QEX 25 March 1984

The ARRL Experimenters' Exchange

Word Processing Dictionary Ideas

Whenever we are preparing a manuscript at ARRL Hq., there is always the problem of introducing new technical words. This is especially true when working with material written for beginners. The basic idea is to assume that everyone knows standard English up to a certain grade level. It is desirable to define a technical term, (one not commonly found in the English vocabulary), when it is introduced, otherwise, you take the chance of loosing the reader at that point.

The present method of recognizing new technical terms is purely manual. The author or editor tries to single them out as they are first used in a manuscript. As you can see, this causes problems such as overlooking new terms or duplicating definitions.

I wonder if any QEX readers can think of a painless way to automate this process? We presently use WordStar for word processing of articles and not a spelling program such as SpellStar because the text is checked visually when the manuscript is proofread.

Ideally, what we'd like to have is a standard English dictionary and a program on IBM ® PC diskette. This dictionary(ies) would make it possible for us to select the reading level -- possibly one level for beginners' material and another for general adult reading. After preparing a manuscript on WordStar, we would run the program and have it flag all first uses of words that do not appear in the dictionary.

If an editor is using the computer at this point, he would be alerted to the fact that a new word needed an introduction. The editor could then insert the definition in the text and move on to the next new word. Alternatively, it should be possible to simply run the text past the dictionary and obtain a hard copy with the new words flagged so the editor can work with the hard copy to insert definitions. That is the preferred mode as the other method would tie up the computer waiting for the definitions to be researched and written.

If you have a practical solution to this problem, I would be happy to hear it. Our problem is not unique, so if you were to write such a program, there would be a market for it.

Packet-Radio Repeaters

A new packet-radio repeater, W1INF/R, is on the air in Newington, CT. It is presently using a VHF Engineering repeater running 18 watts, a Vancouver Amateur Digital Communications Group (VADCG) terminal-node-controller (TNC) board, and a newly designed single-chip Bell 202-compatible modem. It operates on 145.010 MHz, the frequency that is becoming the standard 2-meter packet-radio frequency for EASTNET. Other repeaters on the same frequency are in Lowell, MA; Warwick, NY; central NJ; and Washington, DC. Others are expected to fill in the gaps in Maryland, Delaware and Southern New Jersey in the near future. Using the latest version of the AX.25 packet-radio link-level protocol, it will be possible to route packets via up to eight repeaters.

A similar effort on the West Coast, called WESTNET, will complete the linking of packet-radio repeaters from San Diego to San Francisco. This project will begin as soon as the snow melts on strategically placed mountain repeater sites.

Goodbye to Chirps

You will recall that we mentioned in QEX no. 23 that the Sony ICF-2002 chirps when it receives a strong signal. One of the ARRL lab crew, Jon Towle, WB1DNL, came up with a modification that eliminates the pulling. It involves replacing a single-gate FET with a dual-gate FET plus changing some passive components. Mind you, this is a lot of radio packed into a small PC board, and the modification is not for everyone. We plan to publish it in the near future with ample warnings about needing good eyes, light and nimble fingers, keeping Murphy away, and not blaming us for breaking your nice new radio.

Call for Articles

Do you have some information that you would like to pass along to other experimenters? QEX is an experimenters' exchange that's supposed to be two way. If you have some information of interest to technically minded amateurs, write it in the form of an article or correspondence to QEX. We would like to have more VHF/UHF articles and CW/RTTY programs for personal computers for which such programs have not been published. - W4RI

Correspondence

A Sinclair BASIC Program for Pi-L Networks

Upon seeing Elmer Wingfield's, "A Note on Pi-L Networks," in QEX no. 22, I decided to translate his BASIC program to "Sinclair BASIC." For the users of the Sinclair/Timex 1000 computer, I am sharing this information. In addition, beginning on line 280, I have included the conversion of the X1, X2 and XL numbers to specific C1, C2 and L numbers for a selected frequency. - R. H. Knaack, Jr., W7FGQ, 11415-28th S.W., Seattle, WA 98146.

```
10 REM "PI NET"
15 REM Q BASED FORMULAS FOR CALCULATING PI-NETWORK
   REACTANCE VALUES
20 REM REFER QST AUGUST 1983
25 PRINT AT 1,1; "ENTER R1"
30 INPUT R1
35 PRINT AT 1, 12; "R1=" ,R1
40 PRINT AT 3,1; "ENTER R2"
45 INPUT R2
50 PRINT AT 3, 12; "R2=" ,R2
55 PRINT AT 5,1; "ENTER QO"
60 INPUT QO
65 PRINT AT 5, 12; "QO=" ,QO
70 PRINT
75 IF (R1*R2*QO) <=0 THEN PRINT AT 8,6;  "NOT A PI
   NETWORK"
80 IF R1<>R2 THEN GOTO 130
85 REM SPECIAL CASE WHERE R1=R2
90 IF R1=R2 THEN LET X1=((2*R1)/QO)
95 PRINT AT 7,8; "X1=" ,X1
100 LET X2=((2*R2)/QO)
105 PRINT AT 8,8; "X2=" ,X2
110 LET Q1=QO/2
115 LET XL=(R1*QO)/(Q1*Q1+1)
120 PRINT AT 9,8; "XL=" ,XL
125 GOTO 180
130 IF (R1/R2)>(QO*QO+1) THEN PRINT AT  8,6;  "NO
    SOLUTION"
135 IF (R2/R1)>(QO*QO+1) THEN PRINT AT  8,6;  "NO
    SOLUTION"
140 LET Q1=(R1*QO-SQR ((R1*R2*QO*QO)-((R1-R2)*(R1-
    R2))))/(R1-R2)
145 LET Q2=QO-Q1
150 LET X1=R1/Q1
155 LET X2=R2/Q2
160 LET XL=(R1*QO)/(Q1*Q1+1)
165 PRINT AT 7,8; "X1=" ,X1
170 PRINT AT 8,8; "X2=" ,X2
175 PRINT AT 9,8; "XL=" ,XL
280 PRINT AT 11,0; "ENTER F, MHZ"
285 INPUT F
290 PRINT AT 11, 12; ,F
295 LET PI=PI
300 LET L=XL/(2*PI*F)
305 PRINT AT 13,8; "L(UH)=" ,L
310 LET C1=(1/(X1*2*PI*F))*10**6
315 PRINT AT 14,8;"C1(PF)=" ,C1
320 LET C2=(1/(X2*2*PI*F))*10**6
325 PRINT AT 15,8;"C2(PF)=" ,C2
330 PRINT AT 20,1;"TO CONTINUE, PRESS FUNCTION KEY
    CONT AND ENTER"
335 STOP
340 PRINT
345 PRINT  AT 5,1;  "FOR ADDITIONAL  FREQUENCIES,
    USING SAME R1, R2, AND QO"
355 GOTO 280
```

Errata on "Series Line Matching Sections for Impedance Matching"

Regarding my article in QEX no. 23, there are a few corrections that should be made. In the second to last paragraph of the article, the third sentence should read, "...I was unable to see..." (not able).

The eighth paragraph should read:

$$\frac{246}{8.45 \text{ ft}} = 29.11 \text{ MHz.}$$

The next sentence then begins, "L2 + L22 resonance is..." And for clarity, an addition at the end of this paragraph should state, "Do not forget the V factors." - Russell E. Prack, K5RP, 2239 Creek Road, Brookshire, TX 77423.

Proposal for a 50-MHz Beacon System to Assist Propagation Studies

I have recently sent a copy of a 50-MHz beacon proposal to the Radio Society of Great Britain (RSGB) for their deliberations. A copy is also sent to you in hopes that it will furnish ideas for a similar system within the United States and/or Canada. The proposal will enable amateurs to study propagation such as aurora, sporadic E and F2.

I feel that if a system such as this is established on the North American continent, propagation research for amateurs will take a great step forward. Similar systems worldwide could then be organized following this example, setting up a world-wide beacon system.

I hope this suggestion will promote a better understanding of the 50-MHz spectrum and facilitate greater liaison and research on these frequencies. - A. C. Wright, GW3LDH, 6 Cwm Eithin, Wrexham, Clwyd, N. Wales.

The GB3SIX beacon has proved itself this E season with amateurs in the United States, Canada and Bahamas monitoring it. I feel it would be beneficial for a 50-MHz beacon system to be situated in northern Scotland and Cornwall. These beacons could be constructed of 4 x 5 element Yagis in tandem but phased operation, and possibly powered by something similar to an ex-BBC 50-MHz satellite transmitter (low power CW, not FSK, i.e., +25 W into each pair). The antenna headings should be offset between ±70° and ±20° of true north and a similar offset to the southerly direction. The Scottish and Cornish beacons could be

(continued on page 3)

(Correspondence continued from page 2)
arranged as follows:

Scottish Beacon

	GB3XXX	GB3YYY	GB3XXX	GB3YYY
True Bearing	290	340 Ø	020	070
3dB Points	265-315	315-005	355-045	045-095

Cornish Beacons

	GB3ZZZ	GB3???	GB3ZZZ	GB3???
True Bearing	250	200 180	160	110
3dB Points	275-225	225-175	185-135	135-085

Two antennas could be used on a time-shared basis of around 30 seconds each (-70 and +20 and -20 and +70) in both directions. The beacon in use could simply be identified by the use of two callsigns.

This system has a number of advantages if a look is taken at a great circle map. Allowing for the above beam headings and the beam width of the antenna, coverage of the U.S.A., Canada, North and South Europe, Australia and New Zealand is possible from the northerly beacon. The southerly beacon would include Africa, South America, the Antarctic and other land masses in that direction. This multi-beam beacon could be a major step in propagation research.

Tutorial Update

Not much in life is free anymore -- including the FCC Science and Technology Tutorials! For the past two years, anyone interested in obtaining these lectures on videotape could take advantage of a no-cost duplication service as long as they supplied the tape. Clifford J. Appel, WB6AWM/7, a veteran of this service, recently informed us that because of budget cutbacks the FCC has employed a nearby company to do the job.

Given the name and telephone number of this company, I called Ms. Donna Edwards of the Prism Corp. She confirmed what WB6AWM/7 had told us. Therefore, any interested individual still wanting to obtain tutorials should write or call the Prism Corp. for the latest price list on their copying services. They also handle plain audio tapes -- no picture. Their address is 4400 Jennifer St. N.W., Washington, D.C. 20015. Telephone (202) 686-8250, ext. 33 for Ms. Edwards.

For a complete listing of available tutorials, see QEX issues no. 2 and 20. An estimate on what the corp. charges is approximately $17 per hour, with rate increases over a period of several days. One day service can cost $47 per tape. - KA1DYZ

Solution for the 1960 VW Bug

In the January 1984 (no. 23) QEX "Correspondence" column, we asked for information on converting a 6-V electrical system in a 1960 VW Bug to a 12-V system so AE6U could operate 2-meters while mobile. A quick response appeared in the ARRL Technical Information Specialist's mailbox, and I am printing the solution for interested individuals.

For the 2-meter operator who is also an owner of the VW Bug (or other small vehicle), the use of a Radio Shack Voltage Inverter, catalog #22-129, is an easy solution to increasing voltage output. By driving the inverter with 6-V dc and allowing it to charge a 12-V dc battery, the system can power a QRP rig. The inverter is capable of charging the 12-V battery at a 3-A rate with little chance of overcharging it. This is shown in Fig. 1.

By modifying the turns ratio of the inverter transformer -- removing $\frac{1}{2}$ of the secondary windings, and separating the inverter input and output ground, the unit can be used to charge another 6-V battery in series with the 6-V car battery. This is shown in Fig. 2.

By isolating the grounds in the inverter and running it with 12-V input, a second 12-V battery can be charged to equal a 24-V dc output. Twelve-V input wires will have to be reversed for this operation. - Rick Shepard, AI5H, 130 Devonshire, San Antonio, TX 78209.

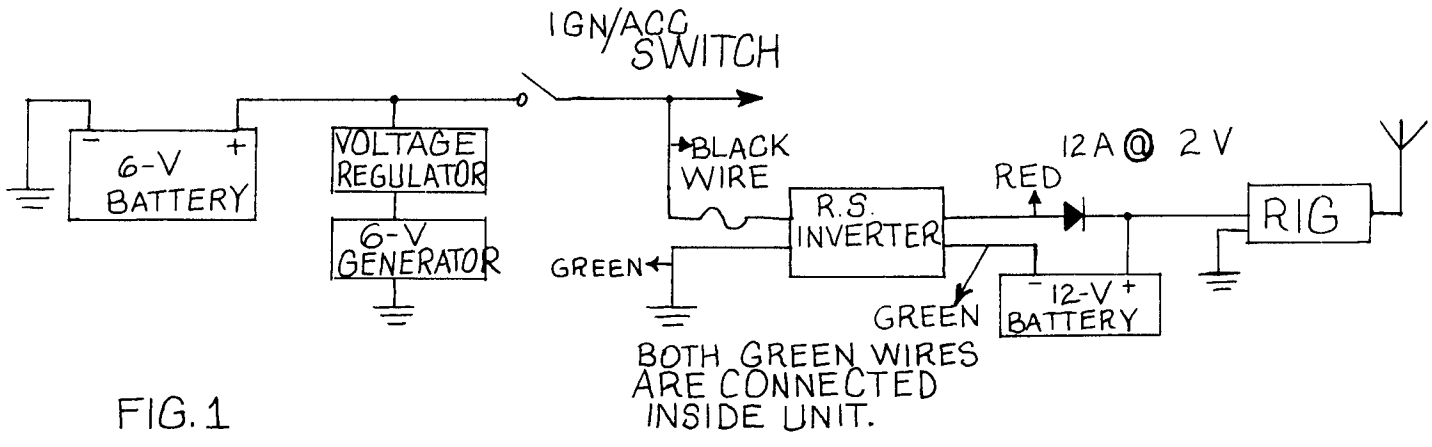

FIG. 1

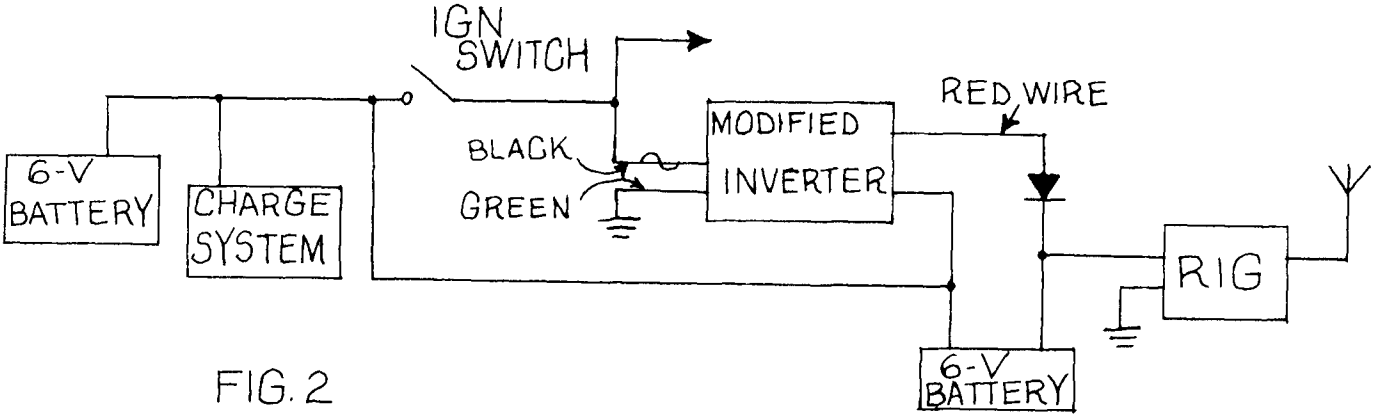

FIG. 2

THE AMERICAN RADIO RELAY LEAGUE
225 MAIN ST.
NEWINGTON, CT 06111

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Sinclair Computers As Low-Cost Data Terminals For Amateur Radio

By Kenneth L. Heitner, * WB4AKK

The small Sinclair computer available on the market today offers great potential for Amateur Radio. This inexpensive computer, developed around the Z80 microprocessor, has significant computing power.

Packaged complete with a keyboard for input and control, it has a fairly powerful software package in its ROM and sufficient RAM (2 kbytes) to serve as a data terminal (a few external chips must be added to transform the computer into this). You will have to supply the video display -- a black-and-white television set.

This article will focus on the Sinclair computer as I am most familiar with them. References to some of these programs and interface designs were published in QEX No. 17, July 1983. With a little engineering, concepts presented can be applied to other low-cost computers. Commercial hardware and software to make these adaptations to amateur needs are already appearing in the marketplace.

Amateur Users for Sinclair Computers

During the last three-year period, the use of computers in Amateur Radio applications has developed rapidly. The Sinclair was no exception. A number of programs and associated circuits were engineered for this computer to serve as a Baudot or ASCII RTTY terminal. Separate research was performed on its CW receive and transmit capability.

How These Programs Work

The development of Baudot or ASCII RTTY programs have followed parallel paths. The key feature in this approach is the use of a UART interface because of its simplicity. It allows the computer to function in a polling mode while the UART collects and stores incoming serial data. Nothing happens within the computer until the UART is ready and waiting with a complete character. The computer then reads the UART in the parallel format, inputting the character. This takes approximately 10 μs, time for one read cycle.

Because the internal code of the Sinclair is neither ASCII nor Baudot, the input character must be "looked-up" in a memory table. Once this is done, the proper character code can be placed in the video file for display. The process is not complex, however, the programs to do this must be written in Z80 machine codes.

More Advanced Applications

The next question might be, "What else can the computer do?" It can do much more, but additional equipment is necessary. Certainly the computer could, in theory, handle AMTOR. AMTOR's data rate is 100 bauds, well within the capabilities already demonstrated. The secret is sitting down and developing the software. I cannot estimate the length of the program, but memory packs up to 64 kbytes are available, and adding on is no problem. My conclusion is that the Sinclair computer can be employed as a low-cost AMTOR terminal with the proper software and interface.

Beyond AMTOR lies more complex possibilities -- packet radio. A few years ago when general purpose computers were too expensive to use as a packet terminal, the main thrust was developing special purpose packet computers that served as terminals for packet networks. Today, with the availability of the general purpose computer, the question raised is, "Can they serve as packet terminals?" The answer is a qualified, "Yes, with the correct software and hardware."

For the beginner in packet radio communication, the Sinclair can be the basis of a low-cost packet terminal. Articles written about this computer as an ASCII terminal indicates that it can handle the 1200-baud rate commonly used by packet systems, and of course, the 300-baud rate found on HF circuits with the use of properly designed modems and transmission circuits. This technology is widely available.

The Sinclair system is flexible, an important characteristic to have because packet radio is in its developmental stage. A system such as this, inherently flexible, will easily adapt itself to changes and modifications. Standardization is easier to achieve since the program can be easily transferred to other computers.

Conclusions

Many changes are taking place in computers today. Don't underestimate that inexpensive computer as there is a powerful system underlying its shell. Amateurs have always been resourceful in adapting technology to their needs and this looks like another opportunity.

*2410 Garnett Court, Vienna, VA 22180

Rule Changes for the Experimental Radio Services

Experimental Licensing Rules are Revised

During the final quarter of 1983, the FCC released an Amendment to Part 5 of the Commission's rules to diminish restrictions on the licensing and use of stations in the Experimental Radio Services (other than Broadcast). This information might be of interest to QEX readers who are also experimenters, and a complete copy of General Docket No. 82-469 can be obtained by writing to the FCC, 1919 M St. N.W., Washington, D.C. 20554, or calling George Harenberg at (202) 653-6288 or Frank Wright at (202) 653-8137. A summary of deletions and/or changes appear below.

* The Commission has deleted certain technical and operational regulations pertaining to experimental radio station operations. It replaced the mandatory routine reporting requirement for certain experimental authorizations with a requirement to submit reports only upon specific Commission request as determined on a case-by-case basis.

* The Commission has deleted certain regulations concerning frequency tolerance, the power roll-off of emissions and the requirement to measure transmitter characteristics.

* Instead, it will require that occupied bandwidth, frequency tolerance and other transmitter characteristics of the experimental station be indicated on the application.

* The Commission said that while, in the past, it had general technical requirements for experimental stations, because of the new and innovative nature of some of the experimental applications, it has been granting waivers of these technical rules on a case-by-case basis. The new rules will eliminate the need for waivers in these instances.

* The new rules eliminate certain requirements pertinent to the operation of experimental stations and to the qualifications of operators. The licensee will now have complete responsibility for maintaining control of the experimental station including its operation according to the specifications as filed in the application.

* The requirement for filing a petition for rulemaking with an experimental application is eliminated. Instead, a public notice will be issued to alert the public to experimental radio station authorizations.

* Finally, the new rules expand the scope of Part 5 to permit limited market studies to determine consumer demand under various conditions of price, quality, etc. The size and scope of such studies will be subject to Commission constraints imposed on a case-by-case basis. Limitations concerning licensing and control of equipment used in such studies are also specified.

144/220-MHz Bandpass Filter

By Paul Drexler, * WB3JYO

Correct operation of a receiver or transmitter complying with FCC regulations on interference-free emissions requires the use of a spectrally pure system. This dictates the need for proper filtering of all oscillator chains and each stage of mixing and amplification in both modes. Spectral purity is necessary during transmitting, and tight filtering in the receiver's system ensures the rejection of out-of-band signals that may otherwise lead to receiver overload and increased intermodulation-distortion products (IMD) that manifest themselves as annoying in-band "birdies."

The double-tuned bandpass filter has been thoroughly discussed in other publications and is not new. [1,2] Filter designs involving this circuit abound in amateur homebrew designs because they are simple, easy to construct, offer a relatively narrow bandpass response and are quite forgiving of resonator variations.

The filters shown at the end of this article include a resonant trap coupled between the resonators to provide increased rejection of undesired frequencies. Many popular VHF conversion schemes use a 28-MHz intermediate frequency (IF).

Proper filtering of the image frequency is often overlooked in amateur designs. The low-side injection frequency used in 144-MHz mixing schemes is 116 MHz and the image frequency, 88 MHz, falls directly in the channel-six television band. Inadequate rejection of a broadcast carrier at this frequency results in a strong, wideband signal present in the low end of the two-meter band. A similar problem exists on the transmit side that can cause TVI. The bandpass filters described have been effectively used to suppress undesired mixing products.

* P. O. Box 73, Wycombe, PA 18980

Circuit construction is easily accomplished using a double-sided copper-clad circuit board. Observing good construction techniques, component lead lengths must be kept to a minimum to eliminate resistive losses and unwanted stray couplings. The piston trimmers are mounted through the board with the coils soldered to the opposite end, parallel to the board. Placing a shield between L1 and L3 decreases mutual coupling and improves the frequency response. Peak C1 and C3 for optimum response.

L1, C1, L3 and C3 form the tank circuits that resonate at the desired frequency. C2 and L2 reject the undesired energy while allowing the desired signal to pass. The tap points on L1 and L3 are for 50-ohm matching and may be adjusted for optimal energy transfer. Several filters have been constructed using a miniature variable capacitor in place of C2 so that the notch frequency could be varied.

The double-tuned circuit represents a good compromise between construction difficulty and performance. Similar filters may be constructed for other frequencies of interest. The designs presented here are not completely optimized, and I encourage experimentation for the homebrewer. The response of the 220-MHz version suffers somewhat because of resonator and component Q degradation. Looser coupling of C2 would narrow the response.

References

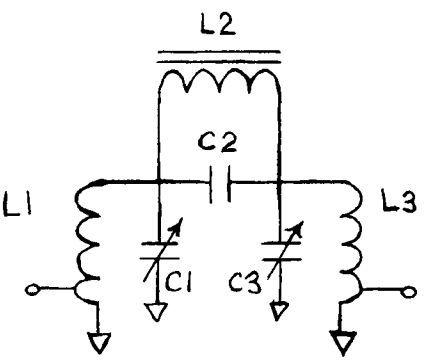
[1] Hayward, Introduction to Radio Frequency Design, Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1982, Chapter 3.

[2] Hardy, High Frequency Circuit Design, Reston, VA: Reston Publishing Co., Inc., 1979, Chapter 3 and 4.

(The filter schematic and charts appear on page 8)

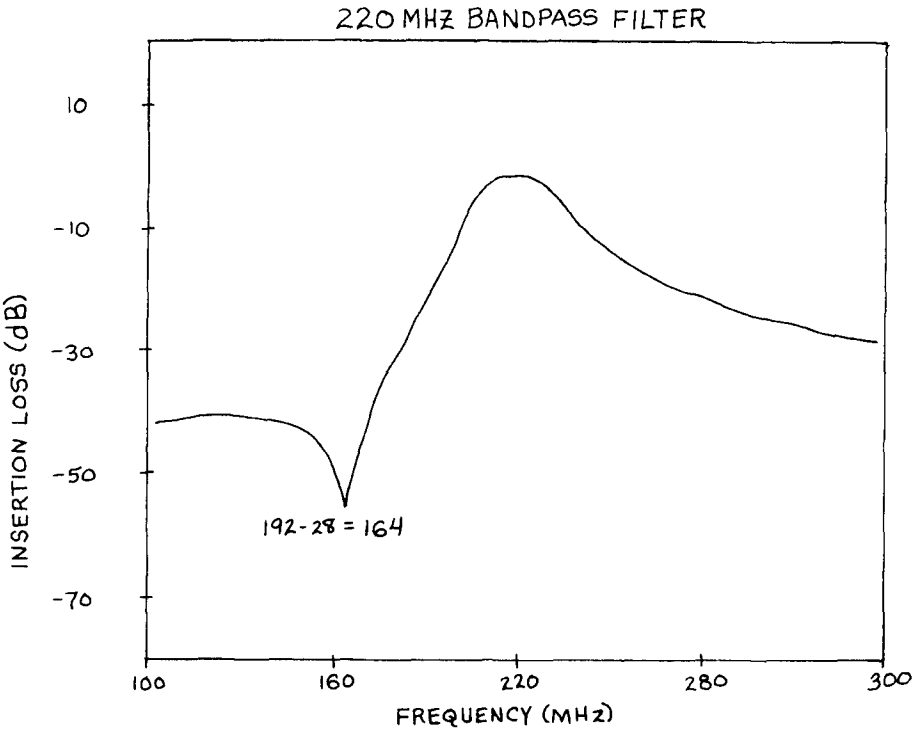
220 MHz

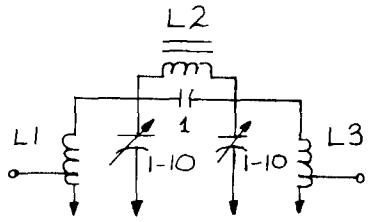
C2	1 pF
C1, C3	1-7 pF piston
L2	15t no. 24 en. on T44-10
L1, L3	4t no. 18, 1/4" 1 D, tap 1½t



144 MHz

C2	1 pF
C1, C3	1-7 pF piston
L2	27t no. 26 en. on T37-10
L1, L3	7t no. 18, 1/4" 1 D, tap 1½t



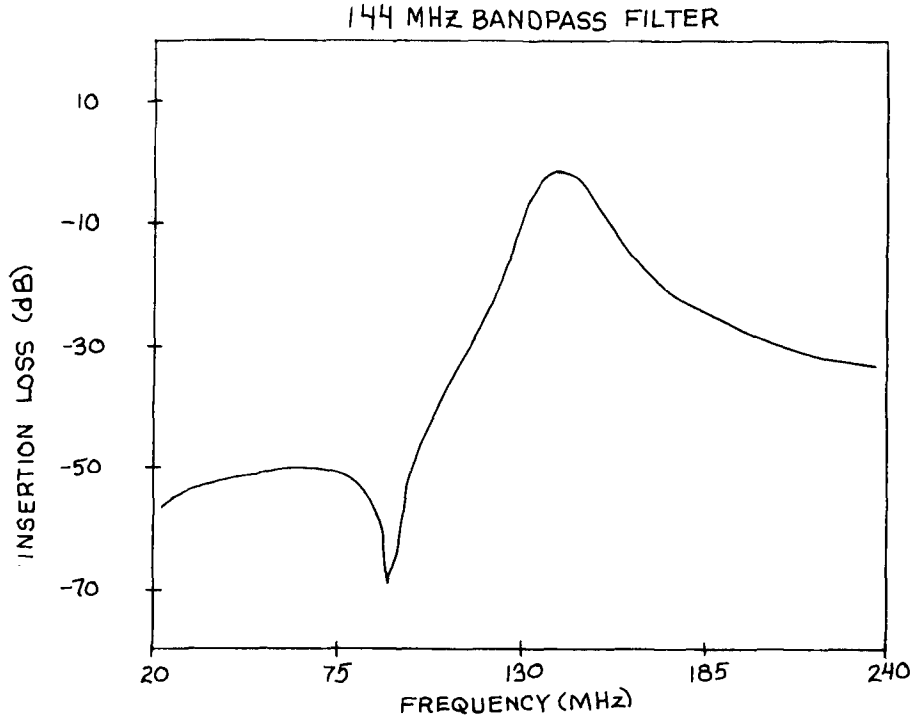


L1, L3 4t #18, 1/4" ID tap at 1 turn.

L2 15t #24 on T44-10

Coils spaced 1/2" Center-Center

Approx. 0.7dB I.L.



VHF+ Technology

Conducted by Geoff Krauss, * WA2GFP

My first column of 1984 begins with news about several new power transistors: The TRW MRA1214-55H and the Acrian 05010-50 transistor. Both devices require 28-V dc and allow microstrip circuitry to be used. The price range is $150-200, but equals the cost of power tube amplifiers with its associated cavities and HVDC supplies. Their cost may lessen over the years as did the LNA GaAs FETs. They were in the same price range five years ago, but today better GaAsFETs are available for 5-10% of the original cost.

The TRW MRA1214-55H produces 70-W CW at 1300 MHz and can be used in a four-transistor hybrid-combiner amplifier, driven by a single device of the same type. This provides 260-300-W output power for a driver with an input power of about 15 W. (This can be obtained from a Motorola MRF 2010 transistor.)

The Acrian 05010-50 transistor, in a two-device amplifier, can produce 50-W of class AB or class C output power at 500-1000 MHz with about 10-W of input power. This was described in MICROWAVES & RF magazine, Nov. 1983, pp. 128 and 129. It is a potentially interesting circuit for the IPA needed at 432 and 902 MHz to provide sufficient drive to a several-hundred-watt-output power amplifier, from a typical SSB transmitting converter.

VHF+ Newsletter

I've had a long-standing pet idea and was going to discuss it in this month's column, however, someone else has apparently started to accomplish this goal. A newsletter concerned only with buying, selling and trading VHF+ amateur equipment for both test and communication purposes is now being published by Jack Parker, KCØW, 1420 E. Sweet Ave., Bismarck, ND 58501. I received his first sample issue of the "VHF+ TRADING POST" in my mailbox the other day. A sample copy and subscription information is available from Jack.

432 and 1296-MHz Receiving Converter Kits

I considered reviewing the 432-MHz and 1296-MHz receiving converter kits available from RADIO-KIT (Box 411, Greenville, NH 03048), but they arrived too late to be built and tested for this month's column. Each kit has a printed circuit board made available by the British publishers of RADIO AND ELECTRONICS WORLD. As with kits occasionally available in this country from the German publishers of VHF COMMUNICATIONS (UKW Berichte), the semiconductors are of European manufacture. The 1296-MHz unit uses a single RF stage into a second-harmonic mixer of the antiparallel-diode-type, while the 432-MHz unit employs a single RF preamplifier stage (BFR 91 device) into a dual-gate MOSFET mixer. The 432-MHz unit is specified to have a conversion gain of 28 dB, but it is my feeling that a better approach might have been to sacrifice active-mixer gain and use a double-balance passive mixer (DBM). Both kits are in the under $50 price range and I should have something on them in a future column.

As an aside, I plan to test the noise figure of these converters using the new HP microprocessor-controlled NF meter. One has just been acquired by my employer and tests of this noise-figure meter against an AIL 70 hot/cold noise source indicate excellent agreement between the measurements. Since some of these new HP units are being used at various VHF+ conference NF measuring contests, I would expect that published NF results would be more meaningful, in an absolute sense, especially if the auto-calibrate procedure for this equipment is carried out when it is set up at the conference site.

We Don't Speak the Same Language

While discussing my feelings on the 432-MHz unit with a local computer enthusiast interested in packet radio, he looked extremely perplexed when I mentioned that the converter should have a DBM. He wanted to know what a Data Base Manager would do in a UHF receiver!

This difference of reference frames is perhaps one of the major reasons for the dichotomy of genus "electronics hobbyists" into vastly different species of "Amateur Radio hobbyists" and "Digital Computer hobbyists." The former is interested in communicating information, of some arbitrary type, between a pair of separated locations by use of a particular medium -- radio. It is generally immaterial as to what the information is, although the type of information may have some bearing in determining some of the communications carrier parameters, such as modulation type and the communications circuitry used. On the other end of the genus, the latter species is primarily interested in the information content, and is generally uninterested in the exact means of transmission between a pair of locations. It is immaterial to the computer enthusiast as to whether his bits, nibbles and/or bytes of data travel via the telephone network or by RF carrier, as long as the transmission medium, and associated transmission/reception equipment, transports the information with a sufficiently low error rate to be useful. Usefulness often implies a high data-transfer rate and is important to VHF+ers because it requires a wider bandwidth than can be used on HF. VHF+ is the natural "home" for digital data exchange if such an exchange is to be done by radio!

The "no-code" proposal is dead, but VHF+ers must still be concerned with FCC Commissioner Dawson's question of Private Radio Bureau Chief

(continued on page 10)

*16 Riviera Dr., Latham, NY 12110

(VHF+ Technology continued from previous page) Foosaner as to whether he "foresaw any service or option for entry to the spectrum for people who might be in the computer hobbyist class." Foosaner's answer was that it is "a petition we will look at."

The obvious answer is for the computer hobbyist to also become an Amateur Radio licensee. Those of us working with VHF+ should contribute our technical skills to help the inevitable introduction of VHF+ digital communications as a technically sound and orderly one. Unlike many computer hobbyists who have little ground for discussion of their various machines and the different programming techniques required by each, we amateurs have always displayed an ability to exchange meaningful information between hams with diverse interests (the HF DXer can understand most of what the 1296 EMEer has to say about weak-signal work, and so on).

Perhaps the above is true because each Amateur Radio licensee was required to know a minimum amount about the hobby to pass an exam, or because all forms of radio communication have certain basic problems we overcome (even if our more esoteric acronyms are misunderstood!). The bottom line is even if you never expect to use a digital data transmission mode, discussion and assistance between digital radio and VHF+ radio enthusiasts is going to be required if for no other reason than to keep us from stepping on each other's toes (and signals). Learn something new about digital data communication and teach a computerist something new about radio communication in return. As the saying goes, "a mind once expanded by new ideas and information can never return to its former shape." Think about it.

Motorola Announces DTMF Dialer and Speech Network Chip

A single-chip DTMF Dialer (tone generator) and Speech Network, the MC34013P, was introduced to the electronics industry by Motorola on January 13, 1984 in Phoenix, AZ. The MC34013P is a derivative of the MC34011 complete telephone circuit, which combines the Speech Network and Dialer with a tone ringer on a single chip. This new chip is available at a lower cost than its successor and permits a choice of a variety of separate tone ringers, providing increased system flexibility.

Integration of the speech network with the Dialer maintains complete compatibility between these two circuits. Low voltage linear I^2L processing provides operation down to 1.4 V for line powered applications.

Motorola is the only manufacturer to offer this combination of functions in a single chip. Present designs use an IC tone dialer and a discrete or transformer speech network. When mated to the recently introduced MC34012 tone ringer, the two ICs comprise a complete tone-dialing telephone.

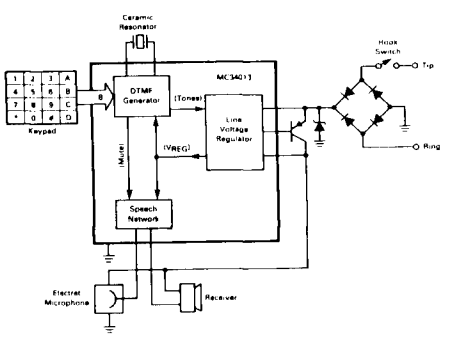
The MC34013 combines a DTMF generator, analog amplifiers and a dc-line interface. It also provides a 2-4 wire conversion with adjustable sidetone utilizing an electret microphone. An on-chip regulator assures stable operation over a wide range of loop lengths. In addition, the tone dialer mutes the speech network with internal delay for click suppression on the DTMF key release.

Motorola now offers a variety of telephone receiver circuit options. These include:

	Device	Price 100-999 Quantities
MC34013	DTMF Dialer and Speech Network	$6.01
MC34012	Tone Ringer with 3 different base frequency options	1.24
MC34011	Electronic telephone circuit which combines the above circuits on a single IC	7.24
MC34010	ETC single-chip IC, plus the MPU interface	8.58

All of the above parts have been released to production. Sampling is now in progress and orders may be placed through the factory and from authorized Motorola distributors.

MC34013 - Functional Block Diagram



Bits

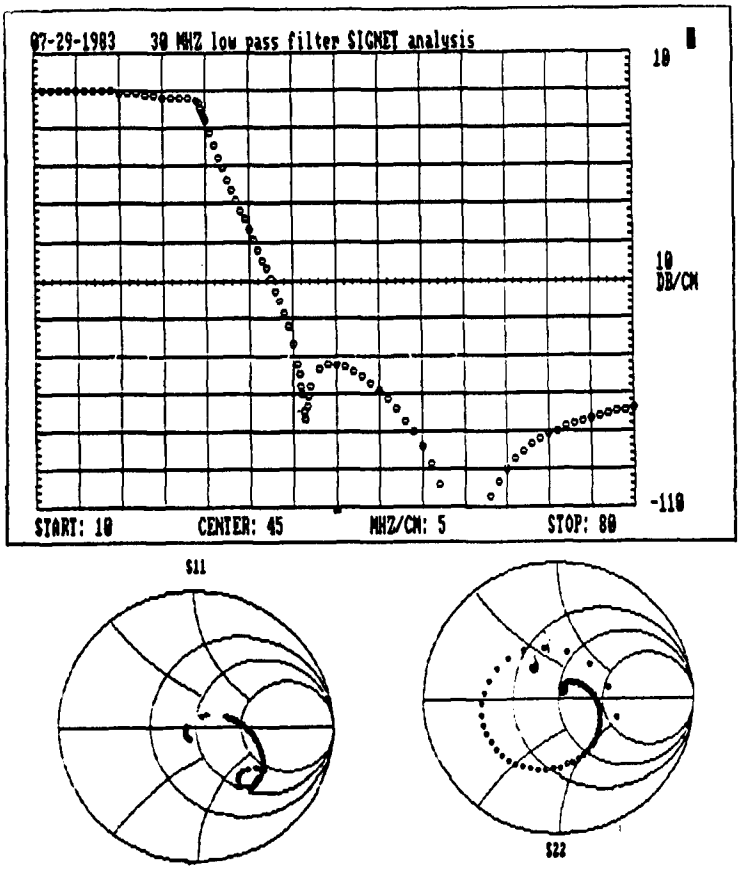
Circuit Design/Analysis Software for IBM-PC

SIGNET, a moderately priced circuit design/analysis program, is written for the RF engineer who appreciates speed and efficiency. The program can handle lumped, distributed, active and passive components (e.g., design of a three-stage, 6-GHz microstrip amplifier).

A major feature of the program is a routine that provides component values for LC low-pass, high-pass, band-stop and several types of band-pass filters. Analysis provides magnitude and angle of S-parameters, group delay, stability factor, gain and so on. Speed is excellent owing to the machine-language run format and optional 8087 co-processor chip support. The user-friendly format is designed for the new or infrequent user not familiar with computers.

Features include semi-automatic design optimization, component value sensitivity analysis, printable screen graphics, extensive on-line help text and much more. Hardware requirements are an IBM, Compaq or similar 8088 computer with 128 kbytes of memory and one disk drive. An 8087 co-processor chip, graphics display and dot-matrix printer are optional.

The SIGNET purchase price is $1,790 and further information can be obtained by contacting Dr. M. Martin & J. Mastropole, 1067 Leigh Mill Road, Great Falls, VA 22066. Prospective buyers may purchase a copy of SIGNET that has been "patched-up" and is of limited usefulness; a demo disk is available for $20, but may be used for credit on a later purchase.



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The purposes of QEX are to:

1) provide a medium for the exchange of ideas and information between Amateur Radio experimenters,

2) document advanced technical work in the Amateur Radio field, and

3) support efforts to advance the state of the Amateur Radio art.

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