MASTER

HONEYSUCKLE

OPERATIONS DIRECTIVE

for

NASA

M.S.F.N. OPERATIONS

21 June 1968

VOLUME 1

HOD

HONEYSUCKLE

OPERATIONS DIRECTIVE

MAY 1973

April 2025 publication note:

The HOD evolved over time, with the master copy continually being updated in Hamish Lindsay's Technical Support Section, and copies distributed around the station. For that reason, no "original" Apollo-era copies exist, though large sections survive in this last version (May/June 1973) of the manned space flight HOD. This scan combines pages from Hamish Lindsay's master copy and John Saxon's copy number 2 (Ops 1) for a complete version.

The HOD was scanned, and this PDF file assembled, by Colin Mackellar for **www.honeysucklecreek.net**,

INTERNAL MEMORANDUM **HONEYSUCKLE CREEK TRACKING STATION**

TO All Sections	YOUR FILE No
FROM TSS	OUR FILE No. 5/6/0/12/5
Copies	Date 26th June, 1973.

SUBJECT

H.O.D. INDEX PAGES

Following a review of the H.O.D., the contents of all copies should conform to the attached index pages.
All personnel responsible for the H.O.D. should :

1) Remove all the present index pages and replace with those supplied with this memo.

2) Check that the contents comply with the new index.

3) If there is a discrepancy, notify TSS who will supply missing or updated copies of any section.

H. LINDSAY,
TSS SUPERVISOR.

PREFACE

1. The Honeysuckle Operations Directive (HOD) supplements the basic STDN documents by clarifying, enlarging, and abstracting as appropriate to this Station.

2. The change mechanism for the HOD is as follows:

   i. OMP completed by originator.

   ii. Section Ops. Contact Comments.

   iii. OPS Comments.

   iv. STADIR Comments.

   v. If not approved, OMP will be returned to originator with reasons.

   vi. If approved, TSS will complete the bottom part of the OMP (distribution, index and incorporation details).

   vii. TSS generates draft change sheets (if not submitted with OMP).

   viii. OPS sign off draft.

   ix. TSS prepare change pages, attaching a copy of the OMP to each up-date copy.

   x. TSS issue up-dates to Section Supervisors for incorporation, the bottom lines of the OMP providing Index change and incorporation details.

3. TSS will keep a master record of Section, Issue, and Change numbers.

4. HOD Sections will only be issued to applicable areas or copies. The index to each part will indicate distribution. An 'X' in the 'DIST' column indicates that all holders in that area have been issued with that Section. An 'R' indicates restricted distribution within the relevant area (actual distribution will be per the HOD Section distribution entry).

5. To ensure rapid change action:

   i. HOD draft changes should be as complete as possible. Hand-written marked up pages, suitable for direct copying and distribution, will be the normal mode of 'change' incorporation.

   ii. Neatly hand-written submissions of complete sections (on HOD format blanks from TSS) are encouraged. Originators should not allocate change, issue and section numbers.

   iii. To keep the physical size of the book to a minimum:

      a) Full use must be made of the space on page 1 (including diagrams and tables).

      b) Typing should be single space as far as possible.

HOD DISTRIBUTION

MASTER COPY	---	T.S.S.
COPY No. 2	---	OPS 1
COPY No. 3	---	OPS 2
COPY No. 4	---	USB 1
COPY No. 5	---	USB RECEIVERS
COPY No. 6	---	SERVO
COPY No. 7	---	TRACKING
COPY No. 8	---	SDDS
COPY No. 9	---	TELTRAC
COPY No. 10	---	COMMAND VAN
COPY No. 11	---	PAM
COPY No. 12	---	RECORDERS
COPY No. 13	---	DATA TLM
COPY No. 14	---	PCM
COPY No. 15	---	COMPUTERS
COPY No. 16	---	CMD/TLM 1218
COPY No. 17	---	COMMS
COPY No. 18	---	WIRE TECH

S-06 H.O.D. INDEX - SECTION 1

GENERAL			DISTRIBUTION				
SEC	TITLE	ACTION	USB	TLM	COMP	COMMS	OPS.
1.1							
1.2							
1.3							
1.4							
1.5							
1.6							
1.7	INTERCOMM PROCEDURES	COMMS	X	X	X	X	X
1.8							
1.9	URGENT OPERATIONAL DOCUMENT UPDATING	TSS	X	X	X	X	X
1.10	STATION PREPASS CHECKLISTS & PROFORMAS	TSS	X	X	X	X	X
1.11							
1.12							
1.13							
1.14							
1.15	HSK, DSS 42, ACSW COMMS CONFIG	COMMS				X	X ACSW

TITLE: INTERCOM PROCEDURES SKYLAB	SEC. No: 1.7
REFS: NIL	ISS.No: 3
DIST: ALL	DATE: 22 MAY'73

CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REF:										
PAGES:										

ORIGINATOR: B. SMITH APPROVED: I.F. GRANT

1. INTERNAL LOOP USAGE

(a). 'A' loop will be used for all OPS traffics between OPS and Section Supervisors. All personnel are expected to have an 'A' monitor up at all times.

(b). 'B' loop will be used for traffic between Section Supervisors.

(c). 'C' loop will be used for Comms - Comtech coordination during pass time and for ADDT and Playback activities involving DATA, RSDP, COMPUTERS and COMMS during Post Pass Time.

(d). 'D' loop is the internal section loop for USB, CMD VAN and ACQ AID.

(e). 'F' loop is the internal section loop for DATA and RSDP sections.

(f). Loop designations are not required between personnel within a section on the internal section loop.

2. EXTERNAL LOOP USAGE

(a). Supervisors will ensure that Net 2 (Network conference/Playback conf) is monitored within their section.

(b). Ops will normally endeavour to call Supervisors to monitor relevant external Net Traffic, providing this does not involve talking over such traffic.

(c). After relevant traffic is complete, Section Supervisor (or back-up) will respond with "(section) copies".

(d). All 'A' loop traffic will normally cease when HSK is called by MCC or Ops is talking on Net 2, with the exception of important inputs relative to the subject being discussed on Net 2.

3. LOOP COVERING

(a). Supervisors will ensure all loops available within their sections are monitored.

(b). Back-up covers should:

i) Call "Standby" or "Will call back" if a Supervisor cannot immediately answer a call.

ii) Call "(Section) Copies" when relevant traffic has been monitored and Supervisor is unable to respond.

iii) Draw Supervisors' attention to relevant traffic on a loop, or log such traffic depending on its applicability/priority.

4. POSITION TITLES

Position titles shall be designated in SRT intercom chart with the following exceptions.

(a). Call sign to either Ops 1 or Ops 2 positions will be "Ops" during pass time.

(b). During Post Pass activity when the Computer Supervisor operates at the IOCC, his call sign will be "computers".

The call sign for the position in the computer area will "RSDP". The OPSR will retain the call sign "Ops".

TITLE: URGENT OPERATIONAL DOCUMENT UPDATING										SEC. No: 1.9
REFS: --										ISS.No: 1
DIST: ALL										DATE: 5 June '73
CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REF:										
PAGES:										
ORIGINATOR: H. LINDSAY						APPROVED: I. F. GRANT				

SUBJECT : URGENT OPERATIONAL DOCUMENT UPDATING

1. Under certain circumstances it may be necessary to update urgent mission documents, before a network committment, or in the absence of T.S.S. staff over a weekend.

The following procedures are formulated to assist personnel assigned to the task.

2. The duty OPSR will decide if a DCN is urgently required to be entered in the MASTER and distributed, and nominate an operator to carry out the task.

3. The assigned operator will be under the direction of the duty OPSR and refer any queries to him.

4. Implementation of DCN's are in two phases :-

(a) Entering DCN's in Master (Ops) copy.

(b) Copying and distribution.

4.1 Entering DCN's in MASTER copy :

4.1.1 Upon receipt of a DCN on station, Ops enter the details, distribution and applicability in the DCN Station page in the front of the document affected.

4.1.2 The BLACK copy of the DCN (obtained from COMMS) is then used to enter the DCN into the text either by hand using only a BLACK fibre-tipped pen, or ballpoint.

The original twx copy is also used where possible by cutting up and glueing into the pages.

4.1.3 Where additional pages have to be added they must have the page titled as the other pages are, and an "A" added to the page number that is being updated . If an alpha numerical number has already been allocated, the next alphabetical letter should be used. e.g., if a page has been numbered 113A either in a printed change or a previous DCN, the new page would be numbered 113B.

4.1.4. Refer any queries to the duty OPSR if the T.S.S. Supervisor is not on site.

5.1 Copying and Distribution :

5.1.1 The distribution of the document is obtained from the Kardex file and this determines the total no. of copies required. In the case of the NOSP 601/SKYLAB distribution is as follows :-

M.(1)	OPS 2
2.	DSD
3.	USB
4.	TLM
5.	COMPUTERS
6.	COMMS

5.1.2 Next, the individual page distribution is determined from the DCN status page, see appendix 1.

5.1.3 Copying must be done on the Bruning 2000 in T.S.S. using American Quarto white paper.

5.1.4 Each set of updates should be then sorted through to place the holes margin on the left, before punching the three holes in with the standard small hole punch, set for the white binder post spacing.

5.1.5 Each set of updates is then marked with the copy no. and section, before distribution.

TITLE: STATION PREPASS CHECKLISTS AND PROFORMAS										SEC. No: 1.10
REFS: N/A										ISS.No: 1
DIST: ALL										DATE: 25 June'73
CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:	25JUN73									
REF:	—									
PAGES:	1,4,5,6									
ORIGINATOR: H. LINDSAY					APPROVED: I.F. GRANT					

1. All the blank forms generated and used by the station have been collected and combined into a system which is designed to be as simple as possible but still retain some control over updating and production.

2. Master or original forms have been produced by T.S.S. and allocated sequential numbers, which simplifies identifying, filing, and locating a form.

. The masters are kept filed in an unlocked standard 3 drawer filing cabinet next to the Remington copying machine. The top drawer has all the masters filed in section and numerical order.

3. FORMAT

All these forms follow a standard format giving all the information necessary.

Form ID and Title : This is on the top left of the form.

Date : Day form was completed in local time.

Initial Rev. Nr. : This identifies the first orbit number seen by the station in a group of passes. Some forms have up to eight columns to cover each individual pass of the day. Some forms have one column as a check is sufficient before a group of passes.

Form Update Status : At the bottom right corner a "Year Julian Day" number identifies the latest revision of the form.

4. Copies of these forms will be held in each section, while station forms (applicable to all station personnel) will be held in pigeon holes in the passage way located between Test Equipment and the clean workshop.

5. This memo does not apply to GSFC forms, which for the present will still be issued by Logistics.

6. A list of all the station forms currently held in T.S.S. follows in the attachment.

STATION PROFORMAS

FORM #	SUBJECT	ISSUE DATE
S-01	EMP	73074
S-02	ETP	73074
S-03	ETR	73074
S-04	SP	73074
S-05	H.O.D. - OMP	73074
S-06	H.O.D. - Index	73074
S-07	H.O.D. - Page 1	73074
S-08	H.O.D. - Follow Up	73074
S-09	H.O.D. - Graph	73074
S-10	H.O.D. - Comms	73074

TELEMETRY PROFORMAS

FORM #	SUBJECT	ISSUE DATE
T-01.1	PCM AREA CHECKLIST	73138
T-01.2	PCM AREA CHECKLIST	73138
T-01.3	PCM AREA CHECKLIST	73138
T-02	RECORDERS CHECKLIST	73138
T-03	MICRODYNE 2200 DUAL RECEIVER CHECKLIST	73131
T-04	MICRODYNE 3300 DIVERSITY COMBINER CHECKLIST	73131
T-05	VITRO DCA 5100A DIVERSITY COMBINER CHECKLIST	73131
T-06	VITRO 2074 DUAL RECEIVER CHECKLIST	73131
T-07	VITRO 1071 DUAL RECEIVER CHECKLIST	73131
T-08	VHF TLM RECEIVER CHECKLIST	73131
T-09.1	TVC PREPASS CHECKLIST	73135
T-09.2	TVC POSTPASS CHECKLIST	73143
T-10.1	VIDEO CHECKLIST	73142
T-10.2	VIDEO CHECKLIST	73142
T-10.3	VIDEO CHECKLIST	73142
T-10.4	VIDEO CHECKLIST	73142
T-11.1	FM TLM CHECKLIST	73143
T-11.2	FM TLM CHECKLIST	73143
T-11.3	FM TLM CHECKLIST	73143
T-12	TLM CONFIGURATION	73149

OPERATIONS PROFORMAS

FORM #	SUBJECT	ISSUE DATE
0-01	Schedule Input	73074
0-02	Schedule Requests Ops Log	73074
0-03.1	Monthly Report (Ops Activity General)	73074
0-03.2	Monthly Report (ALSEP/P&FS Support Summary)	73074
0-03.3	Monthly Report (ERTS -A Support Summary)	73074
0-03.4	SKYLAB Support Summary	73155
0-03.5	PIONEER Support Summary	73155
0-04		
0-05	SRT Status	73074
0-06	Problem Report	73074
0-07	P&FS PSRM	73074
0-08	ALSEP PSRM	73074
0-09	SKYLAB RIC	73093
0-10	SKYLAB S/C Anomaly Report	73093
0-11	ESR Log	73093
0-12	Acq. Data Request	73074
0-13	Doc Update Status	73074
0-14		
0-15.1	NIMBUS Passum - 1	73074
0-15.2	NIMBUS Passum - 2	73074
0-16.1	ERTS Passum - 1	73074
0-16.2	ERTS Passum - 2	73074
0-17	Initial ESR	73074
0-18	Updated ESR	73074

OPERATIONS PROFORMAS (Cont...)

FORM #	SUBJECT	ISSUE DATE
0-19	Final ESR	73074
0-20	Planning Guide	73074
0-21.1	SKYLAB Passum - 1	73093
0-21.2	SKYLAB Passum - 2	73093
0-22	PIONEER Passum	73128
0-23	Video Activity Report	73155
0-24	ADDT P/B Report	73155

COMPUTERS PROFORMAS

FORM #	SUBJECT	ISSUE DATE
R-01.1	ALSEP/P&FS CHECKLIST	73151
R-01.2	ALSEP/P&FS CHECKLIST	73151
R-02.1	ERTS CHECKLIST	73151
R-02.2	ERTS CHECKLIST	73151
R-03.1	SKYLAB CHECKLIST	73163
R-03.2	SKYLAB CHECKLIST	73163
R-03.3	SKYLAB CHECKLIST	73163
R-03.4	SKYLAB CHECKLIST	73163
R-03.5	SKYLAB CHECKLIST	73163
R-03.6	SKYLAB CHECKLIST	73163
R-03.7	SKYLAB CHECKLIST	73163
R-03.8	SKYLAB CHECKLIST	73163
R-04	642B SKYLAB CHECKLIST	73138
R-05	DAPP 1218 CHECKLIST for SKYLAB, ERTS, TELESAT, PIONEER PROGRAM, ACQUIZ.	73138

COMMS PROFORMAS

FORM #	SUBJECT	ISSUE DATE
C-01	SKYLAB CHECKLIST	73135

LOGISTICS PROFORMAS

FORM #	SUBJECT	ISSUE DATE
L-01	TRANSACTION REPORT $4	73074
L-02	TRANSACTION REPORT $9	73074
L-03	FOLLOW ON PARTS REQUEST FORM	73074
L-04	EC,EI MATERIAL TURN-IN	73074
L-05	FAILURE REPORT EQUIPMENT ADVICE	73074
L-06	STORES SURVEY REPORT	73074

USB PROFORMAS

FORM #	SUBJECT	ISSUE DATE
U-01.1	SKYLAB PREPASS CHECKLIST	73131
U-01.2	SKYLAB PREPASS CHECKLIST	73130
U-01.3	SKYLAB PREPASS CHECKLIST	73130
U-01.4	SKYLAB PREPASS CHECKLIST	73130
U-01.5	SKYLAB PREPASS CHECKLIST	73130
U-01.6	SKYLAB PREPASS CHECKLIST	73130
U-01.7	SKYLAB PREPASS CHECKLIST	73131
U-02.1	SKYLAB PREPASS CHECKLIST RE1/RE2	73134
U-02.2	SKYLAB PREPASS CHECKLIST RE1/RE2	73134
U-02.3	SKYLAB PREPASS CHECKLIST RE1/RE2	73134
U-02.4	SKYLAB PREPASS CHECKLIST RE1/RE2	73134
U-03.1	SKYLAB USB/SERVO PREPASS CHECKLIST	73131
U-03.2	SKYLAB USB/SERVO PREPASS CHECKLIST	73131
U-04		
U-05	SKYLAB/ANTENNA/SERVO DAILY CHECKLIST	73131
U-06	SKYLAB/ANTENNA DAILY CHECKLIST	73131
U-07.1	SKYLAB UHF COMMAND PREPASS CHECKLIST	73131
U-07.2	SKYLAB UHF COMMAND PREPASS CHECKLIST	73131
U-08.1	SKYLAB/RE1/RE2 INTERPASS CHECKLIST	73131
U-08.2	SKYLAB/RE1/RE2 INTERPASS CHECKLIST	73131
U-09	SKYLAB TRACKING INTERPASS CHECKLIST	73131
U-10	SKYLAB SERVO/INTERPASS CHECKLIST	73131
U-11	SKYLAB COMTECH/INTERPASS CHECKLIST	73131
U-12	SKYLAB/TRANSMITTER INTERPASS CHECKLIST	73131
U-13	TLM CONFIGURATION	73135

USB PROFORMAS (Cont..)

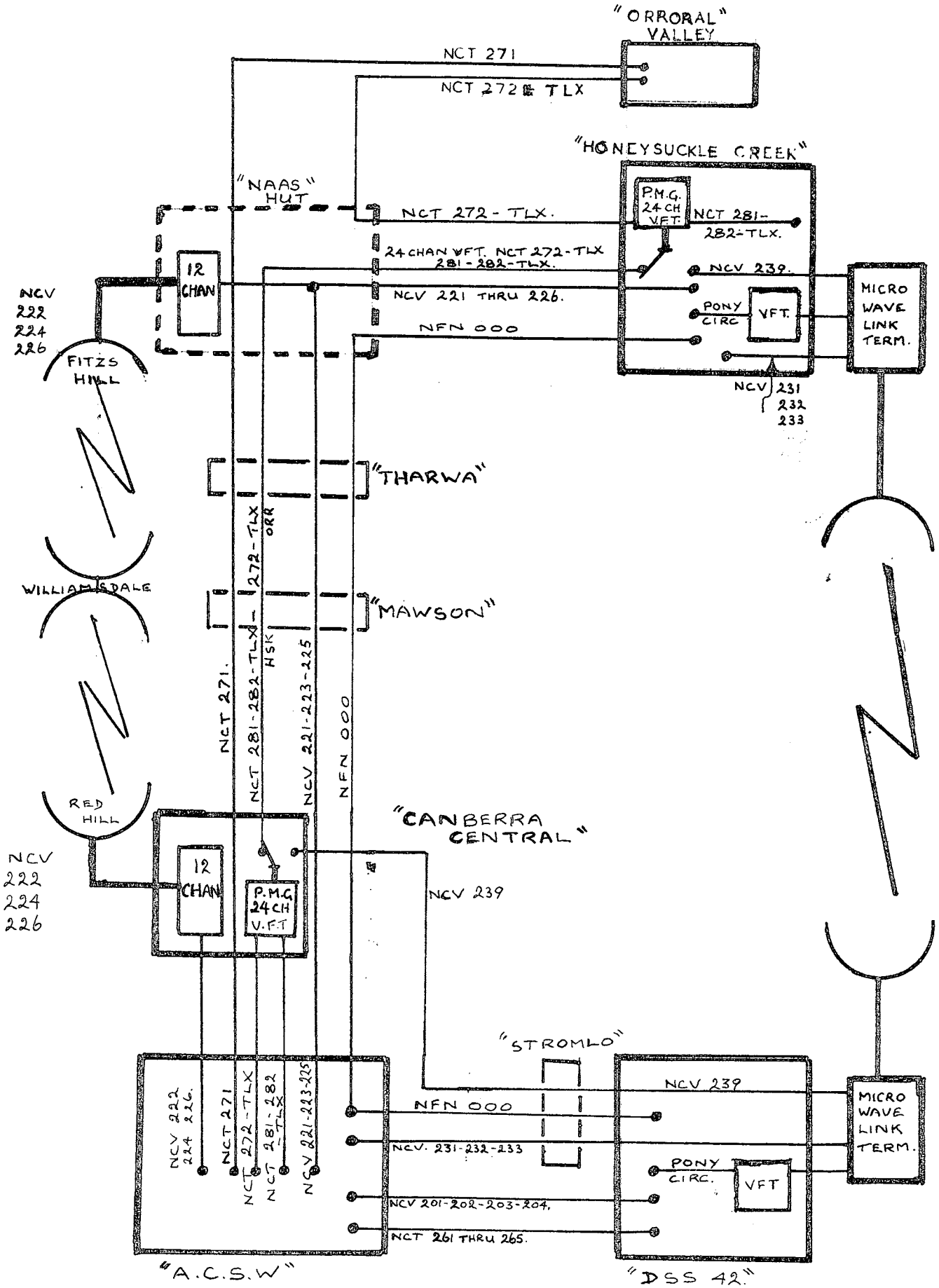
FORM #	SUBJECT	ISSUE DATE
U-14.1	CMD VAN CONSOLE SKYLAB PREPASS CHECKLIST	73138
U-14.2	CMD VAN CONSOLE SKYLAB PREPASS CHECKLIST	73138
U-14.3	CMD VAN CONSOLE SKYLAB PREPASS CHECKLIST	73138

TITLE: HSK, DSS.42, ACSW COMMS CONFIGURATION	SEC. No: 1.15
REFS: (FITZ HILL - WILLIAMSDALE - RED HILL)	ISS.No: 5
DIST: SB 1, COMMS, OPS, ACSW	DATE: 26 MAR'73

CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REF:										
PAGES:										

ORIGINATOR: M. GEASLEY APPROVED: I.F. GRANT

CIRCUIT	ROUTE	DATA CARRIED	PRIORITY	M/W LINK VOICE CHANNEL
NCV 201,202,203, 204	ACSW - Stromlo - DSS 42	"DSN" Voice/Data Lines.		
221,223,225	ACSW - Mawson - Tharwa-NAAS-HSK	HSK Voice/Data lines (Nets 1,7,8).	Prime Route	
222,224,226	ACSW - Central - NAAS - HSK	HSK Voice/Data lines (Nets 2,4,&6). PMG 12 ch carrier.	Prime Route	
231,232,233,	ACSW - Stromlo - DSS 42-M/W-HSK	HSK Voice/Data lines (backup).	Backup Route	NCV 231= Ch 11 NCV 232= Ch 12 NCV 233= Ch 15
239	ACSW-Stromlo-DSS 42 -M/W Link - HSK	Alternate routing of PMG 24 ch VFT for HSK/ ORR TTY & TLX. (On PMG Auto Patch Sys).	Backup Route	Ch 13
NCT 261,262,263 264,265	ACSW - Stromlo - DSS 42	"DSN" TTY lines.		
271	ACSW-Barton-Central Mawson-Tharwa-NAAS-ORR	Orroral TTY line	Prime Route	
272	ACSW-Central(VFT)- ACSW-Mawson-Tharwa- NAAS-HSK(VFT Term 1) -NAAS-ORR.	Orroral TTY line		
281,282	ACSW-VFT Term 1 -HSK	HSK TTY lines		
NFN 000	HSK-NAAS-Tharwa- Mawson-ACSW-Stromlo- -DSS 42.	National Fault Net.		


"ORRORAL" VALLEY
NCT 271
NCT 272 TLX
"HONEYSUCKLE CREEK"
"NAAS" HUT
P.M.G. 24 CH VFT
NCT 281-282-TLX.
NCT 272 - TLX.
24 CHAN VFT. NCT 272-TLX 281-282-TLX.
NCV 239.
12 CHAN
NCV 221 THRU 226.
PONY CIRC
VFT.
MICRO WAVE LINK TERM.
NCV 222 224 226
FITZS HILL
NFN 000
NCV 231 232 233
"THARWA"
WILLIAMSDALE
"MAWSON"
NCT 271.
NCT 281-282-TLX
272-TLX ORR
HSK
NCV 221-223-225
NFN 000
RED HILL
"CANBERRA CENTRAL"
NCV 222 224 226
12 CHAN
P.M.G. 24 CH V.F.T
NCV 239
"STROMLO"
NCV 239
NFN 000
NCV. 231-232-233
PONY CIRC.
VFT
MICRO WAVE LINK TERM.
NCV 201-202-203-204.
NCT 261 THRU 265.
NCV 222 224 226.
NCT 271
NCT 272-TLX
NCT 281-282-TLX
NCV 221-223-225
"A.C.S.W"
"DSS 42"

STATION READINESS TEST (SRT)

SEC	TITLE	ACTION	DISTRIBUTION				
			USB	TLM	COMP	COMMS	OPS.
2.1	SRT PHASE 1 - INTERCOMM	OPS	X	X	X	X	X
2.2	USB PIONEER COUNTDOWN	USB	X				X
2.3	A/G SDDS, COMMS LEVEL TEST	COMMS	X			X	X
2.4	VIDEO SYSTEM CHECKOUT PROCEDURE	TLM		X			X
2.5	SRT BAR CHART	OPS	X	X	X	X	X
2.6	VHF AGC CALIBRATION	USB	X	X			X
2.7	VHF MICRODYNE COMBINER LAMP TEST	USB	X				X
2.8							
2.9	DOWNLINK TESTS - SIMULATION SYSTEM	OPS	X	X	X	X	X
2.10							
2.11							
2.12							
2.13							
2.14	SRT UPLINK MOD INDEX & AGC CHECKS	USB	X				X
2.15	ANGLE CHANNEL CALIBRATION REQUIREMENTS	USB	X				X
2.16							
2.17	PHASE 2 TRACKING DATA TESTS	USB	X	X	X	X	X
2.18							
2.19							
2.20	ANTENNA/TRANSMITTER TESTS	USB	X				X

TITLE: CRT – PHASE 1	SEC.No: 2.1
REFS:	ISS.No: 9
DIST: ALL	DATE: 24 Sept 70

CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:	27. Nov 70	31 JAN 71	3 JUN 71	5 JULY 71	24 FEB 72	4 DEC 72	8 DEC 72	23 MAR 73	14 MAY 73	
REF:	OMP 495	OMP 536	OMP 544	OMP 557	OMP 599	OMP 694	OMP 699	OMP 703	OMP 706	
PAGES:	NEW PAGE 3	NEW PAGE 3	NEW PAGE 3	NEW PAGE 3	NEW PAGE 3	NEW PAGE 3	NEW PAGE 3	P 3	P 3.	

ORIGINATOR: J. SAXON APPROVED:

1. This section covers the testing of all intercomm loops except A/G. A/G loop testing is covered in section 2.2.

2. Prior to commencing Phase 1, Ops 1 will poll all Supervisors as to which positions are not manned. Comms will note these positions and if possible arrange to test them during Phase 2.

3. (Use intercomm facilities chart page 3 for tests). Annotation loop testing will be per para 13.

4. If Ops 3 position cannot be checked during Phase 1, OPS and COMMS will check at a convenient time.

5. All positions will keep all loop monitor keys depressed at all times, except during cross talk checks (see 6.3 below). After each loop is tested, release the talk/listen key of that loop.

6. A long count will be made on Alpha loop and all positions will check their talk/listen and monitor keys as follows :-

6.1 Ensure all monitors are selected.

6.2 Check monitor volume control.

6.3 Release monitor key of loop being checked and listen for cross talk.

6.4 Press talk.listen key of loop being checked.

6.5 Check headset level control.

6.6 Press monitor key of loop being checked.

6.7 Observe that all indications are normal.

6.8 Report status on loop being checked, as follows :-

(a) If a position reads Test Conductor 5/5 and all indications are normal, report "_____" (_____ = position title) e.g. "SB 1" "RE 2" etc.

(b) If a defect is noticed, respond with "RE 1 DEFECT" to ensure continuity of response for the sequence being tested, log the defect and report same to Comms. on Bravo loop at the completion of Phase 1

7. A short count will be made on other specified loops using procedures in sub-paragraph 6, but deleting items 6.2 and 6.5.

8. Positions with monitor only keys will check them per procedures in sub-paragraph 6, but deleting items 6.2, 6.4 and 6.5. Responses will be made on ALPHA loop.

9. Before Phase 1, COMMS will terminate the transmit and in-house receive side of Goss Conf, Net 2 and Net 3. The Nets will remain terminated throughout Phase 1. Wiretech 1 will answer incoming Scama calls during Phase 1, and postpone the call unless it is urgent.

10. When testing Goss Conf, Net 2 and Net 3, Wiretech 1 will use a monitor speaker on the transmit leg of the relevant Net bridge to ensure the bridges are working correctly.

11. Wiretech 1 will activate 112A conference key at all times.

12. Testing sequences will normally be A thru H, Goss, 2,3, 7/VEF, annotation.

13. Annotation loop testing.

A) Recorders configure as per HOD section 5.15 Figure 5.

B) Following the order in Sect 1.4 each position will identify himself and give a long count and wait a "GO" from recorders.

EXAMPLE.

This is RE 2 annotation test, One, Two, Three, Four ....Ten, nine, eight ..... two, one test out.

C) If level tests are unacceptable to recorders then a rerun will be made until levels are adjusted.

D) It is imperative that microphones are adjusted close to the mouth to ensure good annotation levels.

E) Bravo loop will be used for co-ordination.

NOTE :

The timing track made at this time on the data recorder will be used for the Time Tag Translator test. Sect 2.29.

POS #	POSITION TITLE	ALPHA	BRAVO	CHARLIE	DELTA	FOXTROT	NET 1	NET 2	NET 3	GSFC	CHN 3	CHN 4	CHN 5
26	STADIR	X	\	\	\	\	\	X	\		\		\
1	OPS 1	X	X	X	X	X	X	X	X	X	X	X	X
2	OPS 2	X	X	X	X	X	X	X	X	X	X	X	X
22	(OPS 3)	X	X	X			\	X	X				
12	COMMS	X	X	X	X	X	X	X	X	X	X	X	X
11	WIRE TECH	X	X	X	X	X	X	X	X	X	X	X	X
13	(MCCC'S)	X		X			X	X	X	X			
5	COMPUTERS	X	X	X		X	\	X	X	X			
9	RSDP	X	X	X		X	\	X	X				
8	1218	X	X	X	X	X		\	\				
32	DATA	X	X	X	X	X	\	X	X	X			
3	DECOM 1	X	X	X		X		\	\				
27	DECOM 2	X	X	X		X	\	\	X				
29	TVC	X	X	X		X	\	\	X				
28	VIDEO	X	X	X		X	\	X	X				
7	RECORDER 1	X	X	X		X	\	\					
6	RECORDER 2	X	X	X		X	\	\					
33	RECORDER 3	X	X	X	X	X	\	X	X				
25	USB	X	X	\	X		\	X	X	X	X		
14	RE 1	X	X	/	X		\	\	\				
15	RE 2	X	X	\	X		\	\					
16	RE 3	X			X						X	X	X
20	RE 4				X						X	X	X
21	SERVO	X	X		X			\	\		X	X	X
18	SLES	X	X	X	X		\	\	\				
31	COMM TECH	X	X	X	X		X	X	X	X			

POS #	POSITION TITLE	ALPHA	BRAVO	CHARLIE	DELTA	FOXTROT	NET 1	NET 2	NET 3	GSFC	CHN 3	CHN 4	CHN 5
23	TRACKING	X	X		X			\	\		X	X	X
19	VHF	X	X		X	X		\					
30	ACQ AID	X	X		X			\	\				
34	CMD VAN	X	X	X	X	X		\	\				
17	SYS MON	X	X		X								
10	(MICROWAVE)				X						X	X	
24	SRT/SIM	X	X	X		X	\	X	X				
36	PAO/DSD	X	X	\			\	X	X	\			

NOTES:
1. LEGEND / = TALK/LISTEN \ = MONITOR
( ) Potential Operational Positions.
2. OPS 1, OPS 2, COMMS, WIRETECH 1, SERVO 1 & SRT/SIM ALSO HAVE PACING FACILITY.

TITLE: PIONEER COUNTDOWN (USB)										SEC. No: 2.2
REFS:										ISS.No: 1
DIST:										DATE: 7 Aug'73
CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REF:										
PAGES:										
ORIGINATOR: T. JURD						APPROVED:				

PIONEER COUNTDOWN. DAILY

1. Check and record system temperature for T.W.M.

1a. Check correct tracking predicts available. Load APP and check APP/ANT drive.

1b. Check system monitor loaded and ready for pass.

2. Conduct normal servo and power amplifier system checks.

3. Check timing standards sync. and HSK/DSS 44 clock sync.

3a. Perform A.G.C. Calibration at 5 points in 2 Db steps. Centre point will be P.S.L. (predicted signal level, obtained from DSS 44 OPS).

4. At DSS 44 request repeat the points on the A.G.C. calibration using MGC control. Begin at highest point.

4a. Configure and calibrate systems monitor recorder.

No. DSS 660 per PIONEER NOSP. 4.3.4.5.

5. Set up command carrier suppression to 2.9 Db. (0.72 v from Bessel table). N.B. ensure that receivers are in NARROW loop bandwidth for above. Provide a command turnaround to DSS 44.

6. Set up downlink carrier suppression to 8 Dbs (0.399 v from Bessel table).
For telemetry signal to noise check -

a) Ascertain bit rate and required S.N.R. from DSS 44.

b) From Y factor charts determine the attenuation required for the relevant bit rate.

c) With T.W.M. sleected and antenna at zenith use the Y factor detector and chart recorder to establish a reference noise level from receiver 3 or 4. (ensure no test signals are on).

d) Now add the attenuation determined from step b) to the

precision attenuator setting and inject a signal from the test IX. Adjust the test IX attenuator to obtain the same reference level as in step c) and lock receiver.

e) Select PM modulation on the test IX and decrease the signal level by "VALUE OF EXTRA PAD" + "GAIN FACTOR IN DB". Obtained from Y factor chart. The required S.N.R. is now set.
eg. for an S.N.R. of 3.3 Db at 64 Bits/Sec.
Step b) would give an attenuation of 4.14Db and for step e) the signal would be reduced by 20.00Db.
Alternatively, DSS 44 will check the S.N.R. on initial acquisition of the spacecraft.

WEEKLY COUNTDOWN

The countdown at the beginning of each week of tracking will include all of the above plus a check on the T.W.M. gain and bandwidth.

TITLE: VIDEO SYSTEM CHECKOUT PROCEEDURE.	SEC. No: 2.4
REFS: N.O.S.P. 601/AS-512. Sect 25.	ISS.No:
DIST:	DATE:

CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REF:										
PAGES:										

ORIGINATOR: E. G. WAY. APPROVED: I. F. GRANT

THIS section details the proceedure to be used for system checkout prior to S.R.T. Phase 3.

1. Configure as per N.O.S.P. Fig 25.1, with type LPTP-75 Looping plugs in the following positions on the Video Patch Panel:-
   A - B 1,2,3,4,11,16. C - D 1-10 (incl)
   E - F 1,3,5-9, 10,11,12,17,18. G - H 1,3,4,8or9,12,19,20.
   Install 6inch Video patch cords in E19 to D17, E20 to D18, F10 to G8orG9, other positions of thr patch panel are filled with type LP-75 looping plugs.
2. Select T.P.G. on all VS6A switchers, O/P Select and Preview Channel B.
3. Connect external Tek 547 Oscilloscope to A11 using 10:1 probe. Select each T.P.G. and check for 1 Vpp, zero tilt and flat frequency response.
4. Check all Waveform Monitors for Vertical calibration and correct presentation.
5. Place probe at test points on C2-5, C7-10, and by selecting required T.P.G. with T.P.G. select Switch, check Matrix outputs for 1 Vpp, zero tilt and flat frequency response.
6. Select Stairstep on Output Selector. With probe at E17 and E18, check DA's 3 and 4 for 1 Vpp. Adjust DA. if Necessary. Check with other T.P.G's for correct operation, HP191A Waveform Monitor Should agree with Tek 547.
7. With Multiburst selected on Output Selector, Patch E19 to F19 and E20 to F20. If the Multiburst amplitudes change, then the TELCO lines are not terminated properly.
8. For expected downlink mode, refer to following table:-

EXPECTED DOWNLINK	DA-7 OUTPUT (A4)	MATRIX OUTPUT 1.and 6. (test point C1, C6.)
CSM-04	1.75 Vpp	1.5 Vpp
LM-10	1.3 "	1.3 "
LCRU-03	1.7 "	1.3 "
LCRU-04	1.7 "	1.3 "

   Select DA-7 on Input Selector Switch and adjust Matrix 1 & 6 to the required level. The output of DA's 1 & 2 are set to 1 Vpp into the Prime and Back-up Proc. Amp.
9. Select Prime and Back-up on Output selector Switch and check Proc. Amps for the following:-

Sync Amplitude	40 IRE Units.
Set Up	10 IRE Units
White Clipper	110 IRE Units
Video level	100 IRE Units

10. Set SYNC LOCK switch on Grass Valley Sync Generator to ON. Verify that VITs are correctly inserted on both fields of line 16, using HP191A Waveform monitor. Check that line 17 contains colour bar video.
11. Check all operations area picture monitors and selector switchers for correct presentation and operation.
12. Check all closed circuit TV cameras for correct adjustment.

RECORDERS.

1. Load VR1100 with the Video Head Alignment Tape. Check guide height and tip penetration. Remove tape.
2. Load all recorders with scratch tape and select multiburst on output selector and T.P.G. selector.
3. Wiretech insert -18dbm into "MISC RELAY IN " for VR660. Check for + 3dbm at Audio Patch panel. Select and test recorder annotation.
4. Patch timing into AUDIO 2 inputs to all recorders.
5. Adjust audio levels 1 & 2 on all recorders for 0 VU (or 100%)
6. Record Multiburst, tone and timing for five minutes, then rewind & replay noting the following.

   VR1100. Minimum video banding, flat frequency response and 1 Vpp output. Configure replay through Secondary Processing System by selecting input B on Proc. amp. 2.,and B/U on Output selector. Check both Audio tracks for satisfactory reproduction.

   VR660. Servo stability, Flat freq. response and 1 Vpp output. Configure replay through Primary proc. system. VTR 1 configured by selecting input B on Prime path. VTR 3 by patching A16 to F4 in addition to selecting Prime input B.
7. Request Wiretech to remove tone from NET 1. Video and configure normally.
8. Remove scratch tapes, and load recorders with new degaussed tapes for pass support.

TITLE: SRT BARCHART									SEC. No: 2.5	
REFS: STDN 401.1									ISS.No: 12	
DIST: ALL									DATE: 25 June '73	
CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:	30JUL73									
REF:	OMP 722									
PAGES:	1,5,6									
ORIGINATOR: B. SMITH					APPROVED:					

This section provides the following SRT barcharts.

1. SKYLAB MANNED - To be used during normal Skylab.

2. SKYLAB UNMANNED (No Overtime) - To be used during unmanned Skylab when SRT falls within time station is manned by operations shift.

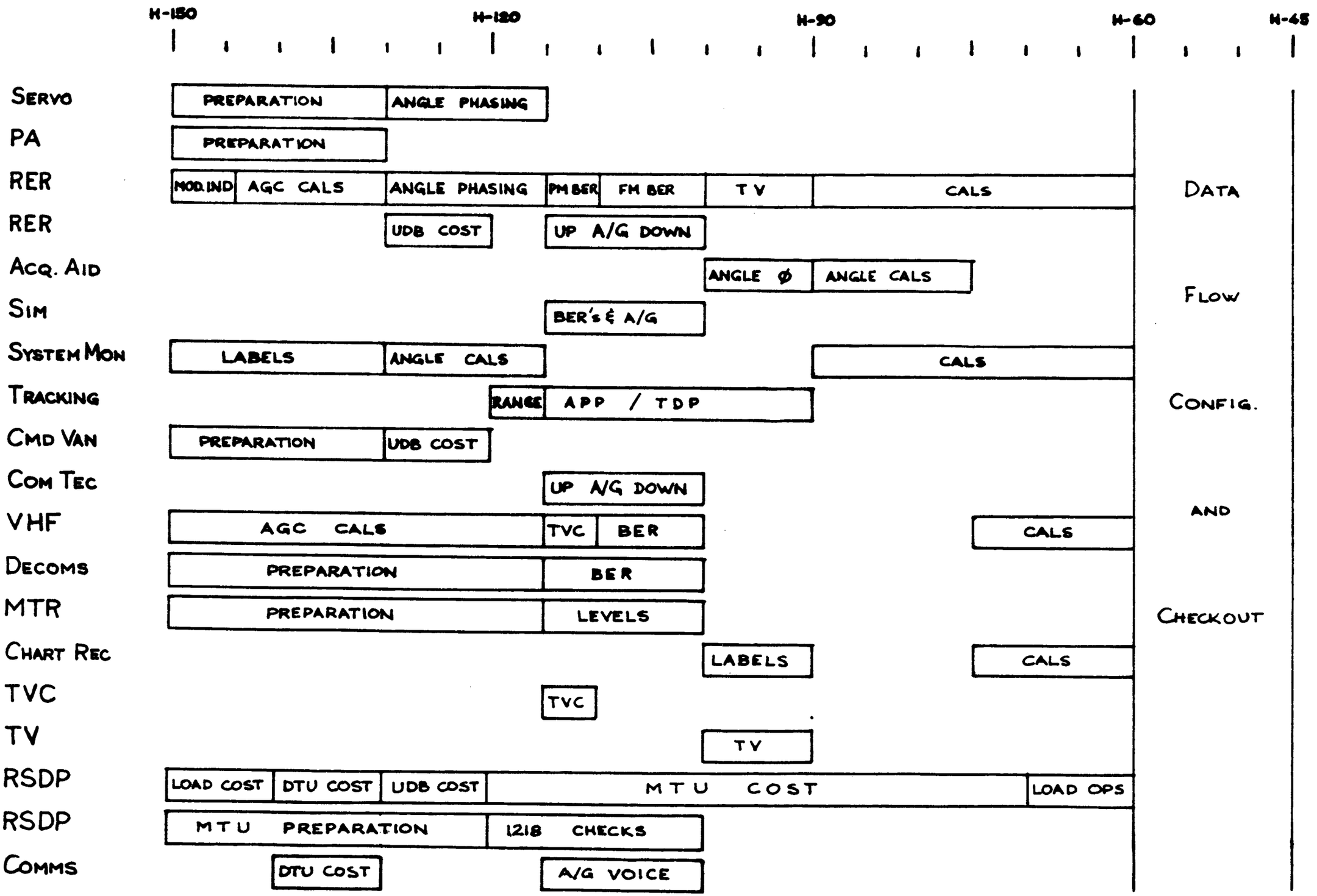
3. SKYLAB UNMANNED (Overtime) - To be used during unmanned Skylab when SRT starts before the normal operations shift start time.

4. SKYLAB/PIONEER - To be used during manned Skylab when Skylab and Pioneer SRT times coincide.

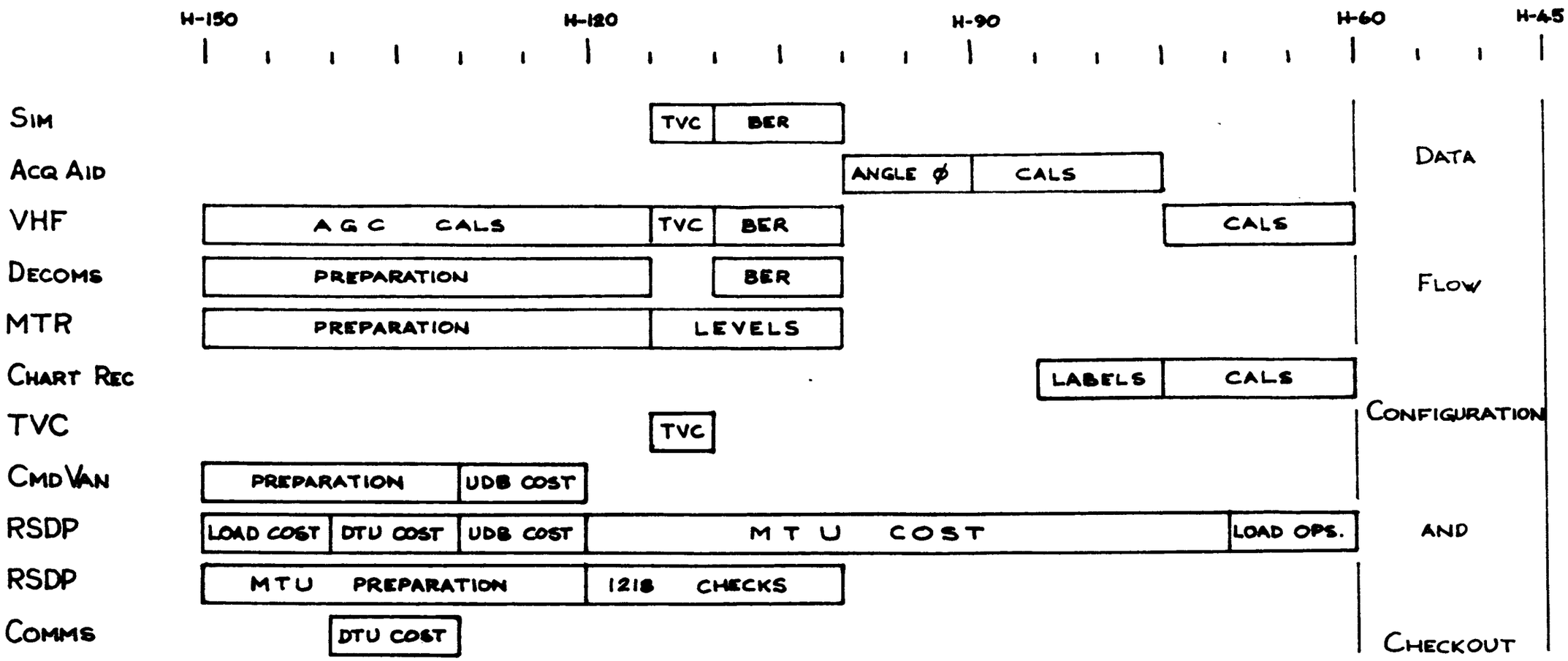
5. PIONEER (Short count) - To be used for Pioneer except when long count is scheduled, or when SRT time conflicts with SKYLAB.

CH #1

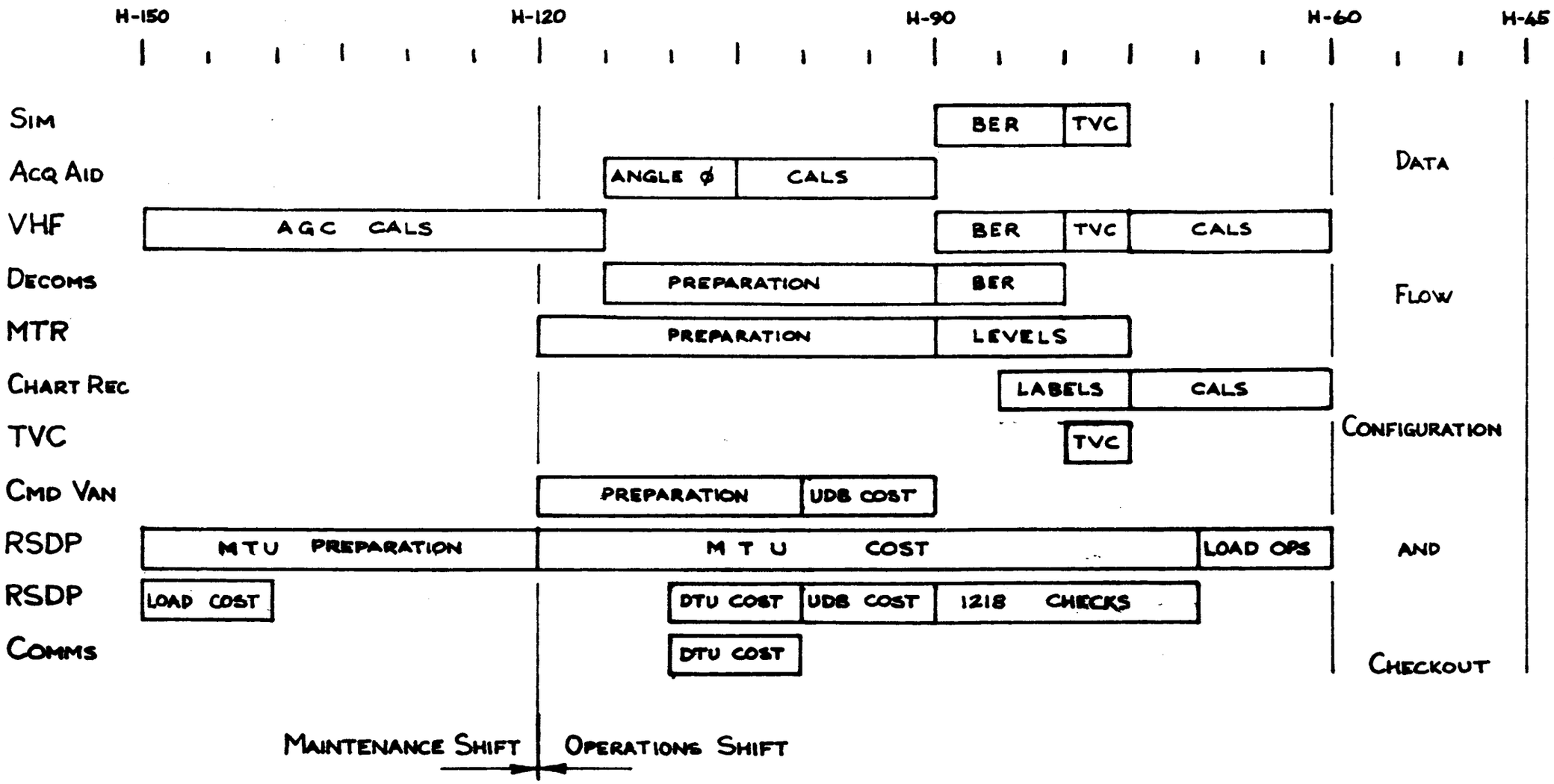
73074



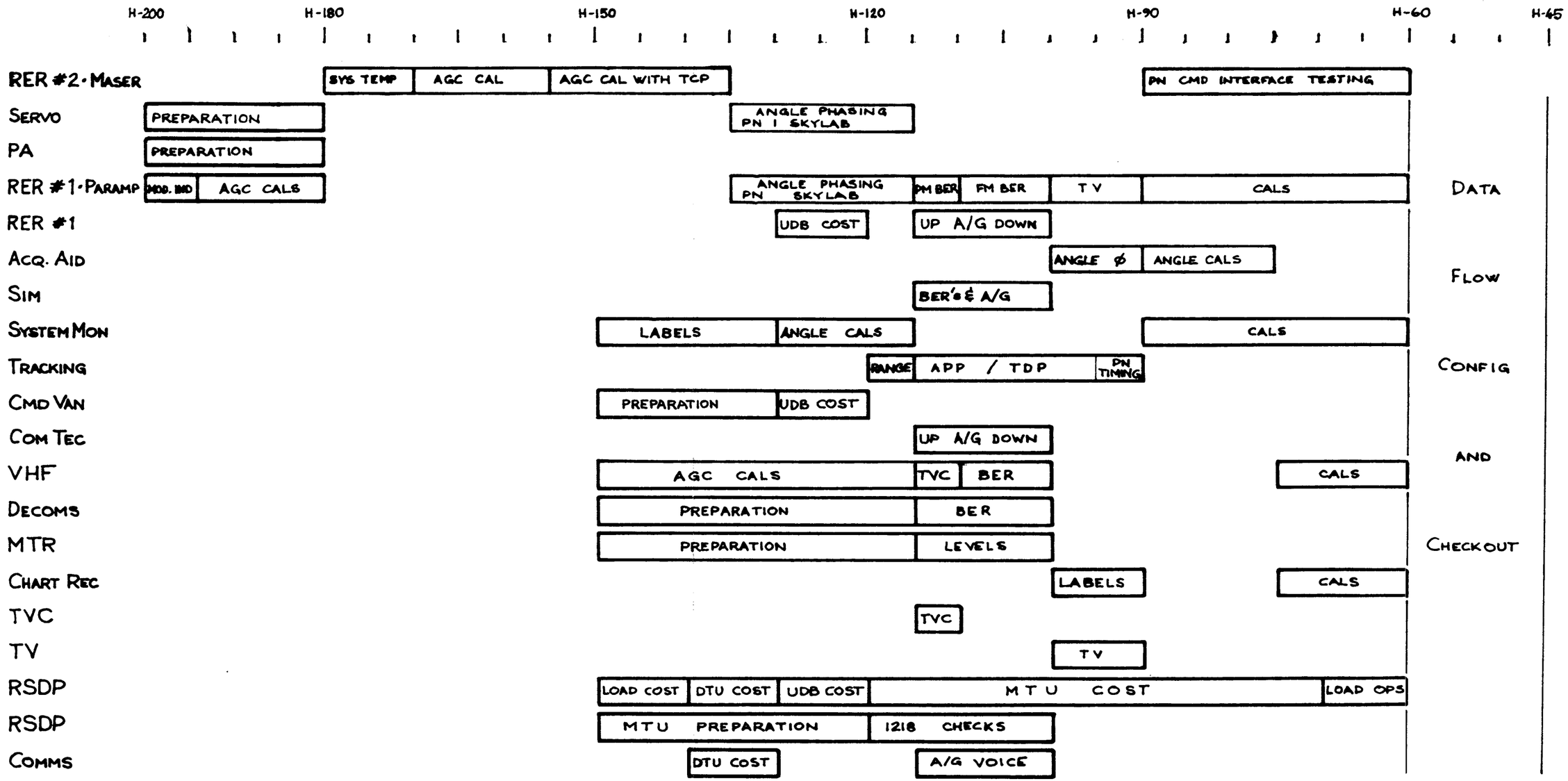
SRT BARCHART – SKYLAB MANNED.



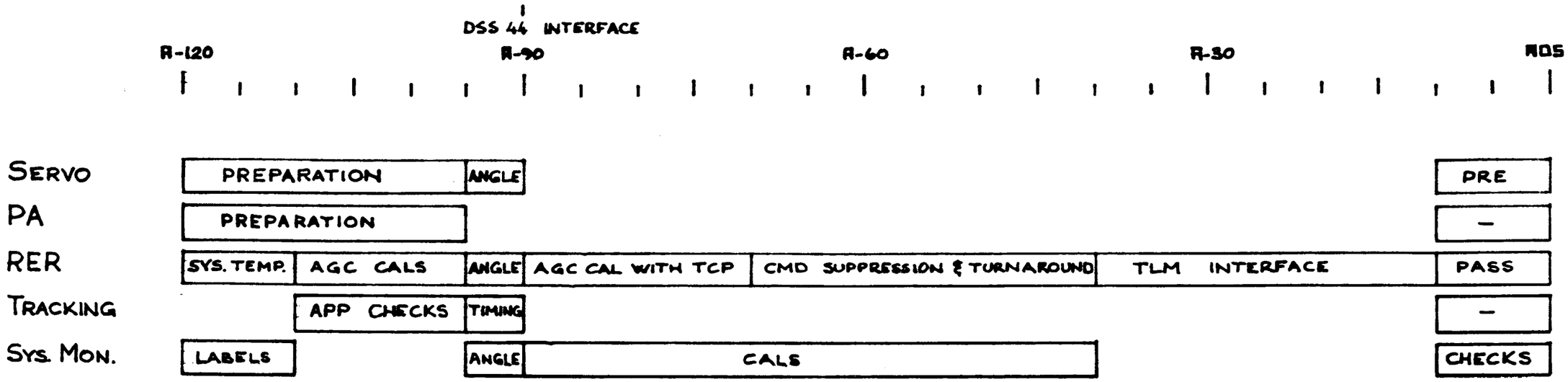
SRT BARCHART – SKYLAB UNMANNED (NO OVERTIME)



SRT BARCHART – SKYLAB UNMANNED (OVERTIME)



SRT BARCHART – SKYLAB MANNED / PIONEER



SRT BARCHART – PIONEER (SHORT COUNT)

TITLE: VHF AGC CALIBRATION	SEC. No: 2.6
REFS:	ISS.No: 3
DIST:	DATE: 9/8/73

CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REF:										
PAGES:										

ORIGINATOR: K. Gallegos APPROVED: B. Smith

A. Weekly Procedure.

Procedure for performing VHF AGC Calibration -

This procedure is designed to ensure that the same setting up and adjustment is performed by all shifts. Two hours have been set aside before SRT start each Sunday to do the RCVR calibration and adjust the Matrix Amps. The complete alignment of all VHF AGC hardware involves the adjustment of 86 potentiometers and some more than once. Should different procedures be used then the issue compounds with ensuing degraded results.

OPSR will control on site traffic and other local RFI generators during performance of this procedure.

1.0 Preliminary

1.1 a) Ensure antenna is at quiet sky.

b) Check spectrum for RFI.

c) Check latest calibration number of Boonton Signal Generator.

d) Ensure RF level Meter is in center of Red Patch for each frequency being used.

e) Ensure ≡ Direct is selected on TELTRAC.

1.2 Check that RCVR frequency is selected for desired operational requirements.

1.3 Select TC of 0.1 Ms on Microdyne Receivers AGC.

2.0 Microdyne Receiver/Combiner

2.1 Voltages Required -

a) Pre Amp Noise (PAN) = -0.50 volts.

b) -67dBm = -8.00 volts.

2.2 Tune Sig. Gen. via Pre Amp to RCVR. Set atten to Max (PAN) for Channel A monitor J38 on Rear Panel and adjust Zero Control for -0.50 volts.

..2/

2.3 Set -67 dBm into Pre Amp and adjust scale for -8.00 volts.

2.4 Repeat 2.2 and 2.3 until no interaction between controls.

2.5 Repeat 2.2 then 2.4 for Channel B J38.

2.6 Monitor Ch. A AGC on Programmable Patch Panel. Go to PAN and adjust Channel A Zero on Combiner for -0.50 volts.

2.7 Set -67dBm and adjust scale for -8.00 volts.

2.8 Repeat 2.6 and 2.7 until no interaction.

2.9 Repeat 2.6 thru 2.8 for Channel B.

2.10 Monitor Combiner AGC out and for - -67dBm set GAIN on Combiner for -8.00 volts.

2.11 Repeat 2.2 thru 2.10 for the remaining Microdyne Hardware.

3.0 Vitro Combiner Alignment

3.1 Monitor Ch.A at Programmable Patch Panel.

3.2 Tune Sig. Gen. to RCVR with 1st LO on Xtal, if available, for 1st LO.

3.3 Go VFO and Peak tuning. Go back to Xtal.

3.4 Set PAN. For Channel B.
Adjust R4 for -1.00 volts (not -0.50 volts).

3.5 Set -67dBm adjust R8 for -8.00 volts.

3.6 Set -87dBm adjust R7 for -6.00 volts.

3.7 Repeat 3.5 and 3.6 until no interaction.

3.8 Repeat 3.4 thru 3.7 for Channel B.
For R4 (Zero) Read R20
For R8 Read R24
For R7 Read R23

3.9 Repeat 3.1 then 3.8 for remaining RCVRS/Combiners.

This completes the VHF AGC Calibration for the Receivers and Combiners.

4.0 Matrix Amp Adjustments :

The matrix amps are an integral part of the VHF AGC hardware and are adjusted to achieve the end result. The following is the method of adjustment.

During this calibration, reference is made to dBm which is power. This power is the dBm input to the pre amp which is what we receive from the spacecraft.

In an ideal FM system, the total power is unchanged by the modulation process. However, should spectra be beyond the IF Bandwidth then some is virtually lost to the corresponding AGC reading. The receivers have been set up on a Single spectrum line therefore there may be differenees

..3/

due to modulation and practical modulators. Firstly the Amps will be set up to linearize the curve. Should any adjustment be required after this on Data Flows, etc., then the Data Supervisor will direct the adjustment.

4.1 Set canoga to strong signal and tune receivers with mission settings. Set canoga to -120dBm and adjust offset for +1.50 volts on all amps.

4.2 Set -67dBm. Adjust Gain for +8.00 volts.

4.3 Repeat 4.1 and 4.2 until no interaction.

4.4 Set -105dBm. Adjust offset for +3.50 volts.

4.5 Check the calibration of each RCVR at following points -

Level (dBm)	AGC Volts Lower	AGC Volts Normal	AGC Volts Higher
-67	7.60	8.00	8.4
-87	5.60	6.00	6.30
-95	4.78	4.95	5.15
-100	4.00	4.25	4.46
-105	3.40	3.50	3.55
-110	2.55	2.78	3.00
-120	1.35	1.50	1.80

4.6 If requirements of para 4.5 are not met, declare receivers Yellow for AGC out of alignment and perform Full Gain/AGC alignment on Receivers.

B. Daily Procedure

1. Set canoga for negative 105dBm - adjust matrix amp offset for 3.50 volts.

2. Set canoga for negative 90dBm - check voltage is between 5.40 and 5.80.

3. Set canoga for negative 110dBm - check voltage is between 2.55 and 3.00.

4. If these specs cannot be met, adjust accordingly until B1, 2 & 3 can be met. A full receiver AGC cal may be necessary.

Note

The interface test is normally done using the Sim Console. No receiver/amp adjustments will be made using the Sim Console. In the event of queries about HSK A.G.C. readings it will be explained that HSK is using the Sim Console and that if required we can switch to canoga which is the HSK calibrated A.G.C. source.

TITLE:	VHF MICRODYNE COMBINER LAMP TEST	SEC. No: 2.7
REPS:		ISS. No: 1
DIST:		DATE: 18 OCT'73

CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REF:										
PAGES:										

ORIGINATOR: K.M.L. GALLEGOS APPROVED: M. EVENETT

TEST PROCEDURE: Prior to Statiom Data Flow Test in the SRT with all RCVRS locked to Sim. Console perform the following:

1. Ensure Comb. Indicator is lit on Comb. Nrs. 1,2,5 & 6.
2. Remove LHC Looping Plug and ensure channel Nr. 2 Indicator is lit on Comb. Nrs. 1,2,5 & 6.
3. Replace LHC and remove RHC Looping Plug. Ensure channel Nr. 1 Indicator is lit on Comb Nrs. 1,2,5 & 6.
4. Replace RHC Looping Plug.

TITLE: SRT UPLINK MODULATION INDEX & AGC CHECKS	SEC. No: 2.14
REFS: MSFN 401.1 APOLLO/ALSEP SYSTEMS READINESS TEST.	ISS.No: 6
DIST:	DATE: 25 June'71.

CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REF:										
PAGES:										

ORIGINATOR: L. LITHERLAND. APPROVED:

1.0 UPLINK MODULATION INDEX CHECKS.

1.1 With IMS switch in 1-8 position and GMS - module connected into extender board, adjust modulation index for modes 1 thru 8 for the value given in Table 1. Re-install GMS-1 into SCO unit.

1.2 Select Mode 2 in GMS-1 module. On IMS unit select modes 13 thru 15 in turn. Adjust mod index for the value given in Table 1.

1.3 Repeat for System 2.

1.4 With upcoming Apollo support frequency selected in Sys Nr.1 synthesizer and RCV Nr.1, select ALSEP on the Exciter Control Panel. Adjust ALSEP mod index control on SCO Nr.1 for the value given in Table 1.

2.0 AGC CHECKS PM ENSURE MODULATION NOT CONNECTED.

2.1 Calibrate each Receiver on frequencies and loop bandwidth required for the pass. (F-day SRT, calibrate all RCV's, all freqs. all bandwidths).

2.2 Compare AGC/signal level to previous AGC curve at -85, -100, -115, -130, -145 dbm 160 & threshold. Redraw curves if necessary.

2.3 Spot check AGC curve at other loop bandwidths, if required.

3.0 AGC CHECKS FM - ENSURE AMPS TERMINATED INTO 50 OHM.

3.1 Calibrate each Receiver FM AGC while PM Cal. is in progress.

3.2 Compare non-coherent AGC/signal level to previous curve at 5 db steps from max. input signal. Redraw curves if necessary.

4.0 SPECIFICATIONS.

SST 417E-01 Receiver Exciter.

UPLINK MOD INDICES AND CHECK LIST

Mission _____ Operator _____ Date _____ Start _____ Finish _____

MODE	MODULATION	S/C FREQ	MOD INDEX DB	MOD INDEX RDNS	MOD INDEX RATIO	CHECK SYS 1/3	CHECK SYS 2/4
1	PRN	NIL	19.50	1.47	0.100		
			12.83	1.34	0.228*		
			8.86	1.20	0.363		
2	VOICE	30 KHz	13.80	2.02	0.200		
			10.15	1.85	0.311*		
			7.40	1.65	0.426		
3	COMMAND	70 KHz	13.80	2.02	0.200		
			10.15	1.85	0.311*		
			7.40	1.65	0.426		
4	PRN	NIL	0.80	0.42	0.913		
			0.64	0.38	0.929*		
			0.52	0.34	0.943		
	VOICE	30 KHz	4.30	1.33	0.610		
			3.46	1.20	0.671*		
			2.70	1.08	0.726		
5	PRN	NIL	0.80	0.42	0.913		
			0.64	0.38	0.929*		
			0.52	0.34	0.943		
	COMMAND	70 KHz	4.30	1.33	0.610		
			3.46	1.20	0.671*		
			2.70	1.08	0.726		
6	PRN	NIL	1.10	0.49	0.885		
			0.88	0.44	0.905*		
			0.68	0.39	0.922		
	VOICE	30 KHz	2.86	1.10	0.719		
			2.32	1.00	0.765*		
			1.86	0.90	0.808		
	COMMAND	70 KHz	2.86	1.10	0.719		
			2.32	1.00	0.765*		
			1.86	0.90	0.808		
7	VOICE	30 KHz	3.46	1.20	0.671		
			2.86	1.10	0.719*		
			2.30	0.99	0.768		
	COMMAND	70 KHz	3.46	1.20	0.671		
			2.86	1.10	0.719*		
			2.30	0.99	0.768		
8	B.U. VOICE	70 KHz	13.80	2.02	0.200		
			10.15	1.85	0.311*		
			7.40	1.65	0.426		
13	VOICE	124 KHz	3.46	1.20	0.671		
			2.80	1.10	0.719*		
			2.30	0.99	0.708		
14	COMMAND	70 KHz	1.70	0.88	0.811		
			1.45	0.80	0.846*		
			1.15	0.72	0.875		
15	VOICE	124 KHz	1.70	0.88	0.811		
			1.45	0.80	0.846*		
			1.15	0.72	0.875		
	COMMAND	70 KHz	1.70	0.88	0.811		
			1.45	0.80	0.846*		
			1.15	0.72	0.875		
16	ALSEP COMMAND	———	26.08	3.30	0.051		
			15.40	3.00	0.167*		
			10.90	2.70	0.286		

S-BAND RCVR AGC CALIBRATION

Mission _____ Operator _____ Date _____ Start _____ Finish _____

PM FREQUENCIES

WARM/COOLED PARAMP

SIGNAL LEVEL	RCV 1 MAIN	RCV 2 ACQ	RCV 2 MAIN	RCV 3 MAIN	RCV 4 MAIN
Freq/BW	/	/	/	/	/
-85 dbm					
-100 dbm					
-115 dbm					
-130 dbm					
-145 dbm					
-160 dbm					
Threshold					
In Spec					

FM FREQUENCIES

SIGNAL LEVEL	RCV 1 MAIN	RCV 2 MAIN	RCV 3 MAIN	RCV 4 MAIN
Frequency				
-70 dbm				
-75 dbm				
-80 dbm				
-85 dbm				
-90 dbm				
-95 dbm				
-100 dbm				
-105 dbm				
-110 dbm				
-115 dbm				
-120 dbm				
In Spec				

* Use extra check sheets as required.

Bessel Functions Square Wave.

RADIANS	θ	CARRIER SUPP cos θ (Volts)	20 log cos θ
0.02	1.15	.9998	0.00 db
0.04	2.29	.9992	0.01
0.06	3.44	.9982	0.02
0.08	4.58	.9968	0.03
0.10	5.73	.995	0.04
0.12	6.88	.9928	0.07
0.14	8.03	.9902	0.09
0.16	9.16	.9872	0.12
0.18	10.30	.9838	0.15
0.20	11.45	.9801	0.18
0.22	12.60	.9759	0.22
0.24	13.75	.9713	0.26
.26	14.90	.9664	0.30
0.28	16.04	.9611	0.35
0.30	17.19	.9553	0.40
0.32	18.34	.9492	0.45
0.34	19.49	.9428	0.52
0.36	20.61	.9359	0.58
0.38	21.78	.9287	0.64
0.40	22.90	.9211	0.71
0.42	24.10	.9131	0.80
0.44	25.24	.9048	0.88
0.46	26.36	.8961	0.96
0.48	27.50	.8870	1.05
0.50	28.68	.8776	1.14
0.52	29.80	.8673	1.24
0.54	30.95	.8577	1.34
0.56	32.06	.8473	1.44
.58	33.20	.8365	1.55
0.60	34.36	.8253	1.67
0.62	35.50	.8139	1.79
0.64	36.65	.8021	1.92
0.66	37.85	.790	2.06
0.68	38.95	.7776	2.19
0.70	40.20	.7648	2.32
0.72	41.30	.7518	2.49
0.74	42.40	.7385	2.64
0.76	43.50	.7248	2.79
0.78	44.60	.7109	2.98
0.80	45.80	.6967	3.14

RADIANS	θ	CARRIER SUPP cos θ (Volts)	20 log cos θ
0.82	47.00	.6822	3.33db
0.84	48.15	.6675	3.52
0.86	49.30	.6524	3.72
0.88	50.40	.6372	3.92
0.90	51.60	.6216	4.14
0.92	52.65	.6058	4.34
0.94	53.80	.5898	4.58
0.96	55.00	.5735	4.84
0.98	56.20	.5570	5.11
1.00	57.30	.5403	5.35
1.02	58.50	.5234	5.64
1.04	59.60	.5062	5.92
1.06	60.75	.4889	6.22
1.08	61.90	.4713	6.54
1.10	63.10	.4536	6.89
1.12	64.20	.4357	7.23
1.14	65.40	.4176	7.62
1.16	66.50	.3993	7.99
1.18	67.60	.3809	8.38
1.20	68.80	.3624	8.86
1.22	70.00	.3437	9.32
1.24	71.10	.3248	9.79
1.26	72.25	.3058	10.32
1.28	73.40	.2867	10.88
1.30	74.55	.2675	11.49
1.32	75.65	.2482	12.12
1.34	76.80	.2288	12.83
1.36	78.00	.2092	13.66
1.38	79.20	.1896	14.55
1.40	80.30	.170	15.48
1.42	81.40	.1502	16.52
1.44	82.50	.1304	17.70
1.46	83.65	.1106	19.13
1.48	84.80	.0907	20.86
1.50	86.00	.0707	23.13
1.52	87.15	.0508	26.08
1.54	88.30	.0308	30.66
1.56	89.40	.0108	39.58
1.57	90.00	.0008	

Bessel Functions - SINE WAVE

DYN AGC

Rdns	Jo(x) (Volts.	20LogJo(x)
0.00	1.00	0.00 db
0.05	.9994	0.01
0.10	.9975	0.02
0.15	.9944	0.05
0.20	.9900	0.09
0.25	.9844	0.14
0.30	.9776	0.20
0.35	.9696	0.27
0.40	.9604	0.35
0.45	.9500	0.45
0.50	.9385	0.55
0.55	.9267	0.67
0.60	.9120	0.80
0.65	.8971	0.94
0.70	.8812	1.10
0.75	.8642	1.27
0.80	.8463	1.45
0.85	.8274	1.65
0.90	.8075	1.86
0.95	.7868	2.10
1.00	.7652	2.32
1.05	.7428	2.58
1.10	.7196	2.86
1.15	.6957	3.15
1.20	.6711	3.46
1.25	.6459	3.80
1.30	.6201	4.15
1.35	.5937	4.53
1.40	.5669	4.93
1.45	.5395	5.36
1.50	.5118	5.82
1.55	.4838	6.31
1.60	.4554	6.83
1.65	.4268	7.40
1.70	.3980	8.00
1.75	.3690	8.66
1.80	.3400	9.37
1.85	.3109	10.15
1.90	.2818	11.00
1.95	.2528	11.95
2.00	.2239	13.00
2.05	.1951	14.20
2.10	.1666	15.56
2.15	.1383	17.18
2.20	.1104	19.14
2.25	.0828	21.66db
2.30	.0555	25.12
2.35	.0288	30.80
2.40	.0025	52.0
2.45	-.0232	32.68
2.50	-.0484	26.30
2.55	-.0729	22.74
2.60	-.0968	20.28
2.65	-.1200	18.42
2.70	-.1424	16.93
2.75	-.1641	15.70
2.80	-.1850	14.66
2.85	-.2051	13.76
2.90	-.2243	12.99
2.95	-.2426	12.30
3.00	-.2601	11.70

TITLE: ANGLE CHANNEL CALIBRATIONS REQUIREMENTS	SEC. No: 2.15
REFS: VARIOUS	ISS. No: 1
DIST: SBA OPS	DATE: 11.2.72

CH. No:	1	2	3	4	5	6	7	8	9	10
DATE:	14.9.72									
REF:	OMP 646									
PAGES:	1 & 2									

ORIGINATOR: L. LITHERLAND APPROVED: I. F. GRANT

1. TABLE 1 should be completed during NRT and subsequently used as reference for spot checks during SRT and actual settings for config. changes.

2. The Table will be completed anew if any equipment status change affects phase paths through the tracking receivers.

NOTE : A. The option to switch main angle channels to a dual transistor does not appear in Table 1 as phase differences will be eliminated during installation.

B. The uncooled main paramp option will not appear since manual connection is required and track has to be interrupted. It is assumed time will be available to phase up on collimation system.

TABLE 1

Enter Phase Shifter Settings

ANT	LNA	ANGLE PREAMP	RCV	2287.5		2282.5		2265.5		ALSEP	
				X	Y	X	Y	X	Y	X	Y
ACQ	UNC	A.UNC	2								
ACQ	UNC	A.UNC	1								
MAIN	TWM	M.UNC	1								
MAIN	TWM	M.UNC	2								
MAIN	COOL	M.UNC	1								
MAIN	COOL	M.UNC	2								

UNC = Uncooled Paramp
A UNC = Acquisition Uncooled Paramp
M UNC = Main Uncooled Paramp
TWM = Travelling Wave Maser
COOL = Cooled Paramp

TABLE 2

To be completed in SRT

The following is minimum requirement for each Apollo phase.

	CONFIG			REQUIREMENT	X	Y
EARTH ORBIT	ACQ	UNC	1	SPOT CHECK ALTERNATE VEHICLE		
	MAIN	TWM	2	SPOT CHECK ALTERNATE VEHICLE ~~CAL & ADJUST ON ASSIGNED VEHICLE~~		
	ACQ	COOL	2	CAL & ADJUST ON ASSIGNED VEHICLE ~~SPOT CHECK ALTERNATE VEHICLE~~		
	MAIN	COOL	1	CAL & ADJUST ON ASSIGNED VEHICLE		
TEC	MAIN	COOL	2	SPOT CHECK ON ALTERNATE VEHICLE		
[illegible]	MAIN	TWM	1	CAL & ADJUST ON ASSIGNED VEHICLE		
LUNAR ORBIT	MAIN	COOL	2	SPOT CHECK ON ALTERNATE VEHICLE 1		
	MAIN	TWM	1	SPOT CHECK ON ALTERNATE VEHICLE 2		
	MAIN	TWM	1	CAL & ADJUST ON ASSIGNED VEHICLE		

NOTE: Tick (✓) Spot checks on alt vehicles.

Enter phase shifter readings for assigned vehicle.

Submit proforma to USB Supvr.

.... Date

.... Mission/Day

.... Operator

	ANTENNA/TRANSMITTER CHECKS	SEC. NO: 2.20
	N/A	ISS. NO: 4
	USB 1, OPS	DATE: 6 Apr '72

	1	2	3	4	5	6	7	8		

COORDINATOR: A. FOSTER APPROVED: I. F. GRANT

TXR/PA CHECKS (PRE-PASS & MISSION)

MISSION :

TIME :

PEDESTAL HOUSE :		SYSTEM 1	SYSTEM 2
W.G. Nitrogen reading (IO P.S.L.)	_____		
Interlock Lamp Test (Pre-pass only)		_____	_____
Auto Run Up (Manual/Auto)		_____	_____
Fault Hold Switch (On/Off)		_____	_____
Magnet Current		_____	_____
Magnet Voltage		_____	_____
Air Conditioner (70°F)	_____		
Nitrogen Gas Bottles (Record Pressure)	_____	_____	

MG ROOM :

Ambient Temperature	_____
Exhaust Fan Operational/Set for 75°F	_____
Close doors after leaving	_____

HEAT EXCHANGER :

Water level (Min 1" below mark)	_____	_____
Inlet Pressure (Set to 28 P.S.I.)	_____	_____
Outlet Pressure (135 P.S.I.)	_____	_____
Inlet Temperature (After 1hr. warm up)	_____	_____
Outlet Temperature (After 1hr. warm up)	_____	_____
Outlet Resistance (Greater than 7.5 meg)	_____	_____
Barnstead Flow Meter (30	_____	_____
Pressure (50 P.S.I.)	_____	_____

MASER COMPRESSOR

Supply (225 P.S.I.)	_____
Refrig Return(70-85 P.S.I.)	_____
J-T Return (+1 - +4 P.S.I.)	_____
J-T Flow (-1.5 SCFM)	_____
Oil Pressure (120 - 135 P.S.I.)	_____
Tank Pressure (120 - 80 P.S.I.)	_____
Oil Level ($\frac{1}{2}$ Glass level)	_____

Y WHEEL HOUSE *	SYSTEM 1	SYSTEM 2
Filament Volts (Set to 7.5)		
Filament Current (11A)		
Collector Flow (Approx. 22)		
Body Flow (Approx 1.3)		
Dummy Load Flow (Set to 3.8)		
Load Pressure (Approx 40)		
Inlet Pressure (Approx 82)		
Outlet Pressure (Approx 20)		
Collector Outlet Temp. (Less than 60°C)		
Body Outlet Temp. (Less than 60°C)		
Reflector Power and ARC Detector check		
Check Security of Equipment		
Check Air Conditioner & Ambient Temp.		
Check cone door is secured and no loose equipment in cone.		
Reset cone coor interlock (Press button)		

USB CONTROL ROOM

Line Stretcher setting (If in Antenna)		
Combined output power (If in Antenna)		
Battle Short (ON/OFF)		
Output Power		
Reflected Power		
Body Current		
Beam Current		
Drive Attn. Setting		
Drive Forward Power		
Beam Volts		

* Y WHEELHOUSE	TICK
Cool Paramp Cryogenic Indicators (All Normal)	
Local/Remote Ind (Remote)	
VAC ION Meter Switch (4KV)	
Maser Klystron Beam Current (45ma)	
Maser VAC ION Meter Switch (4KV)	
692D Sweep Gen Line Volts (Standby)	
PA Klystron tuning system 1 (ALSEP/MSFN)	
Trim & Stagg Power (ON)	
Trim & Stagg Limit (OFF)	
Local/Remote SW Warm Paramp (Remote)	
Local/Remote SW Acq. Paramp (Remote)	
WG Pressure (6ozs ± 1oz)	
Vapour Pressure Guage (Record)	

SIGNATURE .....

ANTENNA SERVO
PRE-FLIGHT CHECK LIST
INFORM POWER HOUSE ANTENNA IS TO BE MOVED

Tick or Record Values	
	USB OPERATIONS ROOM MISSION: DTG START:
	1. Turn POWER ON
	2. Check VTVM ON
	3. Turn ON T.V.
	4. Check Voltages (a) +26v ± 1 volt
	(b) -26v " " "
	(c) X +15v ± .5 volt
	(d) X -15v " " "
	(e) Y +15v " " "
	(f) Y -15v " " "
	5. Check EMERGENCY STOP and SAFE/RUN switches turn GEN light OFF
	6. Set antenna Drive Control Switch to ON
	7. Check Antenna Safety Interlock in NORMAL
	8. Check X and Y AXES DISABLE switches are OFF
	9. Select MANUAL POSITION and SCAN with 5 degree circle scan.
	10. Check ROTATING LIGHTS, SAFETY WARNING LIGHTS & HORN operation.
	PEDESTAL HOUSE
	11. Log X and Y motor hours.
	WHEELHOUSE
	12. Check wheelhouse hoist for safety.
	13. Check dish hoist.
	14. Check all doors, drawers, etc. for security.
	14A. Check that cone door is secured and there is no loose equipment in cone.
	Y AXIS SKID
	15. Start Y hydraulics from the Y servo box (NOTE: Y AXIS RUNS IN SCAN MODE ± 5°)
	16. Check the Y CONTROL pressure 1250 psi ± 50 psi) after REPLENISH pressure 250 psi ± 50 psi) warm-up RESERVOIR Level
	17. Physically check for leaking oil lines, seals, vibration, noise, etc.
	18. Check all cables and plugs for tightness.
	19. Check the Y gearbox lubrication motors are running.

Tick or Record Values

20. Check the Y main bearings for leaking grease,noise,etc.
21. Check cable runs for tight or fraying cables.

X AXIS SKID

22. Start the X Hydraulics from the X servo box.
(NOTE: X & Y AXEX RUN IN SCAN MODE ± 5°).
23. Check the X CONTROL Pressure 1250 psi ± 50 psi)after
REPLENISH Pressure 250 psi ± 50 psi)warm up
RESERVOIR Level
24. Check the X hydraulics for leaking oil lines, seals, vibration, etc.
25. Check all plugs and cables for tightness.
26. Check X main bearings for leaking grease and noise.

USB OPERATIONS ROOM.

27. Check MANUAL POSITION FINE
COARSE
28. Check MANUAL VELOCITY FINE
COARSE
29. Check Test Programme.
30. Check the BRAKES at 1 degree/sec.
31. Check all SCAN modes at 5 degrees OFFSET
SECTOR
CIRCLE
RASTER
SPIRAL
SCAN HOLD
32. Check PRELIMITS X +85.5
-85.5
Y +75.0
-75.0
33. Log on the appropriate sheet Wind Direction
Wind Velocity
Ambient Temp. °F
Zenith X Y
Opt Boresite X Y
RF Boresite X Y

SIGNED ______________________

CALIBRATIONS

SEC	TITLE	ACTION	DISTRIBUTION USB	TLM	COMP	COMMS	OPS.

S-06 H.O.D. INDEX - SECTION 4

SIMULATIONS			DISTRIBUTION				
SEC	TITLE	ACTION	USB	TLM	COMP	COMMS	OPS.

[illegible] .3C7L

CONFIGURATIONS

SEC	TITLE	ACTION	DISTRIBUTION				
			USB	TLM	COMP	COMMS	OPS.
5.1	TYPICAL MISSION SUPPORT CONFIGURATION	OPS	X	X	X	X	X
5.2	RECORDER/TVC PLAYBACK CONFIGURATION	TLM	R	X			X
5.3							
5.4							
5.5							
5.6							
5.7	COMMS CONFIGURATION (TTY & HSD)	COMMS		X	X	X	X
5.8							
5.9							
5.10	TLM RECORDERS CONFIGURATION	TLM		X		X	X
5.11							
5.12	TLM/COMMS TIE LINES	COMMS		X	X	X	X
5.13							
5.14	DSDU PATCH BOARD CONFIGS	TLM		X			X
5.15	TLM PROGRAMMABLE PATCH PANEL PSK CONFIGS	TLM		X	X		X

TITLE: TYPICAL MISSION SUPPORT CONFIGURATIONS										SEC. No: 5.1
REFS: --										ISS.No: 1
DIST: ALL										DATE: 1 JULY
CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:	14.8.73									
REF:	OMP 728									
PAGES:	2 THRU 6									
ORIGINATOR: B. SMITH					APPROVED: I. F. GRANT					

This section details configs for USB and VHF receivers, demods, decoms, and TVC.

STANDARD CONFIGURATION

SKYLAB MANNED

BASIC

R	VEH / LINK	MOD	D'MOD	PATH	REV		CP1-CMD CP2-TLM			
1	CP	RT	1P	CP	C		NB-3	CSM		
2	CP	RT	2P	CA			WB-3	F		
2	CP	RT	2F	CA						
	(CF BU)		2FBB	CA	TV					
4	CF		1F	CP			NB-4	HLBR	INH	DUMP 1
			1FBB	CP	TV		WB-4	ASAP		
7	ATM-2	RT					NB-1	ATM		
10	ATM-2	RT			BU		WB-1	RT		
6	ATM-1	RT/ASAP								
1	AM-A	RT					NB-2	AM		
2	AM-B	RT. VOICE OR SF					NB-2	RT		
8	AM-B	RT. VOICE OR SF			BU		TVC-B			DUMP 3
5	AM-C	SF.					TVC-A			DUMP 2
9	AM-C	SF.			BU					

STANDARD CONFIGURATION

SKYLAB MANNED

DUMPS : DSE, ASAP, SF, VOICE

R	VEH / LINK	MOD	D'MOD	PATH	REV		CP1-CMD	CP2-TLM		
1	CP	RT	1P	CP			NB-3	CSM		
2	CP	RT	2P	CA			WB-3	F		
2	CP	RT	2F	CA						
	(CF BU)		2FBB	CA						
4	CF	DSE	1F	CP			NB-4	HLBR	INH	DUMP 1
			1FBB	CP			WB-4			
7	ATM-2	RT					NB-1	ATM		
10	ATM-2	RT			BU		WB-1	RT		
6	ATM-1	ASAP								
1	AM-A	RT					WB-2	AM		
2	AM-B	RT/VOICE					NB-2	RT		
8	AM-B	RT/VOICE			BU		TVC-A	ASAP		DUMP 2
5	AM-C	SF					TVC-B	AM		DUMP 3
9	AM-C	SF			BU					

STANDARD CONFIGURATION

SKYLAB MANNED

DUMPS: ASAP, SF-X, SF-Y : TV (DUMP OR RT)

R	VEH / LINK	MOD	D'MOD	PATH	REV		CP1-CMD	CP2-TLM		
1	CP	RT	1P	CP			NB-3	CSM F		
2	CP	RT	2P	CA			WB-3			
2	CP	RT	2F	CA						
	(CF BU)		2FBB	CA	TV					
4	CF	TV	1F	CP			NB-4			
			1FBB	CP	TV		WB-4	ASAP	INH	DUMP 1
7	ATM-2	RT					NB-1	ATM RT		
10	ATM-2	RT			BU		WB-1			
6	ATM-1	ASAP								
1	AM-A	RT					WB-2	AM RT		
2	AM-B	SF-x					NB-2			
8	AM-B	SF-X			BU		TVC-B			DUMP 3
5	AM-C	SF-Y					TVC-A			DUMP 2
9	AM-C	SF-Y			BU					

STANDARD CONFIGURATION

SKYLAB UNMANNED

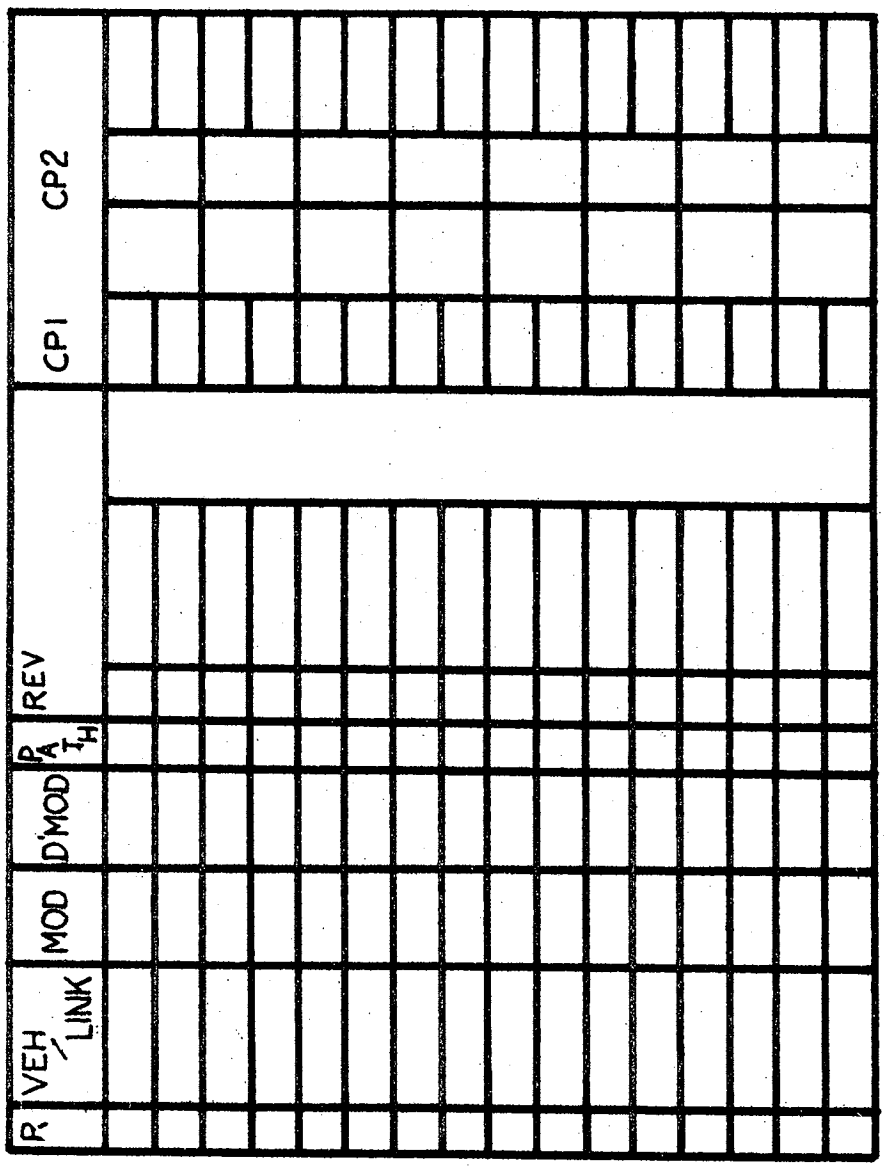
R	VEH / LINK	MOD	D'MOD	PATH	REV		CP1-CMD CP2-TLM
7	ATM-2	RT					NB-1
10	ATM-2	RT			BU		WB-1
6	ATM-1	ASAP					WB-4
1	AM-A	RT					WB-2
2	AM-B	RT/SF					NB-2
8	AM-B	RT/SF			BU		TVC-B
5	AM-C	SF-					TVC-A
9	AM-C	SF-			BU		

STANDARD CONFIGURATION

SKYLAB MANNED – BASIC

USB SYSTEM 2 UNAVAILABLE.

R	VEH / LINK	MOD	D'MOD	PATH	REV			CP1	CP2			
1	CP	RT	1P	CP				NB-3	CSM			
2	CP/CF		2P	CA				WB-3	F			
1	CP	RT	2F	CA								
2	CP/CF		1F	CP				NB-4	HLBR	INH	DUMP 1	
			1F BB	CP	TV			WB-4	ASAP			
7	ATM-2	RT						NB-1	ATM			
10	ATM-2	RT			BU			WB-1	RT			
6	ATM-1	RT/ASAP										
1	AM-A	RT						WB-2	AM			
2	AM-B	RT. VOICE OR SF						NB-2	RT			
8	AM-B	RT VOICE OR SF			BU			TVC-B			DUMP 3	
5	AM-C	SF						TVC-A			DUMP 2	
9	AM-C	SF			BU							


R
VEH / LINK
MOD
D'MOD
PA TH
REV
CP1
CP2

TITLE: RECORDER/TVC PLAYBACK CONFIGURATION	SEC. No: 5.2
REFS: STDN 601/SKYLAB SECTION 2	ISS.No: 1
DIST: TLM/OPS	DATE: 28 May 73

CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REF:										
PAGES:										

ORIGINATOR: E. VON RENOUARD APPROVED: I. F. GRANT

This section tables the requirements for TVC playbacks.

RECORDER/TVC PLAYBACK CONFIGURATION

DOWNLINK DATA	RECORD MODE			PLAYBACK MODE							
	BIT RATE (KB/S)	SPEED (IPS)	IF/FM (KHZ)	P/B RATIO	REF TK	DISC.F. (KHZ)	BIT RATE (KB/S)	P/B RATIO	DISC.F. (KHZ)	BIT RATE (KB/S)	SPEED (IPS)
AM SF 1-4	112.6	60	450	22:1.5	14	30.68	7.68	22:1	20.45	5.12	$3\frac{3}{4}$
M 509) TO 13)	126.0	60	450	22:1.5	14	30.68	8.64	22:1	20.45	5.76	$3\frac{3}{4}$
AM SF 1-4	112.6	120	900	22:1.5	14	61.38	7.68	22:1	40.91	5.12	$7\frac{1}{2}$
M 509) TO 13)	126.0	120	900	22:1.5	14	61.38	8.64	22:1	40.91	5.76	$7\frac{1}{2}$
CSM HLBRD	51.2	120	900	32:1.5	13	42.19	2.40	32:1	INTERNAL	1.60	$3\frac{3}{4}$

NOTES: 22:1 PLAYBACK REQUIRES 290.91 KHZ EXTERNAL REFERENCE, FR1900 REF. OSC. SET TO 'EXT'.
22:1.5 PLAYBACK REQUIRES FR1900 SET TO 'TAPE SYNC', TK 13/14 INPUT (REF OSC TO 'XTAL').
TK 13 CONTAINS RECORDED 133.33 REFERENCE
TK 14 CONTAINS RECORDED 91.66 REFERENCE
VOICE INTO 5 KHZ LP FILTERS
DATA INTO 15 KHZ LP FILTERS
22:1.5 AND 32:1.5 PLAYBACK SPEED SELECT $3\frac{3}{4}$ IPS, 22:1 AND 32:1 AS SHOWN.

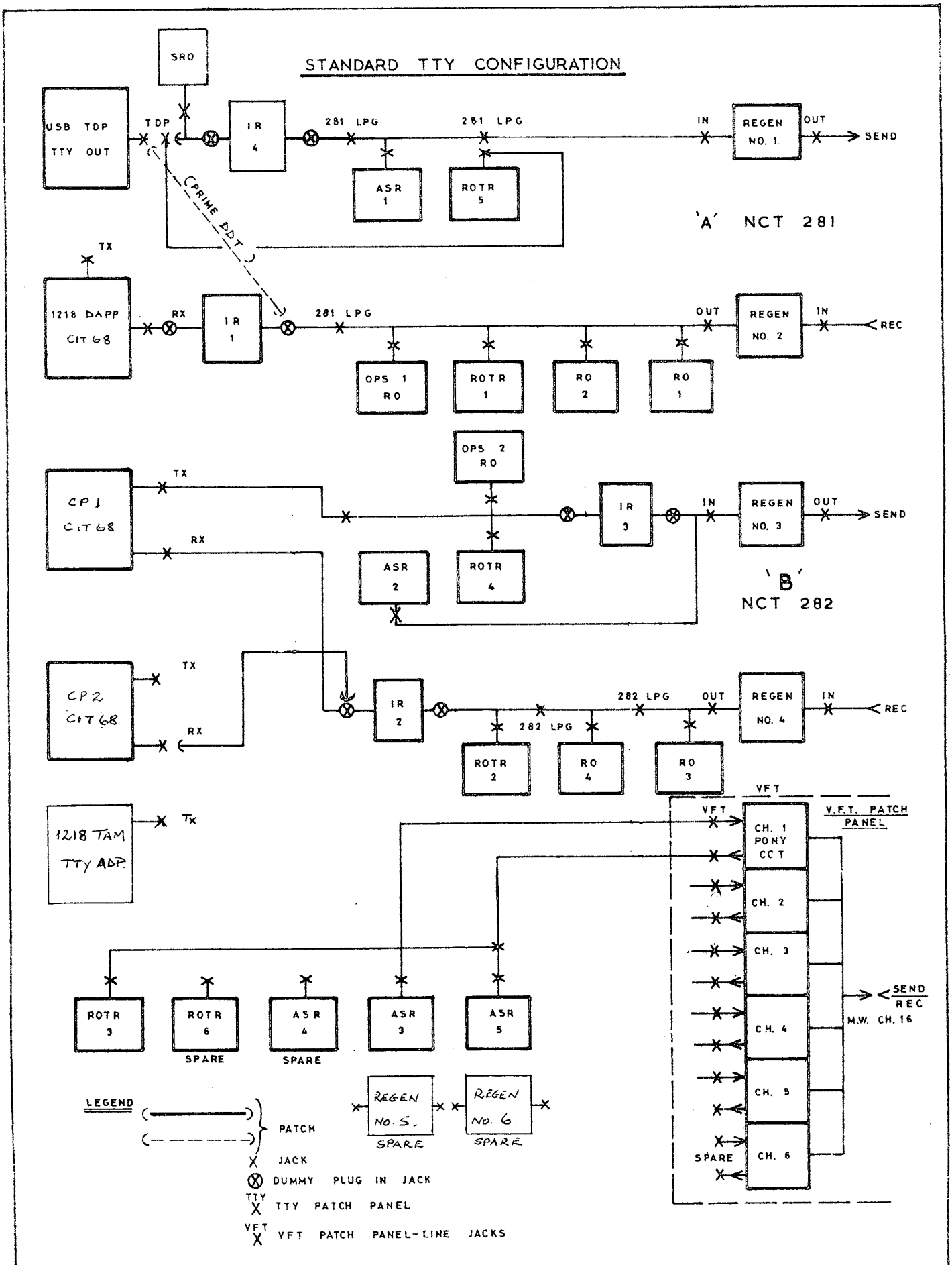
TITLE: COMMS CONFIGURATIONS (TTY & HSD)										SEC. No:5.7
REFS: N/A										ISS.No: 7
DIST: TLM, COMP, COMMS, OPS.										DATE: 14 MAY 73
CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REF:										
PAGES:										
ORIGINATOR: A. GERADA						APPROVED: I.F. GRANT.				

This section details:

(a)TTY CONFIGURATION - Page 2

(b)HSD, TLM & CMD - Pages 5&6

(c)HSD, TRACKING DATA - Page 8


STANDARD TTY CONFIGURATION
SRO
USB TDP TTY OUT
TDP
IR 4
281 LPG
281 LPG
IN
REGEN NO. 1.
OUT
SEND
ASR 1
ROTR 5
PRIME ADT
'A' NCT 281
TX
1218 DAPP CIT 68
RX
IR 1
281 LPG
OUT
REGEN NO. 2
IN
REC
OPS 1 RO
ROTR 1
RO 2
RO 1
OPS 2 RO
CP 1 CIT 68
TX
RX
IR 3
IN
REGEN NO. 3
OUT
SEND
ASR 2
ROTR 4
'B' NCT 282
CP 2 CIT 68
TX
RX
IR 2
282 LPG
OUT
REGEN NO. 4
IN
REC
282 LPG
ROTR 2
RO 4
RO 3
1218 TAM TTY ADP
Tx
VFT
VFT
V.F.T. PATCH PANEL
CH. 1 PONY CCT
CH. 2
CH. 3
CH. 4
CH. 5
CH. 6
SPARE
SEND
REC
M.W. CH. 16
ROTR 3
ROTR 6
SPARE
ASR 4
SPARE
ASR 3
ASR 5
REGEN NO. 5.
SPARE
REGEN NO. 6.
SPARE
LEGEND
PATCH
JACK
DUMMY PLUG IN JACK
TTY TTY PATCH PANEL
VFT VFT PATCH PANEL-LINE JACKS

STANDARD TTY CONFIGURATION

MISSION - NETWORK SIMS - CADFISS

E 23	to	D1	TDP to "A" loop send (Remove DUMMY PLUGS)
F4	to	B23	TDP loop send to Rotr 5 for tape
E 26	and	D5	(Remove DUMMY PLUGS) CPI OUT to "B" line
E2	and	C12	(Remove DUMMY PLUGS) "A" Rx to 1218
C14	to	A13	(Remove DUMMY PLUGS from C14 & E6) "B" Rx to CP2 CIT68

SRT PHASE 2

D23			TDP (Remove DUMMY PLUGS) for page copy
D5	to	A13	CPI Tx to CP2 Rx Loop
C21	to	A14	CP2 Tx to CPI Rx Loop
B23	to	F4	Rotr 5 to TDP loop
A23	to	E2	TDP to IR-1 Rx (CP3 in) (Prime DDT)

SRT PHASE 3

D23			TDP page copy (Remove DUMMY PLUG)
B25	to	C5	(If page copy required in Comms) CP1 loop to ASR 2
B23	to	F4	Rotr 5 to TDP Loop for tape.

TLM & CMD H.S. DATA CONFIGURATION

MISSION - NETWORK SIMS - CADFISS

D.C. PATCH PANEL

JK K2 to E5 F5 (DQM MON. D.S. 3 Tx) MON KBS TLM
J2 K2 to E7 F7 (DQM MON. D.S. 4 Tx) KBS
J2 K2 to E9 F9 (DQM MON. D.S. 5 Tx) KBS TLM

SRT PHASE 2

1) HARD WIRED DTU 3 turnaround thru D.S.5
   C12 D12 to A6 B6 DTU 4 turnaround thru D.S.3
2) C11 D11 to A5 B5 DTU 5 turnaround thru D.S.3
   HARD WIRED DTU 6 turnaround thru D.S.4

A.F. PATCH PANEL

F7 to F8 (D.S.2 Tx to D.S. 2 Rx) (Turnaround of DTU 6)
F5 to F6 (D.S.3 Tx to D.S. 3 Rx) (Turnaround of DTU 4 or 5)
F9 to F10 (D.S. 5 Tx to D.S. 5 Rx) (Turnaround of DTU 3)

SRT PHASE 3

D.C. PATCH PANEL

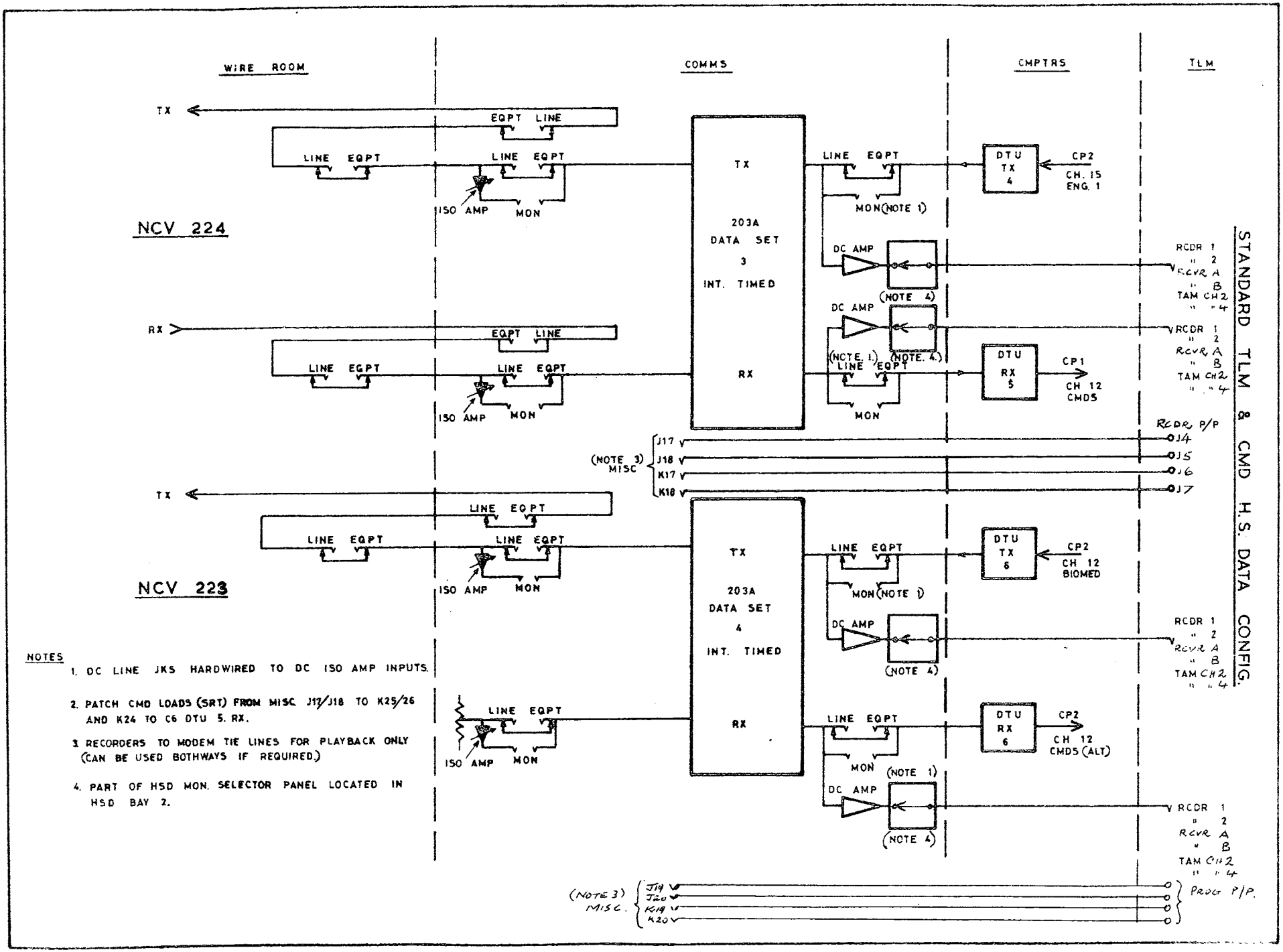
K17 to K25 (CMD DATA PLAYBACK) RCDR T/L 3 SPECIAL JACK IN
K18 to K26 (CMD CLOCK PLAYBACK) RCDR T/L 4 SPECIAL JACK IN
K24 to C6 (CMD DATA AND CLOCK) SPECIAL JACK OUT TO DTU 5 EQ. JACK IN

ALSEP AND ERTS NORMAL CONFIGURATION

D.C. PATCH PANEL

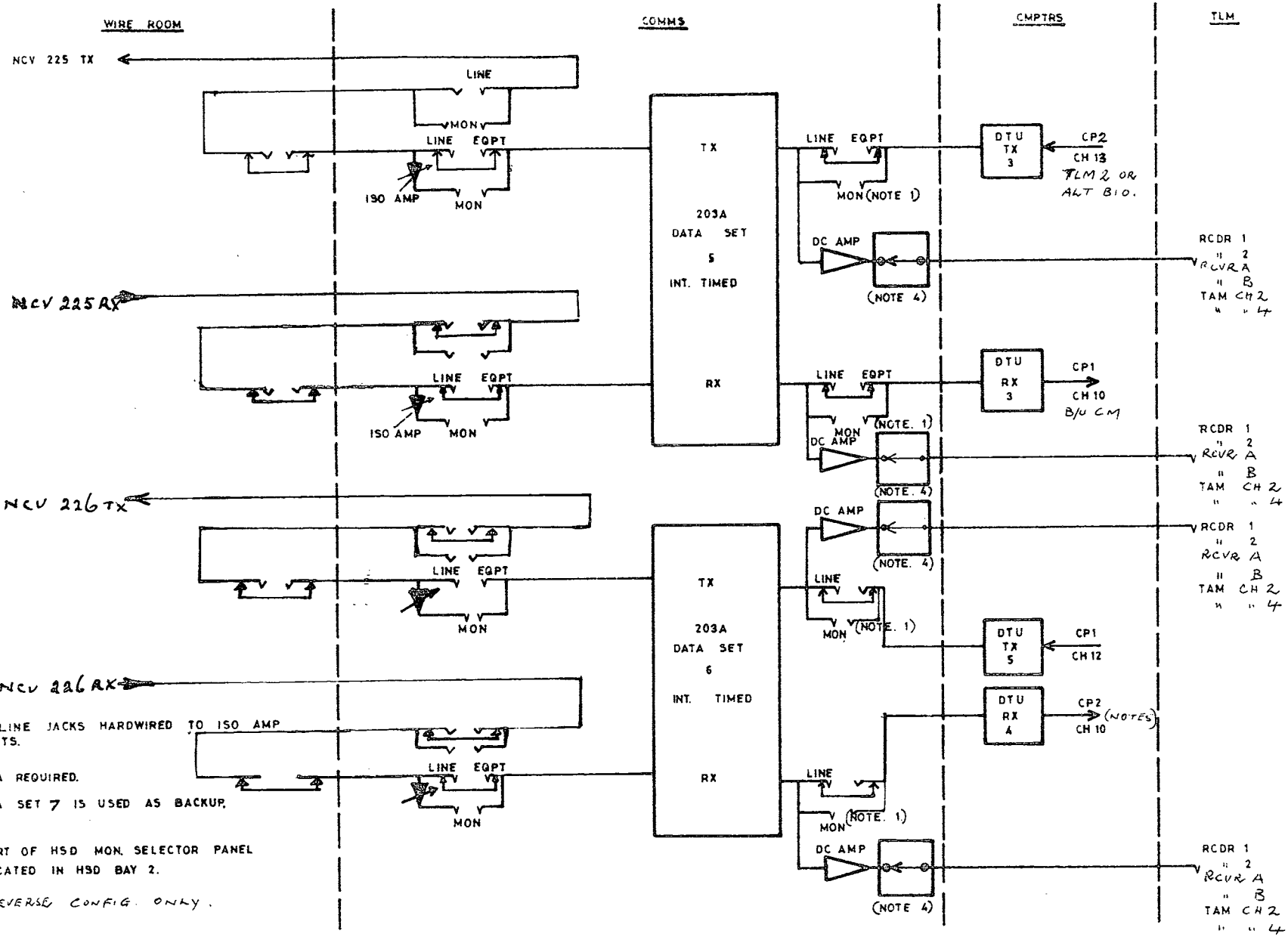
C23 D23 to A3 B3 DTU 5 to D.S. 2

NOTE : NO PATCHING OTHER THAN TURNAROUNDS MUST BE DONE AT THE A.F. PATCH PANEL 203A MODEMS TX/RX



NOTES

1. DC LINE JKS HARDWIRED TO DC ISO AMP INPUTS.
2. PATCH CMD LOADS (SRT) FROM MISC J17/J18 TO K25/26 AND K24 TO C6 DTU 5. RX.
3. RECORDERS TO MODEM TIE LINES FOR PLAYBACK ONLY (CAN BE USED BOTHWAYS IF REQUIRED.)
4. PART OF HSD MON. SELECTOR PANEL LOCATED IN HSD BAY 2.



NOTES

1. DC LINE JACKS HARDWIRED TO ISO AMP INPUTS.
2. DATA REQUIRED.
3. DATA SET 7 IS USED AS BACKUP.
4. PART OF HSD MON. SELECTOR PANEL LOCATED IN HSD BAY 2.
5. REVERSE CONFIG. ONLY.

STANDARD H.S. TRACKING DATA CONFIGURATION.

MISSION - NETWORK SIMS - CADFISS

D.C. PATCH PANEL

J2 K2 to E1 F1 (DQM MON IF REQUIRED)

A.F. PATCH PANEL

J5 to G1 (SCOPE - if required)
A9 to F1 D/S to line
A10 to F2 D/S to line

SRT PHASE 2

D.C. PATCH PANEL

A4 B4 to C22 D22 DDT

A.F. PATCH PANEL

F1 to F4 DDT

NCG 795 P&FS H.S. TRACKING DATA RECORD AND PLAYBACK

RECORD

AF PATCH PANEL

G1 to J20
(line Mon. Jk DS 1 to Rcdr. i/f Adapter Amp 1 input)

DC PATCH PANEL

K23 to J17
(Rcdr. i/f Adapter Amp 1 output to HSDM Patch Panel Tieline 1)

PLAYBACK

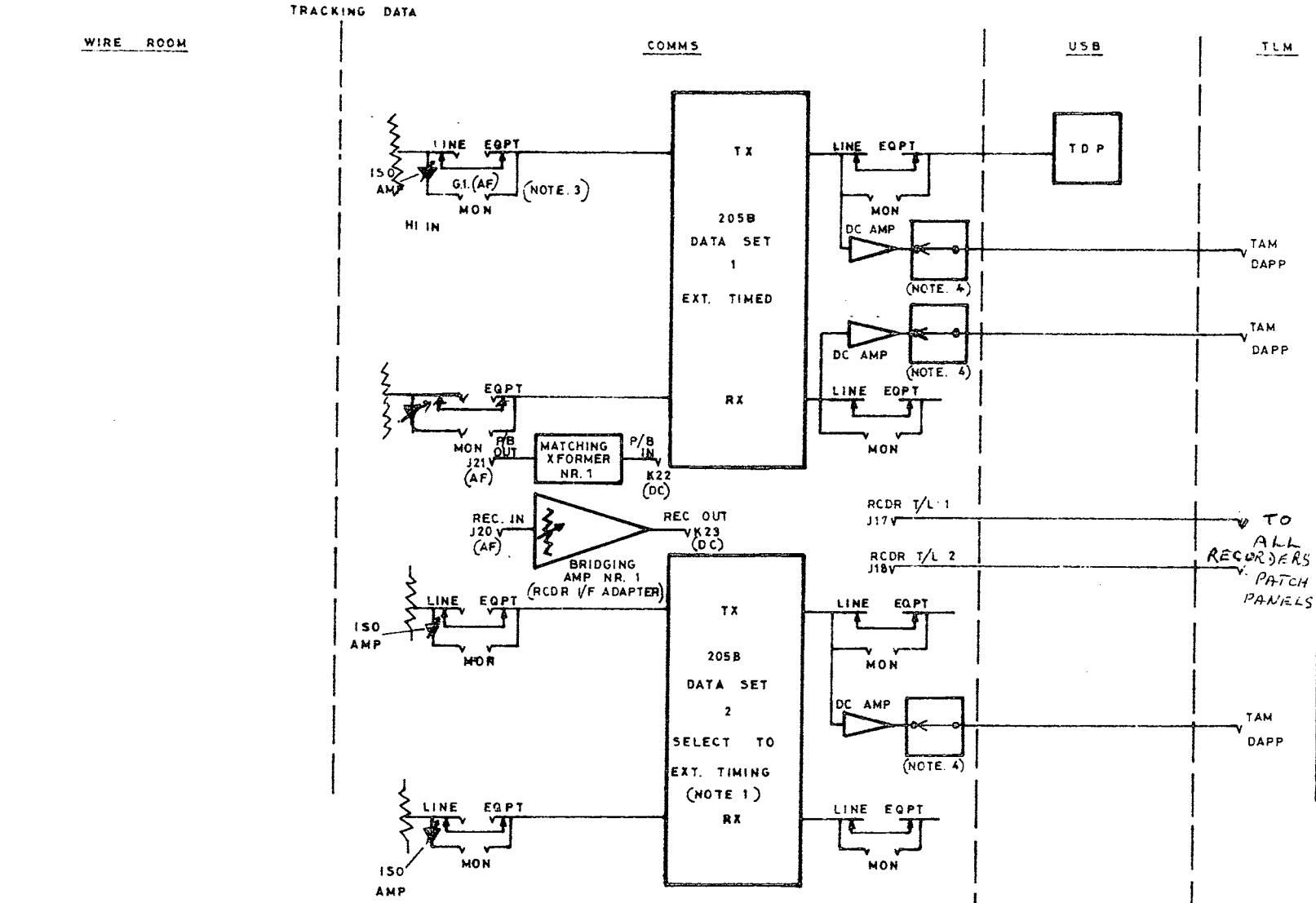
DC PATCH PANEL

J18 to K22
(HSDM Patch panel tieline 2 to i/f Adapter 50 Ohm input)

AF PATCH PANEL

J21 to A9
(I/F Adapter 600 Ohm output to NCV 225 Transmit)

STANDARD H.S. TRACKING DATA CONFIG.



NOTE 1
DATA SET 2 IS USED AS BACK UP.

NOTE 2

NOTE 4
PART OF HSD MON. SEL. PANEL.

NOTE 3 To record tracking data patch from G1 (AF Jackfield) to J20 (AF Jackfield) and from K23 to J17 (DC Jackfield) To playback recorded data patch from J18 to K22 (DC Jackfield) and from J21 to A9 (AF Jackfield)

Ch. 2

TITLE: SKYLAB TLM Recorder Configuration	SEC. No: 5.10
REFS: STDN 601 / SKYLAB NOSP	ISS.No: 14
DIST: TLM / OPS / COMMS	DATE: 28 May 73

CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:	27JUN73									
REF:	OMP 720									
PAGES:	1, 3									

ORIGINATOR: J. Vanderkly APPROVED: I. F. GRANT

This section details the recorders configuration for SKYLAB -1 and -2.

FORMAT SL-1 - DSS 531

TRK	M-22 DSS No. 531	MODE	SOURCE	RCDR MTX	
1	TLM Mixer No. 1	Dir-1	PROG. P.P.1	ABC -Y8	
2	TLM Mixer No. 2/cycle lock	Dir-2	PROG. P.P.2	ABC -Y9	
3					
4					
5					
6	248.6 MHz comb. video BP-1 S2	FM-1	CP-1	DEF-Y12	
7	245.3 MHz comb. video DP-1 1U	FM-2	DP-1	DEF-Y11	
8	2282.5 MHz IU TLM video DP-1B	FM-3	IM PM PR	DEF-Y0	
9					
10					
11	232.9 MHz video BF-2 S2	Dir-11	SPARE-1	DEF-Y9	
12	250.7 MHz comb. video DF-1 1U	Dir-12	DF-1	DEF-Y13	
13	240.2 MHz video BF-1 S2	Dir-13	SPARE-2	DEF-Y10	
14					

FORMAT SL-2 - DSS 531

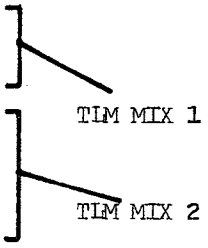
TRK	M-22 DSS No. 531	MODE	SOURCE	RCDR MTX	
1	TLM Mixer No. 1	Dir-1	PROG. P.P.1	ABC -Y8	
2	TLM Mixer No. 2/cycle lock	Dir-2	PROG. P.P.2	ABC -Y9	
3					
4					
5					
6					
7	255.1 MHz comb. video DP-1 1U	FM-1	DP-1	DEF -Y11	
8	258.5 MHz comb. video CP-1 S4B	FM-2	CP-1	DEF -Y12	
9					
10					
11					
12	250.7 MHz comb. video DF-1 1U	Dir-12	DF-1	DEF -Y13	
13					
14					

FORMAT SL-1/2 – DSS 530

TRK	FR -1900A DSS No. 530	MODE	SOURCE	RCDR MTX	
1	TLM Mixer No. 1	Dir-1	PROG. P.P.1	ABC -Y8	
2	36-bit BCD/1 KHz	Dir-2	36 Bit Mtr	N/A	
3	246.3 MHz comb. pre-D IF AM-B	Dir-3	AM-B	DEF -Y5	
4	235.0 MHz comb. pre-D IF AM-C	Dir-4	AM-C	DEF -Y6	
5	230.4 MHz comb. pre-D IF AM-A	Dir-5	AM-A	DEF -Y4	
6	2287.5 MHz CSM PCM-PM	FM-1	CSM PM PR	ABC -Y0	
7	2272.5 MHz CSM PCM-FM	FM-2	CSM FM PR	ABC -Y2	
8	72-kb/sec CMD verification *	FM-3	72kb. VER. MTR.	N/A	
9	231.9 MHz comb. video ATM-1	Dir-9	ATM-1	DEF -Y7	CH 1
10	237.0 MHz comb. video ATM-2	Dir-10	ATM-2	DEF -Y8	
11	2272.5 MHz dump voice CSM	Dir-11	DM B.B. PR	ABC -Y4	
12	TLM Mixer No. 2	Dir-12	PROG. P.P. 2	ABC -Y9	
13	133.33 KHz servo reference	Dir-13	FREQ. SYNC. MTR.	N/A	
14	91.66 KHz servo reference	Dir-14	FREQ. SYNC. MTR.	N/A	

PAM – RECORDERS TIE LINES

1. Spare
2. Spare
3. Spare
4. Spare
5. Playback TIM Mixer No. 1
6. Playback TIM Mixer No. 2
7. Spare
8. Discrim. Playback IRIG. 18 36 BIT BCD
9. " " " 17 USB CMD VER.
10. " " " 16 SDT/ 1 KHz
11. " " " 17 UHF CMD VER.
12. " " " 18 Voice Anno



PROC. P.P. – RECORDER MATRIX

1. TIM Mixer No. 1
2. TIM Mixer No. 2
3. Spare
4. Spare
5. Spare
6. Spare

REPRO. MATRIX – PCM

1. Playback DATA for DECOM 1
2. " " " DECOM 2
3. " " " DECOM 3
4. " " " DECOM 4

TIM MIXER No. 1

IRIG 18 = PRIME ANNO
" 16 = SDT/1 KHz
" 17 = UHF CMD VER.
" 6 = BF-1
" 8 = BF-2
" 10 = BP-1/CP-1
" 12 = DF-1
" 14 = DP-1

= 100 KHz REF.

TIM MIXER No. 2

IRIG
" 18 = 36 BIT BCD
" 17 = USB CMD VER.
" 6 =
" 7 =
" 12 =
" 13 =
" 14 =
" 15 =

USB MIXER SYST. 1

" 4 =
" 5 =
" 8 =
" 9 =
" 10 =
" 11 =

USB MIXER SYST. 2

TITLE: TLM/COMMS TIE LINES	SEC. No: 5.12
REFS: NIL	ISS. No: 7
SYS: COMMS TLM OPS COMPT	DATE: 14 May'73

CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REF:										
PAGES:										

ORIGINATOR: M. GEASLEY/RUCK APPROVED: I.F. GRANT

This section details COMMS/TLM Tie-line configuration.

MODEM/RCDR/P/P TIE -LINES

TIE-LINE	USE
1.	TDP H.S. DATA
2.	P/B TDP H.S. DATA
3.	SPARE
4.	SPARE

PAM/COMMS TIE-LINES

1.	R/T OR P/B DUMP VOICE TO NET-1 AUX BDGE LEG-1 OR AS REQUIRED.
2.	FM/FM TO WIRE ROOM P/P JACK.
3.	SPARE
4.	SPARE
5.	SPARE

TV AUDIO TIE-LINES

1.	NET-1 TO VR-660.
2.	VR-660 P/B TO NET-1.
3.	SPARE
4.	SPARE
5.	SPARE
6.	SPARE
7.	SPARE

MODEM/PROG P/P TIE-LINES

1 THRU 4	SPARES.

TITLE: DSDU P.P. CONFIGURATION									SEC. No: 5.14	
REFS: N/A									ISS.No: 6	
DIST: TIM/OPS									DATE: 28 May'73	
CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REF:										
PAGES:										
ORIGINATOR: G. RUCK						APPROVED: I. F. EKANI				

1. Table 1 lists the basic requirement for SKYLAB DSDU patching.

2. Variations in patching are centred about DAC and possible event remoting, all other patching will remain as shown in the table.

3. The table assigns DAC patching for BIOMED monitoring as follows –

   AM-A – DECOM 2

   CSM – DECOM 3

   Alternative DECOM assignments will require repatching of the relevant DAC 'SET' on a 1 for 1 basis.

4. In the table only the active patch is recorded. The return is assumed to be used.

TABLE 1

DATA		FROM	TO	
Decom Lock,	Decom 1	A2 NN32	A2 EE30	
		QQ33	A2 GG30	
		NN33	A4 AA28	
	Decom 2	SS32	A2 EE31	
		UU33	A2 GG31	
		SS33	A4 AA29	
	Decom 3	WW32	A2 EE32	
		YY33	A2 GG32	
		WW33	A4 AA30	
	Decom 4	UU34	A2 EE33	
		YY34	A2 GG33	
		SS34	A4 AA31	
SPE/AGC	Decom 1	AA9	A2 AA30	
		AA10	A2 CC30	
	Decom 2	CC09	A2 AA31	
		CC10	A2 CC31	
	Decom 3	EE09	A2 AA32	
		EE10	A2 CC32	
	Decom 4	GG09	A2 AA33	
		GG10	A2 CC33	
CSM BIOMED	DAC 40	SS11	LL 22	(DECOM 3)
	41	12	23	
	42	13	24	
	43	14	25	
	44	15	26	
	45	SS16	LL 27	
AM BIOMED	DAC 40	QQ11	UU 10	(DECOM 2)
	41	12	11	
	42	13	12	
	43	14	13	
	44	15	14	
	45	16	15	
	46	17	16	
	47	18	UU 17	

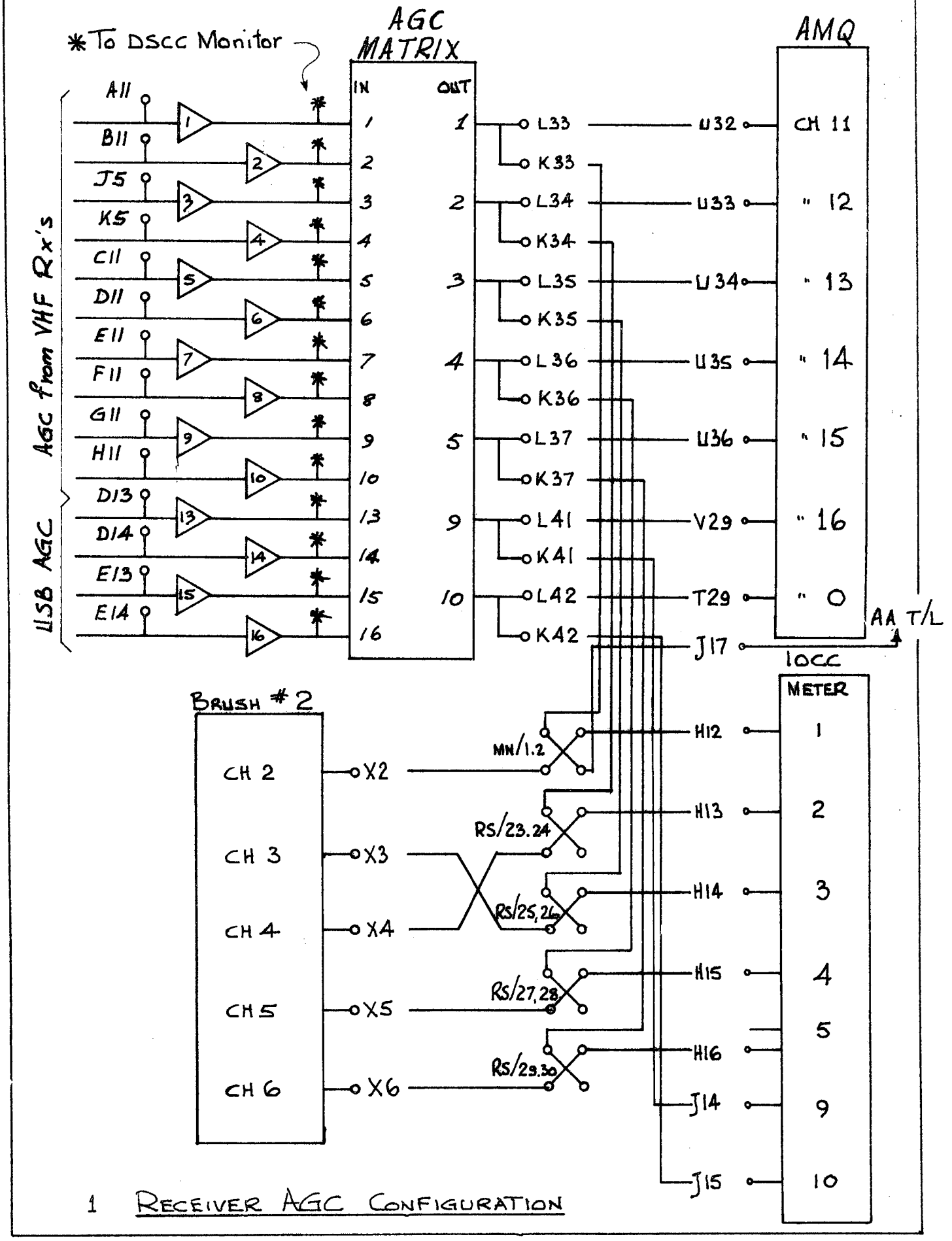
TITLE:	TLM PROG. P.P. CONFIGURATION	SEC. No: 5.15
REFS:	N/A	ISS.No: 8
DIST:	TLM / OPS	DATE: 1 JUNE'73

CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REF:										
PAGES:										

ORIGINATOR: G. RUCK APPROVED: I. F. GRANT

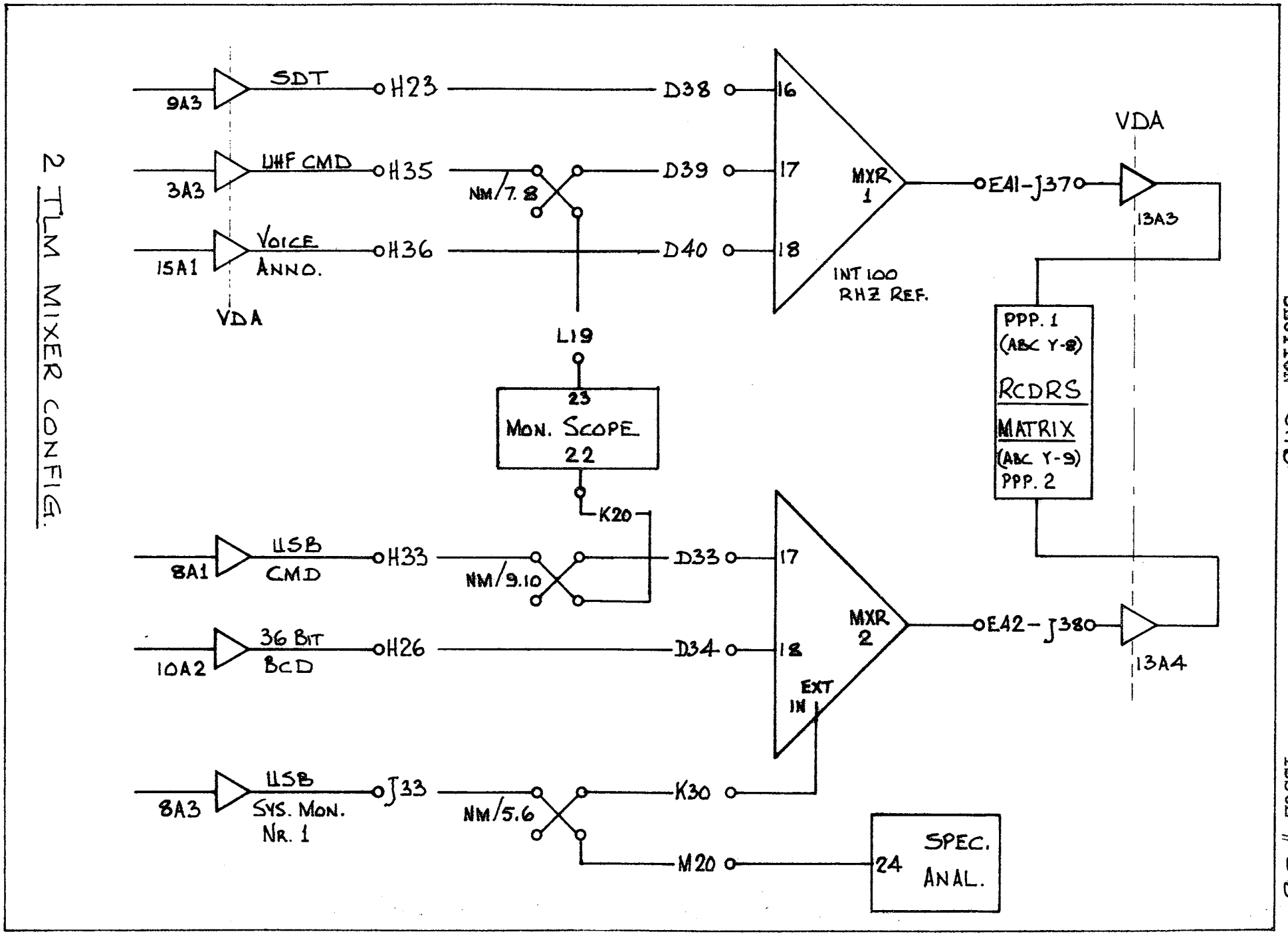
This section details the P.P.P. configuration and associated DATA Flow for the following :-

1. RX AGC Configuration.
2. TLM MXR Configuration.
3. RCDRS MXR Verify Configuration.
4. AM BIOMED Monitor Configuration.

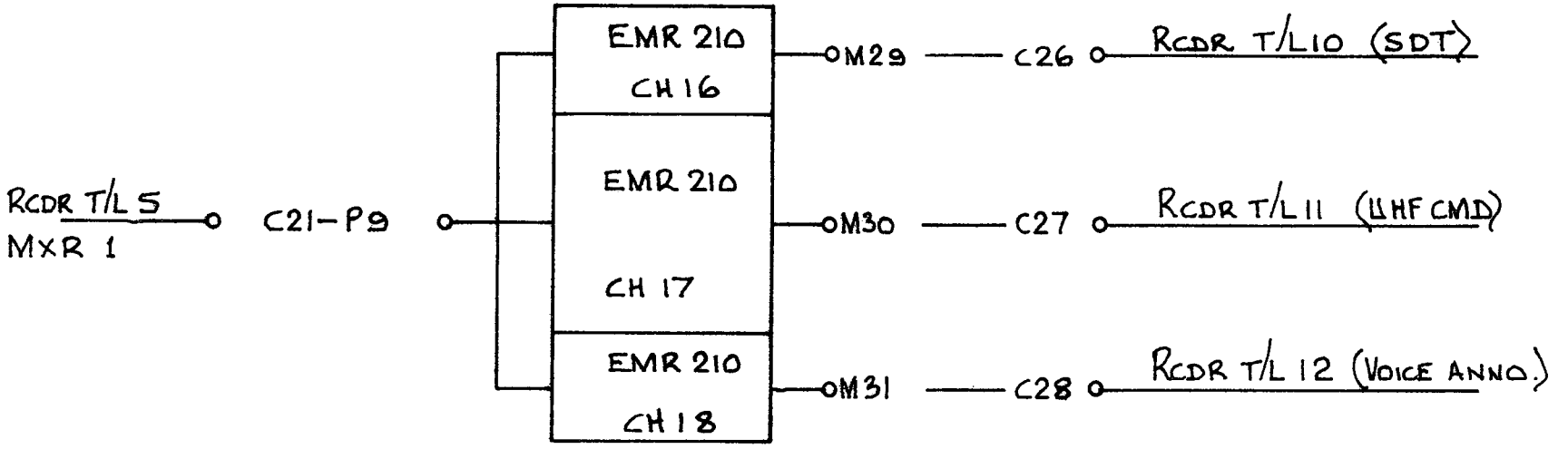


1 RECEIVER AGC CONFIGURATION

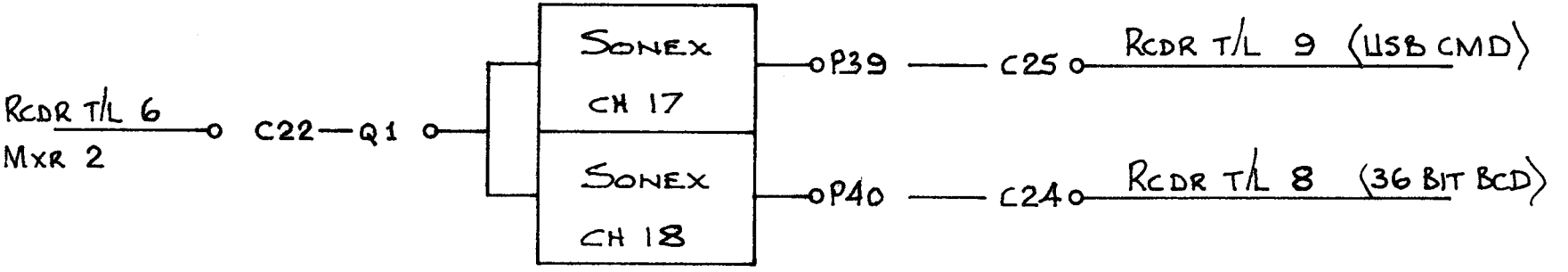
OMP # 718

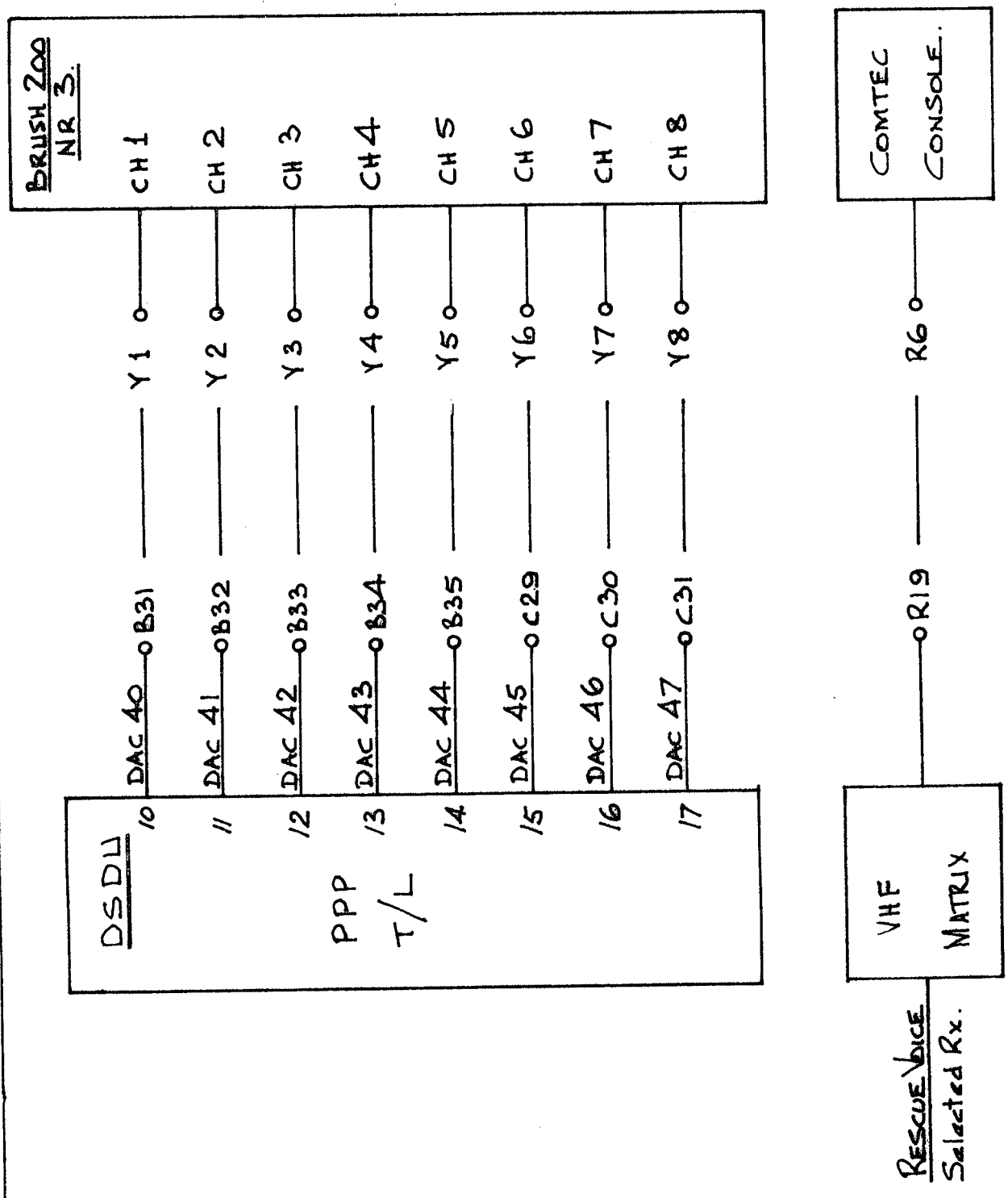

2 TLM MIXER CONFIG.
SDT
9A3
H23
D38
16
UHF CMD
3A3
H35
NM/7.8
D39
17
MXR 1
E41-J370
VDA
13A3
VOICE ANNO.
15A1
H36
D40
18
INT 100 RHZ REF.
VDA
L19
PPP. 1 (ABC Y-8)
RCDRS
MATRIX
(ABC Y-9) PPP. 2
23
MON. SCOPE 22
K20
LSB CMD
8A1
H33
NM/9.10
D33
17
36 BIT BCD
10A2
H26
D34
18
MXR 2
E42-J380
13A4
EXT IN
LSB SYS. MON. NR. 1
8A3
J33
NM/5.6
K30
M20
24
SPEC. ANAL.

DEMOD TLM MXR NR 1



DEMOD TLM MXR NR 2





4. RESCUE VOICE & AM BIOMED MONITOR CONFIGS.

S-06 M.O.D. INDEX - SECTION 6

STATION PLUS TIME PROCEDURES

SEC	TITLE	ACTION	DISTRIBUTION				
			USB	TLM	COMP	COMMS	OPS.
6.1	RETURN FROM STANDBY COUNTS * MISSING 12/7	OPS	X	X	X	X	X
6.2	SKYLAB ACQUISITION PROCEDURES	USB	X		X		X
6.3	R.F.I. TEST PROCEDURES	USB	X	X			X

TITLE: SKYLAB ACQUISITION PROCEDURES										SEC. No: 6.2
REFS: 601/SKYLAB										ISS.No: 1
DIST: USB, OPS, COMPUTERS										DATE: 14 MAY 73
CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REF:										
PAGES:										
ORIGINATOR: M.EVENETT						APPROVED: I.GRANT				

1) USB.

1.1 The USB servo operator will compare the horizon profile with predicts and determine AOS and LOS times. If the pass elevation is less then 10 degrees or the pass goes through keyhole, the pass will be plotted. All relevant information will be passed to USB lead and then to Ops.

1.2 The antenna will be positioned ten seconds along the track from horizon break and "sit" time. This "sit" time will be announced on "Delta" loop for the benefit of Teltrac and Command Van.

1.3 Receiver 1 will normally be the main antenna tracking receiver with receiver on the acquisition antenna.

1.4 Skylab predicts are expected to be sufficiently accurate to enable auto track to be determined by the "bouncing ball" scope and selected direct. Once valid auto track is confirmed it will be announced on "Delta", and receiver 2 may be selected to the main antenna.

1.5 If auto track is not achieved by "sit" time plus twenty seconds, program track will be selected. Acquisition track may be used to obtain auto track. Servo tech has the option to select program track earlier if desired.

1.6 If no RF contact or only intermittent contact USB lead may use the Acquisition Bus to point the S band antenna. (care must be exercised not to slave to Teltrac while Teltrac is slaved to USB).

2. UHF Command.

2.1 USB will nominate before pass which slaving source will be used.

2.2 Prior to the pass the command technician will plot the pass to determine horizon masking and optimum cable wrap conditions. All relevent information, including horizon break and loss will be given to USB lead. DTG of SCM'S and pointing data will be confirmed prior to each pass.

2.3 During the pass, antenna angles will be compared to predicts to confirm correct painting. In the event of computer drive failure, USB or Teltrac will be used as slave source, if not already in use.

NOTES.

1) The computer output can drive the antenna below zero elevation. At horizon masking at the end of the pass the command antenna will be returned to local control and held at this position for at least two minutes at the end of each pass.

2) In certain passes USB will track around the keyhole. For these passes Teltrac is a more reliable slaving source than USB.

3) Teltrac can track through 90 degrees elevation, it must not be used as slaving source for passes within ten degrees of zenith.

5) In some passes the USB dish may mask the command Antenna beam near horizon. CMD servo operator will report to USB time of commencement of masking by 85' Antenna

3. Teltrac.

3.1 Teltrac General Information.

Extract from STDN 502.2. Revision 1.

Table 7-89. Instruction

Time Frame	Instruction Applicability	Instruction	Ref No.
H-1h	AGAVE 584 AGAVE 8417 TELTRAC	Antennas - In order to keep a record of the overall stability and sensitivity of the acquisition aids, the servo azimuth and elevation error voltages and the Automatic Gain Control (AGC) voltages are normally recorded on a paper chart recorder. The procedures for adjusting the recording equipment for the acquisition aid systems are as follows: a. Sanborn Recorders (1) General. Greenwich Mean Time (GMT) will be recorded in serial decimal or 36-bit BCD time. Azimuth and elevation servo tracking error voltages will be recorded on the Sanborn performance recorders. The center of the channel will be used for the zero-error signal. Error channels will be calibrated so that full scale in either direction will represent ±5 degrees of error from the boresight reference target. The ±1 and ±3 degree points will be annotated. When required, system AGC voltage will also be input to the Sanborn recorder. Signal strength calibration levels will be injected at the sum channel Radio Frequency (RF) diplexer via the signal generator test cable. At stations that do not have diplexers, the signal will be injected at the sum channel input. (2) Signal Generator Output. The combined loss introduced by the relay-operated attenuators and the test cable (as determined during the performance of the EMD's) will be used in determining the signal generator output for a required sum channel RF diplexer input level. (3) Atmosphere and System Noise Annotation. The system will be reconnected for normal operation and the antenna positioned to an elevation of 10 degrees. The antenna will be rotated in azimuth while AGC is being recorded and the recorder will be annotated at 0, 90, 180, and 270 degrees. The AGC will be the result of atmospheric and system noises. (4) General Annotation. Recordings will be annotated to indicate the function recorded, calibration labels, system number, mode of operation, and those items specified in the pertinent mission NOSP.	

2.1.2 VHF ACQUISITION SYSTEMS

2.1.2.1 General. Acquisition aid and other VHF telemetry receiving antennas will track the launch vehicle and SWS and provide pointing data to other steerable antennas as required.

2.1.2.2 Link Assignments. The prime tracking links are listed in table 2-2.

Table 2-2. Skylab-1 VHF Prime Tracking Links

Tracking Priority	Vehicle	Freq (MHz)	Power (watts)	Minimum Bandwidth (kHz)
1	IU	245.3	15	100
2	AM	230.4	2/10	300
3	S-II	248.6	15	100

2.1.2.3 Antenna Tracking Requirements. ~~After S-II/SWS separation, all stations except~~ AFTER SII/SWS SEPARATION, CRO, CYI, MAD, MIL, AND TEX WILL BE REQUIRED TO TRACK THE S-II UNTIL BATTERY DEPLETION USING A SEPARATE VHF ANTENNA, IF AVAILABLE. DCN # 016

2.2.2 VHF ACQUISITION SYSTEMS

2.2.2.1 General. Acquisition aid and other VHF telemetry receiving antennas will track the launch vehicle and SWS, provide VHF voice coverage (296.8 MHz) from the CSM, and provide pointing data to other steerable antennas as required.

2.2.2.2 Link Assignments. The prime tracking links are listed in table 2-47.

Table 2-47. Skylab-2 Prime Tracking Links

Tracking Priority	Vehicle	Freq (MHz)	Power (watts)	Minimum Bandwidth (kHz)
1	IU	255.1	15	100
2	AM	230.4	10	300
3	S-IVB	258.5	15	100

Note

1. When supporting the IU/S-IVB links, the IU 255.1-MHz link will be the primary tracking link and the S-IVB 258.5-MHz link will be secondary.

2. When supporting the AM/ATM links, the AM 230.4-MHz link will be the primary tracking link and the ATM 231.9-MHz link will be secondary.

2.2.2.3 Acquisition Antenna Configuration. Stations will conform to STDN No. 502.2 with respect to their individual tracking capabilities.

2.2.2.4 Antenna Tracking Requirements. After S-IVB/CSM separation, dual-capability stations may be required to track both vehicles simultaneously to provide VHF A-G voice remoting from the CSM and VHF TLM data from the S-IVB/IU.

All stations will be required to track the SWS and the S-IVB/IU until battery depletion. IF REQUIRED TO PROVIDE CSM VHF VOICE COVERAGE WHEN THE CSM IS NOT WITHIN THE VHF ANTENNA BEAMWIDTH, THE VHF ANTENNA WILL BE SLAVED TO THE USB ANTENNA.

2.2.2.5 Autotracking. Autotracking the S-IVB/IU or SWS will be done in the cross-correlation mode.

3.2 Instructions

3.2.1 Teltrac operator will confirm DTG of predicts and SCM for upcoming pass. Teltrac operator will plot pass against horizon profile and determine AOS, "sit" and LOS times and will also report times if 85' antenna masks acqaid. He will configure antenna for optium cable wrap position.

3.2.2 If pass goes through 90 degree elevation, Teltrac operator will warn USB lead and command van operator.

3.2.2 Auto track will normally be the prime method of driving the teltrac antenna, with USB to be used if available. If not slave to computer, or as directed by USB during CSM / DWS rendezvous.

3.2.3 Auto track will not normally be used at less than 10 degrees elevation.

3.2.4 VHF auto track will be announced on "Delta" loop. (If strip chart recorder AGC reduces in level - computer mode will be selected immediately).

3.2.4 Strip chart recordings will be annotated both pre and post pass. The combined recordings for the group of passes will be labelled and kept for thirty days.

NOTES.

1) All anomalies will be reported and discussed with USB lead.

2) The prime function of the Teltrac system is to obtain VHF TLM and VOICE information, (Auto track will be exercised with care).

3) The computer output can drive the antenna below zero elevation. At horizon masking at the end of the pass, local control of the antenna will be initiated and antenna will be held at the point for two minutes after last trace of R.F signal.

4) In certain passes USB will track around keyhole, slaving to USB will not be used in these passes.

5) Great care must be exercised not to slave to USB while USB is slaved to Teltrac.

4. 1218 Computers.

4.1 1218 operator will check with USB lead regarding tape/real time requirements for each pass.

4.2 ACQ messages will be referenced by their type and HRTC number e.g. "IRV HRTC 701.

TITLE: R.F.I. TEST PROCEDURE	SEC. No: 6.3
REFS: NIL	ISS.No: 1
DIST: U T	DATE: 22 MAY'73

CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REF:										
PAGES:										

ORIGINATOR: M. EVENETT APPROVED: I.F. GRANT

1) When specified in the H minus count VHF RFI checks will be performed. These will consist of slewing the antenna along the predicted track and observing the spectrum displays in the servo rack and above the VHF TLM rack. Any interference noticed will be recorded in the log with azimuth and elevation angles, approximate signal level and description (ie. ignition type noise - pulsed carrier etc.). Reults will be given to OPSR.

2) The following are known sources of R.F. carriers at Canberra airport.

   a) Canberra Tower at 257.8 MHz FM Voice.

   b) Canberra I.L.S at 242.0 Mhz tones on carrier.

   c) Canberra DME at 224.0 MHz pulsed carrier.

   d) Church Creek location at 246.0 MHz tones on carrier.

S-06 H.O.D. INDEX - SECTION 7

DETAILED PLUS TIME PROCEDURES			DISTRIBUTION				
SEC	TITLE	ACTION	USB	TLM	COMP	COMMS	OPS.
7.1	EMOD Validation procedures	COMP		X	X	X	X
7.2	OUCH procedures	COMP			X	X	X
7.3							
7.4							
7.5							
7.6							
7.7							
7.8	Tracking Data rules	USB	X			X	X
7.9	Handover procedurs	USB	X				X
7.10	Ranging procedures	USB	X				X
7.11	IU/LM frequency offset and trk guidelines	USB	X				X
7.12	APP acquisition message procedures	USB	X		X		X
7.13							
7.14	Comms back-up circuits confidence checks	COMMS				X	X
	*ALL SECTIONS MISSING 12/7						

CONTIGENCY PROCEDURES

SEC	TITLE	ACTION	DISTRIBUTION				
			USB	TLM	COMP	COMMS	OPS.
8.1	USB contingency procedures	USB	X				X
8.2							
8.3	Comms contingency configs	COMMS				X	X
8.4	Computer contingency procedures	COMP		X	X	X	X
8.5							

TITLE: U.S.B. CONTINGENCY SUPPORT									SEC. NO. 8.1	
SUBJ: 502.4 601 ALSEP/P & FS ERTS									ISS. NO: 1	
ORIG: USB (6) OPS									DATE: 14th Sept'72	
CHG NO:	1	2	3	4	5	6	7	8		
DATE:										
APP'D:										
PAGES:										

ORIGINATOR: M. EVENETT APPROVED: I.F. GRANT

This section contains general procedures for operation of USB equipment. These contingency procedures could be used if only part of a shift was on site to support a spacecraft. Certain detailed procedures will be found in the spacecraft sections 10 and 11.

This section includes

A Servo check out procedure

B USB Power Amplifier Operating Procedures

C Guide to Verification

D R.E.R. Operating guide

E Guide to Data Demods

F Timing Checks

G APP/TDP procedures

A. SERVO CHECK-OUT PROCEDURE

NOTE: Use servo check sheets (HOD Sect. 2.24 Pages 3 and 4.)

1. Check with power house that sufficient power is available to run antenna. Check safety board that antenna is clear.

2. Set Safe/Normal key switch on rack 1U10 to NORMAL.

3. Press POWER ON switch on servo console. Check that all sections of adjacent green indicator are lit.
   NOTE: If 'GEN' light is not lit check all emergency stop switches on antenna. Switch which has been pressed will show steady red light. If all emergency switches are open and GEN light still remains white, consult cognisant USB or FACS technician.

4. Switch on VTVM and TV monitor power (2 switches).

5. Check that voltages on VTVM at test switch positions 5, 6, 12, 15 & 16 correspond to figures on front panel.

6. Press emergency stop button at top of rack 1U10 and check that GEN light goes out. Reset switch knob.

7. Set SAFE/NORMAL key switch to SAFE and see that GEN light goes out.

8. Set SAFE/NORMAL to NORMAL and "Warning Control" key switch on servo console to ON.

9. Press X 'HYDRO RUN' switch on servo console. Lower (red) section light should go off and after a few seconds the upper (green) section should be lit. If lower red section flashes after switch is pressed, press again and green section should light after a few seconds. 'Replenishment Press.' light should be out after green 'HYDRO RUN' light is on.
   NOTE: If green hydro run light does not light after 2nd press consult cognisant USB or FACS technician.

10. Repeat para (9) for Y axis hydraulics. The following servo console red indicators only should be lit with both axes hydraulics running:- BRAKE mode select switch/ind, both sections of both 'AXIS DISABLE' switches.

11. Place safety cover over servo console and insert name.

PEDESTAL HOUSE

12. Check X & Y running hours. (Boxes on RH side going in).

Y SKID (S SIDE)

13. Check cables & plugs for security.

WHEELHOUSE

14. Inspect dish hoist for security (S side of Y axis wheelhouse).

15. Check all drawers, doors and equipment for security and check area for loose articles.

16. Inspect upper feed cone for security of equipment and of cone door (door latches hard down). Check for loose articles.

17. Press cone door reset switch outside wheelhouse north side on way down..

Y SKID (N SIDE)

18. Check Y hydraulic package for leaking oil and undue noise or vibration. Inform cognisant technician and shut down hydraulic package if excessive leakage or rough running is evident.

19. Check and record control and replenishment pressures and reservoir level.

20. Check all cables and plugs for security.

X SKID

21. Repeat paras 18 thru 20 for X hydraulics and inspect cables and connectors on E side of X skid.

SERVO CONSOLE

NOTE: During following steps observe X and Y real angles readouts (upper displays) AT ALL TIMES to avoid unintentionally running antenna into pre-limits (+ and - 85° in X, + and - 74° in Y).

22. Enable each axes. Select 'MANUAL POSITION'. After about 5 secs move ball in N - S, E - W directions and check that antenna follows in X and Y axes respectively (about 0.010° per inch of ball movement).

23. Depress either COARSE button and hold. After about 5 seconds move ball N - S, E - W and check that X & Y axes move about 1° per inch of ball movement. Release COARSE button.

24. Select 'MANUAL VELOCITY'. Move ball in each direction and check that antenna drives continuously at rate of 0.05° per second for each inch of ball movement. Press & hold "Velocity Reset" switch to stop antenna after checking in each direction.

25. Depress and hold 'COARSE' button. After about 5 seconds move ball in each direction and check that antenna runs continuously at rate of 0.5°/sec per inch of ball movement. Press VELOCITY RESET to stop antenna after each direction.

26. Select 'STOW'. When antenna is at stow select 'MANUAL POSITION'.

27. Set APP control to REMOTE and Data source switched to MANUAL. Set +10° into X & Y switches on servo console.

28. Select TEST PROGRAM and check that antenna drives to +10° in each axis.

29. Select MANUAL VELOCITY mode and move ball to produce an antenna movement of 1°/sec in both axes (use real angle displays as a guide).

30. Select BRAKE and check that both axes stop moving and that lower section of DISABLE switch is lit red after about 5 secs. If red light is not lit but axis stops moving, consult cognisant technician. If axis does not stop moving when 'brake' is selected, shut down axis hydraulics immediately and inform cognisant technician.

31. Select MANUAL POSITION mode. Select circular scan with a 5° amplitude setting. Press SCAN switch and check that antenna scans in a circular pattern about its previous position.

32. Press SCAN HOLD. Check that antenna stops scanning and COARSE lights are lit.

33. Select MANUAL VELOCITY. Drive antenna towards +X pre-limit at about 0.5°/sec. Press VELOCITY RESET at X = 82°. Drive antenna slowly about 0.1°/sec into pre-limit and check that drive stops at about +85.5° and X pre-limit light flashes. Select STOW.

34. Repeat para 33 in -X, +Y and -Y directions.
NOTE: Y pre-limit occurs about 74.5° so stop antenna at 72° in Y and drive at 0.1°/sec from there to Y pre-limit.

35. Select STOW on completion of pre-limit checks. When antenna is at stow, select BRAKE mode and disable both axes.

B. USB POWER AMPLIFIER OPERATING PROCEDURES

1. Call power house EXT 28, advise operator of requirement to run one or both P.A.s.

2. When power available, press P.A. SYSTEM ON button (bottom L.H. button). (System 1 ALSEP & ERTS, System 2 P & FS).

3. Wait 1 minute until Beam Voltage Lowering Light extinguishes.

4. Press BEAM VOLTAGE INTLK RESET button.

5. Check ANTENNA/DUMMY indicates 'DUMMY'. Select if necessary.

6. T.D. light (Time Delay) extinguishes after 5 min from System on.

7. Observe P.A. status, as follows:-

   All red fault location lights extinguished.

   P.A. SYSTEM indicator GREEN.

   R.F. LOAD indicator AMBER.

   BEAM VOLTAGE READY indicator GREEN.

   BEAM VOLTAGE OFF indicator RED.

   RF DRIVE ATTENUATION meter reads 20db. Adjust RF DRIVE if necessary.

8. Press BEAM VOLTAGE ON button.

9. Observe beam voltage rises to 16 KV.

10. At the appropriate Exciter Control Panel check VCO and Synthesiser frequency status:-

    EXC 1 ERTS VCO 2 freq. 21941732HZ.

    EXC 1 ALSEP. Modulation Select 'ALSEP'. Freq. 22072917HZ.

    EXC 2 P & FS. VCO 1. Freq. 21893772HZ.

    Select TX DRIVE ON.

11. At the P.A. Control Panel, adjust RF DRIVE for 2KW on the RF OUTPUT POWER FWD meter.

NOTE

Inability to reach required output or illumination of fault location lights, indicate equipment malfunction. SWITCH BEAM VOLTS OFF & if necessary, SYSTEM OFF PENDING INVESTIGATION BY COGNISANT TECHNICIAN.

12. At the Line Stretcher Control Panel, adjust line stretcher to setting for required frequency:-

P & FS ..... 2.2 inches (System 2)

ERTS ..... 2.2 inches (System 1)

ALSEP ..... 3.2 inches (System 1)

TRANSMITTING INTO ANTENNA

1. Press BEAM VOLTAGE OFF switch. Observe BEAM VOLT LOWERING indicator illuminates.

2. On Exc Control Panel select TX DRIVE OFF.

3. On P.A. Control Panel select RF LOAD to ANTENNA. Illuminates GREEN.

4. Check BEAM VOLT LOWERING extinguishes after 30 seconds.

5. Press BEAM VOLTAGE ON switch, observe B.V. run-up to 16KV.
Observe RF OUTPUT POWER FWD METER indicates 2KW when TX DRIVE ON selected at the Exc Control Panel.

C. GUIDE TO VERIFICATION

System Description

1. Receivers are System Orientated.

2. Discriminators are Vehicle Orientated.

3. System Outputs are designated LM & CSM.
CSM refers to: ALSEP ERTS & CSM
LM refers to: IU LCRU & LM

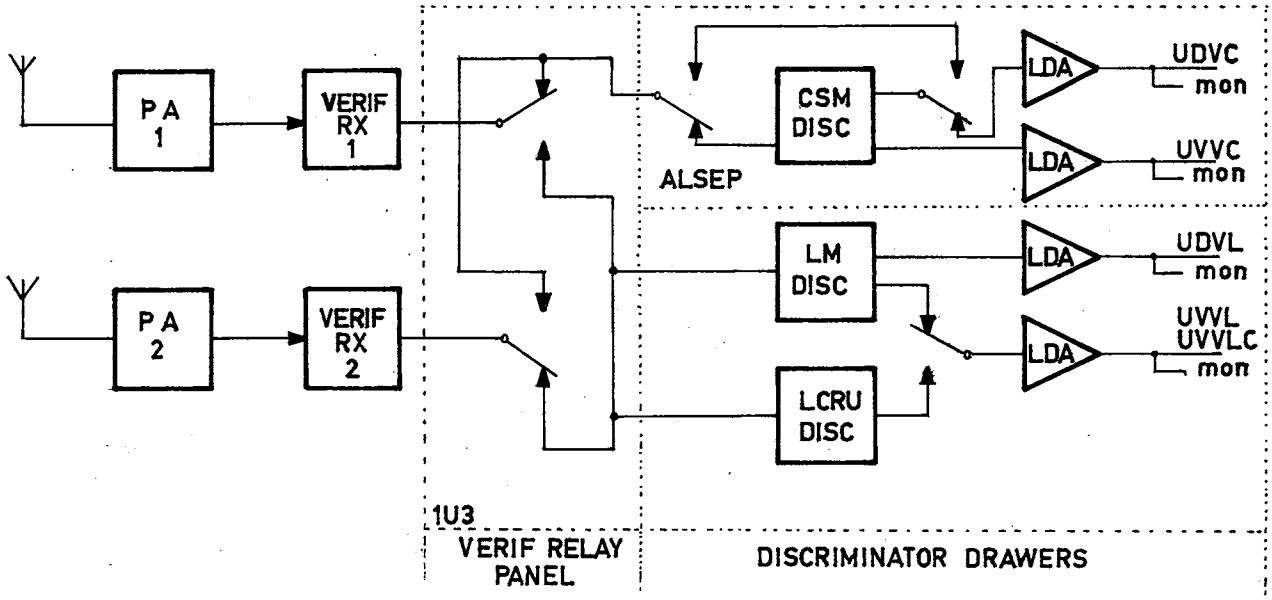
4. Upper Discriminators are CSM.
Lower Discriminators are LM.

5. The 70 KHz Discriminator Output is UDV.
The 30 KHz " " is UVV.
The 124KHZ " " is LCRUUVV.

6. Although there is a 124 KHz Discriminator in the CSM Drawer, it is not used and should be ignored.

7. System Outputs can be monitored on the 'scope in 1U51 by selecting UDV or UVV CSM/LM on the pushbutton selectors.

8. The Logic Switching enabling the verification receiver output to go to the correct discriminator is carried out in the verification Relay Panel.



9. Indicators on the Verification Relay Panel show that the "Radiating" bit is present on the System and frequency illuminated.

10. Override 1 and 2 buttons enable Wing verification to be utilized when a prime system is radiating on a common frequency thereby inhibiting Wing Verification. Prime System verification has priority over Wing.

11. Verification Receiver frequency is determined by the crystal used in the tuner, which is remotely selected by Exciter VCO Selection, therefore the tuner frequency Selector switch is left in REMOTE.

12. For ALSEP operation there is no uplink subcarrier, therefore the discriminator acts only as a line driving amplifier. For this reason the Video output of the receiver must be set to give 1.4vpp on the UDV monitor.
In the case of the IM, CSM, IU or LCRU the Video output should be set to give 0Ø on the Video Output Meter.

13. Video output filter is set to a bandwidth determined by the uplink mode therefore in IM/CSM modes with 30 and 70 KHz uplink subcarriers present. The narrowest usable bandwidth is 100KHz.

14. Second local oscillator is always used in the Xtal position, thereby making use of the internal Xtal.

15. Tuning and Manual Gain are not used in our support configurations.

16. AGC response time is always FAST as receiver is directly coupled to P.A. via Coupler and is not used in a normal receiver configuration.

OPERATIONAL INSTRUCTIONS

1. Check that power is applied to both receivers by observing power ON indicator.

2. Check that correct Demodulator is fitted to Receiver #1. Receiver #2 Demodulator should not be changed.

For ALSEP - PMD 120 A - 1
" IM/CSM - PMD 120 A

3. Check that correct crystals are fitted to Receiver #1. Receiver #2 Crystals should not be changed.

ALSEP Crystal holder marked ALSEP
LM/CSM " " " APOLLO

4. Check Video Bandwidth Settings.

ALSEP	12.5 KHz
IU LM CSM ERTS	100 KHz
LCRU	300 KHz

5. Control Settings. Other than mentioned above.

	IU/LM/CSM/ERTS/LCRU	ALSEP
AGC	FAST	FAST
2/LO	XTAL	XTAL
TUNING	N/A	N/A
MAN GAIN	N/A	N/A
XTAL SELECT	REMOTE	REMOTE
VIDEO O/P	ODB WITH U/L S/C PRESENT	1.4vpp on UDV MON

To obtain uplink modulation. Drive, Normal Mod or Alsep Mod should be on.
Transmitter should be either Radiating into Dummy with UDV Interlock Overridden or into Antenna & the UDB should be in operate.

In this condition the respective verification receiver should indicate SIGNAL STRENGTH (AGC) and the respective indicator should light on the Verification Relay Panel.

Biphase Modulation should be seen on the Monitor Oscilloscope.

D. RER OPERATING GUIDE Assumes operator knows the location of the adjustable devices with reference to the required station configuration.

1. Select correct RCVR VCO on each receiver and on System #1, correct frequency selection on appropriate digit switch bank (these are listed on equipment).

2. Check RCVR TLM bandwidth selection. i.e.

ERTS	3.3 MHz
P & FS	60 KHz
ALSEP	4.5 KHz or 60 KHz (LBR/NBR or HBR)

Check TLM phase shifters (in cabinets 5 and 8 both systems) are set correctly. These figures are supplied for all RCVRS/bandwidths on the operating desk.

3. Ensure correct RCVR # 1 and 2 angle phase shifter settings. These are listed on cabinet 5U4 door. RCVR 1 should be phased for main antenna, and RCVR 2 for acq antenna working.
Main X 5U5A110, Y 5U5A109, ACQ X 5U8A110, Y 5U8A109.

4. Check correct setting of RCVR loop bandwidth. i.e.

ERTS	-	WIDE
ALSEP	-	NARROW
P & FS	-	MEDIUM

Receiver Loop Filters to 'OPERATE'.

5. Select AGC bandwidth to 'WDIE'. 'NARROW' can be used after acquisition of ALSEP or P & FS. Gain control selectors to 'AGC'.

6. Check correct setting of RCVR #2 sum channel select switch.

Use "AUTO"ACQ" for ERTS
"MANUAL"MAIN" for ALSEP – P & FS.

7. Check correct setting of synthesizer keyboard. i.e.

CSM/ERTS	21.94173200
LM/P & FS	21.89377200
ALSEP	22.07291700

Check synthesizer output meter reads in green range.

8. Check Exciter VCO selection.

ERTS	VCO 2
P & FS	VCO 1
ALSEP	IGNORE

For all except Alsep check synthesizer loop lock.
Check Translator switches are OFF. Exc System #2. RCV #1 SYS #1.

9. On exciter control panel check modulation selector is either OFF or ALSEP as applicable. TX drive OFF.

10. On range receiver control panel input select is set for correct tracking receiver. Normally System #1 ERTS is RCVR 1, System #2 P & FS is RCVR 2 (4). Check acquisition switch is set to OPERATE. Range Loop BW – WIDE. CCTL Loop Filter to operate.

11. In rack 1U11 check that the correct uplink mode has been selected. Normally

ERTS – 5
P & FS – 3
ALSEP – 3

For Alsep set Alsep mod toggle switch to operate.

12. In rack 1U12 at A5, A6 select modes 1 – 8 for all vehicles.
At A7 check Preamp Status. Normally – the following lights should be illuminated.
C.P. or W.P. SUM, W.P. X – Y, RCVR 1, TRK, INSTR BLDG.

13. Before acquisition ensure all signal sources are off. i.e. Sim Console – Rack 1U11 A3 switch reads 'TEST RF'
Collimation Tower – Rack 1U12 A9 S4 'RED'.

14. In preparation for valid verification – ensure UDV D/L ILK are 'NORMAL' cracks 1U12 and 13, A4 and A3.

15. The System is now prepared for a track – Acquisition procedures for Alsep P & FS and Erts are detailed in the relevant sections.

E. GUIDE TO SDDS

SYSTEM DESCRIPTION

1. Demods have three inputs.

   a) PM Video
   b) FM (50 MHz)
   c) Backup Voice (BUV)

   These above are receiver outputs from following sources:

Receivers 1, 2, 3 & 4	Prime Site
Receivers 5, 6, 7 & 8	Wing Site
Receivers 9 & 10	Parkes

2. All 4 Prime Site receiver outputs (4PM 4FM & 4BUV) are always available. However in the case of the Wing, only 2 receiver outputs are available at a time (2PM 2FM & 2BUV). Wing receivers configured for support must be patched at the Wing to the Microwave channel in use.

   PM Receivers patched to PMV 1 & 2
   FM Receivers " " 50MHz 1 & 2
   BUV Receiver output to Ch 22 & Ch 23

   The BUV receivers will always be the same as the PM receivers.

3. Although there are 5 Demods, only 4 can be used in the system at one time.

4. All Demods contain the same modules except Demods 1 & 2 which contain the AM Key Demods. The AM Key is not patchable separately but is contained in the PM Input spectrum.

5. All inputs & outputs of the Demods are patched by the SDDS Matrix. On digiswitch Selection this patches the 3 inputs & the 10 or 11 outputs & 2 Control lines to the selected Demod.

6. The Matrix has 4 Main Channels & 4 Bypass channels:

   CSM Prime
   CSM Alternate
   IM Prime
   IM Alternate
   PM Bypass 1 & 2
   FM Bypass 1 & 2

   One Demod only can be patched to any channel however the receivers patched to that channel can be individually selected for PM & FM.

   In the Bypass mode receiver output bypasses the SDDS going direct to the user.

7. Receiver Designations:

   Prime site Receivers are as numbered 1 2 3 & 4 and can be dialled into the Matrix with that designation.

   Wing Site Receivers, as previously stated, are assigned to Microwave Channels regarded by the Matrix as receivers 5 & 6, i.e.

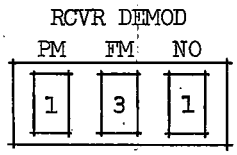
PMV 1 = Rcvr 5 PM
PMV 2 = Rcvr 6 PM
FM 1 = Rcvr 5 FM
FM 2 = Rcvr 6 FM

} Lowest Rcvr number will be patched to PM 1 or FM 1 as applicable

BUV Ch 22 = Patched with Rcvr 5 PM
BUV Ch 23 = Patched with Rcvr 6 PM

Parkes Receivers 9 & 10 are designated thus and can be dialled directly into the Matrix. There are however NO FM outputs from PKS, if PKS is supporting in an FM mode its outputs are still PM.

8. To program the Matrix for support the relevant receivers & Demods are dialled into the assigned channel & the INITIATE P/B pressed.



= RCVR 1 PM to Demod 1 PM *
RCVR 3 FM to Demod 1 FM

* RCVR 1 BUV to Demod 1

Assuming that the above configuration applies to CSM PRIME, the FM & PM STATUS lights should indicate thus:-

	RCVR	DEMOD	LIT GREEN PRI	ALL LIT TLM	DUMP	TV	VOICE	OUTPUT PATHS
FM STATUS:	3	1						

	RCVR	DEMOD	LIT GREEN PRI	ALL LIT TLM	BB	VOICE	BUV	KEY	OUTPUT PATHS
PM STATUS:	1	1							

Failure of any green indicators to light may be due to:

1) Blown Lamp
2) Improper Config
3) Matrix Fault

Should the PRI indicator remain red either no receiver has been assigned to the Channel or no receiver & no demod.

Due to the design of the Matrix no receiver or Demod can be assigned to more than one function. However the PM & FM outputs of any receiver are separate and can be patched separately.

Any attempt to configure the same thing to two places will result in the cancellation of the first selection and the validation of the second.

9. Demod Configuration

Ensure that the following green patch bungs are in place:

	PMV		PM
RCVR OUT	50 MHz	TO DEMOD IN	50 MHz
	BUV		BUV

For operations no other patches should be made.

SDDS PREPASS CHECKLIST

Voice Demod Bandwidths	PM & FM	WIDE
TLM DEMODS	IF BANDWIDTHS PM & FM	REMOTE *
" "	LOOP BANDWIDTHS PM & FM	NARROW
TEST UNIT POWER		OFF
MOTOROLA DEMOD		
POWER		ON
MODE		LOCAL
LOOP STATUS		NORMAL
BANDWIDTH		NARROW **

* Inform Data that they have control of TLM Bandwidths

** Select WIDE for TV or SDS Dump Modes. If in doubt go to WIDE

F. TIMING CHECKS

TIMING: Perform Checks as detailed in Relevant Pre Pass checks. HOD Section 10 or 11.

If Indications are not correct inform cognisant Technician.

G. APP/TDP PROCEDURES

TDP CONTINGENCY OPERATION

1. Perform Relevant Pre Pass checks. Refer HOD Section 10 (ALSEP) or 11 (ERTS).

2. For P & FS Tracking Revs: High Speed Data is sent off site in Real Time and Low Speed is recorded and played back post pass.

3. For ERTS: Low speed is recorded and played back post pass. High speed may be required by OPS for Real Time monitoring at the OPS Console.

4. Data is put on line by Servo Operator as he has control of the TDP. The Data should be on line 2 minutes before AOS/Tx Drive ON.

5. No TDP Support is required for ALSEP.

6. To spool paper tape from punch perform the following:

   a) Turn Power ON/OFF Switch to OFF on Tape Handler.

   b) Feed approx. 3 feet of leader from punch through orifice in chassis to the left hand take up spool.

   c) Configure tape through sensing arms and Roller guides as detailed in ME 1533. Introduction figure.

7. Servo should switch Data off at LOS +2 minutes.

8. Post Pass, spool off TDP tape and make out TWX for Data. Give TWX and Data to OPSR for transmission. TWX formats for particular vehicles can be found in relevant Supps. For P & FS refer STDN No. 601 para 16.3.14. For ERTS refer STDN No. 601 para 16.3.11.

APP CONTINGENCY OPERATION

1. Ensure all Power Breakers are on in Racks 3U3 and 3U4.

2. Check with SB 1 what the current INP (ERTS) acq message is. Locate processed tape (Lagen for ALSEP) or INP (ERTS) should be on top of the APP or being processed by Computers. The tape will be identified with Day, Time of Start, etc.

3. To Load Tape perform the following:
   NOTE: Left Hand Spooler is take up and Right Hand is Feed.

   a) Depress 'Stop Reader' PB1 on APP Control Panel.

   b) On Tape Reader Control Panel Switch Run/Load to 'Load' and depress Tape Gate on photo-cell Assembly to lowest position.

   c) The Tape should be on a spool with identificiation at the start.

   d) Ensure that Power is OFF on Tape Spooler.

   e) Place reel of tape on Right Hub and secure. Feed Tape through Photo-cell Assembly on Tape Reader and onto take up reel. Take up about two feet of tape on take up reel. Ensure 3 holes are to the rear.

   f) Thread tape through guide rollers & sensing arms as shown in Introduction Figure ME 1533.

   g) Rotate Hubs until sensing arms are about mid travel.

   h) On Tape Reader. Raise Tape Gate for required Tape width.

j) Switch Power to ON on Tape Spooler and 'Run' on Tape Reader.

k) On APP Control Panel depress 'Read One Word' PB1 a word will be read for every second the PB1 is depressed. Read 2 words. PB1 must be depressed for at least 1 second to read a word..

4. With APP in Local ensure that 'Add Time' and Offset Angles' PB1 are not selected.

5. Depress 'Start Search'. The APP will read and then stop, the 'Tape Time Ahead' Light and green 'Ready' should be lit.

6. Perform Pre Pass Checks as detailed in HOD Section 10/11. Inform Servo when computers have program loader (Acquiz - ALSEP, INP - ERTS).

7. Before AOS the Servo Operator may request additional words to get Antenna above horizon mask. To move into the track select 'Read One Word' until Servo has the point he requires.

8. Should no Tape be available select Computer as Command Data Source. If machines are not talking the Computer (Green) Light will flash. When current INP is loaded into the CP read two words then depress Start Search. The Computer light should be steady, the Command Angles will be the first Angles on INP and Command Time should be the same as GMT in Hrs, MNS & Secs and tracking.

NOTE: Should it be required to go back to start of Tape perform the following:

a) Depress Stop Reader PB1.

b) Select Load on Tape Reader.

c) Rotate Hubs in desired direction.

d) Roughly centre sensing arms at desired points.

e) Select 'RUN' On Tape Reader.

f) Depress 'Read One Word' to read two words.

TITLE:	COMMS CONTINGENCY CONFIGURATION									SEC. No: 8.3
REFS:	NIL									ISS.No: 6
ISSF:	COMMS OPS									DATE: 14 May'73
CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REF:										
PAGES:										
ORIGINATOR:	M. GEASLEY				APPROVED:		I.F. GRANT			

This section describes COMMS contingency procedures and configurations.

CONTINGENCY PROCEDURES - LINE FAILURES

Normal Mission Configuration (See also Sec. 1.15)

NCV 221	Cable	NET 1 A/G CONF.
NCV 222	Cable	NET 2 NETWORK CONF/PLAYBACK CONF.
NCV 223	Cable	NET 8 TLM 3 H.S. DATA
NCV 224	Cable	NET 4 TLM 1/CMD H.S. DATA
NCV 225	Cable	NET 7 TLM 2/ B/U CMD H.S. DATA
NCV 226	Cable	NET 6 BIO/CEDAR H.S. DATA
NCV 231	M/Wave	SPARE Via DSS 42 to ACSW
NCV 232	M/Wave	SPARE Via DSS 42 to ACSW
NCV 233	M/Wave	SPARE Via DSS 42 to ACSW
NCV 239	M/Wave	P.M.G. Alternate route for VFT to M/Wave ch. 16 via DSS 42 to CTO and ACSW
NCT 281	Cable	Alpha TTY circuit
NCT 282	Cable	Bravo TTY circuit
APOLLO PATCH	Cable	Back-up Voice Circuit to ACSW. PMG line - No NCV number but V/D quality. Parkes B/U Voice for APOLLO 15.

Contingency Patching - Priorities.

Should total loss of normal cable circuits occur due to cable fault. Patch as follows :-
See attached pages 3 4 for Restoral of all circuits and Net priorities.

HSK COMMS RESTORAL VIA TIDBINBILLA D.S.C.C.

1) HSK LAND LINE LOSSES SINGLE LINE FAILURES

NET	USE	ACTION ACSW	ACTION HSK
1	231	X	X
2	232	X	X
4	233	X	X
6	233	X	X
7	233	X	X
8	233	X	X

2) In case of simultaneous failures of nets restore per following net priority lists depending on phase of mission:

Net Priorities (SL-2, -3, -4 and Rescue Launch Through Rendezvous)
The following nets are listed in normal order of priority.

a) Net 1 (A-G Voice Loop)
b) Net 4 (TLM Line 1:command).
c) Net 7 (TLM Line 2: alternate command).
d) Net 8 (TLM Line 3).
e) Net 2 (Network Conference).
f) Net 5 (Tracking High Speed) (BDA,MAD,& MIL, launch phase only).
g) Net 6 (BIOMED/CEDAR).

Net Priorities (All other Manned Phases). The following nets are listed in order of priority.

a) Net 1 (A-G Voice Loop).
b) Net 4 (TLM Line 1: command).
c) Net 7 (TLM Line 2: alternate command).
d) Net 2 (Network Conference).
e) Net 8 (TLM Line 3).
f) Net 6 (BIOMED/CEDAR).

..../3.

Net Priorities (Unmanned Phases). The following nets are listed in order of priority.

a) Net 4 (TLM Line 1: command).
b) Net 7 (TLM Line 2: alternate command).
c) Net 8 (TLM Line 3).
d) Net 2 (Network Conference).
e) Net 5 (Tracking High Speed).
f) Net 6 (BIOMED/CEDAR).

TITLE: COMPUTER CONTINGENCY PROCEDURES									SEC. No: 8.4	
REFS: NOP 502.5 SECTION 8									ISS. No: 7	
DIST:									DATE. 29 Mar'72	
CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:										
INIT:										
PAGES:										
ORIGINATOR: L. TURNER					APPROVED: I. F. GRANT					

This Section cross references contingency procedures to Section 8 of the NOP 502.5 and special procedures for an AMQ or DDF failure.

COMPUTER CONTINGENCY PROCEDURES

SECTION 8, 502.5 XReference

642B	LOSS	CONFIGURATION	PAGE
COMMAND	TOTAL FAILURE	102, 103	8-9, 8-10
TIM	" "	104, 105	8-11, 8-12
MTU	ONE HANDLER	106	8-13
	TWO HANDLERS	107	8-14
CHAN 11 CMD	TOTAL FAILURE	108	8-15, 8-16
CHAN 11 TIM	TOTAL FAILURE	109	8-17, 8-18
CHAN 6 CMD	TOTAL FAILURE	110	8-18
CHAN 6 TIM	TOTAL FAILURE	111	8-19
DTU	TOTAL FAILURE	112, 113	8-20, 8-21
UDB	TOTAL FAILURE	114	8-22
1232	READER	116	8-24
	KEYBOARD	117	8-25
	PRINTER	118	8-26
CMD	TOTAL FAILURE	119	8-27
TIM	TOTAL FAILURE	120	8-28
HSP	ONE SYSTEM ONLY	121	8-29
	TOTAL FAILURE	122	8-30
CMD CAM	TOTAL FAILURE	123	8-31
TIM CAM	" "	124	8-32
BOTH CAMS TO CMD S/W	" "	125	8-33
BOTH CAMS TO TIM S/W	" "	126	8-34
BOTH CAMS TO BOTH CP's	" "	127	8-35
ISA	FAIL TO ONE SYSTEM	128	8-36
	FAIL TO BOTH SYSTEMS	129	8-37
USB STATUS	FAIL TO CMD SYSTEM	130	8-38
	FAIL TO TIM SYSTEM	131	8-39
	FAIL TO BOTH SYSTEMS	132	8-40
CIT 68	TOTAL FAILURE	133	8-41

LOSS	CONFIGURATION	PAGE
CONFIGURATION NOT COVERED IN SECTION 8 i.e. DDF or AMQ ACTION AS PER PAGE 8-42	199	8-42

ALL CONFIGURATIONS WILL BE GOVERNED BY NETWORK REQUIREMENTS AND COMPUTER SUPERVISOR WILL ASSESS BEST ACTION AND REPORT TO OPS.

DDF-13 FAILURES (PAM) Configuration 199 Page 8-42

Failure of DDF No 1 requires a cable change on the 1299 switchboard so that DDF no 3 and DDF no 1 are interchanged.

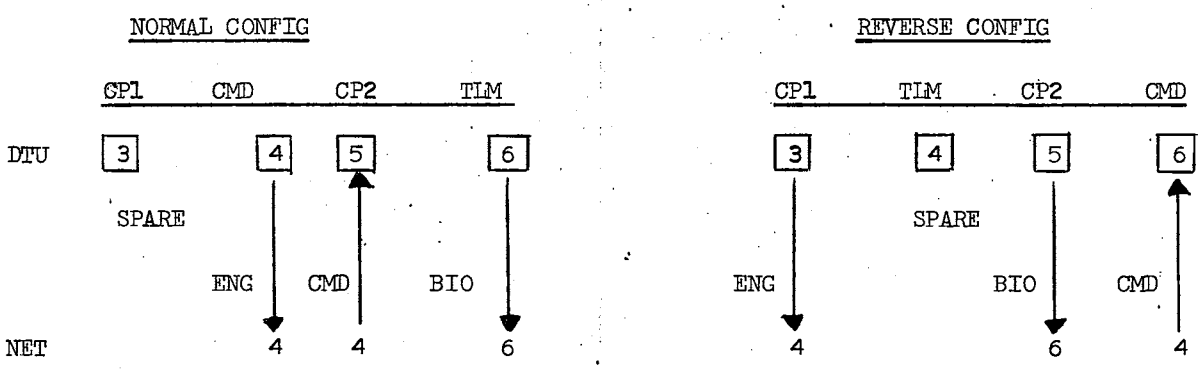
a) Remove cable from J3 on SW8
b) Remove cable from J1 on SW4
c) Insert cable from J3 to J1 on S4

No switch position need to be changed as DDF No 3 will now be input to chan 17.
Failure of DDF No 2 requires a switch to DDF No 3 on SW8.

AMQ Failure

In the event of the failure of the EMR AMQ Telemetry will recable to input from the DYNATRONICS AMQ. Centre the 1299 SW6 whilst changeover is in progress.

COMPUTER/DTU/DATA SET CONFIGURATION



NOTE: INCOMING COMMANDS ARE ALSO AVAILABLE ON NET 6

S-06 H.O.D. INDEX - SECTION 9

CHECKLIST			DISTRIBUTION				
SEC	TITLE	ACTION	USB	TLM	COMP	COMMS	OPS.
9.1							
9.2							
9.3							
9.4							
9.5							
9.6							
9.7							
9.8							
9.9							
9.10							

A.L.S.E.P.

SEC	TITLE	ACTION	DISTRIBUTION				
			USB	TLM	COMP	COMMS	OPS.
10.1	ALSEP/P&FS GENERAL INFORMATION	OPS	X	X	X	X	X
10.2	ALSEP CONFIG/CONFIDENCE TEST	OPS	X	X	X	X	X
10.3	ALSEP & P&FS SUPPORT CONFIG.	OPS	X	X	X	X	X
10.4	TLM RECORDERS CONFIG FOR ALSEP/P&FS	TLM	X	X		X	X
10.5	COMPUTER ALSEP/P&FS CHECKLIST	CMPT			X		X
10.6	ALSEP SRT Ø DATA FLOW COMMAND	OPS		X	X	X	X
10.7	642B ALSEP/P&FS CMPT CONTINGENCY OPS PRO.	CMPT	X	X	X	X	X
10.8	ALSEP PCM CONTINGENCY PROCEDURES	TLM	X	X	X	X	X
10.9	ALSEP/P&FS USB PRE-PASS CHECKLIST	USB	X				X
10.10	AQIZ CONTINGENCY OPERATION PROCEDURES	CMPTS		X	X		X
10.11	TLM ALSEP PREPASS CHECKLIST	TLM		X			X
10.12	EMERGENCY OPERATORS ACQUISITION PROCED-						
	URES FOR ALSEP/P&FS	USB	X				X
10.13	ALSEP TLM WB RCDR CONTINGENCY PROCEDURES	TLM		X			X
10.14	CONTINGENCY MTU LOADING PROCEDURES	CMPT	X	X	X	X	X
10.15	ERTS/ALSEP/P&FS COMMS CONTINGENCY PROCED.	COMMS	X		X	X	X

TITLE: ALSEP/P&FS GENERAL INFORMATION	SEC. No: 10.1
REFS: VARIOUS	ISS.No: 3
DIST: SB 1, DATA, CMPTRS, OPS	DATE: 17 MAY 72

CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REF:										
PAGES:										

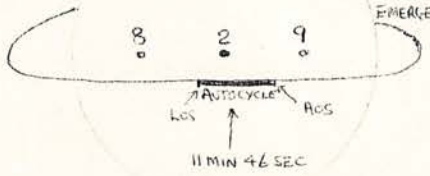
ORIGINATOR: J.H.K. SAXON APPROVED: I. F. GRANT

THE FOLLOWING INFORMATION SHOULD ASSIST IN CALCULATING P&FS 1 & 2 EMERGENCE & OCCULTATION TIMES, AUTOCYCLE AOS TIMES & ACQUIZ ANTENNA POINTING.

LEGEND:- $\overset{2}{\circ}$ = ACQUIZ PT DESIGNATION

ACQUIZ POINTING REQMTS

AOS - EMER TIME < 20 MINS USE PT 9
" " " " + 30 " " " 2
" " " " + 50 " " " 8



TIME FROM AUTOCYCLE LOS TO NEXT AUTO CYCLE AOS = 1 HR 46 MINS 38 SECS

P&FS # 1 DATA

ORBITAL PERIOD = 1 HR 59 MINS 22 SECS
EMERGENCE TO OCCULTATION " = 1 HR 13 MINS 00 SECS (APPROX)
AUTOCYCLE SHIFT PER REV = 58 SECS TOWARDS EMERGENCE POINT OR 19 MINS / DAY
MAX'M OF 63 REVS OR 5 DAYS BEFOR AUTOCYCLE MUST BE RESET

P&FS # 2 DATA

ORBITAL PERIOD = 1 HR 58 MINS 40 SECS
EMERGENCE TO OCCULTATION " = 1 HR 13 MINS 00 SECS (APPROX)
AUTOCYCLE SHIFT PER REV = 16 SECS TOWARDS EMERGENCE POINT OR 3 MINS 12 SECS / DAY
MAX'M OF 274 REVS OR 23 DAYS BEFOR AUTOCYCLE MUST BE RESET

NOTE
PAGES 2 & 3 OF THIS SECTION MAY PROVE USEFUL IN CALCULATING SER'S OF EVENTS & LOGGING DATA RESULTS

VEHICLE: P&FS 2 DATE (Z).

REV NR		HRS	MINS	SECS		HRS	MINS	SECS		[illegible] POINT
	EST EMER (A)				EST AOS (B)				(B)-(A) MINS =	
					ACTUAL AOS				Sig level = MOD ON/OFF	
		1	13	00			11	46		
	EST OCC				EST LOS (C)				(C)-(A) MINS =	
					ACTUAL LOS				Sig level = MOD ON/OFF	
	ADD TO (A)	1	58	40		1	46	38		
	EST EMER (A)				EST AOS (B)				(B)-(A) MINS =	
					ACTUAL AOS				Sig level = MOD ON/OFF	
		1	13	00			11	46		
	EST OCC				EST LOS (C)				(C)-(A) MINS =	
					ACTUAL LOS				Sig level = MOD ON/OFF	
	ADD TO (A)	1	58	40		1	46	38		
	EST EMER (A)				EST AOS (B)				(B)-(A) MINS =	
					ACTUAL AOS				Sig level = MOD ON/OFF	
		1	13	00			11	46		
	EST OCC				EST LOS (C)				(C)-(A) MINS =	
					ACTUAL LOS				Sig level = MOD ON/OFF	
	ADD TO (A)	1	58	40		1	46	38		
	EST EMER (A)				EST AOS (B)				(B)-(A) MINS =	
					ACTUAL AOS				Sig level = MOD ON/OFF	
		1	13	00			11	46		
	EST OCC				EST LOS (C)				(C)-(A) MINS =	
					ACTUAL LOS				Sig level = MOD ON/OFF	
	ADD TO (A)	1	58	40		1	46	38		
	EST EMER (A)				EST AOS (B)				(B)-(A) MINS =	
					ACTUAL AOS				Sig level = MOD ON/OFF	
		1	13	00			11	46		
	EST OCC				EST LOS (C)				(C)-(A) MINS =	
					ACTUAL LOS				Sig level = MOD ON/OFF	
	ADD TO (A)	1	58	40		1	46	38		
	EST EMER (A)				EST AOS (B)				(B)-(A) MINS =	
					ACTUAL AOS				Sig level = MOD ON/OFF	
		1	13	00			11	46		
	EST OCC				EST LOS (C)				(C)-(A) MINS =	
					ACTUAL LOS				Sig level = MOD ON/OFF	

REV NR		HRS	MINS	SECS		HRS	MINS	SECS		REQ'D PRINT
	EST EMER (A)				EST AOS (B)				(B)-(A) MINS =	
					ACTUAL AOS				Sig level = ON MOD OFF	
		1	13	00			11	46		
	EST OCC				EST LOS (C)				(C)-(A) MINS =	
					ACTUAL LOS				Sig level = ON MOD OFF	
	ADD TO (A)	1	59	22		1	46	38		
	EST EMER (A)				EST AOS (B)				(B)-(A) MINS =	
					ACTUAL AOS				Sig level = ON MOD OFF	
		1	13	00			11	46		
	EST OCC				EST LOS (C)				(C)-(A) MINS =	
					ACTUAL LOS				Sig level = ON MOD OFF	
	ADD TO (A)	1	59	22		1	46	38		
	EST EMER (A)				EST AOS (B)				(B)-(A) MINS =	
					ACTUAL AOS				Sig level = ON MOD OFF	
		1	13	00			11	46		
	EST OCC				EST LOS (C)				(C)-(A) MINS =	
					ACTUAL LOS				Sig level = ON MOD OFF	
	ADD TO (A)	1	59	22		1	46	38		
	EST EMER (A)				EST AOS (B)				(B)-(A) MINS =	
					ACTUAL AOS				Sig level = ON MOD OFF	
		1	13	00			11	46		
	EST OCC				EST LOS (C)				(C)-(A) MINS =	
					ACTUAL LOS				Sig level = ON MOD OFF	
	ADD TO (A)	1	59	22		1	46	38		
	EST EMER (A)				EST AOS (B)				(B)-(A) MINS =	
					ACTUAL AOS				Sig level = ON MOD OFF	
		1	13	00			11	46		
	EST OCC				EST LOS (C)				(C)-(A) MINS =	
					ACTUAL LOS				Sig level = ON MOD OFF	
	ADD TO (A)	1	59	22		1	46	38		
	EST EMER (A)				EST AOS (B)				(B)-(A) MINS =	
					ACTUAL AOS				Sig level = ON MOD OFF	
		1	13	00			11	46		
	EST OCC				EST LOS (C)				(C)-(A) MINS =	
					ACTUAL LOS				Sig level = ON MOD OFF	

TITLE: ALSEP CONFIGURATION CONFIDENCE TEST									SEC. No: 10.2	
REFS: H.O.D. SECT 5.2									ISS. No:	
DIST: ALL									DATE: 19 Feb 7..	
CH. No:	1	2	3	4	5	6	7	8	9	1.
DATE:										
REF:										
PAGES:										
ORIGINATOR: J. SAXON						APPROVED: I. F. GRANT				

ALSEP CONFIGURATION/CONFIDENCE TESTING

1. GENERAL :

These tests are performed during the last hour of a working day, if there is to be an ALSEP track during the following night or graveyard shift. Results should be noted in each Section's log and any anomalies or suspected anomalies logged and reported to Ops. Prior to leaving the site, a decision will be made at that time whether to fix the problem or not. Engineers should appoint and inform personnel who will be the checkout Ops contact in each area.

2. CONFIGURATION :

All sections will start internal section configuration checks at 1530K and report to Ops on 'A' loop when they are ready for the overall interface checks. All sections should be complete and ready for overall interface at 1600K. USB will ensure no interface connection is present from the Sim console.)

(A) USB : Configure per HOD Sect 5.2, run up P/A 1 (dummy load if moon is above horizon) to mission power. Also patch SDDS 1 TLM test line via H/P amp to PM test transmitter. Select current ALSEP Net freqs. throughout. Perform B/S snap-ons and go to dummy load before informing Ops.

(B) DATA/RECORDERS : Check recorder config/patching and load mag tapes. Load ALSEP 1 program in Sim No. 1 and change data in address 0075 to 172 Octal. Load ALSEP 4 program in Sim No. 2 and change data in address 0462 to 174 Octal. Load decom programs in supporting decoms. (Normally Decoms 1 and 2). Patch Sim 1 out to SDDS 1 test line at DSDU. Perform self checks, check event/analog recorder patches. Patch Sim 2 out to SDDS 1 test line and repeat checks for ALSEP 4, report to Ops on completion.

(C) CMPTRS : Load ALSEP program in 642B (NOTE 2). Load moon 1 in 1218 and stand by for initialisation time from SB 1. Select operate/operate on UDB. Report to Ops.

(D) COMMS : Patch DTU 5 or 6 to D/S 2. Configure DQM to monitor D/S 2 ALSEP 2.4 KBs output. Enable Ops 2 R/O to CIT 68 of supporting CP. Check Net 4 to and from ACSW. Interface with data for Net 4 recording config. (ISI's 58 and 59). Report to Ops.

3. TESTING :

USB : Slew antenna with moon tape for upcoming pass using appropriate time offsets; then

3. TESTING (CONTINUED)

USB : CONTINUED

slew from 1218 after advising operator of time initialisation required. Lock up RX's 1 and 3 on TIN (set to approx -130dbm).

DATA : Roll recorders and lock up time code translator on time track outputs. Confirm decoms . lock correctly. Release inhibits to computers. Check CMD verification and Net 4 RCDR tracks.

CMPTRS : Standby to take ROACH History on Ops request and to enter 1218 initialisation time.

COMMS : Confirm solid DQM lock on D/S 2.

OPS : Select UDB operate and Mode 1. Uplink CMD 172 and 174 to ALSEP 1, then ALSEP 4. S/C verify on 172 to ALSEP 1 and S/C verify on 174 TO ALSEP 4. Select UDB SAFE and M & O MODE. Request ROACH history. Confirm correct HSP and TTY outputs.

4. When testing is complete, USB will return antenna to stow, run down P/A and unpatch the TLM turnaround. Data will stop recorders, inhibit Decom 1, and unpatch simulator from SDDS 1 test line. CMPTRS will enter 'no more histories required' on Ops request. Ops will return to F/C Mode 2. All programs will be left cycling and no other patches will be changed.

Ops will complete the check sheet (attachment 1) based on inputs from the sections and make it available for the oncoming shift Ops. Oncoming shift will change recorder patching for Phase 2 support, if required.

NOTE : 1. IF ALSEP IS IN VIEW, TLM TURNAROUNDS AND B/S SNAP-ONS CAN BE DELETED. A REAL TIME DATA FLOW TEST WILL BE CONDUCTED INSTEAD.

2. ALSEP SOFTWARE WILL BE ROTATED IN CP1 AND CP 2 ON A DAILY BASIS DURING LONG SUPPORT PERIODS.

ATTACHMENT 1

ALSEP CONFIDENCE CHECKS

DATE : _____

A. TESTS COMPLETED :

USB :	1.	B/S SNAP-ONS .....
	2.	APP MOON TAPE SLEW .....
	3.	1218 MOON PROGRAM SLEW .....
	4.	TLM TURNAROUND REMOVED .....
DATA :	1.	RCDR PATCHING CHECKED .....
	2.	TIME RECORDING CHECKED .....
	3.	DECOMS 1 & 2 LOCK FROM RCDRS .....
	4.	EVENT/ANALOG RCDRS PATCHING CHECKED .....
	5.	SIM DATA TURNAROUND REMOVED .....
CMPTRS :	1.	OPS PROGRAM O.K. .....
	2.	MOON PROGRAM O.K. .....
COMMS :	1.	NET 4 CHECKED .....
	2.	H/S & L/S DATA PATCHES O.K. .....
	3.	2.4 DATA LOCKS ON DQM .....
OPS :	1.	CMD & TLM TURNAROUNDS/DATA O.K. .....
	2.	CMPTRS IN F/C MODE 2 ROACH COMP .....

B. REMARKS :

TITLE: ALSEP & P&FS SUPPORT CONFIGURATION	SEC. No:10.3
REFS: NIL	ISS.No: 4
DIST: A11, Less USB 2	DATE: July 26,1972

CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REF:										
PAGES:										

ORIGINATOR: I.F. GRANT APPROVED: I.F. GRANT

(1) This section details the allocation of interface paths between SDDS and TLM video distribution amplifiers that will be used during ALSEP and P&FS support. Receivers/VCO combinations are also defined.

(2) 2.1 The basic path allocation to be followed is as follows:

ALSEP 1 - PM Bypass 1
ALSEP 2 - LM Prime Base Band
ALSEP 3 - LM Alternate Base Band
ALSEP 4 - PM Bypass 2.

2.2 In the event that P&FS is to be supported, the following configuration holds.

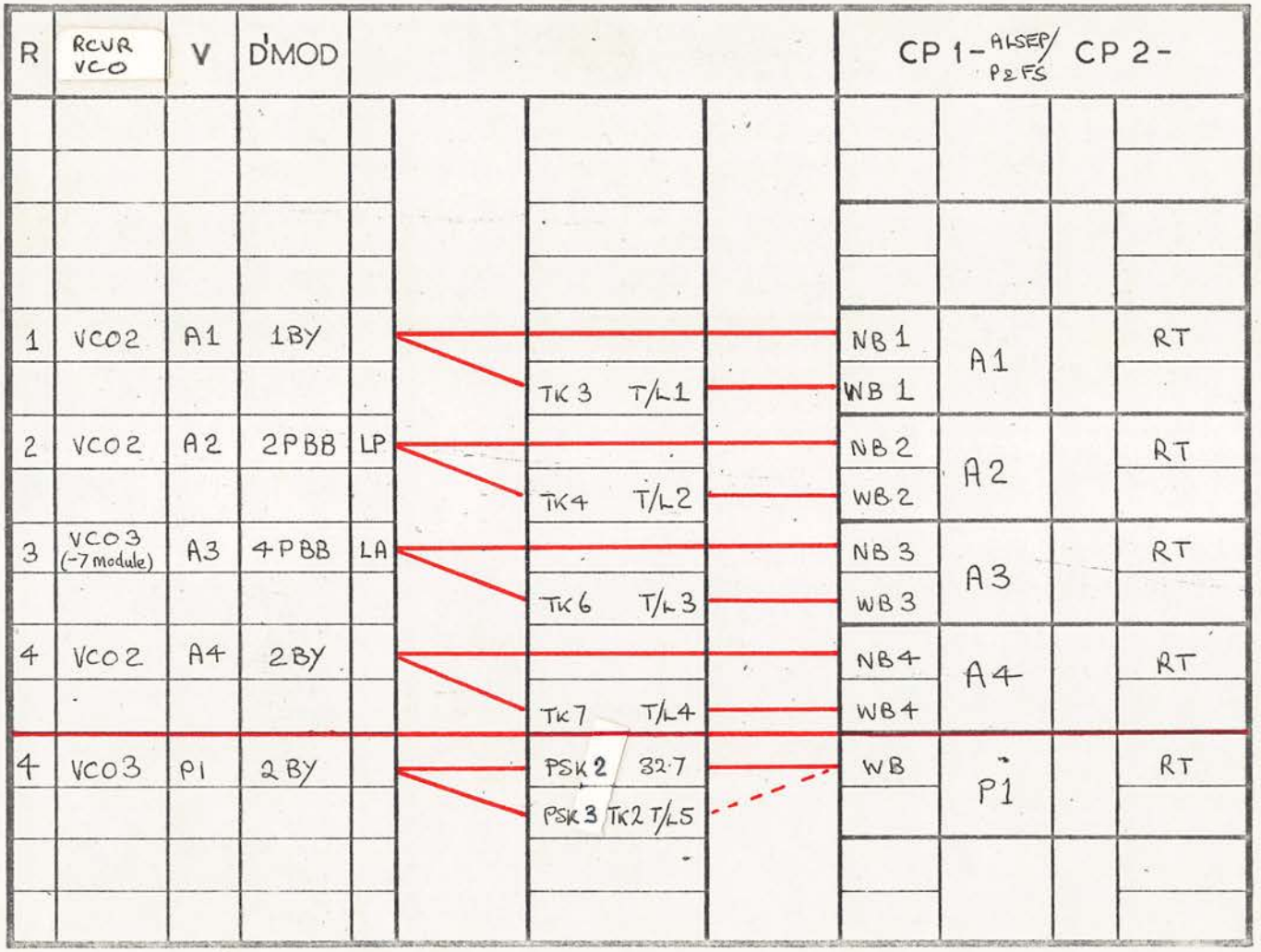
ALSEP 1/4 - PM Bypass 1
ALSEP 2/4 - LM Prime Base Band
ALSEP 3/4 - LM Alternate Base Band
P&FS or ALSEP 4 - PM Bypass 2.

If a requirement exists to support ALSEP 4, it will take the place of any unsupported ALSEP. The OPSR will designate the path to be used by ALSEP 4 in this instance.

2.3 The normal receiver VCO configuration is as follows:

ALSEP 1	RX 1	VCO Ident. N/A
ALSEP 2	RX 2	VCO Ident. N/A
ALSEP 3	RX 3	VCO Ident. -7
ALSEP 4	RX 4	VCO Ident. -4

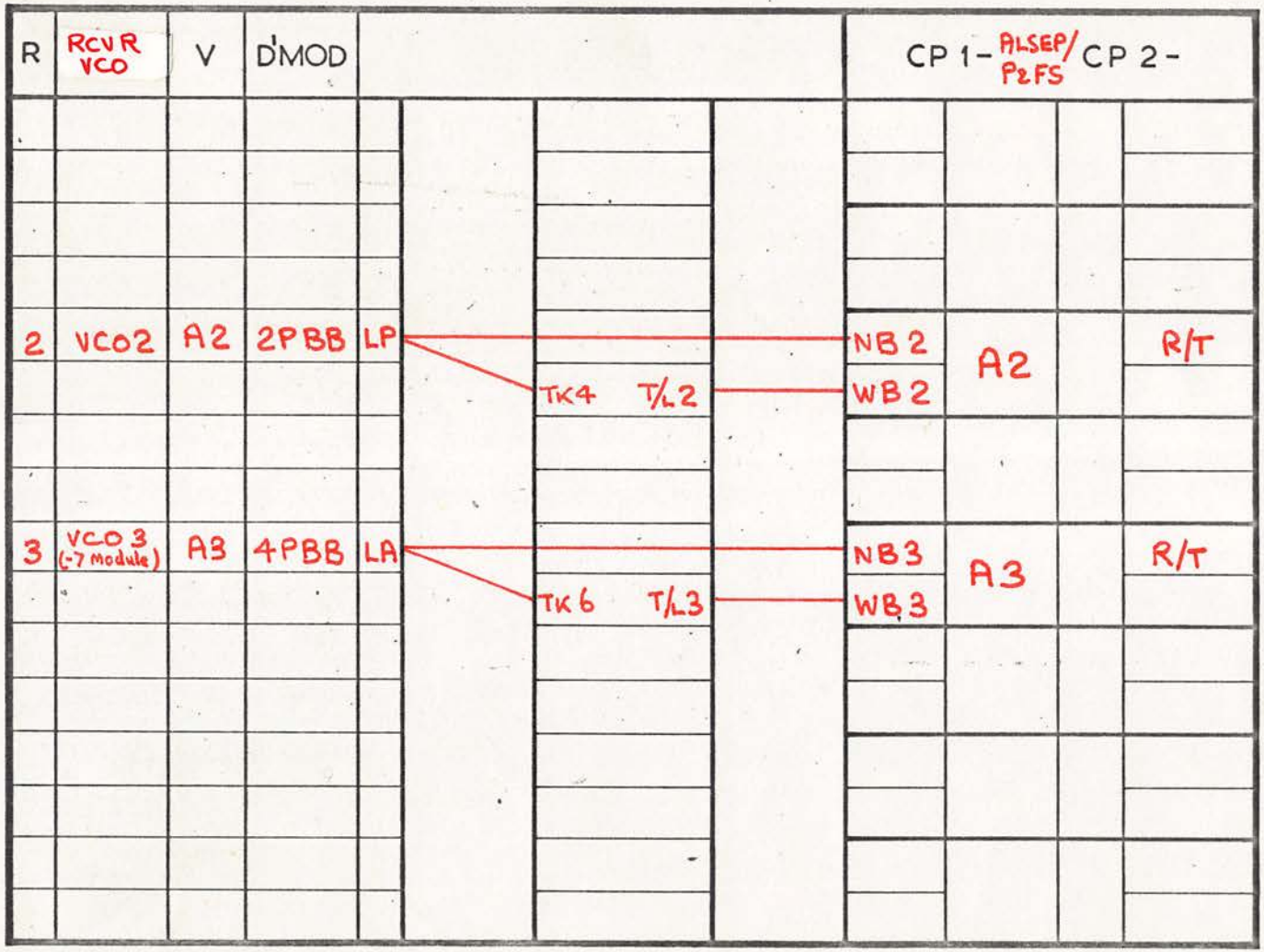
TYPICAL ALSEP/ P&FS SUPPORT CONFIG (ALL ALSEPS PLUS P&FS)



TYPICAL ALSEPS 1 & 4, P&FS CONFIG

R	RCVR VCO	V	DMOD				CP 1 - ALSEP/P&FS			CP 2 -
1	VCO2	A1	1BY				NB1	A1		RT
					TK3 T/L1		WB1			
4	VCO3	P1	2BY		PSK2 32.7 TK2		WB3	P1		RT
					PSK3 T/L5	PLAYBACK				
3	VCO1 (-7 module)	A4	4PBB	LA			NB4	A4		RT
					TK7 T/L4		WB4			

TYPICAL ALSEPS 2 & 3 CONFIG



TITLE: TLM RECORDERS CONFIGURATION FOR ALSEP AND P & FS										SEC. No: 10.4
REFS: STDN 601 / ALSEP / P & FS										ISS. No: 5
DIST: TLM OPS COMMS USB										DATE: 11 APRIL 72
CH. No:	1	2	3	4	5	6	7	8	9	10
DATE:	13/4/72	01 AUG 72								
REF:	640	662								
PAGES:	1, 2	1, 2								
ORIGINATOR: J. Vanderkly					APPROVED: I. F. GRANT					

This section details the Mag. Tape Recorders configuration for NCG 781/782/783/784/791/792

FORMAT B2 (ALSEP, P & FS) – DSS 630

TR	SIGNAL	SOURCE	MODE	RECORDER MTX	PROG. BRD	TERM
1	ANNO/NET 1	PR ANNO MTR PP/VOICE MTR TL	DIR	N/A		
2	P & FS	PSK 32.7 PR LINE 1	FM 1	GHJ-Y0	28-1	
3	ALSEP 1	~~FM BYPASS 1~~	FM 2	GHJ-Y6	~~34-2~~	
4	ALSEP 2	LM PRIME BB	FM 3	GHJ-Y8	~~36-3~~	
5	BCD	36 BIT MTR PP	DIR	N/A		
6	ALSEP 3	~~FM BYPASS 2~~ LM ALT BB	FM 4	GHJ-Y~~7~~ 9	37 ~~35~~	
7	ALSEP 4	~~LM ALT. BB~~ PM BYPASS 2	FM 5	GHJ-Y~~9~~ 7	35 ~~37~~-6	
8						
9	DTU (HS TLM) OUT	RCDR 1 DATA	FM 6	N/A		
10	TAPE SYNC/C LOCK	TAPE SYNC OUT/MTR SW	DIR	N/A		
11	CMD VER RX	CMD RX TL 1/2	FM 7	N/A		
12						
13	TDP MODEM	DSCC-MTR TL 1	DIR	N/A		50 Ω
14	SDT	1KHz – MTR PP	DIR	N/A		

C1

PATCH OUTPUT OFF TRACK 5 TO TIME CODE TRANSLATOR.

RECORDING SPEED : $3\frac{3}{4}$ ips except during HBR when speed will be $7\frac{1}{2}$ ips.

DELETE TR 9 and TR 11 during Phase 3 support.

C1

USB CMD RCVR. – CSM = ALSEP, LM = P & FS

REPRO MATRIX

1 – ALSEP 1
2 – ALSEP 2
3 – ALSEP 3
4 – ALSEP 4
5 – P & FS

RECEIVER 1 – ALSEP 3
RECEIVER 2 – ALSEP 2
RECEIVER 3 – ALSEP 1
RECEIVER 4 – ALSEP 4

HS TLM – PATCH AT COMMS TO "RCDR 1 DATA" LINE (~~4.8~~ 7.2 KB DTU HS DC DATA).

TDP DATA – PATCHED FROM MODEM LINE 1 TO RCDR TL 1 AT HSDM PP (DSCC) – (2.4KB USB TDP AC DATA)

PROVIDE REDUNDANT WB RECORDING DURING TRACKING ORBIT(S).

FORMAT B2 (ALSEP, P & FS) – DSS 630

TR	SIGNAL	SOURCE	MODE	RECORDER MTX	PROG. BRD	TERM
1	ANNO/NET 1	PR ANNO MTR PP/VOICE MTR TL	DIR	N/A		
2	P & FS	PSK 32.7 PR LINE 1	FM 1	GHJ-Y0	28-1	
3	ALSEP 1	PM BYPASS 1	FM 2	GHJ-Y6	34-2	
4	ALSEP 2	IM PRIME BB	FM 3	GHJ-Y8	36-3	
5	BCD	36 BIT MTR PP	DIR	N/A		
6	ALSEP 3	PM BYPASS 2	FM 4	GHJ-Y7	35-5	
7	ALSEP 4	IM ALT. BB	FM 5	GHJ-Y9	37-6	
8						
9	DTU (HS TIM) 'OUT	RCDR 1 DATA	FM 6	N/A		
10	TAPE SYNC/C LOCK	TAPE SYNC OUT/MTR SW	DIR	N/A		
11	CMD VER RX	CMD RX TL 1/2	FM 7	N/A		
12						
13	TDP MODEM	DSCC-MTR TL 1	DIR	N/A		50 Ω
14	SDT	1KHz – MTR PP	DIR	N/A		

C1

PATCH OUTPUT OFF TRACK 5 TO TIME CODE TRANSLATOR.

RECORDING SPEED : $3\frac{3}{4}$ ips except during HBR when speed will be $7\frac{1}{2}$ ips.

DELETE TR 9 and TR 11 during Phase 3 support.

C1

USB CMD RCVR. – CSM = ALSEP, IM = P & FS

REPRO MATRIX

1 – ALSEP 1
2 – ALSEP 2
3 – ALSEP 3
4 – ALSEP 4
5 – P & FS

RECEIVER 1 – ALSEP 3
RECEIVER 2 – ALSEP 2
RECEIVER 3 – ALSEP 1
RECEIVER 4 – ALSEP 4

HS TIM – PATCH AT COMMS TO "RCDR 1 DATA" LINE (4.8 KB DTU HS DC DATA).

TDP DATA – PATCHED FROM MODEM LINE 1 TO RCDR TL 1 AT HSDM PP (DSCC) – (2.4KB USB TDP AC DATA)

PROVIDE REDUNDANT WB RECORDING DURING TRACKING ORBIT(S).

TITLE: ALSEP ART PHASE 3 DATA FLOW COMMAND									SEC. No: 10.6
REFS: GSFC SRT 401.1, NOP 502.5 & SUPPS									ISS.No: 1
DIST: OPS, COMMS, COMPUTERS , DATA									DATE: 03 Sept'71
CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REF:										
PAGES:										
ORIGINATOR: B.J. SULLIVAN						APPROVED:				

GENERAL : The procedure outlined in this section enables the SRT data flow test to be performed with the ALSEP software operating in a MODE 2/FLIGHT CONTROL condition.

ASTAM/SABRE OPERATING PROCEDURES

1 (a) Load the SABRE 3A program via UPAK set P = 700, SYNC on INTERNAL, START

1 (b) Load the SABRE 3A program from the ASTAM maintenance magnetic tape. Press START on the computer and set SYNC on INTERNAL.

2. On the I/O console set KBD, INT, CR. The printer will print "***", after which normal type-ins may be entered.
Type M(ODE CHNG) C(MD) 2 CR. This type in places the SABRE program in the ALSEP/PFS mode.
Type C(EF) 776 CR
Type X(MIT)
The operator should now verify the hardware I/F (Fig. 1) by transmitting this function and verifying the H/S printouts.

3. The following sequences are detailed operations for the ASTAM operator to perform in place of sequences 5 thru 8A in the GSFC SRT manual (401.1 Section 3).

Ops 2 will ensure that the ALSEP software is in MODE 2/FC prior to commencing sequence 5.

Ops 2 will cue the ASTAM operator when to transmit each function.

NOTE : Characters in brackets will be printed by the SABRE program.
CR implies carriage return
If a tying error is made press INT. CR

4. SEQ. 05 Type M(ODE CHNG) D(CDR) A CR
Type R(TC) 172, (VEH) A5 CR
Type X(MIT)

SEQ. 06 Type M(ODE CHNG) D(CDR) B CR
Type R(TC) 174, (VEH) A4 CR
Type X(MIT)

SEQ. 07 Type M(ODE CHNG) D(CDR) A CR
Type R(TC) 061, (VEH) P1 CR
Type X(MIT)

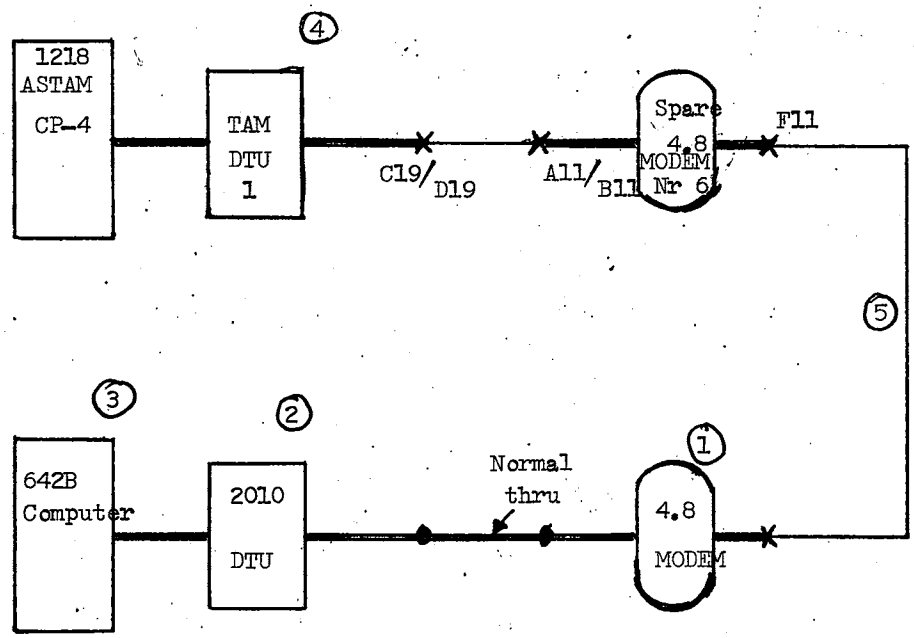
4. CONTINUED.

SEQ. 08 Type C(EF) 777 CR
Type X(MIT)

SEQ. 08A Type C(EF) 775 CR
Type X(MIT)

5. End of SABRE operations, OPS 2 will carry on with remaining sequences.

FIGURE 1 SRT PHASE 3 DATA FLOW COMMAND



NOTE 1 MODEM 3 or 4.) DEPENDING UPON COMPUTER
NOTE 2 DTU 5 or 6) CONFIG FOR ALSEP.
NOTE 3 CP 1 or CP2)

NOTE 4 COMPUTERS MUST USE TAM DTU Nr. 1

NOTE 5 COMMS MANUALLY RETAIN MODEMS ie DS6 Tx → DS 3/4 Rx

TITLE: 642B ALSEP/P & FSS COMPUTER CONTINGENCY OPERATING PROCEDURES										SEC. No: 10.7
REFS: N/A										ISS.No: 1
DIST: USB 1, OPS, CMPTRS, TIM & COMMS HSK ONLY.										DATE: 16 Sept, 71.
CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:	21/7/72	13/10/72								
REF:	STDN 601.	OMP 679								
PAGES:	2, 3, 4	1, 2, 3, 4								
ORIGINATOR: L. TURNER					APPROVED: I. F. GRANT					

CONTINGENCY OPERATING PROCEDURES.

642B ALSEP/P & FSS

ASSUMPTIONS :

1. The person using these instructions is familiar with loading a magnetic tape unit.
2. The computers will normally be powered on with a memory diagnostic cycling. The I/O consoles, high speed printer and TTY machines will be powered down. The power to MTU tape transports may also be off.
3. If answer to 1 is negative reference HOD section 10.14 for detailed procedures. CH.2.

NOTES ON ALSEP CONFIGURATION :

Several equipment configs. exist since ALSEP/PFSS program requires only one 642B computer. A typical config. will be used as an example for ALSEP/PFSS support. CP1, MTU channel 6, UDB 2, DTU 5 and CMD CAM. The following instructions should be followed in sequence.

A. CONFIGURE EQUIPMENT FOR ALSEP/PFSS :

1. Turn power on to CP1 I/O console.
2. Turn power on to CP1 TTY machine (nearest to desks!)
3. Turn power on to HSP (green button).
4. Turn power on to MTU channel 6 tape transports.
5. Follow the following set-up procedures.

a) MTU CHANNEL 6

1. Locate ALSEP SYSTEMS TAPE and mount on tape transport 1. Set address switch to "1". in "MANUAL" mode, position tape at "BOT". Switch to "AUTO" mode.
2. Mount scratch tape on tape transport 2. Set address to "2". In "MANUAL" mode, position the tape at "BOT". Switch to "AUTO" mode and set "WRITE ENABLE". This is the command history tape.
3. Mount scratch tape on transport 3. Set address to "3", In "MANUAL" mode, position the tape at "BOT". Switch to "AUTO" mode and set "WRITE ENABLE". This is the recovery tape.
4. Mount scratch tape on tape transport 4. Set address to "4". In "MANUAL" mode, position the tape at "BOT". Switch to "AUTO" mode and set "WRITE ENABLE". This is the LOG/FAULT dump tape.

5. MTU channel 6 control panel, set rotary "MODE" switch to "T1" and "CLOCK CONTROL" to "NORMAL".

Press "MASTER CLEAR" button.

b) UDB NUMBER 2 CHECK SWITCHES ON CHANGEOVER BOX MOUNTED ON TOP OF UDB 1 ARE IN THE DOWN POSITION

"OPERATE/TEST" to OPERATE.

"COMP TEST/OPERATE" to OPERATE.

c) TTY CP1

Aux/Reperforator	:	ON
TTY motor	:	ON
Page printer	:	SEND
T-D	:	RCV
Keyboard	:	NEUTRAL
Selector	:	K - T
Operate/Test	:	OPERATE

Press "MASTER CLEAR" and set "ODR" if not already lit.

d) 1299 SWITCHES

CMD Status	:	CP1
UDB Uplink (top row of switches)	:	CP1
UDB Verif (top row of switches)	:	CP1
[illegible]	:	[illegible]
	:	[illegible]

GMT tape input : Switch to CP1 only if playback required.

ALL other switches to "NEUTRAL".

B. LOAD 642B ALSEP/PFSS PROGRAM :

At 642B CP1 control panel, "Set indicate set/indicate" switch to indicate set.

1. Set all miniature switches on lower left-hand-side of panel down, except "ADDRESS MODE" switch.
2. Press "OP STEP" then "MASTER CLEAR".
3. Press "LOAD" and hit "START STEP" switch.
4. I/O console should respond with printout. If not, check MTU config. and press start step switch.
5. At CP 1 I/O type ALSEP ☐
6. ALSEP/PFSS program should load off MTU address 1 (systems tape). and I/O printer should then print "ALSEP LOADED.
7. Obtain paper errata tape from ALSEP drawer above CP2 I/O console. Mount the tape on CP1 I/O reader.
8. On CP1 control panel, set "BOOTSTRAP PROGRAM" switch to 1.
9. Press "OP STEP" then "MASTER CLEAR".
10. Set P=2 (octal), φ=1 (octal), set "RUN MODE".
11. Press "START STEP" switch once.
12. 1st errata on tape should read into CP1 and computer will 4-step. (Small red light at lower left-hand-side).

13. Press "START STEP" and next errata will load and computer will 4-step.

14. Repeat 13. until all erratas are loaded. CH. 2

C. INITIALIZE PROGRAM :

1. Set jump switch 2 up.

2. Press "OP STEP" then "MASTER CLEAR".

3. Set P=10,000 (Octal).

4. Set "RUN".

5. Hit "START STEP".

6. Begin type-ins at I/O console (Type the large print sections).

STA, XXX,↑
STA, HSK,↑
MTB, X,↑
MTB, M,↑
FMT, X, YA, ZB,↑ * NOSP 601 Page 1-30 Para 1.3.2.5 h and i. CH 12

MTU CHAN, XX,↑
MTU CHAN, 06,↑
CAM, XXX,↑
CAM, CMD,↑
GMT, XXX,↑ WHERE XX IS LAST TWO DIGITS OF CURRENT YEAR CH 1
GMT, XX,↑ (At the completion of type-ins, a core-image will be written on the recovery tape.) If this is successful, the HSP will output a parameter list. If unsuccessful, CP1 will 4-stop.

Check MTU set-up, correct if necessary then hit "START STEP" at CP1. If still unsuccessful, repeat the initialization.

7. Set "JUMP" switch 2 down.

8. Inform "COMMS" and "RECORDERS" that DTU 5 is on line for this config.

9. Ask "OPS" to CAM "M & O Mode".

10. At CP1 I/O console, press "INTERRUPT".

11. At keyboard, press "CARRIAGE RETURN".

12. Type : SBC, 1, C,↑ (sub-bit code is changed to C for PFSS 1).
Printer will then respond with SBC, ☐ ←(type spec. to exit type-in routine).

13. Ask "OPS" to CAM a parameter listing to check that the sub-bit code was in fact changed to "C".

14. Ask "OPS" to return to "Flight Control, MODE 2".

15. The ALSEP/PFSS program is now ready.

16. Mount the "DARTS" paper tape on CP1 reader. (Use channel 6 DARTS tape which is located in the DARTS drawer above CP2 I/O console).

The DARTS tape is automatically read into the computer if the program faults during the pass.

D. ALSEP ROACH :

This performed at completion of SRT Ø 3, at completion of command interface and at completion of 2-way support. NETWORK NORMALLY REQUEST ALL VEHICLES, ALL TIMES. CH 1

1. Ask Ops for M & O Mode.

2. Press "INTERRUPT" at I/O console, then carriage return.

3. Type CMH, ↑
printer prints .... IN IT CMD HISTORY.

TYPE, A, ↑ (for ALSEP Roach) TYPE B, ↑ FOR ALSEP AND P&FSS CH 1
TIME, A, ↑ (all times) OR P, ↑ FOR P&FSS ONLY.
VEHICLE, A, ↑
DESTINATION, A, ↑

At completion of "ROACH", I/O will print ADDITIONAL HISTORIE HISTORIE REQ, N, ↑ (to exit ROACH)
or Y, ↑ (to repeat ROACH)

E. FORMAT CHANGE :

During the pass, NETWORK may require a change of HSD format.

This is initalized as FMT 1, 4A, 2B

To change the format,
Press interrupt then carriage return.

Type FMT, 1, 1A, 2B, ↑ (if NETWORK requests format with ALSEP 1 in "A" stream and ALSEP 2 in "B" stream, for example).

For ALSEP ASE HBR, Press INT, Carriage return Type "FMT, 2, ↑ ". CH. 2

For LSP (ALSEP 5 ONLY) Press INT, Carriage return, Type "FMT, 3, ↑ ".

TITLE: ALSEP PCM CONTINGENCY PROCEDURES										SEC. No: 10.8
REFS: N/A.										ISS.No: 1
DIST: OPS TIM - ALL										DATE: 6 Oct., 1971
CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REF:										
PAGES:										
ORIGINATOR: G. RUCK						APPROVED: I. F. GRANT				

1.0 The following TLM Equipment is required for ALSEP Operations :-

1.1 PCM Decoms 1 thru 4

1.2 DSDU Patch Board & Matrix

1.3 Programmable Patch Panel (PPP)

1.4 PSK Matrix

1.5 Brush 150 Event Recorder

1.6 Brush MK200 (2 of three)

1.7 DSCC

2.0 Check that the "BOARDS" marked "ALSEP" are installed in the "DSDU" and the "PPP".

3.0 The Decoms should be locked up to one of the SIMULATORS. DSDU Matrix and/or DECOM SYSTEM FUNCTION/STATUS Control will tell you which. Further, the Sim switches and sequence tape in the reader will indicate the Format being simulated and the sequence tapes in the Decom readers will confirm the programs being used. If the foregoing, for all decoms, is unanimously ALSEP, go straight to Para 5.

4.0 Load the Decoms (1 thru 4) with sequence 1010D (Errata A & C) as follows :-

4.1 On the Reader, select "ON" and "LOAD", load the tape in the reader, and select "RUN".

4.2 On the Decom, select "LOCAL" push "RESET", and select "LOAD". Make sure that the program entry switch is at "TAPE-8", and push "TAPE LOAD".

4.3 When the load is complete on the Decom, select "OPERATE", push "RESET" and then push "CHANGE".

4.4 On the reader, rewind the tape and select "OFF" and "LOAD".

5.0 Set the controls and switches on the 4 Decoms as follows :-

CONTROL	DECOMS 1	2	3	4
Format	1	1	6	3
Decom input	NAR	NAR	WIDE	NAR
FS III Errors	← 1 →			
Frame	← 10010020 →			
Sub Frame 1-3	← 1010020 →			
ID	← 02 →			

	SIG COND 1 2 & 4 (NB & WB)	3 (WB Only)
Input Volts	1-15	1-15
DC Restoration	IN	IN
Detector	INTEG	INTEG
Polarity	POS	POS
Loop B/W	MED	MED
Mode	PROG	PROG
Bits/Sec	2.120 (WB Only)	1.280
Bit Rate Mult	X 1K (WB Only)	X 100

6.0 Clear all crosspoints on the DSDU Matrix and set up the following paths (Ref HOD Section 10.3).

6.1 Selection of AUTO PROG 3 will set up the following :-

NB 1 - PMVBP - 1

WB 1 - REPRO - 1

NB 2 - PMBB - P

WB 2 - REPRO - 2

WB 3 - PSK DEMOD - 1 *

NB 4 - PMBB - A.

WB 4 - REPRO - 4

* P & FS TAPE P/B IS ON REPRO 3

6.2 If it is required to send a simulated bit stream to USB, set up the following path.

Required SIM-CD (1 or 2) - PSK-1

Refer to Para 7.2, PSK MATRIX, for path completion.

Refer to Para 12 for SIM loading & set-up.

7.0 On the PSK Matrix, set up the following paths :-

7.1 PMVBP - 2 - PSK D1 & D2

7.2 To complete the path of the Sim data to USB, select the paths :-
PCM - 1 - USB TEST 1 or 2 (Refer Para 6.2).

8.0 Select "REMOTE" on all 4 Decoms and set the Remote Controls as follows :-

	1	2	3	4
Format	1	1	6	3
Input Select	NB	NB	WB	NB

Push "RESET" and then "CHANGE"

Check with OPS, and select Comp. Inhibits "OFF". (Computers can confirm Vehicle/Decom orientation).

9.0 On all active Sig. Conditioners, tune the VCO for centre meter indication. This tuning should be checked on first acquisition of all vehicles. Care should be taken when tuning for P & FS.

10.0 On the Brush 150 Event Recorder (located to the right of the PPP) check that there is sufficient paper, select "ON", "+100" and "200"mm/Sec.

10.1 On the Alarm panel select "Power" and Events 1 2 & 4 to "ON", Events 3 to "OFF ".

11.0 On the nominated BRUSH Mark 200 Recorders, check that there is sufficient paper, select Power "ON", "X.01" and "200" mm/Sec.

NOTE

The TRACK PANELS indicate the parameters being monitored.

11.1 Brush Mark 200 Nr. 1 (near the DSCC) has an alarm panel located immediately below the recorder. The first four events are Decom LOCKS 1 thru 4, and it is convenient to use the alarm facility to Mark P & FS Decom Lock and unlock at AOS and LOS and unscheduled drops on ALSEPS.

11.2 Reference should be made to MSFN Nr. 601/ALSEP/P&FS Page 2-12, "Parameter Monitoring" to appreciate the special requirements, which vary over the moon phases.

12.0 Simulator Loading and Operation.

12.1 On the Tape Reader, select "ON" and "LOAD". Load tape sequence 1011S and select "RUN".

12.2 On the Simulator Select "LOCAL" push "SYSTEM RESET". Select Program ENTRY "TAPE-8" and push "LOAD".

12.3 When load is complete, select BIT RATE "Variable" "1.060", "X 1K", FORMAT as required (1-ALSEP 1 & 2, 2-ALSEP 4) and at the OUTPUT DATA Controls, CODE TYPE to "SØ".

NOTE

For P & FS (FMT 4) set Bit Rate to "1.280" X "100" and CODE TYPE TO "NRZ -M".

12.4 Push "SYSTEM RESET" and then "CHANGE".

12.5 Rewind Tape and select "OFF" and "LOAD".

13.0 Parameter Monitoring (Model 721)

The three (3) vehicles may be monitored at the same time on the three displays. This utilises some of the waiting time between updates :-
allow approximately 2 minutes after each address selection to be sure of an update.

13.1 Select the Decom/Vehicle on "PCM SELECT", set word "WORD LENGTH" to "10".

13.2 Refer to the "MONITOR" table and set "CHANNEL SELECT" to the appropriate DECOM ADDRESS.

13.3 On the "BINARY DISPLAY" read the parameter value in OCTAL (Bits 2 to 10) when the update occurs or after 2 mins.

13.4 Select the next address from the TABLE and repeat 13.3.

14.0 Parameter Monitoring (DECOM)

The 3 vehicles may be monitored at the same time, one on each decom, utilising the waiting time between updates. Allow approximately 2 minutes after address selection to ensure correct update.

14.1 Refer to the "MONITOR" table and on the "DATA MONITOR BINARY DISPLAY" select "SEL CHAN" and set the "CHANNEL ADDRESS" for the parameter to be monitored.

14.2 On the display, read the parameter value in OCTAL (bits 2 to 10) when the update occurs or after 2 minutes.

14.3 Select the next address from the table and repeat 14.2.

15.0 CVW Calibration

The 8 CVW bits appear on "Digital Stores 1 thru 8" and are patched in 4 groups from the Decoms to the 150 Event Recorder. The 3 ALSEPS only are monitored. The decoms must be locked to the Simulator for this procedure. Decom ADDRESS IS 431.

15.1 Select FMT 1 on the ALSEP 1 & 2 Decoms and FMT 3 on the ALSEP 4 Decom. Select FMT 1 on the SIM to be used, and set up interface between the SIM and the Decoms at a bit rate of 10.6Kb. Start the 150 Event Recorder (200MM ± 100).

15.2 Select Address 75 on the SIM, set bits 10 thru 19 to "0" and push "load". The 150 Event Recorder will indicate "0" on all bits of the 2 selected decoms for ALSEP 1 & 2.

15.3 On the SIM load each bit (12 thru 19) in turn for approximately 3 seconds per bit. The Recorder should indicate the bits set.

15.4 On the SIM select FMT 2, Address 435, and set bits 10 thru 19 to "0". Push "LOAD". The 150 Event Recorder will indicate "0" on all bits of the selected Decom for ALSEP 4.

15.5 Repeat 15.3

15.6 Set the SIM and SIG Conditioners to 1.06Kb. Stop the Recorder.

16.0 Parameter Recordering Calibration

Parameters to be recorded appear on the DSDU patch panel at DAC outputs as specified, and are patched to Brush MK200 Recorders as required. The patch panel should be patched for the current requirements. For calibration and interface check, the required SIM interfaced to the required Decom must be set up to the FMT reflecting the required vehicle. It is most convenient to select a bit rate giving a rapid parameter change e.g. 10.6Kb for ALSEP, 12.8Kb for P & FS.

16.1 Refer to the "RECORD" Table and on the SIM, set "ADDRESS" for the required parameter. Set bits 10 thru 19 to "0" and push "LOAD". Repeat for all parameters.

16.2 Start the MK200 Recorder(s) on "200MM" "X.01", At each parameter SIM address set "bits" to give 25, 50, 75, 100, 75, 50, 25, 0, % DAC output. The appropriate MK200 channel pen should respond to the settings.

NOTE For ALSEP, bit 12 is 50%

For P&FS, bit 10 is 50%

16.3 Reset the SIM and Decoms to the correct vehicle bit rate. Stop the Recorder.

17.0 USB Remoting

17.1 The following parameters and indications are remoted to USB from the DSDU Patch Panel via the S/C AGC/SPE Matrix under the control of the S/C AGC/SPE/SYNC Select unit at the DSCC. The patching at the patch panel is DECOM oriented–

Vehicle	Patch Panel Label AGC	SPE	LK	LK
ALSEP	S/C AGC	S/C Tx power	"PRIME" Lock	"WING" Lock
P & FS	Rx Loop Stress		"	"

17.2 In operation the Decoms become vehicle oriented. Selection of the appropriate Decom/Vehicle to the required USB System is achieved by switch selection at the DSCC.

17.3 For calibration at USB, SIM ALSEP FMTS produce a "STEP" CAL. P&FS "Rx LOOP STRESS" may be simulated manually on SIM FMT 4, ADDRESS 1134, loading bits representing % Full Scale (Bit 10 is 50% FS).

NOTE Use bit rate 10.6Kb for ALSEP & 12.8Kb for P & FS.

18.0 Vehicle I.D. (ALSEP)

The 3 bit vehicle I.D. appears as the LSB of a specified WORD in 3 sequential Frames of the Downlink Field (Frames 3, 4 & 5). Para 18.1 & 2 give the procedure for determining the ID from the downlink. Para 18.3 gives the procedure for setting the SIM bit stream to reflect the different Vehicle ID's. The "ID TABLE" gives the addresses and "bit patterns" by Vehicle and FMT for the DECOM and SIM.

18.1 Set a "DECIMAL DISPLAY" to "SEL CHAN" "BITS CONVERTED" to "07" and "CHAN ADDRESS" per "ID TABLE". Set the "BINARY DISPLAY" to "SEL CHAN" and "CHAN ADDRESS" per "ID TABLE".

18.2 The "DECIMAL DISPLAY" now contains the FRAME COUNT (LAST count is 89) and bit 8 will sequentially spell out the Vehicle ID coincident with Frame Counts 3, 4 & 5.

18.3 On the SIM select the 3 sequential addresses given in "ID TABLE" and set BIT 19 as specified, for each address. Care should be taken to set the switches 10 to 18 to reflect the present contents of each word before pressing "LOAD".

RECORD TABLE – (28 September, 1971)

(Refer 601/ALSEP/P & FS Page 2-12)

P & FS (DECOM FMT 6, SIM FMT 4)

PARAMETER No.	DAC	DECOM ADDR	SIM ADDR	PARAMETER
E02B	8	1674	1243	Solar Array Current
E03B	4	1615	1244	Batt Volts
E04B	9	1675	1245	
E05B	5	1617	1250	Batt Temp
E06B	10	1676	1247	Lo Volts Mon
S14B	11	1671	1251	
ALSEP (A1 & A2 only)				
AL05	24	314	301	

MONITOR TABLE - (28 September, 1971)

(Refer 601/ALSEP/P & FS Page 2-12)

Parameter	Decom Addr		SIM Addr		DAC	NOTE
	FMT 1	FMT 3	FMT 1	FMT 2		
AB04	300	1047	265	675	12	1
AB05	302	1051	267	677	14	1
AT33	361	1130	346	756	16	2
AX06	335	1104	322	732	41	3

NOTES
1. LUNAR NIGHT, ALL Vehicles
2. All times, All Vehicles
3. At LUNAR SUNRISE A1 ONLY

ID TABLE - (28 September, 1971)

	SIM			DECOM			
	FMT	ADDR	BIT 19	FMT	ADDR	FR	BIT 8
ALSEP 1	1	122	0	1	26	3	0
		123	1			4	1
		124	0			5	0
ALSEP 2	1	122	0	1	26	3	0
		123	1			4	1
		124	1			5	1
ALSEP 4	2	532	1	3	726	3	1
		533	1			4	1
		534	0			5	0

TITLE: AQUIZ CONTINGENCY OPERATION PROCEDURES										SEC. No: 10.10
REFS: SCAN 2-614.2 (R)										ISS.No: 1
DIST: COMPUTERS / OPS / USB.										DATE: 27/3/72
CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REF:										
PAGES:										
ORIGINATOR: L. TURNER.						APPROVED: I. F. GRANT				

THIS SECTION DETAILS OPERATING INSTRUCTION TO LOAD AND INITIATE THE ANTENNA DRIVE PROGRAM FOR ALSEP AND P/FSS. 'AQUIZ' SCAN NO 2-614.2 (R)

1. PROGRAM DESCRIPTION

1.1 SUBPROGRAMS

The ACQUIZ program essentially consists of three designate subprograms: THIS PROCEDURE CONCERNS THE MUN ROUTINE ONLY.

a. MUN. The MUN routine will output acquisition data to the APP at a 1-second rate to point the USB antenna to one of nine selectable moon designation points in real time. An option (SCN) exists to circle scan 0.2 degree about the selected point.

2. OPERATING INSTRUCTIONS

NUMBERS CIRCLED REFER TO SAMPLE I/O PRINTOUT IN APPENDIX B.

2.1 COMPUTER SETUP { SET ALL SKIPS AND JUMP SWITCHES DOWN. OR

2.1.1 CLEARING CORE { REFER TO SECTION 9.2 OF HOD FOR FULL CHECK. }

Clear core using the instructions in paragraph 1.1 of Appendix A.1

2.1.2 PROGRAM LOADING

a. Prepare the magnetic tape unit using the instructions in paragraph 1.3 of Appendix A2.

b. Load ACP via Bootstrap II using the instructions in paragraph 1.4 of Appendix A.2. I/O WILL PRINT (1) IF NO PRINT OUT OCCURS PROCEED TO 1.2 APPENDIX A1.

c. Load PRIME via ACP, BY TYPING PRI (2) ON COMPLETION OF LOAD I/O PRINTS (3) AND COMES TO A S STOP. PRESS START.

d. If a recovery tape is required, operator types: XREC, ↑ (4) SEE NOTE 1, APPENDIX C

e. I/O console prints an asterisk. (5)

f. Load ACQUIZ via PRIME. TYPE XLOA, 01, ↑ (6) IF A LOAD ERROR OCCURS TRY XLOA, 02, ↑. I/O RESPONDS WITH (7)

g. I/O console prints:

ACQUIZ LOADED 2-614 (7)
STA,

h. Set sync switches to ON and EXT.

i. Operator types:

XXX, ↑ 3-digit station ID. (8)

HSK, ↑

RECOVERY OPTION

IF RECOVERY TAPE IS REQUIRED SWITCH SYSTEMS TAPE HANDLER TO ANY ADDRESS EXCEPT 1. SET HANDLER 2 AS PER 1.3 APPENDIX A2 AND PROCEED TO STEP j.

j. I/O console prints:

YRS, (9)

k. Operator types:

XX, ↑

where: XX = 2-digit year

l. I/O console prints:

DES, (10)

. Operator types:

MUN, X, ↑ (10) SEE APPENDIX D FOR DIAGRAM.

where: X = 0, Terminates MOON subroutine if another designation is available
= 1, Designates antenna to the left equatorial edge of the moon
= 2, Designates antenna to the center of the moon.
= 3, Designates antenna to the right equatorial edge of the moon
= 4, Designates antenna to the N. W. equatorial quandrant of the moon
= 5, Designates antenna to the N. E. equatorial quandrant of the moon
= 6, Designates antenna to the S. W. equatorial quandrant of the moon
= 7, Designates antenna to the S. E. equatorial quandrant of the moon
= 8, Designates antenna to the left half equatorial edge of the moon
= 9, Designates antenna to the right half equatorial edge of the moon

m. I/O console prints:

MOD, (11)

n. Operator chooses between real-time and simulation modes as follows:

(1) Real-time Mode. To configure program to output 1 point/sec in real time, operator types:

RLT, ↑ (11)

AT THIS POINT I/O WILL VERIFY YOUR TYPE INS WITH (12)

o. THEN PRINTS:

OPT, (13)

p. Operator types:

STP, ↑ (13)

q. If a recovery tape was not requested, proceed AS PER APPENDIX B

r. IF A RECOVERY TAPE WAS REQUESTED PROCEED AS PER APPENDIX C

APPENDIX A

1. STANDARD 1218 PROCEDURES

Note

For all procedures the N/N + 1 switch must be in the N + 1 position.

1.1 CLEARING CORE

To clear core, perform the following:

a. Press SEQUENCE STOP switch.

b. Press MASTER CLEAR switch.

c. Enter 40 in the FUNCTION register.

d. Set FUNCTION REPEAT switch up.

e. Press START.

f. Press SEQUENCE STOP switch.

g. Press MASTER CLEAR switch.

h. Set FUNCTION REPEAT switch down.

1.2 To load AQUIZ via BOOTSTRAP 1 perform the following:

a. Set BOOTSTRAP switch to I.

b. Press SEQUENCE STOP switch.

c. Press MASTER CLEAR switch.

d. Place SIMBOOT tape on the I/O console reader.

e. Press LOAD PBI.

f. Press START.

g. TAPE WILL READ AND WILL ACCESS THE MAG TAPE. PROCEED AS NORMAL BOOT 2 LOAD.

APPENDIX A1

1.3 MAGNETIC TAPE UNIT PREPARATION

Prepare the Magnetic Tape Unit as follows:

a. Mount the systems tape at beginning of tape (BOT) on handler No. 1.

b. On the tape control unit:

1. Press MASTER clear.
2. Set MODE switch to T1.
3. Set CLOCK CONTROL to NORMAL.
4. Set MAN/OFF/AUTO switch to AUTO.
5. ENSURE THE OTHER HANDLER IS NOT ADDRESSED AS 1.
6. Set ADDRESS switch to 1.

c. Verify the following indicator light status:

WRITE ENABLE - OFF . IF RECOVERY TAPE WRITE ENABLE - ON.

SELECT - OFF

REWIND - OFF

REV - OFF

FWD - OFF

EOT - OFF

BOT (Load PT) - ON

READY - OFF

1.4 LOADING MAGNETIC TAPE PROGRAM VIA BOOTSTRAP II

To load a magnetic tape program via BOOTSTRAP II, perform the following:

a. Set BOOTSTRAP switch to II.

b. Press LOAD.

c. Press START.

d. Magnetic tape program loads and operator continues using operating instructions.

APPENDIX A2

TYPE IN (1) COMPUTER RESPONSES ARE UNDERLINED

UTL
ALS
DDT
MON
RAP
UD3
PRI

PRI (2) TAPE MOVEMENT.

PRI LOADED (3)
SYS Ø03-03
03/02/72 ← COMPUTER 5 STOPS.
STD PRIME 2-601 FEB 16 72
XREC,↑ (4) RECOVERY OPTION EXERCISED. BYPASS IF NOT REQUIRED
* (5) COMPUTER HAS RECOGNISED OPTION.
XLOA,01,↑ (6) LOAD AGENDA 01. TAPE MOVEMENT.

ACQUIZ LØADED 2-614 (7)

STA,HSK,↑ (8)
YRS,72,↑ (9)
DES,MUN,2,↑ (10) MOON CENTRE.
MOD,RLT,↑ (11) REAL TIME

****** VERIFY INPUTS *** (12)

STA, HØNYSCKLE

YRS,72, GMT ØØØØ/ØØ DAY Ø

MUN,2, CENTER

RLT,

OPT,STP,↑ (13)

AT THIS POINT ERRORS IN SWITCH SETTINGS OR GMT ARE PRINTED.
NO EXT SYNCH. SET SYNCH SWITCHES TO EXT — ON
NO GMT INPUT. ENSURE GREEN ENABLE LIGHTS ARE ON IN THE DUAL TIMING BUFFER LOCATED AT THE TOP OF THE MUX RACK ALONGSIDE ASTAM SYSTEM MONITOR. WAIT FOR FOLLOWING PRINTOUT.

TIME	XA/HA	YA/DEC	RANGE	AZ	EL	STATUS	SOR
1522/11	-54.822	-25.942	12Ø2128Ø	239.239	31.2Ø2	NE = NEGATIVE ELEVATION BLANK = POSITIVE	MUN

VERIFY CORRECT, THEN SET SKIP KEY 4 SWITCH UP.

APPENDIX B

RECOVERY ACTION

STEP (13) STP,↑ HAS BEEN TYPED.

PR WRT ØK (14) RECOVERY TAPE WRITTEN.

AG ØK

AG EØT

WAIT FOR 1ST DATA PRINT-OUT, VERIFY OK THEN SET SKIP KEY 4 SWITCH UP, AUTO-RECOVERY SWITCH UP AND BOOTSTRAP SWITCH UP TO 1.
MOUNT 'SIMBOOT' TAPE ON READER. * NOTE 2.

COMPUTER FAULTS

"SIMBOOT" TAPE WILL BE READ IN AND PROGRAM RELOADED FROM RECOVERY TAPE. I/O PRINTS.

STD PRIME 2-ØØ1 ,ED 16 72 (15)

ACQUIZ LØADED 2-614 (16)

OPERATOR TYPES STP,↑ (17) RECOVERY RESTART.

THE PROGRAM WILL NOW RESTART. TURN SKIP KEY 4 SWITCH DOWN AND VERIFY PRINTOUT IS OK THEN RESET SKIP KEY 4 UP. REWIND SIMBOOT TAPE AND MOUNT ON READER.

NOTE 1. CHECK WITH OPS THAT SPARE HANDLER IS NOT REQUIRED FOR ASTAM LOGGING.

NOTE 2. 'SIMBOOT' TAPE IS STORED IN FILING TRAY ON CP 3 I/O CONSOLE

APPENDIX C

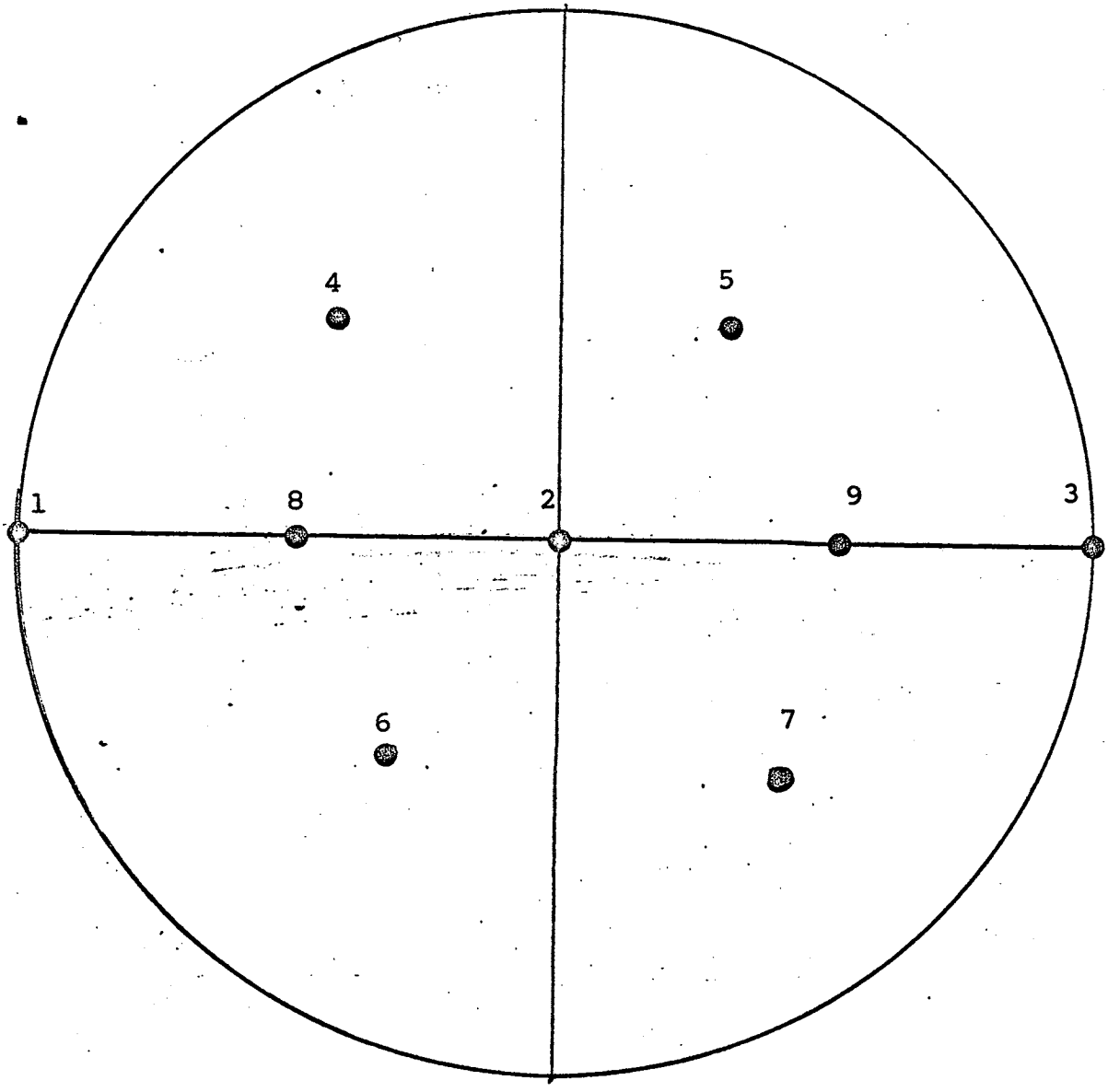


Figure 1. Moon Designation Points

APPENDIX D.

TITLE: EMERGENCY OPERATORS ACQUISITION PROCEDURES FOR ALSEP/P & FS										SEC. No: 10.12
REFS: NOP 502.4 NOSP 601/ALSEP/P & FS										ISS.No: 1
DIST: USB 1, RE 1 & 2, RE 3 & 4										DATE: 12 Sept'72
CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REF:										
PAGES:										
ORIGINATOR: LITHERLAND/FOSTER						APPROVED: I. F. GRANT				

ALSEP SYSTEM #1

1. The equipment should have been set up with reference to the CONTINGENCY SETTING UP PROCEDURES.

2. On the appropriate receiver select Oscilloscope RCV-TLM PM NB.
When Antenna is pointing at the moon, the ALSEP signals will be seen in the Spectrum display. Adjust the receiver acquisition control until a clear square wave is seen on the Oscilloscope. This should be done with Receiver Loop Filter 'SHORT' and 'OPER' selected when clean square wave achieved.

3. For Phase 2 support - select Tx Drive on on verbal cue from OPS.

P & FS SYSTEM #2

1. The equipment should have been set up with reference to the CONTINGENCY SETTING UP PROCEDURES.

2. AUTO CYCLE ACQUISITION.

   a) On Receiver 4 select RCV LOOP FILTER - 'SHORT'. Obtain the P & FS doppler predict curves from the receiver drawer. Determine from the Emergency time, the distance along the curve at which A/cycle will occur. Read off RCV VCO and adjust R4 Acq Control for correct VCO frequency.

   b) When signal is seen in SDU - minor adjustment of VCO Acquisition Control may be necessary to tune to the carrier. Return Loop Filter to 'OPERATE'. Request confirmation from TLM section of positive lock.

3. 3 WAY ACQUISITION

   a) On Receiver 4 - adjust RCV VCO freq. for nominal (0 volts) 23255208Hz. Select Loop Filter 'OPERATE' automatic lock should be achieved when 2 way site sweeps it's uplink.

4. 2 WAY ACQUISITION

   a) Short Synthesizer Loop Filter. Select EXC on the Acquisition Sweep. Turn Sweep Amplitude control to '30' on the dial.

   b) At the time specified by ALSEP NETWORK, select Tx Drive 'ON'. When RCV 4 achieves lock, select Modulation 'NORM'. Announce 'GO FOR COMMAND'.

c) It may be required to COMMAND IN THE BLIND. Select Modulation 'NORM' at the time specified by ALSEP NETWORK.

d) Slowly turn Sweep Amplitude CCW, till switch off occurs. Select Synthesizer Loop Filter 'OPER'. The VCO frequency should lock to the Synthesizer Frequency.

TITLE: ALSEP TLM WB RCDR CONTINGENCY PROCEDURES									SEC. No: 10.13	
REFS: STDN 601/ALSEP/P&FSS STDN 401.1 ALSEP/P&FS SRT									ISS.No: 1	
DIST: OPS & TLM									DATE: 13 Oct'72	
CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:	8 NOV 1972									
REF:	OMP 687									
PAGES:	1,4,5,7									
ORIGINATOR: M. LINNEY						APPROVED: I.F. GRANT				

INDEX :

****

1.0 GENERAL

Two Wideband Magnetic Tape Recorders will normally be patched and ready for ALSEP/P&FS contingency support, these recorders will be labelled on the top glass panel of each recorder. If recorders are not configured, see HOD Section 10.4, for patch -ing reference, and HOD section 10.3 for Basic Path Allocations.

1.1 The Recorder Matrix unit is to the left of each tape deck, and has 42 inputs and 14 outputs, the manual selection is accomplished by pushbuttons on the front panel. A display lamp at the intersection of the co-ordinate associated with the two push buttons, indicates crosspoint closure. To disconnect any co-ordinate press release, and reselect the same co-ordinate, when released return to operate. The auto selection, is accomplished by placing the Auto Program Disable/Normal switch to Normal, and turn the Program selector to No. 3, then push Auto start, this should bring up the basic ALSEP/P&FS data path to the recorder patch panel.

1.2 The Recorder Patch Panel for each recorder, is located under its matrix unit, for ease of identification, consider the patch panel to be labelled "A" for the top row and "B" for the second row, etc. and the patch holes from left to right, 1 to 32. Patch panel identification color codes are :-

Matrix Outputs ..... 1 to 14 (Pink) .....Row "C"
Repro Matrix Inputs .... 1 to 7 (Pink) .....Row "F"
Direct Record Pre-Ampl IN ...1 to 14 (Red)..Row "D"
Direct Record Pre-Ampl OUT ..1 to 14 (Red)..Row "A"
Head Driver Inputs .....1 to 14 (Red)..Row "B"
FM Modulator Inputs .....1 to 7 (Yellow).. Row "B"
FM Modulator Outputs .....1 to 7 (Yellow).. Row "A"
Direct Reproduce Outputs.....1 to 14 (Green)... Row "C"
Direct Reproduce Pre-Ampl IN.1 to 14 (Green)... Row "D"
Direct Reproduce Pre-Ampl OUT 1 to 14 (Green)... Row "E"

A typical path thru the patch field, direct recording to track # 1, out of the matrix would be :

Matrix output line # 1 - Row "C"
To direct record pre-ampl IN line # 1 - Row "D"
Direct record pre-ampl OUT line # 1 - Row "A"
To Head Driver input line # 1 - Row "B"
This is now patched DIRECT to Track # 1.

Same signal recorded in a FM Mode would be :

Matrix output line # 1 - Row "C"
To FM Modulator input line # 1 - Row "B"
FM Modulator output line # 1 - Row "A"
To head driver input line # 1 - Row "B"
This is now patched FM MODE, and can be monitored, in the (mini) monitor scope under the patchpanel.

2.0 EQUIPMENT REQUIRED

1. Two wideband magnetic tape recorders.
2. Tape search clock (located on recorder # 7).
3. Slow code clock (located on recorder # 3).
4. Tektronix mobile oscilloscope.
5. 50Ω BNC feed-thru termination.
6. BNC to mini-trompeter plug, scope lead.
7. Two new 14" dia scotch magnetic tape (1" x 9200ft).
8. Automatic tape degausser.

2.1 Inputs to the tape search and slow code clocks can be accomplished from any one of the tape recorder patch panels. From Row "E" # 2 (36 bit BCD - Real time) to a multi of three, then to the clock inputs Row "A" # 26 and # 27, the slow code clock, needs real time for the Brush MK200 chart recorder at the Data Console. Make sure the Slow Code unit is switched to correct speed for ALSEP (1 per 30 secs). Withdraw the unit and adjust switch inside on top. The tape search clock can be used during a playback, to display time from the tape.

3.0 M22 POWER ON

All machines will normally be powered down, the following are instructions on how to switch on the M22 recorder.

3.1 Pre-check that all switches under the M22 tape deck are OFF:-

Seq. Enable	-	OFF
Main Breaker	-	OFF
Data Locator	-	OFF
Local/Remote	-	LOCAL
Search Switch	-	OFF
Cycle Lock Switch	-	OFF
Transport Power	-	OFF

3.2 Place to ON Main Breaker,

Listen for the - Cooling Blowers Operation
Eight Red Power Failure Lights come ON
Local/Remote Switch Indicates LOCAL

3.3 Place to ON Transport Power Switch,

All Power Failure lights go OFF
3 3/4 IPS Speed indicator lights

3.4 If a tape is already on the top hub, and threaded thru the guides and heads to the lower hub, depress standby switch on the mode control panel. This machine is now ready for recording.

If a tape is not on the machine or not threaded. See ME1400, page 4-23 para 4.4.2 for tape loading and threading.

4.0 M22 START RECORDING

4.1 Simulataneously select record and run pushbuttons on the mode control panel.

4.2 Sync. meter under the tape deck, on power control panel, should indicate half scale, or in the GREEN area.

5.0 M22 QUALITY CHECKING

With the mobile Tektronix oscilloscope, monitor all of the FM demod outputs Row "E" # 12 thru 18, into 50Ω.

5.0 Continued.

FM Demod Output # 1 = ALSEP 1 PCM
2 = ALSEP 2 PCM
3 = ALSEP 3 PCM
4 = ALSEP 4 PCM
5 = ALSEP 5 PCM
6 = P&FS PCM
7 = CMD Ver.

CH. 1

All FM levels should be 2.8 V.P.P. to 3.0 V.P.P. into 50Ω.

If not adjust as follows :-

For a level that is too high or over deviated, turn the deviation control anti-clockwise. This control is located under the seven monitor oscilloscopes. If the level is too low turn the control clockwise. DO NOT MOVE THE REPRO LEVEL CONTROL.

5.1 For direct record levels, check the V.U. meters under the tape deck, the REC/BIAS/REP rotary switch for each track recorded, should be checked for 1 to 1 gain, and if the level is to be adjusted, use the record level control only.

6.0 FR1900 POWER ON

If a tape is not on the machine or not threaded see ME2587 Vol 1 Chapter 2 page 2.2-1 Section 2.2-9 for tape loading and threading. This must be done before the machine is switched on.

6.1 Place to ON main breaker.
Listen for - Cooling Blowers Operation
Power OFF indicator and speed.

Selector should illuminate.

6.2 Push power ON button.

Tape controller indicates STOP.
Listen for - Vacuum pump operation.

6.3 This machine is now ready for recording.

7.0 FR1900 START RECORDING

1. Set the tape/Tach sync switch on the system control bay to the tach sync position.
2. Set the tape speed to 3 3/4 IPS.
3. Press the forward push button on the system control Bay front panel. The tach sync indicator will illuminate when tape speed is correct.
4. Simulataneously press the two record push buttons. This machine is now in a record mode.

8.0 FR1900 QUALITY CHECKING

With the rack-mounted Tektronix oscilloscope, monitor all of the FM demod outputs Row "E" # 12 thru 18 into 50Ω.

FM Demod Output	# 1	= ALSEP 1 PCM	CH. 1
	# 2	= ALSEP 2 PCM	
	# 3	= ALSEP 3 PCM	
	# 4	= ALSEP 4 PCM	
	# 5	= ALSEP 5 PCM	
	# 6	= P&FS PCM	
	# 7	= CMD Ver.	

All FM levels should be 2.8 V.P.P. to 3.0 V.P.P. into 50Ω.

If not, adjust as follows :-

The FM electronics tray is located under the seven monitor oscilloscopes, these are plug-in assemblies, 1 to 7 FM RECORD channel controls are to the left and 1 to 7 reproduce channel controls are to the right, if a channel must be adjusted for the right level, adjust the second pot from the top of that channels P.C. card, on the record side only. DO NOT ADJUST THE REPRODUCE SIDE.

8.1 For direct record levels, check the V.U. meters under the tape deck, the REC/REP/BIAS/OFF push button switches under the V.U. meter, should be checked for 1 to 1 gain, and if the level is to be adjusted the direct electronic trays are located under the meter bays, tracks 1 to 7 are top row and 8 to 14 the bottom row. USE THE RECORD SIDE ONLY for adjustment.

9.0 FR1100 VOICE RECORDER POWER ON

9.1 Place to ON main power toggle switch.

Push button control marked STOP will be lit.

Speed control will be lit.

9.2 If a tape is not on this machine or not threaded see ME1680 page 11/12.

NOTE: The FR1100 voice recorder is not normally used for ALSEP/P&FS operations, but must be switched on, to provide voice repatch to the wideband recorders via patch panel Row "F" voice MTR 1 thru 4.

T/L 1 = NET 1
T/L 2 = NET 2
T/L 3 = NET 3
T/L 4 = ALPHA

10.0 VOICE ANNOTATION

After the recorders have been checked and are recording for the pass. Voice annotation must now go on the tape to identify the data.

Using a headset and plugged into an intercomm panel above recorders 2 or 4 select Prime Anno.

10.1 QUOTE THE FOLLOWING

This is the STDN - H.S.K. Station.
The support identification code is :-

M.0781.0S (ALSEP 1)
M.0782.0S (ALSEP 2)
M.0783.0S (ALSEP 3)
M.0784.0S (ALSEP 4)
M.0785.0S (ALSEP 5)
M.0791.0S (P&FS 1)
M.0792.0S (P&FS 2)

10.2 The GMT date is .....(720628)
YR MO DA

10.3 And the recording system is M22/FR1900.

10.4 The recording speed is 3 3/4 IPS.

10.5 Track assignments are as follows :-

Track ..... Data ..... Mode...
(SEE HOD 10.4 PAGE 2)

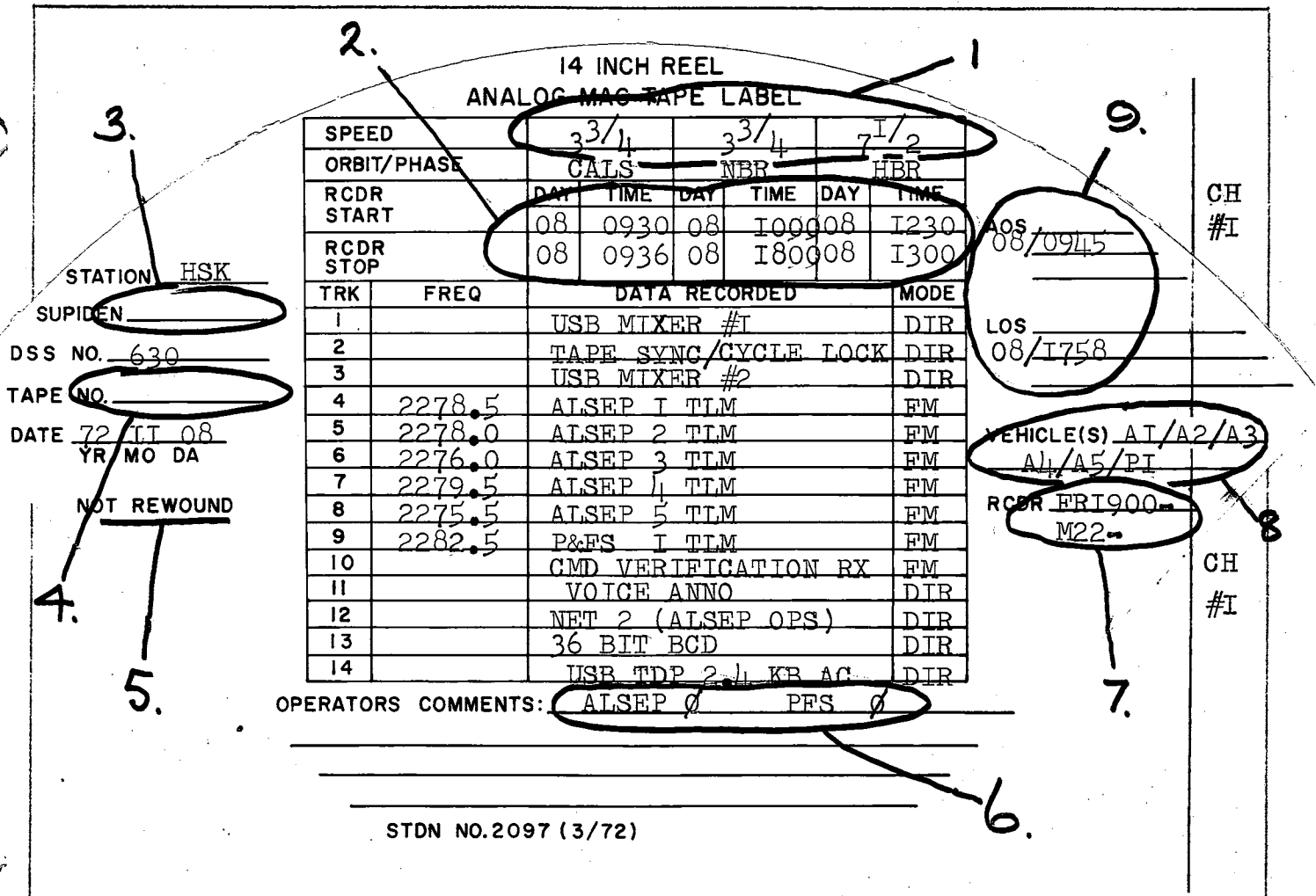
END QUOTE.

NOTE : NO USB PRE OR POST PASS CALS ARE REQUIRED ON THIS TAPE.

11.0 The DATA IDENTIFICATION LABEL STDN # 2097.

For 14 inch analog mag. tape reels, see STDN 502.11, Page 2-5; Section 2.4.3.2. Copies of this label with annotation can be found at the back of the recorder operations log.

EXAMPLE ON FOLLOWING PAGE.



1. RECORDING SPEED $3^{3}/_{4}$ IPS ALSEP NBR, $7^{1}/_{2}$ IPS ALSEP HBR.
2. DAY OF MONTH AND GMT OF START AND STOP OF THE RECORDER.
3. SUPIDEN (Support Identification codes) SEE STDN 506.16 / STDN 808.
4. SEQUENTIAL TAPE NR. SEE ALSEP/PFS TAPE USAGE LOG (in the front of recorder operations log)
5. DO NOT REWIND AFTER USE.
6. SUPPORT PHASE * 2 NOC CMD RT. * 3 RECORD ONLY NO CMD.
   * 4 HSK CMD RT.
7. RECORDER IDENTIFICATION AND NR.(eg. FR1900-5 or M22-1)
8. VEHICLES ON TAPE.
9. GMT STATION AOS/LOS.

TITLE: CONTINGENCY MTU LOADING PROCEDURES								SEC. No: 10.14
REFS: HOD SECT 10.7 and 11.10 and MH-1049								ISS. No: 1
DIST: OPS, USB 1, TLM CMPTRS, COMMS - HSK ONLY								DATE 17 Oct'72
CH.No:	1	2	3	4	5	6	7	8
DATE:								
REF:								
PAGES:								

ORIGINATOR: L. Turner APPROVED: I.F. GRANT

This section details computer magnetic tape unit loading procedures.

****

All operational and scratch tapes are kept in storage area backing on Ops room. Paper tape erratas are stored in file on CP2 1232 I/O cabinet.

TURN-ON PROCEDURE. - The turn-on procedures must be accomplished prior to loading the tape. To turn on the MTU, proceed as follows:

STEP 1. Ensure that circuit breaker on handler electronic drive unit is on. internal switches normally ON.

STEP 2. Set HANDLER MAN-OFF-AUTO switch(s) to OFF. Normally OFF.

STEP 3. Momentarily set primary power control panel POWER switch to ON. Green LOGIC and BLOWERS indicator light. Normally ON.

STEP 4. Momentarily set tape handler control panel POWER switch to ON. Green BLOWER ON indicator lights. Normally ON.

STEP 5. Set appropriate HANDLER MAN-OFF-AUTO switch(s) to MAN.

NOTE

For emergency turnoff, set primary power control panel POWER switch to OFF.

TAPE LOAD PROCEDURE. - Loading the tape on the tape transports requires mounting a reel of tape on the upper or right tape transport hub, attaching the tape to a takeup reel on the lower or left hub, performing the appropriate tape threading, and positioning the tape at the beginning of tape reference mark (load point).

The Systems tape will be loaded on any handler of channel 6 and must be given address 1. No other handler on this channel must have this address. The three scratch tapes normally required will be mounted on channel 6 or 11 and given addresses 2, 3 and 4 as per para STEP 18 page 2.

To load a tape on the MTU, proceed as follows:

STEP 1. Perform turn-on procedure (refer to para 3-2b).

SETP 2. Mount reel of tape on upper hub (see figure 3-6).

NOTE

If a write operation is to be executed during the program, ensure that the write enable ring is positioned in the reel. If a master tape is

used, ensure that the write enable ring has been removed from the reel to prevent accidental writing on the master tape.

STEP 3. Mount empty reel on lower hub if required. (Fixed empty reel).

STEP 4. Depress retraction switch (see figure 3-6) on tape transport. Tension arms position to tape load (center) position.

STEP 5. Open vacuum buffer cover and head cover.

STEP 6. Thread tape through drive assembly (see figure 3-6).

STEP 7. Unwind several feet of tape from upper reel.

STEP 8. Hold free end of tape to core of takeup reel with finger and wind about three turns of tape on takeup reel in clockwise direction (tape path is as shown in figure 3-6).

C A U T I O N

Do not slip the free end of the tape into the reel core slot, and do not secure the free end to the reel in any manner.

STEP 9. Remove slack in tape by rotating lower reel in clockwise direction.

STEP 10. Press retraction switch and wait for tension arms to stop.

STEP 11. Manually rotate reels until tension arms are at their normal run position (mid range).

STEP 12. Inspect to ensure tape is properly positioned within guide rollers and guide trough.

STEP 13. Close head and buffer covers.

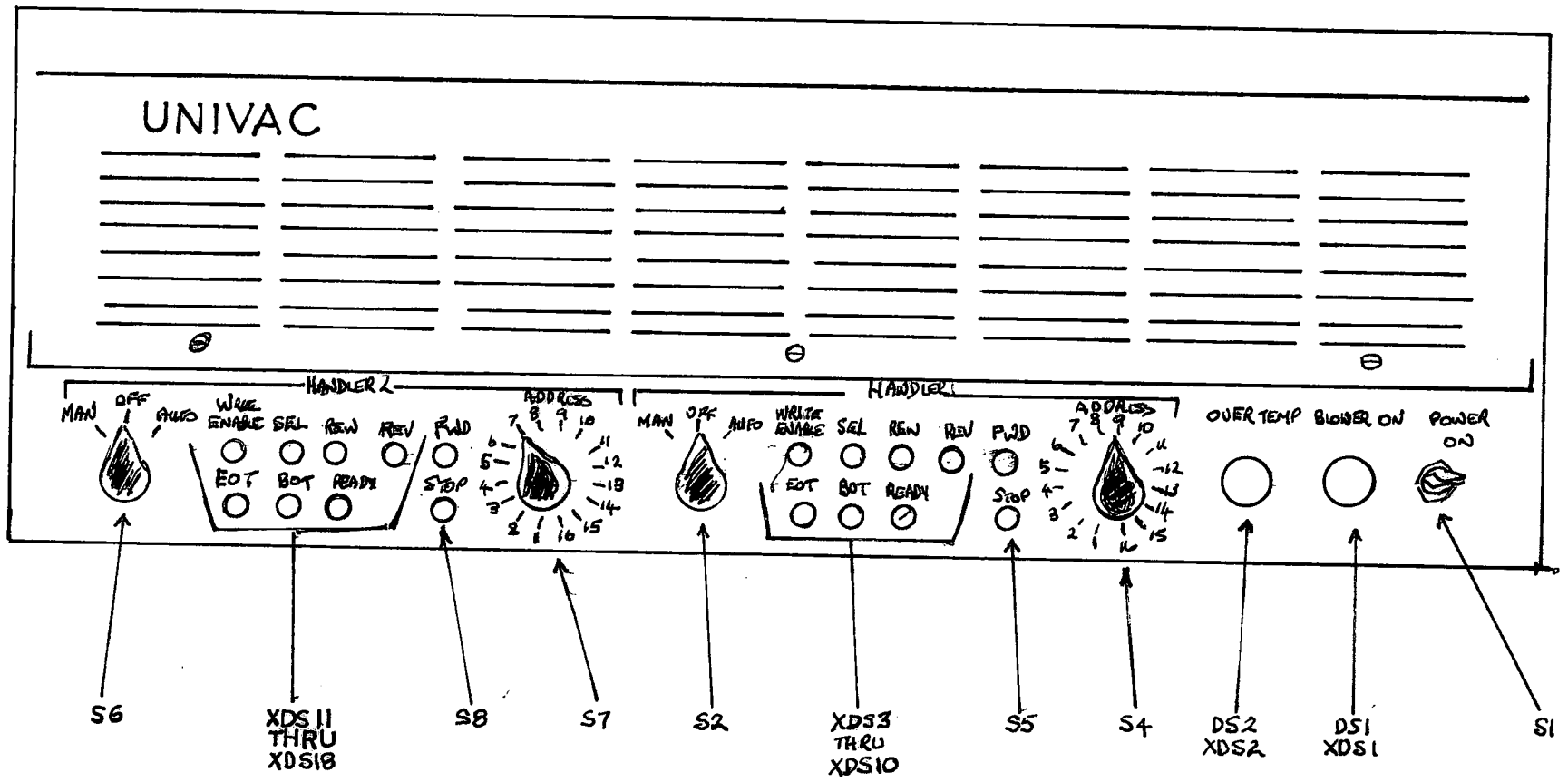
STEP 14. Depress appropriate HANDLER FWD switch and let tape run forward for about 5 seconds. Depress HANDLER STOP switch.

STEP 15. Press HANDLER REWIND switch. Tape will run in reverse to load point and stop.

STEP 16. Switch all HANDLERS to AUTO.

STEP 17. Set write enable switches on handlers 2, 3 and 4.

STEP 18. Set systems tape to address 1, history tape to address 2, recovery tape to address 3, log dump tape to address 4.


UNIVAC
HANDLER 2
MAN
OFF
AUTO
WRITE ENABLE
SEL
REW
REV
EOT
BOT
READY
FWD
STOP
ADDRESS
HANDLER 1
OVER TEMP
BLOWER ON
POWER ON
S6
XDS11 THRU XDS18
S8
S7
S2
XDS3 THRU XDS10
S5
S4
DS2 XDS2
DS1 XDS1
S1

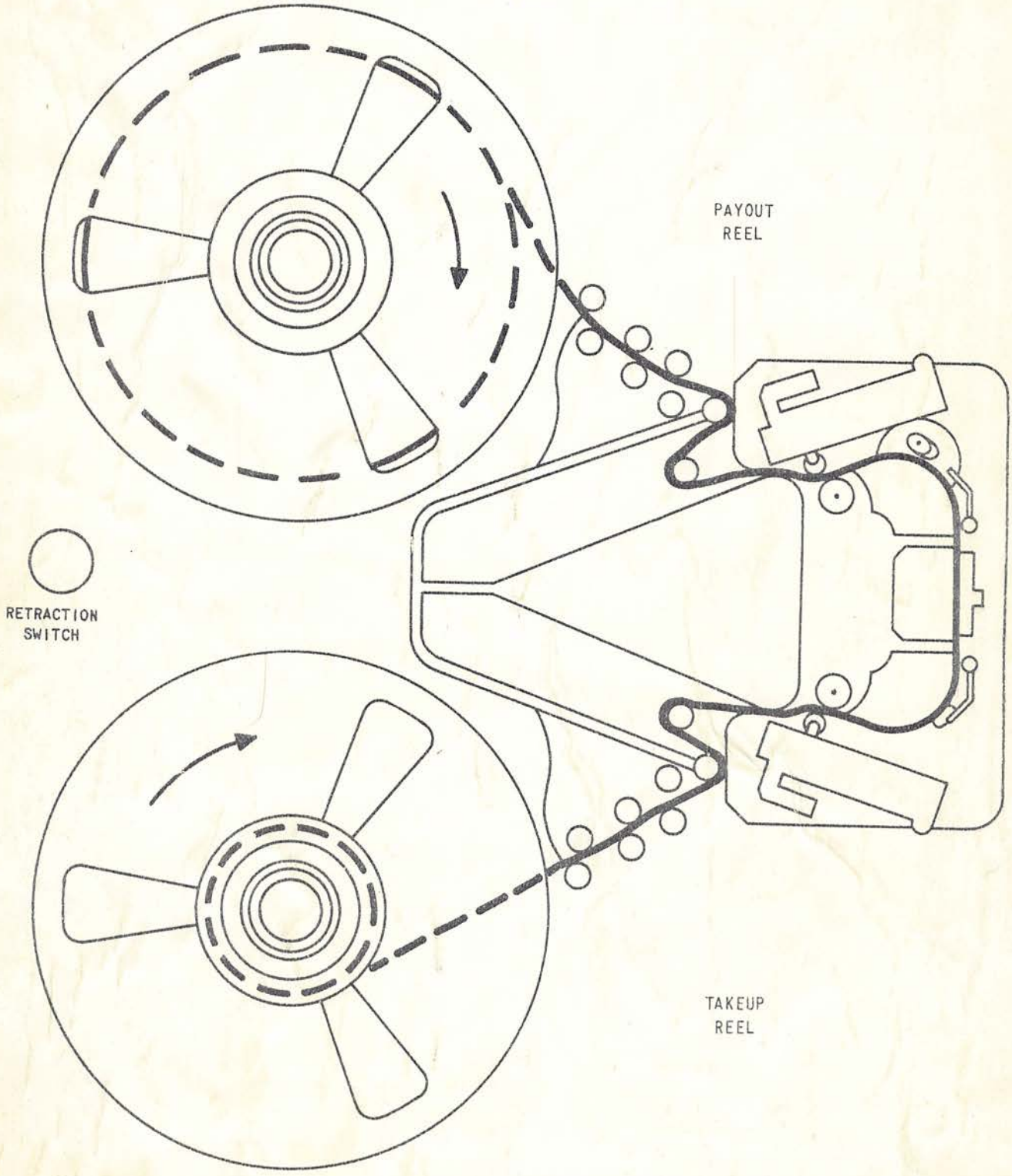
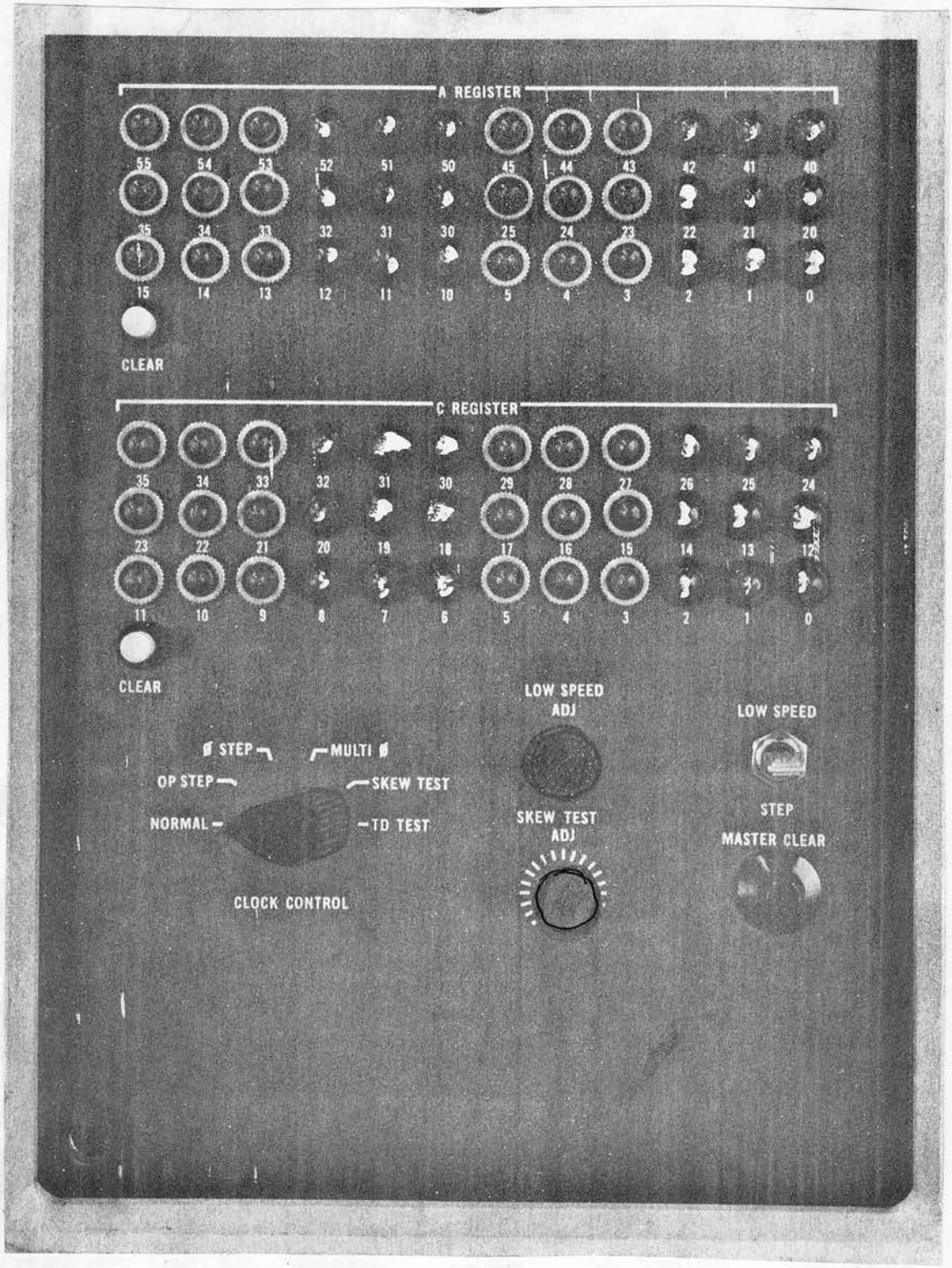
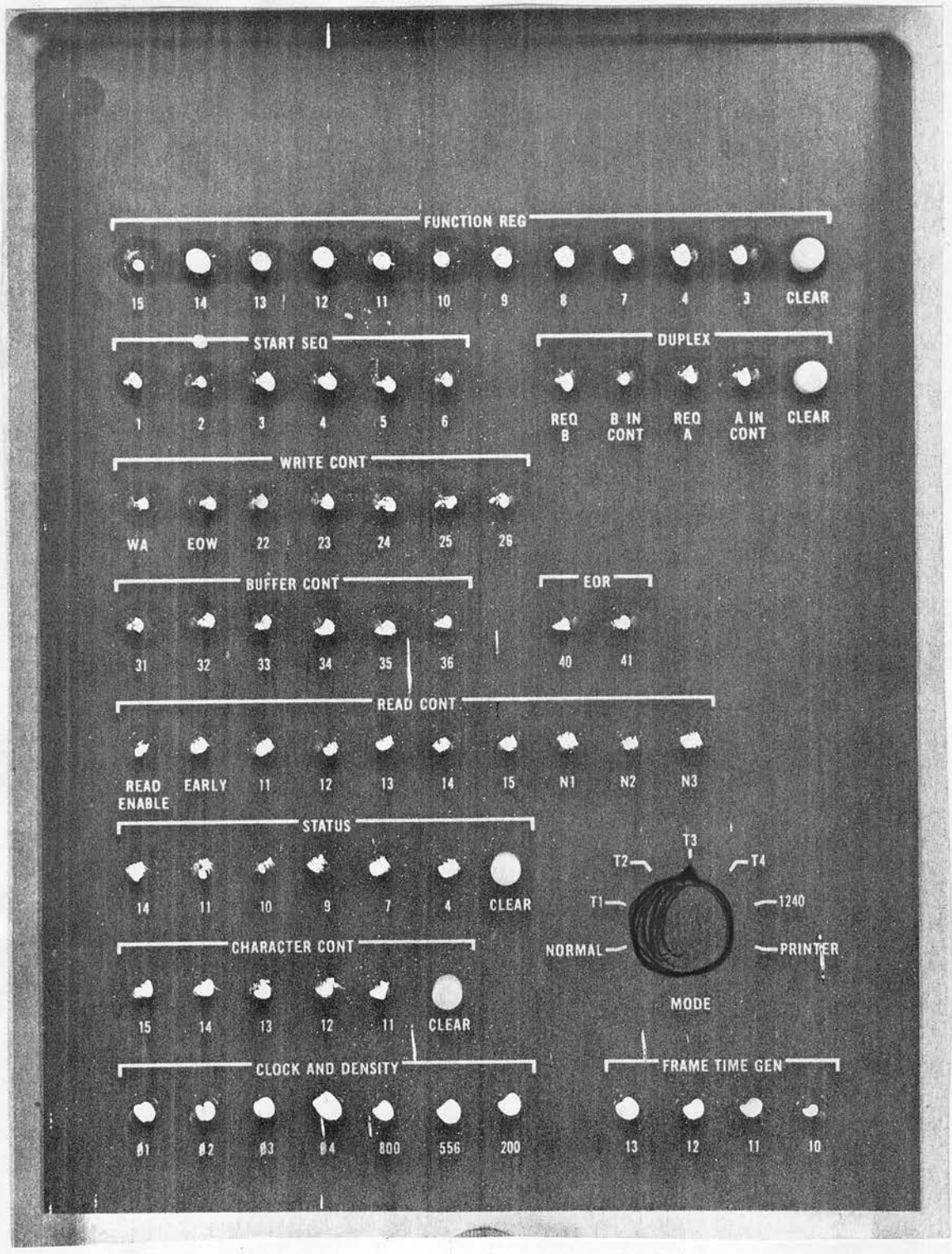


FIGURE 3-6


A REGISTER
55 54 53 52 51 50 45 44 43 42 41 40
35 34 33 32 31 30 25 24 23 22 21 20
15 14 13 12 11 10 5 4 3 2 1 0
CLEAR
C REGISTER
35 34 33 32 31 30 29 28 27 26 25 24
23 22 21 20 19 18 17 16 15 14 13 12
11 10 9 8 7 6 5 4 3 2 1 0
CLEAR
LOW SPEED ADJ
LOW SPEED
Ø STEP
MULTI Ø
OP STEP
SKEW TEST
NORMAL
TD TEST
SKEW TEST ADJ
STEP
MASTER CLEAR
CLOCK CONTROL


FUNCTION REG
15 14 13 12 11 10 9 8 7 4 3 CLEAR
START SEQ
1 2 3 4 5 6
DUPLEX
REQ B
B IN CONT
REQ A
A IN CONT
CLEAR
WRITE CONT
WA EOW 22 23 24 25 26
BUFFER CONT
31 32 33 34 35 36
EOR
40 41
READ CONT
READ ENABLE
EARLY 11 12 13 14 15 N1 N2 N3
STATUS
14 11 10 9 7 4 CLEAR
CHARACTER CONT
15 14 13 12 11 CLEAR
CLOCK AND DENSITY
01 02 03 04 800 556 200
T3
T2
T4
T1
1240
NORMAL
PRINTER
MODE
FRAME TIME GEN
13 12 11 10

TITLE: ERTS/ALSEP/P & FSS COMMS CONTINGENCY PROCEDURES	SEC. No: 10.15
REFS: N/A	ISS.No: 1
DIST: ALL	DATE: 30/8/72

CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REF:										
PAGES:										

ORIGINATOR: M. GEASLEY mgeasley APPROVED: I. F. GRANT

GENERAL:

In order to set up Comms test equipment the following notes are given.

COMMS TEST EQUIPMENT SET-UP:
DATA QUALITY MONITOR (DQM)

For Pseudo Random Pattern tests the Program Plug has to be instal led on the DQM.

SET THE PROGRAM PLUG CONTROLS AS FOLLOWS:

Mode selector to - EXT

Frame sync. word bit error switches - ALL DOWN

Search mode to - 0

Lock mode to - ∞

SET DQM CONTROLS AS FOLLOWS:

Total count period to - 100

Data input polarity to - +ve

The DQM will transmit Pseudo Random Pattern data consisting of 2047 bits block length at any rate between 600 B/S and 10 KB/S depending on the speed selector setting of the INTERNALLY timed data set to which it is connected. To input the P.R. pattern to the data set patch (using double patchcord) between DQM Tx. (JIKI DC JACKFIELD) and the data set Tx line jacks (A B rows DC JACKFIELD). The output of the data set is then put to line at the AF Jackfield by either removing DUMMY PLUGS or patching from data set Tx (F row AF JACKFIELD) to the nominated NCV line Tx (A row AF JACKFIELD), always check that the data set speed select switch is set to the correct bit rate.

For 205B data sets check data set control panels 1 or 2 in HSD bay #2 (JUST BELOW DQM).

For 203A data sets check the BIT RATE KBS switch on the front of each data set in HSD bay #3 and #4 (righthand side cabinets). Check also that the REMOTE TEST - LINE - LOCAL TEST (K1) test switch is set to line on each data set in HSD bay #3 and that power is applied, i e. circuit breakers situated at the bottom of the rack are made.

DQM AS A MONITORING DEVICE:

For Telemetry Data monitoring install the appropriate TEST PLUG and put the data polarity switch in the (-ve) position (all data has negative polarity with the exception of the Pseudo

Random Pattern). To monitor the data patch from line mon (EF row of DC JACKFIELD) of data set (203A) using double patchcord to DQM Rx (J2K2 DC JACKFIELD). The mode lights will go from SEARCH to VERIFY to LOCK when data is present. The ATEC counter is normally configured to the DQM using the BNC to Banana test cord inserted at BIT ERROR OUTPUT and GND. Set counter to manual count ON and attenuator to X10. Any bit or block error will cause the DQM to output errors and the counter will register the number of errors on an accumulating basis. A Sonalert/lamp on the DQM alarm panel beeps or lights when DQM outputs errors. For Tracking Data monitoring install the TRACKING DATA TEST PLUG and set the bit switches as shown on face plate card holder using double patchcord patch from line mon. (E1F1 DC JACKFIELD) of DSI Tx to DQM Rx as before. Should DS2 (backup 205B for Tracking data) be in use then patch from its line mon to DQM Rx. Lock will automatically be achieved as with Telemetry Data when high speed tracking data is being output.

NOTE: ALWAYS SWITCH OFF POWER TO DQM WHEN CHANGING TEST PLUGS AS DAMAGE TO UNIT CAN OCCUR WITH POWER ON.

F.E. 600 DATA TRANSMISSION TEST SET:

The F.E. 600 test set is a pseudo random pattern generator or receiver as required. Its main function is as a receiver since the installation of the Western Reserve Electronics error counter module. The F.E. 600 is equipped with crystals and a tunable VFO to set the bit rate on transmission or reception. CR 1 crystal is for 2.4KBS and CR 2 crystal is for 600 BS operation. The tunable VFO has a range up to 100 KBS but is only used for 7.2KBS OPERATION.

The following are the F.E. 600 switch settings forthe reception of 2.4KBS P.R. Data

PATTERN GENERATOR

½/0 switch to - 0

Error test to - NML

Delay to - 0

Range MS to CR1

EXT/INT to - INT

SYNCHRONIZER

MAN/AUTO to - AUTO

AFC to - 3

Timing to CLOCK

ERROR COUNTER MODULE

RUN-STOP-RESET to - RUN (after RESET)

ALARM to - ON (Reset the RESET switch until all lights are out).

DATA SET ADAPTER

ON/SR switch to - ON

INPUT to - 200

DATA to - PR

SPEED to - 2400 (WHITE)

Make the following patches for F.E. 600 line check at 2.4KBS using 205B data set done usually on NCV 225 prior to support where high speed tracking data is required. This check is one way only from site to Goddard data link.

DC JACKFIELD:

J1K1 to A3B3 DQM Tx to D.S.2 Tx (double patchcord).

A.F. JACKFIELD:

F3 to A9 D.S. 2 Tx to NCV 225 (Single patchcord).

NOTE: By patching F3 to Tx of any other NCV line the F.E. 600 check can be carried out on that line vice NCV 225. When the check is done both ways on the circuit patch the receive side if NCV line to D.S. 2 Rx on AF JACKFIELD and patch from A4B4 using double patchcord to J6K6 (F.E. 600 Rx) both on DC JACKFIELD. The reset switches are operated on the error counter module until BIT and BLOCK ERROR NIXIE INDICATORS stops counting. The bottom row of NIXIE will continue counting the data blocks received.

The following are the F.E. 600 switch settings for the reception of 7.2KBS P.R. data.

PATTERN GENERATOR:

As for 2.4KBS except RANGE MS to 1-.1 and VCO vernier to 1.20.

SYNCHRONIZER:

As for 2.4KBS.

ERROR COUNTER MODULE:

As for 2.4KBS.

DATA SET ADAPTER:

As for 2.4KBS.

Make the following patches for F.E. 600 line check at 7.2 KBS using 203A data set, carried out usually on NCV 224 or NCV 226 prior to support where CMD and Telemetry data is required.

D.C. JACKFIELD:

J1K1 to A5B5 DQM Tx to D.S.3 Tx
OR
J1K1 to A7B7 DQM Tx to D.S.4 Tx
) DOUBLE PATCHCORDS

A6B6 to J6K6 D.S.3 Rx to F.E. 600 Rx
OR
A8B8 to J6K6 D.S.4 Rx to F.E. 600 Rx
) DOUBLE PATCHCORD

A.F. JACKFIELD:

E5, E6, E7, E8 Remove dummy plugs to allow D.S.3 and 4 to be connected to NCV 224 and 226 respectively.

NOTE: Patching the DQM Tx and the F.E. 600 Rx to D.S.6 or 7 at the D.C. JACKFIELD and patching the Tx/Rx (F row AF JACKFIELD) to required line (A row AF JACKFIELD) allows the F.E. 600 line checks to be done using the spare 203A data sets.

ERTS/ALSEP/P & FSS CONFIGURATION TLM AND CMD H.S. DATA D.C. JACKFIELD	NORMAL CONFIGURATION
C23 D23 to A5B5	DTU 5 Tx to D.S.3 Tx

AF JACKFIELD

E5, E6 Remove dummy plugs to connect D.S.3 Tx and Rx to NCV 224 (ensure NO LIGHT IS LIT ON RS control panel above DC JACKFIELD when retrain sequence is completed).

H.S. TRACKING DATA:

Ensure that the DM-1 switch on clock selector panel is set to SCTE. When REAL TIME transmission of H.S. tracking data is required remove dummy plug at E1 on AF JACKFIELD which allows D.S.1 to output to NCV 225.

ERTS & P & FS H.S. TRACKING DATA RECORD AND PLAYBACK

RECORD

AF PATCH PANEL

G1 to J20
(Line Mon. Jk, DS1 to Rcdr. I/F adapter Amp 1 input).

DC PATCH PANEL

K23 to J17
(Rcdr. I/F adapter AMP 1 output to HSDM patch panel tieline 1).

PLAYBACK

DC PATCH PANEL

J18 to K22
(HSDM Patch Panel tieline 2 to I/F adapter 50Ω input).

AF PATCH PANEL

J21 to A9
(I/F adapter 600Ω output to NCV 225 transmit).

NOTE: The line mon jack G1 for D.S.1 is only enabled when dummy plug is removed from E1 under record conditions terminate NCV 225 Tx at A9 with 600Ω term for playback this term has to be removed.

TLM AND CMD H.S. DATA REVERSE CONFIGURATION

In reverse config. DTU 6 Tx and Rx are used which are normalled thru on DC JACKFIELD to D.S.4 all that is necessary to put D.S.4 to line NCV 224 is patch from F7 & F8 to A7 & A8 respectively on the A.F. JACKFIELD.

TLM AND CMD L.S. DATA NORMAL CONFIGURATION

To output L.S. CMD histories etc the NCT 282 ("B" SEND LOOP) remove dummy plugs from IR3 Rx and IR3 Tx on TTY JACKFIELD.

TLM AND CMD L.S. DATA REVERSE CONFIGURATION

Patch TLM Tx (C21) into CMD loop out (A25) and dummy out CMD Tx (C26).

L.S. TRACKING DATA:

When real time L.S. tracking data is required remove dummy plugs from IR4 Rx and IR4 Tx which allows L.S. tracking data to be output to NCT 281 ("A" send loop). To make a tape copy of L.S. tracking data in Comms Centre patch R.O.T.R. #5 (F4) into TDP send loop (A23). A page copy of the data will be printed on the silent R.O. permanently installed in TDP send loop.

NOTE: Always remove the IR Rx dummy plug first to avoid opening the circuit to which it is connected.

L.S. TRACKING DATA NON REAL TIME

When L.S. tracking data is required post pass vice real time the dummy plugs are left inserted in IR4 Rx and IR4 Tx. This prevents the data reaching "A" send line. Postpass L.S. Tracking data is normally sent as normal TTY TWX in 120 line blocks maximum per message.

ERTS

SEC	TITLE	ACTION	DISTRIBUTION				
			USB	TLM	COMP	COMMS	OPS.
11.1	ERTS PASSUM COMPLETION NOTES	OPS	X	X	X	X	X
11.2	ERTS SERVO PROCEDURES	USB	X				X
11.3							
11.4	TLM ERTS PRE-PASS CHECKLIST * MISSING 12/7	TLM		X			X
11.5	ERTS PRE PHASE SRT	OPS	X	X	X	X	X
11.6	USB ERTS PRE-PASS CHECKLISTS * MISSING 12/7	USB	X				X
11.7	RSDP ERTS PRE-PASS CHECKLIST * MISSING 12/7	RSDP			X		X
11.8	TYPICAL ERTS PASS PROCEDURES	OPS	X	X	X	X	X
11.9	EMERGENCY OPERATORS ACQUISITION & RANGING						
	PROCEDURES FOR ERTS	USB	X				X
11.10	642B ERTS COMPUTER CONTINGENCY OPERATING						
	PROCEDURES	CMPTS	X	X	X	X	X
11.11	TLM RECORDERS CONFIGURATION FOR ERTS	TLM		X			X

TITLE: ERTS PASSUM NOTES	SEC. No: 11.1
REFS: STDN 502.16, 601/ERTS, 808 ETC	ISS. No: 1
DIST: USB 1, TIM, CMPTRS, COMMS, OPS	DATE: 25 June 1972

CH. No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REP:										
PAGES:										

ORIGINATOR: J. SAXON APPROVED: I. F. GRANT

This Section should be used with the ERTS Passum Twx proformas available in Ops. Normally the Passum/s will be completed by Ops, Sections must be familiar with the information required for completion, so that this can be passed on the loop to Ops, A.S.A.P. Post-Pass.

Notes:-

Notes on ERTS PASSUM Completion

1. Refs. 502.16 pages 2-85 thru 2-102 (procedure), 25-35 thru 38 (format), 601/ERTS pages 16-9/10 (ERTS peculiar).

2. Submit one PASSUM for EACH pass, except where pass is segmented thru a GMT day change on the schedule . In this case two passums are required.

3. Submit within 45 mins of LOS.

4. Submit RR unless anomaly info included - PPin this case.

5. Non-applicable header sections can be deleted. Do not re-letter remaining headers.

6. ACTIVITY (SECT. A)

   (A) Add SATIDEN if assigned after launch. (Ref STDN 808).

   (B) SUPIDEN: last 2 letters per schedule.

   (C) ORBIT: insert leading 0's as necessary to make 5 characters.

   (D) Start: and stop times per schedule (not including IFCD times).

   (E) Remarks: use codes on STDN 502.16 pages 2-88 or 2-100. Letters and/or numbers.

7. TAPES (SECT. B) No separate line for Cals.

   (A) NUMBR: Station assigned, use leading 0's as necessary to make 5 characters.

   (B) TYPES: R=1KBS R/T, 24P.=24KBS DUMP, 1P=1KBS Dump. Use separate lines for each type received.

   (C) START: HRS MINS. Time when S/C data recording tape rcdr start (include Cal time only if rcdr left running), or time of data rate or type change. Include SEG if 2nd of 2 passums.

   (D) STOP: Include post-cal only if rcdr left running. Include SEG if 1st of 2 passums.

   (E) MINS = MINS x 100 - MINS x 10 - MINS - MINS ÷ 10 for times greater than 10 MINS, Total mins can be rounded off. Leading 0's if necessary.

   (F) SF: S can be E = normal (30 ips) or F = dump (60 ips).

   (G) FILE: 1 for 1st pass on tape ETC. Leading 0's to 3 Figs, F under 'E' for last passum of that tape.

   (H) PARAMS:

P	A(normally)	R	A	M(normally)	S(Cals)
Ant=A	Rx1=A Rx2=B	PSK1=A " 2=B " 3=C " 4=D " 5=E " 6=F	normally X	1900/ 1=F 1900/ 2=C	A=No Cals B=Pre-cals only C=Post-cals only D=Pre & Post Cals E=Pre & Post cals (post needed due suspected problem). Inc. general RMKS. F=Post cals only (No pre due problem). Inc. general RMKS.

   (I) REMARKS: per pages 2-100 & 2-101 of STDN 502.16.

8. COMMANDS (SECT. C)

All header and params column only need be completed for 642B site on a CMD pass. Include DTG history in General Remarks. P=CP1 (A), CP2 (B). A=P/A1(A), P/A2(B). R=A (85' USB). AMS=P/A Power (normally 004=400 watts).

9. PASS DATA (SECT. D)

Per proforma margin notes & self-explanatory. Delete N/A items.

10. QUICK LOOK (SECT. E)

Add to proforma if required.

11. USB (SECT. F)

Self-explanatory. Put in as many TWO or TRE for TREWY & TWOWY times as required. Delete N/A Items.

12. REMARKS (SECT. G)

1st item is "CMD HIST XX/XXXXZ" (DTG). No fixed format.

TITLE: ERTS SERVO PROCEDURES	SEC. No: 11.2
REFS: STDN 502.4 Sect. 2	ISS.No: 1
DIST: USB & OPS	DATE: 21 Jul'72

CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REF:										
PAGES:										

ORIGINATOR: F. CAMPBELL APPROVED: I. GRANT

ERTS SERVO PROCEDURES

1. As early as possible before pass, plot pass on omni-horizon chart. Ascertain the following :-

   1. AOS time.
   2. I.P. (see below)
   3. LOS time.
   4. Y Keyhole in/out times (if applicable) and degrees into keyhole.
   5. Time above 10°
   6. Time below 10° (use AZ-EL chart).
   7. Max elevation.

2. ACQ. PROCEDURES :

   Sit at I.P., 10 seconds along track from horizon break point. If there is a downlink use normal 502.4 procedures, manual position/ACQ/Auto as appropriate. If there is no downlink expected at AOS or horizon break not clean acquire in program mode. Update program using store error A.S.A.P. after initial good auto track.

3. If there is a downlink and no RF acquisition by 30 seconds from I.P. time, go to program mode.

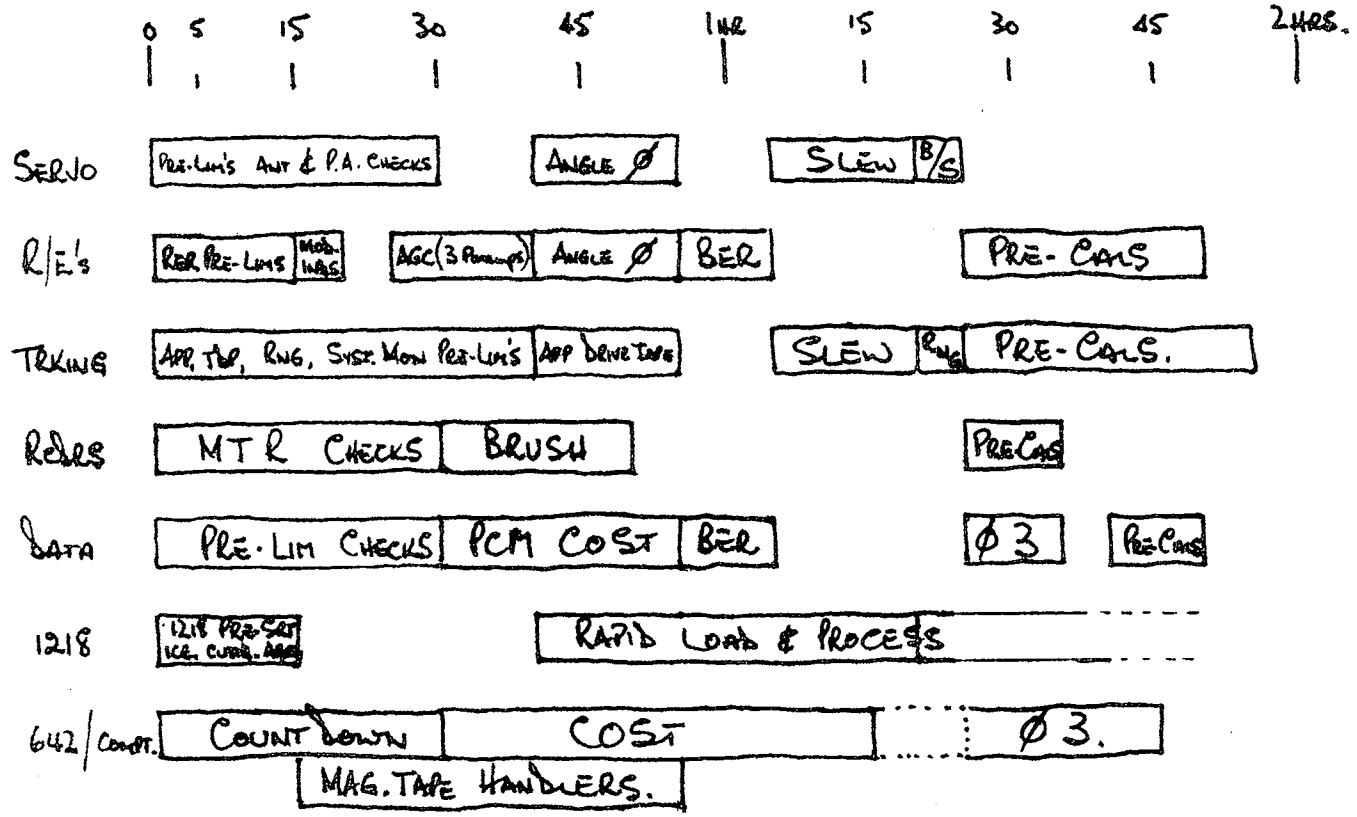
4. If pass tracks into keyhole select program when Y pre-limit light flashes. RE 2 select ACQ when in keyhole. When out of keyhole and ACQ scope indications correct, go Auto Track.

TITLE: ERTS PREPHASE SRT.	SEC. No: 11.5
REFS: 401.1 ERTS	ISS.No: 1
DIST: ALL, Less HSKX	DATE: 19.7.72

CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REF:										
PAGES:										

ORIGINATOR: L. LITHERLAND. APPROVED: I. F. GRANT

FULL PRE-PHASE SRT BAR CHART



SHORT TURNAROUND TEST

WERE SCHEDULED ALSEP OR OTHER COMMITMENTS PRECLUDE FULL SRT TESTING THE FOLLOWING PROCEDURES ARE USED.

CONFIGURE FOR PASS PER PBM - TIME ALLOWED 10 MINS.
CONDUCT USB STRIPCHART & MTR CALS - TIME ALLOWED 10 MINS
CONDUCT ERTS SRT PHASE 3 (PER ~~NASA~~ STDN 401 ERTS PAGE 3-21) USING SIM CONSOLE RF DATA TURNAROUND & MODE 1 CMDS ONLY. CHECK R/T DATA ONLY, HOWEVER IF PBM CALLS FOR DUMP-CHECK R/T & DUMP MODN THRU 642B. DURING R/T DATA FLOW REDUCE S-BAND SIG LEVEL UNTIL DECOM DROPS LOCK. CHECK THIS LEVEL IS -120 DBM ± 3DBM. COMPLETE THIS TESTING & 642B REV NR UPDATE BY H-35 OR H-20 DEPENDING IF PBM CALLS FOR H-35 OR H-15 I/F. - TIME ALLOWED 15 MINS.

TITLE: TYPICAL ERTS PASS PROCEDURES SEC.

REFS: 601/ERTS + EXPERIENCE ISS.No: 1

DIST: ALL EXCEPT USB2 DATE: 28 AUG 72

CH.No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REF:										
PAGES:										

ORIGINATOR: J.SAXON. APPROVED: I. F. GRANT

CAUTION: THIS COUNT IS NOT PER NOSP AND SHOULD BE TAKEN AS A GUIDE ONLY. VARIATIONS WILL OCCUR FROM DAY TO DAY. IF FULL H-30 COUNT IS SCHEDULED ON GENERAL SCHEDULE, USE HOD SECT 11.3 COUNT F.

TIME	POSN'S	ACTIONS.
PRIOR TO H-30	USB	P/A GO FOR CMD, DUMMY LOAD
	TLM	DECOM LOCKED ON FMT 1 SIM DATA - INHIBITED.
	OPS.	CAM DEST NOCC/OCC (CAM 965), HSD DISABLE (CAM 962), PARAM LIST (CAM 990) - CONFIRM REV NR, U/L ENBL, LOCK-LOST = 1, MODE 2 ETC. CHECK DECOM LOCK ON SIM DATA, GO FOR CMD - DUMMY LOAD. ADVISE COMMS TO CONFIGURE CMPTR H/S & L/S LINES. CHECK UDB IN OPERATE.
H-30	OPS/ALL	OPS CONFIRM BY ROLL CALL, SYS GREEN, POSN'S MANNED, CONFIGURED FOR I/F-PASS, PBM & ACQ DATA RCD.
	USB	PASS AOS, LOS & ANY KEYHOLE TIMES TO OPS.
H-25	OPS	ENABLE HSD (CAM 961)
H-20 APPROX	OPS/ALL	CONFERENCED BY ERTS N/C, VOICE & STATUS CHECK, ERTS N/C ADVISE IF TRACKING DATA IS R/T (NORMALLY POSTPASS ONLY)
H-15 APPROX	TLM/OPS	START OCC/NOCC TLM I/F - DATA UNINHIBIT ON OPS CUE, INHIBIT ON OCC REQUEST. TLM RECONFIGURE FOR R/T ON OPS REQUEST
	OPS/USB	A. IF OCC REQUESTS, GO TO MODE 1 (CAM 979) ON CUE U/L CMDS 373 & 457 COMDEC 1, REPORT RESULTS & RETURN TO MODE 2 (CAM 980). B. OCC GES- UPLINK CMDS 373, 345, 375, TIME TAG 345 IS SECS DELAY. C. WHEN CMD I/F GO, USB TAKE DRIVE & MOD OFF & CONFIG TO ANT PER OPS REQUEST. NOTE: PART OR ALL OF SEQ'S A & B MAY BE DELETED AND OR ORDER MAY BE REVERSED. OPS ADVISE USB & ERTS OPS THAT WE ARE CONFIGURING P/A TO ANTENNA IF CMD I/F HAS NOT BEEN STARTED BY CARRIER ON - 1 MIN.
H-8	USB/ALL	USB ANT TO I/P. ALL SYS CONFIRM PRE-PASS CHECKLISTS COMPLETE
H-5	TLM	DECOMS TO CMPTR CONTROL & R/T DECOM ENABLED
H-2	USB/OPS	CARRIER ON (OR PER PBM). OPS CALL "HSK USB CARRIER ON" L/S TRACKING DATA ON.
H-1	TLM/USB	RECORDERS ROLLING & CONFIRM
AOS	USB	CALL AOS, GO FOR CMD & SIG LEVEL ON LOOP.
	OPS	TO OCC "HSK AOS ERTS LINK 4, SIG LEVEL - XX dBm" "HSK DECOM LOCK ON 1 KB DATA" "HSK GO FOR CMD USB" "HSK HAS MOD'N ON 2.4 KBS DOWNLINK" } AS APPLICABLE
PCA-20 SECS APPROX	RE 1	REPORT SIG LEVEL TO OPS.
PCA	RE 1	ANNOUNCE PCA
	OPS	TO OCC "HSK PCA, LINK 4 SIG LEVEL - XX dBm"

PV-669.

TIME	POSN's	ACTIONS
LOS-1	OPS	TO OCC "HSK 1 MIN TO HORIZON LOS"
LOS	OPS	TO OCC "HSK HORIZON/CMD LOS LINK 4" * AS APPLICABLE
LOS +	OPS	TLM SUMMARY BLOCK (CAM 960) DISABLE HSD (CAM 962) MSG I/D LOG REVIEW (CAM 981) END OF FILE (CAM 996) HSP HIST (CAM 992) L/S HIST - IF ON PBM (CAM 994)
LOS +2	USB	L/S TRACKING DATA OFF, CARRIER DOWN (OR PER PBM)
LOS PLUS	USB/ RCDRS	USB/RCDRS PASS PASSUM INFO TO OPS, USB PASS L/S TRACKING DATA TO OPS. START POST PASS CALS.
	CMPTRS	UPDATE REV NR IF NECESSARY
	COMMS/ OPS	TRANSMIT POST PASS TRACKING DATA & PASSUM

NOP 502.4 NOSF 601/ERTS

SB 1, RER 1 & 2, RER 3 & 4

	1	2	3	4	5	6	7	8	

ORIGINATOR: LITHERLAND/FOSTER/GALLEGOS APPROVED: I. F. GRANT

ERTS

1. PRELIMINARY

From the PBM determine AOS time and Tx on time. Derive the period of 1/3 way track & 2 way. If 3 way is less than 30 seconds 2 way acquisition only will be made. Should time allow and sufficient data is involved., a 3 way then 2 way acquisition will be made.
The equipment should have been set up with reference to the CONTINGENCY SETTING UP PROCEDURES.

2. 3Way/1 Way Acquisition System #1

a) Set Zone Bias Controls as follows:

SPACECRAFT POSN BIAS - ASCENT
BIAS BANDWIDTH - WIDE
TWO WAY ACQUISITION - RCVR 1 - 2
RECEIVER 1 - MSFN
RECEIVER 2 - MSFN
ZONE SELECTOR - 4

b) Set Exciter Control

1. SYNTH LOOP FILTER - SHORT
2. ACQ SWEEP - RCVR 1 & RCVR 2
3. SWEEP AMPLITUDE - MAXIMUM
4. CHECK EXCITER FREQUENCY CONTROL VOLTAGE IS ZERO
5. CHECK R1/R2 ACQUISITION VOLTAGE IS ZERO
6. CHECK RANGING RCVR CCTL ACQUISITION CONTROL VOLTAGE IS ZERO

c) With antenna positioned to intercept Point await lock on both Rcvr 1 & Rcvr 2.

d) When AUTO TRK achieved - slowly turn Sweep Amplitude CCW until switch off occurs. Select Exc Synthesizer Loop OPER. The VCO frequency should decay and lock to the Synthesizer frequency. Adjust Exciter acquisition control if necessary.

e) Maintain Zone Selection in accordance with the Range Dopp. Readout and the table adjacent to the Exciter.

f) Select MAIN on Receiver 2 ACQ RCV SUM CH SELECT.

3. 2 Way Acquisition

   a) Per para 2a.

   b) Per para 2b except ACQ SWEEP - EXC.

   c) With antenna positioned to Int except Point sele Tx Drive On as specified in PBM.

   d) When both receivers lock up, select NORM on Modulation Selector. Announce GO FOR CMD. Turn Sweep Amplitude slowly CW until switch off occurs. Select EXC Synthesizer Loop 'OPER'. The VCO frequency should decay and lock to the synthesizer frequency. Adjust Exciter acquisition control if necessary.

   e) Maintain Zone Selection in accord with the Range Doppler readout and the table adjacent to the Exciter Control.

4. Transfer from 1/3 way to 2 way

   a) 30 secs prior to Tx Drive ON. Short the Synthesizer Loop Filter. Select EXC on the Acquisition Sweep and slowly turn Sweep Amplitude full clockwise.

   b) Select Tx Drive ON at time stated in PBM.

   c) Continue per para 3d. (Normally the receivers will not lose lock).

5. Blind Commanding

   Refer to para 3 and instead of selecting Modulation 'NORM' after RCV lock, select it at HORIZON BREAK plus 2 complete uplink sweep cycles (about 16 secs).

RANGING

1. Perform pre pass checks ref HOD section 11.6.

2. After AOS & RER System is two way. Confirm the following valid status on MK 1 Control Panel:

   a) Clock Lock

   b) RF Lock

   c) RF Ready

   d) Ranging Ready

3. Switch Code Selector to clock. Adjust VCO Control for zero Clock Loop SPE. Adjust Correlation Normalize for reading of 85.

4. Switch Code Selector to 'CODE'.

5. Press 'Start'. Check stepping thru PROGRAM STATES. Check TDP LS Print-Out for Range No. after PROGRAM STATE P7 reached. For Format see sheet on TDP L/S Printer. Confirm range correlation equals 80 - 100%.

6. 'RESET' the MK 1 & reacquire the Range by depressing START. Check Range number.

7. Repeat 6 and check Range Nr. The numbers should be decreasing but should be approx. the same.

8. Inform SB1 of Valid Range. Switch Code Select to Clock and monitor Range through-out Pass. Range should decrease to PCA & then Increase. If Clock Lock is lost inform SB1 & await instructions.

9. If Reacquisition is necessary Proceed to para 2.

TITLE:	642B ERTS COMPUTER CONTINGENCY PROCEDURES	SEC. 11.10
REFS:	SCAN 6-863	ISS. 1
DIST:	OPS, CMPTRS, USB 1, TLM COMMS HSK ONLY	DATE:16 Oct'72

CPY. #:	1	2	3	4	5	6	7	8	
DATE:									
ACP:									
PAGES:									

ORIGINATOR: L. TURNER APPROVED: I.F. GRANT

1. This section details the operating instructions for 642B computers to support ERTS refer to page 7 for control panel layout and switch positions.

2. OPERATING INSTRUCTIONS

2.1 Equipment Setup Refer to HOD Sect. 10.14 for loading tapes on handlers.

2.1.1 Magnetic Tape Unit Configuration

a. Mount the ERTS system tape at BOT address 1.

b. Mount a scratch tape (History) on address 2.

c. Mount a scratch tape (Recovery) on address 3.

d. Mount a scratch tape (Log) on address 4.

2.1.2 Computer Setup Before proceeding, turn on power to 1232 console, CIT 68 (TTY) and high speed printer (green button).

Clear core and initially configure the 642B computer using the instructions in paragraph 1.1 and 1.2 Appendix E,(Page2) except leave the ADDRESS MODE switch in the up position.

2.1.3 Program Loading

a. Load RCP5 and the ERTS program using the instructions in para 1. of Appendix F (Page 2).

b. Load program errata (if any) using the instructions in para 2.1.4 of Appendix F (Page 3).

APPENDIX E

1. STANDARD INITIATION, LOADING & EXECUTION PROCEDURES FOR 642B

1.1 CLEARING CORE ON THE 642B COMPUTER Ensure Indicate Set Switch is in the UP Position.

To clear core, perform the following :

a. Set B7 switch up; set all the other JUMP, STOP, and DISCONNECT switches down.

b. Set BOOTSTRAP switch to I.

c. Press LOAD.

d. Press START.

e. Set bit 18 in the U register.

f. Clear the Q register.

g. Set ADDRESS MODE switch up (to 17-bit mode).

h. Press ADDRESS MODE 17-BIT PBI.

i. Press OP STEP.

j. Press MASTER CLEAR

k. Set B7 switch down.

1.2 INITIAL CONFIGURATION OF THE 642B COMPUTER

To initially configure the 642B computer, perform the following:

a. Set AUTOMATIC RECOVERY switch down.

b. Set all JUMP, STOP, & DISCONNECT switches down.

c. Set ADDRESS MODE SWITCH up (17-bit mode).

****

APPENDIX F

1. LOADING MAGNETIC TAPE PROGRAM VIA BOOTSTRAP II

To load a magnetic tape program via BOOTSTRAP II, perform the following :

a. On the 1540 magnetic tape unit:
(1) Place the desired magnetic tape on handler at BOT on Chan 6.
(2) Set MODE switch to T1.
(3) Set CLOCK CONTROL switch to NORMAL.
(4) Press MASTER CLEAR.
(5) Set MAN/OFF/AUTO switch to AUTO.
(6) Set ADDRESS switch to 1.
(7) Verify that no other ADDRESS switches are set to 1.

b. On the 642B Computer:
(1) Set BOOTSTRAP switch to II.
(2)
(3) Press LOAD
(4) Press START
(5) Verify 1232 printer prints "Type ERTS □ or ECHO □ for input"
(6) Type "ERTS □ "
(7) The program will now load from MAG TAPE
(8) Printer will print "ERTS LOADED" Computer will 4 stop.
(9) Go to page 3.

2.1.4 LOADING ERRATA TAPE. Loacted on top of CP2 I/O console. Tape is labelled 690-04 ERTS Errata 01 thru 08.

NOTE

1. Errata tapes must be loaded in numerical sequence.
2. A successful errata load will be indicated by a 4-STOP: a bad errata load is indicated when Q and A are not equal to 0.

To load errata tapes for any systems tape, perform the following:

a. Place errata tape in tape reader.
b. Set BOOTSTRAP switch to I.
c. Press OP STEP.
d. Press MASTER CLEAR.
e. Set the P register to 2 and set the Q register to 1 (OCTAL).
f. Press RUN.
g. Press START.
h. RCP-5 will read in errata tape, print the errata ID (if JUMP key 2 is down), and 4-STOP.
i. Press START, wait for 4-STOP.
j. Repeat step i until all errata are loaded.
k. Proceed to systems execution.
l. Press OP STEP.
m. Press MASTER CLEAR.
n. Set 'P' register to 10000 bit 12 in "P" register.
o. Press RUN.
p. Press START.

If the I/O console prints :

B7 DISCONNECTED

set B7 switch down and press START

If the I/O console prints :

RTC DISCONNECTED

Set RTC switch down and press START

If the I/O console prints :

BOOT 1 DISCONNECTED

set BOOTSTRAP switch to I and press START

If the I/O console prints :

TURN OFF STOP-KEY 7

reset STOP 7 switch and press START

If the I/O console prints :

ENABLE 17 BIT MODE

set ADDRESS MODE switch up and press START

The I/O console prints :

INITALIZATION - ERTS
NEW TP, X ↑
NEW TP,

q. Operator types: Y ↑ for YES (Write new CVA on recovery tape).

r. The I/O console prints :

STA, XXX ↑

s. Operator types: HSK ↑

t. The I/O console prints :

REV,XXXXXX ↑ Rev Nr-1 for SRT testing.

REV,

u. Operator types 1 thru 6 digit revolution number followed by ↑

v. The I/O console prints:

CMP, XXX ↑ or XXX □

CMP,

w. Operator types:

TLM □
or CMD □

NOTE

2.1.5 The following selections are available if XXX □ is typed.

1. The I/O console prints:

CAM, XXX ↑
CAM,

2. The operator types:

TLM ↑ or Ops 2 option, normally TLM.
CMD ↑

3. The I/O console prints:

MTU, XX ↑
MTU,

4. The operator types:

11 ↑ or
6 ↑

a. The I/O console prints:

GMT, XX ↑
GMT,

b. The operator types: XX ↑ (2 digit year)

c. The I/O console prints:

DTU, X ↑
DTU,

d. The operator types:

X ↑ Normally A

Where: X = one of the following letters with the indicated DTU configuration.

(See Over)

d. (cont.)

	DTU #'s CP1	DTU #'s CP2
A = Chan 12 in Chan 12 out	5-5	6-6
B = Chan 12 in Chan 15 out	5-3	6-4
C = Chan 10 in Chan 12 out	3-5	4-6
D = Chan 10 in Chan 15 out	3-3	4-4

e. The I/O console prints:

VEH, X ↑
VEH,

f. The operator types:

A ↑

g. The program rewinds the recovery tape and writes four DARTS images and two iterations of main frame. If an MTU error is encountered, the program will print on the I/O console:

MT BB/YY ERROR ZZ AAAAA
BY PASS, X↑
BY PASS,

Where: BB= Channel 6 or 11
ZZ= Two-digit error number
AAAAA= Five-digit status

) If this occurs check MTU switch settings, addresses & write enable switches on #'s 2,3 & 4. If all appears normal. Type Y ↑.

h. Operator types:

Y ↑ to bypass the error
N ↑ to perform the function again

The Bypass option is not available for all MTU errors.
This message may output again.

) If errors continue, keep typing Y ↑ until a printout of "ERTS cycling" occurs. You may have a problem but this is a contingency.

Go to HOD sect. 11.7 and check all equipment configuration is correct.

i. The I/O console prints:

ERTS CYCLING
GMT YR:MO:DA:HR:MN:SC GMT TAGS UPDATED FROM EXTERNAL SOURCE
GMT YR:MO:DA:HR:MN:SC CH 06 MTU 02 ON-LINE
GMT YR:MO:DA:HR:MN:SC TP GMT TAGS NOT VALIDATED
GMT YR:MO:DA:HR:MN:SC CH 06 MTU 03 ON-LINE
GMT YR:MO:DA:HR:MN:SC CH 06 MTU 04 ON-LINE

j. The HSP printer outputs a parameter message. See Fig. 1.

k. Mount DARTS (Channel 6 or 11) in the I/O console reader.

```
CMD ERTS
GMT 00:00:00:00:00:00      PARAMETER LISTING
     STA- HSK    REV-000001          GMT YEAR-72      INIT PHASE-1
     CMP-CMD     CAM-CMD             MTU-11
     DTU-A     OUTPUT-12         INPUT-12
     VEH-A
     MODE-2   ECHO CHECK OVRD-OFF    UPLINK MODE - ENABLED
     HSD OUTPUT - ENABLED       DESTINATION - OCC
     MINOR FRAME LOCK - 0   LOST - 0          BIT SLIP INDICATOR - D
```

FIGURE 1.

CMP, CAM, MTU, DTU SHOULD REFLECT TYPE INS

* * *

All type ins from now on must be preceeded by 1232 interrupt and a carriage return from the keyboard. The interrupt button is on the far left of the 1232 control panel below the white master clear button. If master clear is pressed inadvertently the 'keyboard' button and 'print' button must be pressed before the interrupt button can be used.

2.1.6 A change to the initialization parameter must now be made.

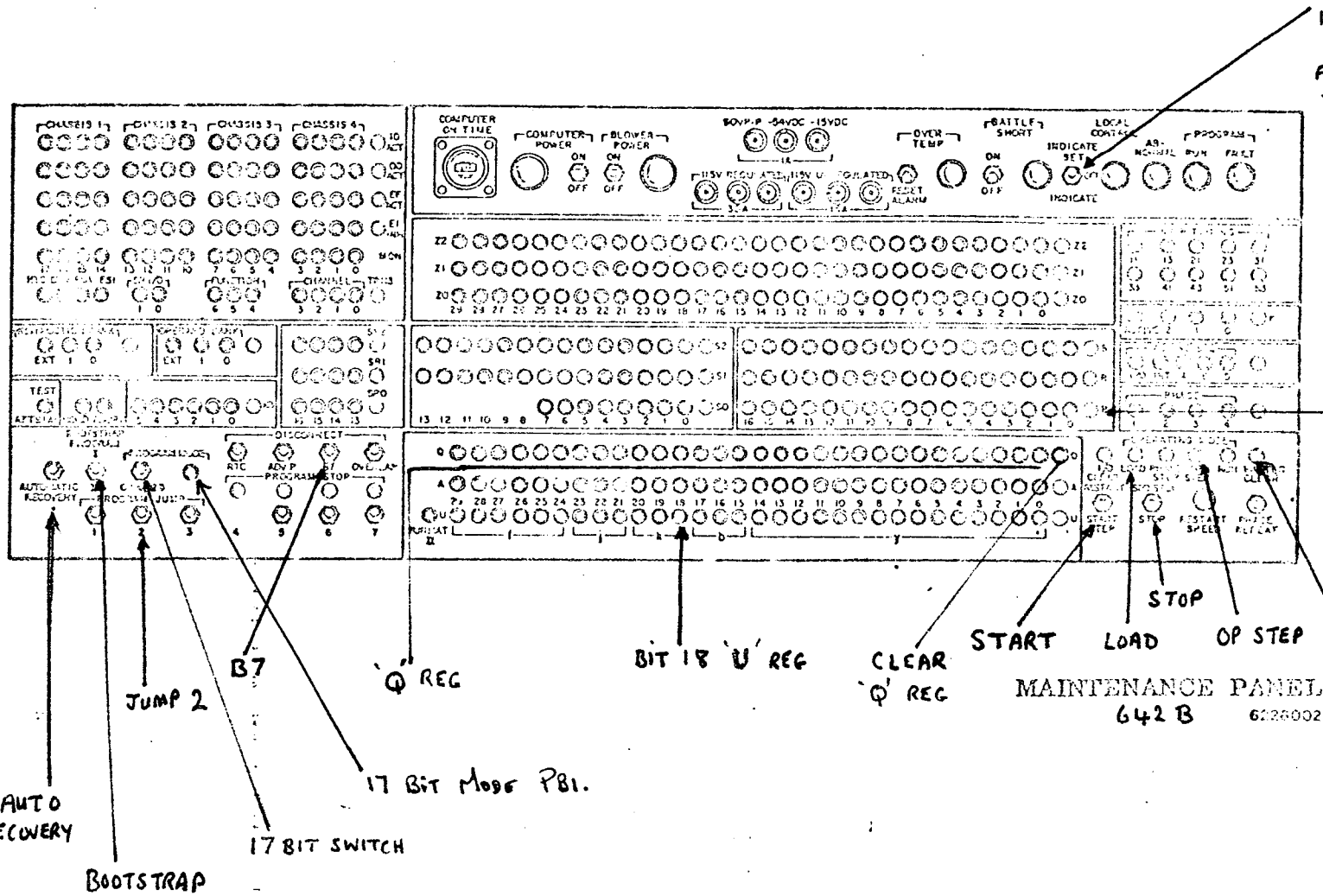
1. Press 1232 interrupt.
2. Press carriage return on keyboard.
3. Type in MFL, 1, 1↑

HSP should now reflect minor frame Lock 1 Lost 1.

```
CMD ERTS
GMT 00:00:00:00:00:00      PARAMETER LISTING
  1. STA-HSK     REV-000001          GMT YEAR-72      INIT PHASE-1
  2. CMP-CMD     CAM-CMD             MTU-11
  3. DTU-A     OUTPUT-12         INPUT-12
  4. VEH-A
  5. MODE-2   ECHO CHECK OVRD-OFF    UPLINK MODE - ENABLED
  6. HSD OUTPUT - ENABLED       DESTINATION - OCC
  7. MINOR FRAME LOCK - 1   LOST - 1          BIT SLIP INDICATOR - D
```

2.1.7 At the completion of SRT testing the upcoming Rev # must be entered.

1. Press 1232 interrupt
2. Press carriage return on keyboard.
3. Type in REV, XXXXXX↑ Leading zeros need not be typed.
4. HSP will output parameter list reflecting new Rev number.
5. All further computer action is under control of the Ops CAM which can change lines 5 and 6.
6. Observe print outs and report to Ops. Normal destination code is changed by Ops. to OCC/NOCC.
7. For normal operations all other parameters in lines 5 and 6 are as shown in sample printout.



MAINTENANCE PANEL
642 B 6128002

TITLE:	TLM RECORDERS CONFIGURATION FOR ERTS		SEC. NO: 11.11
REFS:	STDN 601 ERTS		ISS. No: 1
DIST:	TLM / OPS		DATE: 12 OCT 72

CH. No:	1	2	3	4	5	6	7	8	9	10
DATE:										
REF:										
PAGES:										

ORIGINATOR: M. LINNEY. APPROVED: I. F. GRANT

This section details patching instructions for ERTS-A A06900S

TRK	SIGNAL	SOURCE	MODE	RCDR MTX
1.	CMD Ver. RCVR	CMD Rx T/L 1	FM	N/A.
2.	100 KHz Ref.	100 KHz MTR PP	DIR	N/A.
3.	OPEN			
4.	1 KHz R/T ERTS TLM	PSK 786 KHz Demod	FM	GHJ-Y3
5.	24 KHz Dump ERTS TLM	PSK 597 KHz Demod	FM	GHJ-Y4
6.	36 Bit BCD	36 Bit MTR PP	FM	N/A.
7.	TLM Mixer	PAM PPP T/L 12	DIR	N/A.
8.	OPEN			
9.	OPEN			
10.	OPEN			
11.	OPEN			
12.	OPEN			
13.	OPEN			
14.	OPEN			

RECORD SPEED:- 1 KHz R/T TLM = 30 IPS Playback 30 IPS
24 KHz Dump TLM = 30 IPS Playback 3 3/4IPS
1 KHz Dump TLM = 30 IPS Playback 30 IPS

24 KHz Dump Playback in the reverse mode.
1 KHz Dump Playback in the forward mode.

TLM MIXER :- IRIG 16 Serial Decimal Time Code.
IRIG 18 Recorder Voice Annotation.
External Input USB Mixer # 1.

Pre, and Post Pass Calibrations Recorder speed 30 IPS.

PAM Discriminator T/L 5
Discriminated Voice T/L 6
Discriminated SDT T/L 7