



**EXHIBIT 7**

SCHEMATICS AND DUTY CYCLE INFORMATION

# AATC RT Duty Cycle

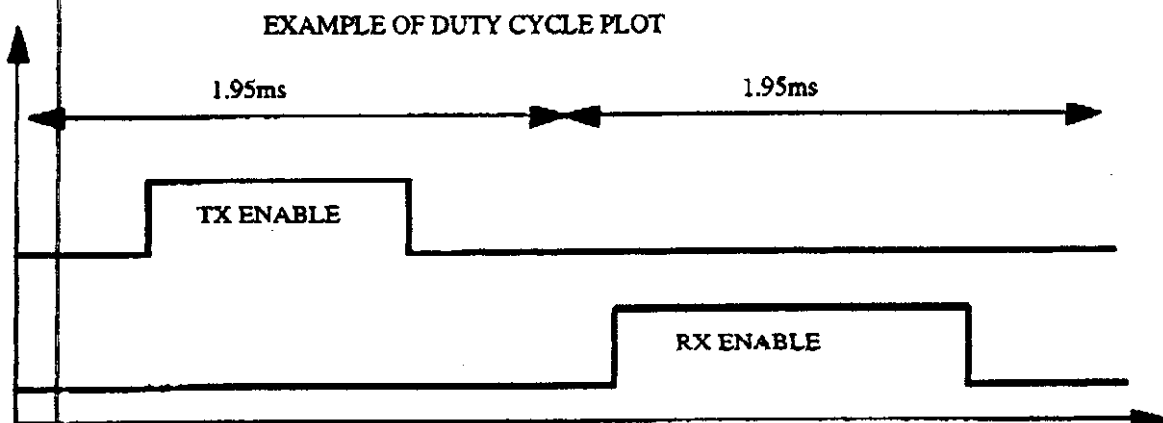
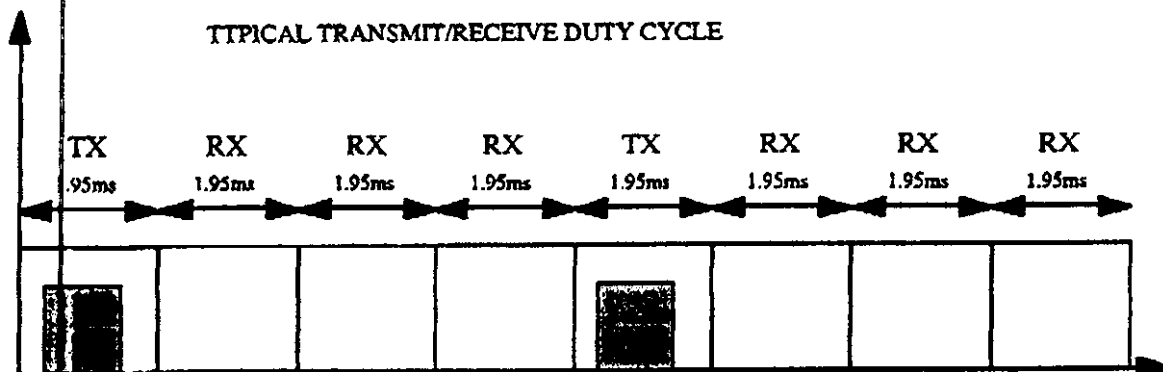
K8-20

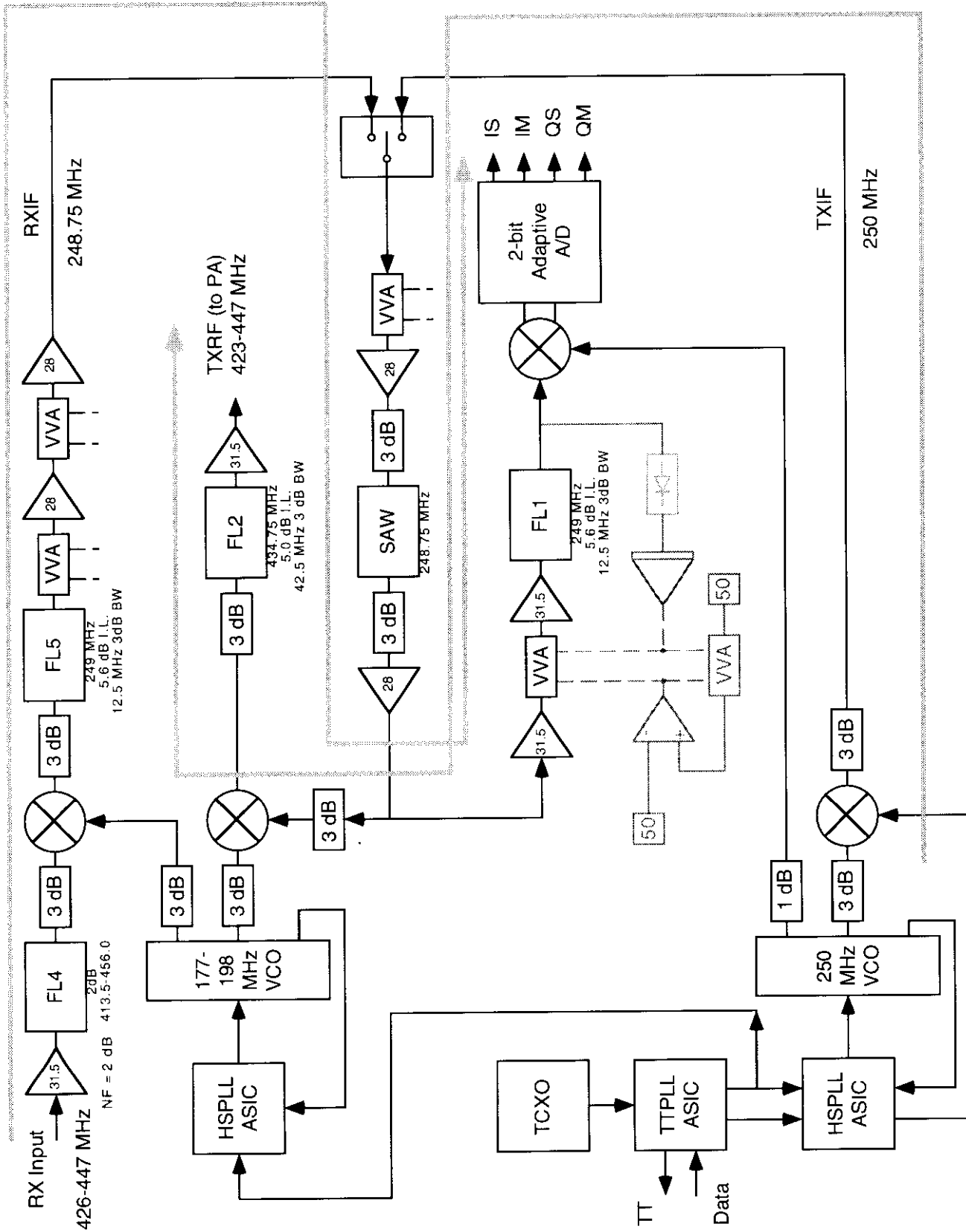
98/6/29

The AATC radio network divides each one second period into 512 timeslots. Within each timeslot a radio may transmit, receive, or be idle. Of these 512 timeslots, 32 are used for network acquisition, and 480 are used for communications. While radios in a network may operate with different transmit duty cycles, the worst case (highest) transmit duty cycle is for a station radio which is also a timing master. The station radio will transmit in 120 of the 480 communications timeslots, with a transmission burst length of approximately 1.482 msec. As a worst case, a radio designated as a timing master can transmit in 16 of the 32 network acquisition timeslots, with a transmission burst length of approximately 1.060 msec. Thus the maximum total transmission duty cycle, DC, is given by:

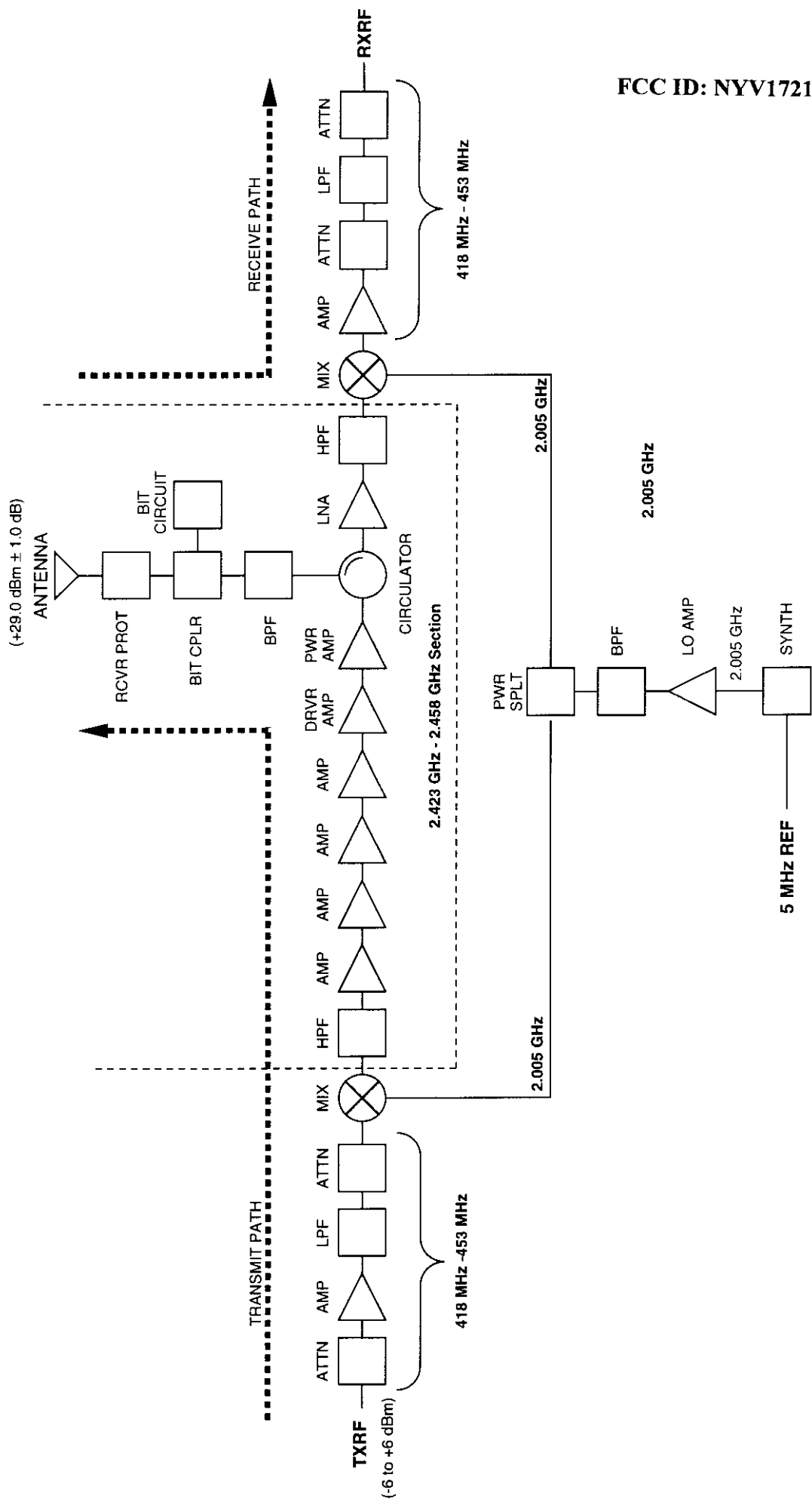
$$\begin{aligned} DC &= (120 \times 1.482 \text{ msec} + 16 \times 1.060 \text{ msec})/\text{sec} \\ &= 194.8 \text{ msec/sec} \\ &= 19.48\% \end{aligned}$$

While most radios in a network will transmit much less often, this worst case scenario was used for the certification testing.

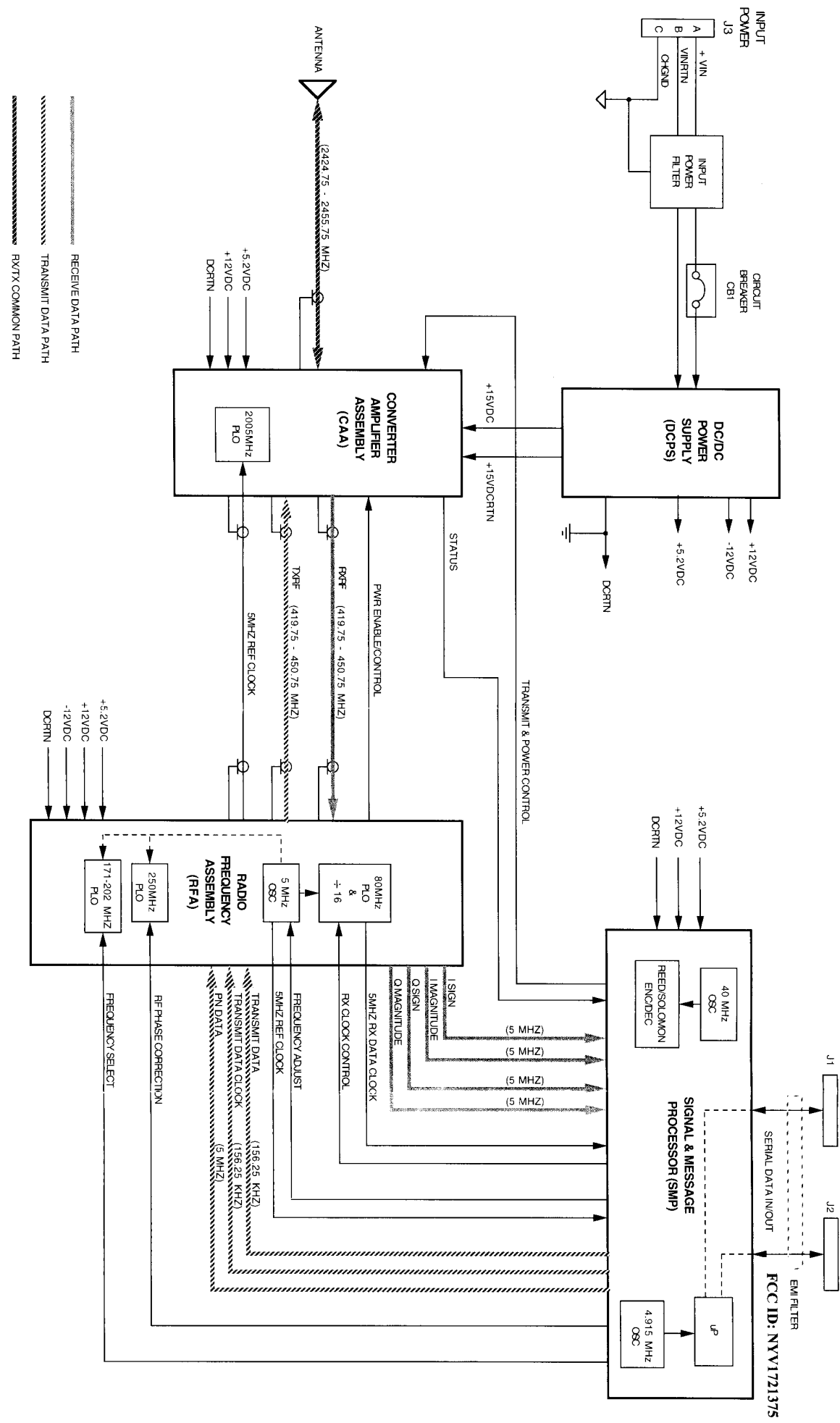




RFA BLOCK DIAGRAM



CONVERTER/AMPLIFIER ASSEMBLY BLOCK DIAGRAM



**BLOCK DIAGRAM - AATC RECEIVER/TRANSMITTER**

FCC ID: NYV1721375



COPYRIGHTED - SEE SHEET 1

D

D0 2C5 3C2 3C5 6C2

D1 2C5 3C2 3C5 6C6

D2 2B5 3C2 3C5 6C2

D3 2B5 3C2 3C5 6C6

D4 2B5 3C2 3C5 6C2

D5 2B5 3C2 3C5 6C6

D6 2B5 3C2 3C5 6C2

D7 2B5 3C2 3C5 6C2

D8 2B5 3B2 3B5 6C7

D9 2B5 3B2 3B5 6C7

D10 2B5 3B2 3B5 6C7

D11 2B5 3B2 3B5 6C7

D12 2B5 3B2 3B5 6C7

D13 2B5 3B2 3B5 6C7

D14 2B5 3B2 3B5 6C7

D15 2B5 3B2 3B5 6C7

C

B

A

A0 2C4 6B2

A1 2C4 3C6 3B6 3B3  
3C3 6A7

A2 2C4 3C6 3B6 3B3  
3C3 6B7

A3 2C4 3C6 3B6 3B3  
3C3 6B7

A4 2C4 3C6 3B6 3B3  
3C3 6C7

A5 2C4 3C6 3B6 3B3  
3C3 6A7

A6 2C4 3C6 3B6 3B3  
3C3 6B2

A7 2C4 3C6 3B6 3B3  
3C3 6C6

A8 2C4 3C6 3B6 3B3  
3C3

A9 2C4 3C6 3B6 3B3  
3C3

A10 2C4 3C6 3B6 3B3  
3C3

A11 2C4 3C6 3B6 3B3  
3C3

A12 2C4 3C6 3B6 3B3  
3C3

A13 2C4 3C6 3B6 3B3  
3C3

A14 2C4 3C6 3B6 3B3  
3C3

A15 2C4 3C6 3B6 3B3  
3C3

A16 7B6 2C4 3C6 3B6  
3B3 3C3

A16 7B6 2C4 3C6 3B6  
3B3 3C3

A17 2C4 3C6 3B6 3B3  
3C3

A18 2C4 3C6 3B6

A19 2C4 3C6 3A6

1B3 OSC  
6B7 MOD  
6B6 MOD  
6C2 TX  
6A7 RX  
2C7 TR1  
6B6 IO3

4

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9

1720960-200

69850

1

REVISIONS			
AUTHORITY	REV	DESCRIPTION	DATE
SEE SHEET 1			

C1102	212	INSTAUS
C18103	268	-BMR
C18102	269	ADD.LE
C9103	266	CTS1
C9102	287	
C8103	284	A4
C8102	285	D15
C7103	281	RXD3
C7102	283	D14
C6103	199	DSR1K
C6102	288	D13
C5103	197	
C5102	198	D12
C4103	195	RES2
C4102	196	D11
C3103	194	D10
C2103	198	
C2102	191	D9
C1103	188	
C1102	189	D8

P11015	238	LOCENBL_TSNBR	702
R11014	1	TOAMEAS	702
R11013	2	CWD2CLK	702
R11012_ADD0	3	GTCT_MODE	702
R11011	4		
R11010_ADD1	5		
R1109	6	-YLWLED	7A2
R1108_ADD2	7	TX	7B5
R21015	11	D0	7D8
R21014	12	BRG03	2B3
R21013	13	D2	7D8
R21012_ADD3	14	D4	7D8
R21011	15	AUX4	4B3
R21010_ADD4	16	D6	7C8
R2109	17	D7	7C8
R2108_ADD5	18	RXD2	2C3
R31015	22	AUX1	4B3
R31014	23	TXD4	2C1
R31013	24	RXD1	2C3
R31012_ADD6	25	RTS4	2B1
R31011	26	TXD1	2C1
R31010_ADD7	27	RXD1A	2C2
R3109	28	TXD2	2C1
R3108_ADD8	29	RTS3	2B1
R41015_ADD9	32	SMTXD1	2B1
R41014	33	CWD2	702
R41013_ADD10	34	BA2	5A4 7D2
R41012	35	CTS4	2B1
R41011_ADD11	36	-BMR	5B5 7D2
R41010	37	A6	7C5
R4109	38	-LPBK3	4D7
R4108	39	A0	7D6
R51015_ADD12	43	BD6	7C2
R51014	44	SMRDX2A	4A6
R51013_ADD13	45	BD7	7A6
R51012	46	BD1	7C2
R51011_ADD14	47		
R51010	48	BD4	7C2
R5109	49	BD0	7C2
R5108	50	WR_LE	5B6
R61015_ADD15	54	CH1_MD_SEL	4D3
R61014	55	SD2	4B3
R61013_ADD16	56	-LPBK2	4B3
R61012	57	CH2_MD_SEL	4B3
R61011_ADD17	58	RCTDEC_REQMODE	7B2
R61010	59		
R6109	60		
R6108	63		
CONF_DONE	160	CONF_DONE	2C1 5C5
DCLK	184		
NSTATUS	141	-STATUS	2C3 5C5

C1108	91	
C18101	92	-1805
C18100	93	SMTXD1A
C9101	94	
C9100	95	CLK1
C8101	96	
C8100	97	CTS2
C7101	98	A1
C7100	99	RXD4
C6101	100	BLOCKST1B1
C6100	101	RXD1A
C5101	102	ME8
C5100	103	
C4101	104	DRQ2
C4100	105	
C3101	106	
C3100	107	
C2101	108	
C2100	109	IPPS
C1101	110	A5
C1100	111	
	112	
	113	EX

HUGHES AIRCRAFT COMPANY EL SEGUNDO, CALIFORNIA	CONTRACT: CA-26-7004
DWN D.V. YOSHIDA	SCALE NONE
DATE 12/04/96	PROJECT CODE ID: AATC
	SHEET 6 of 7

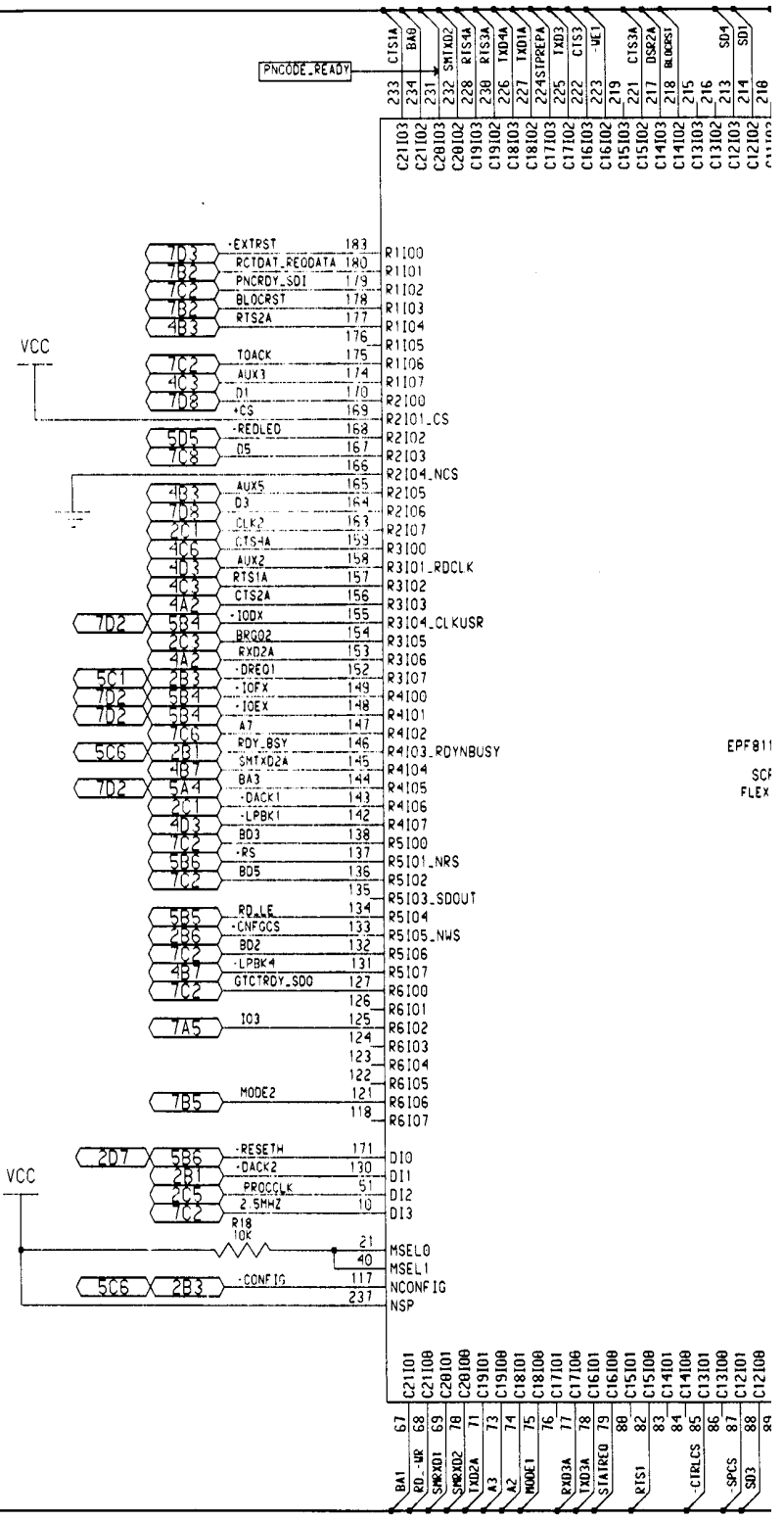
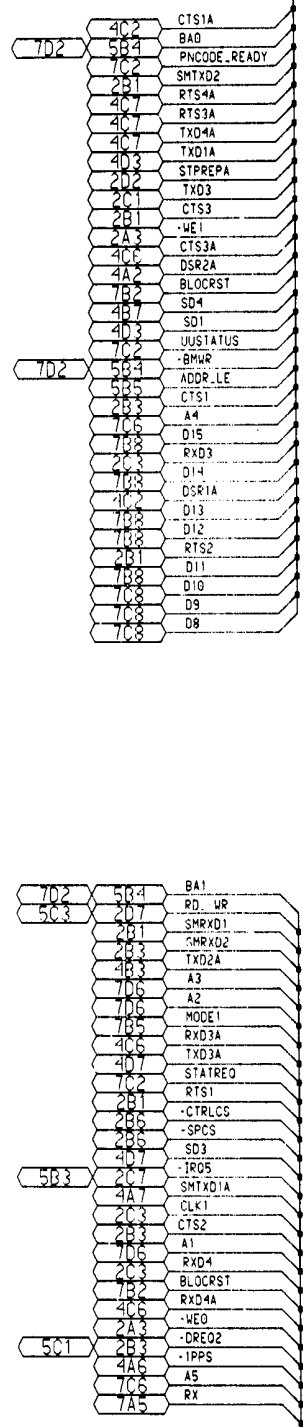
D  
C  
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8.5"  
11"  
17"  
22"

FCC ID: NV1721375



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D  
C  
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EPF811  
SCF  
FLEX

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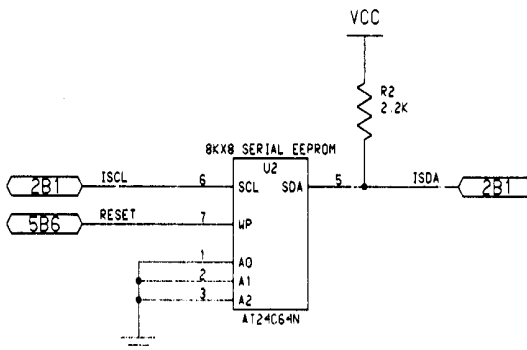
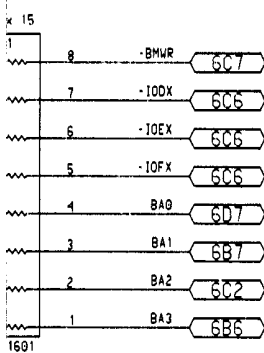
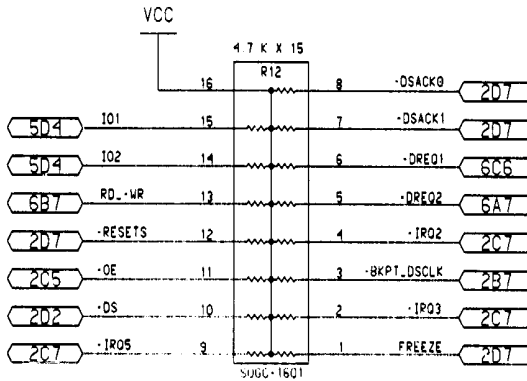
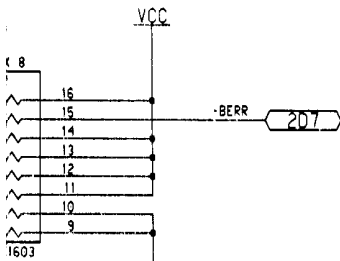
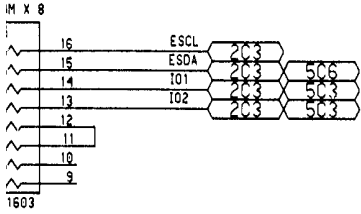
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REVISIONS				
AUTHORITY	REV	DESCRIPTION	DATE	APPROVED
SEE SHEET 1				



D

11

8.5"

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8.5"

11"

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17"

20"

FCC ID: NYY1713175

HUGHES AIRCRAFT COMPANY EL SEGUNDO, CALIFORNIA	CONTRACT: CA-26-7004	SIZE: D	CAGE CODE: 05869	DWG NO: 1720960-200	REV
DWN: D.V. YOSHIDA	DATE: 12/04/96	SCALE: NONE	PROJECT CODE ID: AATC	SHEET: 5 OF 7	

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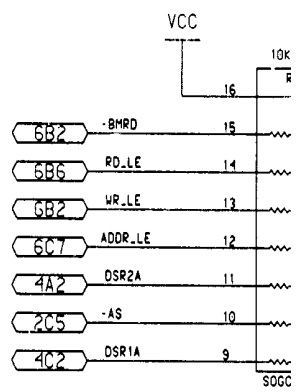
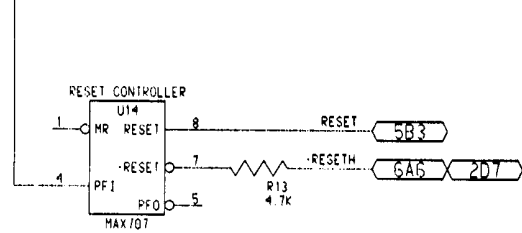
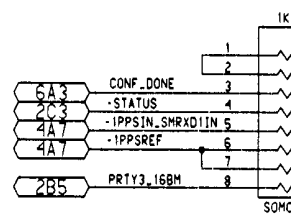
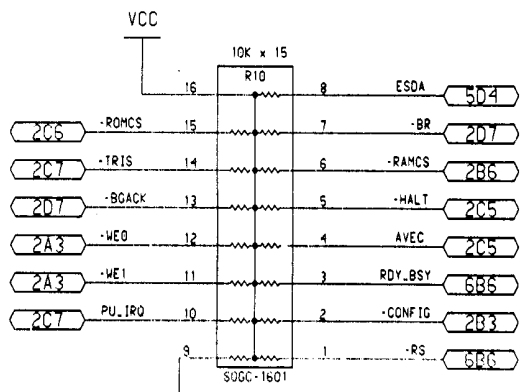
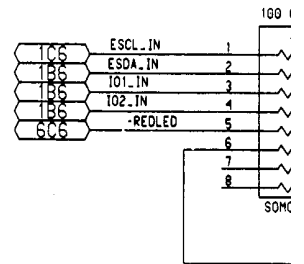
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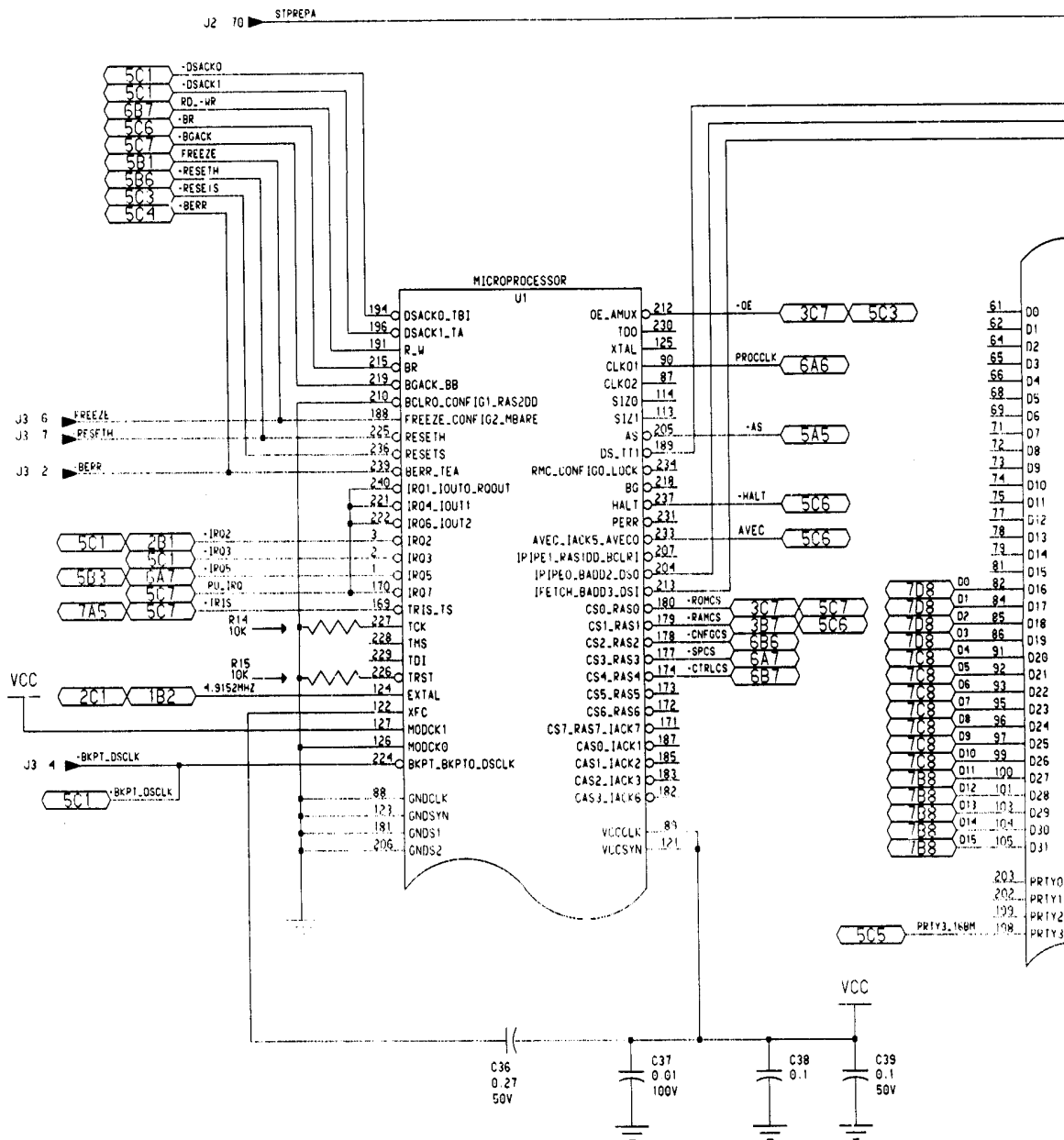


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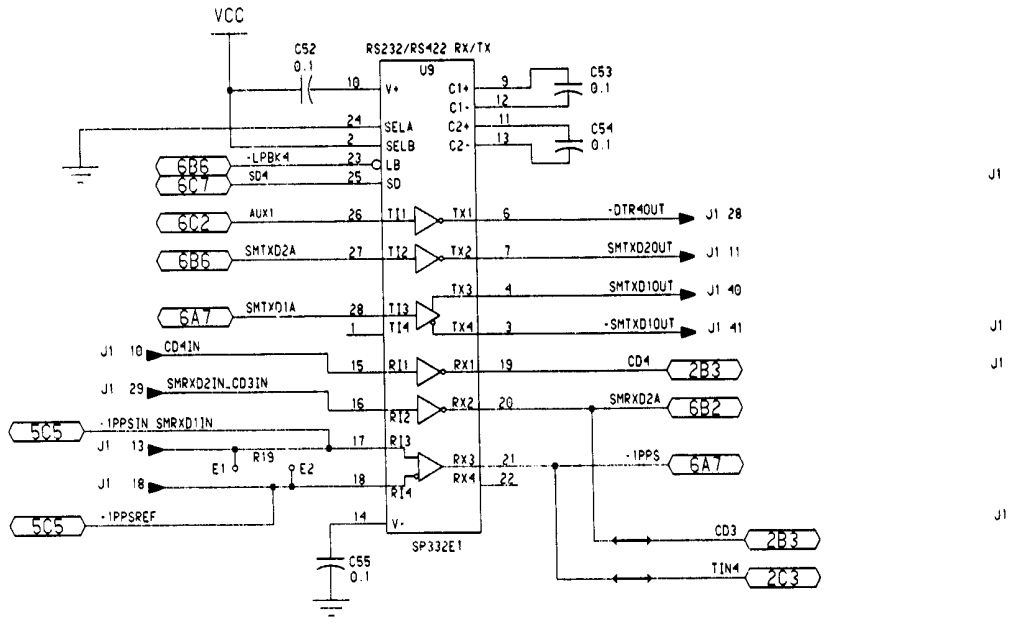
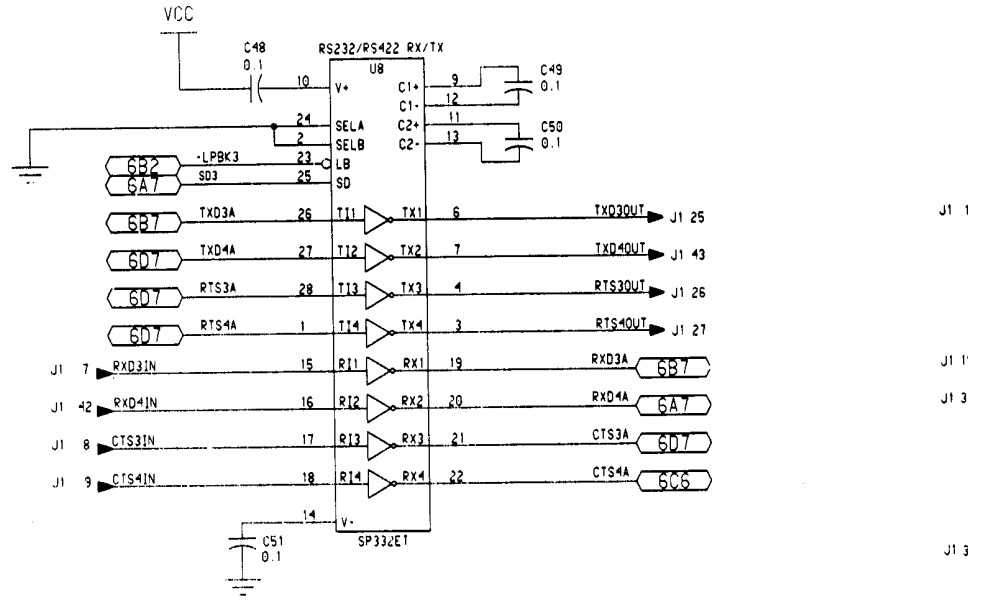
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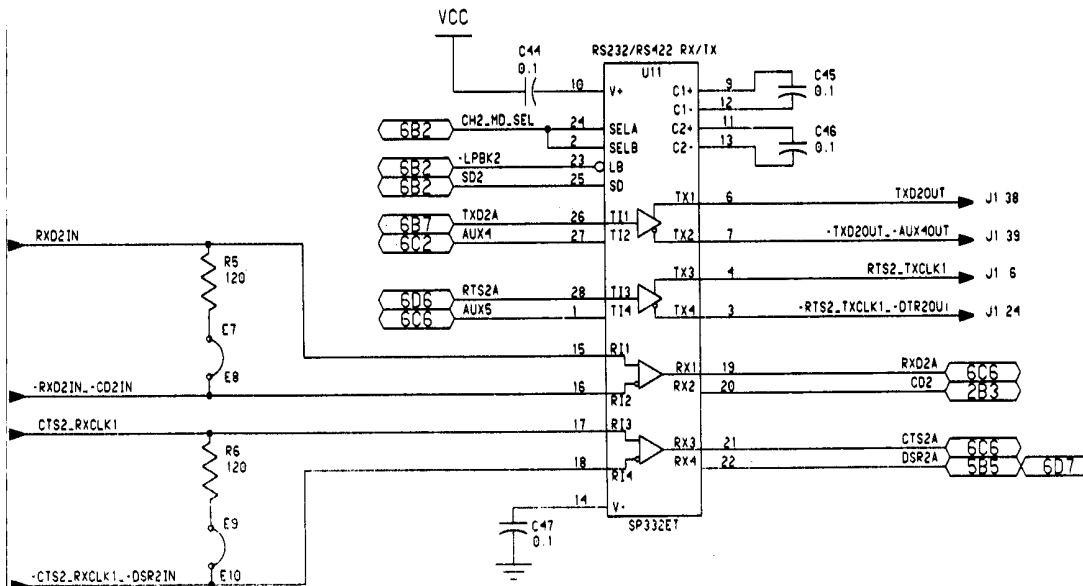
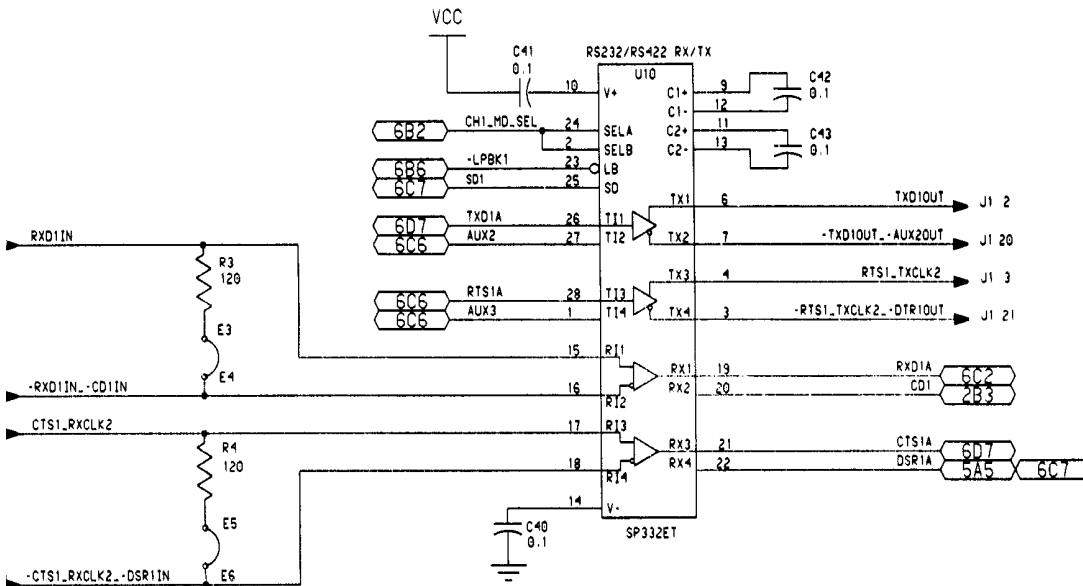
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REVISIONS			
AUTHORITY	REV	DESCRIPTION	DATE
SEE SHEET 1			



HUGHES AIRCRAFT COMPANY EL SEGUNDO, CALIFORNIA		CONTRACT CA-26-7004	
SIZE	DWG NO	REV	
DWN D.V. YDSHIDA	D 05869	1720960-200	
DATE 12/04/96	SCALE NONE	PROJECT CODE ID: AATC	SHEET 4 OF 7

FCC ID: NY1721375

D

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B

A

8.5"

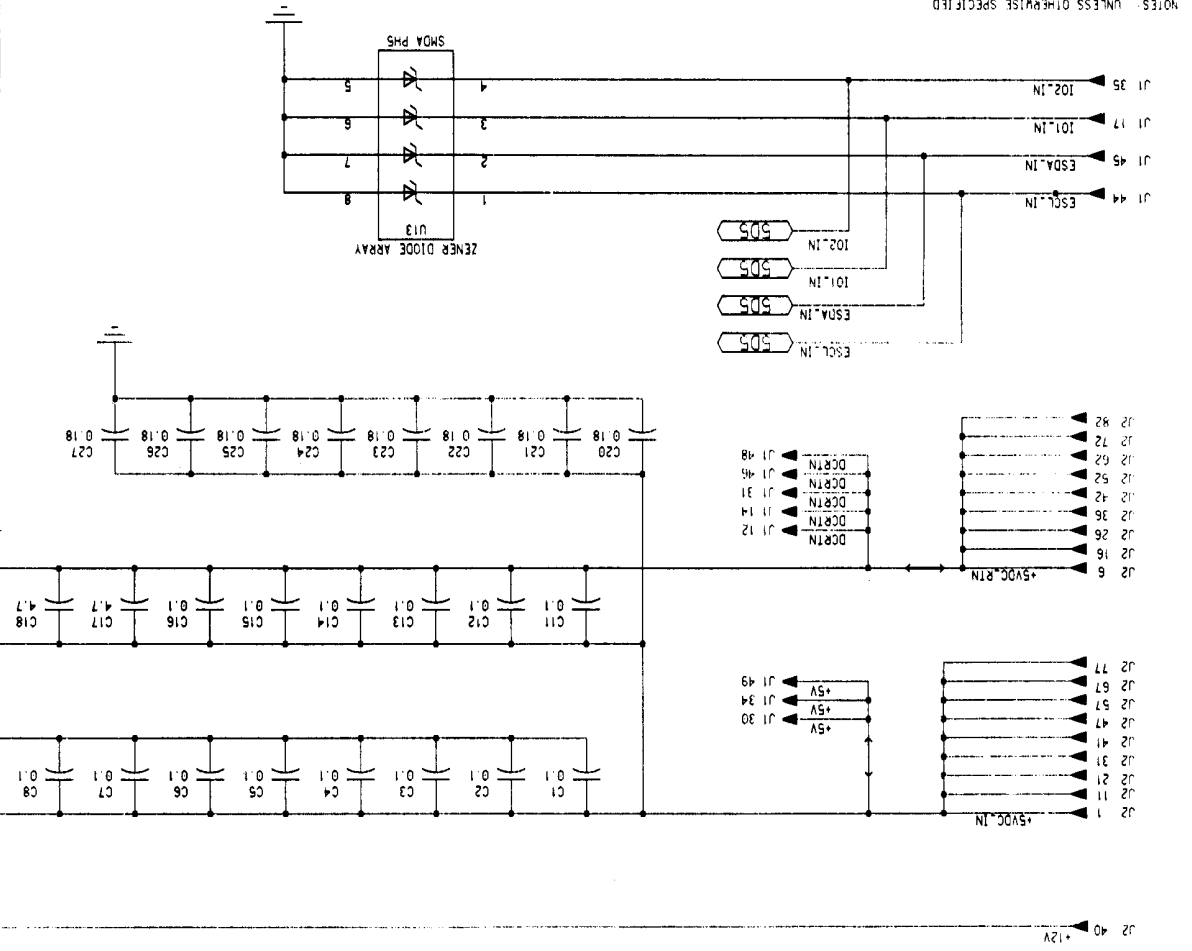
8.5"

11"

17"

22"

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MODULE IDENTIFICATION		
U1	MC68360	Not # 10
U2	8KX8 Serial EEPROM	4
U3, U4	512KX8 Flash EEPROM	16
U5, U6	12KX8 SRAM	16
U7	FLEX 8K CPLD	Not # 12
U8, U9, U10, U11	RS-232 or RS-422	8
U12	OSCILLATOR	2
U13	DIODE ARRAY	N/A
U14	RESET CONTROLLER	3

- 1 FOR ASSEMBLY SEE 1720960-100
- 2 A CIRCLE WITHIN A SQUARE SYMBOL MEANS: SEE NOTE NUMBER INDICATED.
- 3 A HEXAGON SHAPED SYMBOL AND A NUMBER ENCLOSED INDICATES THE SHEET AND ZONE FOR THE ASSOCIATED CONNECTION(S).
- 4 TERMINALS SHOWN WITHOUT CONNECTIONS ARE NOT USED.
- 5 RESISTANCE VALUES ARE IN OHMS PLUS OR MINUS 10%.
- 6 CAPACITANCE VALUES ARE IN MICROFARADS PLUS OR MINUS 10% / 50V.
- 7 MICROCIRCUIT LEADS WITH NO INTERNAL CONNECTIONS ARE NOT SHOWN.
- 8 PARTIAL REFERENCE DESIGNATIONS ARE SHOWN FOR COMPLETE DESIGNATION. PREFIX WITH UNIT NUMBER OR SUBASSEMBLY DESIGNATION.
- 9 WHEN SIGNALS WITH WIDE DISTRIBUTION (SUCH AS VCC) ORIGINATE ON SHEET 1, HEX SYMBOLS FOR THE ASSOCIATED CONNECTIONS ARE NOT SHOWN.
- 10 U1 GND PINS ARE: 7, 17, 26, 36, 41, 47, 57, 63, 70, 76, 83, 88, 94, 102, 106, 111, 118, 123, 128, 133, 141, 147, 153, 156, 160, 166, 175, 181, 186, 190, 195, 197, 200, 206, 211, 217, 223, 232, 238.
- 11 U1 VCC PINS ARE: 12, 31, 42, 52, 67, 80, 89, 98, 107, 115, 121, 137, 150, 157, 163, 176, 184, 193, 201, 208, 216, 220, 235.
- 12 U7 GND PINS ARE: 8, 9, 30, 31, 52, 53, 72, 90, 108, 115, 129, 139, 151, 161, 173, 185, 187, 193, 211, 229.
- 13 U7 VCC PINS ARE: 19, 20, 41, 42, 64, 65, 66, 81, 99, 114, 116, 128, 140, 150, 152, 172, 186, 202, 220, 235, 236.



4

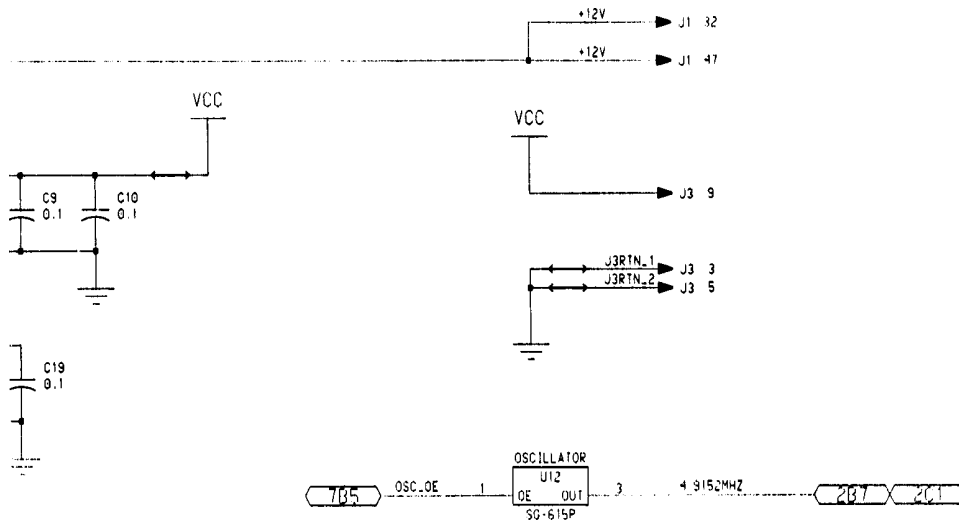
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1720960-200

69850

1

REVISIONS		DATE	APPROVED
AUTHORITY	REV	DESCRIPTION	



NOT USED

J2 05	J2 07	J2 30
J2 10	J2 08	J2 32
J2 12	J2 02	J2 33
J2 13	J2 03	J2 34
J2 17	J2 09	J2 35
J2 55	J2 04	J2 37
J2 56	J2 27	J2 38
J2 58	J2 28	J2 39
J2 54	J2 29	

REFERENCE DESIGNATION	
HIGHEST NO. USED	NUMBERS NOT USED
C55	C28, C29, C30, C31, C32, C33, C34, C35
E10	
J3	
R19	
TP7	
U14	

REV STATUS OF SHEETS	SHEET	1	2	3	4	5	6	7
REV		-	-	-	-	-	-	-

CURRENT DESIGN ACTIVITY CAGE CODE 4U884  
 HUGHES AIRCRAFT COMPANY  
 RADAR AND COMMUNICATIONS SYSTEMS  
 EL SEGUNDO, CALIFORNIA

STANDARD  
RELEASE

FCC ID: NYV1721375

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES & PER ANSI Y14.5M-1982			CONTRACT CA-26-7004		HUGHES AIRCRAFT COMPANY EL SEGUNDO, CALIFORNIA	
.XXX +010	.XX +03	ANGLE +.5°	DWN D.V. YOSHIDA	DATE 12/04/96	MESSAGE PROCESSOR CCA -SCHEMATIC DIAGRAM	
MATERIAL			CHK A.R. LEP1S	97/1/10		
			APVD A.R. LEP1S	97/1/10	SIZE D	CAGE CODE 05869
			PROJECT CODE ID AAIC		DWG NO 1720960-200	REV
			SCALE NONE		SHEET 1 OF 7	

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10-68-00

2

1

22"

D

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B

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8.5"

8.5"

11"

17"



FCC ID: NYV1721375

REV DESCRIPTION DATE APPROVED

REV DESCRIPTION DATE APPROVED

REV DESCRIPTION DATE APPROVED

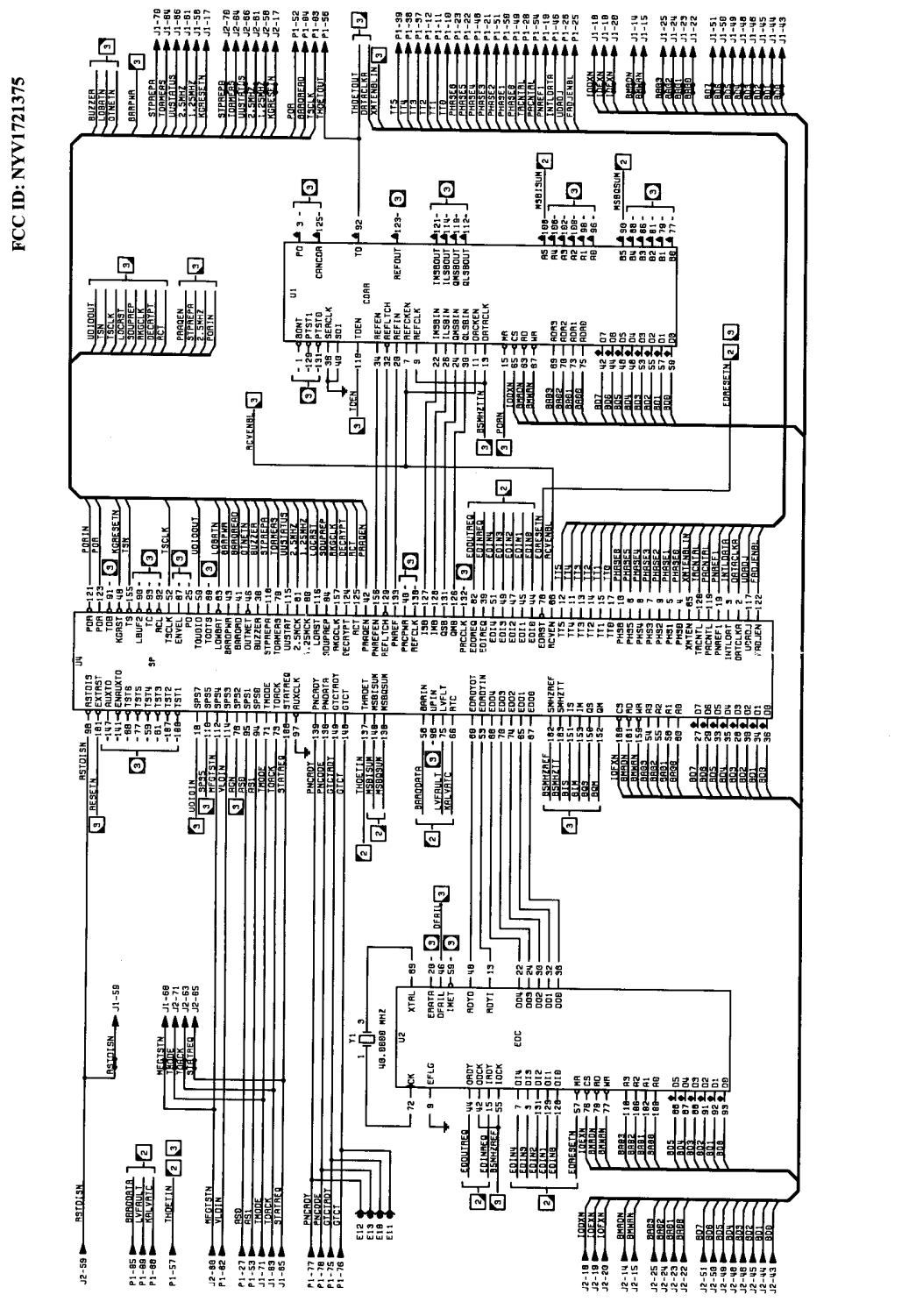
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REV DESCRIPTION DATE APPROVED

REV DESCRIPTION DATE APPROVED

REV DESCRIPTION DATE APPROVED

REV DESCRIPTION DATE APPROVED



DRAWN	R. LEFIS	CHECKED	CECOM	REVIEWED	APPROVED
SIZE			SCALE		
D 80063			A3251399		
SHEET 1			SHEET 2		



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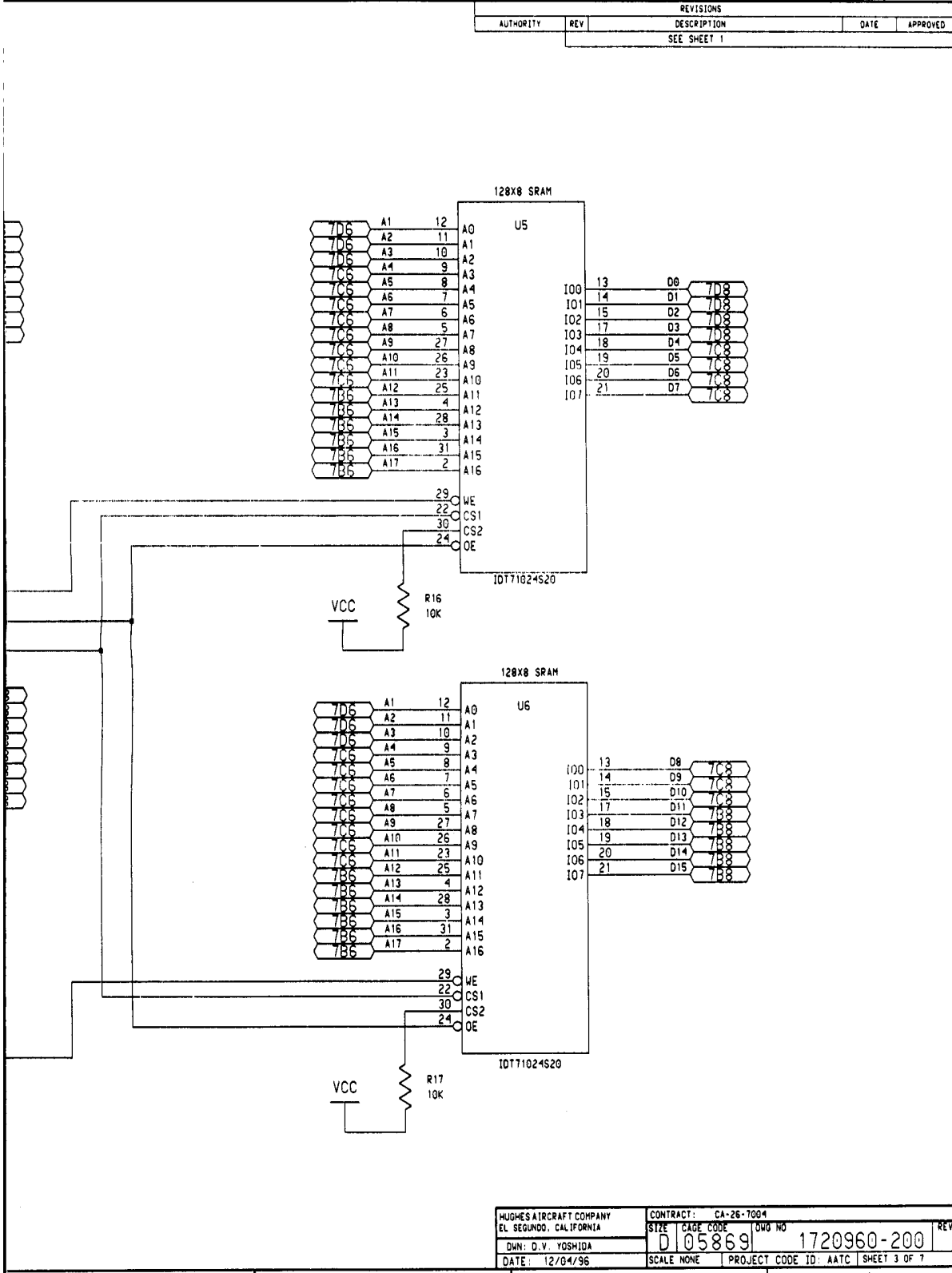
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69850

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REVISIONS			
AUTHORITY	REV	DESCRIPTION	DATE
SEE SHEET 1			



D

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8.5"

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FCC ID: NYV171375

HUGHES AIRCRAFT COMPANY EL SEGUNDO, CALIFORNIA	CONTRACT: CA-26-7094	REV
DWN: D.V. YOSHIDA	SIZE: D 05869	DWG NO: 1720960-200
DATE: 12/04/96	SCALE: NONE	PROJECT CODE ID: AATC SHEET 3 OF 7

4

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D

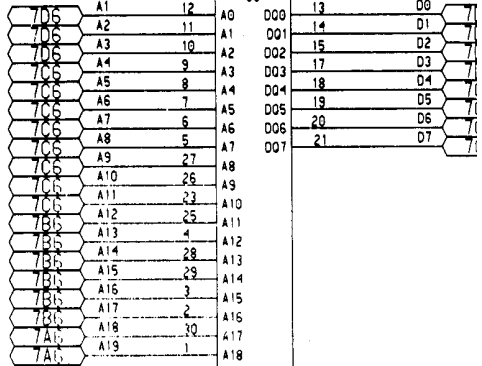
C

B

A

512KX8 EEPROM

U3



206 -ROMCS

2A3 -WE1

205 -OE

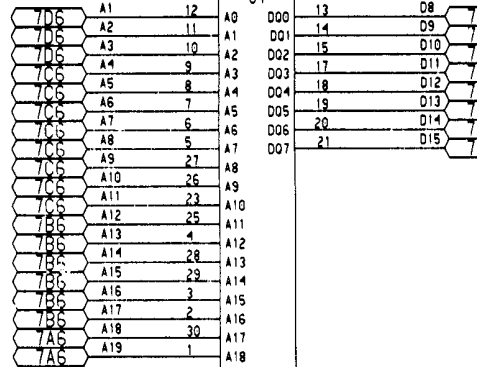
2B6 -RAMCS



AM29F040

512KX8 EEPROM

U4



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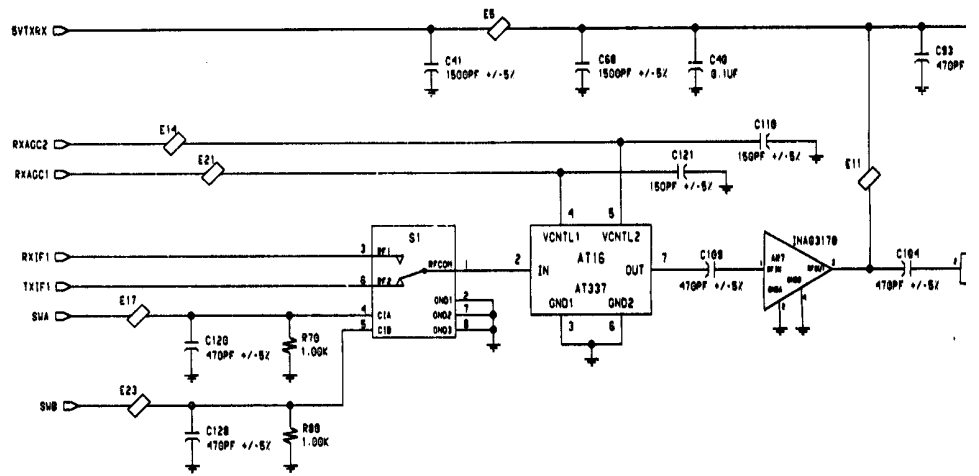


AM29F040



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FCC ID: NYV1721375





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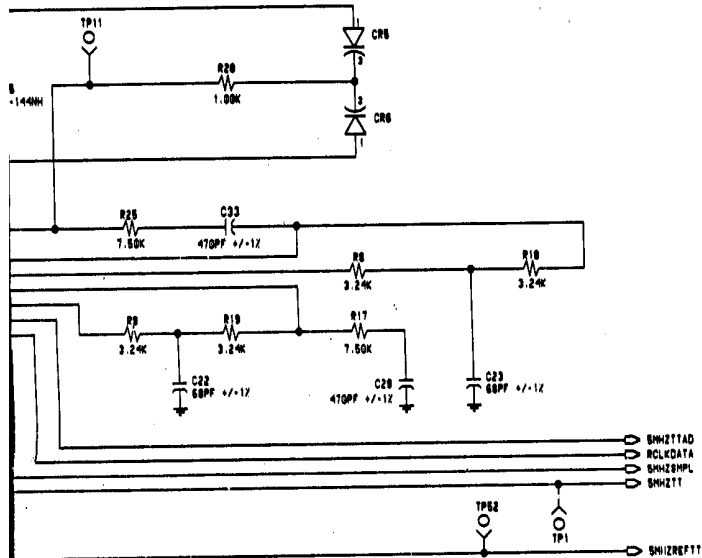
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Y 8  
33R HS

1720971-201 69869

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REVISIONS				
AUTHORITY	REV	DESCRIPTION	DATE	APPROVED
SEE SHEET 1				



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TIME\_TRACK

HUGHES AIRCRAFT COMPANY FULLERTON, CALIFORNIA		CONTRACT: SIZE CAGE CODE DWG NO		REV
		D 05869 1720971-201		A
DWN	SCALE NONE	SHEET		8
DATE				

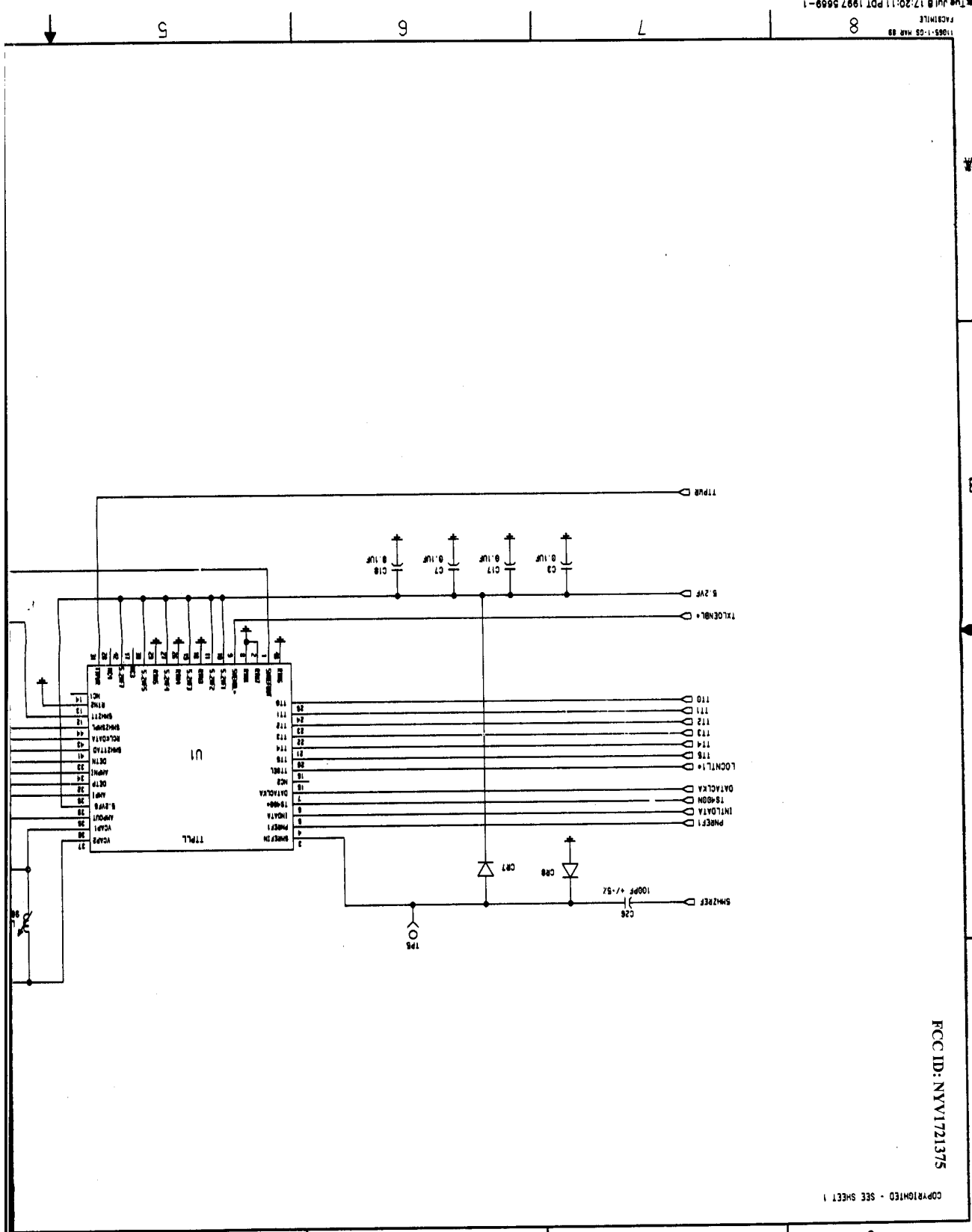
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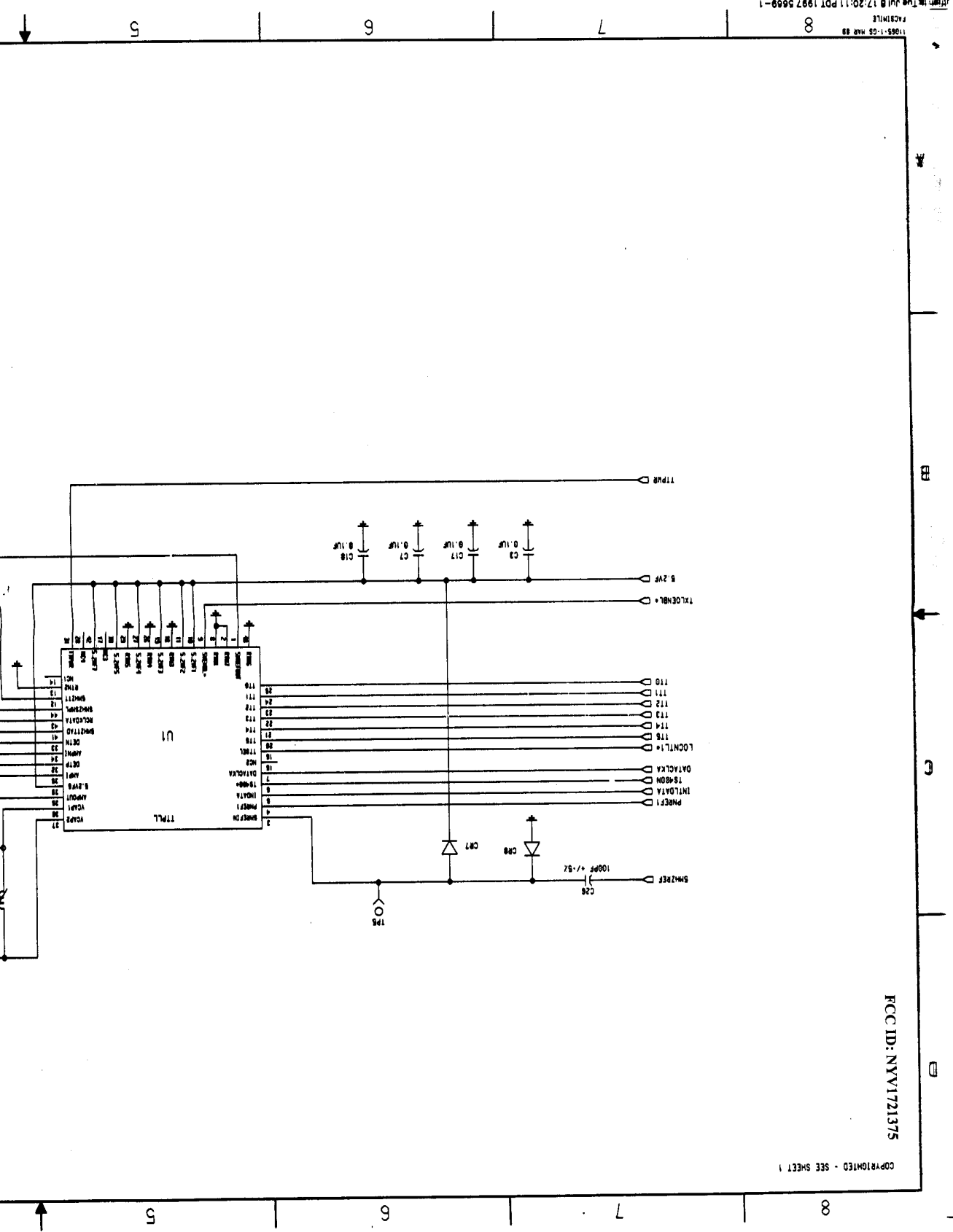
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FCC ID: NYY1721375



FCC ID: NYV1721375

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8

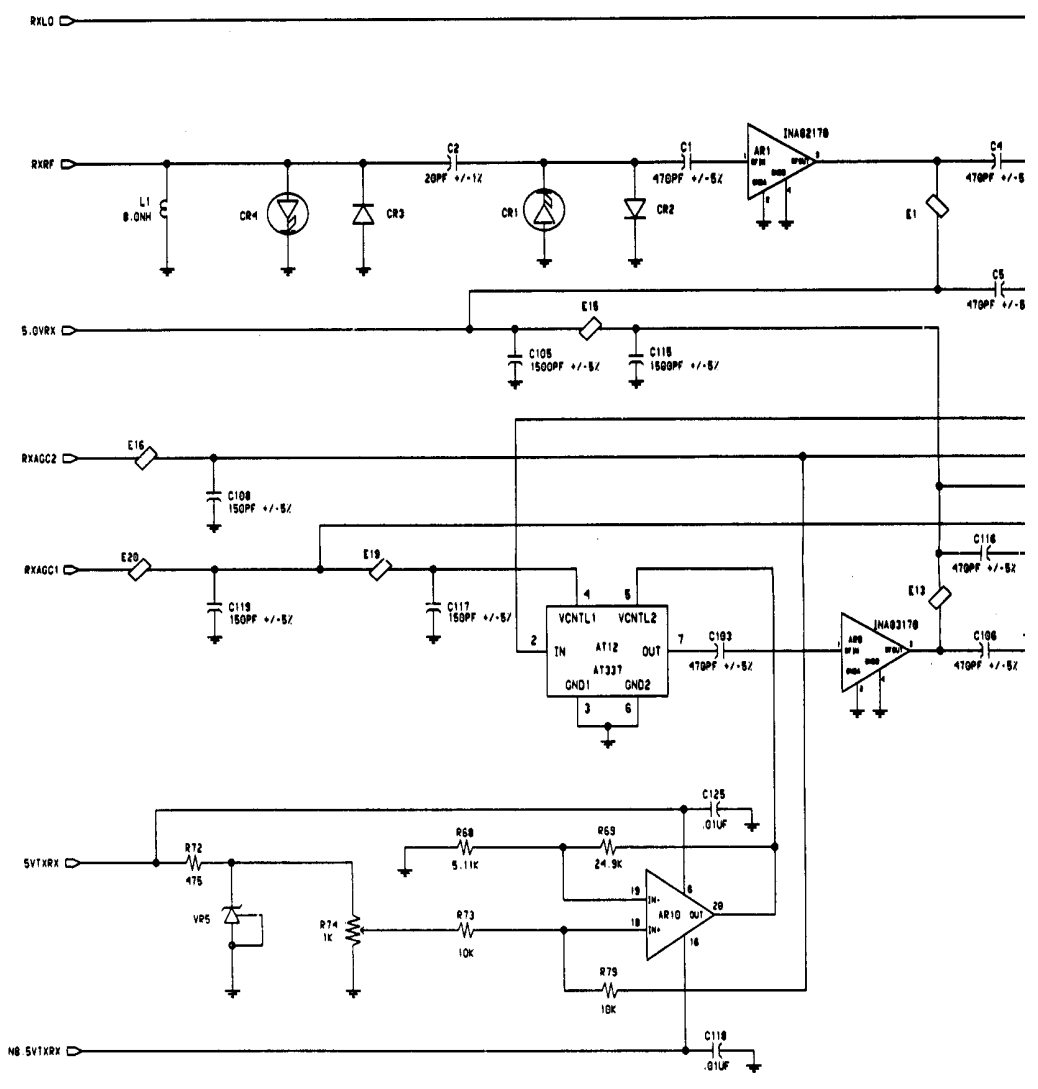
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FCC ID: NYV1721375



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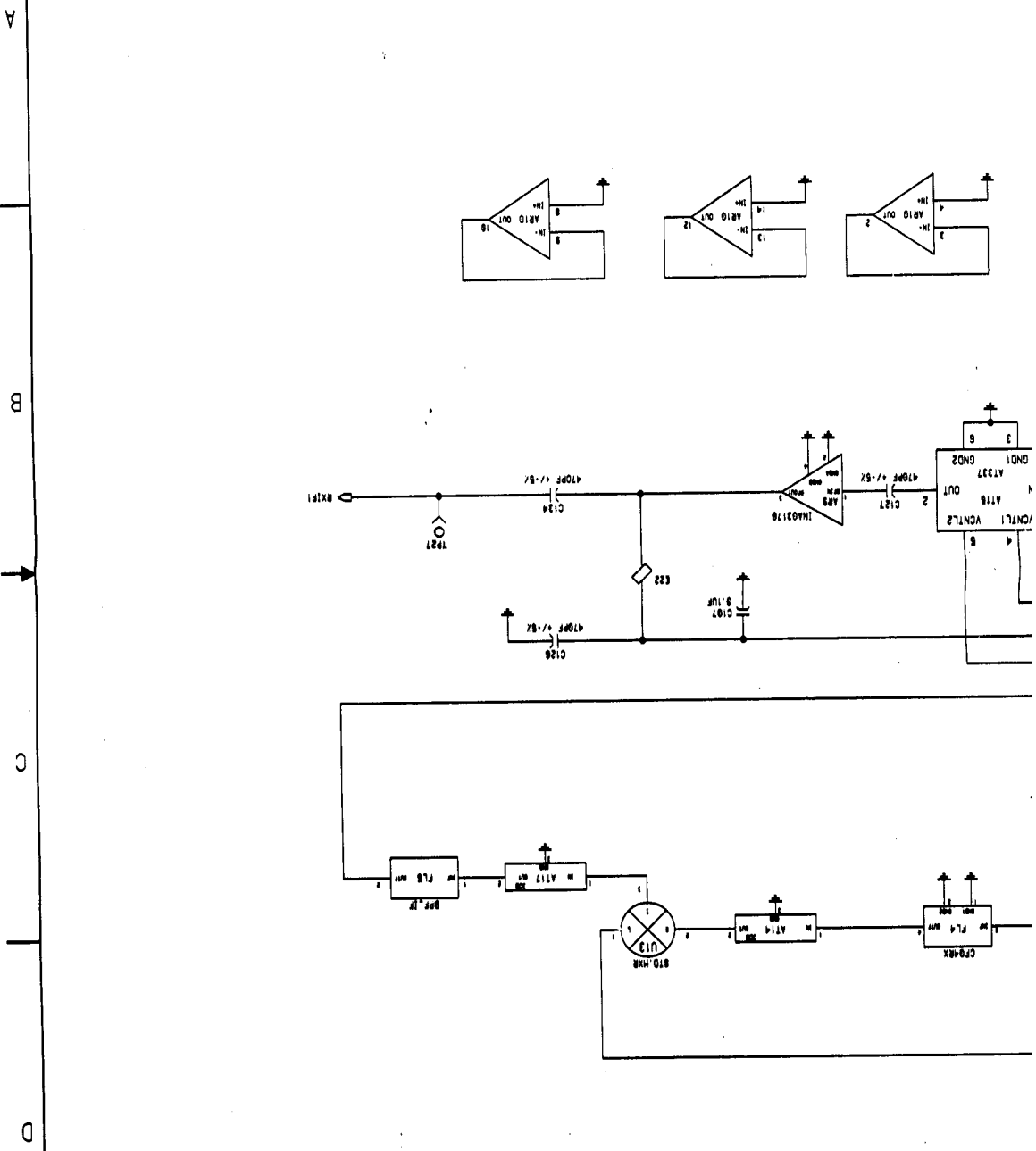
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5

FCC ID: NYV1721375

DATE	SCALE NONE	SHEET	10
DWG	DWG NO	1720971-201	REV
CONTRACT:		HUGHES AIRCRAFT COMPANY	
FULLERTON, CALIFORNIA		REV	
SIZE	DWG NO	1720971-201	REV
D	05869		A

DOWNCONVERTER



REV	DATE	APPROVED
1		

REV	DATE	APPROVED
1		

7" 8.5" 11" 7"

1 2 3 4

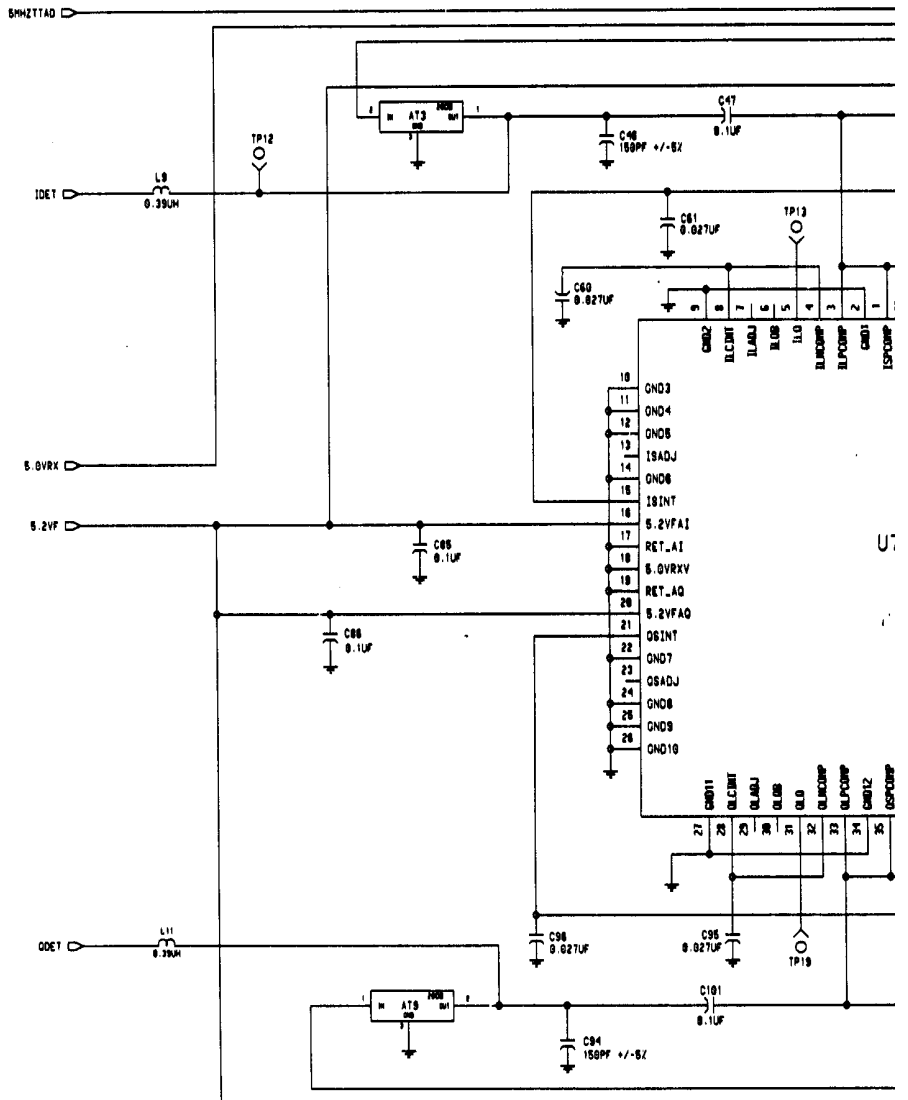
A B C D

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FCC ID: NYV1721375



11065-11-08 MAR 89  
FACTSIMILE

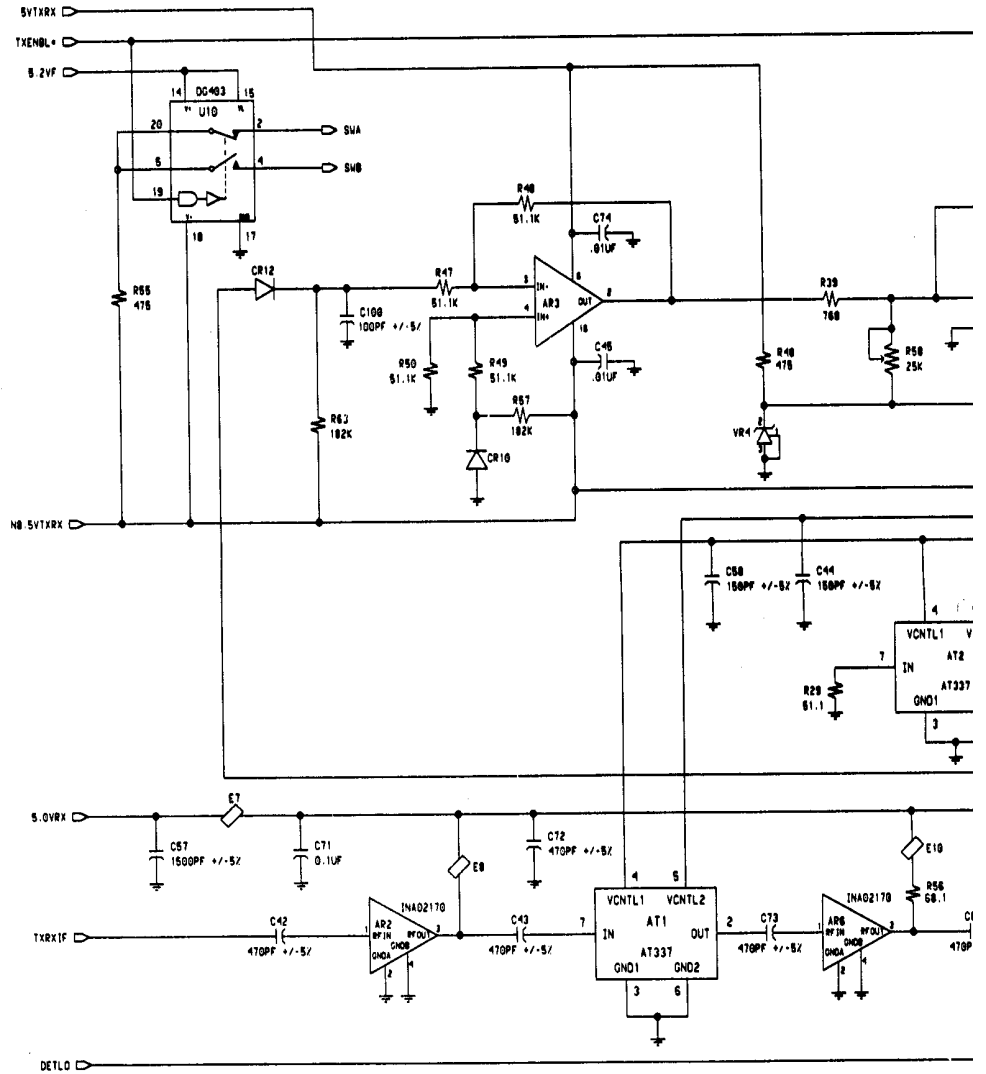
for on Tue Jul 8 17:24:12 PDT 1997 5873-1





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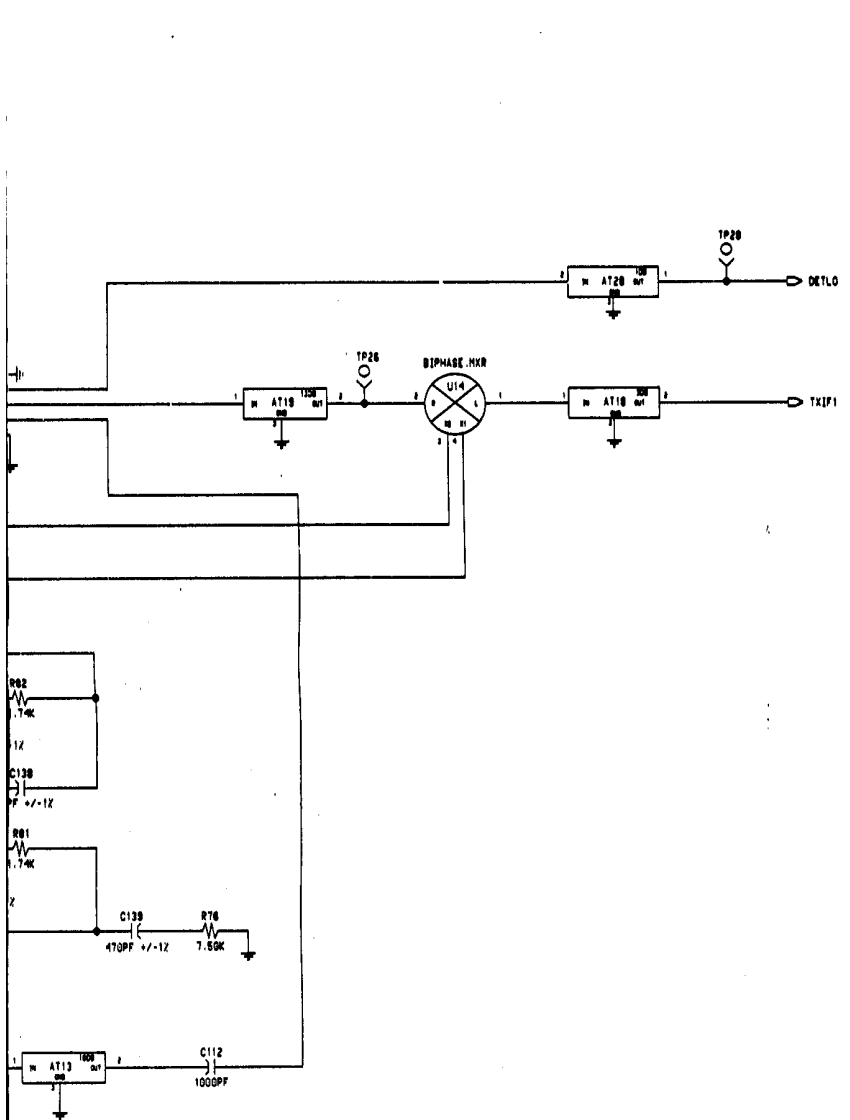


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Y	S	1720971-201	69850	1
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REVISIONS			
AUTHORITY	RCV	DESCRIPTION	DATE
SEE SHEET 1			



D  
7.4  
4  
8.5"  
C  
B  
8.5"  
11"  
A  
17"

MODULATOR

HUGHES AIRCRAFT COMPANY FULLERTON, CALIFORNIA		CONTRACT:		REV
DMN	DATE	SIZE	DWG NO	A
		D 05869	1720971-201	
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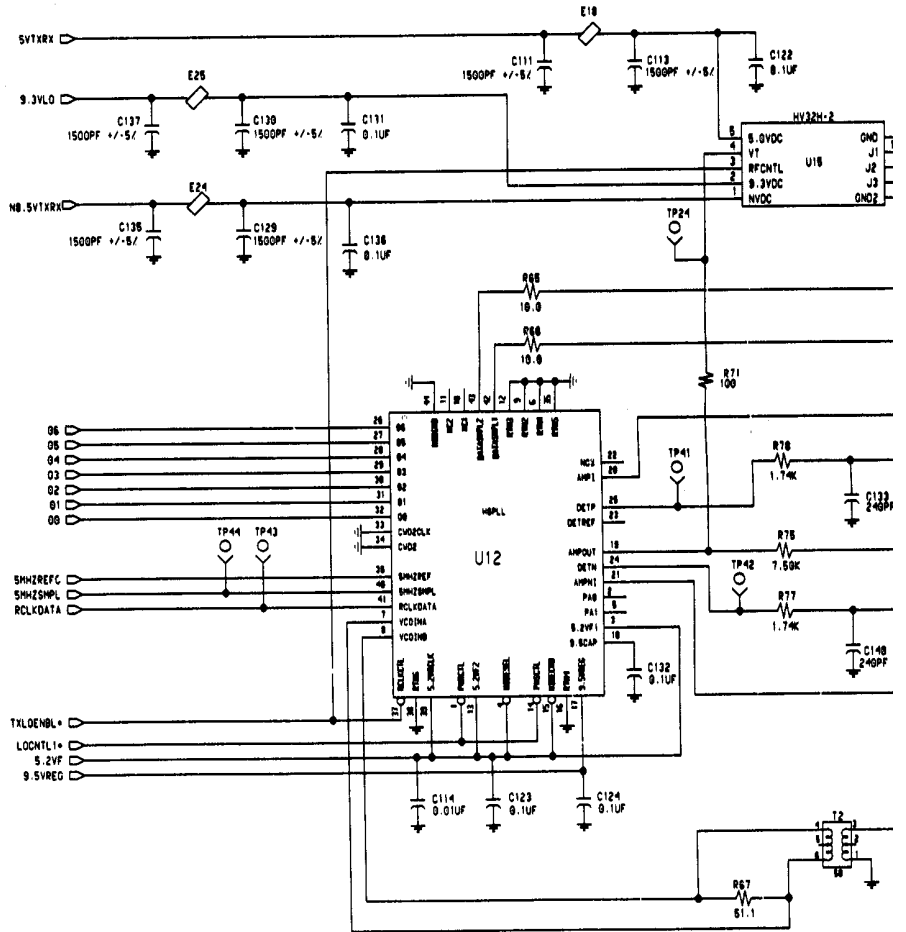
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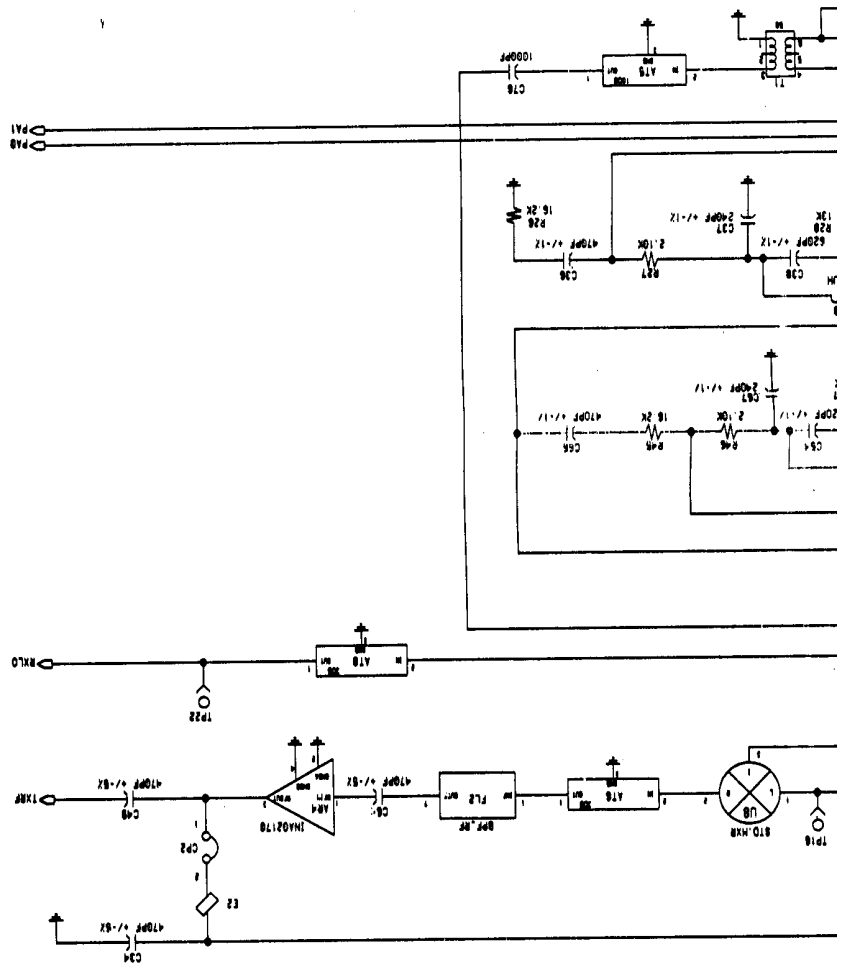
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REV	DESCRIPTION	DATE
A	1720971-201	
	SIZE D 05869	
	DWG NO 1720971-201	

UPCONVERTER



A  
B  
C  
D

8.5"  
11"  
17"

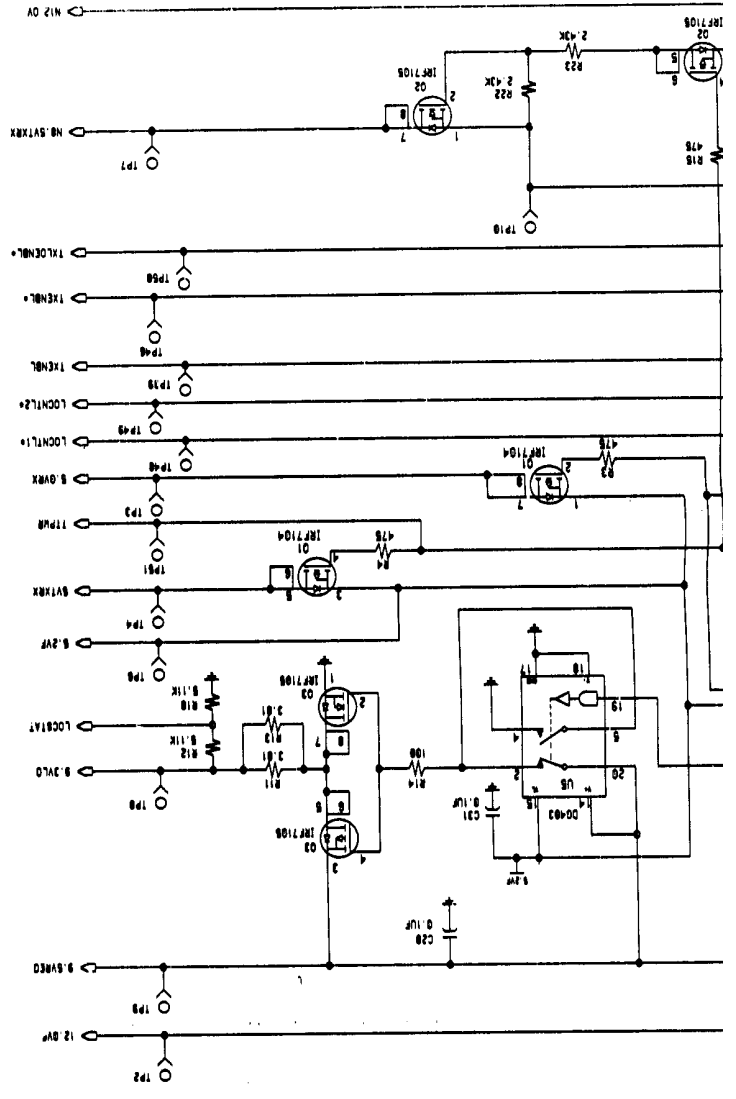
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B			
REV	DESCRIPTION	DATE	APPROVED
A	1720971-201		
B			



DATE	SCALE NONE	SHEET
DWG NO	1720971-201	3
REV	D 058869	A
CONTRACT:	HUGHES AIRCRAFT COMPANY FULLERTON, CALIFORNIA	
REV	DWG NO	DWG CODE
A	1720971-201	

POWER CONTROL

A  
17"  
B  
8.5"  
C  
8.5"  
D  
17"



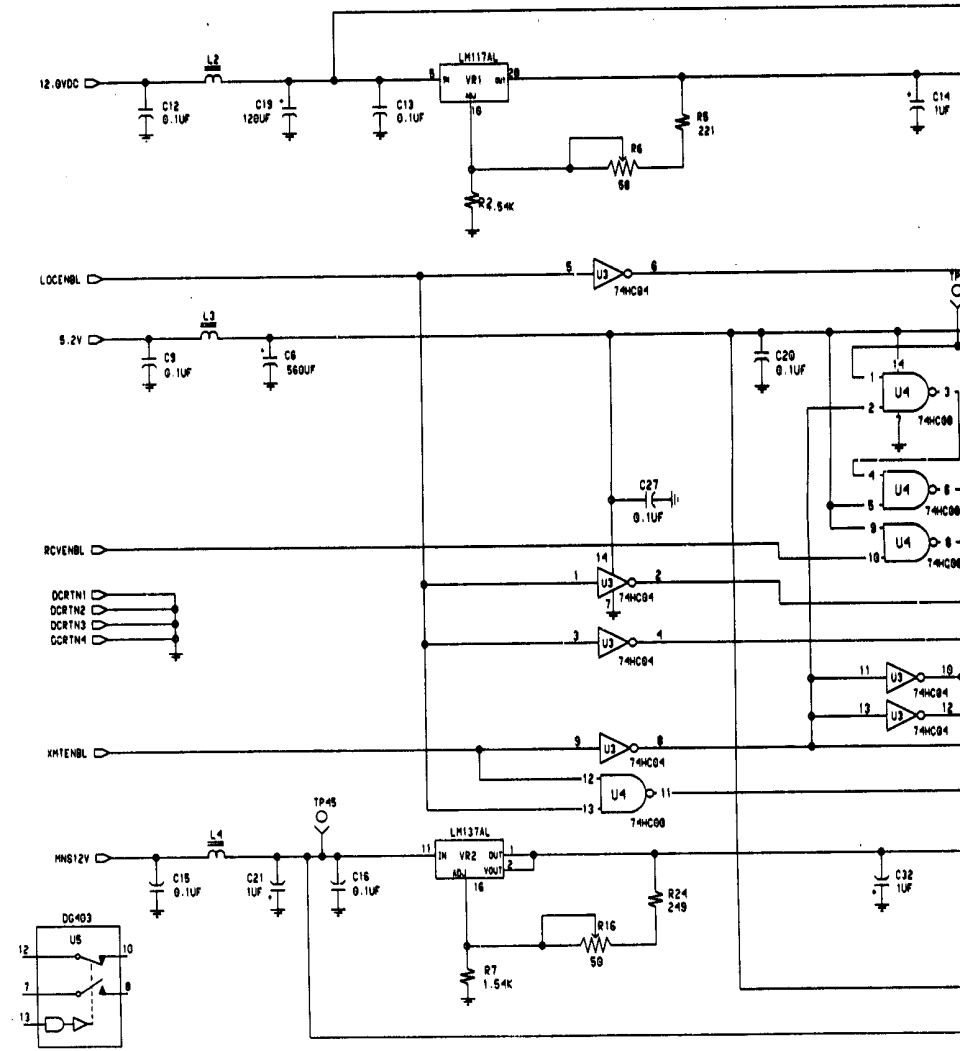
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DESCRIPTION		

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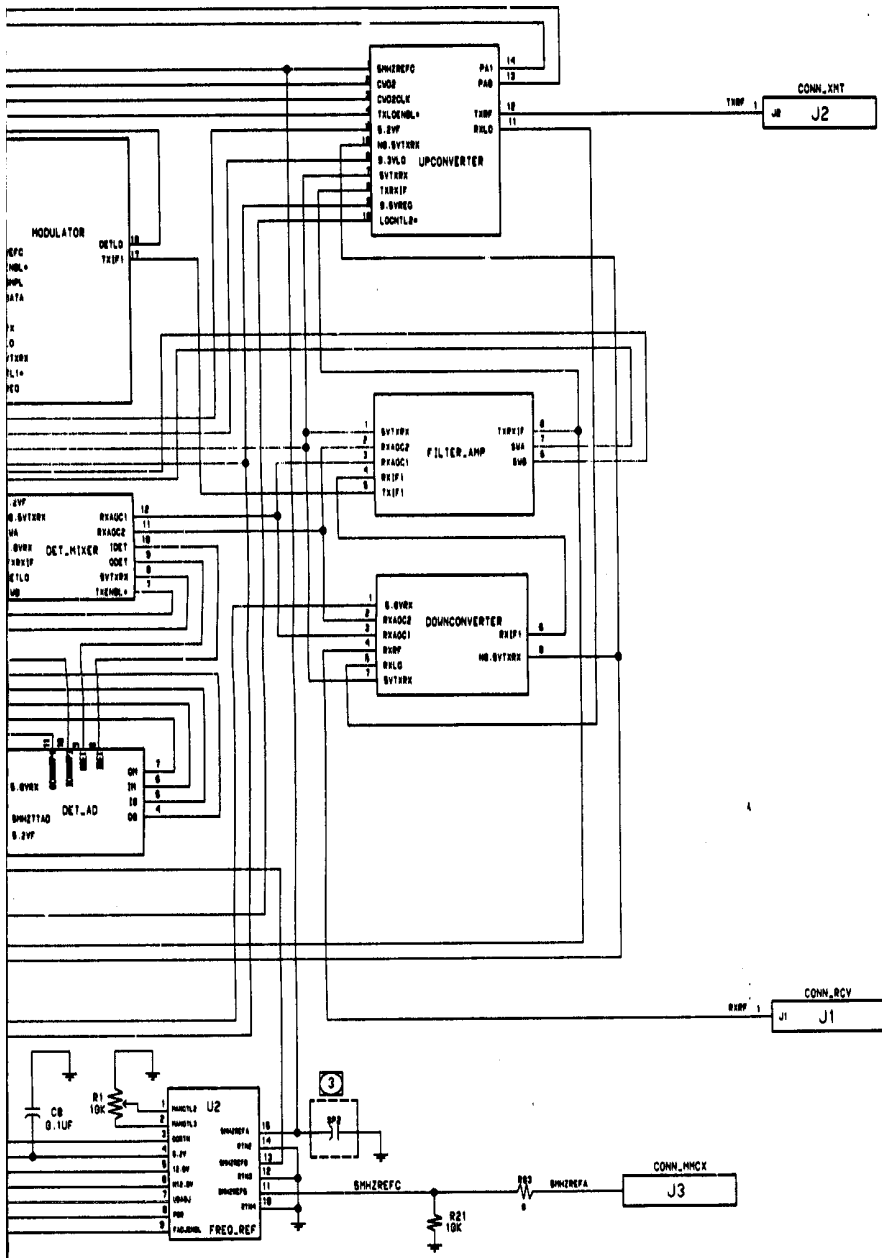
REV 2

1720971-201

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REVISIONS			
AUTHORITY	REV	DESCRIPTION	DATE
SEE SHEET 1			



RFA TOP LEVEL

HUGHES AIRCRAFT COMPANY FULLERTON, CALIFORNIA		CONTRACT: SIZE CAGE CODE DWG NO		REV
DWN	05869	1720971-201	A	
DATE	SCALE NONE	SHEET	2	

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