GLOWBUGS Digest 483

Topics covered in this issue include:

Date: Fri, 21 Mar 1997
From: Chris Trask <ctrask@primenet.com>
To: Multiple recipients of list <glowbugs@sco.theporch.com>
Subject: Re: Vacuum Tube Synchronous Demodulator

On Tue, 18 Mar 1997, John Kolb wrote:

>
> There's a very good article by Craig Siegenthaler in Fine Tuning's
> 1990 "Proceedings" which outlines a number of different ways to do
> "synchronous detection". Craig says the above method was first called
> synchro-phase by Drake and used in the R-7 receiver. Also used
> in the JRC NRD-525.
>

I just received a large envelope chock full of information about synchronous detectors and sheet-beam modulators from John Kolb. Thanks, John.

I also copied the article "A Synchronous Detector for AM Transmissions" by Jukka Vermasvuori, OH2GF (July 1993 QST, pp. 28-33). All in all, I believe that I'll opt for the term "synchro-phase" detection rather that "quasi-synchronous." Semantics, I know.

The synchrophase detector described by Siegenthaler is exactly what I've been describing. I agree with Vermasvuori as to the linitations of this approach when faced with fading signals and the like. In my particular application, I had to detect AM pulses of 5% and less duty cycle, which precludes any PLL sort of carrier recovery. I actually "reinvented" the synchrophase detector based upon the square-law/limiter/divider detector described by Couch ("Digital and Analog Communication Systems," Macmillan, 1993). It was a cost-effective approach to the problem at hand, and the customer is quite happy with the results.

Ulrich Rohde ("Communications Receivers: Principles and Design," McGraw-Hill, 1988) gives a very brief mention of this approach on pages 374-375.

I have made a small 40M receiver based upon my design, as a precursor to the next design for my customer. I used the NE605, which is actually an NE604 and an NE602 in the same package. It's my intention to add a PLL and Basic Stamp for the tuning control.

Okay, okay!! It's NOT vacuum tubes, and I appologize for the off-topic discussion. I have, however, transferred some vacuum tube circuitry to solid state lately (see the August 1996 issue of RF Design), and plan to do even more. Therefore, I feel safe in offering a discussion of solid state circuitry with the intent of developing hollow-state.

Speaking of tubes, I now have enough information about sheet-beam modulators to realize that they would make dandy phase detectors and detectors/demodulators. To fully implement a Costas Loop with tubes, I would have to go back to a 1950's era text on analogue computers to be able to find an analogue multiplier to finish the circuitry. I wonder, however, if one of these jewels would do the job?

Does anyone know where I can find one of those 6-channel Heathkit analogue computers, the one with the vacuum tube op-amps? I always thought they were kinda neat.

Forward, into the past!

I gotta go.

Regards,

Chris

Circuit Design for the RF Impaired

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