

Re: Characteristics of traffic radar

Source: <http://sci.tech-archive.net/Archive/sci.electronics.design/2007-02/msg01869.html>

- *From:* "Paul Hovnanian P.E." <paul@xxxxxxxxxxxxxx>
 - *Date:* Sat, 10 Feb 2007 17:09:50 -0800
-

"Michael A. Terrell" wrote:

Fred Bloggs wrote:

Michael A. Terrell wrote:

Fred Bloggs wrote:

Jan Panteltje wrote:

On a sunny day (Sat, 10 Feb
2007 14:24:44 GMT) it
happened Fred Bloggs
<nospam@xxxxxxxxxx>
wrote in
<45CDD5A9.5050001@xxxxxxxxxx>:

Paul
Hovnanian
P.E. wrote:

I
was
thinking
about
radar
speed
guns
the
other

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day
(No,
I
didn't
get
a
ticket).
My
understanding
of
these
is
that
they
produce
an
IF
frequency
between
the
transmitted
carrier
and
the
Doppler
shifted
reflection
in
the
receiver
diode.
This
is
AC
coupled(?)
to
an
amplifier
with
a
passband
in
the
audio
region.
Most
traffic
radar
operates
with
Doppler

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shifts
in
the
audio
band
and,
as
a
result,
the
signal
may
be
monitored
through
a
speaker
in
addition
to
using
a
frequency
counter.

What
does
the
passband
of
the
IF
section
look
like
in
terms
of
its
lower
and
upper
limits,
dB/octave
slopes,
etc.?
The
initial
AC
coupling

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and
positive
gain
vs
freq.
would
appear
to
create
a
bias
toward
selecting
the
faster
target
over
the
larger
one.
However,
at
some
point,
there
must
be
a
high
frequency
roll-off
where
the
opposite
is
true.

Also,
how
would
one
characterize
the
rejection
of
amplitude
modulation
in
the
receiver/mixer
(if

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any)?
The
common
technique
for
'calibrating'
speed
radar
seems
to
be
to
use
a
tuning
fork
whose
frequency
corresponds
to
some
known
speed
Doppler
shift.
Unless
radar
guns
are
susceptible
to
AM
interference,
it
would
seem
that
a
tuning
fork
would
be
useless.
Unless
one
threw
it,
the
average
'speed'
of

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its
tines
would
be
zero
whereas
the
peak
would
depend
on
the
amplitude
of
its
vibration.
Using
a
tuning
fork
might
verify
the
accuracy
of
the
device's
counter,
but
it
would
also
indicate
that
could
register
something
other
than
a
Doppler
shifted
signal.

You can't
be serious!
Audio IF?
Tuning

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forks?
"positive
gain"?
"reflection"?
"receiver
diode"??
Hey!–
where the
hell is the
cat
whisker
"crystal"
rectifier?
LOL–
throw that
TAB Books
library of
yours
into the
trash where
it belongs.
Your post is
absolutely
demented.

No it is not, reflected RF
will mix with the local osc
and produce
a difference in the audio
range.

Huh? Why even use an LO if it's that close
to the carrier?

I have designed doppler but
not for car speed
measurements.
A tuning fork? use a freq
counter and oscillator.

The LO is used for both transmit, and mixed with the
received signal

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in the receiver to create the audio signal in simple police
RADAR guns.

The *return" may be offset from the xmit by an audio frequency offset,
but not the LO, was my point.

So, Fred, how are you going to recover that Audio signal without the
original L.O. signal? The simplest and most reliable is to use the one
oscillator for both functions. I've seen it in use from the '60s with
tube equipment, and a 1N23 series microwave diode for the mixer.

Traffic radar (in its simplest form) is a CW microwave source feeding a
3 port circulator. The outgoing CW signal is directed out the
receive/transmit horn antenna. The reflected wave (Doppler shifted)
returns via the horn and is directed via the circulator to a cavity and
receiver/mixer diode. A small amount of the CW source is fed into the
receiver cavity (the circulator's leakage may be sufficient).

For a 24 GHz CW source (the local oscillator), the Doppler shift is
approximately 35 Hz per mile per hour. So a vehicle traveling at 30 MPH
will produce a 1.05 kHz IF signal at the mixer.

So much for the basics review. This much, even I know about Doppler
radar and I rarely fiddle with anything more than 60 Hz. I think this
went over a few people's (Fred's) head. So now I'm wondering if I'm
going to get answers to my more involved questions.

--

Paul Hovnanian <mailto:Paul@xxxxxxxxxxxxxx>

Senior staff curmudgeon.

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