

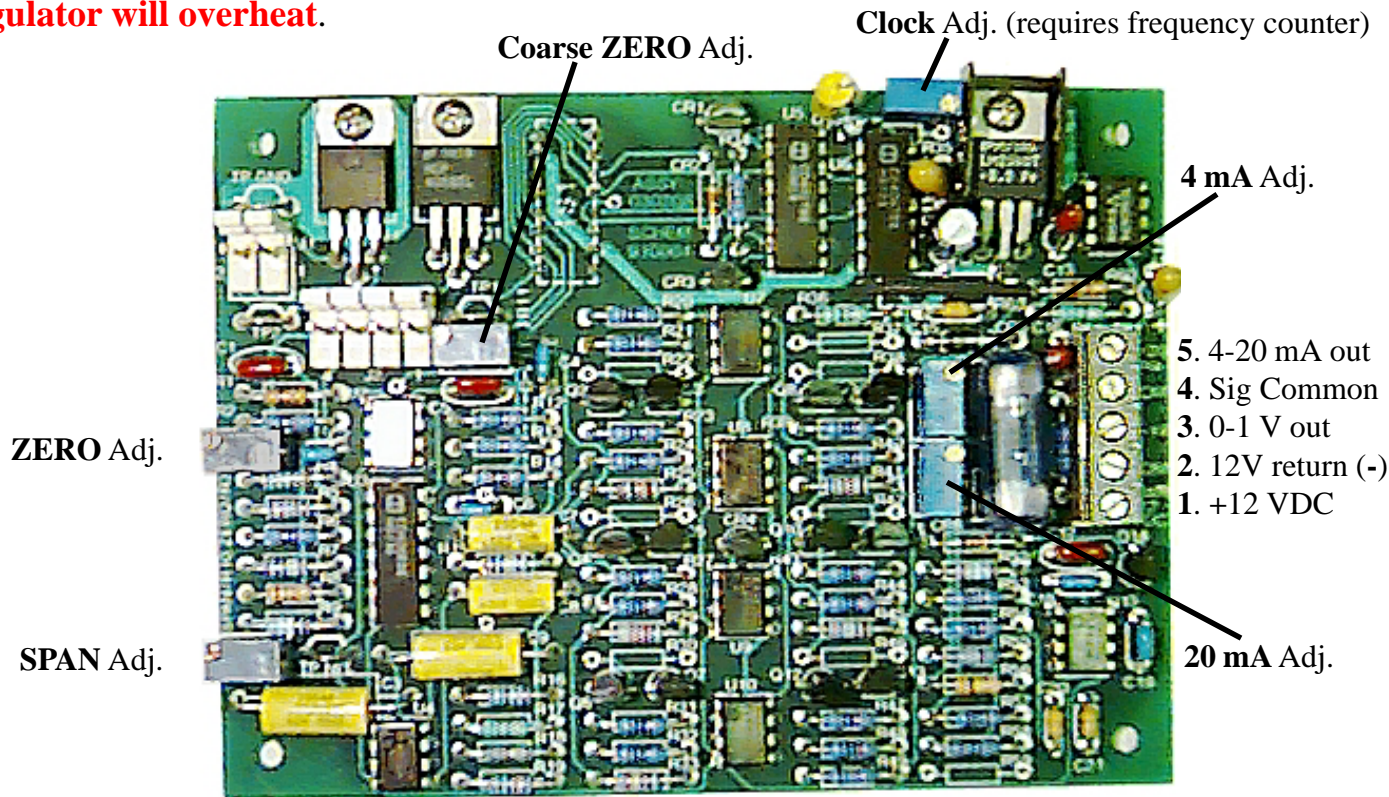


Application Note A60

Model 2008 RT 12 volt & 24 volt powered versions

Shown below is a Model 2008 RT type circuit board. It could be in a Model 2008LRTD-12VDC 1% CO₂ unit, a 2008HRTB-12VDC 5% CO₂ unit or a 2008HRTD-12VDC 20% CO₂ unit are examples of several different gas cell types and full scale ranges that are available. The difference between this 12VDC powered version and a 24VDC powered version consists of three (3) component changes: The 8 volt regulator chip (U11 a 7808 or LM340T8 type) in a 12VDC powered sensor is replaced by a 12 volt regulator chip (7812 type or LM340T12 type). The jumper in location R63 is replaced by a 5 ohm 3 watt resistor for a 24VDC powered version. Resistor R8 changes from 7.5K (12V config) to 11.3K ohms. See page two for component locations.

Caution: A 12VDC configured unit will not operate properly on 24 VDC because the 8 volt regulator will overheat.



See the complete **specification sheet** for detailed operating specifications like a 2008HRTB-24VDC 5% CO₂ unit shown partially on page 2:

Method: N.D. I. R. (Non-dispersive Infra-red) gas diffusion sample cell

Gas: Carbon dioxide (CO₂)

Range: 0-5% CO₂

Accuracy: ± 5% of reading from mid to full scale (± 0.125% CO₂ from 0-2..5% CO₂)

Repeatability: ± 1% of full scale (challenge with same gas sample and assure zero)

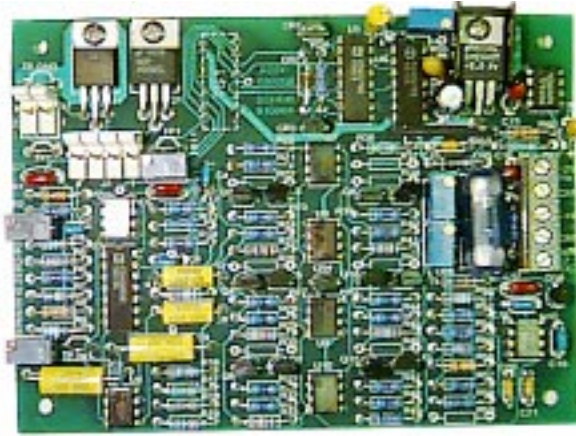
External Power Source: **24 Volts D.C.** @ 0.4 amp. max. (**20.0** to **26.0** VDC absolute **min./max.**)

Power Consumption: 4 watts typical @ 24.0 VDC

Output Signals, voltage output: .. **0 to 1 volt** = 0 to 5% (linear scale data provided)

current loop output: ... **4 to 20 mA** = 0 to 5% (linear scale data provided) **500 Ω max loop resistance**

Model 2008 RT
12V PC board



12 VDC
Configuration

R8 change from
7.5K (12 v config) to
11.3K for 24V

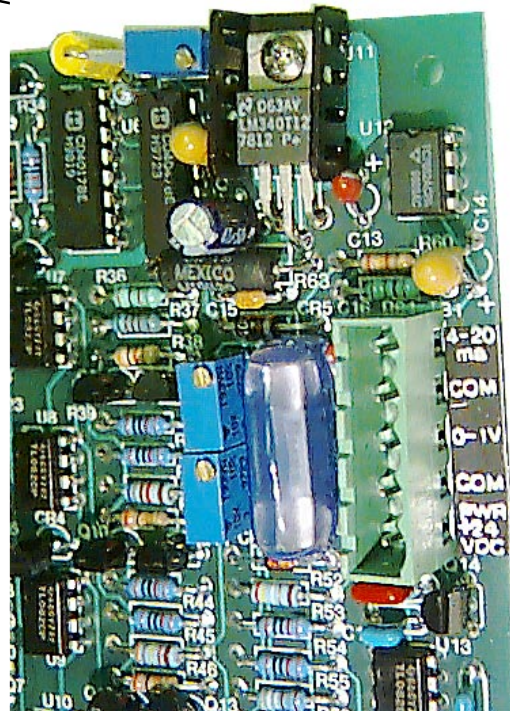
- +8V regulator**
- **U11**, 7808 or LM340T08
- **R63**
Jumper



R65 clock adj
only if you
have a preci-
sion frequency
counter

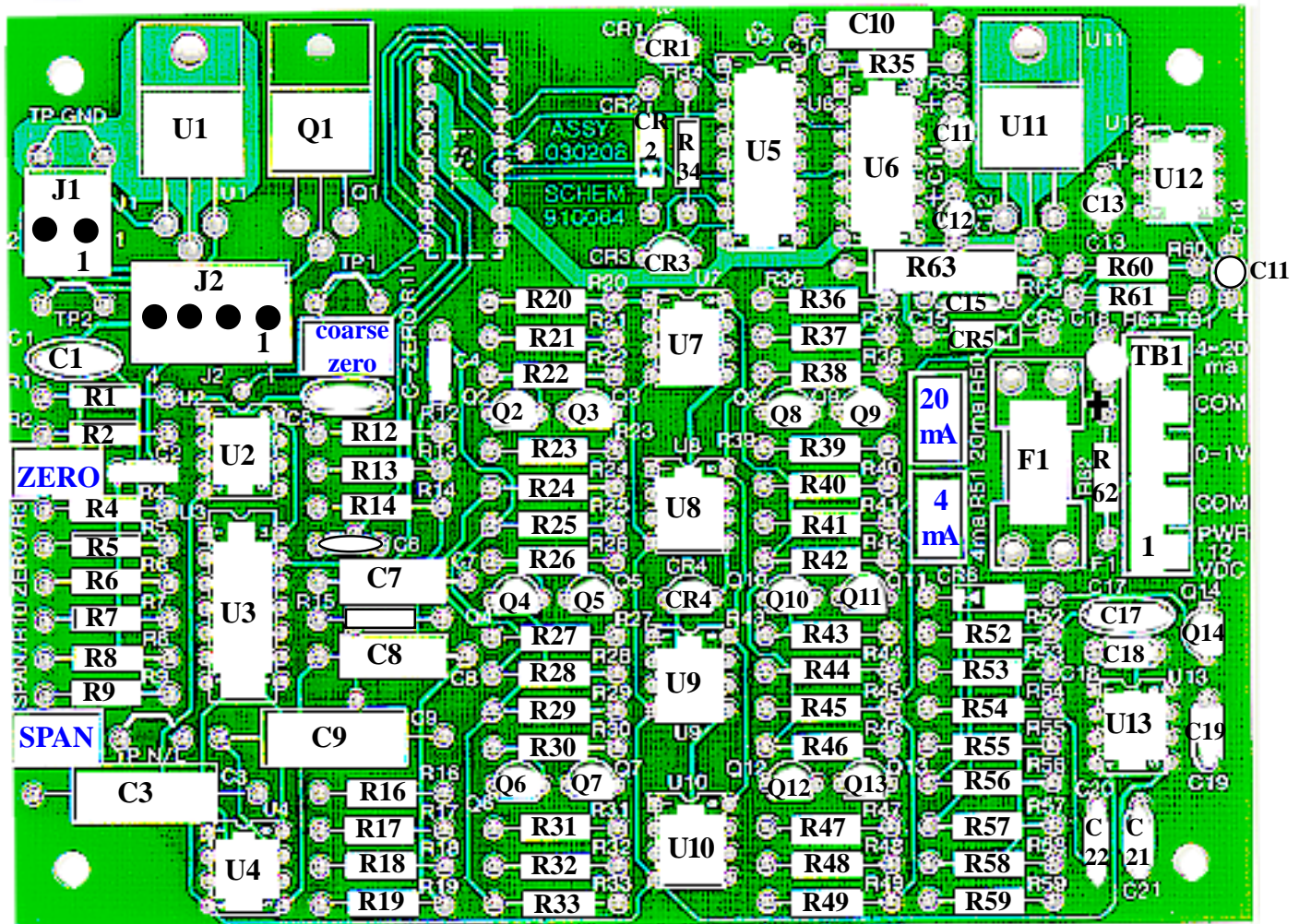
- +12V regulator**
- **U11**, 7812 or LM340T12
- **R63**
5 ohm, 3 watt

Model 2008 RT
24V PC board



24 VDC
Configuration

The **COARSE ZERO** adjustment should only be done if you run out of adjustment range using the **FINE ZERO** adjustment (R3). Adjustments should be done very slowly since the output response is delayed about 8 to 10 seconds.



Reference **schematic** number 910070. U11 is the main DC regulator (either 8V or 12V see page 2). U1 is the IR source 5V regulator. Q1 switches the **IR source** ON and OFF. Continuity of the **IR source** may be measured using an ohmmeter across pins of J1 for about 3.5 ohms with power off. Clock U6 drives counter U5. The clock adjust R65 should only be done using a precision frequency counter for an **IR source** ON/OFF period of 1.4765 seconds. The **4 mA** adjustment (R51) should only be adjusted if the **ZERO** adjust (R3) is first adjusted with nitrogen in the gas cell for 0.000 volts out of the 0 to 1 volt output (pin #3 with respect to #4 of TB1). The **20 mA** adjustment (R50) should only be adjusted if the **SPAN** adjust (R10) is first adjusted with mid scale span gas in the gas cell for 0.500 volts out of the 0 to 1 volt output (pin #3 of TB1) then adjust 20 mA for an output of 12.0 mA. Use the scale data for you specific unit to look up the correct voltage and current loop outputs for the specific span gas level that you are using. As an example different than the mid-scale example given previously, if you have a Model 2008LRTB-12VDC 1.0% CO₂ full scale unit and you have span calibration gas that is certified to 0.60 % CO₂, then you adjust SPAN for 0.600 volts out of the 0 to 1 volt output and then the **20 mA** adjustment for 13.60 mA out of the 4-20 mA output (pin #5 with respect to #4 of TB1). The values of resistors R22, R26, R30, R37, R38, R42, and R46 are selected depending upon the full scale option.