lengths of light don't travel at the same speed, it is inevitable that some slight chromatic aberration will remain in the lens despite all attempts to remove it. This element of chromatic aberration differs from lens to lens, necessitating a registration adjustment when the lens is changed. Since there are three separate tubes, each of which is photoconductive to a specific spectrum of color, there is an opportunity for any of the channels to be out of alignment with one or both of the other two channels, thus being out of registration. Registration is defined as the process of aligning each of the three channels so that they are aligned precisely with each other on the same image plane. Take note that it is prudent to make any registration corrections in the mid-range of the zoom, so as not to introduce any lateral chromatic aberration into the registration procedure. Lateral chromatic aberration is caused by the lens magnification differing in value from the wavelength of the light. The net effect is registration error. The procedure for registering a lens/camera combination is as follows: 1) set up a registration chart as per the other adjustments (ie. mid-range of the zoom), so that the chart fills the frame; 2) use the appropriate select switch on the camera to superimpose the minus (–) green signal over the red channel, then the blue, adjusting each so that they precisely match the green channel. When this procedure is complete, the camera channels will be precisely aligned.

White Balance

This is the last step in the alignment procedure. It is perhaps the easiest to initiate and usually involves the least amount of time. White balance is the process of aligning the color outputs of each channel so that they have a 1:1 ratio. The net result of this is when shooting a black or white scene there will be no color present in the picture. If the camera channels were not balanced, there would be slight-to-moderate coloration in a scene in which no color is actually present. White balance, not unlike registration, is bound to deviate from an established value when a lens change after initial color balance has been established. This is caused by differences in absorption co-efficients of different pieces of lens material. These differences are nullified if a white balance is initiated each time a lens or lighting conditions change. White balance is usually an automatic function of the camera electronics initiated by a manually-operated switch. An alternative is to shoot an EIA logarithmic reflectance chart or a white card (in that all important mid-range of the zoom) under the lighting conditions that will prevail during the shoot. Pressing the white balance switch on the camera balances all three channels to each other to produce white in the absence of color on the white card. Once white balance is completed, a black balance can be performed. The black balance performs the same function for the tube black levels as it does for the white levels or gains.

Now you are ready to shoot.

Determining the order for the various segments of this series on lenses and lighting was difficult. At first, I thought that this particular segment should have been last, but became convinced that it should be first. My aim in this segment was to show the extensive process of properly aligning the lens/camera combination to optimize performance. My goal in future installments will be to show why this optimization process is so lengthy and involved. I will also explain why lighting and lenses have such an influence on one another.

I would like to take this opportunity to express my thanks to Mr. M. Arase and Canon Optical Products Division for the use of their invaluable resource materials.

Bentley Miller is lighting director of CITY-TV/MuchMusic in Toronto.