V14 - 900111
REVISION "A"
FUNCTIONAL INTEGRATED SYSTEM SCHEMATICS

AUTOMATED CONTROL SUBSYSTEM

SPACECRAFT 011

VOLUME 13 DOWNEY & ETR

THIS DRAWING REPLACES
V14-900111, VOLUME 13
DATED 7-7-65

This Document Received and logged by TRIS
SEP - 7 1965
Book 1 Page 146
Item 961

DR BY	E. R. KYLLONEN	8/6/65
CHK BY	692-703	6205-6
APPROVED BY		
R. KLEWENO	RCK 8-6-65	
J R Anderson		

NORTH AMERICAN AVIATION, INC.
SPACE and INFORMATION SYSTEMS DIVISION
12214 LAKEWOOD BLVD., DOWNEY, CALIFORNIA

FUNCTIONAL INTEGRATED SYSTEM SCHEMATICS
AUTOMATED CONTROL SUBSYSTEM

CODE IDENT NO.	SIZE	
03953	A	V14 - 900111
SCALE	REVISION "A"	SHEET 13.1 OF 15

FORM 946-F-8

USE BALLPOINT PEN
PRESS HARD

TRIS DOCUMENT RECEIPT

TRIS No.	Class.	Receipt No.
4460-AR	U	2339

Log Information

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Remarks

Route	Rcvd	Date
1.	Springer gb	9/8/65 1/8
2.	Hurd	
	S. Alger	

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CURRENT SHEET LIST

SHEET NUMBERS ACTIVE AT:

INITIAL RELEASE	REV. "A"	REV. "B"	REV. "C"	REV. "D"		
13.1	13.1 A					
13.2	13.2 A					
13.3	13.3 A					
13.4	13.4 A					
13.5	14.5 A					
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13.7	13.7 A					
13.8	13.8 A					
13.9	13.9 A					
13.10	13.10 A					
13.11	13.11 A					
13.12	13.12 A					
13.13	13.13 A					
13.14	13.14 A					
	13.15 A					
14	15					

TOTAL SHEETS

SC-011 DOWNEY & ETR	CODE IDENT NO. 03953	SIZE A	V14 - 900111 VOL. 13	
	SCALE	REV. "A"	SHEET	13.3

REVISIONS

SYM	DESCRIPTION	DISPOS	DATE	APPROVED
	1. MAY BE REWORKED 3. RECORD CHANGE 2. CANNOT BE REWORKED 4. NOW SHOP PRACTICE 5. PARTS MADE OK			
A	COMPLETE REVISION TO CONFIRM TO PROCUREMENT SPECIFICATION MC901-0529, REVISION B, DATED 4-30-65	3	8-6-65	

SC-011 DOWNEY & ETR	CODE IDENT NO. 03953	SIZE A	V14 - 900111	VOL. 13
	SCALE	REV. "A"	SHEET	13.4

FORM 946-F-4 NAA-S&ID

NOTES

1. UNDERLINED LETTERS DENOTE LOWER CASE.
2. ALL RELAY CONTACTS ARE SHOWN IN THE DE-ENERGIZED OR UNLATCHED POSITION.
3. DIAGRAMS DEPICT DOWNEY & ETR CONFIGURATION ONLY.
4. THIS DRAWING REQUIRES NO IDENTIFICATION AND TRACEABILITY REQUIREMENTS.
5. ALL SYMBOLOGY UTILIZES MIL-STD-15-1 SUPPLEMENTED BY B14-900005.
6. FOR SCHEMATIC COVERAGE OF OTHER BOILERPLATES AND SPACECRAFT REFER TO: V14-900000.

SC-011 DOWNEY & ETR	CODE IDENT NO. 03953	SIZE A	V14 - 900111	VOL. 13
	SCALE	REV. "A"	SHEET	13.5

SYMBOL

DETAIL OF CIRCUIT

N.C RELAY DRIVER

DETAIL FIGURE 15

IMPACT RELAY DRIVER

DETAIL FIGURE 13

DIFFERENTIATOR

DETAIL FIGURE 11

CASE 4 FUNCTIONS CORRECTLY WITH SINGLE POINT FAILURE.

DETAIL FIGURE 9

CASE 4 TRIPLE CIRCUITRY- RESPONDS CORRECTLY WITH SINGLE POINT FAILURE

DETAIL FIGURE 7

EACH LETTER ABC..... DENOTES ONE PARALLEL COIL CIRCUIT

DETAIL FIGURE 5

FUSE OMITTED IF COILS NOT FUSED

CASE 3 SIGNAL CIRCUITRY FUNCTION MUST FAIL ON WITH SINGLE POINT FAILURE

DETAIL FIGURE 3

TYPICAL FOR ALL SINGLE COIL CIRCUITS UNLESS EXCEPTION IS NOTED.

DETAIL FIGURE 1

MONO STABLE RELAY DRIVER

DETAIL FIGURE 16

RELAY DRIVER

DETAIL FIGURE 14

RELAY DRIVER

DETAIL FIGURE 12

CASE 2 DUAL CIRCUITRY- SINGLE POINT FAIL ON CASE

DETAIL FIGURE 8

CASE 2 DUAL CIRCUITRY- SINGLE POINT FAIL OFF CASE

DETAIL FIGURE 6

FUSE OMITTED IF INDIVIDUAL COILS ARE NOT FUSED

FUSE OMITTED IF INDIVIDUAL COILS ARE NOT FUSED

Y-1-1 DESIGNATES CBA1 PANEL
X-1-2D DESIGNATES CBA2 PANEL
Y-1M DESIGNATES MOMENTARY
Y-1L DESIGNATES LATCH
Y-1N DESIGNATES UNLATCH

CASE 4 TRIPLE CIRCUITRY-OUTPUT FUNCTION RESPONDS CORRECTLY WITH SINGLE POINT FAILURE

DETAIL FIGURE 4

FUSE OMITTED IF COILS NOT FUSED

CASE 2 DUAL CIRCUITRY FUNCTION MUST FAIL OFF WITH SINGLE-POINT FAILURE.

DETAIL FIGURE 2

AUXILIARY BATTERY CONTROL BOX CHASSIS

MASTER CONTROL REMOVER

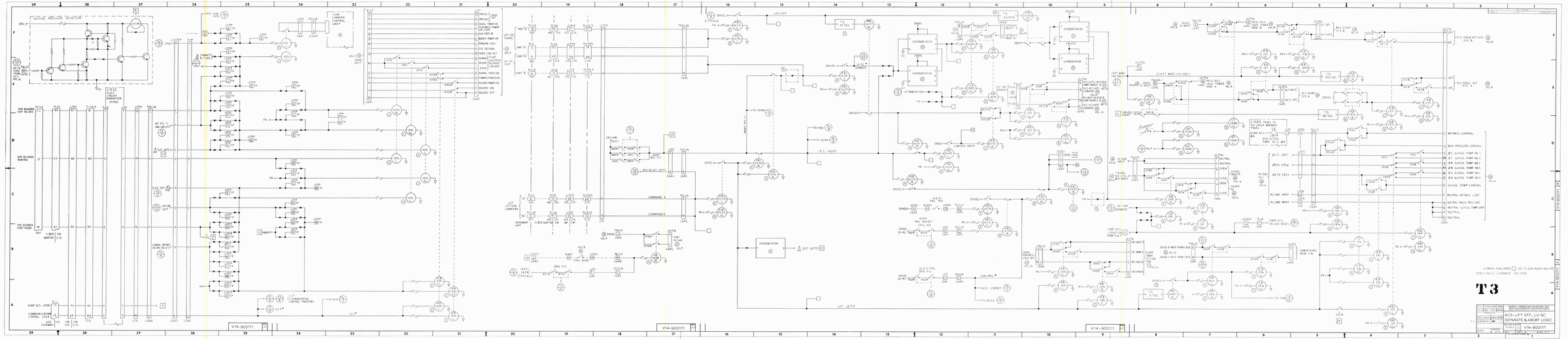
NOTES: UNLESS OTHERWISE SPECIFIED

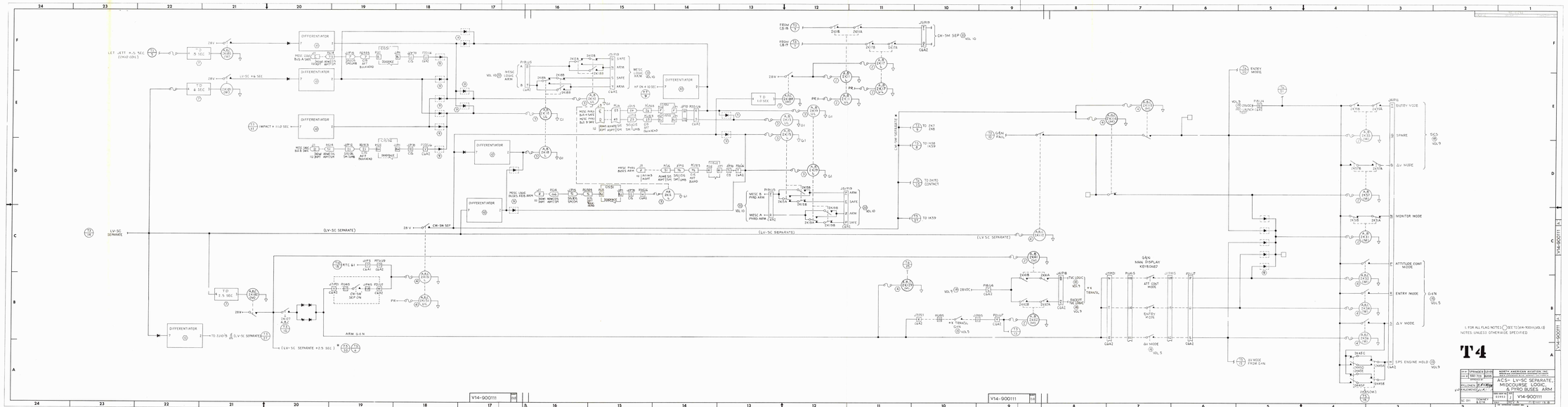
35. FOR CONTINUATION OF CIRCUITS SEE V14-4503B-3
34. FOR CONTINUATION OF CIRCUITS SEE WC-4513-0203
33. SEE DETAIL FIGURE 16
32. SEE DETAIL FIGURE 15
31. FOR ADDITIONAL VAC CONTACT LOCATIONS SEE V14-9503111 VOL. 1
30. FOR CONTINUATION OF CIRCUITS SEE D4-9600-1, VOL.1
29. COMPLETE WIREMARK NOT YET AVAILABLE
28. SEE DETAIL FIGURE 14.
27. SEE DETAIL FIGURE 13.
26. SEE DETAIL FIGURE 12.
25. SEE DETAIL FIGURE 11.
24. SIGNAL POINTS IDENTIFIED BY LABEL & EXTERIOR CONNECTIONS TO BE MADE AT TERMINAL BOARD SIGNAL
23. THIS CIRCUITRY CONTAINS 11 THE TO REVISION OF THE SPECIFICATIONS, THE AUTOMATICS SHOWN ARE NOT YET BEEN CHANGED TO SHOW THIS CHANGE.
22. FOR CONTINUATION OF CIRCUITS SEE V14-9501 VOL 10
21. FOR CONTINUATION OF CIRCUITS SEE V14-9501 VOL 9
20. FOR CONTINUATION OF CIRCUITS SEE V14-9501 VOL 8
19. FOR CONTINUATION OF CIRCUITS SEE V14-9501 VOL 7
18. FOR CONTINUATION OF CIRCUITS SEE V14-9501 VOL 6
17. FOR CONTINUATION OF CIRCUITS SEE V14-9501 VOL 5
16. FOR CONTINUATION OF CIRCUITS SEE V14-9501 VOL 4
15. FOR CONTINUATION OF CIRCUITS SEE V14-9501 VOL 3
14. FOR CONTINUATION OF CIRCUITS SEE V14-9501 VOL 2
13. FOR CONTINUATION OF CIRCUITS SEE V14-9501 VOL 1
12. SEE DETAIL FIGURE 10.
11. SEE DETAIL FIGURE 9.
10. SEE DETAIL FIGURE 8.
9. SEE DETAIL FIGURE 7.
8. SEE DETAIL FIGURE 6.
7. SEE DETAIL FIGURE 5.
6. SEE DETAIL FIGURE 4.
5. SEE DETAIL FIGURE 3.
4. SEE DETAIL FIGURE 2.
3. SEE DETAIL FIGURE 1.
2. SEE DETAIL FIGURE 2.
1. SEE DETAIL FIGURE 1.

T2

APPROVED		WESTINGHOUSE AIR BRAKE COMPANY	
DRAWN		WILMERDING, PENNSYLVANIA	
DESIGNED		APPLICATION DIAGRAM OF CIRCUITRY	
TRACED		FOR T2 TYPE LOCOMOTIVE	
CHECKED			
ENGINEER		SIZE	DRAWING NO.
		D	V14-9503111
		SCALE	SHEET 1 OF 1 SHEETS
		NONE	

V14-900111


T3
ACS - LIFT OFF, LV-SC SEPARATE & ABORT LOGIC
V14-900111
NORTH AMERICAN AVIATION, INC.
SPACE AND INFORMATION SYSTEMS DIVISION
SIZE
SCALE
DRAWING NO.
V14-900111
SHEET
REV LTR
ALL FLAG NOTES ARE IN 900111 VOL III
NOTES UNLESS OTHERWISE SPECIFIED
LIFT OFF
LV-SC SEPARATE
ABORT
ACS PURGE ACTIVATE SYS A
ACS PURGE ACTIVATE SYS B
ACS DUMP SYS A
ACS DUMP SYS B
ACS PURGE ACT SYS A
ACS PURGE ACT SYS B
WITNESS CONTROL
BACK PRESSURE CONTROL
APU GLYCOL PUMP NO 1
APU GLYCOL PUMP NO 2
APU GLYCOL PUMP NO 3
APU GLYCOL PUMP NO 4
APU GLYCOL PUMP NO 5
GLYCOL TEMP CONTROL
NEUTRAL
NEUTRAL ACTIVES CONT
NEUTRAL RACK FEED CONT
NEUTRAL GLYCOL TEMP CONT
NEUTRAL
AC BUS
AC LINE INPUT
TO 150 SEC
TO 180 SEC
TO 5 SEC
TO 3 SEC
(-14 FT RAD +12 SEC)
(LIFT RAD +30 SEC)
(LIFT RAD +130 SEC)
LET JETT
LET JETTISON COMMAND
SEPARATION COMMAND
COMMAND A
COMMAND B
TAPE RECORDER STOP RECORD
TAPE RECORDER REWIND
TAPE RECORDER START RECORD
START ECS OVER
COMMUNICATIONS CONTROL TRANSFER
CAMERA CONTROL UNIT
CAMERA CONTROL UNIT
CAMERA CONTROL UNIT



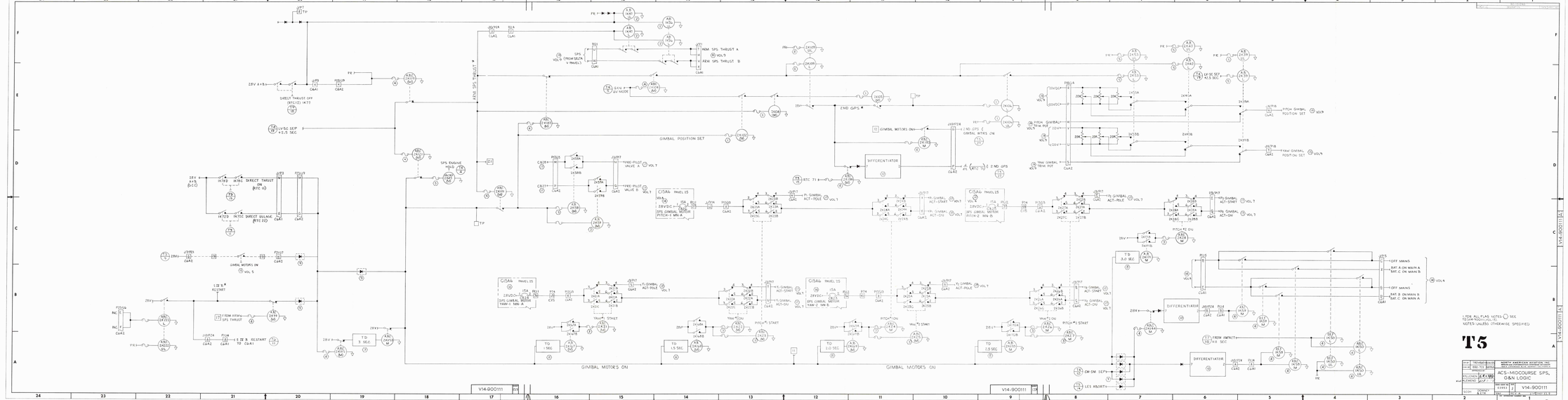
V14-900111

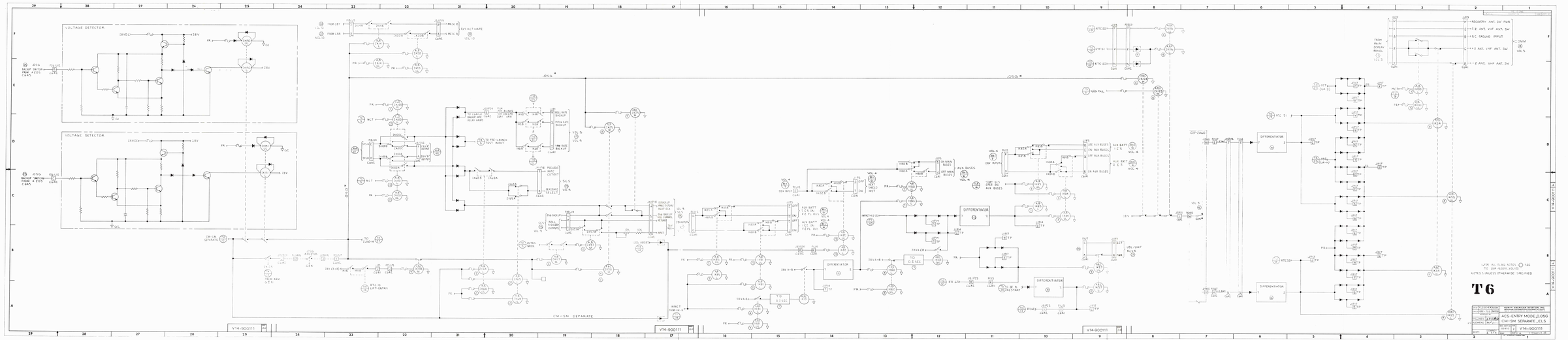
V14-900111

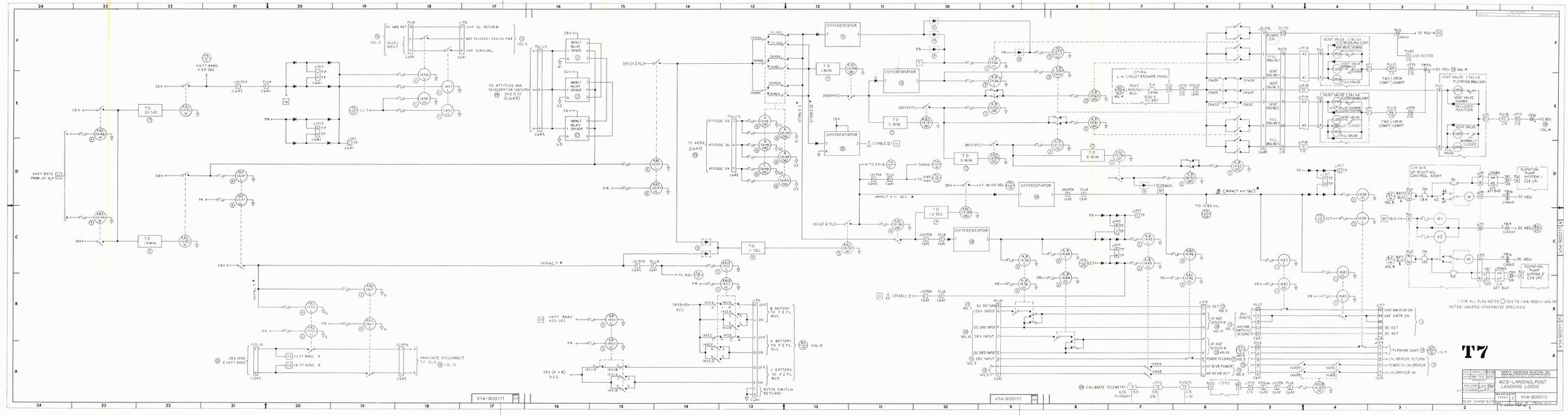
1. FOR ALL FLAG NOTES SEE T0/V4-900111/VOL15
NOTES: UNLESS OTHERWISE SPECIFIED

T4

DRAWN	J.SPRINGER	3-31-70	NORTH AMERICAN ROCKWELL INC.
CHECKED	R. SEID-TEL	3-31-70	SPACE DIVISION, SYSTEMS DEVELOPMENT
APPROVED			12214 LAKEWOOD BLVD., DOWNEY, CALIFORNIA
ENGINEER	R.F. KRAUS		AC5- LV-SC SEPARATE, MIDCOURSE LOGIC, & PYRO BUSES ARM
PROJECT MGR.	R.F. KRAUS		SIZE: B
NEXT ASSY			V14-900111
USED ON			SCALE: NONE
			SHEET 1 OF 1


GIMBAL MOTORS ON
GIMBAL MOTORS ON
GIMBAL POSITION SET
DIFFERENTIATOR
DIFFERENTIATOR
T5
V14-900111


VOLTAGE DETECTOR
28VDC+
+28V
PR
QS
BACKUP SWITCH FROM 4 EDS C985
VOLTAGE DETECTOR
28VDC+
+28V
PR
QS
BACKUP SWITCH FROM 4 EDS C985
CM-LM SEPARATE
TO CDH-A
TO CDH-B
ENTRY MODE
CM-SM SEPARATE
DIFFERENTIATOR
DIFFERENTIATOR
DIFFERENTIATOR
DIFFERENTIATOR
DIFFERENTIATOR
T 0.5 SEC
T 0.5 SEC
T6
ACS-ENTRY MODE,0.05G
CM-SM SEPARATE,ELS
SEQUENCE
V14-900111
SCALE
SIZE
NORTH AMERICAN AVIATION, INC.
SPACE DIVISION
DOWNEY, CALIFORNIA
V14-900111
V14-900111
V14-900111


T7
ACS-LANDING, POST-LANDING LOGIC
V14-900111
NORTH AMERICAN AVIATION, INC.
SPACE AND INFORMATION SYSTEMS DIVISION
DOWNEY, CALIFORNIA
1 FOR ALL FLAG NOTES SEE T2 | V14-900111 VOL III
NOTES: UNLESS OTHERWISE SPECIFIED
TO ATTITUDE AND DECELERATION SENSORS (A6 D3) (C&DS)
TO KEDS (C&DS)
TO ENIB
TO IA35 UL
TO IA35 LL
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TO PUI-B
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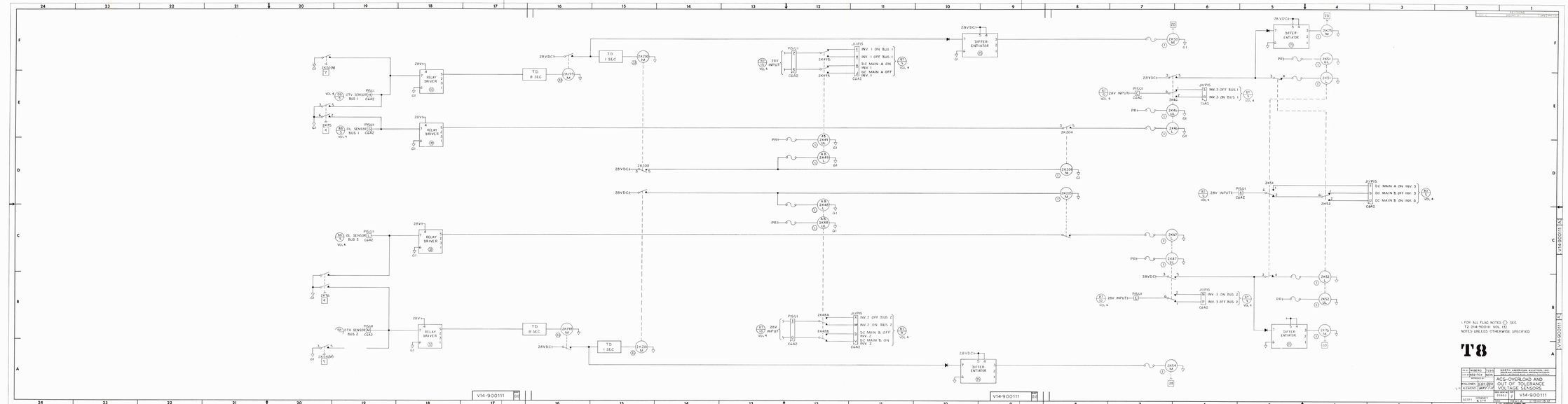
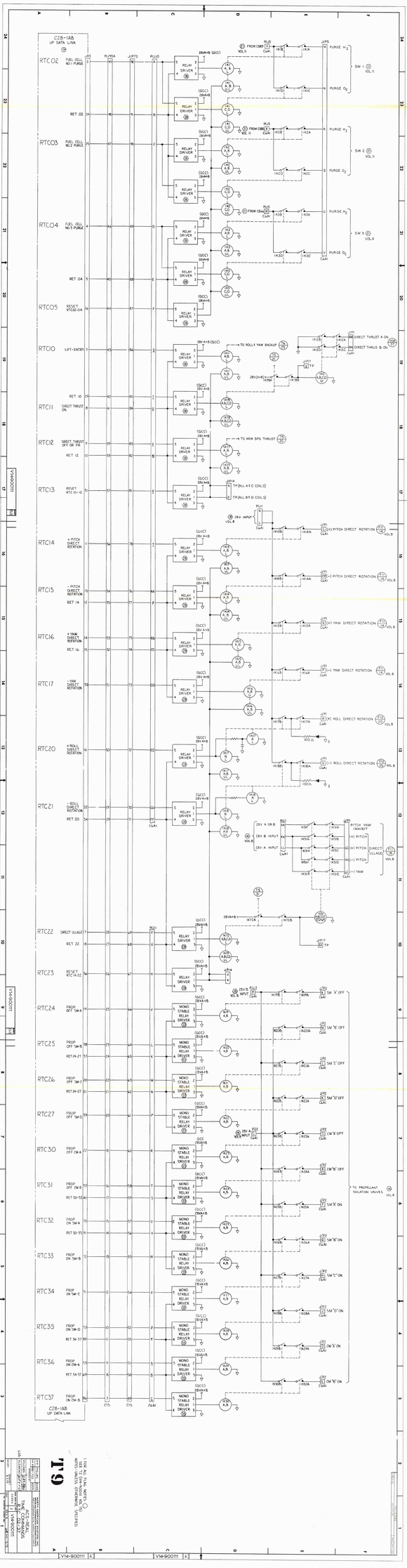

28VDC+
TD .1 SEC
TD .8 SEC
RELAY DRIVER
DIFFER. ENTIATOR
28V INPUT
OTV SENSOR(H) BUS 1
OL SENSOR(L) BUS 1
OL SENSOR(L) BUS 2
OTV SENSOR(H) BUS 2
INV. 1 ON BUS 1
INV. 1 OFF BUS 1
DC MAIN A ON INV. 1
DC MAIN A OFF INV. 1
INV. 2 OFF BUS 2
INV. 2 ON BUS 2
DC MAIN B OFF INV. 2
DC MAIN B ON INV. 2
INV. 3 OFF BUS 1
INV. 3 ON BUS 1
INV. 3 ON BUS 2
INV. 3 OFF BUS 2
DC MAIN A ON INV. 3
DC MAIN B OFF INV. 3
DC MAIN B ON INV. 3
1. FOR ALL FLAG NOTES, SEE T2 (V14-900111 VOL 1).
NOTES: UNLESS OTHERWISE SPECIFIED
T8
NORTH AMERICAN AVIATION, INC.
ACS-OVERLOAD AND OUT OF TOLERANCE VOLTAGE SENSORS
V14-900111
SCALE: NONE
SIZE: D
V14-900111 A1


C28-1A5
UP DATA LINK
RTC02
FUEL CELL NO.1 PURGE
RET 02
RTC03
FUEL CELL NO.2 PURGE
RTC04
FUEL CELL NO.3 PURGE
RET 04
RTC05
RESET RTC02-04
RTC10
LIFT-ENTRY
RET 10
RTC11
DIRECT THRUST ON
RTC12
DIRECT THRUST OFF OR STB
RET 12
RTC13
RESET RTC10-12
RTC14
+ PITCH DIRECT ROTATION
RTC15
- PITCH DIRECT ROTATION
RET 14
RTC16
+ YAW DIRECT ROTATION
RET 16
RTC17
- YAW DIRECT ROTATION
RTC20
+ ROLL DIRECT ROTATION
RTC21
- ROLL DIRECT ROTATION
RET 20
RTC22
DIRECT ULLAGE
RET 22
RTC23
RESET RTC14-22
RTC24
PROP OFF SM-A
RTC25
PROP OFF SM-B
RET 24-27
RTC26
PROP OFF SM-C
RTC27
PROP OFF SM-D
RTC30
PROP OFF CM-A
RTC31
PROP OFF CM-B
RET 30-33
RTC32
PROP ON SM-A
RET 30-33
RTC33
PROP ON SM-B
RTC34
PROP ON SM-C
RTC35
PROP ON SM-D
RET 34-37
RTC36
PROP ON CM-A
RET 34-37
RTC37
PROP ON CM-B
C28-1A5
UP DATA LINK
RELAY DRIVER
MONO STABLE RELAY DRIVER
FROM CMP
FROM CSM
TO ROLL YAW BACKUP
TO ARM SPS THRUST
TP(ALL A C COILS)
TP(ALL B D COILS)
28V INPUT
DIRECT THRUST A ON
DIRECT THRUS B ON
PITCH DIRECT ROTATION
YAW DIRECT ROTATION
ROLL DIRECT ROTATION
PITCH YAW INHIBIT
(+) PITCH
(-) PITCH DIRECT ULLAGE
(-) PITCH
(+) YAW
28V A OR B
28V B INPUT
28V A INPUT
SM 'A' OFF
SM 'B' OFF
SM 'C' OFF
SM 'D' OFF
SM 'A' ON
SM 'B' ON
SM 'C' ON
SM 'D' ON
CM 'A' OFF
CM 'B' OFF
CM 'A' ON
CM 'B' ON
TO PROPELLANT ISOLATION VALVES
SW 1
SW 2
SW 3
PURGE H2
PURGE O2
VOL II
VOL III
VOL IV
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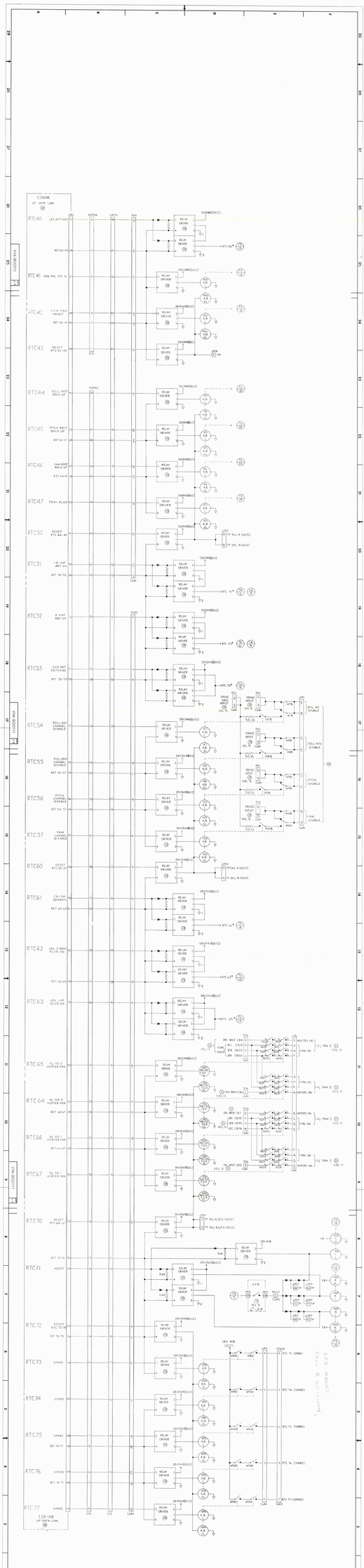
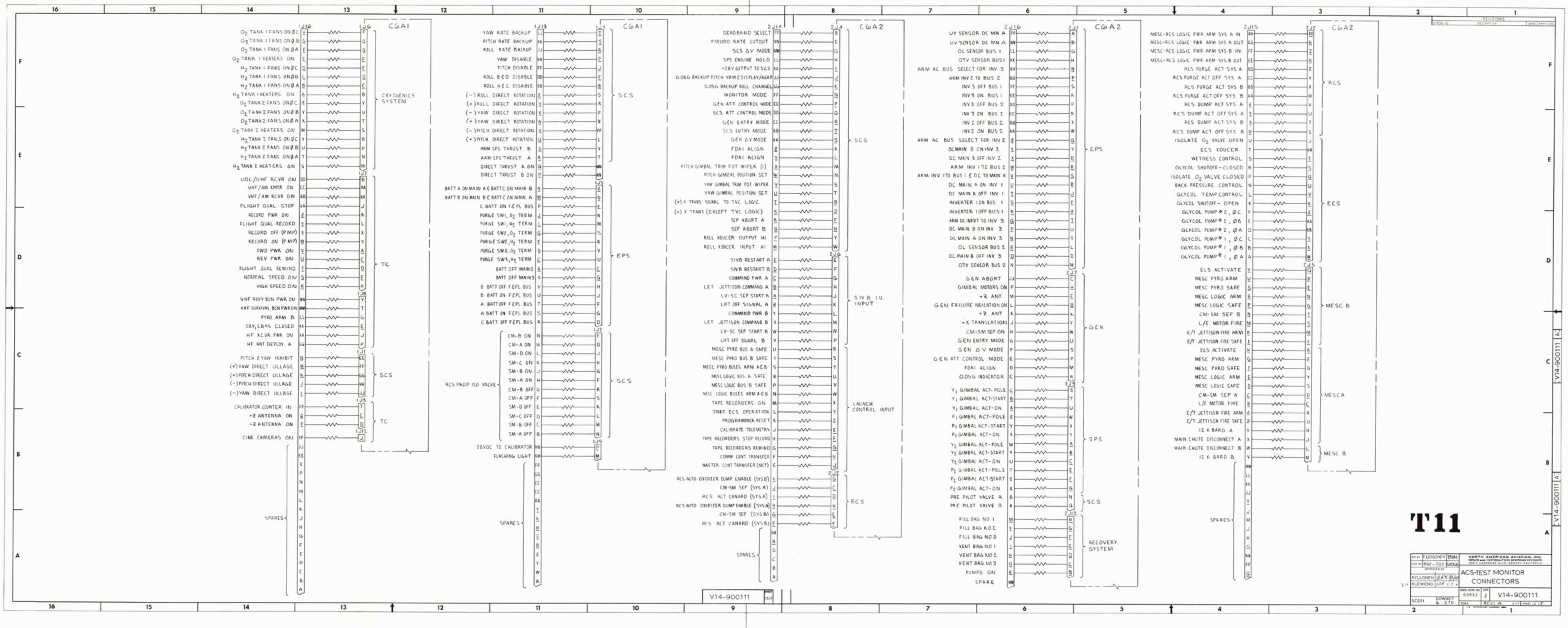

C28A6
UP DATA LINK
RTC40
LET JETTISON
RTC41
GEN FAIL RTC 41
RTC42
GEN FAIL INHIBIT
RTC43
RESET RTC 40-42
RTC44
ROLL RATE BACK UP
RTC45
PITCH RATE BACK UP
RTC46
YAW RATE BACK UP
RTC47
FDAI ALIGN
RTC50
RESET RTC 44-47
RTC51
-Z VHF ANT ON
RTC52
+Z VHF ANT ON
RTC53
S-BAND ANT SWITCHING
RTC54
ROLL RATE CHANNEL DISABLE
RTC55
ROLL RATE CHANNEL DISABLE
RTC56
PITCH RATE CHANNEL DISABLE
RTC57
YAW CHANNEL DISABLE
RTC60
RESET RTC 56-57
RTC61
CM/SM SEPARATE
RTC62
UDL D-BAND RCVR ON
RTC63
UDL UHF RCVR ON
RTC65
-Y NO 2 HEATER FAN
RTC 64
+Y NO 2 HEATER FAN
RTC66
-Y NO 1 HEATER FAN
RTC67
+Y NO 1 HEATER FAN
RTC70
RESET RTC 66-67
RTC71
ABORT
RTC72
RESET RTC 70-71
RTC73
SPARE
RTC74
SPARE
RTC75
SPARE
RTC76
SPARE
RTC77
SPARE
C28-1A6
UP DATA LINK
RELAY DRIVER
TP (ALL A CELLS)
TP (ALL B CELLS)
ROLL RATE DISABLE
PITCH RATE DISABLE
YAW RATE DISABLE
HEATERS ON
ABORT
V14-900111


C6A1
CRYOGENICS SYSTEM
TC
SCS
TC
C6A1
SCS
EPS
SCS
C6A2
SCS
SIVB I.U. INPUT
LAUNCH CONTROL INPUT
ECS
C6A2
EPS
GEN
SCS
RECOVERY SYSTEM
C6A2
RCS
ECS
MESC B
MESC A
MESC B
T11
V14-900111
V14-900111