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 Y' ON THE OPTIONAL RELAY BOARD IF RELAY CONTACT CLOSURES ARE NEEDED. USE PEAKSIMPLE SOFTWARE TO ACTIVATE.

REMEMBER TO GROUND "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.

CHANNEL INPUT (6 VOLTS MAX.) TO SERIAL DATA PORT FOR CONNECTION TO YOUR COMPUTER.

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.

SIG +/- INPUT FROM DETECTOR AMPLIFIER ON AMP BOARD (8V MAXIMUM INPUT)

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.
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

PHONE JACK

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

LM35

D E T E R M I N E S
A C T U A L
T E M P E R A T U R E
O F C O L U M N

+12 V FROM VR2

R1 1M
C8 0.1 uF

R2 10K

R3 1K

C9 0.1 uF

R4 1M

R5 10K

R7 1M

R8 10K

C11 0.1 uF

+12 V UNREGULATED

CONNECTOR FOR Q1: ALLOWS CONNECTION TO EXTERNAL HEATSINK OR CHASSIS

Q1 TIP 100

R6 1K

R10 1M

R11 1M

JUMP COLUMN LOCAL SETPOINT AND COLUMN REMOTE SETPOINT

POWER SUPPLY SECTION

+12VDC SWITCHED INPUT

GROUN D

210Dps - B. PCB
SCHEMATIC

Filename: 210Dps-B1J pcb.tc w
Page 1 of 4
Date: 7/3/04
By: J.BASSETT
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

210Dps - B. PCB SCHEMATIC
Filename: 210Dps-B.4 pcb.twc
Date: 3/24/04
By: M. Watts
Revised: 07/10/04
By: J. Bassett
REMOTE START & SOLVENT RECYCLE VALVE CIRCUITS

REMOTE START-PULSE STRETCHER CIRCUIT

SOLVENT RECYCLE VALVE

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

+12V UNREGULATED

R18 1M

C13 0.01uF

R21 10K

C12 0.01uF

C14 2uF

2N3904

U1

1 2 5 5 5 7 3 TIMER 6 4 5

R17 10M

R19 10K

IN RST G RST OUT

TO LAWSON BOARD LETTER C

ENABLE

Q7

R12 10K

Q2

TIP 100

RECYCLE

SPADE

+12 V UNREGULATED

RECYCLE

SPADE

SOLVENT RECYCLE VALVE

210Dps - B. PCB SCHEMATIC

Page 4 of 4

Date: 3/24/04 By: M. Watts

Filename: 210Dps-8.4 pcb.twc

Revised: 07/10/04 By: J. Bassett
AC WIRING AND TYPICAL LAYOUT OF THE SRI 8610-C GAS CHROMATOGRAPH

BUS BOARDS ARE THE EPC, HEAT, OVEN, PURGE & TRAP AND HVOLT BOARDS. THESE BOARDS CONTROL THE GAS PRESSURES, DETECTOR PARAMETERS AND TEMPERATURE OF HEATED ZONES WITHIN THE GAS CHROMATOGRAPH. THE CONFIGURATION OF BUS BOARDS
POWER SUPPLY SECTION OF AMP BOARD

POWER SUPPLY #2

FROM AC DISTRIBUTION BOARD OR TRANSFORMER PINS 6, 7 & 8

28 VAC #2 GROUND # 2 28 VAC #2 FLOATING GROUND

BR1

ac +
ac -

BRIDGE RECTIFIER BR805D

C10
1000 uF 50V
C12
1000 uF 50V

C11
0.1 uF
C13
10 uF 50V

C14
0.1 uF

VR1 7812 REG
VR2 7912 REG

+12 V -12 V

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.

BIAS POWER SUPPLY

FROM AC DISTRIBUTION BOARD OR TRANSFORMER PINS 1 & 2

24 VAC BIAS

BR2

ac +
ac -

BRIDGE RECTIFIER BR805D

C15
470 uF 50V
C16
0.1 uF

VR3 7824 REG

24 VOLT BIAS VOLTAGE

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

POWER SUPPLY #1

FROM AC DISTRIBUTION BOARD OR TRANSFORMER PINS 3, 4 & 5

28 VAC #1 GROUND

BR3

ac +
ac -

BRIDGE RECTIFIER BR805D

C17
1000 uF 50V
C19
1000 uF 50V

C18
0.1 uF
C20
10 uF 50V

C21
0.1 uF

VR4 7812 REG
VR5 7912 REG

+12 V -12 V

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 28 VAC #1 GROUND GROUND

FROM AC DISTRIBUTION BOARD OR TRANSFORMER

TD A/D BOARD (GROUND FROM CHASSIS GROUND STUD)

18 VOLS AC FROM TRANSFORMER

ECD SECTION

TCD SECTION

DELCD SECTION

DELCD AMP

PID AMP

FID AMP

FPD AMP

AMP-E SCHEMATIC

Page 1 of 8

Date: 12/20/97 By: R. Fenske

Rev. Date: 08/03 By: M. Watts

Filename: Amp-e1.tcw
ECD CURRENT SECTION OF AMP BOARD

FROM DISPLAY BOARD
+12V
R1 4.02 K
R20 20K

GREEN WIRE OF PHONE CABLE FROM DISPLAY BOARD. ECD CURRENT "LOCAL SETPOINT"

U8 2
U10 3

C11 270pF
R11 1000M
U6 2

R10 1M
R19 100K
U10 3

C10 0.1 uF

C14 0.01uF

R20 2K
U5 12V
LM331
R21 6.8K
R22 15.8K
R23 100K
R24 0 V

R12 1M
R13 1M
R14 1.8K
R15 2K
R16 10K

R20 2K

C15 0.01uF
C16 10 uF 50 V

TO DISPLAY BOARD
+12V
J1 1N914

C12 0.1 uF

D1 LSTT

U7 2
U9 3

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.
DELCOD POWER SECTION OF AMP BOARD

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

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

THERMOCOUPLE AMPLIFIER CIRCUIT: DETERMINES ACTUAL TEMPERATURE OF DELCDO REACTOR

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

YELLOW WHITE

LED DRIVER CIRCUIT: PROVIDES VISUAL VERIFICATION OF DELCDO 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.
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.

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

NOTE: MODEL 310 STUDENT TCD
G.C.s AND MODEL 110 STANDALONE
DETEKTORS 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-E
SCHEMATIC
Page 8 of 8
Date: 12/20/97 By: R. Fenske
Rev. Date: 08/08/11 By: M. Roseberry

Filename: Amp-e8.tcw
POWER SUPPLY SECTION OF AMP BOARD

POWER SUPPLY #2
FROM AC DISTRIBUTION BOARD OR TRANSFORMER PINS 6, 7 & 8
28 VAC #2 GROUND #2 28 VAC #2
28 VAC #2 FLOATING GROUND

BR1
ac + ac -

BRIDGE RECTIFIER BR805D

C10 1000 uF 50V
C12 1000 uF 50V

C11 0.1 uF
C13 10 uF 50V
C14 0.1 uF

VR1
7812 REG.

VR2
7812 REG.

+12 V
-12 V

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.

BIAS POWER SUPPLY
FROM AC DISTRIBUTION BOARD OR TRANSFORMER PINS 1 & 2
24 VAC BIAS

BR2
ac + ac -

BRIDGE RECTIFIER BR805D

C15 470uF 50V

VR3
7824 REG.

C16 0.1 uF

24 VOLT BIAS VOLTAGE

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

POWER SUPPLY #1
FROM AC DISTRIBUTION BOARD OR TRANSFORMER PINS 3, 4 & 5
28 VAC #1 GROUND 28 VAC #1

BR3
ac + ac -

BRIDGE RECTIFIER BR805D

C17 1000 uF 50V
C19 1000 uF 50V

C18 0.1 uF
C20 10 uF 50V
C21 0.1 uF

VR4
7812 REG.

VR5
7812 REG.

+12 V
-12 V

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

TCD SECTION 1
TCD SECTION 2
PID AMP
FID AMP
FPD AMP

Page 1 of 7

Date: 12/20/97 By: M. Roseberry
Rev. Date: 08/30/13 By: R. Fenske

Filename: Amp-f1.tcw
TCD 1 CIRCUIT

18VAC INPUT FROM TRANSFORMER PINS 15 & 16

BR4
- + AC + BR805D
Bridge Rectifier
C17 4700uF

12V

TCD Rectifier

RB OPEN IF CARRIER PRESSURE IS LESS THAN SETPOINT

RLY1

GAIN SWITCH 1

HIGH

LOW

TO DISPLAY BOARD

C30 1000uF

(1.2V) ON LOW CURRENT OR HIGH CURRENT

HIGH GAIN LOW GAIN

Screw terminals on AMP BD.

CHASSIS MOUNTED TCD CELL

INHIBIT

NOTE: FOR MULTIGAS 2 ONLY REPLACE RESISTOR AT R32 WITH A JUMPER

LOCAL SETPOINT 10mV = 1 PSI

RED WIRE OF PHONE CABLE J1 FROM DISPLAY BOARD.

TCD PROTECT "LOCAL SETPOINT"

RED WIRE OF PHONE CABLE FROM DISPLAY BOARD.

TCD PROTECT "LOCAL SETPOINT"

GREEN WIRE OF PHONE CABLE FROM DISPLAY BOARD.

TCD PROTECT "TOTAL SETPOINT"

BLACK WIRE OF PHONE CABLE FROM DISPLAY BOARD.

TCD PROTECT LED "TOTAL SETPOINT"

(1.2V) ON LOW CURRENT OR HIGH CURRENT

TCD 2 CIRCUIT

10VAC INPUT FROM TRANSFORMER PINS 12 & 13

BR5
- + AC + BR805D
Bridge Rectifier
C17 4700uF

12V

TCD Rectifier

RLY2

GAIN SWITCH 2

HIGH

LOW

TO DISPLAY BOARD

C31 1000uF

(1.2V) ON LOW CURRENT OR HIGH CURRENT

HIGH GAIN LOW GAIN

Screw terminals on AMP BD.

CHASSIS MOUNTED TCD CELL

INHIBIT

NOTE: FOR MULTIGAS 2 ONLY REPLACE RESISTOR AT R32 WITH A JUMPER

LOCAL SETPOINT 10mV = 1 PSI

RED WIRE OF PHONE CABLE J1 FROM DISPLAY BOARD.

TCD PROTECT "TOTAL SETPOINT"

RED WIRE OF PHONE CABLE FROM DISPLAY BOARD.

TCD PROTECT "TOTAL SETPOINT"

GREEN WIRE OF PHONE CABLE FROM DISPLAY BOARD.

TCD PROTECT "TOTAL SETPOINT"

BLACK WIRE OF PHONE CABLE FROM DISPLAY BOARD.

TCD PROTECT LED "TOTAL SETPOINT"

(1.2V) ON LOW CURRENT OR HIGH CURRENT

NOTE: MODEL 310 STUDENT TCD GC'S AND MODEL 110 STANDALONE DETECTORS 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 210 STUDENT TCD, G.C.4 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.
AMP-F SCHEMATIC

PAGE IN THIS SECTION.

SIGNAL INPUT FROM PID COLLECTOR

SIGNAL OUT TO A/D BOARD

SIGNAL INPUT FROM FPD COLLECTOR

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, OCT, 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, OCT, 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.
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)

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 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.
CUT TRACE BETWEEN R18 AND R41. JUMP R22 AND R41 FOR "TOTAL SETPOINT"

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

YELLOW WIRE OF PHONE CABLE GOES TO DISPLAY BD. "TOTAL SETPOINT"

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

COMPARATOR CIRCUIT COMPARES THE ACTUAL TEMPERATURE (PIN 5) TO THE SETPOINT TEMPERATURE (PIN 8)

JUMP BETWEEN READY AND READY IN

BLACK (+) AND WHITE (-) WIRES TO READY LED ON START/STOP SWITCH

+12V

AUTOSAMPLER CONTACT CLOSURE

DUAL OVEN-G #2 SCHEMATIC

Filename: dual oven-g #2 pg3.twc
Rev. Date: 12/16/03
By: M.Watts

Date: 7/16/03
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.

EPC-G SCHEMATIC

Date: 12/20/97
Rev. Date: 4/21/03
By: R. Fenske
By: M. Watts

FILENAME: epc-g.tcw
THE HIGH VOLTAGE SECTION CONTAINS THE CIRCUITS THAT SUPPLY POWER TO THE HID ELECTRODE.

SETPOINT CIRCUIT:
USER ADJUSTS TO SET DESIRED CURRENT FOR HID.

X 1000 DIFFERENTIAL AMPLIFIER:
COMPARSES THE ACTUAL CURRENT OR VOLTAGE (PIN 13) TO THE SETPOINT CURRENT OR VOLTAGE (PIN10).

POWER SUPPLY SOURCE:
+20 V REGULATED FOR HID

FEEDBACK TO DIFFERENTIAL AMPLIFIER

1500 VDC MAX. OUTPUT
EMCO L15B HIGH VOLTAGE POWER SUPPLY

POWER SUPPLY SECTION
30V REG. FOR HD
30V UNREG. FOR PM, FPD

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

HEAT-G CIRCUIT BOARD LAYOUT

Optional Solenoid Circuit

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 have different inputs:
Heat Circuit #2 uses U5 pin 1 and pin 7 outputs.
Heat Circuit #3 uses U5 pin 14 and pin 8 outputs.

Display Board

Heat Circuit #3

Heat Circuit #2

Heat Zone Local Setpoint (Local and Total Setpoint Pushbuttons)

Thermocouple Input from Heated Zone

Jitter* Circuit: Optimizes Temperature Stability

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 (Pin10)

Thermocouple Amplifier Circuit: Determines Actual Temperature of Heated Zone

Yellow Wire of Phone Cable to Display BD "ACTUAL" (Pushbutton)

AC Switching Circuit: Switches AC to Heated Zone to Achieve Desired Temperature

Switched AC Hot Input (Blue)

Switched AC Input (Brown)

Heat Circuit #3

Display Board

Heat Zone Local Setpoint (Local and Total Setpoint Pushbuttons)

Thermocouple Input from Heated Zone

Jitter* Circuit: Optimizes Temperature Stability

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 (Pin10)

Thermocouple Amplifier Circuit: Determines Actual Temperature of Heated Zone

Yellow Wire of Phone Cable to Display BD "ACTUAL" (Pushbutton)

AC Switching Circuit: Switches AC to Heated Zone to Achieve Desired Temperature

Switched AC Hot Input (Blue)

Switched AC Input (Brown)

Display Board

Heat Circuit #2

Display Board
THE HIGH VOLTAGE SECTION CONTAINS THE CIRCUITS THAT SUPPLY POWER TO THE PID LAMP, THE FPD PHOTO-MULTIPLIER TUBE AND THE HID ELECTRODE.

SETPOINT CIRCUIT:
USER ADJUSTS TO SET DESIRED CURRENT FOR HID, PID OR VOLTAGE FOR FPD

X 1000 DIFFERENTIAL AMPLIFIER:
COMPARES THE ACTUAL CURRENT OR VOLTAGE (PIN 13) TO THE SETPOINT CURRENT OR VOLTAGE (PIN10)

TRANSISTORS Q1 & Q2 PROVIDE THE REQUIRED INPUT VOLTAGE TO THE HIGH VOLTAGE POWER SUPPLY

POWER SUPPLY SOURCE:
REGULATED +12 VDC #1 FOR HID, PID, FPD

FEEDBACK TO DIFFERENTIAL AMPLIFIER

YELLOW WIRES OF PHONE CABLE TO DISPLAY BD. "ACTUAL"

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

NOTE: THERE CAN BE UP TO TWO DETECTOR CIRCUITS PER BOARD. (ANY COMBINATION OF PID, HID & FPD)
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.
- Chassis cooling fan & virtual oven circuit.
- See page two for oven heating and cooling circuits and page three for ready light light circuit.

The LM35 indicates actual chassis temperature +12 V.

Q10 LM35

Jitter input from U3 pin 8 (shown on bottom of this page)

Power supply section

Chassis fan circuit: voltage divider determines fan on/off setpoint for chassis cooling.

CAUTION:
- AC HOT and AC common are hazardous voltages and are present on this and other circuit boards while G.C. power is on.

Comparator circuit: compares the actual temperature (pin 9) to setpoint temperature (pin 10).

AC switching circuit: switches AC to chassis fan for chassis cooling.

MOC3041 optoisolator:
- 100 OHM 1 WATT
- 100 OHM 1 WATT
- 100 OHM 1 WATT
- 100 OHM 1 WATT

To 24V chassis fan

Bridge rectifier

50V 10 uF

BR2

C7

TO 24V CHASSIS FAN

Red

Black

Date: 12/20/97
By: R. Fenske

Rev. Date: 7/26/04
By: J. Bassett

Filename: oven-g pg1 tcw
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
LAWBON 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
LAWBON 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.)
CIRCUIT #1 IS THE ONLY SOLENOID CIRCUIT THAT DOES NOT HAVE A NORMALLY CLOSED INPUT.

S1 SOLENOID CIRCUIT

SOLHEAT-A CIRCUIT BOARD LAYOUT

S2 SOLENOID CIRCUIT

S3 SOLENOID CIRCUIT

S4 SOLENOID CIRCUIT

S5 SOLENOID CIRCUIT

S6 SOLENOID CIRCUIT

THIS PAGE DEPICTS THE SCHEMATICS OF SOLENOID CIRCUITS #1 THRU #6 AND OF THE SINGLE HEAT CIRCUIT.
CIRCUIT #1 IS THE ONLY SOLENOID CIRCUIT THAT DOES NOT HAVE A NORMALLY CLOSED INPUT.

SOLHEAT- A CIRCUIT BOARD LAYOUT

S1 SOLENOID CIRCUIT

+12V

S2 SOLENOID CIRCUIT

+12V

S3 SOLENOID CIRCUIT

+12V

S4 SOLENOID CIRCUIT

+12V

S5 SOLENOID CIRCUIT

+12V

S6 SOLENOID CIRCUIT

+12V

THIS PAGE DEPICTS THE SCHEMATICS OF SOLENOID CIRCUITS #1 THRU #6 AND OF THE SINGLE HEAT CIRCUIT.
THIS PAGE DEPICTS THE SCHEMATICS OF HEAT CIRCUITS #1 AND #2 OF THE SPME BOARD.
THE ONLY DIFFERENCE BETWEEN HEAT CIRCUITS #1 AND #2 IS THAT THE SUMMING CIRCUIT IN EACH SECTION HAVE DIFFERENT OP-AMP PINOUTS:
HEAT CIRCUIT #1 USES U3 PIN 1 AND PIN 7 OUTPUTS.
HEAT CIRCUIT #2 USES U5 PIN 1 AND PIN 7 OUTPUTS.
5 AMP 10 VAC TRANSFORMER

SWITCHED AC NEUTRAL INPUT (BROWN)

THE OVEN TRIAC IS MOUNTED ON THE LEFT HEAT SINK. THE OVEN HEATER IS IN THE COLUMN OVEN.

SWITCHED AC HOT INPUT (BLUE)

(RED WIRE)

(YELLOW WIRE)

OVEN BOARD

35 AMP BRIDGE RECTIFIER

0.2 OHM 5 WATT

LM338 BOTTOM VIEW

DC OUTPUT TO COLUMN COIL

VIRTUAL OVEN SCHEMATIC

Filename: virtual oven.tcw Date: 7/17/03 By: M. Watts