

G&N System Cable Breakout Adapter Sets,
for Block I-Series 100, Block II and LEM
Design Criteria

1.0 SCOPE

1.1 This document established the design and performance requirements for the Cable Breakout Adapter Sets.

2.0 APPLICABLE DOCUMENTS

1015090	Interconnect Diagram Apollo Guidance Equipment C/M, Lower Equipment Bay
2014669	C/M Block II Interconnect Diagram
6014511	LEM Interconnect Diagram

3.0 GENERAL REQUIREMENTS

3.1 The maintenance philosophy used to define the G&N Cable Breakout Adapters set in this XDE is as follows. The Breakout Boxes shall be capable of malfunction isolation to at least one black box or its associated interconnect cable black box combination. This functional capability is limited since it is proposed that only one end of the cable between two black boxes be broken out in most cases i.e. specifically the PSA connectors^{for each}. It is expected that with the aid of the present GSE Test Point Adapters and a proposed CDU Test Point Adapter (see 3.2.7) fault isolation to a single black box will be possible. Since the proposed Cable Breakout Adapter Set is intended for use at all levels of test (ISS, OSS, and System) it was noted in the Block I-Series 100 and Block II G&N system configurations it is impractical to insert any breakout facility between the PSA connectors and their movement and the limited space afforded by the present G&N Mounting

Fixture design. The LEM G&N Mounting Fixture has similar mechanical restrictions which may be relieved with possible changes to the fixture. Three components the CDU, LGC and PSA are mounted on the cold plate with their associated cables in series out of one main harness. If a "TEE" connector for the Breakout Adapter cable can be designed with a maximum thickness of three (3) inches to minimize the movement of the cables involved, no cold plate modifications will be required. A modification to the coldplate will be required if the "TEE" connector thickness is prohibitive. The change would involve relocation of the three components to allow insertion of the Breakout Adapter connector, which may mean an auxiliary cold plate to enlarge the mounting surface. The most practical and less expensive method has yet to be determined. The proposed breakout philosophy will not be ^{AS} costly and has less impact on the present GSE hardware when compared to a breakout for every A/B connector.

The function of the Breakout Box is to make accessible each lead in the cable for voltage and current monitoring and limited continuity testing. The Breakout Box Adapter Set shall consist of three (3) breakout boxes, each of which shall contain test point jacks, box receptacles, adapter cables and a switching device. The adapter cables shall be used to insert the breakout box between the A/B component and the normal G&N cable connections, also they shall be of sufficient length to conveniently locate the breakout box for operation. ^{When practical} The lead wire in these cables shall be the same type as used in the comparable G&N cables, ~~however inside the breakout box they shall be single conductor shielded with the shield collected~~

~~and grounded at one point in the box.~~

3.2 DETAIL REQUIREMENTS

3.2.1 TEST POINT JACK TIPS

Each lead in the Break Out Box shall contain two test point jack tips in the lead. A switch or equivalent shall connect the two test point jacks. The test point jacks shall provide access on the lead for a test probe.

3.2.2 SWITCH

A switch or equivalent shall be inserted into each lead in the cable. The device shall open or close the lead for monitoring the voltage or current ⁱⁿ is the associated cable lead. The contact resistance shall not exceed 0.05 ohms.

3.2.3 BOX RECEPTACLES

ONE OR Two box receptacles shall be part of the break out box to provide a connection between the airborne component connector and the associated adapter cable connector.

3.2.4 ADAPTER CABLES

The adapter cables shall be provided in sets, each cable being approximately four (4) feet long. The lead wire used in the Adapter Cables shall be either the same wire size or larger than the lead in the associated A/B cable, and the wire type ^{shall meet} shall be the G&N equivalent. The adapter cables shall be properly marked. These cables shall connect between the Breakout Box and the Airborne Component box ~~OR~~ AND THE connecting cable.

3.2.5 BREAKOUT BOX

The Breakout Box shall contain the test point jack tips and switching devices arranged and marked for easy identification. A set of Break-out Boxes shall be capable of testing all of the leads entering or

leaving an airborne component of the G&N System which accepts the Breakout Box Adapter connector. Since the airborne components have various types of connectors, and the quantity of pins have such a wide range a method shall be proposed which will require a minimum number of boxes and adapter cables to accomplish this task. The Breakout Box shall be constructed to provide the operator with adequate protection from the voltage on the leads under test.

3.2.6 WIRE TYPE - BREAKOUT BOX

All of the leads in the cables and breakout boxes shall be per Wire Specification ND ^{PNC}1002181, (Type 1), Class 4, white vinyl jacketed conductor insulation white, and various wire sizes.

3.2.7 CDU TEST POINT ADAPTER

A CDU Test Point Adapter shall provide monitor points for all signals in the CDU Test Connector when in Block II and LEM configurations. This adapter shall consist of test point jacks, a box receptacle and connecting cable. The test points will be for monitoring only and the cable shall be of sufficient length for convenient operation of the Adapter Box.

3.2.8 PROPOSED METHOD

The following is a proposed method for the Cable Breakout Assembly Adapter Set which may be used in Block I-Series 100, Block II and LEM system configurations. Each drawing for the configuration shall be keyed to indicate the breakout box and adapter cables which can be used for testing. Table I illustrates how the boxes may be utilized. The breakout boxes may be used in all three system configurations interchangeably. Some of the adapter cables may also be used interchangeably. This duplication of use will minimize the total number of boxes and adapter cable sets necessary for testing all three configurations. Table I is keyed in the same manner as the

referenced drawings. Three sizes of Breakout Boxes will be capable of testing all three configurations.

3.2.9 Signal Identification Tables

A Table shall be supplied with each Adapter Cable which will correlate the pin number with the associated Breakout Box Test Point number to facilitate signal identification.

TABLE I

A/B COMP.	BLOCK I SERIES 100		BLOCK II						LEM			
	CONN. DESG.	TYPE	PINS	B-B	CONN. DESG.	TYPE	PINS	B-B	CONN. DESG.	TYPE	PINS	B-B
1. IMU	56P2	MS3126F-18-32S	32	2	56P15	MD53-06E15-61S1	61	1	56P20	MD53-06E15-61S1	61	1
	56P3	MS3126F-18-32Y	32	2	56P16	MD53-06E15-61SN	61	1	56P21	MD53-06E15-61SN	61	1
	56P4	MS3126F-18-32X	32	2								
	56P5	MS3126F-18-32Z	32	2								
2. CDU	56J1	WSS10-108 V-000	108	2	56P9	MX114867 (Malco)	300	3	56P3	MX11467 (Malco)	300	3
	2	"	"	"								
	3	"	"	"								
	4	"	"	"								
	5	"	"	"								
3. AGC to PSA	56J21	DSM00-27-335-7021	91	2	56P10							
	J22	" " 33SW "	91	2								
	J23	" " 33SX "	91	2								
	J24	" " 33SY "	91	2								
4. PSA		See AGC			56P17	MX114859 (Malco) (connects to GSE adapter of "D" harness	304	3	56P2	MX114868 (Malco)	262	3
5. SXT SXT SCT RSVTRIMMOD	56P4	MR01-212S	12	2	56P3	346-18-85PW	85	1		N/R		
	P5	DSM07-21-30S	91	1								
	P8	DSM07-19-33S	61	1	56P23	DSM32084-18-33SX	33	2				
					P14	346-8-7S	7	2				
6. NAV. KYDB & DISP. PAN.	56J10	WSS108-S00-N00	108	1	56P25	DSM07-27-30S	30	2	05A3P1	DSM07-27-30S	30	2
					56P5	346-18-85PX (H Harness)	85	1	P229	346-18-85PX	85	1

TABLE I

A/B COMP.	BLOCK I SERIES 100		BLOCK II				LEM					
	CONN. DESG.	TYPE	PINS	B-B	CONN. DESG.	TYPE	PINS	B-B	CONN. DESG.	TYPE	PINS	B-B
7. Tracker	56P13	P/N 1010860-1	38	2								
8. Cont. Elect.	56P10	WSS-D-108-S08 BWO02	108	1								
9. D&C Elect.	56P1	WSS10-108-S00 BN	108	1								
10. (AOT) RET DIM. Ass'y									50P1	346-10-19P	19	2
11. Condition Annuncia- tor	15P1	P/N 101824-5-X	108	1								
12. G&N Cont. Pan	56J9	WSSD108S00 BWO00	108	1	56P24	346-18-85SY	85	1				

J2 Malco (6x7)

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J2 Malco (6x7)

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13. CDU TEST
Adapter

Summary: ~~Three (3) types of B/O boxes. 1 - 108 pin, 2 - 38 pin, 3 - 360 pin.~~

~~Block I Series 100 - 18 Adapter cables - Block II, 10 adapter cables - LEM, seven (7) adapter cables.~~



- TABLE I -
(Cont.)

¹⁰⁰ SUMMARY	<u>II</u> SUMMARY	SUMMARY
² 3 Types of B/O Boxes	3 Types of B/O Boxes	3 Types of B/O Boxes
1 - 108 Pin	1 - 108 Pin	1 - 108 Pin
2 - 38 Pin	2 - 38 Pin	2 - 38 Pin
3 - 360 Pin	3 - 360 Pin	3 - 360 Pin
¹⁶ 18 sets of Adapter Cables per Assembly Set	¹² 10 sets of Adapter Cables per Assembly Set	⁽⁴²⁾ 6 ⁷ sets of Adapter Cables per Assembly Set
8 mating Connectors	14 mating Connectors	⁽⁴²⁾ 8 mating Connectors.

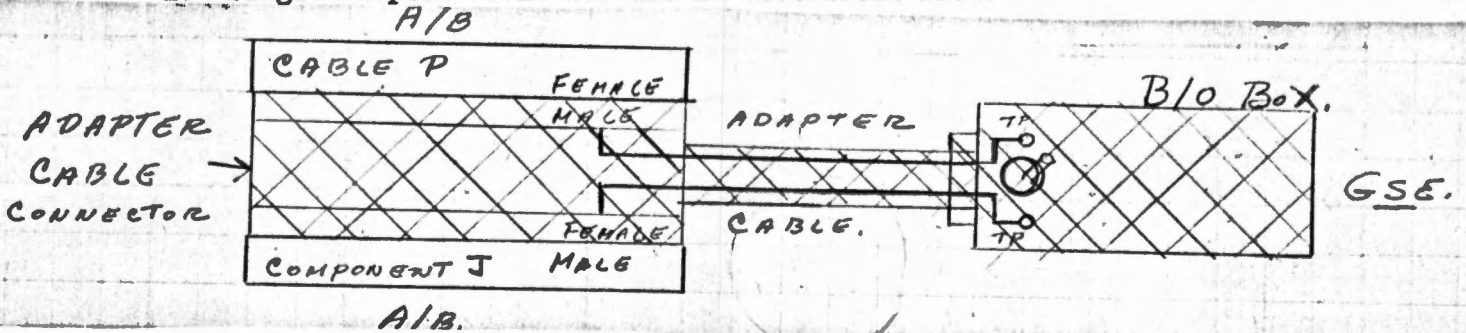
NOTE: The three (3) types of Breakout Boxes shall be in all three system configurations. The adapter cables for the IMU, CDU and NAV. DSKY panel between Block II and LEM are interchangeable.

The following components of Block II and LEM shall have adapter cables which will be interchangeable. IMU, CDU and NAV DSKY Panel.

<u>100</u>	<u>II</u>	<u>LEM</u>
NAA	NAA	GAEC
AMR	AMR	AMR
	AC-2	AC-2

PROPOSED METHOD

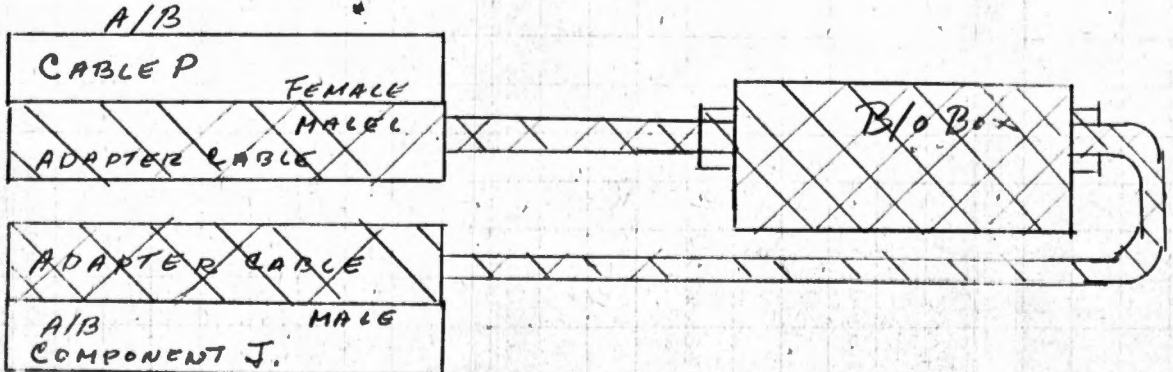
1. Single adapter cable for use in restricted area.



2. Adapter cable sets for use in areas where space is no problem.

2. ADAPTER CABLE SETS FOR USE IN AREAS WHERE

SPACE IS NO PROBLEM.



3. PROPOSED CDUTEST ADAPTER.

