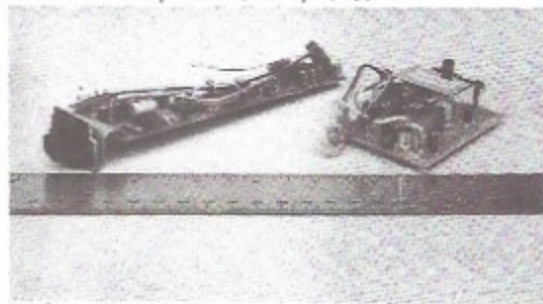


# THE LIONEL RAILSCOPE

by Bill WB8ELK

*World's narrowest (and possibly the most inexpensive) TV camera is now available to the masses for under \$70! For some time now I've been trying to obtain the TV camera from the Lionel Railscope train engine. Until recently, you had to purchase the whole model train engine.*

While leafing through the January issue of Popular Science, I noticed a rather interesting ad entitled "Video Breakthrough for sale - \$69.95 + \$5 handling". Naturally any camera under \$100 gets my attention. After further investigation, it turns out to be the Railscope camera/transmitter and receiver modules. After a couple of weeks I finally had one in my hands!



The Railscope camera/transmitter board sends out a 4 MHz FM TV signal which is coupled through wires into the train tracks. A companion receiver board hooks up to the tracks and allows you to receive the signal on your TV set (channel 3 or 4). The resolution is not fantastic (162 H by 120 V). However, I think it's a better image than that produced by the Uniden camera. In addition, the electronic auto-iris circuit really works quite well on the traincam. Once you move the camera around a bit, your eyes tend to average out the "jaggies" and it really doesn't look bad at all. You do need a fair amount of light since it takes about 40 LUX for best results. The field of view is 22 degrees and the lens focuses from 4 inches to infinity.

There are two disadvantages with the Railscope camera: The current drain is about 350 milliamps at 6 to 9 volts; also you need to locate and tap the video signal off of the board. Really not too bad of a compromise considering the price! I did some sleuthing around the board for video, and finally found a source of 0.5 volt p-p video off of pins 21 or 22 on the 48 pin LA7307 surface mount device. You may need to amplify this up to 1 volt p-p depending on how you set up your ATV transmitter. The best point to tap the video is off of capacitor C53 on the bottom side of the board as shown in the figure.

The Railscope's unusual configuration seems custom made for other amateur TV applications however. Since the camera is only 1.25 inches wide, it'll fit in some of the hobby store variety of model rockets! Also, you could put it in some very small R/C aircraft. No longer do you need a humongous missile or quarter scale model to launch your TV system. We should have a companion micro-ATV transmitter that'll fit in an ESTES model rocket in our next issue. Also the CCD camera sensor hooks up to the camera board via a ribbon cable. This feature makes it easy to point the camera in just about any direction possible. This camera ought to have some possibilities for "LookieTalkie" packages as well. We should have more modifications and information on the train cam in our next issue. Have fun experimenting with this incredible micro camera! The Railscope camera/receiver modules are available for \$69.95 + \$5.00 shipping/handling from (800) 727-7297.

# THE LIONEL RAILSCOPE

## Miniature Video Camera Circuit Board, With TV Modulator Receiver Board

### CAMERA CIRCUIT BOARD

Picture .....	Black & White (CCD)
Output to RX Via Cable .....	4MHZ, FM
Band Width .....	2 MHZ
Resolution .....	162 x 120 Pixels
Viewing Angle .....	30 Degrees Horizontal x 22.5 Degrees Vertical
Focus .....	4 Inches to Infinity
Required Light .....	40 LUX thru Sunlight
Irising .....	Electronic
Power .....	7.0 Vdc - 9.0 Vdc @ 350 mA
Power Connector .....	Radio Battery Clip
Size .....	Approx. 1"Hx1.25"Wx7"L

### RECEIVER CIRCUIT BOARD

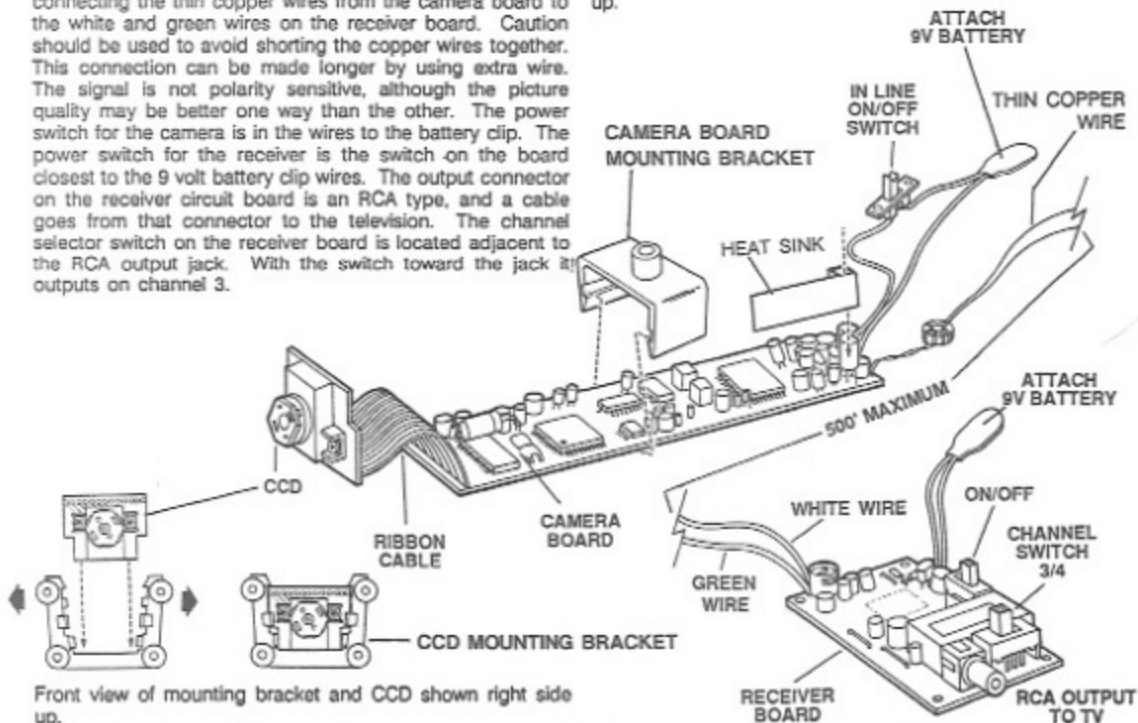
Output Frequency .....	TV Channel 3 or 4 Switch Selectable
Distance Thru Cable .....	Approx. 500' Maximum
Distance Thru Air .....	Will Not Operate Thru Air
Output Connection .....	RCA Approx. 75Ω (With 300Ω Matching Transformer)
Power .....	7.0 Vdc - 9.0 Vdc @ 150mA
Power Connector .....	Radio Battery Clip
Size .....	Approx. 1"Hx2.5"Wx3.5"L

**CAUTION: Static Sensitive Device**

### CONNECTION AND OPERATION

Connection from the camera to the receiver is made by connecting the thin copper wires from the camera board to the white and green wires on the receiver board. Caution should be used to avoid shorting the copper wires together. This connection can be made longer by using extra wire. The signal is not polarity sensitive, although the picture quality may be better one way than the other. The power switch for the camera is in the wires to the battery clip. The power switch for the receiver is the switch on the board closest to the 9 volt battery clip wires. The output connector on the receiver circuit board is an RCA type, and a cable goes from that connector to the television. The channel selector switch on the receiver board is located adjacent to the RCA output jack. With the switch toward the jack it outputs on channel 3.

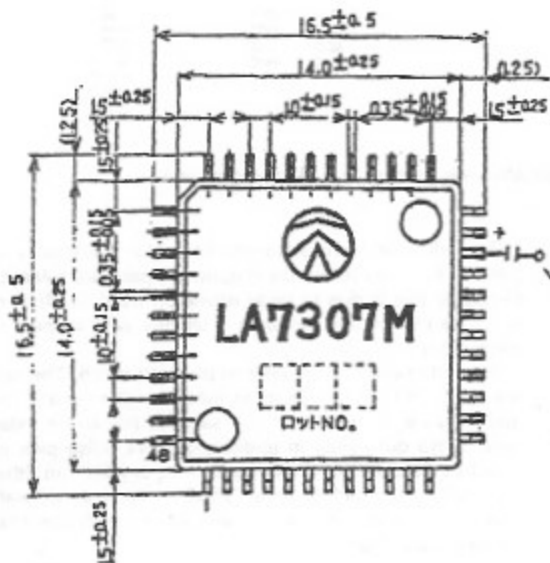
NOTE: Underside view of the camera board is shown for clarity. Camera board and CCD must be mounted right side up.



Front view of mounting bracket and CCD shown right side up.

**CAUTION: Static Sensitive Device**

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RAIL FANS! Maybe we could try this in its intended place, in a model train! Imagine televising your layout engineer's view via ATV to your friends! Take that Amtrak trip you always wanted but couldn't afford!

Video Output

GND

R4B

C53

Bottom view of Camera

CCD Sensor