How to tame the RGB, Component, S-Video, Composite beast

Color video signal is transmitted across a wide variety of transmission medias. Below is an illustration of how they work with each other.

RGB, BNC, HD15
Red + Black and White
Green + Black and White
Blue + Black and White
Color and black and white information is combined and transmitted across multiple lines

Component
Color

S-Video
Black and White
Color

Composite
Color + Black and White

A converter is needed to separate the color signals from the black and white signals so that it can be transmitted across any one of these medias.

Once the RGB signal is separated into color and black & white elements, interconnection between Component, S-Video and Composite is possible without the use of a converter.