

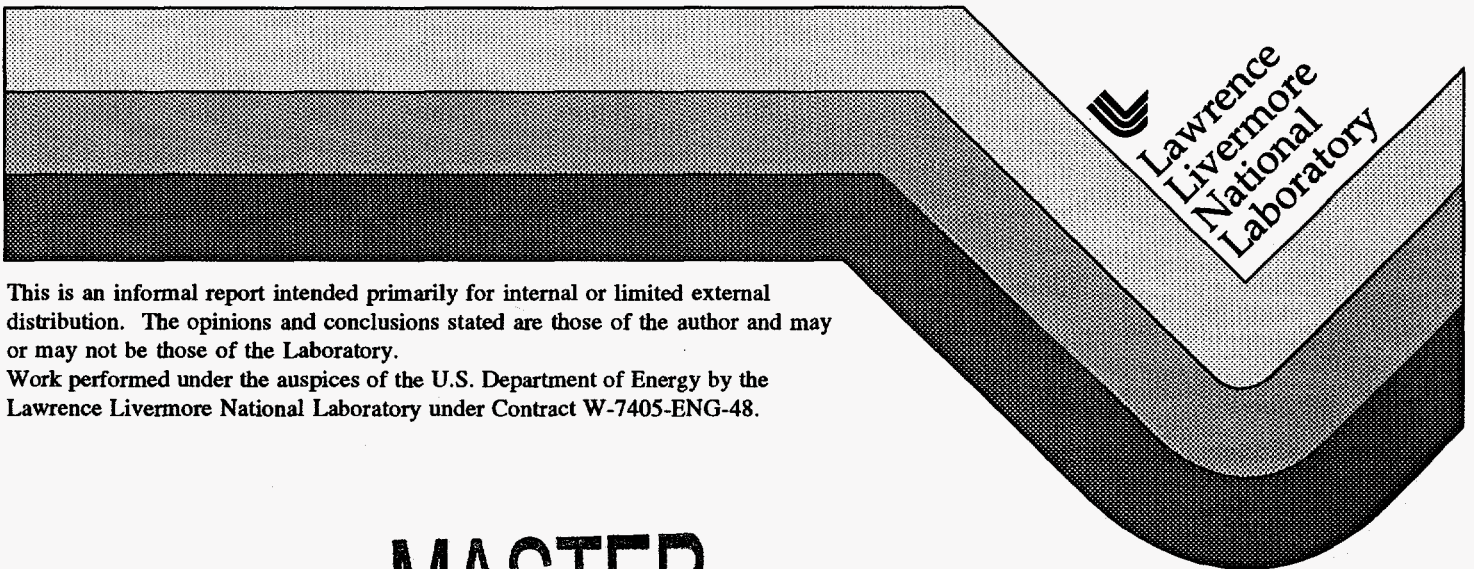
Timing and Firing System Requirements for Area 410

D. A. Dobson
D. N. Pipkorn
R. W. Selden

RECEIVED
APR 14 1997
OSTI

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED *ph*

February 20, 1962



This is an informal report intended primarily for internal or limited external distribution. The opinions and conclusions stated are those of the author and may or may not be those of the Laboratory.
Work performed under the auspices of the U.S. Department of Energy by the Lawrence Livermore National Laboratory under Contract W-7405-ENG-48.

MASTER

DISCLAIMER

This document was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor the University of California nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or the University of California. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or the University of California, and shall not be used for advertising or product endorsement purposes.

This report has been reproduced
directly from the best available copy.

Available to DOE and DOE contractors from the
Office of Scientific and Technical Information
P.O. Box 62, Oak Ridge, TN 37831
Prices available from (615) 576-8401, FTS 626-8401

Available to the public from the
National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Rd.,
Springfield, VA 22161

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, make any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

**Portions of this document may be illegible
in electronic image products. Images are
produced from the best available original
document.**

February 20, 1962

W. Arnold

MEMORANDUM

DECLASSIFICATION
STAMP ON REVERSE.

TO: Paul Phelps
FROM: Myron Knapp
SUBJECT: Timing and Firing System Requirements for Area 410

This memo is written to confirm the requirements for an Area 410 Timing and Firing system as outlined in our meeting of January 23 and as amended in various subsequent discussions.

A. System for 410 Able

1. Desirable Times

-15 min, -10 min, -5 min, -4 min, -3 min, -2½ min, -2 min, -1½ min, -1 min, -30 sec, -25 sec, -20 sec, -15 sec, -10 sec, -5 sec, -4 sec, -3 sec, -2 sec, -1 sec, 0, +1 sec, +2 sec, +3 sec, +4 sec, +5 sec, +6 sec, +7 sec, +8 sec, +9 sec.

2. Manual Advance

A manual advance button should enable the operator to bypass all times up to minus three minutes. All signals beyond this time must be sent out automatically. (In early discussions we talked of advancing to -30 seconds manually and required a key switch to disable the manual advance. In deleting the requirement to advance manually beyond -3 minutes, we also deleted the key switch.)

3. Scram, Reset, Hold and Dump

We have defined four types of stops as follows:

- a. Hold refers to a temporary stop. A hold does not affect any signals that have already gone out.
- b. Scram refers to a complete shut-down of all signals--except that it does not reset the timer. The timer records the time of the scram. After a scram, the timer must be reset before any signals may be sent out. As a result of turning off all signals, a scram accomplishes the following specific functions:

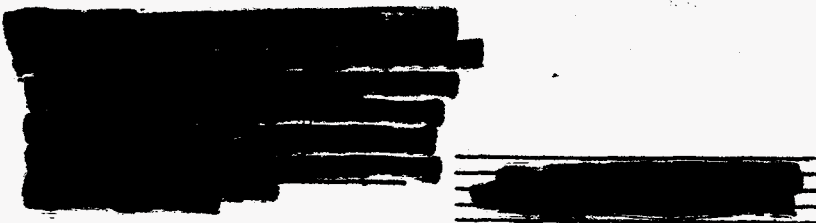
COPD

OCT 6 1965

FEB 1 1963 INV.

D-DIV
63823

CD
NOV 2 1977



[REDACTED]

[REDACTED]

Classification (Declassification/Review Date) Changed to:
UNCLASSIFIED
(Insert appropriate classification level or indicate Unclassified)

by authority of R2D2-COPAC-62-7 12/5/95 (date)
(Authority for change in classification, e.g., the memorandum number.)

by [Signature] 10/1/96 (date)
(Signature of person making the change)

verified by R June Barron 10/4/96 (date)
(Signature of person verifying this is the correct document or info)

[REDACTED]

[REDACTED]

- 1) Removes voltage from CDU's
- 2) Opens fire line to CDU's
- 3) Opens Trl.5* safety chain if the T&F system is operating Trl.5.

A scram does not affect the dump function discussed below.

- c. Reset refers to returning the timer to its original position. If a reset is effected prior to a scram, it accomplishes all the functions of a scram--plus a return to a pre-start condition. If it is effected after a scram, it simply enables one to start over.
- d. Dump refers to initiating a gas abort. This is a key-operated switch; and since one would never want to execute a dump without first scrambling the timing and firing system, the dump switch when operated will automatically execute a reset.

4. Minus Twenty-Second Hold

An automatic hold will occur at -20 seconds. To go beyond this time, one must close the -20 second auto stop switch. This switch is to be wired such that its closure prior to the time the -20 second signal has gone out will effect a reset. The CDU high voltage will come on with closure of this switch.

5. Interlocks

- a. All interlocks will be functional; i.e., no interlocks will be incorporated which simply say a signal did or did not go out. If an item is important enough to be interlocked, the interlock should say that the function has been accomplished.
- b. An open interlock (at or after the time it should be closed) is the equivalent of an automatic Hold, and the system must be re-started after the difficulty is either corrected or buggered.
- c. The following functions should be interlocked:
 - 1) Over-under voltage on both CDU's
 - 2) Pin system camera shutters
 - 3) Camera shutter power
 - 4) Various safety features such as hatches and doors, communication system disconnects, etc.

* In this paper I use Trl.5 in a symbolic sense only in referring to the function Trl.5 has performed in the past.

- d. A bugger switch should be provided for any interlock, and appropriate lights should indicate any interlocks that are bugged.

6. Exchange Key

A pair of key-operated switches--one located on the T&F console and the other on the Trl.5 console, will perform the following functions:

- a. If neither switch is closed, neither system can operate.
- b. If the T&F console switch is closed, the T&F system and Trl.5 can operate entirely independently of one another.
- c. If the Trl.5 console switch is closed, the T&F system operates Trl.5.

These switches are operated by a single "Exchange Key" which cannot be removed from a switch unless the switch is open. It is important that they be wired such that when the T&F system is operating Trl.5, a routine scram of the Trl.5 system does not stop the T&F timer.

7. Other Key Switches

- a. Two additional keys (i.e., additional to the Dump Key and Exchange Key discussed above) will be required as follows:
 - 1) An Arm Key will allow signals to be sent out to all stations;
 - 2) A Safety Chain Key will be in series with the Trl.5 safety chain.
- b. Other keys are integral to the Trl.5 system. Requirements for these should come from the group that operates Trl.5.

8. Diagnostic System Signals

- a. Each of the diagnostic systems should have a switch which allows the timing and firing system to send out signals without affecting that diagnostic system. These switches should be interlocked with the T&F system.
- b. Similarly, any switch that either allows local control of or is used in setting up a diagnostic system should be interlocked with the T&F system. (Examples: P.M. sync. lights, test light pulsers, pin simulators, etc.)

9. CDU Location and Power Source

- a. All "Shot" CDU's should be located in the Operations Room of Building 5100.

- b. CDU power monitors and interlocks will come from the control point through lines that are isolated from all other signal lines such that they may be physically broken and locked out at the C.P. by the arming party prior to arming and such that no shot CDU can be charged or fired except through the T&F system. That is, no diagnostic system while operating on local control can either charge or fire a shot CDU.

If a particular diagnostic system requires the capability of firing a CDU under local control, they should provide their own "Dry Run" CDU and control it subject to the restriction of item 8b above.

10. Other Safety Lockouts

In addition to providing the CDU power-lockout capability discussed above, a Lockout Panel should provide for physical breaks in lines performing any of the following functions:

- a. CDU fire line whenever the fire signal comes from the C.P.
- b. Pin supply voltages (+300 volts) and their return monitors
- c. Fidu (or marker) signals to pin boards.

For experiments where the fire signal comes from the optics system, a lockout on the fire line should be provided external to the Operations Room.

11. Recorder

A recorder should monitor that all signals went out in their proper sequence.

12. World Time

There is no requirement to record the time of an experiment on any world time basis.

B. System for 410 Dog

A complete duplicate of the system listed above for 410 Able will be required for 410 Dog. By complete duplicate, I mean that one could in principle execute experiments simultaneously in both areas.

C. Schedule

1. The Timing and Firing system for 410 Able should be ready to fire the first of a series of high-explosive calibration shots on June 1, 1962.

These shots will be used to check out the sphere and will, of course, require the operation of the mechanical diagnostics system.

2. Because we are on a 90-day readiness to carry out Reaction History-type experiments in 410 Dog, it is not essential to do any work on this system which can be done in the 90-day period.

MWK:mhg

Distribution:

W. Arnold, cy 1A
W. Bennett, cy 2A
D. Born, cy 3A
H. Brown, cy 4A
J. Carothers, cy 5A
R. Casterson, cy 6A
B. Crowley/R. Presentz, cy 7A ←
J. Duncan/K. Wheeler, cy 8A
F. Fairbrother, cy 9A
N. Hansen, cy 10A
W. Harris, cy 11A
A. Hyne/R. Epps, cy 12A
F. Kloverstrom/E. Mendelsohn, cy 13A
O. Krause, cy 14A
M. Knapp, cy 15A
P. Phelps, cy 16A
D. Rollins, cy 17A
E. Woodward, cy 18A
M. Knapp (file), cys 19A and 20A