



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

November 1974
Vol.4 No 8

P.O. Box 1010
Launceston
Tas. 7250

Registered at GPO Hobart
for transmission by post
as a periodical. Category B.

Price 20¢

MEETINGS

- Nov. 8 Northern Branch, A.E.B. rooms, High St.
- Nov. 9 Council meeting, 2 p.m. at the QTH of Bill VK7AK
10 Reid St. Launceston.
- Nov. 12 North West Branch, Lakins Hall Ulverstone.

Y.R.C.S.

- Nov. 9 Room 38, Kings Meadows High School.
This is the last meeting for the year.

CONTESTS

- Nov. 10 Czechoslovakian C.W. and Phone contest
- Nov. 23/24 CQ WW DX, C.W. contest

HAMFEST HAMFEST HAMFEST HAMFEST HAMFEST HAMFEST HAMFEST HAMFEST
NOVEMBER 16 and 17th at the Turners Beach Hall

Northern notes by Reg VK7KK.

The display of equipment last meeting kept the standard up to previous years efforts. Its always a surprise to see projects which people have underway, take for example Lindsay VK7ZLD's series, a \$7 chip LED digital clock, an I.C. C.W. keyer with 4 I.C.'s and 16 diodes (not 200), an I.C. dice play toy and his "Barlow Wadley" style receiver. Brian VK7ZBY showed a receiver digital frequency display, Peter VK7PF a commercial VHF set and his teleprinter set-up, Graeme VK7ZGG's double side band finals, Joe VK7ZGJ a 432 Mhz transverter and Peter VK7PG modifications to an AR7 receiver.

I wonder how much of a pile up will appear on 52.525 this DX season? with the advent of the 60 MR6A's sold recently there should be a major lift in 6 metre FM activity throughout the state. Thanks to, particularly, Joe VK7ZGJ for his efforts in sorting gear and compiling conversion information.

Ed VK7HE and his helpers are continuing to pour much effort into investigating possible club house projects. For those who didn't make the last meeting, the current suggestion is the use of a Launceston City Council building currently used by the Civil Defence Organisation. The building in Upper Bourk St. contains a room suitable for meetings, has ample room for aerials and parking, and would be available for our use just about anytime. It was suggested that we should build a room onto the place for our use for equipment, this would cost around \$3,000. Investigations are proceeding.

Any thoughts on the New Years Eve function? One suggestion is a barbeque at Evandale, or would you prefer to participate in a cabaret. Social convenor Ed 7HE wants ideas HELP PLEASE.

This months lecture gives electronics a rest and is designed to improve your general education, don't miss it. Remember too that the Christmas meeting is a barbeque.

December 6th at VK7HE's QTH - MARK IT.

Congratulations to;

Brian VK7RR on his recent engagement to Susan.

Malcolm Weldon and Mark Corbould on their pass in the LAOCP examinations. I believe Malcolm is ready to go on air as soon as his callsign comes through, with an MR6A low bander which he converted to high band.

Peter Feltham has received the callsign VK7ZPE and can be heard on 2m channel 48.

The J.O.T.A. must have been quite a success, if the number of stations heard are any indication. In the North the following stations were noted, 7DK in Georgetown, 7BC in Legana, 7NZ on Mt. Arthur, 7PG in Launceston and 7KK in West Launceston. Also heard operating from the above stations were, 7RH, 7PD and 7ZWW.

North West notes by Max VK7MX.

What with Bulletins, Broadcasts and QRM it becomes increasingly difficult to find new things to say. However we may make out this month as the bulletin is in December.

Our October meeting was a gala affair with the biggest attendance for years - around 36 present. Our worthy president has certainly had an impact on branch affairs and it is encouraging to see the boys backing him up.

Two notables in attendance were old-timers Frank VK7FH and Bob VK7ZAA, after so long it was good to see them again. However there was a long list of visitors, newcomers and old-timers. Visitors included Frank VK7ZFR from the North.

There was considerable business to get through and this was followed by an offering of some very useful goodies, most people availing themselves of a range of cheap components. Once again some Morse practice was given by Harold VK7MZ. Finally we were treated to a practical demonstration of colour T.V. by Athol VK7LR. We were quite intrigued by the colours up front and the multitude of circuitry at the back. Don't know how many he placed that night.

One outcome of our meeting was the re-establishment of the equipment store. However, henceforth it will be restricted to cheap disposals and firm orders.

The Jamboree of the air has passed once again and a number of stations participated in our area. As far as we know those taking part were; VK7's AI, AX, EM, LH, MZ, MX, TT. From reports some good contacts were made. This year we confined the number per troop and at the same time tried to select suitable voices and those with the wherewithal to conduct conversation. This appeared to be an improvement.

We have two new licensees in our area. Congratulations to Brian Lord and Adrian Sherriff. Don't know of any call signs yet but they will be heard soon.

A visitor through our area recently was VK3YHU Peter. Recently had the pleasure of a mornings fishing with Harvey VK7ZYZ. The pleasure was confined to Harvey's company as it poured with rain and results were nothing to boast about. Better luck next time.

And finally don't forget the HAMFEST. It promises to be a good show, and if the work going on indicates the shape of things to come, it will be good.

Took note the other day that the turn off to Turners Beach is just under one mile from the Forth River Bridge on the Devonport-Ulverstone Highway.

So see you all at Turners Beach

MAX VK7MX



LADIES $\frac{1}{2}$ PAGE

CHOCOLATE QUEEN PUDDING

2 cups soft white breadcrumbs	$\frac{1}{4}$ cup of sugar
2 eggs	essence
$\frac{1}{4}$ teaspoon salt	raspberry jam
2 cups of hot milk	2 tablespoons of castor sugar
3 level teaspoons of cocoa	

Plate breadcrumbs into a greased pie dish, cover with the hot milk and leave to stand for $\frac{1}{2}$ hour. Beat egg yolks, sugar and 3 level teaspoons cocoa blended with a little water, add to bread mixture with salt and essence. Bake in oven 400° , reset to 350° , until set (40-45 minutes. remove from oven and spread with raspberry jam. Beat the two egg whites stiffly, fold in the castor sugar and pile on top of pudding. Return to oven to brown and set meringue (15 minutes).

Ann XYL 7NR

VHF notes by Joe VK7ZGJ.

6 metre openings are just around the corner so if your gear isn't operating, now is the time to get it going.

According to the number of xtals ordered from Kevin we should have around 30 units on 52.525 within the next month. I am pleased to report that all the MR6A's have now been sold and more than half of them should be operating for the coming DX season.

Danny VK7ZDA appears to be enjoying the few openings we have had on 2 metres recently. On the 2nd October he worked VK3's ZUR, ZBB, AKC, BMD, ALZ, and AFW. Danny has been having regular skeds with VK3AKC and VK3ZSJ, (Brian) who runs a Yeasu FT220 barefoot with excellent results. Brian also runs a FT620 on 6 metres into a 6 ell yagi.

On the 14th October Steve 3ZAZ, running 400W P.E.P. into a 7 ell yagi 70ft high, worked Danny on forward scatter, signals were around S3 bursting to S8 at times.

The 23rd was a very fine day and I noticed Danny once again working VK3AKC, at around 21.50 local time Gregor VK3ZCG was working through our repeater.

Hope to have more news next month, till then

73 Joe

H.F. DX Notes by Den VK7DK.

Listening time has been rather limited for me during the month being engaged in home decorating and work, but we did jot down a few calls heard. At the risk of being repetative, I can only say once more that the bands have been very changeable. On the 8th of October there was a great deal of activity from all over the world, and that day was one of the few when it was possible to work all continents in the period of half an hour.

Jim 5W1AL is now at ZM7 and will be on for 7 weeks using the call of ZM7AI. I believe Jim will be on this island with only the birds(feathered variety) to keep him company. Tom 5W1AR will be operating from ZM7, on 3 different islands for 2 days on each.

The Chatham island expedition should be on and possibly completed by the time you read this. I hope those that require this country managed a QSO with this all YL DXpedition.

15 has shown a little of its old self with a few openings to Europe around 9pm local time. 10 metres has been reported as being open to USA some mornings, but I have not heard any signals as yet.

20 metres has been heard to be reasonable, with times and calls as listed below.

0000/0200z	VU, JA, XU1DX.
02/0400z	5Z4, OA, HK, LU7, CE, A35, VE, W, UA3.
04/0600z	OZ7, YN, HI8, KS6, 8R1, OA4, TI2, SM.
06/0800z	GM6, F, G, I, W, OA, DM25K, FK8, DL, JA, EA3, UO5, OK1, TI2, YJ8, SM, PAØ, 7X2, HB9, 3A2, CX3, KH6.
08/1000z	CR8AC, 9V1, DU1, JA,
10/1400z	DM2, VU, UK9 OH2, UK2G, KG6, DU, UQ2, SM, JT, JA, 4S7, KS6, XW8, LA, FB8ZD, (qsl to F8US), 9M8, HI, G3, VS6, DJ, OH2, HKØBKKX (San Andres isl, qsl WA6AHF).
14/1800z	JA, F, UK5, HZ1, I., DL.
18/2200z	OA, LU, 9Y4, A35, EA6, YV, W, TI2, F, OK1.
22/2400z	W, JA, HL, VU.

Most of these were heard in the early part of the month, and the conditions deteriorated, particularly the night time DX, as the month progressed.

Ran into an old DX buddy of mine, ex VR2DK. . Owen is now operating with the call of VK8OM, so those who knew him keep a lookout for his new call.

That winds up the months activity, so lets look forward to lots of DX this month.

73& DX

LETS TALK ABOUT SPORADIC E

Sporadic E occurrence has, in recent years, undergone intensive study and some of the findings with special reference to VHF communication are presented here. There appear to be three main areas where Sporadic E occurs - (i) along the magnetic equator, (ii) in temperate regions, and (iii) in polar regions. (i) is well known and leads to trans-equatorial propagation, while (iii) is unexplored and could well be worth investigating. The 'normal' sporadic E experienced by the Australian amateur is the temperate region variety and this is the one that will be dealt with. .

The E layer generally is about 100 km high and 2 - 3 km thick and is found nearly always both at night and in the day. It is only when irregularities of an intense nature occur in this E layer that DX communications can take place. There are two main mechanisms involved in DX communication namely (i) scattering and (ii) reflection.

The scattering mode is characterized by high attenuation (> 45 dB) of the signal, gradual variation in level (about 10 seconds) and fine and rapid fading (about 0.5 sec.). The reflecting mode is characterized by low attenuation (< 45 dB) and abrupt variations in a wide range of levels. The course of events during a sporadic E event is for the scatter type to appear first, then the reflection type (probably in combination) and, finally, a reversion to the scatter type. The comments by some hams that "the band has not settled down yet" indicates the presence of scatter type prior to the establishment of reflection type. In general the scatter type is due to small irregularities involving high densities of electrons. The reflection type is due to large (1 - 10 km), nearly horizontal clouds of high electron density.

The angle of arrival differs and is narrower for the scatter type and usually arrives at about 4° vertical elevation with a sharp fall-off above and below this figure. The reflection type arrives between 2° and 6° vertically and over a wide angle horizontally, in fact for reception of this type a narrow beam is a distinct disadvantage both in transmission and reception. The reports of $S9+$ on "only a dipole old man" are to be expected, not marvelled at. The area of reflection includes points several tens of km from the great circle path joining transmitter and receiver. This wide angle effect diminishes as the stations are separated but is still of the order of $\pm 10^{\circ}$ for maximum range, single hop transmission.

The variation in sporadic E occurrence follows the 11 year sunspot cycle but in addition there are other regular variations. In the northern hemisphere May to August is the normal "season" with a small subsidiary maximum during December and January. The southern hemisphere shows a reversal of this cycle so that the maximum occurs during local summer. The diurnal variation shows a maximum in the late morning hours, usually around 10.00 a.m. and a secondary maximum in the evening which is more distinct for latitudes further from the equator.

The reason for the generation of sporadic E has not been fully established but the commonest popular theory is that it is caused by wind shear and turbulence effects in the upper atmosphere although this is insufficient on its own to explain all observed phenomena.

Putting the MR6A on 52.525. by Joe VK7ZGJComponents required;

3 - 4.7 pF Disc ceramics	2 - 10 pF Disc ceramics
1 - 33 pF Disc ceramic	1 - 12 Pf Disc ceramic
1 - 10.905 Mhz Xtal, RX	1 - 2.188500 Mhz Xtal, TX

Originally the MR6A used a high IF, around 12 Mhz. This put the local oscillator frequency on 65 Mhz giving you an operating frequency of 77 Mhz. By leaving the oscillator on the same frequency and setting the RF and Mixer stage to 52.525, only a very simple modification is required. This entails placing a 4.7 pF disc ceramic capacitor across L1 L2 and L3. Now switch the set on, place a 0-1 mA meter in TJB receiver oscillator test point and tune the top slug of TR2 for maximum, L6 for maximum and the bottom slug of TR2 for minimum. Because your 10.905 Mhz xtal is close to the original xtal frequency, the stage should have oscillated as soon as it was switched on and tuning should require no more than one or two turns of any one slug to obtain the correct reading.

To align the RF stage.

Tune the signal generator to 52.525 and adjust for centre zero on a meter 50-0-50 uA plugged into Disc. jack TJF. Connect a 0-1 mA meter into the 2nd limiter jack and peak L1 to L5, and the top and bottom slugs of TR1, reducing your signal as you peak each slug so that the meter does not exceed 200 uA. Repeat the alignment of all slugs, to ensure accuracy of tuning adjustments.

After alignment a 1 microvolt signal input to the antenna terminal should give not less than 250 uA in TJD. All this takes about ten minutes if you have the correct equipment.

The Transmitter.

Originally the transmitter used a 2 Mhz xtal and multiplied 36 times to 72 Mhz. Because we wish to maintain the original frequency, we reduce the multiplication to 24 by making the second tripler a doubler, and from this stage we have to lower the frequency of the coils from 72 to 52 Mhz. To do this place a 33 pF capacitor in parallel with the existing 33 pF capacitor of TR10. This reduces the frequency from 36 to 26 Mhz. Next place a 10 pF capacitor across L9 and L11 and a 12 pF capacitor from pin 6 to pin 8 of V21 (QQE03/12).

Transmitter Alignment.

- 1) Disconnect screen resistor at pin7 of V21.
- 2) Plug a 0-1 mA meter into jack TJ6 (1st tripler grid). press PTT and tune top and bottom slugs of TR8 for max.
- 3) Plug a 0-1 mA meter in TJ4 (2nd tripler) and tune top and bottom slugs of TR9 for max..
- 4) With a 0-10 mA meter in TJJ (2nd doubler) tune TR10 for max.
- 5) With 0-10 mA meter in TJK (PA grid) tune L9 and L11 for max.
- 6) Re-connect screen resistor and connect wattmeter to aerial connector.
- 7) Tune the PA anode capacitor C96 for maximum power out, then re-adjust L9 and L11 for max. drive in (PA grid).
- 8) Gradually couple L14 aerial coupling link into L13 PA coil keeping C96 tuned to resonance untill a power output of 10 watts is indicated with a PA anode current of 75Ma or less.

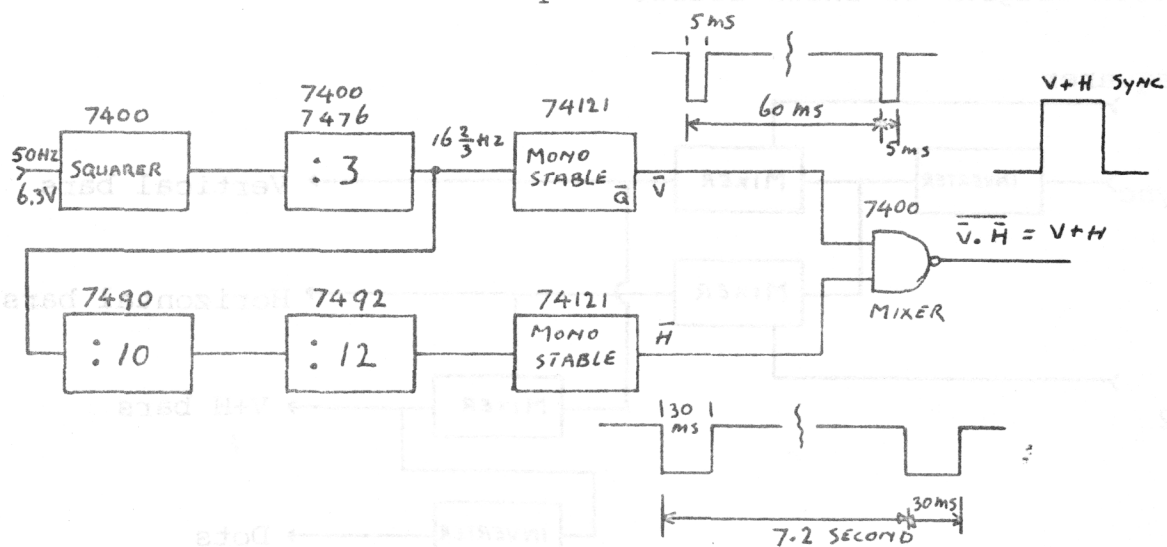
SSTV TEST PATTERN GENERATOR.

by Kevin Henricks VK7ZAH

The need for this unit arose when I was experimenting, some time ago, with SSTV sync separator circuits. I required a source of correctly timed synchronizing signals. At the time I couldn't find a circuit for such a unit in any of the usual magazines, so it meant designing my own or go without. I designed my own and here it is.

It was decided early in the piece to use 7400 series integrated circuits as they were readily available and relatively cheap.

The block diagram of the unit is shown below and I will endeavour to describe its operation.



This unit was designed for the 50Hz SSTV standards but at a later date it is planned to run the unit from a xtal oscillator so 50 or 60Hz may be selected.

The 50Hz input is taken from the secondary of the power supply transformer, fed through a squaring circuit then to a divide by three counter (7476 and 7400). The output of the 7476 is at a frequency of $16 \frac{2}{3}$ Hz which is the frequency of the line synchronizing pulses. As the line sync pulse is required to be of 5ms duration a monostable multivibrator (74121) is triggered from the $16 \frac{2}{3}$ Hz with its duration set to 5ms. So we end up with pulses of 5ms duration at a frequency of $16 \frac{2}{3}$ Hz.

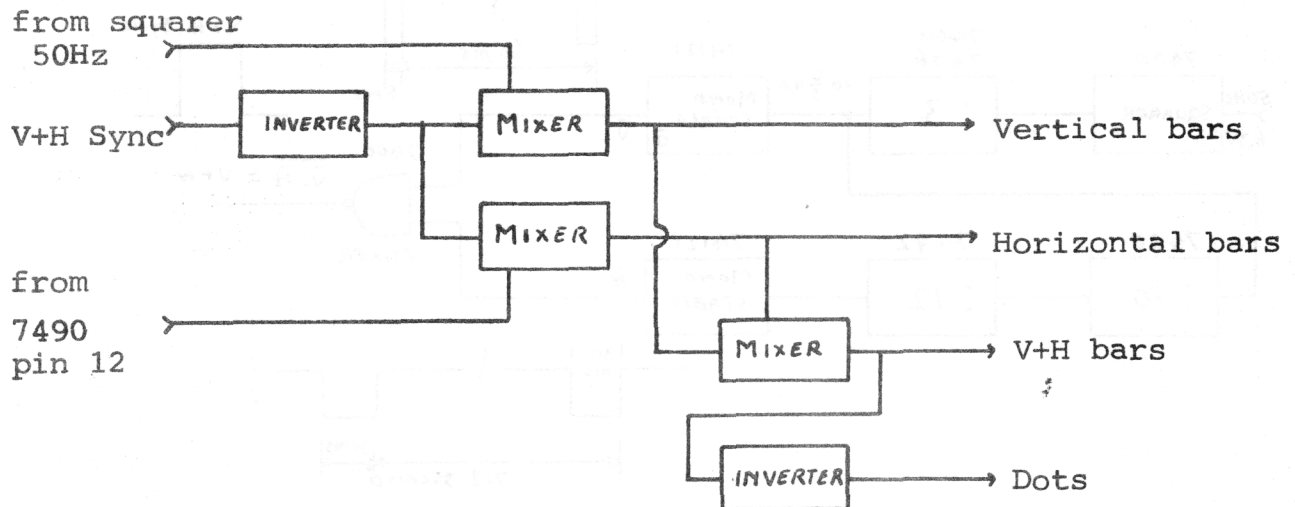
The standard number of horizontal lines for SSTV is 120, therefore the line frequency has to be divided by 120 to obtain field frequency. The 120 times division is performed by a 7490 (:10) and a 7492 (:12) to obtain a frequency of $1/7.2$ Hz or 1Hz in 7.2 seconds, this is passed onto another monostable multivibrator with its duration set to 30 milli seconds. So from the monostable we have a 30ms pulse every 7.2 seconds or a 30ms pulse every 120 lines.

Both the vertical and horizontal are now mixed in the sync mixer (7400) which produces a series of pulses of correct timing to synchronize the SSTV monitor.

The sync could be applied to a voltage controlled oscillator, then filtered to remove frequencies above 3Khz. The produced FM signal may then be applied to an SSTV monitor but would only provide a raster at black or white, depending on the type of modulator. To make the unit more usefull, a test pattern generator was also constructed to produce the following test signals;

- 1) vertical bars
- 2) horizontal bars
- 3) vertical and horizontal bars
- 4) dots
- 5) black
- 6) white

The block diagram is shown below.



Vertical and horizontal sync are passed through a sync inverter. It is necessary to invert the sync to negate video information during the sync period. If this wasn't done the spot on the CRT would appear bright on retrace and interfere with the already scanned picture. So this signal can be called blanking.

To produce vertical bars the blanking signal is mixed with the squared 50Hz signal which will appear on the monitor as 3 cycles of black and white or putting another way 6 alternate black and white vertical bars. To increase the number of vertical bars the 50Hz signal must be increased in frequency. This could be done when the xtal oscillator is used to drive the S.P.G..

Horizontal bars are generated by applying blanking and the output from the 7490 (:10). These two signals produce alternate black and white horizontal bars of 10 line duration on the monitor.

The next pattern is a combination of the two previous signals.

The fourth test signal produces white when the vertical and horizontal bars coincide, thus producing 12 rows of 3 white dots.

For a black picture earth is applied to the video select switch and for a white picture +5V is connected to the switch. From the video output of the video select switch, video without sync appears. The sync must be added to the video before the signal is applied to the FSK modulator.

The sync video mixer modulator unit discribed works, but there is a lot of room for improvement. The principle of the sync video mixer is to produce a signal which has different D.C. levels for sync, black and white, to drive the voltage controlled oscillator. Without the mixer, sync has an extremety somewhere around 0-5 volt and video is 0 volt for black and about +5 volt for white, so the FSK modulator can not differentiate between the black level of sync and the white level of video because they are at the same D.C. level. The sync video mixer, mixes sync and video, sync appears as 0 volt and white at a level of some arbitrary positive voltage. At intermediate levels of voltage various shades of grey appear.

The video varied voltage is used to drive the voltage controlled oscillator, which consists of an astable multivibrator with R.C. time constants varied by the applied voltage, which of course varies the output frequency of the oscillator.

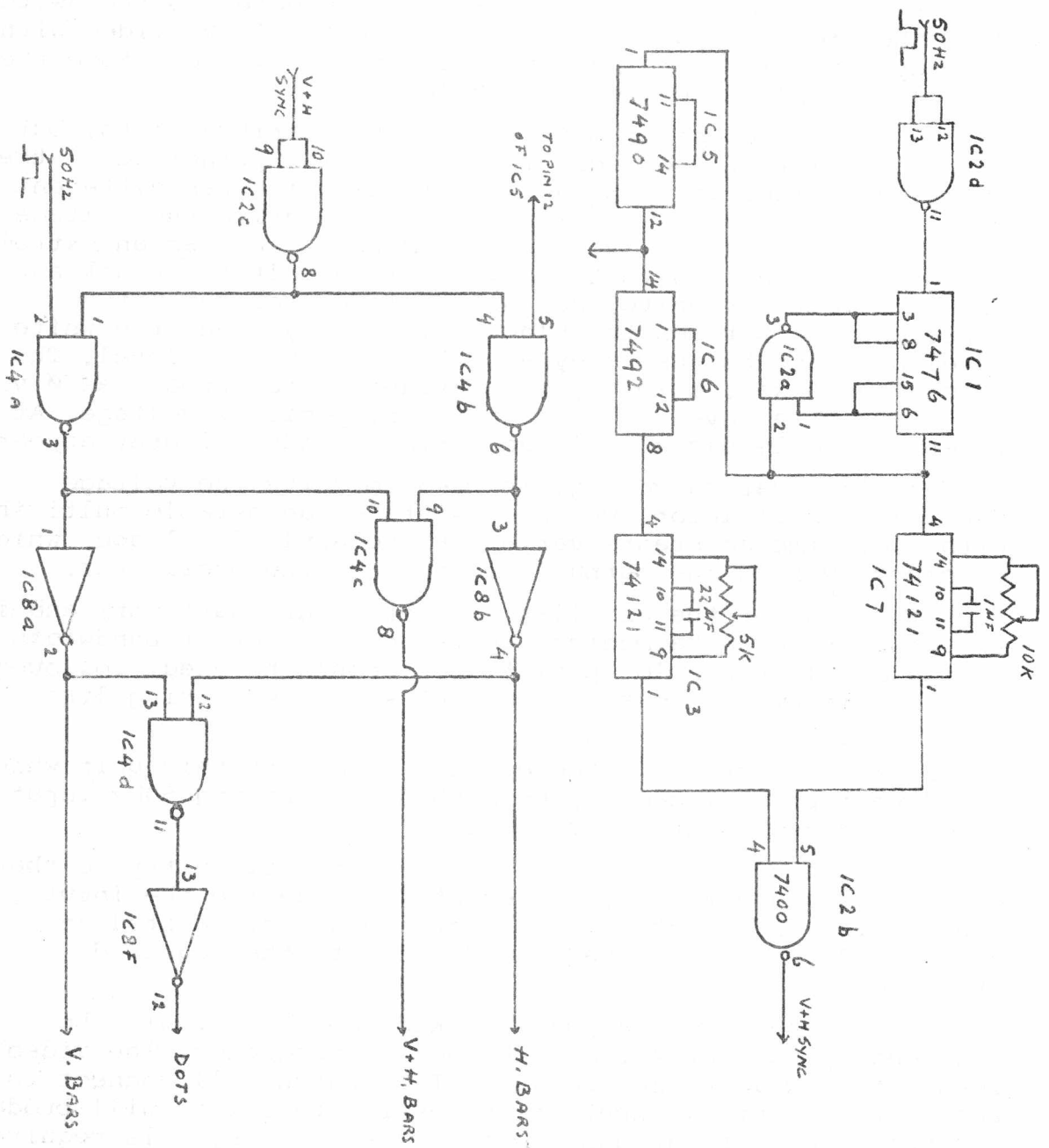
The output of the oscillator is of square wave form and is therefore rich in harmonics. To reduce the output bandwidth of the oscillator a low pass filter should be used, followed by a transformer to make the output signal something like a sine wave.

As stated previously there are sections of this unit which could be improved, namely the method of deriving 50Hz input signal and design of the modulator.

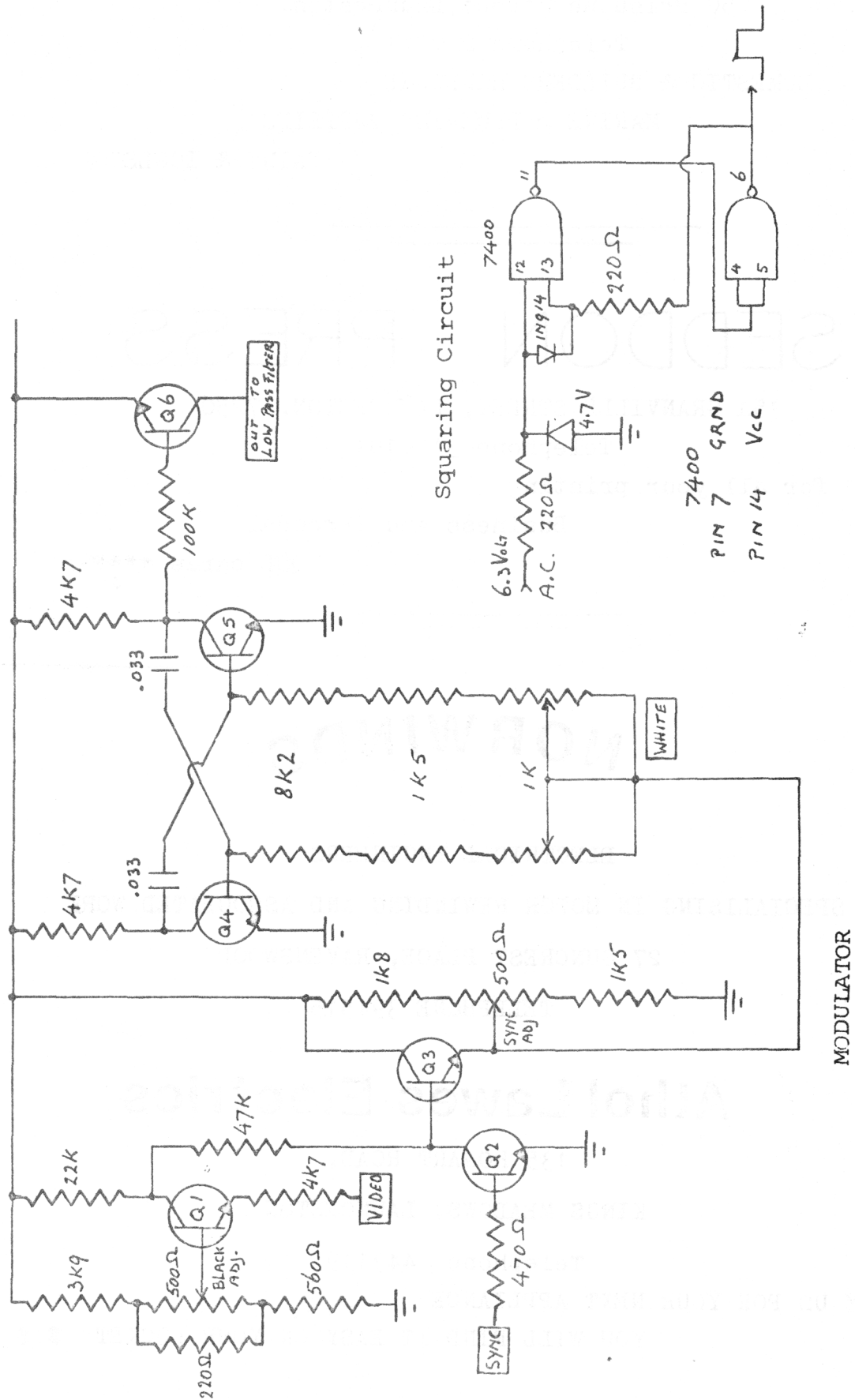
It has been decided to design the input circuitry so that 50 or 60Hz standards may be selected and derive the input frequencies from a xtal oscillator. To do this a xtal on probably 3Mhz will be used and divided to the required standard.

For the modulator, a phase locked loop V.C.O. will be used and operate at 4 times the normal frequency. The video information will be fed to a 741 I.C. which will connect to the voltage control input of the oscillator. This will produce various tones for various video shades. When sync is required the phase locked loop will be locked to the 4800Hz oscillator in the input circuitry and produce sync frequency of very high accuracy. The output of the oscillator is then devided by 4 and fed through an active filter to limit the bandwidth.

Kevin VK7ZAH



IC	GND	+5V
1	12	2,4,5,7 9,12,16
2	7	14
3	7	3,5,14
4	7	14
5	2,3,6, 7,10	5
6	6,7,10	5
7	7	3,5,14
8	7	14



J.&T. GUNN PTY. LTD.

50 Brisbane Street, Launceston.

Telephone 2 2251

DOMESTIC & BUILDERS HARDWARE

MARINE & PLUMBING SUPPLIES

PAINT & TOOLS

SEDDON PRESS

35A GRANVILLE STREET, LAUNCESTON. 7250

Telephone 31 6191

for all your printing

Business and Personal

QSL cards ****

NORWINDS

ELECTRICAL ENGINEERS

SPECIALISING IN MOTOR REWINDING AND ASSOCIATED WORK

27 SUNCREST PLACE, RAVENSWOOD

TELEPHONE 391515

Athol Lawes Electrics

135 HOBART ROAD,

KINGS MEADOWS, LAUNCESTON

Telephone 443119

TRY US FOR YOUR NEXT APPLIANCE

YOU WILL FIND IT EASY ON YOUR POCKET \$ \$ \$