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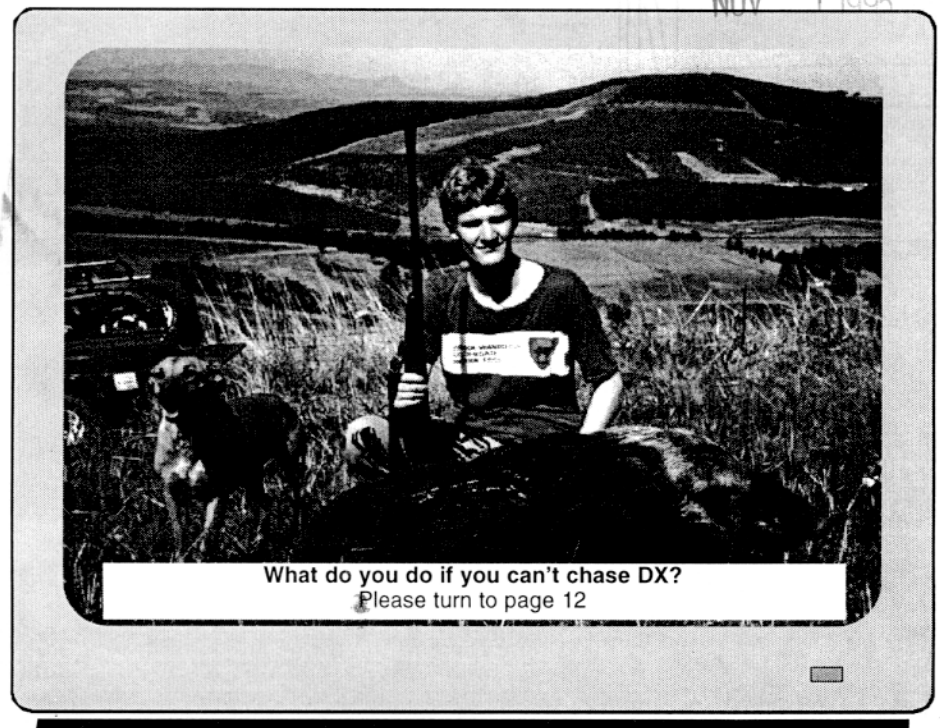
IN THIS ISSUE



What do you do if you can't chase DX?
Please turn to page 12

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Tough Band Conditions Demand The Best HF Modem:

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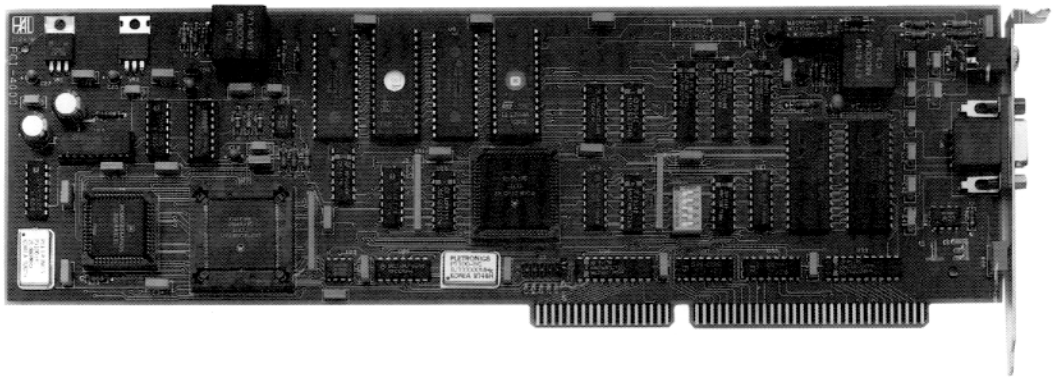

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President's Corner

A view from the top

by Paul S. Richter, W4ZB
P.O. Box 19190 • Washington, DC 20036-9190 / CIS 70743,3517

It is now Fall (at least here in the Northern Hemisphere) which means we have started the season for a full range of RTTY contests which will occupy many of our weekends over the next several months. For those of us in the northerly climates, this is also the last chance to get our outside antennas improved before winter winds and cold weather arrive.

The CQWW RTTY contest in late September began this contesting season and had a high activity level with many stations participating world-wide. Of course, due to the bottoming of the sunspot cycle, propagation is simply not what it was a few years ago (or what it will be again in a few years) and there was grousing about band conditions. But some thought that perhaps conditions had improved just for the contest and most had a good time!

The weekend after that contest, I went up to Boston to attend "family weekend" at the Massachusetts Institute of Technology where my older son (KE4PES) is now enrolled as a freshman. Those of you who know me can imagine that my perspective as a parent was a little different than for many of the other parents attending. I had started out as a freshman there myself 31 years earlier, spending a lot of time there in the 1960's getting three degrees, maintaining a long association with the Electrical Engineering department, but I was far removed from the perspective of a beginning undergraduate. Some things had changed quite a bit! I would like to mention a few of the more noticeable changes pertinent to the realm of digital communications which might be of interest to our readers.

All University computing facilities and buildings, including all dormitory and fraternity housing units are now "wired" together in a series of interconnected high speed LANs. Each student is assigned an e-mail account, a logon user name and a set of password procedures for the LAN which is connected to the Internet at large in addition to the University facilities. "Public use" workstation clusters are available throughout, but students may also connect their personal computers to the LAN through Ethernet adapters. By these arrangements the students now have multitasking access anytime from almost anywhere within the permissions associated with their passwords to all of the computing and data facilities at the University.

E-mail is used universally and most students check their e-mail several times per day to keep current. Web Browsers of the types we now use on the Internet (and other more advanced methods) are used to access information within the various University departments: text based materials as well as sound, image and animation (movie) format materials are available. Some departments post answers (with additional tutorial materials) for homework assignments immediately after the assignments are due. Students may use remote control capabilities over the LAN for certain authorized purposes. Numerous internal "chat" groups (both real time and with posted messages) appear throughout the day (and night) for collaboration in specialized topic areas, including on particular homework assignments. These capabilities are quite impressive now, but still more features will be widely deployed in this environment before long: E-mail with attached binary, sound, image and animation files in forms which are transparently usable; and two way (or multiway) live talk (and video) connections for conferencing users who are sharing, collaborating on or manipulating binary files.

Thirty-one years ago none of this existed although the basic technologies were being developed and the ideas needed to extend them to that which exists today were germinating. I went past one set of rooms where I remember spending many days (and nights) with keypunch machines, card file decks, large line printers and the frustrations of batch processing queues to learn the rudiments of digital computer programming on an IBM 7040 which was then itself (in 1964) almost at the end of its life. By a few years later when I left MIT those particular rooms had been filled with computers which were being used for multitasking and digital communications experiments when 1200 BPS was still regarded as quite high speed. At that time the newest dedicated telephone line modems ran at 9600 BPS at a cost of $30,000 each and depended upon techniques which were regarded by the technical elite of the day as almost magical. Those same rooms today are filled with modern "public cluster" workstations which depend upon technologies perfected from the work done in those same rooms years earlier. And today, the only examples I know about of that equipment which we used in the 1960's are the ones on display in the Information Technology exhibits at the Smithsonian Museum in Washington, DC!

The very close connections between developments in computer and software technologies and advances in the digital communications art should be obvious to any attentive observer. Likewise, the deployment of digital modes in amateur radio operation will continue to benefit from advances in computer technologies. The IDRA will continue to use the Digital Journal and its Internet facilities to keep its members informed and updated about the very rapidly changing technical side of the digital communications art! And, IDRA is continuing to look for members (or others) who have time and talent to write or to volunteer in reporting on digital mode technical developments which will affect the future of this hobby.

On the operating side, IDRA has opened its first Internet mailing list (reflector) for use by members (and others) interested in Clover and related HF digital mode operations. To subscribe, send an e-mail to: "majordomo@iea.com" with a subject and a message: "subscribe adrs-digital". If everything works properly, you should be automatically added to the mailing list. If you have any difficulty subscribing, check the IDRA WWW pages which should provide the most current instructions.

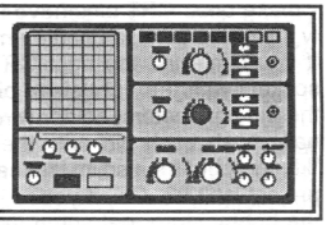
Also, don't forget that IDRA is also always seeking more members! Tell all of your ham colleagues about the IDRA and invite them to join. More IDRA members means more revenue which will enable a further improved and larger Digital Journal, and better support for other IDRA activities. Go out and find some new members and make sure they sign up!

73 Paul Richter W4ZB

Tuning Indicators for RTTY

and other digital modes -- Part 3

by Bill Henry, K9GWT
PO Box 365 • Urbana, IL 61801



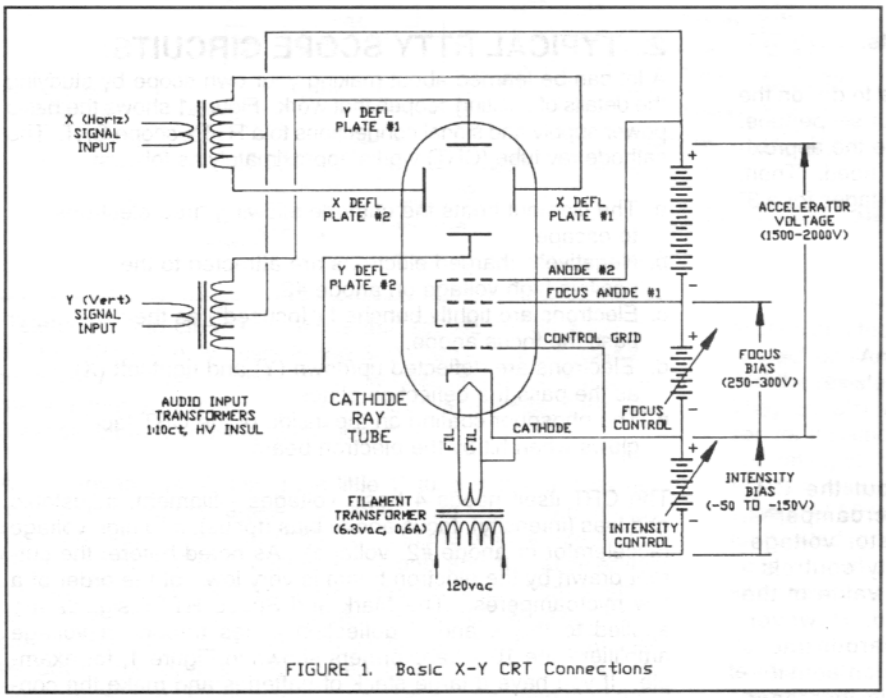


FIGURE 1. Basic X-Y CRT Connections

Making Your Own RTTY Tuning Scope

In Part II, I showed how to connect a commercial oscilloscope to a demodulator so that it can be used as a RTTY tuning scope. This may be all you need to get up and running. However, some of us are die-hards and have to have the "ultimate custom gadget". If that's you, read on.

WARNING - HIGH VOLTAGE!

First, let's repeat the HV warning from Part II: ALL scope circuits involve a high voltage supply - a *potentially lethal* high voltage supply. So, please do the following:

1. KEEP YOUR HANDS OUT OF THE INNARDS WHEN POWER IS CONNECTED.
2. GROUND ALL HV CAPACITORS BEFORE WORKING ON THE CIRCUITRY.
3. KEEP ONE HAND IN YOUR POCKET!

1. WHERE TO START:

In the interest of economy, this is one project that should evolve backwards to conventional design procedures. In engineering school, we are taught to first define the task and device specifications, chose the circuit, and last, choose the parts. In this case, scope tubes, sockets, high voltage transformers, and high voltage capacitors are all "rare devices" in today's world. You'll have to look closely and adapt your design to what you find. If 100 of us build a RTTY scope, there will probably be 100 different designs!

a. Collect surplus parts catalogs and attend some flea markets ("hamfests").

While I normally advocate buying only current run *new* parts, some of the special devices needed to make a scope are really no longer made in this country - at least not at prices we hams can afford. So, make a "wish list" and start walking the flea-market tables. Keep your eyes - and mind - open. Also, don't overlook the idea of buying a obviously old defective scope just for one or two of its parts.

b Buy an old ARRL Radio Amateur's Handbook.

Be sure that you get one of the "small size" jobs (6.5"x9.5") that includes vacuum tube listings near the end of the book. Try to find one from the early 1960's - 1961 is a "keeper" but CRT data was long gone by the 1969 edition. Many of the older handbooks also include schematic diagrams for scope circuits in the "Measurements" chapter.

c. Buy a Scope Tube (CRT)

Look for a round tube with a diameter of 1" to 3". Good numbers include 1EP1, 2AP1, 2BP1, 3BP1, 3GP1, etc. AVOID tubes that have a burned spot in the front face, tubes that you can't read the number, and tubes that use magnetic rather than electrostatic deflection. You can tell the difference between magnetic and electrostatic tubes by (1) a magnetic deflection tube usually has a shorter neck and (2) you can usually see the flat deflection plates in the neck of an electrostatic tube. Tubes in the original box are of course preferred but be sure to take the tube out and examine it *carefully*. Unless you have a large cabinet - and a very high voltage supply (2500-5000 volts), skip the 5" and 7" scope tubes.

There's at least one 3" CRT that has the HV anode terminal right smack-dab in the middle of the front screen. W.W.II radar operators might not have minded, but I'd just as soon see all of my RTTY traces! U.S. scope part numbers have a "method in their madness". The first digit is the approximate diameter or diagonal measure of the face in inches - 1", 2", etc. The end numbers - after the "P" - designate the type of front face phosphor used in the tube. The "P1" (green short persistance) , "P5", and "P11" (blue, short persistance) are all good candidates for RTTY scope use. AVOID "P4" (white, slow persistance for TV) and "P7" (blue-to-yellow, slow for radar) tubes. Very old U.S. tubes and all European tubes use a different numbering scheme. Finding a real data sheet for the tube is about the only safe way to proceed.

d. Buy or make a socket for the CRT.

This can be a "toughie". CRT's can have some very strange and weird bases - larger and with more pins than any other tube. If you find a good tube with a socket, it's worth several bucks more. However, don't give up if you can't find a socket

- *make one.* CRT pins have fairly standard diameters - usually the same size as used on miniature tubes or on octal tubes. If you can't find the right CRT socket, buy a handful of tube sockets with the right sized pin connectors. Pull or break-out the pin connectors, solder wires to the loose pins, and individually push each pin onto the back of the CRT. Yeah, it's a "kludge", but it's also inside the cabinet and this is a home-brew project isn't it? OK, if you're really a perfectionist, go down to the hobby store, get some molding compound and mold your own socket!

e. Design the Power Supply and buy the parts.

This is one of those things you will probably have to do "on the fly" at the hamfest. After you have obtained your scope tube, sit down with the ARRL handbook and determine the approximate power supply voltages and currents you'll need. Then, start shopping for power supply parts. Typical voltages for a 3" scope tube are:

Parameter	Typical for 3" CRT
Filament	6.3V @ 0.6A (AC or DC)
HV	1500-2000 VDC @ 10uA to 2mA
MV	100-500 VDC @ 5 to 20mA
Grid Bias	-50 to -200 VDC
Deflection	100 to 200 volts/inch

The HV supply is always a big problem, but the CRT current is usually very low - 10 to 20 microamperes. Most of the HV current drain is to the resistor voltage-dividers for the position, focus and intensity controls - as much as 1 to 2 milliamperes. The exact value of the HV is not critical and it need not be regulated. However, higher voltages will result in brighter and sharper traces on the front screen. Conversely, the deflection sensitivity of a CRT decreases as the HV supply is increased (takes a stronger signal to produce a given trace deflection on the front face). I suggest the following target values:

1" CRT:	750V - 1000V
2" CRT:	1200 - 1500V
3" CRT:	1500 - 2000V

The MV power supply has to run the deflection amplifiers and provide bias to the "ANTISTIG" control. I like 125 to 150 VDC @ 3 to 5 mA for a 1" or 2" tube. The grid bias for the CRT is usually obtained from a potentiometer in the HV voltage divider chain (INTENSITY control).

Finding the parts to produce these voltages may take some doing. If you are very lucky, you may find a scope power transformer with separate windings for each voltage. They were made and once-in-a-while show-up at flea markets. Unfortunately, I never found the one I needed - when I needed it! As noted before, don't over look the possibility of buying a "junker scope" just to cannibalize it for the HV parts. BE CAREFUL - the non-replaceable item that usually consigns a scope to the scrap heap (hamfest table) is a blown power transformer! I have often resorted to just buying separate power transformers for each voltage. Yeah, it takes a lot more space, but so what? It's a home-brew project anyway. HV capacitors are also a problem and they can get pretty big. I prefer to buy 450 VDC cartridge electrolytics and connect them in series to get the voltage I need - don't forget the equalizing resistors across each one! The next section presents some example circuits with ideas for HV circuits and components.

2. TYPICAL RTTY SCOPE CIRCUITS:

A lot can be learned about making your own scope by studying the details of existing scopes that work. Figure 1 shows the basic power supply and signal connections to a RTTY-scope CRT. The cathode ray tube (CRT) works approximately as follows:

a. The filament heats the cathode allowing "free electrons" to escape.
b. Negatively charged electrons are attracted to the positive high voltage on anode #2.
c. Electrons are tightly bunched ("focused") as they pass the focus anode.
d. Electrons are deflected up/down (Y) and right/left (X) as the pass the deflection plates
e. The phosphor coating on the inside of the CRT face glows when hit by the electron beam

The CRT itself needs 4 basic voltages - filament, adjustable grid bias (intensity), focus anode bias (focus), and high voltage (accelerator or anode #2 voltage). As noted before, the current drawn by the electron beam is very low - of the order of a few microamperes. The Mark and Space RTTY signals are applied to the X and Y deflection plates through a voltage amplifier - the 10:1 transformers shown in Figure 1, for example. If you have a large stack of batteries and make the connections shown in Figure 1, you will have a working oscilloscope. BUT - certain practical issues such as turning it off and on and adjusting for the best display will be pretty clumsy.

The ST-6000 Scope Circuit:

Figure 2 shows the circuit diagram of the RTTY Scope used in the HAL ST-6000 RTTY Demodulator. With minor variations, this is also the circuit used in the HAL RS-2100, one of the few specialized RTTY Scope sold commercially (long ago discontinued). This circuit uses a 1" diameter tube and has proven to be very reliable. The tube itself is imported from AEG (a.k.a.

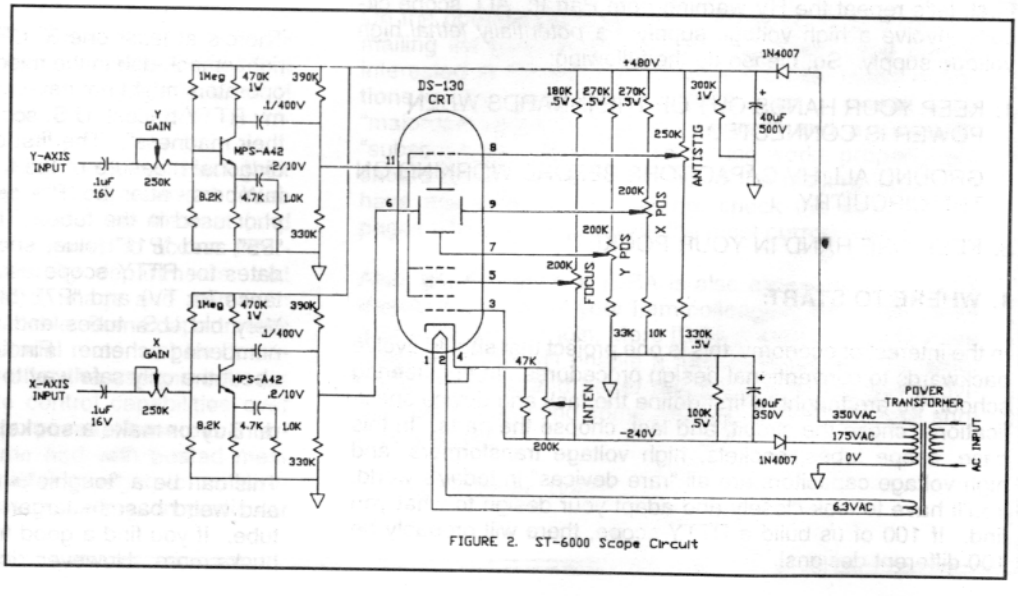


FIGURE 2. ST-6000 Scope Circuit

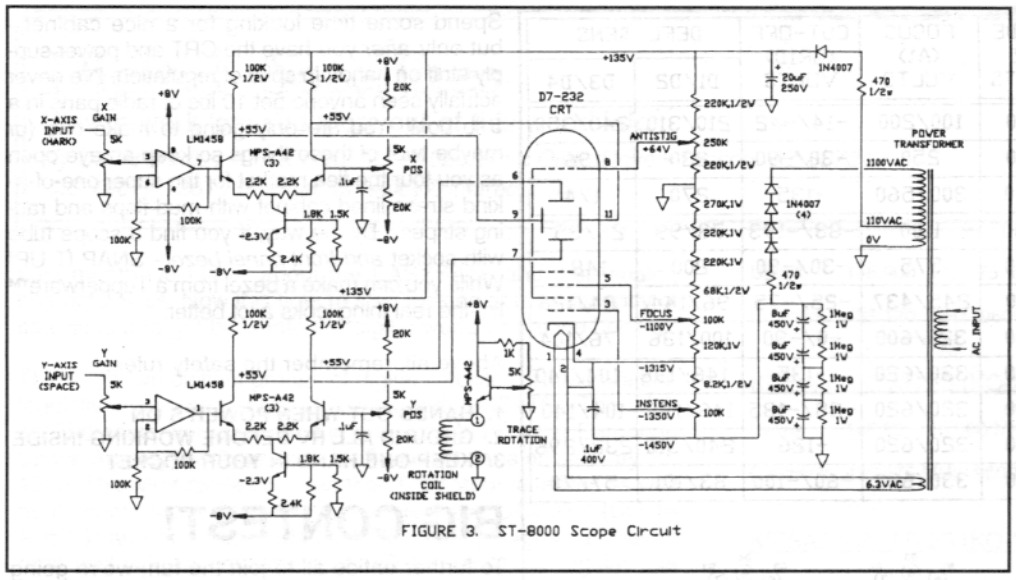


FIGURE 3. ST-8000 Scope Circuit

"Telefunken") in Germany. While this started out as a $25.00 tube in 1975, it now costs in the $200 range - and it takes 6 months to get one. This is not a low cost alternative if you are making your own scope! However, several features of the ST-6000 circuit may provide useful ideas.

A BIG advantage of using the little 1" tube is that it does not require very high voltages to operate. The ST-6000 operates from two supplies, one at +480VDC and the other at -240VDC, for a total of 720VDC between cathode and the accelerator anode. The voltages are relatively easy to obtain from a "standard" tube-type power transformer - a 350VCT winding in this case (175-0-175). The current drain is low (about 5ma) and little power transformers that used to be sold for "UHF TV Converters" and "TV Boosters" should work fine - and may provide the filament voltage as well. Note that the filament is connected directly to the CRT cathode and that the filament winding of the power transformer must be insulated for this voltage - 240 VDC, in this case. This is generally true of CRT circuits - the filament and cathode are connected and operate at voltage considerably removed from ground. The CRT filament winding on the power transformer must therefore have HV insulation.

The deflection amplifiers of the ST-6000 are simple and low cost. The Mark and Space signals from the demodulator channel filters are amplified by single transistor high-voltage amplifiers. The resulting signals are applied to one of the "X" and one of the "Y" deflection plates, respectively. The other "X" and "Y" plates are biased to give control of the trace position. This "unbalanced" deflection circuit works well on small CRT's such as used in the ST-6000, but is not recommended for use with larger screen tubes or where low distortion displays are required. The CRT trace intensity, position, and focus may be set via the four front panel controls. A fifth control, "ANTISTIG" (antistigmatisim) is used to balance the trace focus across the CRT screen.

The ST-8000 Scope Circuit

The HAL ST-8000 HF Modem scope circuit is shown in Figure 3. This high-performance circuit is more expensive than that used in the ST-6000 and has some important and interesting differences.

The ST-8000 uses a 2"x3" rectangular tube, also made by AEG Telefunken. This D7-232 requires a much higher accelerator voltage than the ST-6000 tube - about 1500 VDC. Note that this HV supply produces a very large negative voltage (-1450VDC). This is the more common CRT power supply connection as it allows the deflection plates to operate at or near DC ground potential (about +55VDC in the ST-8000). This greatly simplifies the design of vertical and horizontal deflection amplifier stages. Note that the ST-8000 uses balanced differential deflection amplifier circuits. This provides sharply focused traces at all locations on the screen and the trace position is much simpler to adjust with this circuit.

The INTENSITY, FOCUS, and ANTISTIG control potentiometers are part of one long resistor chain across the HV supply. This is also a common arrangement in most scopes and the series resistor chain also serves as the "bleeder load" on the HV supply - about 1.0 mA in the ST-8000. Note that the resistors in this chain have 1/2W to 2W power ratings. They are also *composition* rather than film resistors. The reason for this choice is not power dissipation but, rather, the voltage rating of the resistors themselves. 1/4W composition and ALL film resistors are rated for a maximum terminal-to-terminal voltage of 50 to 200 VDC. However, a 1/2W composition resistor is rated for 350 volts, a 1W for 500 volts, and a 2W for 750 volts internal breakdown. Always use higher wattage composition resistors in high voltage applications.

A string of 8 uF, 450 VDC electrolytic capacitors is used to filter the -1450V output. This series string has an effective capacitance of 8/4 = 2 uF. A 2uF, 1800V capacitor would have been ideal, but these are expensive, custom-made gadgets. The 8uF jobs are "standard" and "off-the-shelf" (if any 450V capacitor can be called "off-the-shelf" these days!). This technique can save you a lot of money and trouble - but don't forget the equalizing resistors across each capacitor (the 1Meg, 1W jobs).

The HV supply uses a series string of four 1N4007 diodes. The total PIV (4000V) is about double what is really needed - BUT - there's a large safety factor and this supply rarely blows a diode. Also, equalizing resistors and capacitors are not required across each diode, reducing the parts count. When in doubt, put in an extra diode or two.

If you want front panel CRT controls for Intensity and Focus, you'll have to figure out some way to insulate the potentiometers. Note that the resistor terminals of these controls are 1100 to 1300 volts from ground potential. This is well beyond the insulation rating of most potentiometers. The "standard" fix for this problem is to mount the control itself on an insulated plate (Lucite, polystyrene, etc.) and then use an insulated HV shaft coupling to the front panel shaft, bearing and knob. It's a lot of trouble and expense for adjustments that rarely change.

The "rotation coil" shown on the diagram is a special wrinkle, required because the ST-8000 CRT is rectangular. In general, the X and Y deflection plates are not placed inside the tube so that they are exactly square with the rectangular front face plate. This is corrected electronically by the rotation coil, driving transistor and "Trace Rotation" control. A round tube does not have this problem and is therefore recommended for a home-brew project!

CRT TYPE	BASE	FILAMENT		ANODE #2 VOLTS	FOCUS (A1) VOLTS	CUT-OFF (GRID) VOLTS	DEFL SENS	
		Volts	Amps				D1/D2	D3/D4
1EP1 P2 P11	11V	6.3	0.6	1000	100/200	-14/-42	210/310	240/350
2AP1A	11L	6.3	0.6	1000	250	-30/-90	230	196
2BP1, P11	12E	6.3	0.6	2000	300/560	-135	270	174
3AQP1	12E	6.3	0.6	2750	1100	-83/-193	73/99	26/35
3BP1A	14G	6.3	0.6	2000	575	-30/-90	200	148
3GP1A	11N	6.3	0.6	1500	245/437	-25/-75	96/144	84/126
3KP1, P11	11M	6.3	0.6	2000	320/600	-0/-90	100/136	76/104
3RP1/3RP1A	12E	6.3	0.6	2000	330/620	-135	146/198	104/140
3SP1	12E	6.3	0.6	2000	320/620	-28/-135	146/198	104/140
3UP1	12F	6.3	0.6	2000	320/620	-126	240/310	232/296
3WP1, P11	12T	6.3	0.6	2000	330/620	-60/-100	83/101	57/70

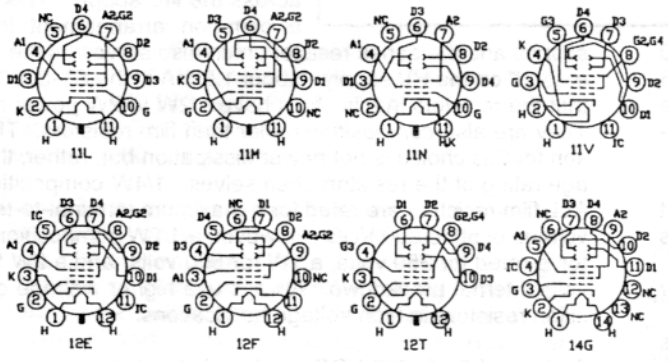


FIGURE 4. Popular CRT's for RTTY

3. MAKE YOUR OWN RTTY SCOPE:

Gather your parts and data sheets. Study the typical circuit diagrams. Draw your own schematic and hash it over with your RTTY friends. Gather the parts to make the power supply (this may be the hardest part). Don't be afraid, make this a fun project. The experience gained will not only teach you the how and why of scopes but you'll also end up with the exact RTTY tuning indicator *you* want.

Figure 4 shows a list of the most popular CRT's, the voltages needed to make them work, and the base pin-out for each. In case you've forgotten, tube pins number clockwise when looking at the *bottom* of the tube (base end of the CRT). Pin 1 starts just to the *left* of the identifying key or gap.

Spend some time looking for a nice cabinet - but only *after* you have the CRT and power supply stuff on hand. In spite of reputation, I've never actually seen anyone get 10 lbs of radio parts in a 5 lb box! You are only going to make one (or maybe two) of these things so keep an eye open as you tour the flea market for the super one-of-a-kind streamlined cabinet with mud-flaps and racing stripes. By the way, if you find a scope tube with socket *and front panel bezel* - SNAP IT UP! While you can make a bezel from a Tupperware™ lid, the real thing looks a lot better.

Above all, remember the safety rules:

1. **HANDS OUT WHEN POWER'S ON**
2. **GROUND ALL HV BEFORE WORKING INSIDE**
3. **KEEP ONE HAND IN YOUR POCKET**

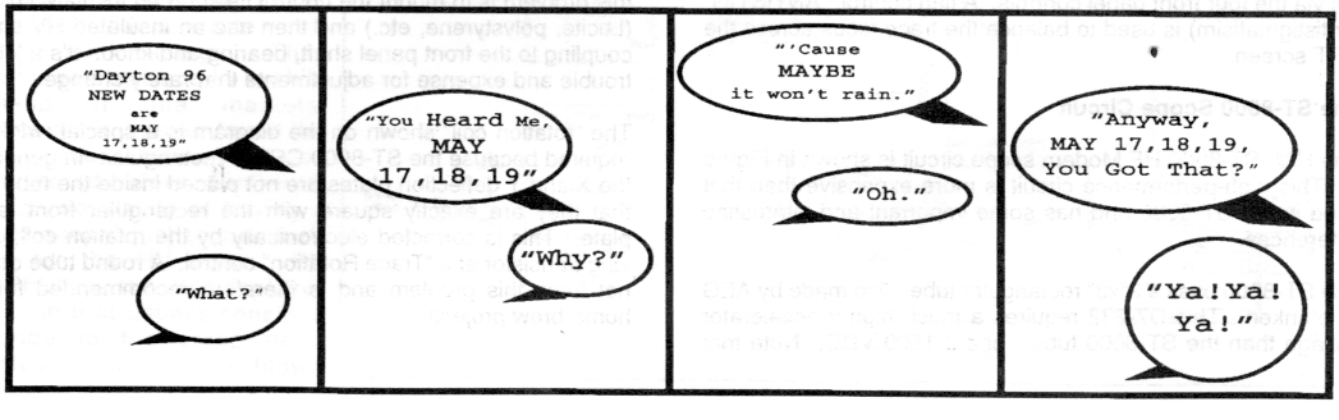
BIG CONTEST!

To further entice all to join the fun, we're going to run a little contest for the next year! Collect your parts, build your RTTY scope and send a photo and schematic diagram of your finished masterpiece to Digital Journal. If, in the exalted opinion of our highly qualified judges (yet to be named, but Oh-Wah-Tah membership is required), your scope is judged to be the "King of All Scopes", a handsome certificate and other valuable awards and honors will be yours for the asking. Best of all, we'll run a picture of your scope and its schematic in the Digital Journal next year.

Rules:

1. The RTTY Scope Contest starts January 1, 1996 and ends December 31, 1996.
2. The prize(s) will be awarded at the RTTY Dinner at the Dayton Hamvention in 1997.
3. The Digital Journal has rights to publication of the technical details of the wining entry.
4. The scope entry must be at least 50% home-brew and not a commercial product.
5. You many enter as many times as you wish but each entry must be a different RTTY scope.
6. The decision of the judges is final.

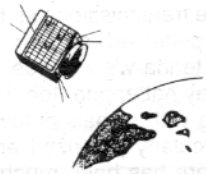
HAVE FUN AND GET THOSE SLIDE-RULES LUBRICATED!



Digital Satellites

How to work 'em and more out of this world info

By David Medley KI6QE/VK2IMJ • 1020 West Oleta Drive • Tucson, AZ 85704
CIS 74072,1261 / Internet: dmedley@indirect.com



Last month we talked about the EASYSATS and their analog characteristics. Now it is time to start looking at the nitty gritty of satelliting and get back into the digital world where we belong.

There are two distinct groups of digital satellites. These are colloquially known as the MICROSATS and UOSATS. The original Microsats were launched in one vehicle from the European Space Agency facility in Korou in French Guiana on January 20, 1990. This shot carried no less than 6 amateur satellites as well as its commercial payload. There were two UOSATS (UO-14 and 15) and four Microsats (AO-16,17,18,19). All six achieved orbit and with the exception of UO-15, are all in regular use today. UO-15 failed catastrophically in the first few days and has not been heard from since. UO-14 was transferred to a commercial emergency medical venture several years ago but has been replaced by a newer amateur satellite, UO-22.

More recently two newer UOSAT type satellites have been put into service. These are owned and operated by the Korean Institute of Science and Technology and are known as KITSATS although they are almost identical to UO-22. These satellites were all built at the University of Surrey in England.

Of the Microsats, we discussed DOVE (DO-17) last month. PACSAT (AO-16), owned and operated by AMSAT and LUSAT(LU-19), owned and operated by AMSAT Argentina have very similar characteristics. We will discuss those shortly. WEBERSAT (WO-18) is owned and operated by Weber State University and carries cameras but no packet facilities. We will discuss photos from space in a subsequent article as this is a subject by itself.

The difference between the Microsats and the Uosats relates to transmission speed. In the case of the Microsats the speed is the familiar 1200 baud but the Uosats operate at the higher speed of 9600 baud.. Both carry a very specialized type of store-and-forward mailbox which requires special software on the ground. Their operation is quite unique as we will see.

The principle characteristics of the Microsats and Uosats are summarized as follows:

AMSAT OSCAR 16 (AO-16)

Uplink 145.90 145.92 145.94 145.96 MHz AFSK (FM) 1200 bps AX.25 Manchester encoded

Downlink Nominal PSK 437.02625 MHz 1200 bps BPSK (SSB) AX.25

Raised Cosine 437.05130 MHz 1200 bps BPSK (SSB) AX.25

LUSAT OSCAR 19 (LU-19)

Uplink 145.84 145.86 145.88 145.90 MHz AFSK (FM) 1200 bps AX.25 Manchester encoded

Downlink Nominal PSK 437.15355 MHz 1200 bps BPSK (SSB) AX.25

Raised Cosine 437.12580 MHz 1200 bps BPSK (SSB) AX.25

CW Beacon 437.125 MHz 12 wpm CW Telemetry. Low power

UOSAT OSCAR 5 (UO-22)

Uplink 145.900 145.975 MHz 9600 bps BPSK (FM) AX.25

Downlink 435.120 MHz 9600 bps BPSK (FM) AX.25

KITSAT OSCAR 23 (KO-23)

Uplink 145.85 145.900 MHz 9600 bps BPSK (FM) AX.25

Downlink 435.175 MHz 9600 bps BPSK (FM) AX.25

KITSAT OSCAR 25 (KO-25)

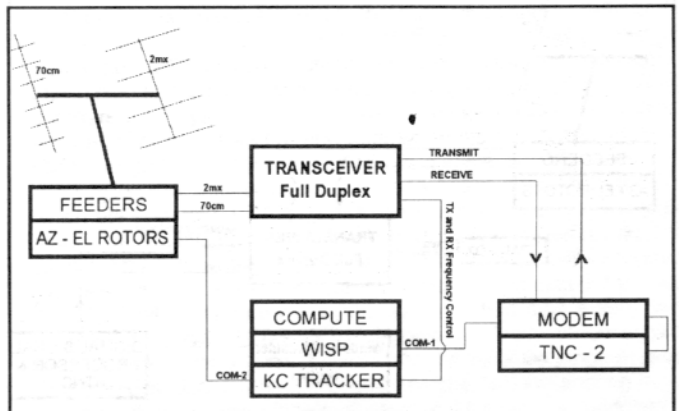
Uplink 145.870 MHz 9600 bps BPSK (FM) AX.25

Downlink 436.500 MHz 9600 bps BPSK (FM) AX.25

The frequencies indicated above are nominal and take no account of the Doppler shift. In practice for a typical satellite pass the actual frequencies will be about 8KHz higher than those indicated. Note the mode of operation of these satellites is "**Mode J**" which means uplink in the 2 meter band and downlink in the 70 cm band.

These satellites are in quasi circular polar orbits with an average height of about 800 kilometers above the earth. They are small and low powered with power levels of only a few watts. Their antennas are also simple and do not provide any significant gain and are circularly polarized.. Therefore we are dealing with rather low signal levels so some special measures have to be taken to work with these satellites.

Now I think we should be able to begin understanding the things we are going to need to become a serious satellite operator. First we must note that the operation is full duplex which means we need a separate transmitter and receiver and these need to be multi mode as we are using both FM and SSB. Such units are quite common these days but they are not cheap. A better approach is a specialized transceiver and the three main Japanese manufacturers offer such units. The most common one used is the Yaesu FT736R or its predecessor the FT726R. The 25 watt output of the 736 is adequate and you will not need to worry about linear power amplifiers unless you want to chase DX on AO-13 which is another subject altogether.

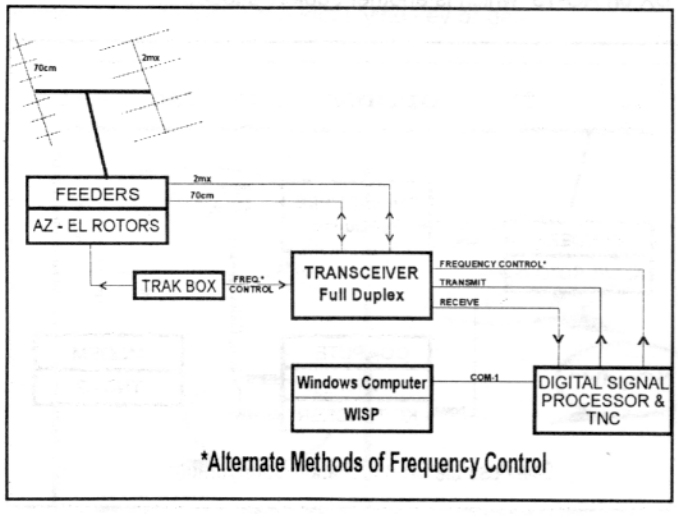


One Possible Ground Station Configuration

The next consideration is the antenna.. As mentioned above, the transmissions as they reach the earth's surface are circularly polarized so if we are using some form of linearly polarized antenna we will lose about 3 db in received signal. While this may not appear too much it really is most significant when dealing with signals of low intensity. So the first thing is we need a circularly polarized antenna. In order to keep the cost down there has been much experimentation with an antenna known as a Lindenblad. This is a circularly polarized vertical type antenna which lends itself well to home brewing. The construction of such antennas is described in the Satellite Experimenters Handbook and much more detailed material is to be found in AMSAT publications particularly in the AMSAT Home Page on the INTERNET World Wide Web (http://www.amsat.org). Here you will find construction articles by Howard Sodja (W6SHP) giving much useful information. As a starter system for experimenting with the Microsats this is the way to go.

However, for more serious experimenters, the Lindenblad type antenna has some drawbacks. It has no real gain so signals at the receiver are still quite weak so that a low noise preamplifier is an essential addition. Like all vertical antennas it has a lobe which weakens as the angle of elevation increases. This means that useable signals are only obtained when the satellite is at 45 degrees or less from the horizon. Thus some form of steerable directional array is needed. The most frequently used system today is composed of Yagi type circularly polarized antennas. It is not particularly difficult to home brew suitable systems from readily available materials and you will find descriptions of these projects in the Satellite Experimenters Handbook as well as in the aforementioned AMSAT resources in the World Wide Web. Here again there are some very practical articles by W6SHP describing how to build these arrays using scrap material. If you are not into home brewing antennas then there are a number of commercial items available at reasonable cost from such manufacturers as KLM, M Squared and Hy-Gain.

To turn the antenna array you will need an azimuth-elevation type rotor. There are several such items sold on the commercial market but they are not cheap but there are again home brew possibilities. For an azimuth rotor any of the older ham types (HAM-M for example) are quite suitable and these may often be picked up at flea markets and ham conventions. The elevation rotor can be a cheap TV type or a specialized type available at ham stores. It does not take much mechanical ingenuity to put this together but remember to use PVC or fiberglass tubing wherever possible. Steel or aluminum masts and booms tend to distort the radiation patterns of your antennas. A low noise preamplifier is again a most desirable addition which is not an expensive item from most ham stores.



Tracking the satellite manually is fine as a start but you will soon tire of this. Your computer tracking program probably has some way to interface with your rotors, most probably via a device known as the Kansas City Tracker. This is a card which plugs into your computer. QUIKTRAK 4.0 obtainable from AMSAT is the one most used as it readily interfaces with the Kansas City Tracker and your radio if it has a computer control function similar to the Yaesu CAT. A much more convenient solution to this problem is a stand alone device such as a TRAKBOX which has been marketed by TAPR as a kit. This device is loaded with data via a serial port on your computer but once loaded will run by itself and interface both with your rotors and your CAT radio. A plug and play unit of similar capability is marketed by AEA.

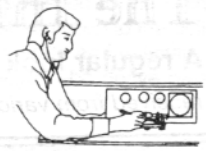
Now we need to talk about the practical mode of operation. These are all packet satellites but unfortunately our TNC-2 with our favorite communications software will not do even with the Microsats at 1200 baud. This is because of the specialized mode of operation of the BBS which is quite unlike our terrestrial systems and because of the special coding of the uplinks (Manchester). For the 1200 baud satellites a special FSK modem is needed to work with the TNC-2. A kit for this was marketed by TAPR some time ago and these units are beginning to show up at flea markets. Otherwise a plug and play unit is marketed by PacCoMM. For the 9600 baud Uosats a G3RUH type modem is needed to go with the TNC-2. You can buy a kit from TAPR or plug and play units from MFJ and PacCoMM. This all sounds a little daunting and complicated but today there is a better solution. You may have read in the literature of units called DSP (Digital Signal Processor). Such have been around for several years but have been quite expensive and not well supported. However today you can purchase such a unit from TAPR in kit form. This works in conjunction with your TNC and provides all the functions described above and a whole lot more. The feature of a DSP is that the modem function is supplied by software which can be readily modified as circumstances change. With such a device you can work with all existing satellites as well as those that may appear in the future.

The BBS operation revolves around the maintenance at the ground station of a file directory corresponding to that in the satellite. This directory is broadcast by the satellite and received by all stations within range. Items of interest may be selected by the ground station and requested from the satellite. This again is broadcast and received by all stations. Note that this is all done in a non connected mode. If the ground station has missed parts of the message then a "fill" request is sent to the satellite and the necessary part of the message is then again broadcast. Those of you who have used the TPK package on your packet station will recognize a similarity here. Uplinking messages to the satellite is done in a connected mode and each satellite has the capability of handling four uplinks simultaneously.

To operate with these satellites you need special software which is readily obtainable from AMSAT. If you are running DOS on your computer, as distinct from Windows, you will need the PB/PG package from AMSAT. This comes with an excellent manual which will be of great help to you. If you are into Windows then you need the WiSP package, also from AMSAT. This is a very professional software package and is highly recommended. It has been tested with windows 95 as well as Windows 3.1.

Next month we will talk about the new satellite being prepared by AMSAT for launch in mid 1996. This satellite is the most ambitious amateur satellite yet and will carry both analog and digital facilities.

Coherent CW - Another Digital Mode



CCW -- 35Khz up on all bands

by Peter Lumb, G3IRM
2 Briarwood Ave • Bury St. Edmunds, Suffolk • UK IP33 3QF

Operating schedules:

VE3RAT -
Low power beacon believed to operate continuously on 18.101

G3IRM -
Tuesdays at 1900z on 10135 - Thursdays at 1900z on 7035 - Saturdays and Sundays at 1900z on 14035.

VE3OXX -
Sundays at 2000z on 7033

W6HDO -
Thursdays at 0500z on 7035 and at 1830z on 14035.

W6HDO or WB6RIJ
on Saturdays and Sundays at 1900z on 14035.

I again ask all who can transmit CCW using the Petit system or one or other of the two computer programs to let me know the times and frequencies they use for inclusion in this column. You are not expected to appear every time you suggest but lists will give others an idea of when and where to look for contacts.

Bernhard Raab DF3CT writes regularly and tells me that Dieter Trummer OE6WTD is almost operational with the CCW program and is hoping to be able to conduct tests with a friend who lives in a neighbouring city. We may be hearing CCW signals from Austria in the near future. I had a little further success this last month when I nearly had a three-way contact with PA0OCD and DJ2ZV. Unfortunately this just did not succeed as Alfred DJ2ZV disappeared. It was, I think, his first CCW contact and we were not all quite on the same frequency. It did, however, show that there is an increase in activity even if only very slight. We are all hoping for more contacts in the future and hope there will be others who will join in.

What do we have to do to get more amateurs around the world to give Coherent CW a try? My article submitted to the RSGB for publication some time ago finally appeared in print in the August issue of their magazine RadCom. As over a year had elapsed since the article was written no mention was made of the PCW program by DJ7HS. However, I did manage to persuade the editor to include an update on another page of the magazine. This offered a copy of the PCW program disk free to those who would like one. Nearly two months have now passed since the article appeared and the result of all this effort has been six enquiries and two of these were from readers of my old Newsletter. I don't know what the current membership of the RSGB is but I imagine it to be somewhere between 8,000 and 10,000. To receive only six replies from such a membership is hardly believable but there it is! I suppose that there is still time for enquiries from overseas members but the response from U.K. members has been very poor indeed. At the time of writing I have heard from Cliff W6HDO who distributes the PCW disk in the States but not from Ernst who has his own method of distribution in Germany. Cliff has had two requests from Canadian RSGB members. So far I have sent out 24 copies of the PCW program to magazines, national societies, shareware distributors and those who have asked for a copy. The shareware distributors have acknowledged receipt and have indicated that the program will be included in their catalogues. Not one of the national societies has even acknowledged receipt though I suppose they may still be thinking about it. I was somewhat annoyed that the RSGB did not even say they had received it. It is almost enough to drive me to cancel my membership after over fifty years. However they have now decided to allow those of us who have been members for a long time to pay reduced subscriptions. In my case this is a 50% saving so I think I will give them another chance.

One of the early problems with the Petit system was tuning stations using such a narrow bandwidth. The same applies with Bill de Carle's COHERENT. This of course is why fixed frequencies are used. However, for the benefit of anyone who may think this is inconvenient and have not yet thought of giving CCW a try, let me point out that PCW includes four bandwidths, the widest being 200 hz. This makes tuning a lot easier and it is possible to tune around the listed frequency in case the calling station is not quite where it should be. Finding a station is therefore much easier. Once this has been done the fine tuning buttons on Kenwood transceivers (and perhaps others) can then be used to reduce the error displayed on the screen to as small as possible before switching to one of the narrower bandwidths available.

Are dot strings necessary? This question has been raised more than once. It appears that sending a thirty-second dot string before transmitting has been irritating some operators in California - or so Cliff tells me. To anyone who does not understand the purpose of these strings I suppose this makes sense. One alternative would be to send shorter strings before, in the middle of and after the call. The other suggestion which I think I have made before is for the calling station not to send dots but to include CCW several times in the call. The answering station then sends the dots to synchronize. Following on from this the question arises as to whether to send strings on every changeover. During a contact I had with PA0OCD some time ago we found it advantageous to do this but only because conditions were very bad with weak signals and interference from packet stations. Given reasonable conditions and passable signal strengths dot strings (after the initial synchronization string) should not and do not appear to be necessary. On the 17th August conditions on 7035 between here and Holland were good with reports up to 599 at times and Paul PA0OCD and I decided to give double speed CCW a try - 24 w.p.m. Excellent results were obtained with screen copy almost 100% at both ends. We hope to repeat this on many more occasions.

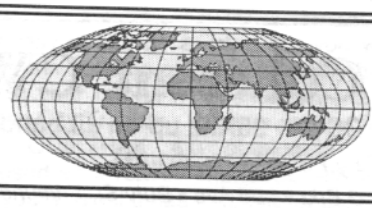
Cliff W6HDO and Bill WB6RIJ have been having difficulties on 7035 and have been wondering if propagation has anything to do with the system's inability to synchronize which has been noticed on more than one occasion. They have had no difficulty on 3535 but even on 187.65 the problem sometimes appears. Various suggestions have been made including the question of whether or not the state of the battery supplying the S-D board can be the cause. So far I have not noticed any problems but this could be because the contacts I have had have not been under ideal conditions - or it may be because I have the S-D power supply regulated! Cliff and Bill are even building small crystal controlled transceivers to see if that will throw light on the problem.

As I have a little space left let me write a few notes on an one of my favourite subjects - the English language. This is a victim of its own success. As a result there are thousands of errors made every day and some of these are made by people who should know better. Among these I include many famous establishments including the BBC who not only make grammatical errors but have started altering the pronunciation of some words. I apologize to American readers if I use English spelling in my column but I am sure that they will be able to make sense of what I write. I try to use correct English grammar although this gets increasingly difficult as so much incorrect English is heard and written - I even tend to make the same mistakes as a result. I do not use spell-checkers (I always thought spells were cast by witches - the correct word is, of course, spelling) and refer when necessary to a standard Oxford English dictionary. I could fill this magazine many times commenting on the various errors seen and heard every day, some of which are appalling. I will give just one example seen in a computer manual yesterday - to selectively not undelete. I still haven't worked out what this means. This is an example of an instance where someone in the past did not know the correct word and invented the word "undelete" which has now become common. It is also a very good example of a split infinitive of which there are literally thousands of examples every day. I won't even say what I think of the program called GRAMMATIK. Just for the fun of it I have checked the spelling in this column with the checker in WordPerfect and it says that "undelete" is incorrect! It also does not recognize "shareware " as a word. Apparently it does not understand computer jargon.

The International Scene

A regular look at the odds & ends from around the digital globe

received from various sources



G3/G3/G3/G3/G3

Andy G3YZP (<g3yzp@anglianet.co.uk> is one busy, busy ham, devoting endless hours to BARTG as Chairman and publicity officer. But that's not all. At his home QTH he also operates GB7MXM which is a multi-port VHF/UHF packet BBS for the Suffolk Data Group. Yet he finds time to forward various and assorted information to the Digital Journal each month. We appreciate his help and look forward to his contributions. In his most recent note, he passed along news about Paul's (DJ0CU) new Pactor software for Windows. An early review is on the agenda.

TY/TY/TY/TY/TY

Peter TY1PS recently returned home from a European holiday to find another 15 meters of his beach permanently removed. That leaves, according to his projection, another 36 months before the house he wisely rents slides gently into the greedy Atlantic ocean. Immediately after that discovery he was invaded by DXpedition Task Force #1, which made 13,500 CW and SSB contacts during the week before the CQWW RTTY contest. At that point Peter recruited them all to mount a multi-op assault on RTTY. The fact that none of them had ever done such a foolish thing before didn't dissuade Peter one whit. Before it was over (560 QSO's) he had not only trained them on the use of the computer and WF1B software, several had been converted to RTTY as well! How's that for a weekend's work?

Next comes Task Force # 2, or perhaps it is better described as Super Armada Number 1, for the next BIG SSB contest. They are now busily engaged in the arrangements for shipping seven (yes, that is seven) Alpha amplifiers and seven 'larger' transceivers. That's just for starters, of course. And yes, we do call this amateur radio.

CP5/CP5/CP5/CP5/CP5

The Digital Journal has a new correspondent in CP land. Mike CP5VW (ex N5QZP) is interested in seeing a bit of news now and then about the Bolivian digital scene. (We hope he sends pictures as well). He should know for he is Technical Director for the Bolivian Radio Club Board of Directors and is running a BBS on HF (with VHF ports to the locals) using Clover. The club is now building a second BBS which will operate Pactor on 40 meters. Mike is busily engaged in upgrading local knowledge and experience in the digital modes.

Mike and his XYL Teresa CP5TB live in 'beautiful Cochabamba, in the center of the country, an area which enjoys the best climate around.' He returned to Bolivia, the country of his birth, after retiring from the US Army. 'At present my two brothers and I are starting a small software development business and I do a little electronic repair on the side. In general, I have quite a bit of fun. My young son, Michael, who will be two in November will hopefully be a ham soon.'

Happy Birthday Michael!
We look forward to hearing from your dad in future issues.

A 24-hour-a-day Clover BBS now operates in Cochabamba, Bolivia. The BBS scans the frequencies 14100, 14110, 14113.5 and 14116 and has delivery within Bolivia for the moment. It also has users in Ecuador and soon will have users all over South America. In the next few weeks we expect to add operations on Pactor in the 40 meter band. International users and forwarding BBS stations are welcome! The BBS callsign is CP5VW for all operations, which are currently utilizing W0RLI software. We hope to attract many users from other South American countries!

A nationwide Radio Amateur Convention is being held in Cochabamba, Bolivia the third week in October. This convention will bring together Hams from all 9 call areas for fellowship and Bolivian Radio Club business.

ZS5/ZS5/ZS5/ZS5/ZS5

What do you do if you can't chase DX? Some operators switch to the Internet. But there are other pursuits. Marc ZS5BA (son of Mary ZS5V and Joe ZS5S) took out his frustration on an angry looking Bush Hog. This one, his first, looks big enough. But he soon knocked over one that weighed in at 112 KG! Hey, this might beat the heck out of the Honor Roll if propagation doesn't improve soon.

G4/G4/G4/G4/G4

Or should we say 'M/4?' Seems as though the UK has run out of all the 'G' options. The announcement, according to Ian G4EAN, states that 'from the 1st of April, 1996, new amateur callsigns will be issued using the M prefix instead of G now currently in use, starting with M0 and M1 for the class A and B licenses. The change will take place whether or not any G calls remain unused. The new series will use the same regional indicators as in the past. Existing holders of G calls will not be affected, but they will not be able to change to an M call. The G prefix will continue to be used for repeaters, beacons and packet nodes.' Full details from <http://www.rsgb.org/rsgb/levtwo/gb2rs/main.htm>.

Not satisfied with that news, the UK authorities kept right on going. 'We surveyed licensees in 1993 about the expressed concerns about the continued relevance of the Morse Code Test. The result of that survey shoed that the majority of Class licensees wished to retain the test, while the majority of Class B licensees saw no need for this requirement. From these conflicting views we have concluded that the UK should not act unilaterally but we do not consider it appropriate that the code test should remain a requirement at the international level. We

consider it outdated and have therefore supported proposals for its deletion from the Radio Regulations. This would remove the international requirement for a mandatory Morse code test.'

We will hear more on this subject, but how can we be surprised? Once it's gone for any class it is but a matter of time before it is gone for all.

Signing, Ian concludes, 'Regards from a sunny and slightly damp Nottingham where we're about to start our Goose Fair. This is a funfair - rides, big wheels (Ferris Wheels), sideshows and that sort of thing. It is claimed to be the largest non-permanent funfair (*we'd call it a carnival in the US . . . .ed.*) in Europe. This year is the 701st Goose Fair - but we lost about 10 due to wars and so forth so it was actually first held about 1285.'

And then Bob G0ARF chimes in with a look at the relationship, or lack thereof, between our hobby and the Internet. This is truly an international phenomenon worth considerable discussion.

RADIO VERSUS THE COMPUTER.

A frequent discussion taking place at my local radio club, and I suspect at many other clubs, poses the question "Is the computer and Internet a challenge to our hobby ?".

How may hams who once rag chewed into a microphone or tapped out an interesting topic on the straight key have been drawn into data modes? Perhaps they experimented with packet radio, then found themselves becoming attracted to the use of computers providing world wide access through Internet. You already have the computer, no need for an expensive black box from Japan, no license requirements and no governing body so no rules to abide by. It's the latest in-thing, and so sure to attract many followers.

The principal interest of the ham is communicating, so what's so very different about the computer operator? He is also communicating and like the earlier days of amateur radio, the number of countries he is able to access via Internet increases month by month world-wide.

So is the radio amateur hobby under threat from this expanding Information Super Highway? It only requires a modest amount of expertise, a telephone modem plus the unit cost of an existing telecommunications network. No need to fathom the vagaries of the ether, improve the design and performance of an antenna, calculate the probability factor of a rare country being activated on data mode coinciding with the required free time of the chasing ham. In fact there is little need to convince the family of the wisdom of moving the house to a location providing ample grounds to support an antenna farm.

Yes, the amateur radio hobby is changing. Not into something different but into something better. As with the interest in computing, we enjoy the ever faster rate of development. I am no great prophet but I see this fascinating, interesting hobby of ours withstanding the test of time, attracting new blood for decades to come. I know very little about Internet and the World Wide Web but it strikes me as a spin-off from Packet Radio and Satellite Communication. There seems little doubt it will continue to grow and become a hobby within itself, much like its mother and father. It will no doubt take with it some licensed hams who prefer that interest. Who knows where it will end up?

But amateur radio, like Old Father Time, will just keep rolling along. Data modes in particular will continue to flourish and develop, making full use of computers as an aid to greater efficiency. But the addition of other modern developments like Digital Signal Processing, spectrum economy with modes like Clover and Pactor II, faster throughput of error free data and increased use of Satellite links for long distance traffic handling as well.

If we look at the continued use of RTTY as the mode most used for live keyboard exchanges, where we feel the success of holding the link depends entirely on the skill of the operator at each end (and not some magic formula built into the computer software), the future is interesting indeed. It can be compared with the history of other interests retaining dedicated groups of followers flying in the face of gigantic leaps into future technology. It's called preferring to do things the old fashioned way. You could put it down to nostalgia but from experience I attribute it to being a hell of a lot more fun.

The smelly, dirty old steam train, eventually banished to the sidings, returns as a flourishing, privately owned tourist attraction to the delight of young and old alike. The skill required to operate and maintain the system resting in the hands of dedicated people who derive greater pleasure from it than riding Le Shuttle.

Ships like the QE2 fail to fulfill the urge to pit our skill against the high seas under sail, (even following an expensive refit !!!).. That need is now provided by specialist companies offering the experience of a lifetime as a crew member under sail. The expertise and know-how resting in the hands of the dedicated.

The jet engine will fly you to the other side of the world before breakfast and you don't even feel the draught. So why are so many people sinking their money into an elongated kite carrying a lawn mower engine suspended by bits of aluminum pole and wires, exposed to the elements at 2000 feet without a
parachute ?.

Reading articles in various journals it is obvious the future of ham radio concerns many of us where modern technology is freely available and viewed as a threat to our hobby. I can't think of any other hobby, or industry for that matter, where we enjoy almost exclusive use of such a priceless element as the radio spectrum. The only solution to increased use being through greater economy of what is available. Amateurs have always proved to be among the pioneers of such challenges and I am sure this will continue, providing the powers that be allow continued use of much of our present allocation, value the contributions made over past decades and not sell it off for a quick profit.

This is not intended as a prophetic statement, merely a personal view from a gut feeling. I am crammed full of hope that I can continue to enjoy using RTTY despite the predictions regarding its early death. Some say amateur radio will die before I do. I doubt it. I could be described as an appliance operator but I am at least capable of connecting my home-brew antenna system to the various bits at the other end and letting the world know I am here, without too much blue smoke.

If you find my views are unfounded or contrary to popular belief, then by all means let's have your view. A question like this will be viewed from many angles depending on your particular interest within the hobby. If there is a threat to the hobby we all enjoy perhaps an open discussion would prompt others to express their opinion on the subject. If we need to protect our interests, the sooner we do it the better.

Better late than never we used to say, but if we are too late it will never get better.

de Bob G0ARF. Eard island.
GB2ATG RTTY news editor for BARTG.

SM4/SM4/SM4/SM4/SM4

Speaking of the death of RTTY, and nobody I know is serious about such nonsense, there is some question about the future of modes other than RTTY in the contest world. See the Contest Chair for other news about SM4CMG

"Dear Amtor Friends,
This was the last Amtor only contest sponsored by SARTG. Due to decreasing interest in Amtor the Contest Committee has decided it is now time to close this event. Many thanks to all magazines and bulletins for running the rules, to all those who participated in this interesting experiment during the past five years!

However, we will continue with the WW RTTY contest on the third full weekend of August and the New Year RTTY contest (for EU's only), as before. The ever increasing number of logs demonstrates that the RTTY mode is still the most popular one for the contests.

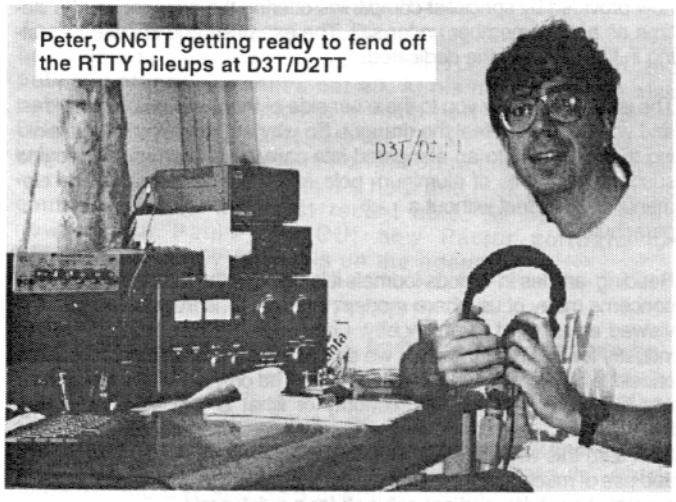
73 de Bo, SM4CMG"

Thanks to all the many contributors to this growing column. Please keep it coming. The more the merrier! Address it to Jim Jim N2HOS at <mortjame@westnet.com>or CIS 71573,1077.

DX News

The latest digi-doings from around the globe

by Jules Freundlich, W2JGR • 825 Summit Ave., Apt. 1401 • Minneapolis, MN 55403



Peter, ON6TT getting ready to fend off the RTTY pileups at D3T/D2TT

The Digital Side of D3T/D2TT

Digital DXing is alive and well.

The most interesting (and somewhat controversial) recent event has got to be the September expeditions to Easter Island, XR0Y and Salas y Gomez, XR0Z. While this DXCC country is not rare on any mode, the trips were notable for the experimental approach utilizing digital technology, including the Internet, as support functions. The attempt to verify a contact as soon as possible after it was made ran into some glitches, both operational and technological. Errors and delays in getting the correct information into the data bases on the Internet got off to a rocky start with data errors and lags of days. But they were breaking new ground, and gradually chipped away at the problems. After all, it was an experiment, and Bob, KK6EK, and his crew are to be commended for their courage and foresight in attempting such a venture.

Other than experimenting with technology applications, applicable to over 45000 QSOs, the expedition hopes to recoup a major part of the expedition cost by the sale of books, videos, and souvenirs, rather than by soliciting individual contributions. In addition to a QSL card, a useful reminder, such as a souvenir mug is a neat idea, previously used in a limited way by other expeditions.

It will be interesting to see how much of what they did accomplish will be adopted as standard operating procedure by future DXpeditions. There will be plenty of opportunity to read about the details in their forthcoming book as well as articles in the DX periodicals. We hope to be able to have a specific writeup oriented to the digital operator in a future issue of the DJ.

Peter, ON6TT (see photo) always seems to be on the run these days. He is not running away from anything, rather he is running to places of human suffering, impoverishment, and disease. As a telecommunications consultant to such organizations as the United Nations High Commission for Refugees (UNHCR), and the International Red Cross, 1995 assignments have included 9Q, Zaire, and D2 Angola. These locations offered him the opportunity to hone his RTTY skills, when time away from his duties permitted. In the September 1995 issue of the DJ, Peter told us of his operating experiences at 9Q5TT. Now we have his comments from his most recent African operation, at D3T/D2TT.

When Peter goes on a trip, he is well equipped. For the trip to Angola, he carried a FT900/AT, Cushcraft vertical, and TL-922A Amplifier. RTTY gear included a PK900, an MFJ tunable DSP filter, (see photo) and WF1B's RTTY software. Remember that the software includes a 'DXpedition Mode'. This combination made RTTY a "joy to run."

Here are some of his random observations from this trip. "D2 seemed to be pretty high in demand....the second RTTY QSO I made, the guy asked me when I was going to Pactor! (I swear!)....working split in RTTY proves to be a pain. It takes a very long time before all go split, and when I finally succeed in getting my split-wish to be known, someone would come along and decide my TX frequency (which must have been very quiet) was THE place to call CQ....just a handfull tried to dupe....I did not have the same trouble with the dot-dot guys as in 9Q....the MFJ DSP filter proved to be worth its weight in gold, especially as I had very strong QRN in my evenings. Without the filter, I often could not hear any signal, but the filter got the sigs out of the noise as if by magic....Ray's software worked great....made running the pileups a piece of cake....there are still a few problems, and some room for enhancements, but overall I recommend this software to anyone who is seriously into RTTY contesting or DXing (from the DX-end)... propagation was lousy, still succeeded in covering all continents....if you got a '111' instead of a '599' report, this meant I was pretty mad at the way you behaved in the pileup. (Ed. Note - Bill, W7LZP has opined "this is an interesting comment. A quick way for the DX to send a message to the lids. Maybe it will catch on.")....if you still miss D2 in the digital mode, D2EV is also active someimes in both Pactor and RTTY."

Peter's next DX operating will be from Heard Island this month. He promises plenty of RTTY, although don't expect to see it the first day of operation. See Heard Island, under DX DOINGS.

DX DOINGS

(Signals are 45.5 Baud RTTY unless noted.)

Note that the DX Doings below include activity as reported from worldwide sources. Therefore, some stations may not be seen, in your particular part of the world, at the hours indicated. To make best use of the data given, couple it with your knowledge of propagation paths to your QTH. For help in this regard, see the monthly propagation charts in QST, and listen to the hourly propagation forecasts at 18 minutes past each hour on WWV. Good luck!

BENIN, TY - Peter, TY1PS, operates RTTY, Amtor and Clover from time to time. You will always find him in the RTTY contests. He no longer operates the satellites, since he moved to a new house last year. He has received two letters asking for satellite schedules. If anyone is interested in going to his QTH to operate Oscars or the Microsats, he extends the invitation. He has all the equipment and it only needs to be remounted.

Incidentally, Peter does not operate CW, but he hosted a group of LA hams during September that used his station to give TY on CW to those needing it. For Peter's address, and QSL information see 'QSL BLUES OUT OF AFRICA' below.

BRUNEI, V8 - Gerard, V85GA will gladly give you a new one if you can find him on 20 meters around 1300Z. QSL to P.O. Box 1200, B.S.B. 1912, Brunei, Borneo.

CUBA, CO - If you still need Cuba, look for CO3ZD on 20 meters after 2200Z. Best QSL route for this country still seems to be via the Bureau.

HEARD ISLAND, VK0 - November is here, and it is the month of THE BIG ONE. Ralph, K0IR/VK6DIR is scheduled to arrive with his team on 12 November, and operate for about two weeks. With the decline in sunspot activity, the ability to reach all parts of the world, particularly North America, will present a tremendous challenge. Fortunately, as one of the team members, ON6TT has pointed out, most propagation forecasts understate expected conditions. Peter has come to this conclusion based on his recent African operations. The RTTY end of the expedition will be in the hands of Peter, ON6TT, Arie, PA3DUU, and Jun, JH4RHF. See the weekly DX bulletins for callsign, frequencies, and QSL route.

INDONESIA, YB - YB8NA and YB5NOF/8 can be found on 20 meters between 1600Z and 1700Z. QSL routes are needed for both.

JORDAN, JY - As a result of equipment help, and advice, from Mike, WB9B we can look forward to seeing a lot more activity on RTTY from Jordan. Mike has shipped a PK-232 to Mohammad (no callsign known yet) through the efforts of Bob, WB9YXY. Keep eyes and ears peeled.

KERGUELEN, FT8X - Jean Jacques, FB1LYF, ex-J28CW and TA/FB1LYF will be QRV as FT5XL for one year starting this month. He will operate CW, SSB, SSB, RTTY, and RS-12. QSL via F5NZO, Didier Bruriaud, Lebourg, F-71140, Vitry-sur-Loire, France.

KERMADEC, ZL8 - Ron, ZL1AMO is reported planning a trip in 1996 contingent upon his being able to raise the $45K needed. Send your contributions to his CBA.

MADAGASCAR, 5R - Ben, 5R8DS, the most active 5R station will have left Madagascar by the time you read this. There have been many armed robberies, killings, and kidnappings in the capital city. Ben and his family decided to go home in Europe for safety's sake. If you still need a QSL for 5R8DS, or 5R8DY, send your request to their home address: Ben Witvliet (5R8DS, ex-PA3BXC) and Marian Witvliet (5R8DY), Sleedorn 65, Emmen - 7822an, Netherlands, Europe. If you happened to catch Shun, 5R8EU, during his brief appearance during October, QSL to the home CBA of JF1MGI.

MAURITIUS, 3B8 - Jacky, 3B8CF makes occaisional appearances on 20 meters between 1500Z and 1700Z. QSL via his CBA.

OMAN, A4 - Tony, G4KLF will be active for the next two years from Oman as A45ZN, and also from the club station, A47RS, on CW, SSB, RTTY, Amtor, and Packet. QSL to T. Selmes, P.O. Box 981, Muscat, Sultanate of Oman.

POLAND, SP, 3Z - I recently asked Chris, SP4TKK the significance of the 3Z0RY callsign. Chris advised it is a club station call which was acquired mainly for contest activities, but they also enjoy using it to give out the rare prefix. Because of the 65 years of PZK (their amateur radio society) they use it from time to time outside of contests as a commemorative event. The call is valid until the end of 1995. For a full color attractive QSL see route in the DJ, DX DOINGS, October 1995 issue.

QATAR, A7 - A71BH, Mohamed is usually found on 20 meters between 1400Z and 1830Z. QSL to OE6EEG, Dr. Selim El Rafai, P.O. Box 31, A-8011 Graz, Austria. A71AB is also active on 20 meters from time to time. QSL route is needed.

RWANDA, 9X - Mark, 9X/ON4WW is back in Kigali until the end of 1995, operating CW, SSB, RTTY, and satellite. He has erected a DX77 vertical for 10-40 meters, and inverted L antennae for 80 and 160. He is interested in helping NA stations work 9X. QSL via ON5NT.

SOUTH SHETLANDS IS., VP8 - Andy, VP8CQS continues to give out a new country on a regular basis. He can be found, with a good signal, on 20 meters between 1700Z and 2200Z. QSL to SP2GOW.

TUNISIA - 3V - Many have been delighted with the prompt response of JF2EZA with 3V8BB QSL cards. Enclosed with the QSL card was a little note from the Manager suggesting that hams write letters to the Tunisian Embassy in their countries celebrating the opening of 3V8BB, the first club station in Tunisia, and encouraging them to license many individual stations in the near future.

WESTERN SAHARA, S0 - If you were fortunate enough to work S07URE, operated by EA4URE, this past summer, QSL to P.O. Box 220, 28080 Madrid, Spain. QSLs for contacts with S0RASD go to EA7JG.

QSL BLUES OUT OF AFRICA

Peter, TY1PS, in addition to helping bring his adopted country into the 20th century of commerical telecommunictions, writes great multimode amateur software, and loves to operate RTTY and Clover. He takes his QSLing obligations seriously, but is plagued by many annoyances, some amusing, because of his particular location in Africa in the country of Benin. If you studied geography 25 years ago, you will recognize Benin as the former Dahomey.

Here are some snippets from a recent communication.

"Please note my correct post office address is Peter Schulze, B.P. 06-2535, Cotonou, Benin, Africa. Somewhere it got published as 06-2525. Unfortunately the person who owns B.P. 2525 is not cooperative and after initially moving the mail into my box, now seems to have discovered the valuable contents and prefers keeping my mail. Please send QSLs only to B.P. 06-2535. (Ed. note. For those who never took high school French, B.P. means Boite Postale. i.e Postal Box.)

"An increasing number of QSL's arrive as registered mail. The Post Office refuses to deliver those letters to my secretary, as they are addressed to me personally, and not to my company. So I have to drive to the airport, wait sometimes up to 45 minutes in the queue, and then drive back. I would prefer to use that time to work some RTTY, rather losing one hour of time to retrive a QSL request. Cards received via registered mail will no longer be answered.

"Green stamps - good news. Benin currency was recently devalued to a US dollar now as 550 of our CFA francs. Postage is approximately 300 something so a green stamp does fine. However the post Office insists on two IRC's for airmail, so a US dollar is better for you and me. Some of you send up to $10.00 along with the QSL request. Whereas I thank you for that, it really is not necessary and is embarassing to me. I only want to cover costs of printing and mailing cards.

"Other currency - I sometimes get currency other than one USD. Some I-stations think that a 1000 lira note is appropriate to cover return mail. Their own letters having stamps for 1350 on it. It is not sufficient. There is nothing I can do with these bills but give them to the kids to play with. From now on, they get the QSL cards to play with also.

"I am getting an increasing number of QSL requests for QSOs that never took place. Most of these come from Italy or South America, and most claim CW contacts. Makes me wonder. Is DXCC madness really THAT important?

"Here's a good one. Some funny people are sending me messages via mailbox forwarding and then requesting QSLs for that 'contact.' An Austrian station states that the QSL is needed for his 'Packet DXCC.' I am wondering how soon I will receive a request for a QSL to confirm an Internet mail.

"Do you know this fellow? I have his card in hand. He is a brave person and sent his green but no return envelope. It seems that air mail postage is not affordable , the letter posted the 10th of April made it here in mid-September. Maybe he just forgot to mark it 'Air Mail', as many do. If you don't mark 'Air Mail' it may take up to two months to get to me. But that is not all. His address is not written on his QSL card, nor on the envelope in which the card arrived. No name on it either. I do know the person is using a 6 element KLM, as I can learn from the card, and he is 'one of the Monte Capra DX Gang' WOW!

"A K4 sends a card for a contact back in '91. I will have to dig out the old logs from a backup tape...no return postage either. Well I better put this one on the 'later stack'. Aha his card carries a little round stamp 'Verified by K4**.' I have seen that several times. Can anybody explain the purpose of it to me? Did he verify his own card? Wasn't he careful enough when filling it in?

"And by the way, Benin is not South Africa. as many write on the address. Nevertheless IK2***'s letter made it here after seven months, but it has a nice stamp from Johannesburg on the back. This one is not

marked 'Air Mail' either but has two nice red stamps on each side. One says 'Diamond DX Club' and the other reads 'IOTA Island Chaser'. I am deeply impressed but suggest B**** should have better invested in one that reads 'Air Mail'. By the way, such markings are invitations for a postman somewhere deep in the NYC, Milano, or Moscow post offices to 'inspect' (and then lose the contents) in order to increase his salary slightly.

"And now..what's that? I am sure I have seen that call before. Here comes the card! The band is playing for our good friend Ron, AB5KD. Ron posted his QSL request on April 10 at 4 PM. US mail did a perfect job of marking it. There are three 29 ct stamps on it, so that should do for 'Air Mail'. But that is nowhere written. So it seems it went by ship and made it here by 23 of August, as the Benin Post Office proudly marked on the back. Let me look closer. Seems something is written underneath these nice stamps that show Billy Clinton's current home. I peel the stamps off carefully and look. Now guess what is written there. Yes, you won the prize. It says 'Air Mail'. Sorry for you Ron, but that teaches all of us a lesson to better mark it several times and in large print. Watch out where the postman puts the stamps.

(Ed. note. USA hams can get little pads of yellow stickers (1-1/4"x1-1/2") free from their local post office, that prominently say 'PAR AVION AIR MAIL'. The optical character readers used in the automated mail handling systems apparently recognize the words. If the OCR's miss it, it is easily visible at a distance by the human eye.. Ask for a pad of Form 'Label 19-B, June 1990.')

Peter adds one final note: "I did not mean anything personally in my comments above,. But I have had several complaints recently about not getting cards. It seems that the responses might improve if the senders are a little more careful with their submissions. I am doing my reasonable best at this end to satisfy all requests.

"Congratulations to the Japanese. All their QSL requests are just perfect and they have the most beautiful cards. 73 Peter TY1PS"

MISCELLANY

When Hurricane Marylin swept over the U. S. Virgin Islands it not only swept away the roof of KP2N's house, but it also scrapped the plans of a multioperator team to again challenge W3LPL in the CQ/DJ WW RTTY contest Multi-Multi category. Fortunately, no one was physically hurt, but you can be sure several egos were injured. Ray, WF1B consoled himself by taking his family to Disneyworld. Ron, AB5KD, had to operate from his home station in the Single Operator, Low Power category! Ron borrowed an expression from another world in an earlier era. He said "Wait until next year!"

If you are an Internet user, and use Ws_ftp software, you may have run into the same problem I did when I first tried it. When logging into an FTP site, you are asked for an I.D., and a password. As an amateur radio operator for some 60 years I have always assumed that my I.D. was 'w2jgr'. If a meaningless password was necessary I assumed that 'anonymous' would be appropriate. Not so on the Internet. I always got an error message 'login failed'. Apparently the software writer never considered radio callsigns as I.D.'s. Jay, WS7I tipped me off on the login procedure that works. I log in I.D. as 'anonymous' and password as 'w2jgr'. Works like a charm every time.

Ray, WB4M, an avid RTTY operator for many years advises that if there are any DX stations that would like a QSL Manager in the U.S.A., he is ready, willing and able. Ray has been a ham for almost two decades, and has a fully computerized station. If interested, contact Ray Ashley, at P.O. Box 2394, Burlington, NC 27216, U.S.A. or via Internet: frashley@netpath.net

HAVE DX NEWS?

Leave a Pactor message at W5KSI.#NOLA.LA.USA.NOAM mbx, or via any of the following: Packet: W2JGR @ WB0GDB.#MSP.MN.USA.NA FAX: 612 377 3600 (mark for my attention) USPS to my CBA.

THANKS - Thanks to the following for all your information: AI1N, D2TT/D3T/ON6TT, I5FLN, IK5PWJ, JF1MGI/5R8EU, N2MIP, NJ1Q, TY1PS, W7LZP, WB2CJL, WB9B, WS7I, ZS5S, and 425 DX News.

See you all next month. For now, bye bye from Minnesota, PAX....
73 de Jules W2JGR

Using Diddle

on RTTY -- why it's important

by Brian Beezley, K6STI
507 1/2 Taylor Street • Vista, CA 92084

I've been away from RTTY since the 1970s. When I recently got back on the mode, the first thing I noticed was the widespread use of diddle. Diddle is the transmission of a do-nothing, idle character (usually LTRS) when your carrier is on but there's nothing else to send. Without diddle your signal would be just a steady mark tone.

Diddle originates in your terminal unit. Usually a parameter is provided to enable/disable the feature. The purpose of this article is to motivate those of you not using it to enable diddle. Although transmission of an idling character may seem unimportant, using diddle has many benefits, some quite profound.

To begin with, diddle allows an operator tuning the band to immediately identify yours as an RTTY signal. Without diddle, the steady mark signal your terminal unit emits whenever it runs out of text is indistinguishable from an unmodulated carrier. You might just as well be someone tuning up, a computer birdie, Radio Moscow between programs, etc. Diddle uniquely identifies your signal as RTTY.

With diddle an operator tuning across your signal can immediately determine your baud rate and your frequency shift (experienced operators can do this by ear). Diddle thus allows an operator to quickly set the parameters of his terminal unit to match those of your transmitted signal. (Advanced RTTY decoders can set baud rate and channel-filter frequencies automatically by analyzing the input signal.) Without diddle, the operator must wait for you to begin typing before setting parameters and tuning you in. If you pause long or type irregularly, the operator may become frustrated and pass your signal by for one that's easier to decode.

The diddle advantages mentioned above are receiving conveniences. If you're patient, once your modem parameters are correctly set you'll copy the same text with diddle as without if the signal is strong. But diddle's greatest advantage is that it can help recover text when signals are weak. One way it does this is to correct your receiving mode whenever your terminal unit incorrectly decodes a FIGS character due to noise. As soon as you decode a LTRS diddle character, your receiving mode is again synchronized with that of the transmitter. This can help prevent printing strings of numbers that should be letters.

Some terminal units use automatic threshold correction (ATC). This feature automatically adjusts the decision threshold that determines whether a received element is a mark or space. When the mark and space signals have equal amplitude, the best threshold for the mark-minus-space signal is zero. But when selective fading or IF-filter ripple/rolloff causes the two signals to be received with different levels, a threshold of zero is no longer optimal. ATC continually adjusts the threshold based on an estimate of the relative mark and space amplitudes. However, it's impossible to do this when there's no space signal to sample! This is the case during a non-diddled idle. An optimal decision threshold is unavailable for the first character or two sent after a pure-mark idle. (Digital ATC can compensate somewhat by peeking into the future and extrapolating a threshold back into the past. Analog circuits don't have this luxury.) Using diddle ensures that ATC has the signal it needs to work effectively.

Here's an even better reason to use diddle: It allows a receiver greatly enhanced immunity to loss of synchronization due to noise. RTTY uses asynchronous transmission. The five data bits of the Baudot code are preceded by a start bit, which is always a space. The decoder in your terminal unit waits for a start bit, collects the data bits, and at some point in the stop bit becomes ready for a new character. But what if while you're sending nothing, a noise burst on the space frequency overrides your steady mark signal and masquerades as a start bit? Your receiving decoder must commit itself to decoding an entire character. But if you happen to begin sending text during the middle of the decoding cycle, the receiver loses sync. It may take a dozen characters, each garbled, before it locates your start bits and resumes decoding correctly.

(Cont'd on page 19)

CQWW RTTY CLAIMED SCORES 1995

Compiled by WA4ZXA

OPERATOR CLASS	SCORE	QSO's	PTS	QTH	DX	ZONES
SINGLE OP/HP ALL BAND						
P40JT	1,664,569	1485	4369	?	?	?
K1NG	1,347,367	1381	2711	181	224	92
S56A	1,254,800	1228	3137	322	78	
VY2SS	1,047,510	1257	?	123	159	57
N4CC	710,940	957	1734	169	157	84
WE9V	703,131	1066	1937	159	139	65
K2PS	619,718	805	1657	142	163	69
NA4M	430,810	757	1286	147	122	66
WA3WJD	314,534	541	986	13	125	61
W3GG	302,872	472	1048	94	133	62
N0AB	258,475	620	1055	108	90	47
W7LZP	256,563	682	983	147	67	47
NA2M (HP or LP)	148,560	376	619	106	86	48
JH7QXJ	143,500	313	875	37	81	46
WA6SDM	140,499	426	603	124	61	48
SINGLE OP/LP ALL BAND						
4X6ZK	804,528	938	2718	41	194	61
AB5KD	639,846	1112	1734	180	122	67
4X0A	487,012	758	2234	40	131	47
KA4RRU	437,987	754	1373	125	134	60
KA1SIE	399,434	754	1442	119	112	46
WA4ZXA	285,948	512	1014	110	115	57
WB2HMF	127,160	313	578	96	80	44
KB2POP	105,225	352	575	85	64	34
KF2OG	95,634	317	506	92	61	36
N7UJJ	93,696	370	488	110	42	40
N4PYD	56,784	189	338	69	61	30
WA5JWU	45,474	167	286	73	50	36
N2VYU	1,548	30	43	18	9	9
SINGLE OP/ASSISTED						
NO2T	498,624	729	1484	121	149	66
N4ONI	485,030	775	1435	143	135	60
V31JU (UN or ASST)	421,852	734	1604	133	86	44
JR5JAQ	355,266	517	1462	46	132	65
N2OL	307,840	634	?	296		
N2FF	293,601	525	1023	114	114	59
KE7GH	186,935	587	763	145	54	46
OH2LU	158,388	338	788	29	125	47
SINGLE OP/SINGLE BAND						
10 Meters						
15 Meters						
ZS6NW	222,120	624	1857	33	64	23
N4SR	21,084	117	251	21	41	22
20 Meters						
JA5EXW	255,910	565	1630	43	81	31
WB7AVD	152,395	576	1051	49	66	30
N1OAZ	114,600	426	955	41	63	16
VE7OR	92,575	349	805	45	45	25
VE6WQ	83,625	299	669	44	55	26
JR2BNF/1	31,920	121	336	21	48	26
K3EST	?	113	?	21	39	14
WA2WYR	5,082	48	121	8	25	9
40 Meters						
K1IU	185,277	674	1227	54	71	26
9A1A	156,240	558	1302	35	62	23
ZS6EZ	87,000	275	?	39	50	20
W2UP	83,760	380	698	49	50	21
WF5E	53,954	352	509	50	35	21
KN6DV	46,552	363	506	51	22	19
80 Meters						
MULTI SINGLE/HP						
OT5T	1,983,016	1551	4166	248	142	86
VP5C	1,845,152	1767	4232	185	182	69
WU3V	1,388,862	1337	?	?	?	?
DF7RX	1,325,280	1164	3012	232	122	86
PI4COM	1,108,357	1046	2687	120	214	77
K2TW	868,436	1089	136	188	74	
WA4QVD	744,640	1153	2080	157	139	62
PI4CC	620,165	753	1885	81	182	66
N9ITX/7	519,930	1060	1635	159	101	58
VK9LZ	517,000	784	2219	79	91	63
PI4ZLD	470,463	627	1563	73	164	63
VE3FJB	404,550	606	1450	111	119	40
N9ENA	199,045	?	?	?	?	?
MULTI SINGLE/LP						
AA5AU	630,400	929	1600	166	151	77
K8UNP	562,872	803	1497	147	158	71
KF4KL	432,928	665	1304	132	138	62
T99MT	287,523	553	1389	65	107	35
MULTI OP/MULTI						
W3LPL	2,154,387	2045	3953	214	237	94

Contesting

Coming Events and Awards

by Rich Lawton, N6GG • 14395 Bevers Way • Pioneer, CA 95666

Rtty Contests - Coming Events

Date:	Contest:	
NOV 11-12	WAE WWRTTY	(German)
DEC 9-10	TARA RTTY Sprinti	(USA)
JAN 6-7, '96	ARRL RTTY Roundup	(USA)
FEB 3-4	IDRA WW Digital WPX	(USA)

— Reminders for Logs —

CQ/DJ WW RTTY Contest
(Sept 23-24) log entry deadline is December 1.
Mail logs to:

Roy Gould, KT1N
CQ WW RTTY Contest Dir.
Box DX
Stow, MA 01775

JARTS WW RTTY Contest
(Oct 21-22) log entry deadline is December 31.
Mail logs to:

JARTS Contest Manager, Hiroshi Aihara, JH1BIH
1-29 Honcho,
4 Shiki Saitama 353
JAPAN

— — COMING UP — —

WAE RTTY CONTEST
November 11-12, 1995
Sponsored by Deutscher ARC (Germany)

CONTEST PERIOD: 0000 UTC Saturday to 2400 UTC Sunday. (48 hours)

CONTEST PERIODS: Only 36 hours of operation are permitted for Single op stations. The 6 hours of non-operation may be taken in one but not more than 3 periods at any time during the contest, and must be clearly noted in the log.

BANDS: 80, 40, 20, 15, and 10M. (five bands) Minimum operating time on a band is 15 minutes. A quick band change is allowed only for QSO with new multiplier.

MODES: Baudot (RTTY) only.

OPERATOR CLASSES: **Note:** DX Cluster support is allowed for all classifications.
a) Single op, all bands; b) Multi-op, Single transmitter (only one signal on any band at the same time is permitted); c) Multi-op multi transmitter (no limit to transmitters, but only one signal per band permitted). All HF transmitters must be located within a 500 meter diameter and within the property limits of the station licensee's address. d) SWL.

MESSAGE EXCHANGE: RST + QSO serial number, starting with 001. (Multi-multi stations must keep serial number by band.) A station may be worked only once per band.

QSO POINTS: Count 1 point for each QSO and 1 point for each QTC (see below).

MULTIPLIERS: Each DXCC/WAE country counts as a multiplier. Multipliers count only once per band. WAE country list: C3 CT1 CU DL EA EA6 EI F G GD GI GJ GM GM(Shetland) GU GW HA HB HB0 HV I IS IT JW(Bear) JW(Spitsbergen) JX LA LX LZ OE OH OH0 OJ0 OK ON OY OZ PA SM SP SV SV5(Rhodes) SV9(Crete) SV(Athos) T7 TA1 TF TK UA1,3,4,6 UA2/UZ2F UA1FJL UB UC UN/UA1N/UZ1N UO UP UQ UR Y2 YO YU ZA ZB2 1A0 3A 4J1 4U1(Geneva) 4U1(Vienna) 9H1. MULTIPLIER BONUS: Each mult on 80M counts as 4 mults; each mult on 40M counts as 3 mults; each mult on 20/15/10M counts as 2 mults.

QTC POINTS: Count 1 point for each QTC reported to any station NOT ON YOUR OWN CONTINENT. Each station may both send and receive QTCs, but the sum of QTCs exchanged between two stations (sent plus received) must not exceed 10. Each QTC (message) will contain: Time, callsign, and QSO number. Example: "QTC: 1307/WA7EGA/131" means that you worked WA7EGA at 1307 UTC and received his serial number 131. A QSO may be reported only once and not back to the originating station. (You cannot report a QSO with WA7EGA back to WA7EGA for credit.) The same station can be worked several times to complete the quota of 10, but only the original contact has QSO point value. A uniform list of QTCs sent must be kept. QTC 3/7 indicates that this is the 3rd series and that 7 QTCs are now being sent. Record all received QTCs on a separate sheet with a clear indication of the sender. If more than 100 QTCs are claimed, a QTC checklist must show that the maximum quota of 10 QTCs per station has not been exceeded.

FINAL SCORE: Multiply total number of QSOs + QTCs by total of multipliers.

AWARDS: Certificates will be awarded to highest scorer of the different classifications in each country (a reasonable score provided). Continental leaders will receive a plaque. Each participant with at least half of the score of the continental leader will also receive a certificate.

LOGS AND SUMMARY: Use separate logsheets for each band. Indicate clearly all band changes. Duplicate contacts must be clearly marked in the log. If more than 100 stations have been worked on a band, a separate dupe sheet is required.
NOTE: Logs violating these rules can be regarded as checklogs.

DEADLINE: Log entries must be received by December 15, 1995. Mail to:

WAEDC CONTEST COMMITTEE
P.O. BOX 1126
D-74370 SERSHEIM
FEDERAL REPUBLIC OF GERMANY

COMMENTS: This is the RTTY version of the CW/SSB WAE Contest. While the QTC rules seem complex, one doesn't have to get into the QTC portion of it to enjoy the comaraderie. Besides, there may be a new country to work, or a DXpedition pileup challenge to undertake. A maximum of 36 hours of operation is allowed. Check out those low band bonuses - expecially if you have a good shot to Europe.

— TARA RTTY Sprint —

9-10 December, 1995
Sponsored by Troy Amateur Radio Association, New York
(Ref: TARA, NY2U)

CONTEST PERIOD: From 2100Z Saturday, to 0100Z Sunday (4 hours)

MODES: RTTY only

BANDS: 80, 40, 20, 15, and 10M

CLASSES:
A) Single op, all band
1) Less than 150W output
2) More than 150W output
B) Multi-op, single transmitter

EXCHANGE: USA stations: send RST + state
Canadians: send RST + province
All others: send RST + QSO nr.

MULTIPLIERS: each USA state, DXCC country, and each Canadian province, + VE8 and VY1

NOTES:
- n Multipliers count only once, not once per band.
- n KH6 and KL7 count as DXCC countries only.
- n USA and Canada do NOT count as DXCC countries.

QSO POINTS: Count 1 point per QSO.

FINAL SCORE: Total of QSO points x total of mults.

DEADLINE: Logs must be received by January 17th. Mail to:

Bill Eddy, NY2U
c/o TARA, 2204 22nd St
Troy NY 12180

COMMENTS: Strictly a 4-hour RTTY speed contest. Rules are the same as ARRL Roundup. There are NO band multipliers. It should be a good warm-up for the ARRL Roundup 4 weeks later.

— HAL's P38 for RTTY Contesting —

I broke down and ordered a P38 card from HAL Comm., after using a PK-232 for 10 years. The ads and the write-ups were intriguing, and since I was fascinated by DSP (Digital Signal Processing) technology, I leaped. I just had to know how DSP would perform in RTTY contests, and pileups.

My timing was poor. I received it about 2 weeks before the big CQ/DJ WW RTTY Contest. No sooner had I hooked it up, when one of the TS-930S's fans broke down. No time to fix that, so I placed a 3-inch fan behind the rig to blow into the dead fan. (It worked and it's still there.)

To the point: Which to use - AFSK or FSK? I tried 'em both. It was no contest! I found that for RTTY DX pileups you simply MUST use sharp 500 Hz CW filters in transceivers. The broad 2.7 kHz SSB filter used with AFSK cannot dig out the weak ones in crowded RTTY bands during contests. The P38 can cleanly separate 2 or 3 RTTY sigs almost on top of each other, but they'd have to be about the same signal strength. Suprisingly, I fould that the P38 could easily read very narrow-shifted RTTY signals that the PK-232 always had a hard time doing.

Another point: I found that to get full benefit of P38's DSP, one has to be prudent about front end blocking from very loud sigs when trying to dig out very weak DX. In other words, crank down the RF gain and compensate by cranking up the AF gain. I discovered that I could use Fast AGC with the P38 as long as the "S" meter didn't move. Since I wear earphones, I have to protect my ears from the occasional shrill blasts of adjacent frequency QROers. It appears that the P38 is less forgiving of the potential distortion created by *any* AGC - even Fast AGC - with its digital filtering, than is the PK-232. I found this more so on 40 and 80M, where static crashes can either: a) kick your low-set Fast AGC, or b) kick your ear drums with no AGC! Also, using 10 dB of RF attunuation (RF ATT knob) really helps cut down most of those LOUD static crashes so prevalent on the low bands. Evidently digital filters can get knocked out of whack by sharp static crashes or adjacent channel clicks, whereas regular LC filters don't appear to be as sensitive. I also found that using **Alt-G** (force letters) very quickly put the P38 rightside up when clobbered by static crashes, clicks, or fast AGC moves.

NOTE: Using "RTTY by WF1B" that would be **Alt-L**.

Setting the CW filter for FSK: I cranked both Slope Tune knobs fully clockwise. This set the low-pitched CW filter to pass the higher-pitched (2130-2300 Hz) RTTY tones. This works great on RTTY, Amtor, and Pactor. A minor obstacle with FSK: The digital frequency indicator reads 2.2 kHz lower than the AFSK reading. (If you're going to sked someone on a different band, take the 2 kHz into account.)

Major disappointment: No tuning indicator. Using contesting software, such as **"RTTY by WF1B,"** there is no indicator because the HAL software uses tuning bars integrated with their plug-in card in the PC. Whoops! What to do? Well, after saying, "Oh, for pity's sake!" a couple of times, I operated the entire CQ WW RTTY contest by simply listening to the signal's highest tone (Space), making sure it didn't roll off the high end of the transceiver's CW filter, as I slowly turned the main dial and watched the monitor screen. That worked OK, but was a bit of a bother. Perhaps that Plus-Plus circuit that W6FFC used in his ST-5 and ST-6 demodulators would work. (See "Tuning Indicators for RTTY" by Bill Henry, K9GWT, page 5 of Sept '95 Digital Journal. Good stuff!)

Bottom line: I really like the P38! Even with NO tuning indicator, I made 531 QSO's in 55 countries and 42 states, all with NO sunspots! Band conditions were poor, and strange. With SFI around 70 I even worked a few JA stations on 20M long path, with my yagi pointed over South America. I'll bet that if I had a tuning indicator I could have made at least 532 QSOs!

Seriously though, I found that I could copy extremely weak stations consistantly better than I have ever been able to do before. Maybe that's a combination of P38's all-digital state-of-the-art design using DSP, and me being dumb enough to try to operate an entire RTTY contest while tuning by ear!

((73)) See you in the pileups, Rich, N6GG

(Cont'd from page 16)

Leaving a steady mark signal between characters or words is just waiting for an accident to happen. If you're lucky, a noise burst or signal fade will be decoded as a single bogus character and your receiver will then resume waiting for a start bit. If you're unlucky, you'll lose sync and print garbled text until the transmitter and receiver relock. Using diddle greatly minimizes the chance of this happening. Diddle causes the receiver to commit to decoding an idle character whenever there's nothing to send. This forces the receiver to maintain sync with the transmitter. Noise can cause a false trigger only by occurring in the very brief interval between the receipt of the stop bit and the beginning of the start bit. (The width of this open window is a modern design parameter. It involves a trade-off between rejecting false start bits and missing valid start bits of signals whose timing is fast).

The window for detection of a new start bit might begin 22 ms into a 45-baud stop bit. The window ends when the diddling transmitter emits another start bit, typically 9 ms later. Thus, out of a nominal character length of 163 ms, the receiver can be thrown out of sync only during a window 9 ms long. Diddle has improved its noise immunity from 0% to 94.5%. That is, the receiver will falsely trigger on sufficiently strong noise only 5.5% of the time rather than 100%!

While these arguments for diddle are compelling, I think this is the most powerful of all: Modems with advanced synchronization algorithms can lock to asynchronous character streams and essentially receive RTTY synchronously. The critical asynchronous-protocol dependency on a start bit can be virtually eliminated. A modem can do this by implementing what amounts to a numerical flywheel whose rotation is synchronized in phase and frequency with the transmitted characters. Timing marks engraved on the flywheel determine when received characters begin rather than noisy start pulses. With a flywheel of enough mass, a modem can maintain sync through deep fades in which the signal disappears completely. The flywheel permits you to recover text that would otherwise be lost.

Use of a numerical flywheel also improves decoding by greatly reducing timing jitter. When optimal channel filters are used to receive RTTY, the exact point at which the signal is sampled to determine whether it's a mark or space becomes more critical. Optimal filters do not output rectangular or rounded pulses. Instead, they generate triangular waveforms. The optimal sampling point is at the peak of the triangle, but this location can't be determined by waveform inspection. Instead, sample timing must be derived from the timing of the start pulse. When it's noisy, the samples will be mistimed and a mark may be mistaken as a space. A well-implemented numerical flywheel can virtually eliminate decoding errors due to timing jitter.

But here's the rub: Without diddle, a numerical flywheel has no way to maintain lock when you stop typing (or worse, when you type irregularly). Even if once locked, a prolonged mark tone or intermittent character timing will cause the flywheel to wander off and become useless.

While I believe they've been attempted before, RTTY modems with robust numerical flywheels will become widely available in the near future. You can take advantage of their advanced synchronization capabilities only by using diddle on your transmit signal. For this reason and all of the others mentioned above, do yourself a favor and always use diddle.

The Contest Chair

Hints, Tips & Inspiration for Better Scores

by Ron Stailey, AB5KD • 504 Dove Haven Dr • Round Rock, TX 78664
Internet:ron481@austin.email.net

Hello contesters and DXers. Here it is November already, and time for The WAEDC-Worked All Europe! This contest will definitely grow to become one of the biggest contests of the year when and IF we get software to support the QTC exchanges. I'm sure Ray WF1B is working on it and should have software going in '96. If not we will all have to gather around his house and chuck 'ground apples' at him when he comes out the front door. (Ground apples are commonly known as ROCKS in South Texas. Hi!) Even if we don't have software that supports WAEDC this year we can all join in the fun and do the best we can and have a good time.

This month we are going to talk with Jan Palmquist SM5FUG of Vasteras Sweden, a callsign we have all logged many times over the years. Jan is in almost every contest that comes along and usually finishes very high in the final results. He has been a reader of the Digital Journal for sometime, but feels it is very much USA oriented. (Note: We are aware of this and we are working very hard on it. But to be more international we need contributors from more countries! What are you waiting for??? . . . Ed.)

Jan has been on RTTY since 1974. His first RTTY contest from his home base was the CARTG contest that same year. He mad 29 QSO's and finished 90th place world wide then. Before this he took part in some multi/single entries from their local club station SK5AA. The following year he participated in many RTTY contests, though mostly just for fun. In '82 he graduated from the University and moved into a new apartment. He then started his serious contest efforts. He had the opportunity to put up a directional antenna and took full advantage of it. He picked up an old, corroded TH3mk3 and the world opened up!

He still lives in the same apartment. His apartment is in a nine story building, one with a flat tin roof and most important, a REASONABLE landlord. His apartment is located in the city of Vasteras and, like most apartment buildings contains quite a few VCR's and stereos that sometimes work well as radio receivers! He has cured a number of these problems, but new neighbors bring in new equipment all the time. Since Cable-TV was installed he has had no TVI problems.

Towers and Antennas: For the moment his antenna farm consists of The old TH3mk3 tribander. It sits about 3.5m (11.5 Ft.) above the tin roof and about 30m (98.5 Ft) above ground level. Jan says it works OK, but it is too close to the tin roof for optimum use on 20m. A full size 80m Delta Loop hangs between his apartment building and an identical building next door. Jan says it works very well in all directions. He uses a Butternut HF6V-X Vertical as his primary 40m but also uses the same antenna on the high bands to grab a quick mult when the beam is in the wrong direction. Like many contesters, he has found it very convenient to have an omni-directional antenna as a complement to the beam.

Jan's station is built around a Kenwood TS-850S. It works quite well on RTTY when he uses a 270Hz filter, which is just wide enough to let RTTY signals pass. Using FSK, Jan has always used the narrow filter to gain the maximum benefit. He tried AFSK once but had too many complaints of stereo interference. All these problems disappeared using FSK! "Quite a few stations can be heard on two or three different frequencies because of overdriving their microphone inputs with AFSK," says Jan. "This problem wouldn't exist if they would run FSK."

I love his recommendation for choosing an Amplifier. He doesn't recommend any special brand. "When choosing a linear, take the one with the heaviest transformer and the loudest blower, spend as much money as you can afford and run half the promised power, then it might survive longer than half a RTTY contest." Great!!

Jan claims to be the last contester to convert from mechanical RTTY to computers, back in '91. He tried a few programs and was never satisfied until he used RTTY by WF1B. He recognized that it was a program made by a contester and not just a software programmer. And he loves the ease of operation. Jan recently upgraded to a 486DX-33. Now he likes running RTTY in color!!

His PK-232MBX works well. However, he feels it doesn't work as effectively as his old ST-5 that he built in '74. He still has the

ST-5 connected to his Siemens T100 machine and likes the built in tuning scope in the ST-5 and often starts up the Siemens machine when QRM is bad. The ST-5 has sharper filters than the PK-232 and is more tolerant to wrong baud rates. Jan says he wouldn't seriously consider doing a contest without a tuning scope. Nothing beats a scope for tuning!

His favorite bands are 15m and 80m. When 15m is open it gives good signals from the whole world and high power isn't as important as on 20m. His beam seems to do the best job on 15m setting a quarter wave above the tin roof. On 80m he has the best antenna and often has a high number of multipliers there. He is always on 80m just after his sun rise trying to get USA stations to put more mults in the log. In the evenings he tries to work the Europeans and some Asia (so far no JA's worked but he has heard a few). African stations can also be worked from Sweden but they are very rare. Jan said last year during CQWW he almost fell out of the chair when A22MN called during a European run. His high Latitude, 60 deg N is almost the same as Anchorage, makes 80 and 40m propagation diffjcult. Jan envies stations living farther south. 40m can be especially frustrating, hearing Southern Europeans running stations he can't even hear. 40m is tricky with different RTTY segments. In Europe and Asia they run RTTY on 7030 to 7045, the USA uses 7080 to 7100 which is in Europe's Phone segment. CQWW is normally the same weekend as a Scandinavian Phone Contest. 7080-7100 is usually crowded with RTTY and Phone contesters on Sunday. Jan normally tries to cover both segments depending on propagation, IF AWAKE. He tries to be on 40m just before his sunrise when propagation is often best to the USA, then goes to 80m to see if any USA is coming through, then back to 40m before it closes.

Favorite Contests: SARTG, BARTG and CQ/DJWW for they are in the right time of year. These contests usually have good propagation on all bands along with high activity from all over the world. SARTG is his favorite, being a Scandinavian. He likes the 3 x 8 hour periods. It makes it possible to operate the whole contest without killing himself. It also covers the whole 24 hours making it equal for all. Serial numbers helps you keep track of your competition. Jan says, the Alexander Volta contest is also fun with QSO points depending on distance but he sees the need for software support by WF1B for there is not much activity. (Note: As of last June, RTTY by WF1B now supports Volta contest on Ver-2.20...)

Worst Contest: ARRL Roundup! A combination of wrong time of year starting with the wrong time of day. Most of all, the lack of band multipliers makes this contest useless for those living in northern Europe. Jan feels without band multipliers all activity flocks to the best band to the USA meaning that he can only work about 6 hours of the 30 hour contest. He feels contests should have band multipliers to spread out the activity on all bands.

Jan's Contest Strategy: Call CQ 75% of the time, hunt for new mults 25%. Don't miss openings to the USA on 80 and 40m. Don't miss a good long path opening to VK/ZL/JA on 20m in the mornings. Check for short openings on 10m around noon. Be on 15m when it opens toward the East in the morning and when it opens to North America in the afternoon. In between, run 20m except for 80 and 40m in the evening to Europe and Asia. Jan usually goes to bed after midnight to sleep a few hours before 40m opens. On Sunday he usually shuts down early so he can go to work on Monday morning.

SM5FUG's Contests Results: Jan feels he lives in the wrong part of the world for big results. He thinks operating form the Caribbean would be nice with normal propagation, no Aurora, and no angry neighbors at the door. Like all of us Jan wants to win, but tries to at least get into the Top-10 if possible. He says competition is getting harder and harder with some of the Big Gun Phone/CW contesters doing RTTY now. Note: It is getting harder to win. That's a fact. However, Jan has carved his SM5FUG callsign into a few contest results. Here is a look at a few of his accomplishments.

CQ/DJWW	SARTG	BARTG
9th WW S/O H.P.'91	12th WW S/O '92	12th WW S/O '92
9th WW S/O H.P.'93	3rd WW S/O '93	6th WW S/O '93
10th WW S/O H.P.'94	5th WW S/O '94	15th WW S/O '94

I want to thank Jan for all his help in preparing this article. Next month we will talk with Eric Heikkinen OH2BBF/OH0BBF in Finland.

The next three contests:

Contest	Dates	Start Time	End Time	Operating Time
Sprint	Dec 09-10	2100 UTC Sat	0100 UTC Sun	No off times
Roundup	Jan 06-07	1800 UTC Sat	2400 UTC Sun	24 of 30 hrs.
WPX	Feb 10-11	0000 UTC Sat	2400 UTC Sun	30 of 48 hrs.

This will be the 2nd running of the World Wide RTTY WPX Contest sponsored by The Digital Journal. It will be another big contest, I'm sure you don't want to miss. MARK YOUR CALENDAR.

Until next time, 73's de Ron AB5KD

"Remember"
Big antennas high in the sky work better
than little ones close to the ground....

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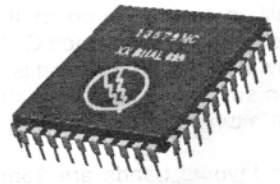
PS Form 3526, October 1994 (Reverse)

8-bits, 16-bits, 32-bits a Dollar??

Part Three

by Steve Holton, N2QCA
1113 Sunset Street • Yorktown Heights, N.Y. 10598 / Internet: slapshot@westnet.com



Last month we looked at the evolution of the Intel microprocessors for PCs from the hardware viewpoint. This month we'll switch our focus to the software side of the equation. With all the hoopla surrounding the Windows 95 introduction extravaganza, about it being a 32-bit operating system running in protect mode, for example, you may be in for a few surprises. I think two things will become clear as you read on: one is the fact that both protect mode and 32-bit operation have been increasingly present in both DOS & Windows for some time, as well as OS/2, NT and UNIX; second, running in protect mode is no guarantee of any protection whatsoever - it only provides the potential for a system to provide protection.

Let's quickly review the key stages in the progression of Intel microprocessor evolution that we covered last month that are significant to the evolution of PC software:

8088/86 Real mode execution with maximum memory 1MB and no protection mechanisms.

80286 Memory only directly addressable in 64KB segments. Real mode identical to 8086/86. Protect mode providing protection mechanisms and allowing 16MB of memory. Memory segments limited to max of 64KB. (16-bit protect mode) No clean way to run real and protect mode programs together.

80386 & up-Real mode identical to 8088/86. Protect mode identical to 80286. Protect mode extended to allow 32-bit addressing as well. Up to 4GB of memory all directly addressable. Concurrent operation of real mode programs in protected mode (Virtual 86 mode).

Of course the continuing dramatic performance improvements are important in enabling ever more complex applications, but the functional features listed above are they key ones in the evolution of PC operating system software. Let's look now at each major PC operating system in turn to see how they evolved.

DOS

DOS appeared on the scene with the initial IBM PC and was the only serious game in town. The maximum of 640K, out of the total 1MB, for RAM seemed huge. Most systems had 64KB or less so even the awkwardness of 64KB segments wasn't apparent. This didn't last, and the 640KB maximum was began to limit things very quickly.

The first approach to a solution were expanded memory cards - watch the words here *expanded* and *extended* memory. The words sound and look the same but they aren't! Expanded memory cards were adapter cards with additional memory on them and logic which allowed a portion of their memory to appear to the PC in a "window" of unused addresses somewhere between 640K and 1M. You could not address more than1MB at any one time, but could program the card to make different parts of the expanded memory appear in the window. This was pretty much a stopgap measure and we won't dwell on this any further though it's legacy still lingers on as EMS memory in the DOS memory managers which we are now going to introduce.
The 80286 processor itself was capable of addressing up to 16MB of memory when running in protect mode. The memory that it could access above the 1MB real mode limit for DOS was called extended memory (XMS). The initial use of that extended memory was as a RAM disk to provide very fast access to commonly used files by keeping a copy in memory. DOS switched into protect mode long enough to copy data to and from DOS's conventional memory and the RAM disk in extended memory. Even then DOS was running some of the time in protect mode! DOS was just not designed to take any advantage of the potential of protect mode to protect itself from applications or run multiple applications concurrently, and so it remains to this day. Other uses soon became apparent, starting with simulating the earlier EMS expanded memory cards with the processor's XMS extended memory. Bless'em! I still get confused myself and have to stop and think XMS vs. EMS - expanded or is that extended?? and I've been writing 32-bit protect mode operating systems since '86!

Other folks realized that even though DOS wasn't ever going to be a real protected operating system - to do so it wouldn't be DOS- they could try and get a least one program running using protect mode to get at all that memory above 1MB. With that the beginning of the world of DOS memory managers and extenders began. Firms like PharLap, QuarterDeck Systems and others started offering products to allow use of the 80286 system's extended memory. At first it was rather helter-skelter. Conflicting approaches to managing the memory introduced problems as to what programs might run together, and in what order they had to run etc. Two different standards arose: VCPI (Virtual Control Program Interface) from almost all the vendors; and DPMI (DOS Protected Mode Interface) from Microsoft. The winner after some fairly bitter wrangling was - you guessed it - DPMI. Programming in 16-bit protect mode was not as pretty as everything in the program and it's data had to be broken up into segments smaller than 64KB. But one could use the additional extended memory to write larger programs, accessing more data than with plain real mode DOS. To write programs to run under DOS in 16-bit protect mode required special tools for the developer. If you venture out of the digital world into phone/CW contesting and use the program CT. You may recall that there are 3 versions of the program: CT86.EXE for real mode, CT286.EXE for an 80286, and CT386.EXE for 80386s and up. Each one successively utilizes more memory, more efficiently. This also illustrates the other problem - backward compatibility. You cut yourself off from potential customers if you just put out a version for the latest processor - though this is now finally fading as so many people now have '386 or better systems.

DOS reached it's final plateau when running on the 80386 (or later) processors. Two things change for DOS on the 386 compared to the 286. The first is the fact that greatly increased extended memory - up to 4GB if you have deep pockets - is much easier to program because of the disappearance of the ugly 64KB limits. The second is the introduction of the Virtual 86 mode which allows real mode DOS programs to run in a protect mode environment. This is the world of today's DOS with memory managers like HIMEM.SYS, EMM386, QEMM-386 or 386MAX. These allow most of DOS itself to run outside the first 640KB of memory, and provide support for programs like CT386.EXE that were built containing DOS extenders to allow them to run in 32 bit protect mode and use all the avail-

able free memory. How is this done - by running DOS in protect mode all the time! These memory managers, in fact, switch into protect mode and run DOS in Virtual 86 mode. Using the page table mechanisms of the 386 they are able to map memory from above 1MB into unused areas between 640KB and 1MB and also through some trickery exploit a "loophole" dating back to the 8088/86 that allows real mode to work 64KB beyond 1MB as well. This is how you can get 600+KB free under DOS. If you, your kids or grandkids are into games you find that they seem to have an insatiable hunger for lots of free conventional memory below 640K and many also now run only on 386s and above using DOS extenders and run in 32-bit protect mode.

To conclude with respect to DOS, if you have a 386 or better DOS is probably running in protect mode all the time. You are probably also running 32-bit programs like RAMDRIVE and SMARTDRV all the time, and probably own a number of programs that also run in 32-bit protect mode like CT. This brings home a key point - your DOS is running in protect mode, but you see no protection. DOS is using protect mode to access more memory and to make it easier to run a single large program and for no other reason. It's not designed to take advantage of the potential for protection or running multiple concurrent programs safely - multi-tasking. DOS really can't do this - part of it's very success is the fact that it is such a wide open - naked system. Creative programmers all over the world have written some incredible programs and some of them have found unbelievable shortcuts and holes in the system which they exploit. Any attempt to close up the system with protection would break so many programs that DOS will remain where it is. This problem will continue to appear as we look at the operating systems that followed DOS.

Windows

When the development of Window began several factors had a strong influence on how it evolved. For one, there were still a substantial proportion of systems with 8088/86 processors, with the balance being 286 based. There were very few 386 systems, and doubts as to how fast they would penetrate the market. So there appeared to be a requirement to support both real mode 8088 based PCs and 80286 16 bit protect mode capable machines with support for the 386 to follow. In addition, a powerful GUI (Graphical User Interface) extension to PC DOS was really new territory. Aside from the significant 1984 release of the Mac with the first real mass market GUI - which drew heavily on work from Xerox PARC - there was little in the PC world to build on. These factors combined to guarantee that there would be more than a few growing pains before Windows would anything but a toy. It was not until the release of Windows 3.0 in May 1990 that a really useful product was available.

Windows release 3.0 still persisted in offering a real mode that could run on the original real mode only PCs but real mode was truly a nonstarter. There was simply no way to cram all that was needed to produce a useful offering in 640KB nor was their the computing horsepower that was required on these older machines. The effective target of Windows 3.0 was 286 based machines - ie Windows Standard mode. To be sure, it would run on 386s and up but didn't exploit any of the advances available in these machines. What does this all mean? Windows does run in protect mode when running on a 286 or better machine. To be clear, Windows is started from DOS (running in real mode of course) and it then switches to protect mode, but Windows depends on DOS for a number of things including access to files. It also depends on DOS to run a single DOS session under Windows. Thus it is switching back and forth from real to protect regularly which is rather clumsy and inefficient on the 286. Well if Windows is running in protect mode where did all the UAEs (Unrecoverable Application Errors) and other crashes come from in 3.0? This brings home a key point about protect mode systems.

The features in the protect mode of the Intel microprocessors only *offer* the opportunity to build a system that really provides bulletproof protection. Simply running in protect mode provides no protection in and of itself - witness DOS's use of protect mode. There are three essential elements in constructing a bulletproof system. The first is to use at least two privilege levels (kernel -user or in Intel lingo ring0 - ring3) to protect the operating system from all applications. This is also used to restrict key instructions to only the operating system. These key instructions include things like manipulating I/O or disable interrupts. If an application were able to disable interrupts and then wandered off into the weeds the system becomes completely locked up. Other instructions manipulate the protection mechanisms - letting applications issue these instructions either deliberately or accidentally is effectively canceling any protection. The second thing is to protect one application from another. This is done by using the memory management features of the chip to isolate the memory of each application from the others. A further use of the memory protection features is to separate programs from their data so that program code can't accidentally alter itself. This can be done for the system and for applications. The third element is the system taking a 'trust no one' attitude. This means that when the system is asked to do something it must validate all of the parameters it is given that could corrupt the system or another application if the parameters were bogus. If you can do all this and make a bulletproof system then why don't all protect mode systems offer this kind of protection?

Well that old expression "there ain't no such thing as a free lunch" certainly applies here. In fact it applies in two important ways. One is the cost in terms of performance. In order to protect things you are, in effect, forcing applications to ask the system to do anything that potentially "dangerous" to the system. It costs something each time you switch from a user level application to the kernel level system, and on the Intel processors the cost is rather high. The validation of parameters to protect the system also has it's costs in performance. The second cost is in terms of compatibility. In DOS, programs were able to and regularly did things like 1)access and manipulate the hardware directly 2)stomp on DOS, themselves or other programs deliberately and 3) a multitude of other creative things. This was both good news and bad - the good was some amazing programs, the bad was the fact that programs didn't always get along with each other and caused various mysterious crashes and hangs. These two factors cause a system designer to make some tradeoffs to balance the level of protection a system can offer with it's performance and compatibility with previous systems. With these things in minds let's return to the real world of Windows.

The tradeoffs made in Windows 3.0 were heavily on the side of compatibility and performance vs. protection. The fact that it had to run DOS programs in true real mode forced a significant exposure in terms of protection. It also failed to restrict applications from all privileged type instructions which opened more potential problems areas. Further, all windows applications were run in the same memory space so they were not isolated from each other. Program code was protected from spurious accesses but little else done to make a rigidly protected system. Much of this was the result of conscious decisions driven by the perceived performance and compatibility requirements. Some of this was driven by the existence of a real mode in Windows, which while never really viable did, by it's existence force some of the compromises. Having set out on this course, programmers took advantage of the of the rather wide open Windows structure making it very difficult to tighten up the system without breaking large numbers of popular programs. This legacy is still with us today.

The arrival of Windows 3.1 in March of 1992 did, however, make a number of strides within the constraints we've just discussed. For one, multiple DOS programs could now ran and run in V86 mode which greatly improved the reliability from ill-behaving DOS programs. Secondly, work was done to improve the validation of parameters passed to the system -parts of 3.0 were downright nonchalant in this area. Windows 3.1 was still solidly a 16 bit protect mode system. Memory was managed in segments no larger than 64KB. This made programming large application rather complex. It also forced applications and the system to be very specific to the Intel segmented architecture making them decidedly non-portable to platforms based on other platforms. Some ability to run 32 bit programs was also available in 3.1. Virtual Device Drivers (VxDs) was one vehicle, 32 bit DOS extender applications in a DOS V86 DOS box was another, and there were others. But the system itself was thoroughly 16 bit in nature. The 'out of system resources' problem many people experienced when running multiple complex applications were due to the system running out of space in one of several key system data areas that were limited to single 64KB segments.

Lest this sound too negative, let's put things in perspective. No one predicted the amazing success of the IBM PC and DOS. Part of it's success was the fact that it was so wide open. The original DOS was a very simple system which drove programmers all over the world to stretch, extend, bypass and occasionally break it to create a multi-billion dollar industry. A great deal of what followed in DOS and Windows had to recognize what had gone before and had to offer attractive performance and compatibility. The sustained dramatic success in the market place of later versions of DOS and Windows, once it passed the teething stages, clearly indicates that the compromises and tradeoffs made were in tune with the marketplace.

We've seen so far that our old favorite systems have been increasingly utilizing Intel protect mode and 32 bit mode even if we were not entirely aware of it. We have also seen that running in protect mode doesn't automatically bring a bulletproof system. This installment has been looking backward, our final installment next month will look at the "32-bit" systems that are drawing a lot of attention today - Windows95, OS/2 Warp, Windows NT and even UNIX systems like Linux. We'll also try and demystify multi-tasking and multithreading, the other buzzwords that are always mentioned right after the '32 bit' phrase.

73 de Steve N2QCA

SARTG WorldWide AMTOR Contest 1995

Results

Call	Final Score	QSO	Pts	Multiplier/Band (MHz) 3,5	7	14	21	28
Single Opr - All Bands								
G4BMK	26085	70	705	8	17	9	2	1
G4ZKJ	14105	48	455	4	8	15	3	1
7S4RY[1]	10925	58	475	9	12		1	1
SM6BSK	8450	35	325	10	9	7		
G0MBQ	6840	31	285	8	3	10	2	1
HB9AWS	3360	21	210	9	7			
SM0TGG	2145	16	165		6	7		
UA6LP	1260	14	140		4	5		
YL2KF	880	11	110	3	2	3		
SM4CMG	225	6	45	3			1	1
SM7BGE	40	3	20	1		1		
7 MHz								
G4BMK	6885	39	405		17			
7S4RY[1]	3240	29	270		12			
I2KFW	2940	25	245		12			
HB9AON[2]	660	11	110		6			
UA6LP	200	5	50		4			
SM6PVB	80	4	40		2			
14 MHz								
JA3DLE/1	450	5	75		6			
Multi Opr								
SK4RY[3]	27090	65	645	7	10	22	2	1

Operators

[1] SM4RGD. [2] DJ2YE. [3] SM4CMG + XYL Eva.

Results compiled by SM4CMG, 20 July 1995

Comments

G4ZKJ: Again a hard but enjoyable Contest, with the added pleasure of meeting old friends. Hopefully next year Sun Spot conditions should improve and therefore help. Checking before calling that QRG is not QRV would also help. Pactorites please listen!

7S4RY (op SM4RGD): KUL att köra med SARTG:s specialcall. SYND bara att konditionerna var emot oss den här gången och en WW-test i påskhelgen var nog inte heller så lyckat, många var säkert upptagna med annat.

SM6BSK: Om årets konditioner och aktivitet vill man bara utbrista i ett: USCH!!! Måtte det bli bättre tills nästa gång.

HB9AON (DJ2YE): War mal wieder wie 1993 gerade zur Zeit des Testes in HB9 zum Skirlaub. Konnte daher nicht so viel mitmachen, hi.

SM0TGG: Tuff!

SM7BGE: Bara tre QSO — men jag var med — och jag kommer igen!

SM6PVB: Inte så mycket kört egentligen, men skoj att contesta i Amtor. Första Amtor testen, inte den sista.

JA3DLE/1: The conditions were really awful, meantime I was so busy and could not join the first two rounds.

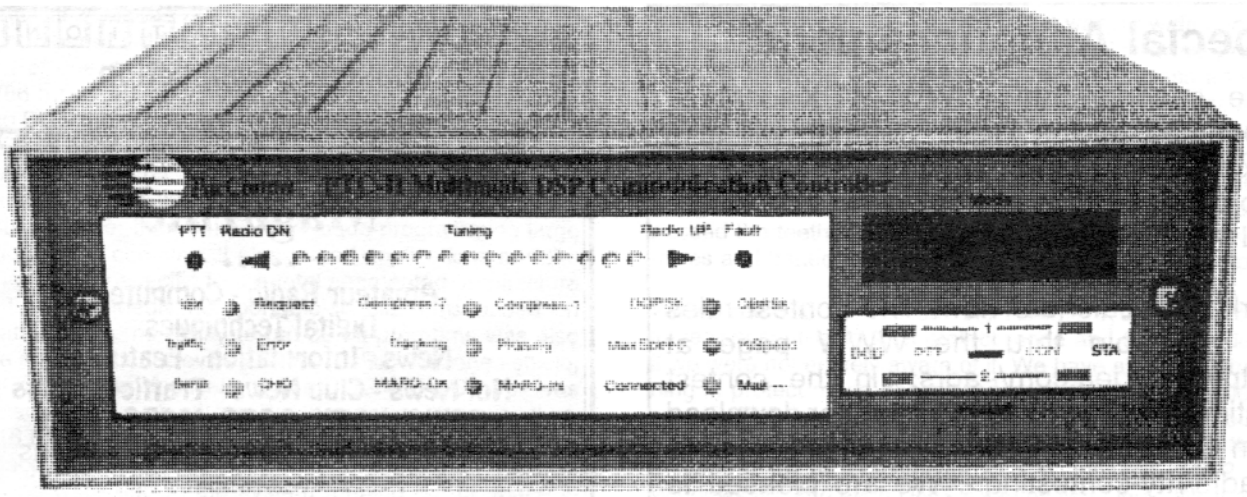
G4BMK: 14 MHz was wide open to Caribbean / Brazil on evening of 15th, but practically all the activity heard was in Pactor! — I thoroughly enjoyed the contest, and the effort putting up some antennas especially for the contest proved to be worthwhile.

Special Announcement!

"The second annual WW WPX contest, sponsored by the Digital Journal, will take place during the second weekend of February 1996. The dates are set as the 10th and 11th of February, 1996.

Mark your calendar now! The contest rules are available thru the WWW page at <http://www.iea.com/~adrs> in the contest section. They are also available for download from the IDRA FTP site at <ftp:iea.com/public/adrs/rtty-contesting>. We are pleased to announce that the second annual running of what is becoming one of the major digital events will once again have many plaques and awards. Contact Ron Stailey AB5KD for information if you are interested in sponsoring any open plaques or additional awards.

73 Jay WS7I and Ron AB5KD"



You've been hearing about it for several years.... Now it is available. PACTOR-II.

The PTC-II is a new multi-mode controller and "communications platform" which contains very powerful and flexible hardware and firmware.

It is being built in the United States by PacComm under license from S.C.S., the group that developed both the original PACTOR and PACTOR-II.

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Like PACTOR-I, PACTOR-II is a communication system. There is a unique protocol, carefully designed and optimized for excellent HF performance, new and powerful modems realized via Digital Signal Processing, and a hardware platform to allow the firmware to realize its full operating potential.

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- Full compatibility with PACTOR-I (the original PACTOR system), AMTOR, and RTTY.
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  - » Markov (2 level Huffmann) compression.
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- 10 character MODE display, numerous multi-colored LED tuning and status displays.
- Watchdog timer on HF PTT port.
- Specialized communication program provided
- Firmware contained in Flash memory. Easy upgrade.
- Limited availability beginning late August 1995. Packet modems will be available somewhat later.
- $995. Packet modems are optional at extra cost.

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Jay Sez . . .

Comments & Perspective from around the Digital Frontier

By Jay Townsend, WS7I • P.O. Box 644 • Spokane, WA 99210-0644
Internet: jayt@comtch.iea.com

Arubian Nights, the adventure to P40. Betsy, WV7Y and I had rented the P40V/AI6V cottage in Aruba in February for the World Wide RTTY WPX contest next February, but it turned out that a previous commitment had been made by Carl for that weekend. So we moved the dates to September for CQ DJ WW RTTY.

I seem to get a lot of requests for information on how these little contest expeditions work and what things are like so I will take this month and give you an idea. The first thing I do is always call somebody who has done it before. In this case that was easy as Don, AA5AU, had been down a few years ago.

Answering an ad in QST I sent Carl AI6V a note and requested all the info, a package which included a description of the place along with all the necessary paperwork and various costs. We decided to get pretty much everything, including pickup at the airport by Lance P43WLP. Costs are about the same as a deluxe hotel for a week, but this place has towers, radios, antennas, and a computer.

We sent for the licenses and received back all the necessary documents to get our "gear" into Aruba. We then requested and paid additionally for the calls of P40JT and P40BT (about $50 each).

I spent a lot of time getting various terminal units and cables made for the Kenwood 930 which was in Aruba. I took the Kantronics KAM, my HAL Communications P38, and my "normal" contest rig which is a UDC 232 (PK232 look alike without filters). One would think a long time AEA reviewer like me would have a PK900 or something, but I don't! I also took the HAL Communications ST 6000 which has a built in scope and hooks to the UDC 232.

We carried about 15 pounds of wire and cables to hook all of the TU's to just about anything I might find, in case I needed to borrow a Yaesu, Icom or Kenwood. I also took along my laptop as backup. There is a nice 386 at the cottage. I also rented the Alpha 78 for the contest from Carl (helps pay for tubes and repairs). A few days before the contest I received word that the 40 meter yagi was not working. So I made up a delta loop and carried it along.

Miami was the normal hassle that it always seem to be. Arrived with a 'guaranteed late arrival' and pre-paid reservation at the hotel, only to find that they didn't have what they had sold us. I am pretty tired of this little concept so held firm and finally received a 'comp' room for the night. Off on the ALM plane to Aruba and all was smooth sailing. Arubian nights, here we come....

Everything was perfect upon arrival, and there were no customs problems. Lance P43WLP met us and delivered us to the cottage. His little remark about knocks on the door and TVI complaints, however, didn't leave me with too good feeling. I told Betsy, if someone knocks, speak in Swedish (she knows a little of everything this gal of mine). But no knocks ever came. Probably one of Lance's little jokes I would say.

The contest came and went. I played and competed. Murphy was there as he often seems to be. A few goals were met. You can tell by the scores. Hi!

Aruba is a dry, dessert island flat with cactus and aloe vera plants and a few scrub trees. It is hot and doesn't rain very often but the humidity is quite high. Beautiful white beaches! Well frankly I was both intrigued and disappointed. The shopping is plain lousy. The sand beaches are perfect white and full of pretty girls. The casinos are casinos...money suckers. Snorkeling was fun, but I found the fish not quite as neat as the ones in Hawaii. Radio was fun with Europe there as soon as the sun came up in the morning and into the night.

Betsy and I had many nice dinners and sampled the island quite a bit during the 10 day trip. We spent a delightful afternoon with Lance P43WLP and got his RTTY setup working and left him with a few instructions on how to do RTTY with the gear he is using. He is a delightful Arubian.

Compared to a trip to the Galapogos, Aruba is very easy and Carl, AI6V has made it very simple. One nice thing about doing a RTTY contest while at one of these spots is that the dates are easy to get and confirm in advance. To be where the best have been, and to sample yet another culture and country is just fun.

Lots of mailbag stuff this month of which I can only mention a few. Rick, KV9U, has gotten a P38 and is active on Clover on 14.065.5 (which by the way has gotten so busy we are also using 14.066.6 and 14.067.5 LSB dial). Rick and I had a QSO on Clover and he states, "It sure was neat to actually connect up with you "live and on the radio". Chuck, WA0ROI commented in one of the groups that one source for good quality and cheap scopes is the medical field. He picked up a scope built by HP for Sanborn for $15. It was a medical scope with very slow sweep times and high persistence display, just what you want for RTTY.

Bill Mullin, AA4M/0 was located in his new digs in Graff, MO and enjoying life on a big new ranch. We hope to hear more from him. Mike Candy, KI7FX phoned the other day and I tried to entice him into doing a few more reviews. Hal, WA7EGA, took a lightning strike and is still getting Jim, WB7AVD to fix piece after piece of his equipment (don't buy anything from Hal!).

We will be sending out notices in early December to the plaque sponsors for WW RTTY WPX for the 1996 contest. We need to know right away if you sponsored one last year and don't want to this upcoming year. Or if you want to be a "new" sponsor. Direct your info to either Ron, AB5KD or myself. We are looking in particular for some Canadian, Japanese, and European sponsors as we need more plaques for those areas.

Its not too early to start thinking about Dayton '96. The dates for your calendars are the 17,18,19th of May. If you have any ideas or suggestions please drop them my way. This year will mark the second annual DX/CONTEST dinner on Friday as well as the big bash on Saturday evening at the Digital Journal Dinner.

For those needing a QSL from P40JT the route is to the manager WV7Y with an SASE. I don't do bureau cards any more as it just takes too much time and effort to deal with 'em.

73, Jay WS7I/P40JT

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The Last Word

from the Editor

Jim Mortensen, N2HOS • PO Box 596 • Somers, NY 10589
CompuServe ID: 71573,1077

Rule number one! The E-mail message minced no words. "HELP," it said. And since my stressed mind needed diversion, I prepared a reply without delay despite my suspicion. Here is a ham with a "W" prefix of some age, leading off the message by saying, "I am absolutely brand new to the HF digital modes. I have a HAL P38 on order." That sounded about as realistic as a three dollar bill, but I gave him the benefit of the doubt and decided to treat the message as the genuine article. Thus began my dialogue with a true beginner.

The message went on to say, "Is the HAL software my best choice as a beginner? I suspect that I will want to explore RTTY, AMTOR, Pactor and Clover. But I have no idea which mode I will end up using most often since DX is one of my goals. I imagine that RTTY and AMTOR still are the most popular with most DX stations (is that correct?)." There was more, "As a beginner I need software which is good and easy to use. Also, instructions for the software need to be in words of one syllable or less! What is your recommendation concerning software?? Are there unofficial subbands for the various digital modes? If so, where can I get a list of them? I am particularly interested in 20 and 40 meters."

"BTW, I really like the Digital Journal. You are doing an excellent job. The September issue is especially good. Thanks for any help you can provide." Hmmm. Here is a ham who has a senior-citizen callsign, uses E-mail on the Internet, is a regular reader of the Digital Journal, has ordered a P38 and professes to be such a beginner that he doesn't even know where to look for digital signals, or what mode is used for DX? This has to be some kind of trap, the more logical side of my brain quipped. Yet, he clearly has good taste in magazines, so I went to work on a reply. Or more accurately, a list of questions, for there was no way to give any meaningful advice until I knew a bit more about the environment!

What kind of computer do you have? What operating system? Software? Windows? Have you done any listening on the HF bands (thinking this might be a pure VHF packet strain of operator)? Licensed when? It was a detailed list, but since I had decided to help out, I was going to do it the right way—no swift, important sounding generalizations, no sweeping statements to make me look smart, outpourings that glaze the eyes of the beginner (I was hoping all the time, of course, that the request was genuine).

It was! A long E-mail came roaring back in no time. "Thanks for your offer to help me. My computer is a 486/66 with 8 megs of RAM and a 540 disk. I use Word Perfect frequently and QuatroPro less frequently. My communications software is QuickLink II. I also us a couple of the satellite tracking programs. I have DOS 6.22 and Win3.11 but I prefer DOS for some reason. I have been using computers for a number of years but have been on Internet only for about two year."

I haven't really done much listening on the digital subbands. I guess I didn't see any reason to do so without an HF modem. My P38 should be here next week. Right now I couldn't tell a RTTY signal from Pactor, AMTOR or Clover by ear. That's one of my concerns. How will I know what mode I'm hearing so that I can set my software appropriately?

I've been licensed for 36 years but until now I've operated 99.99% CW. I guess I had always figured that computers drove me nuts enough at work so why mess up my hobby with them. Hi! My rig is a barefoot Ten-Tec OMNI-VI and I have a windom antenna. I'll appreciate any suggestions you can give me."

My answer bounced back without delay and I complimented him on his sense of adventure and daring. Jumping from the role of 'old-timer' with 36 years at the key, to 'rank beginner' with no time at the keyboard is not for everyone! So I gave him two pages worth of detailed advice and commentary. I told him where to look and listen, what the sounds were like. I pointed out the W1AW RTTY schedule and the CQWW contest as great places to learn all about our basic mode. I described AMTOR as an anxious pulsing sound with a regular beat when compared to Pactor and so on. I couldn't think of a good description of the Clover at the time, but I would now tell him to listen for the hush of a Rolls-Royce passing by in the rain. I stressed the listening part of it for there is no better way to understand the structure and routines.

He responded with a note of thanks. I answered and volunteered more help. One day soon I expect a note from him about his digital accomplishments. Or better yet, we might meet on the air. I hope so for there could be not better form of payment (though none is expected).

There is a moral to the story. It is not about the death of CW. Nor is it about the triumph of the digital modes. The moral is this: we who have played around with some or all of this digital stuff for a few years or more; we who take it all for granted; we who can hookup a computer/transceiver/TNC in the dark—we think it's easy! And we say, "Oh, just hook up the whazzit to the whozzit and slap in some software and bang away. Nothing could be simpler." To most newcomers or potential newcomers, and to even many current users of some form of digital communication, it isn't easy at all. In fact, its a daunting task. I have seen Extra class hams with years of experience (and even with engineering backgrounds) quake at the thought of hooking up a TNC to their rig so they might get on packet. I also remember when it took me the better part of two days to find the cable color-coding (TNC to XCVR) in the original PK-232 manual! I remember my reluctance (strong resistance is a better term) to try AMTOR after becoming rather good at the RTTY thing. In fact, I probably wouldn't ever have made the move if it had not been for a very pushy and persistent friend. (Think back, that giant step into the error correcting modes was a bit scary, wasn't it?) I have met people on the air with thirty years of experience who have yet to attempt any mode but RTTY even though their station is fully equipped. So let's forget 'easy.'

Somehow, it's that third black box that throws newcomers off balance, even those very experienced in the use of a key and/or a mike and a transceiver. And even those who have some degree of computer expertise. There seems to be no difference whether the black box is inside or outside of the computer. Hooking up a key to a transceiver is logical and straightforward. Hooking up a computer to a TNC and then to the back of the transceiver is, for some reason, extraordinarily complex to many. Our help simplifies, flattens the learning curve, restores 'easy' to the beginner's vocabulary.

Helping a beginner is fundamental to the practice of our hobby. Few of us would have accomplished much in the pursuit of our digital interests if it hadn't been for such assistance, on or off the

air. We all accept that rule. In the digital world, though, helping probably demands more of us over a longer period of time. I am not at all certain we accept that responsibility quite as freely. But I feel it is more forgetfulness on our part rather than an overt act of impatience or unkindness. Let's agree to remember how much help we needed, then remember to extend the same kind of help to those struggling to join us on the air. It is very much worthwhile.

The Clover calling frequency faces a funny problem. It's too busy in the US! Yes, it's too damned full of Clover signals. Great news! In Europe, the calling frequency is packed with collisions. Bad news! Let's get organized and solve the problem. In the US, the basic frequency is 14065.5 (same on 40 and 15 as well). Jay WS7I suggests we move both down and up from there. In other words, if 065.5 is busy, either drop to 064.5 or go to 066.5, and so on.

In Europe, the basic frequency has been 066, but there is heavy BBS traffic there. My question is a simple one . . . why doesn't Europe (and the rest of the world for that matter) follow the same pattern as the US? It has worked exceptionally well and there seem to be relatively few traffic jams on the selected LSB frequencies. The narrow bandwidth of Clover allows an unimpeded flow with only 500 Hz separation. So let's take advantage of it! Let's discuss and then implement a worldwide switch to these '**.5' calling frequencies. What do you think? Spread the word . . . and your comments if you don't concur.

Doug KF4KL is one of the newest members of the Digital Journal staff, and a most welcome one. His first article, one for the newcomer, appears in next month's issue and is the first of many. Subsequent articles will be a bit heavier on the technical side. As you can tell from the following comments, he is a good guy to have around. Welcome aboard Doug!

"I work for JPS Communications, Inc., a firm which manufactures peripheral equipment for HF and VHF radios in the commercial, governmental, and amateur radio markets. My specialty is DSP hardware and software design. I've designed a number of DSP audio filters, and introduced DSP to the amateur market.

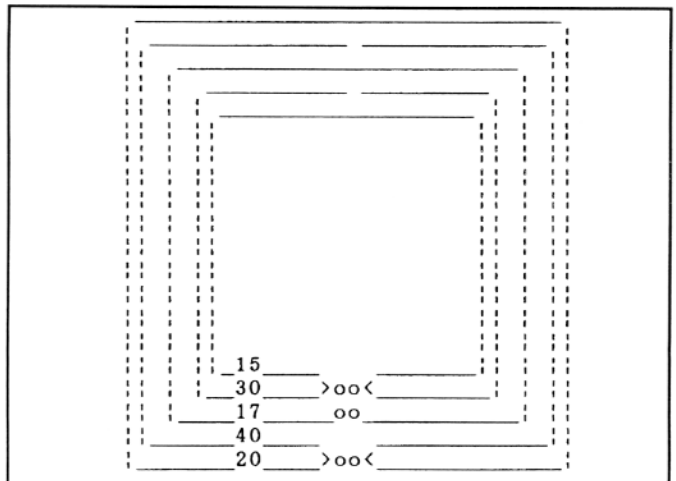
A North Carolina State graduate in Electrical and Computer Engineering, I'm an Extra Class amateur, with interests in the digital modes, CW, DXing, and RTTY Contesting. I enjoy homebrewing equipment, and antenna modeling and construction.

Outside amateur radio I enjoy motorcycling ('83 Honda Gold Wing 1100), short-wave listening, and spending time with my family. I have two children, a daughter age 10 (Tiffany) and a son age 8 (Christopher.) I have a lovely wife named Bonnie who is very tolerant of all my hobbies and interests."

And speaking of modeling, another author makes his debut on these pages this month. Brian K6STI is one of the foremost developers of antenna software. But that isn't all he does. For example, he is currently developing (and testing on the air) a new DSP RTTY modem based on a 16 bit Sound Blaster card. This new product will be available soon and, if all goes as planned, you will read all about it next month. Brian who is returning to the RTTY mode after a lengthy hiatus, was last on the air during the 'oily machine days.' Welcome back to the digital world and to the pages of the Digital Journal, Brian.

John NOFAC improved the Quad-Loop after his article ran in the June issue. This new trapless version 'works great.' For 20/40 meters, use the same feed point. Use two loops two inches apart with one loop split with an insulator. Use the number 14 Monster Ladder Line from The Radio Works and you should have no trouble keeping the two lines separated. More information? Contace John at 10644 Grant Dr., Northglenn, CO 80233.

I didn't know we had a problem until Denny WB7SNH contact-



N0FAC - Split Quad Loop

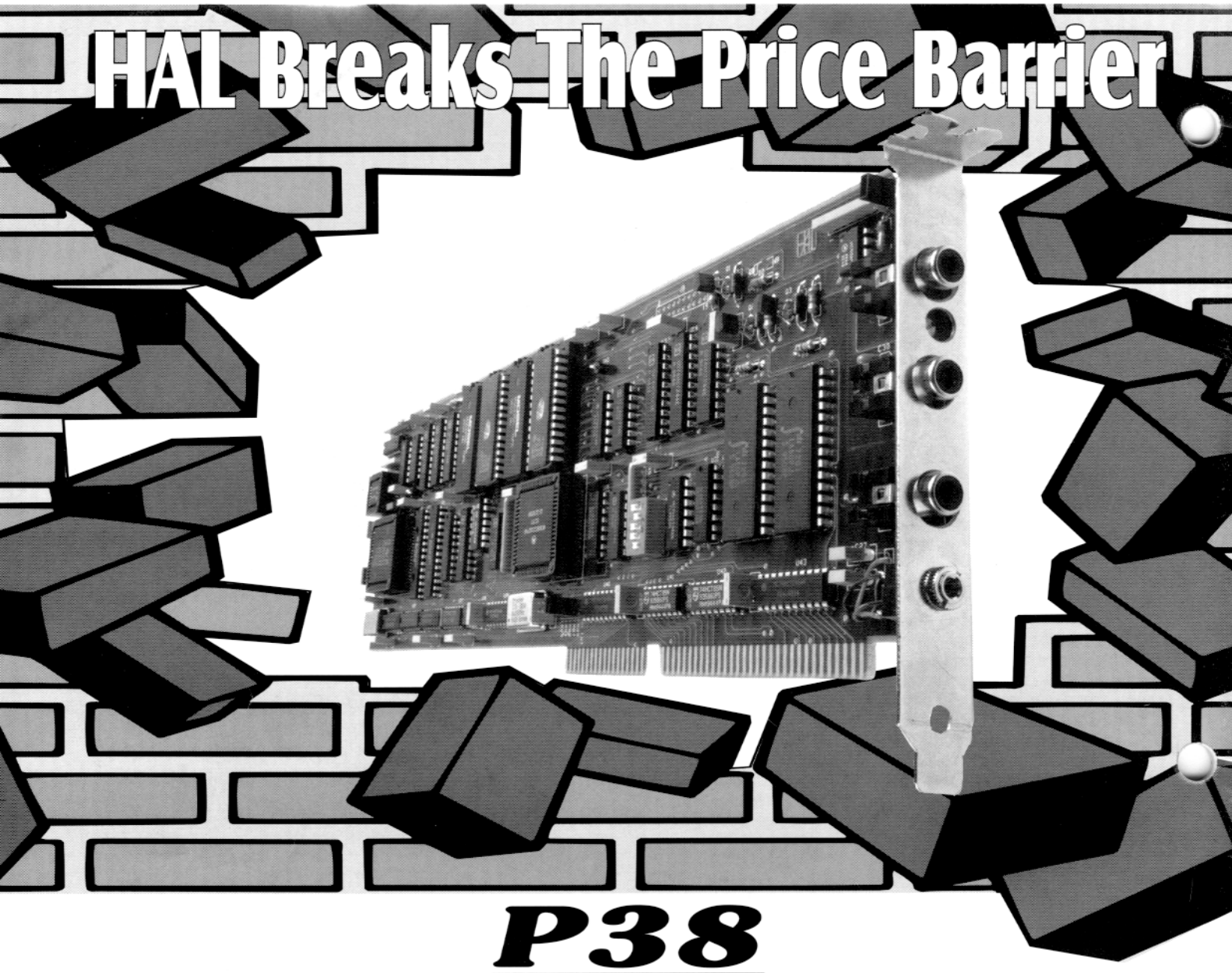
ed me about the size of the holes punched in the Digital Journal. Seems he has trouble with what I thought was the worldwide standard for a 'three-holer.' Not so, says he. It seems as though his firm, which publishes many technical documents in 1½ to 3" binders discovered that their customers (including the US Government's DOD (glad it isn't the IRS!)) requested a slightly larger hole because of tearing and binding. He's probably right and we will now see if our printer can oblige. Come to find out, Denny does other things beside worry about such empty things. He runs 'an Aplink station on 14.069 Mark and has since 1987. It is primarily for commercial and pleasure ships at sea, and maintains a VHF packet link with Victoria, BC as well. It is a standalone system and is not connected to any forwarding system' He is on the Internet, too, and can be reached at <dbowman@atk.com>. Thanks Denny for the information.

FAIRS Director David KK4WW received a very special honor at Virginia Tech recently. He was the recipient of the first ever award for University Outreach. David has been teaching Instrument Automation in chemistry for 28 years and has also assisted the University in establishing exchange programs around the world (ham radio also went along in the briefcase!). The easiest way to keep up with FAIRS is to drop by their Internet location at <david.larsen@fairs.org.> Support this group for they are doing wonderful things with radio (mostly digital) in the Ukraine, Ghana, China and Bangladesh. They deserve your help.

The holiday season begins this month, at least in the US. I know because it has been apparent in the stores and in the endless number of catalogs stuffing our mail box. But how can you complain when the supermarkets put up Halloween stuff by mid-September!! You will read these words well before Thanksgiving but this is our only opportunity to pass along our greetings. First, a word of thanks to you, our members and readers. Without your active support this magazine and the IDRA would soon wither. We trust our growing audience suggests that, at least to some extent, we fulfill your thirst for digital news and knowledge. Please tell us if we don't! Three cheers also to our advertisers who are equally faithful and from whom we continually draw strength. They are a loyal lot and share our belief in the future of this hobby. And finally, heartfelt thanks to those dedicated volunteers who contribute their time and talent in order to fill these pages every month with tales of their collective experience and wisdom. Our staff is a remarkable and a remarkably varied crew of wonderful and wonderfully talented and patient folks. My unreasonable requests are always met with a willingness to do more, and again, more, even when they have no time. They are special friends, compatriots, colleagues and fellow travelers on this journey of ours. Each one of them deserves our applause. Join me in the ovation!

73 de Jim N2HOS sk

HAL Breaks The Price Barrier



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