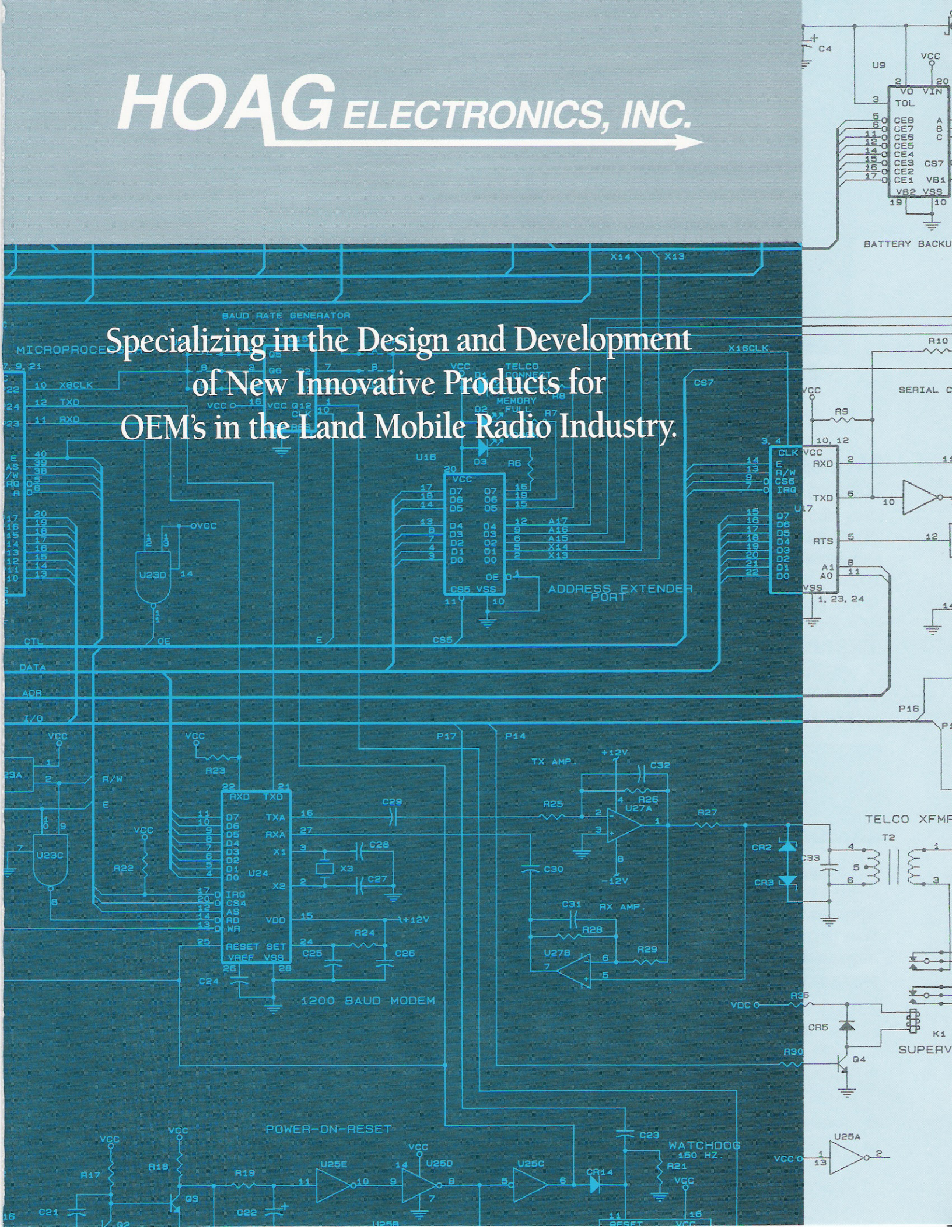


HOAG ELECTRONICS, INC.

Specializing in the Design and Development
of New Innovative Products for
OEM's in the Land Mobile Radio Industry.

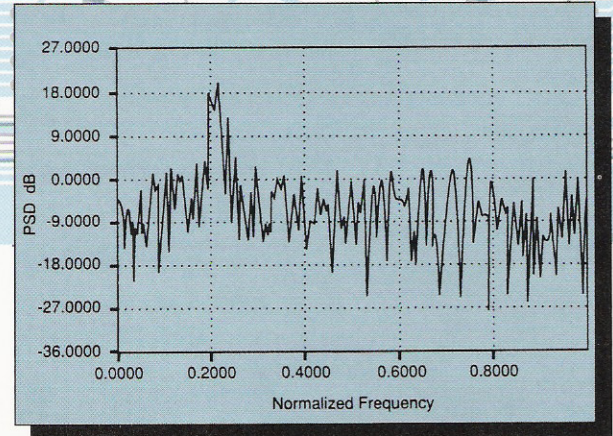


```

(***** COMPUTE FREQUENCY RESP
for N:=1 to 320 do begin
  FREQ:=3.141593*(N-1)/320;W[N]:=H0;
  for K:=1 to M do begin
    W[N]:=W[N]+2*H[K]*cos(K*FREQ);en
MAX:=0;
for N:=1 to 320 do begin
  if abs(W[N])>MAX then MAX:=abs(W[N])
  for N:=1 to 320 do begin
    DB:=20*ln(abs(W[N])/MAX)*0.4343;
    draw(N,130,N,round(30-2*DB),1);e
writeln('ENTER ANY INTEGER TO PRINT
clearscreen;
writeln('VALUES h[0] TO h[M]:');
writeln('CORRECTED FOR UNITY MAXIMUM
writeln(H0/MAX);
for N:=1 to M do begin writeln(H[N]/MA
end.

```

Software Development



DSP Signal Analysis

Who is Hoag Electronics?

Hoag Electronics is a highly specialized engineering design firm. We specialize in the design and development of new products for the Land Mobile Radio Industry. Our primary target is original equipment manufacturers (OEMs) wishing to add new highly profitable products to their product line.

Experience is what counts

When it comes to new product design in a particular field, it takes more than just engineering talent to design the right product the first time. Experience makes the difference.

"Our client base is our best testimonial."

It's those small details that can either make or break a new product. Knowing these details is what keeps a company ahead of the competition, and that's

why we specialize in land mobile communications product design. No statement illustrates our capabilities or reputation better than our project achievements—because Hoag Electronics offers a commitment to quality, a responsiveness to client needs, and a proven record of experience.

By using our experience in land mobile radio, our engineering expertise covers the following areas:

- ❖ Single and multi-chip microprocessor based hardware design
- ❖ Software development and assembly language programming

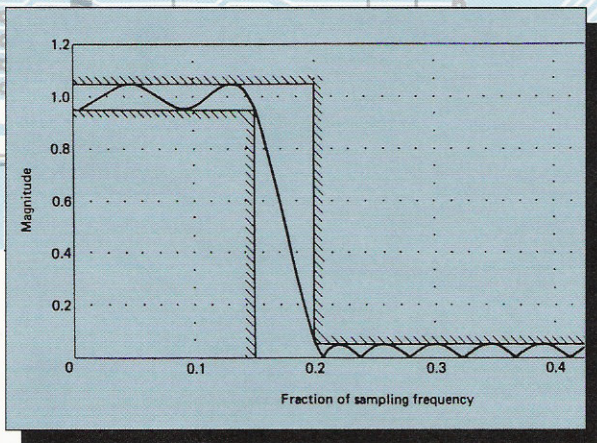
- ❖ Digital Signal Processing (DSP)
- ❖ Analog and digital data encoding and decoding
- ❖ Analog and digital logic design
- ❖ PCB design, layout and product prototypes
- ❖ Surface mount technology, hybrids and miniaturization
- ❖ Technical writing (Instruction and Service Manuals)
- ❖ Custom and semi-custom ASIC design
- ❖ Product packaging and artwork
- ❖ EMI

"Our clients appreciate working with the right team—they keep hiring us again...and again"

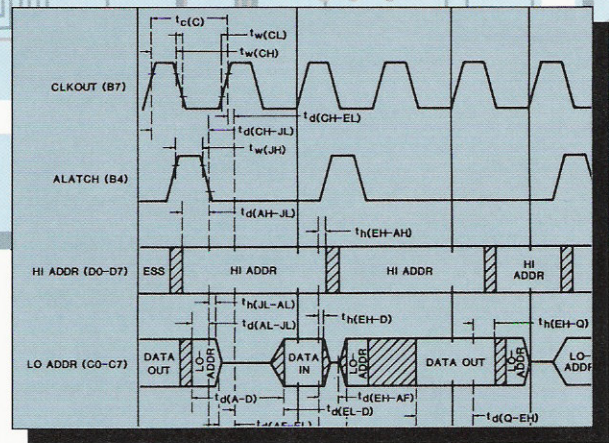
What Hoag Electronics can do for you

A consulting engineering firm demonstrates excellence in different ways—through innovation, by developing cost effective solutions, and by efficiently coordinating the many components of a project. But in every project, excellence means the same thing—providing high quality services that meet a client's needs within the constraints of a project.

Hoag Electronics can provide you with a new product that utilizes recent developments and the latest technology because we know you want the very best product...not only in performance, but a product with higher margins and lower built cost. Since we take pride in our work, you can be assured of receiving the quality and workmanship you



Analog and Digital Filter Design



Logic Timing Design

expect. We are totally devoted to our customers because we share a common goal. Hoag Electronics succeeds when the project succeeds, so we treat each project as if it were our own. We care about your satisfaction and base our reputation and ability on our past accomplishments.

We have extensive 'hands on' experience in the following product areas:

- ❖ Analog/digital Radio-paging and Signaling
- ❖ Mobile Data and ANI on radio channels
- ❖ Telephone Interconnect and Modems
- ❖ Trunking and Conventional Radio Transceivers
- ❖ Speech Security and Voice Scrambling
- ❖ Speech synthesis, Storage and Digitization
- ❖ Miniature Encoder-Decoder Boards
- ❖ Cellular Telephone design
- ❖ Telecommunications
- ❖ Industrial Control
- ❖ Remote Data Collection
- ❖ RF interface

"Nothing illustrates our capabilities or reputation better than our project achievements"

Complete engineering support

We offer a wide range of engineering support for all phases of product development. This includes product definition, working prototypes, schematic diagrams, printed circuit board artwork, component assembly drawings, bill

of materials, mechanical drawings, operation and service manuals, block diagrams, and specification sheets. You will have a complete documentation package ready for production. The final product design that is submitted to you is usually in production form, which can be used as a model for your production department.

We can interface with all phases of your corporate structure from marketing, to engineering, to purchasing. Commitment to project goals, attention to detail and timely project completion within budget are all hallmarks of our project management. We recognize that design work does not stop with a working prototype—that's why we provide valuable follow-up support.

Find out for yourself

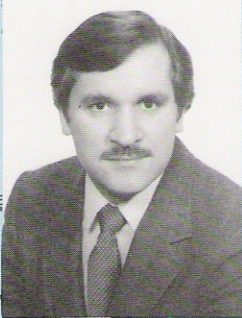
Total capabilities, effective communication and commitment to a high standard of excellence—these are the qualities we bring to every new product design.

Satisfied customers come back, and this is why clients from our previous projects appreciate the benefits of working with the right team.

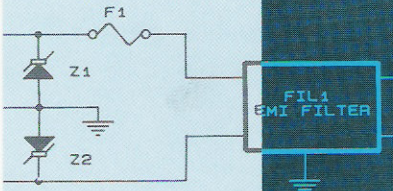
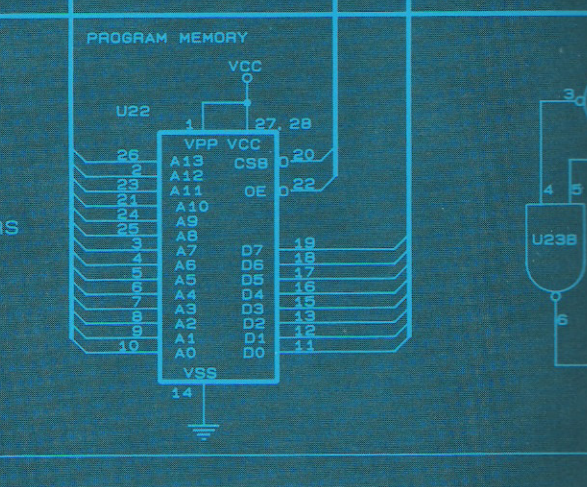
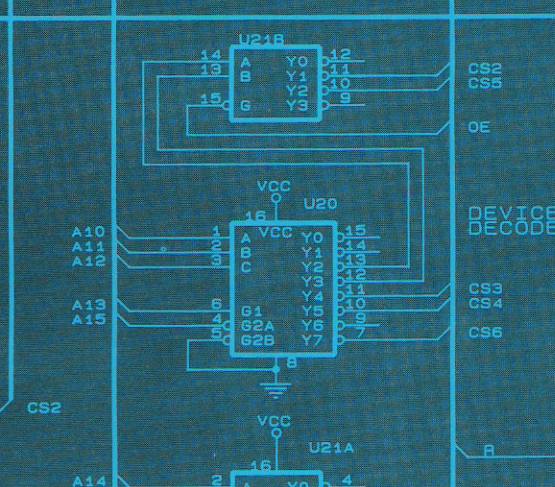
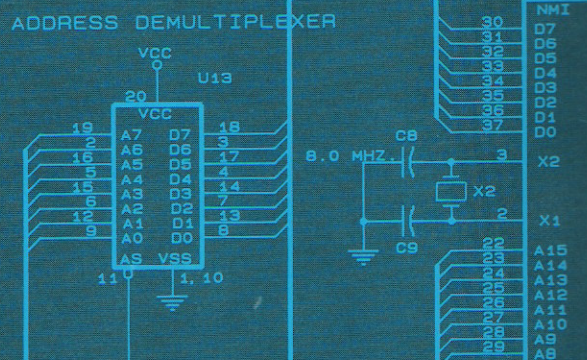
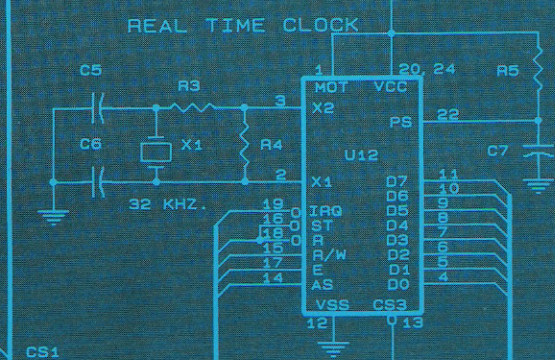
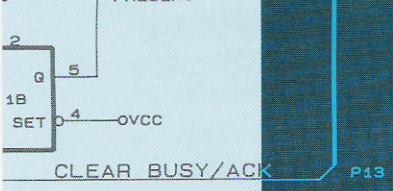
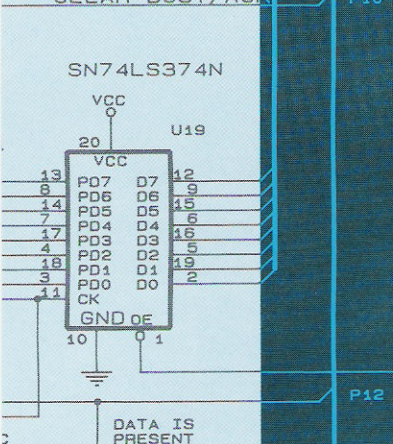
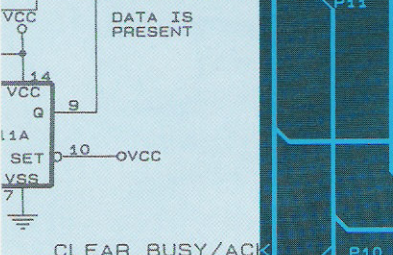
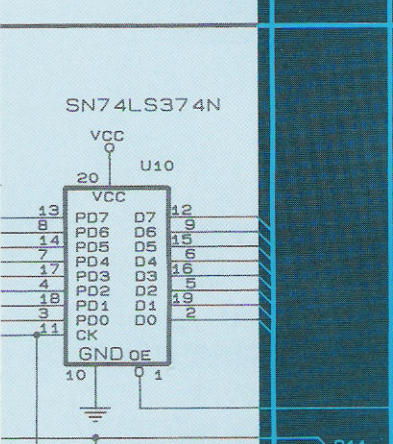
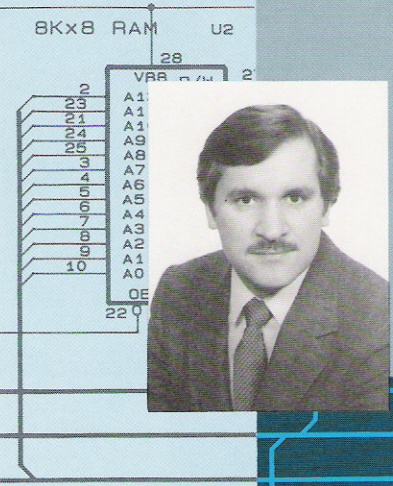
Hoag Electronics can provide

you with in-depth expertise, fast turnaround time and unbeatable performance in a new product. If you have a new product idea, or are interested in a new and profitable product for your company to manufacture and market, call Hoag Electronics today. We welcome you to check it all out for yourself. We can discuss your needs and there is absolutely no obligation.

8Kx8 RAM U2



Thomas E. Hoag President and Founder of Hoag Electronics is well known for his innovative designs in the land mobile radio industry. With over 20 years of experience in land mobile radio communications, he has conceived and engineered numerous high-tech products for the industry. Hoag has an Amateur Extra Class (N6XB) and a Commercial Radiotelephone license. He has written numerous technical articles which have appeared in Communications Magazine, Mobile Radio Technology, 73 Magazine, and Global Communications. He has been selected as a consultant in the Motorola and Intel Consultants Support Program. Hoag is a graduate from the Department of Electrical Engineering at the University of Washington in Seattle.



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