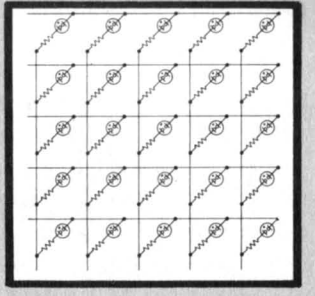
Signalite
APPLICATION NEWS
A General Instrument company



Vol. 5, No. 2 Signalite Inc., 1933 Heck Avenue, Neptune, N J 07753

NEON LAMP TRIGGERS OCEANOGRAPHIC FLASH-FINDER

By John Cawley
Signalite, Incorporated

The flashing locator unit for the Benthos Boomerang Corer is housed in a glass sphere. All components must be rugged enough to withstand the deceleration forces when the corer strikes the ocean bottom at a velocity of 425 meters per second.

Oceanographic research, although still an infant field, is being hailed by scientists and others as the next major frontier to be conquered. Oceanology programs are dwarfed beside our multi-billion dollar space programs, but forecasts indicate that in the next decade expenditures will increase rapidly

One of the major problems that has plagued oceanology is an environment every bit as hostile as outer space. And although there has been a concentration of space programs in the hands of one major

Yours free . . . for telling us how you use or would like to use neon glow lamps

You can get a free Signalite Owl Eye Nite Lite simply by sending us an application for neon glow lamps a problem or solution on their use Each reader will receive the Nite Lite whether or not his letter is used in the Application News. In addition we welcome longer articles for feature treatment which we will also place in a leading technical magazine in your name.

governmental agency, NASA, ocean activities are the function of 22 different government departments and agencies. Such diversification of effort has made it difficult to conquer this hostile environment. However, a variety of equipment and instrumentation is being developed and used which promises to provide answers about the ocean, its contents, its physiognomy, and through these, information about our planet itself.

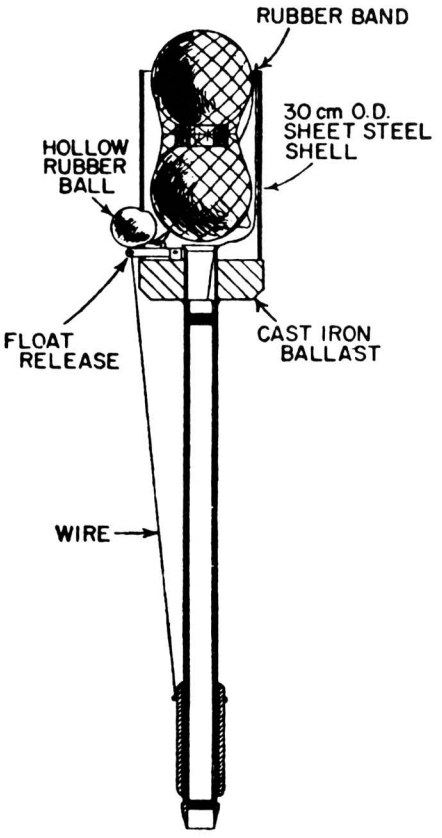


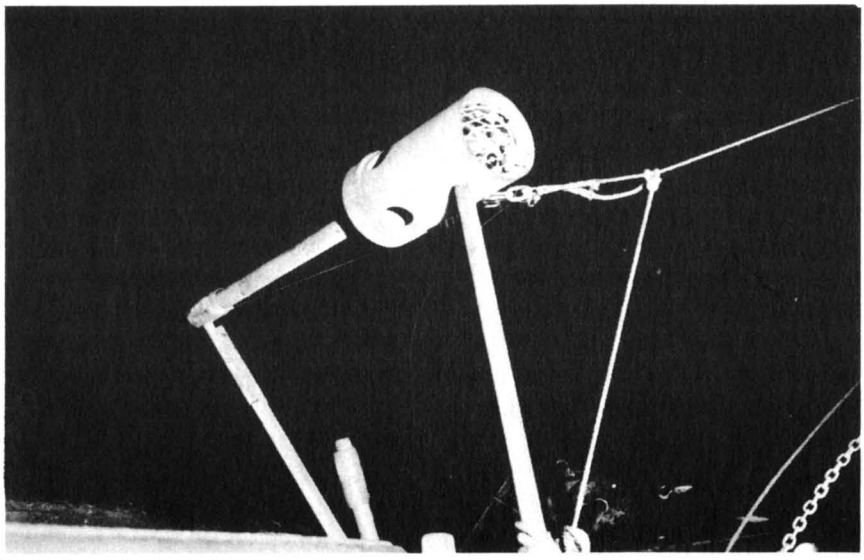
FIGURE 1:

Drawing of the Benthos Corer as it is assembled ready for launching. When it strikes the ocean floor, the glass spheres are released and float to the surface with the sample core extracted from the bottom.

One of these programs is the analysis of the sediment that lies on the ocean floor Much that has been learned comes from devices which collect cores of bottom sediment and return them to the surface for study Benthos has been working in this area for a number of years and has developed a number of units to accomplish the coring task.

One of these is the "Boomerang" Corer which was designed to overcome the disadvantages of the more conventional wire-connected devices. It was developed jointly by Samuel Raymond of Benthos Co., N Falmouth, Mass., and Peter Sachs of the Woods Hole Oceanographic Institution of Woods Hole, Mass. The corer consists of a heavy disposable coring unit, a light recoverable assembly of glass floats, and a plastic liner tube. (Figure 1) Dropped free from the moving ship, the corer quickly goes to the bottom where it drives deep into the sediment, forcing a column of reasonably undisturbed sediment into the liner-tube. The glass floats are then released, withdrawing the sediment filled liner from the coring tube and raising it to the surface where it is recovered.

Dr T J Fan Andel of Scripps Institution of Oceanography remarked, "It is an eerie feeling to throw an instrument over the side without a string attached," but on the first major use of the corers subsequent performance of Boomerang Corers at sea has now overcome this.



Ready for launch during night operations, this Corer will sink to the ocean bottom, take a sample core, float back to the surface, and give off a bright flashing light to facilitate location and recovery operations.

In making a careful echo-sounding survey in areas of rugged relief, an accompanying series of sediment samples is extremely desireable. However, it is hard to do the job if wire-line sampling is used because the ship must be stopped to collect the cores. It is then likely to drift enough to spoil the echo-sounding trace and to make it impossible to correlate the two sets of data precisely

With the Boomerang Corer the vessel can make its run, dropping the corers at predetermined intervals or in conjunction with echo-soundings of the bottom. At the end of a suitable length of run, the vessel can then return to retrieve the samples. Each corer, then, can be dropped on a selected target with an accuracy resembling the bombing accuracy of an aircraft over land.

Until now there has been one major disadvantage in using unattached instruments this is the difficulty of locating a small floating object at sea. Even simple, passive locating aids such as radar reflectors or flags require additional buoyancy and are difficult to streamline. Active recovery aids such as sonar or radio transmitters, if made small, light and reliable, soon become very expensive. And when the equipment is not recovered, there is no way of ascertaining whether it malfunctioned or simply could not be located because of high seas or poor visibility.

The Boomerang Corer incorporates a high visibility Xenon flash tube in one of the two glass floats which has proven to be highly effective at night. (Figure 2) During actual operations from a small vessel, in fairly rough weather and at a range of about two kilometers, about one direct flash out of 15 was directly visible. However, the loom, that is

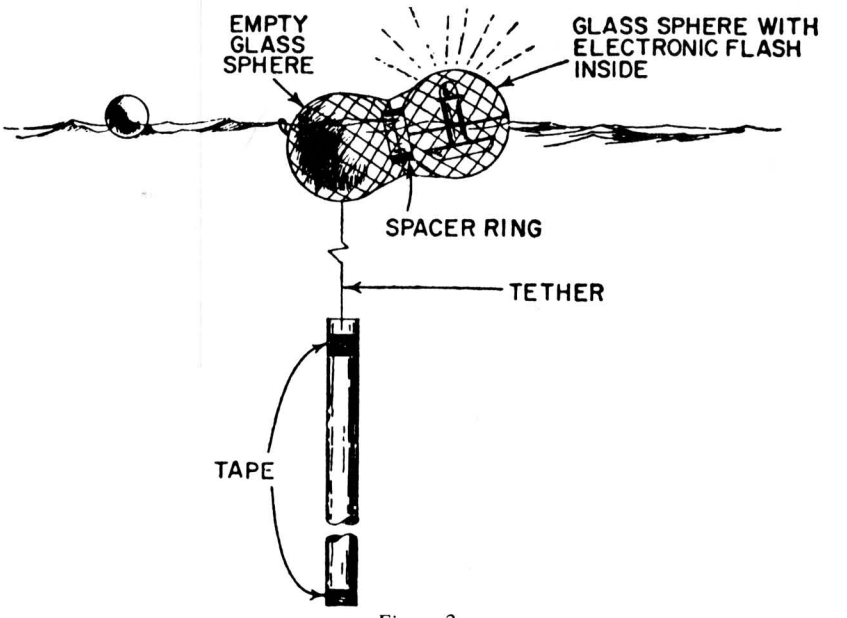


Figure 2:

Glass spheres provide flotation for the sample core and a flashing signal for locating the unit. The flashing Xenon lamp can be seen as far as 15 miles on a clear, calm night.

the illumination of the mist or spray that is usually in the air just above the surface of the sea, could be seen even when the waves were breaking over the float. Of 24 corers launched during one cruise, 23 of the floats were sighted and recovered on a bright, moonlight night almost immediately as they surfaced.

The problem generated by the hostile environment—the salt atmosphere, the moisture, the high pressure when the corer is submerged at great depths—made design of the flashing unit critical. The entire unit is housed within one of the two glass spheres which is sealed glass-to-glass on flat finely ground surfaces. The entire corer reaches a terminal velocity of about 425 meters per minute. Deceleration on bottom impact is severe so that only the most rugged components can be used in the flasher The unit is designed to be reuseable indefinitely with only the battery being replaceable after about 20 hours of operation.

The circuit for the flasher is shown in Figure 3. When the magnet is removed from the outside of the sphere, magnetic switch S_1 closes

causing the high voltage battery (240 volts) B_1 to send current through resistance R_1 and charge capacitor C_1. Voltage E_1 on the capacitor is not ionized, the tube resistance is infinite and it does not conduct. Current also passes through resistor R_2 charging capacitor C_2. Voltage now appears across silicon controlled rectifier (SCR) D_1 but it does not conduct because of the absence of voltage in its gate. Through resistor R_4 capacitor C_3 also becomes charged. As capacitor C_3 charges, voltage across Signalite neon tube I_1 increases until (after about 2 seconds), it reaches 75 volts where the neon gas ionized passing current through the gate of the SCR so that it suddenly becomes a conductor C_2 therefore discharges through D_1 and steps up transformer T_1, sending a

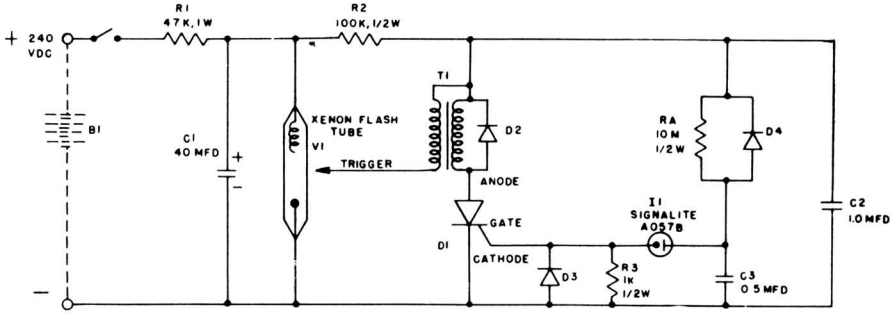


Figure 3:

Schematic diagram of the circuit for firing the Xenon tube in the Benthos Corer. With the components shown the flashing period is two seconds. Changing R_4 to 1 meg. and C_3 to 10 MFD results in a flashing period of four seconds, and changing R_4 to 10 meg. and C_3 to 10 MFD results in a 30-second flashing period.

high voltage trigger to flash tube V_1 causing it to emit a brief and brilliant flash of light. Capacitor C_1 then charges up again and the cycle is repeated.

The normal flashing rate is 2 to 3 seconds. As the battery begins to run down, this rate decreases somewhat and can be used as a guide to the battery condition.

The neon lamp is Type A057B, designed and produced by Signalite Inc., Neptune, N.J., specifically for use with SCR's. Like the other components in the flasher, it was chosen for its extreme long life, reliability, and ruggedness.

CAN YOU SOLVE THIS? ?????

Dear Sir:

I have a problem that perhaps can be solved by the readers of Signalite Application News. am trying to design an intruder alarm system, and I think neon lamps may be the answer I know the following facts:

A. Power Source — 115 VAC
B. Actuator — microswitch that closes when door is opened
C. Circuit must latch for continuous signaling when switch is closed
D. Signaling device 110 VAC bell
E Circuit should be disarmed on the closing of a lock-switch, and activated when this switch is opened.

Thanking you in advance for your help, I remain,

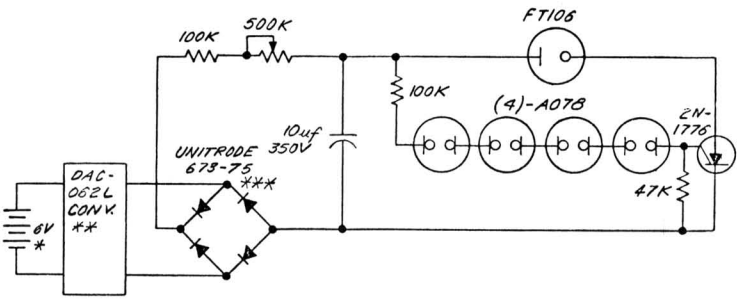
David Fiedler
Bronx, N Y

ANSWER TO CAN YOU SOLVE THIS. Vol. 4, No. 3 .....

(Mr Eisenstat had asked for assistance in designing a circuit to flash a Xenon flash tube at a fixed rate of 60 flashes per minute using a neon lamp firing an SCR.)

Dear Mr Bauman:

(Below) is one of the many possible solutions to Mr Nathan Eisenstat's problem with a Xenon flash tube (Vol. 4, No. 3, p. 193) Since I didn't have specifications of a GE-FT 106 at hand, have assumed that: 1. It is self-ionizing near 300V, otherwise a conventional trigger circuit will have to be added; 2. It will extinguish when the supply current falls below 10 ma.



* 6V LANTERN OR 4-EVEREADY E956P ALKALINE ENERGIZERS OR 5 SONATONE S-103 NICADS

** AMGLO CORP 4325-33 N. RAVENSWOOD AVE, CHICAGO 60613

*** UNITRODE CORP, 580 PLEASANT ST., WATERTOWN, MASS. 02172

The design is made along the simplest lines, using a commercial converter of small size. A trade off between life, regulation of flash rate, and regulation of flash intensity has been made in favor of life and flash intensity. Note that the discharge capacitor is also the timing capacitor

D. S. Bottorff
Development Engineer
Western Electric Company Inc.

Ed. Note: It would seem that a conventional trigger circuit would be necessary to operate this. The four AO 78 lamps can be replaced by one AO 51 lamp which has a breakdown voltage rating of 200 250 vdc. It might be noted that the circuit in our lead article shows a conventional trigger circuit, but due to the fact that it is operating at high voltage, there is no reason to go through the converter.

YOUR GLOW LAMP APPLICATION FORUM

It is Signalite's policy to publish letters based on their intrinsic interest only. We do not necessarily agree with all comments and suggested uses and will upon occasion wait for your reaction before taking editorial space for ours.

CHECK FOR CONTINUOUS GAS FLOW

Dear Mr Bauman:

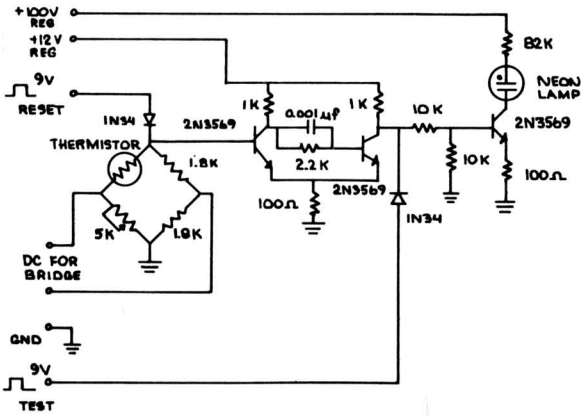
As a materials scientist, I have occasion to use pure argon to flush my experimental apparatus during the observation of the various electrical properties of the solid under investigation. Since this system is left unattended for extended periods of time, it was desired to have some method of seeing whether or not the flow of argon was inadvertantly interrupted during this time. Such an interruption could be caused by a break or constriction in the gas line. therefore devised the circuit included with this letter to determine whether or not gas flow was interrupted.

The operation of this device is as follows: Any interruption of the gas flow causes the self heated thermistor to overheat, thus unbalancing the bridge in such a manner that a negative signal appears at the base of the first transistor This causes the output of the Schmidt trigger to switch from 0.7 volts to 12 volts, thus firing the neon lamp driver If the problem corrects itself, and the thermistor returns to its proper resistance, the neon indicator will remain on because of the hysteresis of the Schmidt trigger. After the operator checks the system, the gas flow alarm can be reset by supplying a positive pulse to the base of the first transistor

My question is this; what neon indicator do you recommend for this application? The 2N3569 is a good silicon switching transistor, but perhaps you can suggest an alternative which is better matched with regard to the neon indicator

It is my opinion that insufficient respect is given to the fantastic capabilities of the gas discharge tube. It is not uncommon to see otherwise rational engineers become livid at the mention of neon lamp multivibrator circuits, etc. I am very pleased to see the effort you and your company are making to place the neon lamp in its proper and versatile role in industry

Thank you very much.



Note: This circuit is in design stage only Pending the information requested in the accompanying letter, it is anticipated that the above circuit will perform as described.

David D. Thornburg
Research Assistant
Northwestern University

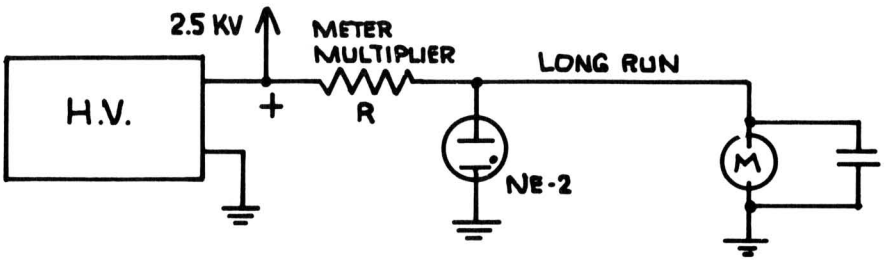
Ed. Note: Amen and thank you on your last paragraph. We are trying harder With regard to the proper neon lamp, we would recommend using our A079 which breaks down at 70 vdc and has a maintaining voltage rating of 58 vdc at 0.3 ma.

PROTECTING METER LEADS

Ed Bauman:

Thank you for the current copy of Signalite Application News. I have a circuit that at least I have never seen published before. In my ham transmitter, the high voltage power supply is mounted at the bottom of a large relay rack. The high voltage dc meter is on a meter panel at the top. Because the dc runs about 2500 volts, the meter has an external multiplier I didn't want to run high voltage wire up to the meter, so the multiplier was mounted at the bottom near the HV output. This allows regular hookup wire to be run to the meter But what happens if the meter leads should become disconnected, or if the meter movement opens? There would no longer be any drop through the multiplier and the full HV would appear on the

hookup wire Meantime, the meter would be assuring me that there was no HV present. To avoid all this unpleasantness, I placed a NE-2 from the output of the meter multiplier to ground. Normally, the meter movement shunts the neon so it isn't lighted. Being unlighted, it has no effect on the meter readings. However if a lead or the meter opens, the neon fires, holding the voltage on the meter leads to a reasonably low level while serving as a warning that things are not quite normal The meter multiplier seems to limit neon current to an easily handled value (1 ma.)

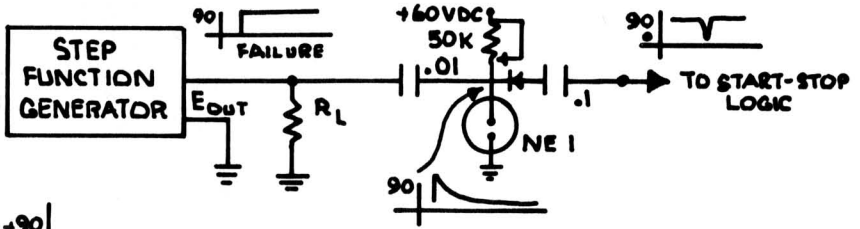


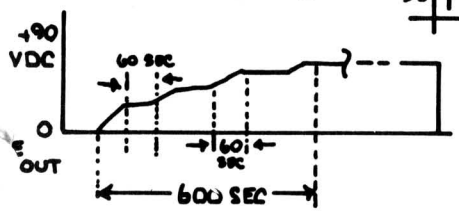
Allen Auten
WOECN
DESIGN NEWS

SAVED: THE COST OF ONE SCR

Application News Editor:

A transducer control module generates a very long step function (as long as 10 min.) into a 500Ω transducer load. Premature application of $E_{RL\ max}$ across the load must be avoided and indication of circuit failure on an error display is desireable. The following circuit functions satisfactorily





If E_{RL} rises to $E_{out\ max}$ before 80% of T_2 decay has elapsed, NE 1 will ignite on failure indicator display and an error signal will be generated.

I hope somebody else may find this technique useful It saved use of an SCR at a cost reduction.

Lance F DiNonno
Spence Engineering Co.

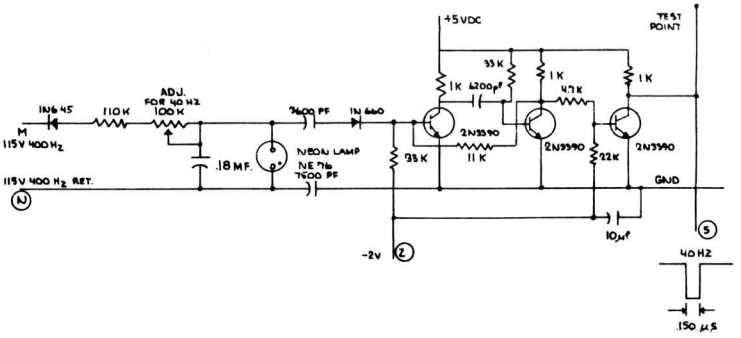
Ed. Note: Recommend substituting an NE-30 for the NE-1 shown.

SYNCHRONIZING FREQUENCY IN TEST SET

Sir·

In reply to your request for neon lamp applications in 'Signalite Application News' I am enclosing a schematic showing how I used a NE-76.

The circuit is used in a test set to provide the 40 Hz. signal shown. Since 400 Hz ripple peaks trigger the neon lamp relaxation oscillator the output 40 Hz is synchronized to the 400 Hz power ine. The circuit is being used to synchronize a digital character generator for presentation on an airborne display system being tested. Synchronizing the display's character generator logic to the power source helps to prevent flickering of displayed patterns. This method can not be used in the actual airborne system due to temperature instability (There it must be accomplished with a divide by ten flip-flop counter)



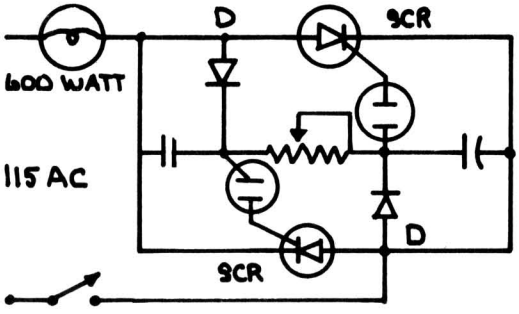
Robert I Wexelbaum
Loral Electronic Systems

HOUSE LIGHT ELECTRONIC DIMMER

Dear Mr Bauman:

The following is the schematic for a house light electronic dimmer

I am told to use an NE83 as a trigger Do you have a substitute for NE83:



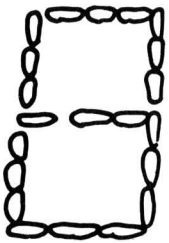
M. Jeffrey
New York, N Y

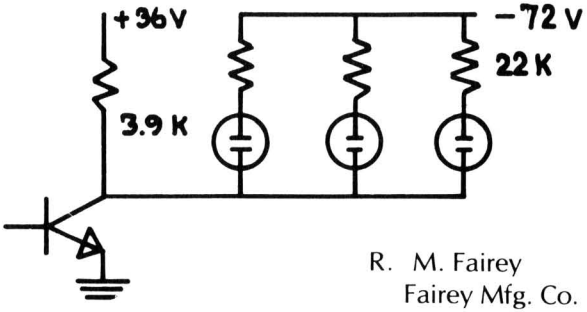
Ed. Note: Another approach to this circuit might be to use a triac in place of the two SCR's. Perhaps some of our readers could give Mr Jeffrey some suggestions.

LIGHT FOR A 7 BAR READOUT

Dear Ed:

I am trying to develop a 7 bar readout using 3 NE2H in parallel. (I use the) 2H because of low cost and high brightness. The switching transistor is being driven by a Motorola integrated gate circuit, 1.6 v at 2.6 ma. The circuit I am using is shown below. I cannot get reliable operation of all three neons. What do you suggest.





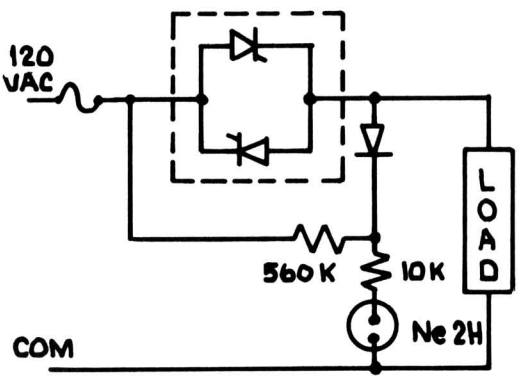
R. M. Fairey
Fairey Mfg. Co.

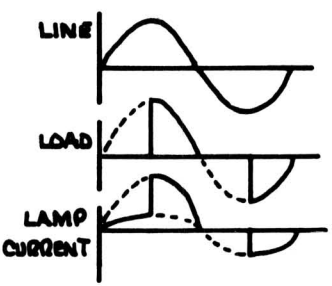
Ed. Note: The reason for the unreliable result is that you only have 108 volts for firing the NE2H. We would advise that this value be increased to 135 volts and that you select the NE2H's for a maximum breakdown of 115 volts.

DUAL PURPOSE PILOT LIGHT

Dear Editor,

Here's a way I'm using neon lamps: The application is a dual-purpose pilot light for an SCR AC power controller—the lamp glows dimly when power is applied and the output is zero; and gets brighter as the output increases. Because of the spiked output waveform, the pilot begins getting brighter at about 30V RMS output.





Frederick A. Moore
Rockville, Md.

Drop Us A Line.

If you have an interesting application of neon glow lamps in your circuitry or a problem concerning the use of neon lamps, drop us a note telling about it. Interesting letters will be published in a future issue of the **Application News**—and we will send you an Owl Eye Nite Lite for your home.

Applications which in the opinion of Signalite have significant interest will also be brought to the attention of the editors of leading technical publications for consideration as articles and featurettes. If you would like help in preparing your material for publication, just send us the facts and data. We will put it in the correct form for publication. Your by-line and company credit will be given with your permission.

For immediate technical application or circuit design assistance, you may contact Signalite directly at:

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* * * * *

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