TCD PROTECT      | 453K     | RED    |
| VIRT. OVEN PROT. | 390K     | RED    |
| FLAME IGNITE     | 100 ohm  | YELLOW |
| PID CURRENT      | 40.2K    | YELLOW |
| HID CURRENT      | 40.2K    | YELLOW |
| PMT VOLTS        | 20K      | YELLOW |
| ECD CURRENT      | 4.02K    | YELLOW |
| TRAP 1           | 48.7K    | ORANGE |
| TRAP 2           | 48.7K    | ORANGE |
| VALVE 1          | 100K     | ORANGE |
| VALVE 2          | 100K     | ORANGE |
| VIAL             | 453K     | ORANGE |
| HEADSPACE        | 220K     | ORANGE |
| FID w/ METH.     | 38.3K    | ORANGE |
| DESORBER         | 48.7K    | ORANGE |
| INJECTOR 1       | 48.7K    | ORANGE |
| INJECTOR 2       | 48.7K    | ORANGE |
| FID BLOCK        | 38.3K    | ORANGE |
| NPD BLOCK        | 40.2K    | ORANGE |
| HID BLOCK        | 40.2K    | ORANGE |
| FPD BLOCK        | 40.2K    | ORANGE |
| TID BLOCK        | 40.2K    | ORANGE |
| DELCD BLOCK      | 40.2K    | ORANGE |
| PID BLOCK        | 75K      | ORANGE |
| TCD CELL         | 48.7K    | ORANGE |
| ECD BLOCK        | 44.2K    | ORANGE |
| X-FER LINE       | 82K      | ORANGE |
| COLUMN OVEN 1    | 40.2K    | ORANGE |
| COLUMN OVEN 2    | 40.2K    | ORANGE |
| OVEN MAX         | 38.3K    | ORANGE |

**DISPLAY BOARD PUSHBUTTON CIRCUITS**



**8610 DISPLAY-K SCHEMATIC**



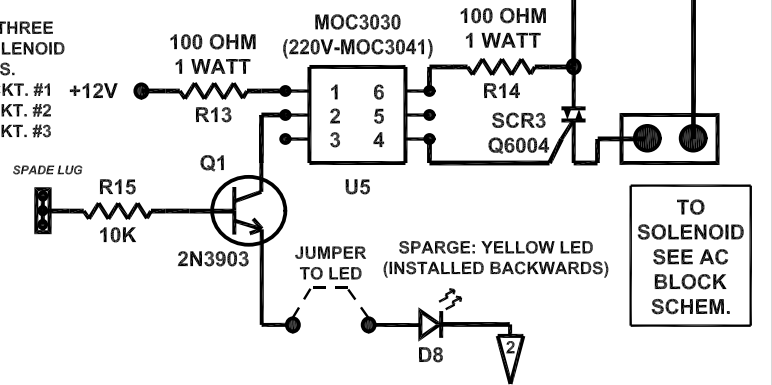


**SOLENOID CIRCUIT FOR ACTIVATION OF 'SPARGE', 'SPLIT VENT', 'CRYO TRAP'**

SOLENOID CKT. #1

THERE ARE THREE IDENTICAL SOLENOID CIRCUITS.  
SOLENOID CKT. #1  
SOLENOID CKT. #2  
SOLENOID CKT. #3

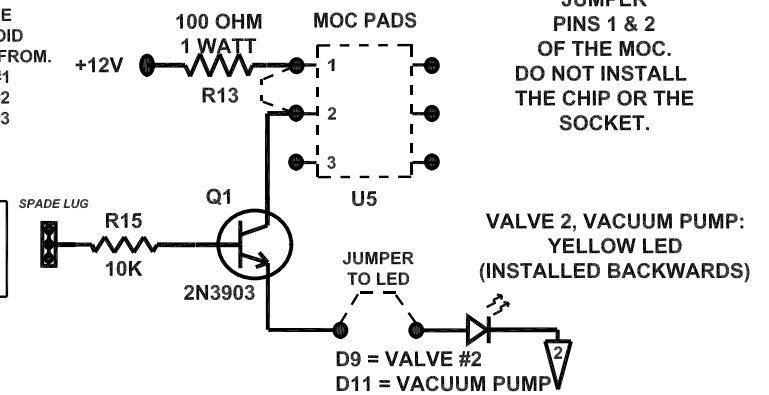
SOLENOID INPUT FROM A/D BOARD



**TO LIGHT THE VALVE OR VACUUM PUMP LED(S) ONLY, THIS SECTION OF ANY OF THE THREE SOLENOID CIRCUITS IS USED.**

THERE ARE THREE IDENTICAL SOLENOID CIRCUITS TO SELECT FROM.  
SOLENOID CKT. #1  
SOLENOID CKT. #2  
SOLENOID CKT. #3

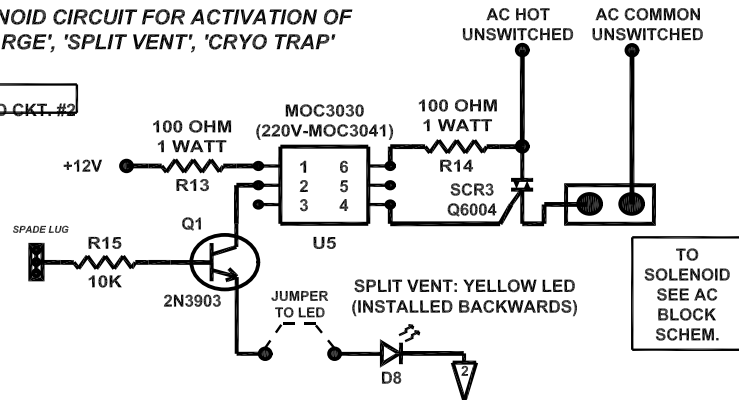
VIOLET OR GRAY FROM A/D BOARD



**SOLENOID CIRCUIT FOR ACTIVATION OF 'SPARGE', 'SPLIT VENT', 'CRYO TRAP'**

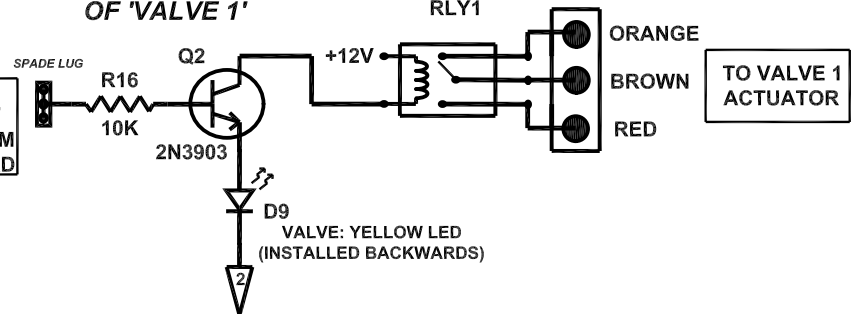
SOLENOID CKT. #2

SOLENOID INPUT FROM A/D BOARD



**RELAY CIRCUIT FOR ACTIVATION OF 'VALVE 1'**

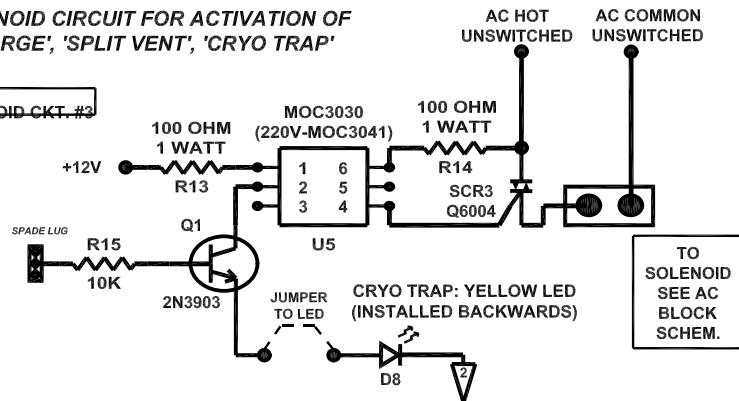
VALVE 1 RELAY 'G' INPUT FROM A/D BOARD

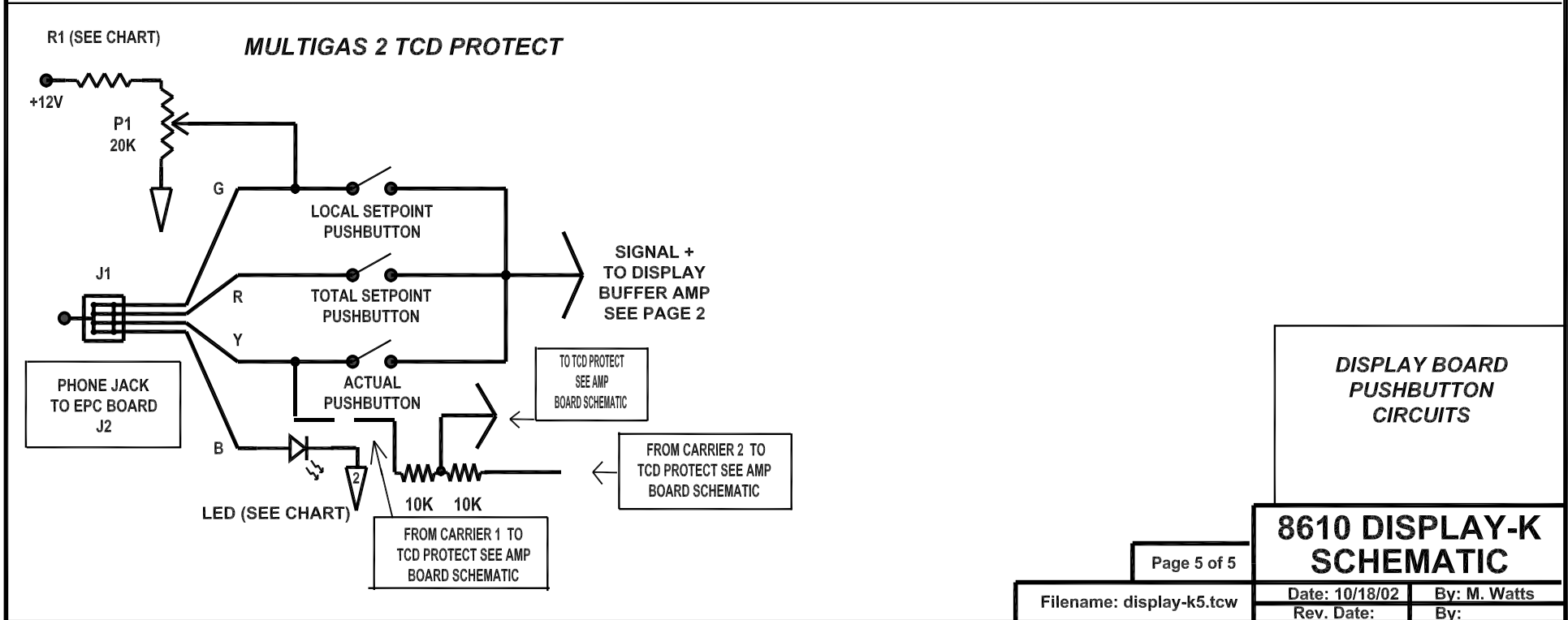
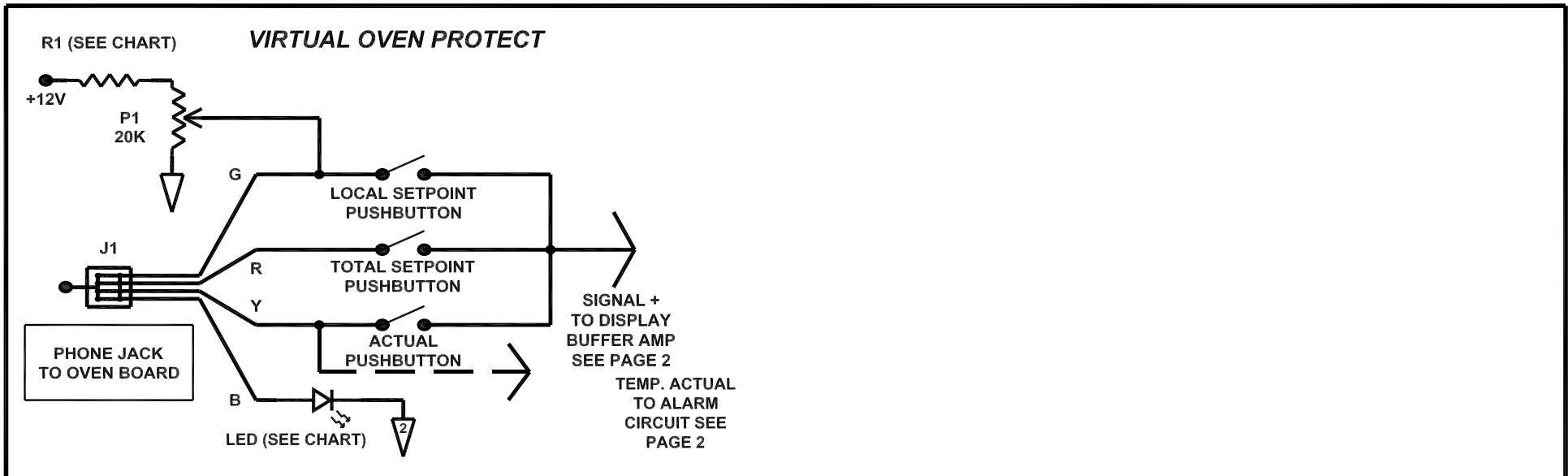


**SOLENOID CIRCUIT FOR ACTIVATION OF 'SPARGE', 'SPLIT VENT', 'CRYO TRAP'**

SOLENOID CKT. #3

SOLENOID INPUT FROM A/D BOARD



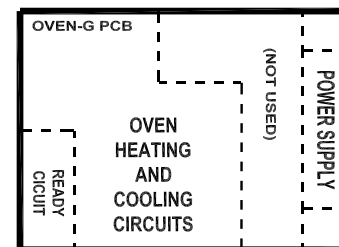




THE DUAL OVEN BOARD #2 PROVIDES CONTROL OF OVEN HEATING AND COOLING. THIS PAGE DEPICTS THE POWER SUPPLY CIRCUIT AND JITTER CIRCUIT.  
SEE PAGE TWO FOR OVEN HEATING AND COOLING CIRCUITS.

**CHASSIS COOLING FAN CIRCUIT (NOT USED)**

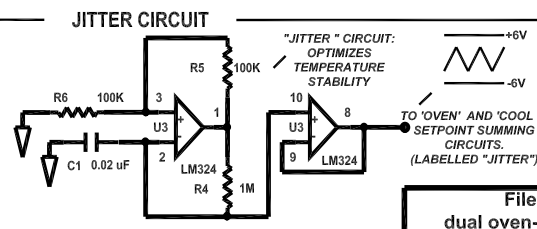
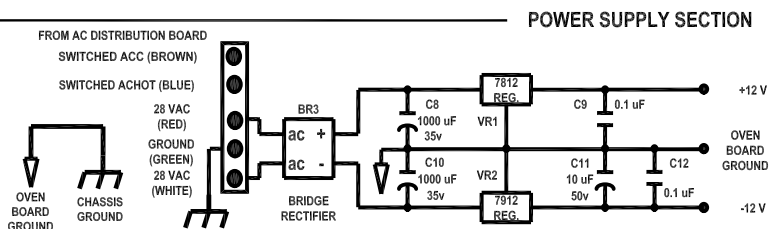
**OVEN-G CIRCUIT BOARD LAYOUT**



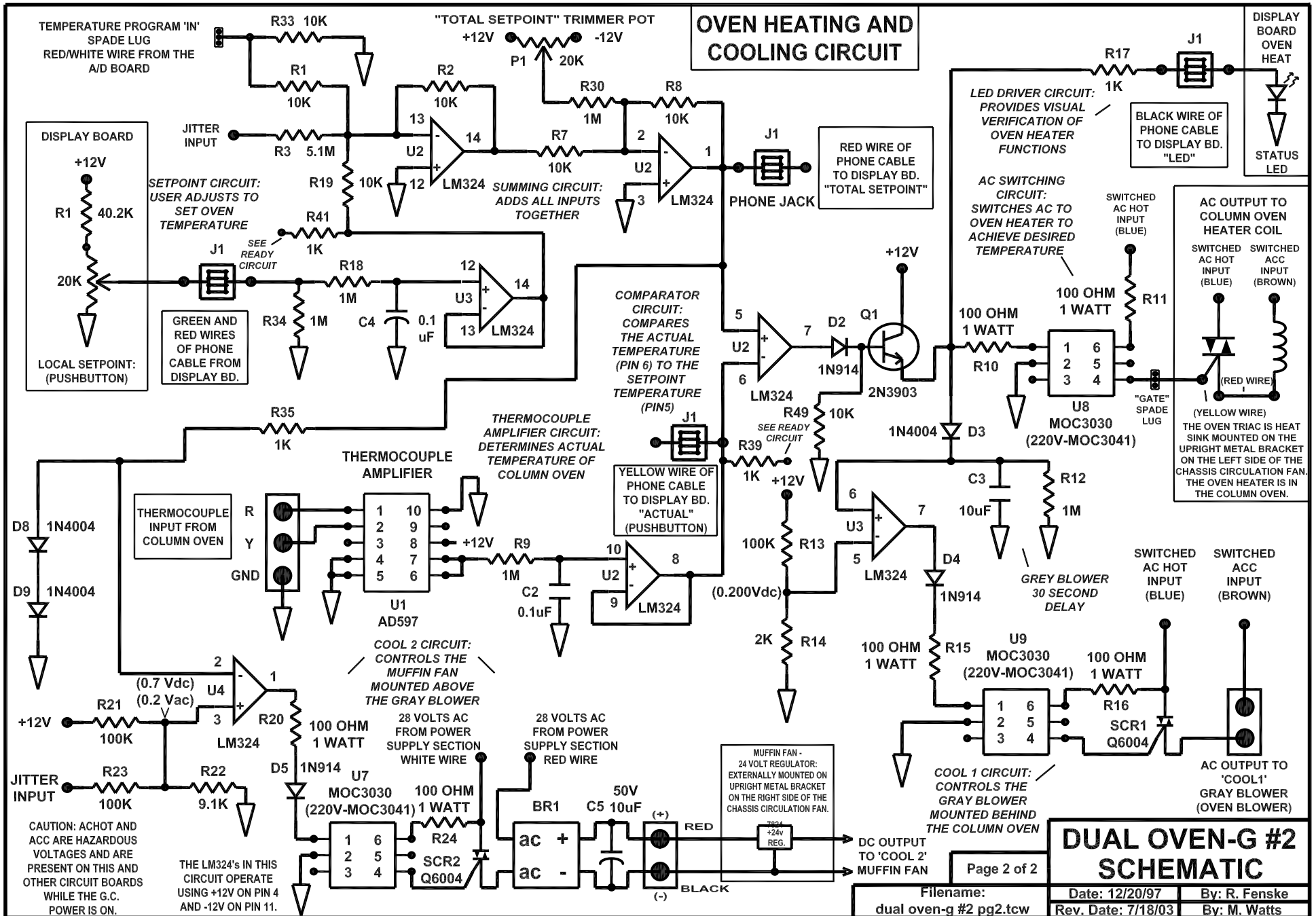
DUAL OVEN CONFIGURATION REQUIRES THE USE OF A STANDARD OVEN PCB FOR OVEN #1 AND A SECOND OVEN PCB WITHOUT THE CHASSIS COOLING FAN CIRCUIT FOR OVEN #2. IF NECESSARY, A STANDARD OVEN BOARD MAYBE USED FOR OVEN #2, PROVIDED THAT THE CHASSIS COOLING CIRCUIT IS LEFT UN-USED. OVEN-F #2 IS THE SCHEMATIC DIAGRAM FOR THE OVEN BOARD WITHOUT THE CHASSIS COOLING CIRCUIT; AS USED FOR THE SECOND OVEN IN A DUAL OVEN CONFIGURATION.

THE LM324's IN THIS CIRCUIT OPERATE USING +12V ON PIN 4 AND -12V ON PIN 11.

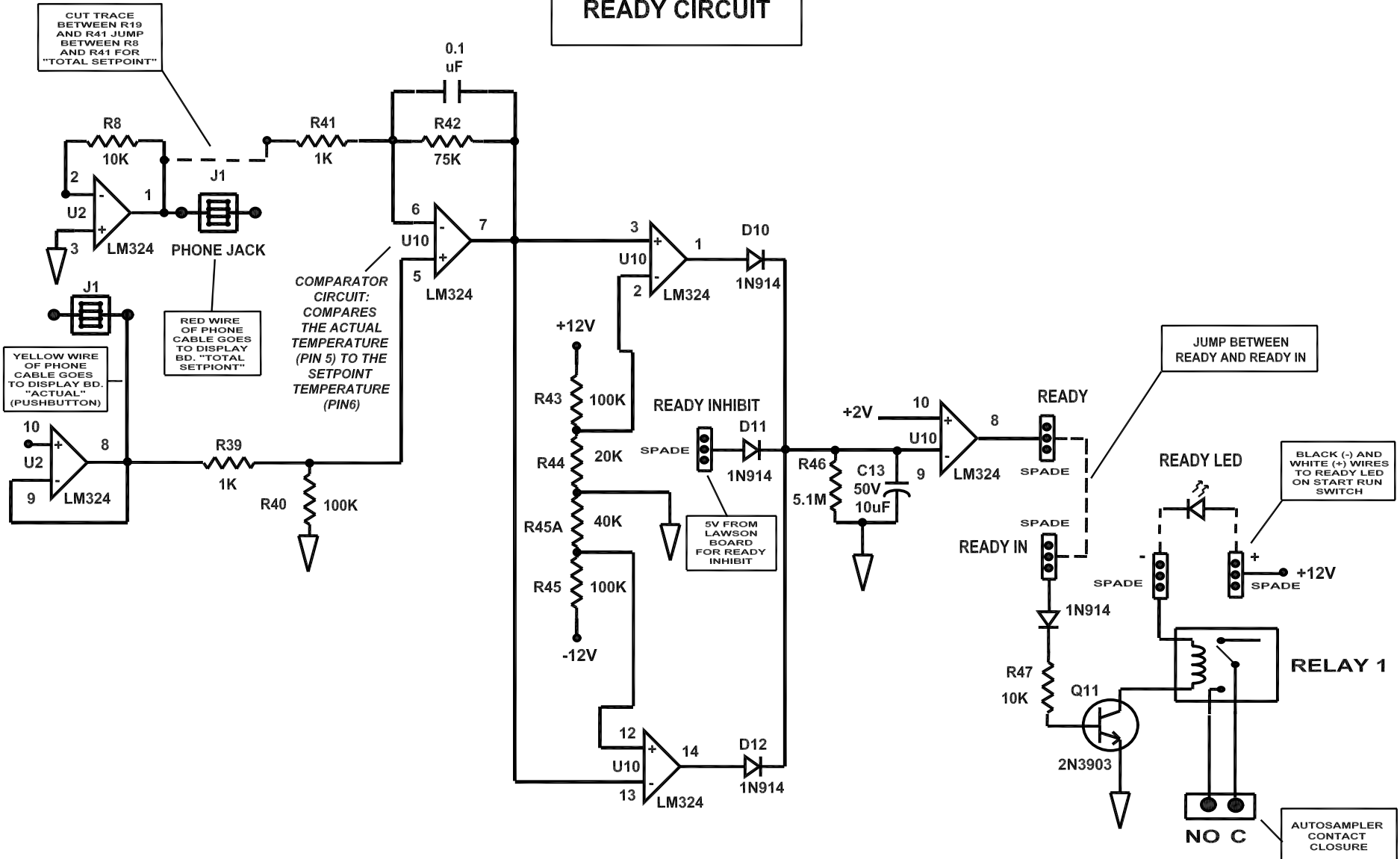
CAUTION: ACHOT AND ACC ARE HAZARDOUS VOLTAGES AND ARE PRESENT ON THIS AND OTHER CIRCUIT BOARDS WHILE THE G.C. POWER IS ON.



**DUAL OVEN-G #2 SCHEMATIC**



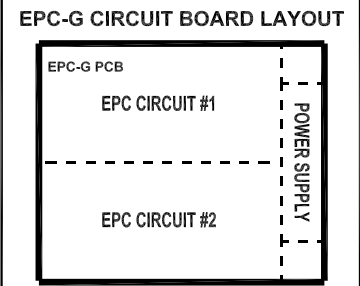
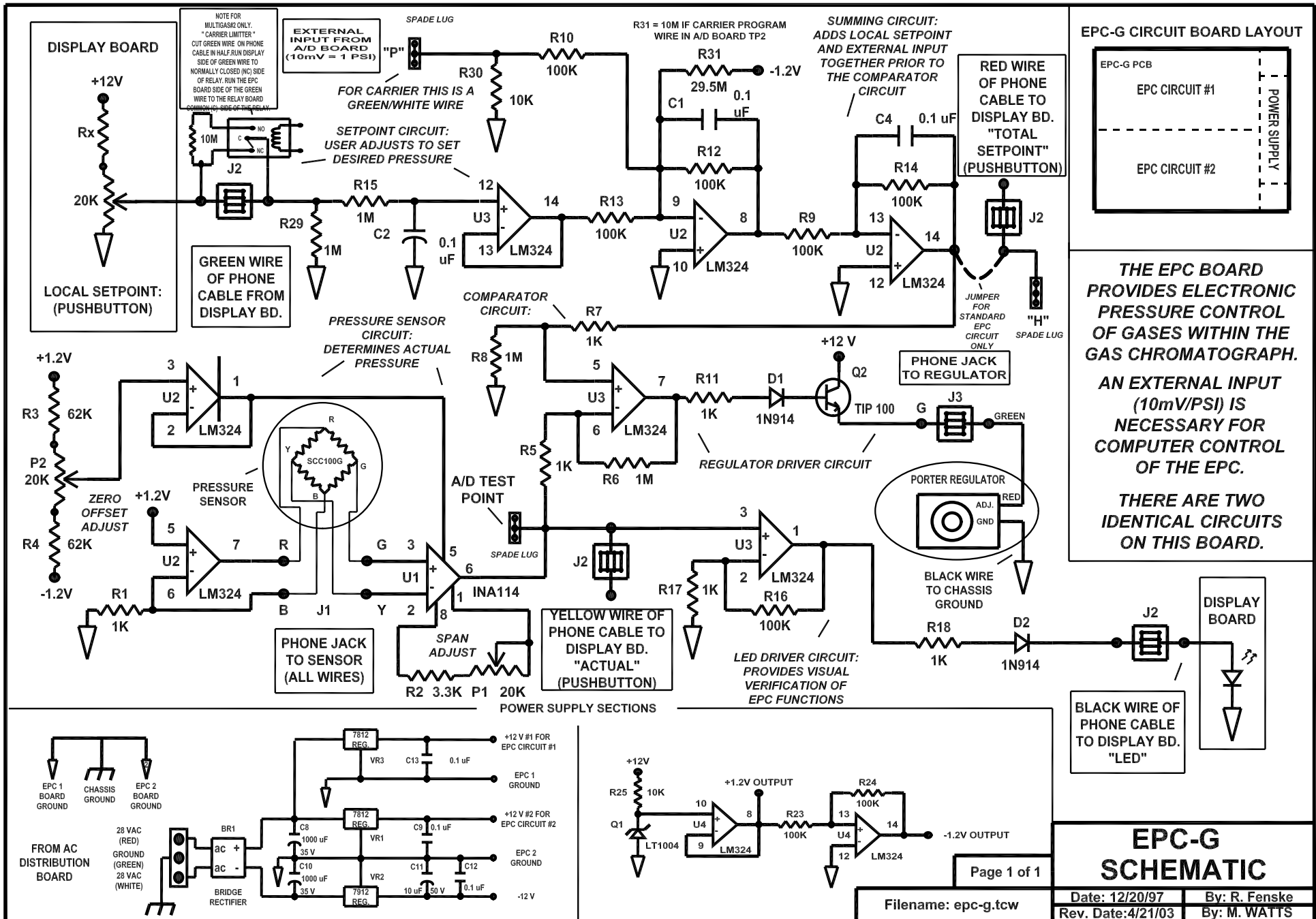
# READY CIRCUIT



## DUAL OVEN-G #2 SCHEMATIC

THE LM324's IN THIS CIRCUIT OPERATE USING +12V ON PIN 4 AND -12V ON PIN 11.

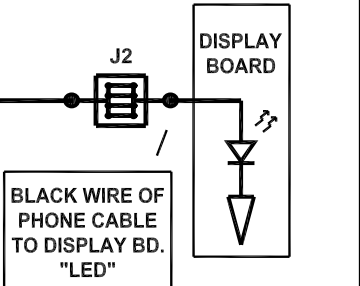
|                                     |                     |             |
|-------------------------------------|---------------------|-------------|
| Filename:<br>dual oven-g #2 pg3.tcw | Date: 7/16/03       | By: M.Watts |
|                                     | Rev. Date: 12/16/03 | By: M.Watts |

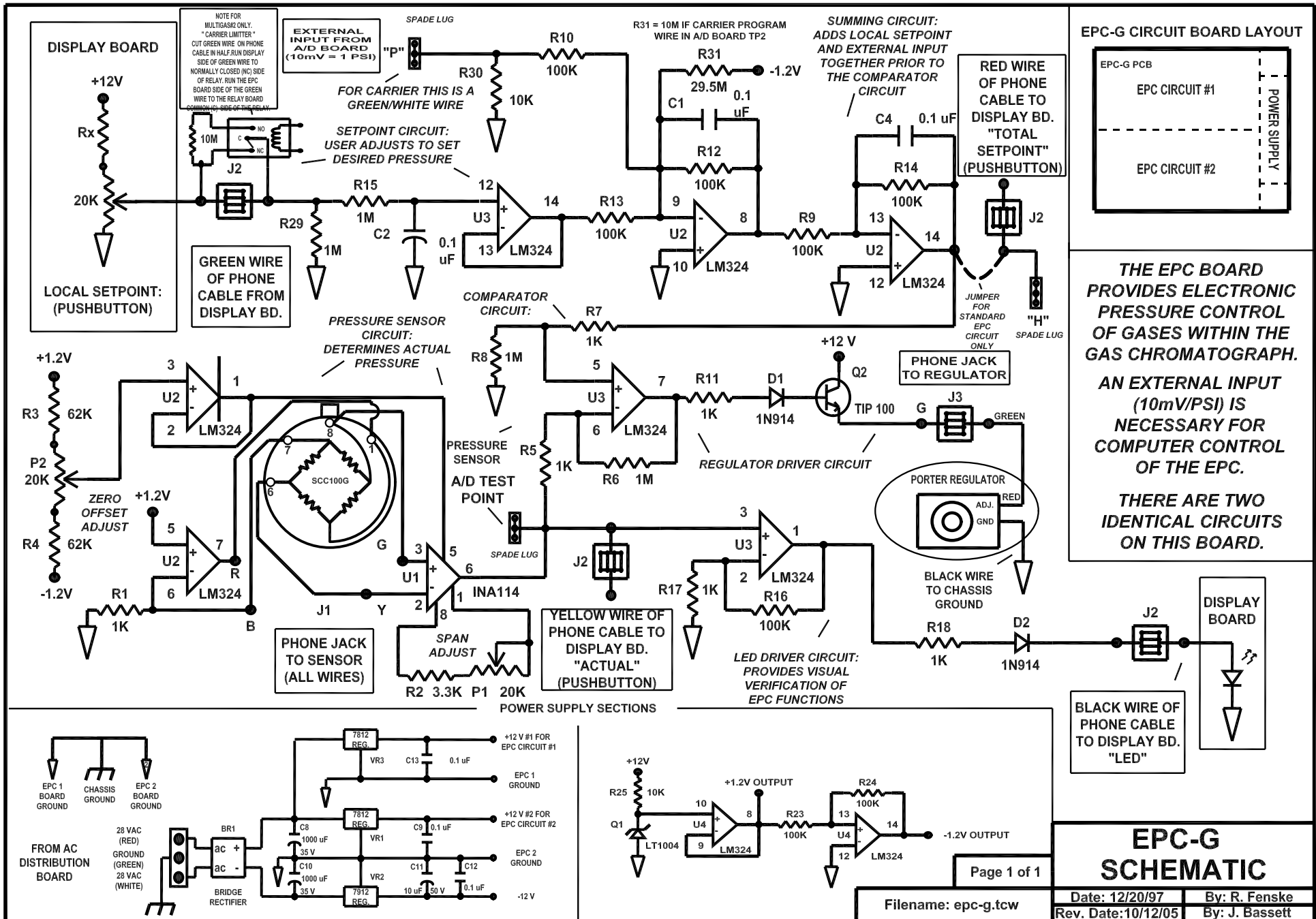


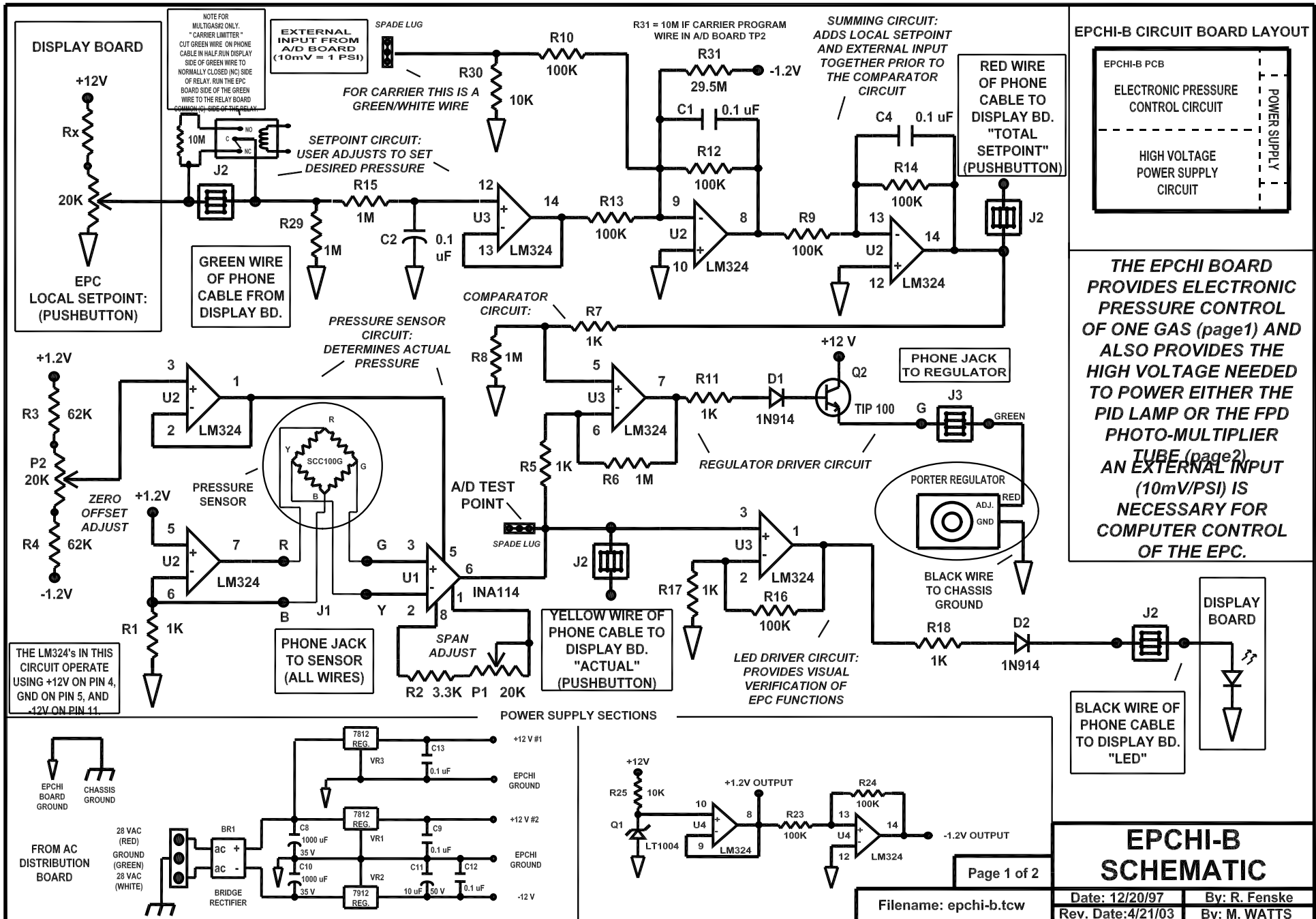
**THE EPC BOARD PROVIDES ELECTRONIC PRESSURE CONTROL OF GASES WITHIN THE GAS CHROMATOGRAPH.**

**AN EXTERNAL INPUT (10mV/PSI) IS NECESSARY FOR COMPUTER CONTROL OF THE EPC.**

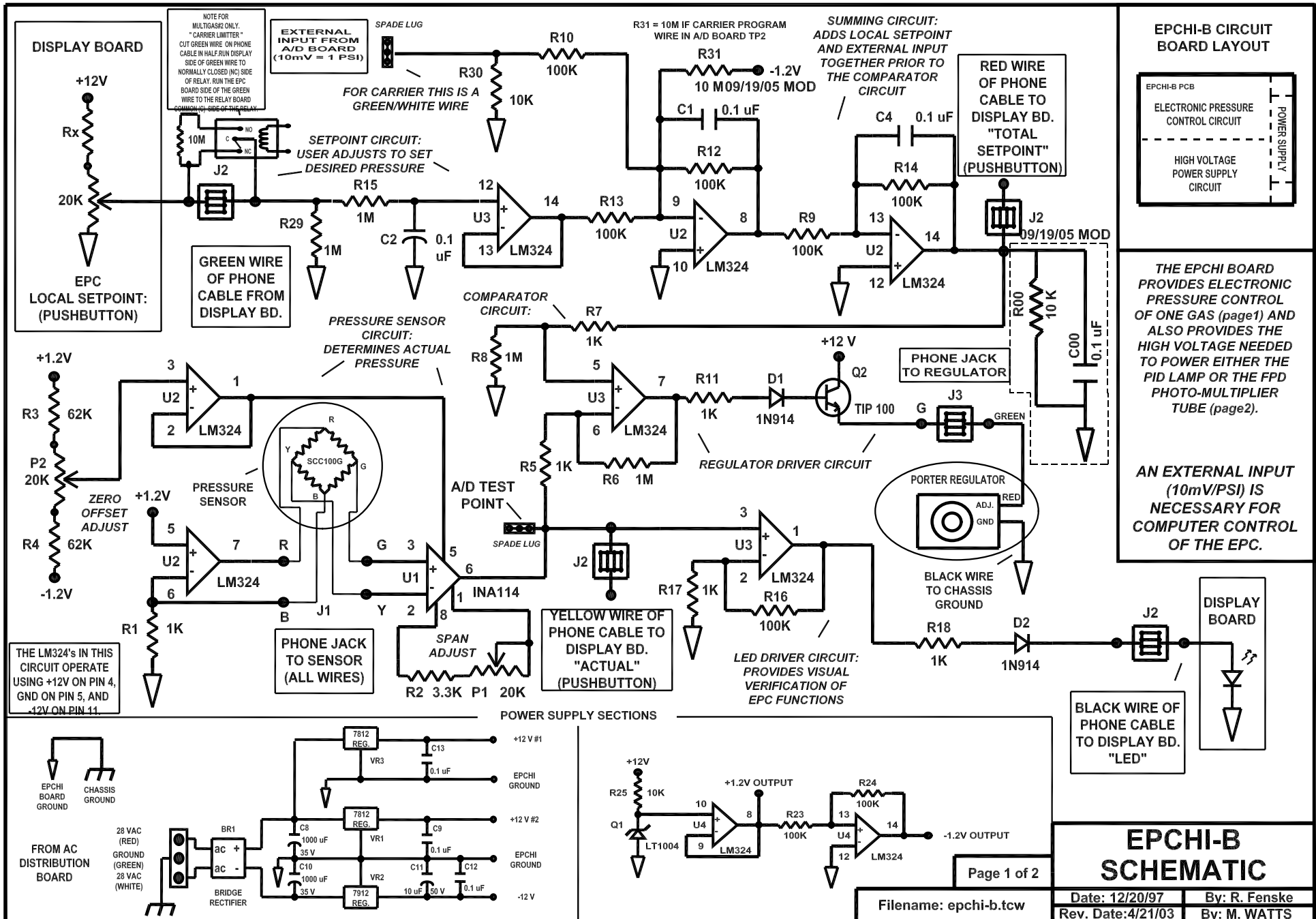
**THERE ARE TWO IDENTICAL CIRCUITS ON THIS BOARD.**



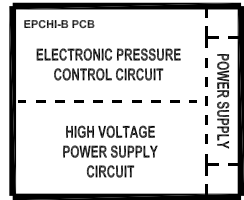




# EPCHI-B SCHEMATIC



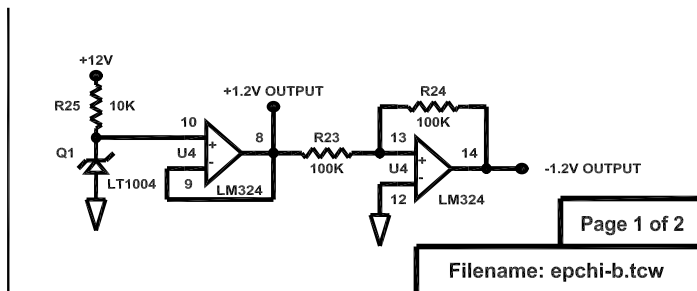
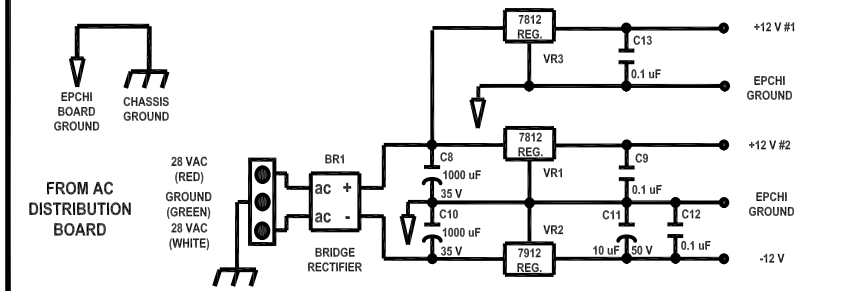
**EPCHI-B CIRCUIT BOARD LAYOUT**

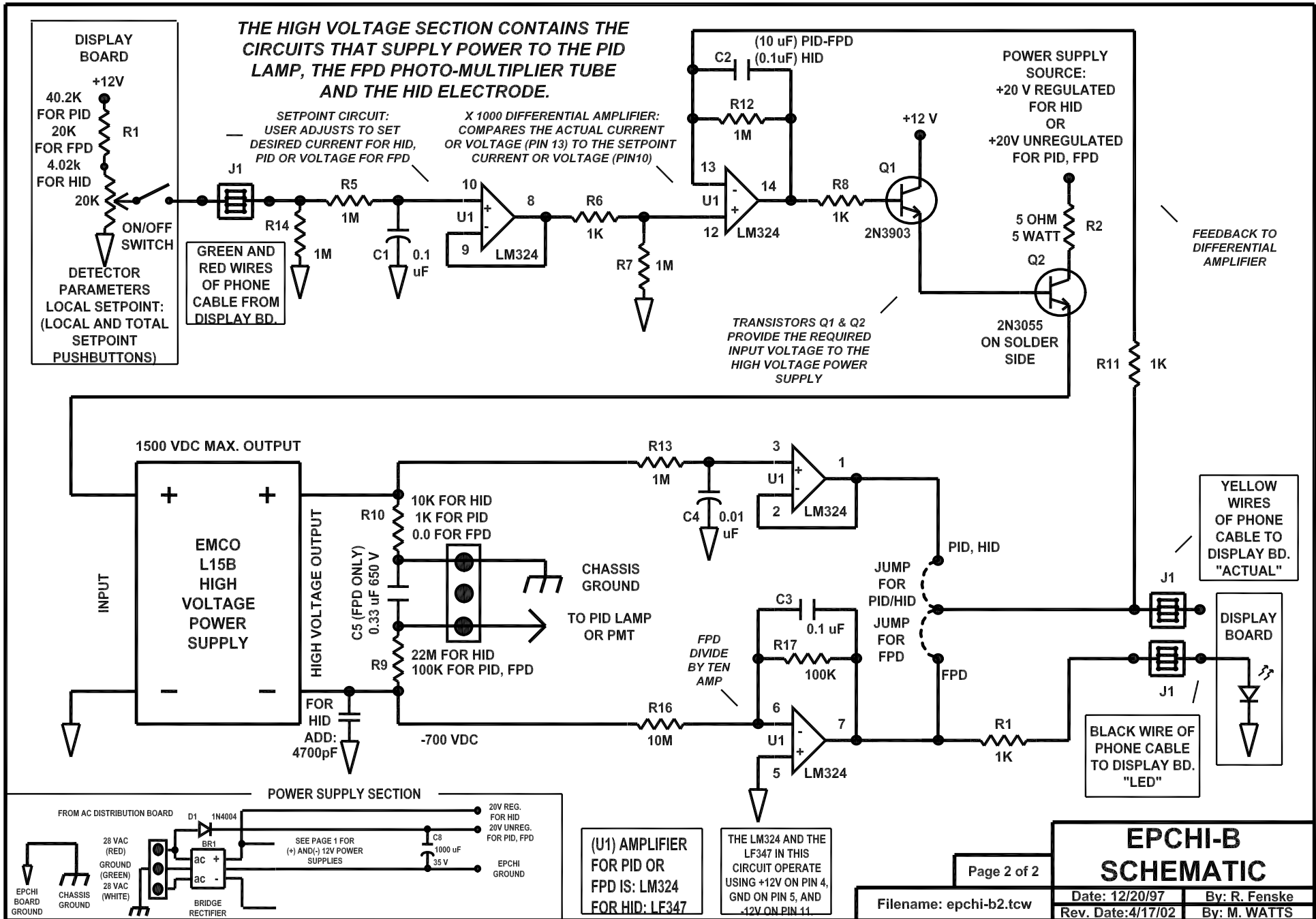


THE EPCHI BOARD PROVIDES ELECTRONIC PRESSURE CONTROL OF ONE GAS (page1) AND ALSO PROVIDES THE HIGH VOLTAGE NEEDED TO POWER EITHER THE PID LAMP OR THE FPD PHOTO-MULTIPLIER TUBE (page2).

AN EXTERNAL INPUT (10mV/PSI) IS NECESSARY FOR COMPUTER CONTROL OF THE EPC.

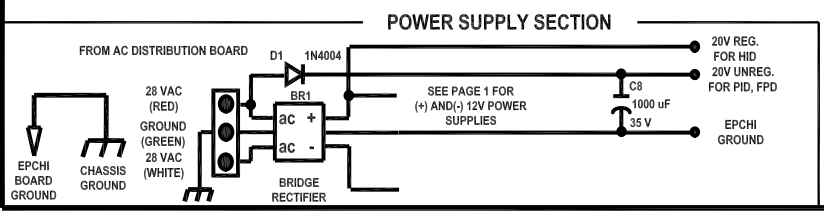
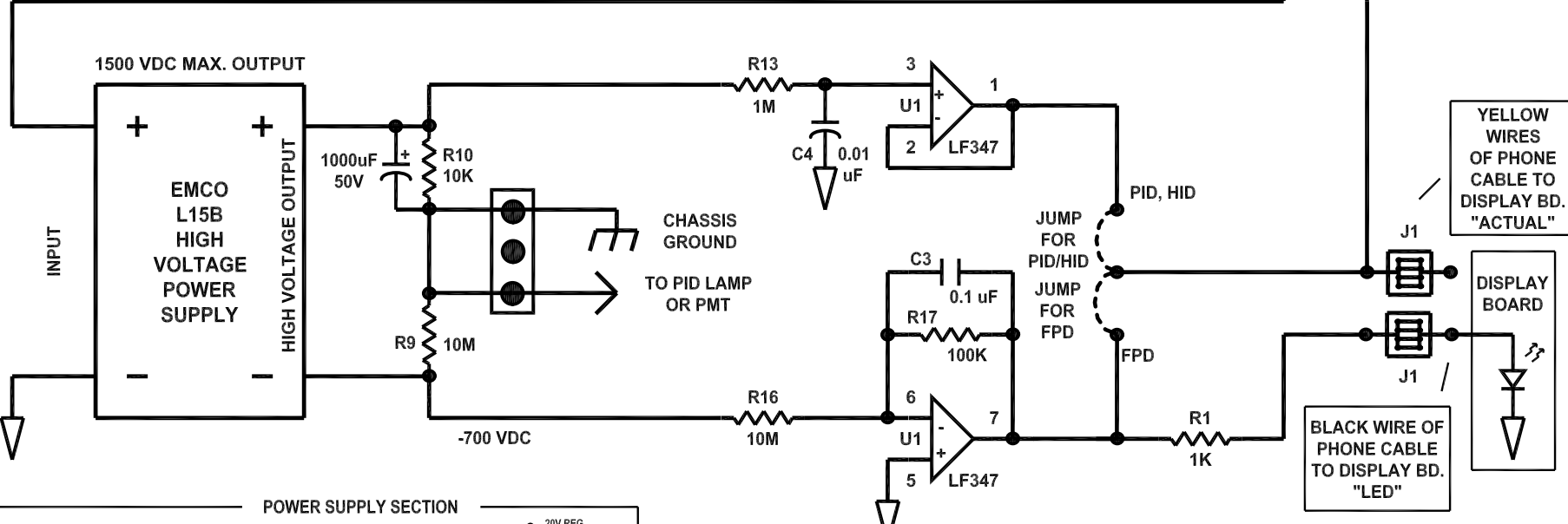
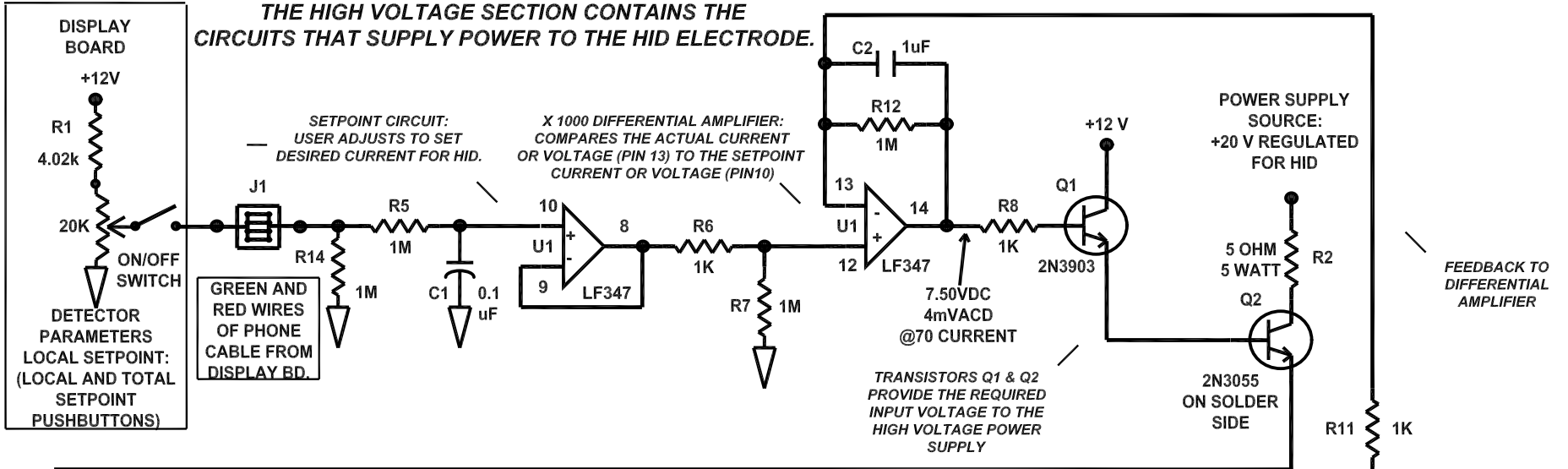
**POWER SUPPLY SECTIONS**







**THE HIGH VOLTAGE SECTION CONTAINS THE CIRCUITS THAT SUPPLY POWER TO THE HID ELECTRODE.**

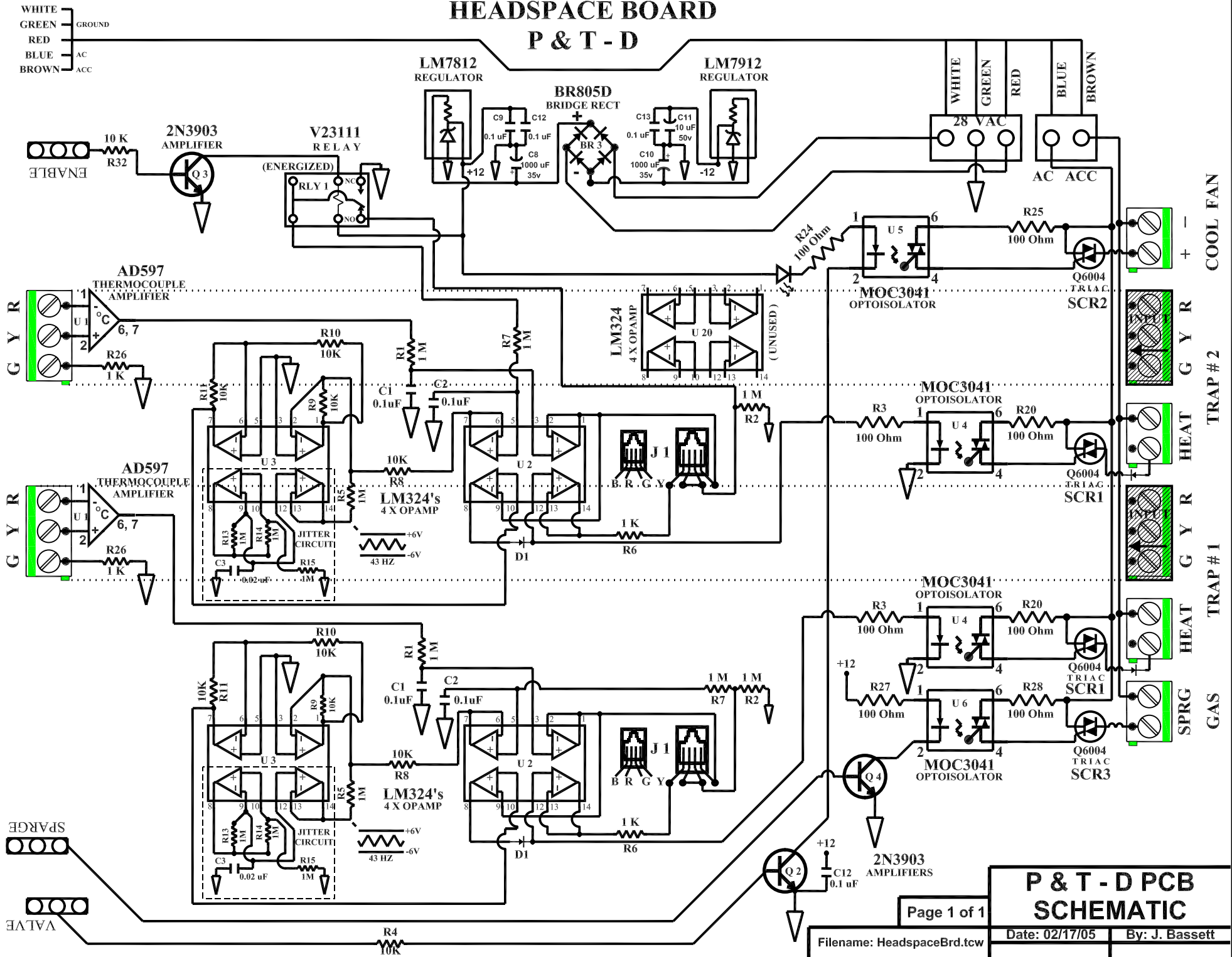


THE LF347 IN THIS CIRCUIT OPERATE USING +12V ON PIN 4, GND ON PIN 5, AND -12V ON PIN 11.



# HEADSPACE BOARD

## P & T - D

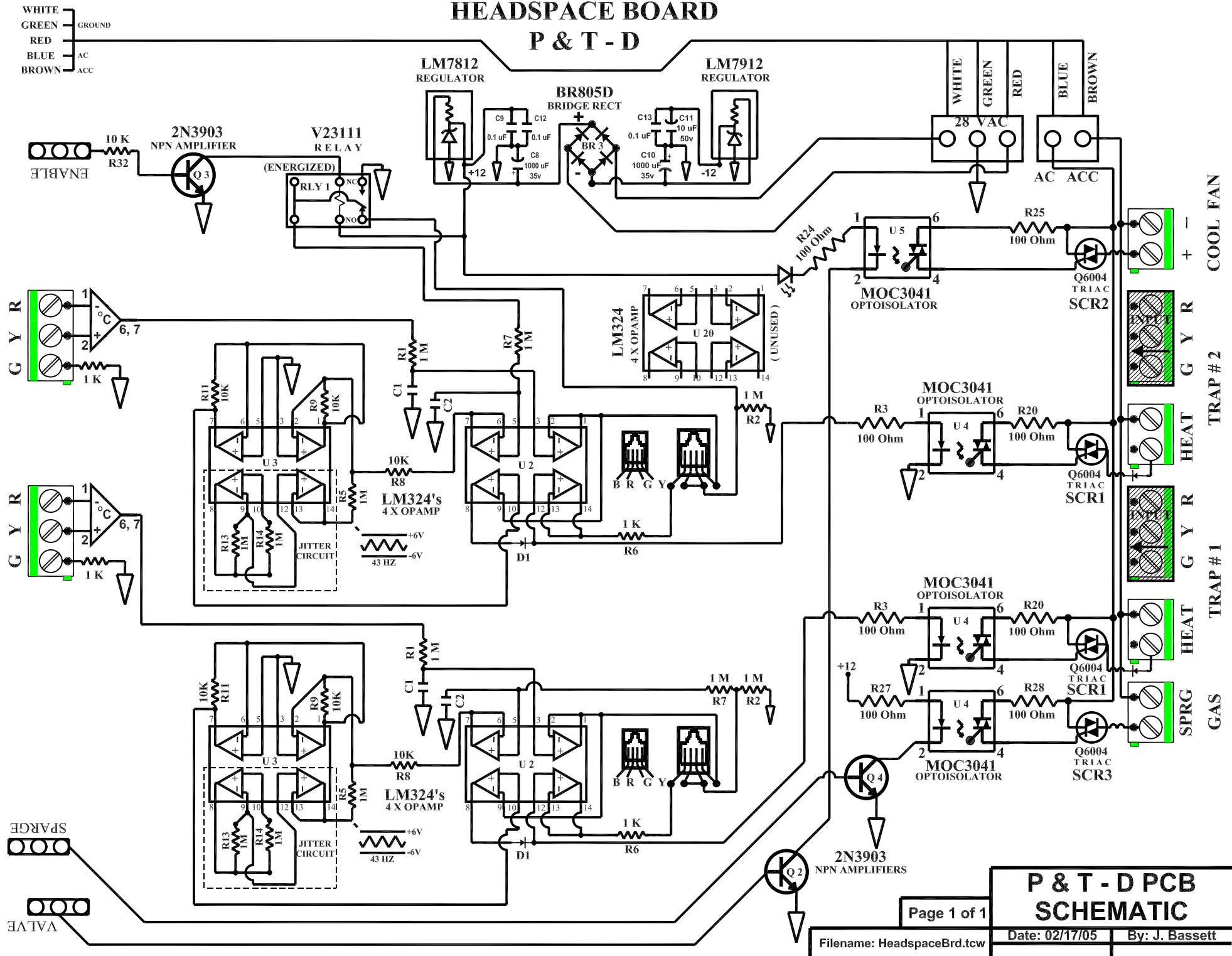


WHITE  
GREEN  
RED  
BLUE  
BROWN

GROUND  
AC  
ACC

# HEADSPACE BOARD

## P & T - D



P & T - D PCB  
SCHEMATIC

Page 1 of 1

Filename: HeadspaceBrd.tcw

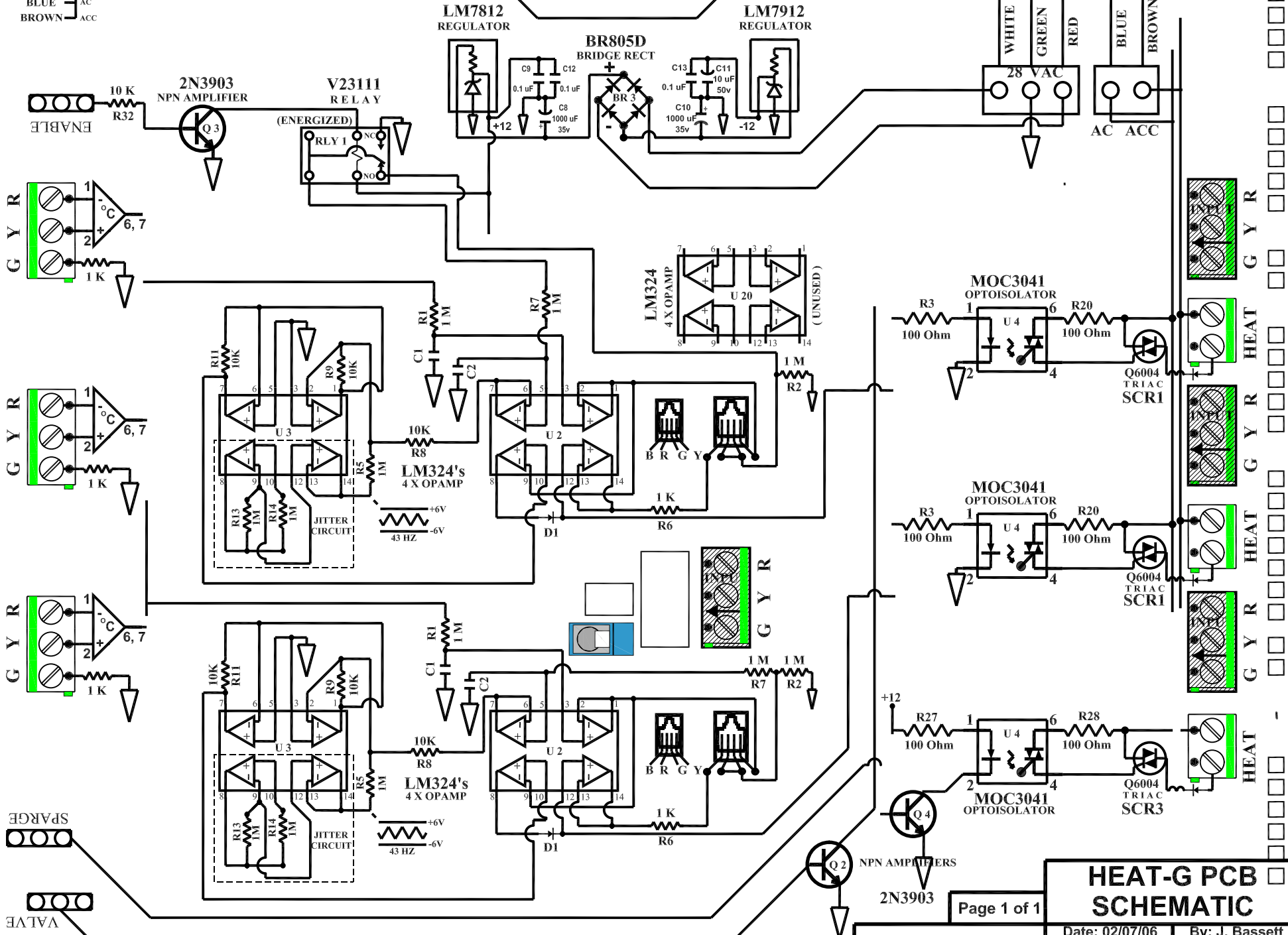
Date: 02/17/05

By: J. Bassett

# HEAT-G PCB

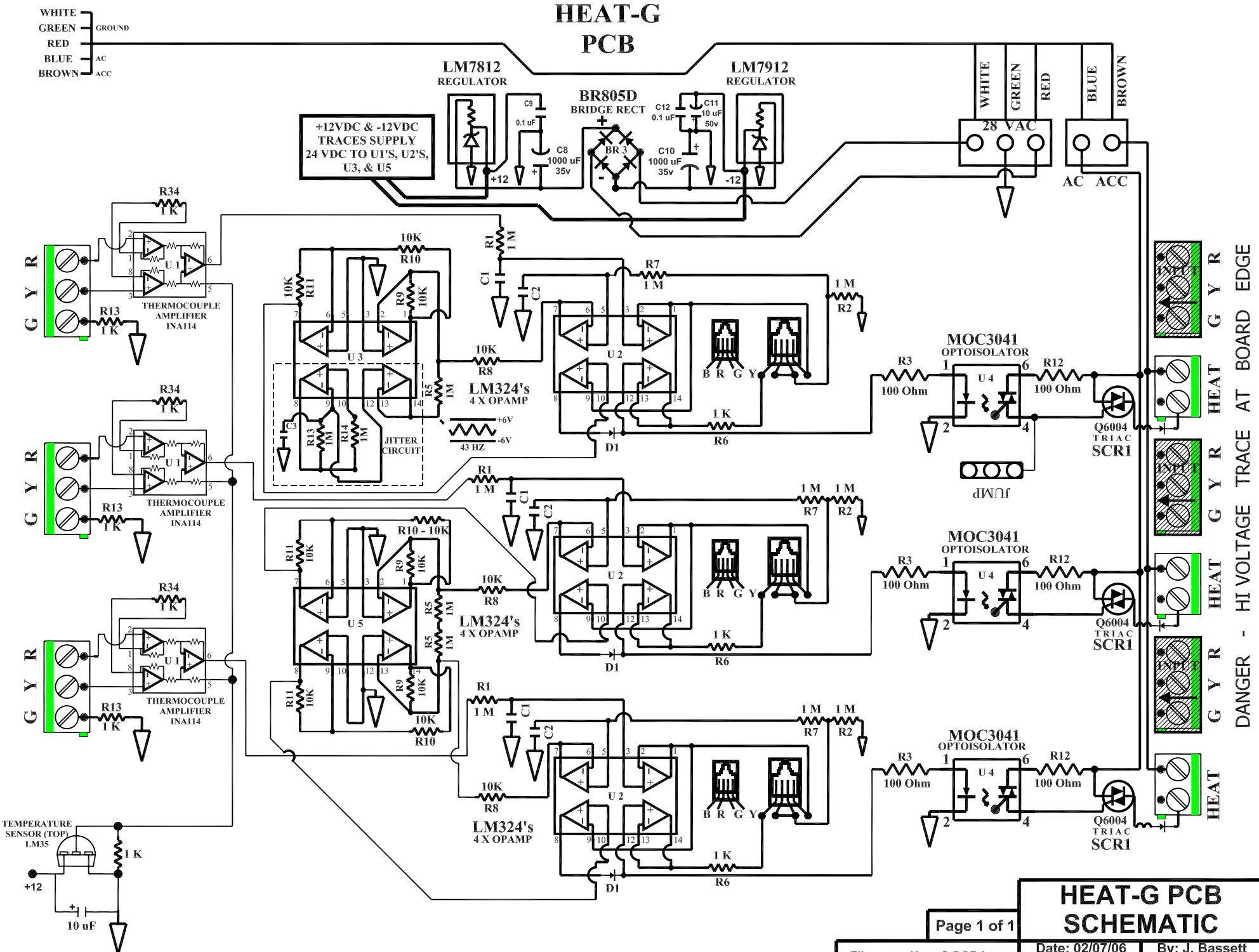
WHITE  
GREEN  
RED  
BLUE  
BROWN

GROUND  
AC  
ACC



## HEAT-G PCB SCHEMATIC

# HEAT-G PCB



## HEAT-G PCB SCHEMATIC

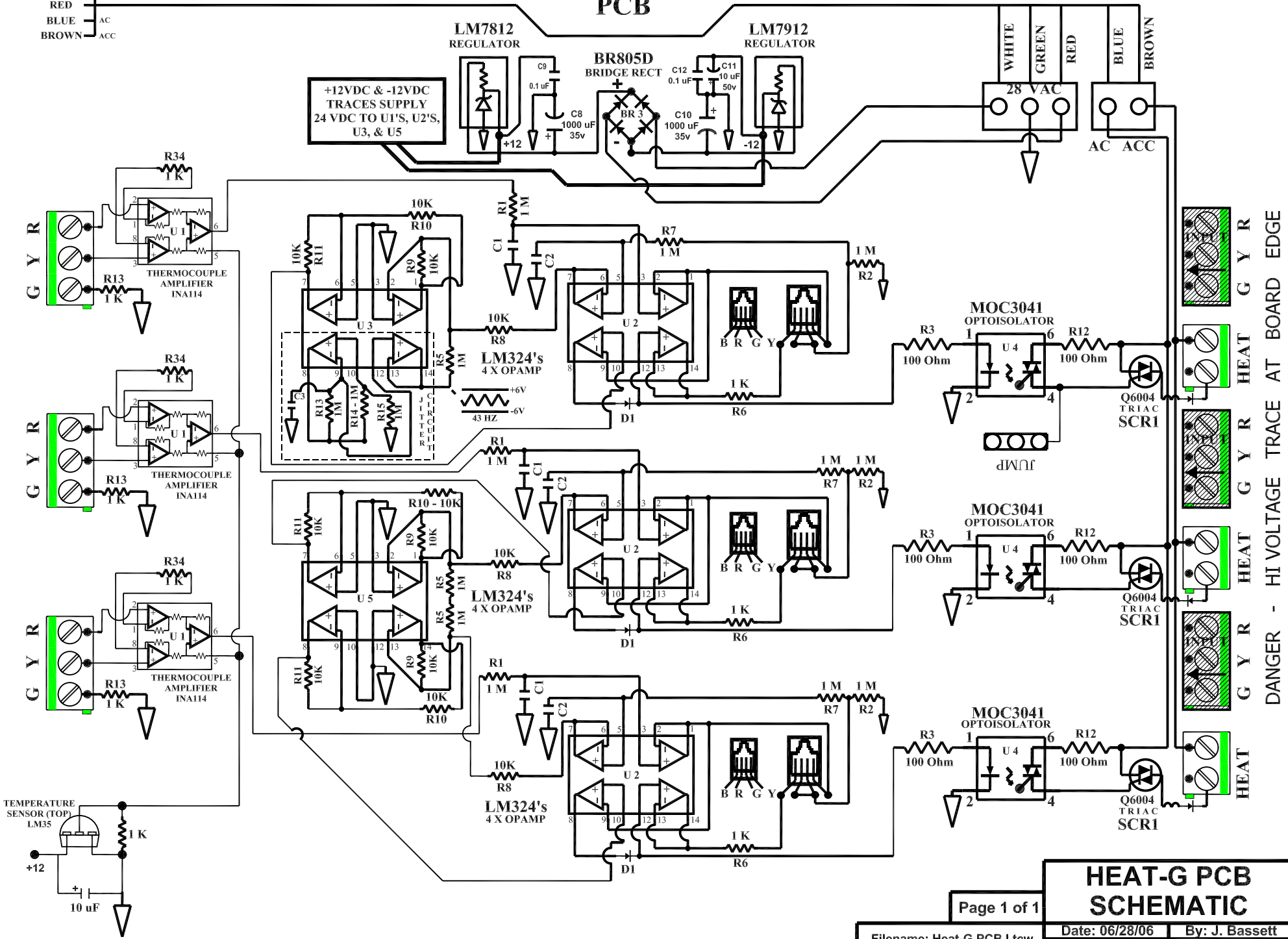
Page 1 of 1

DANGER - HI VOLTAGE TRACE AT BOARD EDGE

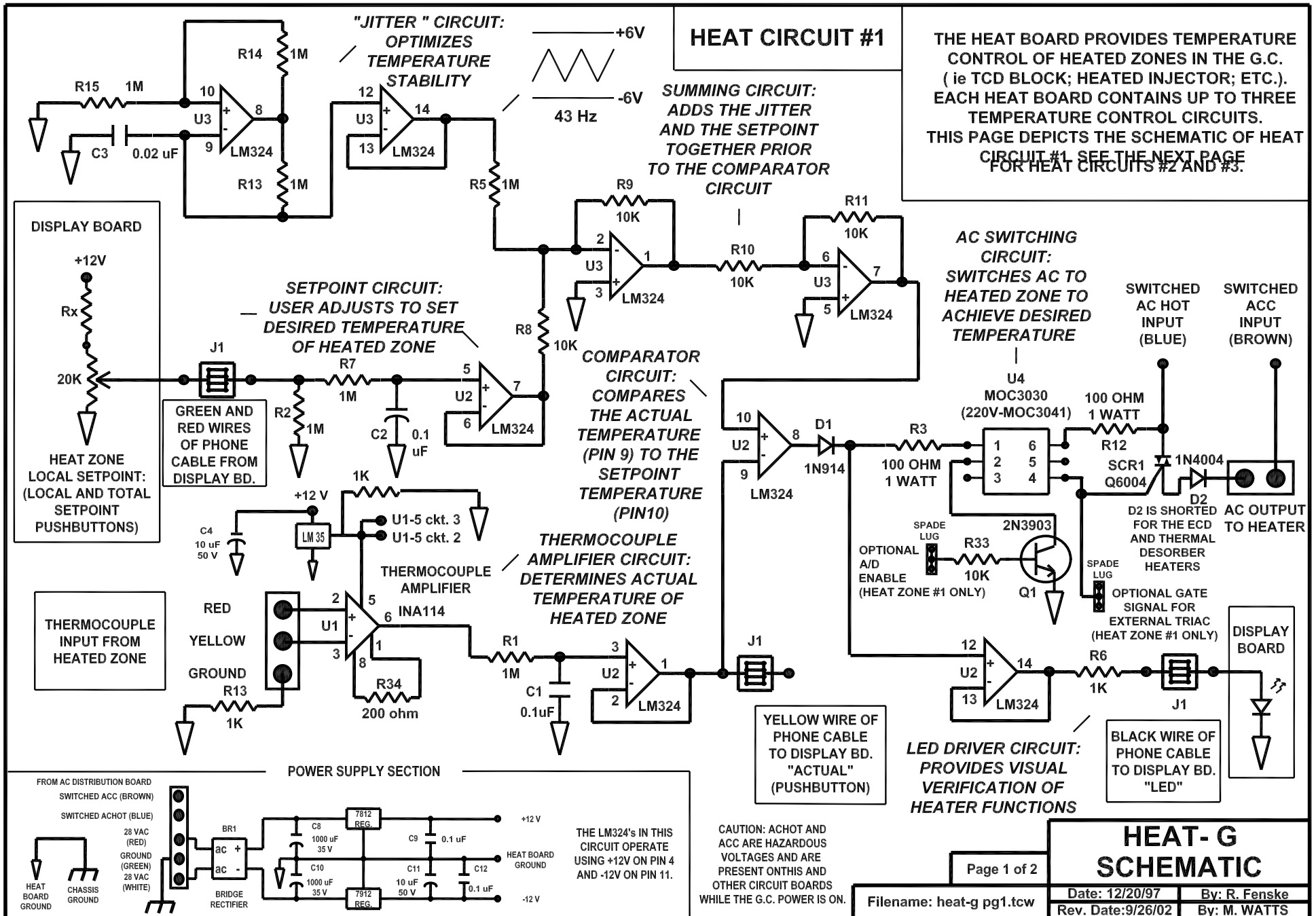
# HEAT-G PCB

WHITE  
GREEN  
RED  
BLUE  
BROWN

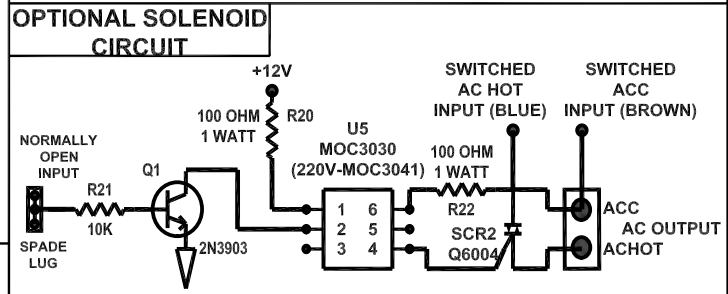
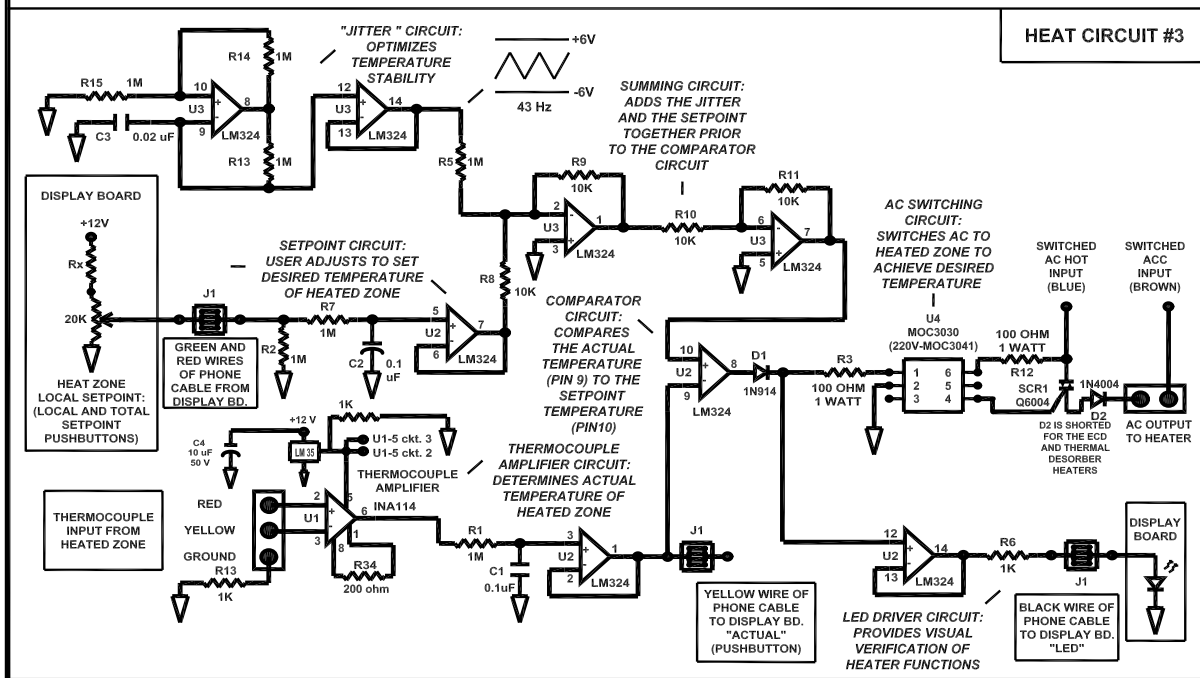
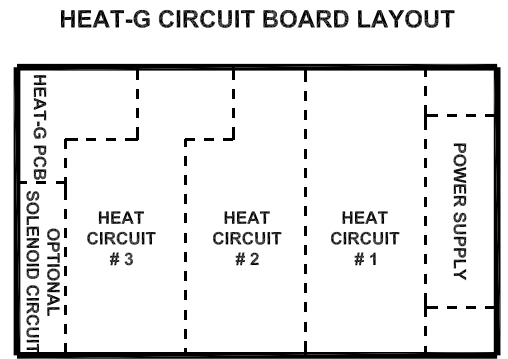
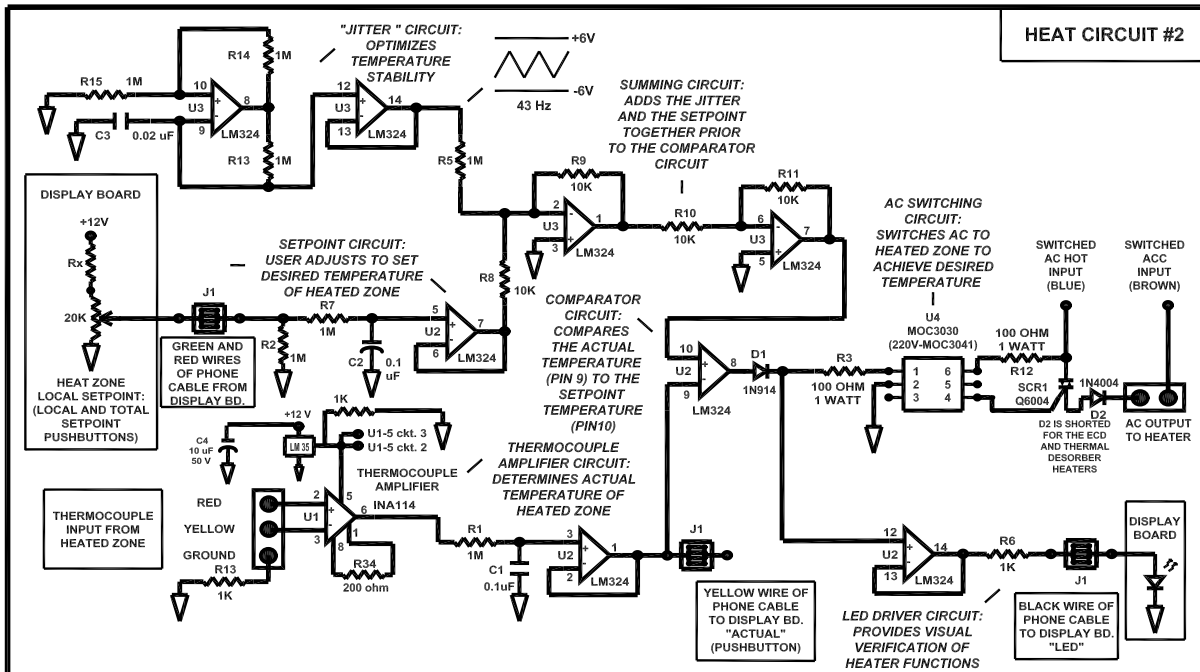
GROUND  
AC  
ACC



DANGER - HI VOLTAGE TRACE AT BOARD EDGE







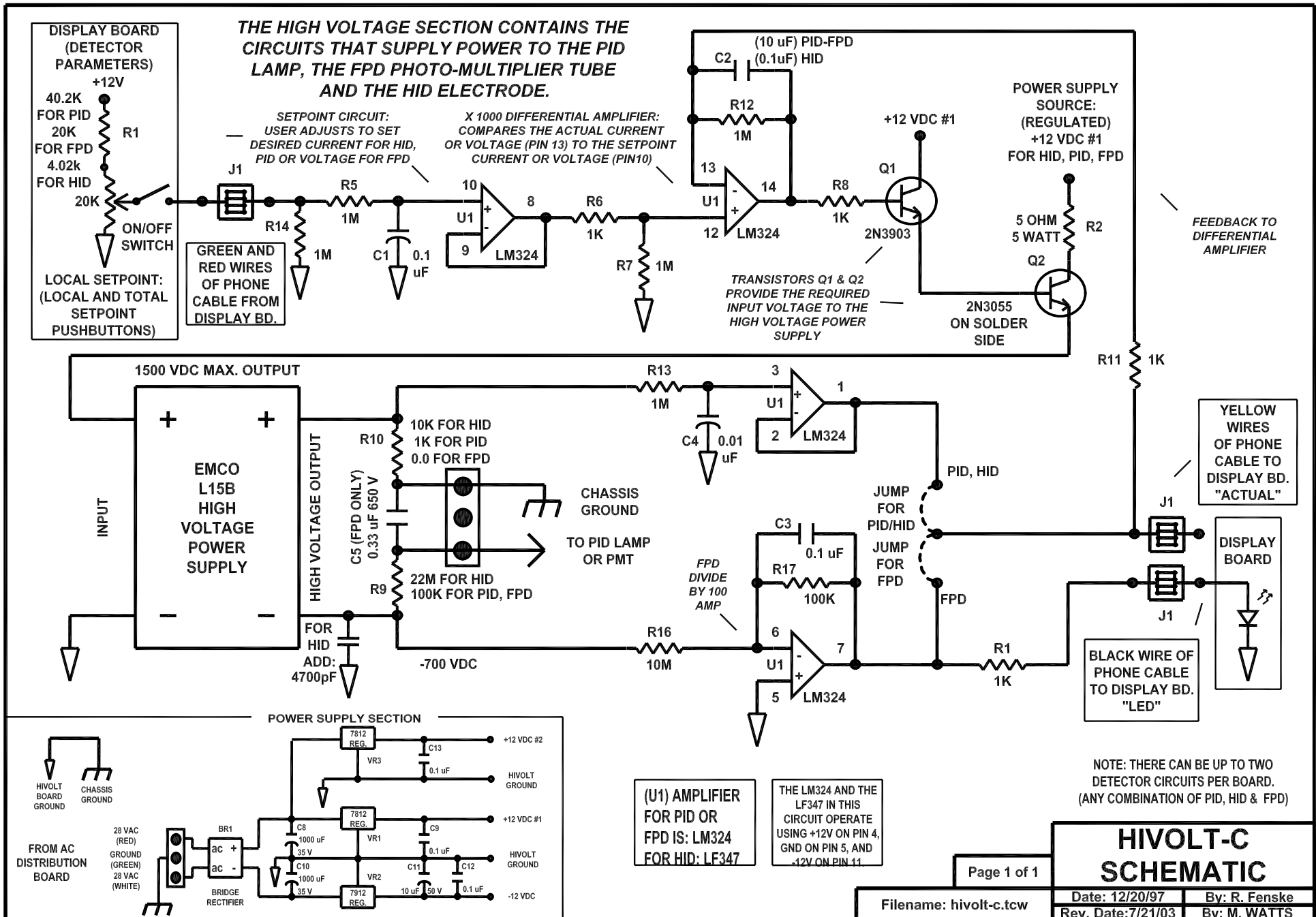
THIS PAGE DEPICTS THE SCHEMATICS OF HEAT CIRCUITS #2 AND #3 AND OF THE OPTIONAL SOLENOID CIRCUIT. THE DIFFERENCES BETWEEN HEAT CIRCUITS #1, #2 AND #3 ARE:

CIRCUIT #1 HAS AN OPTIONAL A/D ENABLE OF THE HEAT ZONE AND AN OPTIONAL GATE SIGNAL INPUT FOR AN EXTERNAL TRIAC.

ALSO, THE SUMMING CIRCUIT IN EACH HEAT CIRCUIT #1 USES U3 PINS 6 AND PIN 7 OUTPUTS.

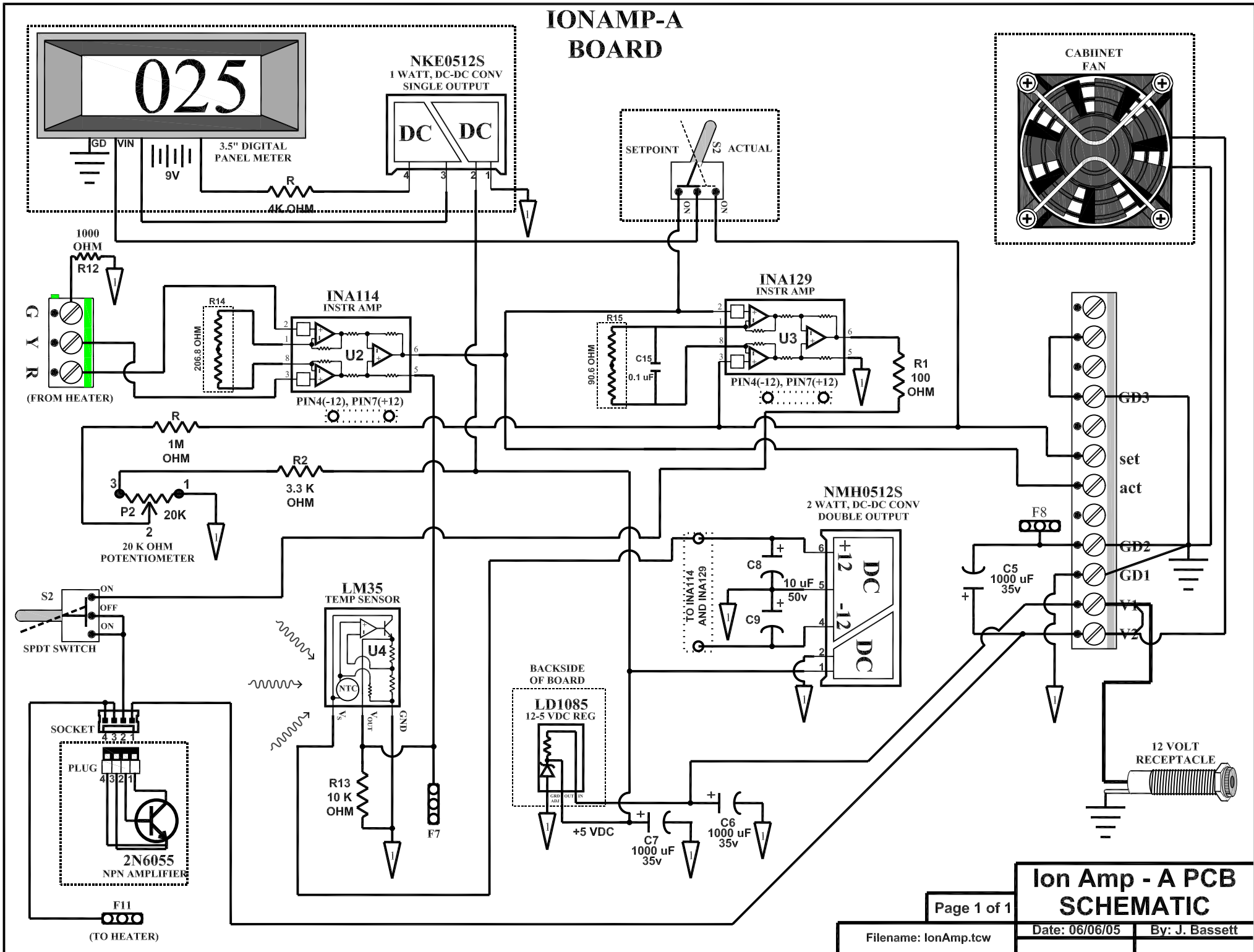
HEAT CIRCUIT #2 USES U5 PIN 1 AND PIN 7 OUTPUTS.

HEAT CIRCUIT #3 USES U5 PIN 14 AND PIN 8 OUTPUTS.

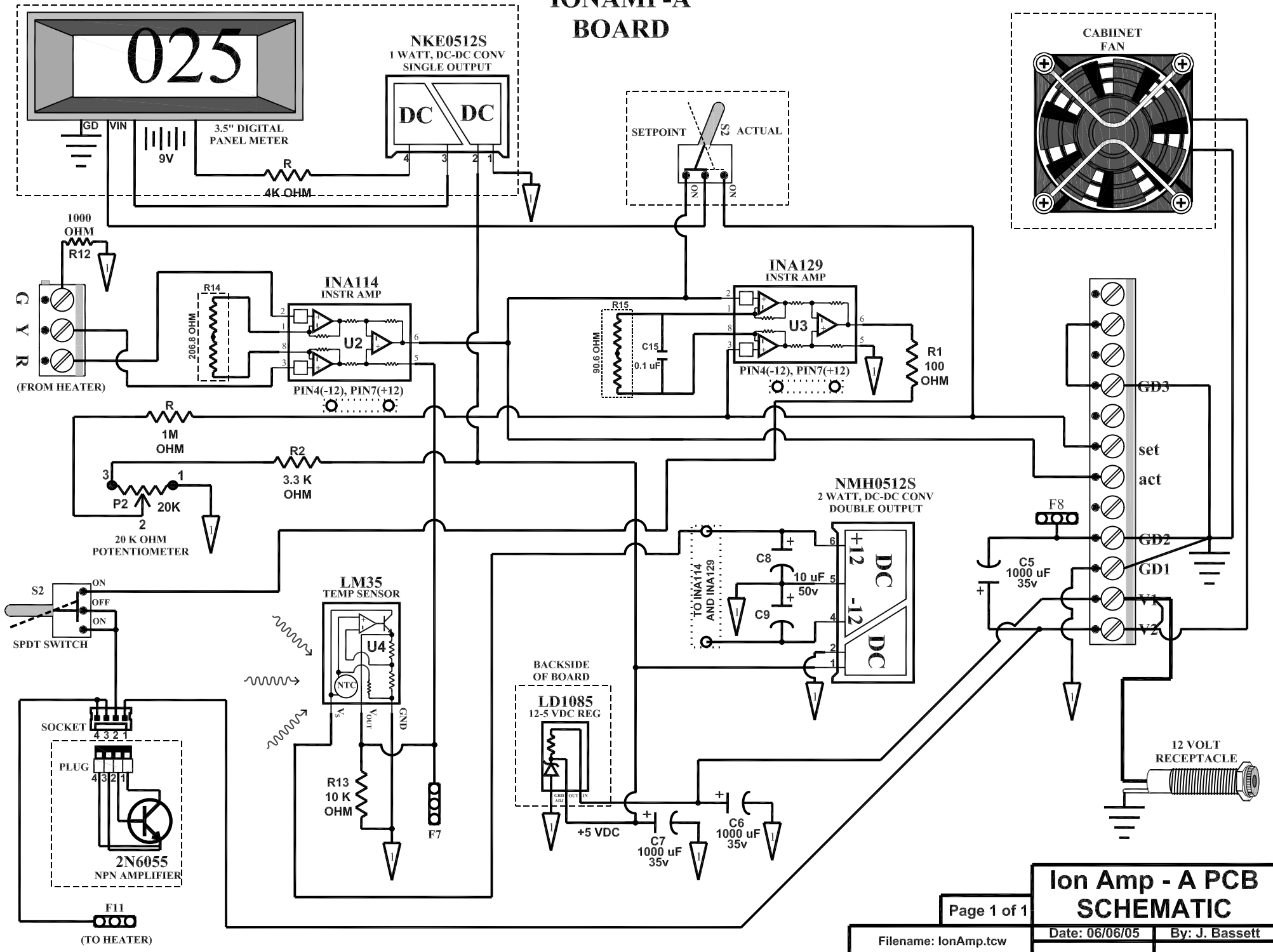


# HIVOULT-C SCHEMATIC

# IONAMP-A BOARD

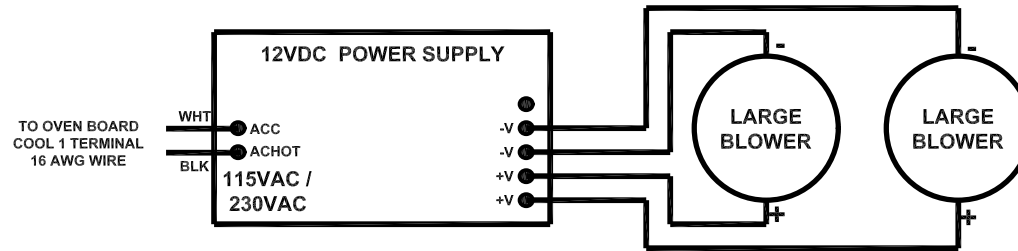


# IONAMP-A BOARD

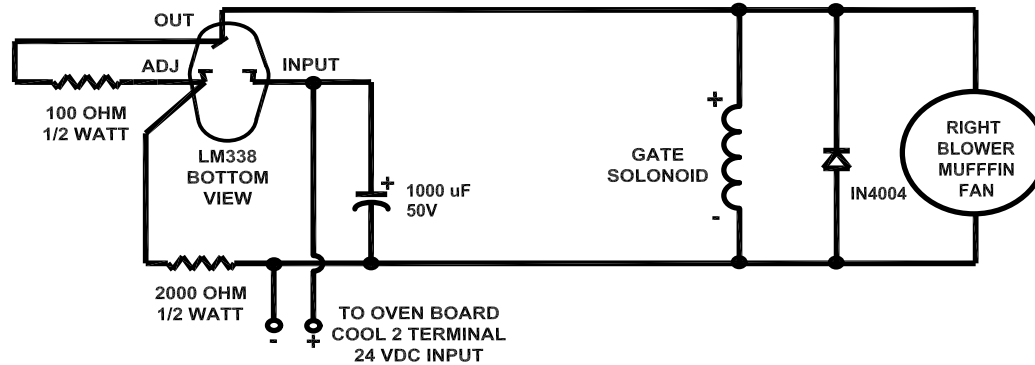


**Ion Amp - A PCB  
SCHEMATIC**

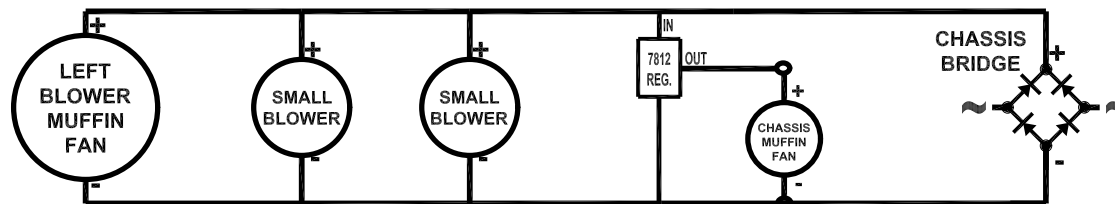
## VERTICAL OVEN COOL DOWN CIRCUIT



## GATE SOLONOID CIRCUIT



## CIRCULATING FANS CIRCUIT

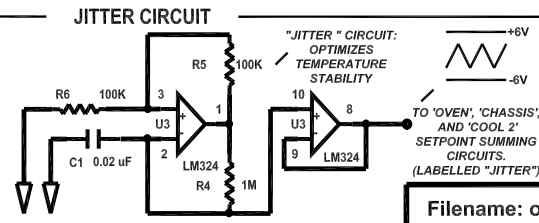
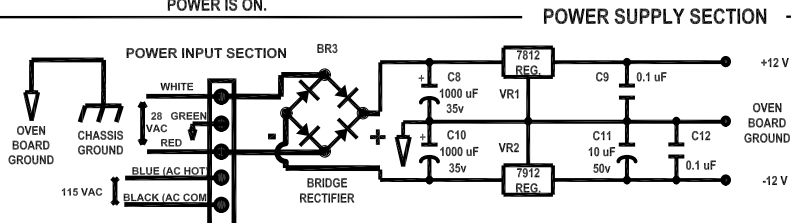
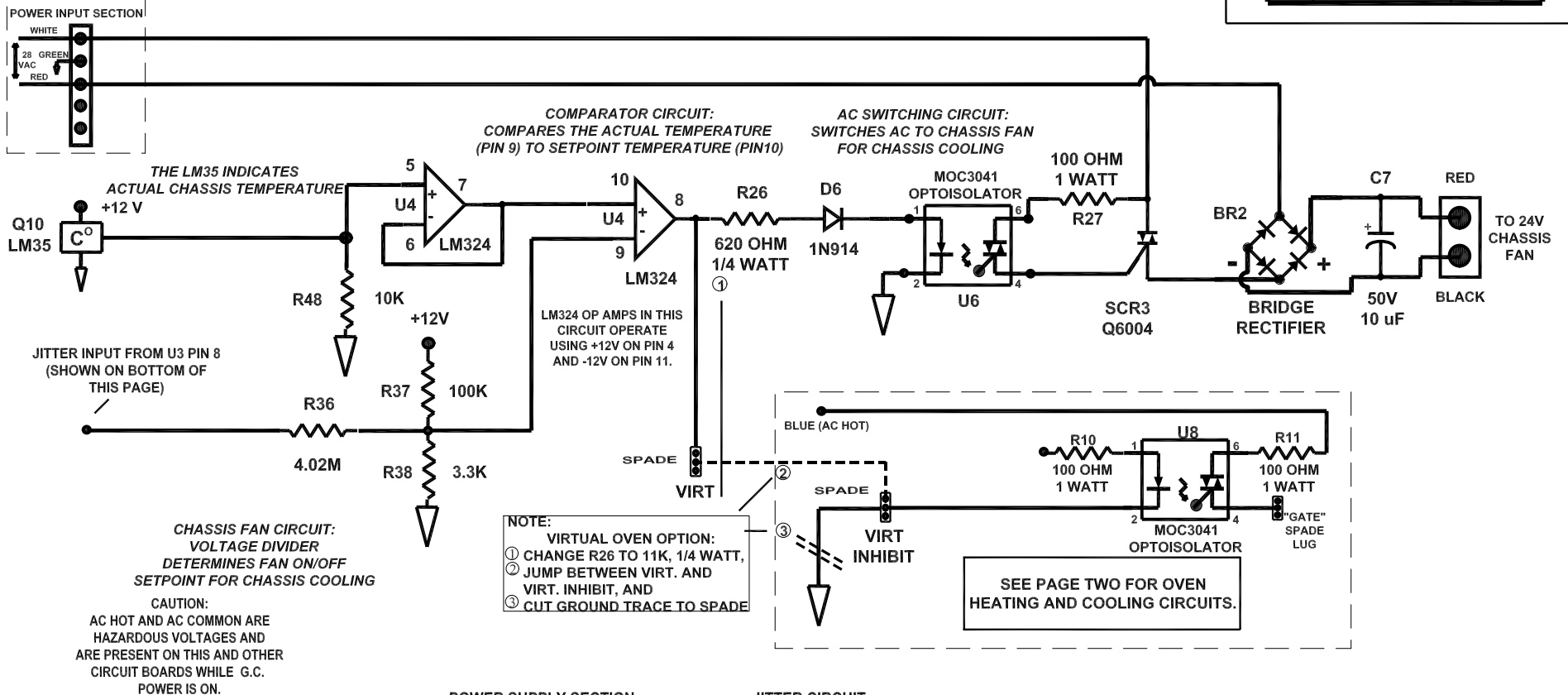
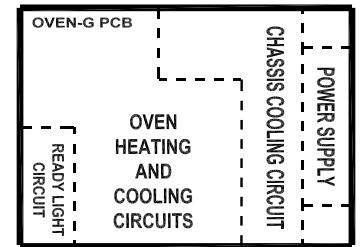


THE OVEN BOARD CONTROLS READY LIGHT, OVEN HEATING / COOLING, AND INTERNAL G.C. CHASSIS TEMPERATURE REGULATION.

THIS PAGE DEPICTS:  
POWER SUPPLY, JITTER, VIRTUAL OVEN,  
AND CHASSIS COOLING CIRCUITS.  
SEE PAGE TWO FOR OVEN HEATING AND COOLING  
CIRCUITS AND PAGE THREE FOR READY LIGHT CIRCUIT.

## CHASSIS COOLING FAN & VIRTUAL OVEN CIRCUIT

OVEN-G CIRCUIT BOARD LAYOUT



Page 1 of 3

## OVEN-G SCHEMATIC

Filename: oven-g pg1.tcw

Date: 12/20/97

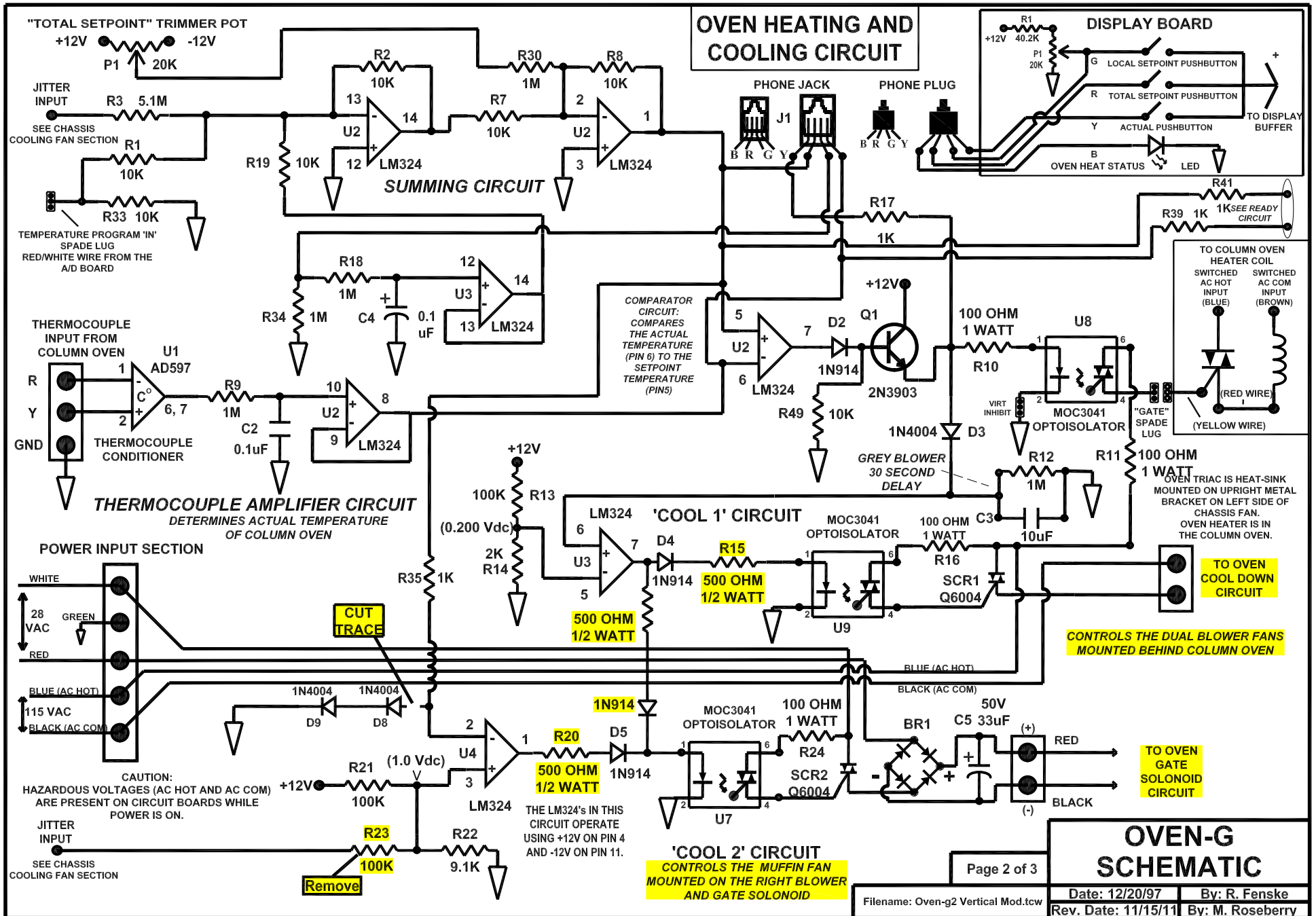
By: R. Fenske

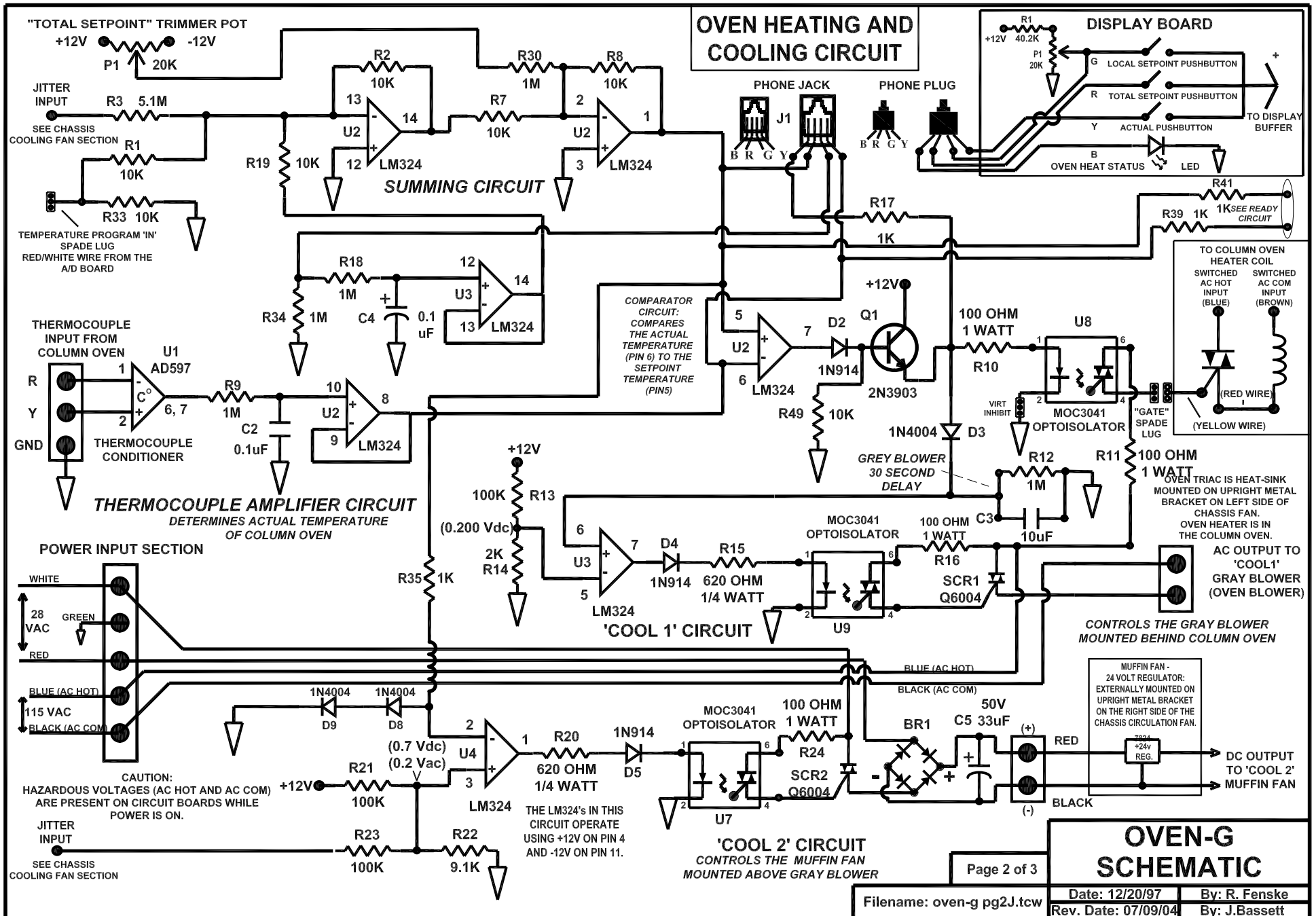
Rev. Date: 7/26/04

By: J. Bassett

# VERTICAL OVEN BOARD MOD

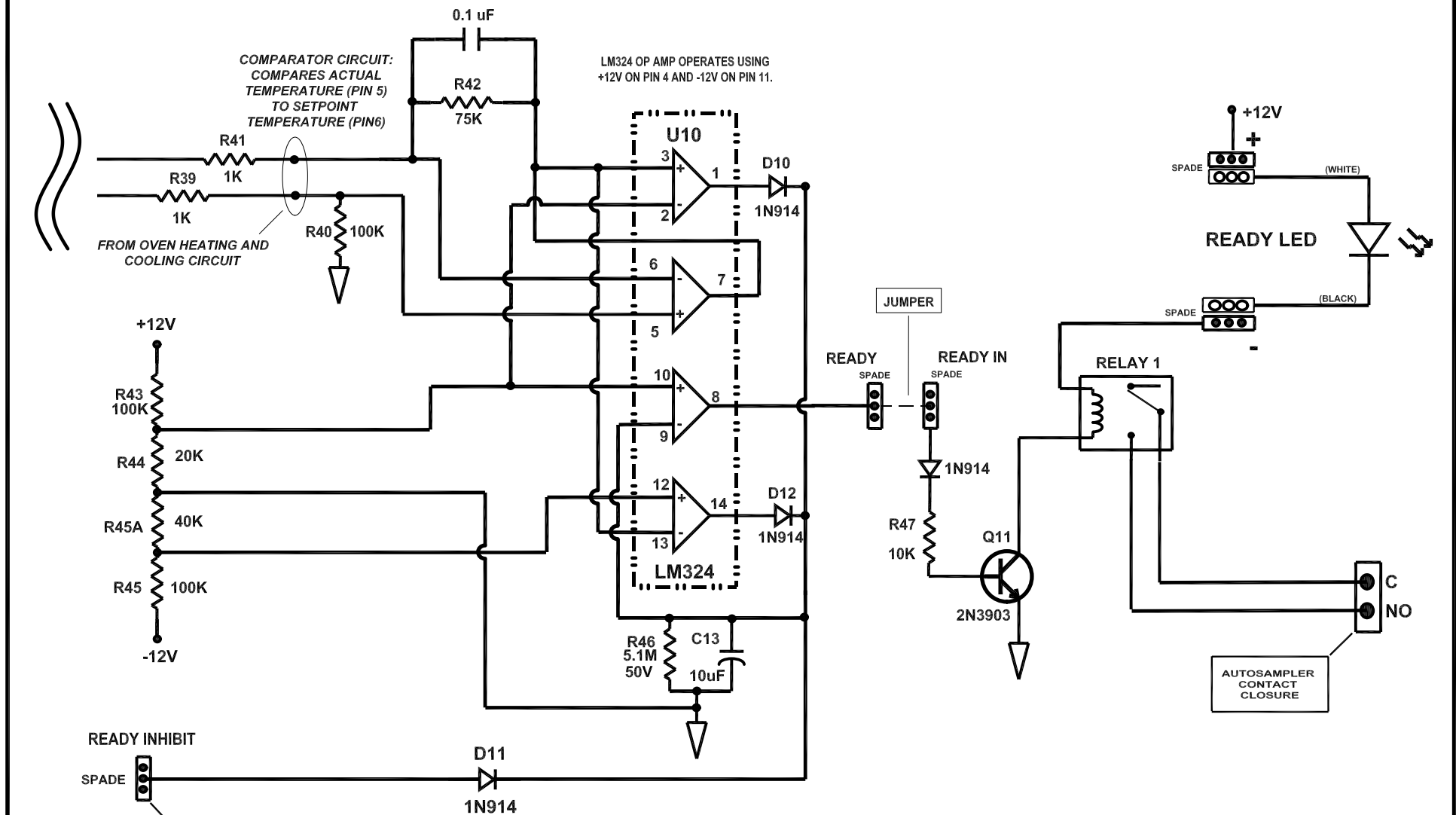
Oven-g2 Vertical Mod.tcw - 9-8-11 - MR

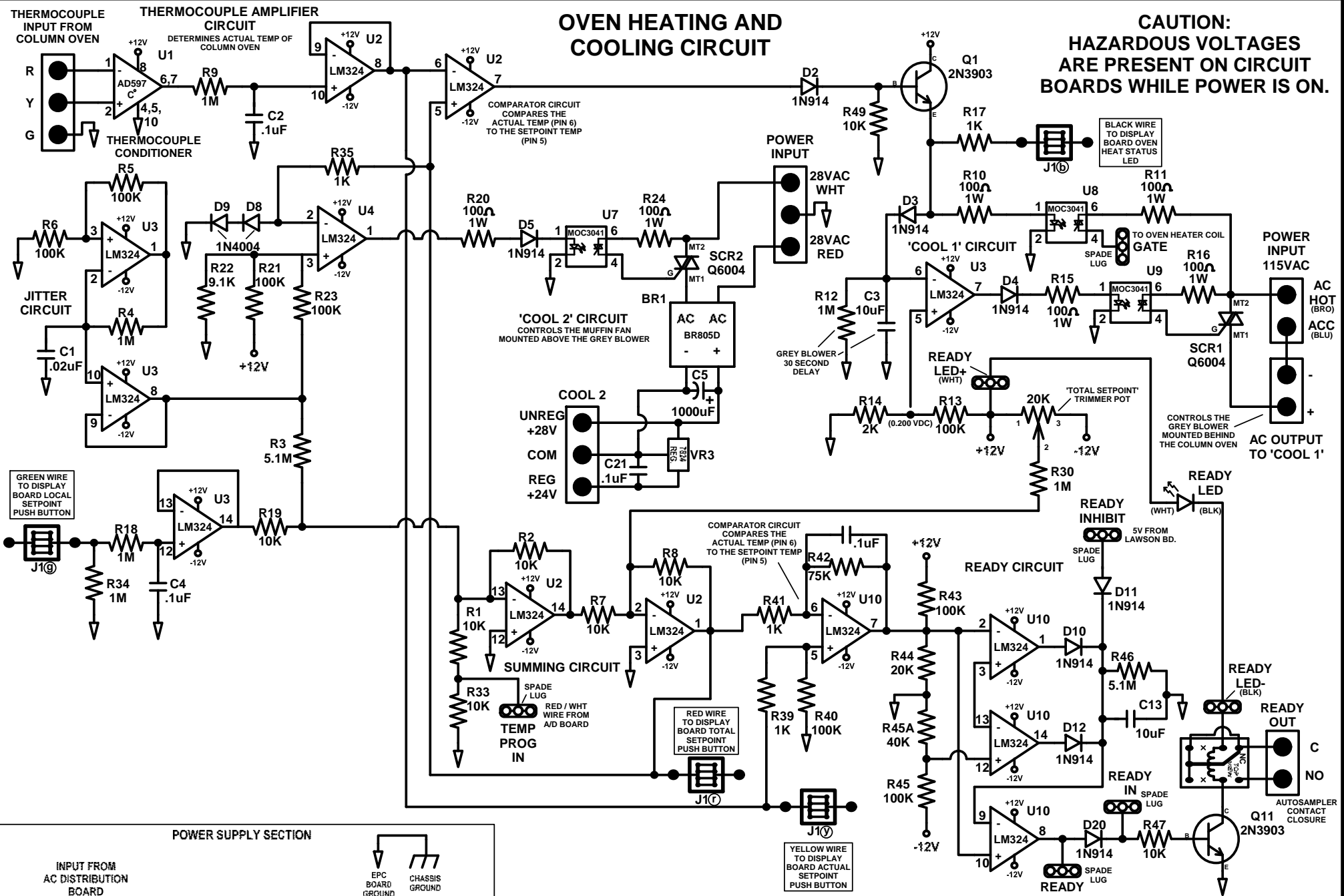






# READY CIRCUIT





**CAUTION:**  
HAZARDOUS VOLTAGES  
ARE PRESENT ON CIRCUIT  
BOARDS WHILE POWER IS ON.

### OVEN HEATING AND COOLING CIRCUIT

#### THERMOCOUPLE AMPLIFIER CIRCUIT

THERMOCOUPLE INPUT FROM COLUMN OVEN

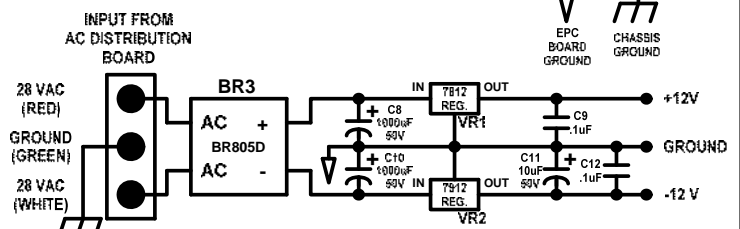
DETERMINES ACTUAL TEMP OF COLUMN OVEN

COMPARATOR CIRCUIT  
COMPARES THE ACTUAL TEMP (PIN 6)  
TO THE SETPOINT TEMP (PIN 5)

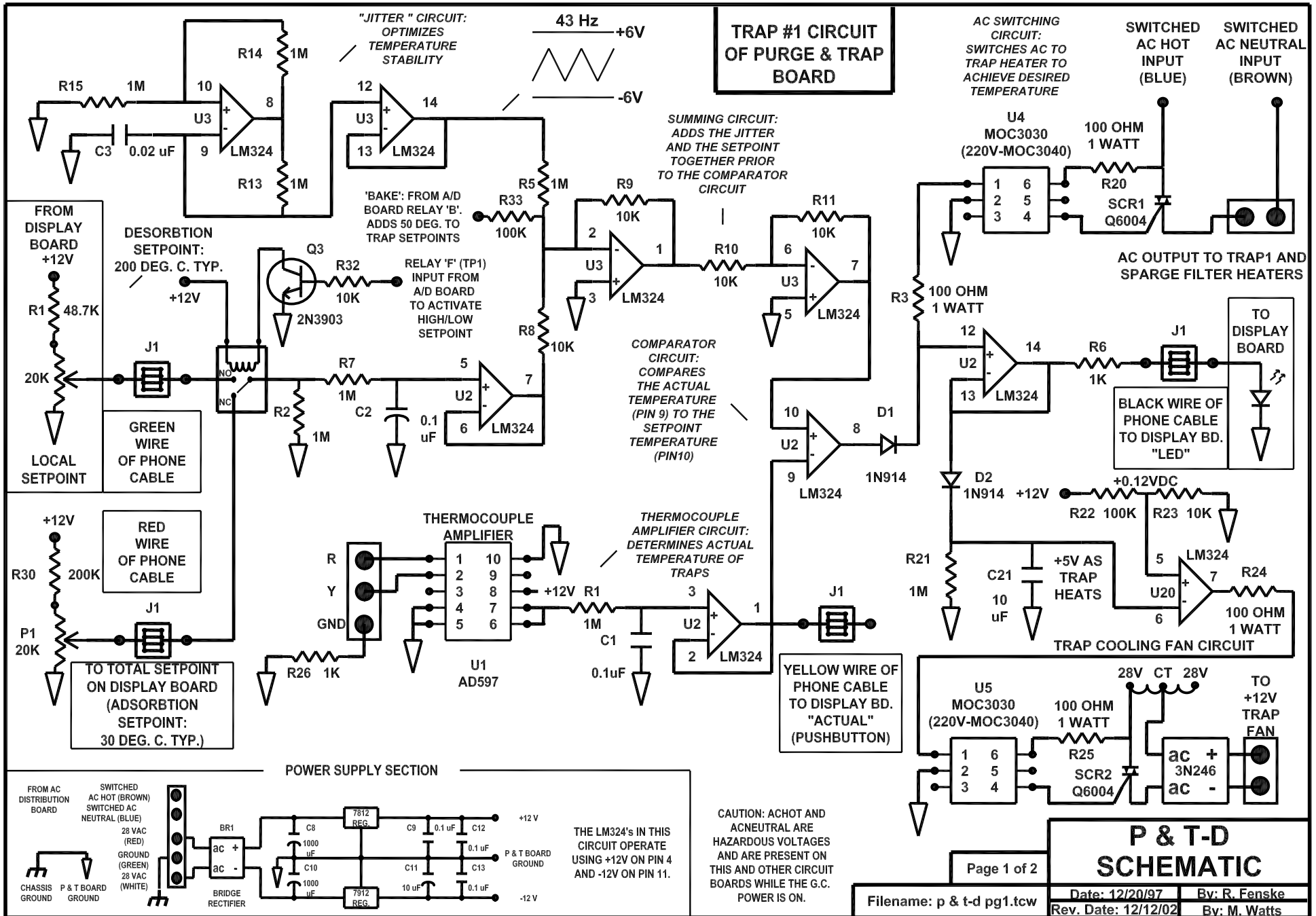
'COOL 2' CIRCUIT  
CONTROLS THE MUFFLE FAN  
MOUNTED ABOVE THE GREY BLOWER

COMPARATOR CIRCUIT  
COMPARES THE ACTUAL TEMP (PIN 6)  
TO THE SETPOINT TEMP (PIN 5)

#### POWER SUPPLY SECTION

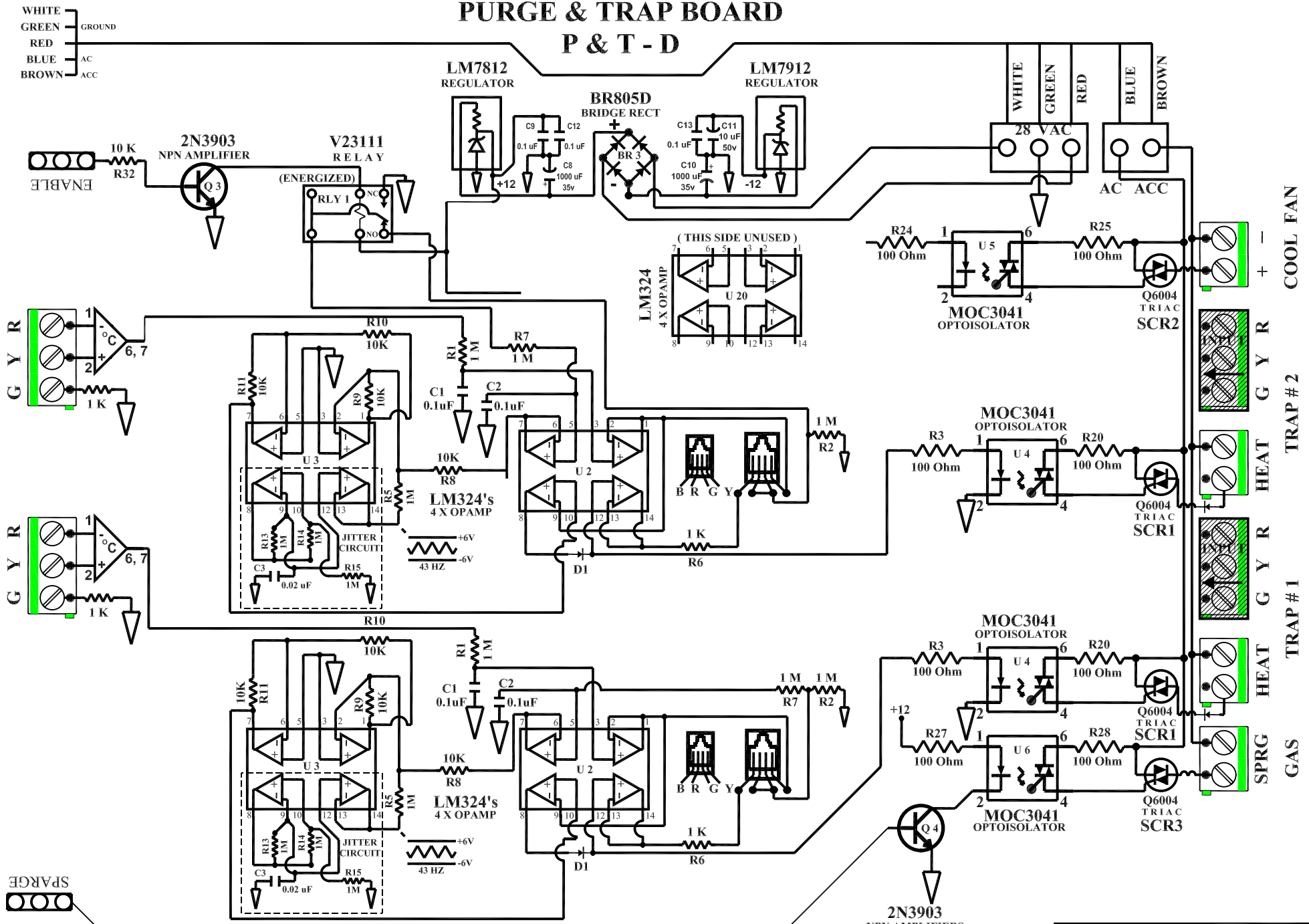


## OVEN-I SCHEMATIC





# PURGE & TRAP BOARD P & T - D



WHITE — GROUND  
 GREEN — AC  
 RED — ACC  
 BLUE — ACC  
 BROWN — ACC

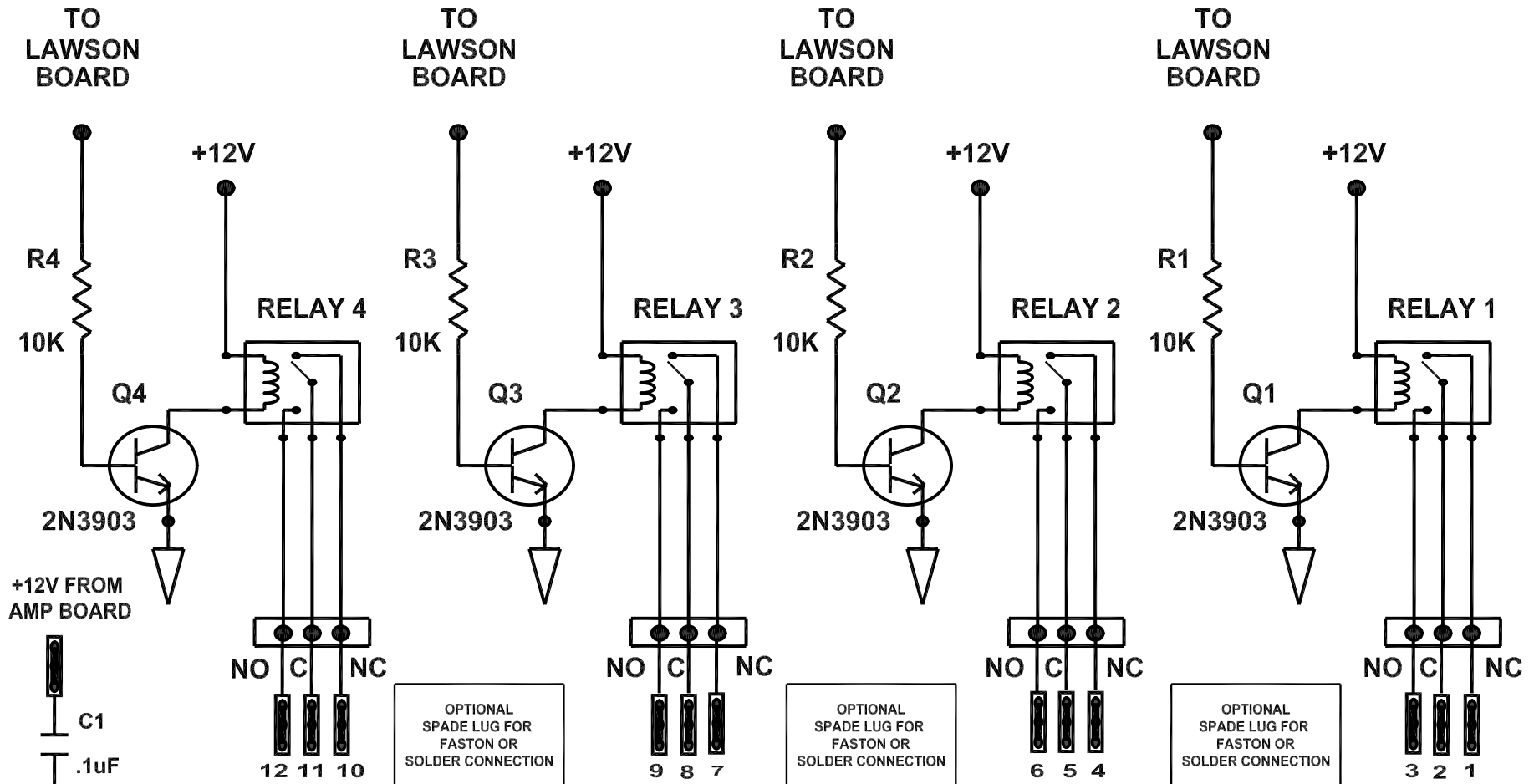
COOL FAN  
 TRAP # 2  
 TRAP # 1  
 GAS

**P & T - D II PCB  
SCHEMATIC**

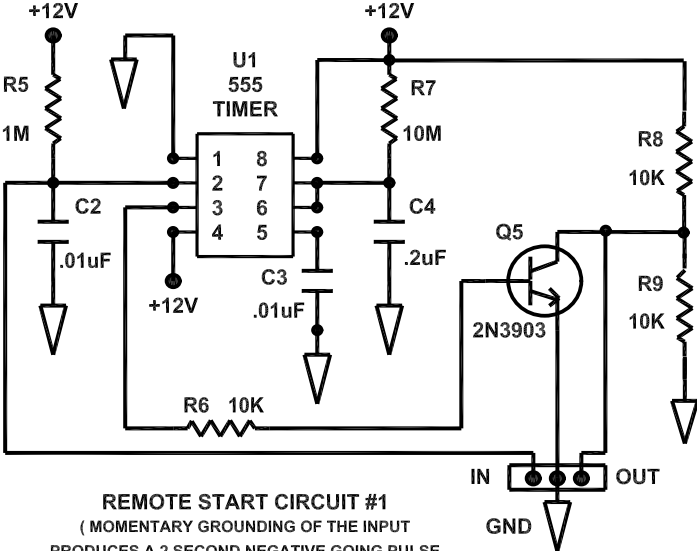
Page 1 of 1

Filename: HeadspaceBrd.tcw      Date: 03/15/05      By: J. Bassett

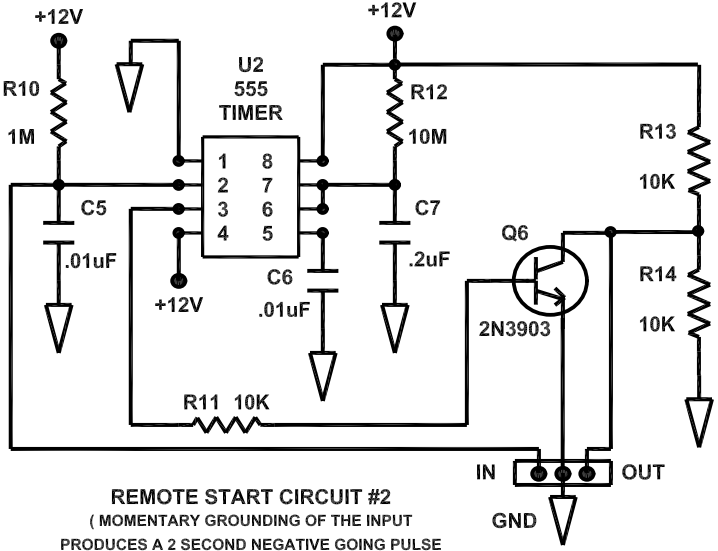
# ACCESSORY RELAY BOARD (1-4 RELAYS) WITH EXTERNAL CONNECTOR



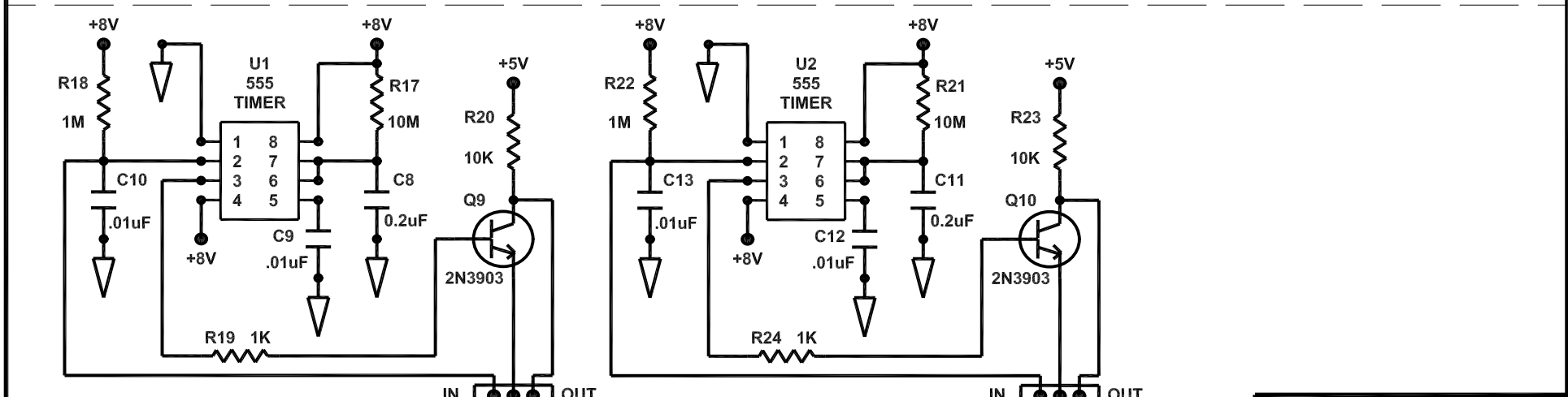
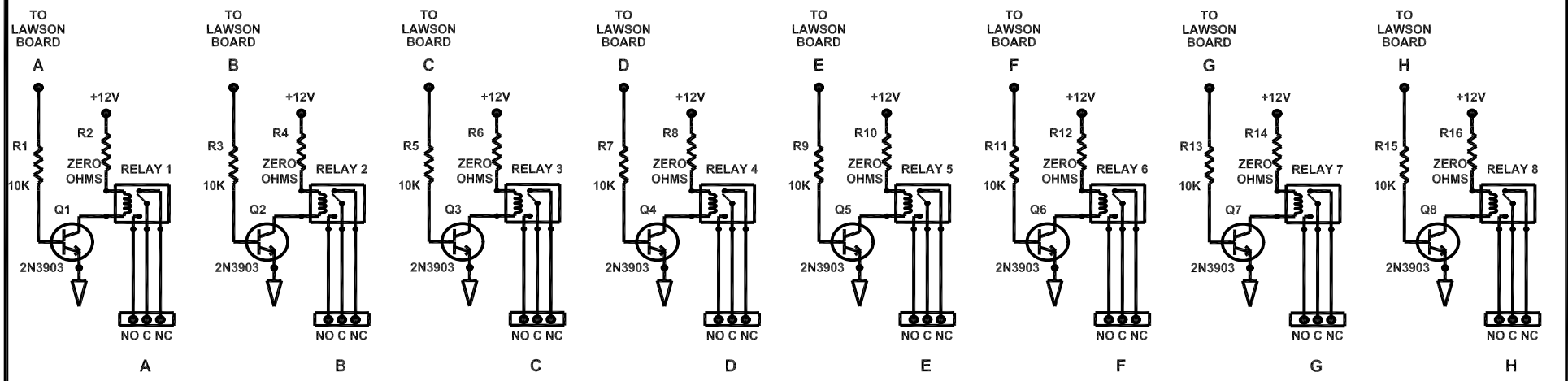
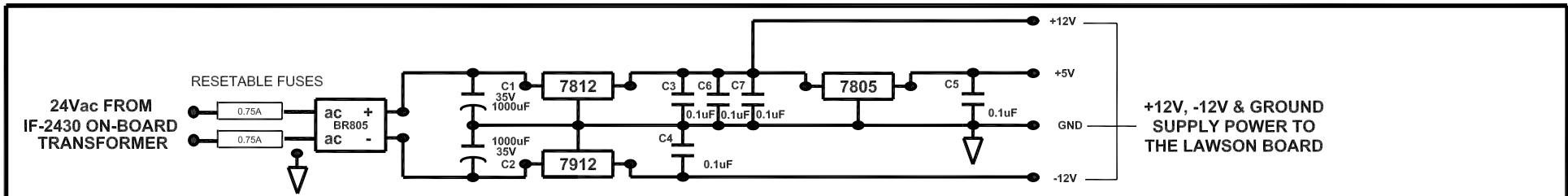
# DUAL REMOTE START PULSE STRETCHER



**REMOTE START CIRCUIT #1**  
 (MOMENTARY GROUNDING OF THE INPUT  
 PRODUCES A 2 SECOND NEGATIVE GOING PULSE  
 ON THE OUTPUT WHICH TRIGGERS THE  
 LAWSON BOARD REMOTE START FUNCTION.)



**REMOTE START CIRCUIT #2**  
 (MOMENTARY GROUNDING OF THE INPUT  
 PRODUCES A 2 SECOND NEGATIVE GOING PULSE  
 ON THE OUTPUT WHICH TRIGGERS THE  
 LAWSON BOARD REMOTE START FUNCTION.)

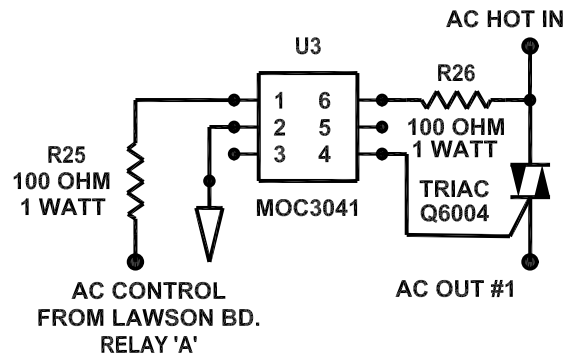


**REMOTE START CIRCUIT #1**  
 (MOMENTARY GROUNDING OF THE INPUT PRODUCES A 2 SECOND NEGATIVE GOING PULSE ON THE OUTPUT WHICH TRIGGERS THE LAWSON BOARD REMOTE START FUNCTION.)

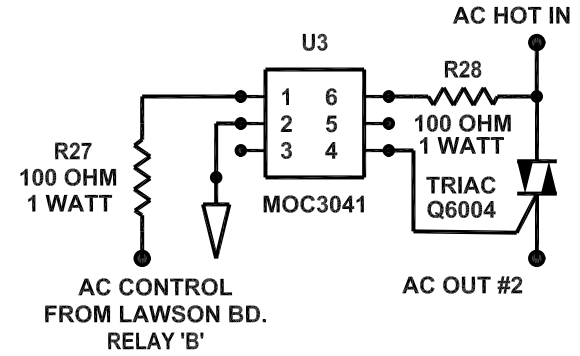
**REMOTE START CIRCUIT #2**  
 (MOMENTARY GROUNDING OF THE INPUT PRODUCES A 2 SECOND NEGATIVE GOING PULSE ON THE OUTPUT WHICH TRIGGERS THE LAWSON BOARD REMOTE START FUNCTION.)

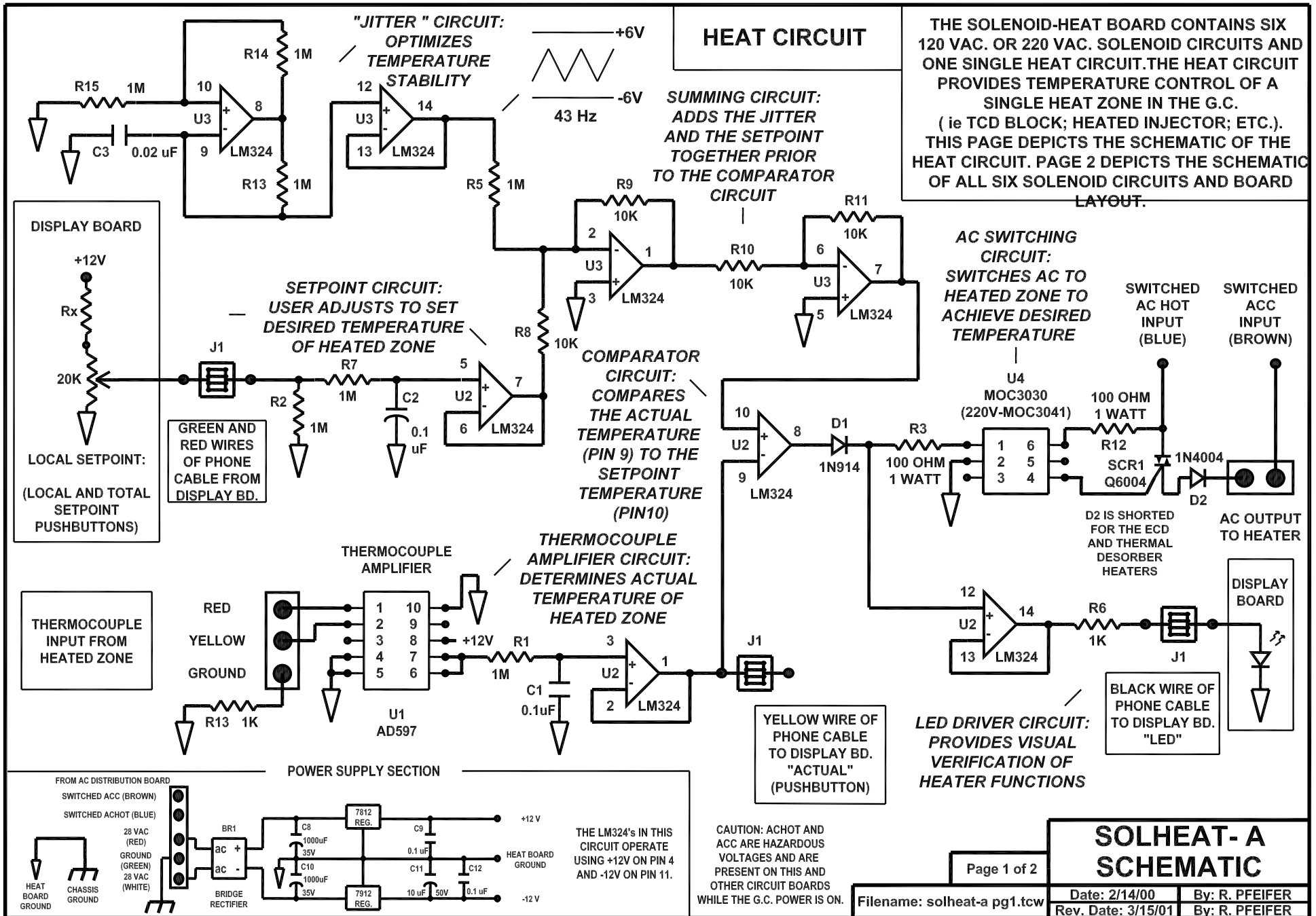


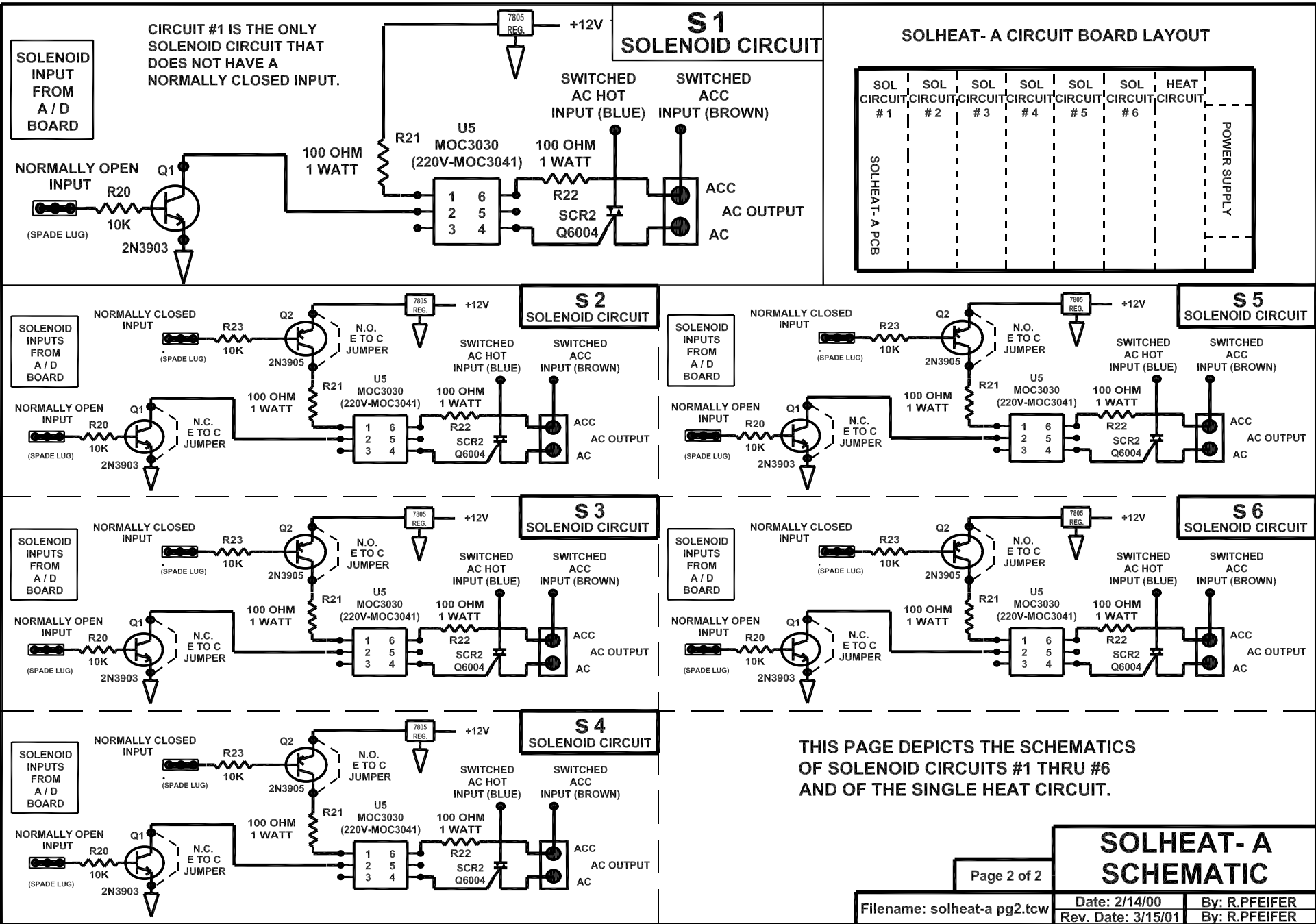
### OPTIONAL AC OUTPUT CIRCUIT #1

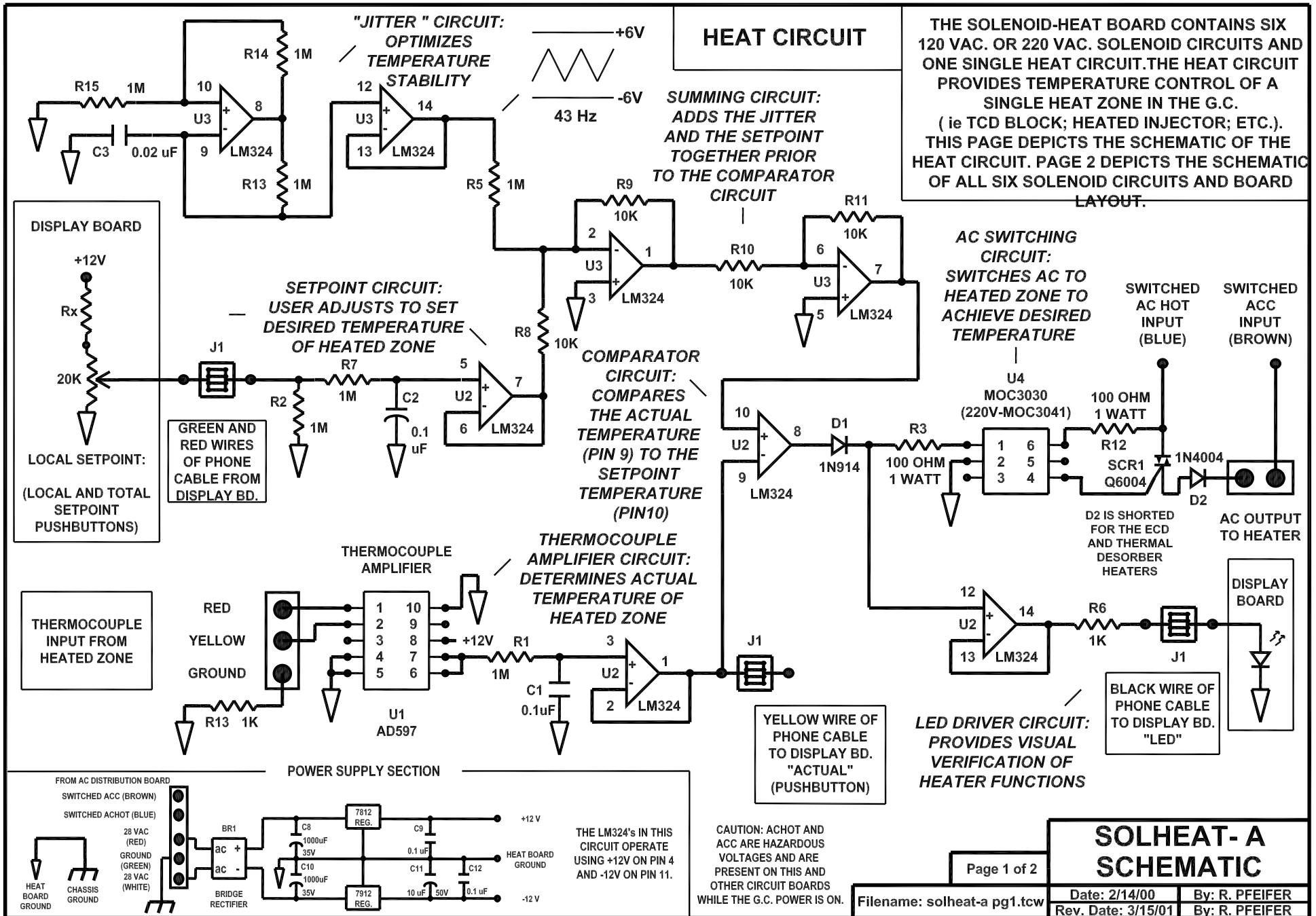


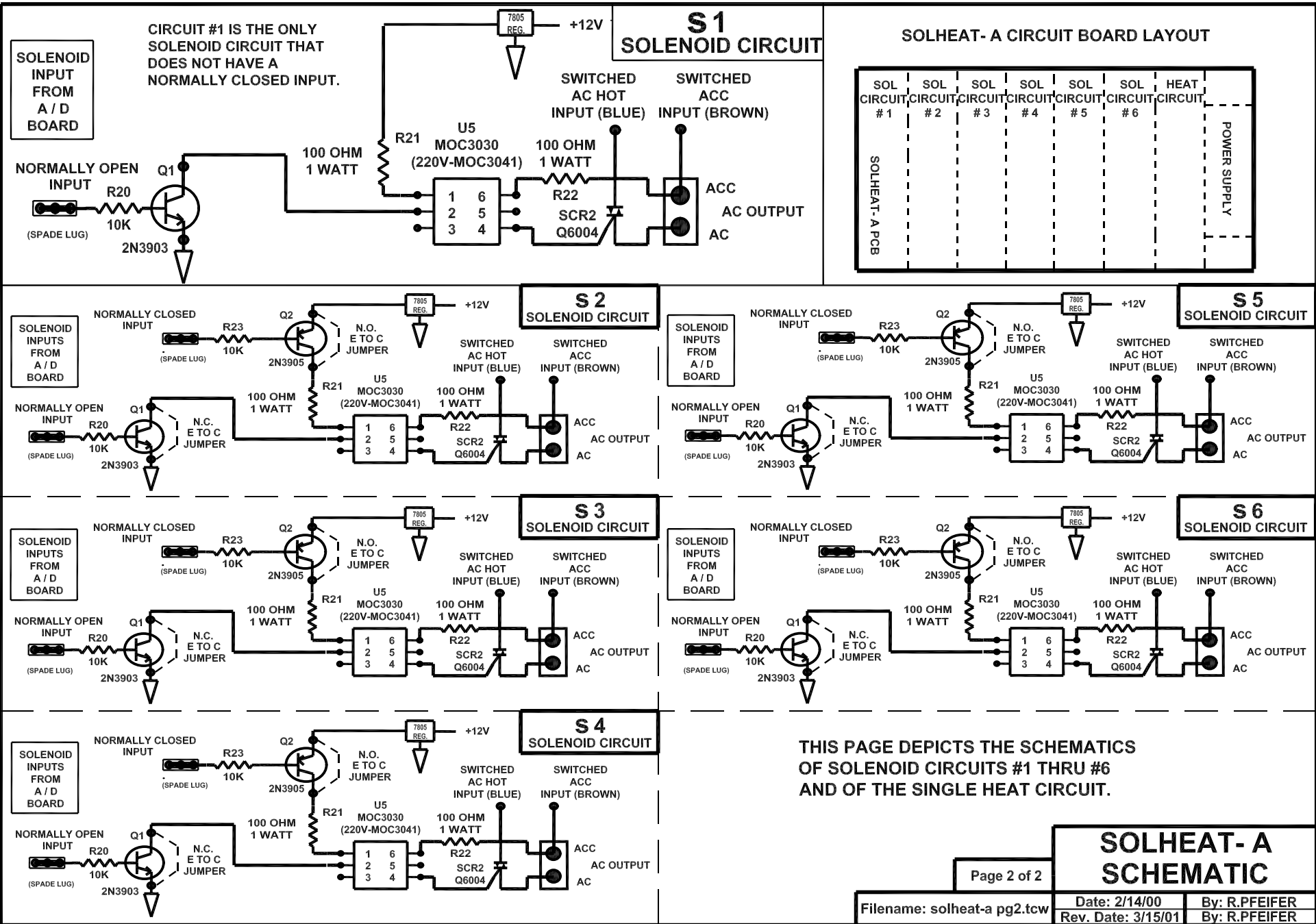
### OPTIONAL AC OUTPUT CIRCUIT #2



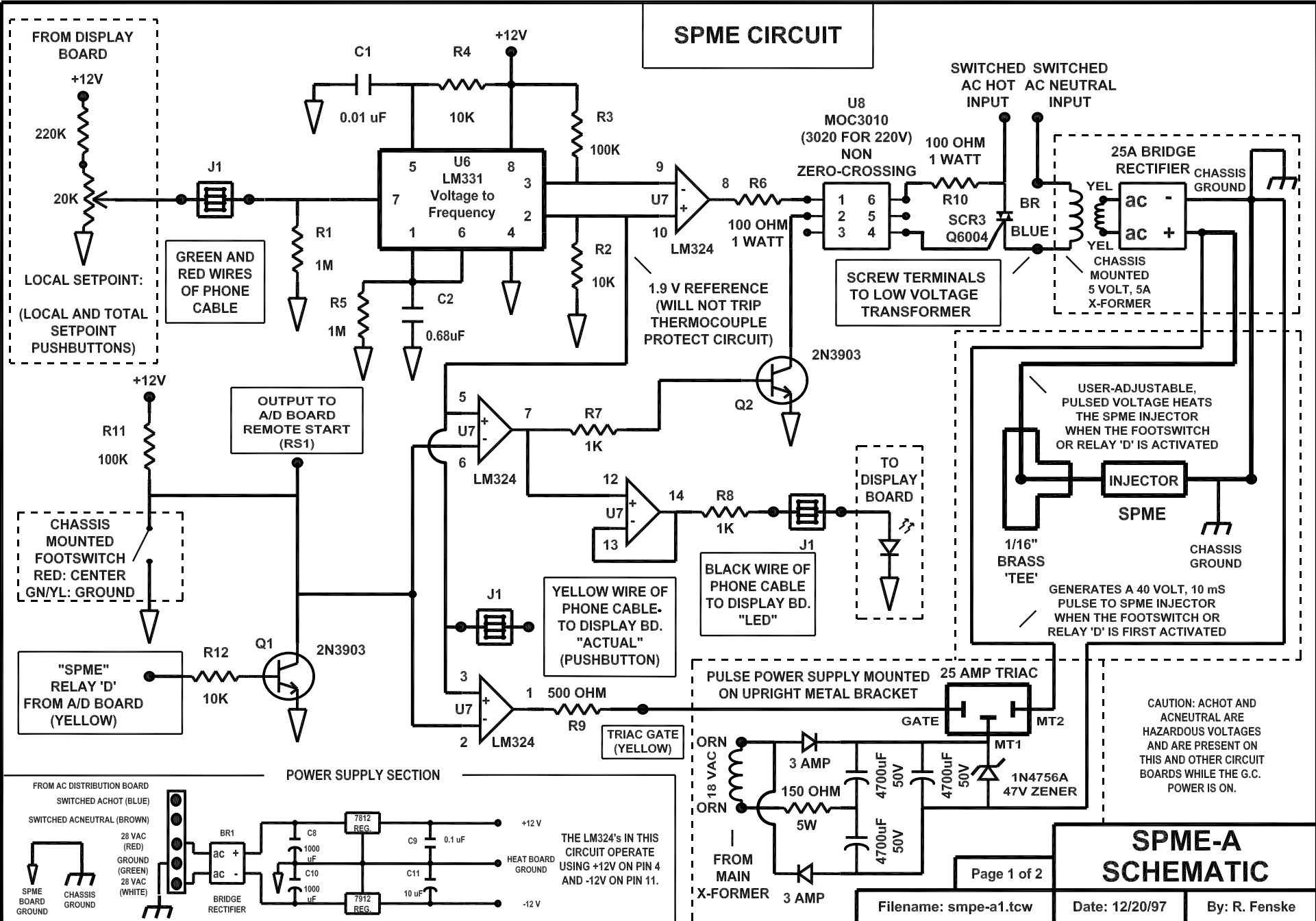








# SPME CIRCUIT



SPME CIRCUIT

1.9 V REFERENCE  
(WILL NOT TRIP  
THERMOCOUPLE  
PROTECT CIRCUIT)

SCREW TERMINALS  
TO LOW VOLTAGE  
TRANSFORMER

USER-ADJUSTABLE,  
PULSED VOLTAGE HEATS  
THE SPME INJECTOR  
WHEN THE FOOTSWITCH  
OR RELAY 'D' IS ACTIVATED

PULSE POWER SUPPLY MOUNTED  
ON UPRIGHT METAL BRACKET

CAUTION: AC HOT AND  
AC NEUTRAL ARE  
HAZARDOUS VOLTAGES  
AND ARE PRESENT ON  
THIS AND OTHER CIRCUIT  
BOARDS WHILE THE G.C.  
POWER IS ON.

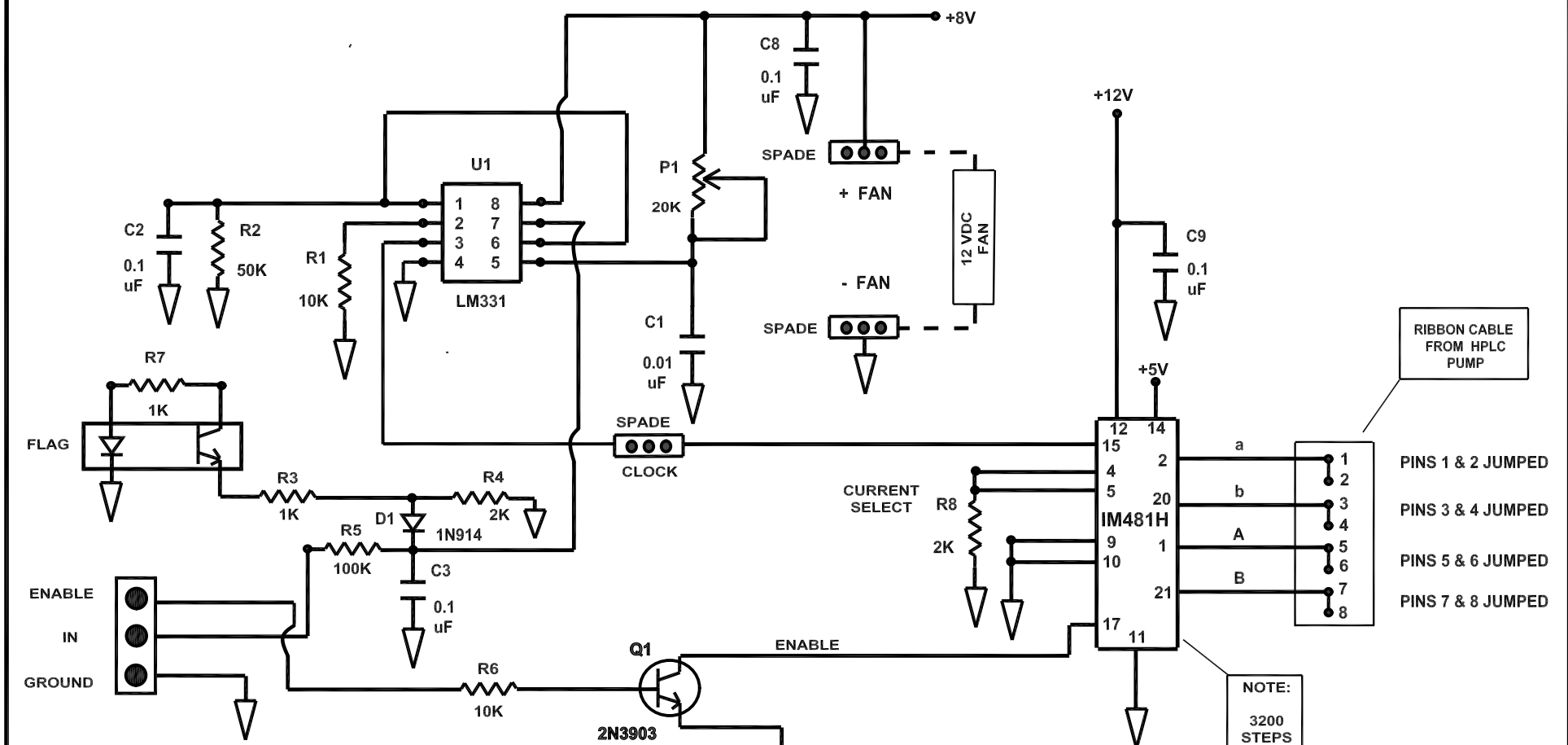
### POWER SUPPLY SECTION

THE LM324's IN THIS  
CIRCUIT OPERATE  
USING +12V ON PIN 4  
AND -12V ON PIN 11.

## SPME-A SCHEMATIC



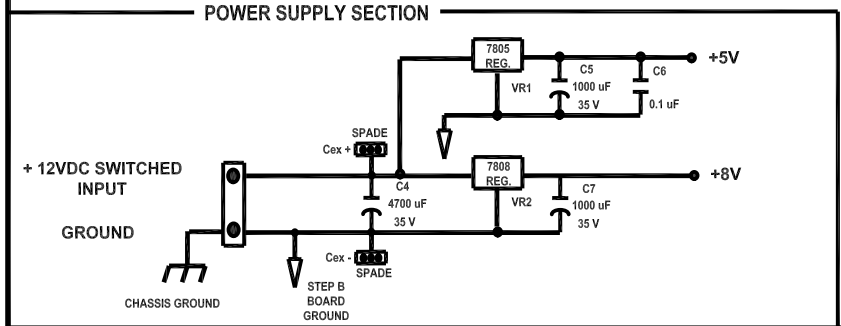
# STEPPER CIRCUIT



RIBBON CABLE FROM HPLC PUMP

- PINS 1 & 2 JUMPED
- PINS 3 & 4 JUMPED
- PINS 5 & 6 JUMPED
- PINS 7 & 8 JUMPED

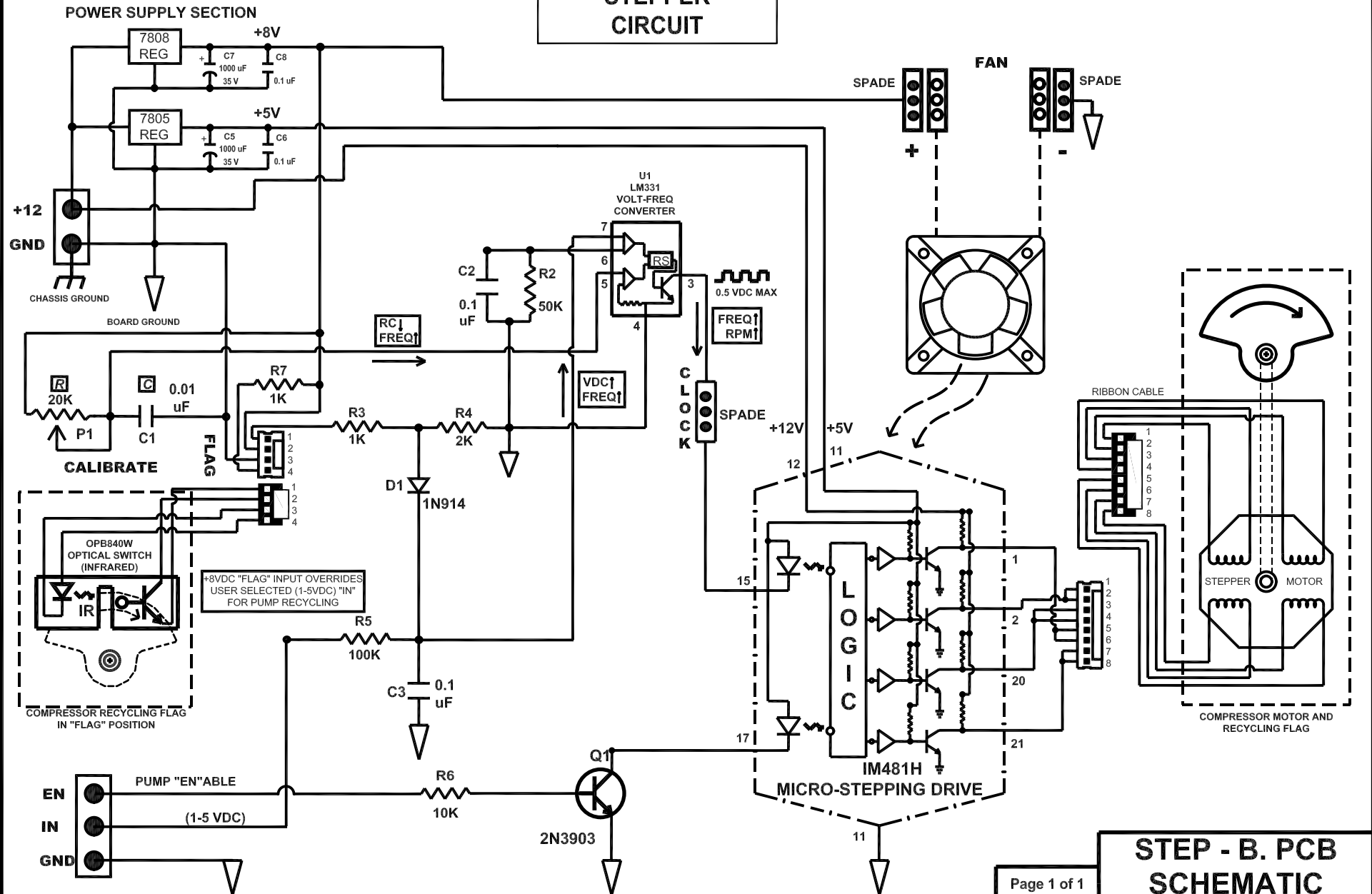
NOTE:  
3200 STEPS  
-----  
REV.







# STEPPER CIRCUIT

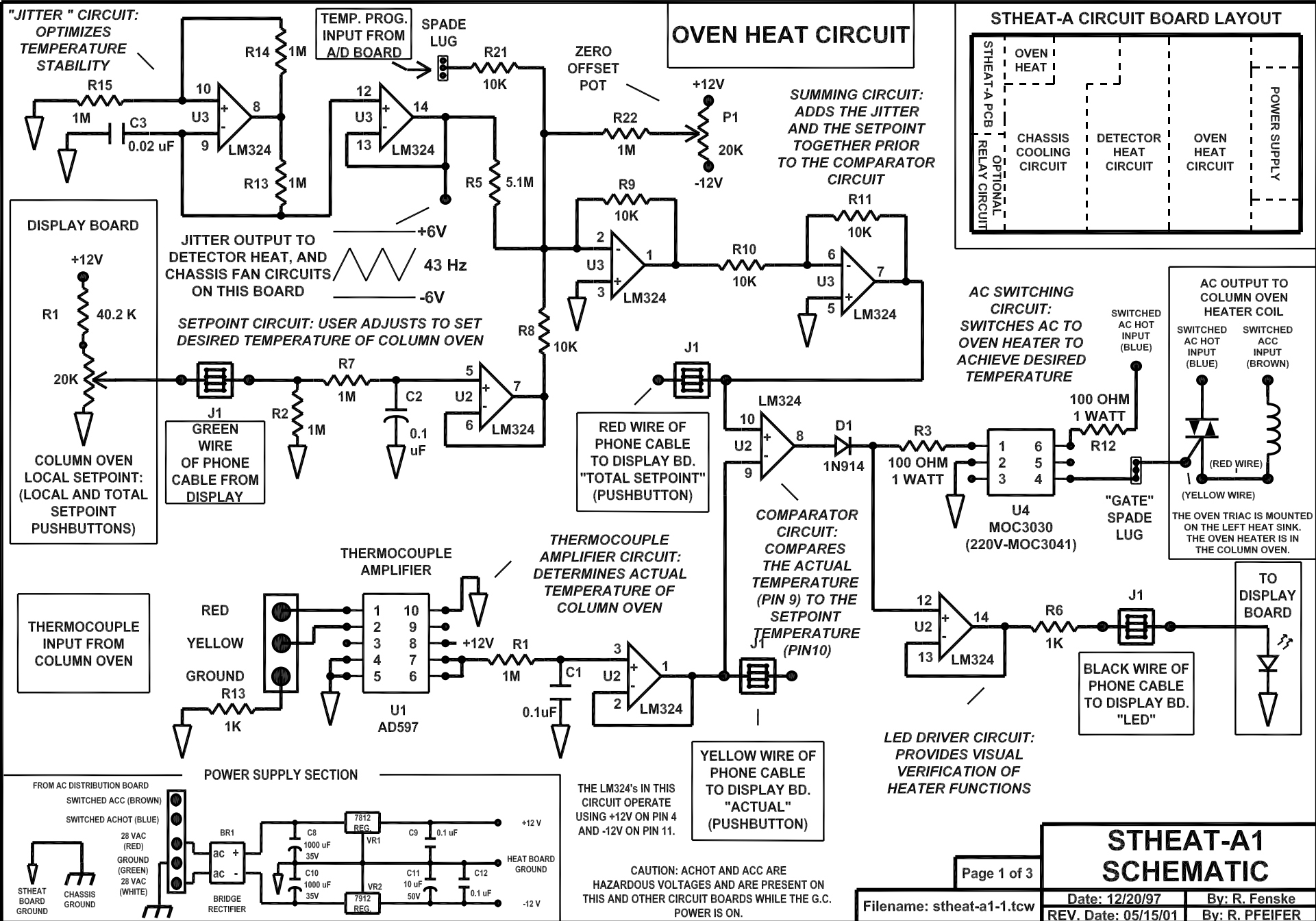


## STEP - B. PCB SCHEMATIC

Page 1 of 1

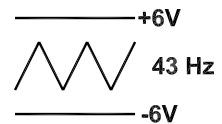
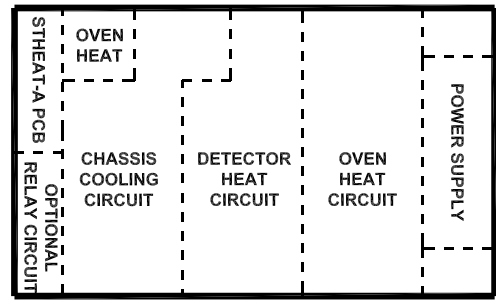
Filename: step-b pcb.tcw

Date: 10/02/03 By: M. Watts  
REV. DATE: 08/03/04 By: J. Bassett



# DETECTOR HEAT CIRCUIT

## STHEAT-A CIRCUIT BOARD LAYOUT



JITTER INPUT FROM OVEN CIRCUIT ON THIS BOARD

**SUMMING CIRCUIT:**  
ADDS THE JITTER AND THE SETPOINT TOGETHER PRIOR TO THE COMPARATOR CIRCUIT

**COMPARATOR CIRCUIT:**  
COMPARES THE ACTUAL TEMPERATURE (PIN 9) TO THE SETPOINT TEMPERATURE (PIN 10)

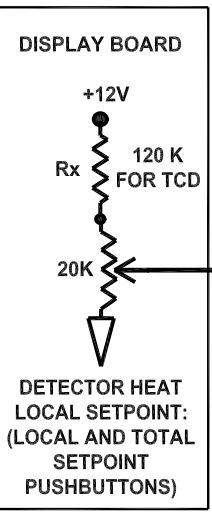
**THERMOCOUPLE AMPLIFIER CIRCUIT:**  
DETERMINES ACTUAL TEMPERATURE OF HEATED ZONE

**AC SWITCHING CIRCUIT:**  
SWITCHES AC TO HEATED ZONE TO ACHIEVE DESIRED TEMPERATURE

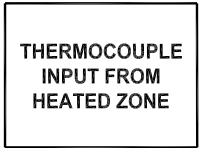
SWITCHED AC HOT INPUT (BLUE)  
SWITCHED AC COMMON INPUT (BROWN)

D2 IS SHORTED FOR THE ECD AND THERMAL DESORBER HEATERS  
AC OUTPUT TO HEATER

**LED DRIVER CIRCUIT:**  
PROVIDES VISUAL VERIFICATION OF HEATER FUNCTIONS



GREEN AND RED WIRES OF PHONE CABLE FROM DISPLAY BD.



THE LM324's IN THIS CIRCUIT OPERATE USING +12V ON PIN 4 AND -12V ON PIN 11.

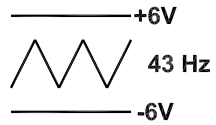
CAUTION: ACHOT AND AC COMMON ARE HAZARDOUS VOLTAGES AND ARE PRESENT ON THIS AND OTHER CIRCUIT BOARDS WHILE THE G.C. POWER IS ON.

YELLOW WIRE OF PHONE CABLE TO DISPLAY BD. "ACTUAL" (PUSHBUTTON)

BLACK WIRE OF PHONE CABLE TO DISPLAY BD. "LED"

# STHEAT-A2 SCHEMATIC

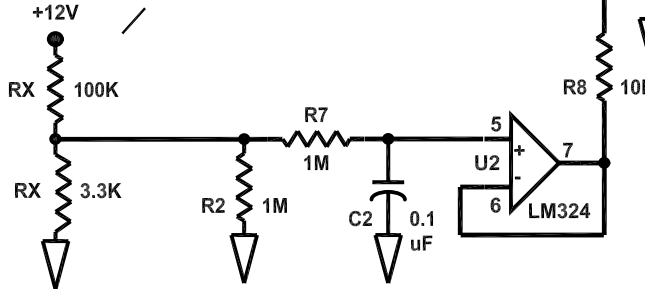
# CHASSIS FAN CIRCUIT



JITTER INPUT FROM OVEN CIRCUIT ON THIS BOARD

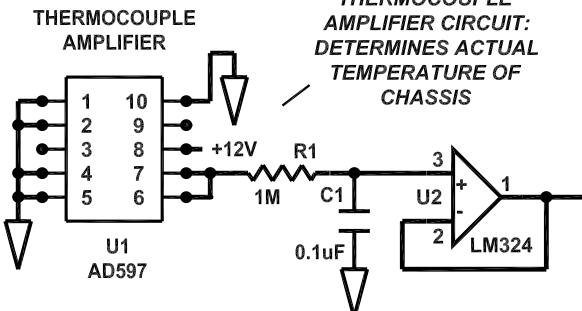
**SUMMING CIRCUIT:**  
ADDS THE JITTER AND THE SETPOINT TOGETHER PRIOR TO THE COMPARATOR CIRCUIT

**VOLTAGE DIVIDER**  
DETERMINES FAN ON/OFF SETPOINT TO COOL TEMPERATURE WITHIN CHASSIS



**COMPARATOR CIRCUIT:**  
COMPARES THE ACTUAL TEMPERATURE (PIN 10) TO THE SETPOINT TEMPERATURE (PIN 9)

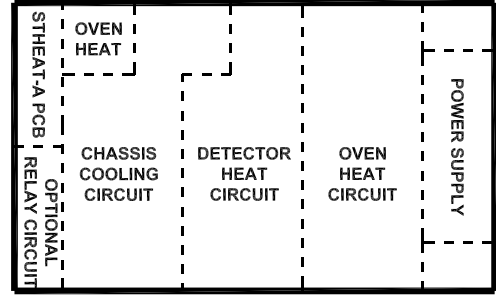
**THERMOCOUPLE AMPLIFIER:**  
DETERMINES ACTUAL TEMPERATURE OF CHASSIS



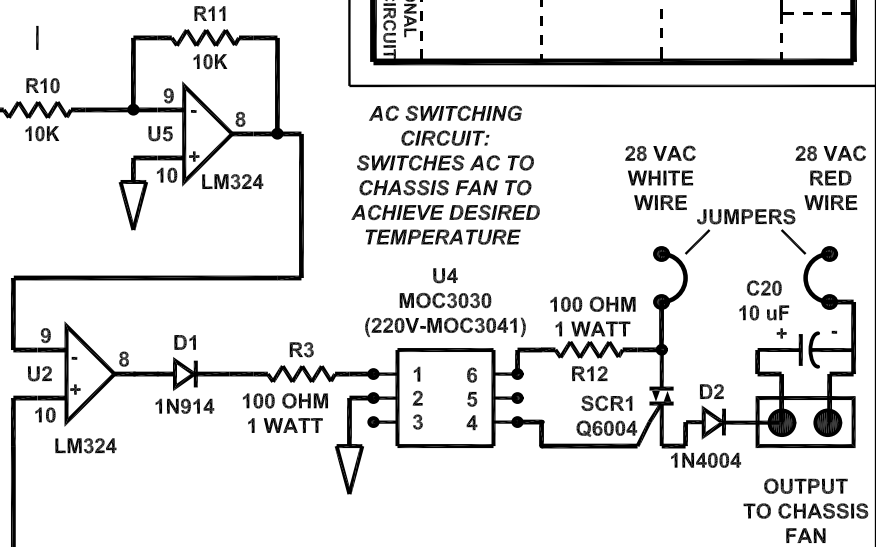
THE LM324's IN THIS CIRCUIT OPERATE USING +12V ON PIN 4 AND -12V ON PIN 11.

CAUTION: A HOT AND AC COMMON ARE HAZARDOUS VOLTAGES AND ARE PRESENT ON THIS AND OTHER CIRCUIT BOARDS WHILE THE G.C. POWER IS ON.

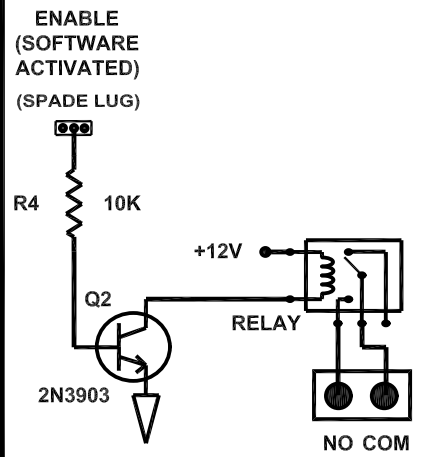
## STHEAT-A CIRCUIT BOARD LAYOUT



**AC SWITCHING CIRCUIT:**  
SWITCHES AC TO CHASSIS FAN TO ACHIEVE DESIRED TEMPERATURE



### OPTIONAL RELAY CIRCUIT



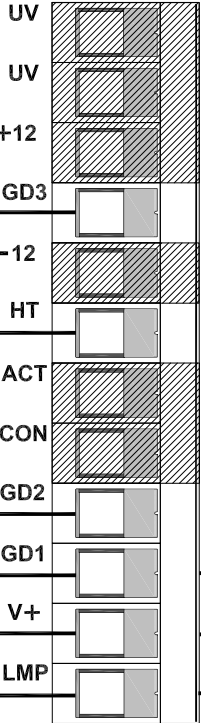
## STHEAT-A3 SCHEMATIC



# UV & CONDUCTIVITY DETECTOR BOARD

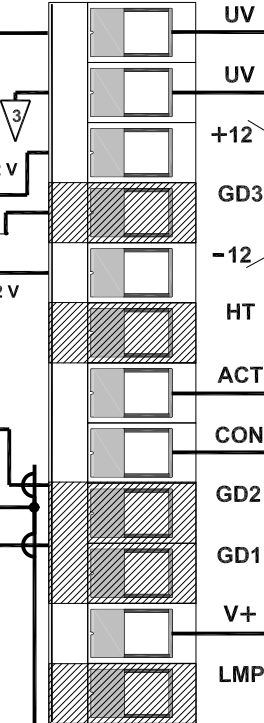
## INPUT

### CONNECTOR: PLUG & HEADER

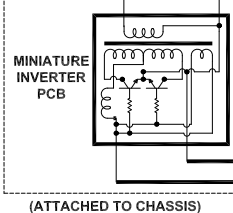
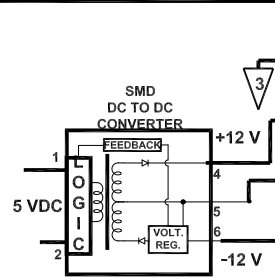
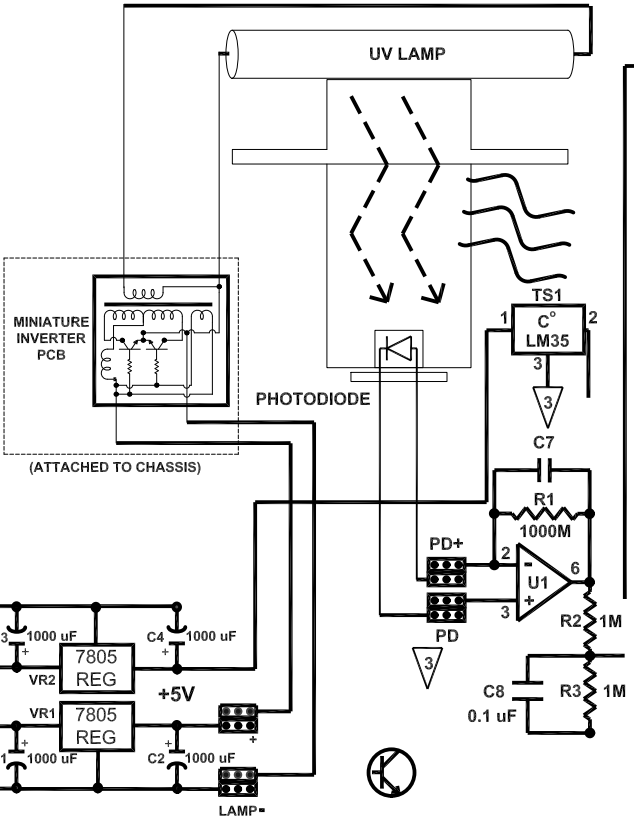
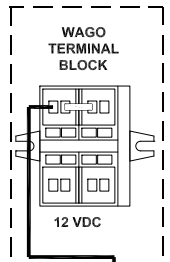
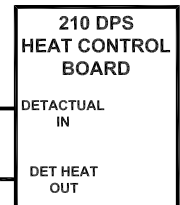
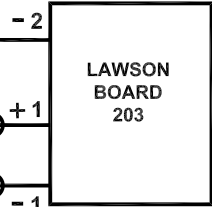


## OUTPUT

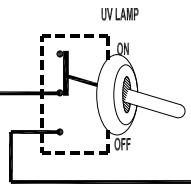
### CONNECTOR: PLUG & HEADER



## EXTERNAL BOARDS

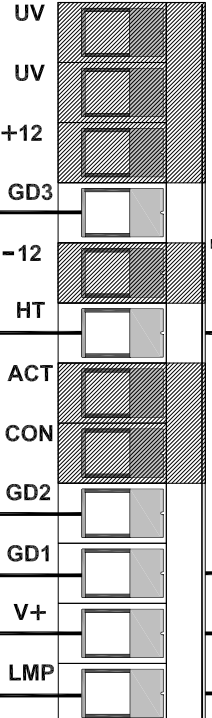


GROUND WIRES RUN SEPARATELY TO GROUND STUD

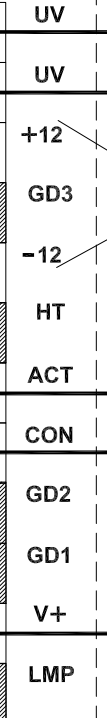


# UV & CONDUCTIVITY DETECTOR BOARD

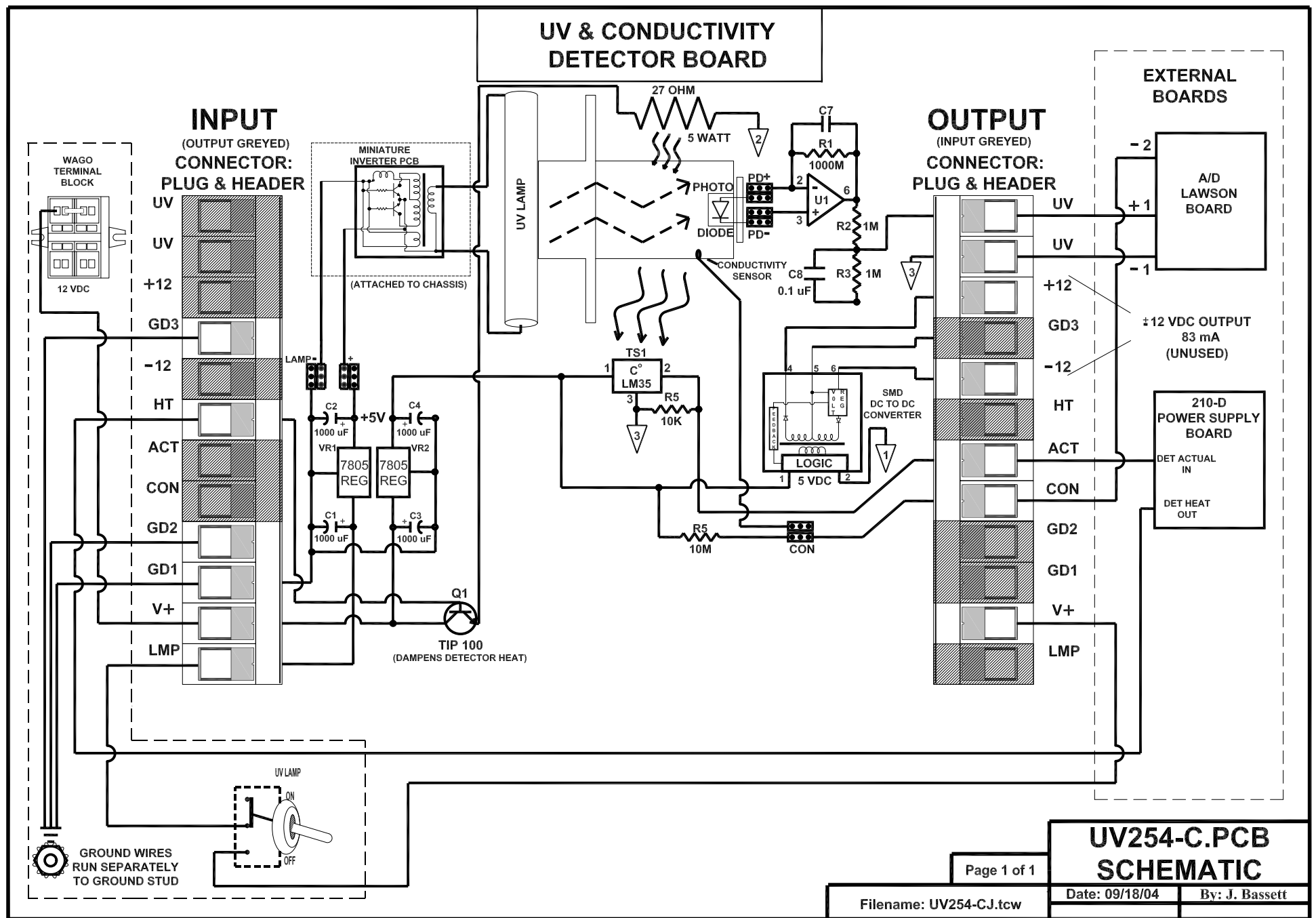
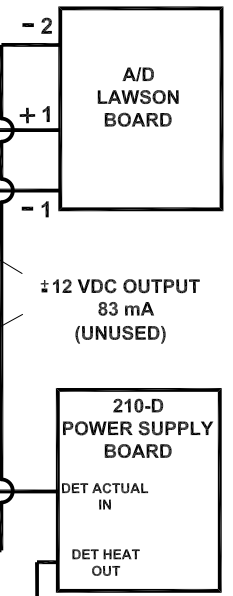
## INPUT (OUTPUT GREYED) CONNECTOR: PLUG & HEADER



## OUTPUT (INPUT GREYED) CONNECTOR: PLUG & HEADER



## EXTERNAL BOARDS



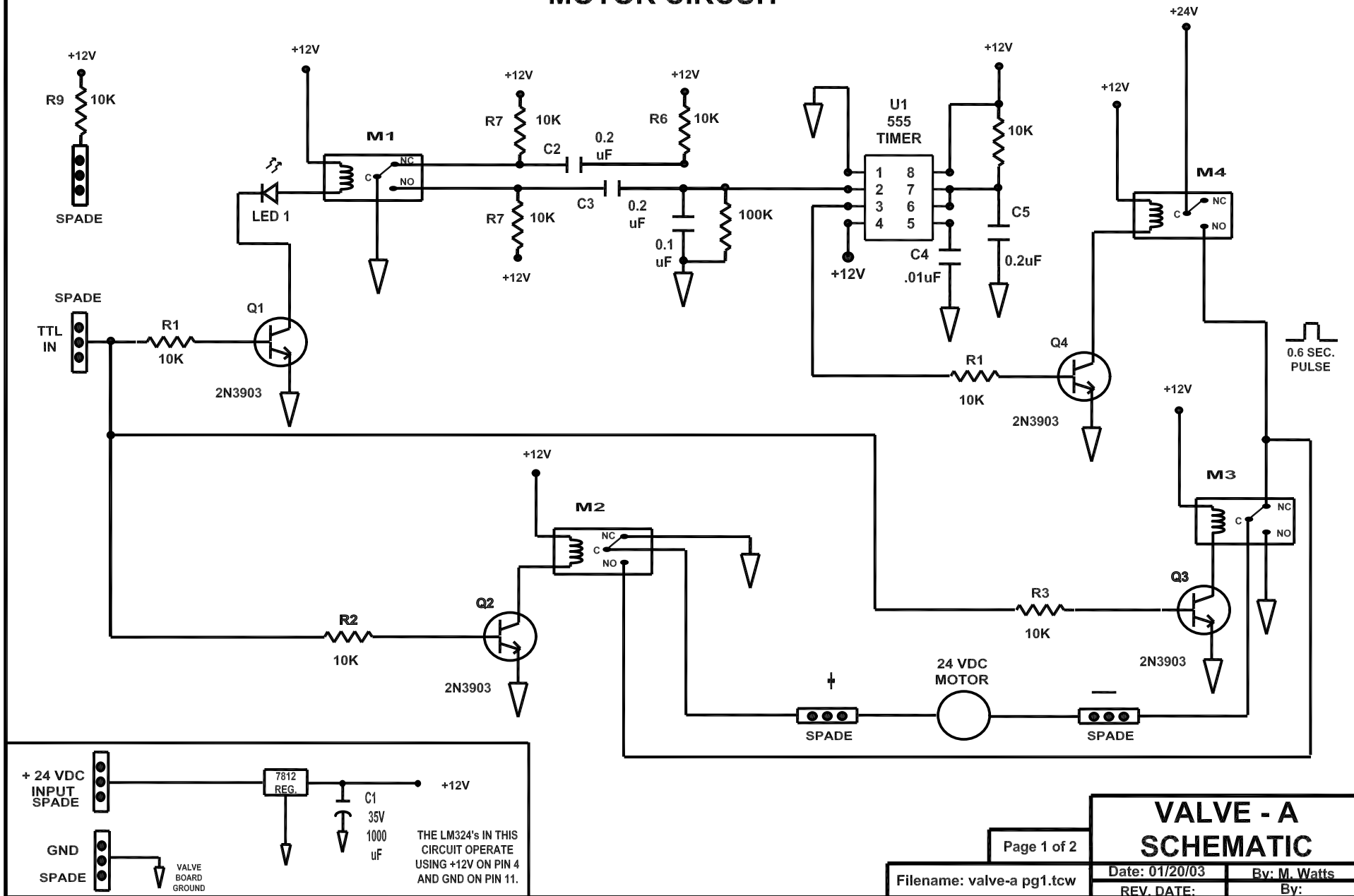
# UV254-C.PCB SCHEMATIC







# MOTOR CIRCUIT



# HEATER CIRCUIT

