THE WEST RAND AMATEUR RADIO CLUB

August 2002
Volume 3, Issue 1

ANODE

Inside this issue:

Editor's Comments

With some people it is socks, others it's ball-point pens. Douglas Adams wrote about a 'hole in space' that allowed single socks and pens to migrate from this universe to another. Me, I seem to lose hand drills. I went looking for mine the other night and it wasn't where it was supposed to be, in the toolbox. Checked in the drawer, nope. Looked all over the study for it, no luck. In a few minutes I shall have a forage in the garage for it. But I am not too hopeful as it shouldn't be there either. So its probably gone to that planet in that other universe which caters to small lightweight hand drills.

In the play, "...Earnest" the grandmother refers to the fact that he/she 'lost her mother' as a cardinal sin. After all where did you see her last? Amateurs that lose their information should be classified similarly. With today's computers having the storage capacity of an '80's mainframe you have no excuse for not recording all relevant details of your hobby.

At my recent 'April 1st in July' talk about the 21st Century Radio Amateur, I talked about the possibilities of using modern data capture techniques to log all contacts. Also shown at the time were other methods that you could use for writing up the station log and even recording the en-

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Games Port Input

Special points of interest:

- Contact details on back page

The "IBM Games Port" is designed as a 'joystick' port. Two joysticks, each with two switches and two 'paddles' (100k ohm potentiometers) may be connected via the 15 pin socket at the rear of the machine. For our purposes, this means we have access to four 'switched' lines and 4 'analogue to digital' lines. As an added bonus, the Games port also provides +5 volts! (and GROUND)

This port is very safe to experiment with. All lines feed through a 74LS244 Integrated Circuit (IC) which helps ensure reliable signals and provides a degree of protection against "accidents".

The 'switched' inputs are tied high inside the computer using 1K resistors connected to the 5 volt rail. An external switch is used to switch directly to GROUND. No other current-limiting circuitry is required. You could, in fact, use two lengths of wire pushed into the port and simply touch the bare ends together. (This is, after all, the way a 'switch' works!)

Reading the Games Port Switched Input

The four 'switched' lines may be read using a standard <IN address 512> command.

In Pascal this would be:
InValue := port[512].
In MSW Logo it would be:
make "InValue InportB 512
In Qbasic it would be:
InValue = Inp(512)

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Games Port Input

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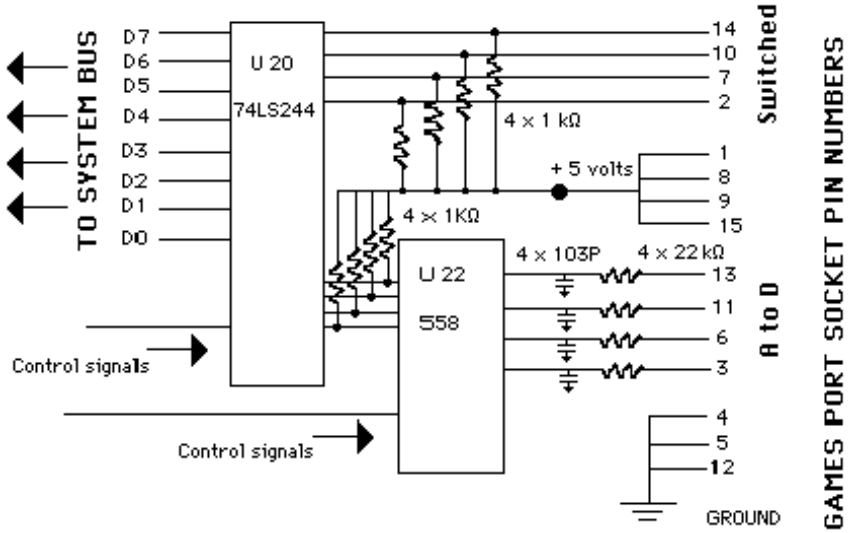

NOTE: All the "+5 Volts" lines and all the "GROUND" lines are connected internally. In your experimenting, you need only connect to ONE of each.

A to D Sensors

The four 'analogue' lines available at the Games Port offer exciting possibilities. These lines allow conversion of the value of an external resistance into digital form which the computer can manipulate. The resistance may be from 0 ohm to 100k ohm. If you wanted to, you could simply push the legs of a Light Dependant Resistor (LDR) into the appropriate pin holes at the games port and "read" the change in light intensity falling on the LDR. (I certainly don't endorse the procedure, but the port is sufficiently robust to take this type of treatment.)

A better approach is to use an external 'adapter' board con-

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WinLink 2000 - Internet E-mail from Anywhere!

The Internet has become the mail medium of choice for most hams, but there is a sizable group of amateurs who often travel beyond the reach of the Internet. This group includes hams at sea, travellers in recreational vehicles, missionaries, scientists and explorers. No doubt the day will come when wireless, affordable internet e-mail access will be available to anyone from any point on the globe. Until that day arrives, however, Amateur Radio HF Digital operators have a very capable substitute.

More than 21 HF digital stations worldwide have formed a remarkably efficient e-mail network known as WinLink 2000. Running WinLink 2000 software and using primarily PACTOR or PACTOR II, these facilities transfer e-mail between the HF stations and the Internet. They also 'mirror' (share) messages between themselves using the internet allowing amateurs to pick up their E-mail from any WinLink 2000 station.

The network evolved in the 1990's from the original AMTOR based APLINK system. APLink was a network of stations that relayed messages to and from the VHF Packet network. As PC's became more powerful and as PACTOR and Clover superseded AMTOR, a new software system was needed. That brought about the debut of WinLink, originally authored by Victor D Poor, W5SSM, with additions from Peter Schultz, TY1PS. WinLink itself evolved with substantial enhancements courtesy of Hans Kessler, N8PGR. To bring the internet into the picture WinLInk stations needed an e-mail "agent" to interface with cyberspace. To meet that requirement Jim Jennings, W5EUT, added NetLink. The entire system was integrated and overhauled last year to create WinLInk 2000.

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Editors Comments

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tire QSO to hard disk. Aren't QSL cards obsolete now? The generation of interesting and eye-catching QSL cards is an easy task on the later personal computers. But they can also be emailed, saving the trees.

I (unfortunately and humorously) suggested that the modern radio amateur would have to justify his existence by submitting his station log to the tax authorities. Whoops! It would appear that the authorities are spending a lot of taxpayers money investing in a very high tech radio tracking & tracing system. In future I think we shall see a very aggressive elimination of interference on VHF & UHF around the urban areas. And woe betide the Ham who hasn't got a credible log book in the event of being caught up in an ongoing investigation.

Test and measurement equipment has always been one of my favourite subjects. So it was with great sorrow that I saw that Marconi Instruments was sold off to IFRsys. It would seem from the web sites devoted to both companies that old test equipment will get no support from either company.

Oh, and the hand drill was in the garage.

Boot Sale!

Don't forget the Boot Sale on the 31st of August at 12:00.

DX-pedition to Dassen Island Lighthouse
[Says Andrew ZS1AN]

I have completed my preliminary propagation forecast and drawn up an operating schedule for my visit to Dassen Island Lighthouse (IOTA AF-064, ARLHS SAF-042) during International Lighthouse and Lightship Weekend 2002. I will be operating as ZS1AN/P from 1600 UTC on Friday 16 August until 1200 UTC on Sunday 18 August, on the following frequencies (repeated daily):

Please note that the entire expedition is weather dependant and that precise operating frequencies depend on the

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WinLink 2000 - Internet E-mail from Anywhere!

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Thanks to these advancements, an HF operator at sea, for example, can exchange internet e-mail with non-ham friends and family.

WinLink stations scan a variety of HF digital frequencies on a regular basis listening on each frequency for about two seconds. By scanning through the frequencies on several bands, the WinLInk stations can be accessed on whichever band is appropriate according to your location and the propagation conditions at the time.

You can access WinLink 2000 stations using just a basic Pactor setup. However., most users rely on a piece of software known as AIRMAIL to handle uploading and down loading automatically. Airmail is a 32-bit program that runs under Windows 95, 98, or NT4.0. Airmail supports the SCS PTC-lll and lle PACTOR-2 processors, as well as the Kamtronics KAM+ orKAM-98, AEA/ Timewave PK-232 and PK-900 modems, and the MFJ 1276 and 1278B. You can download a copy of Airmail online at www.airmail2000.com. To learn more about WinLink 2000, see K4CJX's website at www.winlink.org/k4cjx/ .

from ZR6CRW with thanks to WB8IMY (QST magazine)

Circuit Magnification

The symbol Q and the term Circuit Magnification are generally taken to be synonymous, but technical usage has produced a second-more commonmeaning for Q, which is sufficiently different from magnification to cause ambiguity in certain circumstances.

Magnification is a term really applicable only to series tuned circuits at resonance. where Q is equal to the ratio of the voltage developed across either reactance to the applied e.m.f. i.e., V/E in Fig. 1. The current in the circuit at resonance is equal to E/RT, where RT Is the total effective series resistance in the circuit. At resonance the inductive and capacitive reactances are, of course, equal, and we can write

V = X . E / Rt so that
V / E = X / Rt = Q

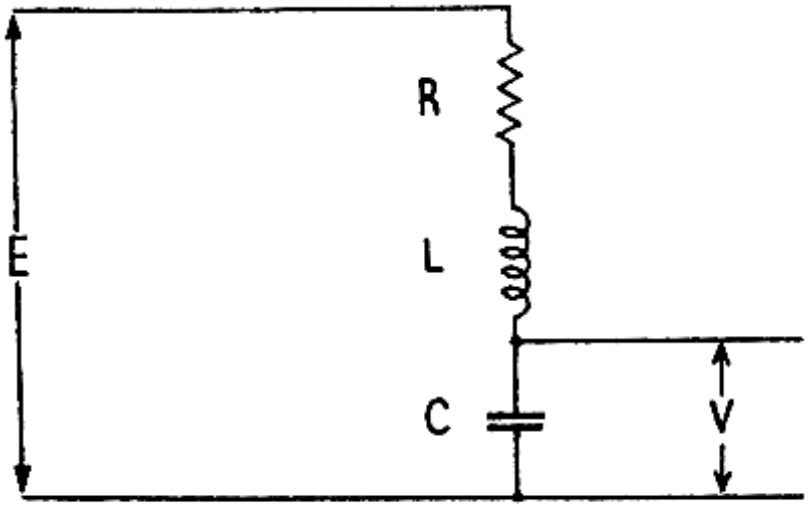

Fig. 1

But in this context Rt is the total effective series resistance in the circuit, as distinct from the loss resistance of either of the reactive elements.

Taking the point that in practical tuned circuits most of the loss is in the inductor, it has become customary to specify the loss in inductors in terms of Q, on the assumption that the associated capacitor is virtually loss free. and the philosophy is then extended to regard Q as a general statement of X/R for any reactive component. either capacitive or inductive.

It is, however, often more convenient to use the reciprocal term, D or dissipation factor, which is equal to R/X. For low loss components. this is numerically nearly equal to the power factor or ratio of true power to VA. Power factor may be represented by the cosine of phase angle Ø between the voltage and current vectors. In other words. cos Ø is the ratio between resistance and impedance as distinct from reactance (see Fig. 2). The dissipation factor, D, is equal to the tangent of the complementary angle, theta, and the expression tan theta is frequently used as an alternative to the symbol D.

Circuit Q

Expressed as X/RT, Q is the magnification of a series resonant circuit. but. in practical selective amplifiers, etc., parallel tuned circuits are probably more common. With these, the term magnification has very little meaning, and the significance of the circuit Q is in its relevance to dynamic resistance and bandwidth.

If resonance of a parallel circuit is defined as the frequency at which the circuit becomes purely resistive, the dynamic resistance is equal to the parallel combination of the effective shunt loss resistances of the reactive circuit elements Rp in Fig. 3. If Rp is then regarded wholly as the shunt loss in either element, D=tan theta = X/Rp, and hence, Q = Rp/X.

The dynamic resistance is thus equal to $\omega . L . Q$ or $Q / \omega . C$. For Q values above 10, the dynamic resistance is very nearly equal to L / C . Rs, where Rs is the effective series resistance, but it must be remembered that this expres-

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Games Port Input

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nected to the computer via ribbon cable. (See below ...)

How the A to D function works

When an output command is issued to the Games Port, a "control signal" is sent to the port and a digital pulse is generated on each of the four output lines of IC U22 (558). The lines remain HIGH for a time determined by the value of the external resistance connected to each respective input line of IC 558.

The data pulse (HIGH) produced on each of the lines of the 558 remains high for a duration determined by the value of the external resistance, according to:

Time = 24.2 micro sec
+ 0.011 (R) micro sec
(R is ohms)

The state of lines D3 to D0 are then read using INP(512). (Where 512 is the digital 'address' of the analogue input lines.) The programmer must therefore produce a "looping" routine to determine the duration of each pulse. As can be seen by the formula, the maximum pulse length for a 100k ohm resistor is:

24.2 microsec + 11000 microseconds = 11,024.2 microseconds

If you want accurate timing, your "loop" routine will need to be **very** fast! For most applications, even a Pascal routine will be too slow.

A to D conversion

The 'control signal' referred to above is:

Pascal - Port[512] := <any value>

The sequence for reading the 'A to D' lines therefore becomes:

- Send the control signal. (<out 512>)
- Read the port.
- Set up a counting LOOP until each line goes LOW.
- Interpret the 'count' as a resistance value.

A typical Pascal Input routine would be:

```
repeat
   count := 0;

   Port[512] := 1;

   repeat

    PortByte := Port[512];
       count := count + 1;
   until (PortByte AND 4 =
0);
   writeln(count);


until KeyPressed;
```

{Start the main loop.}
{Initialises the loop counter.}
{Starts the 'A to D' process. Any value would do.}

{Start the counting loop.}
{Reads the Games Port.}
{Increments the count.}
{Tests to see if D2 is still HIGH - ie pin number 4.}
{Writes the value of "count" to screen.}
{The main loop stops when a key is pressed.}

Having obtained a 'count' for a data line, the software must then relate this 'raw' value to resistance.

NOTE: The example given above examines only ONE of the four data lines. If you want simultaneous conversion of all lines, you would need to 'AND' "PortByte" with 1, 2, 4 and 8, while 'counting' during the HIGH state of each!

A Games Port Interface

The Games Port is sufficiently protected to avoid the necessity of additional electronic 'interfacing'. Its location at the rear of the system does however make it inconvenient for experimenting. The PCB below may be used to provide easy access. You will also need a "Joystick Extension Cable" which consists of a straight-through lead with a Male connector on one end and a Female connector on the other.

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Games Port Input

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ANDing

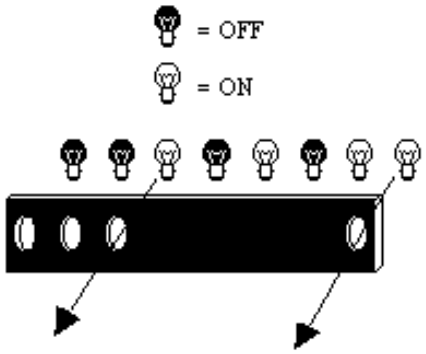
When you read the Games Port with
Pascal - InValue := Port[512], or
MSW Logo - Make "InValue InportB 512
you will return a number for "InValue" that represents the TOTAL value of the input lines. To be able to decode which individual line is turned on you must understand the concept of "ANDing". MSW Logo refers the process as "**BitAnd**".

Imagine each data line is represented by the little globes in the diagram below. The 'screen' in front of the globes represents the data values we want to "AND" with the globes. An "ON" globe represents a "1" and a hole in the screen represents a "1".

This example could be represented by :

00101011 AND 11100001.

The result of ANDing these two binary numbers is: **00100001.** If they are written under each



other it may be a little easier to see:

00101011
AND
11100001
is ...
00100001

If two corresponding values in the binary numbers are "1" the value in the result will also be "1". It is also said that the result of this ANDing is "TRUE" for bits one and six.

When dealing with decimal numbers it is not quite as obvious, but the same principle applies. eg 01000000 AND 64 is TRUE, 10001001 AND 8 is TRUE. 10001001 AND 128 is TRUE, 10001001 AND 1 is TRUE.

The typical code to decode an individual line at the Games Port in MSW Logo would be:

```
to DecodeLine
   make "Line8 [OFF]
   make "InValue inportb
512
   make "result BitAND :
InValue 128
   test :result = 128
   iftrue [make "Line8
[ON]]
   label :Line8
end
```

Parts List

- 1 x DB15 Male PCB Socket
- 5 x 2-way PCB Terminals
- 1 piece of 'link' wire
- 1 x Joystick Extension Cable
  4 x 100K to 1M 1/2 watt carbon resistors

More information about the Games Port can be found at:

http://www.2xtreme.net/dage/index.html

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sion is an approximation, which is not valid for very low Q values.

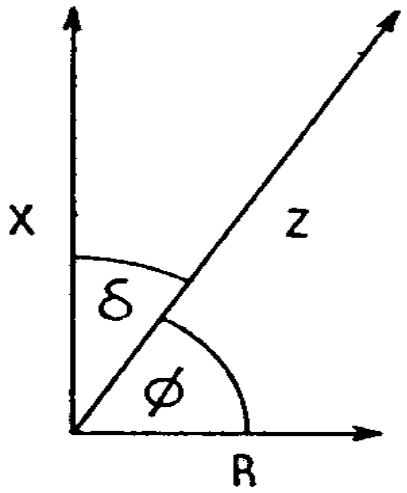

Fig. 2

The -3dB bandwidth of a series tuned circuit is taken as the interval between the two frequences (f1 and f2) either side of resonance where the voltage

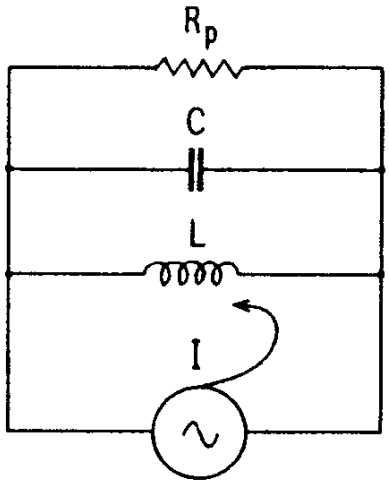

Fig. 3

(Vb) across either reactance is equal to 0.7071 of the voltage (Vb) at resonance. If $\Delta f = f1 - f2$, $Q = fo/\Delta f$, where fo is the resonance frequency. The same expression is applicable to a parallel circuit when f1 and f2 are defined as the frequencies at which the dynamic impedance of the circuit falls to 0.7071 times the dynamic resistance at resonance. When a parallel tuned circuit is fed from a constant current source (e.g., a transistor or pentode) the voltage across it is directly proportional to the dynamic impedance, so that the symbols Vr and Vb can be applied to both series and parallel networks.

The general expression for bandwidth at any voltage ratio can then be written as

Q = fo / Δf . (Vr ^ 2 / Vb ^2 - 1) ^ 0.5

Editors Comments

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vagaries of propagation and the whim of the operator. However this should give you a good idea of where to look for me. Additional information including propagation predictions for all the NCDXF beacon locations can be found on my web site, **www.qsl.net/zs1an/dassen.html**

I have also applied for a World Lighthouse Award number for Dassen Island Lighthouse as it has not previously been activated for the WLA.

73,
Andrew ZS1AN

0500-0600	7026	CW
0600-0800	14026	CW
0900-1000	14026	CW
1000-1100	14226	USB (Primarily for other South African Lighthouses)
1200-1500	21026	CW
1500-1600	14026	CW
1600-1700	21026	CW
1700-1900	14026	CW
1900-2000	7026	CW
2000-2200	3526	CW

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Bulletins (Sundays at …)
11h15 Start call in of stations
11h30 Main bulletin start

Frequencies
145,625 MHz (West Rand Repeater)
10,135 MHz (HF Relay)

Radio Amateurs do it with more frequency!

We are going on the Web
www.zs6wr.org.za

Please note this has been just been registered. Our site will be up in the new year.

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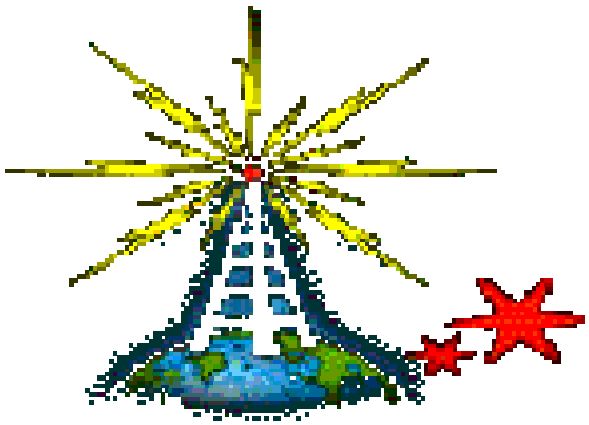
Vice-Chairman/Events	Simon	ZR6SS	084 308 2665	ssnyman@securehome.co.za
Secretary	John	ZS6FJ	672 4359 (A/H)	
Technical	Phillip	ZS6PVT	083 267 3835	
Technical	Greg	ZR6JDD	083 289 2072	gjarrett@webb.co.za
Member	Craig	ZR6CRW	795 1550 (H)	craig.woods@absamail.co.za

West Rand members input - we need your input!

To make this the best ham radio magazine in South Africa we need your input. Please submit articles, comments, suggestions etc.

Please send plain text with no formatting to the email address below.

In November 2001, we published an Anode Compendium on CD. It has the issues from July 2000 until November this year. This included IE5.5 and the new Adobe reader. It is soon to be updated, check with the vice-chairman for details.



We need your input! Email us articles, comments and suggestions please.
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