

QRM

Bulletin issued by the Northern
Branches of the Wireless Institute
of Australia, Tas. Division.

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MEETINGS

- September 10th North West Branch, Lakins Hall, Ulverstone.
NOTE the new date. All meetings will be on
the SECOND TUESDAY of the month.
- September 13th Northern Branch, AEB rooms, High st.
Lecture by Roger Greenwood VK7UV, PMG
engineer, on TV translator networks.
- September 14th Council meeting at the QTH of VK7JV, 2pm
- September 28th Social film evening at the Postal Institute
Hall, start 8pm sharp.

YRCS

- September 27th room 38, Kings Meadows High School.
there is no meeting during the school holidays.

CONTESTS

- September 14/15 European phone contest
September 14/15 SAC CW contest
September 21/22 SAC Phone contest
October 5/6 VK/ZL contest (phone)
October 12/13 VK/ZL contest (CW)

HAMFEST

HAMFEST

HAMFEST

HAMFEST

HAMFEST

November 14 and 15 Turners Beach Hall

Northern notes by Reg VK7KK.

Perhaps there's still an interest in obtaining clubrooms? A committee has been formed to investigate the feasibility of getting something concrete decided in this regard, Ed 7HE, Norm 7NR, Bob 7ZRF and John 7JV will be advising us, in due course, of their ideas. If you have any suggestions collar one of these gents.

It wasn't Ed's night! He also now wears the hat of Social Convenor. Its good to see members offering to help share the work load and no doubt instill further ideas.

Attendance was better this month, 38 is rather more respectable Phil Thompson's (7SS) talk on PMG radio telephone systems was well presented and pitched at a level suited to all present. Apparanly we now have a secret weapon against him - present a sniff of diesel fuel and he'll run a mile! Obviously the most valuable object in some of those Cape Barren houses is their Radio-Telephone. Thanks Phil for the trip to Maatsuyker and Cape Barren Island.

The R.D. contest is now dead and buried. If you disagreed with the present rules concerning repeaters, I hope that you'll make note of it on sending in your log. Dont sit back and let others do your stirring.

Four members are awaiting the postman's knock after the August AOCF exams, congratulations or better luck next time. We must be made of money! The Branch buys a \$20 ex DCA unit and reaps 500% profit. I wont put anyone into the doghouse by mentioning names and prices but thanks for bidding generously to swell our funds. After Ed's succes as an auctioneer he'll be charging a higher commission!

Noticed we have some people willing to assist in consumer spending, Peter 7PD and Bill 7AK with new cars and Danny 7ZDA is spending high with new electronics gear.

At the opposite end of the scale. Seen Joe 7ZGJ's garage recently? Steptoe's got nothing! Washing machines are his latest exploit, they dont work, he's only flogging the bits! Suppose there is a story behind the lack of a bumper bar on Danny's verhicle but havent heard it.

Norm should have known he can trust Ch.48 listeners. Fancy being worried about someone dobbing him in to Anne. Seems on a recent North West trip he had a problem diagnosed as a touch of food poisoning. The only food he'd had was some from home. All he worried about was upsetting Anne, he didn't want her to find out. What a gentleman!

Incidently there's a big move going on in the 7NR household, they are moving accross the river to West Riverside.

No doubt in cleaning up he'll find plenty of historical junk for next years exhibition.

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A.T.V. Camera

For those who would like to get on with the job, we have included some more circuits of the ATV camera which we started to discribe last month.

Due to lack of time we were unable to prepare the discription and hook-up diagrams, these will be published next month The design of this camera is by VK2ZPM/T and has been compiled by VK7ZFR.

circuits on Page 6 and 7

North West Branch notes by Max VK7MX.

I have just seen a revolution and I wasn't watching TV either. Our branch has been getting pretty lethargic, metaphorically speaking. The sign of the times no doubt. Anyhow something had to be done and who better to launch a renaissance, to coin a phrase, than Tony 7AX. He reasoned, and rightly so, that a good stir was called for and promptly got on with it. He pointed out to all and sundry that our branch is a co-operative affair run by the members for the members, and the result was that we had a pretty good roll up at the annual general meeting. Before the election of officers the same gentleman addressed the meeting with a few suggestions and enthusiasm mounted. So much so that it wasn't long before Tony was elected president for the coming year. A very wise move as we all feel that with Tony's enthusiasm behind us we can look forward to a good year. The election of other officers resulted in the following-

Vice President	Terry VK7TT
Secretary	David VK7MS
Treasurer	Graham VK7ZAQ
QSL Officer	Harold VK7MZ
Branch Correspondent	Max VK7MX
Activities Committee	Graham VK7ZAQ Sid VK7SF Adrian Sherriff

I was agreeably surprised when the meeting, after some discussion, decided that we would organise the Hamfest for the Division this year. There was a definite vote in favour, and those who supported it were formed into an organising committee.

This is good news and they are certainly getting on with it as I heard something going on 2 metres a week later which indicated that a meeting was already under way to do the initial planning. So keep that date free at the end of November and we will keep you informed on developments. It will be somewhat different we think.

We have now got into the swing of the Sunday Broadcast from our branch. Perhaps someone else would like to take part.

Sid 7SF turned up at the meeting with some real goodies from overseas (Melbourne I think) and these were quickly taken up by the boys including some of the Northern visitors.

Which reminds me, we were pleased to welcome 7KK, 7ZBY, 7PF and 7JV, to the annual meeting. I am sure that they returned with some new armtwisting ideas so look out Northerners.

A little bird whispered that a certain Ham has been stuck into the tall building at Sandy Bay. You remember the gee-gee computer thingo, well he is working on one to break the bank down South. Hope its O.K. OM.

Peter 7PF has been heard in our area quite frequently, almost a North Wester again.

In concluding these notes there is one very important notice to members, after many years our meeting night has been changed. It used to be the first Tuesday in the month, forget that.

It is now on the second Tuesday at the same place, so that the next meeting will be September 10th. See you all there.

Max VK7MX

H.F. notes by Den VK7DK.

With conditions as they are it is difficult to know what to write about, but I guess if the conditions were really wide open it would be difficult to chose what to leave out. Actually the 20 metre band has had a few good moments and some very rare ones have popped up, such as PQØNS, on the Fernando de Noronha Isl. QSL via PY7NS. He was heard one morning with a s5 signal. There was Crozet isl., FB8WB. He was on one afternoon for a short time, but was frightened off by the enormous dogpile that developed in minutes. Col, VK7LZ managed a contact. Good work Col. The 20 metre band opened to Asia on the 20th of August, but was back to its normal quiet state next night. You will notice that there are no listings for 0800/1000z. Not because there are no sigs to be heard, but it happens to co-incide with my prime T.V viewing time.

15 has had a little dx activity, mainly JA, KA etc. Only two stations were heard on 10, and both were within 8 miles, so hardly dx. Hi. Well, here are the ones I have heard in the last month.

80. W's YJ8, VR4, YBØ.

40. JA, CT2BL, G3A00, EI8F.

20.

0000/0200z. TI2, HE9, VU2.

0200/0400z. W's VE3, KG4, 5W1, HI8,

0400/0600z. I's, 3A2GX (QSL via I1SCL), OX3, VR1, XE, HR6, (Swan Isl), VE3/5/6/7, 7Q7, VK2BKL (L.H.)

0600/0800z. EA6, LX1, DL, G, 9G1, W8s, VE's, SM, CR8AC, FB8WB (QSL via FBUS).

1000/1200z. VE8, HL9, KA, JA, P29, SM, KL7, OX3, DJ9, and W's.

1200/1400z. XW', DU, JA, VU, YB1, VS5, W's, VS6, OH6, SM5 OY3X, CY2 (Canada), DJ9, AC3PT, XV5, 9K2, EP2, UK4, LA.

1400/1600z. OH, KA6,, DL, HS1, YO, SM5, UR2, HL9.

2200z PQØNS. LU7, G, OH.

5W1AL is rumoured to be heading for 3M7. VK9YP on Cocos, is active on 20 metres. Spratley Island was to be activated but when within sight of the island, great activity was noticed, and due to the recent controversy over the island, the operator decided that discretion was the better part of valour. SV1GA/A, Mt. Athos, was to be on from Aug 16, but nothing has been heard of this station from this QTH.

With the coming of the spring, the conditions should improve somewhat, but that remains to be seen.

The VK/ZL/Ociana contest is on October 5 (phone), and CW on the 12th. (see A.R., August). This contest can bring some of the rare countries, so make a note of these dates.

That about winds it up for this month, so good DX to you all.

SOCIAL NIGHT OUT

The film "2001 - a Space Odyssey" will be screened on Saturday, 28th September, at the Australian Postal Institute Hall, 81 Cimitiere street, at the rear of the District Telephone Office.

This is the film version of Arthur C. Clarke's novel "2001 - a Space Odyssey" a futuristic science fiction masterpiece by the man who predicted the use of communications satellites in 1948 and currently is a scientific adviser to N.A.S.A.

The film runs for 2 hours and starts at 8.00 p.m. sharp! Bring the whole family for a night out. Good chit chat after the film. Supper provided by the men, ladies next time.

(\$1.00 donation for adults, a maximum of \$2.00 for family)

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VHF notes by Joe VK7ZGJ.

The 6UP state of the art contest provided plenty of activity on 6m, it is surprising the number of people who will get up at 5.45 to try and have a contact.

As luck had it, only one morning in twenty I was unable to exchange a report with another station.

VK2ZQJ was the most consistent station, being worked 13 times, 2ZKY 5 times, 2ZYP once and we heard VK3ZAZ once, I assume on back scatter from a meteor shower.

On the morning of the R.D. contest Kevin VK7ZAH worked four states, which is not bad considering the time of the year, they were, VK2ZQJ and VK5MM on 6m meteor scatter, VK3AKC on 144 Mhz forward scatter and of course VK7 on 6 and 2 metres. Stations heard on 52.050 in the past month include VK7's OO, ZAH, JV, ZGJ, ZGG, ZDA, ZBY, ZWX, ZIF.

73 Joe

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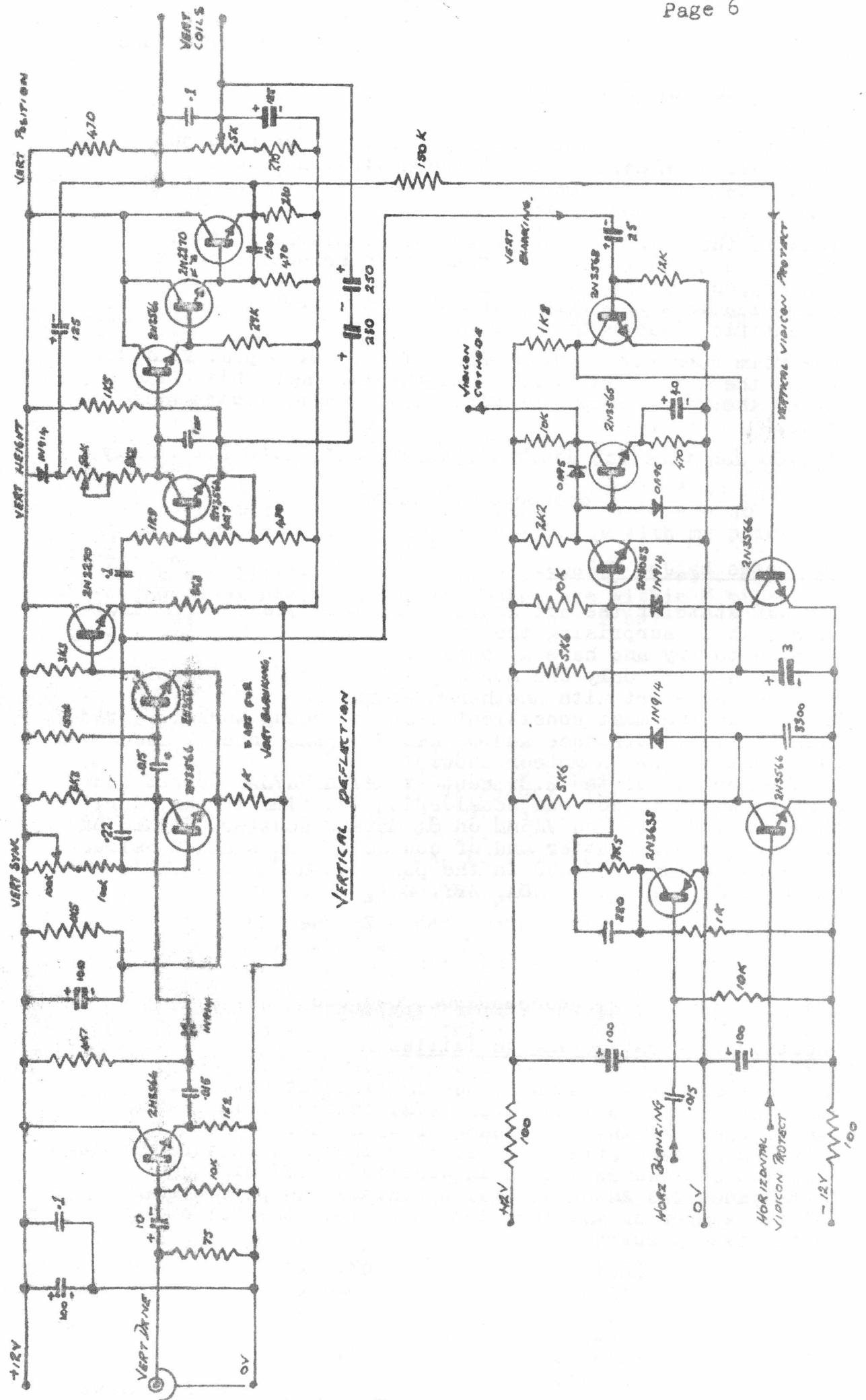
Northern Branch Meeting Activities.

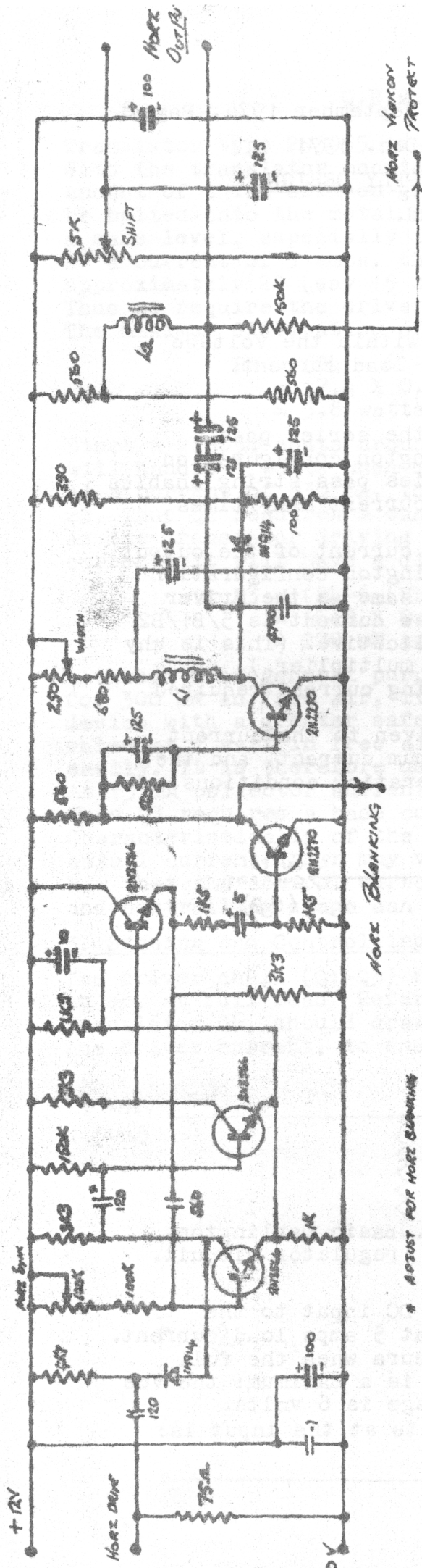
An analysis of Northern Branch meeting Activities in the period May 1971 to April 1974, indicates an average meeting attendance of 33 members. There was also an average attendance of 33 members on Lecture nights. Maximum attendance was 50 in June 1973, and minimum attendance was 24 on several occasions. As percentages of the number of meetings in the period, the following activities occurred:

Lectures	43.0 %
Films	13.8 %
Auctions	11.0 %
Equipment display	8.0 %
Bar-B-Q	5.2 %
Nothing	19.0 %

100.0 %

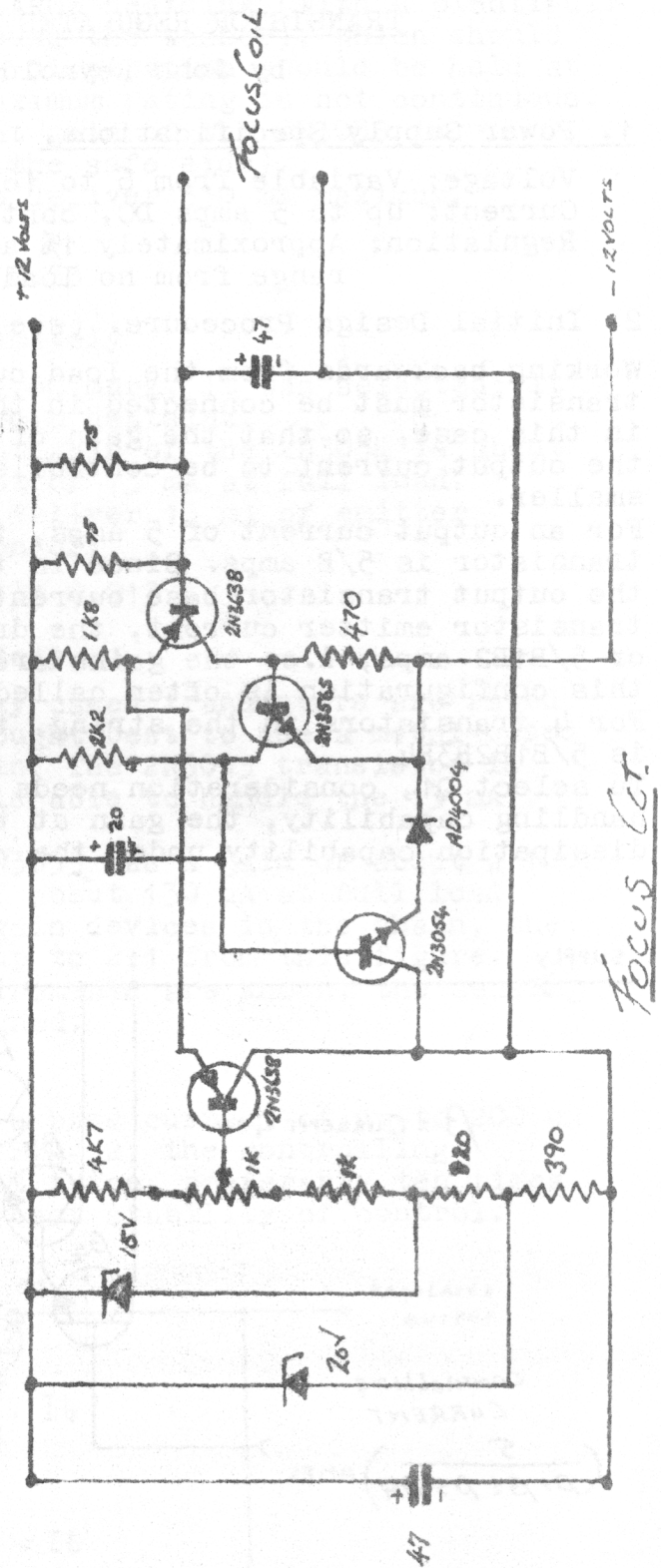
Wally VK7ZWX
Lecture officer





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* ADJUST FOR HORIZ BLANKING
L1, L2 18 MM. POT CORE
TUN WITH 20 SWG WIRE



Reprinted from "THE RADIO BULLETIN" Nov.-Dec. 1971

TRANSISTOR REGULATED POWER SUPPLY DESIGN

by John Reynolds, VK3ZMU.

1. Power Supply Specifications.

Voltage: Variable from 6 to 16 volts.

Current: Up to 5 amps DC, continuous.

Regulation: Approximately 1% anywhere within the voltage range from no load to full load current.

2. Initial Design Procedure. (see fig. 1.)

Working backwards from the load current, the series pass transistor must be connected in the Darlington configuration in this case, so that the gain of the series pass string enables the output current to be controlled by a current many times smaller.

For an output current of 5 amps, the base current of the output transistor is $5/\beta$ amps. Since in the Darlington configuration the output transistor base current is the same as the driver transistor emitter current, the driver base current is $5/\beta_1/\beta_2$ or $5/\beta_1\beta_2$ amps, i.e. the gains are multiplicative. (This is why this configuration is often called a Beta multiplier.)

For 4 transistors in the string, the driving current required is $5/\beta_1\beta_2\beta_3\beta_4$.

To select Q1, consideration needs to be given to the current handling capability, the gain at the maximum current, and the dissipation capability under the worst operating conditions.

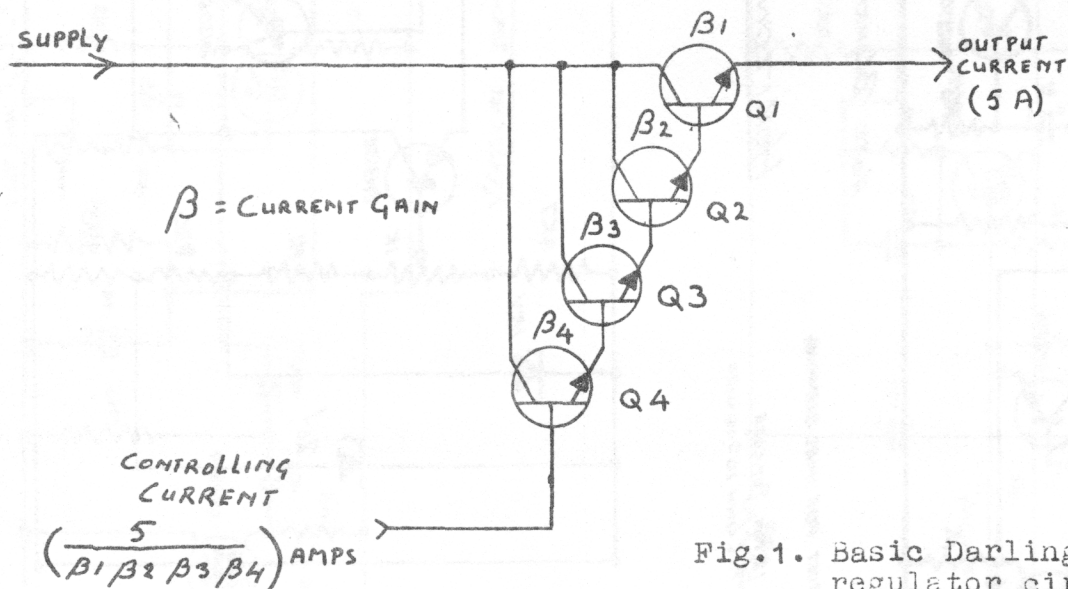


Fig.1. Basic Darlington regulator circuit.

With the particular transformer used, the DC input to the regulator was measured as being 24 volts at 5 amps load current. The worst case in terms of dissipation occurs when the full load current is flowing and the V_{ce} of Q1 is a maximum: the V_{ce} maximum of Q1 occurs when the output voltage is 6 volts. The maximum dissipation of Q1, with 24 volts at the input is:

$$\begin{aligned} P_1 &= (24-6) \times 5 \\ &= 18 \times 5 \\ &= 90 \text{ watts} \end{aligned}$$

Transistor type 2N3055 is rated at 115 watts dissipation at 25°C. With the transistor mounted on a LARGE heatsink (with a plentiful amount of thick silicon grease around the washer), which should be bolted onto the metal case, the dissipation should be held at a safe level, especially if the maximum rating is not continuous. At a current of 5 amps, the current gain of the 2N3055 is approximately 20 (say 15 to be on the safe side). Thus we require the driver (Q2) to deliver 330 mA maximum. The maximum dissipation of Q2 is:

$$\begin{aligned} P_2 &= (24 - 6 - V_{be1}) \times 0.33 \\ &= 17.4 \times 0.33 \\ &= 5.8 \text{ watts approximately} \end{aligned}$$

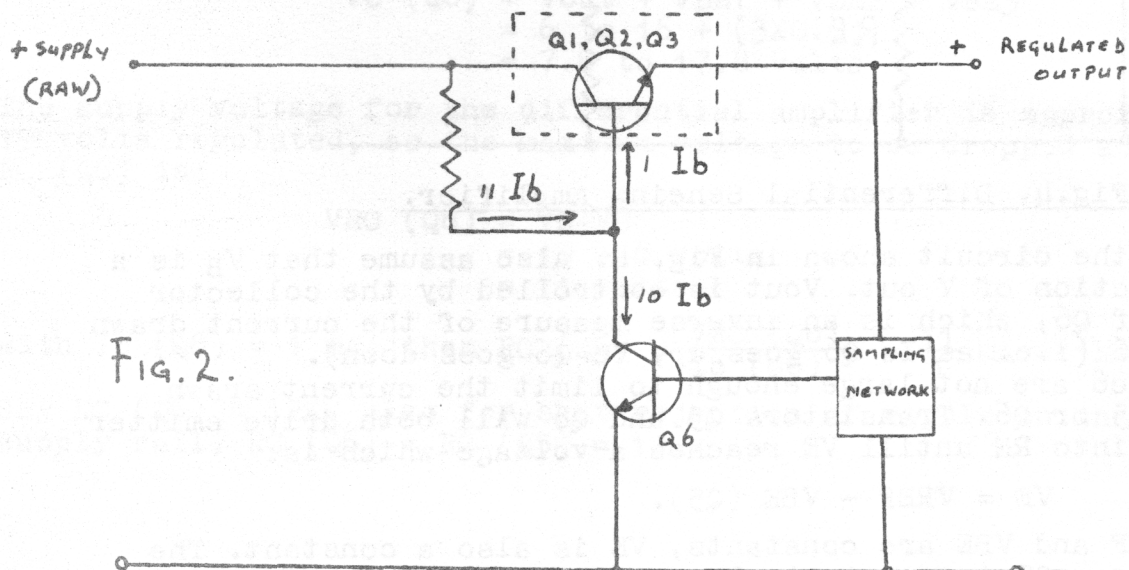
Since a 2N3054 costs around the \$1.80 mark, it was selected; it will handle 6 watts when mounted on a heatsink. At a current of 330 mA, the current gain of the 2N3054 is about 25. Thus Q2 requires a base current of 13 mA at full load. As the transistor driving Q2 will deliver 13 mA of emitter current, it will have a dissipation of:

$$\begin{aligned} P_3 &= (24 - 6 - (V_{be1} + V_{be2})) \times 0.013 \\ &= 16.8 \times 0.013 \\ &= 220 \text{ mW approximately} \end{aligned}$$

Although most general purpose epoxy cased transistors are rated for 300 mW in free air, it was thought best to use a metal-cased device with a greater safety margin. The 2N3053 transistor is rated at 1 watt in free air, and is able to handle the 13 mA easily. It is therefore used as Q3. At 13 mA collector current, the 2N3053 has a gain of about a 100. Thus Q3 requires a base current of about 130 uA at full load. Characteristically of the lowest gain devices in the chain, the actual current drawn may vary by up to 2:1 from this figure. Now that the control current requirements are known, the sensing and controlling stage can be designed.

3. Sensing and Controlling Stage.

The driver chain (Q1-Q3) requires a base current of up to 200 uA or so, at full load. Referring to Fig. 2, the controlling transistor Q6, should draw at least twice, preferably ten times the driver current, to ensure the best stability of control.



The sampling network in Fig. 2 can be a DC resistive voltage divider as in Fig. 3a. The disadvantage of this is that any variation of output is similarly divided before it reaches Q6. If the circuit of Fig. 3b is used, the zener diode exhibits a very small resistance to voltage variations, while still performing the voltage dropping function. The voltage divider ratio with the zener in the top allows a much larger percentage of change to be coupled into the base of Q6.

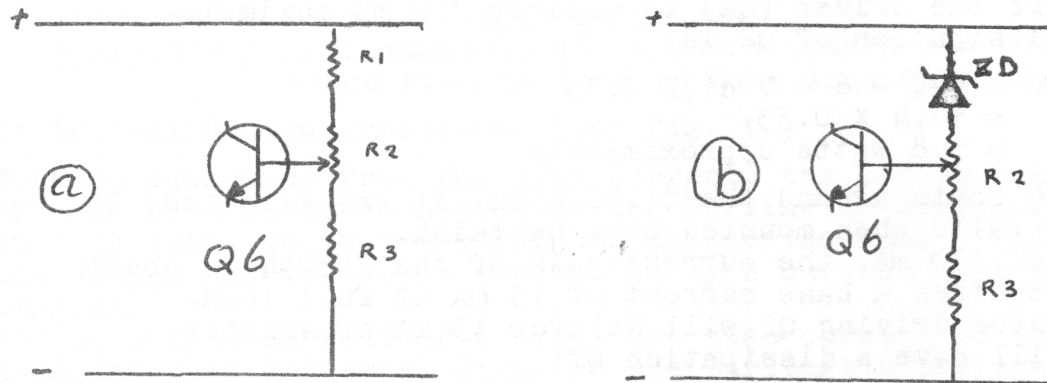


Fig.3. Types of voltage dividers.

The exact voltage divider ratio is dependent on the swing of voltage required and the zener voltages available. Since the output will have a range of 6 to 24 volts, the worst case is 6 volts. The differential sensing and control stage to be used is shown in Fig.4.

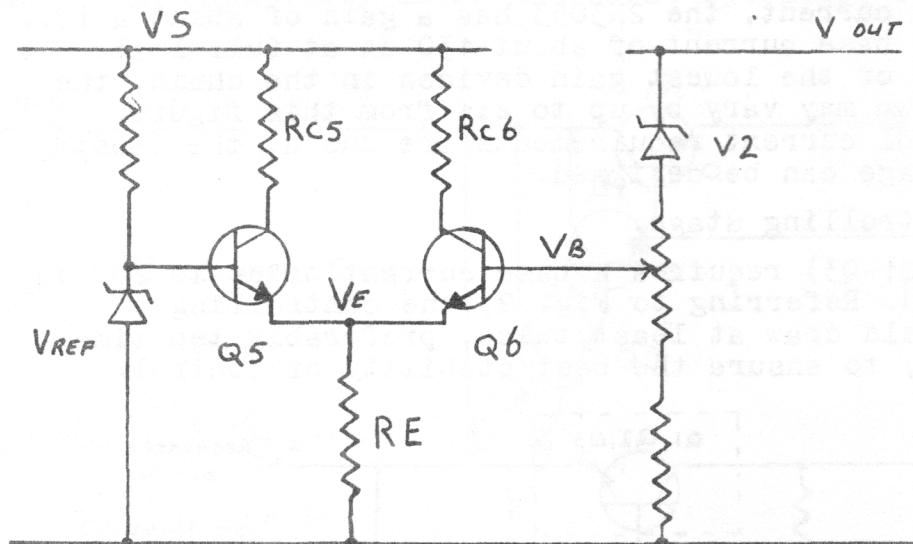


Fig.4. Differential Sensing Amplifier.

Consider the circuit shown in Fig. 4. Also assume that V_B is a fixed fraction of V_{out} . V_{out} is controlled by the collector voltage of Q6, which is an inverse measure of the current drawn through Q6 (i.e. as I_C Q6 goes up, V_C Q6 goes down). R_{C5} and R_{C6} are not large enough to limit the current drawn through Q5 or Q6. Transistors Q5 and Q6 will both drive emitter currents into R_E until V_E reaches a voltage which is:

$$V_E = V_{REF} - V_{BE}(Q5).$$

Since V_{REF} and V_{BE} are constants, V_E is also a constant. The current from Q5 is constant also, so any variations in the base voltage of Q6 (V_B) will change the current in Q6 by changing V_B (Q6).

The changing current into the collector changes the collector voltage of Q6, and causes a change in available base-emitter voltage driving Q1, Q2 and Q3.

If the Vout rises in a positive direction, the VB (Q6) rises; VE is constant, so VC (Q6) drops. The drop of VC (Q6) reduces the total voltage across the base-emitter junctions of Q1-3, and forces less current through their collectors. As Q1 passes less current, the collector-emitter voltage increases (it is tending to turn off), and Vout decreases (provided the collector voltage of Q1 is constant). In practice, Q1's collector voltage will drop with increased load current drawn, and the current around the loop will stabilise at a value slightly higher than expected.

Conversely, should Vout drop, VB drops, Q6 takes less current, enabling Q3 to take more current from Rc6 and thus turn Q1 on a bit more, thus reducing VCE and increasing the output up to the original value, whereupon it will again be stable.

The feedback amplifier Q1, Q2, Q3 and Q6 thus acts as a null-seeking device, which will be nulled when VB is equal to VREF. This is the principal of operation of differential amplifiers.

4. Designing the Differential Sensing Stage.

Since Q3 will draw 200 uA at full load, let the current through the transistor Q6 be say, five times that, i.e. 1 mA.

The differential transistors should draw about equal currents (1 mA each).

The voltage VE = 2 mA X RE is determined by VREF and VZ.

If VZ = VREF = 3.3v nominal, the two bases will be at approximately equal voltages for Vout = 6V. For higher output voltages to result, the base is simply tapped down to the bottom of the voltage divider, so that the output must rise in order to produce the same potential at the base of Q6.

Assuming that VREF = VB (Q6) = 3.3V, then

$$\begin{aligned} VE &= VRE - VBE (Q5) \\ &= 3.3 - 0.6 \\ &= 2.7V. (= 2 \text{ mA} \times RE) \end{aligned}$$

Therefore, RE = 1.35K ohms (say 1.2K)

If the output range is 6 - 16 volts, then the voltage VC (Q6) is:

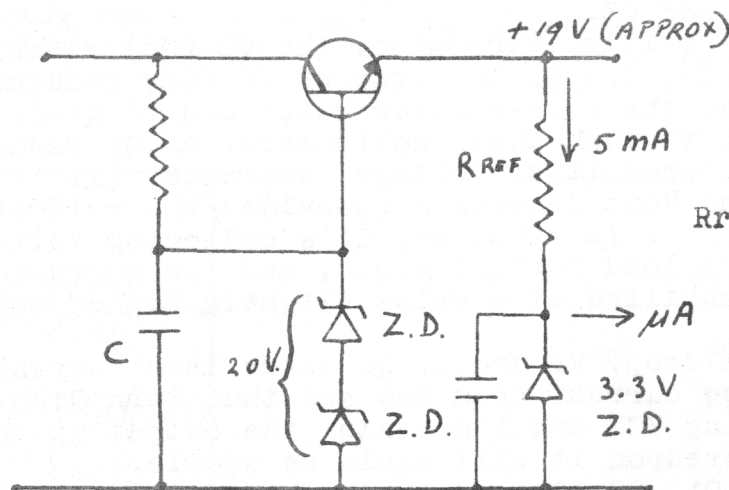
$$\begin{aligned} VC (Q6) &= Vout + VBE1 + VBE2 + VBE3 \\ &= 6 \text{ to } 16 + (3 \times 0.6) \\ &= 7.8 \text{ to } 17.8 \text{ volts} \end{aligned}$$

The supply voltage for the differential amplifier is approximately 19 volts regulated, so the maximum voltage to be dropped across RC (Q6) is:

$$\begin{aligned} VRC (Q6) &= VS - VC \\ &= 19 - 8 \text{ volts} \\ &= 11 \text{ volts} \end{aligned}$$

With Ic (Q6) = 1 mA, then $RC (Q6) = \frac{VRC (Q6)}{Ic (Q6)} = \frac{11}{1} \text{ mA} = 11K.$

Say RC (Q6) = 12K. Also for best rejection of ripple on the supply rail, RC (Q6) = RC (Q5) = 12K.

Fig.5. Design of Regulator stage.

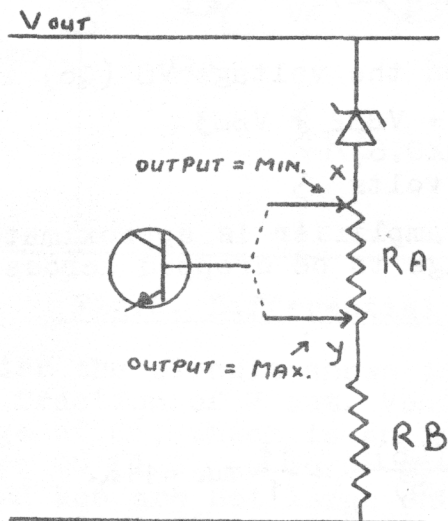
$$\begin{aligned}
 R_{ref} &= \frac{19v - 3.3v}{5 \text{ mA}} \\
 &= \frac{15.7K}{5} \\
 &= 3.3K
 \end{aligned}$$

To keep VC REF constant, about 3-5 mA should be passed through it. Since the regulating zeners produce noise, they should be bypassed, 1 uF tantalum electrolytics are fine. To complete the sensing circuitry, the bias divider resistors must be calculated.

The output varies from 6 to 16 volts. The junction between the zener and the control pot varies from approx. 3 to 13 volts about a 4:1 variation. With the pot slider at the top, the output voltage will stabilize when the potential is 3 volts, i.e. when $V_{out} = 3v + 3.3v = 6.3v$. This is close enough for the moment to satisfy the lower extreme of voltage.

With the slider at the bottom end of the pot, the output voltage will stabilize when the potential on the slider is 3v. When this is so, the voltage at the output is required to be maximum, i.e. 16 volts.

Referring to Fig.6, when $V_{out} = 16$ volts, $V_X = 13$ volts approx.



$$\text{So } V_Y = 3v = \frac{R_B}{R_A + R_B} \times 13 \text{ volt}$$

$$\text{Or, } 3R_A + 3R_B = 13 \times R_B.$$

$$R_A = \frac{10R_B}{3} = 3.33 R_B.$$

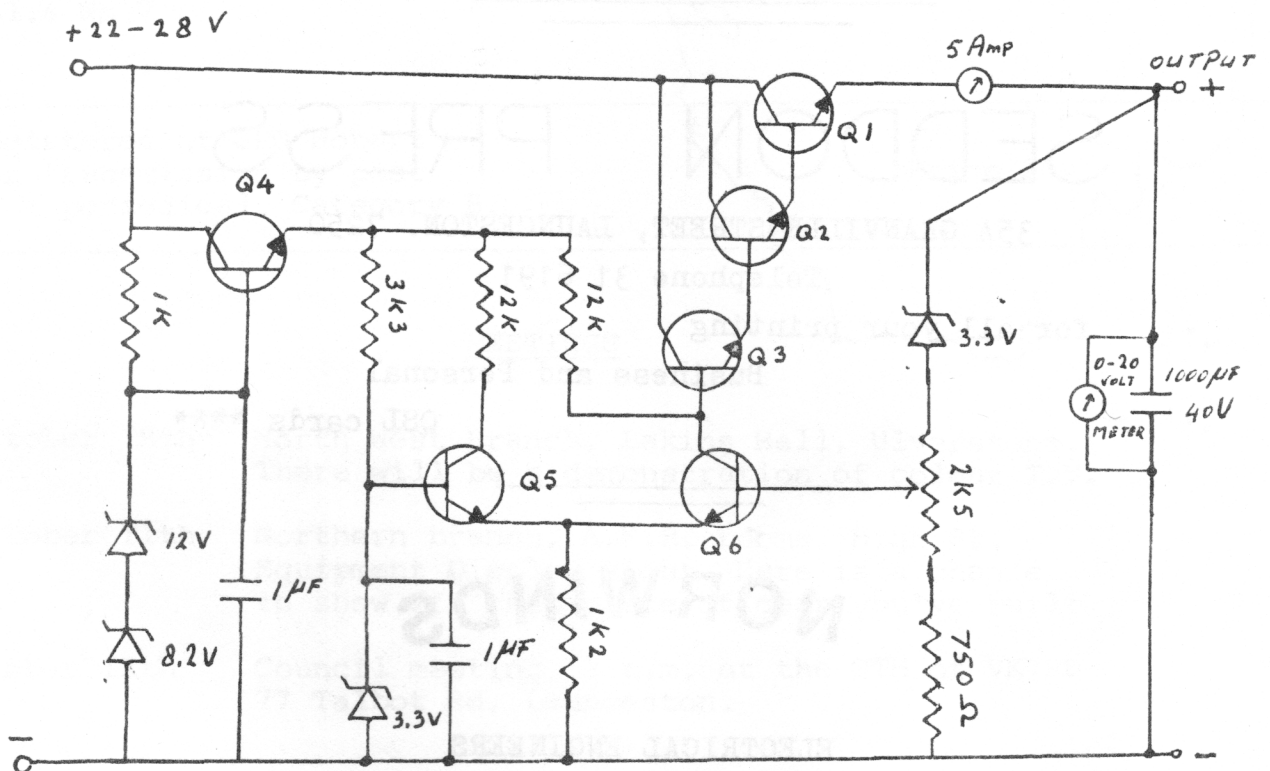
$$\text{If } R_A = 2.5K, \text{ then } R_B = \frac{2.5K}{3.33} = 750 \Omega$$

Fig.6. Bias Resistors.

At this stage the circuit of the complete regulator is as in Fig.7

Q1 = 2N3055 (on heatsink)
 Q2 = 2N3054 (on heatsink)
 Q3 = 2N3053
 Q4 = SE4010, 2N3565 etc.
 Q5 = SE4010
 Q6 = SE4010
 Zener diodes are 400 mW

NOTE: sampling leads are taken direct to the output terminals via separate wires which do not carry the load current. This is to prevent the regulation from being affected by voltage drop in the wires.



Next Month: Overload Protection Circuitry.

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LADIES PAGE

As you can see, WE didn't forget the ladies page, but you did!
 If you like to keep the Ladies Page going you'll just have to supply us with material, how about next month?

M.M. Editor.

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