CB Action

AUSTRALIA'S ONLY CB MAGAZINE

November/December 1992 $3.75

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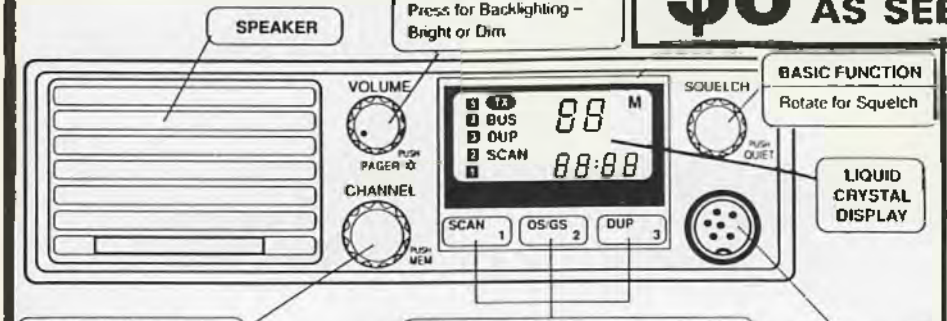

BASIC FUNCTION
Rotate for volume ON/ OFF
Press for Backlighting – Bright or Dim

BASIC FUNCTION
Rotate for Squelch

LIQUID CRYSTAL DISPLAY

BASIC FUNCTION
Rotate to select channels
Press to store channels in memory
Press to SKIP channels when scanning

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CBA 1192

AUSTRALIA'S CB SPECIALISTS

ON CHANNEL

WAS IT REALLY MURPHY...?

Boy, when Murphy hits CBA he really does it in a big way. I would love to say that the errors in the Sep/Oct issue were caused by our old friend Murphy, however, as editor, I get to wear the Dunce's cap...

We weren't all that surprised to find that the entries for our crossword in the last issue were far more numerous than usual for a competition such as this - considering that we also printed the solution on the following page!

Mind you, there were some very confused readers, not to mention a very embarrassed editor.

...and of course we also know that brilliant is not spelt brillant - as it appeared on the cover..!

Because of the major crossword disaster, we have pulled six letters out of all the entries and those readers will receive a six issue free subscription. We were going to simply pull out a couple of winners for the rigs, but, there must be a lot of readers who didn't enter when they saw our stuff up and this would have been unfair to them.

So you all get another chance at the prizes in this issue - and this time you'll have to figure it out rather than just read the solution.

CONFUSED ABOUT THE TIME?

Anyone who regularly works overseas DX knows that it's essential that the correct time of the QSO appears on the QSL card, however, many newcomers put their own local time on the card and then wonder why they do not receive a confirmation card from the overseas station.

Jack Haden, our regular DX contributor, has worked more international DX than he's had hot dinners and we've got a lengthy article from him explaining, in depth, why and how the correct time/date format must appear if you expect to receive a QSL card.

Check it out.

HF UTILITIES

Folowing our request for reader input about HF utilities in the last issue, we received strong support for the inclusion of more about this interesting aspect of radio-communications. In consquence, we have kicked off with a broad description of just what a variety of digital HF/UHF/VHF utilities are all about in this issue.

It is not going to become a dominant part of CBA and will appear on an irregular basis. This form of radio-communications is, however, an extremely interesting one yet not one that is ridiculously expensive.

With Cycle 22 fast going down the plug-hole, long-haul DX is fast vanishing and many 27MHz operators will find that when the band goes quiet - it really goes *extremely* quiet. This should not, however, mean the end of your radio activity as there are a heap of equally interesting (and often more challenging) areas to get involved in - scanning, shortwave listening, computer communications and utilities - to mention the main ones. Of course you can also use the time to study for an amateur licence so that you're ready to hit the many Ham bands when Cycle 23 kicks off and/or obtain a fullcall and continue working DX on 20 metres the year-round right now.

LETTERS

Elsewhere in this issue you'll find a couple of 'letters to the editor' pages - the first in a long time. AS CBA is a virtual one-man-band operation, the time is simply not available to answer all the mail we receive, however, we will now run a few in each issue. If you will also include your home 'phone number we'll do our best to reply directly to those letters requesting information and/or assistance.

CB Action

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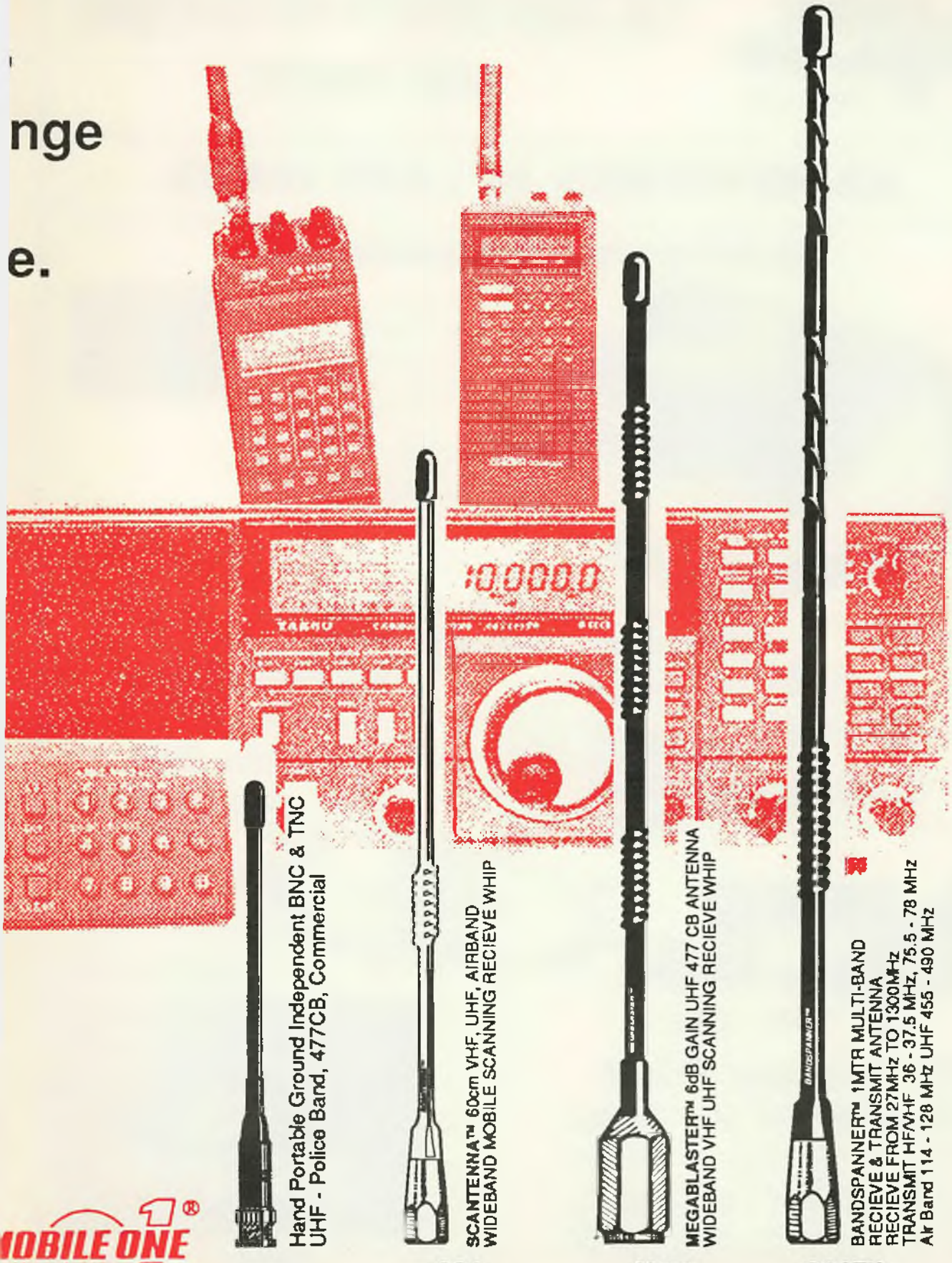

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MOBILE ONE®

Ken Reynolds looks at...

ANTENNAS and SWR

Part two of this article was published in the last (Sep/Oct) issue

In the last two issues of CBA we have discussed some of the electrical theory and some practical aspects of CB antennas that we need to know to grasp the overall concept of antenna efficiency and how it relates to antenna size, antenna location and impedance matching or Standing Wave Ratio (SWR).

This issue we return to the reader's original questions which started this series and attempt to put the foregoing two articles (issues June/July and Aug/Sep) into perspective with some appropriate answers.

We used David's (the reader) enquiry over a number of others, not because his was any better than the rest, but because his particular installation problem was a little different from the rest in that his mobile antenna is mounted on a 'ski-bar' type roof rack rather than directly on the body of the car.

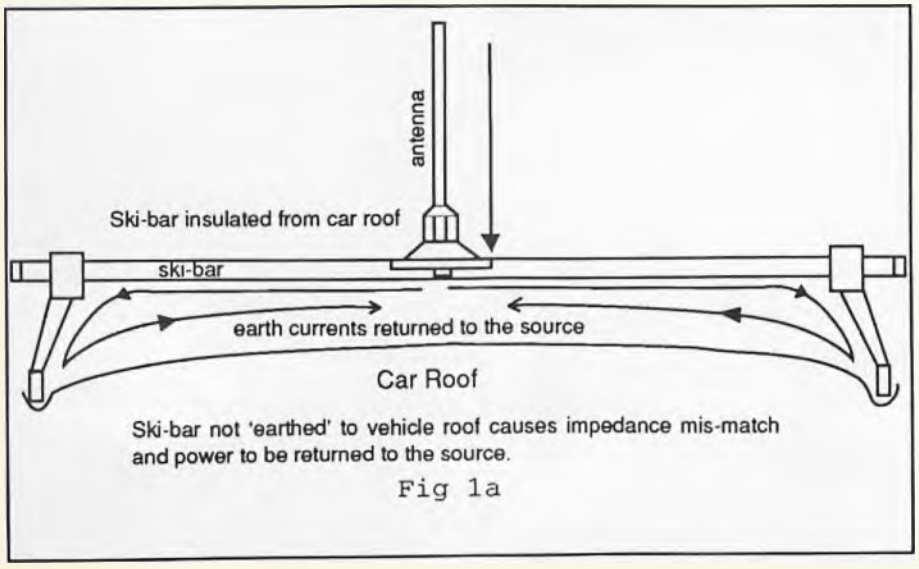
Roof rack mounting of an antenna is certainly not uncommon but it does produce a few uncertainties if one specific condition is not met to the letter.

The ski-bar **MUST** be connected electrically at each end to the vehicle roof directly at the points of contact - usually in the rain gutter.

Figure 1a shows what happens to the 'aerial' currents when they flow into a ski-bar that is electrically insulated from the car body. Because the ski-bar is short when compared with the wavelength of the radio signal at 27MHz, only a portion of the antenna current (earth current in this case) can flow into the bar before it reaches a 'dead-end' - at either end of the ski-bar.

As we have seen previously, the power, once generated by the transmitter, must be consumed somewhere and the ski-bar scenario illustrates one of the ways that the energy is returned to the source as an impedance mismatch or high SWR.

As indicated by the arrows, the excess current is turned back toward the source because the ground-plane is too short to accept all the electrical 'force' before the end of the electrical cycle when the current will decrease before it reverses direction. The actual radiator (antenna), even if it has been tuned to the correct operating frequency, will be 'thrown off balance' by the inadequate ground plane and a considerable amount of the power will be reflected back from whence it came as a result of the mismatch.



Ski-bar not 'earthed' to vehicle roof causes impedance mis-match and power to be returned to the source.

Fig 1a

AN EXCEPTION TO THE RULE

Having said that, I should mention that there is always an exception to the rule.

Sometimes, the length of the feedline and/or its position relative to the other reactive components in the antenna system (ski-bar, coupling of cable and bar to surroundings, etc.) can offer the transmitter a proper impedance match even though the correct conditions for operation as an efficient antenna do not exist. Although one might read a low SWR and believe the system to be working properly, without realising it, much of the power may be dissipated into the surrounding 'body' of the vehicle.

Sort of a "Claytons" SWR if you like.

Which just goes to prove; you **can** have a low SWR and a crummy radiated signal at one and the same time.

Figure 1b shows the currents flowing into the electrically connected vehicle roof. If the antenna is mounted in the centre of the ski-bar you will appreciate that some symmetry exists, however, try to imagine the confusion of currents and associated voltages created by off-setting the antenna from the ski-bar centre and you are visualizing what is known as a complex impedance that is almost as incalculable in its outcome as it is unpredictable - especially when those currents induce other currents to flow in adjacent conductors like the car roof and the induced currents do likewise.

A similar dilemma is produced by only 'earthing' one end of the ski-bar to the roof on which it is mounted. Poor earthing can also cause numerous headaches and this may well be the reason for David's fluctuating SWR when he gets mobile.

To eliminate one of the variables, always properly earth both ends of a ski-bar to the roof of your car; this may entail using screws in some installations.

If you are not prepared to take the risk of minor damage to your vehicle you would be best advised to forget the ski-bar idea for aerials and just use the bar to carry skis.

(continued over page...)

ANTENNAS AND SWR
Continued...

SWR INCREASES WHEN MOBILE

David also reports his SWR goes up from 1.2:1 to 1.8:1 when he gets on the move. This is quite a common problem, even with normal antenna installations, and while the SWR remains below 2 to 1 there is little likelihood that the radio will be damaged.

However, it can be a baffling irritation that requires explanation.

Most commonly this effect is observed when using long, flexible style loaded whip antennas. As the vehicle gains speed the developing force of wind pressure applied to the antenna causes it to bend thus changing its relative position to everything else in the antenna system.

As the whip top moves closer to, or away from, the main mass of the vehicle body the coupling between the two changes thus altering the electrical characteristics of the antenna system. The SWR doesn't always go up - it is just as likely to be reduced instead. This effect is usually caused by the tuning of the antenna or even the channel selected when the SWR is measured. More about this a little later.

Some other potential causes of wildly fluctuating SWR with mobility are:

1. **Loose or poor connections on the antenna base.**
2. **Loose or poor connection at cable connector or connector not screwed down tightly.**
3. **Break in cable conductor - usually the centre conductor.**
4. **Badly corroded 'bolt' or antenna not screwed down tightly.**
5. **Broken wire on the antenna - frequent on some cheap antennas.**

WHAT IS THE BEST KIND OF ANTENNA?

This is a question that really opens up the proverbial 'can-of-worms'.

To remain objective in answering this question, one must consider that the concept of **BEST** is in itself largely subjective.

For example, Joe might say that the best antenna (for him) is a 'Wankantenna" because it is big and heavy with an appropriate big, heavy spring mounted on a big, heavy base. But you can bet it cost Joe a packet.

Peter could well have a different view because he only uses his CB to talk car-to-car over a few hundred metres when he goes on holiday with family and friends.

So here you have the epitome of subjectivity - Peter bought a 'Whimpy' because a short, cheap antenna will fill his needs perfectly, and he will go to his grave thinking Joe is a boofhead.

He will never understand that Joe needs the last word in quality and efficiency for his radio system because one day he might be stranded in the Simpson dessert and his life may just depend on that big, ugly Wankantenna that hangs-off his 4WD's bullbar.

If best means longevity, then you will probably buy one of the more expensive mobile whips with a woven copper braid covering the fibreglass and finally sheathed with one of the more durable, long life plastics like polyolefin which should last 8 to 10 years in the weather.

As a general rule, top loaded antennas are usually more efficient than either centre loading or base loading, however, there are design parameters which may well render this statement untrue.

For example, it is possible to design a low-loss base loading using heavy gauge conductors that will be superior to an equivalent length, poor 'top-loader' but I do not know of any readily available on the Oz market at the moment.

Well designed 'helical' antennas are strong contenders in the efficiency stakes because there is no tightly wound coil as such but rather a gentle spiral that does not 'choke-off' the antenna current like so many other loadings.

Incidentally, the name helical describes a different type of specialised antenna that is normally used to produce circular polarization for space communications and TV links, etc. at VHF and UHF.

The CB antennas usually known as helicals are termed 'constant-spaced linear loaded' antennas because the coil is wound along the full length of the supporting fibreglass rod.

There are other variations on the theme.

TOP OR BOTTOM RADIATION

Another of David's questions - "Does an antenna radiate from the top or bottom".

As we discussed last issue - **figure 2** - the current distribution along the length of the antenna is directly related to the resistance encountered in its path. Therefore, loading coils, having some considerable RF resistance, will modify the strength of the current at appropriate points along the radiator length and in turn will affect the radiated field.

Let's assume we have an almost perfect match from transmitter to antenna - a low SWR. We already know that when the SWR is low almost all the power is radiated by the antenna and to all intents all the current flows into the antenna and virtually nothing is returned to the source. We also know that antenna current appears at all points along the antenna and it will have an associated voltage which is the driving force. Therefore, without resorting to maths, we can reason that since RF power is distributed all along the antenna it will radiate signal along the whole length of the antenna. This only holds true for our simple groundplane come dipole style antenna....but what else do we use for a mobile antenna at 27 Megs?

WHAT LENGTH ANTENNA CABLE?

Let's go back to our basic impedance theory from last issue.

If our source impedance (transmitter) is 50 ohms and our load impedance (antenna) is 50 ohms and we connect the two together with 50 ohm co-axial cable we have achieved the best power transfer

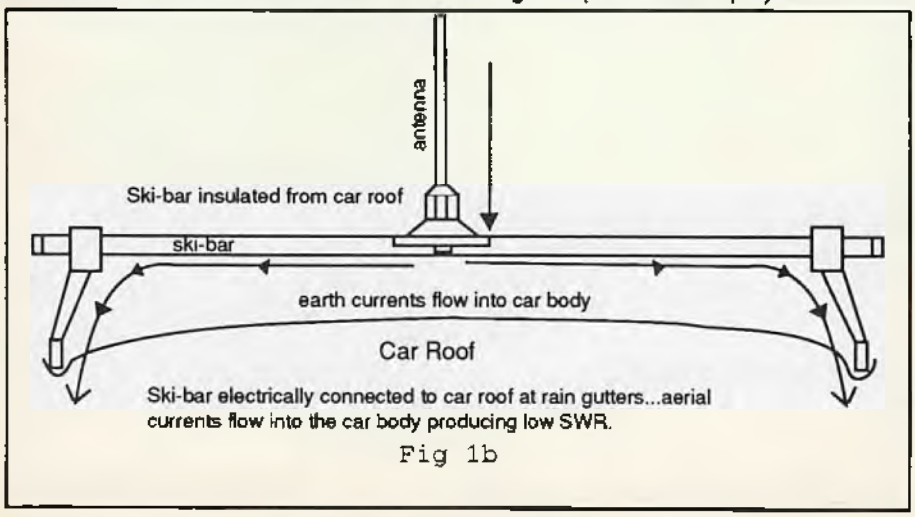


Fig 1b

possible assuming our cable has no loss.

We can easily prove this by some simple Ohms Law calculations.

SO, WHAT'S THE ARGUMENT ABOUT CABLE LENGTH?

In the real world, co-axial cables are not perfect and quite high losses can be sustained especially when using long cable runs at VHF, UHF and microwave frequencies. So, in this case it is only common sense to use the shortest practical cable length - this also reduces costs.

As usual there some exceptions to the general rule.

In the event that the antenna system is incapable of being tuned to our preferred 50 ohms non-reactive (pure resistance) impedance the inductance and capacitive elements within the cable can react with those in the antenna system to produce some unusual collective effects and this is why short lengths of co-axial cable can be used for 'stub' tuning an antenna or lengths of different impedance cable inserted in line can be used for impedance transformation. While the theory of stubs and Q-sections is way beyond the scope of this discussion, the effect of cable length on unusual impedance antennas must be considered when attempting to match an unusual load situation.

Fortunately for us, most commercial CB antennas will tune quite easily on the average car, van or truck and we can largely ignore the effect of cable length.

Some special types of antennas are designed with the cable length as an integrated part of the tuning and a specific length cable must be used. An example of this is 27MHz marine antennas that are ground independent for use on fibreglass and wooden hull boats. The new Maxi-Metre 27MHz base station antenna from Itron is another example where a 'tuned' length feedline is required. The cable should be cut to the nearest half wavelength for the frequency in use.

If you are still worried about cable lengths, be comforted by the fact that most base and lead assemblies for CB radios are supplied with one half wavelength of cable - about 12 feet.

TUNING MOBILE WHIPS

Finally, David asks what is the best channel on which to tune antennas.

Figure 2 shows some typical SWR curves that might be expected from different style antennas. Generally the longer antennas offer a wider channel coverage than shorter whips.

In **figure 3** we have shown the same antenna SWR curve tuned for three different, closely related frequencies.

Curve B, the middle one, gives the best coverage of the 40 channel Citizen's Band with a suitably low SWR across the whole band. The other two curves both have a rising SWR within the band and although they will be OK for part of the band the match could be better on some other channels. So, it immediately becomes apparent that the best channel to tune the antenna on is 'all of them'.

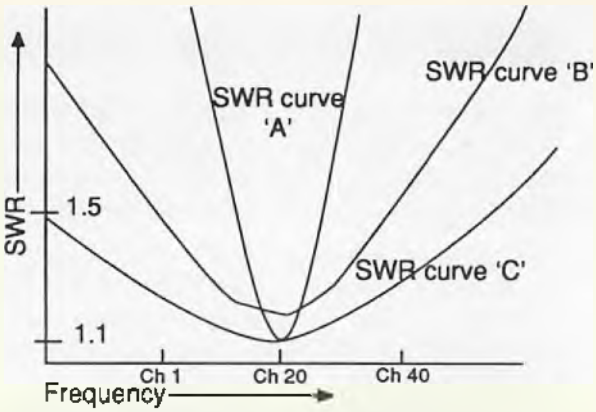
By observing the shape of the curves we can get a pretty good idea of the tuning condition be taking a reading at the highest channel and the lowest channel and perhaps mid-band as well to be sure the main 'dip' is in the right place.

Most mobile whips are manufactured intentionally too long to allow for 'trimming' or tuning.

Rule of thumb:- Check the SWR at both ends of the band before you touch the tuning. If the SWR is noticeably lower on channel 1 than channel 40 you will probably need to 'trim' the antenna or if the tip is adjustable, you will need to shorten the antenna. Before you do any cutting remember that long antennas will respond to 'trimming' much more slowly than short antennas. You might remove one centimetre from the tip of a six foot antenna with little change to the SWR while the tiniest amount trimmed from a 2 foot whip could alter the SWR by leaps and bounds.

ALWAYS replace the plastic tip on fibreglass antennas before taking another reading. It might seem like a pain in the you-know-where, but the 'tip' can have quite a significant effect on the tuning.

If the SWR reading is already lower on channel 40 than channel 1, your antenna is most likely too short in the first place, but don't throw it away yet. Sometimes what appears to be a short antenna may be caused by another problem.



SWR curve '1A' is that of a very short loaded antenna. Curve "B' is a one metre long whip and curve 'C' is that of a 1.7m long mobile whip.

Fig 2

(continued over page...)

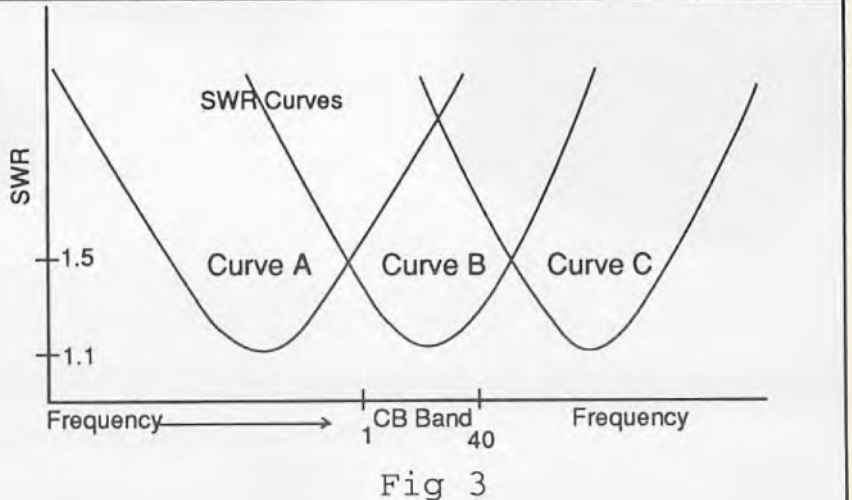


Fig 3

ROAD-RUNNER

RR477X UHF CB TRANSCEIVER

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NEW MODEL IMPROVED PERFORMANCE

Functions not found on other transceivers include:

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- Electronic channel control - avoiding hard to turn miniature channel switches
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Units are fitted with plug connections for external speaker, speaker microphone, antenna, and battery charger.

Supplied with quarter wave antenna, Nicad battery, AC charger, carry case, and belt clip.

A full range of accessories including:

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- Vehicle Adaptor
- Communications Headset
- Glass Mount Antenna
- Communications Headset
- CTCSS Board
- Spare Batteries are available
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SPECIFICATIONS

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Output power: 5 watts
Spurious Emissions: 65db
Current Drain:1.6 amps (high power)
0.45 amps (low power)
Hum and noise: 40db or better
Frequency tolerance:1 KHz or better

RECEIVER

Sensitivity: .25uV for 12dB sinad
Audio output power: 0.5 watts
Hum and Noise: 45dB or better
Current drain: 20mA (power saver mode)

GENERAL

Power source:10.8 V DC 450mAH Nicad battery
Operating temperature:-10 to +60 degrees C
Number of channels: 40
Frequency range:476.425MHz-477.400MHz
Microphone:Electret
Antenna Impedance: 50 OHMS
Size:130(H) 5 63 (W) 5 44(D) mm
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ANTENNAS AND SWR
Continued...

CHECK OUT ALL THE POSSIBILITIES

So, if you have this problem, check all the other possibilities before drawing what might turn out to be a rash decision. I've known dozens of CBers to destroy several antennas before coming for help only to find that a poor earth connection at the antenna base or cable connector - or a ski-bar for that matter - was responsible for the problem from the very beginning. Some - usually Cheapantennas - antennas are so long to begin that no amount of checking channels will locate the beginning of a 'dip' in SWR.

f you encounter this problem, first check your installation for poor connections and all the other common sense things. At this point it might be a good idea to seek some help. Or, if you sure everything is OK, start trimming the antenna while making frequent checks for the beginning of a 'dip'.

Remember the SWR will 'drop' on the low channels first if the antenna is too long. When an antenna is way off tune the SWR readings obtained can be deceptive and one can be easily fooled by a difference in readings between high and low channels which is a result of the collective effects of the antenna system, the SWR meter and the radio itself.

When the real SWR 'dip' begins it is easy to recognise.

Assuming everything is going according to plan, you should carefully position the SWR characteristic curve as evenly as possible across the band for best results. If using a short antenna that will not successfully cover the whole band, carefully tune the whip to your most used portion of the band - the truck channel for example.

Don't forget the little plastic tip.

scan by Russell Bryant

FREQUENCIES, CODES and EVERYTHING ELSE YOU WANT TO KNOW ABOUT SCANNING

All frequencies are FM and all times are local, unless stated otherwise.

SCANNING NEW ZEALAND

As modern jet aircraft become faster, the time taken to travel the world decreases proportionally. This is evident when you consider it takes less time to fly to New Zealand than some centres within Australia.

Add to this, the value of the NZ dollar in relation to ours and it becomes a very attractive holiday destination. As more and more Australian tourists cross the Tasman, some will, inevitability take a scanner with them. As a hapless and devoted scanner user, I certainly would. I couldn't resist being in another country without the facilities to monitor their railway system for example. Others may wish to chase aircraft or police, the list is almost endless.

Whatever your favorite target for monitoring activities, New Zealand is only a short distance across the Tasman. One could be forgiven for assuming that their use of the radio spectrum would be the same as it is here. That isn't the case.

New Zealand maintains a unique nationwide radio communications network. The NZ Radio Frequency Service, (their equivalent to DoTaC), establishes and administers the spectrum, as well as erecting the hardware. If you require radio comms it is the RFS who rent you the space on the repeaters.

THE RULE AND THE EXCEPTION

The Land Mobile Bands are spread amongst the other specific user allocations, as in Australia, services such as aircraft and marine for example. However the frequency limits are not the same as those employed here. Each band is designated by a letter of the alphabet. Each channel within the band is then allocated a number. There are a few exceptions to this rule, the police are possibly the only ones.

The following is a list of the New Zealand Land Mobile allocations. Apart from the repeater output and input frequencies, other information includes, the number of channels within the allocation, the transmission mode as well as the spacing between channels.

A Band CH.1 81.0125/84.98125 to CH.242 84.0250/87.99375. Simplex channels are CH.243 84.0375 to CH.318 84.975 AM 12.5 kHz.

B Band CH.1 104.975/101.000 to CH.242 107.9875/104.0125. Simplex channels are CH.243 104.0250 to CH.104.5000 AM 12.5 kHz.

C Band CH.1 455.325/450.2875 to CH.121 458.325/453.2875. Simplex channels are designated 'CX' and are, CH.CX1 449.7625 to CH.CX10 449.9875, CH.CX11 453.3125 to CH.CX23 453.6125, CH.CX24 454.9875 to CH.CX36 455.2875, FM 25 kHz.

D Band CH.1 461.825/467.0125 to CH.120 464.800/469.9875. Simplex channels are designated 'DX' and are, CH.DX1 458.350 to CH.DX13 458.650, CH.DX14 461.4875 to CH.DX 461.7875, CH.DX27 464.825 to CH.DX41 465.175, CH.DX42 466.6875 to CH.DX53 466.9625, FM 25 kHz.E Band CH.23 151.0250/155.20625 to CH.213 153.4000/155.18125. Simplex channels are CH.215 153.43125 to CH.227 153.58125, then CH.229 150.0625 to CH.303 150.9875, (Note the channels in this band are designated by odd numbers only), FM 25 kHz.

E Band CH.23 151.0250/155.20625 to CH.213 153.4000/155.18125. Simplex channels are CH.215 153.43125 to CH.227 153.58125, then CH.229 150.0625 to CH.303 150.9875, (Note the channels in this band are designated by odd numbers only), FM 25 kHz.

F Band CH.1 478.000/472.0125 to CH.320 487.975/493.9875. Simplex channels are designated 'FX' and are, CH.FX1 470.500 to CH.FX60 471.975, CH.FX61 476.025 to CH.FX139 477.975, CH.FX140 482.000 to CH.FX219 483.975, CH.FX220 488.000 to CH.FX299 489.975, FM 25 kHz.

TD Band, (Trunking Despatch Band), CH.1 414.0125/406.0125 to CH.320 418.000/410.000, FM 12.5 kHz.

Cellular Telephone Band CH.334 880.020/835.0200 to CH.666 889.980/844.980, FM 30 kHz.

Several other bands are scattered amongst those listed above, for example, Civil Defence groups have a separate allocation. The repeater channels are 149.400/148.000 to 149.900/148.500. Simplex channels are 148.800 to 149.050.

Transmissions are FM with 25 kHz spacing.

POLICE SYSTEMS

The New Zealand Police are the primary law enforcement authority across the country. To assist them in their day to day activities, they employ a number of radio systems. Comprising both VHF and UHF frequencies, the police are undergoing a change from AM to FM on their VHF network, as well as an upgrade in UHF channels.

The AM allocations are, (repeater outputs only supplied), CH.01 75.425, CH.02 75.475, CH.03 75.525, CH.04 75.575, CH.05 75.625, CH.06 75.675, CH.07 75.725, CH.07A 75.750, CH.08 75.775, CH.08A 75.800, CH.09 75.825, CH.09A 75.850, CH.10 75.875, CH.11 76.300 simplex, CH.12 77.9375 simplex. These channels are used widely throughout NZ, especially in the larger cities.

These FM channels are used in the smaller centres across New Zealand. Again only the repeater outputs are given. CH.01 75.425, CH.02 75.450, CH.03 75.475, CH.04 75.500, CH.05 75.525, CH.06 75.550, CH.07 75.575, CH.08 75.600, CH.09 75.625, CH.10 75.650, CH.11 75.6625, CH.12 75.6875, CH.13 75.7125, CH.14 75.7375, CH.15 75.7625, CH.16 75.7875, CH.17 75.8125, CH.18 75.8375, CH.19 75.8625, CH.20 75.8875, CH.21 76.300 simplex, CH.76.400 simplex.

To extend the range of the VHF as well as take advantage of UHF technology, the NZ Police have two UHF bands located amongst the Land Mobile allocations. The Police 'D' band was previously the mainstay of UHF police communications. The introduction of the 'F' band channels has largely seen a reduction in use of 'D' band frequencies, except in smaller areas throughout New Zealand.

The UHF 'D' band channels are, CH.1 465.025 simplex, CH.2 464.675, CH.3 464.700, CH.4 464.725, CH.5 464.750, CH.6a 465.050 simplex, CH.6b 465.075 simplex, CH.6c 465.100 simplex, CH.6d 465.125 simplex, CH.6e 465.150 simplex, CH.6f 465.175, CH.6v 466.9375 simplex, CH.7 464.775 and finally CH.8 464.800.

NEW BAND-NEW RADIOS

In the larger New Zealand cities 'F' band Motorola Saber portables have replaced the 464 MHz 'D' band radios. The 'F' band channels are, CH.A1 488.000 simplex, CH.A2 488.050 simplex, CH.A3 488.100 simplex, CH.A4 485.200, CH.A5 485.225, CH.A6 485.250, CH.A7 485.275, CH.A8 485.300, CH.A9 485.325, CH.A10 485.350, CH.B1 488.025 simplex, CH.B2 488.075 simplex, CH.B3 488.150 simplex, CH.B5 488.225 simplex. As this is not a complete list, it may be necessary to search the Land Mobile 'F' band for further police allocations.

This is just a brief look at the overall communications scene across a country, that one day I will get to see. If only for the railways. Only joking, there is a lot more to New Zealand than just trains. If you are planning a visit, take your scanner, they are legal over there. In fact it is not illegal to monitor the cellphones, as it is here. Many thanks to a temporarily expatriate Kiwi for the above information.

POSTSCRIPT

Yes, the frequencies listed for the NZ Police in a previous issue were wrong.

MAILBAG

UP IN THE AIR

Lino, Cranbourne VIC is first letter out of the bag with an update on some of the airband frequencies used in and around Melbourne Airport, (all frequencies are AM). Melbourne RADAR has moved from 135.900 to 135.700, with Melbourne FIS switching from 124.9 to 124.95 MHz. Qantas's company channel was 131.900, however they too have changed to 130.850. Other Victorian airfields include Berwick 126.700, Tyabb 126.700, Tooradin 124.200 and finally Bacchus Marsh 118.800 MHz. Lino uses a combination of Icom and Tandy scanners to track the airbands.

LOW BAND SCANNING

John, Ingleburn NSW has been monitoring a variety of strange transmissions on frequencies in the lowband VHF portion of the spectrum. 35.090 has, what sound like digital/data space to earth transmissions. John's frequency guide lists three local users for this

scan

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frequency. When down around these numbers the rules go out the door. Radio signals often originate from many hundreds and even thousands of kilometres away. Chances are these signals are from overseas. As to their owner, your guess is as good as mine. Military comms on 37.500 and 44.400 MHz are out of Holsworthy. 37.500 is the range control channel, with 44.400 being the Flight Information Service channel at Luscombe Field, (Holsworthy).

GOING UP

MB, South Hedland WA says the WA Police have moved from the 78/79 MHz band, to frequencies within the 64 channel UHF allocations. The new repeater channels are 467.950, 468.775 and 468.475.

SAPD MYSTERY DEEPENS

Andrew, Windsor Gardens SA mentioned in a letter that appeared several issues ago that the SA Police still had 73.190 MHz up and running long after the other midband VHF channels were withdrawn in favor of the VHF highband. He now says that 73.190 is back to back with 169.780 MHz, whatever is heard on one is transmitted on the other. Can any SA readers enlighten us as to the use of this channel(s)?

GYMPIE SECURITY

GB, Gympie QLD writes to correct a typographical error that was made regarding the Queensland Ambulance. The QAB use 460.075 as a link in the south east corner of the state. This frequency was incorrectly given as 470.075 in a past issue of SCAN. GB would like to know the frequencies used by Gympie City Council as well as MSS and Wormald Security in the township. The City Council have two frequencies 157.450 and 157.750 MHz. MSS can be monitored on 169.615. Wormalds don't have a specific listing for Gympie, however 166.240 is used extensively throughout Queensland.

OUTBACK POLICE

A reader from Winnellie NT checks in with a host of frequencies for the Darwin area. He starts by saying that the NT Police have designated their own channel numbers to frequencies from the 64 national UHF block. They are CH.1 468.450, CH.3 468.475, CH.4 468.425, CH.5 468.375, CH.8 468.800 and CH.13 467.950 has DVP transmissions. Others frequencies that may be of interest to NT readers are Telecom 500.100 and 501.025, DoTaC 494.425, Chief Ministers Department 78.525, Television station NTD 8 157.450, Conservation Commission 485.350, Transport Inspectors 469.475, Customs 489.625, Darwin Hospital Security 467.725 and finally 466.450 Correctional Services.

MORE OR LESS

SM, Eagle Hawk VIC has a PRO 2022 and was wondering if he could get wider frequency coverage or more channels out it. The short answer is NO. These scanners don't lend themselves to modification at all. Our reader would like to know if Transcom Security have a radio channel. Transcom don't have a frequency allocated to them, at least at February 1992 they didn't. That doesn't mean they don't have one, check out their cars. If they have an aerial look inside to see if the radio isn't UHF CB, they might be using one of the many commercial repeaters that are licenced to communications companies in the area.

THEY'RE RACING

DC, Bathurst NSW says he monitors the action of the car races whenever they are on the Mt.Panorama circuit. During the Tooheys 1000 477.850 was being used by Crash Rescue. Every Easter weekend the mountain comes alive with the James Hardie 12 Hour Race, with not all of the action being on the track. Frequencies that have been monitored during the 12 Hour are 460.750 Crash Rescue, 466.2 Race Control Ambulance, 469.225 and 475.350 Medical, 509.525 Channel 10 OB, 515.275 Crash Rescue 4WD vehicles. Race Control 501.800 and 504.200.

SCANNING IN THE SUN

Neil, Nambour QLD sent along the frequencies he monitors around Queensland Sunshine Coast. Running in alphabetical order, the Ambulance have switched to UHF channels 412.575 and 413.025. The Fire Service have 467.350 and 467.675 linked for total area comms, Noosa use 466.925. Maroochydore Medi Vac helicopter can be monitored on 485.000 MHz, while the police have 468.250, 468.450, 468.475, 468.700, 469.100, 469.175 for dispatch. The Nambour C.I.B have been heard on 469.225. The State Emergency Service channels 168.820 and 467.250 swing in action when needed in the Nambour area. Gympie SES are on 467.775 with Caloundra using 467.725 MHz.

MELBOURNE MEDICAL

RS, Reservoir VIC monitors some of the more unusual medical and ambulance services about the Victorian capital. St.John Ambulance are prominent at AFL games, fun runs and other sporting events. To co-ordinate staff they use 469.525 which is a simplex channel. A Net Control Unit with callsigns in the 100s can be heard as well as 'ground level' personnel. Heidelberg Hospital Security, Fire and Porters use Kenwood TK300 portables to communicate on the frequency 463.950. Meanwhile Austin Hospital Security can be monitored on 461.550. Both hospitals employ phone patch on their systems. The Royal District Nursing Service can be found on the following frequencies, 412.950, 412.975, 413.000, 413.250, 413.400, 413.450, callsign VH3DNS. Our reader is interested in locating the frequency for the Victorian Coroners Office, if they have one. Any offers?

TASSIE TALES

Lyndon, Dover TAS uses a PRO 38 to keep an ear on the marine and emergency services channels used around the southeast corner of the state. He asks if he can use his PRO 38 to track satellite frequencies. The answer is Yes and No. Some satellite services are hidden away in the 136-138 MHz band. They mostly contain data so would be of little interest. Apart from amateur birds on 145 and 430 MHz no other satellite services are available to you. For HF traffic Lyndon uses a DX 100 and 8 metres of fence wire between two trees for the job. Running an earth wire will do nothing to improve or protect the radio. If lightning was to hit the antenna directly, or even nearby you would need an earth wire the size of Arnold Swartzenwhatsitsname to carry the current away. Frequencies monitored in the Dover area, Marine 161.800, 161.950 both of which carry Seaphone Traffic. Forestry 77.000, Ambulance 78.385 and Police south 76.145, Police Kingston 76.115.

PROPAGATION

THE LAW IS AN ASS !

I can't remember who said that, however if the comment was directed to the laws governing the monitoring of cellular telephone conversations, then I admire the persons foresight.

At the time of compiling this column, (late August), a storm has blow up in England regarding the alleged interception of a cellular telephone conversation between Princess Diana and an unknown male. The British and Foreign press are highlighting the fact that a "150 pound wideband scanner" was used to illegally overhear and record this seemingly 'private' telephone conversation.

I will bet that NO one in England is ever brought to task for the unlawful act of recording the phone call, even though someone has admitted the breach. Why? Anytime the press take an interest in a recorded cellular telephone call, it has to be worthwhile, (newsworthy). The contents will be evocative, incriminating or down-right dirty. The second factor that will spark media interest is the fame or infamy of the parties to the conversation.

Accordingly those involved will never admit that they are the victims of the phone tap, embarrassment will see to that. For a successful prosecution of the offender, the victim has to give evidence in court. "Yes, that is my voice". "Yes, I had that conversation with so and so on that day". "Yes, I said those words during that conversation". "No, I gave no one permission to record that conversation".

Denial always carries with it the element of doubt. Is it who they say it is? Could it be a setup? More importantly, was the conversation intercepted by means other than those stated, (illegal hardwire tap)? Ask no questions, be told no lies. Without the evidence of the victim, a prosecution would fail. No victim will ever incriminate themselves, given the chance. Happy monitoring.

MORE ON THE D707

Following my discussion of the problems encountered by several owners of the Diamond D 707 active antenna, EG of Berowra

Philips announces the new FM650SD UHF CB Radio.

If you're always on the move... your next move should be to a FM650SD from Philips.

Philips Mobile Communication Systems Pty. Limited

For further information contact your Philips State Office or local Philips dealer:
VIC/TAS (03) 881 3600 **NSW** (02) 805 4444 **QLD** (07) 840 5798 **ACT** (06) 257 4411 **WA** (09) 277 9399 **SA/NT** (08) 348 2888

PHILIPS

PHILIPS

scan

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Heights NSW detailed a few of the defects he has encountered with the RF/DC splitter unit, and their remedy.

The first problem is the fly lead that is attached to the RF/DC splitter and connects to the receiver. It is stiff and often needs to be bent to enable it to be connected to the receiver. This bending places strain on the connection within the housing, causing the solder to fracture at the PC board, thereby reducing the effectiveness of the unit.

To allow for movement within the splitter our correspondent soldered a small length of flexible wire between the centre core of the coax and the PC board. A single coil in the wire eliminate strain on the coaxial connection. Problems can also be encountered with the RF input socket, (SO 239), located on the RF/DC splitter housing. The centre connector is a split brass sleeve, into which is fitted the centre pin of the main coaxial cable connector, (PL259). When new this sleeve is a tight fit, however over a period of time the brass separates and a poor connection is the result. EG cured the fault by placing a small section of coil spring over the sleeve, preventing it from opening. Care was taken to ensure that the spring remained clear of the outer tube of the SO 239 socket, so as to prevent a short.

And last but by no means least, the centre pin of the 12 volt DC fly lead socket is not compatible with any power pack pin currently available within Australia. Some connectors will fit the socket, however there is no connection between the centre sleeve and the pin. Our reader overcame the poor fit by opening the pin slightly, then filling the gap with solder.

These are one persons solutions to the problems at hand. Owners of the 707 active antenna from Diamond may or may not be experiencing similar faults. If you have anything to say about this or any other product that you feel may be enhanced please drop me a line.

FOOTNOTE

Referring back to the fly lead that connects to the radio, after examining the splitter box I decided to replace the lead with a BNC female connector. I simply remove some of the nickel plating around the BNC and soldered it into place onto the PC board, where the outer shielding was attached. I installed a ceramic capacitor between the earth side of the PC board and the centre pin of the RF connector. This reduced interference from external electrical services. The result is a far more flexible setup, especially if you wish to switch from one scanner to another.

FIRE VISOR-CODE

Nearly twelve months ago two enterprising gentlemen in Victoria R and Ded the Police Visor-Code. A card sealed in plastic that attached to the sun visor of your car. A quick glance revealed all the necessary information on frequencies, codes, callsigns and districts etc. After burning considerable quantities of midnight oil, Visor-Code have released the Victorian Fire card. Details of all C.F.A and Melbourne Metropolitan Brigades are included. Again frequencies, station numbers, callsigns, radio codes and appliance identifiers are clearly displayed for quick and easy reference. Now for the good news, Visor-Code have provided six copies of their Fire card to be given away. The first six Victorian readers whose letters come out of PO Box 344 SPRINGWOOD NSW 2777 will win a copy of the Fire card. If you can't wait the card is available from Just Communications, Time Plus, Delta Base and Powerband. For country Victorians, write to *Visor-Code PO Box 202 MELTON VIC 3337, telephone 03 747 8632 during business hours and 03 457 5357 after hours.*

WHEN YOU'RE HOT YOU'RE HOT

Cellular telephones are everywhere, or so it seems. Their acceptance by everyone from the local plumber to Chief Executive Officers of multi national companies, has lead Telecom to look at ways of expanding the system. The popularity of the cellphone can be highlighted by the fact that at the end of March '92, 401,365 subscribers were 'online'. Telecom's expenditure on AMPS, (Telecom's name for analogue cellular), now exceeds $700 million dollars. The service potentially reaches 84 percent of the population and has the world longest stretch of continuous cellphone coverage.

Two factors have moved Telecom and other telecommunications providers to look at other modes for delivery of cellular services. Saturation of analogue frequencies and improved digital technology. With this in mind Telecom, Optus and a third as yet unnamed network have been allocated frequencies in the 800/900 MHz band for the GSM, (Groupe Special Mobile), digital telephone services. April 1993 will see the launch of the GSM digital technology in Sydney and Brisbane, with other centres following shortly thereafter. The new frequencies for GSM are,

Band 1 TX 890-895 RX 935-940 Spare
Band 2 TX 895-900 RX 940-945 Spare
Band 3 TX 900-905 RX 945-950 Telecom (AOTC)
Band 4 TX 905-910 RX 950-955 Optus
Band 5 TX 910-915 RX 955-960 Third Carrier

GSM was developed in 1982 as the European standard for cellular telephone services. To date only seventeen countries have signed the charter, accepting GSM as the prime carrier mode. It is anticipated that by 1995 all areas of Europe will be covered by GSM, replacing many 'island' networks.

Australia decided on GSM because of improved sound quality and accuracy, especially considering the amount of data being sent on cellular networks. The ability to offer improved services, such as international and intra-country roaming as well as call waiting facilities also swayed our decision. Before you rush out and purchase a scanner capable of receiving these frequencies, there is something you should know. Digital is 100 percent unscannerable (nice new word that...). All you will hear is a rush of noise because our ears pick up speech in analogue and scanners don't have digital to analogue converters onboard - yet! Sorry about that.

ESG GIVEAWAY

As highlighted in the Sept/Oct issue of CBA, ESG has released the Complete Frequency Register for NSW, Victoria, South Australia and Tasmania. They have also kindly provided me one of the 'Complete' guides for each of the states mentioned to giveaway. As always it is up to me to decide how! If you would like to win one of these 'must have' reference sources then this is how you go about it. 1. A sticker from your local radio station. 2. Two frequencies used by the railway system of your home state and the purpose for which they are used. 3. What frequency is channel 41 of the national police allocations? It will be the first correct answers out of *PO Box 344 SPRINGWOOD NSW 2777, that will win the guides.*

The Complete Frequency Registers retail for $149.50 NSW, $99.50 VIC, $59.50 SA and $39.50 for Tasmania. All enquiries for these and other ESG products should be directed to ESG GPO Box 1200 Adelaide 5001.

CHANGE OF ADDRESS

The Newcastle District Scanner Group, who supplied the information for the article on Scanning Newcastle, have changed their postal address. The one featured in the article was wrong, all correspondence should now be addressed to Newcastle District Scanner Group, PO Box 132 WARATAH NSW 2298.

NSW AMBULANCE TRIAL UHF

In September this year the NSW Ambulance commenced a trial of the 413 MHz national ambulance frequencies in and around the Illawarra Region. The Illawarra was selected because of it's compact size and ease of establishing repeater sites on the mountain range to the west. If all goes well, the Ambulance will expand the system to Sydney, Newcastle and other major regional areas. The 76 MHz VHF will remain the mainstay of country communications.

STOP PRESS

Mobile One Australia announced the SCATX Multi-band transmit and receive antenna. Early indications are that this antenna can replace up to four transmitting aerials and seven receive aerials. Frequency coverage is from 27-1300 MHz banded receive and 36-490 MHz banded transmit. Look for a complete run down on this and other Mobile One products in the next edition. The SCATX is available from Dick Smith Electronic stores.

THAT'S ALL FOLKS
That's it for this episode of SCAN, all correspondence should be addressed to,
SCAN
PO BOX 344
SPRINGWOOD NSW 2776.

CALCULATING AND UNDERSTANDING GMT TIME

By Jack D. Haden

CB radio is an excellent medium in which to gain experience in the field of radio communications, and in the case of DXers on 11 meters this represents an excellent avenue to gain some understanding of radio propagation, terminology and the understanding of time factors and its application within the world of DX.

Those of you who are shortwave listeners or avid DXers on the band will no doubt already understand the fundamentals which apply to the use of WORLD TIME. Judging by a couple of letters I received recently there is some confusion about the times I quote in my DX INTERNATIONAL column when DX stations are logged.

Apparently the figures 0355z or 0001z create a deal of confusion with some newcomers to the DX arena, well, basically the term "z" - better known as ZULU time - is an abbreviated (or lazy) term for Greenwich Mean Time (GMT) also commonly known as Universal Time Coordinated (UTC).

In reality all three mean exactly the same thing, in layman's terms you could call it WORLD TIME.

VARIATIONS OF LOCAL TIME

Before we become involved with the nitty gritty of Zulu, GMT or UTC, we will look at the two main forms of local time that are in use in Australia and around the world.

In overseas countries, especially Europe, the 24-hour clock is used to express local time, unlike Australia, where we add the suffix AM or PM to decipher the time of day. In many overseas countries, in order to make things much clearer, the 24-hour clock is used as a standard feature determining time of day.

I personally prefer this method of clearly defining the difference between AM and PM. Many organisations in Australia already use the 24-hour clock system with the main users being the military, airlines, shipping and most state railways.

I know that timetables are much easily read when in the 24-hour clock as you don't have to recheck as to whether you're reading the AM or PM section of the timetable.

So 9.23am becomes 0923 and 9.23pm become 2123 and thus there is no need to add the AM or FM suffix to the figures.

Midnight becomes 0000 hours and midday becomes 1200 hours under the 24-hour clock system.

Any readers who have been overseas will no doubt know many countries adhere to the 24-hour clock.

It is much easier to define AM and PM times than the AM/PM system that we use in Australia with the block of 12 numbers with the time of day clarified by the addition of either AM or PM at the suffix end.

Imagine buying a prebooked train ticket in Paris, Cairo or Rabat and seeing your departure times and arrival times as 9.00 followed by some foreign squiggles.

You wouldn't know if it was AM or PM departure time. However, with the 24-hour clock, if you see 0900 or 2100 you immediately know if it is an AM or PM departure because the prefix numbers are totally different.

As mentioned, the 24-hour clock is in use within Australia, the airlines and military use it to avoid any mistakes or confusion, and some large companies use it on their staff rosters so the employees are aware of their shift times, especially on a large rotating roster.

How many of us have purchased a new foreign-made video recorder (VCR) to find that the programmable clock is a 24-hour clock, so 1.00pm becomes 1300 hours, 11.45pm becomes 2345 hours etc.

You will have to understand this system if you wish to tape a movie while you are chasing DX or asleep in bed!

I find the 24-hour clock most comfortable to use, perhaps Paul Keating, who is intent on changing the national flag would like to also suggest a change to the 24-hour clock format?

After all one would not have to add AM or PM to the suffix as with our 12 numeral standard system we use to calculate the 24-hour period. We would alleviate a lot of reading problems for people with poor sight or reading substandard printed timetables as it is a lot easier to read 1400 hours instead of 2.00am or 2.00pm in poor conditions.

LOOKING AT WORLD TIME

Surprisingly, many radio amateurs read CB ACTION, so there is no need for them to read on.

The experienced radio amateur will know what WORLD TIME is all about. Officially WORLD TIME as I call it is an international time standard set throughout the world.

Without this international standard of time we would be in one great mess.

GMT, ZULU, UTC, and LOCAL - ALL INDICATE THE TIME BUT WHERE AND TO WHOM

Imagine that you are talking to a mate or listening to a shortwave station that tells you to come on at 9.00 o'clock their time tomorrow or to make it more confusing, at 9.00 o'clock on Friday.

When I mentioned talking to a mate, I mean someone who is overseas and not within Australia.

Now, 9.00am in New York on Friday, is definitely not 9.00am on Friday in Sydney or in Rome or Cairo for that matter either, and not forgetting that the actual day will even be different. In the case of New York, which will be one day behind us, remember the crazy thing called the International Dateline?

So without the advent of GMT or UTC it would be quite a long task working out all the local times to get everyone on the frequency the same time and on the same day.

When I was a boy attending school in the Solomon Islands I have a clear memory of a saying my geography teacher used to help remember the different time of day across the International Dateline, the saying goes: "When it's Monday in Moresby, it's Sunday in Samoa."

The same saying, slightly varied, could go for Australia: "When it's Sunday in Sydney, it's Saturday in Sacramento USA."

You must remember that this rule only applies more or less for local time and in regard to GMT the date and time are the same no matter where you are in the world thus simplifying the whole issue.

By using the GMT or UTC time scale there is no confusion at all, the end result is the same right around the entire world, and you will arrive on the right frequency at the right time on the correct day, ready to receive the signal sought, propagation willing of course.

WORLD TIME AND ITS HISTORY

I use the term WORLD TIME to make it more appealing to the newcomer, old hands will know I am referring to GMT, UTC or ZULU time, call it what you will.

Now, without a standard world time, as I previously mentioned, the world communications systems would be in utter chaos.

No one would know when to contact the other in a foreign country or even within his own country if different local times zones are established (here in Australia, Norfolk Island, South Australia and Western Australia are all on different times to that of the eastern coast of Australia), so to ease this confusion back in 1880 Greenwich Mean Time became the standard time base for the whole of the United Kingdom.

In 1884, after long international discussions, the Greenwich meridian was accepted by general international agreement as the prime meridian from which international time zones and degrees of longitude are calculated.

The reason for all this was due to the mergence of international world wide communications, both in travel and with the advent of radio and telephonic media, the overall concept of mean time, as applied locally, also become inadequate.

When it is noon Greenwich Mean Time, the "mean Sun" is due south, on the meridian, at the Greenwich Royal Observatory (near London).

It is only rising in the eastern States of the United States, and has set in Tokyo.

On the other hand, every place on earth with a different longitude has a different local mean solar time, as well as different local apparent solar time and local sidereal time! (sidereal: involving the stars, ie: sunset and sunrise of the stars).

In fact, if you are not an astronomer, then sidereal time is not really important especially in the field of actual time calculation within relation to world time (GMT). Since 1880, when Greenwich Mean Time was adopted in Britain as the legal definition of time, other countries have gradually followed suit and thus adopted GMT as the basis for their own time, correcting their local time by one hour for each 15 degrees of longitude east or west of Greenwich.

In theory, the world is therefore divided into 24 zones of time, with their centres at 15 degree intervals from each other and thus each differing by one hour from the adjacent zone.

So, without going into further detail about the formation and the fundamentals of GMT, a world time standard was adopted on an international basis. Thus, by working to this standard and ignoring your local date and time, one can establish communications with other countries with ease.

Whether it be Barcelona, Bangkok, Brisbane or Barbados, in GMT the date and time is the same in each resp
fective country.

GMT/UTC APPLICATION IN RADIO

Many CB and other radio newcomers who progress to amateur radio in the pursuit of DX soon find out that the humble QSL card must be filled in properly in order to confirm a contact from abroad.

This is where the GMT or UTC date and time become very important and give you the status of a good DX operator.

There is nothing more frustrating than receiving a DX card where the operator has put the date and time as local and not in GMT.

This would be OK if the contact was within the same state or zone. However, this doesn't wash too well with overseas cards or interstate for that matter.

At least 95 per cent of radio traffic on the HF bands is scheduled and recorded in the GMT date and time standard.

Shortwave broadcasters announce the time in UTC or GMT, which is the same thing remember, radio amateurs arrange schedules with mates abroad in GMT, often on the amateur bands you will hear it being referred to as "ZULU" time which again is the same thing as GMT and UTC.

This is where the use of GMT as the standard of time recording becomes much more easier to use than fiddling around converting your local time to theirs.

Any DXer worth his grain of salt always runs his log to GMT and not local time, the same when it comes to filling out QSL cards, always made out in GM date and time, not local.

By using the GMT standard everyone contacted is on the same date and time and appears in the logs as such regardless of local date and time.

You can quickly pick the professional DXers on 11 metres by just seeing that their QSL card is made out in the GMT standard and not their local date/time.

However, as 11 metres is more or less a learning stage of radio the GMT standard is not really enforced unlike what you will find on the amateur radio DX bands.

If you decide to take up the hobby of shortwave listening (SWL) you will have to learn the rules of GMT standard in order to send accurate reception reports to the international broadcasters that you are seeking verification from.

If you send your reception report in local date and time your report will most likely go to FILE-13 (the garbage bin) as the broadcaster expects a reasonably accurate and detailed report based on the GMT date and times.

One of the biggest mistakes newcomers make when starting out on radio is trying to convert local date and time to GMT standard mentally, once experienced you will be able to do it with ease but starting off you are better to have an additional clock in your shack (preferably a 24-hour clock) set to GMT/UTC Time.

(continued over page...)

STANDARD TIME THROUGHOUT THE WORLD

The standard time system is based on the theoretical division of the surface of the globe into 24 zones, each of 15° of longitude. The initial zone is the one which has as its central meridian the Greenwich Meridian and which, the meridians 7° 30' E and 7° 30' W as its eastern and western limits. Time in this zone is called Greenwich Mean Time, or GMT. Places to the east of Greenwich are ahead of GMT, while places to the west are behind GMT. Not all countries follow the International Time Zone System, but will use the time of some principal city as a standard or will have no standard time at all.

Reference: "Standard Time Chart of the World" No. 5192, published by the U.S. Navy Hydrographic Office, Washington D.C.

The theoretical system described is applied, in a strict sense, only in oceanic regions. On land or on groups of islands the system is applied with certain local deviations made necessary by frontiers or to permit an entire island group to have the same time zone. The time used in each country, whether it is the time of the corresponding zone or a modified time, is fixed by law and is called legal time, or more generally, standard time.

Another deviation from the theoretical system is that certain countries, for economic reasons, modify their legal time for part of the year, especially in summer, by advancing it an hour or another fraction of time. Where such deviations are maintained on a year-round basis, the time kept is considered to be standard time.

Country	Standard or Local Time: Hours fast or slow of GMT	Time at 12:00 hrs. GMT
Afghanistan	+ 4½	16:30
Aland Is	+ 2	14 00
Alaska: Juneau, Ketchikan, Sitka	− 8	04 00
Yakutat	− 9	03 00
Central Port, Kodiak Is	− 10	02 00
West Coast, Aleutian Is	− 11	01 00
Albania	+ 1	13 00
Algeria	0	12 00
Amsterdam Is	+ 5	17 00
Andaman Is	+ 5½	17 30
Andorra	+ 1	13 00
Angola	+ 1	13 00
Anguilla	− 4	08 00
Antigua	− 4	08 00
Argentina	− 3	09 00
Aruba Is	− 4	08 00
Ascension Is	0	12 00
Australia: Western Australia	+ 8	20 00
Northern Territory, South Australia	+ 9½	21 30
New South Wales, Queensland, and Victoria	+ 10	22 00
Austria	+ 1	13 00
Azores Is	− 1	11 00
Bahamas	− 5	07 00
Bahrain	+ 3	15 00
Baker Is. (U.S.)	− 11	01 00
Balearic Is	+ 1	13 00
Bangladesh	+ 6	18 00
Barbados	− 4	08 00
Belgium	+ 1	13 00
Belize	− 6	06 00
Benin	+ 1	13 00
Bermuda Is	− 4	08 00
Bhutan	+ 6	18 00
Bolivia	− 4	08 00
Bonaire	− 4	08 00
Borneo (Indonesia)	+ 8	20 00
Botswana	+ 2	14 00
Brazil: East of 52° 30' W (approx.)	− 3	09 00
Amazonas, Matto Grosso	− 4	08 00
Acre Territory	− 5	07 00
British Isles	0	12 00
Brunei	+ 8	20 00
Bulgaria	+ 2	14 00
Burma	+ 6½	18 30
Burundi	+ 2	14 00
Caicos Is	− 5	07 00
Cambodia	+ 7	19 00
Cameroon	+ 1	13 00
Canada: Belle Isle, Labrador, and Newfoundland	− 3½	08 30
Anticosti Is., Cape Breton Is., Magdalen Is., New Brunswick, Nova Scotia, Prince Edward Is., Quebec (E of 68° W), and Sable Is	− 4	08 00
Melville Peninsula (east), Ontario (E of 90° W), Quebec (W of 68°), and Southampton Is.	− 5	07 00
Manitoba, Ontario (W of 90° W), Melville Peninsula (west), and N.W. Territories (east)	− 6	06 00
Alberta, Saskatchewan, and N.W. Territories (middle)	− 7	05 00
British Columbia and N.W. Territories (west)	− 8	04 00
Yukon	− 9	03 00
Arctic Is.*		
Canary Is	0	12 00
Cape Verde	− 1	11 00
Caroline Is: Palau	+ 9	21 00
Truk	+ 10	22 00
Ponape	+ 11	23 00
Cayman Is	− 5	07 00
Celebes Is. (Indonesia)	+ 8	20 00
Central African Republic	+ 1	13 00
Chad	+ 1	13 00
Chagos Is.	+ 5	17 00
Chatham Is.	+ 12¾	00 45
Chile	− 4	08 00
China: Western part	+ 6	18 00
Mid-Western part	+ 7	19 00
Mid Eastern part	+ 8	20 00
Eastern part	+ 8½	20 30
Christmas Is.	+ 7	19 00
Clipperton Is	− 7	05 00
Cocos Is.	− 6	06 00
Cocos (Keeling) Is	+ 6½	18 30
Colombia	− 5	07 00
Comoro, State of	+ 3	15 00
Congo	+ 1	13 00
Cook Is	− 10	02 00
Corsica	+ 1	13 00
Costa Rica	− 6	06 00
Crete	+ 2	14 00
Crozet Is	+ 3	15 00
Cuba	− 5	07 00
Curacao	− 4	08 00
Cyprus	+ 2	14 00
Czechoslovakia	+ 1	13 00
Denmark	+ 1	13 00
Djibouti	+ 3	15 00
Dominica	− 4	08 00
Dominican Republic	− 4	08 00
Easter Is	− 7	05 00
Ecuador	− 5	07 00
Egypt	+ 2	14 00
El Salvador	− 6	06 00
Enderbury Is. (Kiribati)	− 11	01 00
Equatorial Guinea	+ 1	13 00
Ethiopia	+ 3	15 00

*No definite standard time used.

Country	Standard or Local Time: Hours fast or slow of GMT	Time at 12:00 hrs. GMT
Faeroe Is	0	12 00
Falkland Is	− 4	08 00
Fanning Is	− 10	02 00
Fernando de Noronha Is	− 2	10 00
Fiji Is	+ 12	24 00
Finland	+ 2	14 00
France	+ 1	13 00
French Guiana	− 3	09 00
French Polynesia	− 10	02 00
Gabon	+ 1	13 00
Galapagos Is	− 5	07 00
Gambia, The	0	12 00
Germany (East and West)	+ 1	13 00
Ghana	0	12 00
Gibraltar	+ 1	13 00
Gilbert Is. (Kiribati)	+ 12	24 00
Gough Is	0	12 00
Greece	+ 2	14 00
Greenland: Eastern	− 2	10 00
Western	− 3	09 00
Thule Area	− 4	08 00
Grenada	− 4	08 00
Guadeloupe	− 4	08 00
Guam	+ 10	22 00
Guantanamo Bay	− 5	07 00
Guatemala	− 6	06 00
Guinea	0	12 00
Guinea Bissau	0	12 00
Guyana	− 3	09 00
Haiti	− 5	07 00
Hawaii	− 10	02 00
Heard Is.	+ 5	17 00
Honduras	− 6	06 00
Hong Kong	+ 8	20 00
Howland Is. (U.S.)	− 11	01 00
Hungary	+ 1	13 00
Iceland	0	12 00
India	+ 5½	17 30
Iran	+ 3½	15 30
Iraq	+ 3	15 00
Ireland	0	12 00
Israel	+ 2	14 00
Italy	+ 1	13 00
Ivory Coast	0	12 00
Jamaica	− 5	07 00
Jan Mayen Is	− 1	11 00
Japan	+ 9	21 00
Jarvis Is	− 10	02 00
Java (Indonesia)	+ 7	19 00
Johnston Is	− 10	02 00
Jordan	+ 2	14 00
Juan Fernandez Is. (Chile)	− 4	08 00
Kanton Is. (Kiribati)	− 11	01 00
Kenya	+ 3	15 00
Kerguelen Is	+ 5	17 00
Kermadec Is	+ 12	24 00
Korea	+ 9	21 00
Kuwait	+ 3	15 00
Laccadive Is	+ 5½	17 30
Laos	+ 7	19 00
Lebanon	+ 2	14 00
Liberia	0	12 00
Libya	+ 2	14 00
Liechtenstein	+ 1	13 00
Line Is. (Kiribati)	− 10	02 00
Lord Howe Is	+ 10½	22 30
Luxembourg	+ 1	13 00
Macao	+ 8	20 00
Macquarie Is	+ 11	23 00
Madagascar	+ 3	15 00
Madeira Is	0	12 00
Malawi	+ 2	14 00
Malaysia	+ 7½	19 30
Maldive Is	+ 5	17 00
Mali	0	12 00
Malta	+ 1	13 00
Manchuria	+ 8	20 00
Manihiki Is	− 11	01 00
Mariana Is	+ 10	22 00
Marshall Is	+ 12	24 00
Martin Vaz Is	− 2	10 00
Martinique Is	− 4	08 00
Mauritania	0	12 00
Mauritius Is	+ 4	16 00
Mayotte	+ 3	15 00
Mexico: East of the States of Sonora, Sinaloa, and Nayarit	− 6	06 00
Sonora, Sinaloa, Nayarit, and Baja California (south of 28° N)	− 7	05 00
Baja California (north of 28° N)	− 8	04 00
Midway Is	− 11	01 00
Moluccas Is. (Indonesia)	+ 9	21 00
Monaco	+ 1	13 00
Mongolia	+ 8	20 00
Montserrat	− 4	08 00
Morocco	0	12 00
Mozambique	+ 2	14 00
Namibia	+ 2	14 00
Nauru	+ 11½	23 30
Navassa Is	− 5	07 00
Nepal	+ 5¾	17 30
Netherlands	+ 1	13 00
New Caledonia	+ 11	23 00
New Zealand	+ 12	24 00
Nicaragua	− 6	06 00
Nicobar Is	+ 5½	17 30
Niger	+ 1	13 00
Nigeria	+ 1	13 00
Niue	− 11	01 00
Norfolk Is	+ 11½	23 30
Norway	+ 1	13 00
Ogasawara Is.	+ 10	22 00
Oman	+ 4	16 00

Country	Standard or Local Time: Hours fast or slow of GMT	Time at 12:00 hrs. GMT
Pakistan	+ 5	17 00
Palmyra Is	− 10	02 00
Panama	− 5	07 00
Papua New Guinea	+ 10	22 00
Paraguay	− 4	08 00
Peru	− 5	07 00
Philippines	+ 8	20 00
Phoenix Is. (Kiribati)	− 11	01 00
Pitcairn Is	− 10	02 00
Poland	+ 1	13 00
Portugal	0	12 00
Prince Edward & Marion Is	+ 3	15 00
Providencia Is	− 5	07 00
Puerto Rico	− 4	08 00
Qatar	+ 3	15 00
Reunion Is	+ 4	16 00
Revilla Gigedo Is	− 7	05 00
Romania	+ 2	14 00
Rwanda	+ 2	14 00
Ryukyu Is	+ 9	21 00
Sabah (Malaysia)	+ 8	20 00
St. Helena Is	0	12 00
St. Kitts	− 4	08 00
St. Lucia	− 4	08 00
St. Paul Is	+ 6	17 00
St. Pierre & Miquelon Is	− 3	09 00
St. Thomas & Principe Is	0	12 00
St. Vincent	− 4	08 00
Saipan	+ 10	22 00
Samoa Is	− 11	01 00
San Andres Is	− 5	07 00
San Marino	+ 1	13 00
Sarawak (Malaysia)	+ 8	20 00
Sardinia	+ 1	13 00
Saudi Arabia	+ 3	15 00
Senegal	0	12 00
Seychelles Is	+ 4	16 00
Sicily	+ 1	13 00
Sierra Leone	0	12 00
Singapore	+ 7½	19 30
Sint Eustatius	− 4	08 00
Sint Maarten	− 4	08 00
Solomon Is	+ 11	23 00
Somali Republic	+ 3	15 00
South Africa	+ 2	14 00
South Georgia Is., South Sandwich Is., South Shetland Is., South Orkney Is.*	− 2	10 00
South Yemen	+ 3	15 00
Spain	+ 1	13 00
Sri Lanka	+ 5½	17 30
Sudan	+ 2	14 00
Sumatra (Indonesia)	+ 7	19 00
Surinam	− 3½	08 30
Svalbard Is	+ 1	13 00
Swan Is	− 6	06 00
Swaziland	+ 2	14 00
Sweden	+ 1	13 00
Switzerland	+ 1	13 00
Syria	+ 2	14 00
Taiwan	+ 8	20 00
Tanzania	+ 3	15 00
Tasmania (Australia)	+ 10	22 00
Thailand	+ 7	19 00
Timor Is. (Indonesia)	+ 8	20 00
Togo	0	12 00
Tonga	+ 13	01 00
Transkei	+ 2	14 00
Trindade Is	− 2	10 00
Trinidad & Tobago	− 4	08 00
Tristan da Cunha Is	0	12 00
Tromelin Is	+ 4	16 00
Tunisia	+ 1	13 00
Turkey	+ 2	14 00
Turks Is	− 5	07 00
Tuvalu	+ 12	24 00
Uganda	+ 3	15 00
United Arab Emirates	+ 4	16 00
United States of America: Eastern Time	− 5	07 00
Central Time	− 6	06 00
Mountain Time	− 7	05 00
Pacific Time	− 8	04 00
Uruguay	− 3	09 00
U.S.S.R.: Estonia, Latvia, Lithuania, Karelo-Finnish, White Russia, Ukraine, Moldavia, and European Russia	+ 3	15 00
Georgia, Armenia, and Azerbaidzhan	+ 4	16 00
Kazakh, Uzbek, Turkmen, Tadzhik	+ 5	17 00
Kirgiz, and West Siberian region	+ 6	18 00
approx. 82° 30' to 97° 30'W	+ 7	19 00
Buryat, East Siberian region	+ 8	20 00
approx. 112° 30' to 127° 30'W	+ 9	21 00
Kurile Is., Sakhalin Is	+ 10	22 00
approx. 142° 30' to 157° 30'W	+ 11	23 00
approx. 157° 30' to 172° 30'W	+ 12	24 00
approx. 172° 30'W to coast	+ 13	01 00
Vanuatu	+ 11	23 00
Venezuela	− 4	08 00
Vietnam	+ 7	19 00
Virgin Is	− 4	08 00
Volcano Is	+ 10	22 00
Voltaic Republic	0	12 00
Wake Is	+ 12	24 00
Wallis & Futuna Is	+ 12	24 00
West Irian (Indonesia)	+ 9	21 00
West Indies	− 4	08 00
Yemen	+ 3	15 00
Yugoslavia	+ 1	13 00
Zaire	+ 2	14 00
Zambia	+ 2	14 00
Zanzibar (Tanzania)	+ 3	15 00
Zimbabwe	+ 2	14 00

CALCULATING AND UNDERSTANDING GMT TIME

CONVERTING LOCAL TIME TO GMT/UTC TIME

This can be a very tricky department for the newcomer who has very little experience in radio so I will try and make it as clear and simple as I can.

One of the easiest methods of finding out what the time is in GMT is by tuning to one of the many Time Signal Stations that are about the HF bands, so you will either need a shortwave receiver or an amateur radio with general coverage receive to tune in on these stations.

The most popular and easiest to understand would be the 24-hour transmission from Time Signal stations WWV and WWVH located in the USA and Hawaii respectively. They broadcast on AM mode on 2.500, 5.000, 10.000 and 15.000MHz providing time of day and standard time interval 24-hours per day all year round.

Announcements are made in English every minute which is basically as follows: "At the tone 11 hours, 15 minutes coordinated universal time." followed by a tone indicating the "zero" minute.

Well and good, you now know where to find GMT or ZULU time when you need it, but how do you know the correct GMT date?

They don't announce the date on WWV or WWVH so how do we arrive at the correct GMT date? Now as we all know the International Dateline straddles the Pacific Ocean, but it means nothing when it comes to calculating the GMT/UTC date. The date is changed at 0000 hours at Greenwich in the United Kingdom, not at midnight our local time. Confused?

THE GMT/UTC DATE

This will probably be the most confusing section of the whole article for the newcomer, the art of separating the actual GMT date from the local date and when this happens.

You will remember earlier in the article I explained the fundamentals of the 24-hour clock, how time of day evolves around starting at 1200 hours and concludes at 0000 hours or midnight.

The GMT date also changes at 0000 hours Greenwich Mean Time or if you like Coordinated Universal Time or Zulu, all meaning the same thing. This is not too confusing to people who are in the United Kingdom, after all this is where the Greenwich Royal Observatory is located not far from London. So when it is midnight local time in London it is also 0000 hours at Greenwich and the new day is born, however, people overseas have to adjust to the fact that is where the date changes in reference to world time and that is it.

Sometimes 0000 hours is referred to as 2400 hours. I wouldn't worry too much about reference to 2400 hours, as 0000 hours is the far more acceptable description, that is what you will hear being announced on WWV and WWVH and not 2400 hours.

Communications agencies and the world's amateur radio population also refer to it as 0000 hours and not 2400 hours.

To make it more simple for you let's use a basic example of following the GMT/UTC date and time system for log book record keeping. Table A is the log recorded in Eastern Standard Time which is followed by those on Australia's eastern coast.

Table B is recorded in GMT which as you all know by now is followed by the rest of the world.

TABLE A

As you can see the details are recorded in the log at Sydney for these contacts in local time (EST) and the current date at the time and they may be either local or overseas, possibly even interstate contacts, as the operator is either unaware or unconcerned about log keeping in GMT.

Now let's look at the same log in GMT and note the difference in times and dates recorded.

TABLE B

You will notice the difference in dates for a start, as it is not yet 0000 hours at Greenwich it is still officially the 06 of May in Britain so the first two contacts our operator made fell into the 06 May but the last two contacts our operator

(continued over page...)

TABLE "A"

DATE	TIME	STATION	NAME	R	S	T
07 May	9.45am	UNIT-44221	BOB	5	5	-
07 May	9.55am	UNIT-959	JIM	5	8	-
07 May	10.08am	UNIT-6644	NED	5	4	-
07 May	10.55am	UNIT-722	KEN	5	5	-

TABLE "B"

DATE	TIME	STATION	NAME	R	S	T
06 May	2345z	UNIT-44221	BOB	5	5	-
07 May	2355z	UNIT-959	JIM	5	8	-
07 May	0008z	UNIT-6644	NED	5	4	-
07 May	0055z	UNIT-722	KEN	5	5	-

TABLE "C"

DATE	TIME		STATION	NAME	R	S	T
14 Aug (14 Aug)	1155z	(9.55pm)	KB-006	TIM	5	9	-
14 Aug (14 Aug)	1206z	(10.06pm)	SK-2011	KEL	4	3	-
14 Aug (15 Aug)	1523z	(1.23am)	1C-874	SYD	5	2	-
14 Aug (15 Aug)	2155z	(7.55am)	UNIT-300	TOM	5	6	-
14 Aug (15 Aug)	2354z	(9.54am)	HH-4509	REG	4	4	-
15 Aug (15 Aug)	0003z	(10.03am)	MAI-2255	MAC	5	6	-
15 Aug (15 Aug)	0333z	(1.33pm)	JD-5198	KAO	5	9	-
15 Aug (15 Aug)	0648z	(4.48pm)	MAI-2255	MAC	4	3	-
15 Aug (15 Aug)	1206z	(10.06pm)	SK-2011	KEL	5	7	-
15 Aug (16 Aug)	1448z	(12.48am)	KC-665	SAM	5	8	-

CALCULATING AND UNDERSTANDING GMT TIME

worked after 0000 hours (and thus past midnight at Greenwich) is now the next day and so 07 May is entered for these last two contacts.

The local time in Sydney means nothing, even though it is still broad daylight, the same applies in all other countries around the world if you are keeping your log in GMT/UTC time. The GMT world date changes with the arrival of 0000 hours or midnight at Greenwich in the UK.

Still confused? Well, the easiest way to follow the GMT date and time standard is to set your clock up at night while tuned to WWV or WWVH while the date is the same in Greenwich as here in Australia.

A mistake a lot of new radio amateurs make is that after midnight local time they change the date in the log to the next day's date, this is incorrect as it is still daylight at Greenwich while we are in darkness thus the GMT date remains same until 0000z.

Let's have a look at a DXer's log featured in Table C where he is on and off the radio quite a bit. I have put the local Sydney time and date in brackets so you can compare it with GMT time and date:

TABLE C

The log I made up for you in Table C is based on Eastern Standard Time on the east coast of Australia.

As mentioned, the time and date in Sydney is in brackets while the GMT date and time are not.

That is how a proper log should look in GMT date and time when working the DX.

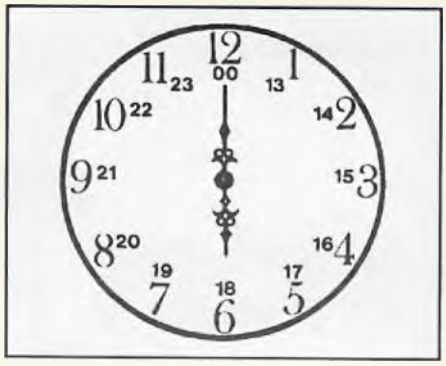
You will note that contact three, the one our operator made with Syd, who sign as the IC-874, was made after midnight EST so the actual date in Sydney was 15 August but at Greenwich where it is still daylight and not yet near 0000z it is still 14 August and this is entered into the log regardless of local time and date.

So now we will move on to the next important contact our operator made and that was with Mac who calls himself the MAI-2255, actually it was one of two contacts in the log so we will deal with the first one.

Here at 0003z we see the GMT date match with the Sydney date which is in brackets so both are 15 August. Even though it was daytime in Sydney (10.03am in the morning) it was night time in Greenwich and thus when the time reached 0000z the new day was ushered in at Greenwich and then it became 15 August for all times recorded thereafter in your GMT log, and for that matter right around the entire world.

All you really have to keep clearly in mind is that the GMT/UTC date changes at 0000z irrespective of whether it is daylight or dark anywhere you may be at the time.

It all comes so easy once you get the hang of it and you will be amazed how simple it is to record your DX loggings



A 24-hour clock where AM and PM are clearly signified, the time displayed could be either 0600 in the morning or 1800 hours in the evening in this case.

in the GMT date and time.

Actually it will be one less thing you will be expected to learn should you progress to amateur radio as a DXer.

All amateur radio DXers use the GMT log system and expect cards that are sent to them to be in this format, as there is nothing more annoying than receiving a QSL card from overseas where the operator has just put his local time and date on the card.

This makes it hard for the other station to find you in the logs, especially if he is a rare DX station and works hundreds of stations a day.

So there you are, I have tried to make it as simple as I can for you and now you know that GMT, UTC and ZULU are all the same things, just different terminology.

As for DX INTERNATIONAL, I have been using "zulu" times since its inception.

73 Jack.

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Sensitivity: 0.4uV 66-88MHz
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0.7uV 406-512MHz

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NEW '92

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MOBILE ONE

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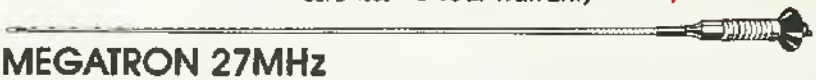
Cat D-4088 *5 Year Warranty* *Only* **$69.95**



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MOBILE ONE

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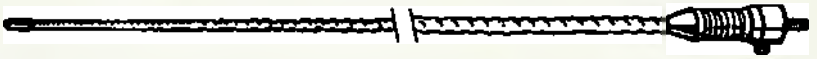
$149



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online

by Patrick McDonald

ALL ABOUT COMMUNICATION RELATED COMPUTER PROGRAMS

Yep - we've back again, live and kicking! It will take more than a measly little worldwide economic recession to knock ONLINE off the newsstands, and we have the usual red hot news about radio and computer matters that has been pouring automagically into our electronic bunker non-stop over the past two months since the last issue of CBA.

Good News!

First of all, it's a pleasure to report lots of big changes at your friendly neighborhood **SHORTWAVE POSSUMS** computer bulletin board, and changes for the better too! Thanks to the generosity of longtime friend and supporter Larry Lewis, of Sydney's Prophet Computer Services, we have the loan of a fast 286 PC and a new, humungous 240 megabyte hard disk.

This means much, much more space to store even more radio programs, files and other radio-related information, and the faster processing speed means that SWP BBS will be offline for shorter periods for daily mail processing, housekeeping procedures and the like.

Larry has also loaned a second 2400 baud modem as a backup and for shifting files to and from other BBS systems. Myself, the 137 duty possums and hundreds more CBA readers and SWP aficionados thank you, Larry!

Melbourne readers have Spectrum

And **SPECTRUM RADIO BBS** in sunny Melbourne is improving too, with the new ScanBuff online database in operation now, for fast dial-up enquiries about frequencies.

This program is compatible with the excellent ScanBuff radio database that so many of you have downloaded from SWP and SPECTRUM, and SPECTRUM sysop Michael Evans has now set up a special file area especially for ScanBuff data files.

This particular database system is well on the way to becoming a 'standard' around the world, and now you can exchange your database of frequencies with those of others... and we all gain!

You can call SPECTRUM RADIO BBS 24 hours daily on (03) 819-9167 to connect with Michael's nice, new shiny 9600 bps modem. (Of course he also accepts 2400 and 1200 baud calls).

Note that poor SWP BBS still has a top speed of 2400 baud, although we are saving our pennies and users' donations towards the cause) for an upgrade.

As a matter of interest, SWP BBS is now running on SPECTRUM's original modem since the demise of our own hardworking little comms machine, so thanks are also due to our Melbourne colleague for his timely hardware helping hand.

By the way, please note that SWP and SPECTRUM, being such good mates, regularly share their various radio files so that Victorians don't have to waste valuable cash on Telecom getting your radio files from Sydney.

Adelaide readers have PC Information Exchange

And those of you in Adelaide might try Graham Smith's **PC INFORMATION EXCHANGE BBS** at (08) 234-0244, because the possums have sent a batch of our best radio files down that way lately. Finally, the above-mentioned Prophet Computer Services also keeps SWP BBS radio files (and much more) online at (02) 835-1122, so you really don't have to stand in queue for our single line!

Gee, that was some good news, wasn't it? Who says there's only bad news and tragedy to read about at your local newsagency? Things are really booming in the radio/computer department!

ScanBook - Scanning By The Book!

OK... now let's look at some new software. First up, Australian-made ScanBook has been released lately and might be of some interest to those of who like to produce lo-tech paper 'hitlists' of frequencies.

Queensland programmer Noela Hill says her concept was to have a 'book' with frequency-by-frequency listings in the appropriate steps, where the scanner or radio enthusiast can jot down notes, look at the general overall usage of any given band, or see if there are any known users of a particular frequency.

ScanBook creates printed text files (averaging around 50k in size) with the frequency information fed into its innards, and the environmentally aware user can print out the results using the least paper possible with Noela's own 'Document Reducer Programme', supplied along with ScanBook, in the same compressed ZIP-format file.

ScanBook also ties in nicely with the well-known ScanBuff radio database program, mentioned above, and can create its required frequency data files from your existing ScanBuff databases (naturally, you can also enter your frequencies by hand).

So you can see that while ScanBook doesn't pretend to be a ScanBuff-style frequency database as such, perhaps it serves a niche in the market and will be just the thing for those of you who want 'hard copy' close at hand--and the noisy computer turned off--while you're listening to your radio or scanner.

Longwire Antenna Calculator

LWAC.ZIP is another new radio-related program and, though it's extremely simple, might be of interest to you antenna-building freaks. In brief, it computes the optimum length of longwire antenna suitable for your favorite listening bands.

LWAC creator Craig Still has built dozens of antennas in his native Kentucky with his simple calculator.

You just type in the frequency (in the centre of the range of frequencies you want to monitor) and LWAC instantly throws out the exact length required, right before your eyes, in good old fashioned feet and inches.

This could be ideal for those of you who have trouble with numerical computations and such! (And don't forget that there are several other programs available, mentioned in past issues of this great mag, that do the more complicated maths for constructing Yagis and dipoles as well.)

Kenwood-PC Interface

Finally, I have just received another relatively new program that allows control of receivers and transceivers via your computer.

Written by US-based amateur operator Thomas J. Dan-

drea, N3EQF, it's called RIG-EQF.ZIP and works with those Kenwood rigs that utilize the IF-232C computer interface.

Various radio parameters can be controlled and monitored via the computer keyboard, increasing the power, flexibility and plain old fun in your shack.

RIG-EQF can even be used to control two radios, with fast and easy switching between the two communications ports. Here are a few of the radio functions supported by RIG-EQF: large digital display of current VFO frequency; control over VFO frequency with direct entry; shifting of current frequency up or down in 1 MHz increments; tuning current frequency in small variable-rate increments; switching between VFOs; RIT and XIT control for radios with these features; sophisticated programmable scanning, including lower and upper frequency limits, frequency increment, and scanning rate; local memory control (an advanced memory system providing storage of radio parameters on the computer's disk), and transmit/receive switch control for transceivers.

Setting up RIG-EQF hardware-wise is fairly easy.

Just connect your Kenwood radio to either the COM1 or COM2 serial port of your computer, following the recommendations in the Kenwood manual. You should use a good quality serial cable, preferably shielded, and one that uses (at least) 5 wires. These 5 wires are standard for RS-232C devices (like your Kenwood), but occasionally 3-wire cables are sold. However, a 3-wire "RS-232C" cable will not work correctly with this program, so ask at your local electronics outlet if you're not sure.

Operation of RIG-EQF is straight-forward too; there are no hidden commands, says the author. All the available commands are always displayed on the program screens.

These always consist of a single letter or function key, and each command is shown on the screen next to its corresponding function. Looks pretty foolproof to me!

Note that some RIG-EQF commands are not available with certain Kenwood models. In most cases, if the command is not available for the radio currently in use, they will not appear on the screen. For example, the transmit/receive, split, and XIT/RIT controls will obviously have no effect on the R5000 receiver. If you own a suitable Kenwood radio and an IBM compatible computer, why not try RIG-EQF out?

Like all the other programs mentioned in this column, it's 'shareware', meaning that you can experiment with it free of charge. If you like it, and want to use it regularly, you send the author a small fee, usually $10 or so, on the 'honor system'. Sure does beat those $500 packages you see at the local software shop, huh?

☐ Special Offer - The SWP Software Pack!

This brings me to a final topic...

There are plenty of you computer owners and radio nuts, still without your own modems, who write and ask me about the availability of the super-duper radio software reviewed here by means other than calling a BBS - which is admittedly a little hard to do if you don't have a modem!

You are right to say that the ubiquitous 'mail order shareware' companies don't carry specialised radio programs and that what they do sell is often several versions out of date.

Yep, that's true! But my own problem is that the computer bulletin board system was invented to avoid just such laborious, time-consuming, money-wasting stuff as copying files out onto floppies and posting them off, dammit!

That's why my first advice to radio folks is always to go out and buy a cheap 2400 modem. You won't regret it.

Some sell for under $200 these days, and pre-loved ones go even cheaper. However, I'm a real pushover for sob stories and so I'm going to make one of those 'for a limited time only' offers, like you see on TV!

Just to let you get your hands on these fabulous programs, the SWP BBS will for the next few months provide the limited edition 'Shortwave Possum Software Pack'!

Send up to 6 5.25" or 3.5" floppy disks (but please, no more than that) - formatted to anywhere from 360k to 1.4 meg - and a $35 cheque made out to Shortwave Possums BBS, and you'll get your disks back filled with the definitive collection of shareware radio files suitable for all IBM compatible computers. This includes the ScanBuff frequency database, GeoClock and EarthWatch 'grayline' DX programs, some radio-computer control programs like PROCAT and an wide assortment of other popular programs and text files reviewed here in CBA and available from SWP. And if you want any particular programs mentioned in previous installments of ONLINE, just say the word! This is a once-only offer - we don't aim to get into the flogging of mail-order radio software permanently, as we want you all to eventually get those modems hooked firmly onto your phone lines.

Gee, I seem to have been typing away here for hours now, like a little beaver, and I think I can hear the rather rotund musical girl down at the big CBA magazine factory starting on her vocal warm-ups, so I'd better close and zap this info off to the printing presses.

Just remember this essential information about SHORTWAVE POSSUMS BBS so you can contact me with your bright ideas, questions and suggestions, as well as for the above-mentioned shareware radio files:

write to SHORTWAVE POSSUMS BBS,
PO Box 357
Round Corner, NSW 2158
(or dial in with that modem on 02- 6513055).

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COMMEX UHF CB's

BUSHRANGER
c/w 12/24 volt DC convt
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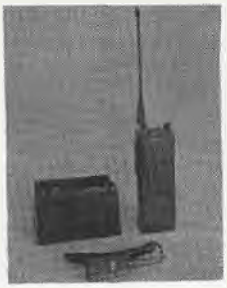
EXECUTIVE 9 mem ch, keypad, entry, keypad multicall, selcall selection, scan, LCD



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GME TX4000 ..... $449
Built-in selcall, paging, alarm input, remote control output & much more.

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BACK TO BASICS - SCANNING AS IT WAS

By Russell Bryant

Back to Basics. It is a term used by economists,politicans and educators alike. For the scanner user it is understanding where that 1000 channels all-frequency black box came from.

America is the home of many things, apple pie, baseball, Hollywood and 250 million people. One of the best things to come out of America was the scanner. In 1968 Bearcat released to the technology-hungry population the scanning radio receiver as we know it. Prior to then monitoring the airwaves was via piggyback devices or frequency converters, hooked up to AM broadcast receivers. Frequencies were selected by using a manual tuning knob and simply dialling them up.

The hobby of monitoring the airwaves can be traced back to the late 1940s, when the Regency company developed the tunable public service band receiver. Somewhat like the aforementioned AM radio but with the converter built in.

Primitive by today's standards, these receivers attracted a considerable following. The PSB receiver was unstable and the calibrations on the tuning dial inaccurate.

An exact frequency readout was almost unobtainable.

ENTER THE CRYSTAL SCANNER

The introduction of the crystal locked multi-channel fixed frequency receiver permitted more than one channel to be monitored at the discretion of the operator. A crystal was required for each channel, thereby making it an expensive proposition each time a frequency change was needed. Crystals cost between five and $10 a time.

The stability of crystal-controlled receivers was second to none, however, it was still not possible to listen in on more than one channel at a time, unless you purchased several receivers. Bearcat quickly filled what was a large void in the PSB receiver market.

They developed, along with TenTec,the circuitry necessary to make the receiver toggle back and forth across those channels that had crystals fitted.

Thus the 'scanner' was born.

The first scanners were basic, less than a dozen channels and usually restricted to one or two bands and still crystal controlled. Many entered the race to become the first to develop the truly programmable scanner, one that didn't need expensive and limiting crystals, that had more channels and wider frequency limits. Many of the big names of the electronic industry failed to produce more than an over-extended research and development budget and promptly withdrew.

BINARY CODES

Early attempts at 'programmable' models produced a great variety, all ultimately doomed to scanner heaven, or whereever dead scanners go. One such method that failed to capture the imagination, and therefore the money of scanner users, employed binary code.

Supplied with the radio was a list of frequencies, plus the corresponding positions to which a series of switches were to be set in order to convert binary to a frequency. It was clumsy and failed to survive the race.

The history of scanners goes back .....way back. Russell Bryant reviews what used to be.

More like something out of 'B' grade sci-fi movie, the Opti Scan used a series of cards, similar to the old-fashioned computer cards.

'Holes' were created in the card by lifting small adhesive squares. The holes created a binary code that, as with the first scanner, converted to a frequency. Each card supported 10 frequencies per card, which corresponded to one frequency per channel.

Again, the Opti Scan bombed out.

In the meantime the Electra Corporation, under the brandname 'Bearcat', had developed and was about to release the first truly programmable scanner.

It was driven by a PLL or Phased Locked Loop chip and programmed via a calculator-type keyboard. It was accepted by Public Service monitors immediately. Before long other manufacturers followed suit and Regency, JIL, Fanon Courier and Radio Shack became household names.

TWENTY FOUR YEARS HENCE

That was 24 years ago, many have come, many have gone, however the scanner has not changed that dramatically.

They now have more memories than we can use, extend from kHz to GHz, but they still do one thing...scan.

The circuitry that causes them do so has basically remained the same.

Many of these dinosaurs are still around even in today's hi-tech world.

While they may lack the sophistication of an AR 3000 or the memory capacity of the AR 1000, a bargain can still be had. Given Australia's economic climate, many will see the purchase of a used or secondhand scanner as the only way of getting involved.

On the other hand there maybe enthusiasts that decide to put together a collection of 'older' scanners.

Or the third catagory, to supplement an existing super scanner.

The motive matters little, what should be at the fore is checking to make sure the prospective purchase is a good one.

STARTING TO GET OLD

Scanners first appeared in Australia around 1974 and as such would now be starting to show their age.

While solid state circuitry is good, it can and does deteriorate with age.

Electrolitic capacitors are the worst offenders for this. Other parts, particularly the microprocessor, would be difficult or impossible to obtain.

(continued over page...)

BACK TO BASICS SCANNING AS IT WAS

If you could find them, the cost may exceed the total purchase price of the scanner.

As technology produces bigger and better machines, those of humble features will be offered for sale through a variety of outlets. However, before parting with the cash you should check the receiver to ascertain its operational capabilities and condition. Repairs will often be expensive and most certainly take a lot of dollars.

WHERE TO BEGIN?

Start by examining the external condition of the receiver.

The case should be devoid of scratches,marks and dents. A clean case indicates little abuse or non-mobile use. Do all the screws holding the case together have clean heads or have they been burred? Burring should tell you that someone has had their finger within.

Are all connectors, antenna, power and audio original or have they been replaced?

Top: AOR1000 packs 1,000 channels into a small handheld. Lower: Icom IC-40G is generally acknowledged as one of the best, however, you pay a little more for top quality.

Replacement could be an indicator of prior troubles.

CHECK THE INSIDE AS WELL

If the seller will allow, check the internals.

Do all the solder joints appear clean and unaltered or has someone had a crowbar into it?

Are there any flash marks on the circuit boards or cases? A flash or burn mark maybe evident because a component has exploded due to oversupply of current or reverse polarity.

If you are satisfied with the condition of the radio's interior, try programming a few different frequencies into its memory.

Select at least one frequency from each of the bands that the receiver covers. Program in a few services beyond the local area, no response is a good indicator that sensitivity maybe down.

Sensitivity is the receiver's ability to pick low level signals and bring them forward to the speaker. The lack of sensitivity may be due to a backyarder trying to get a little more out of the radio or a strong static electric charge entering the circuitry.

Run the scanner through its paces. Check that the buttons work and the functions function. A handbook or photocopy thereof will be of assistance, especially if the scanner is not a well known one.

The handbook should also contain the manufacturer's specifications and, if you are lucky, a circuit diagram.

ALL THE BITS AND PIECES

In the ideal world,all the bits and pieces originally supplied by the manufacturer will still be with the secondhand scanner you are buying.

I sometimes think that the various screws,cables and aerials end up in the same place as the sock that is always missing.

Don't be fooled by ads that say in 'original box'.

Unless you are into collecting original boxes it should have little if any bearing on the price you pay. It is an extra that some people seem to think adds extra dollars to the price.

I have in my time seen some right beasts still in their original boxes. As scanners they would have made good re-enforcing for newly laid concrete.

Nearly 30 years after their release, crystal-locked scanners are still unfortunately available both on the new and secondhand market.

The highest price you should pay for a secondhand crystal-controlled receiver is around $30.

A one-off crystal will cost $20, so it is not economical scanning.

Dick Smith Electronics have a good range of scanners, as does Tandy, and this Realistic PRO58 is a good base unit at a reasonable price.

If the crystal receiver comes fully 'rocked up' with frequencies that are of some use to you, the price may vary.

The last thing to remember about buying secondhand equipment...check to the best of your ability that the radio is not stolen. In some states possession of stolen property is an offence, irrespective of the fact you have a receipt or a belief that the goods are/were legit.

LET THE BUYER BEWARE

Finally, "Caveat Emptor - let the buyer beware, since he buys without recourse". In more simple terms, scanners bought privately rarely come with a guarantee and seldom can they be returned if they malfunction.

Take care!

Be it new, be it old, the decision to purchase a scanner should be governed by more than just the glossy pictures or even my ramblings in this magazine.

A little time plus the answers to five questions may, in the long run, save you money.

Question 1:

What services or users do I wish to monitor?

Chances are the police, fire and ambulance would rate fairly high here.

If you live in a rural area, by the time you take into account the maximum number of channels required for the emergency and rescue services in your local and surrounding area, you are looking at 20 at the most.

Add to this some aircraft, marine (even if you are NOT near the water), railway, local council and miscellaneous frequencies, then 200 channels are possibly the limit you need go to.

For the city and urban dweller, the sky is the limit.

Allowing for spares, a 1000-memory scanner will only ever have half that many channels programmed.

However, should the need arise, the unused capacity is available. For the country enthusiast a 1000-channel scanner is still a proposition.

To keep services and users in order a bank of channels can be allocated for the various frequencies.

Bank 1 police, bank 2 fire and so on, even though a bank may only have two or three channels with data in them.

Question 2:

Should I go for a portable or mobile?

A portable will generally give you the best of both worlds. It can be used in the car,on foot or when listening at home.

The prudent use of aerials will enhance the performance of a handheld unit. With scanners like the Yupiteru, AOR 1000 and 1500, the mobile is somewhat redundant. Industry sources indicate that portable scanners outsell their mobile/base counterparts almost three to one.

Question 3:

Frequency coverage, what should I look for?

Go for as much as you think you will need. But remember the radio spectrum does not stand still, it is forever changing and as it does you may want to keep track with it.

A scanner that doesn't have 800/900 MHz will be missing a lot in the not-too-distant future. The scanner that has kHz to GHz band width will cost more than one with half a dozen selected portions or RF. However, the future holds many interesting things for those who wish to seek them out.

Question 4:

Which brand is best?

It is hard to compare brand names, especially if their products vary in content. In their own markets all of today's scanners are good.

Don't try to compare the basic PRO 41 to the AOR 1500, it isn't a fair comparison. They are scanners at either end of the scale and their prices and features relect this.

Question 5:

Do I need a subscription to CBA?

Yes, where else are you going to find out frequencies as well as what is happening in the scanning world.

Sorry about that, can't help myself.

YOUR PASSPORT SIR!

A scanner is your passport to your community,it is the key to unlock many of the secrets of VHF/UHF communications. Believe me,the frequencies above 30 MHz hold just as many mysteries as those below.

bandspread

FROM DC TO DAYLIGHT *with Greg Towells*

NEW ALINCO DUAL-BAND RADIO

Recession or no recession, the huge range of equipment continually appearing on the market is amazing.

More and more features with functions and options squeezed into smaller packages really makes you wonder how far it will go, or what things will indeed be like in the next five years or so.

What catches my attention is the ever-increasing capabilities being fitted into the ever- decreasing size of the amateur dual-band handheld radios. How can what are basically two radios be fitted into such a small size?

That question came up again when I received for review the latest addition to the Alinco range, the DJ-580A.

GETTING SMALLER ALL THE TIME

Even smaller than its predecessor the DJ-560T, this radio comfortably slips into the hand, with room to spare, almost! The great thing about the size of this radio is that it is easy to slot the radio into your briefcase, handbag or even pocket - and there is still plenty of space for everything else.

I tend not to take my usual radio everywhere because of the amount of area it occupies, however, this tiny radio only measures 140(H) x 58(W) x 33 (D)mm, including battery pack.

The Alinco DJ-580A is the Australian version of the radio advertised in overseas publications and is a dual-band transceiver covering 144-148 and 430- 440 MHz transceive and 130-174 and 420-480 MHz receive.

Naturally enough, the radio can only be used for transmit purposes by licensed amateurs, another reason to study for that ticket! Frequencies are entered by keyboard, up/down keys or by tunable control with steps of 5,10,12.5,20 or 25 kHz.

There are 42 memory channels available, two for call channels to be entered for VHF or UHF, and the remaining 40 for either VHF or UHF. VHF or UHF frequencies can be entered into any channel or any order, unlike some other radios, meaning that you could enter 147.000 into channel 1, 438.525 into channel 2, 438.375 into channel 3 and so on.

Many other radios only allow the first half of memory channels to be used for one band, an inconvenient arrangement.

Alinco calls this feature 'Memory Channel Free Set'.

All memory channels can store frequency, any offset 0 - 15.995 MHz, and any sub-audible tone setting.

If 40 mixed memory channels is convenient, then 8 available scanning functions lends more versatility to the radio.

There are four distinct types of scanning operations.

Each can be set up to stop and wait on the next busy channel called Busy Scan, or stop for five seconds on the next busy channel and then continue scanning, called Time Scan.

Time Scan is handy when some repeaters are occupied by long-winded talkers, whereas Busy Scan is useful when the band is quiet.

SUPER LOW BATTERY CONSUMPTION

A brand new feature introduced by Alinco is the Super Low Battery Consumption function. What happens is that when the battery pack drops to 5 volts or less, this function cuts in and reduces power and **sensitivity**, so that operations can continue until the supply drops below 3.8 volts.

This could give you a considerably further time period to communicate until power is completely lost.

How many times have you used a handheld when the battery suddenly drops its bundle, and you disappear off channel...?

Everyone has no idea if you switched off, fell over or collided with something or someone, or actually suffered a flat battery.

At least with this system, you have ample time to warn people that your battery is on the way out.

This feature only works with a dry cell battery pack.

DTMF code squelch and paging functions (DSQ) and tone squelch (CTCSS) are both standard inclusions with the DJ-580A.

DSQ can be used to silence the radio until a transmission is received from a station with the right DSQ code is received, and used with CTCSS will ensure no unwanted stations or noise has to be endured. Other features of the DJ-580A include automatic dialer function, 3 power level settings (very handy in a portable), battery saving function, automatic power-off function and an illuminated keyboard.

Also, VHF and UHF transmissions can be received simultaneously, or you can transmit on one band whilst listening on the other band, allowing for full duplex operation.

ON-AIR TEST

So what was it like?

My first impression was that it fitted the hand well and all the controls were in just the right place. I tried driving the radio without the benefit of reading the handbook (as usual) and found no problems finding VFOs or memories, setting up memories, sub-tones, scanning, or just going from one band to another.

Incidentally, when I did resort to the handbook (to work out how DSQ worked), I found a well written, easy to follow set of instructions, so you just can't go wrong.

The LCD display, even given it's small size, was easy to read, and the backlight lamp for the display and keyboard can be set to turn off automatically or stay on for as long as you want.

In operation, other stations reported good, crisp transmissions, and the receiver gave a great account of itself, giving my scanner a run for the money. I took the DJ-580A to work in the car a few times, with an external antenna connected and found while it was affected by pagers (aren't we all??), generally it was only at fairly high points which seem to grow pager antennae.

Using the radio in the car with just the supplied antenna did not give any problems at all. One outstanding plus for the radio was the fact that there is plenty of audio output available, and it sounds just right.

When used in the car, the radio was perched on the seat next to me, with volume halfway and I could hear what was happening above the road noise, something that many handhelds I have operated have no hope of doing.

There was just no need for an external speaker at all.

The only drawbacks I could find (being picky) was that you can't hit a button to mute the sub-band VFO, at least not that I could find. When you have a situation where you want to listen to a station on one band, and the other side starts up, it's a matter of turning that band's audio down.

The radio has extended receiving range beyond the amateur bands, however, the range scan (scanning for signals between two set limits) only works on the amateur bands. There is scanning available though for frequencies outside amateur bands.

...THREE YEAR WARRANTY

One **huge** advantage that all Alinco equipment enjoy is a **three** year warranty , the longest available of any amateur radio equipment that I am aware of anywhere in Australia.

Many people consider three years a good life for radio equip-

ment, let alone being covered by warranty for that long.

Precious few cars get a three year warranty.

I think that Alinco has a winner with the DJ-580A handheld.

Thanks to Andrews Communications for the chance to review this tiny radio.

INCREASE SIGNAL LEVEL FROM R71A REC JACK

Many people use PK-232s and similar machines with communications receivers to decode Packet, Amtor, Morse and numerous other types on signals on HF.

If you are taking the audio from the recording jack of an Icom IC-R71A, you may find the level too low on some modes to work effectively. Here is a method to remedy the problem.

Solder a 0.1 uf capacitor to pin 8 of IC6 - AN829. Pin 8 is located at the upper right of the IC closest to R170. Solder the other lead of the cap to the top of R170, shorting out R170.

This will increase Recording Jack output from 100mv to 300mv and is easier than removing the main PCB.

SELCALL AND CTCSS

From what I am hearing around the traps, UHF CBs are out-selling 27 MHz radios by a ratio of at least 2 to 1.

This can be easily explained by the extended range of UHF transmissions through the use of repeaters, the quiet and high quality sound of FM and the sophisticated scanning features that are becoming the norm on modern UHF CBs these days.

Many people are confused by options available that can dramatically improve the ease of use of these radios.

If you are monitoring the usual channel waiting for a call, you can be constantly disturbed by others using the channel making their calls or conversations. This is to be expected on CB since no-one has absolute right to use of any channel.

However, there are options that can eliminate having to listen to everyone else's call whilst waiting for your call. These are CTCSS (sub-audible tone) and Selcall (Selective Calling).

Selective calling operates by the calling station pressing the call button which sends out a series of audible tones, usually five different tones.

The receiving station recognizes these tones as the ones it is programmed for, sends an acknowledgement transmission and opens the squelch for the calling station. Normal communications then proceed. If no-one is present at the called station, most systems either sound an alarm or flashing light, to let the operator of the called station know that a call has come in.

The drawback with this system is that after the initial call has been made and communications are happening, all other transmissions on the channel can be heard.

Sub-Audible Tone is simply a system where, when activated, each transmission has included with it a sub-audible tone.

Both stations have encoding and decoding of transmissions on and the squelch of both stations only open for transmissions including the programmed tone.

A user simply has his radio set on the channel desired and nothing is heard until another radio with the appropriate tone transmits. During and between transmissions, nothing except the transmission with the tone included is heard. Both users do not hear the tone at all and transmissions sound absolutely normal. The drawback with this system is that no alarm of an incoming call is received, so if you are of the room at the time of call, you will never know that you were called.

With both systems, the users must first check that the channel is clear before starting their call.

Too many people with Selcall or CTCSS assume that because they cannot hear anything, the channel is clear and away they go, blasting anything on channel at the time.

The use of Selcall or CTCSS does not encode your transmissions, meaning that anyone else can hear and understand your conversation, nor does it prevent others from jamming out your calls. If you go ahead and transmit without first checking that the channel is clear , you are just begging for someone to obliterate your signals in retaliation. Think about it.

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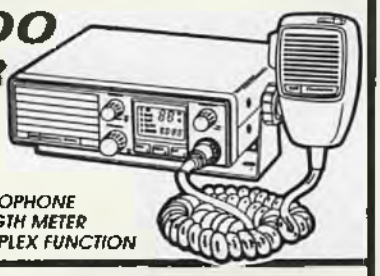

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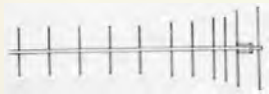

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SO YOU WANT TO BE AN AMATEUR?

The path to amateur radio

Part three of a regular series by Paul Butler, VK3DBP.

(Paul Butler teaches physics at Mentone Girls' Grammar School in Victoria)

Welcome to Part 3 of the **CBA Novice Course**. This month, we are getting right down to basics with a look at electricity — both DC and AC — and some maths including Ohm's Law, series and parallel circuits. There might even be space left for a few questions along the way, so have that pencil and paper at the ready.

Electric current

Matter is made of single atoms, or *groups* of atoms called molecules. Atoms are incredibly small particles made of even smaller particles called **electrons**, **protons** and **neutrons**. There is strong experimental evidence that protons and neutrons are themselves made of even smaller particles called **quarks**, but that's another story...

Electrons are of particular interest to us here, because in certain types of materials called **conductors**, electrons can leave the atoms and move about freely. The most common conductors are metals. Materials which do not allow a flow of electrons through them are known as **insulators**.

Electrons have a property called **negative charge**. When a conductor is connected to a battery, electrons are 'pushed' around the circuit, repelled away from the negative terminal (similar charges repel) and attracted to the positive terminal (opposite charges attract). This flow of electrons is called an **electric current**. Note that, for historical reasons, electric current is shown in circuit diagrams as flowing from positive to negative. This is called *conventional current* and the main reason for using it seems to be to confuse students of electrical theory.

Electromotive force

The magnitude (size) of the current in a circuit, measured in **amperes** or **amps** (**A**), is determined by several factors. The battery provides the 'push' or **electromotive force** (**EMF**, pronounced ee em eff!), which is measured in **volts** (**V**). The greater the EMF, the greater the current it will produce in a circuit. So a 12 V battery will produce an EMF twice that of a 6 V battery connected to the same circuit. Solar cells and generators are sources of EMF — so are electric eels!

The smallest EMF commonly used in electrical equipment is obtained from what is commonly known as a 1.5 V *battery*, but should really be called a 1.5 V **CELL**. A battery is several cells connected together. Some kinds of cells run down and must be thrown away — these are **primary cells**. Other kinds are called **secondary cells** and can be recharged in a battery charger. Don't throw this type away!

Resistance

The current is also affected by the resistance in the circuit. Just as water flows more easily through a wide pipe than a thin one, so electrons flow more easily along a thick wire than a thin one. And the longer the wire, the greater the **resistance**, too. Resistance is measured in **ohms** (Ω). Cells and batteries have their own resistance, known as internal resistance, which is normally quite low. As a battery runs down, the internal resistance rises, and so the current leaving the battery falls — time for a new battery or a recharge!

The resistance of a component is defined as the ratio of the potential difference across it to the current through it. When the current in a component of resistance R ohms is I amperes (don't ask me why I is used, it just *is*), we can write that as $R = V/I$. This relationship, known as Ohm's Law, is more commonly written $V = IR$.

Power

Electrons continually get energy from the source of EMF and lose the energy again around the circuit. The energy is converted to heat and light by a bulb, into energy of motion by a motor, and so on. The amount of energy used each second is measured in **watts** (**W**), so a 60 W household lamp uses less energy per second than a 100 W lamp.

The rate at which electrons gain energy in a battery is determined by the EMF. Correspondingly, the rate at which the electrons lose energy in a component like a bulb determines the voltage drop or **potential difference** across the bulb. Both EMF and potential difference are measured in volts; the first is an energy gain, the second an energy loss. The amount of energy gained by an electron from the battery must be equal to the amount it loses as it travels around the circuit.

The rate at which energy is dissipated in a resistance is called the **power P**. It is found by using the power equation $P = VI$.

Here are some sample questions to illustrate the use of these equations.

Question: What is the potential difference, in volts, across a resistance of 10 Ω in which the current is 2 A?

Answer: Since V = IR, we get V = 2 X 10 = 20 V

Question: What is the current in a resistance of 2 Ω connected to a battery of EMF 6 V?

Answer: Rewriting V = IR as I = V/R, we get I = 6/2 = 3 A

Question: What is the power of a light bulb connected to a 9 V battery if the current is 0.1 A?

Answer: Since P=VI, P = 9 x 0.1 = 0.9 W

Question: What is the current in a 60 W lamp connected to the 240 V mains supply?

Answer: Rewriting P = VI as I = P/V, I = 60/240 = ¼ A

Series and parallel circuits

What about circuits which contain more than one resistance? Well, it depends on whether the resistors are connected end-to-end (in **series**) or side-by-side (in **parallel**). Let's have a look at some further examples.

Question: What is the total resistance of 2 ohms, 3 ohms and 4 ohms connected in series?

Answer: simply add up the resistances. R(total) = R1 + R2 + R3 (and so on, if there are more)

In this case, R(total) = 2 + 3 + 4 = 9 ohms.

Question: What happens if you connect the same resistors side-by-side, in a parallel circuit?

Answer: This time, we use the formula: 1/R(total) = 1/R1 + 1/R2 + 1/R3 (and so on, if necessary)

In this case, 1/R(total)

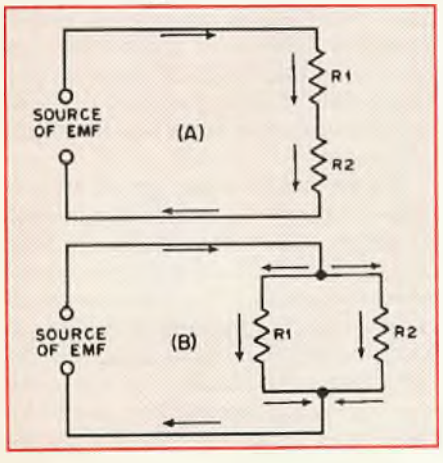
= ½ + ⅓ + ¼

$= \frac{6 + 4 + 3}{12}$

(Do you remember the **lowest common denominator** from your maths classes at school?)

$= \frac{13}{12}$

So R(total) = $\frac{12}{13}$, or about 0.9 ohms.



Clearly, putting resistors in series makes the total resistance higher, while putting them in parallel makes it lower.

Here are a few to practice on; find the total resistance in each case.

A. 10 ohms, 15 ohms and 20 ohms in series; then in parallel

B. Five 20 ohm resistors in series; then in parallel

C. 100 ohms, 150 ohms and 500 ohms in series; then in parallel

Here are some trickier ones, for which you should draw a diagram:

D. Two 10 ohm resistors in parallel, connected in series with two 20 ohm resistors in parallel.

E. Two 50 ohm resistors in series, connected in parallel with two 100 ohm resistors in series.

Now here are the answers so you can check your work:

A. 45 ohms, 4.6 ohms

B. 100 ohms, 4 ohms

C. 750 ohms, 53.6 ohms

D. 15 ohms

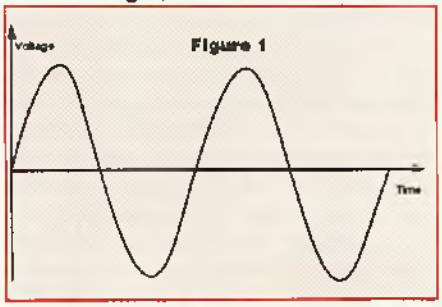
E. 66.7 ohms

DC or AC?

Batteries provide a voltage which sends electrons one way around a circuit. The positive terminal stays positive and the negative terminal stays negative. Electrons move from negative to positive, but it is usual to refer to conventional current flowing the other way. This one-way current is called **direct current**, or **DC**.

The electrical mains supply, however, provides a voltage which changes polarity in a periodic way, so that half the time the electrons move one way and the rest of the time they spend going back the other way. This may seem pretty pointless, but it *works*, because energy is transferred whenever the electrons are moving, regardless of their direction of motion. An alternating voltage like this gives rise to an **alternating current**, or **AC**.

AC voltages vary in a regular way, as shown in **Fig.1**, below.



The pattern repeats itself every 1/50 s, that is, there are 50 cycles per second. We express this as 50 **Hertz** or **Hz**. (Hertz was a well-respected physicist in whose honor the unit was named.)

The number of cycles per second is called the **frequency**.

The Australian mains supply operates at 50 Hz but not all AC waveforms have such a low frequency. Radio transmitters generate AC voltages at much higher frequencies, like 27 MHz (27 *million* cycles per second) on the 11 metre CB band, or 477 MHz on the UHF CB band, or even more, on up to the *giga*hertz region. That's more cycles than in China... We'll look some more at radio waves later, but remember for now that if you jiggle electrons backwards and forwards at a high enough frequency under the right conditions, they put out energy into the atmosphere which we call **radio waves**.

Transformers

One source of magnetism is a permanent magnet which, as its name implies, retains its magnetism forever. (Actually, that's not strictly true, because even the so-called permanent magnets lose their magnetism over time (don't we all?). This is particularly true if they are dropped, because the shock mixes up the neatly-arranged bits of magnetism in the magnet (called domains) so they cancel one another out.)

Another way to produce magnetism, in a much more useful and controllable way, is to use the fact that **all electric currents produce a magnetic field**; the greater the current, the stronger the magnetism. This principle is used in an **electromagnet**, which is essentially a coil of insulated wire wrapped around an iron core called a former.

If an AC voltage is applied to the coil of an electromagnet, it generates a rapidly-changing magnetic field.

It took the early physicists quite a while to work out that a changing field like this could be used to generate another voltage, by the process we now call **electromagnetic induction**. It sounds pretty odd that anyone should use a voltage to generate a magnetic field, only to use the magnetic field simply to generate another voltage.

But that is *precisely* what we do. We can arrange things so that the new voltage is greater than the original, or less, simply by changing the number of turns of wire on the coils of wire involved.

A transformer has two coils wound onto the same former. The input is called the **primary winding**, and the output is the **secondary winding**. If the secondary has more turns than the primary, a greater output voltage will be generated than that applied to the primary.

The varying voltage applied to the primary winding creates a varying magnetic

field, which loops through the secondary coil and generates a new voltage which is greater than the input, because there are more turns on the secondary to pick up the magnetic field.

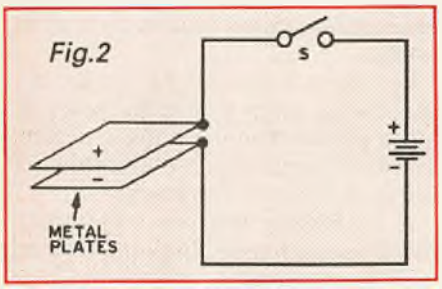
If there are fewer turns in the secondary winding than in the primary, the output voltage will be less than the input and the transformer will step down the voltage. The ignition coil in a car steps up the 12 V supply from the battery to a voltage high enough to generate a spark in the spark plugs. A mains plug-pack, however, steps down the 240 V mains supply to a voltage more acceptable to a battery charger or a calculator — say 12 V or so.

How many times greater or less than the input is the output? This is determined quite neatly by the ratio of turns on the primary and secondary windings. If there are, say, ten times as many secondary turns as primary turns, for example, the output voltage will be ten times as great as the input voltage.

Even though it sounds as though you get something for nothing from a transformer, you don't really, because what counts here is not voltage but *energy*. You cannot get more energy out than you put in. In fact, you get *less* energy out because the transformer gets warm due to heat losses caused by small electric currents (**eddy currents**) in the iron former around which the coils are wound. These losses cannot be avoided, but they can be reduced by making the former from layers (**laminations**) of iron and insulator. This keeps the eddy currents to a minimum and makes the transformer more efficient.

Capacitors

Any current needs a path along which to flow. DC and AC can both use ordinary copper wires, but AC has the added advantage that it can apparently flow across a gap in a circuit. This seemingly impossible feat is explained as follows, with reference to **Fig.2**, below.



You can see in this diagram two parallel metal plates with an insulating space between them. This arrangement forms a device called a **capacitor**.

The alternating voltage first makes one plate positive and the other negative, because electrons flow onto one and off the other. As the voltage reverses electrons flow off the negative plate, leaving it positive, and onto the other plate, making it negative.

This means that applying AC to a capacitor generates an alternating current in the circuit, even though electrons do not actually get across the gap. *(If they do get across, the capacitor goes up in smoke with a big bang! Ed.)*

If a battery was connected to the capacitor, electrons would flow briefly but would stop as soon as the plates reached the same voltage as the terminals of the battery, which can happen pretty quickly. So capacitors stop DC but allow AC to pass. This nifty trick is vital to the operation of just about any electronic box of tricks you are likely to acquire, so it's worth getting used to the idea.

Inductors

Another way to make use of the alternating nature of AC is to apply it to a coil of wire or **Inductor**. The coil may be as simple as a few turns of insulated copper wire wrapped around a cotton reel or a pencil.

A direct current in the coil of wire generates a magnetic field, which will send any self-respecting compass wild. If AC is used, however, different things happen. Since AC cannot make its mind up which way to go, its magnetic field reverses at quite a rapid rate. As the magnetic field collapses to zero, it tends to oppose the changing voltage by setting up its own voltage in the opposite direction. This extraordinary effect means that AC cannot get through a coil of wire (the inductor) as easily as might be expected. Just as a conductor resists DC (and AC, of course), an inductor impedes AC. So conductors have resistance, while inductors have **impedance**.

Resonant circuits

If both a capacitor and an inductor are connected into the same circuit, very interesting things happen. As the AC pushes and pulls the electrons on and off the plates of the capacitor, the inductor tries to prevent it from doing so. If the size of the capacitor, or its capacitance, and the size of the inductor, or its inductance, are chosen carefully, the circuit **resonates**.

A resonant circuit vibrates electronically, rather as a wine glass 'sings' when you run a wet finger over its rim. The number of vibrations produced each second (the frequency) is determined by the values of capacitance and inductance in the circuit. The expression to use for calculating the resonant frequency of a circuit containing capacitance **C** and inductance **L** is:

$$f = \frac{1}{2\pi\sqrt{(LC)}}$$

If one resonant system can somehow be linked to another, energy is transferred most efficiently from one to the other if they vibrate at the same resonant frequency. So when you turn the dial on your transistor radio, you are changing the resonant frequency of its input circuit until it matches that of the output circuit at the transmitter of your favorite rock station. Get the resonance wrong and you end up with the wrong radio station.

Modulation

Radio communication involves more than making circuits resonate, however. Assuming you can send radio waves to your CB mates down the road or across the world, how can they hear what you are saying?

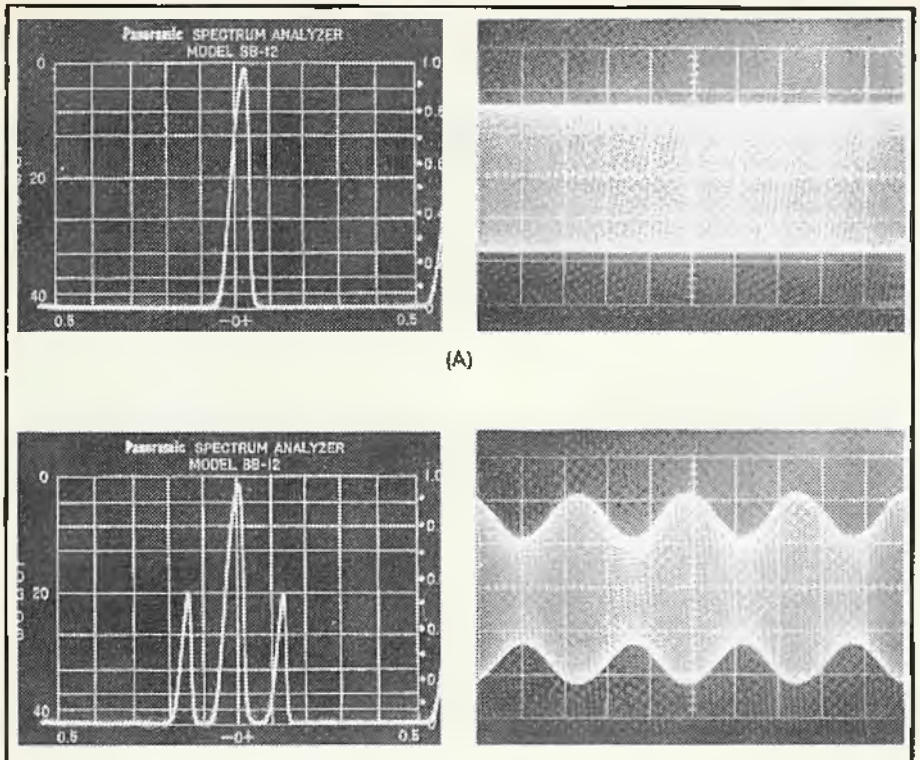
The key to this important point is the idea of **modulation**. The radio wave will zip from A to B, but its journey is wasted unless it carries some information with it. Putting the information onto the radio wave (known as a **carrier**, because it 'carries' the information), and getting it off again at the other end, relies on the processes of modulation and **demodulation**.

The simplest form of modulation is switching the carrier on and off, in a way which has been agreed upon beforehand. Luckily, Samuel Morse thought up a way of coding bursts of carrier, and this universally-recognised code is known as the **Morse Code**.

Alternatively, you can make the radio waves get bigger or smaller, in step with the vibrations of your voice, in a system called **amplitude modulation** or **AM**.

This is a bit wasteful of energy, since it turns out that quite a lot of the information carried by an amplitude-modulated carrier is duplicated, so we can get away with much less energy by sending the information just once. Trimming away the bits we don't need leaves us with a **single sideband** (**SSB**: more about sidebands later), so we talk about SSB transmission. This is now the most common way of modulating a carrier on the high-frequency (HF) bands.

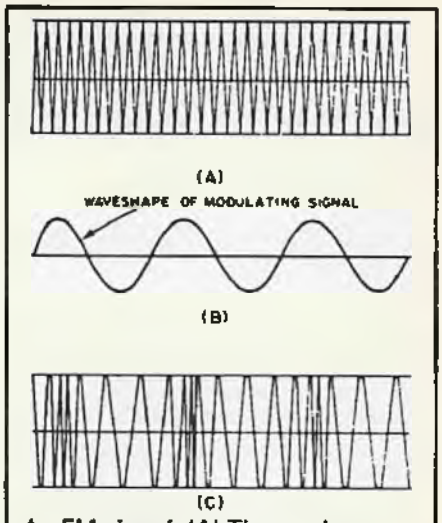
The third way is to play around with the resonant frequency of the transmitter output circuit, again in step with the vibrations of your voice, in the **frequency-modulated** (**FM**) mode. FM is freer from interference than AM because of the way in which the information is removed from the radio frequency carrier. The frequency spectrum space (**bandwidth**) needed for FM is rather broad in comparison to some



(A)

(B)

Electronic displays of AM signals in the frequency and time domains. (A) Unmodulated carrier or single-tone SSB signal. (B) Full-carrier AM signal with single-tone sinusoidal modulation.



An FM signal. (A) The carrier before modulation. When the modulation is applied (B) the radio frequency is increased and decreased. (C) shows the result.

others, so it tends to be used mainly on the very high frequencies (VHF) or above. There is a place in radio for all these modulation modes, and even a few more that we haven't mentioned yet.

Finally, here are this month's questions:

1. Decreasing the amount of capacitance in a tuned circuit will:
(a) lower the resonant frequency
(b) raise the resonant frequency
(c) not change the resonant frequency
(d) prevent the circuit from being resonant at a higher frequency

2. Six 1.5 volt dry cells are needed to provide a battery for a 9 volt transistor radio. The cells are connected:
(a) in series and parallel
(b) in series only
(c) in parallel only
(d) with series capacitance

3. Power transformers usually have laminated iron cores in order to:
(a) reduce eddy-current losses
(b) increase the output voltage
(c) improve output voltage regulation
(d) reduce copper losses

4. Three resistors, each of value 30 ohms, are connected in series. The total resistance value of this combination is:
(a) 7.5 ohms
(b) 10 ohms
(c) 30 ohms
(d) 90 ohms

5. A 100% efficient transformer would have a POWER ratio of:
(a) 4:1
(b) 2:1
(c) 1:1
(d) 1:2

6. In a DC circuit, power can be calculated from the formula:
(a) $P = V \times R$
(b) $P = V \times R^2$
(c) $P = V \times I$
(d) $P = V \times I^2$
where P = power I = current V = voltage and R = resistance

7. Four 20 watt resistors are connected in parallel. The maximum total power dissipation is:
(a) 5 watts
(b) 10 watts
(c) 40 watts
(d) 80 watts

8. A direct current of 100 milliampéres flows through a resistance of 100 ohms. The voltage drop across the resistor is:
(a) 0.1 volt
(b) 1 volt
(c) 10 volts
(d) 100 volts

9. If the current through a 300 ohm resistor is 50 milliampéres, the voltage drop across the resistor is:
(a) 5 volts
(b) 10 volts
(c) 15 volts
(d) 20 volts

10. An 8:1 step-up transformer has 120 volts applied across the primary. The secondary voltage is:
(a) 15 volts
(b) 120 volts
(c) 180 volts
(d) 960 volts

See you next time. Cheers from Paul, VK3DBP.

Answers
1 (b), 2 (b), 3 (a), 4(d), 5(c), 6(c), 7(d), 8(c), 9(c), 10(d).

***CB Action** thanks the **American Radio Relay League (ARRL)** for permission to reproduce the two diagrams above from its ARRL Handbook for Radio Amateurs.*

Letters

If you've something worth saying, tell us....

CHASING THE HORSES

Dear Sir,

I thought I would write to your fine Magazine about the great support that Gardners Electronics of Fremantle, W.A. has given to our club, "The Black Swans".

Next year is our 10th Anniversary and we are still going strong. We have all the normal outlets as other clubs, T/shirts, QSL cards, monthly newsletter, BBQs and weekend camps...we even have our own Country and Western Band.

Through the winter months, starting about February through to October we run the Communications for the West Australian Endurance Riders Association.

We do all the communications at the base "start/finish line" via our P/A System and we man however many radio check points the WAERA needs by way of 27 MHz or UHF radios.

With our members in their mobiles, the horse riders ride round a set distance, 25 km, 40 km, 80 km up to 160 kms with our mobile checkpoints placed where-ever we think they will be of most assistance to both horses and riders.

The operators manning the check-points report back to control each time a horse pass their checkpoint with the number of the rider and at what time it passed so that we (back at base) and the rider's helper know at all times where their riders are and if need be can always get help out to them.

As most of our members have 4WDs we have check-points in some hard to get to places...even for horses to get to let alone vehicles. However, we always get by and cover the ride so that all riders feel that they are not far away from help if needed.

Our radio club is based in Rockingham, WA and for the horse rides, one every other weekend, we travel as far north as Geraldton, east to Northam and south to Demark and all towns in between.

As I said our members use their own vehicles as the check points but at control the club has it's own caravan with one end decked out for radio work.

We have a console with a P/A system, 40 channel 27MHz AX144, Royce 40 channel UHF set, a small AM rig and a tape deck that can be played over the P/A system.

We have had a lot of help from sponsors to set up the caravan...especially Gardner Electronics of Fremantle who donated the UHF Royce radio along with coax and a 6dB home base antenna.

Once we get to base camp...the start/finish line where we set up control...it only takes one person about 10 to 15 minutes to set up the caravan, along with all the antennas. All antennas (27MHz and UHF along with their supporting poles) slip into their footings on the caravan and you just walk them up then clamp them in place with scaffold clamps.

Thanks for your support with your magazine to all CBers...keep up the good work.

Black Swan C.O.D.X. Club of W.A.
P.O. Box 626, Rockingham,
Western Australia,
6168.

FROM UP NORTH

Dear Sir,

For some years now we have enjoyed CB Action, the only CB magazine available in Australia, and for some years now, we have enjoyed the most informative services that your magazine provides.

The only problem that I and a few others like me can find with the service provided within is that 95% of it is aimed at the southern States of Australia...usually Victoria and the Southern half of New South Wales.

For some years now I have lived in Queensland and can find very little about what is happening in our neck of the woods. Even more rare is anything that concerns far north Queensland or Northern Australia.

I am still relatively new to CB and CB Action compared to the old timers of 20 plus years or so, I would, however, like to rectify the problem if that is at all possible.

I am writing to you to ask if it is possible, space permitting, to add a segment to CBA that covers Northern Queensland, the Territory and Western Australia's Northern region.

At the moment it would be like me sending my local paper down to you to read. Not much relevant information for you down south.

Following are a few comments that have more than a few people baffled at the moment:

The Cairns UHF repeater (3/33) has been off air for sometime now...nearly three months if memory serves me right. It is off air completely, never to return, it seems. The repeater was initially used in harmony by both sections of the community - businesses and private users. Although the facts behind its closure are relatively scarce, it appears that after months of abuse from the commercial operators aimed at the private operators, things finally came to head.

The hobby operators were sick and tired of being told to get off the frequency and they decided one day to remain on the repeater all day long. Several hours of heated discussions took place between commercial and private operators (including physical threats) and in the end the owner of the repeater disconnected the power and closed the repeater down.

It would now seem that the Cairns 3/33 repeater has had its day and is now in permanent retirement!

A word of warning to the other towns in Australia that have repeaters. Learn to restrict your time on a repeater and live in harmony with the rest of the world and with luck you might still have your repeater operational this time next year.

For those people unaware of it, Ingham is now operating on a second repeater and a third is in the planning stages. The channels now in use for repeaters in the Ingham area are 2/32 and 7/37.

I believe that if information similar to the above could be published in CBA it would help us Northerners informed and also be of interest to Southerners travelling north.

If all the information up here could sent to one address in the north, correlated and sent onto CBA for publishing, we could help make CB Action more Australian orientated.

I am prepared to have Northern Australian residents send information through to me at my post office box. I could then research the facts, talk to the people concerned (skip permitting) and dispatch the information through to CBA for publishing.

Any information concerning; -

HF utilities, Bandspread, Scanning, On line, DX logbook, DX International, UHF repeater list updates, Northern Australia's North Coast Radio Club Frequencies, local news of what is happening in Northern Australia, general enquiries, etc. could then appear in the magazine. Such a step would be much appreciated by CB users living any where from Pt. Hedland in Western Australia to Mackay in Queensland and all towns north of that line. To achieve this goal, I would need at least one person in the following areas to report to me on the local happenings every month in their neck of the woods: Western Australia, Port Hedland, Broome/Derby; Northern Territory, Tennant Creek, Katherine, Darwin; Queensland, Mt. Isa, Cairns, Townsville, Mackay; and all associated areas and districts in between to relay information to me.

Information gathered can be sent through to the various department prior to going to print. Anyone serious about helping me with information can write to me with information from the above areas/townships and/or topics at:

"Northern News"
P.O. Box 1772,
Innisfail, 4860, North Queensland.

Come on guys, let's help Cbing to be more informative and active within the community!

Yours in Cbing,
Gregg Curnow

(Best of luck Gregg. If you can provide the news we will try and find space for it...editor)

Graeme of Garder Electronics presenting the Black Swan Club with a much appreciated 40 ch. Royce UHF rig.

SCAN FREQUENCIES...?

Dear Sir,

Firstly I would like to congratulate you and everyone else concerned in compiling CBA.

I have been "monitoring" the HF/V/UHF bands since 1983 and have found CBA excellent value.

I would, however, like to "voice my concern" about the publishing of various "sensitive" freqs, as used by both Australian and overseas governmental departments.

This encompasses a vast list of users, but primarily I'm talking about defence and low enforcement/security agencies of which many frequencies and information rel. the operation has been published in the past.

I know that word tends to travel fast within these circles (as perhaps you're aware), hence it doesn't take long for people who make a decision on security (be it comms or not) that a compromise has occurred of their freqs and perhaps change freqs or use Cypher.

I mention the compromise of freqs with regards to all services - (the navy some time ago changed their HF VX freqs - apparently because of such a problem).

The Americans dislike (putting it mildly) their freqs being listened to despite being "in the clear" and having so many of them they don't seem to employ many safeguards for their HF Comms (Air Force) though they must have them.

However, many "sensitive" issues have been discussed, if only distantly relating to something, that many a compromise (I feel) has been given about a situation.

The Navy as you probably know uses Cypher, occasionally; I couldn't see them being too thrilled about their Fitsatcom freqs appearing in various articles though as I understand that system is only "temporary" anyway.

I am also concerned on the extent of Australian Police freqs appearing...they are a comprehensive guide to police comms.

When I say "concerned", I say it in relation to other users, or better termed "monitors" of the spectrum.

If constant freqs and information is published then this can only expedite the introduction of DVP on our police channels (already in use by some) and as far as defence goes, a more secure form of communications, hence making it impossible for the "enthusiast" to pursue his/her hobby of that particular service.

I am not and never would, tell you what to include in your magazine, but, rather than listing specific freqs, perhaps to mention that..." the freq you're after is in the national UHF Police Band "or", yes the Air Force has many HF/V.UHF freqs (or Navy, or Army).

This perhaps is not what the articles (Ref "Scan" and "HF Utilities" - or other features) are there for...

If it is the view of the contributors that this would defeat the purpose of the columns then end of story.

I certainly don't want to destroy the magazine, or part thereof.

But if someone really wants to find a freq (or user of one) then if they have, or can learn, of the "BandPlan" (though I know - not always correct) then perhaps they can find, or at least know where to look, still remembering what they're looking for may well be outside of the plan.

To me, this is more rewarding and more "educational" and, perhaps, keeps the frequency user happy for a little while longer!

In finishing, I would be telling a huge lie if I said I haven't used any freqs you've published in the past, but then I've found many, many more on HF and V/UHF from searching.

Also I'm aware that there are many more publications around that make reference to the services I've mentioned.

Name and address supplied.

(I thank you for your thoughts, however, I do not claim to be the moral guardian of any radio communication service and, let's be honest, anything we list can be found by simply listening...we just make it a little easier. I also think there is a degree of naivity in thinking that we might be breaching 'secure communication channels'.

If the communication is meant to be genuinely 'secure' you can rest assured that it is. I wonder how many people actually heard 'secure communications' between ground and air during Desert Storm.

Sure, there were plenty of 'low level' communications which were heard and yes, you will occasionally - very occasionally - hear 'secure communications' when someone stuffs up, however, you would need to be monitoring a specific frequency 24 hours a day just on the chance that such a stuff up occurs...editor)

HELPING THE RFDS

Dear Sir,

I am writing this letter in the hope that you may consider printing an article about the above club, not just for the club and its' members, but, for the thousands of people who rely upon the services of the RFDS each year.

The reason for the existence of the A.M.O.S. Club is to raise funds for the RFDS in keeping with our motto "Helping to Keep the Doctors Flying".

This we manage to do, mainly at our own expense or from the generous donations of goods and/or services to us from many businesses, both national and local.

As we operate as a totally NON-PROFIT organisation, we cannot afford the luxuries that many other CB social clubs enjoy.

However, we can offer our members the sense of helping to maintain the most unique medical service in the world...the RFDS of Australia.

Our subscriptions are kept as low as possible with the single fee being a mere $8.00 p/a of which $4.00 is donated to the RFDS in the member's name. The RFDS then receipts all donations and issues a personal receipt as well as a comprehensive thank you letter.

The remaining $4.00 is then utilized as club funds for which the new member receives a sample of the Club's distinctive QSL card, a membership card, a listing of members (updated twice a year) and two club newsletters per year.

Some of the club's fund raising activities include cake stalls, disposals, White Elephant stall (when we can find enough White Elephants - Canberra seems to have the monopoly on them) and our annual 72 hour Talk-a-Thon. Of the funds raised from these activities, 71% is donated to the RFDS and 29 % is utilized by the club.

We intend to hold the Talk-a-Thon again during Easter weekend in 1993.

Although it may seem that we are a very staid and serious club, we can assure you that we do let our hair down quite often and enjoy as much good, clean fun as the next person. Our membership now stands in excess of 500 with members from as far afield as the USA, Indonesia, New Zealand and Papua-New Guinea, as well as from every state and territory of Australia.

Should any reader wish to enquire as to membership of the A.M.O.S. Club they need only write to; **A.M.O.S. Club, P.O. Box 351, Broken Hill, N.S.W., 2880,** and we will send them an application form and any available information they may require.

You need not be a CB nut to become a member and many of our members are not radio operators while quite a few are also amateur radio operators as well.

The club is presently introducing to the Broken Hill area a new concept in the CBRS, that being the "Community Radio Watch" which is to operated in close conjunction with the police force in this area.

This concept operates in a manner very similar to that of "Neighborhood Watch" but with the involvement of both mobile and base station CBRS units. These units will have a direct 28MHz (I certainly hope you meant 27MHz...editor) link with the Broken Hill Police Station, virtually eliminating the use of the telephone when a CB radio is available.

Tony Williams, Founder and Chief Co-ordinator.

NICE ONE....?

Dear Sir,

Nice one regarding the crossword quiz for the TX4000, have you seen page 65 of the same mag?? Or was it a trick question? As you have no doubt been told many times by now, you appear to have inadvertently published the answers to this issues crossword.

I thoroughly enjoy CB Action, although not a subscriber I always pick up a copy. My main interest lies in the Scanning and Computing sections. I haven't picked up a rig here yet (returned to Oz last year after an absence of many years, it's good to be back). With the involvement with Amateur Radio I will probably find additional items of interest as I am currently studying for my Novice Licence. I hope you don't duplicate too much from ARA which I also get on a regular basis.

Side band on CB is great, I've been listening on my 7000 frog. When I left UK they only had FM, mind you when the skip was in I managed to contact Iceland 5 by 9. That was a few years ago now. SSB rigs could be purchased if you knew where and how. Some used them, penalties were strict if caught. Call channel there is 19. To make contact you call on channel 19 for your contact's handle (no first names but name like 'Pipeline', or 'Screwdriver'. Alfa Tango members call on their call signs as do other club members. First names come after you establish contact.) For a general call it goes "One Nine for a copy" sometimes giving your handle. This is repeated until you get someone to come back to you then you designate a clear channel to speak on (sometimes an almost impossible task) or you just say up two or down one referring to the number of channels you want to jump. Instead of breaking in by saying "Breaker" between overs you say "On the side" and wait to be called in. Power and Echo mikes are tolerated much more there than here, in fact for FM DX are a necessity. The regs do not allow for colinears. The effective radiated energy must be restricted to 4 watts peak (I think it was 4 watts). The antenna had to be a quarter wavelength. Not many people stayed at this length. There are none of the Yagi's or Quads allowed in back gardens, even if you had the room. By the best of my knowledge these were only allowed by licenced radio amateurs and again in accordance with local government restrictions.

Getting back to your magazine having given you an insight of the UK system as I remember it, one thing puzzles me is why you do not print frequencies or channel numbers of DX International contacts. It would enable those without a lot of knowledge of working DX to know where to look. Perhaps you may pass that one onto Jack Haden.

Good luck on a great mag, some construction items wouldn't go amiss, e.g. home brew antennas, audio filters to cut the mush out of DX audio, antenna tuner units (RX and TX). I have an AOR1000XLT, any mods for that would be useful.

Tony Yates.
67 High Street
GRANGE SA 5022

We're happy to publish a few letters (providing they are of general interest) in CBA and dependent on space availability. Please note, however, to be considered for publication they must be typed with double spaced lines. Now seems an opportune time to also mention that while we would like to reply to the many letters received, CBA is about as close to a one-man-band as it's possible to get and the time is simply not available for individual replies. If you include your 'phone number, we will make every attempt to get back to you. We apologise for this but unfortunately can't do much about it.

SHORT REVIEW

ICOM IC-U210T UHF

By Ken Reynolds
POWER BAND COMMUNICATIONS

Is the Icom IC-U210 a high power UHF CBRS transceiver? No. It's a programmable, 25 watt commercial grade rig with DoTaC type approval for UHF CB, provided of course, the RF output power level is restricted to meet the CBRS five watts specification.

HOW ABOUT 25 WATTS OUT!

In keeping with the styling of Icom's range of excellent mobile Ham Band transceivers, the IC-U210 is an attractive, all black, compact unit featuring the robustness of a rigid die-cast frame with an integrated, heavy, molded heat sink to cope with the heat generated in its 25 watt transmitter.

The operator interface is through the use of one rotary control (off/on and volume with SQuelch on and off by pushing or pulling the knob), six press buttons and a numeric keypad.

KEYPAD SELECTIONS

The key pad allows channel selection and code number dial-up for the multi-mode, optional SELCAL facility.

The six press buttons account for - CALL and RESET SELCAL functions, SCAN and SET, which controls display brightness and SELCAL code, TONE is used to select transmit SELCAL code via the keypad and CHannel button selects a memory channel also via the keypad.

The display window is big and incorporates a comprehensive LCD unit which includes an alpha-numeric for password or PIN number entry.

PIN NUMBER ENTRY

At power-up the display usually asks for your PIN number entry, however, someone in the Icom jokes department programmed the test rig to display "KEN".

Ha Ha!! Very droll chaps.

Our test rig was supplied close to deadline and, being short of time to think up a 'clever' little routine to exploit the IC-U210's many features, we just asked Icom to 'whack-in' the UHF CB channels with channels 1 to 40 set for simplex operation and channels 41 to 48 to operate in repeater mode.

100 PROGRAMMABLE CHANNELS

Since the IC-U210 provides for a possible 100 programmable channels our meagre program request left the remaining 52 channel capacity unloaded - a bit of a shame really because this transceiver is one of the New Breed rigs offering a wide band, self-tuning receiver that covers a large chunk of the UHF spectrum in one bite.

STATE-OF-THE-ART TUNING

Receiver tuning is accomplished using an algorithm that varies the voltage applied to varicap (variable capacity) diodes according to the selected frequency. The varicaps replace the normal manual, variable capacitors in the early tuned circuits of the IC-U210 receiver.

This enables the usual limit of about 10MHz bandwidth to be considerably extended to cover a wider than usual frequency split, or, multiple, unrelated frequency splits can be used.

COMMERCIAL USERS ALSO USE CB FREQS

For example, a number of commercial users find that a high power, single frequency allocation is not always adequate and being able to also use UHF CB frequencies is desirable (much more useful than many are prepared to credit) giving them common ground with the thousands of UHF CRS users - with reduced power of course.

Unfortunately, many existing, multi-channel, synthesized transceivers will not cope with the wide frequency split necessary to bridge the gap between frequency allocations and one or the other band suffers in the 'stretching' process.

IT OVERCOMES PROBLEMS WITH A DEGREE OF FINESSE

The IC-U210 overcomes this annoying little problem with some finesse.

When programmed for CB operation I don't see any reason why the remaining channels shouldn't

be used for 50 or so 'listening' frequencies ordered before purchase by the customer. If you read last issue's review on the GME TX-4000 with the all singing-and-dancing SELCAL, the IC-U210 offers very similar features except the Icom SELCAL unit offers all digit programmability and any one of the several international tone-call standards are available.

SELCAL IDENTIFIES CALLING STATION

This rig, like the TX-4000, also identifies the appropriate calling station and displays the SELCAL code on the LCD. The SELCAL module is an inexpensive option on the IC-U210. Naturally time-out-timer (TOT) and Sub Audible Tone calling (CTCSS) encoder and decoder is included in the package.

There are various permutations available for scanning, automatic number identification (ANI), transmit inhibit, external alarm function, auto-scan, auto transmit, power on scan etc.

BIG SIMILARITY WITH TX-4000

In fact there is such similarity between functions of the two brands one could be forgiven for thinking the same 'brains-trust' was involved with the design of both units. Although the U210 has just been released in Australia it has been available overseas for some time. The Icom IC-U210 is in keeping with the familiar high standard we have come to expect from Icom products and receive and transmit performance are right up to specification, although we couldn't test the high power function on CB channels. If you are perchance tempted to launch the 25w onto CB channels - we suggest you don't - DoTaC would not be amused.

But, you can bet the power is there with the right frequencies programmed.

SUMMARY

The Icom IC-U210T UHF transceiver is an attractive, compact full featured transceiver that delivers the goods and will cost you big bucks. It is designed for use in commercial systems and so offers suitable specifications, however, it can be legally programmed for 5 watts on UHF CB, alone, or to complement a commercial frequency. It could also have listening channels inserted and tailored to suit the user - provided the frequencies are within the tuning limits of the receiver.

dxlogbook

with Rob Williams

WHAT'S HAPPENING IN THE WORLD OF SHORT WAVE RADIO...

Welcome again to the world of shortwave broadcasting. DX Logbook is CBA's column for the shortwave enthusiast, where we keep you up to date with all those changes in the SW scene. As always all times are in UTC (same as GMT) and all frequencies are in kilohertz unless stated otherwise. Now on with the show.

☐ Birthday Call

To start off this month's column, a big "birthday call" to the BBC World Service. The famed UK shortwaver and one of international broadcasting's "big guns" will be 60 years old in December. Starting in 1932 as the "Empire Service" the WS has grown to be respected throughout the world for its unbiased and accurate reporting of world news events.

But, there have also been big changes to "London Calling", the magazine-style guide for all BBC World Service radio programs. From the November issue, LC will be incorporated into a new magazine called "BBC Worldwide". LC has been with us since 1939, back in the days when shortwave played a more important role in world news. While still heard on HF, BBC programs can also be received in many countries over FM, MW and now via satellite. Reflecting these changes, "BBC Worldwide" will also contain details on their World Service satellite television programs.

While I accept that we must move with the times, I would say that 99 percent of listeners in Australia won't be able to watch BBC TV and don't have access to a constant output of BBC radio programs on FM or MW, making shortwave our only means of enjoying the BBC. So does this new magazine offer any benefit for Australians? At the time of writing I haven't seen the new magazine but, I will be reading the first issue from cover to cover and let you know where we stand.

☐ Mailbag Time

Wayne Larsen, from Busselton WA, is a regular reader of CBA and writes with some of his latest loggings - 2200 Albania on 9760 with a strong signal, 2030 Alma Ata on 3955 with a good signal, 2330 UN via Radio for Peace International on 13630 USB with a good signal, WMLK on 9465 at 0800, KVOH on 9785 at 0300, and Jordan at 1600 on 9560. Wayne has been busy sending out reception reports to all those loggings - so, Wayne, expect to find your mailbox full with some new QSL cards soon. Wayne would also like to hear from other DXers. His address is PO Box 157 Busselton WA 6280.

Wayne also sent in the latest English sked for Ulaanbaatar Radio: Monday, Thursday and Saturday between 0910-0940 and 1200-1230 on 12015 and 11850; 1445-1515 on 13780 and 7260; 1940-2010 on 11850 and 11790. On Tuesday, Wednesday, Friday and Saturday tune between 0910-0940 on 12015 and 11850; 1445-1515 on 13780 and 7260; and finally 1940-2010 on 11850 and 11790. Thanks for the sked, Wayne.

☐ Confidential Frequency List Update

In the last edition of CBA I reviewed the latest edition of the Confidential Frequency List from Gilfer Shortwave. Well, news to hand is that the book is now available at the Technical Book and Magazine shop at 295 Swanston St, Melbourne. Their phone number is (03) 663-3951, fax (03) 663-2094. Thanks to Mitchell Prax for the tip.

☐ New Sked From Israel

Here's the latest English-language sked for Kol Israel from 1/9 to 1/11: to India, S/E Asia, Australia and New Zealand at 1400-1425 on 15650; at 1800-1815 on 15640, 11603, 17575 and 11587 to West Europe and the USA, and 2000-2030 on 15640 to Central and East USA and West Europe; 2230-2300 on 9435 to Central and South America; 17575 to South America; 11587 to Central and East USA and West Europe; 11675 to East Europe, Russia and West USA. Thanks to Daniel Rosenzweig reporting in the Fido international shortwave echo.

☐ Radio RSA Heard On Shortwave

An old-time favorite of many DXers, Radio RSA was recently heard by Wayne from his WA QTH at 0200-0400 on 7270 (with a good signal), 0300-0500 on 5960, 0400-0600 on 9695 (QRM from Japan at 0500), 0600-0700 on 15220, 1000-1200 on 11900 and 1600-1800 on 9565 and 11885. That's a much rarer station to hear these days since they ended their external shortwave service.

☐ New Gear from Yaesu

According to a report over Media Network, well-known manufacturer of amateur radio and shortwave gear Yaesu Musen has announced the release of a new shortwave receiver. Initially to be called the FRG-800 but now renamed as the FRG-100, this desktop dynamo is based on the receiver section of their FT-890 ham transceiver and is designed to compete against the Drake R8 and Lowe Electronics' new HF-250 which isn't expected on the market until early next year. It is expected to be priced at the top end of the market

The FT-100 was scheduled for a public debut in Japan during August, with world-wide release planned for December this year, hopefully in time for Santa to plant one under your Christmas tree! I'll have more on this once the receiver starts rolling off the assembly line. Dick Smith Electronics are Australia's long-time importers of the Yaesu range, so expect them to start promoting the radio soon. It's uncertain at this stage whether Yaesu will discontinue the FRG-8800, but based on past experiences they will. If this happens, keep a watch in the radio magazines for ads from Dick Smith selling last stocks of the 8800 at a discounted price.

☐ New VOA Site Planned

As reported over Media Network recently, VOA has found a new site to replace the one lost in the civil war in Liberia. The tiny country of Sao Tome, west of Gabon, has signed an agreement with the VOA. Within two years VOA hope to have 4 x SW and 1 x MW transmitter on the air. VOA see the need to start a mediumwave service sooner and hope to have a 100 kW transmitter on air by March 1993 with a 600 kW MW sender running by 1995. Updating my report in the previous edition of DX LOGBOOK, we also have news to hand about the new VOA site in Kuwait. Plans are to eventually have 11 MW and SW transmitters to serve the Middle East, Central and South Asian regions. The Kuwait Government will provide essential services to the new site and in return Radio Kuwait will get airtime over the new relay station.

☐ NTA To Manage ABC/SBS Transmitters.

Effective from 1st of July the Federal Government has created the National Transmission Agency to manage all ABC and SBS transmitters. This includes all TV, AM and FM broadcast services as well as HF domestic services and Radio Australia. The Canberra agency will operate with staff and offices provided by DoTaC and will initiate more cost-competitive tendering for the maintenance of these broadcasting services.

AOTC, formerly Telecom Australia, has been building and maintaining the network - one of the world's largest broadcasting operations - with funding coming from the Federal Government but, to continue maintaining the service they must win a tender from the NTA. A review of the NTA will be undertaken in 18 months to judge its effectiveness.

☐ RNZ Updates Summer Sked

Here is the new sked for Radio New Zealand effective 4/10: 1650-1849 on 9675 Sun-Fri; 1850-2138 on 15120 Sun-Fri;

2139-0658 on 17770 daily; 0659-1207 on 9700 daily, with 1208-1649 on 9510 being used on occasions.

☐ This Month's Name Changes

As of 1/10/92, Radio Beijing has changed the name of its international service to China Radio International.

The title "Radio Beijing" will still be used for local services. Meanwhile, the DX Party Line reports that Swaziland Commercial Radio is now known simply as Swaziland Radio.

Their new address is PO Box 5572 Rivonia 2128, Republic of South Africa. Their current sked is 6155 Mondays to Fridays between 1700-2030, Saturdays 0500-0600 and 1700-2045. Their other frequency allocation of 9750 is now inactive.

PIRATE NEWS

Reporting in the latest edition of OZ-DX, David Martin has QSL'd famous international pirate Radio Caroline from Ireland.

On the QSL card was a message that they were to move to 6295 and increase power above the present 1 kW. Their QSL address is PO Box 1514, London W7 2LL, UK.

Peter Bunn reports that a press release from recent Australian pirate Radio G'Day gives their new address as via Radio Waves International, BP 130, 92504 Rueil Cedex, France.

For the first time, they have admitted that G'Day broadcasts from Australia and not PNG, and with 30 watts and not 2 kW.

Sked details for Radio G'Day are given out only a few weeks before the broadcasts making it impossible to put in this magazine, but DXers with access to a computer can keep up to date via the Shortwave Possums computer bulletin board or any other BBS which carries the OzRadio Forum, as details are placed there as soon as they are known.

In the meantime, keep an ear on 11400 as well as 9447, 13630 and 15040. Their suggested times are 0100-0145, 0600-0645 and/or 1000-1045 on weekends.

ANOTHER PIRATE EXPECTED ON AIR SOON

It seems that it's the season for pirates!. Southern Music Radio plans to broadcast from New Zealand in late September or early October, with 11400 and 9400 expected to be used.

While this may be too late for this edition, keep a check on the two channels for future broadcasts. Hopefully a QSL address will be announced during the broadcasts.

☐ HCJB Expands SSB Services

A report from HCJB is that they have selected 17535 for their second SSB shortwave broadcast to replace their service carried on 25950.

Our current position in the solar cycle offered poor propagation for 25 MHz frequencies, making it necessary for HCJB to move down the shortwave bands.

This SSB transmitter is of the two purchased from the Swiss PTT several years ago. Using a diplexer, similar to the way TV stations feed the video and sound to one antenna, both this and their 21 MHz SSB channel are sent to a unterminated four band rhombic array, which is bi-directional to Europe and the South Pacific.

Each transmitter is running 10 kW with 30% carrier insertion. With initial testing successful HCJB are to incorporate this new channel into their new sked commencing 1/11/92.

While I was preparing this column I checked 21455 at 0752 and found a good signal in parallel with their regular 9745 outlet beamed this way. Also thanks to Tony from Bunbury, WA who put me onto 17535, which he says comes into his QTH at good levels.

☐ Frequency Changes For Radio Nederlands

A new sked for Radio Nederlands came into effect on 27/9. While their Pacific service remains the same there are a few changes for the late-night Asian service: now at 1330-1430 on 17610 and 13770, and 1430-1630 on 17610, 15150, 13770 and 9895.

☐ Palau QSL Cards Start Arriving

CBA computer wiz Patrick McDonald has received a QSL for his 168th confirmed shortwave country - this latest one is Palau, snared courtesy of their "Voice Of Hope World Network". Nice one, Patrick - I'm getting jealous at the thought!

And that wraps up DX LOGBOOK for another edition. If you have and good loggings or wish to write to me my address is:
PO Box 108,Minto NSW 2566
or via my E-mail address to 3:713/605.
If you wish a reply please include a SSAE.

AUSTRALIAN ASSOCIATION OF CITIZENS and BAND RADIO OPERATORS INC.

August 31, 1992
Minister for Communications
Parliament House
CANBERRA ACT 2600
Dear Sirs,

I am instructed by the Annual General Meeting of members of this Association to contact you in respect to there being no increase made to CBRS license fees in the next twelve month period.

We were disappointed last year when on November 5th, you indicated a minimum increase would apply, following which due to a rounding up/down policy by your department, your assurance became false -

(Quote) "I wish to assure you that there are no plans by the Department to increase CBRS fees above the cost of living in the next twelve months"

By calculation, we have suggested to our membership, that the CBRS community in Australia was "ripped off" by an amount of $166,000.00 as a result of this "rounding up" policy.

With this unsatisfactory policy now having been established, and the CPI figures having been calculated, we seek your, and the Minister's statements to assure us that this year the traditional increase in license fees relating to the CBRS, will not occur, at the 1st of December next or during the next twelve months.

Your early response and/or a press release from the Minister indicating the granting of our request would be appreciated.

for the ACBRO COMMITTEE
T.G. Colwell (Mr.)
Assist. Secretary.

ANIMOSITY AMONGST C.BERs

With all groups of people, clubs, and organisations established to serve those of their kind, it appears nature plays a part to provide that all shall not be plain sailing. Arguments occur over differences of opinion, or the ways to do things, in fact throughout the world wars are started for just these reasons, and perhaps the word "animosity" could be used appropriately as that which invariably results in conflict that changes a course of direction originally intended.

ACBRO Inc. is in a position to see forms of animosity amongst the C.B. fraternity, particularly with groups who have got together with a common interest, and before not too long, have by way of argument or difference of opinion, collapsed or divided with a splinter group being formed.

Many of these groups become affiliated with ACBRO, who are obliged to practice without discrimination, and take them as CB organisations under their umbrella. Perhaps over the years, committees made up of different people with ACBRO, who change as the years roll by, may have had to consider a group for acceptance, and had some reservations. In making such a decision, they are guided by their constitution which outlines its objects, and as a result, it can be found that there are little grounds to choose between these groups with such common interests.

At this time, it is known that there are some CB groups around Australia suffering with problems that stemmed from some form of animosity, and their lifestyle has been changed with some degree of frustration as a result of whatever their altercation may have been.

How can any change be made to this which was suggested as being a natural phenomenon? Well ACBRO in following a policy of not being dictatorial toward those with whom they are associated as Affiliates, merely offer suggestions that may be of assistance.

And here, a suggestion that would be appropriate would be, for all who are involved in CB radio to consider themselves as equal to each other, and remain banded to each other so that thier union will provide strength.

It is this form of strength that ACBRO seek amongst CBers, as if a time comes again as it did back in '82 when the Minister of the day threatened to take the band away from the CBer, we will need to be unified in a togetheress throughout Australia to repel such action. Provided below, are the few simple "objects" from ACBRO's constitution which other clubs may wish to observe and follow. It may solve any animosity problem before it occurs.

AUSTRALIAN ASSOCIATION OF CITIZENS AND BAND RADIO Operators INC.

AIMS AND OBJECTIVES

(a) To promote and maintain good relations between all radio operators throughout Australia.
(b) To act on behalf of such radio operators in matters vital to the attaining and retention of their rights.
(c) To become a nationally incorporated body in order to defend the maintenance of currently used frequencies if necessary.
(d) To liaise between radio operators and Government.
(e) To obtain improved conditions governing radio operation.
(f) To keep members informed of the progress of the Association.
(g) To promote public interest in the aims and objects of the Association.
(h) To set standard for radio operators and issue awards & certificates of merit.

REQUEST TO HALT LICENSE FEE INCREASE THIS YEAR

This time last year ACBRO made a concerted effort to have the Government desist from increasing CB license fees in a period when the recession/depression was having a severe effect on the ability of the citizens to meet living costs as well as increased taxes imposed by the powers that be.

As well documented in these pages, as well as ACBRO's members' bi-monthly publication, it was announced from the Minister for Communication's office that license fees related to the CBRS would not increase more than the CPI for the year. At the date of December 1 1991, when increases normally are effected for this form of tax, alas,

ACBRO ASSOCIATED CLUBS

Below is a list of clubs and organisations affiliated with ACBRO Inc. If you have one of them in your area, please give them your support of membership. Full details can be obtained by contacting the group of your choice from below.

ALPHA WHISKY ALPHA RADIO CLUB	P.O. Box 1457, Albany, W.A. 6330
ALBANY COMMUNICATIONS GROUP	65 Hassell St. Elleker, W.A. 6330
RADIO CITY AUSTRALIA	26 Wootten St. Greenacres S.A.5086
PIONEER RADIO ASSOCIATION (S.A.)	P.O. Box 1017 Salisbury, S.A. 5108
PLANTAGANET REP'T INSTITUTE OF W.A.	PMB 306, Cranbrook, W.A. 6321
BURNIE CITIZENS RADIO CLUB.	P.O. Box 655, Burnie, Tasmania 7320
TRANSWORLD C.B. RADIO CLUB	90 Crozier Avenue, Daw Park, S.A. 5041
CANNING RIVER RADIO CLUB	53 Parkside Ave Mt Pleasant W.A. 6153
OVERLAND RADIO CLUB	P.O. Box 1010 Murray Bridge, S.A. 5235
EUREKA C.B. RADIO CLUB	P.O. Box 27, Reynella S.A. 5161
HACKMAN RADIO CLUB	P.O. Box 13, Hackham, S.A. 5163
EAGLE RADIO GROUP	P.O. Box 302, Morphett Vale S.A. 5162
ROTTEN RADIO GROUP INTNL	P.O. Box 4, Dry Creek. S.A. 5094
BROKEN HILL UHF REPEATER CLUB Inc.	Box 1023, Broken Hill, N.S.W. 2880
RIVERLAND C.B. CLUB	P.O. Box 742, Loxton S.A. 5333
GIPPSLAND REPEATER ASSOC. Inc.	P.O. Box 555, Maffra, Vict. 3860
MURRAY BRIDGE AGRIC. & HORT.SOCIETY	P.O. Box 315 Murray Br. S.A. 5235
SAMBA CLUB	P.O. Box 16, Salisbury, S.A. 5108
TWEED RADIO DX GROUP INTNL.	P.O. Box 773, Murwillumbah, NSW.2484
THE PATHFINDER RADIO SOC. CLUB.	P.O. Box 24, Woodridge, QLD 4114
DIRTY DOZEN RADIO GROUP	P.O. Box 380, Blair Athol, S.A. 5084
HOTEL ZULU RADIO GROUP Inc.	P.O. Box 66, Elizabeth, S.A. 5112
WHITE FOX RADIO CLUB	P.O. Box 288, Salisbury, S.A.5108
MEGA MOUTH INTERNATIONAL	P.O. Box 1534, Launceston, Tas 7250
THE TRIPLE "R's" GROUP	43 Cross Keys Road, Salisbury S.A.5108
TRU BLUE RADIO GROUP	P.O. Box 379, Blackwater, QLD 4717
BLUE O RADIO GROUP	P.O. Box 53, Monaro Cresc. A.C.T 2603
SYDNEY RADIO GROUP	P.O. Box 185, Gordon, N.S.W. 2072
UHF ASSOC. OF W.A. INC.	P.O. Box 1238 East Victoria Pk WA 6101
RATBAG CB. RADIO CLUB	P.O. Box 227, Welland, S.A. 5007
SUN CENTRE C.B. RADIO CLUB	P.O. Box 912, Swan Hill, Vict. 3585
PEGASUS CB RADIO CLUB	Cab 1 100 Jabez St Broken Hill NSW 2880
SOUTH AUSTRALIA RADIO	P.O. Box 162, Campbelltown S.A. 5074
PORT ADELAIDE RADIO CLUB	P.O. Box 218, Alberton, S.A. 5014
CHEROKEE INDIA AUST. GROUP	P.O. Box 1679, Mildura, Vict. 3502
STH. WEST DISTRICT CB RADIO CLUB	P.O. Box 620, Warrnambook, Vict. 3280
A.M.O.S. CB RADIO CLUB INTNL.	P.O. Box 351, Broken Hill, N.S.W. 2880
PIONEER RADIO ASSOCIATION AUST.	P.O. Box 112, Bentley, W.A. 6102
NARACOORTE UHF ASSOCIATION	P.O. Box 465, Naracoorte, S.A. 5271
GOSFORD CITIZENS RADIO CLUB	P.O. Box 447, Gosford, N.S.W. 2250
FELIX RADIO CLUB	P.O. Box 78, Goodna, QLD 4300
INLANDER CB RADIO CLUB	P.O. Box 5712, Rockhampton, QLD 4702
AUST. RED-HEELER SOC. RADIO CLUB	P.O. Box 313, Drysdale, Vict. 3222
CENTRAL WEST C.B. AD.CL.Inc.	P.O. Box 628, Orange, N.S.W. 2800
VIC RED HEELER RADIO & DX GROUP	P.O. Box 1802, Ballarat, Viv 3354

the increase was as promised, plus an additional amount as a result of DoTC's policy of rounding up, or rounding down to the nearest dollar.

As a result of this occurrence, ACBRO exposed this as a "rip-off" and insisted that the matter would not be laid to rest.

The President of ACBRO, at the recent Annual General Meeting, in commenting on this matter, said "...I feel that I can assure you that our success will be that you will not have to pay an increase this year when the 1st. of December arrives, as a result of our actions and statements that have been made".

At that meeting, it was resolved by those present that a further approach to the Minister should be made to gain confirmation that for the first year in many gone by, this traditional impost on the CBer will not be made. The brief text of the earlier letter asks for this assurance, and following the usual two or three months wait for a reply,

ACBRO expect good news for the CBer by way of saving this dollar per set, which nationally represents, by last year's calculation, $166,000.

If, on the other hand, the Government changes the rules that applied last year relating to the method used for establishing whether a tax would be increased or not, and the usual one dollar "slug" is made again, be assured that ACBRO will be seeking the support of members, Affiliates and CBers generally to create an issue on this matter in a more demonstrative way.

EQUIPMENT REVIEW

NEW UHF RIG FROM COMMEX

By Ken Reynolds
POWER BAND COMMUNICATIONS

The popular "black is beautiful" adage is seen incorporated in the Commex Executive, but unlike most other UHF rigs, this contender presents with only two rotary controls; a combination on/off come volume control and a concentrically mounted squelch control accessed by little 'wings' protruding from either side of the central volume knob.

All other functions are activated through soft touch, detent action press button switches that deliver instant instructions to the surface mount (SMD) microprocessor attached to the immediate rear of the fascia panel.

A conventional numeric keypad, mounted to the far right hand side of the front panel, serves as a multi-functional interface for channel selection, scanning control, memory selection and SELCAL code selection.

WHAT THE KEYS DO...

The remaining press-keys serve to activate and disable the following functions:-

1. DUPLEX - repeater operation to us. This function accesses all repeater channels simultaneously and cancels automatically when the band edges of the ch 1 to ch 8 repeater allocation is exceeded. This means, each time you leave the repeater channel block you will need to re-select DUPlex operation when you return to this area.

2. SEEK - is the term used for memory scan - activate this function to search the 9 user programmed memories.

The big LCD (Liquid Crystal Display) window shows the SEEK operation in progress and as each memory allocation is interrogated the memory number and contents are displayed simultaneously. To release this function the operator must press the STOP button located on the numeric keypad.

3. T-SQ stands for Tone Squelch, a function usually associated with sub-audible Continuous Tone Coded Squelch (CTCSS) which only allows the mute to open in the presence of a specific, continuous sub audible tone.

As with some other rigs, this term relates to the QUIET mode for SELCAL operation and activating this function excludes audible reception of signals and the display indicates TONESQ has been selected.

4. SELcal when pressed changes the LCD to read SEL followed by two digits that represent the last SELCAL code numbers that are user programmable.

"COMMEX EXECUTIVE UHF IS No. 1.

Announces headlines printed on the copper colored carton containing the Commex Executive UHF transceiver. A bold claim? Certainly a challenge to the reviewer. Or, just another marketing ploy?

One thing is for sure, you can't say the Taiwanese manufacturers of this product are backward at coming forward. "

While this display is active the user can select tone numbers from 00 to 99.

If the keyboard does not respond to the prompt after a few seconds, the function is self cancelling and the SELCAL number already programmed will be used as the default sequence.

5. T-CALL is pressed to send out the SELCAL tone stream, the timing sequences are hardware programmed on a standard SIGTEC 1506 SELCAL board which is not supplied with the Executive as standard equipment.

An interlock function prevents the user from sending a SELCAL tone burst when the radio is muted by the tone squelch key.

You must release this function first.

6. MEM stands for memory - as if you didn't know. Entering data into any of the memory allocations is simple.

Whatever channel is selected on the main display will be entered into memory by pressing the MEM button followed by the memory number. e.g., Select Ch 10. Press MEM. Press 5. Channel 10 will be entered into memory allocation 5.

7. DIM controls the illumination level for the LCD window and operates in a cycle of three steps of brightness and a fourth step turns off the lamp.

8. CH stands for channel which, when activated, prepares the micro to accept a channel number entry from the keypad. To select channel 24, press CH and 2 and 4. The LCD shows CH 24 in response.

The channels can be incremented or decremented via two arrow keys located at the lower left and right corners of the numeric keypad.

The Right arrow steps the channel counter UP in single step increments and vice-versa for the Left hand arrow key.

Press either key for about two seconds and the Executive shifts into scan mode. Scan up or down can be selected with the appropriate arrow keys.

The LCD provides plenty of information about the selected functions and has designations for:- TX for transmit, BUSY to register a received signal, SEEK shows memory scan, SCAN for normal channel scan, MEM with an associated seven segment display, CH and two seven segment digits for channel numbers, DUPLEX for repeater operation, TONESQ to indicate the Quiet mode is selected, CALL to register a recognised SELCAL and finally, a seven segment bar graph display for received signal strength and transmitted power level.

The 'S' meter shapes up like this:-
1 = 0.20 microvolts
2 = 0.50 microvolts
3 = 0.80 microvolts
4 = 2.00 microvolts
5 = 5.00 microvolts
6 = 17.0 microvolts
7 = your guess is as good as ours??

KEYBOARD CAN BE LOCKED

Last but not least, located above the volume control, is a slide switch labelled KEY LOCK which allows the whole keyboard to be set with a desired combination of functions and locked to prevent accidental change of events.

The microphone socket is located around the right hand side panel.

There is always some dispute about the convenience of this position and in recent years front mounted mike sockets have proved popular. In certain mounting positions I have found front mounted mikes to be a real nuisance when the cable fouls the other controls and sometimes makes it difficult to read the display.

REAR PANEL IS 'DIFFERENT'

The rear panel of the executive is a bit different from most other rigs. It carries the standard extension speaker socket, a three pin DC power receptacle and the now popular 'flying-lead' antenna socket, but a third socket of three pins, similar in appearance to a microphone socket, presents a bit of a quandary.

HANDBOOK COULD BE BETTER

The handbook, is a bit inadequate and had no reference to the mystery at hand, however, a look inside the case revealed a black sense wire connected to the SELCAL board which, when a SELCAL signal is identified, performs a switching operation allowing external equipment to be operated through the extra, mystery three pin socket.

The COMMEX Executive uses an all steel chassis and steel covers laminated with black PVC fabric and attached to the sub frame by chrome plated machine screws.

The covers are well earthed by extra screwed down tabs to keep the whole mechanical assembly 'cool' to RF currents.

12 OR 24 VOLT OPERATION...A NICE FEATURE

The main circuit board suffers 'component-cramp' in places and a couple of shields are a bit untidy, but in the main, the assembly has easy service access and the soldering appears very sound.

The Executive has a great little idea that we have only noticed in one other UHF rig before; it has a built-in 24 volt to 12 volt reducer which means this little piggy is equally at home in a truck or car without having to worry about power adaptors or blown-up rigs because "I didn't know the system was 24 volts"!

Actually, it is quite a money saver for truckies as a suitable voltage reducer can set you back $70 or more.

TRANSMIT/RECEIVE ARE GOOD

The received audio is good and the sensitivity about 0.3 microvolts for 12dB SINAD. The squelch opened at about 0.3 microvolts input level and required 2.5 microvolts to 'crack' the tight condition.

The transmitter also works well with the 5 watts RF power output right up to specifications.

The Executive easily passed the five minute transmit test with the rear case only managing to get lukewarm while the power level held up admirably. Could be a good rig for bucket mouths...

SUMMARY

The COMMEX Executive offers a wide range of features for around $400 or less and at this price is a very competitive product. We can't comment about the long term reliability at this point in time, however, we see no reason to doubt the integrity of the unit.

HF Utilites...

What they are – and how to listen to them

By Chris Edmondson, VK3CE,Editor, Amateur Radio Action

How many times have you tuned across the shortwave bands – right across them, I mean, where the shortwave broadcasters are very thin on the ground? You'll have heard some pretty strange noises there, I'll warrant.

So what are these signals?

UTILITIES.

A utility broadcaster is one which transmits voice or data signals of one kind or another. There is an enormous variety of traffic available to even the casual listener, with many signals able to be received in any part of Australia at very good strength indeed.

I guess the easiest services to listen to use plain language transmissions. These include such things as Marine, Royal Flying Doctor Service and OTC channels, all of which transmit plain-language signals almost invariably using upper sideband (USB). Many of these signals run power levels of up to 10kW (10,000 watts) so you don't really need a very sophisticated setup to hear them -- provided your communications receiver is capable of resolving a single sideband transmission, of course.

You'll also find some really fascinating listening on the international aircraft channels. Such outlets as the 8867kHz Pacific Ocean channel bring in surprisingly strong signals from aircraft and ground stations right across the Pacific from the west coast of the USA to Sydney -- and all ports in between.

The Flying Doctor and OTC channels are primarily service outlets catering to people who live, work or travel in the more remote regions of the country, as well as mariners plying Australian waters. As these channels are often used for interconnection of telephone calls they are rarely listed in listener guides, as AOTC regulations forbid the monitoring of channels used to carry telephone traffic. However, a modest $17 will buy you a Remote Outpost Station operator licence, and I doubt you'd ever be questioned for listening to a service you are licensed to use! Channels 402 and 802 are the ones I usually tune to when roaming the bush -- and 802 is almost always the better of the two. For Channel 802, which emanates from Sydney at 10kW into directional aerials, tuning to 8722kHz will allow you to hear the OTC signal, but the mobile or outpost station speaks to OTC on another frequency altogether. This second channel is 8198kHz, and its use means the stations actually work on a 'duplex pair' of frequencies. This has many advantages for both the remote and base stations, but it can make listening a frustrating experience indeed -- unless your receiver is something like an Icom IC-781 or Yaesu FT-1000 amateur transceiver, either of which allow you to tune into two separated frequencies at one time!

Other voice users on HF include the military forces as well as meteorological and commercial users. Yes! A surprising amount of commercial traffic is carried on HF, and there are even some commercial repeaters with FM voice transmissions used just above 30MHz. These can have a surprising range, as evidenced recently by some astonished users of a commercial FM voice repeater in southern NSW. Early one morning their repeater suddenly started yelling in Russian. The signals were absolutely 'full bash' into the repeater but, due to the different repeater offsets being used, the Australians were unable to alert the Russians, far less chase them off!

WHERE SHOULD I LOOK?

So what should you look for, and where are you most likely to find it?

Diplomacy (and legal etiquette!) dictates that we don't divulge any commercial frequencies here, but old-fashioned commonsense also plays a hand in this. A quick look at my aging ESG HF frequency register reveals **thousands** of entries spread over several hundred pages, so I suspect we couldn't quite list them all here anyway! However, your best bet is to look fairly low in the bands -- say from about 3MHz up, and you're very unlikely to hear anything at all above about 16MHz or so.

In between these two spots you'll find an enormous number of trucking companies, government utilities, yacht clubs, mining, farming, council and other users. The majority of activity is confined to the frequencies below about 9MHz, as the official policy is always to use the lowest frequency possible for reliable communications. As a guide, my HF frequency register devotes its first 300 pages or so to frequencies below 8MHz -- and the first 200 to frequencies below 5MHz or so, but it has less than 400 pages in total.

So if you're looking for utility service stations, start low and work up. Remember, too, that the convenient 5kHz station separations generally employed by the broadcasting service are the exception in utility work rather than the rule. You could, for example, find some services licensed to operate on 4621.4kHz, while others may operate on the almost identical frequency of 4621.5kHz!

By the way, the ESG frequency registers I've mentioned are available for all states of Australia, and cover HF, VHF and UHF allocations although, as I said, frequencies used to carry telephone traf-

"There's a whole world of listening out there..."

fic are not listed. There are a number of alternative listings available as well. Some leading bookshops stock them, and specialist electronics outlets including Stewart Electronics Components in Melbourne or TC Communications in Sydney also have them. Alternatively, you can write direct to Richard Barrett at ESG, GPO Box 1200, Adelaide, SA 5001 for details of his publications.

NON-VOICE MODES

So far we've dealt only with voice transmissions. There are a few other notable users of the HF spectrum, too, and it's here that we move to the more esoteric modes.

Most of the so-called 'digital' modes rely on specialist additional equipment, which is added to your receiver to enable it to translate these modes. In fact, only one of the digital modes can be received without any particular decoding equipment, and that is the oldest mode of all: CW or continuous wave telegraphy. This granddaddy of modes works by keying a carrier in alternating long and short bursts, referred to as 'dits' and 'dahs'. We use an internationally-recognised set of characters devised many years ago by a visionary named Samuel Morse, and his famous code still bears his name...

MORSE CODE.

Traditionally sent with a hand-operated 'key', Morse Code is renowned for 'getting through' when conditions are tough. It's also the only digital mode able to be received 'by ear' -- in other words, by putting your receiver into SSB mode (or CW mode if you have it, which is essentially the same thing but generally with a much more narrow filter to reduce interference) those who understand it can receive Morse. The code has assumed a lower profile with most commercial and military users over the last few years, with newer digital modes and satellites taking over in many applications.

As far as I can recall, the only major broadcast station anywhere to still use Morse Code transmissions is a news bureau service in Italy. This service pumps out high-quality Morse (in Italian!) every hour at very high speed. The Morse purists simply love it, and I suppose it's very good practice for them, but the only time I ever bothered to tune in I came away with a whopping headache...

Most modern digital mode terminal units are also capable of receiving the Morse Code. These handy gadgets work in a very similar manner to the common telephone modem. You connect your receiver to a personal computer or terminal via the 'terminal node controller' (TNC), as these gadgets are generally known. The TNC takes the receiver's audio output and computer-processes it to extract the required signal from the audio, then translates its output to ASCII computer code for transmission to the computer.

Your purchase of one of these units opens a whole new world of communications to you. Let's now look at some of the other modes you'll be able to explore with a TNC and a communications receiver:

RTTY

The abbreviation RTTY refers to 'radio teletype', which is little more than telex via radio. The greatest limitation of Morse Code came to light when the world's military wanted to send a large amount of material using the mode. Quite simply, because it needs up to five (or six, if you include punctuation) dits or dahs for each character sent, Morse is too slow for applications which demand a high throughput. Some military applications only served to increase the transmission length, as many of their encryption schemes doubled the length of the message.

Machines were developed which used a keyboard to transmit Morse characters at far higher speeds (although top speed was still limited as reception was still by ear), but even this was still too slow for the military. As the speeds increased the danger of errors in message transcription -- a vital factor when encrypted messages were considered. (Imagine the scene: atmospheric noise or operator inattention gets the message "place your bombs at point 123aa" misread as "place your bombs at point 12a", which just happens to be Command HQ. Oops...)

And so, at around the time of the Second World War, the US military further developed its wire teletype technology to herald a new form of communication by radio called RTTY. These signals can be transmitted at far higher speeds than Morse Code, but they still rely on a simple on/off, high/low or 0/1 technology for transmission. In other words, RTTY is similar to Morse in that it has three simple fields -- a dit (the high tone in RTTY), a dah (the low tone in RTTY), or a space, which is the absence of information.

In a RTTY signal the two tones are called 'mark' and 'space', and it's the variation between the two which the RTTY decoder looks for. To confuse, however, the tones are pretty much arbitrary -- most users employ a 170Hz shift between the high and low tone, but you can set your modern RTTY encoder to use just about any two tones your heart desires. For use on HF, the best results come from two tones just above 2000Hz in amplitude, and separated by no more than about 200 Hz. This allows the receiver to use a very narrow filter, which means interfering signals can be effectively tuned out.

Although RTTY is best known for its wheezing, clanking mechanical machines (which look something like old-fashioned steam-driven typewriters on steroids), modern computer-controlled TNCs such as the Kantronics All Mode (KAM) allow the user to completely tailor the transmission and reception parameters.

A RTTY signal sounds pretty distinctive on air. In periods of inactivity (when the keyboard is idle) you hear either a single, pure tone, or the same single tone with minute pulses of silence between -- a sort-of regular pipping sound. When text is being transmitted continuously you hear two alternating tones with a rhythmical but clearly varying sound. Clearly, the sound will vary according to the tones selected and the speed of transmission, as well as with the actual characters being typed. The speed most commonly used in this country is 45.45 baud, although the advent of modern TNCs has meant that other sub-groups are now using a variety of speeds up to about 300 baud. However, such high-speed transmissions are usually limited to VHF FM paths which, with their relatively wide transmission bandwidths, allow the use of more widely-separated mark and space tones.

continued over page...

A TNC such as this MFJ PK-232 will open up a whole new world of listening - providing of course that you have a computer and decent receiver.

CQ CQ Anyone... HF UTILITIES *continued...*

But there was another simple reason for the historically slow transmission rates: until relatively recently the mechanical machines used to generate and receive the tones simply could not keep up with the pace of mechanical printing.

I mentioned 'text being transmitted'; this was the big bug-bear of such modes as Morse Code and RTTY, as well as several of the other modes to follow. You were limited to sending pure text, as the whole concept revolved around the transmission of letters, numerals or punctuation. This meant that maps or photographs, for instance, could not be sent via these means -- and, for that matter, had computers been around in those early days, such things as their executable programs could not have been transmitted either.

That aside, it wasn't long before people started to capitalise on the teleprinter's use of monospaced characters, in which every letter, number or punctuation mark used exactly the same amount of space on the printed page. So-called RTTY art used a lot of spaces with a small amount of text to transmit pictures from one station to another, but these were certainly not of photographic quality!

ASCII

Other digital modes which followed also employed basically the same technology as RTTY. ASCII is probably the best-known of these alternatives. It, too, sounded a bit like very fast STD pips to listen to on air, and suffered from the same limitations as RTTY: its one-way transmissions meant that no 'error correction' was possible, and it was limited to text-only signals but, unlike RTTY, even a marginal HF signal path could allow transmission speeds of up to 300 baud, some six times faster than RTTY had historically allowed. In very good conditions substantially faster speeds were sometimes employed.

In the hobby arena at least, ASCII didn't attract the same following as RTTY. It remains to this day an 'alternative' mode. I've been called on FM voice by many puzzled VHF operators over the years demanding to know what new-fangled mode I was running...

In today's commercial marketplace it's now a rarity to find any large-scale ASCII transmissions on air, although some satellite data transmissions still rely on straight ASCII. (Yes, it is very similar to transmitting text files by ASCII to your local telephone bulletin board.)

AMTOR

Now we're getting somewhere! Amtor has a very characteristic signature when heard on the air. It relies on a pulsing series of transmissions, where the transceiver quickly cycles back and forth between receive and transmit. The signals sound like demented crickets chirping madly in unison. Very recognisable, that...

AMTOR was the first 'mainstream' mode to allow automated error-correction of text messages, so the bomb aimer's sweaty brow could at last find some relief. However, early AMTOR systems were restricted as another of the text transmission protocols, so those wanting to send 'high bit' computer-type code still had to wait.

Users of AMTOR generally employ late-generation TNCs, although purpose-designed terminal units have been around for years. The simple difference is that a check code is transmitted along with each bundle of information. The check code is a number calculated by adding the character value of specific components of the transmitted text. The receiving decoder adds the value of those same parts of the signal and displays the text on screen only if the two check codes agree. If the codes do not agree, the receiving station sends a reject message to instruct the originating station to re-send that part of the message.

But there's a lot more to AMTOR than meets the eye. The mode is automatic, in that its controller -- whether a TNC or purpose-built AMTOR unit -- actually controls the PTT line. With RTTY or AMTOR the operator keys the transmitter, sends the message, then throws the switch back to receive. Very civilised. But AMTOR is different. You tell the computer to send something, and it does it at its own pace. To add to the confusion you don't use your normal station callsign -- the computer brain of the thing requires a four-digit Selcal code, and there are very few callsigns that short!

Another significant difference is that a network of stations could occupy one frequency, but only the screen (or printer) of a specific station will display the message being transmitted at the time. This differs greatly from the RTTY (or CW!) approach, in which a signal is transmitted whether or not anyone is actually listening to it! AMTOR stations have to exchange a little dialogue before a file transfer can take place. In other words, three of us could be sitting on the frequency with only the machines actually sending and receiving doing anything. That was a very worthwhile development on its own. On a busy RTTY frequency your old Siemens ex-PMG teleprinter could burn up a whole roll of paper in a day or two!

However, in AMTOR a 'broadcast' mode is available as well, and this is often referred to as FEC. No error-checking is available in FEC, but any number of correctly-tuned stations can listen to the proceedings. (By the way, that's quite an important point: if your receiver wanders all over the spectrum in the normal course of its operation, it's probably time you considered replacing it, as the digital modes demand top receiver performance. The ability to remain precisely-tuned on frequency is vital, particularly when narrow filters are used. A drift of little more than 10 or 20Hz could put the signals out of your decoder's passband.)

A sub-set of AMTOR is called NAVTEX. This mode is also one-way (broadcast) only, and is used in the maritime industry to broadcast weather alerts to ships at sea.

Another variation on the main theme is called SITOR. This is another mode aimed at mariners, and is used very extensively -- primarily in the USA -- for two-way transmission of telex messages via radio. Most commercial US HF transceivers are fitted with both the international voice channels and those for SITOR. Commercial Australian HF transceivers are not fitted with those channels, and are limited to USB transmission only, save a couple of marine channels just above 2MHz.

Although AMTOR and its derivatives were revolutionising automated data transmissions by radio, a parallel technology was being developed in the post-Vietnam USA (where else?). The X.25 protocol was specifically designed for high-performance data transmissions along cables and between computers, and it wasn't long before the amateur radio community had pressed X.25 into amateur service as AX.25. You'll find a section devoted to 'Packet Radio', as AX.25 became known, further down this article.

FACSIMILE, SSTV

At last the means of transmitting narrow-band pictures by wire and radio were being seriously considered, and standards were adopted to make these transmissions a viable technology.

Both fax and SSTV modes also sound quite distinctive on your receiver. A fax transmission is capable of putting pictures on your printer or screen from almost anywhere on earth. Until the advent of the inexpensive TNC and home computer, a facsimile machine devoted to off-air picture reception was an expensive investment indeed, but these days you can tune to 24-hour weather map transmissions from Canberra on 5.1MHz for a very modest outlay.

Heard on an AM receiver, a fax signal

sounds something like a rapid drumbeat, or fingernails being dragged along your grandmother's old washing board. On a SSB receiver, however, you can hear a multitude of different tones. There are as many different ways to encode a fax signal as there are ways to skin the proverbial cat, but each is based on an image being rotated at a fairly fast rate around a drum. Of course, fax images aren't often generated that way any more, but they certainly were in the early days.

Slow-scan television (SSTV) is a way of transmitting moving pictures over a standard-bandwidth HF transceiver. Unlike its remotely-related cousin, the fast-scan TV most of us watch at home, SSTV refreshes its picture only about every 15 seconds, so 'moving' is actually something where a fair bit of interpretation is required by the viewer! This mode is almost entirely the domain of amateur operators, and is quite rarely employed in this country.

PACKET RADIO/PACTOR

Here, at last, we have a couple of modes with a bright future! Packet Radio is probably best described as an extension of your computer.

You issue a lot of very strange commands to your computer via a terminal software package, and the computer and TNC chat together.

The overall effect is magic. You can send computer files, executable software, high-resolution still pictures... just about **anything** from station to station -- and multiple stations can occupy the same frequency without significant effect on each other.

Packet Radio sounds rather strange to the listener. It chips merrily away, but only in single, rather short bursts. On HF most transmissions are at 300 baud, while VHF and UHF see 1200, 2400, 9600... the sky is the limit. PacTOR, on the other hand, is a brand new technology which marries the best parts of AMTOR with the best parts of Packet Radio, and allows far higher transmission speeds on HF than are at present achieved with narrow-bandwidth transmissions.

Packet Radio is one of the fastest-growing areas in amateur radio today, and it has spread like wildfire around the globe. It is also getting used by a surprising number of commercial organisations, and looks like revolutionising many aspects of radio.

For the computer buff, Packet Radio is Nirvana! It allows access to bulletin board systems literally anywhere on earth -- at no cost beyond the equipment used and a little electricity to drive it.

With the forthcoming no-code Limited Novice licensees set to get access to digital modes, the world of Packet Radio will expend even more.

HERE'S SOME FREQUENCIES TO START WITH...

The following frequencies were supplied by a reader and will provide you with a good starting point to hear some utility stations.

CALLSIGN	FREQUENCY	UTC	MODE
VHP	8479 MHz	2330	CW
P50	18979 MHz	2350	CW
VID	8479 MHz	0010	CW
VIX	16917 MHz	0032	CW
VPS79	16985 MHz	0045	CW
VHI	8510 MHz	Various	CW
VHI	12748 MHz	"	CW
VIP04	12995 MHz	"	CW
ZLW	8503 MHz	1119	CW
ZLW	8577 MHz	1130	CW
ZLP	8504 MHz	0558	CW
BMB	13559 MHz	1015	CW
BMB	8117 MHz	1015	CW

WEATHER FAX AS FOLLOWS:

AX134	10555	MHz	Darwin Fax
NPM	9396	MHz	USN Pearl Harb.
JMH7	23523	MHz	Met Tokyo
JMH5	18220	MHz	" " Fax
JMJ4	14693	MHz	" " Fax
BDF	18940	MHz	Met Shanghai
USAF	20381	MHz	Show Arctic WX
NPN	16029	MHz	USN Guam
ZKLF	9460	MHz	Met Auckland
Met[KVM70?]	9980		Honolulu

AND FROM THE SAME READER...

Many other Fax signals heard, but have been unable to ID to date, owing to noise from super VGA monitor on computer.
Some frequencies are as follows:
5404; 5755 [Aust. map];
5850 - 5858 [a couple I think];
7536 [Aust. map]; and so they go on.
Only decent copy of press on RTTY to date is C.E.P Central News Agency Inc., 209 Sungchaing Rd., Taipei, Taiwan. R.O.C. who broadcast at 0730Z on 7695/10235/10960/13563 and 16224.
The signal on 7695 is poor while all the others are good.

CONCLUSION

There are many other non-voice modes which crop up from time to time on HF, but the ones detailed above are the ones you're most likely to hear -- and be able to decode! Some of the other modes are quite hideously encrypted, and it would require some pretty powerful computer equipment to extract an intelligible signal.

While there are a number of receive-only decoders on the market, I'd recommend a full-blown TNC from the outset. The costs are not significantly higher, there are far more of them in use, they are supported better by manufacturers and their software is constantly being upgraded. The major brands of TNCs are sold by Stewart Electronics, Melbourne (Kantronics and MFJ), telephone (03) 543 3733; Blamac, Cooma (PacComm), telephone (064) 52 3112; and Emtronics, Sydney (AEA), telephone (02) 211 0988. And a little plug for Amateur Radio Action: we review these gadgets on a fairly regular basis, as well as the quality receivers you'll need to use to obtain the best results.

hf utilities

with Richard Jary

WHERE TO LISTEN and WHAT'S BEING HEARD

Another festive season looming, and here's the last HF UTILITIES for 1992. I hope that the DX Gods have been kind and given you many good logs, and that they continue to be kind and fill up the Christmas stocking with new radios, aerials and the like.

I mentioned last issue that I was possibly heading to Cambodia to do some work for a few weeks. This job is now on, and by the time this hits the newsstands I will have been over there for a few weeks. The fun part of the job is underway as I type, with arms (and other parts of the body) punctured with injections! When I come back there should be a few good stories to tell, of things radio-ish and not, so there might be some info in the March issue.

» New Loggings

The annual Variety Club Bash, a madcap fund-raising car rally, left Darling Harbour in Sydney on the 4th of September. Every year this event uses HF radio to control everything, and the signal appears to be well heard around Australia. Their frequency is 6997 kHz, callsign VH2LVH, and a thumbnail guide to the callsigns is that Mobiles 1 to 5 are the mechanics, and Alpha to Delta are the officials. So jot that one down for reference when next years Bash takes off.

» RTTY News Schedules

I've got a couple more RTTY news schedules from the International Shortwave Echo on the computer bulletin board network, carried on Sydney's Shortwave Possums and Melbourne's Spectrum Radio BBS (among others).

* **The Iraqi News Agency** on 13524 (50/425/N) seems to be scheduled with news in English 1245-1700 UTC, except Sundays. This is probably beamed to Europe and northern Africa.

* **MENA in Cairo** on 15935 (75/330/N - change from 50/300/N previously used) noted with news in English 1400-1435 in English, then into French.

» Search and Rescue

I've had a note from Shane over in WA asking about some of the recent publicized search and rescue operations involving ships and the like. He would like to know frequencies that may be used for the RAAF helicopters, search aircraft, and ship-to-shore frequencies. Well, Tom, I don't have a list of these, however I expect the local traffic around the scene to be on VHF, likely the maritime channels around 156 MHz. For coordination of the search, this would almost have to be done on one of the standard HF maritime channels for boats in the area, as these would be the only ones they would have access to. Similarly with aircraft, they would need to stick to their own allocations. If anyone has some specific SAR frequencies let me know and I'll publish them here.

» Aviation Utilities

Gary from Blaxland has written in and reported his favorite types of ute are aviation related. Well, Gary, you should find plenty friends with that one. Gary would like to know if anyone has the addresses for the VOLMET weather stations, particularly Auckland radio. I can't answer this one offhand, but guess the stations would be fairly closely tied to the airport in each place. Therefore a letter addressed to Auckland Radio, c/- Auckland International Airport, may work. I'll see what I can chase up however. Gary also offered some of his recent (July) loggings:

» Aircraft:

* **6679 kHz** - Vancouver Radio with VOLMET forecasts at 1027 UTC.
* **6680 kHz** - Sydney VOLMET with weather for Australian airfields at 1200-1204 UTC.
* **8867 kHz** - Auckland Air Traffic Control working QANTAS 47 at 2334 UTC.
* **8867 kHz** - Sydney Air Traffic Control working Express 160 at 2340 UTC.
* **8975 kHz** - RAAF Perth with radio checks at 2323 UTC.
* **13305 kHz** - Sydney VOLMET 1100-1104 UTC with weather for Sydney and Melbourne.

» Assorted:

* **6504 kHz** - NMN Coast Guard, Portsmouth Virginia with weather for Gulf & Caribbean, and new toll-free number.
* **8145 kHz** - School of the Air, "Mrs. Nicholls" with primary lessons at 0002 UTC, and holiday news from the children.
* **8765 kHz** - VIT Townsville Radio (maritime) with phone patch for M.V. Conroy re: engine problems at 2326 UTC. Vessel had left Thursday Island the previous day.

» 'Numbers' Station Heard

Max from South Hedland in Western Australia has dropped in with a log of a numbers station. This was heard on the 28th of July at 1550 UTC on 12168 kHz. The speaker was a young lady with American accent, and the transmission consisted of the reasonably common format of 5 number groups.

While there have been plenty of theories as to what these transmissions are, nobody seems really able to pinpoint their exact location. The number of stations has decreased with the end of the USSR as we knew it, however this sort of activity is still common around Latin America.

At least one of these has been proved to be a form of updating odds for horse racing somewhere in Eastern Europe from memory. But that is one of many, and a number of years ago.

» Fax Stations

Back in the May/June issue, I talked about fax stations, with some information regarding the weather transmissions from Canberra & Darwin. In response I've received an unsigned letter postmarked Raymond Terrace, NSW. This letter states that the transmission from the AXM Naval Base in Canberra on 5100 won't happen for a couple of years at least. I'm not sure what this means, as I can hear the station, and information received from other contributors and the weather bureau itself indicated that this is the transmitter site.

He also comments that the move of the transmission from Gungahlin to Belgium is unlikely to happen for 3 to 4 years at least, according to a "reliable source". Lastly the Darwin transmitters are actually 17 km, not miles, south of Darwin.

That's it for now - I'll catch you in the first issue of the new year, when I'm back on Australian soil.

EQUIPMENT REVIEW

UNIDEN UH-011 UHF CB

....nice rig - pity about the model name

By Ken Reynolds
POWER BAND COMMUNICATIONS

It was time for an overhaul of the long running UNIDEN UH-001 UHF CB. After nearly a decade of success in the 'base' model stakes the little rig has well and truly earned its retirement, but its simplicity and reliability will always be remembered.

I've no idea who is responsible for naming UNIDEN's new products, but someone should take to whomever with a big stick until they yield and agree to a model naming system that won't confuse the heli out of the prospective buyers.

For the last few years customers have been asking for UH-007s when they really want an 077, or get peeved when they get what they order - a UH-005 instead of a UH-055 that they thought they ordered.

Needless to say, UNIDEN has managed, with little difficulty I might add, to do-it-again.

Just as well UNIDEN makes good rigs so we don't hold their lack of imagination in model naming against the product.

The new model presents well and one could be forgiven for mistaking its new, all black, sleek appearance for that of the UH-077 - the whistles and bells UHF model.

The front panel is similar to the more expensive model, however, the difference is immediately obvious when the rig is powered-up and you notice the channel display is done in red LEDs instead of the newer, yellow/green innovation of the UH-077. Closer examination reveals three of the press buttons from the UH-077 have been deleted - the ones associated with the scan functions - and the display window now shows an array of discreet LED components instead of a single integrated display unit. While this may not be so 'flash', a component failure in this area will be cheaper to repair - a single LED replacement instead of a whole display assembly.

SIMPLICITY IS RETAINED

The simplicity of the UH-001 has been retained with operating controls just being shuffled round the fascia a bit, however, a couple of minor improvements for the better have been incorporated.

LED indicators to register DUPlex (repeater) operation has been selected and, a "CALLed" light offers visual indication for SELCALL users. SELCALL buttons are provided but the selective calling feature is a $100 plus option.

YES, IT HAS AN 'S' METER

And, you guessed it, by popular demand, a signal strength meter has been added for your enjoyment.

The five segment indicator displays diagonally across the viewing window - all five lights illuminated registering the strongest incoming signal.

On the new model the DUPlex control allows the operator to activate the repeater function on individual channels (channels 1 through 8) instead of the whole block in one press of the button.

The obvious advantage here is that if you only have access to one or two repeaters in your area, the other available channels can remain in the simplex mode without continual simplex/duplex switching to swap from one channel to the next.

Uniden introduces their new UH-011 UHF CB transceiver as an attractive replacement for the now dated UH-001.

The rear, aluminium panel layout is identical to the UH-011's predecessor carrying the 12 volt dc power inlet socket, SO-239 antenna socket and the usual 3.5 millimetre phono socket for an extension speaker.

Lifting the 'lid' discloses a new main circuit board design for this model that incorporates a UNIDEN custom microprocessor for function, display and frequency synthesiser control.

Except for the RF power output stages, just about everything is new.

On the underside of the main circuit board we find a touch of surface mount technology creeping into this model with the inclusion of one subminiature integrated circuit and, for good measure, a scattering of mini surface mount capacitors.

CONSTRUCTION BEYOND REPROACH

As usual, the UNIDEN component insertion techniques are beyond reproach, the whole circuit board assembly being neatly laid out and assembled with excellent soldering.

There are few discreet wires to cause 'dry-joint' problems thus we expect the UH-011 to be just as reliable as the model it replaces.

UNIDEN has used the same highly successful, light but strong, pressed aluminium and steel sub frame in most of its recent CB models and the UH-011 is no exception to the rule.

Performance of the new rig is pretty similar to the UH-001 with the minor exception or two.

Receiver sensitivity - out of the box - was quite good at 0.28 microvolts for 12dB SINAD but, as we have often found with UH-001s, a quick 'squeeze' of the resonators on the spectrum analyser produced a narrower bandpass with an appropriate increase in sensitivity to about 0.25 microvolts.

MICRO NOISE

We found a 'micro' noise sneaking in to the receiver audio system in the 'no-signal' condition with the mute closed. In a quiet room with the volume set to average listening level, the background "tsszzinging" became an annoyance to the point where one tended to be listening for the sound.

The SQUELCH range has a low threshold of 0.15 microvolts ranging to 1.25 microvolts at the 'tight' or high end of the

scale and adequate hysteresis is available for average flutter and fade conditions.

RECOVERED AUDIO IS GOOD

We feel the recovered audio quality is a tad better than the old rig with a more gutsy sound coming from the improved low frequency audio response.

The signal strength indicator employs 4 green LEDs for low to medium strength signals and a single red LED to tell the user a 10 microvolt has arrived.

Signal levels in LEDs:

1 = 0.35 microvolts
2 = 0.50 microvolts
3 = 0.90 microvolts
4 = 1.60 microvolts
5 = 10.0 microvolts.

As with most signal strength indicators used in UHF CB transceivers, the scale is rather compressed, however, the 'S' 5 indication is an improvement on the norm.

A DAMN NUISANCE

The CAll indicator is a damn nuisance in the rig's normal operating mode.

Every time a received signal is strong enough to break the mute the 'CALL' LED lights up and refuses to extinguish until the rig is either turned off or the PTT switch is activated - a minor bug but an annoying one. This problem goes away if the TSQ (Tone SQuelch) button is pressed..... but guess what? This puts you into the QUIET mode so you can't hear a signal anyway.

On air reports verified that the transmitted audio is good.

Our regular five minute transmit test left the 011 feeling warm but unfussed with little deterioration in output power level or frequency drift.

SUMMARY

The UH-001's new styling, construction and performance is good, but, the overall picture is slightly degraded by the annoying little bugs mentioned in the report.

Keep in mind, however, that our review rig is part of a very early production run and I imagine Uniden will quickly rectify them.

The price of the unit was unavailable at the time of our testing but you should be able to buy a UH-011 for the same price as a UH-001 because they are distributed at the same cost price.

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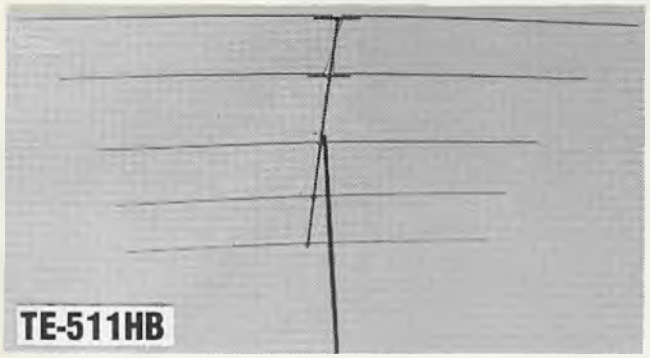
The performance of this new system exceeds even conventional YAGI-UDA DESIGN. TET-EMTRON ANTENNAS ARE MADE ONLY OF HIGH GRADE ALUMINIUM AND STAINLESS STEEL HARDWARE.



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BAND	26 to 29 MHz	GAIN	MIN. 10dBi/7.8dBd
F/B RATIO	25 dB	POWER	2 KW
BOOM LENGTH	5 M	MAX. ELE. LENGTH	5.3 M

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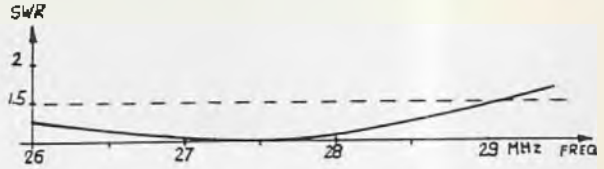
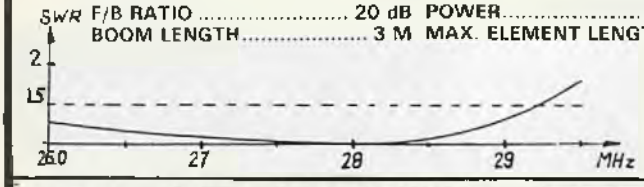


THIS NEW TET-EMTRON 3 ELEMENT DUAL DRIVE TE-311HB ANTENNA FAVORABLY COMPARES WITH 4 ELEMENT BEAMS. ITS ALL ALUMINIUM AND STAINLESS STEEL HARDWARE ASSURES LONG LIFE AND RELIABILITY.

SPECIFICATIONS:

BAND	26 to 29 MHz	GAIN	MIN 8.5 dBi/6.3 dBd
F/B RATIO	20 dB	POWER	2 KW
BOOM LENGTH	3 M	MAX. ELEMENT LENGTH	5.3 M



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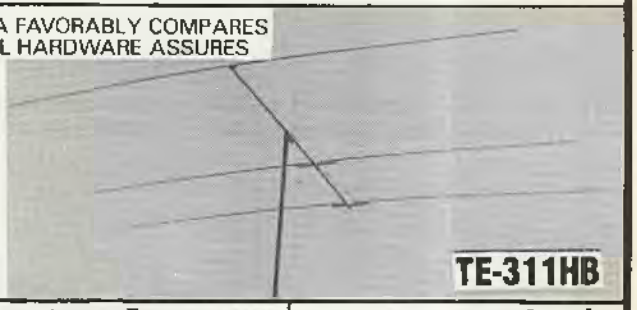

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The Listening Post

Compiled by Tony Santos, Robert Peel and Phillip Gould

Tullamarine Airport

Tullamarine Aiport lies twenty kilometres northwest of the Melbourne business precinct. A city within a city, the airport is the home of many different and interesting radio users. This is a selection of government and commercial services that can be found in the vicinity.

Ansett: 130.600, 130.650, 130.950 (AM), 461.425 ramp, 463.675 baggage
Australian: 132.650 (AM), 463.525, 463.300
Continental Airlines: 129.850 (AM), 464.400 ramp
Qantas: 131.900 (AM),166.660 Engineering, 461.100, 465.625
IPEC Aviation: 128.900 (AM) ,450.075
Singapore Airlines: 129.850 (AM), 466.625 ramp
TNT: 126.400 (AM)
Airport: Approach 124.7, 135.7 (AM), departures 118.9, 129.4 (AM), tower 120.5 (AM), SMC 121.2, 121.7 (AM), ATIS 114.1 (AM)
Federal Airports Corp: 472.575, 471.075 simplex
Airport Fire Service: 466.350
Australian Protective Service: 486.000
Customs: 489.600
Victoria Police: 468.825, 468.850, 469.375

- Robert Peel

Fast Food Frequencies

Bob Lopaka started it and here's the latest list of "fast food frequencies" used in their drive through restaurants across Australia... I like it like that!

McDonalds: 35.020/154.690, 40.430/151.020, 35.020/154.600. *(McDonalds have a variety of allocations so as to avoid interference when stores are located close to another drive-through facility)*
Hungry Jacks: 40.410/154.600
Tuckers Rest (Port Melbourne) : 40.410/154.600
Kentucky Fried Chicken (now known as KFC): 40.490/150.875.

- Tony Santos

Tuning Into Telecom

Monitoring telephone conversations is totally illegal but you can still monitor the company and people that make the phone calls possible. Telecom is Australia's biggest employer, with tens of thousands of staff in offices and exchanges scattered around the country. The following frequencies cover Telecom's VHF/UHF networks in NSW and Tasmania.

VHF

ch	btx	mtx
1	158.710	164.620

(Armidale, Bowral, Braidwood, Broken Hill, Cobar, Cooma, Cowra, Denniliquin, Dubbo, Forster, Goodooga, Gunnedah, Hay, Ivanhoe, Lismore, Lithgow, Macksville, Moree, Mungindi, Newcastle, Thredbo, Walgett, Warren)

2	158.680	164.590

(Ballina, Balranald, Bathurst, Bendemeer, Bega, Bourke, Broken Hill, Canberra, Cessnock, Cobar, Coolah, Crookwell, Darnick, Glen Innes, Grafton, Hay, Hillston, Jindabyne, Moree, Mungindi, Parkes, Qurindi, Wagga Wagga, Walcha, Walgett, Warren, Wilcannia, Wollombi, Wollongong, Ulladulla)

3	158.650	164.560

(Balranald, Bellbrook, Bombala, Casino, Coffs Harbour, Collarenebri, Coonabarabran, Gosford, Grafton, Ivanhoe, Jerilderie, Lake Cargelligo, Moree, Morrisset, Nowra, Nyngan, Orange, Tamworth, Tumut, Singleton, Yass)

4	158.620	164.530

(Adaminaby, Booligal, Bourke, Broken Hill, Casino, Carinda, Cobar, Condobolin, Cooma, Dorrigo, Eden, Gosford, Goulburn, Grafton, Grenfell, Griffith, Kempsie, Lightning Ridge, Merriwa, Mudgee, Mungindi, Moulamein, Narrabri, Singleton, Smiggins Hole, Trangie, Walcha, White Cliffs, Wollongong)

5	158.695	164.605

(Colleambaly, Corryong, Gosford, Inverell, Muswellbrook, Nelson Bay, Penrith, Tamworth, Taree, Tenterfield, Wellington, Young)

6	158.665	164.575

(Blackheath, Bourke, Broken Hill, Bundara, Kyogle, Newcastle, Taree, West Wyalong)

7	158.635	164.545

(Albury, Buladelah, Coolatai, Guyra, Moruya, Murwillumbah, Penrith, Scone)

8	158.740	164.650	(Picton)
-	159.100		mobiles, NSW-wide
-	159.400		mobiles, NSW-wide

UHF

1	500.050	510.050	Gosford
2	500.075	510.075	Dural
3	500.100	510.100	Waverley
4	500.125	510.125	Bilgola
5	500.150	510.150	Cecil Park
6	500.225	510.220	Sydney
7	500.250	510.250	Cecil Park
8	500.275	510.275	Bilgola
9	500.300	510.300	Dural
10	500.325	510.325	Chatswood
11	500.425	510.425	Chatswood
12	500.450	500.450	Hurstville
13	500.600	510.600	Parramatta
14	500.625	510.625	Sydney
--	472.100	h'helds,	NSW-wide
--	490.675	495.875	
	""	Telecom Security	
--	494.950		
	""	Telecom security	
--	500.725	510.725	
	Expressway telephones ch 1		
--	500.750	500.725	
	Expressway telephones ch 2		
--	500.775	510.775	
	Expressway telephones ch 3		

TASMANIA

ch	btx	mtx	
1	80.040	-	Hobart
2	80.280	-	Launceston
3	80.040	-	Burnie, Devonport
4	80.145	-	West Coast King Island
5	80.040	80.520	
6	80.280	80.655	
7	80.520	-	Mobile to mobile
8	80.655	-	Mobile to mobile
9	80.415	-	Hobart
10	80.310	-	Launceston
-	76.790	-	SES Liaison
-	519.975	-	Cable layers (handheld,si'ex)

CBA's monitoring team bring you the hottest frequencies from around Australia! Readers' contributions are welcome, to PO Box 344 Springwood, NSW, 2777

WHY SETTLE FOR LESS ?

Picture this... you've earned your "No-code" Novice Limited amateur operator's license, you've bought your flashy new 2-metre handy talkie, and have made a lot of new friends on your local repeater.

It's fun, but it doesn't seem that different from CB...

Later, you expand your technical skills, perhaps learn the Morse code, and experiment with other modes on other bands.

There are so many possibilities, so many directions to go, but nothing that really gets your pulse racing...

Meanwhile, back in the pages of "CB Action", Russell Bryant's scanner section reaches out with secret ears to hear the activities of ambulance, fire brigades, SES, police... this is where the real dramas take place, isn't it?

Real people in real trouble, with the professionals tackling the problems.

Exciting stuff, but even with your scanner, you're still on the outside.

Pity amateur radio doesn't get you any closer to the real action.

Stop there. It does.

Radio amateurs have a long history of assisting the professionals in times of crisis.

There are many well-known examples: the Newcastle earthquake, the Ash Wednesday bushfires in Victoria, Cyclone Tracy in Darwin... in all these cases, and many more like them, radio amateurs (and to be fair, often CBers) provide emergency assistance when the usual lines of communcation fail.

Such assistance is always needed at times like this, and radio amateurs have formed an organisation specially geared to serve this need: WICEN, the Wireless Institute Civil Emergency Network. WICEN offers professional communications support to other emergency services, such as bushfire fighters, ambulance and cave rescue squads, police etc.

As amateurs, we have equipment, frequencies, and modes of operation matched only by the Australian defense forces.

In New South Wales, WICEN is an affiliate of the Wireless Institute of Australia and the NSW Volunteer Rescue Association, but operates as an independent accredited emergency services support group (in NSW, radio amateurs may assist during emergencies only if they are members of such an accredited group).

In the event of a major emergency, WICEN can be activated to provide communications assistance, for example, intercommunication between the various services, registration of victims of a natural disaster, or as relief radio operators working under the direct control of the other emergency services.

So how do you get a piece of this action?

Richard (VK2SKY) looks at the upcoming 'no-code' amateur licence and poses a few questions - and answers.

JOIN WICEN...

The first step is to join WICEN. You do not need to be a member of the WIA to join (in NSW - other states may vary), but you do need to be a licensed radio amateur, and you must be willing to take part in several training exercises each year.

These are quite challenging and enjoyable, and let you interact directly with the real heroes of the rescue and emergency services world.

Some typical NSW WICEN training exercises are:

* Safety communications net for the Sydney City-to-Surf Fun Run;
* Cave rescue exercises at Bungonia National Park, and Jenolan Caves;
* Hawkesbury River Canoe Classic safety and race progress net;
* International Six Day Motorcycle Enduro communications net.

These exercises test your ability to pass high levels of emergency traffic, and to operate for prolonged periods under difficult conditions; sometimes, genuine emergencies develop, which require effective handling by the communications team.

WICEN conducts weekly HF and VHF nets to discuss operations: feel free to call in when your license allows! (In NSW, listen on 3.615 MHz LSB on Tuesdays at 8:30 pm, and on Thursdays at 9:30 pm on 147.150 MHz).

You can find out more about WICEN by contacting any office of the Wireless Institute of Australia, or by writing to:

WICEN (NSW) Inc., PO Box 123, St. Leonards 2065.

However, why wait for the "No-code" amateur license anyway?

You can get on the air now, and on HF!

HOW TO MASTER THE MORSE OGRE

1. Forget about the exam: if you set out with the aim of getting just good enough so you can upgrade your license and throw the key away, you're going to waste a lot of time and effort, because "just good enough" is never good enough; you'll waste a lot of money on exam fees, only to find the elusive pass just out of reach. (I failed the 10 wpm receive six times last year, until I decided to learn to read CW for the sake of having the skill. After that, I got much better at it.)

2. Put your PC to work: there are some very good instructional programs which produce Morse code and monitor how well you are learning it.

Some keep track on the characters you have trouble reading, and give you extra practice on those.

3. Find a mentor at your local radio club: there's nothing like an old hand to help you along; these guys know their

CW, and love it too, and are often more than happy to assist newcomers in learning code.

They'll quite often throw in twists like Morse abbreviations in the middle of plain text, or speed up gradually to well beyond exam speed without telling you.

Don't forget, you can pick up a lot of theory and operating tips from them too.

4. Form a syndicate: study CW with friends who also wish to upgrade.

Some friendly peer pressure can go a long way, and can help overcome the inertia that causes many to lose heart and give up after a few weeks.

Organise CW round-table contacts that are just that: around a table with Morse keys and buzzers.

5. Roll your own tapes: for those times when you are away from the radio, make up some practice tapes, using your PC.

Most programs let you type in text and convert it to Morse.

Use plain text instead of random groups - it's more interesting.

Ah, but then you know what it is you typed! Simple solution - swap tapes with your syndicate friends! Make the text simple and entertaining (jokes, funny magazine articles, etc).

6. Listen on air: computer generated Morse code is one thing - what you hear from the tape in the exam room often sounds completely different!

The solution is to listen to CW from many sources, particularly off-air.

Once you can cope with static crashes, interference, weak signals, and QLF (operator sending with the left foot!), you can easily deal with a little wow and flutter...

7. 10 minutes a day keeps the ogre away: forget about practising two hours a day for the exam in two weeks. It's exhausting, demoralising, and a waste of energy.

Ten to fifteen minutes a day will get you there just as quickly.

8. Throw away your pencil: don't write anything down! It's hard at first, but once you learn to follow the context of the story in your head, writing down the text in the exam is easy.

9. Get stuck in a traffic jam: make use of those idle moments during the day: read car rego plates, street signs, and advertisements to yourself in Morse code.

10. Ignore the begrudgers: there never seems to be a shortage of people to tell you why Morse should be dropped from the Amateur Radio license requirements.

Now, are you going to wait another ten or twenty years hoping that it might happen, or are you going to focus your energy on achieving what thousands of others have done before you?

11. Use headphones: for some peculiar reason, family members and other ordinary mortals don't seem to like the sound of Morse code echoing about the house all day long.

So spare them the annoyance: like your Walkman, these people are your friends!

12. Talk to your spouse: don't let your determination to upgrade take away from the important people in your life.

You'll pass the exams much easier if your "significant others" don't feel they'll lose you completely once you're let loose on HF!

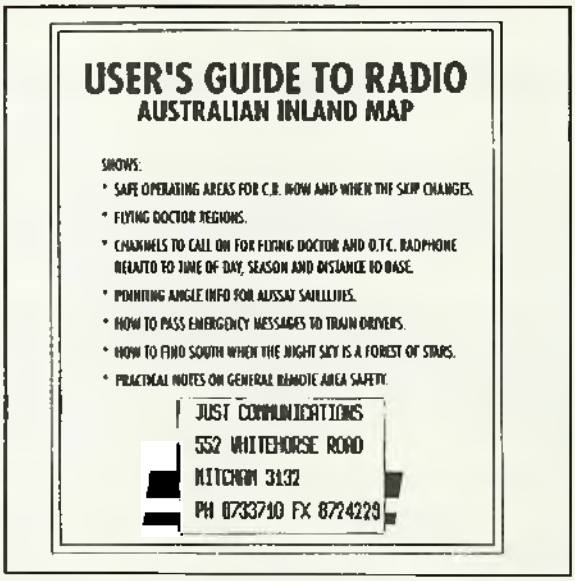
13 . Relax: you can already walk, drive, and understand spoken English: all of these activities are more complicated than Morse, but you have already mastered them.

Think of Morse as just one more thing to acomplish during a lifetime of achievements.

Good luck, stay with it and you will earn a 'real' amateur licence a great deal sooner than you think.

USERS GUIDE TO RADIO (Australian Inland Map)

Every now and again there appears in the marketplace a product that is extremely useful and doesn't cost a fortune. Such is the 'Users Guide to Radio, Australian Inland Map'.



This map is primarily designed for travellers on the Australian continent to determine the radio system (CB, UHF, HF) that will provide them with emergency communications. Being color coded, the map is easy to read and understand.

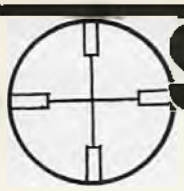
All the traveller has to do is look at the map with his intended itinerary, see the radio system that will provide coverage at a glance. It also shows the maximum and minimum ranges for CB "skip" for the 1992 winter season, so far as safety communications are concerned.

On the rear of the map are items of interest, including RFDS and OTC frequency listings, plus safety tips for outback travellers, including how to pass emergency messages to train drivers.

The author states that this map and information is the result of three years extensive travel and research and I can well believe it. The map is easy to read, clear, and provides an excellent radio reference for any inland traveller.

The Users Guide To Radio sells at $6, including p&p, and is available from:

Just Communications in Melbourne - address: P.O. Box 50, Mitcham, 3132, and Sinclair Hi-Tec Communications in Adelaide - P.O. Box 95, Clarendon, SA, 5157.



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SSB ENGINEERING . . . VOLUME 2 covers "second generation" PLL rigs, has updated information on many of the oldest rigs and includes some build-it-yourself test equipment projects. Price $17.50 $1.50 P&P.

SSB ENGINEERING . . . VOLUME 3 covers the latest PLL-ICs, has a ham radio modification section and an AM to FM CB conversion section. Price $20. $1.50 P&P.

THE CB MODIFICATION HANDBOOK covers Australia's most common CB radios. Everything from a few extra channels to full-house conversions covering hundreds of channels. 5 kHz steps, increasing power, slides etc. Price $15. $1.50 P&P.

THE CB PLL DATA BOOK is the CB modifier's Bible. This all-new international edition covers fifty specific phase-locked loop ICs, with manufacturers' cross-references. Price $15, $1.50 P&P.

THE SCREWDRIVER EXPERT'S GUIDE will enable the average non-technical CBer to locate and repair up to 95% of CB radio problems, as well as helping the advanced hobbyist to tune and modify hisequipment for improved performances. Price $15. $1.50 P&P.

CB ANTENNA CONSTRUCTION, illustated plans for quarter-wave and half-wave ground-planes, two-element quad, three-element beam, and high-performance stacked beams. Price $3 including postage.

HAM AND CB ANTENNA DIMENSIONS 130 charts covering dipoles, beams, quads, vees, triangles, and verticals. An essential reference work for any serious antenna builder, this book covers the CB band, HF bands from 160 metres to 10 metres and the 2 and 6 metre bands. Price $15, $1.50 P&P.

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IN LIKE FLYNN
(or how to DX when all else fails)

It's not my fault. Not entirely.

Half the blame lies with the local radio stations, whose abysmal identikit programming forces me to choose between new rock and rap, old pop and pap, or a mixture of the two. And don't tell me about "light and easy" - it may be a good description for a laxative, but not a modern music station.

The other half lies solely with me. I've grown just a little tired of the push-button ease of the scanning world, and after years of listening to VKG it has faded into an odd "background music" to which I can listen while I work. I'll get better soon, I know, but what I need right now is therapy, some "back to basics" spinning of the dial and straining of the ear.

You see, I've gotten back into DXing the AM broadcast band!

It's everything that could spark a young chap's interest in radio. It certainly did the trick for me some twenty years ago. The gear is cheap and in fact you probably have it already, in the form of a portable "transistor radio" or a clock radio. There's the novelty of listening to adverts for a movie theatre or brake centre or restaurant on the other side of the country. It's easy and it's fun. Yes, after twenty years it's still fun.

It's also a practical introduction to the theory of skip. The lessons you learn from the AM broadcast band are equally applicable to 27 MHz, shortwave radio and the amateur bands. Here's how it works for the AM broadcast band.

Radio signals leaving the broadcasting antenna consist of two quite distinct components, two "waves". The first is a "ground wave" which ambles along the earth's surface, following our planet's curvature until the signals weakens and fades right out. It's this ground wave which brings you music and chat from your local AM station.

There is also a "sky wave". Naturally enough, this one heads for the sky rather than along the ground, reaching up into the atmosphere and above it the ionosphere, a heavily-ionised region of clouds and gasses some hundreds of kilometres above the earth's surface. There are several layers of the ionosphere - each with their own characteristics, their own range of frequencies which they will either absorb or reflect to earth. These layers are the reason for DX.

The three main layers of the ionosphere are the D, E and F layers, D being closest to our planet's surface and F as high as 420 km above ground level. And it is the F layer which lets people from Perth listen to 2WS, or conversely lets a Sydney-sider tune to 6PM. As the sky wave of an AM station leaves our atmosphere it reaches out to the F layer, where it and all other signals below around 2 MHz will be reflected back to earth.

But there's a catch. Lying beneath the F layer is the 'D' layer, a very dense and heavily-ionised region which soaks up the low frequency signals. Signals must pass through the D layer twice - once on the way up to the F region and again as they travel back down to earth. And by the time they've made the return journey there is very little (if anything) left of the sky wave to be heard on your portable radio.

The D layer draws its strength from the sun's ionising radiation. No sunlight, so D layer. So the AM DXer waits for the earth's rotation to carry their side of the planet away from the sun and suddenly those AM sky waves come booming through, with an unobstructed path to the F layer and another clear run to come crashing back down. The other key benefit of night-time DXing is that man-made, industrial radio noise is virtually non-existent.

When you start your night-time DXing attack it's probably best to work down from the very top of the band, around 1605 kHz. True, the lower frequency signals propagate the best, and for this very reason this is where you'll find a gamut of ABC radio stations and relays - effectively the same program a dozen times over. It's a little more interesting when you start at the top end. And you can do quite well using your radio's in-built ferrite core antenna. If you find the signal a little weak then turn the radio around as if you were turning it from north to south and back again, right through 360 degrees. At one stage the signal will be noticeably at its weakest. Hold the radio at this position and then turn it a full 180 degrees, at right angles, which will take it into the position of strongest reception.

To help identify your catch, or to assist you in tuning into a particular station, you'll need to get your hands on a list of AM broadcast stations. One good reference is the World Radio TV Handbook. The WRTH is a great resource if you decide to write to a distant station to seek confirmation of your logging. If you work in a large company or government organisation, you might also want to ask your PR or Marketing Section if they have a copy of either the Margaret Gee Media Guide or the Media People directory - both of which list all Australian AM and FM broadcasters, along with all sorts of other essential contact detail for PR-types. If you smile nicely they might let you take a photocopy of the relevant pages.

The real trick to AM BCB DX is to take it easy, take it slow and enjoy yourself. Find yourself a suitable target - a strong station, one with bearable fading or perhaps one where the music or programming takes your fancy. You have to have a bit of patience in this , like so many other parts of the radio hobby. It make take a few songs until the station will ID itself, although even the adverts can give you an idea of just where you're tuning into.

If you want to log the station and try for a verification, you'll need to take some notes of what you heard and when you heard it, just to prove that you really DO deserve that letter or sticker!

Start by noting the time you heard the station. List a few of the songs played, in order; the name of the DJ, some of the advertisements you heard, and any station promos or ID's heard.

All of this is a really good training ground for DXing on any band. And even an avowed non-DXer like me finds that a spot of hunting on the AM broadcast band puts some pep back into radio - at least until VKG start playing requests!

DAVID FLYNN HAS BEEN BITTEN BY THE BROADCAST DX BUG

HERE'S YOUR CHANCE TO WIN ONE OF TWO NEW GME - ELECTROPHONE TX-4000 UHF RIGS (again !)

Ken Reynolds tested one of these just released new UHF CB rigs and wrote what for him is a 'rave review'. ...and, courtesy of Standard Communications, you can win one of them by trying your skill on the crossword. Winners will be announced in the next issue

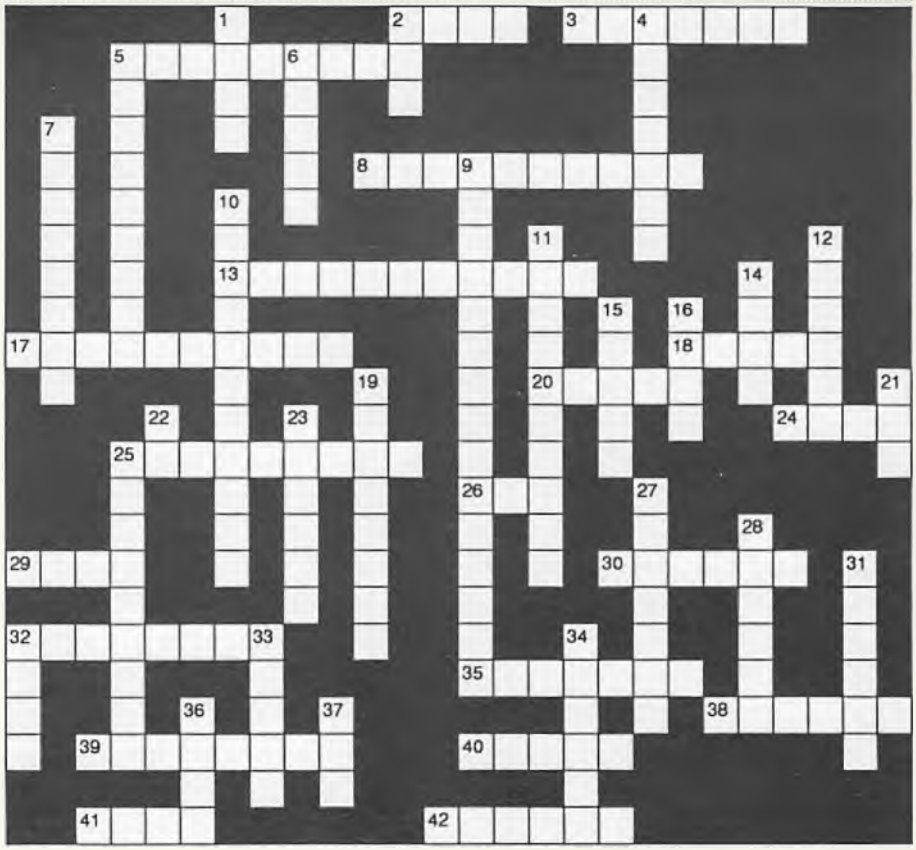
(and the solution is NOT on the following page this time around...!)

WINNERS OF A SIX ISSUE SUBSCRIPTION FOLLOWING THE CHAOTIC XWORD IN THE SEP/OCT ISSUE ARE:

M. Nash, Kinglake West, Vic
P. Wood, Brahma Lodge, SA
B. Barker, Moonah, Tas
C. Burdon, Moorook, Qld
P. Stacey, Bathurst, NSW
R. Francis, Port Hedland, WA

WIN A GME TX-4000 UHF RIG

You'll find most, but not all, the answers contained somewhere within the pages of either this or the Sept/October issue. Address your entries to CB XWORD, P.O. Box 628e, GPO, Melbourne 3001. Good luck !



CLUES ACROSS

2. A popular type of directional antenna.
3. A unique type of antenna usually found in a UHF/VHF environment.
5. This thing can be used to provide speech security - even on most UHF CB rigs.
8. The ------- is largely responsible for HF DX.
13. Where is the factory that manufactures the TX-4000 located?
17. By far the majority of mobile antennas are based on what material?
18. If you heard a DX station using the callsign AT-214 it would be operating from what country?
20. A South Australian-based CB association (init).
24. A generic name for a directional antenna.
25. A major Australian antenna manufacturer (6,3).
26. The thirty metre band is also known as the -- MHz band ?
29. A doctor's service in an aeroplane (init).
30. An AT-310 callsign would mean the operator was in what country?
32. The name of the Melbourne BBS which specialises in radio information.
35. This operator is not a Novice or a Fullcall, he's a ------ .
38. This is a fast expanding type of radio communication.
39. A generic name for a collection of scanning frequencies?
40. The Dept of Transport and Communications is referred to as (what?) in CBA (inits).
41. CBA's advertising manager's first name is the missing word.
42. The 27MHz band is also known as the ----- metre band?

CLUES DOWN

1. The surname of the contributor who supplies our HF Utilities column?
2. The Q-Code letters to denote a low-power transmission?
4. The 999 UHF rig is made by this company.
5. The UH-001 CB is also known as a Uniden ------- ?
6. What word did Ken Reynolds use to 'sum up' his review of the TX-4000 in our last issue?
7. If you heard an amateur using a VK3 prefix he would be in what state?
9. An antenna which radiates a signal equally in all directions is called this (4,12).
10. To obtain an amateur licence you need to pass theory, morsecode and --------?
11. In connection with DX groups, the letters AT stand for what (5,5)?
12. A pretty basic type of antenna.
14. (Word ?) Services produce QSL cards.
15. Both a CB rig and a snake.
16. AN IC-781 transceiver is made by this company.
19. If a scanner is not base or mobile it is probably a ------ ?
21. What three letters are associated with Electrophone?
22. Are CBers allowed to operate on the 17 metre band?
23. The Pearce-Simpson UF-2020 has a (word ?) mountable panel.
25. A requirement for an amateur licence which stops many people dead in their tracks (5,4)?
27. If you went to buy an AR2800 you would be buying a ------ .
28. This, the best known of the Chinese news agencies is known as the X---- News Agency ?
31. Dick Smith Electronics markets a lot of CB rigs manufactured by this company.
32. A CBer's term for DX.
33. In what city is Rob William's P.O. Box located?
34. One word which sums up the 'Radio G'day' illegal operation?
36. Many antenna 'formers' are made of this material.
37. Q-Code for "please stand by".

The solution to this crossword will be published in the next issue along with the winners.

NAME.....

ADDRESS.....

.....'PHONE.....

AUSTRALIAN UHF REPEATER LIST

NOTE: Corrections and updates may be sent to: CBA Repeater Listing, PO Box E160, St James, NSW 2000.

ACT

Canberra	2/32
Canberra	8/38

New South Wales

Armidale	4/34
Barraba	6/36
Bathurst	8/38
Bega	6/36
Belbora	1/31
Binya	3/33
Blue Mountains	2/32
Bombala	8/38
Booral	7/37
Bowral	6/36
Braidwood	
Brewarrina	1/31
Brindabella Ranges	7/37
Broken Hill	4/34
Broken Hill	7/37
Buladelah	7/37
Casino	6/36
Cobar	8/38
Coffs Harbour	6/36
Coolah	6/36
Cooma	4/34
Coonabarabran	4/34
Corowa	2/32
Corowa	5/35
Corwa	7/37
Deepwater	5/35
Deniliquin	1/31
Dungog	3/33
Eden	2/32
Glen Innes	7/37
Gratton	8/36
Grenfell	1/31
Gundagai	7/37
Gunnedah	2/32
Guyra	1/31
Warden	1/31
Hampton	1/31
Hay	4/34
Inverell	2/32
Jindabyne	1/31
Junee	5/35
Kanong	8/38
Lavington	4/34
Manilla	3/33
Monkey Hill	6/36
Mt Lambie	2/32
Murrirundi	3/33
Muswellbrook	4/34
Narrabri	2/32
Narranderra	8/38
Narromine	5/35
Narromine	6/36
Newcastle	1/31
Newcastle	2/32
Newcastle	5/35
Newcastle	6/36
Nundle	7/37
Orange	3/33
Port Macquarie	2/32
Sydney	5/35
Sydney (south)	1/31
Sydney (west)	3/33
Sydney (outer-west)	4/34
Sydney (north)	7/37
Tamworth	4/34
Tenterfield	3/33
Tumbarumba	3/33
Tumut	6/36
Tweeds Heads	4/34
Wagga Wagga	1/31
Wagga Wagga	5/35
Walbundrie	2/32
Walcha	2/32
Walcha	6/36
Walcha	8/38
Warrumbungles	1/31
Wingham	1/31
Wilcannia	1/31
Wollongong	8/38
Northern Territory	
Bushy Park	1/31
Darwin	1/31
Erldunda Station	3/33
Katherine	2/32
Maryvale Station	4/34
Mt Swan	2/32

Queensland

Alpha	2/32
Atherton	8/38
Amiens	8/38
Ayr	3/33
Barcaldine Downs	1/31
Bathurst Heads	1/31
Bauhinia Downs	4/34
Biloela	7/37
Blackall	8/38
Blackwater	6/36
Brisbane	1/31
Brisbane	5/35
Brisbane	7/37
Bundaberg	4/34
Bundaberg	7/37
Cairns	3/33
Chinchilla	8/38
Clermont	6/36
Clermont	7/37
Crows Nest	6/36
Dimbulah	6/36
Dirranbandi	8/38
Double Island Point	3/33
Edward River	3/33
Emerald	8/38
Gladstone	6/36
Gold Coast	3/33
Goondiwindi	4/34
Gympie	2/32
Gympie	5/35
Gympie	7/37
Hervey Bay	8/38
Hughenden	1/31
Ingham	2/32
Inglewood	1/31
Innisfail	1/31
Ipswich	4/34
Jericho	4/34
Kilcoy	3/33
Lakeland Downs	2/32
Longreach	3/33
Mackay	3/33
Mackay	6/36
Marlborough	2/32
Maryborough	6/36
Maxwelton	2/32
Miles	6/36
Monto	3/33
Moranbah	4/34
Moura	1/31
Mt Isa	1/31
Mundubbera	6/36
Murgon	7/37
Quilpie	2/32
Rockhampton	1/31
Rockhampton	4/34
Roma	1/31
Springsure	3/33
Sunshine Coast	6/36
Sunshine Coast	8/38
Tambo	6/36
Taroom	2/32
Thargomindah	6/36
Toowoomba	2/32
Toowoomba	4/34
Townsville	1/31
Townsville	4/34
Wavell Heights	2/32
Warwick	1/31
Wide Bay	1/31
Yaraka	7/37

South Australia

Adelaide	5/35
Angaston	4/34
Blinman	3/33
Carrietown	1/31
Ceduna	1/31
Clare	7/37
Cleve	2/32
Coonalpyn	6/36
Coppudurba Hill	1/31
Hawker	7/37
Kangaroo Island	4/34
Manum	8/38
Mt Bryan	8/38
Mt Gambier	5/35
Mt Gambier	7/37
Myponga	2/32
Naracoorte	4/34
Orroroo	2/32
Port Lincoln	8/38
Port Pirie	4/34
Renmark	6/36
Snowtown	6/36
Tarcoola	6/36
Wilkatana	8/38
Yorketown	7/37

Tasmania

Burnie	8/38
Central Highlands	7/37
Devonport	1/31
East Coast	6/36
Flinders Island	1/31
Hobart	1/31
Hobart	5/35
Launceston	2/32
Launceston	6/36
Midlands	4/34
North East Coast	3/33
North West Coast	4/34
North West Coast	6/36
Sandfly	2/32
West Coast	2/32

Victoria

Alexandra	1/31
Ballarat	2/32
Ballarat	5/35
Bairnsdale	7/37
Beech Forest	3/33
Bendigo	4/34
Cavendish	8/38
Currajung	4/34
Echuca	6/36
Euroa	3/33
Falls Creek	3/33
Foster	6/36
Geelong	4/34
Halls Gap	6/36
Hamilton	5/35
Harcourt	8/38
Hawkesdale	4/34
Horsham	3/33
Kerang	2/32
Mansfield	2/32
Melbourne (north)	1/31
Melbourne (metro)	3/33
Melbourne (metro)	5/35
Melbourne (south)	7/37
Mildura	3/33
Moe	2/32
Mornington Pen.	8/38
Mortlake	7/37
Mt Cann	8/38
Mt Concord	6/36
Mt Delegate	3/33
Mt Terrible	8/38
Myrtleford	8/38
Penshurst	1/31
Shepparton	7/37
St Arnaud	1/31
Swifts Creek	1/31
Talangatta	7/37
Wangarrata	6/36
Waubra	7/37

West Australia

Albany	3/33
Augusta	7/37
Bencubin	2/32
Boyup Brook	4/34
Bunbury	2/32
Carnamah	2/32
Carnarvon	2/32
Coolgardie	7/37
Darkin	6/36
Denmark	1/31
Esperance	4/34
Kalgoorlie	2/32
Kambalda	1/31
Katanning	1/31
Kellerberrin	1/31
Kulin	4/34
Lancelin	4/34
Mandurah	7/37
Manjimup	6/36
Margaret River	6/36
Meekatharra	1/31
Merredin	2/32
Mia Mia	1/31
Mt Manypeaks	6/36
Mt Barker	5/35
Mt Barrow	7/37
Mt Saddleback	1/31
Mt Solus	4/34
Nannup	2/32
Perth	1/31
Perth	3/33
Perth	5/35
Perth	8/38
Ravensthorpe	8/38
Stirling Ranges	7/37
Wickham	1/31
Wongan Hills	8/38
Wyalkatchem	6/36
York	7/37

Lismore

UF2020

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