LETTERS

BRITISH HI-FI

I'm informed by John Crabbe of *Hi-Fi News/Record Review* that the Acoustical manufacturing company's claim that the QUAD FM4 brings 'Home the world's best broadcasting system at the touch of a button' is ethically justified, as Acoustical, in contributing to the support of the Philharmonica, helps to pay the piper.

Most other British high fidelity manufacturers do not, and subsist upon music making of all kinds parasitically, and thus have no prestige or reputation internationally amongst serious consumers of reproduced music.

By and large, British high-fidelity products are not materially competitive or competitive in terms of dazzling or convenient features. But they are perhaps more competitive qualitatively. Unhappily, however, recognition of their qualities is pretty well reserved to engineers, technicians, and 'hi-fi fans'. Most serious consumers of reproduced music, here and abroad, don't know about them, and have precious little opportunity to learn.

Thus, while the programming and technical quality of the world's best broadcasting system is revered – and envied – internationally, British high-fidelity products are known about and coveted only by the membership of tiny audiophilic cults, here and abroad.

I have at hand No 1 of the 1982 Edinburgh Festival newsletter. It's publication was apparently entirely supported by the advertisements of hoteliers, restaurant-keepers, one or two insurance companies, and a bank or two. Many people who will attend Festival events, or wish to, and many who – due to privation or remoteness – are dependent upon broadcast reception and recordings for musical enjoyment during most of the year, will remain in ignorance of the products of Linn, Syrinx, Strathclyde Transcription Devices, the makers of the Systemdek, and even Tannoy – not to mention KEF, B&W, Sugden, Castle, Celef, Mitchell, Acoustical, Naim, Riga, C&J Walker, MB Creek, Boothroyd, Stuart-Meridian, and even Wharfedale, south of the border.

It would be too charitable to say that the British high-fidelity industry has its head in the sand. A harsher but more appropriate judgement would suggest that it is contemplating its own navel from the inside, is unwholesomely involved and beguiled subjectively by its own entrails.

John F. Withey
Pollockshields
Glasgow

SCIENTIFIC COMPUTER

Please could you note in your records that I am the new Editor of The Sci. Comp. 80 monthly newsletter for users of the scientific computer designed by John Adams, M.Sc., details of which were published in your magazine.

Any of your readers who built the SC80, who are not members of the group, would find it well worth joining. Back issues, still available, contain a plethora of hardware, software and firmware. Mr Adams contributes articles monthly, and has developed no less than five versions of the BURP high level language, an excellent 64K d.o.s. (CP/M compatible), a standard Basic interpreter and some excellent hardware improvements. These include a 32K dynamic memory expansion, 64K mapping circuits, interrupt vector circuits, ASCII character generator modification and a floppy disc controller p.c.b. Details of all these are in the newsletter. One year's subscription is £6.50 for U.K. members, £8 for the continent, and £8.50 for elsewhere. Cheques sent to the address below.

I would like to take this opportunity to thank Mr Philip Probetts for the past two years of excellent newsletters under his editorship. I hope I can do as well.

John Hodson
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AMATEURS AND CB

C. G. Howard's comments in the June issue of *WW* under 'Amateurs and c.b.' highlighted the indifference of the Home Office towards illegal c.b. amateur operations. But what about the specific identifiable violations where the Home Office attitude is downright irresponsible?

I am referring to the illegal pirate radio stations that flagrantly operate in the v.h.f./f.m. broadcast band. There are a number of them, but two examples serve to illustrate the general case – 'Thameside Radio' and 'Liberation Radio'.

I asked British Telecom why these stations were not closed down and imagine my surprise, as a legal broadcasting operator, when I was told that the Home Office would not give the necessary authorization for British Telecom to do so. Must a campaign be mounted privately to ensure that the law of the land is upheld when a government department refuses to do so? Continual violation of the law in this way is a form of anarchy, in principal every bit as bad as other, more subversive, movements.

The Home Office, in supporting the violation of statutory laws by its non-action is encouraging further escalation. This is yet another of a growing number of examples of where government legislation controls the actions of responsible citizens but not those who chose to flout the law of the land.

H. Clayton
Northwood
Middlesex

CARTRIDGE ALIGNMENT

Referring to P. E. Cryer's letter in the June 82 issue, I found some difficulty in understanding the layout instructions in his second paragraph together with the associated diagram on the next page. However, it is of course quite true, as he says, that it makes no difference to the geometry whether you think of the stylus traversing over the record, or the record traversing under the stylus; all that matters is the relative moment of the two.

Two or three points seems to warrant comment: firstly, there is nothing particularly new or useful in finding out that the *proportion* of tracking angle errors depends on the choice of setting radii – of course it does. It is necessary, in the interests of minimizing tracking error *distortion*, for the angular error to vary inversely with radius, and as Cryer's figures indicate, this is exactly what does happen. The relationship of tracking angle errors at both outer and inner radii to the error at the radius for minimum angle (my R_{min}) depends on the amount of dip in the curve of angle across the record, as is obvious from my Fig. 1.

Secondly, I cannot understand Cryer's statement that my own factors "would place B on the other side of the datum line". If the datum line is defined as a line through the two points where the stylus cuts the circles having radii p and q as in his diagram, then obviously the intersections at both inner and outer record grooves (his B and A) must necessarily lie on one side of the said datum line, and none of my 'factors' can alter this condition.

Thirdly, Cryer's roundabout method of calculating p and q as described in his last paragraph, cannot work. The expression $pq/p=(p+q)-p$, is meaningless, a mere identity which reduces to $q=q$. Obviously it cannot be used to separate q from p when $(q+p)$ is known. The whole point of my final paragraph in the Oct '81 issue, was to show that one did not need to go through the whole procedure based on formula 4(b) every time, in the light of the linear $y=a+bx$ relationship ascertained at middle of paragraph. The final outcome, which cannot be simplified or improved, was to evaluate p and q (my r_0 and R_0), from the empirical expression $R_0=79+hC/84$ and $r_0=12+hC/71$ or ideally L^2-C^2/R_0. For the recommended overhang value of $h=2600/C$, this reduced further to $R_0=110$ and $r_0=49$ (ideally 48.81, but the 0.19 discrepancy is insignificant in practice).

If one uses a protractor, or my setting gauge, as in the November 1981 article, there is no need to evaluate the offset angle O (my B), but if desired it can be very easily obtained, within about 0.1° accuracy, from my empirical expression $4380/C$.

R. J. Gilson
Winchester
Hampshire

HERETIC'S GUIDE TO MODERN PHYSICS

I was delighted to see you are still providing a forum for open and constructive criticism of modern theory.

That Dr Murray should need to assure his colleagues that he has "no wish to cause you offence" is a sad comment on the state of physics. Doubtless his article is the result of a long and critical investigation of modern theory, and he would welcome any constructive criticism of his article. Equally doubtless, a few of his colleagues know his investigation is a deliberate attempt to revive the flat earth theory and Maxwell's wave theory of light – an insult to Newton's corpuscular theory of light.

I predict Dr Murray will soon learn to appreciate the truth of the supreme investigator, Michael Faraday's bitter response to the hostility to his theories of the self-satisfied mathematicians of his day – "A man who makes assertions, or draws conclusions, regarding any given case, ought to be competent to investigate it."

Many Nobel prizes were awarded for contributions to the basic premise of relativity – that nothing in the universe can travel faster than the speed of light. Cerenkov received the 1958 prize for his experimental proof that "when charged atomic particles pass through water or other media at a speed in excess of that of light itself, a bluish light is emitted."

LETTERS

Aspden, Dingle, Essen, MacCausland and other critics of relativity are dismissed as cranks and crackpots by the Establishment. Is there any member of the Establishment competent to investigate the strange case of why the crank Cerenkov received a Nobel prize?

M. G. Wellard
Kenley
Surrey

WALSH FUNCTIONS

I write with respect to the recent articles on Walsh Functions by Mr T. Roddam (*WW* Dec. 1981, pp 31 *et seq.* and *WW* Jan. 1982, pp 47 *et seq.*) to raise the following points.

The Rademacher functions, shown in Fig. 4 of this series correspond to Wal (1,θ), Wal (3,θ), Wal (7,θ), Wal (15,θ) . . . The associated intermediate Walsh functions may be derived by "exclusive Or" processing all combinations of the Walsh functions. Thus, for example referring to Fig. 3, the Wal (2,θ) function is derived from Wal(3,θ)⊕Wal(1,θ) and should be inverted in the Figure. Several other derived Walsh functions have been inverted in Fig. 3. A correctly-signed set is enclosed for reference.

There is also an error in Fig. 5.

$$Wal(5,\theta)=Wal(2,\theta)\oplus Wal(7,\theta)$$

which does not hold for this diagram. I enclose a modified diagram which will satisfy this requirement. Incidentally, the paper by Barratt, Gordon and Brammer also contains these errors.

I mention these slips since many people seem to be becoming interested in these functions that valuable introductory articles, such as Mr Roddam's are worth these small corrections in the interests of accuracy.

R. T. Irish
Swindon,
Wilts.

Mr Irish enclosed an amended set of functions, which we have regretfully been obliged to omit for reasons of space. They can be obtained from this office – Ed.

FUNCTION OF FUNCTIONS

With reference to Mr Sutherland's letter (June), I think that the view of sidebands as mathematical fiction is not entirely unfounded. I believe that a periodic complex waveform and it's Fourier series expansion are not one and the same thing in the sense of somehow being freely interchangeable without the active involvement of suitable physical devices to perform the complex series and conversion and vice versa. On this view a modulated radio transmission propagates in its complex form and there is no need to postulate any sidefrequencies at the transmitter end. The sidefrequencies are generated at the receiving end by tuned circuits. These have the capability to store energy and thus perform integration, thereby generating the continuous waves known as Fourier series components or sidefrequencies. The physical process by which a sidefrequency is generated can be understood by considering the following experiment:

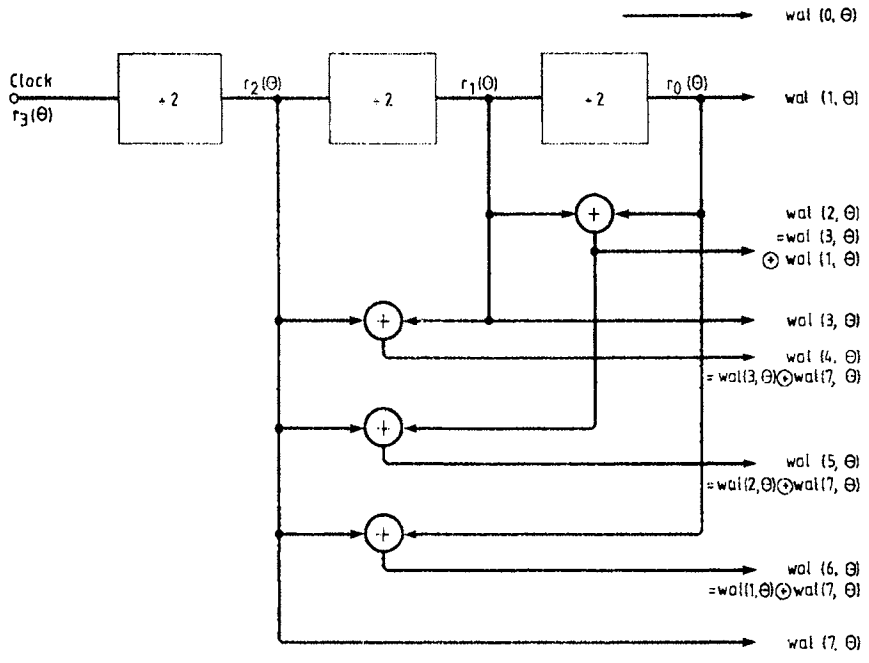
Suppose that a high "Q" tuned circuit is adjusted for resonance at 110kHz and placed near a 100kHz oscillator. Clearly, the tuned circuit will not begin to oscillate since any such oscillations would move in and out of phase with the oscillator, thus receiving just as much help as hindrance. However, should the amplitude of the oscillator be decreased whenever out of phase with the tuned circuit and increased when in phase, then the tuned circuit would receive more help than hindrance and would build up oscillations. It would oscillate at 110kHz whilst receiving it's energy in burst of 100kHz. Assuming a very high "Q", the inertia of the tuned circuit would be large enough to smooth out any amplitude variations and it would appear to receive a continuous wave input (i.e. one of the sidefrequencies). In fact it would be generating the continuous wave.

For the above process to take place the amplitude of the oscillator would have to be altered (i.e. modulated) at 10kHz which is, of course, the appropriate modulating frequency for the 110kHz sidefrequency.

It is interesting to note that it would not be essential to alter the amplitude of the oscillator in order to generate the 110kHz response. The same effect could be achieved by alternating the phase of the oscillator at 10kHz, which suggests how sidefrequencies are generated in the case of suppressed carrier, frequency and phase modulation systems.

So, although the sideband concept is a very useful, even essential part of radio theory, it is not necessary to assume that sidefrequencies have physical existence prior to the complex waveforms arriving at the receiving equipment. As explained by the *Wireless World* contributor Cathode Ray (September 1955, under the heading "Fourier – Fact or Fiction") continuous sinewaves are not the only possible form into which complex waveforms may be "decomposed", and hence it makes sense to assume that the sine form occurs simply because of the sinewave nature of oscillations in tuned circuits at the receiving end of transmitter – receiver link.

G. Berzins
Frimley
Surrey



REMOTE CONTROL FOR HI-FI

I read Mr. Kirby's article on a remote control hi-fi system (*WW*, March 1982) with some interest, as I was at that time busy designing a similar system. I too used the Mullard voltage-controlled potentiometers for control of the audio signal path, but found a much simpler and cheaper remote control system.

The major drawback of Mr Kirby's system seem to be the fact that the Plessey receiver (ML 922) only has three analogue control outputs; hence the need to use a 'stepped' volume control. The Motorola remote control system (MC 14497 – transmitter and MC 6203 – receiver) has four analogue channels and a host of other useful features. For example, toggle action volume mute and a single button operation which sets three of the analogue channels to 50% and the fourth to 30%.

This system is the same as that used on Grundig remote control television and so the modifications for hi-fi applications are quite simple. I wondered whether Mr Kirby was aware of this possibility and if not, and he was interested, I could send him some details.

D. F. Lovely,
Bioengineering Unit,
University of Strathclyde.

The author replies:

It seems from Dr Lovely's comments that we are heading in opposite directions. I regard the use of the two analogue outputs on the Plessey ML 922 as a necessary evil! I would much rather have used all digital tone level setting controls. The reason I did not was my inability to design a stereo bass and treble control circuit using less than four of the Analog Devices AD7110 chips. These cost around £8 each and the extra expense compared to the use of the Mullard analogue tone control i.c. seemed unwarranted.

I chose the Plessey remote control chip set (after looking at several alternatives) because of the analogue and digital outputs available on the ML922, and their use of an infrared photodiode to logic level integrated preamp, which saves much trouble with discrete high gain amplifiers.