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EDITORIAL

Technology...we live practically every second of our lives cheek by jowl with modern technology. It is part of our world, a constant companion taken for granted.

Perhaps the area of our lives in which technology has made the greatest impact is electronics, and we amateurs are more acutely aware of this than many other sections of the population. Take just one example.

Most people dial a number on their mobile phones without any thought about what's happening or how mobile phones work at all. We at least have some understanding of the technology that enables these little modern miracles of communication to function, because radiocommunications is of intrinsic interest to us. Twenty years ago we watched episodes of "Star Trek" and smiled as Captain Kirk whipped out his communicator to talk to the ship from the surface of a strange planet. Today we open up our Motorola flip-phone and do exactly as Captain Kirk did all those years ago, and still we smile. There are some who could advance a pretty good case that we, too, are on a strange planet.

Technological advances have their price, and so it is with today's electronics. The in-

In This Issue:...

WANTED!

One of our newly-qualified full calls, Dominic (VK2SX), is seeking old copies of "Amateur Radio" - for what diverse purposes he has not as yet revealed. If you can help him please contact him via all or any of the usual methods (which I assume means 2m, 70cm, HF, packet, RTTY, email, snail-mail, phone, mobile phone, whatever. You might even see him at the next meeting).

Coming Events:-...

1. **The Gosford Field Day** is coming up on Sunday 22nd February. The plan is to hire a bus to take interested members up and back. To reserve your place we need a $10 deposit. Usually the trip up and back is about $18-20:- you couldn't do that on your own, even the fuel would cost more! Be early.

2. **No club meeting in January** BUT there will be a committee meeting on the **2nd Tuesday** in January - just to be different.

3. **The next IARS meeting** will be on February 10th at the usual venue. You need a relaxing meeting after the hectic rush of the Festive Season and the hurly-burly of the New Year, so be there for the first meeting of 1998.

creasing use of VLSIs, surface-mount components and proprietary ICs gives us very reliable equipment but there is down-side... the repairability of such equipment is now open to question, and this implies another problem.

The ubiquitous mobile phone yet again serves as an example. As it happens I used to have two identical digital mobile phones. Because I rely on them for my daily business communications it made good sense to have a spare and since the SIM card is the key to network access, in practice a user can have as many digital mobile phones as he or she likes.

One of these phones has been very troublesome and has failed in exactly the same manner on five occasions. The repair is always the same - the GSM module is replaced. Four times under warranty, once as a paid repair - and a damned expensive one it was too. For a hundred dollars more I could have bought a brand-new one.

The failure mode is sudden and has no warning. The unit refuses to receive using its internal antenna. Stick it into the vehicle hands-free kit and it works fine. You'd diagnose this as a simple failure of the connection between the internal antenna and the receiver board - and you're quite right - but apparently it is impossible to repair the unit because the surface-mount components are too densely packed and the circuit board itself is so thin and flexible it can't be worked on. So the whole module is replaced - only to experience the same failure some months later. I am not amused by this situation partly because it is inconvenient and because it illustrates the problem I alluded to earlier.

I believe we are now losing the last generation of technicians trained to get down to component level on a circuit-board...technicians who could actually locate a failed component, haul it out and replace it. As fewer and fewer field-repairable circuit-boards are made, the skills of fault-finding will become progressively eroded until a technician is merely a "Board-Jockey" and users of communications equipment will become mere button-pushers with no real understanding of the communications systems and their structures (and therefore their strengths and weaknesses and how to engineer a way around problems). It has already happened in the area of maritime communications and I have every reason to believe it will happen in other areas. It is a trend I do not particularly like although I am quite prepared to admit it does offer economies in terms of repair time and cost - provided enough spare boards/modules/whatever are held ready for immediate use and enough service centres exist to effect timely repairs. In some situations that is a big ask.

Timely, cheap repairs are one thing, loss of skills and technical knowledge are another. I dare say a lot of this trend has to do with "Economic Rationalism" - a term I think is rather mis-named. I prefer to call it "Economic Fundamentalism" and in some ways it bears striking similarities to its religious counterpart. Its adherents pursue it with a zeal which is sometimes downright alarming.

I vividly recall a television interview with one of the economic advisers to the Treasury in which he was asked whether the tarrif reductions leading to closure of what was left of the Australian shoe-manufacturing industry and consequent loss of jobs caused him any concern. His reply was delivered completely deadpan; "people will be able to buy cheaper shoes". The logical next question - "what if people who are out of work can't afford shoes no matter how cheap they are?" - went unasked but I have no doubt the economic rationalist would have had something equally glib by way of an answer.

It was the total lack of any compassion in the man which worried me. Here was a functionary for whom people didn't exist as individuals, they were just numbers to be entered into equations, factored into predictions and used as cannon-fodder to test someone's pet theory about global economics. Real people didn't matter, statistics did. We should bear in mind similar men, unaccountable to the populace, daily plan other experiments in which people are just statistics. Governments and their bureaucracies have never hesitated to see individuals as expendable and a number of the ills of our

modern society can be sheeted home to these modern-day Fabians.)

Today it seems technology and economics march hand in hand although which one leads and which one follows is open to debate. Over the past two decades it has been something of a double-edged sword. Certainly we enjoy a standard of living which is the envy of many of our near neighbours, although it has slipped somewhat compared to some other nations with whom we once compared favourably. But technology has also cost many of us our jobs and we are seeing a limit to the number of times a worker can - or will - retrain. Economists (and politicians) promised new jobs in so-called "sunrise industries", especially in the area of information technology. I'd like to know where these new jobs all went. Most of them seem to have been exported overseas well before they ever looked like taking root here. It is time, perhaps, to recall a definition: "An economist is to the economy what a weather forecaster is to the weather."

What has all this to do with amateur radio anyway? The answer is by way of an observation. I believe amateurs are one of the few remaining repositories of technical skill at component level, just as we were historically the first. The nature of our hobby more or less forces us to keep these skills alive and for this we have to thank those for whom the term "home-brew" means something other than self-made foaming refreshment of a liquid variety. Few of us have the inclination to make a complete HF transceiver (for those who do the Heathkit range of DIY kits provide ample outlet) but any exercise we get building, for example, an interface between two items of equipment or repairing a faulty item or whatever is time well-spent - it preserves this skill and makes us inventive.

For example, an amateur had no circuit for a RTTY modem to drive an old Siemens M100 so he designed one, working from first principles. It wasn't sophisticated but it was logical. The modulator used free-running 555s to generate the tones. Passive (and lossy) R-C filters turned square waves into sine waves. Two 741 op-amps amplified them to mic input levels for the transceiver and a toggle switch selected transmit or receive. The demod was just an active bandpass filter in front of a pair of 567 tone-decoder ICs set for Mark and Space frequencies, the outputs of which were converted to CMOS logic levels and fed to an XOR gate on the simple principle that you have either Mark or Space but not both or neither. This drove a salvaged 2N3055 which keyed the loop. The unit was built on two separate circuit boards so each module could be tested on its own for easy assembly and fault-finding. In a case with a few LEDs to indicate Mark, Space and Power, with the T/R switch on the front it worked very nicely. The cost of the project was minimal; mostly parts literally out of the junk-box. It's just one example of an Australian ability to improvise which used to be endemic within our society and reached perhaps its zenith amongst our soldiers during two world wars. Now it is systematically being destroyed, all in the name of economic rationalism.

What we build may be simple, as above, or outstandingly complex. It does not even need to have a direct relationship with amateur radio, just as long as we keep using those hard-won skills. While ever we can still buy discrete components, etch and drill a circuit-board and use a soldering iron, we are helping preserve what is now a dying art - the art of the technician. How long we can keep it alive depends partly on us and partly on the electronics industry itself. When conventional components are in such short supply they become too expensive to purchase, then we too will have to make the switch to surface-mount technology. For some this will be possible - with a bit of an investment in basic equipment - but for those of us who are of advancing years, the demands on our eyesight and manual dexterity may be greater than we can realistically manage.

When you proudly show your home-made equipment to your sons, grandsons, or some interested group of young people, don't be too surprised if they find it hard to believe you made it yourself. The concept of making something yourself may be difficult, even impossible, for them to understand. When that happens, yet another small fragment of self-sufficiency will have slipped away, silent and unmourned, from the Australian identity.

LINUX and Ham Radio.

Amateur radio is well served with applications which are MS DOS-based software. Many TNCs, for example, interface to computers via DOS. However, for those curious souls with a desire to use a different operating system there is a non-DOS alternative - a shareware Unix-clone called Linux.

Just exactly what is Linux and what does it have to do with amateur radio? First things first. Linux is an operating system which is functionally identical to Unix, itself a venerable OS which has proved sufficiently durable to have survived and be thriving amongst mini-systems, mainframes and workstations in colleges, universities and large corporate organisations.

What makes Linux different is the way it evolves. Development is a co-operative effort by many hundreds of hackers (in the noblest sense of the term) scattered throughout the entire world. The Linux kernel is therefore a constantly-evolving entity. As soon as a new device is released, somewhere a Linux kernel hacker sets to and writes a driver or kernel patch to enable use of the new device. When someone reports a bug in the kernel or an application, Linux hackers everywhere start writing patches to eliminate it. They contribute them via the internet and voila!...Linux continues to evolve, strengthen and attract a growing army of users.

Unlike MS-DOS, there are several flavours of Linux available, at very reasonable prices. The two most common are Red Hat Linux and Slackware (by Volkerding, Reichard & Johnson), Slackware 96 being the most recent version. A full installation from the CD-ROM fits easily onto a 540Mb partition with room to spare. The easiest way to get Linux is to buy a book on it (there are several and they're all good) and install from the CD-ROM which accompanies it. You'll find installation instructions in the book plus a number of chapters on some of the features of Linux. If you're new to Linux these are vital. If, on the other hand, you're an experienced Unix user, you'll find Linux and Unix are virtually indistinguishable - except in price. (Did you know Unix is the OS of most of the larger machines which form part of the Internet? Of course you did!)

An OS is not much use on its own and that's where ham radio comes in. On the Slackware 96 CD-ROM there is a docs directory and in it are two documents, HAM-HOWTO and AX.25-HOWTO. HOWTOs are a tradition in Linux and there is an official HOWTO maintainer for each document, with with an email address and sometimes a snail-mail one as well. The HAM-HOWTO and AX.25-HOWTO in Slackware 96 is maintained by an Australian, Terry Dawson (VK2KTJ).

In the HAM-HOWTO you'll find a list of downloadable amateur radio software developed for, or ported to, Linux. The range of what's on offer is wide. Predictably a lot of it is to do with interfacing computers to radios; Packet is quite well represented. There is shack automation software - logkeeping, control of transceivers, rotator control and so forth. There is software specific to particular rigs; a program to control the Yaesu FT-890, for example. JNOS and TNOS are available. Software for a Linux BBS message Gateway is available. There are programs for Morse code, Amtor and Pactor, slow-scan TV, PCB design, circuit design and simulation (analogue and digital), a software oscilloscope and even a software spectrum analyser. A lot of them are alpha or beta test versions, but there are notes as to the stability, status and bug-reporting procedures for just about all of it. Naturally this software assumes you have the right sort of ham radio hardware (TNCs etc) to enable it to be used.

Contributions to the Linux project come from all over the world and are being posted via the Internet all the time - both additions to the Linux kernel itself as well as special-purpose software. By convention they are written in C and the source code is also supplied; it's a very sound and strongly-held Linux tradition. Development is from the "grass-roots" up - not from the top down.

Linux is a true multi-user, multi-tasking OS. It too has a windows-style interface, known as the X Windows System or just X. (A point of etiquette; it is **never** called X Windows. To do so displays

ignorance.) Setting up X (the Linux version is XFree86) is potentially tricky; the process requires you know your monitor and video card's exact technical specifications. X is very hardware-specific and it is quite possible to overdrive the scanning coils of the monitor and literally blow it up - real flames, real smoke and a real repair bill!

Once you are in X, you can launch applications until you fill up memory - and the more memory you have the better Linux likes it. 8Mb works. 16Mb is better. 32Mb is fine, 64Mb is just great. Because there is no 640Kb low-memory limit under Linux, the OS can see every single byte of RAM, up to the addressing limit of the microprocessor. With a 486 that's a lot. With a Pentium it's a lot more. The result is Linux can run many, many processes and applications simultaneously, without crashing. Try to exceed the memory limit and the application simply won't load...the OS remains stable and all previously-loaded applications just keep right on running. Want to run a Packet window, a text-editor, a calculator, a clock, listen to a CD, use a spreadsheet, look at a fractal image as it is constructed, run the line printer daemon, the network daemon, the system logging daemon, the login daemon and a whole bunch more, all at the same time? Fine. Linux will do it; no crashes, no drama. A typical installation runs 33 processes in the background before any X applications are started, and users typically run 6 or 7 of those simultaneously. Try that under Win95 or 3.11! By the way, you can turn off your shadow RAM as well - under Linux, shadow RAM is wasted RAM.

Because it is a genuine multi-user OS, Linux has a very different flavour to Windows or DOS. You must log onto the machine after it boots, otherwise you simply won't get anywhere. You must have your own user name and home directory where your files reside, and you may find your access to other files that you don't "own" severely restricted - if not completely forbidden. This is tied up with the issue of file permissions - who can do what with what sort of thing. As a user you will probably have a password to allow you to gain access to the system and your files. You are just one of many potential users which the OS will recognise and handle. Different to DOS and Windows? Oh yes, very different! Remember, this mimics an OS designed for mainframes, not PCs.

There are no discrete disk drives to log onto under Linux - at bootup the whole collection of fixed mass-storage devices is examined and mounted as one filesystem. The boot process is interesting, and informative but rather lengthy. Each hardware device is polled, identified and reported on. Port addresses for devices are returned with the device status. The filesystem partitions are checked and the integrity of the entire filesystem verified - if "dirty", Linux will rebuild it so it is "clean". Linux can also (optionally) see some or all of your DOS partitions as you boot and incorporate them into the filesystem. That means you can reach into a DOS partition and copy text files into the Linux filesystem, filtering them for unwanted characters as they go. The trade is one-way only - DOS can't see the Linux partition although DOS FDISK can and correctly reports it as a non-DOS partition.

Like most multi-user systems, Linux uses a "shell" (AmigaDOS called it the Command Line Interpreter or CLI, in DOS we just call it the DOS prompt) and you can have several shells running simultaneously. Think of them as virtual terminals in which you type commands and you've got the right idea. Under X each shell will occupy a re-sizeable window and you can "park" it anywhere. A single click on the mouse button inside the shell window and it's active. X (XFree86 in Linux, remember) has no fewer than six contiguous window areas and you can move any application window between them - handy if you want to park an application in its own window somewhere out of the way but where you can still use it. You can move freely between these six window areas. A small graphic in the lower right corner of each window shows you which window area you are in - a sort of map. X is really neat, and the Slackware Windows Manager has a Win95 look about it which is no coincidence. Windows NT v4.0 has the same look, once again not a coincidence.

Remember the cluster-size problems with large DOS partitions and the slack-space it causes? Well, Linux uses disk space in units called inodes for file storage; they come in just three sizes - 1K, 2K or

4K. You choose the size at installation. Result? Linux stores little files as efficiently as big ones - far less wasted disk space.

What about floppies? No problem, just a point of procedure. If you place a floppy into a drive, the filesystem won't know it's there until you mount it into the filesystem. The MOUNT command does this, attaching the new device to a specified directory (called the mount point). Once mounted, the floppy (or removeable hard-drive, CD-ROM, Jaz drive or whatever other removeable device you want to use) is now part of the filesystem. To physically remove the device, unmount it (using UMOUNT) first before you remove it! Once unmounted, the disk is no longer visible to the filesystem - even if you leave it in the drive.

Another useful thing under Linux is Script files. These are pretty much the same as Batch files under DOS, but they are not immediately executable until you make them so. For example, making a floppy useable under Linux involves first formatting it and then creating a filesystem on it. Can't recall the commands? No problem...write them into a script file with a name you can remember, then make the script file executable. Now you can format a floppy under Linux with your very own command. To see what I mean, here are the Linux commands to format a 3-1/2" 1.4Mb floppy and create a Linux filesystem on it:-

fdformat /dev/fd0H1440 (that formats it)

mkfs -t ext2 -m 0 /dev/fd0H1440 1440 (that creates the filesystem)

No wonder you couldn't remember the commands! Using a text-editor these could all be made into an executable script file called something really cryptic like "format_floppy" - what could be easier? By the way, you make it executable with the CHMOD command, thus:

chmod +x format_floppy

Okay, Linux is an interesting OS and there is amateur radio software available via the Internet for it. What's the down-side?

1. Killer applications like MS-Word, Excel and so forth haven't been ported to Linux - and don't hold your breath waiting for them, either. There are excellent technical writing packages (Tex being one) but they are not WYSIWYG and usually require post-processing for formatted printing. They work fine; many textbooks are written using them. One of the most popular text-editors is EMACS which has been ported to just about every OS that ever existed. Other text-editors include vi, Jed, Joe and Jove which work very much like EMACS. There are spreadsheets and databases, but often you have to download them from Internet sites and de-compress them as well. Linux has all the tools necessary for this, including full TCP/IP support. You select how much of it you want to install when you set up Linux initially from the CD-ROM. (Yes, there are games as well - for the kids, of course!)

2. Erased files in Linux are really gone - there are no unerase utilities.

3. Filenames can be long - almost a sentence long, and (like DOS) there are some characters you don't use in filenames, but (unlike DOS) they are case-sensitive.

4. Linux commands can be cryptic - groff, grep, chown, chmod, troff. The sound of a dinosaur eating? No, just a few common Linux commands. Many are similar or the same as DOS (which borrowed them from Unix in the first place) so it's not as bad as it seems. The X Windows System helps a lot, especially with file management. It has a number of good file managers.

5. Linux commands accept wildcards and can be piped to other commands - use extreme caution, especially when deleting files. Linux is very literal; it has no DWIM ("Do what I mean!") capability.

6. Linux does not delete interactively - unless you specify it. In less than a heartbeat a mis-typed delete command can delete an entire directory - or the whole filesystem - with clinical impartiality.

Don't say I didn't warn you! You can get around this by defining the command with the iteractive switch enabled and giving it a new name via the "alias" command - very useful!

So, do you get rid of MS-DOS, Win 3.11 or Win95 and install Linux instead? No - keep them but find a spare half-gig partition and install Linux in addition to your other OSs. If you use a floppy to boot Linux (highly advisable) then you'll have no problems. Boot from the floppy and your machine becomes a Linux computer. Leave the boot floppy out and it boots DOS or Windows, just like it always did. Remember to read the book before installing! If you want to see what your hardware can do without the baggage of DOS or Windows, give Linux a try.

1985...More Electronic Nostalgia & Trivia...Do You Recall These?

Collins Avionics (a world leader in military and civilian avionics) announced a new type of gyroscope which was not mounted in the traditional gimbal system but was rigidly attached directly to the airframe of an aircraft. Although still using a rotor, acceleration sensing was achieved by piezo-electric elements mounted on the rotor itself. In the absence of any accelerations the sensors give a steady DC output. When an acceleration occurs, an AC signal is superimposed on the DC one. Four sensors - two mounted along the axis of the rotor and two mounted perpendicularly, detect motion in two directions. A second gyro, mounted at right angles to the first, allowed for motion sensing in the third direction. One of the great advantages was the comparatively slow rotor speed - about 3,200 RPM instead of the usual 24,000 RPM of conventional gyros. This permitted much greater bearing life. It's not quite the laser-ring gyro, or the triple-laser Inertial Reference System as used on the Boeing 747-400, but it was quite an advance. Ships still use the conventional gyro and we have yet to see any marine implementation of such advanced technology.

Engineers in Britain responded to complaints from Australian Post Office telex operators complaints about neck, shoulder and wrist pain from using conventional QWERTY-type keyboards by designing a new keyboard layout. I don't know how many times someone's redesigned the layout of the typewriter keyboard but I'm beginning to suspect it's probably more times than I've had hot dinners! This may come as a surprise, but the original reason for the QWERTY layout was to slow down typists back in the days when all typewriters were heavy, clunky mechanical things in which the type hammers would jam if the typist went too fast! There is still plenty of scope for redesigning the layout of the keyboard. With 101 keys, there should be something like 101 factorial (101 times 100 times 99 times 98.....times 2) ways of laying it out. We'd print the actual number except we can't afford to cut down a major deciduous forest to make the paper necessary to print all the digits. You'll just have to take our word for it. For those of us used to QWERTY, altering the layout seems like an exercise in re-inventing the wheel and having a furious argument about what colour it should be. Telex itself is almost extinct due to the ubiquitous fax machine - and, more recently, email - assuming an increasingly dominant role in business communications. Anyone who gets RSI from using a fax machine is surely sending a lot of faxes!

You know those destination displays at the front of Sydney buses - the ones which are composed of a few hundred little yellow and black "eyes" and spell out the destination and number of the bus? Well, back in 1985, when they were trialled by the then Urban Transit Authority, they cost a mere $11,000 each! All that money and I'll bet within a week every display had a few "eyes" that didn't work. Still, they must have been better than anything else because the latest buses still use the same system. Before this technology was introduced it required three fabric scrolls, each with a capacity of about one hundred destinations, to do the same job - and a bus driver with an encyclopaedic knowledge of the routes to make sure he had the correct scroll in use.

Telecom phased out the old carbon microphone in its telephone handsets in favour of a

newly-developed unit using a moving-coil mic and a preamplifier. Frequency response of the capsule was 400Hz to 5Khz. To guard against RFI the plastic housing was coated with a nickel-filled resin which was electrically connected to one of the wires of the unit and the aluminium front cover. The carbon mic had been in use since the first days of the telephone but was a high-maintenance device. The lower maintenance costs of the new unit more than offset its initial higher purchase cost. Initially there were a few teething problems but they were rapidly dealt with and the new device has been standard in phones ever since.

The electronic speedometer became a reality when VDO announced a universal model for commercial vehicles fitted with a universal signal generator. The device used a Hall Effect transducer to drive the display unit and claimed better than 1% error throughout the range. Conventional cable-driven units usually had about 3% error at their most accurate point and it increased either side of it. I have made known my feelings about motor vehicle instrumentation and presentation on previous occasions so I shall refrain from labouring the point any further.

Apple introduced its high-performance Macintosh with 512Kb of RAM, a considerable step up from the 128Kb systems it had started the Macintosh line with. Another computer which made an appearance during 1985 was Commodore's Plus/4. If they got it spectacularly right with the the 64, then they got it spectacularly wrong with the Plus/4. The idea was good - a computer with ROM-based word-processing, spreadsheet (with graphic abilities) and database as well as BASIC, 64K or RAM (60K useable) but the Plus/4 was a flop and few these days will even admit to owing one. More successful, for a few years at least, was Amstrad's CPC 664 which was advertised as a business system. It ran AMSDOS or CP/M and used the Panasonic small floppy disk rather than the Sony-developed 3-1/2" disk. The machine worked well enough but became extinct within a few years. Other computers were becoming extinct, too. The Coleco company announced it was abandoning further development of its Adam computer in favour of a much lower-tech product that outsold just about every other toy that year - the Cabbage-Patch Doll! They did rather well out of them for a while. An exciting new computer was the Bondwell 14 - a transportable 8-bit machine which ran the industry-standard CP/M operating system, had two drives, an inbuilt monitor and was a pretty capable machine. Any software that ran under CP/M ran on this machine, and that meant some very famous names like Wordstar and Visicalc to name just two. The machine could also read disks from Kaypro, Osborne and Spectravideo computers which was a damn smart idea.

Yaesu unveiled a new 2m handheld in the FT-703 which was hailed as "tiny" (but would be huge compared to the latest from the same company today). It was the "no-frills" handheld for about $450. If you wanted the one with all the bells and whistles then you bought the fully-synthesised version which cost a whopping $20 more than the FT-703. A choice of different battery packs gave the option of longer operating time. They also introduced a pair of almost identical 2m mobile rigs, one high power unit (45W) as the FT270RH and its lower power brother (25W), the FT270R. At about $700 and $650 respectively they were good value. Yaesu rigs had a well-earned reputation for reliability and performance. Dual-band VHF/UHF enthusiasts could buy the FT2700RH for just $950. I seem to recall these were popular with OSCAR enthusiasts.

A new format had emerged in the domestic camcorder arena - Sony's 8mm videotape. It was radically different and much, much smaller than the existing Betamax and VHS formats. The camcorder used a new solid-state image sensor called a charge-coupled device (CCD) rather than the conventional image tube such as a Plumbicon or Saticon. The techniques of recording on tape were also new, dispensing with the linear control track and linear audio tracks and using a technique called depth-multiplexing where the audio tracks are recorded under the video tracks using a different azimuth to prevent cross-talk. Pilot tones were used in a special sequence to assume the role normally carried out by the control track. What prompted Sony to introduce this new format was the

continuing decline in sales of their Betamax system. The pictures were marvellous and the format had sufficient development potential to spawn Hi8, an industrial-grade analogue acquisition format still widely used today. Only now is it yielding to the compact digital formats of DVCPRO and DVCAM.

The Federal government began implementation of the HACBSS service (Homestead & Community Broadcasting Satellite Service) with the launch of two AUSSAT satellites, AUSSAT-1 and -2, and the adoption of the B-MAC (a variant of the Multiplexed Analogue Component) system for colour television transmission via the satellite service. Previously, remote viewers had received television via an ABC service transmitted via Intelsat IVA but with the successful launch of the two Aussat birds this ceased. B-MAC offers considerable technical advantages for satellite transmission, multiplexing the luminance and chrominance components and removing the requirement to transmit a colour sub-carrier signal, a colour burst signal and even the line sync pulses, leaving the 11uS blanking interval free to carry something more useful. Special syc codewords in lines 2 and 315 allowed the sync to be reconstituted, and allow encryptation by subtle alterations to the timing. The audio is multiplexed, digitally compressed and transmitted at video rate in this interval, the process reversed in the receiver/decoder to recover high-quality audio. For remote areas the new service brought entertainment/news/current affairs on both radio and television, all the sorts of things we city-dwellers take for granted. A cynic would call this a mixed blessing.

So much for 1985. I trust you have enjoyed this somewhat erratic series of articles because this is the last one. The box of old magazines from which I culled these gems (nuggets, uncut diamonds, stones or whatever) has finally run out and the space formerly occupied by these musings is now available for someone else's contribution. Why not make it yours?

Construction Of The J-Pole Antenna

by Phil Howchin, VK2TPH.

1. Refer to the diagram on page 10 which sets out critical dimensions, calculated in millimetres.

2. To those who have built J-Poles before, ignore the rest of these notes. For those who have not, read on...

3. The stub is connected to the driven element by a shorting bar. The stub length starts at the upper edge of the shorting bar. The stub gap is crucial for good performance and all dimensions should be within plus or minus 1-2mm. Stubs used on 146, 52 and 29Mhz will require extra support further up the length of the stub to provide extra strength. These extra supports must be NON-CONDUCTIVE. Perspex does the job nicely.

4. The length of the driven element starts at the upper edge of the stub shorting bar. Please note all lengths quoted are ELECTRICAL. Add more for the mechanics of the thing (joints etc).

5. The J-Pole shown here is obviously a mono-bander. To make it operate on more than one band just add more matching stubs further up. If you can, a neat touch would be to feed the coaxial cables within the aluminium tube. This is only for neatness, not really performance enhancement.

6. When making a multi-band J-Pole the stubs MUST NOT line up. If you fit 3 stubs, for example, offset each by 30 degrees. If you make it for 4 bands then offset the stubs by 25 degrees.

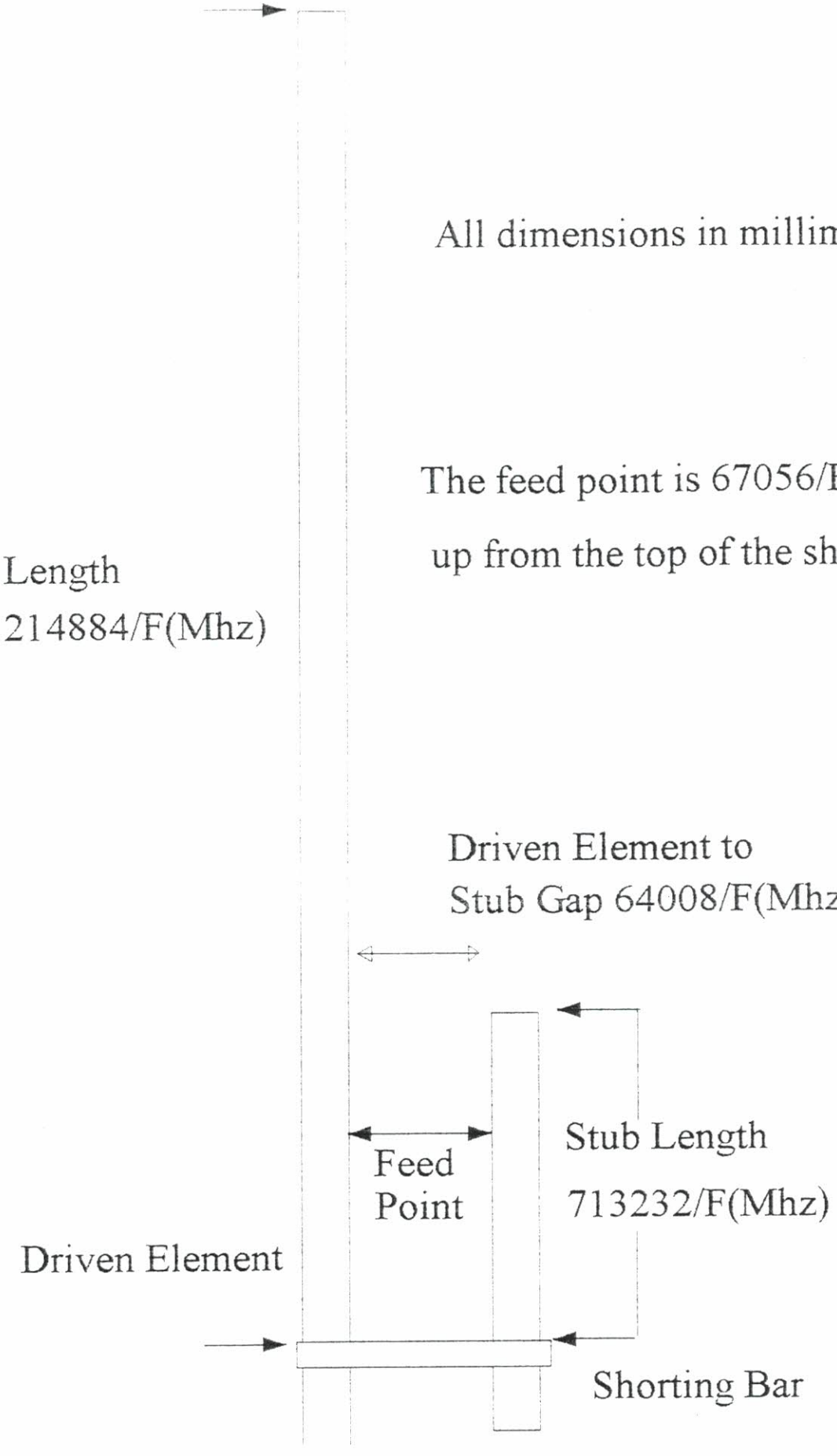
7. The feed-point calculation determines the coaxial cable connection ABOVE the shorting bar. Also, the centre conductor MUST be connected to the stub and the braid of the co-ax to the driven element.

8. All lengths must be measured from the TOP of the antenna. Yes, I know some would say "we know!" but many who are not sure wouldn't ask.

The J-Pole Antenna

All dimensions in millimetres.

The feed point is 67056/F(Mhz)mm up from the top of the shorting bar.



The main advantage of this antenna is it is CHEAP. Mind you, 4 lengths of co-ax can get a bit expensive, Another advantage is at DC the whole thing is earthed; you may survive lightning near misses, but not a direct hit! I built one for 29, 52, 146 and 433 Mhz and it was a very good antenna, however its mechanical properties were not so good, so if you start by modifying a 27Mhz vertical for the job, increase the length by adding thicker tube at the bottom, not thinner tube at the top, so as to keep the flex in windy conditions down to a minimum.

Should anyone want to know more, contact Phil Howchin VK2TPH @ VK2KGJ.NSW.AUS.OC on packet or on VK2RMP or VK2RUW.

(Editor's Note: This antenna is very easily constructed from commmonly available materials; an ARRL Antenna Handbook several years ago had the same antenna constructed entirely out of domestic plumbing fittings and copper pipe. They work really well for 2m and 70cm portable work . Well worth making one as a spare.)

CW/AUDIO NOTCH FILTER NOTES.

(Circuit Diagram on page 12) This circuit originates (many years ago!) from Gio Donk, VK2FJP, who lived in Wollongong about eighteen years ago and now lives in Bathurst. Gio waxed somewhat lyrical about this circuit and since it contains relatively few components, most of which are non-critical, I thought it might be worth a run in the Propagator.

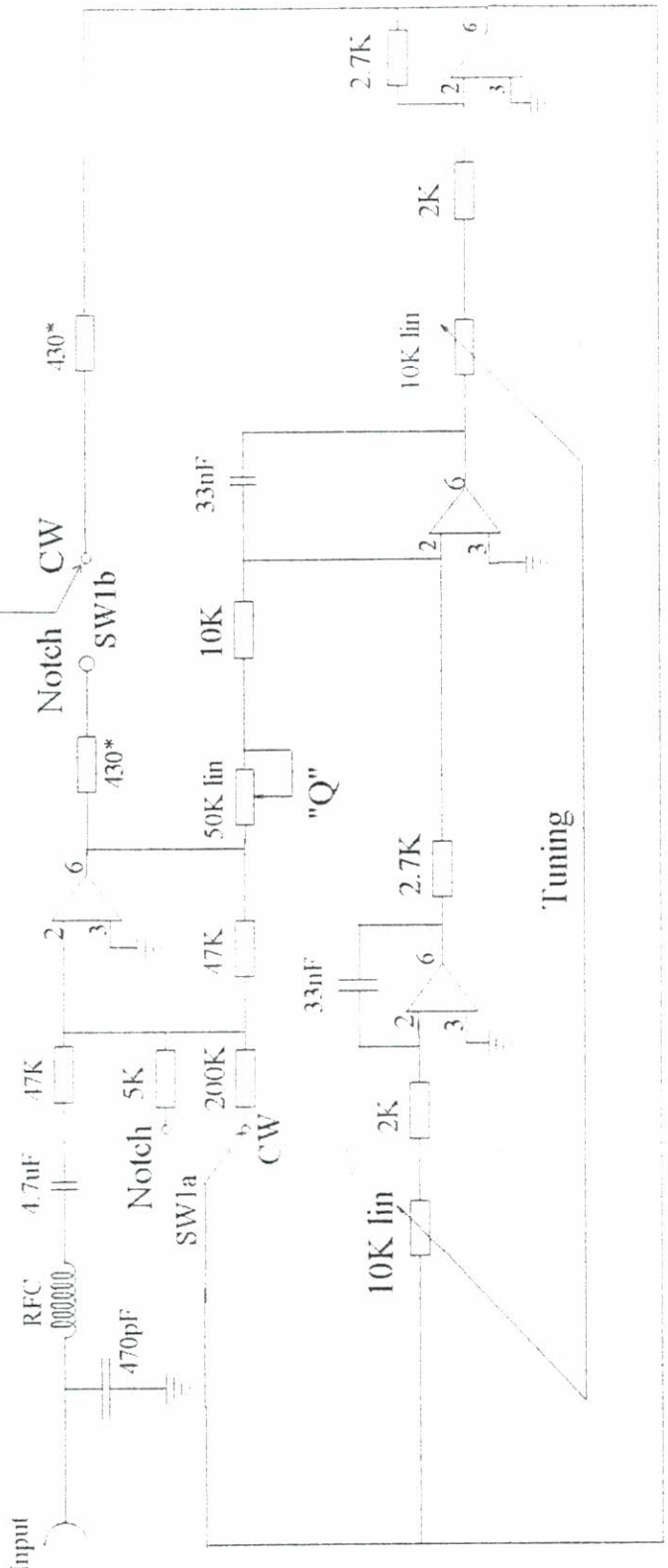
The 430 Ohm resistors at the output can be adjusted in value for impedance-matching purposes (headphone or speaker) since the circuit is designed primarily for use with a transceiver. The RF Choke is not critical and was originally 15 turns of wire on a ferrite former. Its main purpose is transient suppression. The op-amps require positive and negative supplies (two 9V batteries) and pin 3 on each op-amp is common - i. e. connected to the negative terminal of one battery and the positive terminal of the other. All resistors are 1/4 watt, 5% or better tolerance.

Construction is straightforward and if 1/4" jacks are used then it will fit neatly into a small diecast box. Use a switchable input socket to save fitting an on/off switch - plugging a jack in switches the unit on and keeps the parts count down.

Apart from the CW use, the notch filter would be potentially very useful with a domestic camcorder using an external mic in difficult locations - by judicious use of the notch function a sigificant improvement in recorded audio could be achieved. This will require some amplification at the input to raise the mic level input signal to the same magnitude as a headphone signal, but a couple of additional op-amps would do that nicely. There are probably other applications for which this basic idea could be adapted. For example, if you needed to remove an objectionable background noise of constant pitch from your mic input to your transceiver something adapted from this idea might serve you well indeed.

Although originally designed for the 741, there are better op-amps available these days. Using modern CMOS low-noise examples would pep this little unit up somewhat as far as noise figures go - and extend battery life as a bonus.

Unless you are a whizz at designing and producing one-off printed circuit boards, I suggest wire-wrap construction. This technique also allows rapid circuit alteration if you want to add to or modify the design. Resistor leads can be trimmed and bent so the resistor plugs into a standard wire-wrap socket (from one side to the other), a technique used with success on a number of one-off projects. The result is efficient use of circuit-board area. Veroboard push-in pins allow easy termination of flying leads from sockets, pots as well as components such as capacitors which don't readily lend themselves to the use of a wire-wrap socket. Only a few items of basic equipment are required (principally a wrap\unwrap\stripping tool) and the usual suppliers should be consulted.



Most components not critical

* The 430 Ohm resistors may be removed or reduced in value for impedance-matching purposes.

All op-amps are 741 or low-noise equivalent on dual supplies.

Thought for the moment...

"The capacity of human beings to bore one another seems to be vastly greater than that of any other animal. Some of their most esteemed inventions have no other purpose, for example, the dinner party of more than two, the epic poem, and the science of metaphysics." - H. L. Mencken, American author and philospher.

(Not) The Last Word.

In February 1999, Morse Code will cease to be a communications mode used in the maritime mobile service. When that occurs, there will follow a concerted push for the elimination of a Morse Code qualification for the AOCP. Australia still maintains this qualification, although many critics can argue, quite convincingly, that it has no relevance for modern communications operators.

The decision to retain or delete Morse will probably be made at a senior level in the Institute after surveying state representative bodies, gathering submissions and investigation of the implications of both courses of action. The Federal Government of the day which will then decide and make whatever amendments, if any, are required to the regulations.

It is not the purpose of this article to defend, or attack, Morse Code. High-speed machine-generated Morse can be sent by anybody with a modestly-capable communications terminal and a transceiver - there is now no technological requirement to key it by hand, nor even to read it by ear although at times this ability is useful. The real issue, I think, is whether the amateur service wishes to set a precedent for future updating of qualifications for admission to the ranks. This may not be a bad thing - it will allow the service to remain flexible enough to embrace whatever new communications technologies are developed in the next century. Provided we are allowed to retain old technologies as legal modes of emission, whether they are required for the AOCP or not, we may reap the benefit by significantly increased numbers of amateurs, and we undoubtedly need them. Morse, compulsory or not, will survive, as does RTTY, SSTV and so on. Perhaps we need a US-style no-code "Technician class" licence in addition to the existing classes, although the Limited is effectively that now. Any thoughts on this?

The Illawarra Amateur Radio Society Inc.

PO Box 1838 WOLLONGONG NSW 2500

REPEATERS:-

Callsign	Freq	Mode	Location	Linked to:
VK2RMP	146.850	Voice	Maddens Plains	VK2RMU
VK2RMP	438.725	Voice	Maddens Plains	
VK2RIS	146.975	Voice	Saddleback Mtn	
VK2RUW	438.225	Voice	Knights Hill	VK2RGN, VK1RGI
VK2RUW	29.620	Voice	Wollongong (On test linked to VK2RMP)	
VK2AMW-7	147.575	Packet	Mt Murray	Netrom
VK2AMW-1	144.625	Packet	Woll. University	
VK2XGJ	144.700	Packet	Dapto (& 147.575)	
VK2XGJ	439.075	Packet	Dapto	
VK2AMW-6	144.700	Packet	Maddens Plains	Netrom

Membership:- $20.00 per annum. $15.00 concession (enquiries to the Treasurer). Memberships expire immediately after the AGM in August.

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