THE PROPAGATOR

JULY ISSUE 1997

It's me again! but that's OK 'cause after this issue I have only one to go and I'm not the editor anymore. Someone else has asked for the job!!! "What I hear you say". Uncle Neddy Seagoon is going to take over, and I'll bet he has just as much , if not more fun, than I have this past 2 years or so. At this point I should mention that Vaughan VK2KBI offered during the year past to be the editor, but Vaughan lives in far wee Kiama and the logistics of the last minute deadline and printing problems were far greater to overcome than from here to Rob's joint. Thanks for the offer Vaughan.

Look out for Vaughan's contribution in this issue and subsequent issues of the propagator.

It would appear that there is some interest in filling the Clubs official positions already as there have been 7 or so expressions of interest. Lets get some more in by August so we can have an actual vote.
This also means that there is no need to avoid the AGM for fear of being bludgeoned into a position. As a matter of fact at the AGM there will be not one, not two, but THREE raffle prizes..

COMMING EVENTS

JULY
Raffle will be conducted with the prize being an analogue multimeter.
Rob Skelcher will give a talk and pics on sailing from England to Australia.

AUGUST
This the AGM of the Illawarra Amateur Radio Society. There will also be the raffle with three prizes instead of the usual one.Prizes include a free membership to the club for one year, a multiband AM/FM radio and a lottery gift pack. First ticket drawn out gets his or her choice of prizes.
There may also be a mystery guest speaker.

SEPTEMBER
Possibly a talk on Community Radio by a representative from 2VOX FM our local community radio station.

MORSE OR VAIL WHO REALLY DESERVES THE CREDIT?

What again? This subject does not want to sleep! Its was said that VAIL devised the dots and dashes code and this gave rise to a lot of interesting comments. I had to recant, accepting G4FAI's opinion that no one really knows. Now some more evidence has come to light:

Louis Varney G5RV, wrote that there was an article in the April 1888 CENTURY MAGAZINE titled "The American Inventor of Telegraph"
by Franklin Leonard Pope.
Pope described how in 1837 Vail attended a demonstration of Morse's telegraph system and, impressed by the possibilities , offered to work as his assistant and become a partner.
He saw that Morse's purely numerical method, involving first the translation of his signals into numbers groups and then from numbers into words, was cumbersome and time consuming.G5RV continues: "It was VAIL who hit upon the idea of using combinations of dots and dashes to represent, directly, letters.....Vail also had the brilliant idea of visiting the local newspaper and, from an examination of the compositor's type case, he immediately realized that the letter 'E' was the most frequently used letter in English....Vail also invented what we know as the "MORSE" key...."
G5RV ends with with: "of course, it is far too late now to rectify the unhappy misnomer and to give credit where credit is due, but I for one wish to salute ALFRED VAIL."
Having the idea and developing the invention are not quite the same thing, but POPE'S article was written only 16 years after Professor Morse died, and within living memory of the event, so I thought I would pass it on for what it's worth.

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FREE TO GOOD HOME

Vaughan VK2KBI has a type 15 teleprinter available. It is in excellent condition, and its yours for a phone call. Check the call book for details

A METHOD OF OBTAINING ANOTHER 40 CHANNELS FROM A UHF "EXPLORER"

by Vaughan Williamson, VK2KBI

Preamble: Most amateurs with a few years behind them will have heard of the Dick Smith UHF "Explorer" even if they have not actually touched them. The unit was released as a kit in September, 1983 and over 700 kits were understood to have been sold. Several members of IARS were successful builders of the "Explorer", even if there were general difficulties with the kit. A number of constructors apparently were not so successful, and so there were disappointments.

The "Explorer" was a 40 channel unit using frequency synthesis based on a phase locked loop and had simplex transmit and receive frequencies of between 438.025 MHz and 439 MHz. An option was to have repeater access with transmit frequencies 5 MHz lower than the simplex frequencies. With the advent of repeaters outputting above 439 MHz, I decided to try and extend my "Explorer" to cover an additional 1 MHz from 439.025 to 440 MHz. Thus I would have an 80 Channel "Explorer"!

Design Considerations: Some technical data sheets on the PLL 02A phase lock loop IC which was the "heart" of the frequency synthesizer had been obtained courtesy of the Dick Smith technical department people some time ago and from this we found that the PLL has a possible 512 channels of operation (of which only 40 were being used in the original "Explorer" design. Expansion to 80 channels was possible so far as the frequency synthesizer was concerned, and I didn't think that the final stages of the transmitter, nor the front end of the receiver would be so sharply tuned that it couldn't squeeze out another Meg! So we moved on.....

The first step was to consider how the extra channels would be made available. This was easy. A simple toggle switch would select either the 438-439 MHz 40 Channels or the 439-440 MHz channels. I decided that a little bit of digital logic would sort out the inputs to the PLL and the extras would be inserted between the 40 Channel rotary switch and the PLL. To understand why the job is done this way, we need a clear understanding of how a PLL frequency synthesizer works... but that's another story. Maybe later I'll assemble some tutorial notes on PLLs for the benefit of the newcomers and those who haven't yet fully grasped their operation.

Digital Design: To produce the expansion module, as I will now call it, we need to know what signals are being applied to the PLL from the 40 Channel switch. We then write down what signals are required to give our extra 40 Channels. I have written this down in Table 1.

	PLL input bits								
	P8	P7	P6	P5	P4	P3	P2	P1	P0
Ch 1	1	0	0	1	0	0	0	1	1
Ch 2	1	0	0	1	0	0	1	0	0
Ch 3	1	0	0	1	0	0	1	0	1
Ch 4	1	0	0	1	0	0	1	1	0
Ch 5	1	0	0	1	0	0	1	1	1
Ch 6	1	0	0	1	0	1	0	0	0

	PLL input bits								
	P8	P7	P6	P5	P4	P3	P2	P1	P0
Ch 41	1	0	1	0	0	1	0	1	1
Ch 42	1	0	1	0	0	1	1	0	0
Ch 43	1	0	1	0	0	1	1	0	1
Ch 44	1	0	1	0	0	1	1	1	0
Ch 45	1	0	1	0	0	1	1	1	1
Ch 46	1	0	1	0	1	0	0	0	0

Ch 7	1	0	0	1	0	1	0	0	1
Ch 8	1	0	0	1	0	1	0	1	0
Ch 9	1	0	0	1	0	1	0	1	1
Ch 10	1	0	0	1	0	1	1	0	0
Ch 11	1	0	0	1	0	1	1	0	1
Ch 12	1	0	0	1	0	1	1	1	0
Ch 13	1	0	0	1	0	1	1	1	1
Ch 14	1	0	0	1	1	0	0	0	0
Ch 15	1	0	0	1	1	0	0	0	1
Ch 16	1	0	0	1	1	0	0	1	0
Ch 17	1	0	0	1	1	0	0	1	1
Ch 18	1	0	0	1	1	0	1	0	0
Ch 19	1	0	0	1	1	0	1	0	1
Ch 20	1	0	0	1	1	0	1	1	0
Ch 21	1	0	0	1	1	0	1	1	1
Ch 22	1	0	0	1	1	1	0	0	0
Ch 23	1	0	0	1	1	1	0	0	1
Ch 24	1	0	0	1	1	1	0	1	0
Ch 25	1	0	0	1	1	1	0	1	1
Ch 26	1	0	0	1	1	1	1	0	0
Ch 27	1	0	0	1	1	1	1	0	1
Ch 28	1	0	0	1	1	1	1	1	0
Ch 29	1	0	0	1	1	1	1	1	1
Ch 30	1	0	1	0	0	0	0	0	0
Ch 31	1	0	1	0	0	0	0	0	1
Ch 32	1	0	1	0	0	0	0	1	0
Ch 33	1	0	1	0	0	0	0	1	1
Ch 34	1	0	1	0	0	0	1	0	0
Ch 35	1	0	1	0	0	0	1	0	1
Ch 36	1	0	1	0	0	0	1	1	0
Ch 37	1	0	1	0	0	0	1	1	1
Ch 38	1	0	1	0	0	1	0	0	0
Ch 39	1	0	1	0	0	1	0	0	1
Ch 40	1	0	1	0	0	1	0	1	0
Ch 47	1	0	1	0	1	0	0	0	1
Ch 48	1	0	1	0	1	0	0	1	0
Ch 49	1	0	1	0	1	0	0	1	1
Ch 50	1	0	1	0	1	0	1	0	0
Ch 51	1	0	1	0	1	0	1	0	1
Ch 52	1	0	1	0	1	0	1	1	0
Ch 53	1	0	1	0	1	0	1	1	1
Ch 54	1	0	1	0	1	1	0	0	0
Ch 55	1	0	1	0	1	1	0	0	1
Ch 56	1	0	1	0	1	1	0	1	0
Ch 57	1	0	1	0	1	1	0	1	1
Ch 58	1	0	1	0	1	1	1	0	0
Ch 59	1	0	1	0	1	1	1	0	1
Ch 60	1	0	1	0	1	1	1	1	0
Ch 61	1	0	1	0	1	1	1	1	1
Ch 62	1	0	1	1	0	0	0	0	0
Ch 63	1	0	1	1	0	0	0	0	1
Ch 64	1	0	1	1	0	0	0	1	0
Ch 65	1	0	1	1	0	0	0	1	1
Ch 66	1	0	1	1	0	0	1	0	0
Ch 67	1	0	1	1	0	0	1	0	1
Ch 68	1	0	1	1	0	0	1	1	0
Ch 69	1	0	1	1	0	0	1	1	1
Ch 70	1	0	1	1	0	1	0	0	0
Ch 71	1	0	1	1	0	1	0	0	1
Ch 72	1	0	1	1	0	1	0	1	0
Ch 73	1	0	1	1	0	1	0	1	1
Ch 74	1	0	1	1	0	1	1	0	0
Ch 75	1	0	1	1	0	1	1	0	1
Ch 76	1	0	1	1	0	1	1	1	0
Ch 77	1	0	1	1	0	1	1	1	1
Ch 78	1	0	1	1	1	0	0	0	0
Ch 79	1	0	1	1	1	0	0	0	1
Ch 80	1	0	1	1	1	0	0	1	0

Table 1

PLL channel input signals for 80 Channels

It looks heavy, but it isn't that bad really. All Table 1 is is simply a binary counting sequence, but we need it so as to observe what needs to be done to design our expansion module.

Have a look at the table. The rotary 40 position switch will be in the same position for channels 1 and 41 etc through to 40 and 80. Note that bits P8, P7, P2, P1 and P0 are the same in each comparable case. What does this mean? It means that we don't have to touch these five bits at all! That immediately simplifies the design (and implementation too). But now what do we do with the remaining bits? What we really need to do is perform an addition of either 0 (no change) or 40 (extra frequencies). So,

basically, we need an adder circuit. Let's see an example in decimal, and then the same numbers added in binary.

Ch 1		100100011
+ 40	which in binary is	+ 101000
41		101001011

Note that when adding we have to account for a number of factors. Do this by way of simple examples.

0 + 0 = 0
0 + 1 = 1
1 + 0 = 1
1 + 1 = 10, otherwise we say 1 + 1 = 0, carry 1

If a carry is involved,

1 + 1 + 0 = 0, carry 1 (i.e. 10)
1 + 1 + 1 = 1, carry 1 (i.e. 11)

(other combinations of three digits are trivial and not shown here).

So here is the basis of binary addition, the same basis which applies to operations within your "you beaut" Pentium 200, 2 GB hard disk, 64 MB RAM etc computer, or any other digital computer big or small for that matter.

We start our additions and hence our adder design at the least significant bit and work towards the most significant bit. To help us, let us designate the output of the rotary switch as P, the bits to add either 0 or 40 as Q, and the resultant input to the PLL as Z. Further we append the bit number to precisely identify the bits being worked.

Observation of Table 1 will tell us that there is no carry from bit 2 to 3, hence the possible combinations of P3 + Q3 = Z3 are 0+0=0, 0+1=1, 1+0=1 and 1+1=0 carry1. We can organize this in a truth table

P3	Q3	Z3	carry3
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

Looking at the truth table, we note $Z3 = \overline{P3}$ AND Q3 OR P3 AND $\overline{Q3}$ which is the EXOR operation. Note that AND has precedence over OR.
Hence Z3 = P3 EXOR Q3
Also looking at the truth table, we note carry3 = P3 AND Q3. Our design for bit 3 is complete!

For bit 4, we will draw up the truth table. This involves a carry from bit three, but Q4 is always 0 and hence can be neglected (again simplifying matters!).

P4	carry3	Z4	carry4
0	0	0	0
0	1	1	0

1	0	|	1	0
1	1	|	0	1

From our work on bit 3, we can readily see that

Z4 = P4 EXOR carry3

and carry4 = P4 AND carry3.

Bit 5 is a tad more complex as it involves P, Q and carry4, but the process is much the same as before, viz draw up the truth table and determine a boolean expression for Z5. Observation of table 1 will show that bit 5 never carries and so the expression for carry5 can be neglected. The truth table and its result for Z5 is

P5	Q5	carry4	Z5	
0	0	0	0	
0	0	1	1	-- doesn't exist
0	1	0	1	
0	1	1	0	-- doesn't exist
1	0	0	1	
1	0	1	0	-- doesn't exist
1	1	0	0	
1	1	1	1	

Again observation of table 1 shows that several combinations above do not occur and can be neglected. Therefore

Z5 = $\overline{P5}$ AND Q5 AND $\overline{carry4}$

OR P5 AND $\overline{Q5}$ AND $\overline{carry4}$

OR P5 AND Q5 AND carry4.

Now ORed groups of ANDed terms lend themselves to manipulation using DeMorgan's Theorems to give us

Z5 =

$\overline{\overline{P5 \text{ AND } Q5 \text{ AND } carry4}}$ $\overline{\overline{P5 \text{ AND } \overline{Q5} \text{ AND } carry4}}$ $\overline{P5 \text{ AND } Q5 \text{ AND } carry4}$

We do this so that we economise on the types of logic gates required, which in the case of Z5, we implement the function using NAND gates alone. By the way, note I have left off explicit use of the AND term between the groups of terms -- this is quite allowable and understood as an ANDing operation.

Finally, we consider bit 6 and we note from Table 1 that not only does carry5 *not* exist, but we can, from inspection of Table 1, determine that

Z6 = P6 OR Q6.

So our design is now complete!

Implementation: The "Explorer" design had the PLL02A IC fed by a zener diode regulated 5.6 V supply (derived from other power supply sections). It would be simplest and surest to operate the digital logic from the same 5.6 V supply and so CMOS logic gates were the obvious way to go. Mine were placed onto vero board and sockets were used with ribbon cable and the like between the expansion module and the main circuit board. The expansion module could then be sandwiched in the tranceiver case between two layers of foam. This will then allow access to the main tranceiver board as required.

The main tranceiver board was drilled so as to allow wire access as well as sever the printed circuit board connection between the rotary switch and bits 3, 4, 5 & 6 (pins 12, 11, 10 & 9) on the PLL02A. Connections from the rotary switch to the expansion module and then from the expansion module back to the PLL were then made with the printed circuit track scraped clean and carefully soldered to the respective connecting wires.

The vero board was pre-wired to accept soldered-in IC's even though sockets were eventually used. If the CMOS is soldered, it should be the last to be done and anti-static precautions (e.g. grounded soldering iron bit, operator statically discharged, etc) should be taken. The layout I used is shown in Figure 1.

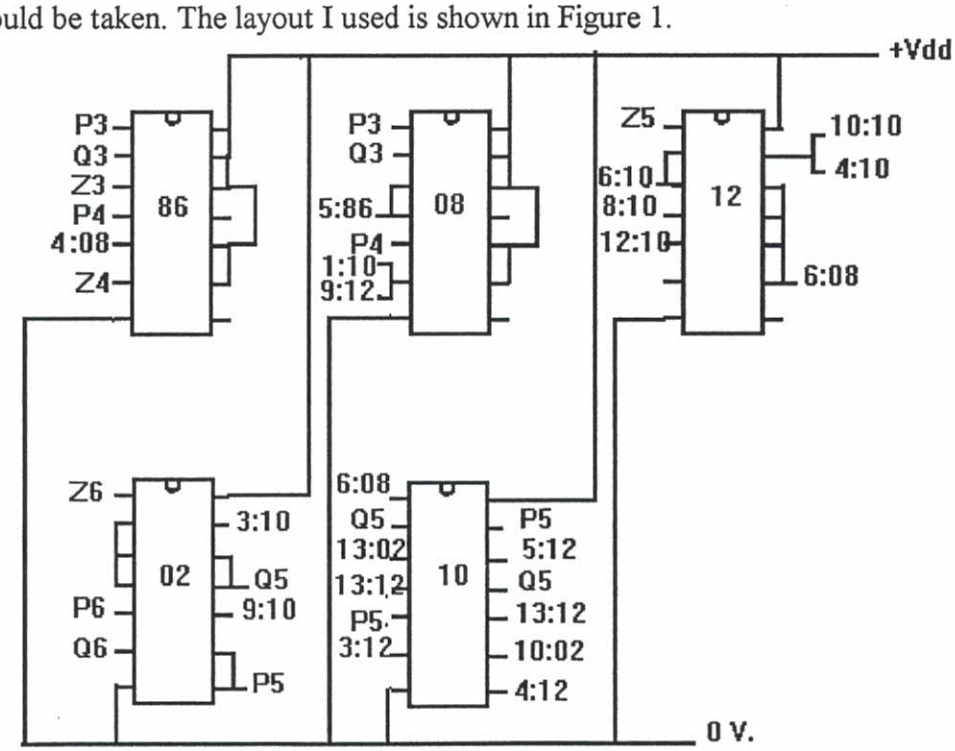


Figure 1
Vero Board Layout Diagram for the Expansion Module.

To read Figure 1, note that P's refer to rotary switch outputs, Q's refer to the toggle switch setting (Q3 = Q5 = Q6), Z's refer to the PLL inputs. Other terminals are either shown connected or unconnected as necessary or with a code which represents firstly the pin number and then the unit number to which it is connected e.g. pin 10 on unit 02 is connected to pin 9 on unit 10. Not shown in Figure 1 are resistors which are placed

between the 4 rotary switch ouputs and ground. These resistors prevent any floating of the voltages on the P inputs to the CMOS logic (the major problem encountered). The IC units in Figure 1 are identified by the last two numbers of their identifying code.

Parts List: CMOS IC's were used of which the following types were used:

1 X 74HC02 Quad 2 input NOR gate
1 X 74HC86 Quad 2 input EXOR gate
1 X 74HC08 Quad 2 input AND gate
1 X 74HC10 Tri 3 input NAND gate
1 X 4012 Dual 4 input NAND gate
as well as 1 X toggle switch
and 4 X 2k2 resistors

Problems: As noted above, the major problem encountered was the floating of voltages from the rotary switch. Apparently the PLL02A could handle it ok, but the CMOS logic couldn't. A difficulty was that I thought that when the P voltages were low, they were low becase they were forced there, but it seems they were actually floating. Of course the CMOS merrily responded to the floating input as if it were high and the output behaved accordingly! I thought I had several dud chips on my hands until a bit of thinking and a bit of chinwagging on Ch 6850 revealed the problem!

Other than that, the expansion module worked fine as can be testified by a frequency counter. The only difficulty is that like the good doctor's comment "the operation was a success, but the patient died...", the same thing has happened to the "Explorer". As several people would be aware, the transmit tripler circuit (which was working) has now decided to be a doubler! So my transmitter is a bit off frequency (like about 146 MHz)! Having another unit has helped give me suspicion that this area has been the Achille's heel of the "Explorer" and probably responsible for other "unsuccesses".
But I assure you that the expansion module is fine!

Hope the above might be helpful to you as I have tried to give reasonable detail about the design process undertaken -- a facet of projects often not written up.

73's

Vaughan.

CONVERTING AN "E" BAND FM 828 FOR 52-53 MEG OPERATION

There will be no mega technical stuff in this article , because I am basically technically incompetent. The conversion method used by me is a mixture of a few articles that I have read to produce the desired result. If you read this and say to yourself that the procedures don't sound quite right, that well maybe. However, the unit that I converted WORKS great.

Most things to do are only changes in capacitance value. It is quite possible to just add capacitance to the various points on the circuit boards, but I found it much neater to change them for a single value cap.

The first thing to look at is the receiver board, because it is the easiest.

* Add 8.2pf across each of the RF front end tuned circuits. Unsolder one side of the tin lids and bend up. There are 2 in each side. Solder the 8.2 from the top of the piston cap to the side of the tin box it is located in.(tin the side of the box first)
* The other tin box to the left of the two we have just worked on, which you resoldered into place, has to have its lid lifted up as well. In here you will see 2 empty coil formers i.e. no slugs in them. Put a slug in each and screw them in until they are flush with the top of former. Replace tin lid.

Receiver conversion is now complete and you have only been at it for 5 minutes.

TIP- Make sure that your 828 tx's and rx's before you start, or you have just wasted 5 minutes.

Ok turn the radio over and we will start work on the exciter board.

* Locate C2 100pf. It is Between L1 and the transistor just beside the Xtal socket.
Replace it with a 270pf.
* Add 22pf across L1. Do this from underneath.
* Remove 680 ohm resistor and replace with a 1.5k.
* Repeat these 3 procedures for 3 channel or 10 channel units at the appropriate Xtal sites.
* Locate C19 and C28. These are the smallest caps beside L4 & L5. They probably have a purple top.Change from 22pf to 68pf
*Locate C45, C46 47pf and replace with 100pf.
* Locate C44 , C47 33pf and replace with 47pf.

TIP- C44,45,46,47 are located hear the group of 6 transistors and will probably have black tops.

* Locate C54, C55, C61. These caps are inside the uncovered tin box.
Change C54 1.8pf to 4.7pf
Change C55 8.2pf to 15pf
Change C61 6.8pf to 18pf

TIP Remove the tin box for easier access to C54, C55, C61.

* Locate L8. It is the coil former inside the tin box closest to the outside of the board. Place a 3.3pf cap across the bottom of L8.
Ok the component changes to the exciter board are now complete.

The PA stage must now be removed from the back of the radio.
* Remove the cover plate and make a drawing for yourself of where the wire connections are.
* Remove the RF cables and the black cables from the feed through caps.
Turn the radio over and CAREFULLY remove the two nuts in the middle of the heat sink. You should now be able to remove the PA board from the heat sink.
*Locate C26 just beside C21 and replace it with 82pf.(on top of board)
* Add 22pf to C22 trimmer cap.
* Add 56pf to C23 trimmer cap.
* Add 33pf to C25 trimmer cap.
* Add 10pf to C24 trimmer cap.
TIP Do not replace the board at this stage.

Now comes the finger busting bit. The rewinding of the harmonic filter coils. You need some 1.0mm enamelled wire and a 7/32 drill bit to use as a former.
* Rewind L1 8 turns.
* Rewind L2 5 1/2 turns.
* Rewind L3 8 turns.
These coils are located in the tin box beside the BNC plug.

TIP Keep the ends of the coils as short as possible.
I found it quite possible to remove and install the coils without removing the box.
* Reinstall the PA board and make the wire connections.
TIP Apply some heat sink compound to the transistor studs and replace. Do not over tighten the nuts on the studs as the transistor are expensive.

TUNING PROCEDURE

* Put your new Xtals in.
* Locate pin 4 on the exciter board. Connect analogue meter +ve to pin 4 and -ve to chassis. Operate PTT and look for 10 volts. If this is found all is OK and we can continue. If you don't have 10 volts, you've stuffed up somewhere, assuming that the radio was working before the conversion.
* Locate TP1 and L 4 & L 5.
+ve to TP1 and -ve to chassis. With meter on the 10 volt DC scale, operate PTT and adjust L 4 and then L 5 for a 2.0v reading.
* Locate TP2 .
+ve to TP2 -ve to chassis operate PTT and adjust L 8 for a 5.0 volt reading.
* At this point a radio or a scanner to receive your new frequency. Hit the PTT and give a whistle and you should hear yourself. If all is ok move to the trimmer caps in the PA and peak them for maximum RF out put

But do not exceed 25 watts.

An RF signal generator is desirable with an attenuator box, but not essential to tune up the receiver.
* By adjusting and peaking L 1,L 2, L 3, L 4 on the receiver board you will tune the receiver in. Do this with the receiver board in the down position. Once the receiver is working satisfactorily you can make minor adjustments for best performance.
TIP If you are going to have more than one set of Xtals in your radio, choose the centre frequency to do your tuning up.

As I said before, this is what I did and its up and away.

TIP When selecting your radio be it a local version i.e with all the controls on the radio or a remote version, be sure that you get the corresponding head unit. Remotes are available in single channel or multi channel units . A single channel head does not work properly on a multi channel body and vice versa without some rewiring.

PARTS LIST

Ceramic caps

1 x 3.3 pf	**1 x 4.7 pf**
4 x 8.2 pf	**1 x 10 pf**
1 x 15 pf	**1 x 18 pf**
2 x 22 pf min	**1 x 33 pf**
2 x 47 pf	**1 x 56 pf**
2 x 68 pf	**1 x 82 pf**
2 x 100 pf	**3 x 270 pf**

40 cm of 1.0 mm enamelled wire

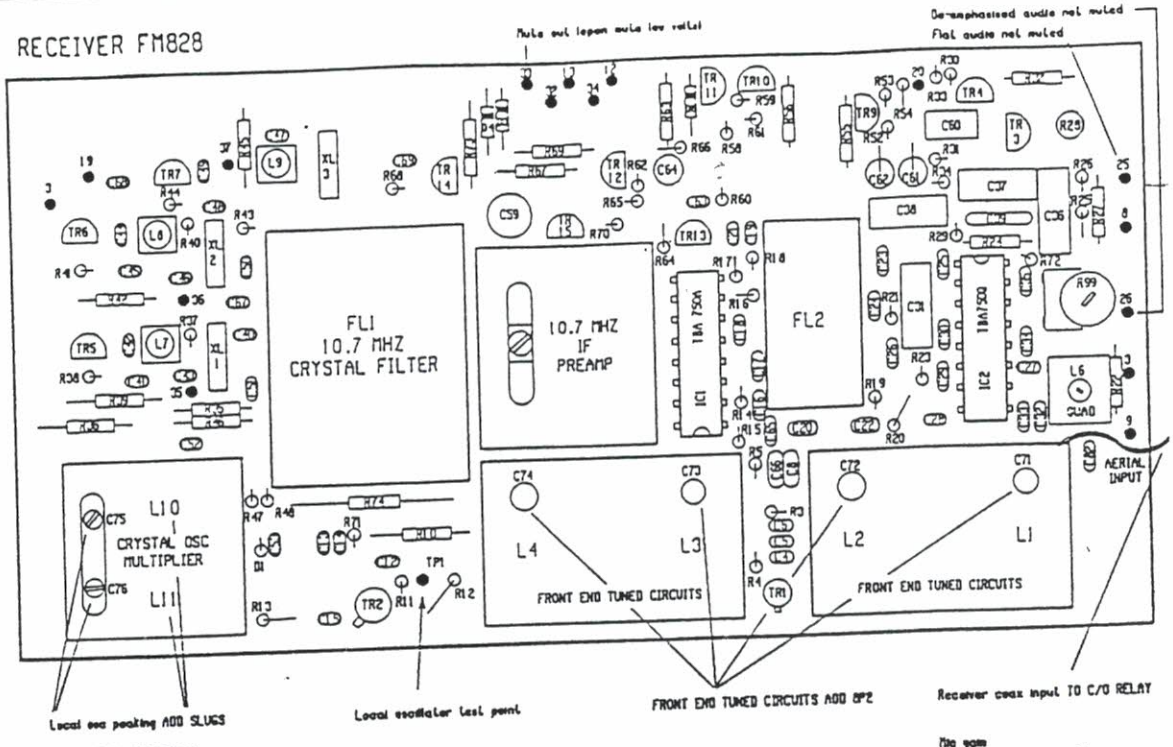
Cheers
Simon VK2XQX

Dave VK2KWY
Dave is away for a bit. That may be the reason he is away, but its supposed to be with work commitments. In his absence, Richard will be looking after the PIG and Denis VK2DMR will be looking after IP addresses.
Have a good time Dave and don't do anyone we wouldn't.

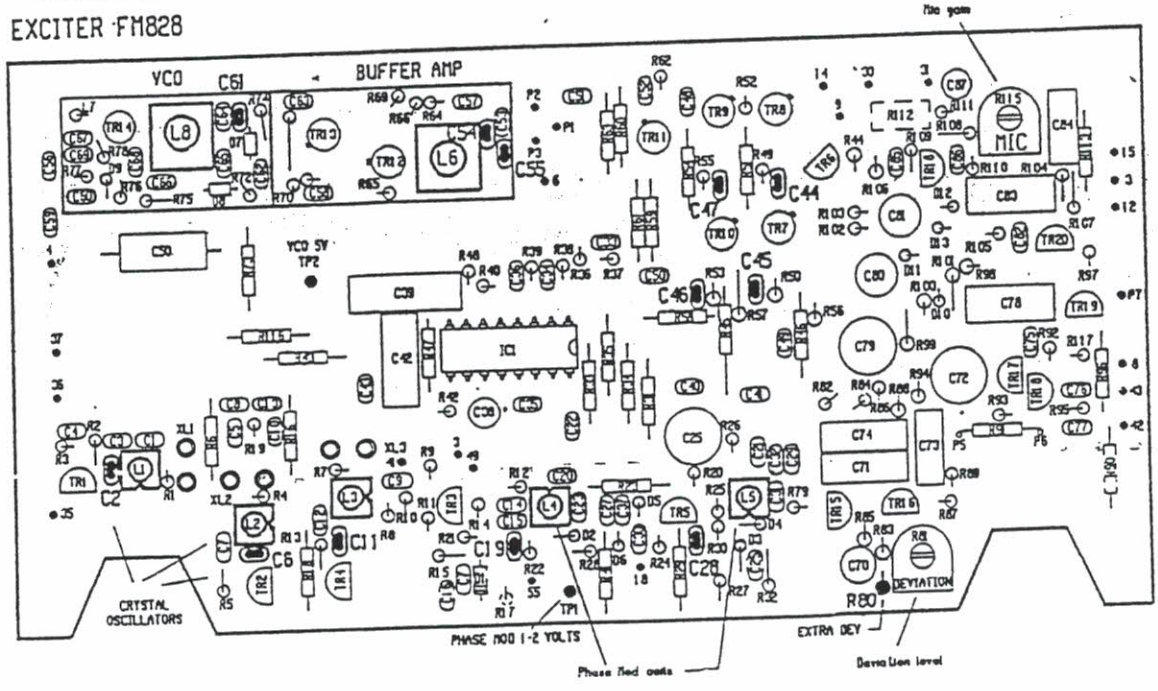
AGM

The Annual General Meeting of the Illawarra Amateur Radio Society is on the eighth day of August 1997. Be there and make a difference.

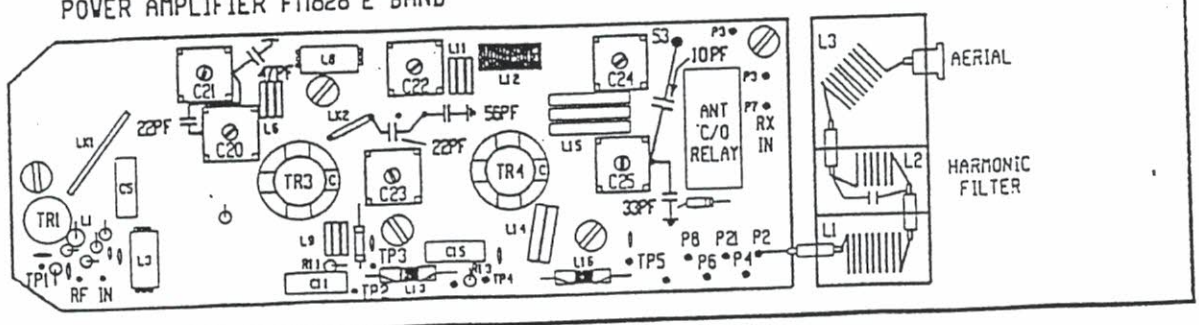
RECEIVER FM828



EXCITER FM828



POWER AMPLIFIER FM828 E BAND



INVITATION

Dear Member,

You are invited to renew your membership with the Society for the following financial year. Please return this completed form with your remittence to:

THE TREASURER
PO BOX 1838
WOLLONGONG 2500.

If you are paying at the meeting, kindly bring the completed form with you.

Name:.....

Address:.....

.....

Call:.....

W.I.A. member yes..... no.....

Member $20.00 Pensioner $15.00

PC BASICS cont.

Hello again. I trust that the first article was easy enough to read for those who are not experts with a PC, and not too over simplified for those who are.

I will just list a couple of chips that you will find on some of the older mother boards.
74LSZ80 Parity Generator
As it says this chip generates the parity bit and tests memory integrity.

8237 DMA(Direct Memory Access)
special purpose CPU
used for high speed data transfer

8284 Clock Generator
used to generate reset pulse
supplies multi phase clock for CPU & peripherals.

8253 Programable Interval Timer
multi purpose timer.
develops up to 3 delays under software control.
used by PC speaker.

8288 Bus Controller

8259 Programmable Interrupt Controller

The Boot Sequence
i.e. what happens when the power is switched on.

Power supply performs self test.

CPU timer chip receives power good signal

The CPU begins executing ROM BIOS code from address FFFF:0000

BIOS performs test of control hard ware

BIOS scans for video adaptor Rom, and if found it executes it

Scans through other Rom addresses. Any address with Rom code is executed .

BIOS checks memory location 0000:0472 1234h at this address indicates a warm boot.

Executes POST (cold boot) and signals a beep on success.

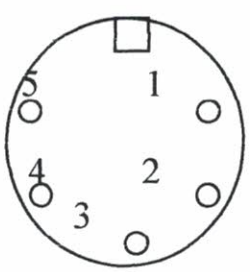
BIOS looks for an operating system on hard disk or floppy.

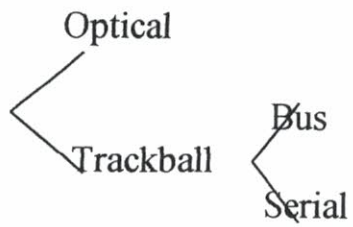
INPUT DEVICES

Keyboard
The keyboard contains 4 basic sections
K/B switching elements
Strobe circuit
Scanning circuit
Character lookup rom

The K/B is an interrupt driven device. It occupies interrupt 1 on your system interrupts.
The K/B contains an X-Y matrix of switches and the logic to detect, identify, debounce and decode a key press. Pressing a key shorts a row to column.(debounce is switch or contact bounce)
A pulse is applied to the row(one at a time or collectively) & the columns are scanned.
When a key press is detected, a short delay is imposed and the key is rechecked. This is to eliminate key bounce. The Row/Column address is applied to the character look up rom.

1.K/B clock
2.Ground
3.Data
4.+5
5.No connection





Mouse usually found on interrupts 3 & 4.

Mouses use a mouse driver or device driver.

Trackball uses opto coupling to generate digital pulses which can be interpreted as X-Y movement.

JOYSTICK

Digital——— microswitches
Analogue— potentiometers

Next issue we will look at
disk drives and I/O.

FOR SALE

Bill VK2JBS has for sale a TET 5 element beam. (HF of course). This is a very well built antenna and has had many strengthening features added to it. Ask Simon VK2XQX in you have any inquiries. Aking price is only

$80.00

REPEATER REPORT

(May - July 1997)

Well the best news (although it was 3 weeks to late for us) concerning Amateur Repeaters was the decision by SMA to change the Repeater licencing from "per transmitter", back to "per site" (as it was a about 3 years ago).

This will save the IARS a bit of money, but not as much as a few years ago. The reason for this is because the IARS has, over recent years, moved Rptrs & relinquished licences in an effort to get maximun value from the SMA licensing charges. We had only just paid the licence fees (& relinquished VK2RIL), when the WIA announced on the Sunday Broadcast a month or so ago, that the SMA charges had been changed after apparently much lobbying by the WIA. I just wish we had known this was being worked on, we may have been able to save the IARS even more money.

VK2RMP (Maddens Plains)

146.850 - Everything still functioning fairly well. The interference (& four letter words) from Communication Site Rentals is still with us, some days very strong, some days just noticeable. The tower owners are planning refurbishment of the tower in the next month or so & we are hoping that the removal of rusty nuts/bolts, brackets & unterminated feedlines & antennas may rectify the interference problem. If this clean-up doesn't help, a detailed letter will be written to the SMA, requesting them to start investigations. Hopefully, this won't be needed.

During the week before Sunday the 1/6/97, I noticed some rather severe scratching/static noises affecting all but the very strong signals. On that day, I had planned another trip to the site (had been there the previous 2 Sundays as well), so after doing the other Rptr jobs, climbed the tower & after much time, found a piece of so-called "professionally installed" LDF 4-50 heliax flapping in the wind on the SE leg & in turn hitting two large U-bolts. Goodness knows how long this had been hitting, but the hard steel U-bolts had worn thru' the softer black outer heliax jacket, the copper shield & was proceeding to work thru' the foam dielectric. Everytime the copper earth shield hit the metal U-bolt, it was causing the static on 6850. By using an old cable tie, managed to stop the heliax from further movement.

This problem was directly side on to CSR's VHF dipoles, so it must have been causing them some problems as it did to us 50' away. I'm sure there is a thank-you letter from them in the post right now. Hey the letter may even include a thank-you for us saving their antenna system from falling 120' to the ground on the 1/9/96. The rope I used to tie it off then, is still connected to their antenna system 8 months later!

438.725 - The Rptr has performed flawlessly since it's installation in February. Coverage & sensitivity appear

to be quite good. Plans are progressing in linking this Rptr to a "Gateway" to either 6 or 10m. (Frequencies either 52.525MHz or 29.120MHz.)

VK2RIL (Sublime Point)

147.275 - This site's licence has been relinquished due to the aforementioned SMA licence cost-cutting. The (-) offset 7275 Rptr will be removed shortly (the 96/97 licence is still current). The amount of usage was felt to be low to justify the licence expense. Site access will be maintained for any future projects.

VK2RAW (Mount Murray)

147.575 - The digipeater is still working fine although further improvements are planned. Phil (TPH) has pulled apart & fixed the 27' long VHF collinear & will be reinstalling it in the next week or so. This should improve the system's coverage by a fair amount.

Also, the IARS has purchased (at about half price), an almost brand new low current consumption TNC. This TNC draws about 35mA as against 320mA from a normal TNC, a significant power reduction for the solar-powered site. Also, when this change over happens, the digipeater's callsign will become VK2AMW-7.

VK2RUW (Knights Hill)

438.225 - Everything working fine. Due to there being no problems with the system, the site has had only one visit in the last 8 months & that was just to adjust the talking clock at the end of daylight saving.

On Thursday 1/5/97, VK1RGI at Mt Ginini came back on the link circuit. Rptr coverage seems to be better than before it was removed. Due to some link RXer audio changes at their end, we'll have to make a slight adjustment to our link's TXed audio to them. This will be done soon, maybe the same day the antenna & TNC work will be done to Mt Murray.

29.620 - The 10m Rptr has been a long time coming. The eqpmt, feedline & antennas have been ready for months. The delay has been caused by many things, but mostly due to uncertainties & delays with tower work at Saddleback Mtn. 6975 is planned to be linked into the 10m Rptr, but due to site delays, have been unable to plan required eqpmt & antenna changes to accommodate the linking. Further delays appear to be due to the new Vodaphone/Optus 120' tower at Saddleback Mtn sinking about 6" one week it was raining & the obvious concerns over this little problem.

VK2RIS (Saddleback Mtn)

6975 - The Rptr is working fine. As mentioned above, further delays have been experienced at the site, preventing planned improvement, including the 10m Rptr linking plus the installation of a 4 stage helical filter preamp with about 16dB of gain, to try & "hot-up' the Rptr's RXer sensitivity.

That's all for now,
till next time - RoB VK2MT.

This voucher is worth $5 off your next membership renewal. To claim this voucher you must sign up a new member. A maximum of 4 vouchers may be claimed.

i signed up a new member did you?

THE ILLAWARRA AMATEUR RADIO SOCIETY SOCIETY INC

PO BOX 1838

WOLLONGONG NSW 2500

REPEATERS

Call	*Fx*	*Mode*	*Location*	*Linked to*
VK2RMP	146.850	VOICE	MADDENS PLAINS	VK2RMU
VK2RMP	438.725	VOICE	MADDENS PLAINS	VK2RMP
VK2RIS	146.975	VOICE	SADDLEBACK MT.	FUTURE
VK2RUW	438.225	VOICE	KNIGHTS HILL	VK2RGN VK1RGI
VK2RUW	29.620	VOICE	KNIGHTS HILL	OFF AIR
VK2RAW	147.575	PAKET	MT. MURRAY	
VK2AMW-1	144.625	PAKET	WOLLONGONG UNI	
VK2XGJ	144.700	PAKET	DAPTO	
VK2XGJ	439.075	PAKET	DAPTO	

MEMBERSHIP $20.00 PA $15.00 CONCESSION EXPIRING IMMEDIATELY AFTER THE AGM IN AUGUST

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