LETTERS

Write to Letters, Radio-Electronics, 500-B Bi-County Blvd., Farmingdale, NY 11735

CHROMINANCE CLARIFICATION

Regarding the project "Color Bar Generator" (**Radio-Electronics**, July 1991), there were a couple of statements relating to chrominance that were incorrect. It was stated that "A 3.58-MHz subcarrier is *sent by the transmitter* and used in the receiver to restore the original color information." It also stated that "the colorburst signal is used as a reference to synchronize the phase and *amplitude* of the color subcarrier," and that "the colorburst also determines the tint and *saturation* of the color that is displayed." (The italics were added to pinpoint errors.)

At the transmitter, the R – Y and B – Y signals are each applied to separate modulators. Each of these also receives a 3.58-MHz carrier. The carriers are 90° out of phase with each other. The two resulting amplitude-modulated carriers are applied to a balanced modulator that *suppresses the 3.58-MHz subcarrier*, leaving only the sidebands containing the chroma information for transmission.

At the receiver, a 3.58-MHz subcarrier is generated and reinserted to enable the extraction of the original R – Y and B – Y signals on their respective carriers. The colorburst, which has the phase and *frequency* (not amplitude) of the original 3.58-MHz carrier, is used as a reference to lock the new one. The colorburst, however, does not contain the information relating to hue or saturation. This information is contained in the color sidebands.

To understand how the hue and saturation is determined, try to view the R – Y and B – Y and their respective carriers as two phasors that differ by 90°. The phase angle of the resultant determines the hue (or color) while the amplitude of the resultant determines the saturation. If proper lock between the colorburst and the 3.58-MHz subcarrier generated in the receiver isn't maintained, improper tint will result.

I have presented this additional information because I believe it fills a gap in an otherwise reasonably thorough discussion of the NTSC method of luma/chroma transmission.

S.J. BABBERT
Worthington, OH

PSUEDO TUBE AMPLIFIER

I read Larry Klein's *Audio Update* column about making a transistor amplifier sound like a tube amplifier by adding resistance to the speaker line (**Radio-Electronics**, April 1991), and I tried his method. I own an old tube Dynaco and a transistorized, later model Technics set. I know how the Technics should sound because the 70-watt Dynaco is practically the best any amplifier could sound.

I tried it and it works! It really sounds much better. Larry Klein is a very creative thinker to come up with such a simple and effective approach. It saved me a couple hundred dollars.

KARL G. MAEDER
Hemet, CA

SATISFIED SUBSCRIBER

Bravo! for the "PC-Based Test Equipment" articles by James Barbarello (**Radio-Electronics**, May, June, and July 1991). Those pieces make me glad that I renewed my subscription to **Radio-Electronics**, which I had considered canceling. Well done, guys. You've allowed me to renew my work on a long-term project by letting me get inside my PC.

AMBROSE C. CAMPBELL

MAGNETIC-FIELD EXPOSURE

After reading the concerns and opinions expressed in the Letters section of the July 1991 issue of **Radio-Electronics**, I thought the position of the American Conference of Governmental Industrial Hygienists (ACGIH) concerning exposures to magnetic fields should be expressed.

First, a definition is in order. The standard of measure used by the ACGIH is the Threshold Limit Value (TLV), which represents "conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse health effects." Second, a distinction is made between "Static Magnetic Fields" and "Sub-Radiofrequency Magnetic Fields." the ACGIH (1990–91) recommended exposure limits are as follows:

Static Magnetic Fields: Routine occupational exposures should not exceed 60 milliTeslas (mT)—equivalent to 600 Gauss—over the whole body or 600 mT (6000 Gauss) to the extremities on a daily, time-weighted average basis. A flux density of 2 Teslas is recommended as a ceiling value. Safety hazards from the mechanical forces exerted by the magnetic field upon ferromagnetic tools and medical implants may exist. Workers having implanted cardiac pacemakers should not be exposed above 1.0 mT (10 Gauss). Perceptible or adverse effects may also be produced at higher flux densities resulting from forces upon other implanted ferromagnetic medical devices, e.g., suture staples, aneurism clips, prostheses, etc.

Sub-Radiofrequency Magnetic Fields (30 kHz and below): These TLV's refer to the amplitude of the magnetic flux density (B) of sub-radiofrequency magnetic fields in the frequency range of 30 kHz and below, to which it is believed that nearly all workers may be exposed repeatedly without adverse health effects. The magnetic field strengths in these TLV's are root-mean-square (RMS) values. Those values should be used as guides in the control of exposure to sub-radiofrequency magnetic fields and should not be regarded as a fine line between safe and dangerous levels. Routine occupational exposure should not exceed B_{TLV} = 60 mT/*f*, where *f* is the frequency in Hz. At frequencies below 1 Hz, the TLV is 60 mT (600 Gauss). The permissible magnetic flux density of 60 mT/*f* (Hz) at 60 Hz corresponds to a maximum permissible flux density of 1.0 mT. At 30 kHz, the TLV is 2μT, which corresponds to a magnetic field strength of 1.6 A/m. For workers wearing cardiac pacemakers, the TLV may not protect against electromagnetic interference with the pacemaker function. The TLV for pacemaker wearers should be reduced by a safety factor of ten.

Of course, there currently is not a clear understanding of the health effects resulting from exposure to magnetic fields (especially low-intensity, low-frequency ones). I hope that this information will help to clarify what is considered safe exposure to magnetic fields.

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