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file ICD's

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SATURN/APOLLO FREQUENCY PLAN
INSTRUMENTATION & COMMUNICATIONS INTERFACES

D			
C			
B	<i>0</i>	<i>MSFC: 9/5/64</i>	<i>Ordn. L. L. L. 5/9/64</i>
A	<i>0</i>		
ORIG			
SYM	NAME MSC	DATE	NAME KSC
			NAME MSFC
APPROVAL			
REPOSITORY: THE GEORGE C. MARSHALL SPACE FLIGHT CENTER HUNTSVILLE, ALABAMA NATIONAL AERONAUTICS AND SPACE ADMINISTRATION			
PREPARED FOR:		Instrumentation/Communication	PANEL
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APOLLO INTER-CENTER INTERFACE CONTROL DOCUMENT			

MSFC - Form 1916 (Rev July 1964)

1.0 SCOPE

- 1.1 This Interface Control Document (ICD) defines the Saturn/Apollo Frequency Plan for the following Space Vehicle Missions:

AS201	205	501	505	509
202	206 (LEM Only)	502	506	
203	207	503	507	
204	208 (LEM Only)	504	508	

The attached listings illustrate the transmitting and receiving frequencies that will be utilized for various systems during the respective missions. This document does not control systems, only frequency assignments.

2.0 DOCUMENTATION

2.1 Associated Interface Documents

The Interface Control Document Log indexes documents which, not a part of this ICD, are intended as companion documents to specify applicable information not part of Instrumentation and Communications (I/C) Panel's Responsibility.

2.2 Precedence of Document

This ICD supersedes ICD #13M60002 as a "Master" Frequency Plan.

2.3 Amendments to Documentation

Amendments to this document shall be subject to approval of the I/C Panel.

3.0 EQUIPMENT LOCATION

No attempt is made in this ICD to describe equipment locations except to specify major space vehicle component, i.e., CSM, IU, S-IB, etc.

AS-201 and 202

Vehicle Location	Frequency MHz (Mcps)		System	Remarks
	Xmtr	Rec		
S-IB	240.2		PAM/FM/FM GF-1	
S-IB	244.3		PAM/FM/FM GF-2	
S-IB	252.4		SS/FM GS-1	
S-IB	256.2		PCM/FM GP-1	
S-IB	960	890	ODOP	
S-IB(1)		450	Secure Range Safety	
S-IB	242		Camera Recovery	
S-IVB	258.5		PAM/FM/FM CF-1	
S-IVB	253.8		PAM/FM/FM CF-3	
S-IVB	246.3		PAM/FM/FM CF-2	
S-IVB	226.2		SS/FM CS-1	
S-IVB	232.9		PCM/FM CP-1	
S-IVB(1)		450	Secure Range Safety	
IU	250.7		FM/FM DF-1	
IU	245.3		PAM/FM/FM DF-2	
IU	259.7		SS/FM DS-1	
IU	255.1		PCM/FM DP-1	
IU		420	Secure Range Safety	Experimental System (AS-201 Only)
IU	5000	5060.194	AZUSA/CLOTRAC	
IU	5765	5690	C-Band Radar	Different Code than Beacon on SC
IU	860		Television	AS-202 Only
CSM	296.8	296.8	Voice Transmit/Receive	Receive Function Not Used
CSM	10.006	10.006	Beacon/Voice	Receive Function Not Used
CSM	243.0	243.0	Beacon/Voice	Receive Function Not Used
CSM(1)		450	Update	
CSM	5765	5690	C-Band Radar	
CSM	2287.5	2106.4	USB	Only on AS-202
CSM	237.8		PCM/FM	Operational System
CSM	247.3		PAM/FM/FM	
CSM	257.3		PAM/FM/FM	

(1) Analog - Mission 201
Digital - Mission 202

AS-203

Vehicle Location	Frequency MHz (Mcps)		System	Remarks
	Xmtr	Rec		
S-IB	240.2		PAM/FM/FM CF-1	
S-IB	244.3		PAM/FM/FM CF-2	
S-IB	252.4		SS/FM CS-1	
S-IB	256.2		PCM/FM CP-1	
S-IB	960	890	ODOP	
S-IB		450	Secure Range Safety	
S-IB	242.0		Camera Recovery	
S-IVB*	258.5		PAM/FM/FM CF-1	
S-IVB*	253.8		PAM/FM/FM CF-3	
S-IVB*	246.3		PAM/FM/FM CF-2	
S-IVB	226.2		SS/FM CS-1	
S-IVB*	232.9		PCM/FM CP-1	
S-IVB		450	Secure Range Safety	
IU*	250.7		FM/FM DF-1	
IU*	245.3		PAM/FM/FM DF-2	
IU	259.7		SS/FM DS-1	
IU*	255.1		PCM/FM DP-1	
IU*		450	Updata	
IU	5000	5060.194	AZUSA/Glotrac	
IU*	5765	5690	C-Band Radar	
IU*	2270		Television	

* May Require Orbital Support

AS-204

Vehicle Location	Frequency MHz (Mcps)		System	Remarks
	Xmtr	Rec		
S-IB	240.2		PAM/FM/FM GF-1	
S-IB	244.3		PAM/FM/FM GF-2	
S-IB	252.4		SS/FM GS-1	
S-IB	256.2		PCM/FM GP-1	
S-IB	960	890	ODOP	
S-IB		450	Secure Range Safety	
S-IVB*	258.5		PAM/FM/FM CF-1	
S-IVB*	253.8		PAM/FM/FM CF-3	
S-IVB*	246.3		PAM/FM/FM CF-2	
S-IVB	226.2		SS/FM CS-1	
S-IVB	232.9		PCM/FM CP-1	
S-IVB		450	Secure Range Safety	
IU*	250.7		FM/FM DF-1	
IU*	245.3		PAM/FM/FM DF-2	
IU	259.7		SS/FM DS-1	
IU*	255.1		PCM/FM DP-1	
IU*		450	Updata	
IU	5000	5060.194	AZUSA/Glotrac	
IU*	5765	5690	C-Band Radar	Different Code than Beacon on SC
CSM*	296.8	296.8	Voice Transmit/Receive	
CSM	10.006	10.006	Beacon/Voice	
CSM*		450	Updata	
CSM*	237.8		PCM/FM	
CSM*	5765	5690	C-Band Radar	
CSM*	2287.5	2106.4	USB	
CSM	243.0	243.0	Beacon/Voice	
CSM*		259.7	Receive	IU's DS-1 will be Off when this frequency is used.

* May require orbital support.

Vehicle Location	Frequency MHz (Mcps)		System	Remarks
	Xmtr	Rec		
S-IB	240.2		FM/FM GF-1	
S-IB	256.2		PCM/FM GP-1	
S-IB	960	890	ODOP	
S-IB		450	Secure Range Safety	
S-IVB*(1)	253.8		FM/FM CF-1	
S-IVB*	258.5		PCM/FM CP-1	
S-IVB		450	Secure Range Safety	
IU*	250.7		FM/FM DF-1	
IU*	255.1		PCM/FM DP-1	
IU*		450	Udata	
IU*	5765	5690	C-Band Radar	Different code than beacon on SC
IU	5000	5060.194	AZUSA/Glotrac	
CSM*	247.3		PCM/FM or FM/FM	
CSM*	296.8	296.8	Voice Transmit/Receive	
CSM	10.006	10.006	Beacon/Voice	
CSM*		450	Udata	
CSM*	237.8		PCM/FM	
CSM*	5765	5690	C-Band Radar	
CSM*	2287.5	2106.4	USB	
CSM	243.0	243.0	Beacon/Voice	
CSM*		259.7	Receive	

*May Require orbital support

(1) Not presently scheduled, but provisions to carry this system are incorporated.

IU's DS-1 will be off
when this frequency is
used.
NO IU DS-1 ON 205

AS-206 (LEM Only)

Vehicle Location	Frequency MHz (Mcps)		System	Remarks
	Xmtr	Rec		
S-IB	240.2		FM/FM GF-1	
S-IB	256.2		PCM/FM GP-1	
S-IB	960	890	ODOP	
S-IB		450	Secure Range Safety	
S-IVB*(1)	253.8		FM/FM CF-1	
S-IVB*	258.5		PCM/FM CP-1	
S-IVB		450	Secure Range Safety	
IU*	250.7		FM/FM DF-1	
IU*	255.1		PCM/FM DP-1	
IU*		450	Update	
IU*	5765	5690	C-Band Radar	Different Code than beacon on SC
IU	5000	5060.194	AZUSA/Glotrac	
LEM*	241.5		PAM/FM/FM	
LEM*	257.3		PAM/FM/FM	
LEM*	247.3		PAM/FM/FM	
LEM*	230.9		Constant Bandwidth System/FM	
LEM*	5765	5690	C-Band Radar	
LEM*		450	Update	
LEM*	296.8	296.8	Voice Transmit, SSC & Voice Receive	
LEM(2)	9832.8	9792.0	X-Band Rendezvous Radar	
LEM*	2282.5	2101.8	USB	
LEM*	259.7	259.7	Voice & LEM TM Transmit, Voice Receive	
LEM*	237.8		PCM/FM	

*May Require orbital support.

(1) Not presently scheduled, but provisions to carry this system are incorporated.

(2) Will be turned on only after LEM separation.

AS-207

Vehicle Location	Frequency MHz (Mcps)		System	Remarks
	Xmtr	Rec		
S-IB	240.2		FM/FM GF-1	
S-IB	256.2		PCM/FM GP-1	
S-IB	960	890	ODOP	
S-IB		450	Secure Range Safety	
S-IVB*(1)	253.8		FM/FM CF-1	
S-IVB*	258.5		PCM/FM CP-1	
S-IVB		450	Secure Range Safety	
IU*	255.1		PCM/FM DP-1	
IU*	250.7		FM/FM DF-1	
IU*	2765	5690	C-Band Radar	
IU	5000	5060.194	AZUSA/Glotrac	
IU*		450	Udata	
CSM	10.006	10.006	Beacon/Voice	
CSM*	259.7	259.7	SSC, Voice & LEM	
			TM Receive, Voice	
			Transmit	
CSM(2)	9792.0	9832.8	X-Band Rendezvous	
			Radar	
CSM*	2287.5	2106.4	USB	
CSM*	2272.5		S-Band Transmit	
CSM*	5765*	5690	C-Band Radar	
CSM*	296.8	296.8	Voice Transmit/Receive	
CSM	243.0	243.0	Beacon/Voice	

* May require orbital support.

(1) Not presently scheduled, but provisions to carry this system are incorporated.

(2) Will only be turned on after CSM separation.

AS-208 (LEM Only)

Vehicle Location	Frequency MHz (Mcps)		System	Remarks
	Xmtr	Rec		
S-IB	240.2		FM/FM GF-1	
S-IB	256.2		PCM/FM GP-1	
S-IB	960	890	ODOP	
S-IB		450	Secure Range Safety	
S-IVB*(1)	253.8		FM/FM CF-1	
S-IVB*	258.5		PCM/FM CP-1	
S-IVB		450	Secure Range Safety	
IU*	250.7		FM/FM DF-1	
IU*	255.1		PCM/FM DP-1	
IU*		450	Updata	
IU*	5765	5690	C-Band Radar	Different Code than Beacon on SC
IU	5000	5060.194	AZUSA/Glotrac	
LEM*	241.5		PAM/FM/FM	
LEM*	257.3		PAM/FM/FM	
LEM*	247.3		PAM/FM/FM	
LEM*	237.8		PCM/FM	
LEM*	230.9		Constant Bandwidth System/FM	
LEM*	5765	5690	C-Band Radar	
LEM*		450	Updata	
LEM*	296.8	296.8	Voice Transmit, SSC & Voice Receive	
LEM(2)	9832.8	9792.0	X-Band Rendezvous Radar	
LEM*	2282.5	2101.8	USB	
LEM*	259.7	259.7	Voice & LEM TM Transmit, Voice Receive	

* May require orbital support.

- (1) Not presently scheduled, but provisions to carry this system are incorporated.
(2) Will be turned on only after LEM separation.

AS-501 and 502

Vehicle Location	Frequency MHz (Mcps)		System	Remarks
	Xmtr	Rec		
S-IC	231.9		PAM/FM/FM AF-3	
S-IC	252.4		PAM/FM/FM AF-2	
S-IC	240.2		PAM/FM/FM AF-1	
S-IC	235.0		SS/FM AS-1	
S-IC	256.2		SS/FM AS-2	
S-IC	244.3		PCM/FM AP-1	
S-IC	960	890	ODOP	
S-IC		450	Secure Range Safety	
S-IC	1710		Television	AS-502 Only
S-IC	242.0		Camera Recovery	AS-502 Only
S-II	241.5		PAM/FM/FM BF-1	
S-II	234.0		PAM/FM/FM BF-2	
S-II	229.9		PAM/FM/FM BF-3	
S-II	248.6		PCM/FM BP-1	
S-II	227.2		SS/FM BS-1	
S-II	236.2		SS/FM BS-2	
S-II		450	Secure Range Safety	
S-II	242.0		Camera Recovery	
S-IVB*	258.5		PAM/FM/FM CF-1	
S-IVB*	253.8		PAM/FM/FM CF-3	
S-IVB*	246.3		PAM/FM/FM CF-2	
S-IVB	226.2		SS/FM CS-1	
S-IVB*	232.9		PCM/FM CP-1	
S-IVB		450	Secure Range Safety	
IU*	250.7		FM/FM DF-1	
IU*	245.3		PAM/FM/FM DF-2	
IU	259.7		SS/FM DS-1	
IU*	255.1		PCM/FM DP-1	
IU*	2277.5		PCM/FM DP-1A	DP-1A is parallel with DP-1
IU*	2282.5	2101.8	CCS - Updata, DP-1B	DP-1B is parallel with DP-1
IU	5765	5690	C-Band Radar	Different Code than Beacon on SC
IU	5000	5060.194	AZUSA/Glotrac	

*May require orbital support.

AS-501 and 502 (Continued)

Vehicle Location	Frequency MHz (Mcps)		System	Remarks
	Xmtr	Rec		
CSM*	296.8	296.8	Voice Transmit/Receive	Receive Function Not Used
CSM*		450	Updata	
CSM*	5765	5690	C-Band Radar	
CSM*	2287.5	2106.4	USB	
CSM	243.0	243.0	Beacon/Voice	Receive Function Not Used
CSM	10.006	10.006	Beacon/Voice	Receive Function Not Used
CSM*	237.8		PCM/FM	
LTA*	247.3		PAM/FM/FM	
LTA*	230.9		Constant Bandwidth	

* May require orbital support.

Vehicle Location	Frequency MHz (Mcps)		System	Remarks
	Xmtr	Rec		
S-IC	231.9		PAM/FM/FM AF-3	
S-IC	252.4		PAM/FM/FM AF-2	
S-IC	240.2		PAM/FM/FM AF-1	
S-IC	235.0		SS/FM AS-1	
S-IC	256.2		SS/FM AS-2	
S-IC	244.3		PCM/FM AP-1	
S-IC	960	890	ODOP	
S-IC		450	Secure Range Safety	
S-IC	1710		Television	
S-IC	242.0		Camera Recovery	
S-II	241.5		PAM/FM/FM BF-1	
S-II	234.0		PAM/FM/FM BF-2	
S-II	229.9		PAM/FM/FM BF-3	
S-II	248.6		PCM/FM BP-1	
S-II	227.2		SS/FM BS-1	
S-II	236.2		SS/FM BS-2	
S-II		450	Secure Range Safety	
S-IVB*	258.5		PAM/FM/FM CF-1	
S-IVB*	253.8		PAM/FM/FM CF-3	
S-IVB*	246.3		PAM/FM/FM CF-2	
S-IVB	226.2		SS/FM CS-1	
S-IVB	232.9		PCM/FM CP-1	
S-IVB		450	Secure Range Safety	
IU*	250.7		FM/FM DF-1	
IU*	245.3		PAM/FM/FM DF-2	
IU	259.7		SS/FM DS-1	
IU*	255.1		PCM/FM DP-1	
IU*	2277.5		PCM/FM DP-1A	DP-1A is parallel with DP-1
IU*	2282.5	2101.8	CCS DP-1B	DP-1B is parallel with DP-1
IU*	5765	5690	C-Band Radar	Different Code than Beacon on SC
IU	5000	5060.194	AZUSA/Glotrac	

* May Require orbital support.

AS-503 (Continued)

Vehicle Location	Frequency MHz (Mcps)		System	Remarks
	Xmtr	Rxc		
CSM*	296.8	296.8	Voice Transmit/Receive	
CSM	10.006	10.006	Beacon/Voice	
CSM*(2)	259.7	259.7	Voice, SSC and LEM TM Receive Voice Transmit	IU's DS-1 will be Off When these frequencies are used.
CSM(2)	9792.0	9832.8	X-Band Rendezvous Radar	
CSM*	5765.1	5690	C-Band Radar	
CSM*	2287.5	2106.4	USB	
CSM*	2272.5		S-Band Transmitter	
CSM	243.0	243.0	Beacon/Voice	
LEM*	296.8	296.8	Voice Transmit, SSC & Voice Receive	
LEM(2)	9832.8	9792.0	X-Band Rendezvous Radar	
LEM*(2)	259.7	259.7	Voice & LEM TM Transmit, Voice Receive Biomed and Voice Receive	
LEM*	257.3		PAM/FM/FM	
LEM*	228.2		PAM/FM/FM	
LEM*	247.3		PAM/FM/FM	
LEM*	237.8		PCM/FM	
LEM*	230.9		Constant Bandwidth System	
LEM*		450	Updata	
LEM*	5765	5690	C-Band Radar	
LEM*(2)	2282.5	2101.8	USB	Shares frequency with IU's CCS

* May require orbital support.

(2) Will only be turned on after CSM-LEM separation.

Vehicle Location	Frequency MHz(Mcps)		System	Remarks
	Xmtr	Rec		
S-IC(3)	231.9		PAM/FM/FM AF-3	
S-IC(3)	252.4		PAM/FM/FM AF-2	
S-IC	240.2		PAM/FM/FM AF-1	
S-IC(3)	235.0		SS/FM AS-1	
S-IC(3)	256.2		SS/FM AS-2	
S-IC	244.3		PCM/FM AP-1	
S-IC(4)	960	890	ODOP	
S-IC		450	Secure Range Safety	
S-II	241.5		PAM/FM/FM BF-1	
S-II	234.0		PAM/FM/FM BF-2	
S-II	299.9		PAM/FM/FM BF-3	
S-II	248.6		PCM/FM BP-1	
S-II	236.2		SS/FM BS-2	
S-II		450	Secure Range Safety	
S-II	227.2		SS/FM BS-1	
S-IVB*(1)	253.8		FM/FM CF-1	
S-IVB*	258.5		PCM/FM CP-1	
S-IVB		450	Secure Range Safety	
IU*	250.7		FM/FM DF-1	
IU*	245.3		PCM/FM DP-1	
IU*(4)	2277.5		PCM/FM DP-1A	DP-1A is parallel with DP-1
IU*	2282.5	2101.8	CCS DP-1B	DP-1B is parallel with CP-1
IU*	5765	5690	C-Band Radar	
IU	5000	5060.194	AZUSA/Glotrac	
CSM(2)	9792.0	9832.8	X-Band Rendezvous Radar	
CSM	243.0	243.0	Beacon/Voice	
CSM*	296.8	296.8	Voice Transmit/Receive	
CSM*	259.7	259.7	Voice, SSC LEM TM Receive	
			Voice Transmit	
CSM*	2287.5	2106.4	USB	
CSM*	2272.5		S-Band Transmitter	
CSM	10.006	10.006	Beacon/Voice	
LEM*(2)	296.8	296.8	Voice Transmit, SSC & Voice Receive	
LEM*(2)	259.7	259.7	Voice & LEM TM Transmit, Voice Receive	
LEM*(2)	2282.5	2101.8	USB	Shares Frequency with CCS
LEM(2)	9832.8	9792.0	X-Band Rendezvous Radar	

*May require orbital support.

- (1) Not presently scheduled, but provisions to carry this system are incorporated.
- (2) Will only be turned on after CSM-LEM separation or some fixed point after injection.
- (3) Possibility of being removed.
- (4) Possibility of its requirements being fulfilled by the CCS

AS-506, 507, 508, and 509

Vehicle Location	Frequency MHz (Mcps)		System		Remarks
	Xmtr	Rec			
S-IC	256.2	.	FM/FM	AF-1	
S-IC	244.3	.	PCM/FM	AP-1	
S-IC		450	Secure Range Safety		
S-IC(4)	960	890	ODOP		
S-II	241.5		FM/FM	BF-1	
S-II	234.0		FM/FM	BF-2	
S-II	248.6		PCM/FM	BP-1	
S-II		450	Secure Range Safety		
S-IVB*(1)	253.8		FM/FM	CF-1	
S-IVB*	258.5		PCM/FM	CP-1	
S-IVB		450	Secure Range Safety		
IU*	250.7		FM/FM	DF-1	
IU*	245.3		PCM/FM	DP-1	
IU*(4)	2277.5		PCM/FM	DP-1A	DP-1A is parallel with DP-1
IU*	2282.5	2101.8	CCS	DP-1B	DP-1B is parallel with CP-1
IU*	5765	5690	C-Band Radar		
IU	5000	5060.194	AZUSA/Glotrac		
CSM	243.0	243.0	Beacon/Voice		
CSM*	296.8	296.8	Voice Transmit/Receive		
CSM*	259.7	259.7	Voice, SSC, LEM TM		
			Receive Voice Transmit		
CSM*	2287.5	2106.4	USB		
CSM*	2272.5		S-Band Transmitter		
CSM(2)	10.006	10.006	Beacon/Voice		
CSM(2)	9792.0	9832.8	X-Band Rendezvous Radar		
LEM*(2)	296.8	296.8	Voice Transmit, SSC &		
			Voice Receive		
LEM*(2)	259.7	259.7	Voice & LEM TM Transmit,		
			Voice Receive		
LEM*(2)	2282.5	2101.8	USB		Shares Frequency with CCS
LEM(2)	9832.8	9792.0	X-Band Rendezvous		
			Radar		

*May require orbital support.

- (1) Not presently scheduled, but provisions to carry this system are incorporated.
- (2) Will only be turned on after CSM-LEM separation or some fixed point after injection.
- (4) Possibility of its requirements being fulfilled by the CCS.