

January 26, 2000

FEDERAL COMMUNICATIONS COMMISSION
Equipment Authorization Branch

REF: Rothenbuhler Engineering, Inc.
1668 Remote Firing Device, FCC ID: CW21668-1, FCCID: CW21668-2

To whom it may concern

Since 1946, Rothenbuhler Engineering has been a leader in the field of VHF engineering and digital electronics. Rothenbuhler Engineering certifies that this equipment is in full compliance with the rules under which we have tested it. The applicable rules are listed in the following test report.

This unit has been tested in accordance with TIA/EIA Standards ANSI/TIA/EIA-603-1992 by Acme Testing at their Acme, Washington, test site. Bench tests and measurements were performed by Rothenbuhler Engineering.

Sincerely

TOM JACOBSON, P.E.

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Enclosures

Letter of Introduction

The Remote Firing Device System

The Model 1668 Remote Firing Device is an intelligent two-way radio controlled firing system. The Remote Firing Device is intended to be used by individuals who are trained in the use of explosives. The Remote Firing Device system will allow the operator to detonate an explosive charge from a remote location. This system is safer than a conventional hardwired system since the accumulative resistance and resultant voltage drops on the wires has been eliminated. The Detonator is designed to be re-useable, and should be placed at a safe position relative to the explosives during normal operation.

The Master Control unit will fire up to eight Detonator units. The typical transmission range of the Master Controller is five miles, while the Detonator is limited to 1000 feet. Commands that are sent to the Detonator within 1000 feet of the Master Controller will be confirmed on the display of the Master Controller. Commands that are sent to the Detonator from more than 1000 feet, yet out of range of the Detonator, will be received by the Detonator, but the Master Controller will not be able to receive the confirmation message sent out by the Detonator. A confirmation command will be issued by the Detonator, whether or not the Master Controller is in range to receive it. The display of the Master Controller will indicate an assumed status if no confirmation is received.

Confirmation allows the user of the Master Controller to determine the status of the Detonator unit, while at a safe distance from the explosives. The Detonator uses a very low level of radio frequency transmit power, so that unintentional detonation of explosives does not occur.

Two-way communication is not a requirement of operation, so the operating range of the system is limited to the output power of the Master Control unit. The maximum range of the Master Control Unit is approximately five miles (line-of-sight).

The transmission power of the Detonator unit is limited to 100 milliwatts. This low power level will not detonate a blasting cap, including one directly connected to the antenna terminals. This "safe" power level has been established by the Institute of Makers of Explosives (IME), in Pamphlet 20, titled "Safety Guide for the Prevention of Radio Frequency Radiation Hazards in the Use of Commercial Electric Detonators (Blasting Caps)".

The very low transmit output power from the Detonator unit insures safe operation used properly in conjunction with explosives. The Detonator's radio frequency power output is well below safe energy limits cited by the IME (Institute of Makers of Explosives) to detonate a single blasting cap via radio frequency energy.

The Master Controller unit employs a 5 watt transmitter, and the receiver section has a sensitivity of $0.25\mu\text{V}$. The Detonator has a 100 milliwatt transmitter and the receiver section has a sensitivity of $0.25\mu\text{V}$. There is a microprocessor in both the Master Controller and the Detonator. The microprocessor controls frequency of operation and determines if the radio is in transmit or receive mode.