ELECTRONOTES

WEBNOTE 49   7/2/2017

ENWN-49

FOOD ON THE TABLE:

Leaving Well Enough Alone

-by Bernie Hutchins

There is a famous Asian aphorism that says that "when there is food on the table, you have lots of problems – when there is no food on the table, you have only one problem." Here I would suggest that when *Electronotes* are at least <u>somehow available</u>, people have a lot of suggestions about how their personal access could be improved if someone would only do such-and-such. You can complete the analogy yourself.

Older *Electronotes* (1972-2000) are currently available in paper copies (some 6500+ pages) for sale at little more than the printing/shipping costs as charged. We pay (replacement costs) 4.5 cents per page to copy. Shipping on the entire set is about $40 which is included in our prices. IN ADDITION all the post-2000 material and some other items are posted online absolutely FREE. It would be hard for me to accept any judgment other than that, overall, **we are quite generous in this regard**. This, from a customer's point of view, is food on the table.

What about food on my table? Doing the math you can see that when we sell an "Everything" package, the bottom line is about $40 before time and gas, etc. are considered. ($373 – 6500x0.045 – 3x13.60). **Clearly this is a hobby**. Does this mean that when I get an order, I only see an extra $40 in the bank? Of course not. Once we receive and mail an order, $330 is added to the balance. Thus it is looking good for a

while – but those inventory piles stacked on the shelf start to grow short. Eventually, we need to go to the printer when one or more item gets low. The printer gets paid. In business, you don't get your investment back until you sell your **entire** inventory. This is a point which we have often made to persons asking our advice (often our permission!) to sell a few parts or circuit boards.   [Incidentally, the IRS considers that the cost of inventory can be taken as a business expense only when the item is actually sold – not when you paid the supplier.   Stores don't do inventory in January for their own use – it's for taxes.]   It's not a garage sale.   But I digress.

So because Electronotes **is** available some folks wish it were better: cheaper, digital, and in other ways more convenient. It must be understood that these proposed "improvements" seem to involve my putting in MY time and MY money.   (There is a basic presumptive flavor in such suggestions about how something that is already working in its fundamental aspects should be changed to accommodate a particular customer. Context is of course incompletely guessed.   The customer always has the option of not buying. The seller has, presumably, the option of not selling.   Each should understand that the other party may have a concern that is not so evident.*)

Many comments have involved the issue of whether or not a digital version of the older portions of Electronotes should be offered. Most recently this was on the SDIY website (June 2017 – search Electronotes). Two previous postings of our own are:

http://electronotes.netfirms.com/en200.html

http://electronotes.netfirms.com/ENWN34.pdf

To date, nothing has been authorized or even seriously discussed.   A lot of people still assure me it would be easy to do.

When I take a full order to the PO, I often joke with the clerks, who are by now my friends, that no one ever reads all this paper. It's a joke because a few do go through it quite carefully.   But honestly, at least some people are almost certainly just collectors.

THE ISSUE OF OCR

People sometimes use a term too loosely. We understand paper copies pretty well, but the essential characteristic of a "digital copy" or "electronic copy" seems to be that it can be delivered over the Internet, on demand, indestructibly, and often at no cost or low cost. Thus something like a PDF file might be just a scan (a photocopy or glorified

FAX), it might be purely digital (like a converted Word document), a scan to OCR, or something in between. The file size is likely much smaller for a digitally converted document, as text characters are represented with a small bit size.

A good example of what OCR does well would be the reposting of the Moog interview that I did recently:

http://electronotes.netfirms.com/ENWN14.pdf

This, being an interview, was purely a text. There were no figures and no equations. It scanned near perfectly to begin with, and was interesting for me to read in proof. It was inserted in a Word document, edited, and saved as a PDF, however Word does this. A PDF version from a paper copy. The OCR software came with my Lexmark printer many years ago.

Another example of obtaining a PDF from a paper copy is shown here for an app note that contained text, figures, and equations. This is just a scan saved as a PDF with the same printer/scanner. This one is scanned at 300 dpi – our usual scans on this site are 150 dpi. This one was scanned from a printed copy (the next person ordering gets the exactly corresponding piece of paper). This is a large file (1.4M) and serves to remind us that a digital scan can be excellent. It also serves as a downloadable source in case anyone want to try (please do) a different OCR to compare to the example below.

http://electronotes.netfirms.com/AN23.PDF

A portion of page 2 of the AN23 scan was chosen here (Fig. A) and the corresponding portion as an OCR is shown in Fig. B. Obviously, the OCR worked fairly well for the text (but still requires a proof read and edit) but is a disaster for the figures and is even worse for the now totally unusable equations. Your OCR results might be better. In fact, it seems that different (subsequent) OCR scans of the same exact page give different disasters (apparently slight alignment differences). Can it be fixed? Certainly not easy. Could an OCR with different equipment give a near-perfect result?

If I really needed to fix Fig. B (and I couldn't imagine trying this for 6000 pages), I would scan the original, and clip out the figures **and** equations using **paint** and save them as BMPs. Then I would OCR the same original, save the text in **word**, proof-read/correct the text, paste the figures/equations back in, and save as a PDF. That is, the same as the original scan except better text characters. Purely style over substance. About an hour's work. If you think you can do a better job, and automate it, that's what the AN23.PDF is for. How good a quality can you get? How much time invested?

# FIG. A   PDF scan 131k residing as .jpg in Word workspace

$$I_{out} = 19.2 \cdot I_c \cdot V_{diff} = 19.2 \cdot I_c \, (V_+ - V_-) = \frac{I_c(V_{in}-V_{out})}{23.7} = \frac{(V_{in}-V_{out})}{R_{eq}}$$

This can be compared with the same equation for the circuit of Fig. 3a where the current through the resistor is given by:

$$I_R = (V_{in} - x)/R = (V_{in} - V_{out})/R$$

Thus we have implemented three types of VCR's. The first (Fig. 1a) is useful for supplying current to a ground potential. The second (Fig. 2a) is useful as a resistor to ground. The third (using the differential input arrangement of which Fig 3b is an example) is one form of a floating resistor.

A more general form of a floating resistor is shown in Fig. 4, and is a circuit first suggested by G. Wilcox.

Fig. 4   Fig. 5
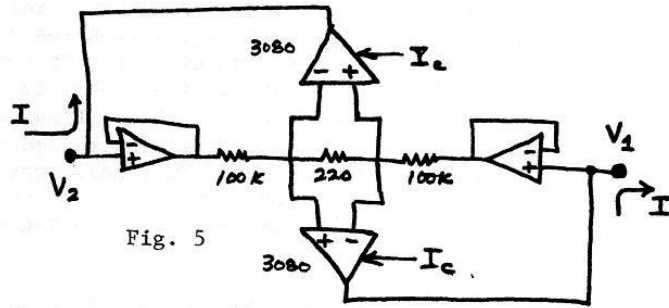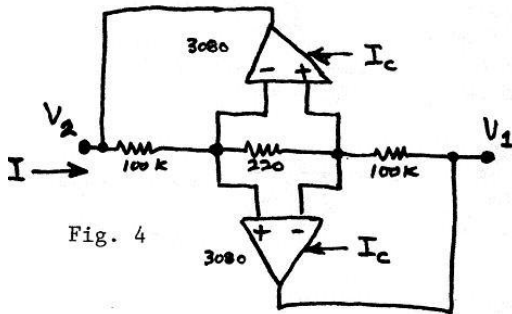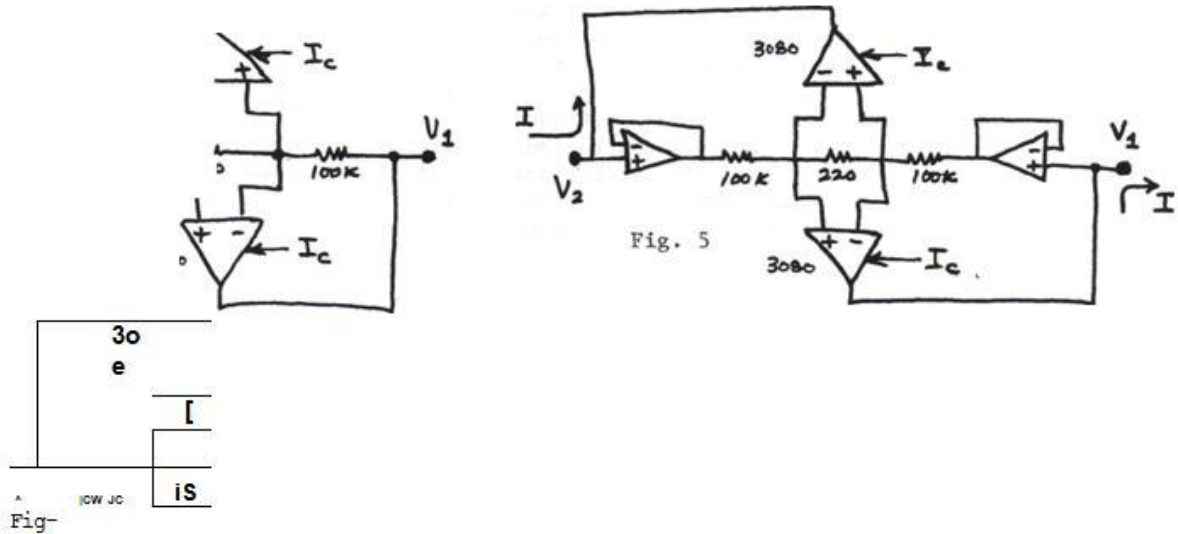
First assume that $I_c = 0$, and thus the two CA3080's are effectively out of the circuit. The resulting resistance between V_1 and V_2 is just 100k + 100k + 220 which is approximately

   DO the math and I think you will see that doing 6000 pages is something like two years of 8-hour days. And we still have the original figures and equations. Note that both Barry Klein and Terry Bowman, both speaking from actual experience with OCR, have commented (SYNTH DIY June 25, 2017) on the extreme difficulties of achieving a digital version of Electronotes.   If you disagree, submit your calculations. If you have a program that redraws schematics, tell-me/show-me.   If you have an equation editor that works reliably, tell-me/show-me.

   Now, would our "collector" be happy with Fig. B? Not if he actually tired to understand it, but Fig. A should satisfy. A serviceable but slightly oversized file is preferable to a file of nonsense. But there remains the problem of getting even the PDF scans done.

# FIG. B   OCR scan 60k residing as .jpg in Word workspace

I_c diff $= 19.2-1$ $-v..$ $<- 19.2-1_c$ $(v - v)$ $-$ out   23.7   R

eq

This can be compared with the same equation for the circuit of Fig. 3a where the current
through the resistor is given by:

$_R$ $- x)/R =$

Thus we have implemented three types of VCR's.   The first (Fig. la) is useful for
supplying current to a ground potential.   The second (Fig. 2a) is useful as a resistor to
ground.   The third (using the differential input arrangement of which Fig 3b is an example)
is one form of a floating resistor.

A more general form of a floating resistor is shown in Fig. 4, and is a circuit first
suggested by G. Wilcox.

Fig. 5

First assume that $I_c = 0$, and thus the two CA3080's are effectively out of the circuit. The
resulting resistance between V^ and V2 is just 100k + 100k + 220 which is approximately 200k.

It is possible, I believe, to automatically feed and scan pages. My printer/scanner auto
feeds perhaps a dozen pages. But that's when it is in a good mood.   It takes probably
20 seconds per page, only does single sides (you have to flip 2-sided stuff quickly, page
by page, else start over). Then the software has to "think" about forming the PDF.
Allowing for the hand sorting of originals and checking results, I think 3 minutes/page
might be a reasonable estimate. Assuming the scanner even survived the 6000 pages,

that's about 40 eight-hour days.   All this effort for analog scans that are inferior to the material being shipped.   All for the privilege of putting myself out of the paper copy business. Could it be more clear that THIS ISN'T GOING TO HAPPEN.

Couldn't better equipment be used? Likely so, but I don't have any such. Couldn't someone be hired to do this for me? Likely so, but who is going to pay them? Don't we suppose that someone is likely to just scan everything (copies they bought) and post it? I think the community would take a dim view of anyone ripping us off this way, and we would know who purchased the source copy (they are marked). Any OWNER is free, or course, to make a digital copy for his/her own use.

Beyond the financial injury of scanning a purchased set, there is the fact that no actual value is added. There are two things that could add value. [I am assuming that an OCR followed by redrawing of figures and resetting equations is too ludicrous for anyone to entertain – please don't.] The first would be to scan from originals rather than salable copies as discussed in ENWN-34 as linked above. If any SERIOUS BUSINESS-LIKE EFFORT by a reputable person to scan to PDF were offered, this would be a condition. Secondly, each scanned PDF would have a corresponding unseen OCR overlay intended for a text search. I saw this done recently for S-019 sourced from the free portion of our site. This would of course add to the file size, but would add a useful feature.   My guess: THIS IS NOT GOING TO HAPPEN EITHER.

CONTEXT MATTERS – DON'T ASSUME

   As a long time believer in "Live and Let Live" I mind my own business (figuratively and literally). Even a great idea on the part of someone making a suggestion may well lack a fuller CONTEXT to which only the person receiving the suggestion may be acutely privy. Never assume. You know that. In my army training as a Counterintelligence Special Agent (a title with a whole lot less cachet than you might – erroneously - assume!) the actors training us delighted in correcting a habit of assuming (me: "I assume you went from there to your next job." actor: "Okay.")   So something like "I assume you would jump at the chance to triple your sales," does not make the grade.   In fact, as you get older, your life is more dominated by things to NOT jump at!

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* I delight in remembering a case where I was tending cash register one evening in a liquor store which my wife and I owned and operated (mostly she did). A customer had selected a couple bottles of wine and as I was about to hand him his receipt and change, he balked and said exactly how he wanted the items handed to him (like receipt and paper bills in his right hand, metal coins in his left).   I put his $20 bill back on the counter, pulled back the wine bottles, and told him that he should go to a store where they did just that. I was not adverse to having him chuckle and apologize.   Instead he said "You can't do that – you don't own this store!" I told him that my wife and I owned it.   Then, showing his lack of imagination is two respects, he said "No you don't, it's owned by a Chinese lady." (My wife of 45 years is Korean.)