APOLLO SPACECRAFT SOFTWARE CONFIGURATION CONTROL BOARD
PROGRAM CHANGE REQUEST

1.0 COMPLETED BY ORIGINATOR

1.1 ORIGINATOR
G. Cherry

1.2 ORGANIZATION
MIT/IL

1.3 EFFECTIVITY
Luminary 1A

1.4 TITLE OF CHANGE
Improve the Rate-of-descent Mode (P56) Performance

1.5 PLANNED FOR CHANGE

See Data Amplification Sheet

1.6 DESCRIPTION OF CHANGE
See Data Amplification Sheet

2.0 SOFTWARE CONTROL BOARD OR FLIGHT SOFTWARE BRANCH
DECISION FOR VISIBILITY IMPACT ESTIMATE BY MIT

2.1
\[\begin{array}{c}
\square \text{APPROVED} \\
\square \text{DISAPPROVED}
\end{array}\]

2.2 REMARKS:

2.3 SOFTWARE CONTROL BOARD OR FLIGHT SOFTWARE BRANCH SIGN OFF

DATE

3.0 MIT VISIBILITY IMPACT EVALUATION:

3.1 SCHEDULE IMPACT
Baseline 15 March 1969

3.2 STORAGE IMPACT

3.3 MIT COORDINATOR

G. M. G.

DATE 15 Jan 1969

3.4 REMARKS:

4.0 SOFTWARE CONTROL BOARD ACTION

4.1 IMPLEMENT AND PROVIDE DETAILED CHANGE EVAL.

4.2 REMARKS

4.3 SOFTWARE CONTROL BOARD SIGN OFF

DATE

5.0 MIT DETAILED PROGRAM CHANGE EVALUATION

5.1 MIT COORDINATOR

DATE

5.2 MIT EVALUATION

6.0 SOFTWARE CONTROL BOARD DECISION ON MIT DETAILED PROGRAM CHANGE EVALUATION

6.1 START OR CONTINUE IMPLEMENTATION

6.2 MIT REMARKS

6.3 SOFTWARE CONTROL BOARD SIGN OFF

DATE
1. Neil Armstrong has mentioned that if the rate-of-descent mode program (p55) is entered from P64, P65, or P67 with a high sink rate that a very large number of clicks must be entered with the ROD switch. Furthermore, some of these clicks seem to get lost. Neil suggested that we explore a scaling change which would command greater change than 1 ft/sec/click.

2. Pete Conrad has mentioned some difficulties with P66 on the LMS. When he was changing the attitude of the spacecraft rapidly and simultaneously commanding a change in descent rate via the ROD switch, the system seemed to come up with a different rate from the one intended and commanded.

1.6 Design improvements are currently being studied. One design change proposed at MIT which would help with the problem Neil noted would be to establish a pad-loaded descent rate on the first entry to P65. This pad-loaded value could be, say 5 ft/sec, and if the astronaut entered P66 while descending at 15 ft/sec the program would immediately without ROD switch clicks adjust the throttle to establish 5 ft/sec descent rate. This modification might allow us to retain the present scaling, 1 ft/sec, for fine descent rate adjustment.

Another modification being explored is to examine higher sample frequencies for measuring descent rate, accounting for input ROD clicks, and adjusting the throttle. The engine can react to a commanded change within one second, but the program changes the command thrust only once per two seconds.

The optimization of $T_A$ in Fig. 3.4.4-12 (page 5.3-137) will also be undertaken.