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## Macintosh II: Problems With Limelight Projector

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TOPIC -----

I'm having problems using a Limelight projector with a Macintosh II. The resolution isn't very good.

DISCUSSION -----

There are two problems with connecting a Limelight to a Macintosh II video card:

1. The Macintosh II video card has a 15 pin DB-style female connector, whereas the Limelight has a BNC female input.
2. The Macintosh II video signals are 35KHz for horizontal frequency and 66.67Hz for vertical scan rate. To properly display the video signal, a bandwidth of 21 MHz for monochrome and 22MHz for color is needed. The Limelight projector has a bandwidth of 20Mhz and a horizontal auto lock maximum frequency of 33Khz

The first problem can be fixed with a specially configured cable. We wired a Macintosh video cable to split the green signal on pin 5 to a BNC connector. This cable allowed connection of both the monitor and the projector. Another solution would be to contact Arizona Covid or Extron Electronics. These companies manufacture break-out cables and converter boxes. In this case, it would merely be a cable change. Although some enhancements (vertical and horizontal picture centering or color enhancement) are included in their converter boxes, this is not particularly useful on a monochrome projector like the Limelight. Since screen position controls are also supplied on the projector, a converter will probably not be needed.

The second problem is not as easily dealt with without modifications to the projector. Since its circuitry can not accept higher frequency data rates, there is some image loss. Also, the plastic lens of the projector can't focus all parts of the screen clearly, resulting in a good deal of blurring on the edges. (A curved-back screen helps somewhat.) Though the Limelight specification claims a maximum of 33 KHz for the horizontal scan

rate, the projector we tested was able to handle a full line of video from the Macintosh at 35KHz. This may be a specification set below the performance level on the projector -- however, the Macintosh scan frequencies were pushing the limits of the projector: it took very little adjustment to the horizontal control to lose the signal. A black box is not likely to sharpen the image by modifying the signals, since the problems are inherent in the projector's ability to handle the resolution. As it stands, with a break-out cable the projector does display the Macintosh II video, though the image may be objectionable to some.  
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