Transparencies used in the following talk:

Testing of MCP PMTs: use of fiber optic coupled Gbps laser drivers to create ersatz laser return pulses.

by Thomas Cuff & Richard Chabot (retired) both from Honeywell-TSI

From an operational point of view, it is important to be able to test the MCP (Micro Channel Plate) PMT (PhotoMultiplier Tube) front end of LIDAR transceivers used in SLR (Satellite Laser Ranging) work. In the day-to-day operation of SLR systems, one needs to have an independent method of ascertaining that the receiver half of the LIDAR transceiver is functioning properly. In addition, the sensitivity and stability of the MCP PMT front end of the LIDAR transceiver also needs to be periodically checked against a standardized source to prevent long and short term errors from insinuating themselves into the production data stream. The creation of ersatz laser return pulses is also useful when developing new LIDAR systems such as NASA's micro-laser altimeter and SLR2k robotic observatory. This paper describes a number of ways of constructing a laser return pulse generator from COTS (Commercial Off The Shelf) parts. In particular, we detail the use of currently available single chip laser drivers – normally employed in fiber optic LAN (Local Area Network) and WAN (Wide Area Network) telecommunication systems – as the 'heart' of the generator. Fiber optics is used to 'plumb' the ersatz laser return pulses together with the optical noise baseline to the output connector of the generator. The use of fiber optics allows one to conveniently fold the optic path within the generator without utilizing mirrors or prisms needed in a free space design and so results in a flatter volume for the generator and obviates the need for enclosing the generator in a light tight box. Since the specifying and ordering of single chip laser drivers and fiber optic components involve considerable amounts of jargon this aspect will also be covered.

Figure 1 - Lockheed P3B Orion Aircraft Used To Fly The MMLA

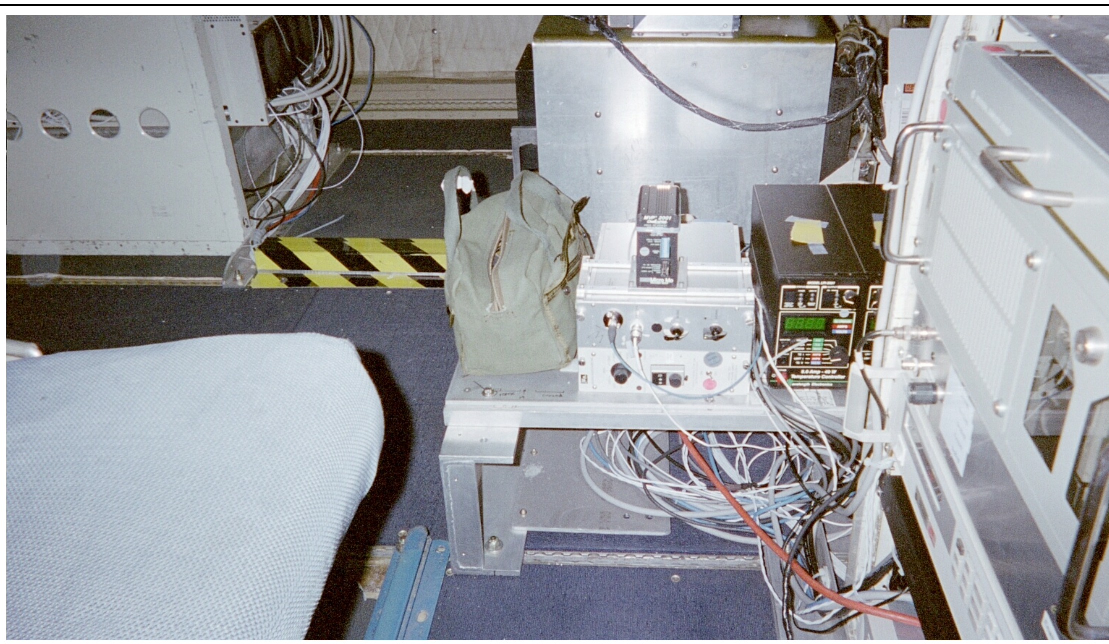

Figure 2 - MMLA Laser Simulator

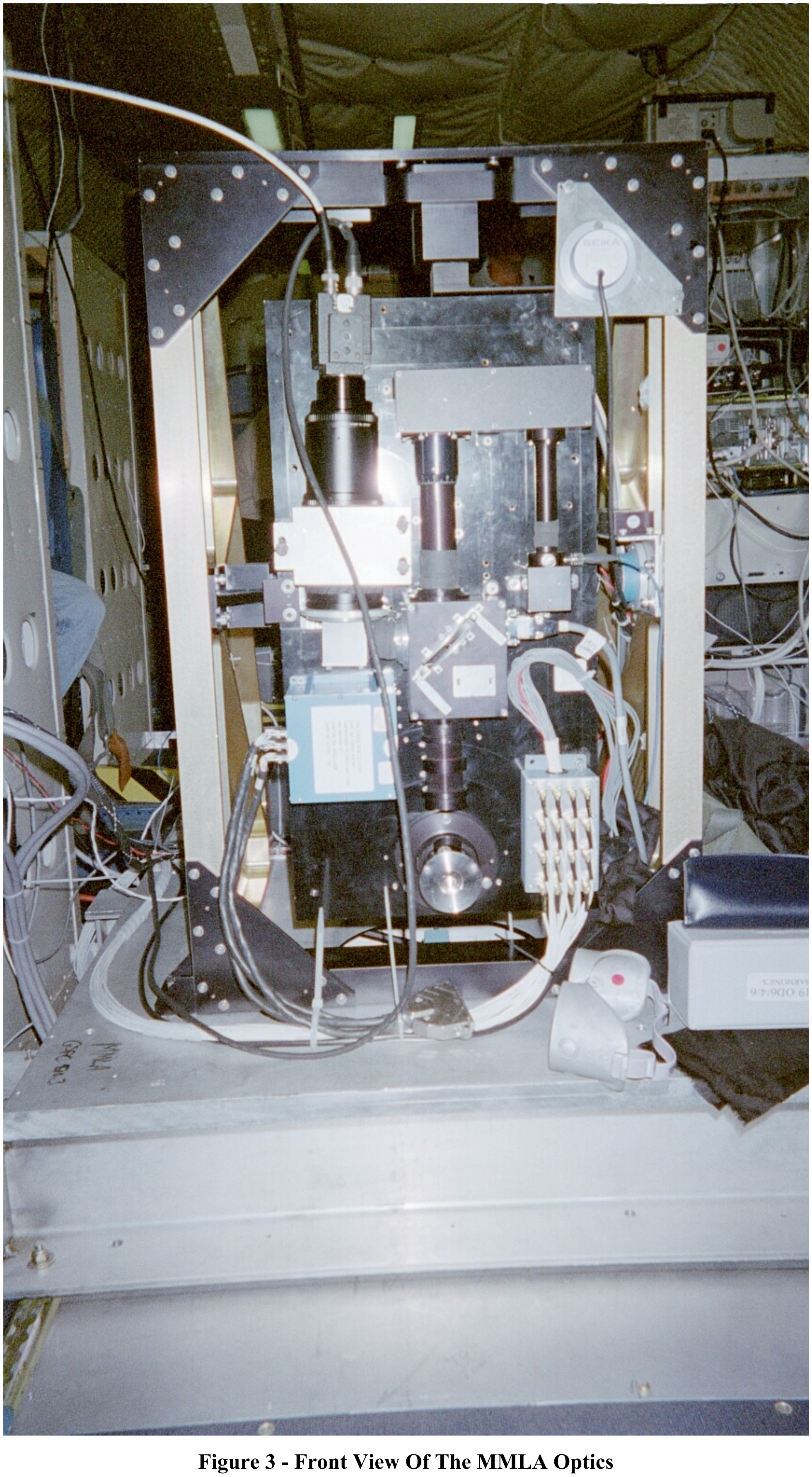

Figure 3 - Front View Of The MMLA Optics

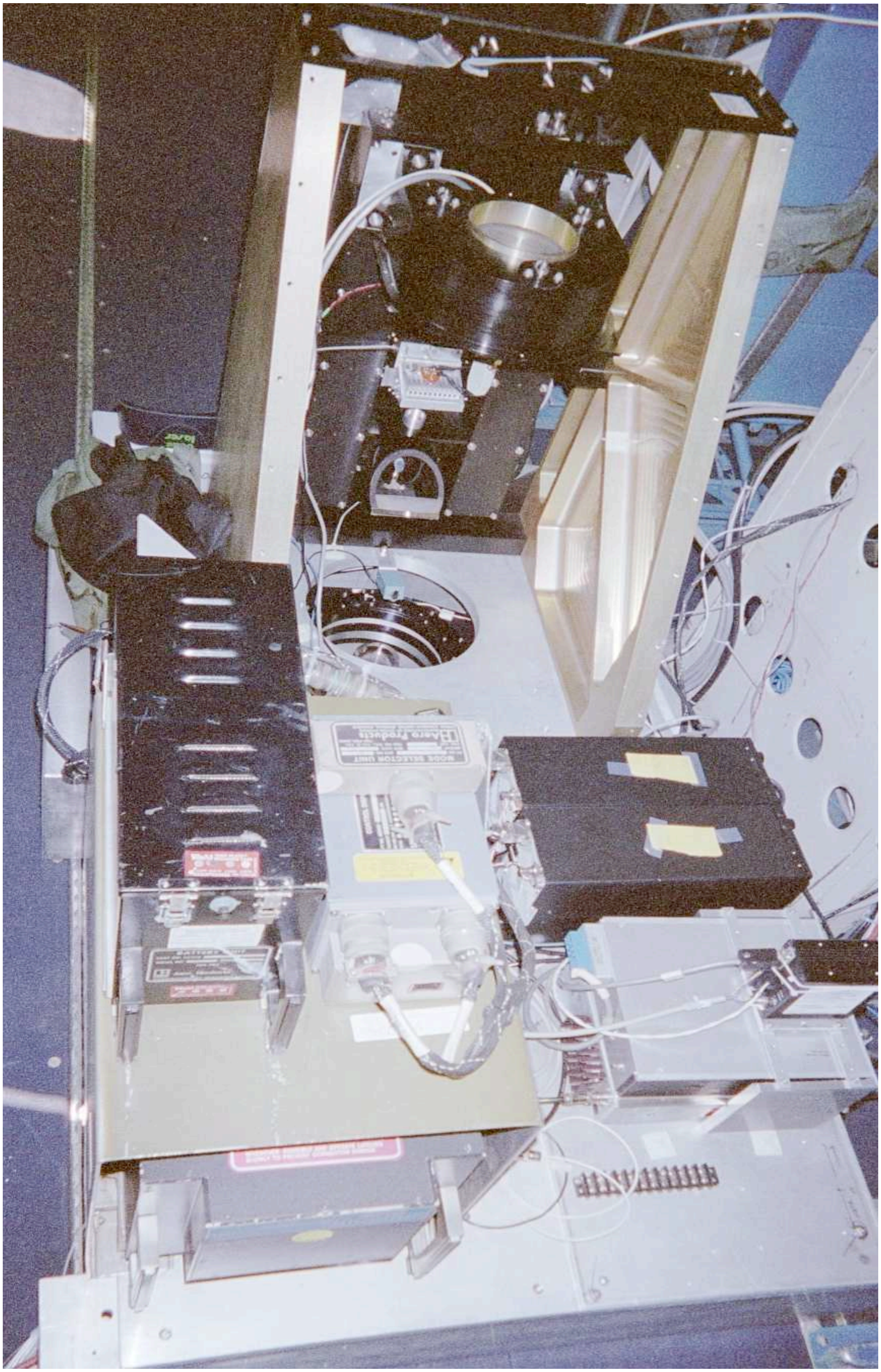

Figure 4 - Rear View Of The MMLA Optics

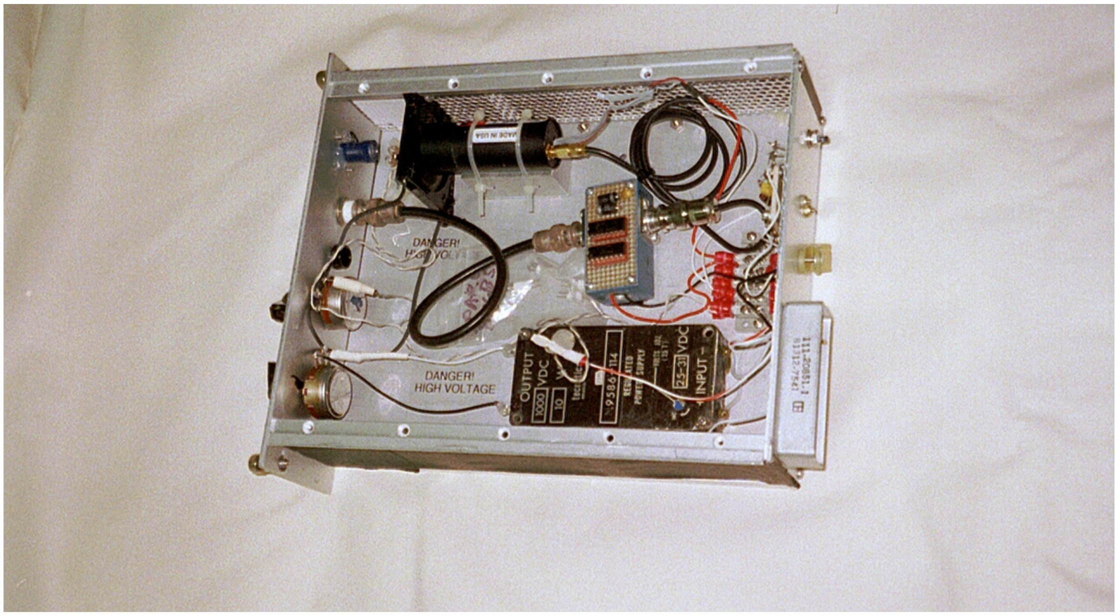

Figure 5 - View Of The Inside Of The MMLA Laser Simulator

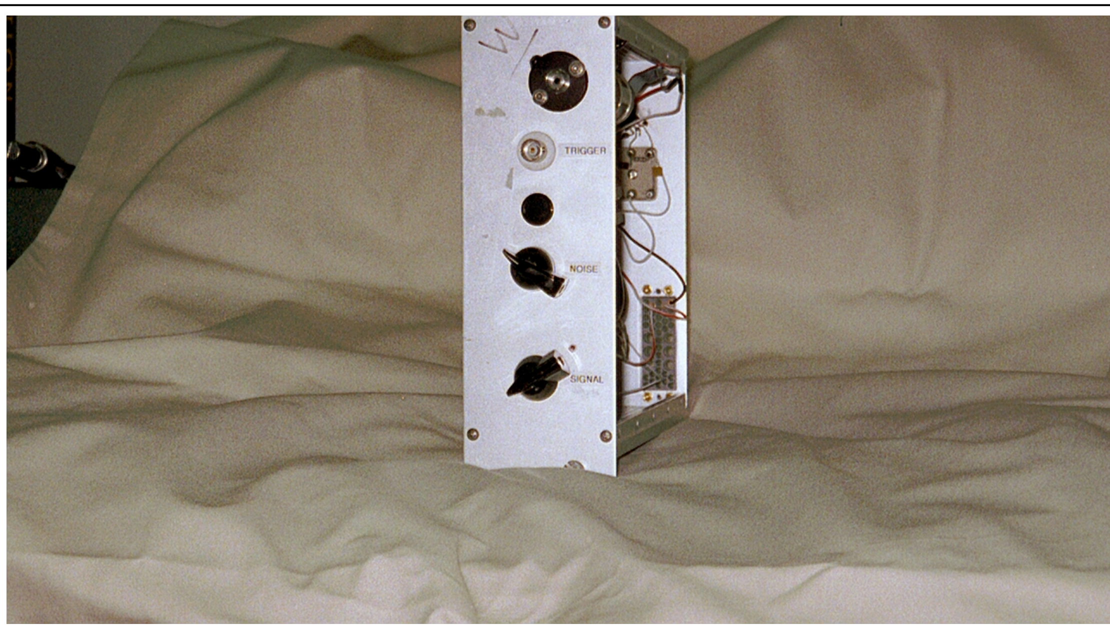

Figure 6 - Front Panel Controls Of The MMLA Laser Simulator

Figure 7 - SLR2K Shelter, Exterior

Figure 8 - SLR2K Shelter, Interior

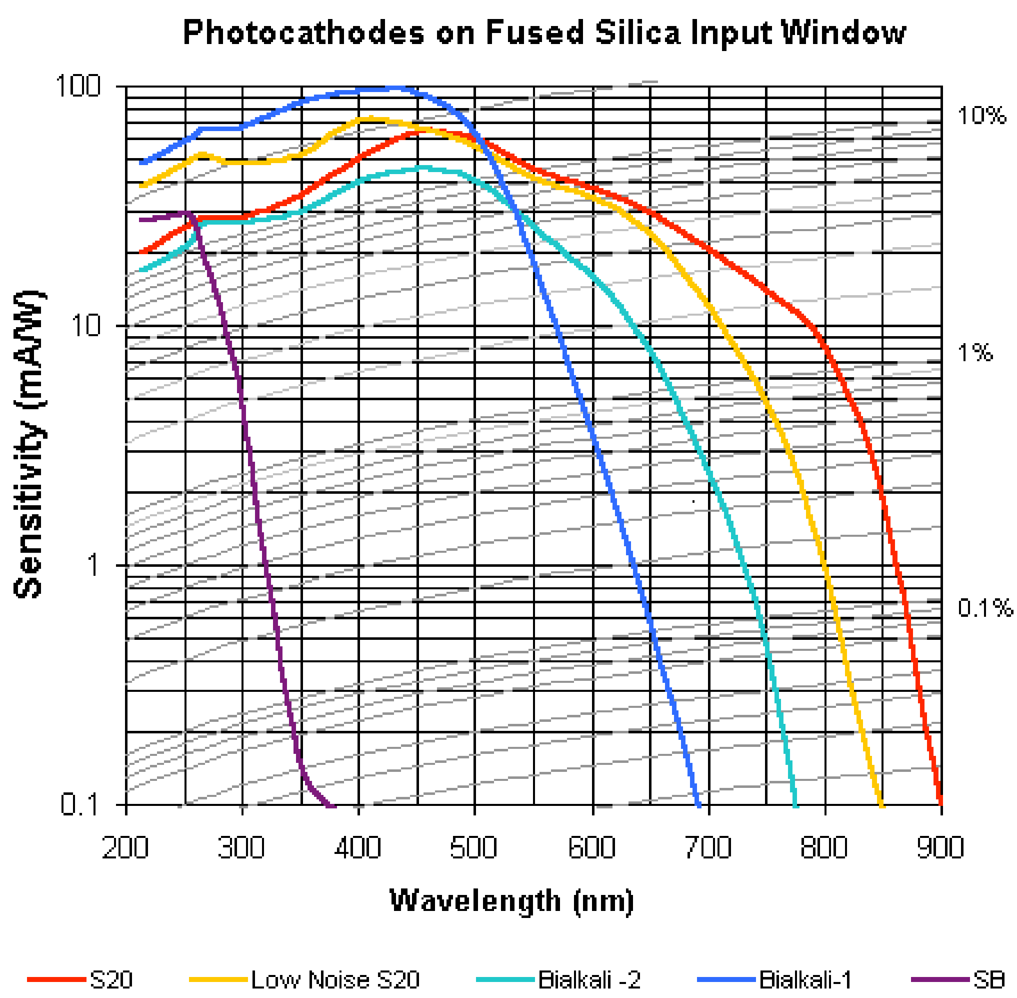

Figure 9 - Photek, Inc., Model Quad PMT 308 Spectral Response

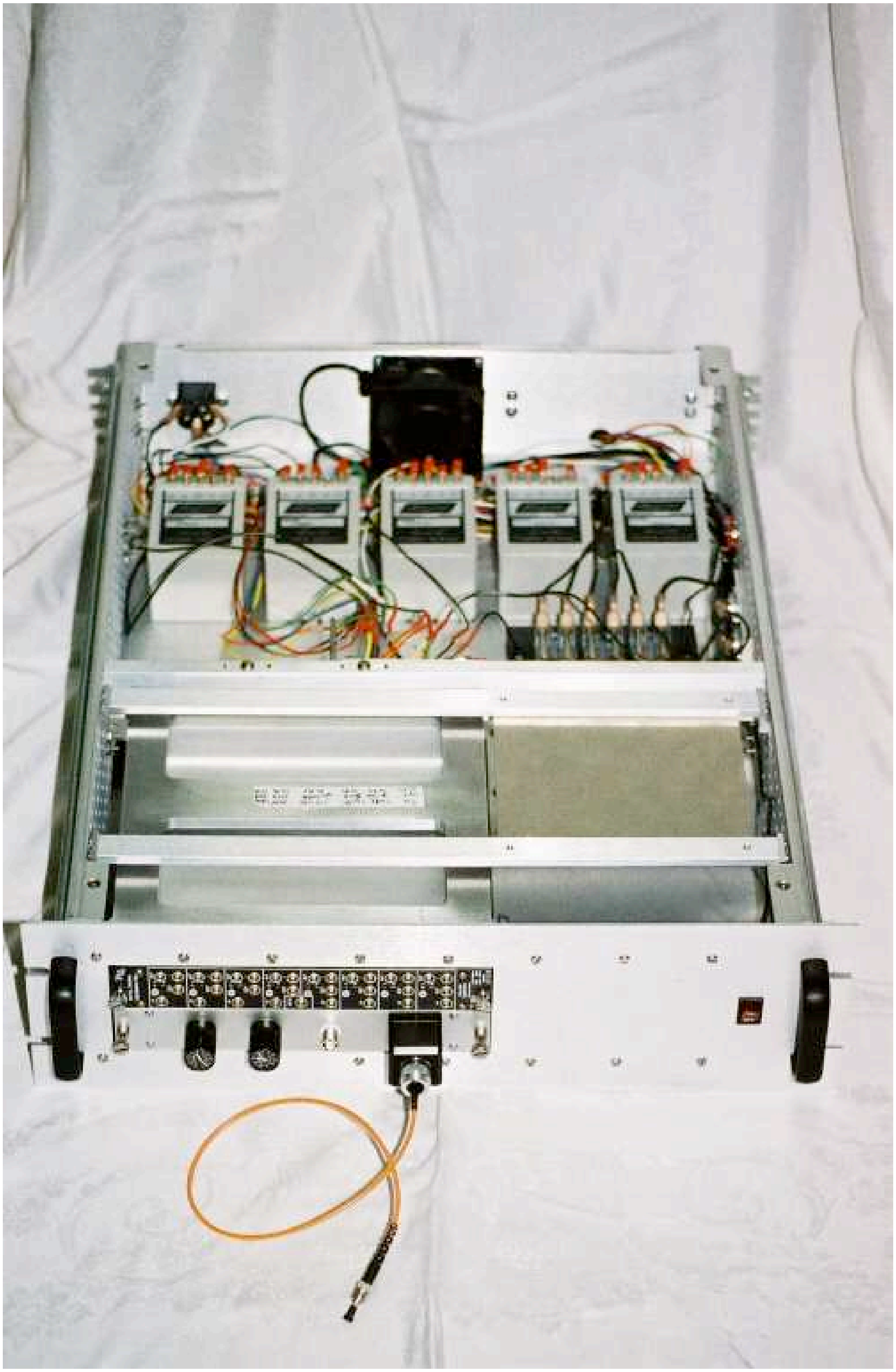

Figure 10 - 2 Slot NIM Power Supply

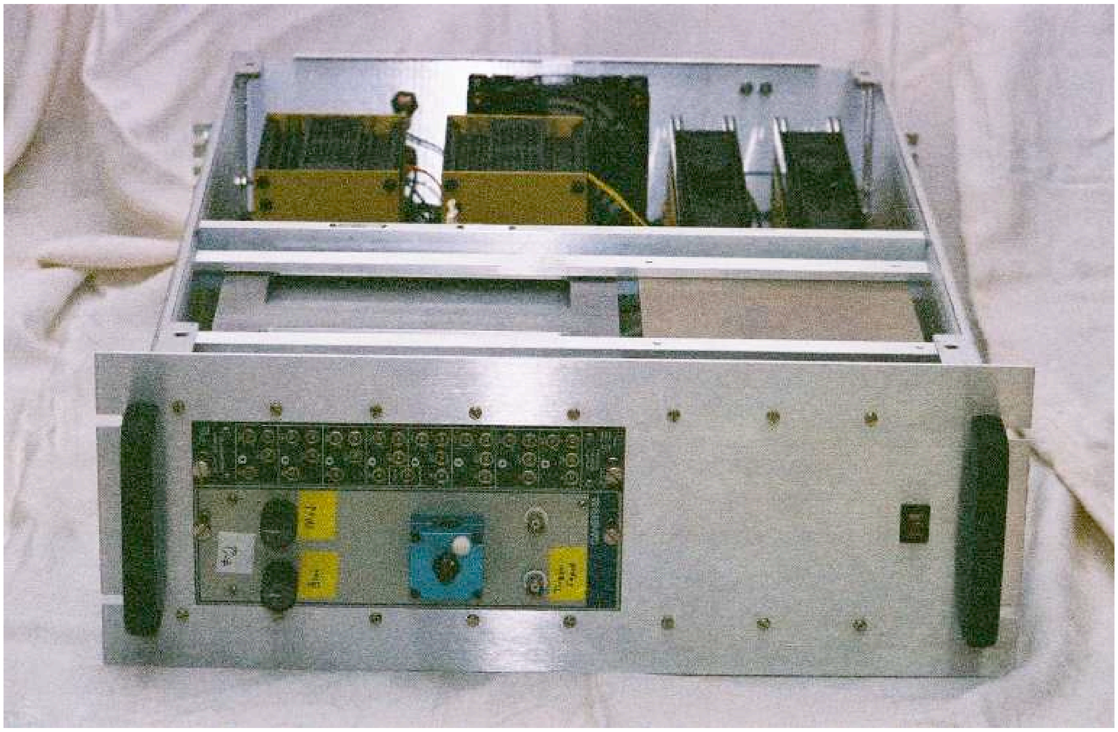

Figure 11 - 3 Slot NIM Power Supply

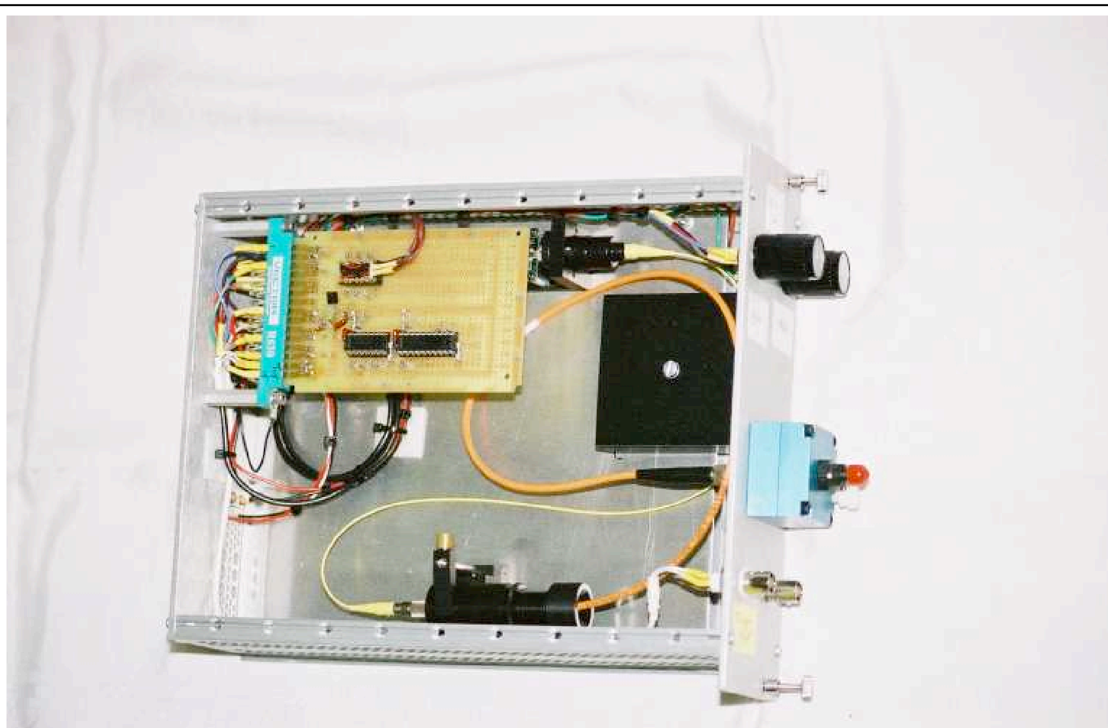

Figure 12 – SLR2K Laser Simulator #1

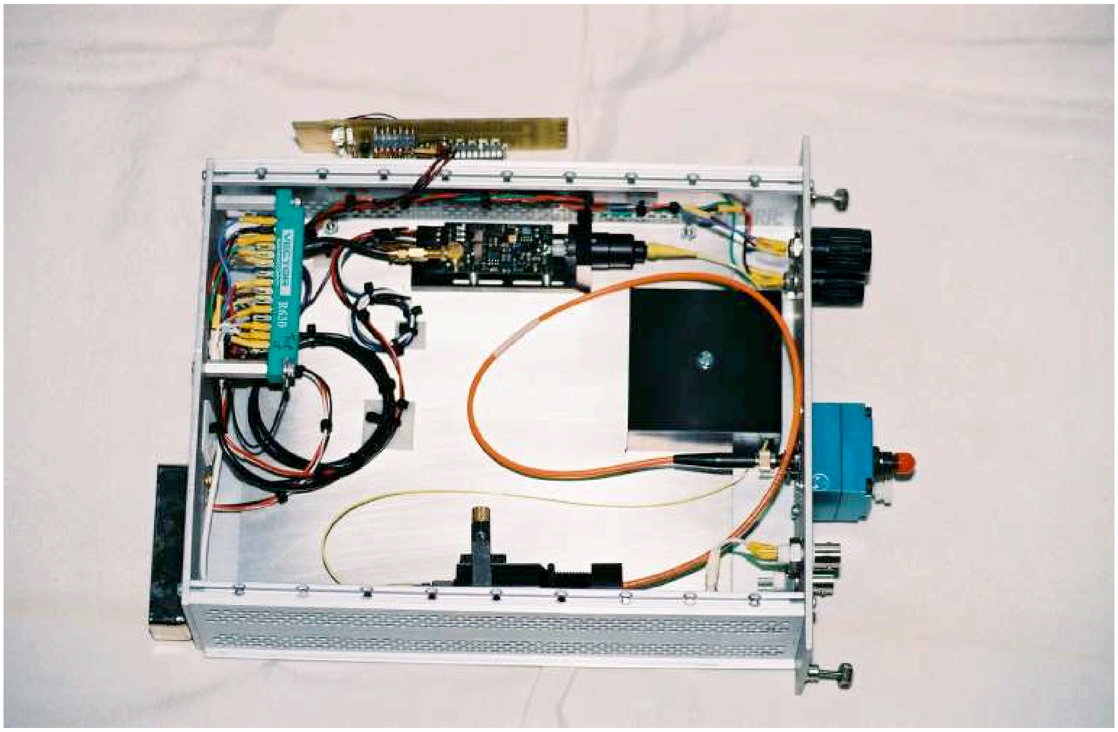

Figure 13 – SLR2K Laser Simulator #1 With Laser Diode Driver Board Exposed

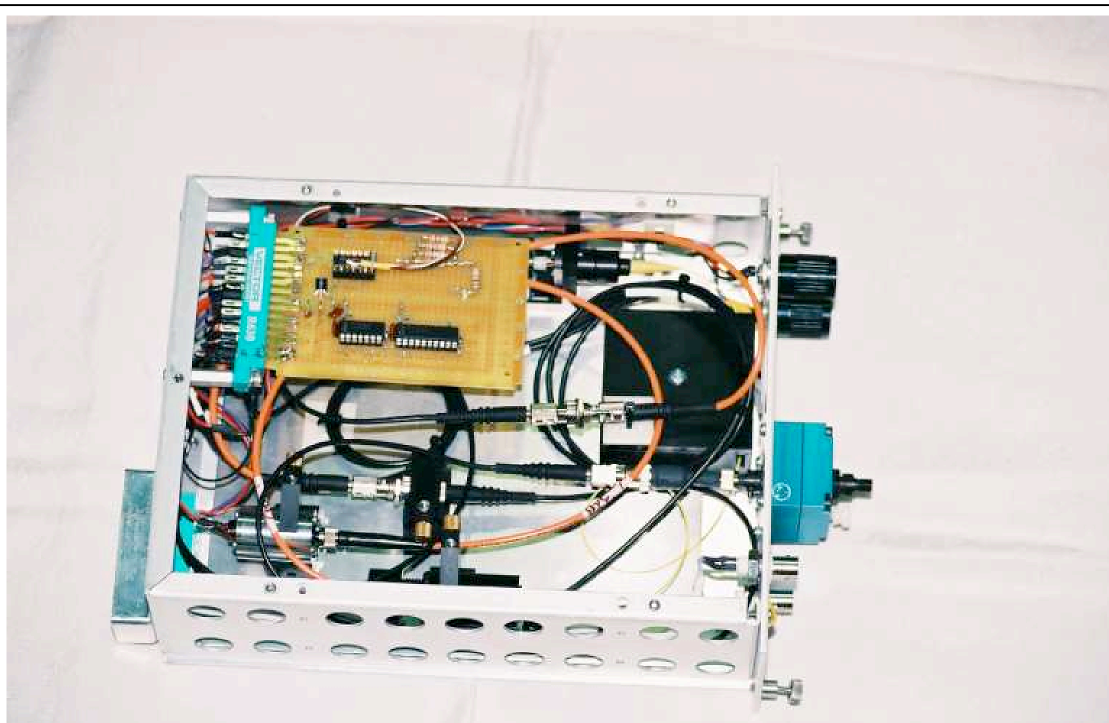

Figure 14 - SLR2K Laser Simulator #2

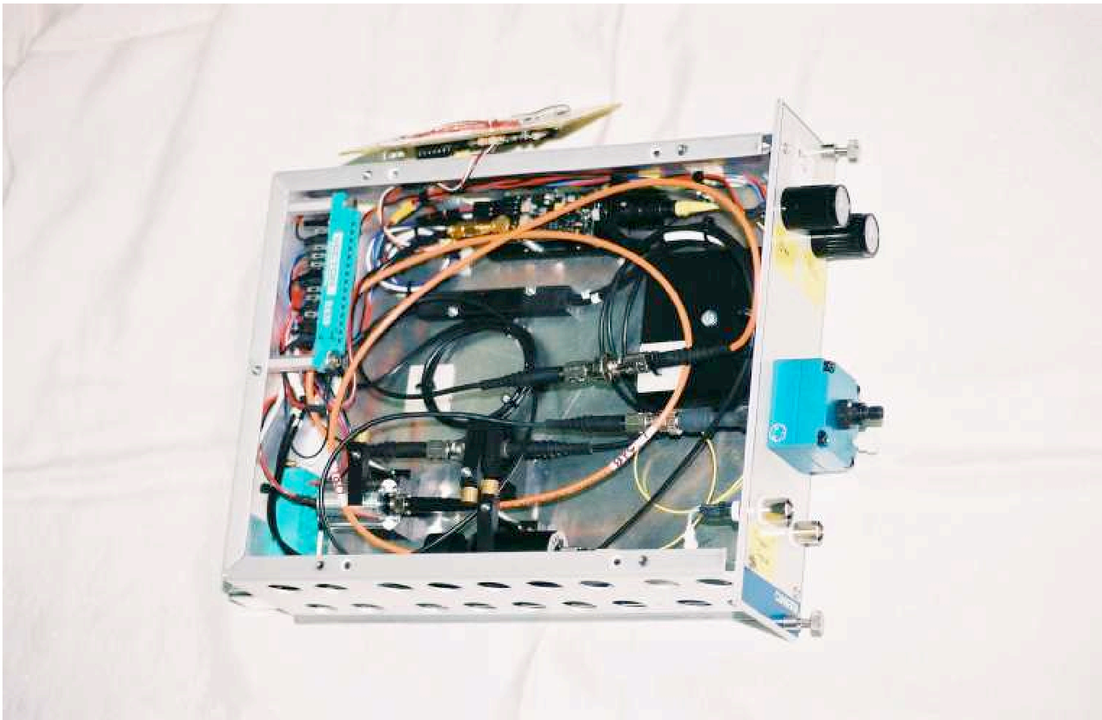

Figure 15 - SLR2K Laser Simulator #2 With Laser Diode Driver Board Exposed

Figure 16 - Front Panel Of The SLR2K Laser Simulators

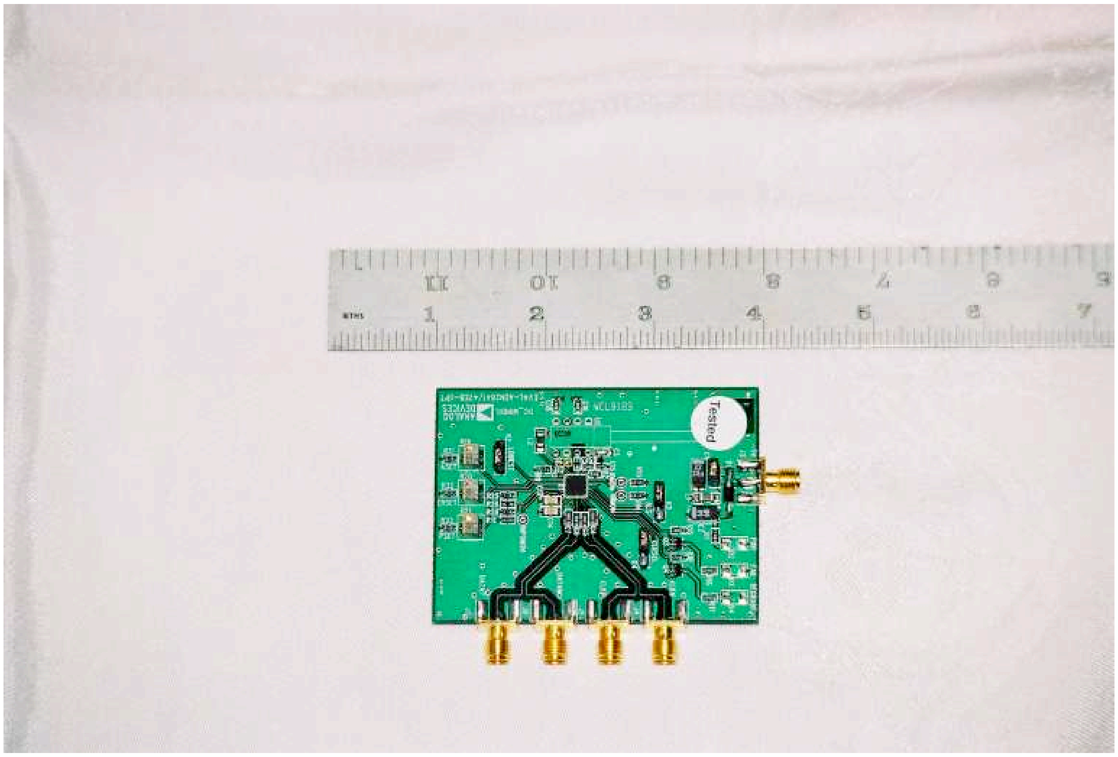

Figure 17 - Analog Devices, Inc. ADN2841 Laser Diode Driver IC Evaluation Board

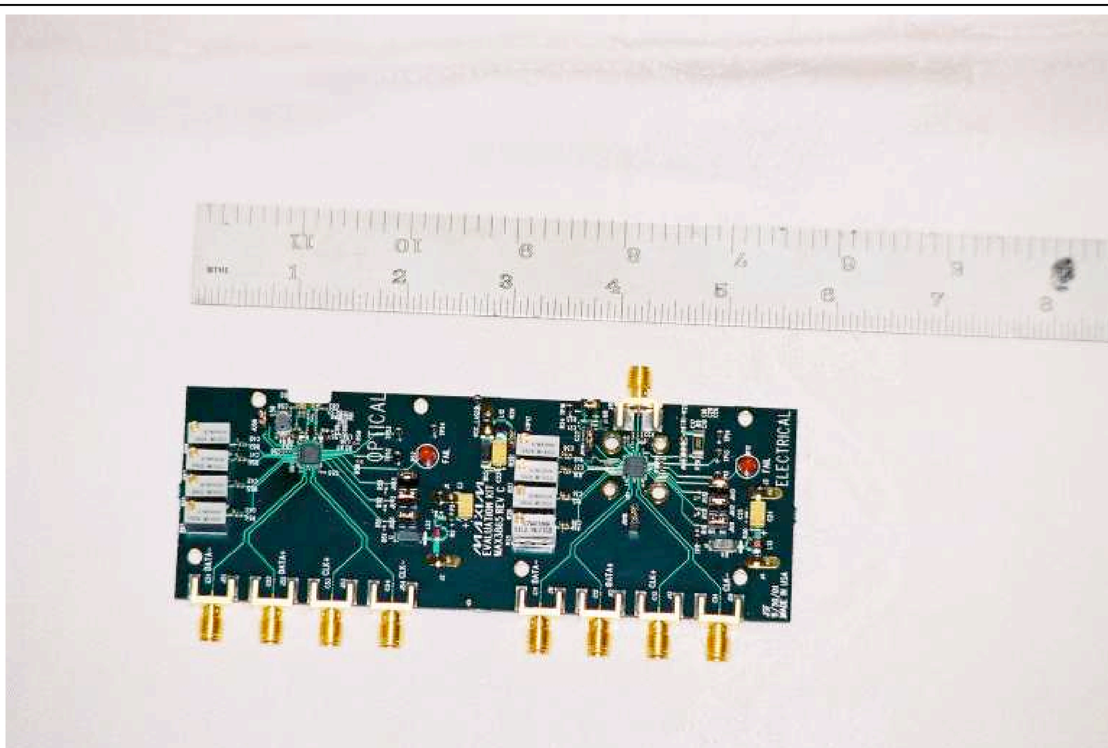

Figure 18 - Maxim Integrated Products MAX3865 Laser Diode Driver IC Evaluation Board

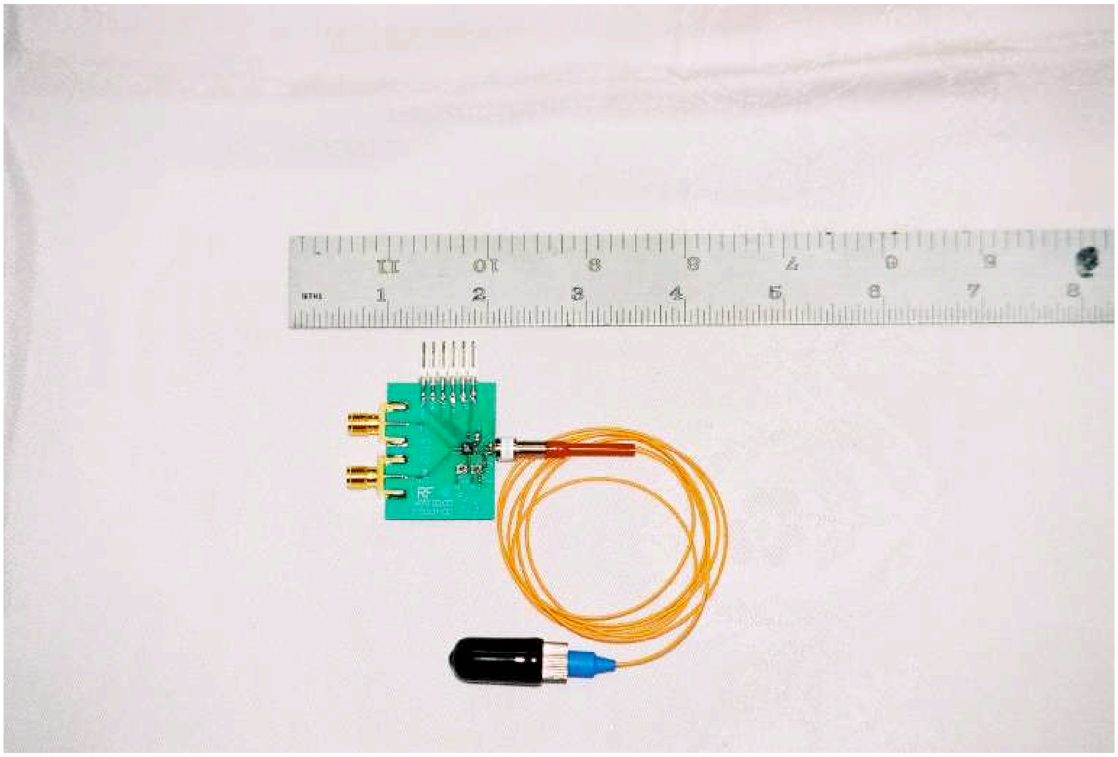

Figure 19 - RF Micro Devices, Inc. Laser Diode Driver IC Evaluation Board

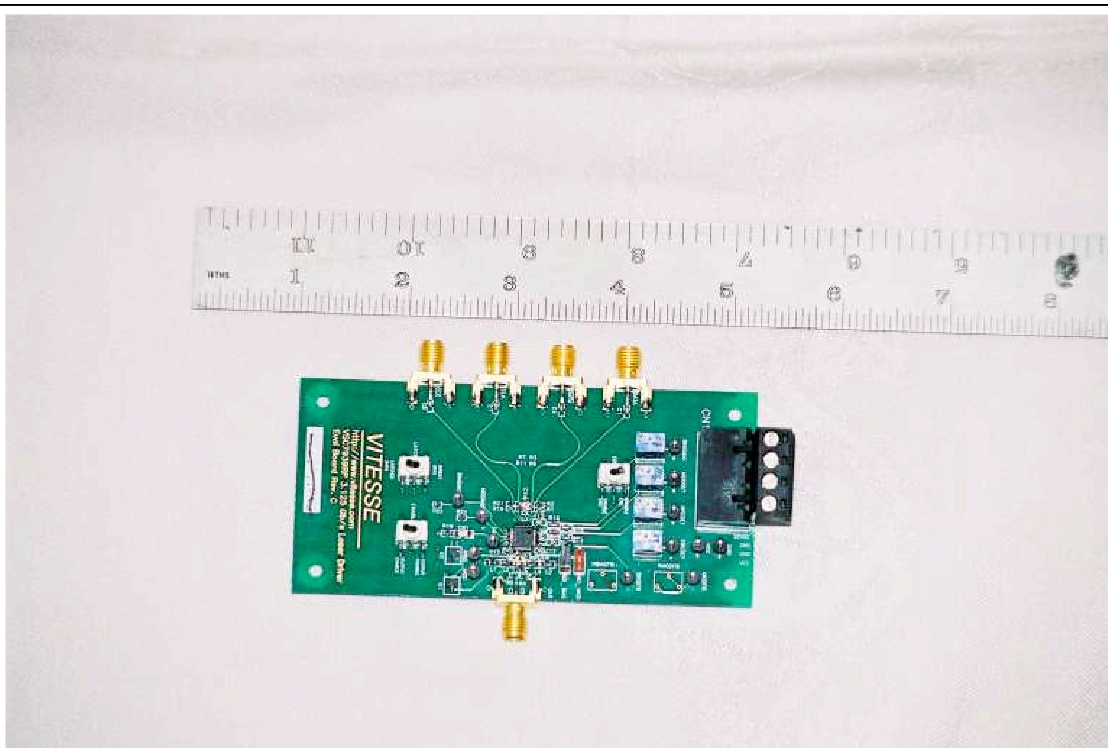

Figure 20 - Vitesse Semiconductor Corp. VSC7939 Laser Diode Driver IC Evaluation Board