

GRUMMAN AIRCRAFT ENGINEERING CORPORATION
BETHPAGE, L. I., NEW YORK

NAS 9-1100
Exhibit B
Para. 5.6.2
Line Item 1
Primary No. 997
Type II

INTERFACE CONTROL DOCUMENT

THIS DOCUMENT SPECIFIES TECHNICAL REQUIREMENTS BETWEEN ALL PARTIES AFFECTED HEREIN. NOTHING CONTAINED IN THIS DOCUMENT SHALL BE DEEMED TO ALTER THE TERMS OF ANY CONTRACT OR PURCHASE ORDER BETWEEN GAEC AND THE ADDRESSEE.

APPROVALS

AUTHORIZED SIGNATURES

REPRESENTING

DATE

Perry L. Gardner
Arnold B. Whitaker

GAEC

1/8/65

GAEC

1/8/65

MIT

PREPARED BY: H. Donnelly/S. Glasser

CHECKED: G. Henderson

1/5/65

TITLE:

EGC-LIM ELECTRICAL INTERFACE

CCA NO.

LM-8, LM-1 and subsequent

MODEL NUMBER

REV

MODEL NUMBER

REV

MODEL NUMBER

EFFECTIVITY

DOCUMENT NO.

SHEET 1 OF 114

ICD NO. LIS 370-10004

REV

D

IDRR 38154

JUN 11 1970

INTERFACE CONTROL DOCUMENT

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REVISIONS

REV LTR	IRN NO.	SHEET	DESCRIPTION — INCLUDE CCA NUMBER	REV. BY	APPROVALS	DATE
A	-1	12 25 37	DSKY Dimmer Circuit	H. Donnelly	GAEC	<i>[Signature]</i>
A	-2	20 21 22 23	Pulse Transformer Specification		GAEC	
					MIT	<i>[Signature]</i>
A	-3	ALL	General Revision and Update			
A	-4	28 29	Radar Pulse Timing			
A	-5	12 37	ACS Digital Data (Downlink)			
A	-6	6 8 33 34 35	Re-identification of RCS Jets			
A	-7	14 29	LMP Warning (MIT)			
A	-8	11	LMP Warning (GAEC)			
Rev. A Sheet				REV. BY	APPROVALS	DATE
B	A-1	5 10 11 12 24 26-28	General Update	J. Dalessandro	GAEC	<i>[Signature]</i> 12/5/66
					MIT	<i>[Signature]</i> 13 Oct 66
B	A-2	22	Throttle Increase/Decrease Commands			
B	A-3	6-13 15 28 32 37-39 41 44 45	General Update			

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REVISIONS

REV LTR	IRN NO.	SHEET	DESCRIPTION — INCLUDE CCA NUMBER	REV. BY	APPROVALS	DATE
					GAEC	
B	A-4	38-41	Additional Shielding			
B	A-5	21	RCS Discretes			
B	A-7	44	Deletion of Shielding			
B	A-8	18	Auto Angle Track Enable Discrete			
B	A-9	6,39	PGNS Pulse Commands for LPD and PGNS Single Pulse Control Mode			
B	A-10	42,43, 44	Correct connector designation			
B	A-11	12	Status light current requirement			
B	A-12	9,25	Update radar-LGC signals			

REV LTR	IRN NO.	SHEET	DESCRIPTION — INCLUDE CCA NUMBER	REV. BY	APPROVALS	DATE
C	B-1	30	Deleted LGC DC return wire to N2 BUS.	R. Kerr	GAEC	12/17/68
	B-2	9, 39	"Gimbal Off" was "Pitch Gimbal Off". "Apparent Gimbal Fail" was "Roll Gimbal Off".		MIT	W. Stamer 14 Jan 1969
	B-3	1	Added EST, LTA-1, LTA-1R, LTA-2 and LM-1 Thru LM-15 to effectivity block.			
	B-4	7,8,9, 11,12,14	Changed interface requirements to reflect deletion of ACA's, T/PCA's, Rendezvous Radar, Landing Radar, ACS and Display Meter from LM-1. Revised by IRN #16.			
	B-5	11,20	Added circuit and interface characteristics for "Auto Angle Track Enable".			
	B-6	42,43, 44	Added RF Uplink Interface for LM-4 & subsequent.			
	B-7	12,26	Changed PCM load impedance for 1.024 MC Sync. Signal.			
	B-8	36	Changed polarity of sign bit for "Altitude Rate" words.			
	B-9	9,19, 34	Changed DECA input circuit and interface characteristics for Gimbal Trim Commands.			

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REVISIONS

REV LTR	IRN NO.	SHEET	DESCRIPTION — INCLUDE CCA NUMBER	REV. BY	APPROVALS	DATE
C	B-10	22	Redefined interface characteristics for Attitude Hand Controller		GAEC	
	B-11	15,46	Added "PROCEED" function to DSKY "STANDBY" Key.			
	B-12	5,13	Added UPLINK interface circuit (circuit 15) and corrected interface characteristics for LGC UPLINK.			
	B-13	12	Decreased lower limit of 1.024 MC sync. signal			
	B-14	14	Increased allowable peak current drain for DSKY annunciators.			
	B-15	36	Clarified ALTITUDE and ALTITUDE RATE signal format.			
	B-16	11,12	Revised IRN #4 to reflect deletion of Rendezvous and Landing Radars in LM-2.			
	--	36	Changed update rate for ALTITUDE and ALTITUDE RATE.			
D		ALL	Deleted ESI, LTA-1 and LTA-1R from effectivity. ICD completely revised and re-formatted.			
	C-1	26,27	Changed ACA Rate Command Scaling	REV. BY	APPROVALS	DATE
	C-2	49,50 55-59, 61,112, 113	Documented LGC Split Pulse Phenomenon.	R KERR	GAEC	6/2/70
					MIT	W. Stamos 11 June 1970
	C-3	50,56	Removed pulse correction circuit from LM-6.			
		1	"LM-1 and subsequent" effectivity was LM-1 through LM-15"			
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GRUMMAN AIRCRAFT ENGINEERING CORPORATION
BETHPAGE, L. I., NEW YORK

KEY: Responsibility is identified herein as follows:

- ① Grumman Aircraft Engineering Corporation
Bethpage, L. I., New York
- ② Massachusetts Institute of Technology
Cambridge, Massachusetts
- ③ National Aeronautics and Space Administration
Manned Spacecraft Center
- ④ Design data to be supplied by: .

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Introduction

This ICD defines and unless otherwise stated, controls the electrical signal interface between the LM Guidance Computer (LGC), including the DSKY, and IM Spacecraft subsystems. Electrical requirements for the interface through which spacecraft prime power is supplied to the LGC are included for reference only. The controlling document for prime power is LIS-390-10002.

This ICD is divided into sixteen sub-sections. Each sub-section defines particular LGC-LM interfaces with respect to the following:

1. Signal Nomenclature
2. Signal/connector/pin assignments
3. Source and load impedance
4. Signal characteristics
5. Interfacing circuitry
6. Functional Description

The noise limits referred to for a given interface circuit are those which could be attained without affecting the proper functioning of the interface. As a general rule, however, the interference emanating from either side of the interface shall not exceed the limits specified in MIL-I-26600/MSC-EMP-10A. The susceptibility of the respective equipments on either side of the interface shall meet the requirements of the same specifications.

The nomenclature used in describing the pulse signal characteristics is defined in appendix A (Sheet 110).

For the purpose of this ICD, a logic "1" denotes that the function or condition specified by the signal nomenclature is being performed. i.e.: A logic "1" for the Auto Angle Track Enable means that the Auto Angle Track function is enabled. Conversely, a logic "0" denotes that the function is not being performed or the condition does not exist.

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