Review Old Quizzes of Gary Vann's

Question	*Answer*
Primary purpose of a prism	To "filter three primary colors". Not "provide 3 paths for incoming light" since there is only one path for incoming light. Not "provide a connection point for pick-up devices" since the prism doesn't do that –the prism is part of the beam splitter which can have mounts for pick-up devices.
The Three Wideband Channels in a Camera	They are R, G, B. Not "Y, R-Y, B-Y" because the camera separates R G and B in their own circuits until the encoder which creates Y, R-Y, and B-Y. Why does Gary Vann use the term "*wideband channel*"? R-Y and B-Y aren't so wideband because the Y has been removed; that's part of why there's 3:1 compression in a color TV signal. So, the use of the term *wideband* is a clue.
Video White	It is the presence of all colors. It isn't the absence of color (that's black). It isn't the outermost ring of the vectorscope.
NTSC Encoded Video is Bandwidth Limited	To 4.2 MHz. 3 dB down at 4.2 MHz. 4.5MHz is the relative audio frequency. 3.58 MHz is the color subcarrier. 14.318181818 is 4 times the frequency of the color subcarrier (use this when digitizing).
Common Base Transistor Circuit	Inputs on the emitter and outputs on the collector.
A Transistor with Outputs from the Emitter and Collector	This will have opposite polarities at each output.
Composite Video	A combination of luminance, sync, burst, and chrominance..
The Sweep Waveform	A sawtooth.
The Gun in a CRT	Controls a stream of electrons that excite phosphors on the screen.
The Vertical Blanking	Consists of broad pulses, serrations, pre and post equalization pulses.
Interlace	Caused by the ½ line shift in the vertical interval.
Bandwidth of Full Audio Spectrum	0-20 kHz.
Color temperature for studio lighting	3200 degrees
Color temperature of the color television screen	6500 degrees
The subcarrier for the stereo television's L-R (L minus R) channel	See later section in this note. 15734 Hz.
To remain compatible with current	L+R as the main channel.

Question	*Answer*
receivers, stereo uses	
Terminators	installed at the furthest end of a series of units. Radio uses 50 ohms termination, TV uses 75 ohms.
Inversion and add	is a convenient way to remove a component
The first attempt at television	used a mechanical disk to scan both pickup and display. Called image dissector. Done by Baird.
Balancing I and Q	removed unwanted subcarrier from non color signal information. Balanced modulator outputs no subcarrier when there is no color information.
H blanking sync time is composed of	H sync, blanking, burst, front and back porch, breezeway. Burst, not subcarrier, since subcarrier is continuous wave.
We can generate any color electronically by	adding different amounts of primary colors
A balanced modulator	suppresses (balances out) carrier and leaves the sidebands. See the later section on balanced modulators.
To create I and Q from R-Y and B-Y	I and Q are 33 degrees phase shifted from R-Y and B-Y
The burst is	on the -B-Y axis.
The 33 degree phase shift	can be generated by the matrix resistors.
The bandwidth of Q is	500 kHz.
The center frequency of the I and Q modulation	3.58 MHz (3579545 Hz).
The vestigial sideband is	not used –a space of 1.25 MHz is reserved for it. Have it to ensure we have good low frequency response on the upper sideband, so it is used but not for the information it contains.
Where is 0 degrees on a vector scope?	B-Y
A square wave is	a multiple of (odd) harmonics of a fundamental frequency. Get a triangle wave with even harmonics.
Timebase is	the sweep on the oscilloscope
Field rate for NTSC color television is	59.94 per second. 60 is for black and white. NTSC is never twice the same color. RS 170. PAL is pretty awful lousy. SECAM is system essentially contrary to the American method.
During the time that a 50% neutral gray signal is transmitted, the subcarrier component of the composite signal is	zero.
Burst amplitude is	equal to sync amplitude

Question	*Answer*
Burst phase is	180 degrees from zero.
Hum and other forms of interference that are synchronous with the power line	move slowly through the picture, since the field rate is 59.94 fields per second and power line frequency is 60 Hz. NTSC would move slowly.
The video portion of the transmitted signal employs what type of modulation	amplitude.
An increase in 3.58 MHz chrominance amplitude with no change in phase represents	an increase in the saturation. The color remains the same because the phase remains the same.
What is the recommended setting of the white peak clip control in the encoder?	What are IEEE units? Originally IRE units were IEEE units. Can only transmit to 107, so answer is 105 IRE.
A reversal of polarity of the chrominance signal applied to one of the modulators	When go from green to magenta, that's a complete reversal of phase (180 degrees). So, it reverses the phase of the subcarrier output.
Changing the analog video to digital video, what is the most significant bit?	The largest value.
Digital data can be serial or parallel	serial is one wire parallel is more than one wire.
What is the best HDTV format for picture quality?	1080 interlace. Mechanical TV with spinning disk was 30P.
White balance occurs in a camera when	red green and blue are in the ratio 30 to 59 to 11.
Bias light on the surface of saticons is primarily to reduce	lag
An error in scan centering in a 3 plumbicon camera results in	misregistration. If the center is off, then all the registration would be off.
Cameras must be rebalanced for white every time there is a change in the	color of the light source
Knee is set at	88 to 93 IRE units.
White compression begins at	the start of slope.
At white compression	whites are reduced (but not eliminated).
A white or black smear on resolution chart denotes	low frequency adjustments are required
Loss of scan in a camera deflection yoke will	permanently damage the pickup tube. Sending a beam of electrons toward a fine mesh which heats up. Not burn in from this (burn-in comes from incoming light).
Gamma correction acts to	compress the blacks and stretch the whites.
The output of a CCD is	analog.

Stereo Television and FM Television Audio

For video, transmit luminance and also want to transmit red, green, and blue. Break down spectrum and recombine it to Y R-Y B-Y.

For audio, have left and right audio channels. Two channels in audio. Left + Right on main channel (monaural). On subcarrier, send Left –Right (invert right and add to left). Difference channel is AM on the FM carrier.

Modulate at 15734 * 2 = 31468 Hz. Picked horizontal oscillator frequency since it's there and locked. Put **pilot** at 15734 Hz. Carrier at 4.5 MHz.

When demodulate 4.5 MHz FM, have monaural from the L+R. Get L and R separately by inverting and adding. L+R + (L –R) = 2L. L + R + (- (L –R)) = 2R.

Had similar constraints of backward compatibility in audio as did video.

To compare, FM stereo radio has pilot of 19 kHz and carrier (the center frequency) of 38 kHz, AM'd. FM radio had similar constraints of backward compatibility as did TV video and audio.

What else could get put onto this signal? Second audio program (SAP) on television. On FM, is muzak (elevator music); official name is SCA (subsidiary carrier allotment).

The SAP and L-R are both AM'd.

Balanced Modulators

Would be very hard to tune the TV were there no carrier. So, it is used to remove the carrier while modulating only the sidebands. Monitor/receiver regenerates the carrier using a 3.579545.XX Hz crystal. TV stations never transmit the color subcarrier. Balanced modulators create chroma from R-Y and B-Y.

The **double balanced modulator** balances out the carriers and also balances out the sidebands when there is no color.

The **matrix** is used to remove luminance from R or B to create R-Y and B-Y. Diagram 2.

When transmit video, include the reference to the missing color subcarrier within the space reserved for the burst. There is nothing within the transmitted signal that indicates that the monitor should inject burst into the signal; the monitor figures out when to inject burst at a prescribed amount of time after horizontal sync pulse. Must stop the burst phase before it gets into active video, else might see the real colors in the active video and attempt to synch color oscillator to that, which would mess up color accuracy.

Balanced modulator uses invert and add to remove the carrier. The carrier has no information; the only reason to send it is ease of tuning at the receiver.

Systems don't go to 100% modulation since systems would create distortion when balancing out the carrier.

Modulation and Signal Phases

Modulate on I and Q, but colors come out at the right places even if we didn't modulate there. Recall modifying the formulas that compressed the B axis and the colors still came out in the same places. There are W and X axes, and U and V axes (for PAL). We have the ability in NTSC US to change hue by changing phase; designed in to ours because we had drift. PAL decided to do a cancellation thing to cancel out phase shift. The carrier to sideband power ratio is pretty high, maybe 3 to 1, so removing the carrier allows much more power to go to the sidebands.