Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	111617509	MONROE, DAVID A
	Examiner	Art Unit
	HOUSHANG SAFAIPOUR	2625

SEARCHED			
Class	Subclass	Date	Examiner
358	1.15, 402, 403, 407, 442, 468, 474	12/5/08	HS

SEARCH NOTES		
Search Notes	Date	Examiner
East	12/5/08	HS
Inventor search performed	8/15/09	HS
Interference search performed	8/15/09	HS

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
358	1.15, 402, 403, 407	8/15/09	HS

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	11617509
	Filing Date	2006-12-28
	First Named Inventor	David A Monroe
	Art Unit	2625
	Examiner Name	Houshang Safaipour
	Attorney Docket Number	06-0719

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	5136628		1992-08-04	Araki et al.	
	2	5164979		1992-11-17	Choi et al.	
	3	5400068		1995-03-21	Ishida et al.	
	4	7372447		2008-05-13	Jacobson et al.	
	5	5042061		1991-08-20	Kaneke et al.	
	6	5485504		1996-01-16	Ohnsorge	
	7	7310072		2007-12-18	Ronzani	
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	11617509 11617509 - GAU: 2625
	Filing Date	2006-12-28
	First Named Inventor	David A Monroe
	Art Unit	2625
	Examiner Name	Houshang Safaipour
	Attorney Docket Number	06-0719

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	JP03089691			1991-04-15	Yamamoto		☐

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	Copy of Office Action issued on October 4, 2007 in Appl. No. 11/617,509 (present application).	☐
	2	Copy of Office Action issued on December 12, 2008 in Appl. No. 11/617,509 (present application).	☐
	3	Copy of Office Action issued on September 27, 2004 in Appl. No. 10/336,470 (the parent of the present application).	☐
	4	Copy of Office Action issued on August 9, 2005 in Appl. No. 10/336,470 (the parent of the present application).	☐

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	11617509 11617509 - GAU: 2625
	Filing Date	2006-12-28
	First Named Inventor	David A Monroe
	Art Unit	2625
	Examiner Name	Houshang Safaipour
	Attorney Docket Number	06-0719

	5	Copy of Office Action issued on December 16, 2005 in Appl. No. 10/336,470 (the parent of the present application).	☐
	6	Copy of Office Action issued on July 27, 2006 in Appl. No. 10/336,470 (the parent of the present application).	☐
	7	Copy of Office Action issued on March 8, 2007 in Appl. No. 10/366,470 (the parent of the present application).	☐

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EXAMINER SIGNATURE

Examiner Signature	/Houshang Safaipour/	Date Considered	11/07/2009

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/617,509	12/28/2006	David A Monroe	06-0719	4247

TITLE OF INVENTION: APPARATUS FOR CAPTURING, CONVERTING AND TRANSMITTING A VISUAL IMAGE SIGNAL VIA A DIGITAL TRANSMISSION SYSTEM

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510	$300	$0	$1810	11/20/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
SAFAIPOUR, BOUSHANG	2625	358-474000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363)
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
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☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

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Typed or printed name Jeffrey D. Hunt Registration No. 38,189

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Electronic Patent Application Fee Transmittal

Application Number:	11617509
Filing Date:	28-Dec-2006
Title of Invention:	APPARATUS FOR CAPTURING, CONVERTING AND TRANSMITTING A VISUAL IMAGE SIGNAL VIA A DIGITAL TRANSMISSION SYSTEM
First Named Inventor/Applicant Name:	David A Monroe
Filer:	Jeffrey Darryl Hunt/Jacob Cowart
Attorney Docket Number:	06-0719

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl issue fee	1501	1	1510	1510
Publ. Fee- early, voluntary, or normal	1504	1	300	300

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**1810**

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EFS ID:	6496890
Application Number:	11617509
International Application Number:	
Confirmation Number:	4247
Title of Invention:	APPARATUS FOR CAPTURING, CONVERTING AND TRANSMITTING A VISUAL IMAGE SIGNAL VIA A DIGITAL TRANSMISSION SYSTEM
First Named Inventor/Applicant Name:	David A Monroe
Customer Number:	67589
Filer:	Jeffrey Darryl Hunt/Jacob Cowart
Filer Authorized By:	Jeffrey Darryl Hunt
Attorney Docket Number:	06-0719
Receipt Date:	20-NOV-2009
Filing Date:	28-DEC-2006
Time Stamp:	15:01:10
Application Type:	Utility under 35 USC 111(a)

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Payment Type	Deposit Account
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1	Issue Fee Payment (PTO-85B)	feetrans.pdf	332913 3f6a1b7d298ed561825a0d84402d4e9b8c25b2ff	no	1
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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/617,509	01/05/2010	7643168	06-0719	4247

67589 7590 12/16/2009

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1609 SHOAL CREEK BLVD
SUITE 100
AUSTIN, TX 78701

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

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If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

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APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

David A Monroe, San Antonio, TX;


MOTOROLA


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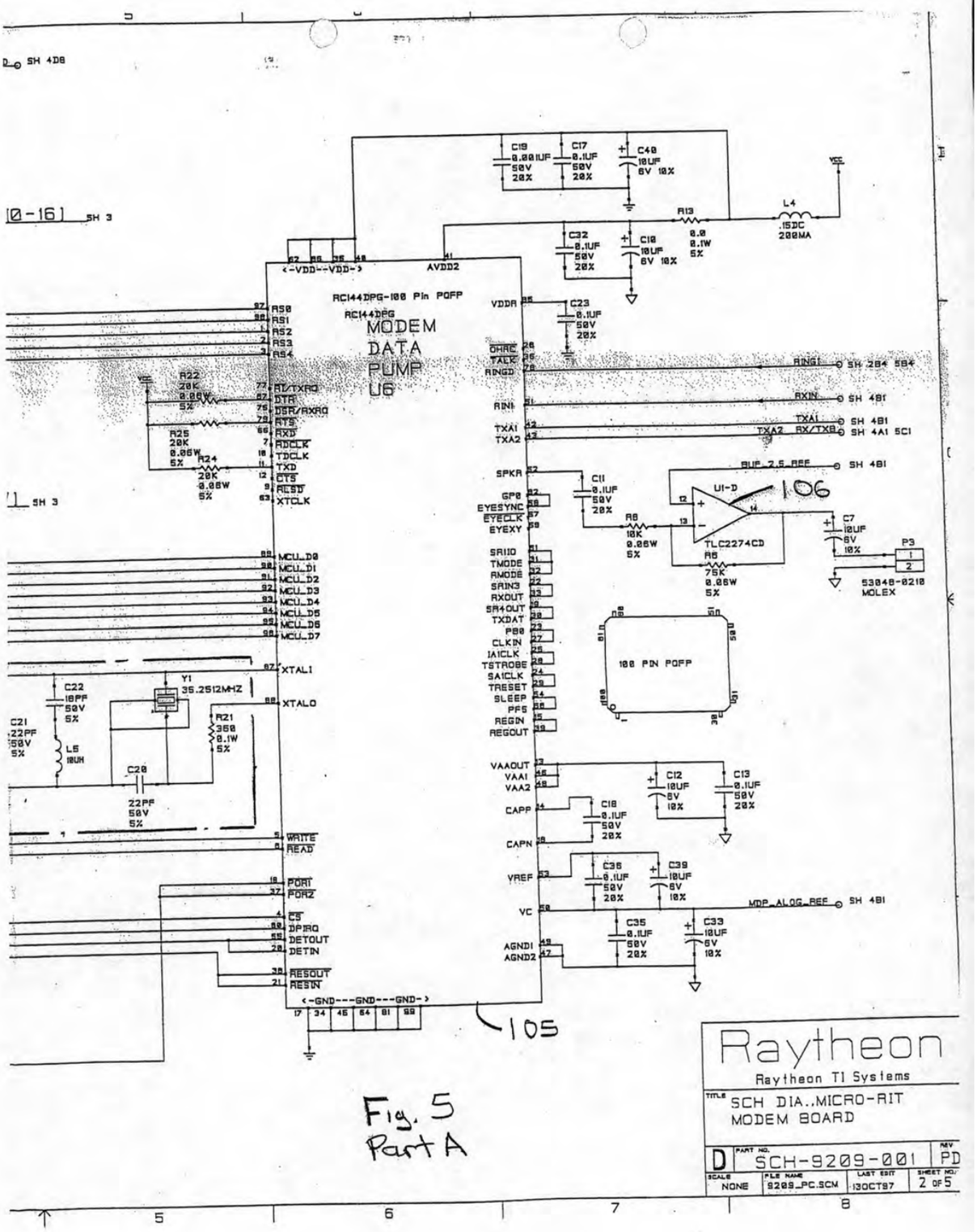
MicroRIT™
PhotoTelesis
Image Transmission™
Patent Pending
7800 IH-10 West, Suite 700
San Antonio, Tx 78230-4753
Tel:210.349.2020
Fax: 210.341.1020
www.raytheon.com/photot
MicroRIT
97112020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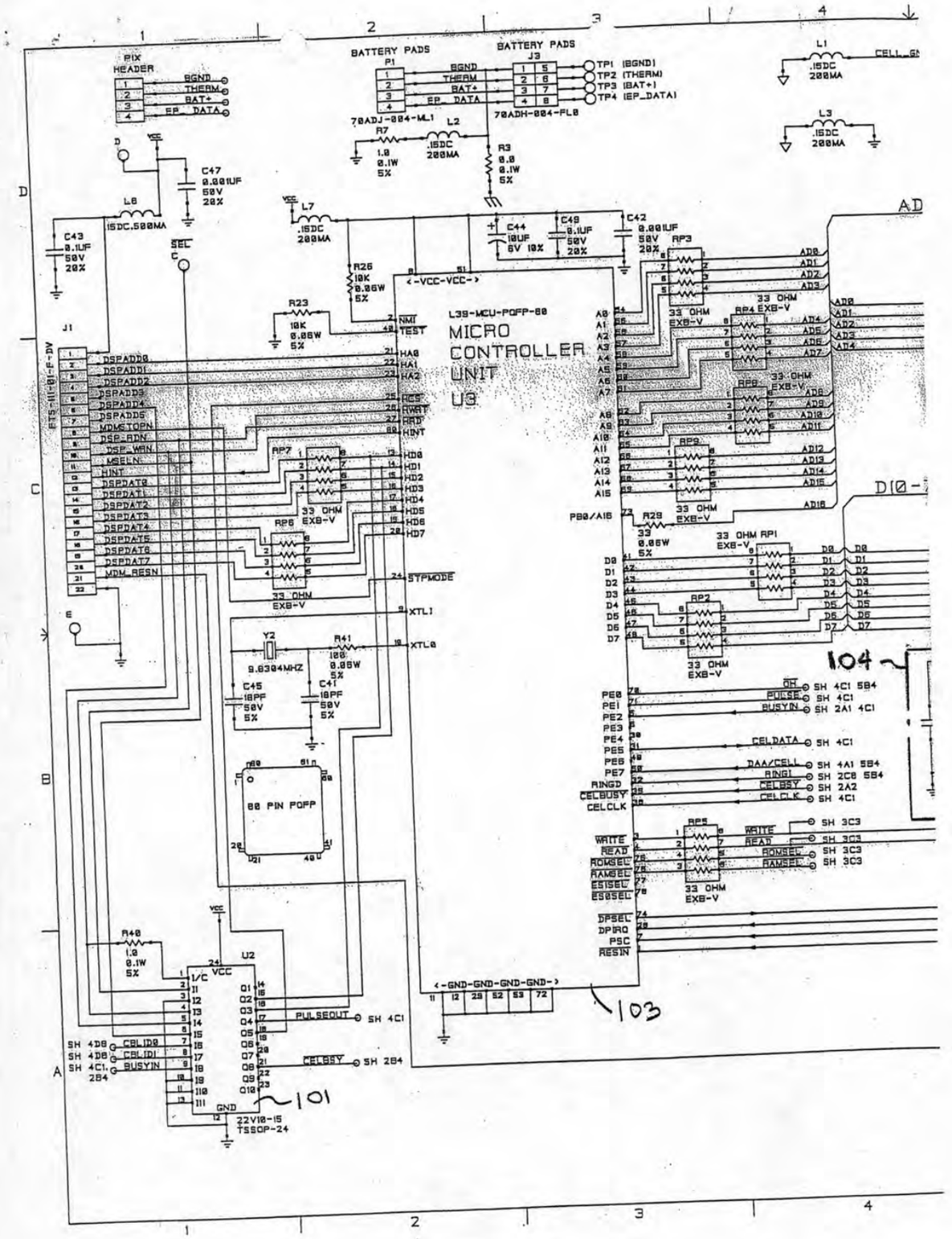
2 OF 5

Fig. 5
Part A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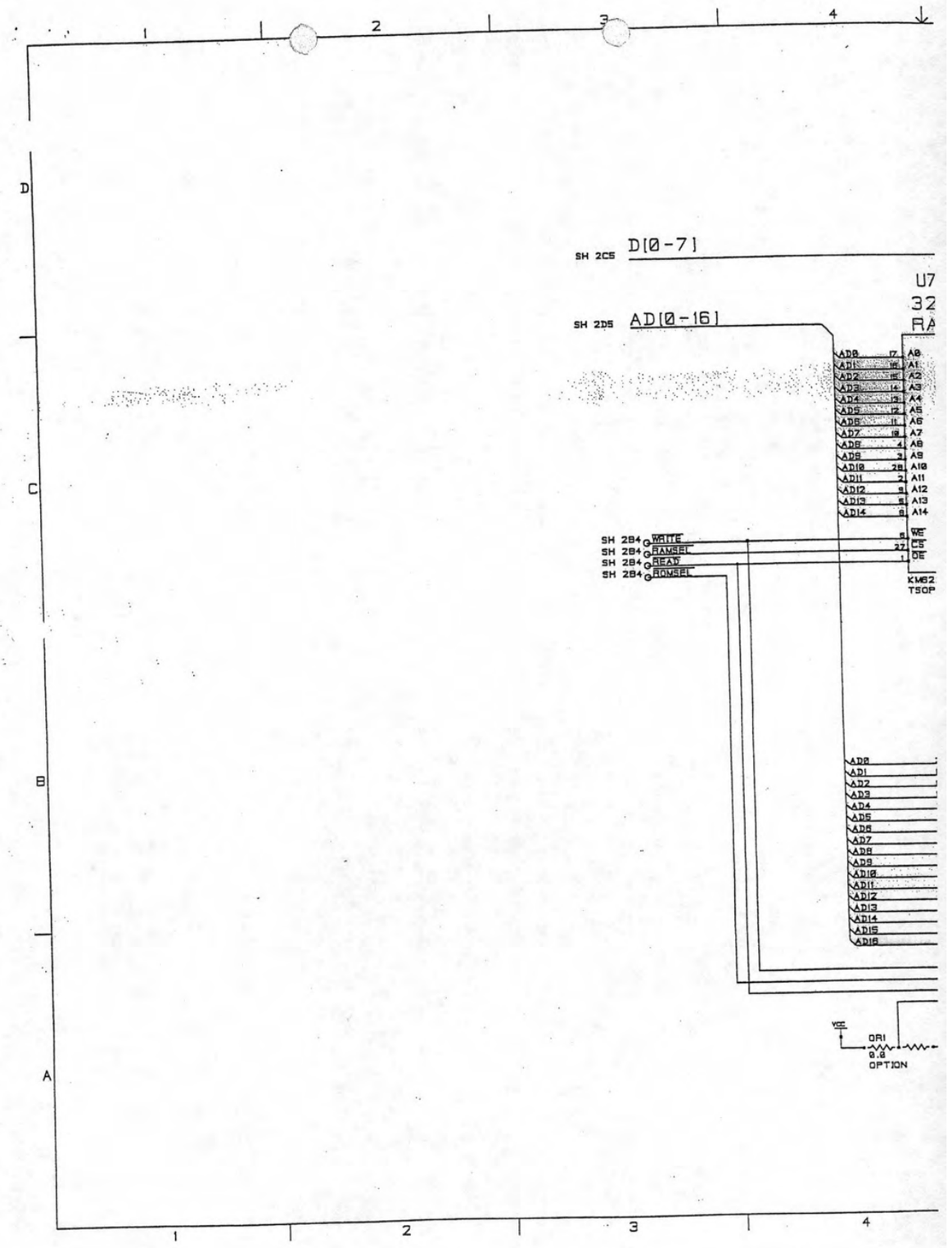
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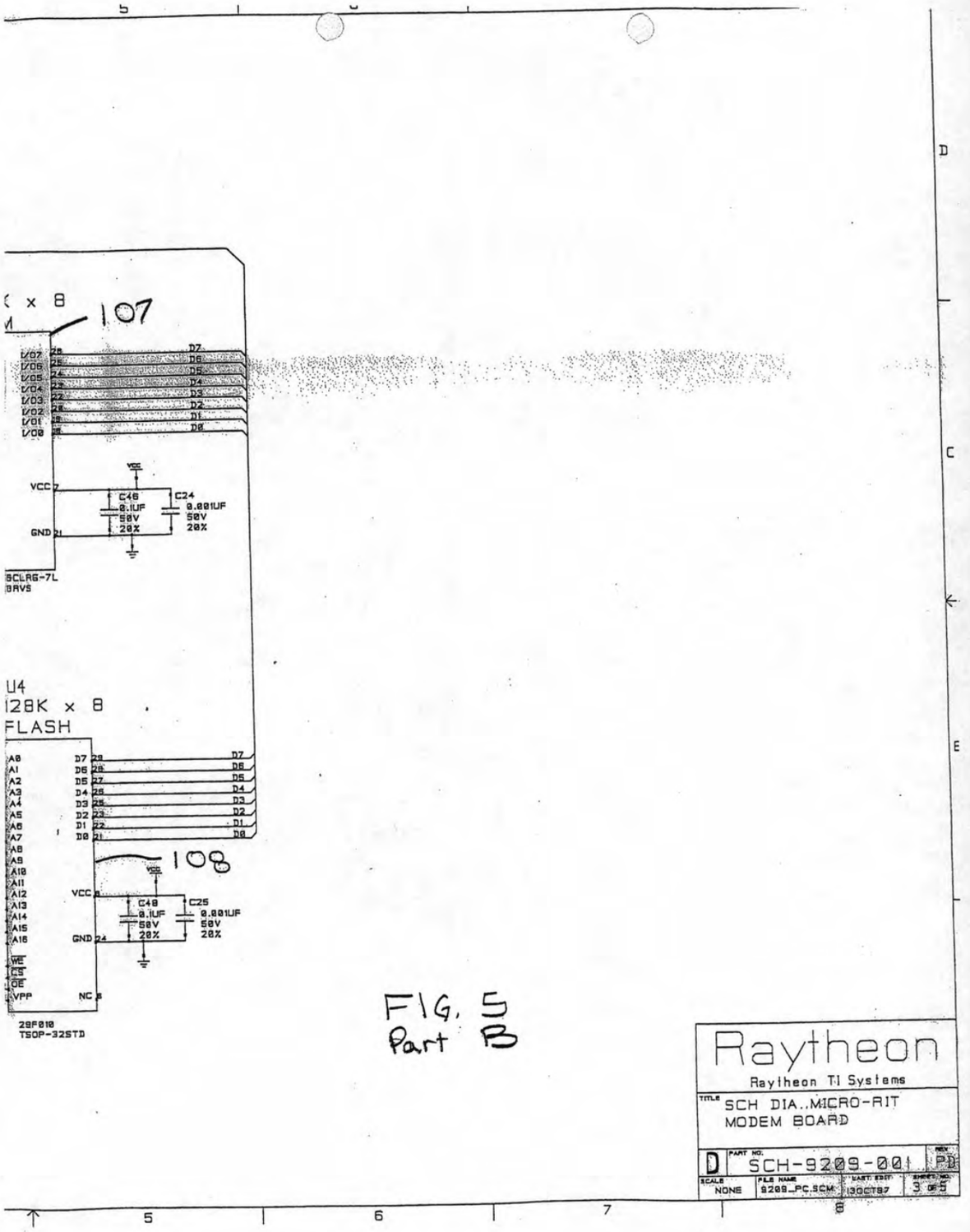

FIG. 5
Part B

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Raytheon T.I Systems
TITLE SCH DIA..MICRO-RIT
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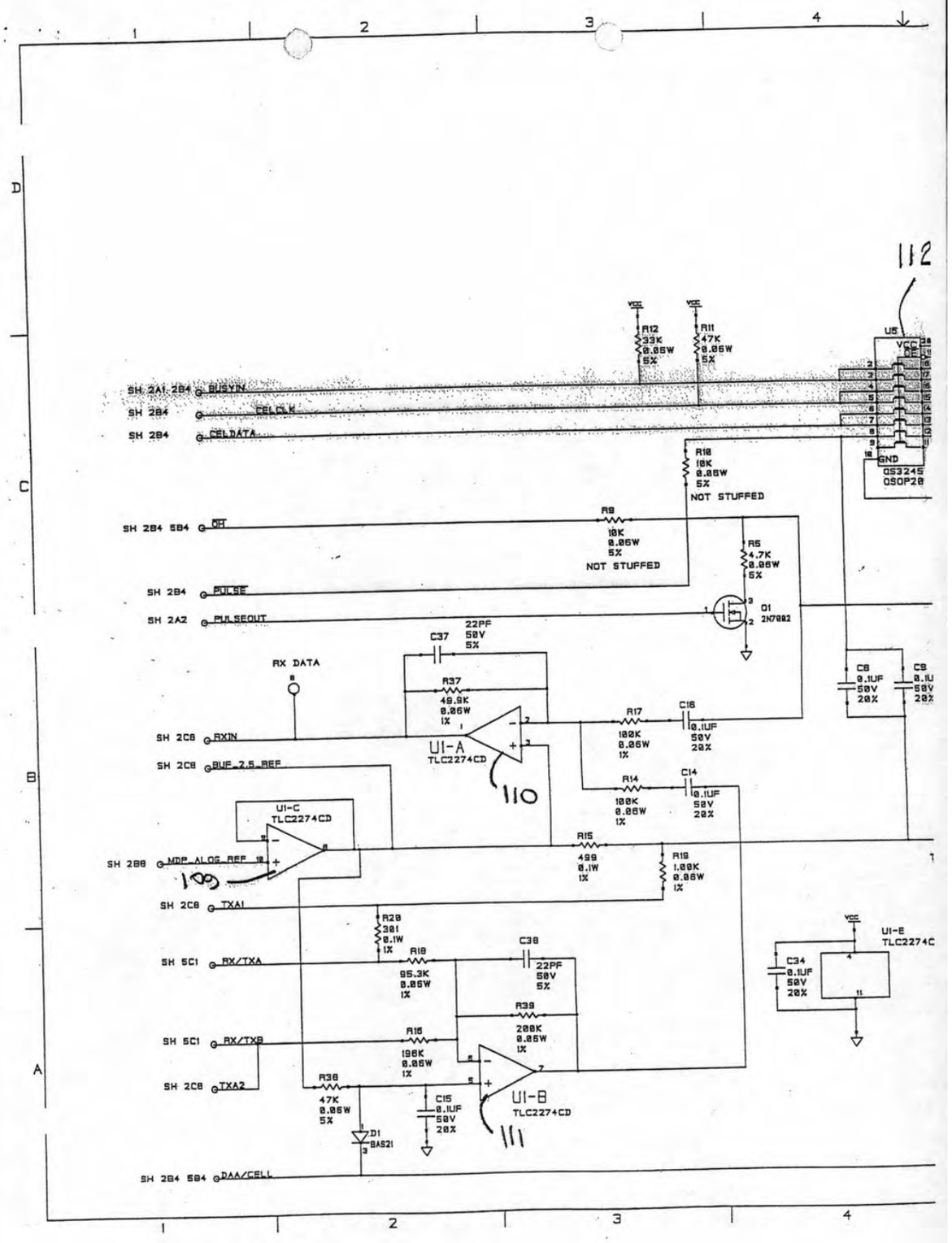
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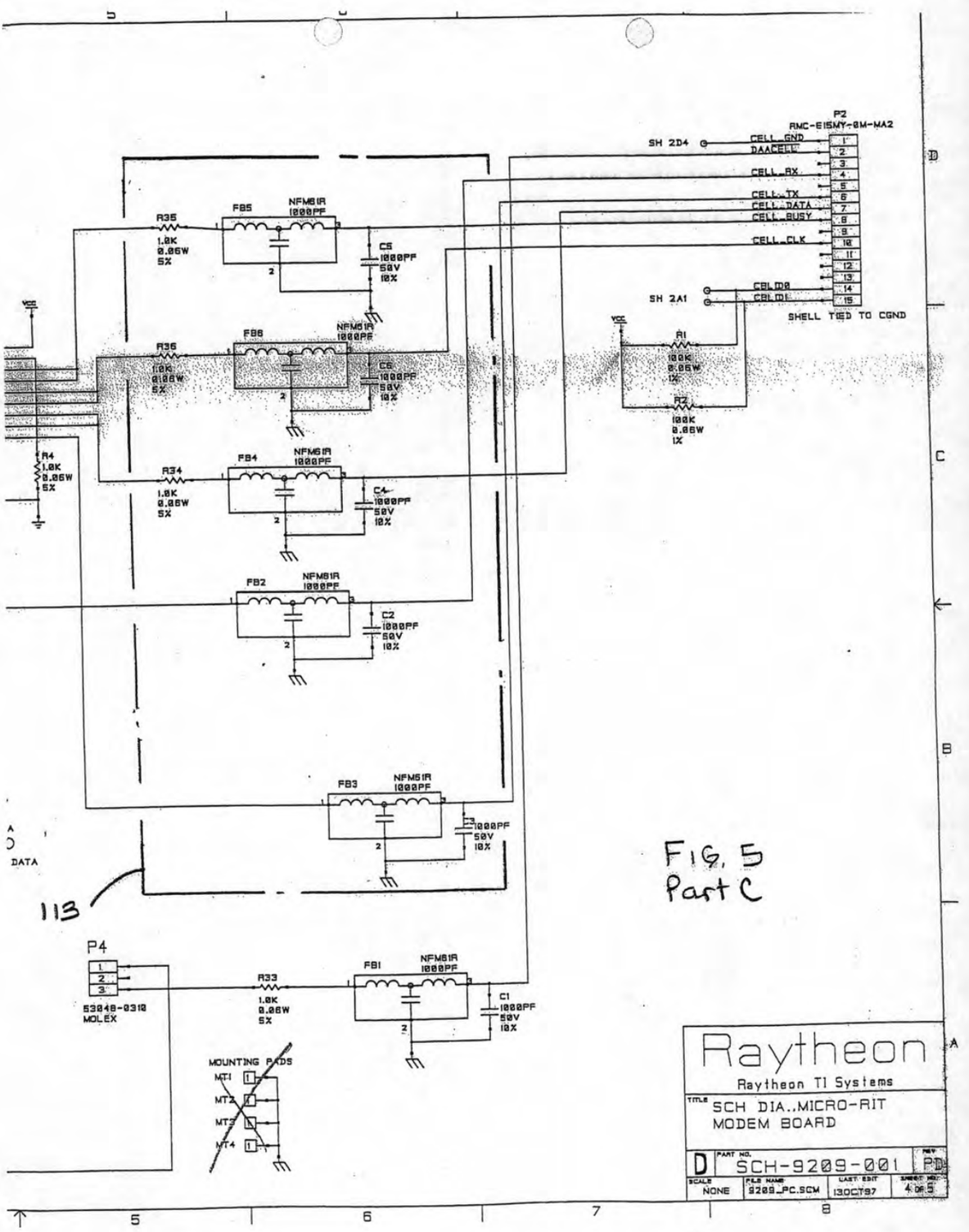
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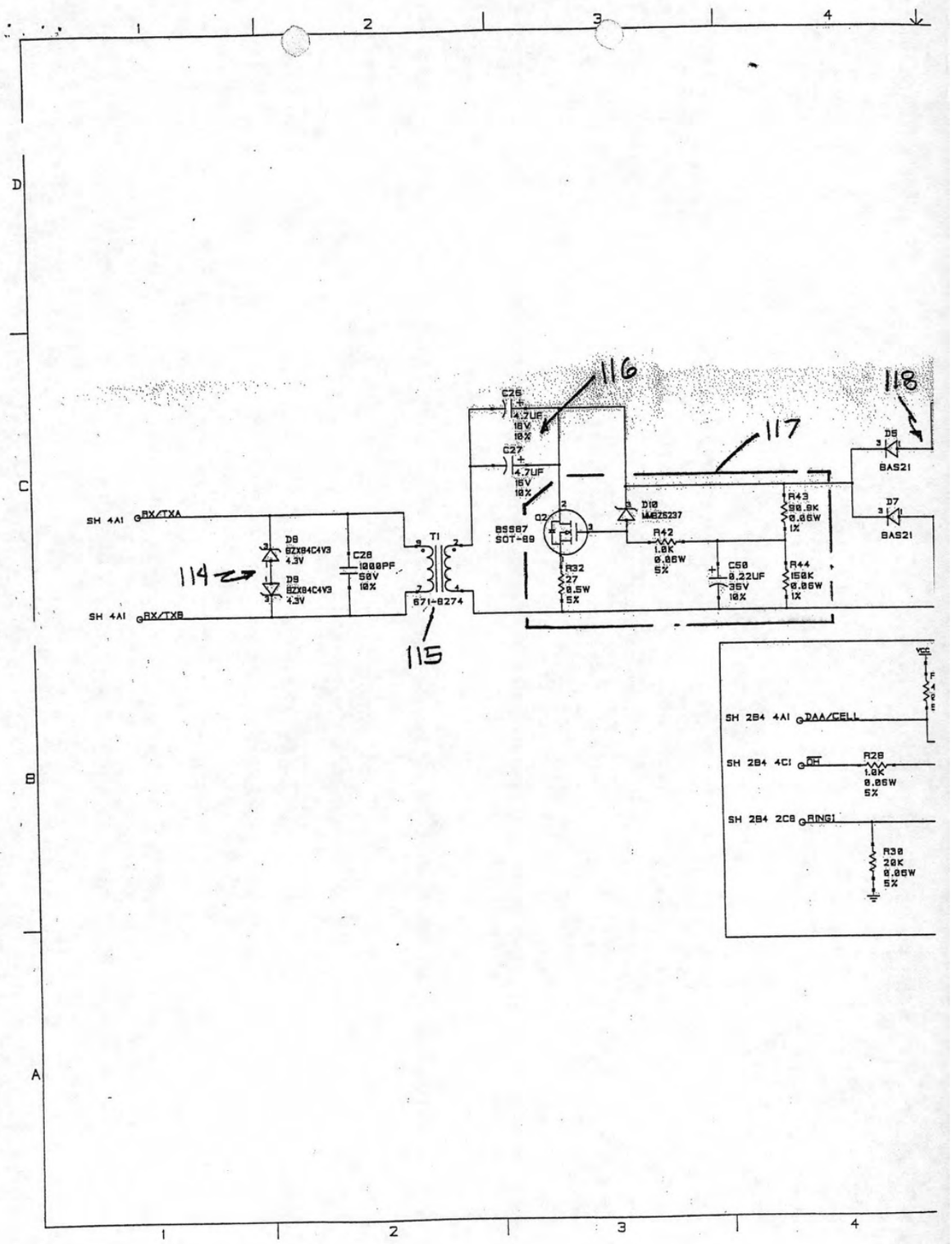
MOUNTING PADS
MT1
MT2
MT3
MT4
Raytheon
Raytheon TI Systems
SCH DIA.,MICRO-RIT
MODEM BOARD
PART NO. SCH-9209-001
REV P0
SCALE NONE
FILE NAME 9209_PC.SCM
LAST EDIT 130CT97
SHEET NO. 4 OF 5

FIG. 5
Part C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C28 1000PF 50V 10%
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C26 4.7UF 16V 10%
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C58 0.22UF 35V 10%
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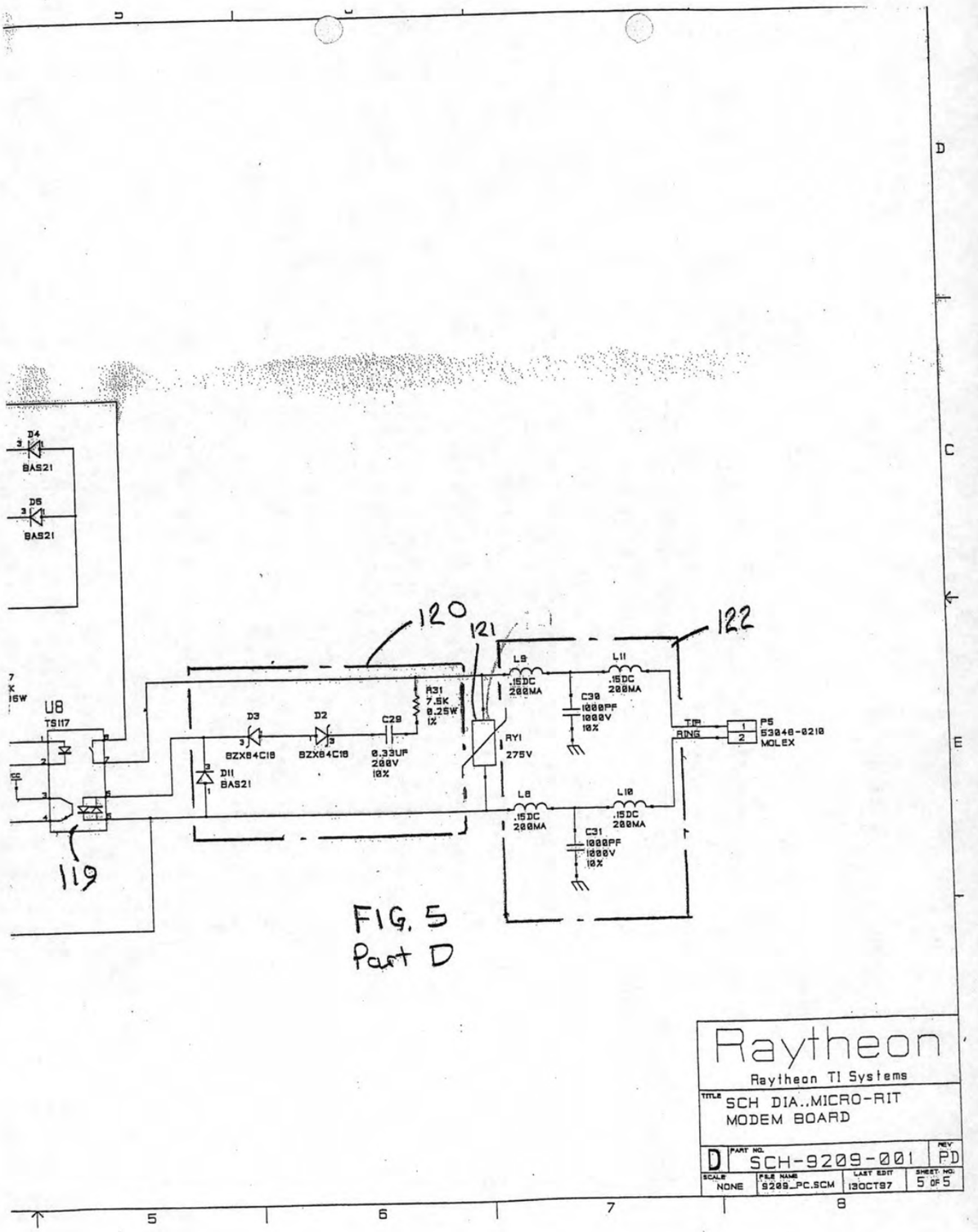
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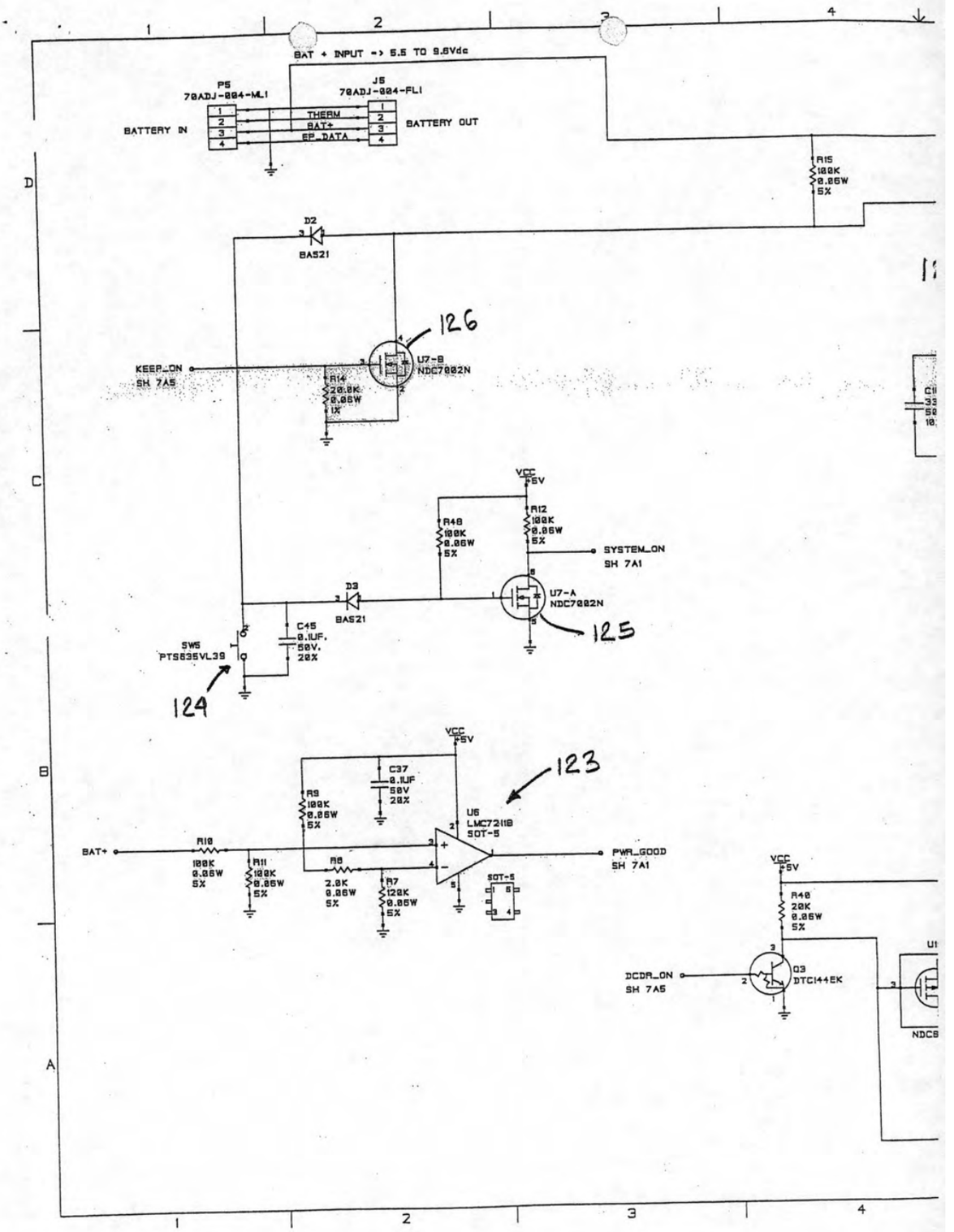
5 OF 5

FIG. 5
Part D


BAT + INPUT => 5.5 TO 9.6Vdc
P5
70ADJ-004-ML1
J5
70ADJ-004-FL1
BATTERY IN
THERM
BAT+
EP_DATA
BATTERY OUT
R15
100K
0.06W
5%
D2
BAS21
126
KEEP_ON
SH 7A5
U7-B
NDC7002N
R14
20.0K
0.06W
1%
VCC
5V
R48
100K
0.06W
5%
R12
100K
0.06W
5%
SYSTEM_ON
SH 7A1
D3
BAS21
U7-A
NDC7002N
125
SW5
PTS635VL39
C45
0.1UF,
50V,
20%
124
VCC
5V
C37
0.1UF
50V
20%
123
R9
100K
0.06W
5%
U6
LMC7211B
SOT-5
BAT+
R10
100K
0.06W
5%
R11
100K
0.06W
5%
R8
2.8K
0.06W
5%
R7
120K
0.06W
5%
SOT-5
PWR_GOOD
SH 7A1
VCC
5V
R46
20K
0.06W
5%
DCDR_ON
SH 7A5
Q3
DTC144EK
NDCS

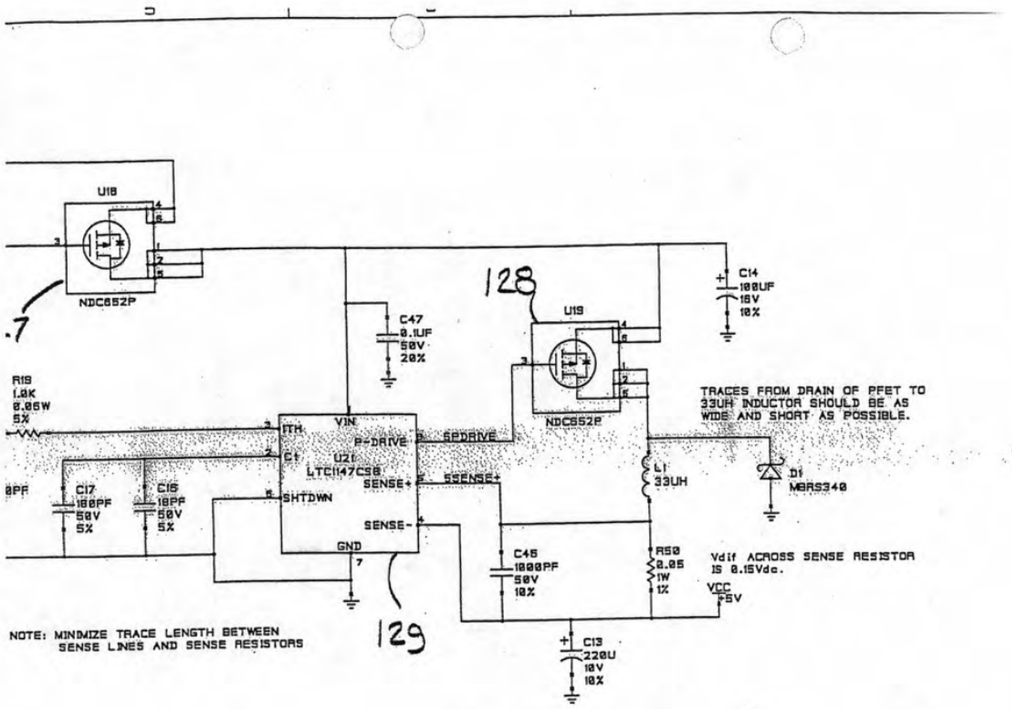
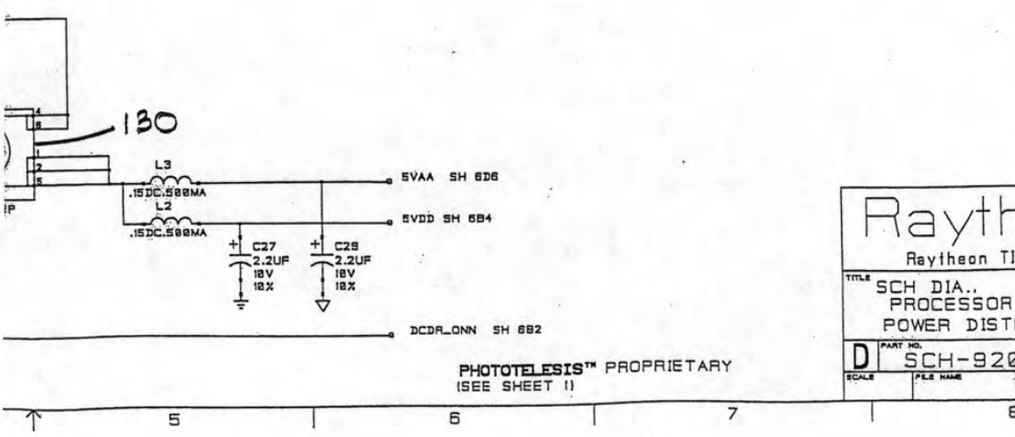
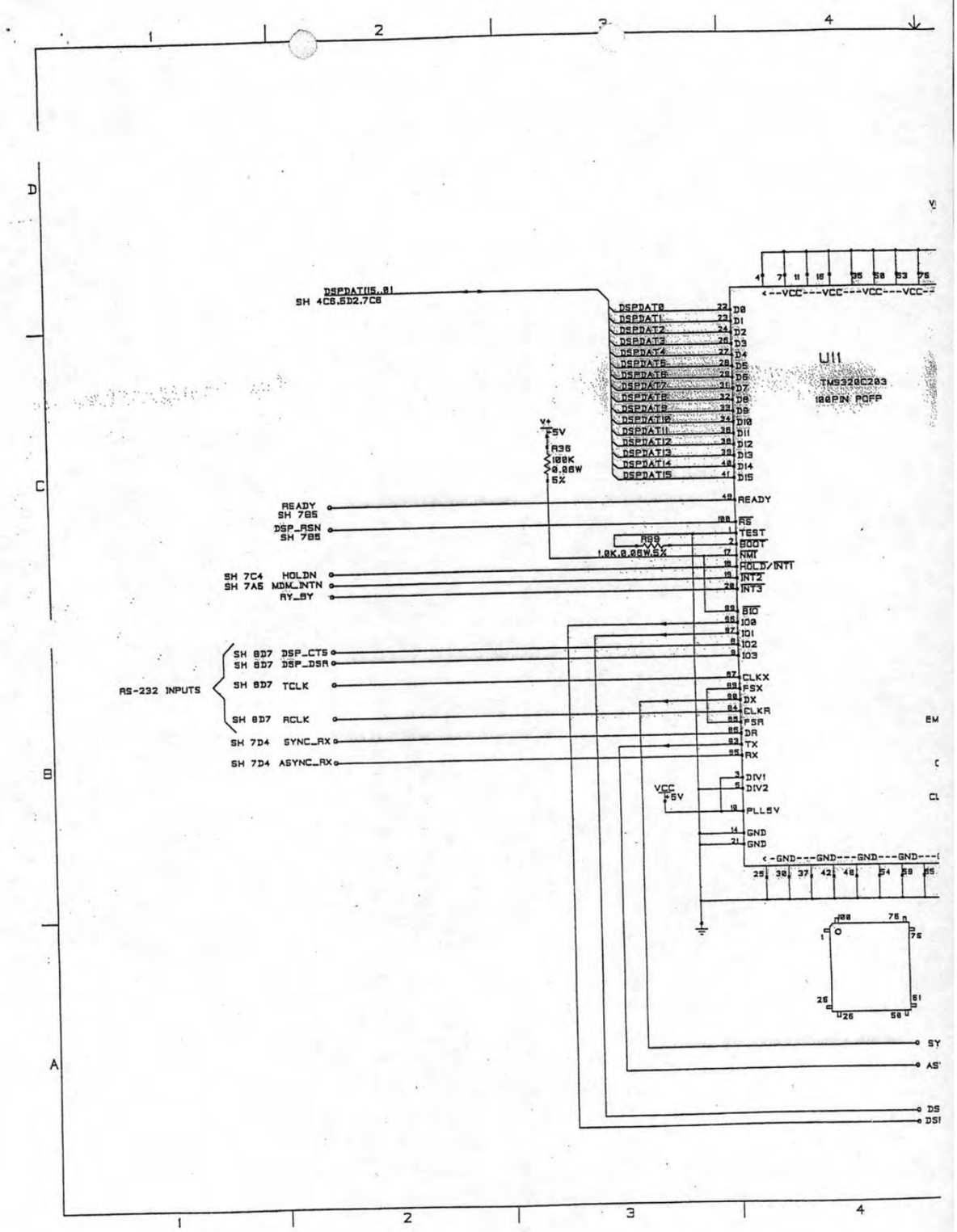
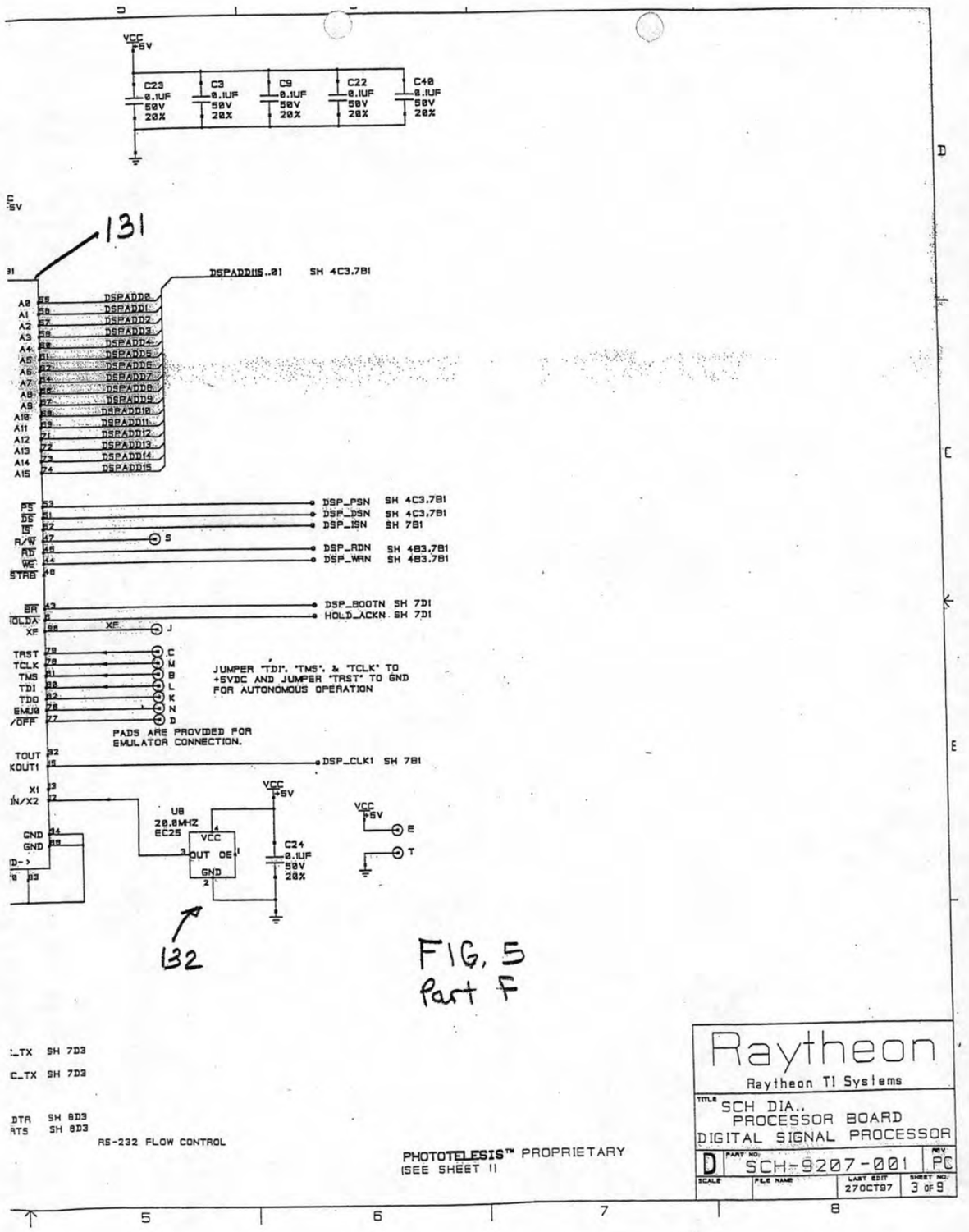
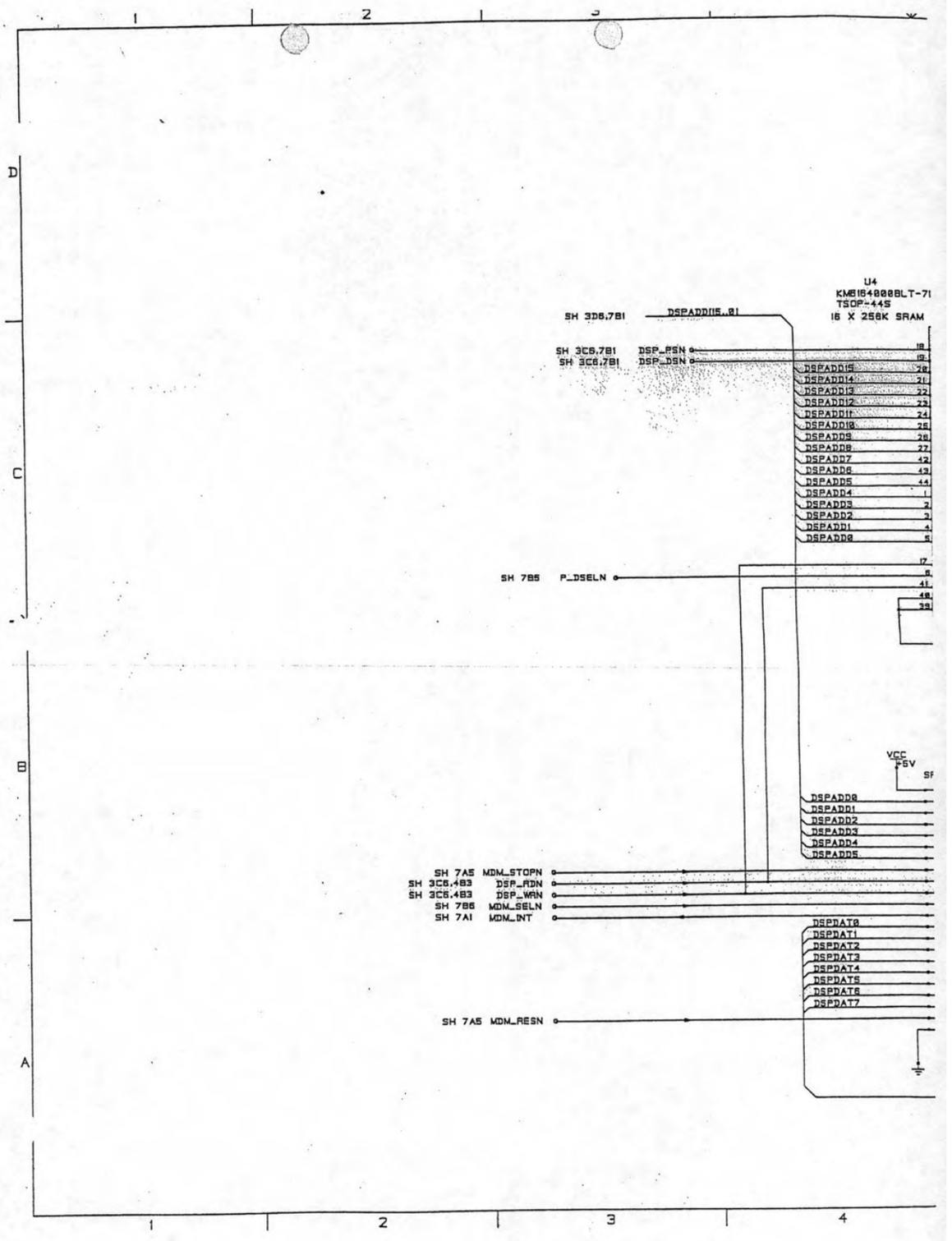

U18
NDC652P
128
U19
NDC652P
C14
100UF
16V
10%
C47
0.1UF
50V
20%
R18
1.8K
0.05W
5%
ITH
VIN
P-DRIVE
BPDRIVE
C1
U21
LTC1147CS8
SENSE+
BSENSE+
SHTDWN
SENSE-
GND
TRACES FROM DRAIN OF PFET TO 33UH INDUCTOR SHOULD BE AS WIDE AND SHORT AS POSSIBLE.
L1
33UH
D1
MBRS340
C17
100PF
50V
5%
C15
10PF
50V
5%
C45
1000PF
50V
10%
R50
0.05
1W
1%
Vdif ACROSS SENSE RESISTOR IS 0.15Vdc.
VCC
+5V
C13
220U
16V
10%
NOTE: MINIMIZE TRACE LENGTH BETWEEN SENSE LINES AND SENSE RESISTORS
129

Fig. 5
Part E


130
L3
.15DC.500MA
L2
.15DC.500MA
5VAA SH 6D6
5VDD SH 6B4
C27
2.2UF
16V
10%
C29
2.2UF
16V
10%
DCDR_ONN SH 6B2
PHOTOTELESIS™ PROPRIETARY
(SEE SHEET 1)
Raytheon
Raytheon TI Systems
SCH DIA..
PROCESSOR BOARD
POWER DISTRIBUTION
D
SCH-9207-001
REV
PC
SCALE
FILE NAME
LAST EDIT
27OCT97
SHEET NO.
2 OF 9


DSPDAT[15..0]
SH 4C8,5D2,7C8
U11
TMS320C203
100PIN PQFP
READY
SH 7B5
DSP_RSN
SH 7B5
SH 7C4 HOLDN
SH 7A5 MDM_INTN
AY_BY
RS-232 INPUTS
SH 8D7 DSP_CTS
SH 8D7 DSP_DSR
SH 8D7 TCLK
SH 8D7 RCLK
SH 7D4 SYNC_RX
SH 7D4 ASYNC_RX
R36
100K
0.06W
5%
R59
1.0K,0.06W,5%
VCC
+5V
PLL5V
GND
U26


VCC +5V
C23 0.1UF 50V 20%
C3 0.1UF 50V 20%
C9 0.1UF 50V 20%
C22 0.1UF 50V 20%
C40 0.1UF 50V 20%
131
DSPADD15..01 SH 4C3,7B1
DSPADD0
DSPADD1
DSPADD2
DSPADD3
DSPADD4
DSPADD5
DSPADD6
DSPADD7
DSPADD8
DSPADD9
DSPADD10
DSPADD11
DSPADD12
DSPADD13
DSPADD14
DSPADD15
DSP_PSN SH 4C3,7B1
DSP_DSN SH 4C3,7B1
DSP_ISN SH 7B1
DSP_RDN SH 4B3,7B1
DSP_WRN SH 4B3,7B1
DSP_BOOTN SH 7D1
HOLD_ACKN SH 7D1
JUMPER "TDI", "TMS", & "TCLK" TO +5VDC AND JUMPER "TRST" TO GND FOR AUTONOMOUS OPERATION
PADS ARE PROVIDED FOR EMULATOR CONNECTION.
DSP_CLK1 SH 7B1
U8 20.8MHZ EC25
C24 0.1UF 50V 20%
132
FIG. 5 Part F
RS-232 FLOW CONTROL
PHOTOTELESIS™ PROPRIETARY
(SEE SHEET 11)
Raytheon
Raytheon TI Systems
SCH DIA.. PROCESSOR BOARD DIGITAL SIGNAL PROCESSOR
SCH-9207-001
LAST EDIT 27OCT97
SHEET NO. 3 OF 9


U4
KM6164008BLT-7L
TSOP-44S
16 X 256K SRAM
SH 3D6,7B1
DSPADD[15..0]
SH 3C6,7B1 DSP_PSN
SH 3C6,7B1 DSP_DSN
DSPADD15
DSPADD14
DSPADD13
DSPADD12
DSPADD11
DSPADD10
DSPADD9
DSPADD8
DSPADD7
DSPADD6
DSPADD5
DSPADD4
DSPADD3
DSPADD2
DSPADD1
DSPADD0
SH 7B5 P_DSELN
VCC
+5V
DSPADD0
DSPADD1
DSPADD2
DSPADD3
DSPADD4
DSPADD5
SH 7A5 MDM_STOPN
SH 3C6,4B3 DSP_RDN
SH 3C6,4B3 DSP_WRN
SH 7B6 MDM_SELN
SH 7A1 MDM_INT
DSPDAT0
DSPDAT1
DSPDAT2
DSPDAT3
DSPDAT4
DSPDAT5
DSPDAT6
DSPDAT7
SH 7A5 MDM_RESN
1
2
3
4
A
B
C
D

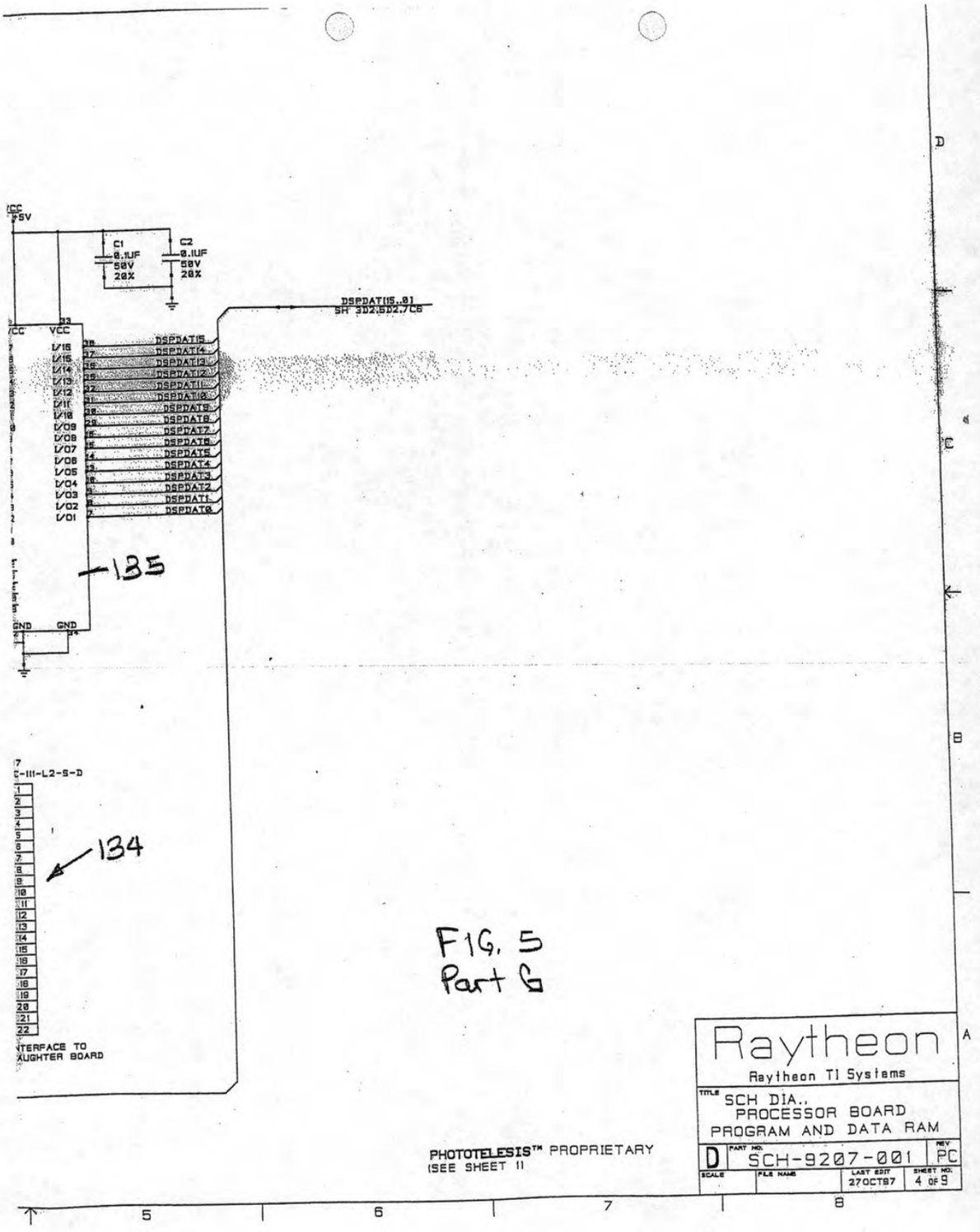
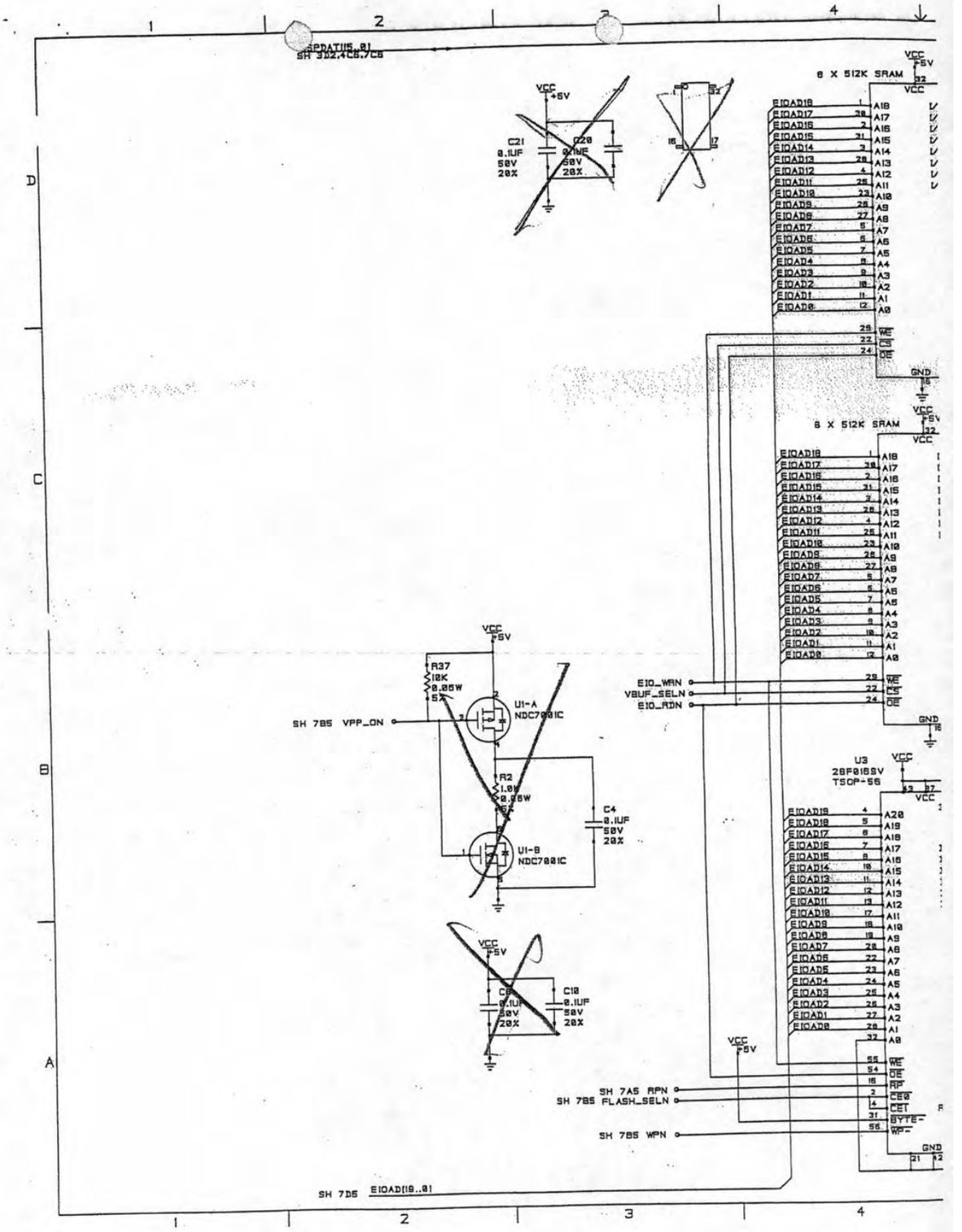

C1
0.1UF
50V
20%
C2
0.1UF
50V
20%
DSPDAT[15..0]
SH 3D2,5D2,7C6
DSPDAT15
DSPDAT14
DSPDAT13
DSPDAT12
DSPDAT11
DSPDAT10
DSPDAT9
DSPDAT8
DSPDAT7
DSPDAT6
DSPDAT5
DSPDAT4
DSPDAT3
DSPDAT2
DSPDAT1
DSPDAT0
135
134
TERFACE TO
AUGHTER BOARD
PHOTOTELESIS™ PROPRIETARY
(SEE SHEET 11
Raytheon
Raytheon TI Systems
SCH DIA..
PROCESSOR BOARD
PROGRAM AND DATA RAM
SCH-9207-001
27OCT97
4 OF 9

FIG. 5
Part 6


SPDAT[15..0]
SH 302,4C6,7C6
8 X 512K SRAM
VCC
+5V
GND
EIOAD[19..0]
EIO_WRN
VBUF_SELN
EIO_RDN
SH 785 VPP_ON
R37
18K
0.05W
5%
R2
1.8K
0.05W
5%
U1-A
NDC7001C
U1-B
NDC7001C
C4
0.1UF
50V
20%
C21
0.1UF
50V
20%
C28
0.1UF
50V
20%
C8
0.1UF
50V
20%
C18
0.1UF
50V
20%
U3
28F016SV
TSOP-56
SH 7A5 RPN
SH 785 FLASH_SELN
SH 785 WPN
SH 7D5 EIOAD[19..0]

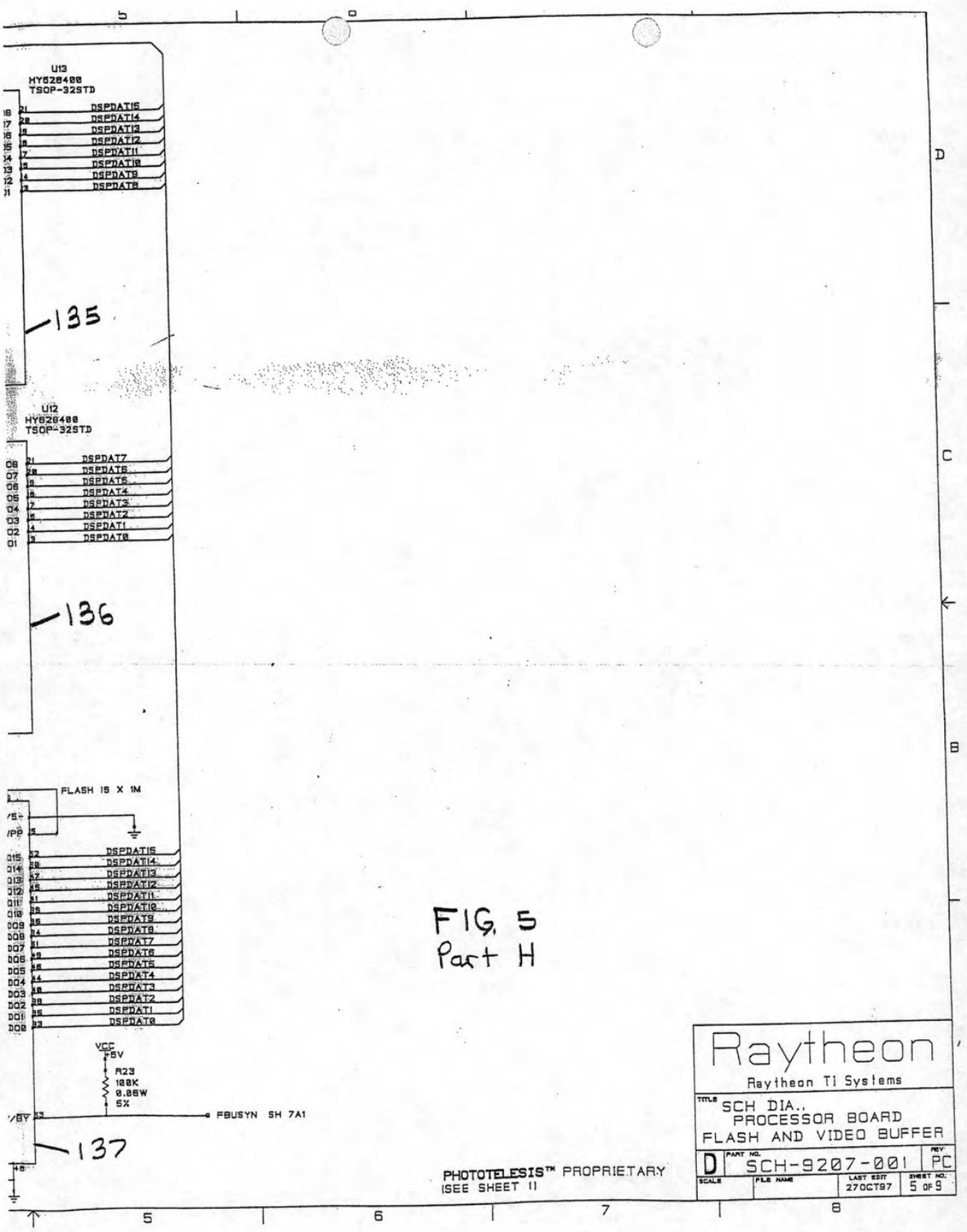
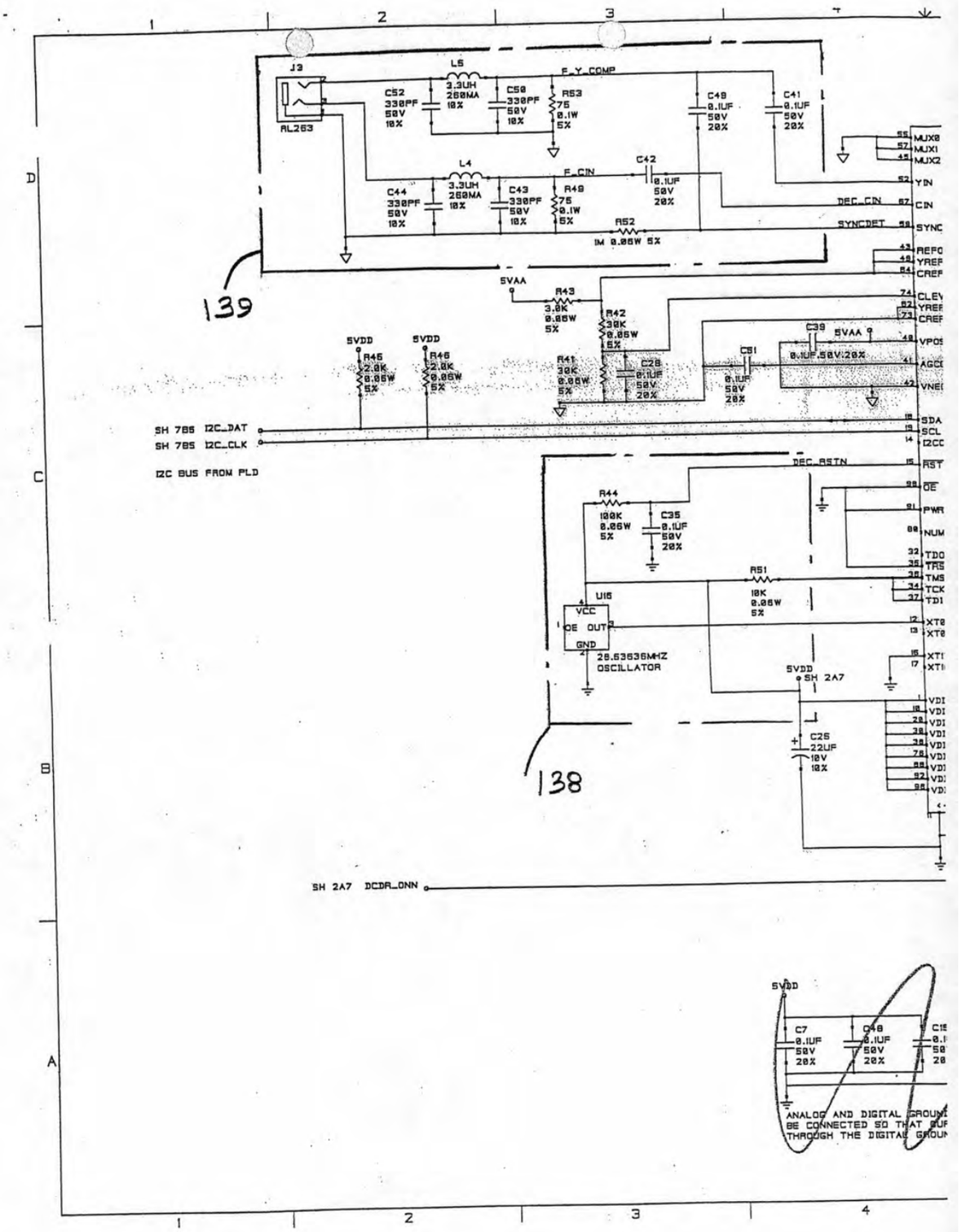

U13
HY628400
TSOP-32STD
DSPDAT15
DSPDAT14
DSPDAT13
DSPDAT12
DSPDAT11
DSPDAT10
DSPDAT9
DSPDAT8
135
U12
HY628400
TSOP-32STD
DSPDAT7
DSPDAT6
DSPDAT5
DSPDAT4
DSPDAT3
DSPDAT2
DSPDAT1
DSPDAT0
136
FLASH 15 X 1M
DSPDAT15
DSPDAT14
DSPDAT13
DSPDAT12
DSPDAT11
DSPDAT10
DSPDAT9
DSPDAT8
DSPDAT7
DSPDAT6
DSPDAT5
DSPDAT4
DSPDAT3
DSPDAT2
DSPDAT1
DSPDAT0
VCC
+5V
R23
100K
0.06W
5%
FBUSYN SH 7A1
137
PHOTOTELESIS™ PROPRIETARY
(SEE SHEET 11
Raytheon
Raytheon TI Systems
TITLE
SCH DIA.,
PROCESSOR BOARD
FLASH AND VIDEO BUFFER
D
PART NO.
SCH-9207-001
REV
PC
SCALE
FILE NAME
LAST EDIT
27OCT97
SHEET NO.
5 OF 9

FIG. 5
Part H


J3
AL263
L6
3.3UH 260MA 10%
C52 330PF 50V 10%
C50 330PF 50V 10%
R53 75 0.1W 5%
F_Y_COMP
C49 0.1UF 50V 20%
C41 0.1UF 50V 20%
L4
3.3UH 260MA 10%
C44 330PF 50V 10%
C43 330PF 50V 10%
R49 75 0.1W 5%
F_CIN
C42 0.1UF 50V 20%
R52 1M 0.06W 5%
DEC_CIN
SYNCDET
MUX0
MUX1
MUX2
YIN
CIN
SYNC
139
5VAA
R43 3.6K 0.06W 5%
R42 30K 0.06W 5%
R41 30K 0.06W 5%
C28 0.1UF 50V 20%
C81 0.1UF 50V 20%
C39 0.1UF 50V 20%
5VDD
R45 2.0K 0.06W 5%
R46 2.0K 0.06W 5%
SH 7B5 I2C_DAT
SH 7B5 I2C_CLK
I2C BUS FROM PLD
SDA
SCL
DEC_RSTN
RST
OE
PWR
R44 100K 0.06W 5%
C35 0.1UF 50V 20%
R51 18K 0.06W 5%
U16
VCC
OE
OUT
GND
28.63636MHZ OSCILLATOR
5VDD
SH 2A7
C26 22UF 10V 10%
138
SH 2A7 DCDR_DNN
C7 0.1UF 50V 20%
C48 0.1UF 50V 20%
ANALOG AND DIGITAL GROUN
BE CONNECTED SO THAT
THROUGH THE DIGITAL

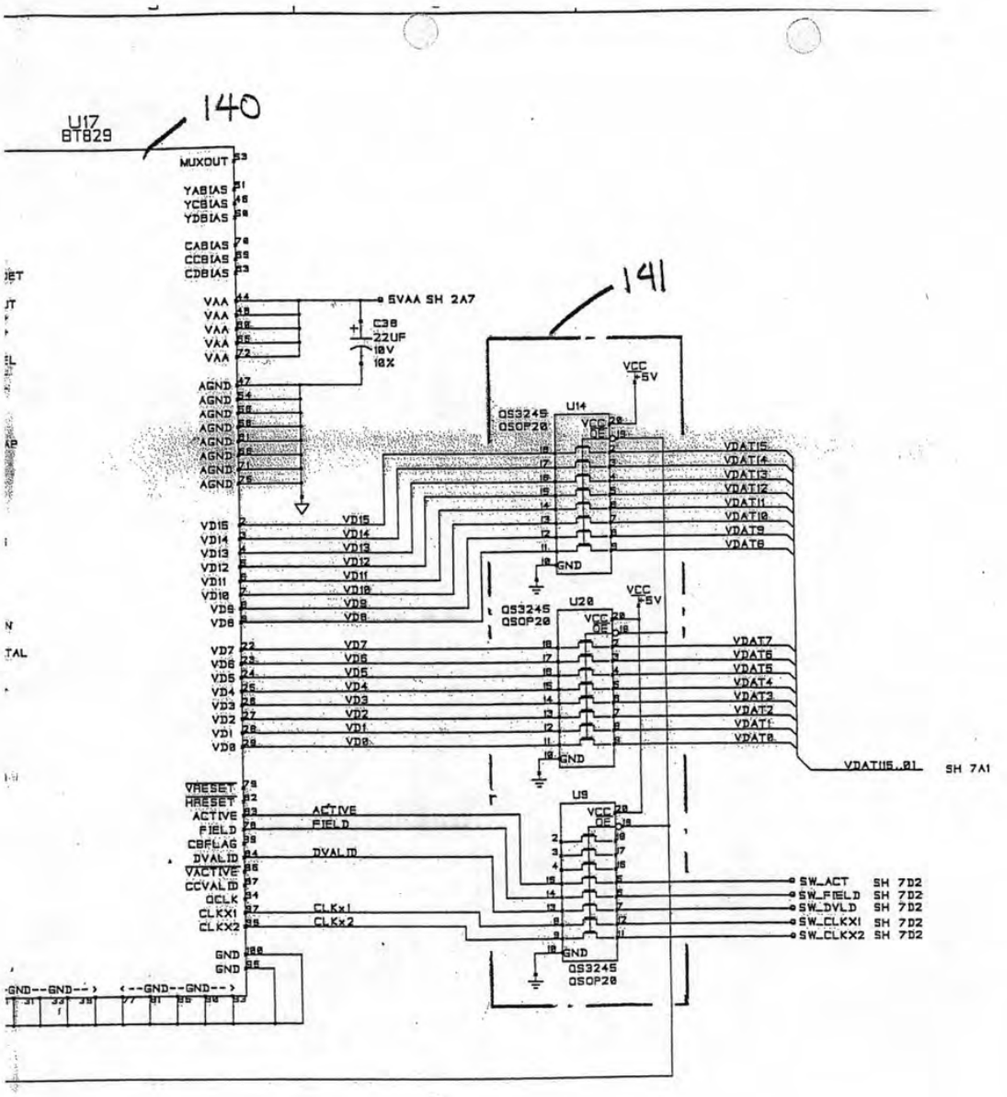
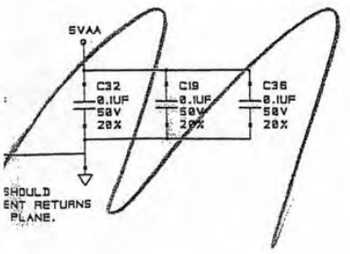


FIG. 5
Part I



PHOTOTELESIS™ PROPRIETARY
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Raytheon
Raytheon TI Systems

TITLE: SCH DIA.,
PROCESSOR BOARD
VIDEO DECODER

D | PART NO. SCH-9207-001 | REV PC

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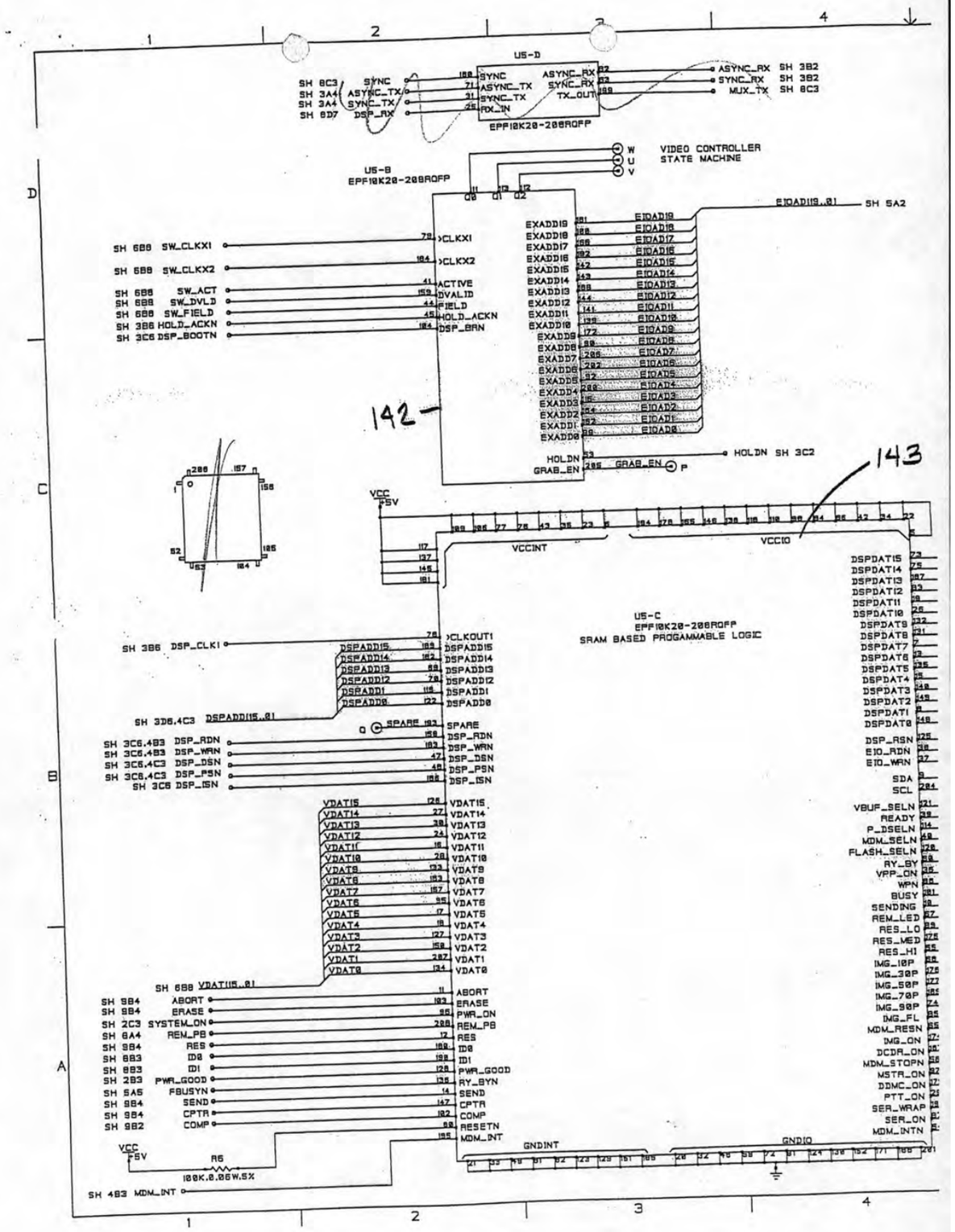
5 6 7 8


U5-D
EPF10K20-208RQFP
SYNC
ASYNC_TX
SYNC_TX
DSP_RX
ASYNC_RX
SYNC_RX
TX_OUT
RX_IN
ASYNC_RX SH 3B2
SYNC_RX SH 3B2
MUX_TX SH 8C3
VIDEO CONTROLLER STATE MACHINE
U5-B
EPF10K20-208RQFP
SW_CLKX1
SW_CLKX2
SW_ACT
SW_DVLD
SW_FIELD
HOLD_ACKN
DSP_BOOTN
DSP_BRN
EXADD19
EXADD18
EXADD17
EXADD16
EXADD15
EXADD14
EXADD13
EXADD12
EXADD11
EXADD10
EXADD9
EXADD8
EXADD7
EXADD6
EXADD5
EXADD4
EXADD3
EXADD2
EXADD1
EXADD0
E10AD19
E10AD18
E10AD17
E10AD16
E10AD15
E10AD14
E10AD13
E10AD12
E10AD11
E10AD10
E10AD9
E10AD8
E10AD7
E10AD6
E10AD5
E10AD4
E10AD3
E10AD2
E10AD1
E10AD0
E10AD[19..0]
SH 5A2
HOLDN
GRAB_EN
HOLDN SH 3C2
142
143
VCC
5V
VCCINT
VCCIO
U5-C
EPF10K20-208RQFP
SRAM BASED PROGAMMABLE LOGIC
DSP_CLK1
DSPADD[15..0]
SPARE
DSP_RDN
DSP_WRN
DSP_DSN
DSP_PSN
DSP_ISN
VDAT[15..0]
ABORT
ERASE
PWR_ON
REM_PB
RES
ID0
ID1
PWR_GOOD
RY_BYN
SEND
CPTR
COMP
RESETN
MDM_INT
GNDINT
GNDIO
R6
100K,0.06W,5%
DSPDAT[15..0]
E10_RDN
E10_WRN
SDA
SCL
VBUF_SELN
READY
P_DSELN
MDM_SELN
FLASH_SELN
RY_BY
VPP_ON
WPN
BUSY
SENDING
REM_LED
RES_LO
RES_MED
RES_HI
IMG_10P
IMG_30P
IMG_50P
IMG_70P
IMG_90P
IMG_FL
MDM_RESN
IMG_ON
DCDR_ON
MDM_STOPN
MSTR_ON
DDMC_ON
PTT_ON
SER_WRAP
SER_ON
MDM_INTN

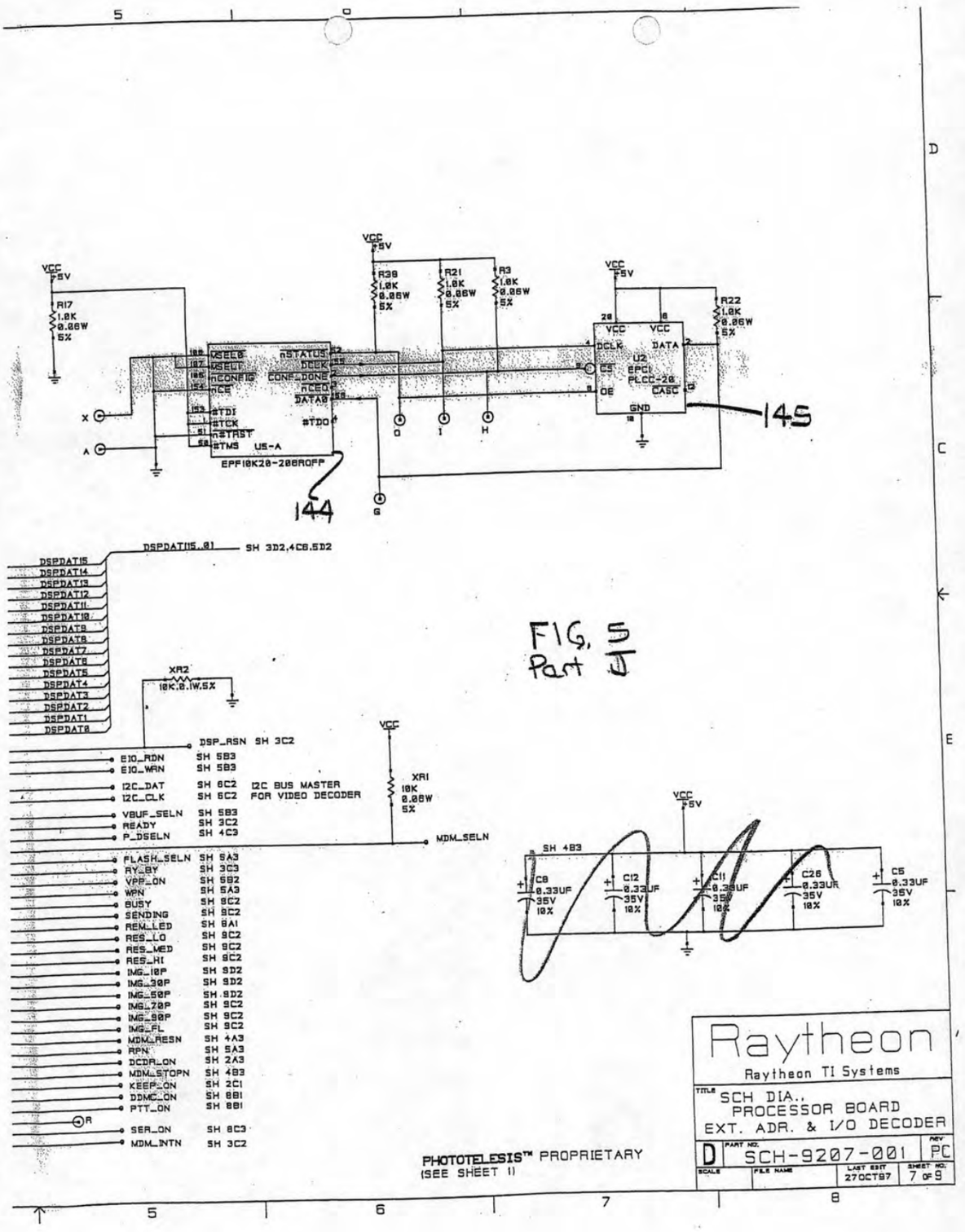

VCC
+5V
R17
1.0K
0.06W
5%
R39
R21
R3
U2
EPC1
PLCC-20
CASC
GND
DCLK
DATA
nCS
OE
EPF10K20-208RQFP
#TDI
#TCK
#TRST
#TMS
#TDO
nSTATUS
CONF_DONE
nCEO
DATA0
nCONFIG
nCE
nSEED
nSELF
145
144
DSPDAT[15..0]
SH 3D2,4C8,5D2
DSPDAT15
DSPDAT14
DSPDAT13
DSPDAT12
DSPDAT11
DSPDAT10
DSPDAT9
DSPDAT8
DSPDAT7
DSPDAT6
DSPDAT5
DSPDAT4
DSPDAT3
DSPDAT2
DSPDAT1
DSPDAT0
XR2
10K,8,1W,5%
DSP_RSN SH 3C2
E10_RDN SH 5B3
E10_WRN SH 5B3
I2C_DAT SH 6C2
I2C_CLK SH 6C2
I2C BUS MASTER
FOR VIDEO DECODER
VBUF_SELN SH 5B3
READY SH 3C2
P_DSELN SH 4C3
XR1
10K
0.06W
5%
MDM_SELN
FLASH_SELN SH 5A3
RY_BY SH 3C3
VPP_ON SH 5B2
WPN SH 5A3
BUSY SH 6C2
SENDING SH 8C2
REM_LED SH 8A1
RES_LO SH 9C2
RES_MED SH 9C2
RES_HI SH 9C2
IMG_10P SH 9D2
IMG_30P SH 9D2
IMG_50P SH 9D2
IMG_70P SH 9C2
IMG_90P SH 9C2
IMG_FL SH 9C2
MDM_RESN SH 4A3
RPN SH 5A3
DCDR_ON SH 2A3
MDM_STOPN SH 4B3
KEEP_ON SH 2C1
DDMC_ON SH 8B1
PTT_ON SH 8B1
SER_ON SH 8C3
MDM_INTN SH 3C2
SH 4B3
C8
C12
C11
C26
C5
0.33UF
35V
10%
PHOTOTELESIS™ PROPRIETARY
(SEE SHEET 1)
Raytheon
Raytheon TI Systems
SCH DIA.,
PROCESSOR BOARD
EXT. ADR. & I/O DECODER
PART NO.
SCH-9207-001
REV
PC
SCALE
FILE NAME
LAST EDIT
27OCT97
SHEET NO.
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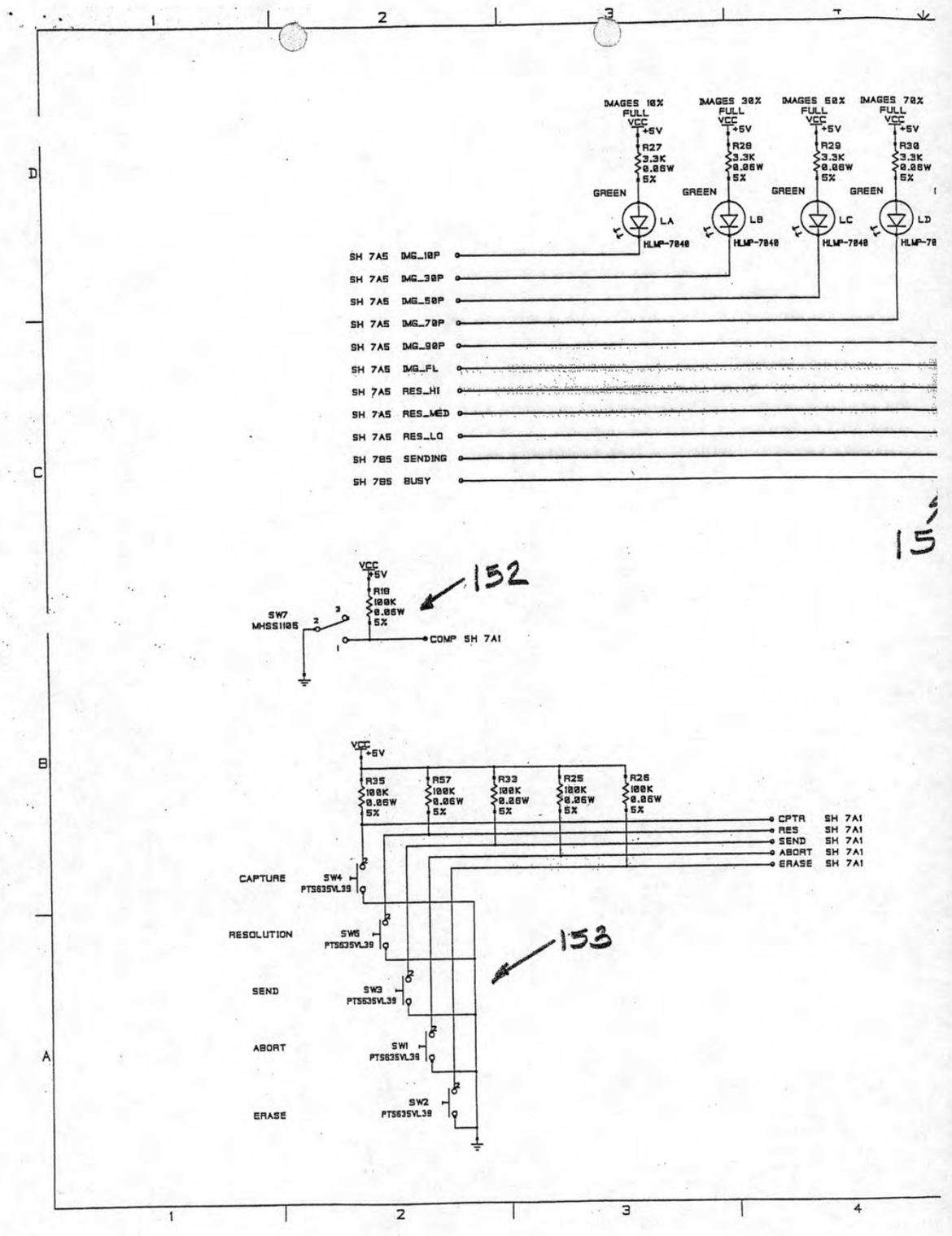
FIG. 5
Part 5


IMAGES 10% FULL
IMAGES 30% FULL
IMAGES 50% FULL
IMAGES 70% FULL
VCC
+5V
R27
R28
R29
R30
3.3K
0.06W
5%
GREEN
LA
LB
LC
LD
HLMP-7840
SH 7A5 IMG_10P
SH 7A5 IMG_30P
SH 7A5 IMG_50P
SH 7A5 IMG_70P
SH 7A5 IMG_90P
SH 7A5 IMG_FL
SH 7A5 RES_HI
SH 7A5 RES_MED
SH 7A5 RES_LO
SH 7B5 SENDING
SH 7B5 BUSY
152
R19
100K
0.06W
SW7
MHSS1105
COMP SH 7A1
R35
R57
R33
R25
R26
CPTR SH 7A1
RES SH 7A1
SEND SH 7A1
ABORT SH 7A1
ERASE SH 7A1
CAPTURE
SW4
PTS635VL39
RESOLUTION
SW5
153
SEND
SW3
ABORT
SW1
ERASE
SW2

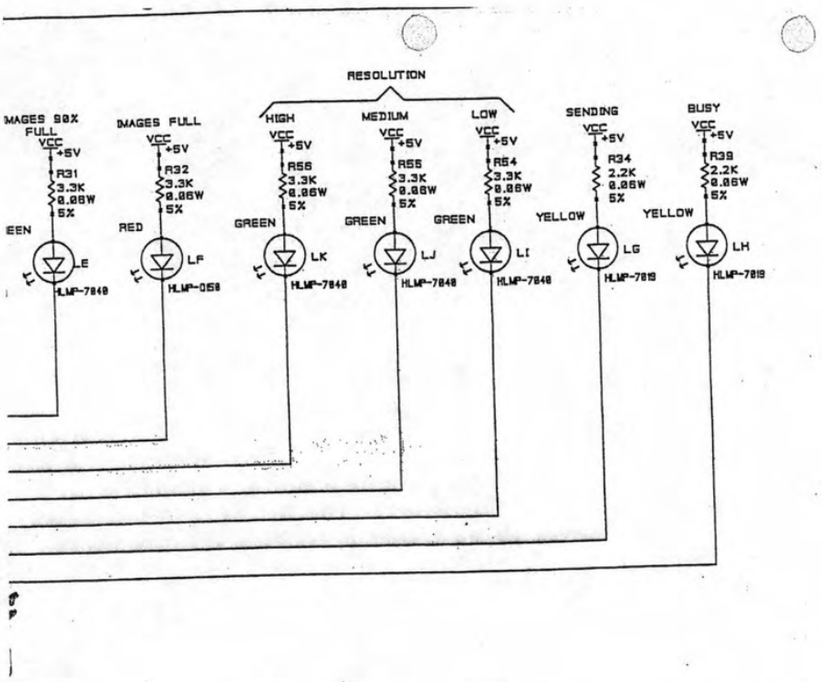


FIG. 5
Part L

PHOTOTELESIS™ PROPRIETARY
(SEE SHEET 11

Raytheon
Raytheon TI Systems

TITLE: SCH DIA..
PROCESSOR BOARD
PUSH BUTTONS & LEDS

D | PART NO. SCH-9207-001 | REV PC

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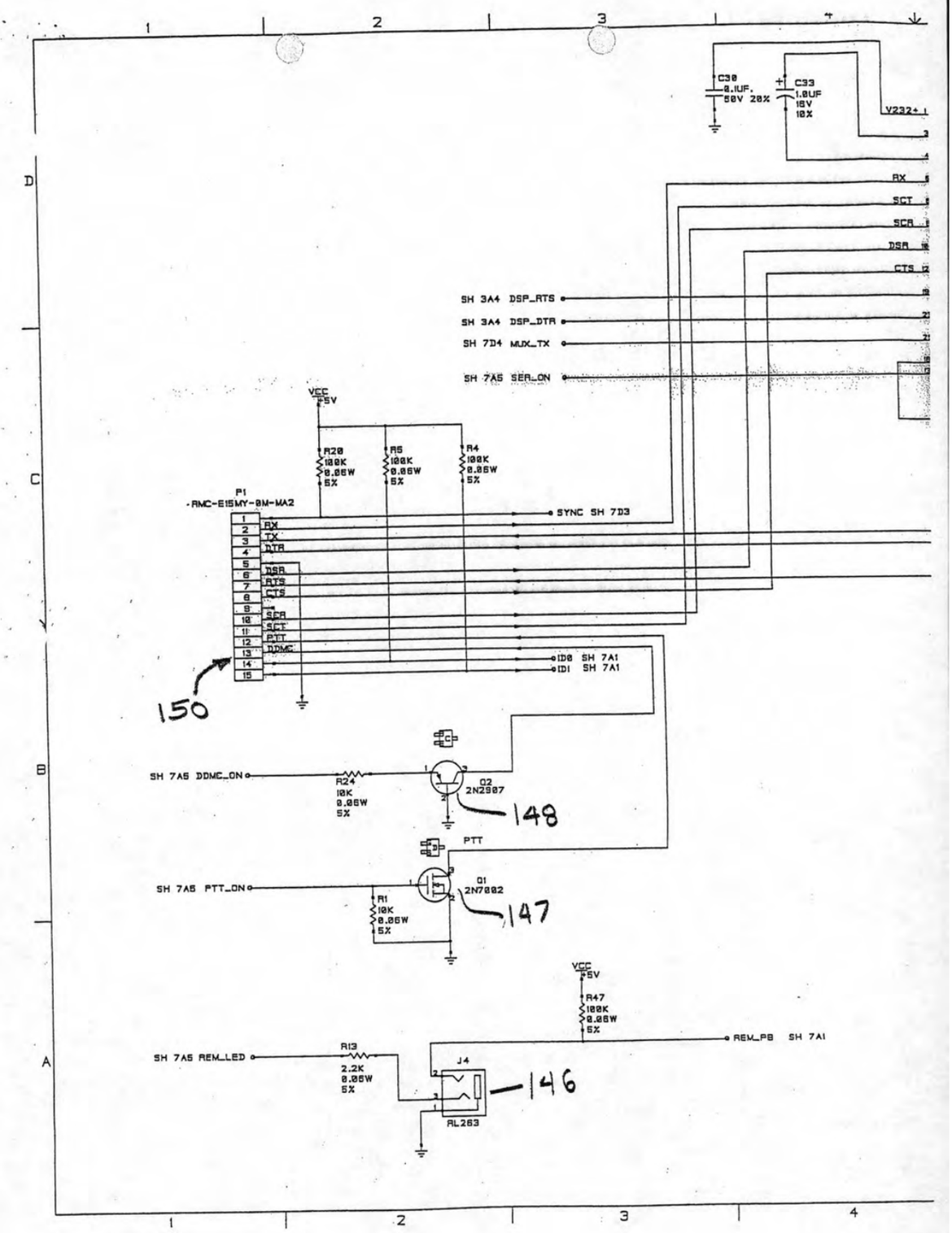

C30
0.1UF,
50V 20%
C33
1.0UF
16V
10%
V232+
RX
SCT
SCR
DSR
CTS
SH 3A4 DSP_RTS
SH 3A4 DSP_DTR
SH 7D4 MUX_TX
SH 7A5 SER_ON
VCC
5V
R20
100K
0.06W
5%
R5
100K
0.06W
5%
R4
100K
0.06W
5%
P1
-RMC-E15MY-0M-MA2
SYNC SH 7D3
RX
TX
DTR
DSR
RTS
CTS
SCR
SCT
PTT
DDMC
ID0 SH 7A1
ID1 SH 7A1
150
SH 7A5 DDMC_ON
R24
10K
0.06W
5%
Q2
2N2907
148
PTT
SH 7A5 PTT_ON
R1
10K
0.06W
5%
Q1
2N7002
147
VCC
5V
R47
100K
0.06W
5%
REM_PB SH 7A1
SH 7A5 REM_LED
R13
2.2K
0.06W
5%
J4
146
RL263

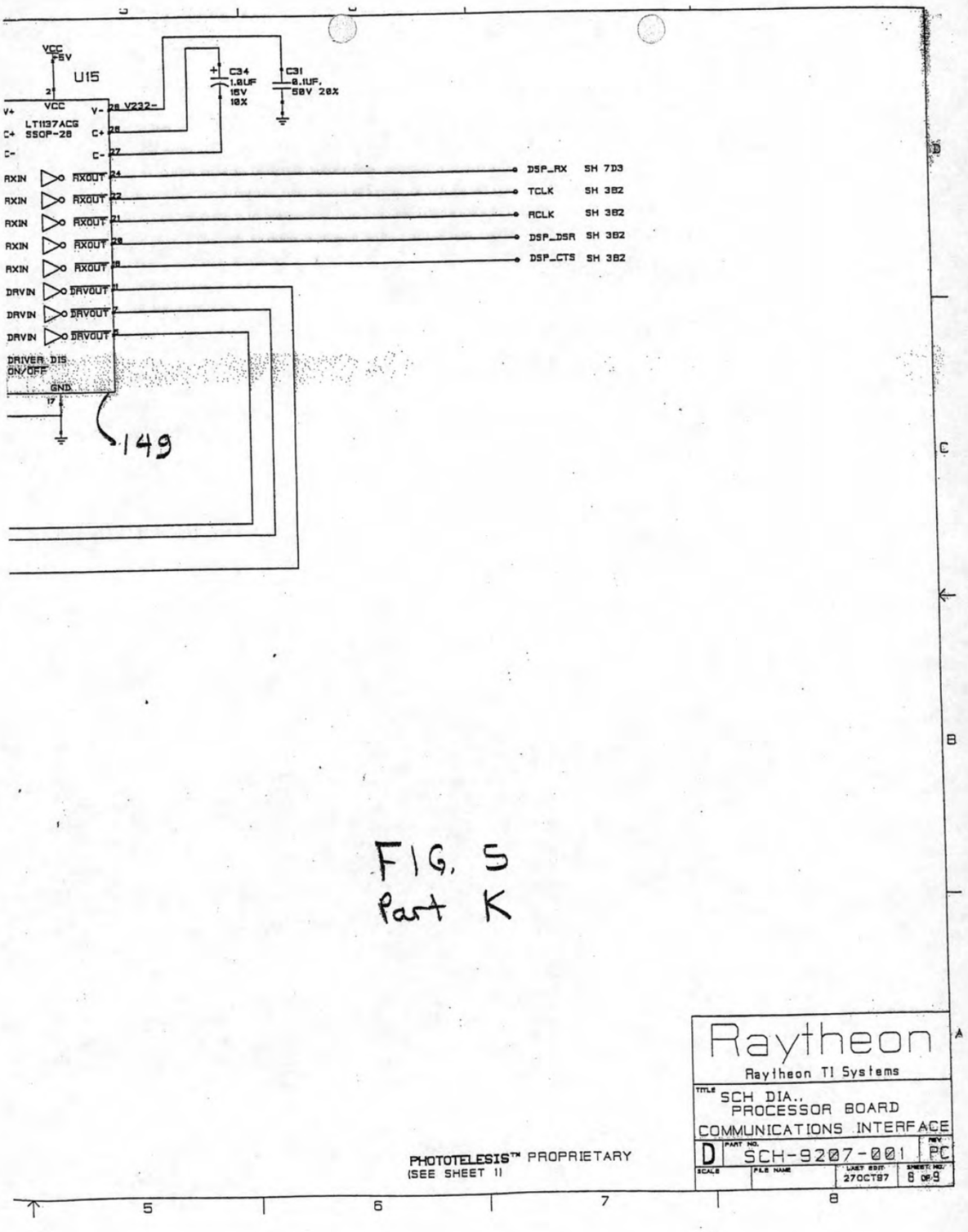


FIG. 5
Part K

Raytheon
Raytheon TI Systems

TITLE
SCH DIA.,
PROCESSOR BOARD
COMMUNICATIONS INTERFACE

D | PART NO. SCH-9207-001 | REV PC
SCALE | FILE NAME | LAST REV. 27OCT87 | SHEET NO. 8 OF 9

PHOTOTELESIS™ PROPRIETARY
(SEE SHEET 1)


PHOTOTELESIS
MicroRIT
Phototelesis
Image Transmission
Patent Pending
7800 IH-10 West, Suite 700
San Antonio, Tx 78230-4753
Tel 210 349 2020
Fax 210 341 1020
MicroRIT
Prototype #1


PHOTOTELESIS
MicroRIT™
PhotoTelesis
Image Transmission™
Patent Pending
7800 IH-10 West, Suite 700
San Antonio Tx 78230-4753
Tel:210 349 2020
Fax 210 341 1020
MicroRIT
Prototype #1

Table of Contents

SECTION 1

EXECUTIVE SUMMARY

MicroRIT™ Proposal

2 November 1995

EXECUTIVE SUMMARY

This unsolicited proposal describes a state-of-the-art image transmitter that is specifically designed for field agent applications with handheld and vehicle mounted digital/secure radios. The MicroRIT image transmitter will capture and transmit high quality monochrome or color images over typical radio circuits, such as the Government Saber Secure Radio on the B-Radio net or commercial cellular phone circuits. The MicroRIT is unique because it can transmit a high quality image in ten to twenty seconds from a unit that is small, low power, and *low cost*. This unique capability is currently unavailable and is crucial for field law enforcement applications.

This MicroRIT miniaturized image transmitter proposal is submitted by PhotoTelesis, a Business of Texas Instruments Incorporated. The PhotoTelesis group is a world leader in Tactical Image Transmission technology, and Texas Instruments (TI) is a world leader in Digital Signal Processing technology and Micro Electronics technology. The proven track records and technology bases of the PhotoTelesis/TI combined team places this technically challenging program well within reach.

1.0 The PhotoTelesis Organization Background:

PhotoTelesis has a 10 year history of specialization in Government tactical image transmission. PhotoTelesis is the leader in tactical transmission of monochrome or color imagery, captured from either television or digital cameras over Government secure radios, Government satellite circuits, and commercial cellular and satellite radios.

The company has installed more than 1000 systems within the Army, Navy, Air Force, Special Operations, Federal Law Enforcement, and Intelligence groups. These systems have been used in classified and unclassified operations. The PhotoTelesis name has become well known as the leader in the tactical image transmission field.

The PhotoTelesis comprehensive product line provides users with a full complement of hardware and software, to support operation from various platforms, including:

- ⇒ Man Portable Applications
- ⇒ Covert Operations
- ⇒ Aircraft Platforms
- ⇒ Ground Vehicle Platforms
- ⇒ Portable Base Stations
- ⇒ Fixed Base Stations

The tactical communications functions of the PhotoTelesis products include:

- ⇒ Distribution of images, text and data over all government secure voice bandwidth circuits.
- ⇒ Database Archiving of stored images and text data.
- ⇒ Traditional Data Processing activities in MS-DOS and Windows
- ⇒ Interoperability with Government NITFS 2.0 "National Imagery Transmission Systems"

Distinctive Competence

A unique blend of Independent Research and Development, combined with commercial off-the-shelf technology, has allowed PhotoTelesis to offer products with innovative designs and superior performance at competitive prices. The modular construction of products allows easy technology insertion of hardware and software enhancements lowering life cycle costs.

The success of PhotoTelesis can be attributed to a commitment to service and providing solutions to our customer problems. Our reputation has been earned by focusing our expertise in the following key areas:

• **Reliable/Dependable Transmission of Data.** Imagery and Data can be sent from a harsh tactical environment where air time for transmissions is limited. Users depend upon their equipment to transmit images and data reliably over wideband SATCOM or narrowband communication channels. To compensate for natural and man-made noise, PhotoTelesis' proprietary protocols incorporate error correction techniques and compression algorithms that provide both efficient and reliable transmissions. These message and image transmission protocols are specifically designed for noisy narrow-band radio communications, and are currently heavily used in operations involving Command, Control, Communications, and Intelligence (C4I) applications.

• **Ease of Operation for the User.** The operational simplicity and versatility of both hardware and software design allow non-technical user compatibility with a wide range of cryptologic devices, secure telephones, and radios. The systems are designed to be automatically configured by cable connections reducing hardware damage by operator error. The equipment is built with user friendly interfaces (GUI) or a menu driven screen.

• **Products for Various Platforms.** The company has focused on customer requirements to develop, with IR&D funds, products used on various platforms, i.e., vehicle, aircraft, and man-portable units. This has resulted in building a repertoire of off-the-shelf products for Aircraft, Special Operations, and Law Enforcement.

• **Rapid Product Development.** PhotoTelesis has reduced the time and cost of product development, from product definition through design, development, and pilot production. This is accomplished by significant technology re-use, in conjunction with strong specialized skill sets of the engineering team. The majority of the PhotoTelesis products have been sold as Non-

Developed-Items on Indefinite Delivery Order or Fixed Priced Contracts, thus reducing customer financial and technical risks.

1.1 Texas Instruments (TI) Incorporated Background:

Texas Instruments has diverse capability in micro-electronics, Government, commercial, and consumer products. TI is a high technology company with sales or manufacturing operations in more than 30 countries; a major supplier of integrated high performance EO based fire control systems, high performance processors, thermal sensors, missile systems, and radar components to the U.S. Department of Defense (DoD). The MicroRIT program will utilize several key TI capabilities:

TI is a world leader in Digital Signal Processing (DSP) technology. The DSP is key to the MicroRIT's small size, low power, and low cost. Commercial technology and the capability for high volume production also provide opportunity for significant unit cost reductions, allowing for *extensive* deployment of the technology at a *very affordable* cost.

1.2 The Combined PhotoTelesis/Texas Instruments Team:

On August 18, 1995, PhotoTelesis Corporation was acquired by Texas Instruments Incorporated. PhotoTelesis' expertise with tactical image transmission combined with the financial strength of Texas Instruments offer our customers innovative and cost effective tactical imaging product solutions.

PhotoTelesis and Texas Instruments have a two year continuing history of cooperation and teaming on other Government imagery programs, including the US Army Hunter Sensor Suite program and the Lightweight Video Reconnaissance System (LVRS) program.

PhotoTelesis/Texas Instruments is excited about the opportunity to provide new state-of-the-art capability through more closely integrated efforts on the part of all team members.

1.3 The Program Background:

Tactical Imagery has proven to be the most efficient and quickest means to distribute critical information to the decision maker. Imagery in the field can provide agents with near-real time secure surveillance that improves their situational awareness, suspect identification capability, and thus, reduces allocation of limited personnel resources. Unfortunately, both military and commercial products used for transmission of Tactical Imagery are currently unsuitable for law enforcement because the military products are too large and too expensive, and the commercial products are too large and are not capable of operation over Government tactical radio circuits.

Current generation Remote Image Transceivers (RIT's) manufactured by PhotoTelesis are in operation over the Motorola digital radio systems owned by the Government for the purpose of transmitting secure (encrypted) imagery from mobile platforms to fixed sites.

Still Imagery is being transmitted using the SABER II, with the Secure INDICTOR option, at 12Kbps. A primary requirement of maintaining minimum data transmission times and a quick restoration of the radio-to-voice communications have been met in product demonstrations of this capability. At a recent test, using the PhotoTelesis man-pack TAC-RIT, monochrome images at a resolution 592 by 440, 8-bit pixels were transmitted in 8 seconds using Wavelet compression, and 21 seconds using industry standard JPEG compression.

This proposal describes an engineering program that miniaturizes the PhotoTelesis current capability into a very small, covert, low power Remote Image Transmitter (MicroRIT) *specifically* designed for agent use. The primary goals for field agent use are:

- ⇒ Very Small Size (Cellular phone size)
- ⇒ Low Power (2-4 watts)
- ⇒ Simple User Interface
- ⇒ Fast Transmission Time
- ⇒ Monochrome or Color Use

SECTION 2

TECHNICAL APPROACH

TECHNICAL APPROACH

Until the advent of small, low power digital signal processor (DSP) semiconductors, the MicroRIT was unfeasible. Now, however, such DSP's allow the design of very small, but highly sophisticated data acquisition and processing devices. In fact, the DSP component is the heart of the MicroRIT, controlling all aspects of its operation from video acquisition, to image compression, to tactical communications protocol, to user interface.

A digital signal processor, or DSP, is a special type of microprocessor that has been highly optimized for numerical computations (namely digital signal processing) which involve long sequences of multiplication and addition operations. Digital filters, spectrum analyzers, and data compression algorithms fall squarely in this category. While the DSP is not often used as a generalized host processor (such as an 80486, Pentium, or 68000), it can certainly be used as a host CPU. Because of the particular hardware optimizations that were implemented for digital signal processing, a DSP tends to have smaller address spaces (under 1 megabyte) and less support for string-oriented operations (for handling character strings). However, several DSP variants can quite easily be used as an embedded controller and signal processor - obviating the need for two separate processors. This often simplifies the hardware design and interprocessor communications mechanisms.

The MicroRIT was conceptualized specifically with a DSP as the system controller in mind to reduce the size and power requirements of the unit. In addition, to controlling the overall system function, the DSP is responsible for controlling the digitization of video, the compression of this captured video, and the communications protocol and link-layer interface. These functions would occur serially. That is, it would not be possible to be capturing video while sending a compressed image at the same time. This one-at-a-time restriction is due to two problems. The first is the limited amount of multi-tasking support in the DSP architecture. Few DSP operating systems are available that support preemptive multi-tasking. The second is the limited address space of the DSP. Many DSP's have a fairly limited address space - often under 64K words! This will require that both the codespace and the dataspace be page-swapped. Page-swapping essentially means that only one software function can be active at a time - which implies the serial nature of the major functions.

2.0 Capturing Video

A conventional frame grabber contains a great deal of circuitry necessary for demodulating the video signal, identifying and triggering off the vertical sync signal, stripping the sync signals from the image data, digitizing the demodulated data, and storing it in a dual-ported RAM. This is required because the host processor has neither access to the raw video signal, nor the processing power to execute these functions in a real-time fashion. The DSP used in the MicroRIT approach, will however, be controlling the video digitization while itself does the vertical sync identification. External analog-to-digital converters (ADC) will still be used to digitize the video signal, rather than using any onboard ADC capabilities of the DSP chip, because most DSP ADC's are not fast enough to digitize at video rates (at least those DSP's that can meet our low-power requirements). Another subtle point about this approach is that video need only be digitized on user demand. This implies that the video ADC circuitry only has to be energized for 1-2 frame times to acquire the image. Video ADC's can consume several watts if left free running. The non-requirement for video output allows this digitization-on-demand

approach that should significantly help reduce size, weight, and heat dissipation, as well as extend battery life.

2.1 Video Demodulation

A color video signal, in particular a composite color video signal, carries the luminance and color (chrominance) information in different frequency bands. Usually, an analog filter is used to separate these signals into two analog channels that can then be digitized separately. In order to save power and space in the MicroRIT, we will perform this demodulation in software running on the DSP after a frame's worth of video data has been captured. Even an S-Video signal carries two color channels on the chrominance signal (which is physically separated from the luminance channel). The same type of *software* demodulation will be done on the S-Video chrominance channel for S-Video. The video demodulation is performed after a frame acquisition, not during. This is significant because it restricts the MicroRIT to performing system functions in a serial fashion. That is, one high level function after another is performed by the central processor (the DSP). There is no multitasking of system functionality in the MicroRIT. This is due in part to the lack of multitasking DSP operating systems as well as the somewhat limited addressing capability of today's DSP's (under 1 megabyte of codespace). Thus, after the user specifies that an image is to be acquired, the video digitization circuitry powers up, acquires a frame of video data, and passes control to the video demodulation software which then separates luminance from the color signal by a digital filter.

2.2 Image Compression

After the image has been digitized, separated, and demodulated by the system DSP, it will be compressed with either the JPEG or PhotoTelesis wavelet image compressor. This choice is user selectable (via the set of buttons and alphanumeric display). The wavelet compressor is well suited to the S-Video type of input since it was designed to work on L/Cr/Cb video data. Like all other PhotoTelesis implementations of the wavelet codec, the user will be able to select several choice of compression ratio and/or "quality". PhotoTelesis is constantly improving its image compression technology. These improvements affect compression/decompression time and image quality. They also affect compression features such as, quality specification (Q-Factor), multiresolution compression, and industry standardization. The contractor will strive to incorporate image compression improvements into the MicroRIT product, subject to the program schedule.

2.3 Image Storage

There will be enough battery-backed SRAM within the MicroRIT to hold 40 wavelet compressed color images. These can be held on-board until downloaded to a host computer via an RS-232 port. Originally, it was conceived to use a PCMCIA SRAM card for this image storage. However, the physical size of the mechanical PCMCIA slot and the extra interface circuitry was not justified. If the images are stored within the MicroRIT, the user will have to bring back something, be it the MicroRIT or a PCMCIA card, in order to offload the images to some sort of Base Station unit. Thus, the SRAM memory was chosen over PCMCIA.

2.4 Communications

The MicroRIT will be able to connect to all standard COMSEC equipment including STU-III's, SINCGAR's, SABER and RACAL (MHSR) radios, KY-57, KY-58, and Sunburst. The DSP processor will run the PTAC and PTAC-2 (required for file pull capability) protocols in order to

be backward compatible with existing PhotoTelesis equipment. The DSP will also directly control all COMSEC control lines (PTT, BDMC, etc.) as well. The DSP and some glue logic will essentially replace the original EIS card of the PhotoTelesis ACT product line.

Note that this version of the MicroRIT will not include the NITFS TACO-2 protocol. There is an assumption that the MicroRIT will be communicating with other PhotoTelesis equipment (i.e., Base Stations) which do have the TACO-2 capability.

Note that the automatic voice/data cutover modes for the KY-57 and KY-58 will not be implemented. Manual data switching will be used.

2.5 User Interface

The user will be able to interface to the MicroRIT two ways: 1) the set of onboard pushbuttons, 2) an RS-232 cable linking the MicroRIT to a host computer. There will be five (5) buttons on the MicroRIT to control normal operation of the system. There will also be an alphanumeric display for status and menu information. The functions on the MicroRIT will include power (on/off), capture, send, and menu. The menu will allow the specification of compression type, compression ratio, protocol, call sign information, send/hold modes, etc.

The RS-232 interface to the MicroRIT will be used for 3 functions: 1) Update system software (stored in FlashRAM on the MicroRIT), 2) download configuration information to the MicroRIT (call sign lists, compression defaults, etc.), and 3) download compressed/stored images from the MicroRIT to a workstation (such as an MIT-301). This will be a very simple RS-232 interface with a subminiature connector on the MicroRIT to the standard 9-pin COM connector on a PC.

2.6 Hardware

2.6.1 Packaging. The MicroRIT is designed to utilize standard snap on cellular telephone batteries. Several battery sizes and capacities are available from telephone retail outlets. The MicroRIT's overall size approximates that of a hand-held cellular flip-phone. High capacity battery life is estimated at 1 hour of full operation, with standby time approaching 30 hours.

The initial design and packaging will be implemented with an aluminum machined case. The finish will be black anodized for cosmetic finish. High volume applications could be done with a plastic injected molded case, but these costs are not included in the funding proposals submitted. A conceptual drawing is shown in Figure 1. The display and interface panel will allow system status and operational menus to be displayed to the operator. There is a recessed subminature-D connector on the bottom edge of the unit that provides all input/output connections. If this unit is used in embedded system applications, external power can also be provided through this same connector. The connector is recessed to prevent damage to the connector by accidental dropping or stricking other objects. The connector is installed on the bottom edge to provide best comfort to the operator when the cable is installed.

This MicroRIT package design will also include the ability to embed this device in higher capability equipment. Examples include radios, portable video equipment, or other equipment including cameras and radio transmission capabilities. This concept is similar to equipment with font cartridges, game cartridges, etc. The operator interface and display panel will not be included on these embedded applications. Power will be supplied through the external I/O connector.

2.6.2 Hardware Implementation. The MicroRIT architecture is based on the Texas Instruments TMS320 series of Digital Signal Processors. This DSP is the core of the design, with additional components providing the input/output interfaces to the operator, external power source, radios/Cryptos, and external computer links. There is one D-subminiature connector that provides these I/O functions. There are 5 control buttons, along with an alpha-numeric LED display for operator control and feedback status. The Overall block diagram is shown in Figure 2.

2.6.3 Memory. The memory implemented in the MicroRIT consists of low-power Static Rams (S-Rams). These memories are page partitioned to provide both program storage, raw video data workspace, as well as compressed video image storage. The design goal is to provide the capability to store a minimum of 40 images of 32K each in compressed image size. The architecture provides one memory page per image when storing compressed images.

2.6.4 I/O Ports. There are 2 input/output Serial ports incorporated into the design. One is designated for communication over radios, Crypto's, and STU type telephone devices. The other is intended for interfacing to other standard RS-232 computer devices such as Global Positioning Systems, some camera devices, and personal computer links for downloading image data or downloading operating program software. If the system needs to be reprogrammed for different mission requirements, the planned mechanism is to download from any serial computer device, the operating parameters and program software. If the user elects to save images, rather than send them immediately, these saved images could also be downloaded from the internal S-RAM memory via this serial port.

2.6.5 Power Sources. The MicroRIT is powered from either an attached cellular phone compatible battery, or via external power input through the I/O connector. For extended operating times, the external power mode is used. The input DC voltage range is 5.5-8.0 volt.

SECTION 3

COST

COST

The project represents a significant development effort with a medium level of risk. The contractor is keenly aware of the budget constraints and has taken steps to reduce the government's cost. The proposed cost has been reduced by the contractor's program investment of $576K and utilization of the contractor's Image Compression and Communication Software, which was previously developed with IR&D funds.

The development effort is allocated into hardware engineering and software engineering as follows:

Hardware	$661,093.80
Software	$984,492.21
Total Development Effort	$1,645,586.01
Less:Contractor's Investment	($645,586.01)
Cost to government	$1,000,000.00

Upon completion of the project the government will receive 2 prototypes. The production cost per unit is targeted to be $3,000.00-$4,000.00 in lot sizes of 100. Cost reductions are possible by tooling the cage for plastic injection molding based upon higher volumes.

3.0 Schedule

The contractor anticipates the project will require 12 months from inception to prototype delivery. After prototype delivery, unit production could begin immediately. Attached are program schedules for Hardware and Software.

3.1 GFE

The contractor will require two SABRE II radios for testing during the program.

3.2 Personnel

The contractor will assign two Engineering managers and one program manager to this project. Their resumes are attached:

SOFTWARE

Dr. Bruce Mather.....Manager of Software Engineering

ELECTRONICS HARDWARE

Roger Vest.....Manager of Hardware Engineering

PROGRAM MANAGEMENT

Bill Kidd.....Program Manager

3.3 Attachments:

1. Micro-RIT Technical Specifications
2. Block Diagram
3. Drawing
4. Program Schedule
5. Detail Costs

SECTION 4

PRODUCT SPECIFICATIONS

MicoRIT Functional & Physical Specifications

Video Input:	Color/Monochrome Composite/S-Video 640 x 480 x 16-bit color (8-bit grayscale) 768 x 512
Image Storage:	Onboard flash (or battery-backed SRAM) for 40 + compressed color images (@32K)
Video Output:	None
Audio:	Digitized voice annotation will be provided
Comms:	PTAC (KY-57, Sunburst/STU-III, Sincgars, Saber)
RS-232 Interface:	External GPS receiver, S/W update, offload images, system configuration (call sign download, etc.)
User Controls:	Five (5) buttons - (1) On/Off and (4) controls: On/Off switch, Call Sign Select, Grab Image, Send Image, Settings (scrolls menus)
Display:	5x7 dot alpha-numeric low power green LED's (like cellular phones) One (1) flashing "battery low" LED

* User Controls & Display are optional for embedded applications (i.e., RIT can be built without them)

Power:	2-4 watts @ full operation (idle mode when not doing imaging portion)
Battery:	Internal battery and/or external power 30 hours idle, 1 hour operational Disposables or Rechargeable (like cellular phone)
Weight:	1 pound (plastic) 1.5 pounds (metal)
Size:	1" x 4" x 3" (Hand-Held Cellular Size)
Temperature:	-20° to 50° C

System does only one function at a time:

Grab image	one frame at a time
Color demodulation	
Image Compression	< 5 seconds (to grab, demodulate, and compress)
Store image (40+)	< 1 second per image
Send Image	12Kbit line - 15 seconds goal for image xmit; up to 64Kbit comm link

Modem functions - built in FEC

Remote Control (configure) capability:

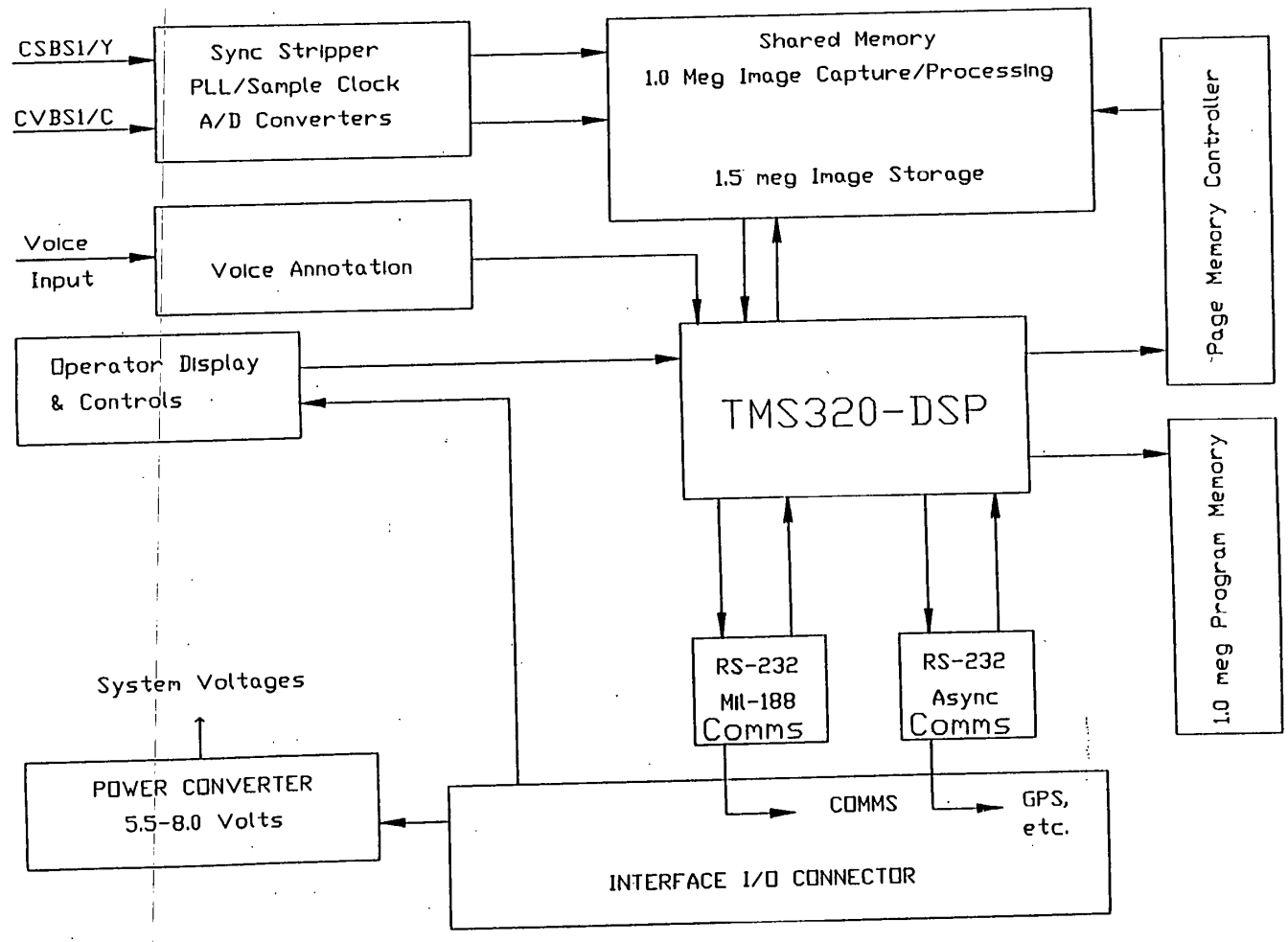
- New call signs
- Set compression ratio
- Snap picture
- Retrieve image

SECTION 5

DRAWING AND BLOCK DIAGRAM

Figure 1 - Micro ™ Drawing

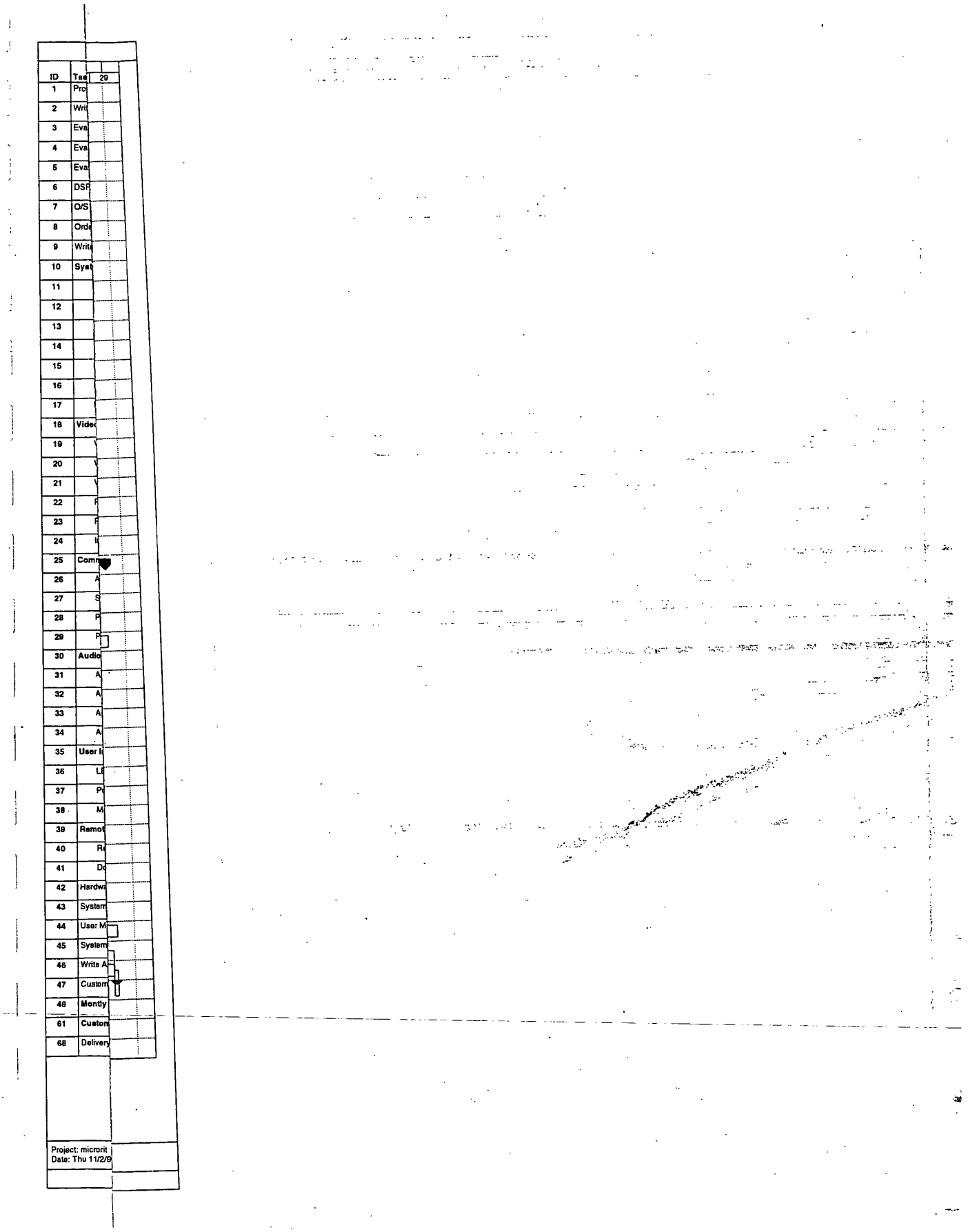
Figure 2 - MicroRIT™ Block Diagram



MICRO-RIT™ BLOCK DIAGRAM

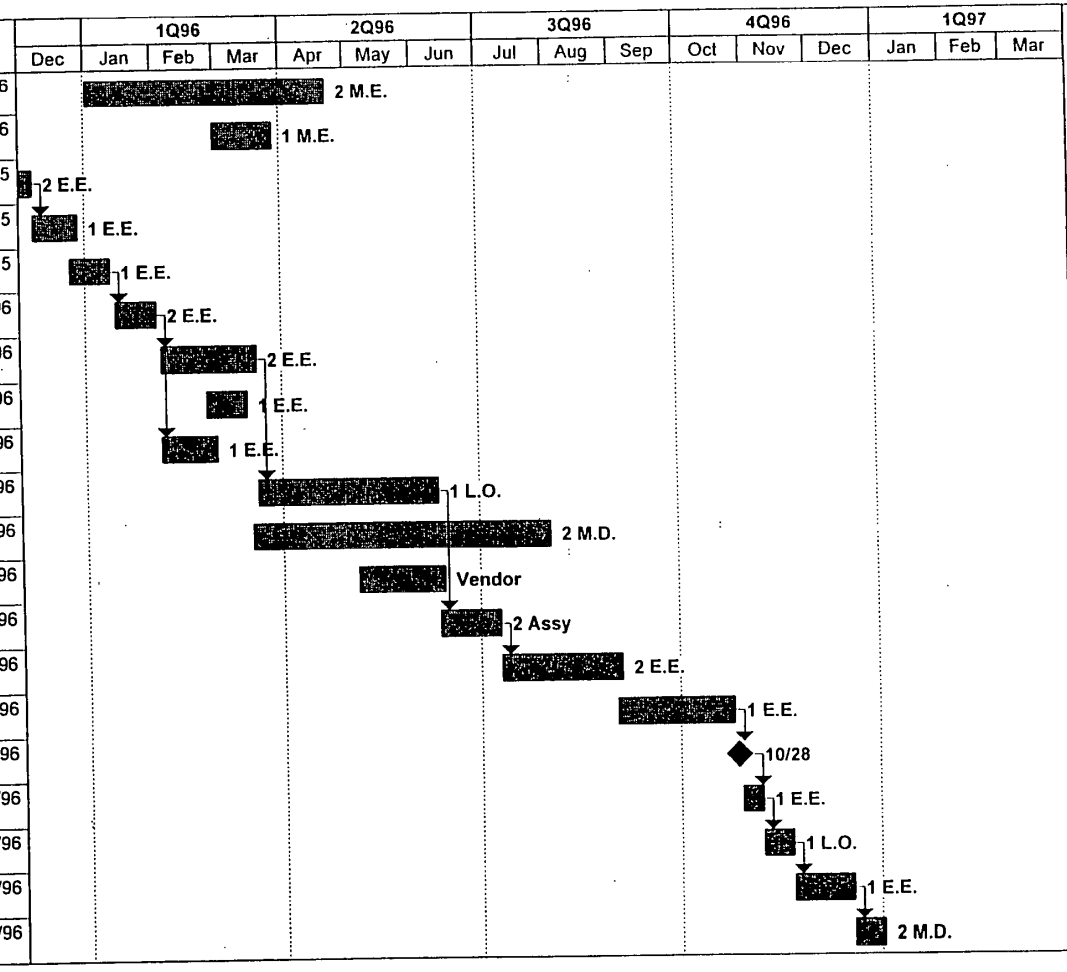
SECTION 6

SCHEDULE


ID
29
Project: microrit
Date: Thu 11/2/9

MicroRit Hardware Development

ID	Task Name	Duration	Start
1	Package Design	16w	Tue 1/2/96
2	Control Panel & I/O Interface	4w	Fri 3/1/96
3	DSP Evaluation/Selection	1w	Fri 12/1/95
4	Block Diagram	3w	Fri 12/8/95
5	Engineering Specs	3w	Mon 12/25/95
6	Component Selection	3w	Mon 1/15/96
7	Schematic Design/Capture	6.5w	Mon 2/5/96
8	Power Heat Analysis	3w	Mon 2/26/96
9	Interconnect & Cabling Design	4w	Mon 2/5/96
10	PWB Artwork Layouts (3 ea)	12w	Wed 3/20/96
11	Documentation	20w	Mon 3/18/96
12	Prototype Build (FAB)	6w	Mon 5/6/96
13	Prototype Build (Assy)	4w	Wed 6/12/96
14	Prototype Checkout	8w	Wed 7/10/96
15	System Integration H/W-S/W	8w	Mon 9/2/96
16	Prototype Delivery (2 ea)	1d	Mon 10/28/96
17	Schematic Updates (Pass 2)	1.5w	Tue 10/29/96
18	Artwork Updates (Pass 2)	2w	Thu 11/7/96
19	Assy/Checkout (Pass 2)	4w	Thu 11/21/96
20	Pass 2 Updates/Release	2w	Thu 12/19/96



SECTION 7

COST DETAIL

MICI . RIT
PHOTOTELESIS

Micro-Rit

Hardware

	Hours	Rates	Labor $	Materials	Overhead	Total Cost
Mechanical design						
Packaging	1040	$26.62	$27,684.80		$69,212.00	$96,896.80
Control Panel & I/O Interface	160	$27.47	$4,395.20		$10,988.00	$15,383.20
Electrical design						
DSP Evaluation /Selection	80	$30.52	$2,441.60		$6,104.00	$8,545.60
Block Diagram	120	$30.52	$3,662.40		$9,156.00	$12,818.40
Engineering Specifications/ Updates	240	$30.52	$7,324.80		$18,312.00	$25,636.80
Component Selection	180	$30.52	$5,493.60		$13,734.00	$19,227.60
Power/Heat Analysis	120	$42.19	$5,062.80		$12,657.00	$17,719.80
Interconnect/Cabling Design	160	$26.62	$4,259.20		$10,648.00	$14,907.20
Schematic Design/Capture	520	$30.56	$15,891.20		$39,728.00	$55,619.20
Schematic update Pass2 (3 each)	80	$30.56	$2,444.80		$6,112.00	$8,556.80
PWB artwork desgin/layout (3 each)	480	$22.92	$11,001.60		$27,504.00	$38,505.60
PWB layout Pass 2 (2 each)	120	$22.92	$2,750.40		$6,876.00	$9,626.40
Documentation	800	$19.53	$15,624.00		$39,060.00	$54,684.00
Prototype						
Assembly /Checkout labor	960	$21.93	$21,052.80		$52,632.00	$73,684.80
Materials & Fab				$30,000.00		$30,000.00
H/W Project Management	480	$42.19	$20,251.20		$50,628.00	$70,879.20
Project review	320	$42.19	$13,500.80		$33,752.00	$47,252.80
Development Equipment						
DSP Development station	320	$27.47	$8,790.40	$15,000.00	$21,976.00	$45,766.40
DSP Evaluation Kit	160	$27.47	$4,395.20		$10,988.00	$15,383.20
Total Hardware	6340		$176,026.80	$45,000.00	$440,067.00	$661,093.80

CONFIDENTIAL DATA

MICRO-RIT
PHOTOTELESIS

Software	Hours	Rates	Labor $	Materials	Overhead	Total Cost
Specification Document	80	$32.81	$2,624.80		$6,562.00	$9,186.80
Evaluate and select DSP	80	$32.81	$2,624.80		$6,562.00	$9,186.80
Evaluate and Select Operating system	170	$31.51	$5,356.70		$13,391.75	$18,748.45
Evaluate and Select Complier	170	$31.51	$5,356.70		$13,391.75	$18,748.45
Other Development O/S complier				$15,000.00	$0.00	$15,000.00
Software Specification	170	$32.81	$5,577.70		$13,944.25	$19,521.95
System Management Functions						
Memory Management Routines						
Code Space Manager	320	$30.21	$9,667.20		$24,168.00	$33,835.20
Data Space Manager	320	$32.81	$10,499.20		$26,248.00	$36,747.20
Reflash Interface	160	$25.00	$4,000.00		$10,000.00	$14,000.00
Interrupt Handling	160	$32.81	$5,249.60		$13,124.00	$18,373.60
Power Management	320	$25.00	$8,000.00		$20,000.00	$28,000.00
Video System						
Video Frame Grabber S/W	420	$28.91	$12,140.10		$30,350.25	$42,490.35
Video Demodulation S/W S-Video	160	$32.81	$5,249.60		$13,124.00	$18,373.60
Video Demodulation S/W Composite	160	$32.81	$5,249.60		$13,124.00	$18,373.60
Port Wavelet compressor	240	$32.81	$7,874.40		$19,686.00	$27,560.40
Port JPEG compressor	240	$25.00	$6,000.00		$15,000.00	$21,000.00
Image Storage Handler	80	$30.21	$2,416.80		$6,042.00	$8,458.80
Communications System						
Asynch Port Interface	60	$25.00	$1,500.00		$3,750.00	$5,250.00
Synch Port Interface	120	$25.00	$3,000.00		$7,500.00	$10,500.00
Port PTAC	1650	$28.91	$47,693.25		$119,233.13	$166,926.38
Port PTAC-2	240	$25.00	$6,000.00		$15,000.00	$21,000.00
Audio System	545	$32.64	$17,791.00		$44,477.50	$62,268.50
User Interface	160	$30.21	$4,833.60		$12,084.00	$16,917.60
LED Display Driver	60	$25.00	$1,500.00		$3,750.00	$5,250.00
Push Button Interface	60	$25.00	$1,500.00		$3,750.00	$5,250.00
Menuing Interface	120	$25.00	$3,000.00		$7,500.00	$10,500.00
Remote Control/Host Mode						
Remote Control Interface	480	$30.21	$14,500.80		$36,252.00	$50,752.80
Docking Station Interface	320	$30.21	$9,667.20		$24,168.00	$33,835.20

CONFIDENTIAL DATA

MICRO-RIT
PHOTOTELESIS

Software	Hours	Rates	Labor $	Materials	Overhead	Total Cost
System Integration	1200	$28.26	$33,906.00		$84,765.00	$118,671.00
User Manuals	280	$21.10	$5,906.60		$14,766.50	$20,673.10
System Checkout & rework	475	$25.72	$12,217.30		$30,543.24	$42,760.54
Write acceptance test plan	120	$38.91	$4,668.60		$11,671.50	$16,340.10
Customer Acceptance test Plan	14	$45.84	$641.76		$1,604.40	$2,246.16
Management	277.2	$38.91	$10,784.47		$26,961.17	$37,745.63
Total Software	9431.2		$276,997.77	$15,000.00	$692,494.43	$984,492.21
Combined	15771.2		$453,024.57	$60,000.00	$1,132,561.43	$1,645,586.01

CONFIDENTIAL DATA

SECTION 8

PERSONNEL RESUMES

BRUCE C. MATHER

Manager of Software Engineering
PhotoTelesis...a business of Texas Instruments Incorporated

Dr. Mather joined PhotoTelesis Corporation in December 1993, as Director of Software Engineering. Prior to joining PhotoTelesis, he was a Senior Research Engineer at Southwest Research Institute where he was employed for seven years. He also serves as an Adjunct Professor at St. Mary's University where he teaches a course in Digital Speech Processing.

Among Dr. Mather's technical areas of expertise are robotic systems, image processing, machine perception, neural networks, virtual reality, multimedia database systems and digital signal processing. He is a member of the Institute of Electrical and Electronic Engineers (IEEE), the Society of Manufacturing Engineers (SME), and the International Neural Network Society (INNS).

Dr. Mather attended the University of Illinois in Champaign, Urbana, where he earned his BSEE degree in 1980, his MSEE in 1983, and his PhD in Electrical Engineering in 1986. He graduated with highest honors and received the Eta Kappa Nu Senior Honor Award for academic excellence. His PhD dissertation involved advanced, multidimentional digital signal processing (DSP) of synthetic aperture radar (SAR) data.

At Southwest Research Institute, while working in their Advanced Robotics Department, he designed and developed interprocess and intercomputer communication and synchronization in the C programming language under the Unix operating system.

In 1991, Bruce joined the Advanced Training Concepts Section at SWRI and was instrumental in the development of the Visual Information System multimedia database product which runs under Windows 3.1. He also worked on an IR&D project involving a Virtual Environment system for multidimensional data visualization. His other areas of interest include speech recognition, position sensing, and holographic sound.

ROGER D. VEST

Manager of Hardware Engineering
PhotoTelesis...a business of Texas Instruments Incorporated

Mr. Vest joined PhotoTelesis Corporation in January of 1994 as Director of Hardware Engineering. Previously, he was Manager of Engineering for CompuAdd Express Corporation in Austin, Texas. In that position, he reported to the President and was responsible for all phases of product development and product sourcing. During his time there, three portable computer (notebook) products were introduced.

Prior to CompuAdd Express, Mr. Vest was employed by Texas Instruments, also in Austin, for over fifteen years. When he resigned to accept the CompuAdd Express position, he was a Senior Member of the Technical Staff. During his last year with TI, Mr. Vest managed a PWB design/layout center for their Custom Manufacturing Group. This effort included initial layout, prototype PWB fabrication, PWB assembly, and prototype checkout of customer products for several high volume computer suppliers. He has an extensive background in surface-mount technology, including footprint design, PWB layout guidelines and automatic test compatibility. He has published several articles on surface-mount technology design rules and footprint requirements.

Mr. Vest graduated from Texas Tech University in Lubbock, Texas, with a Bachelor of Science degree in Electrical Engineering. He was on the Dean's list at the time of his graduation.

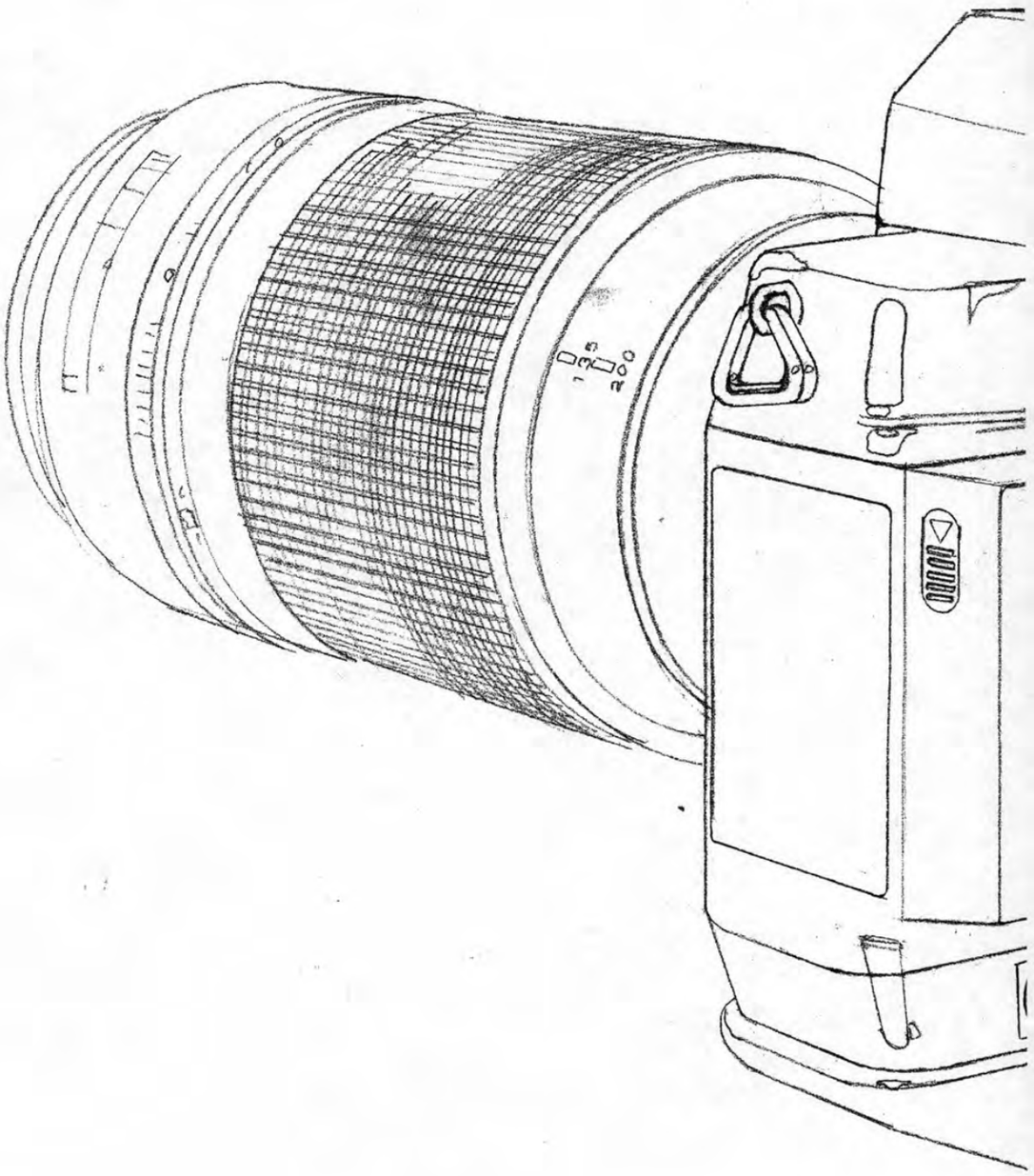
WILLIAM A. KIDD

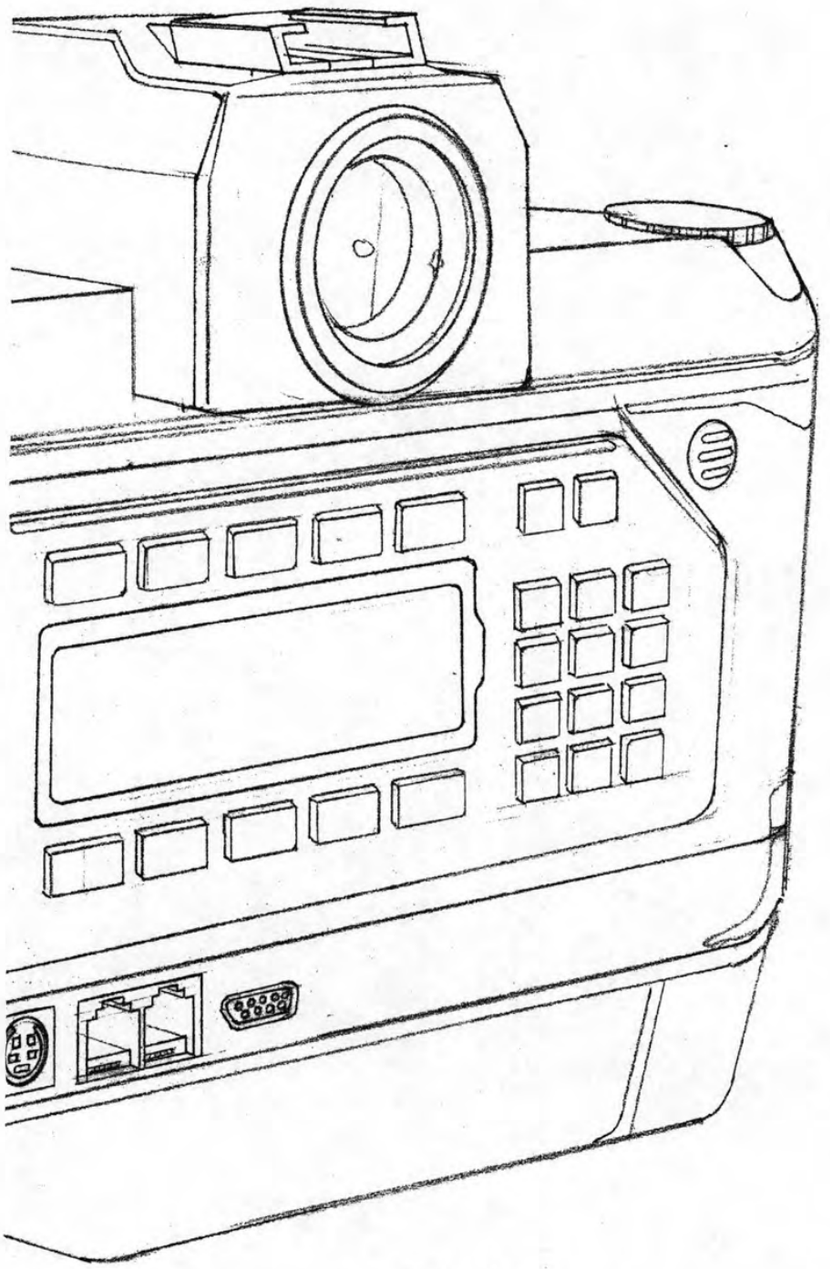
Program Manager
PhotoTelesis...a business of Texas Instruments Incorporated

Mr. Kidd joined Texas Instruments in June 1988. While assigned to the Airborne department of the Defense Systems and Electronics Group, Mr. Kidd was a member of the Light Helicopter program where he was the Program Control manager and cost account manager for several hundred data item submittals. Follow-on assignments included management support to numerous projects. Most recently Mr. Kidd was transferred to PhotoTelesis, a business of Texas Instruments, where he was assigned the program management responsibility for the U.S. Army's Light Weight Video Reconnaissance System (LVRS).

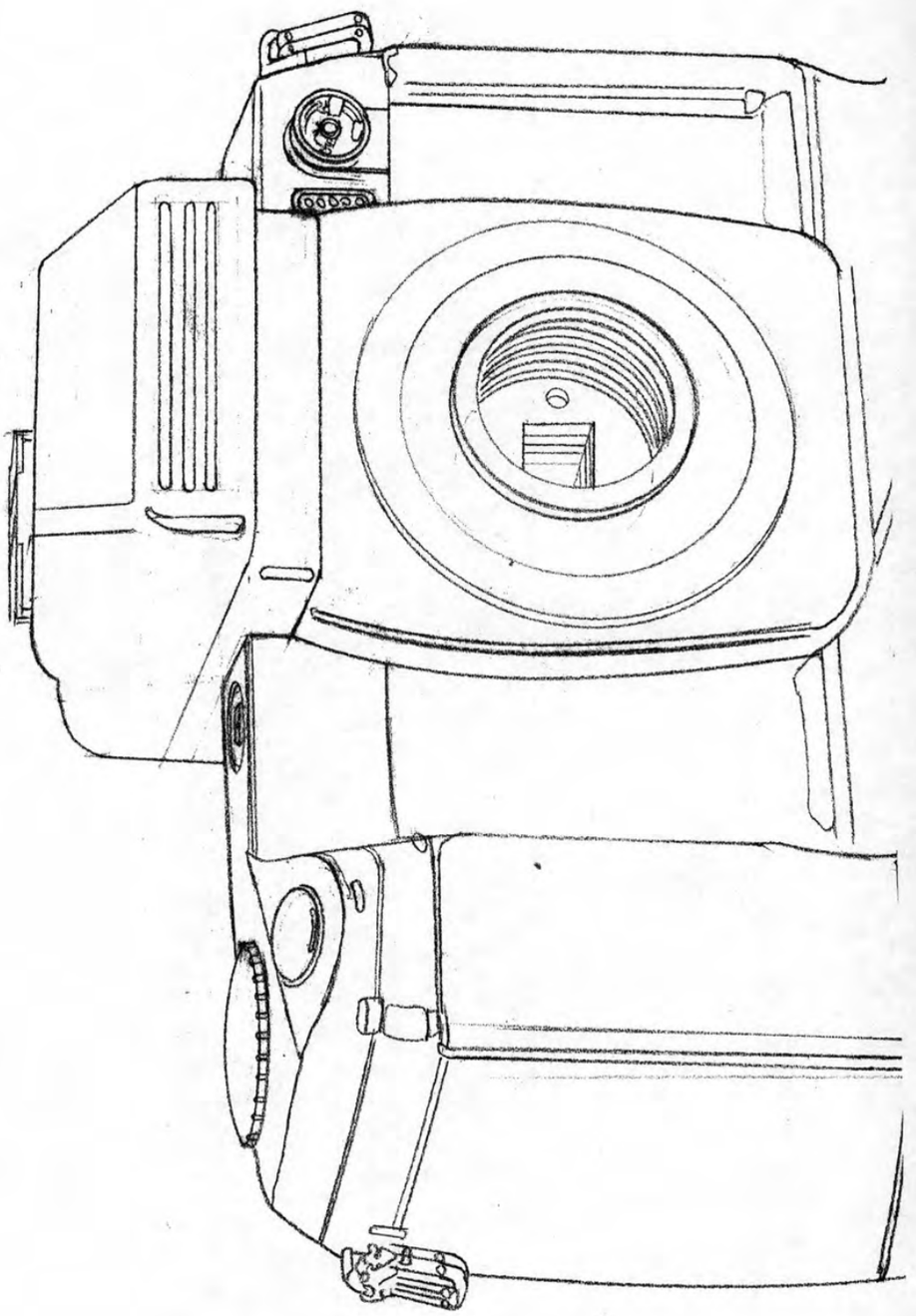
Mr. Kidd developed an excellent understanding of DoD acquisition while on active duty with the U.S. Air Force from 1967-1988. During his military career he gained more than 20 years direct experience in DoD Systems Acquisition Management. At the time of his retirement, Mr. Kidd was the Commander of Air Force Systems Command's, Systems Acquisition School. Previous Air Force program management assignments included the Pave Tack Pod program, the Pave Tack Forward Looking Infrared (FLIR) subsystem, and the Pave Tiger Mini-Drone program. Other relevant Air Force assignments include schedule planning and control for launch, on-orbit support, and recovery of satellite payloads, and Air Force Plant Representative Officer at a defense contractor's facility, responsible for on-site engineering management of DEM/VAL and production programs.

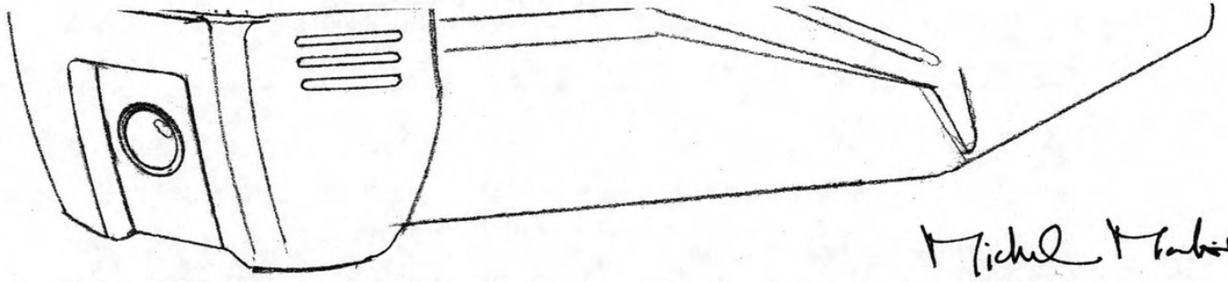
Mr. Kidd has an MS degree in Engineering Management from Arizona State University, Tempe, AZ. His undergraduate BS degree in Mechanical Engineering, was received from Grove City College, Grove City, PA.

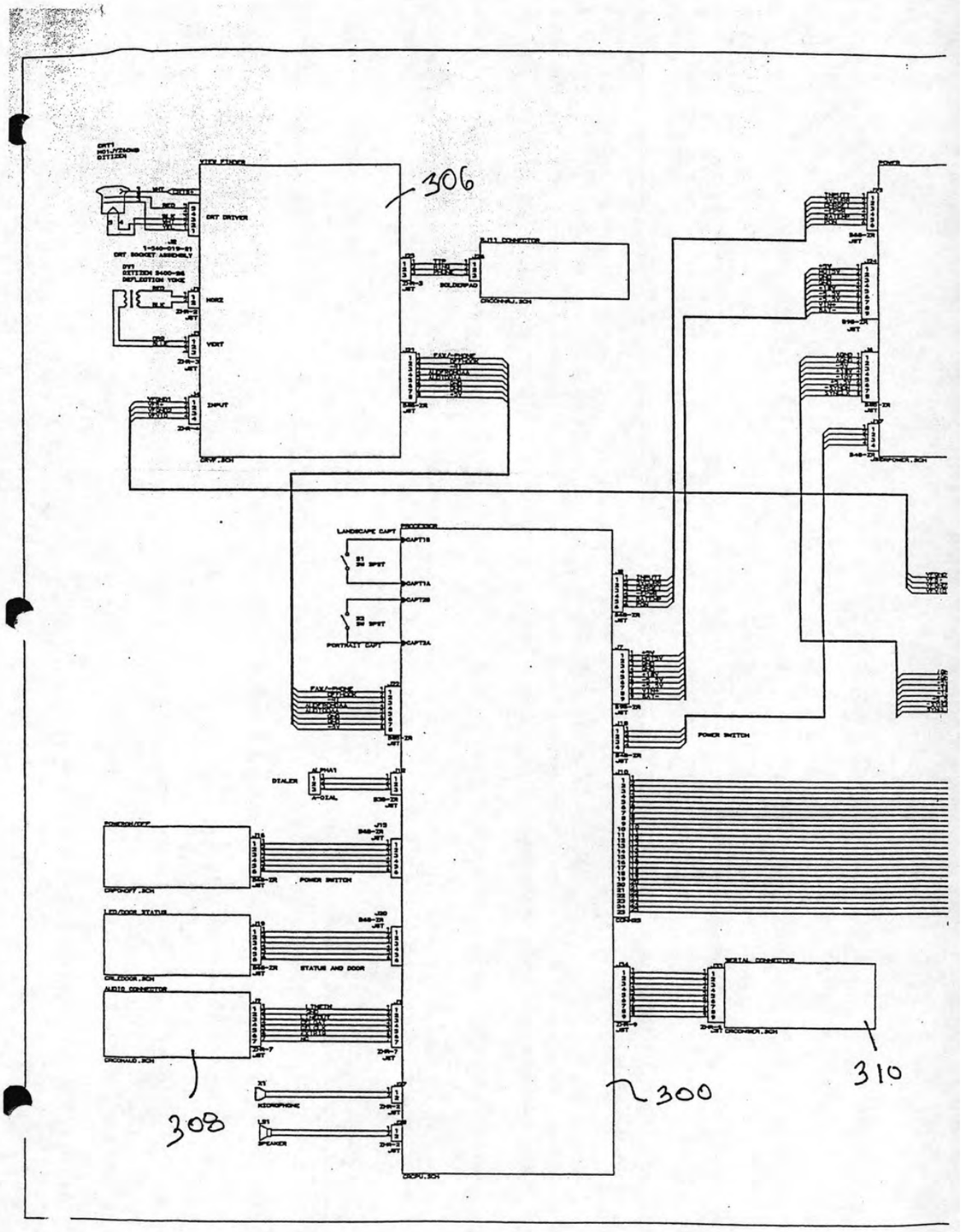




Michel Mahon 4.92



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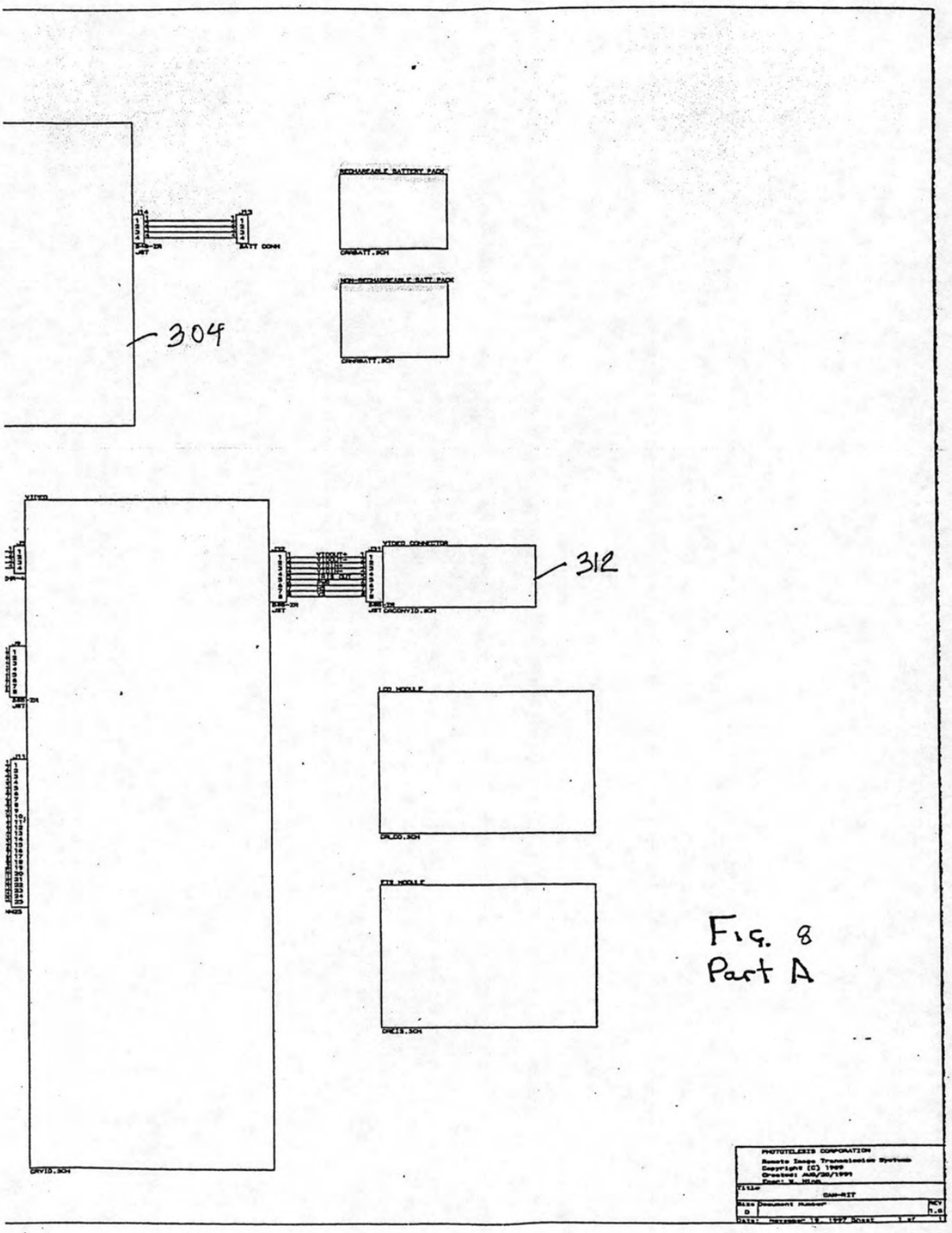
308
300
310
CRT DRIVER
KEYPAD
POWER SWITCH
STATUS AND DOOR
SERIAL CONNECTOR
MICROPHONE
SPEAKER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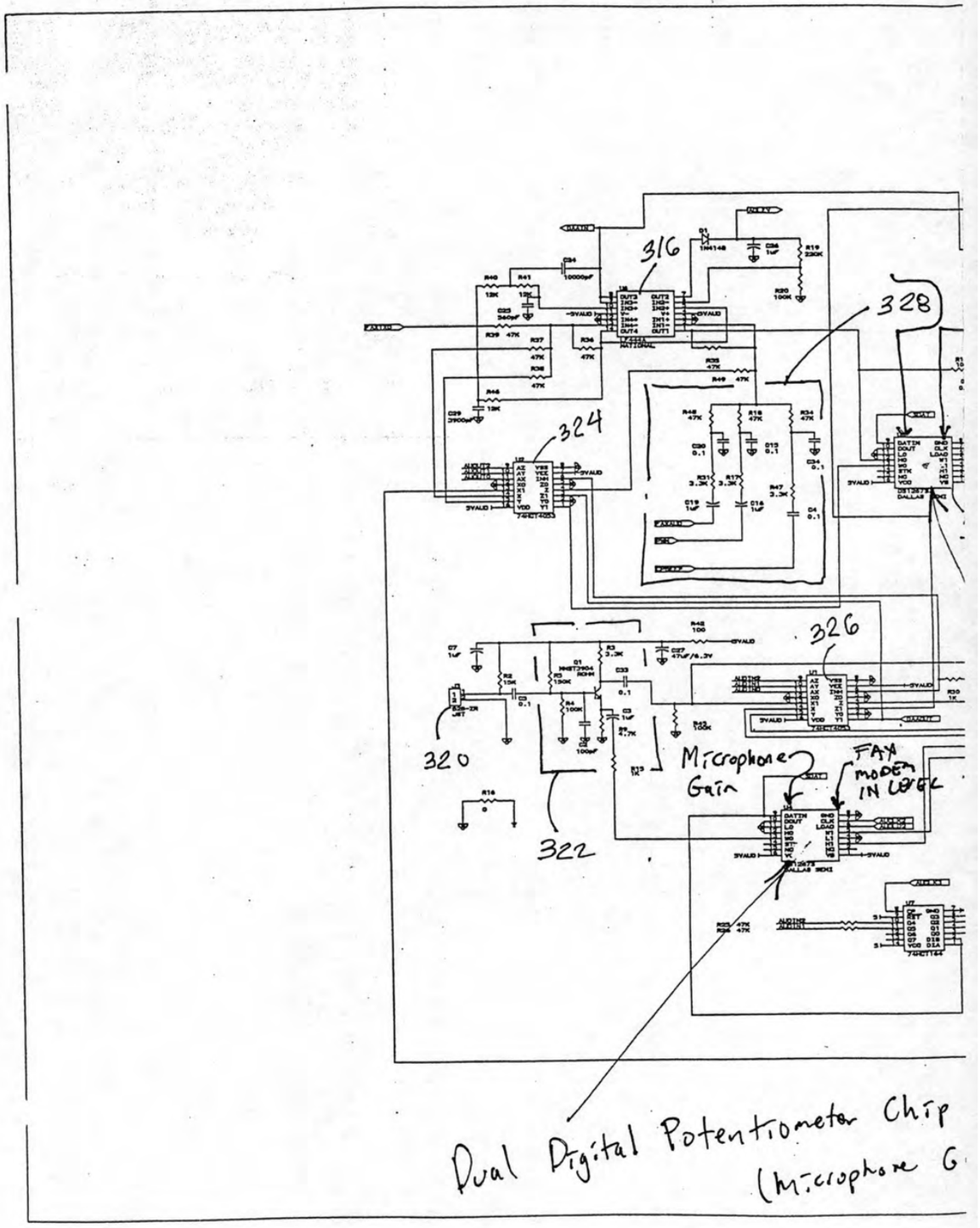
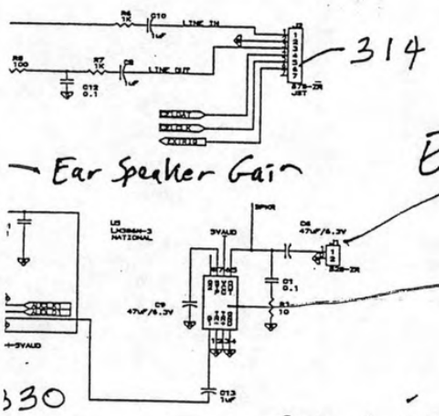
Part A


316
328
324
326
320
322
Microphone Gain
FAX MODEM IN USE
Dual Digital Potentiometer Chip
(Microphone G



Ear Speaker Gain

Ear Speaker ~~Amp~~ Connector

Ear Speaker [illegible] Amplifier

Dual Digital Potentiometer Chip [illegible] Data)

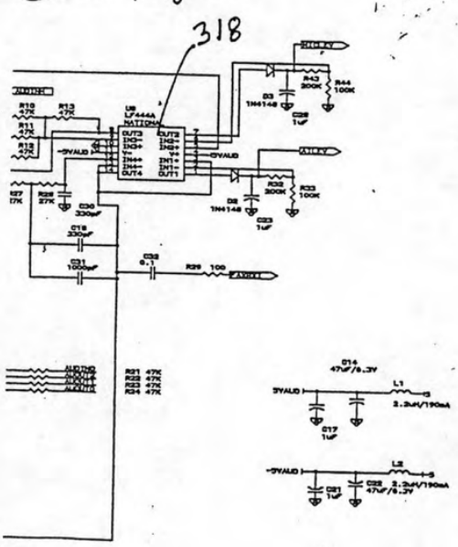


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Fig. 8 Part B

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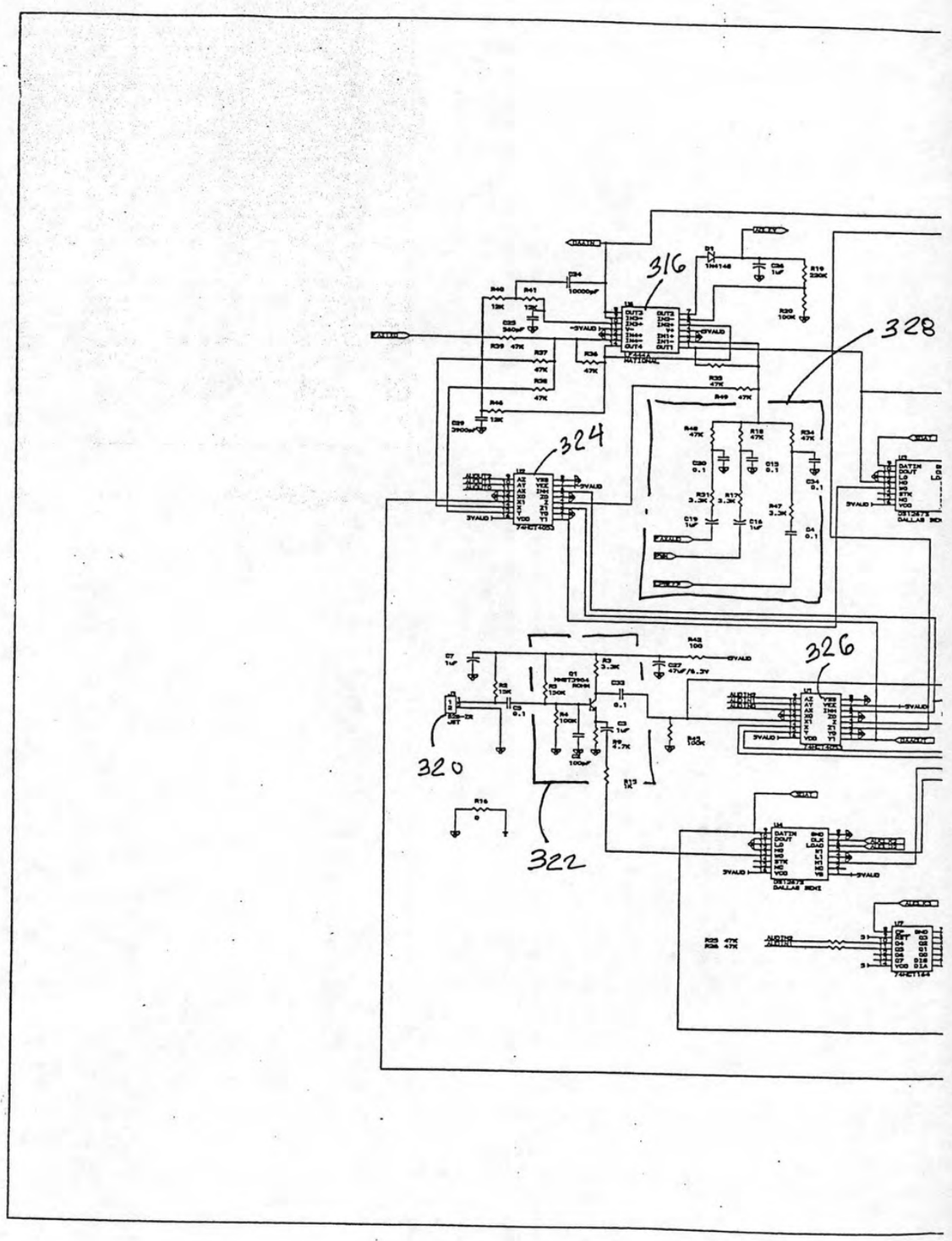
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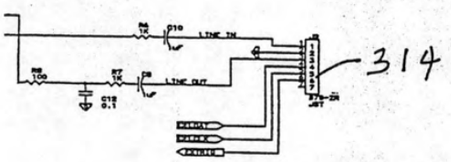
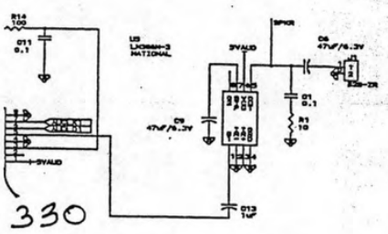




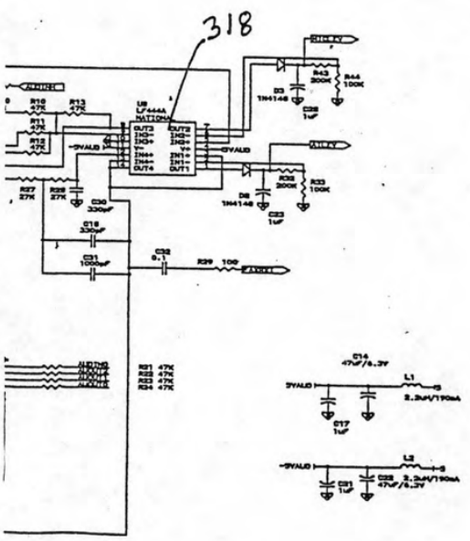
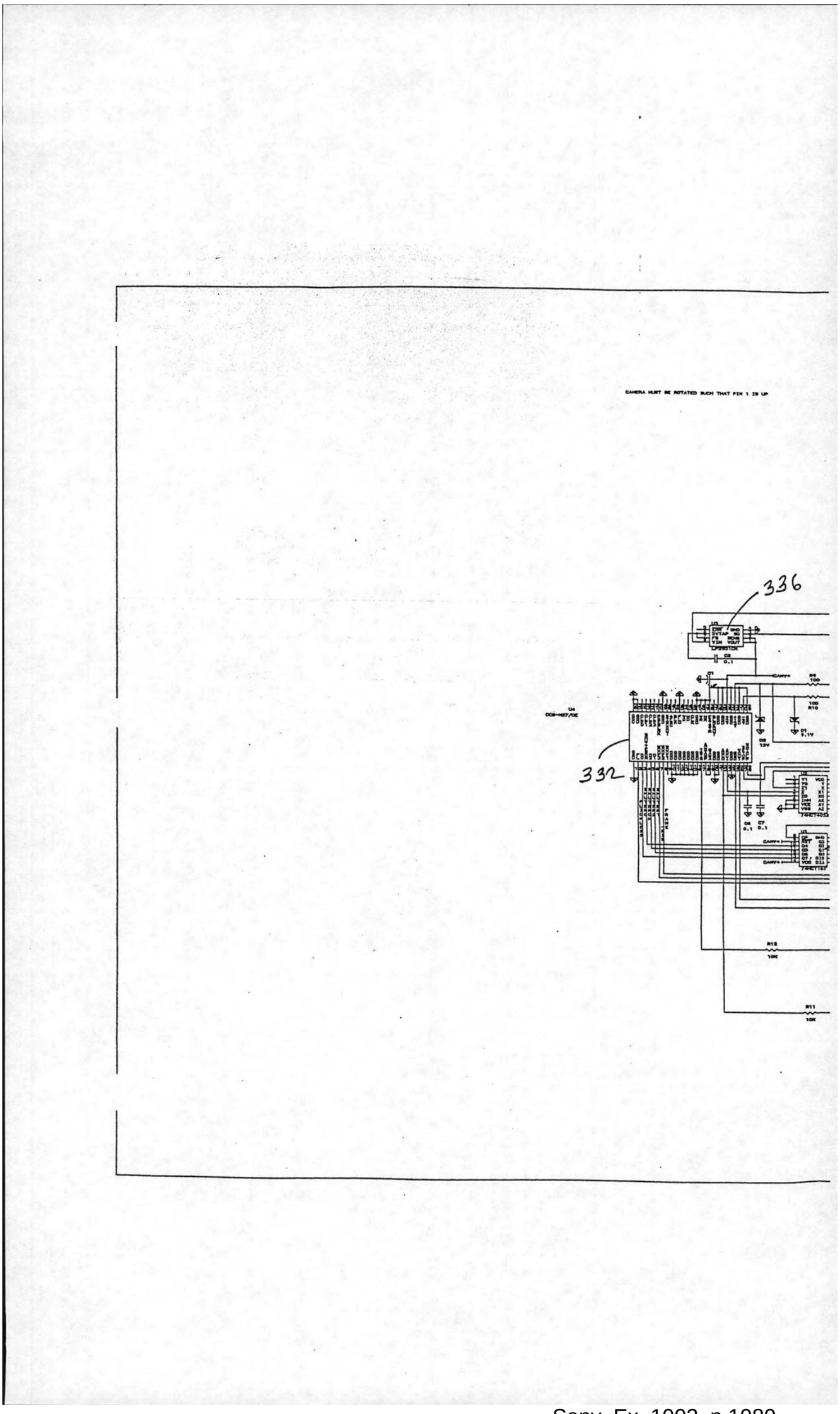
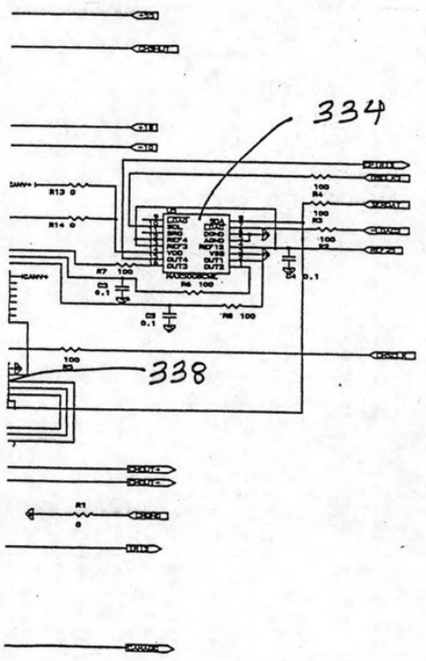


Fig 8
Part B


CAMERA MUST BE ROTATED SUCH THAT PIN 1 IS UP
336
332



other early schematics dated prior to reference date.

(from 1992)

Fig. 8
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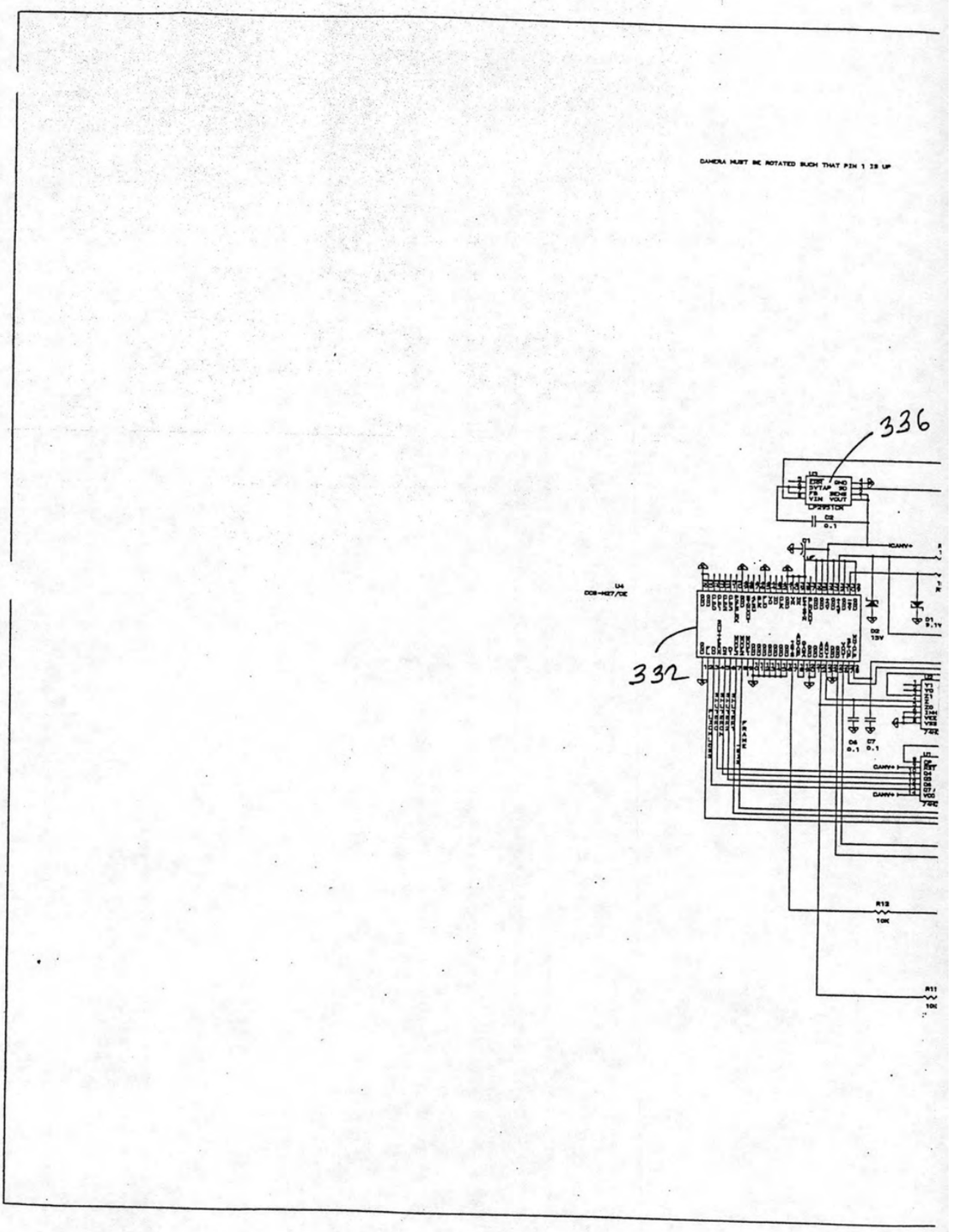
CAMERA MUST BE ROTATED SUCH THAT PIN 1 IS UP
336
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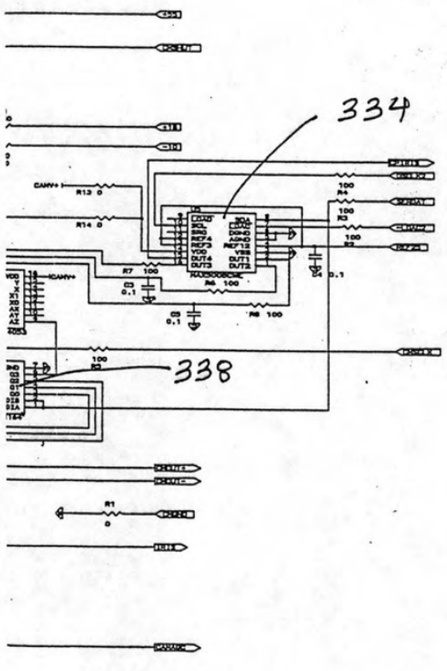
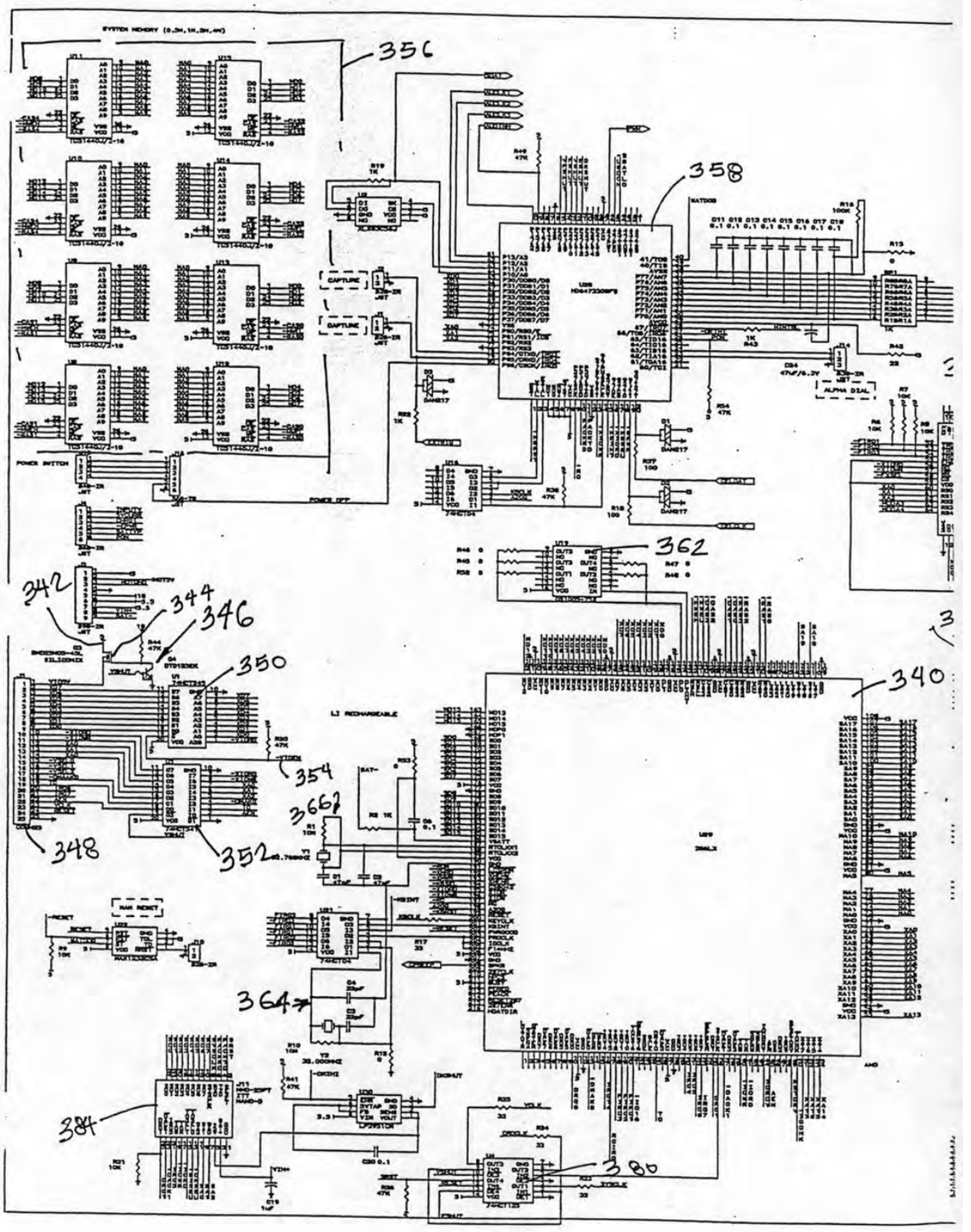


Fig. 8
Part C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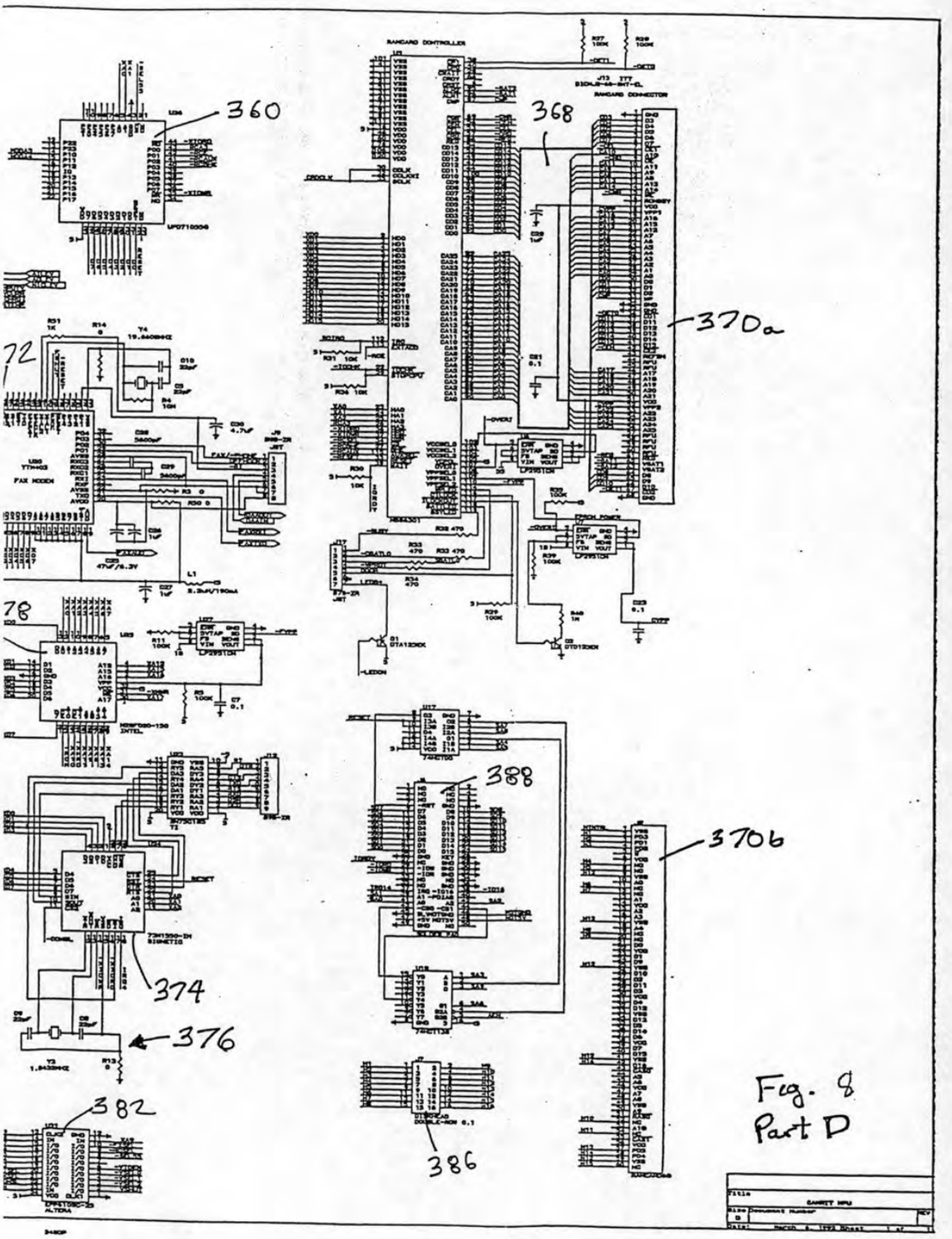

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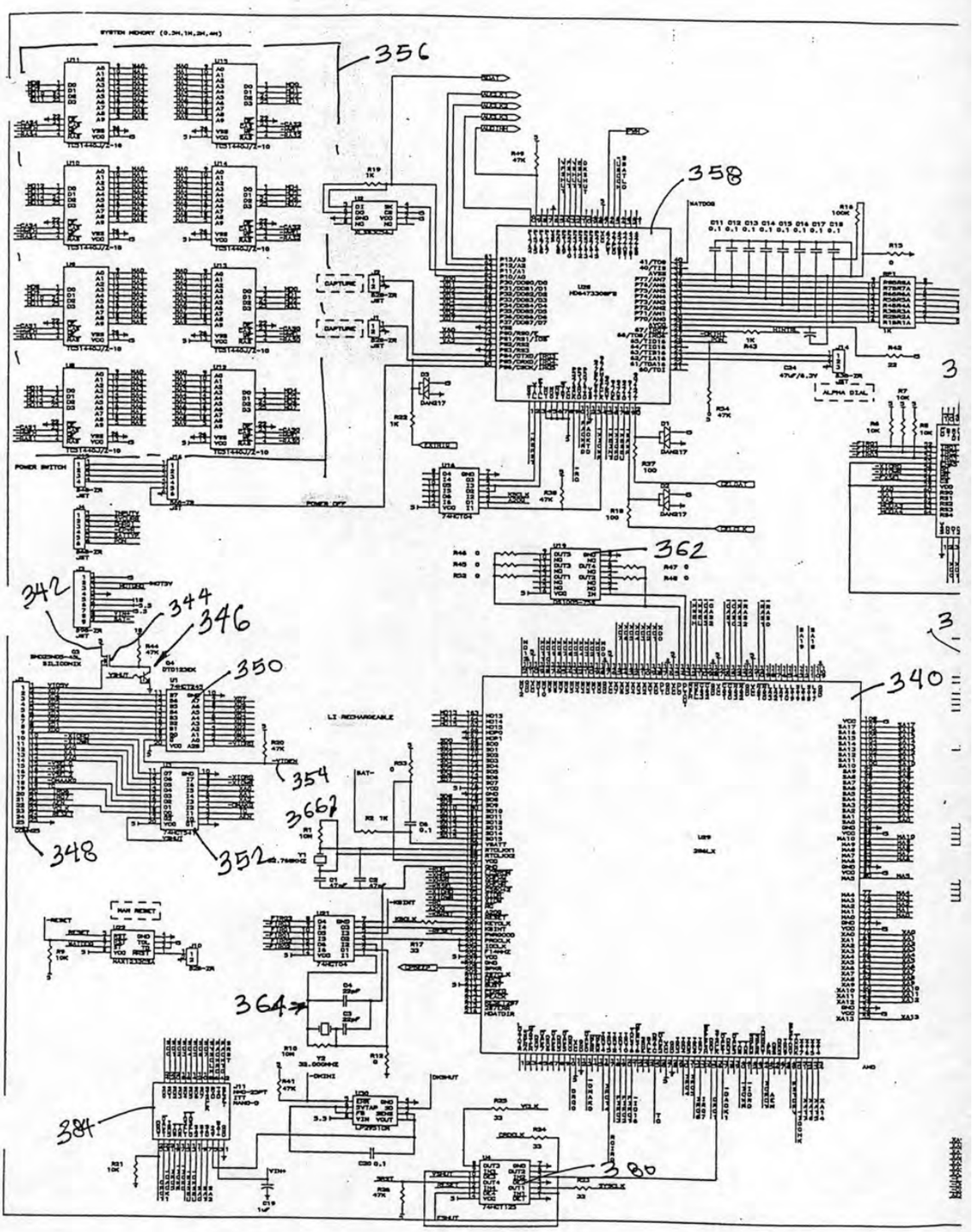
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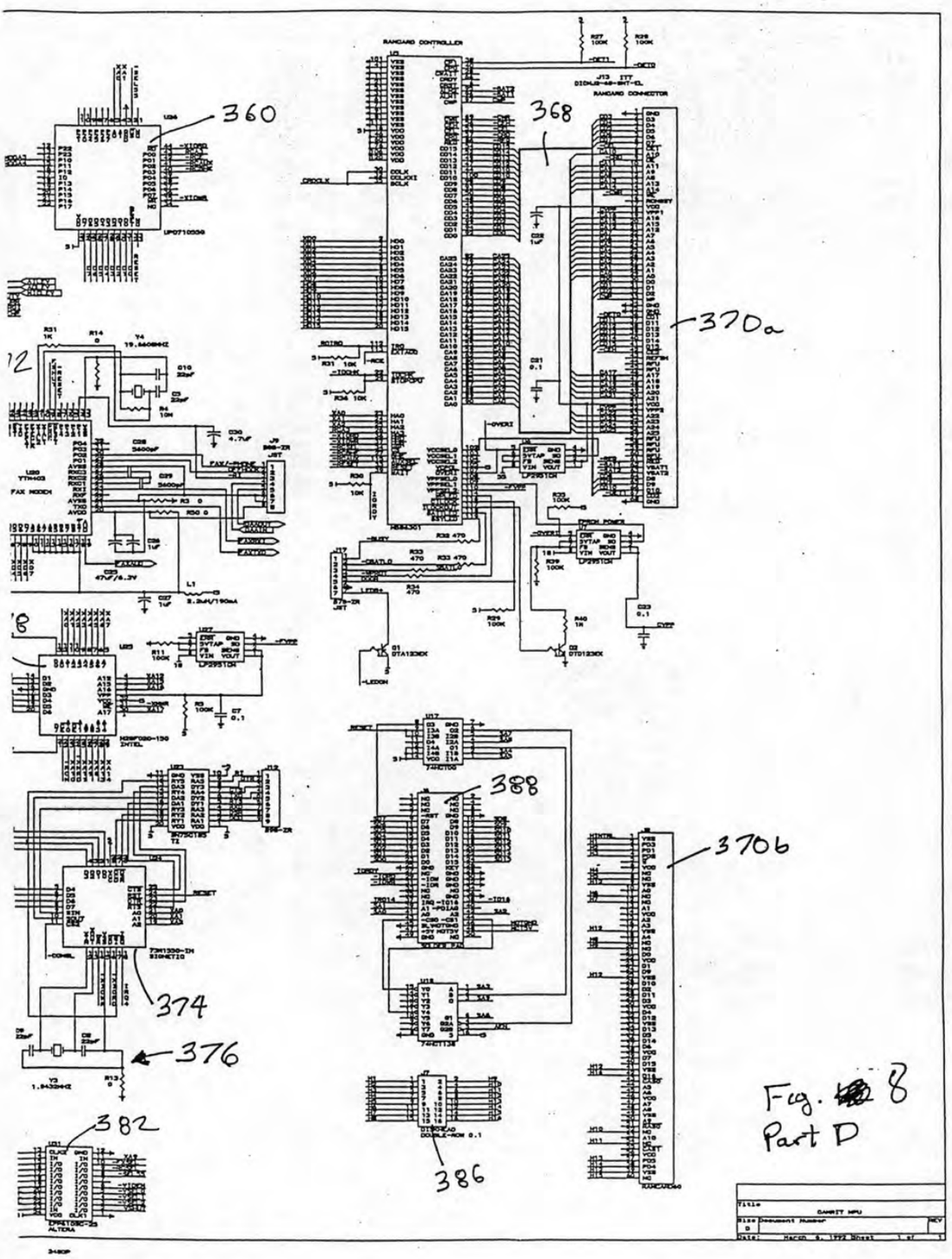
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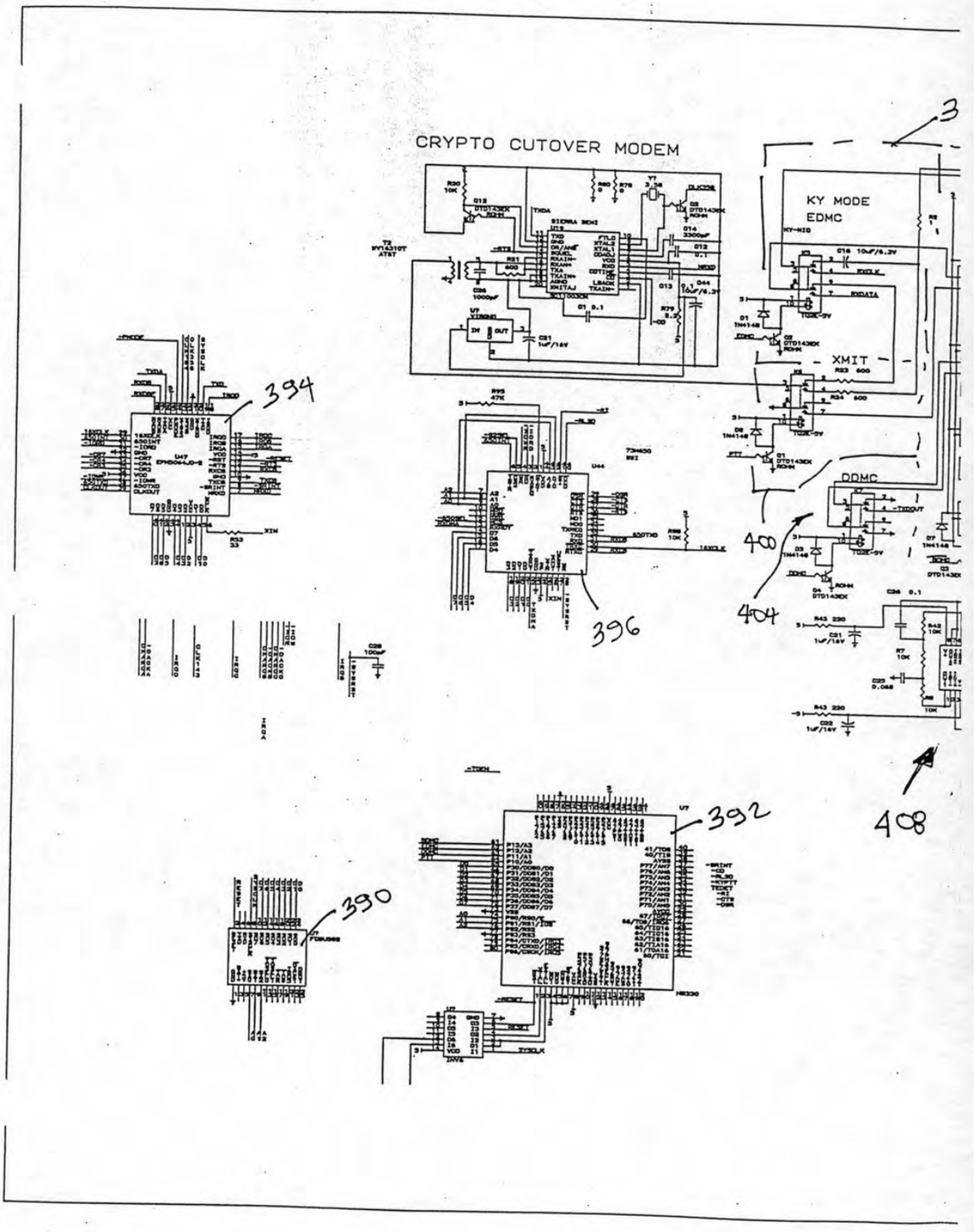
Fig. 8
Part D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KY MODE
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XMIT
DDMC
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404
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390
392

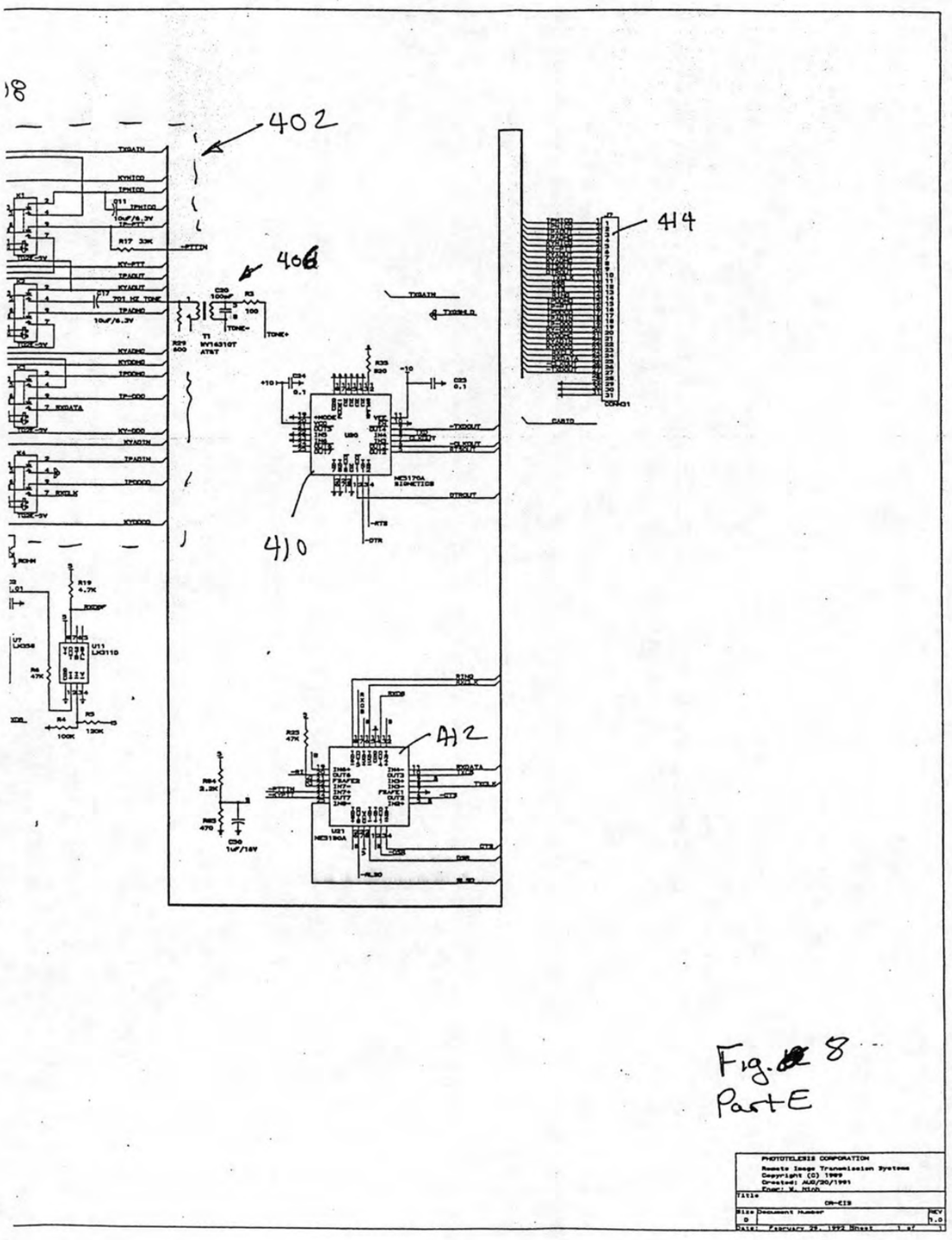
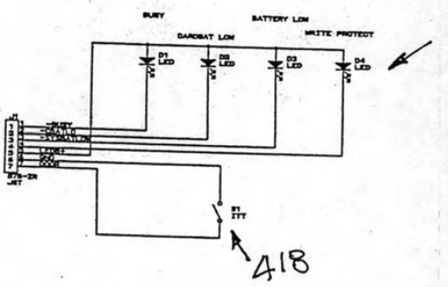


Fig. 8
Part E


BUSY
BATTERY LOW
CARDBAT LOW
WRITE PROTECT
D1 LED
D2 LED
D3 LED
D4 LED
418

916

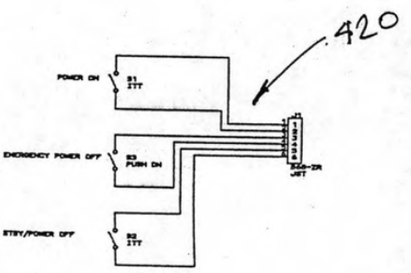
Fig. 8
Part F

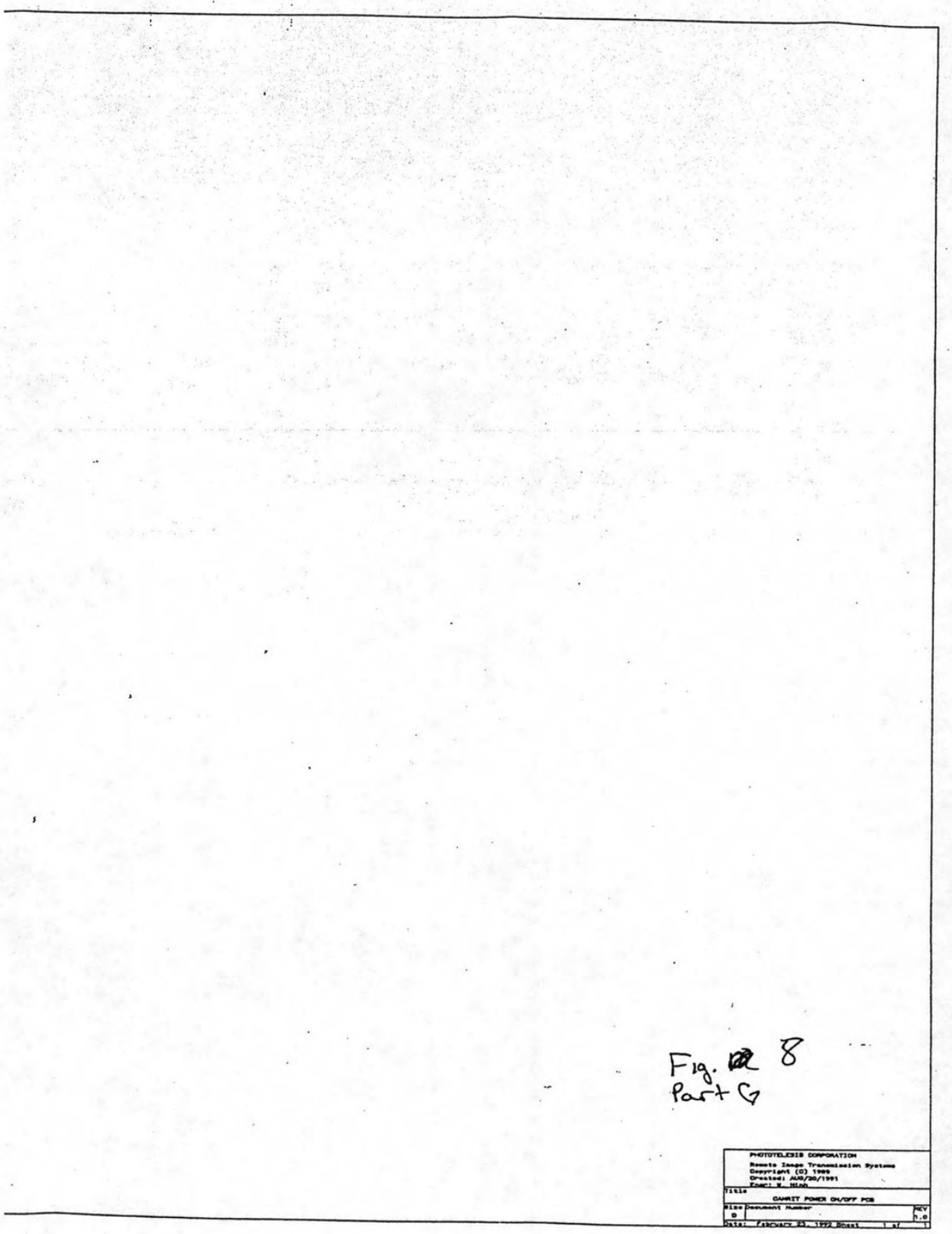
PHOTOTELESIS CORPORATION
Remote Image Transmission Systems
Copyright (C) 1989
Created: AUG/20/1991
Exec: W. OLDS

Title: CAMRIT STATUS AND DOOR STATUS

Size: D | Document Number: | REV: 0.0

Date: February 23, 1992 Sheet 1 of 1


420
POWER ON
S1
ITT
EMERGENCY POWER OFF
S3
PUSH ON
S2
ITT
RTSY/POWER OFF


PHOTOTELESIS CORPORATION
Remote Image Transmission Systems
Copyright (C) 1989
Created: AUG/30/1991
Title
CAMBIT POWER ON/OFF PCB
Size Document Number
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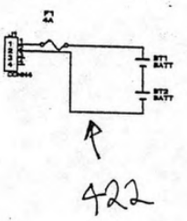
Date: FEBRUARY 23, 1992 Sheet 1 of 1

Fig. 8
Part G



Battery

Pack

Fig.
Part H

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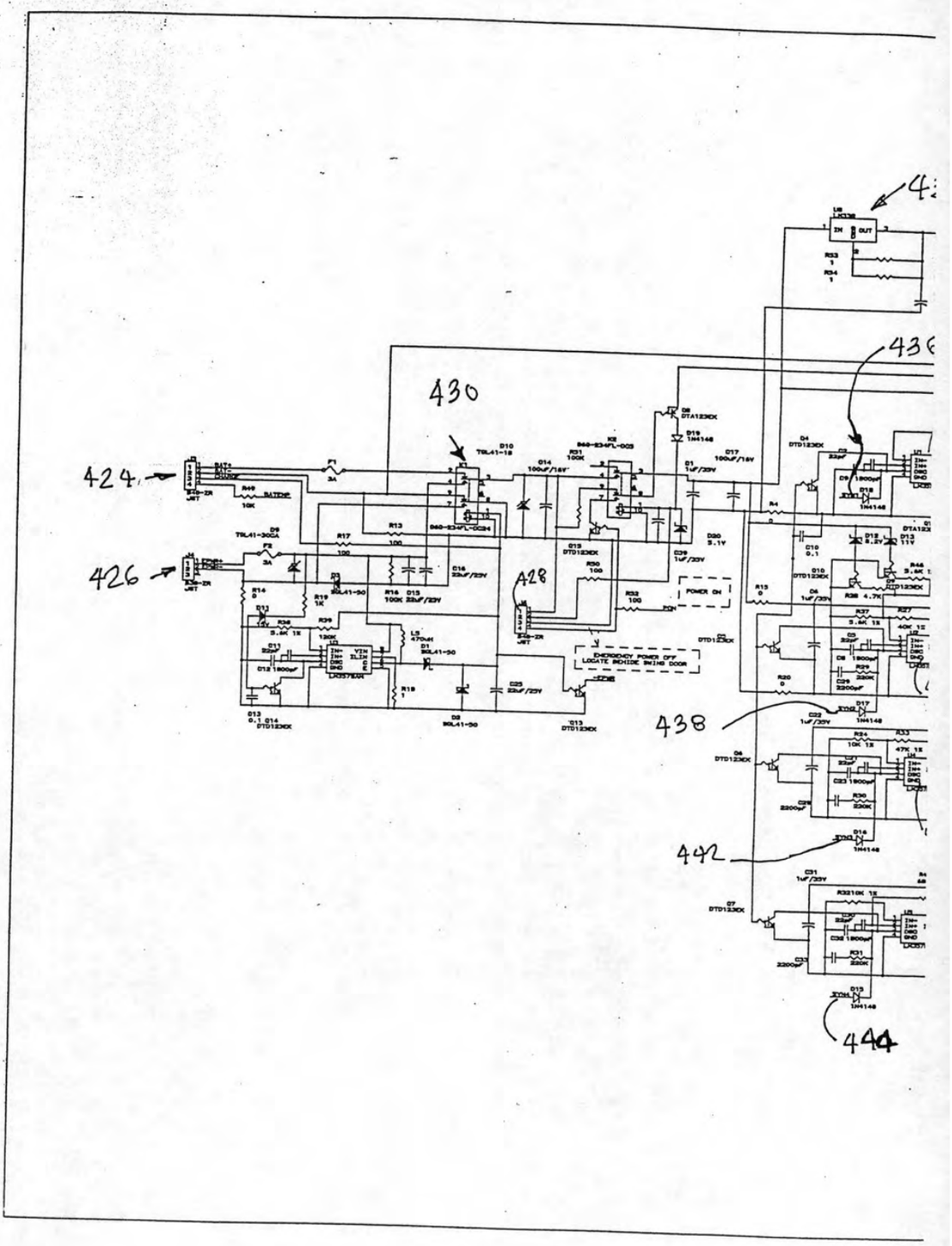
Date: February 14, 1992	Sheet 1 of 1	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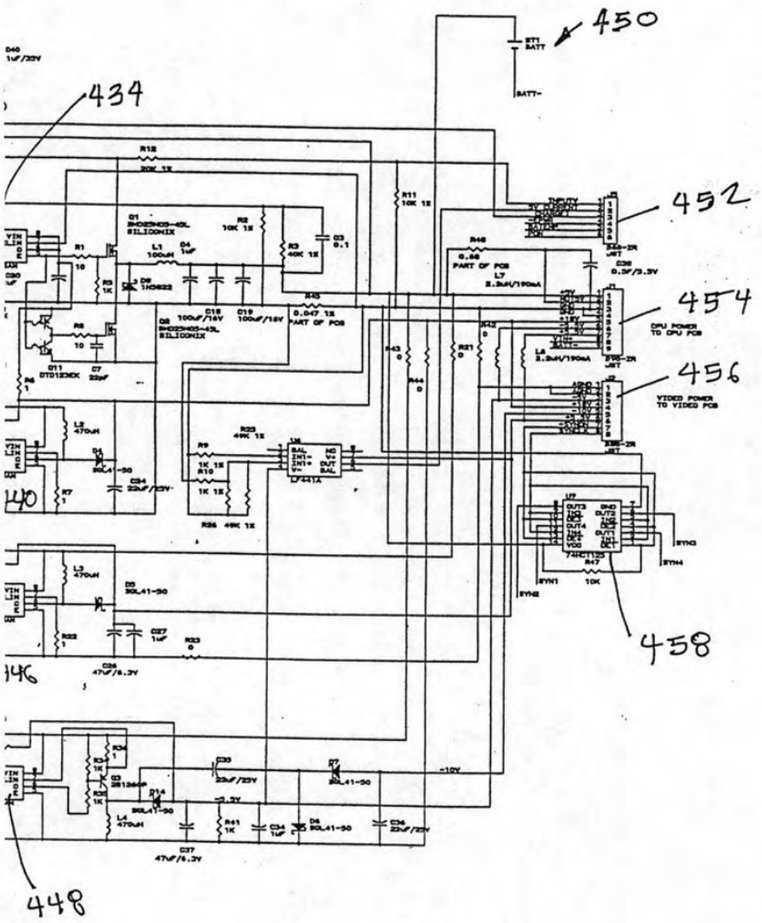
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458
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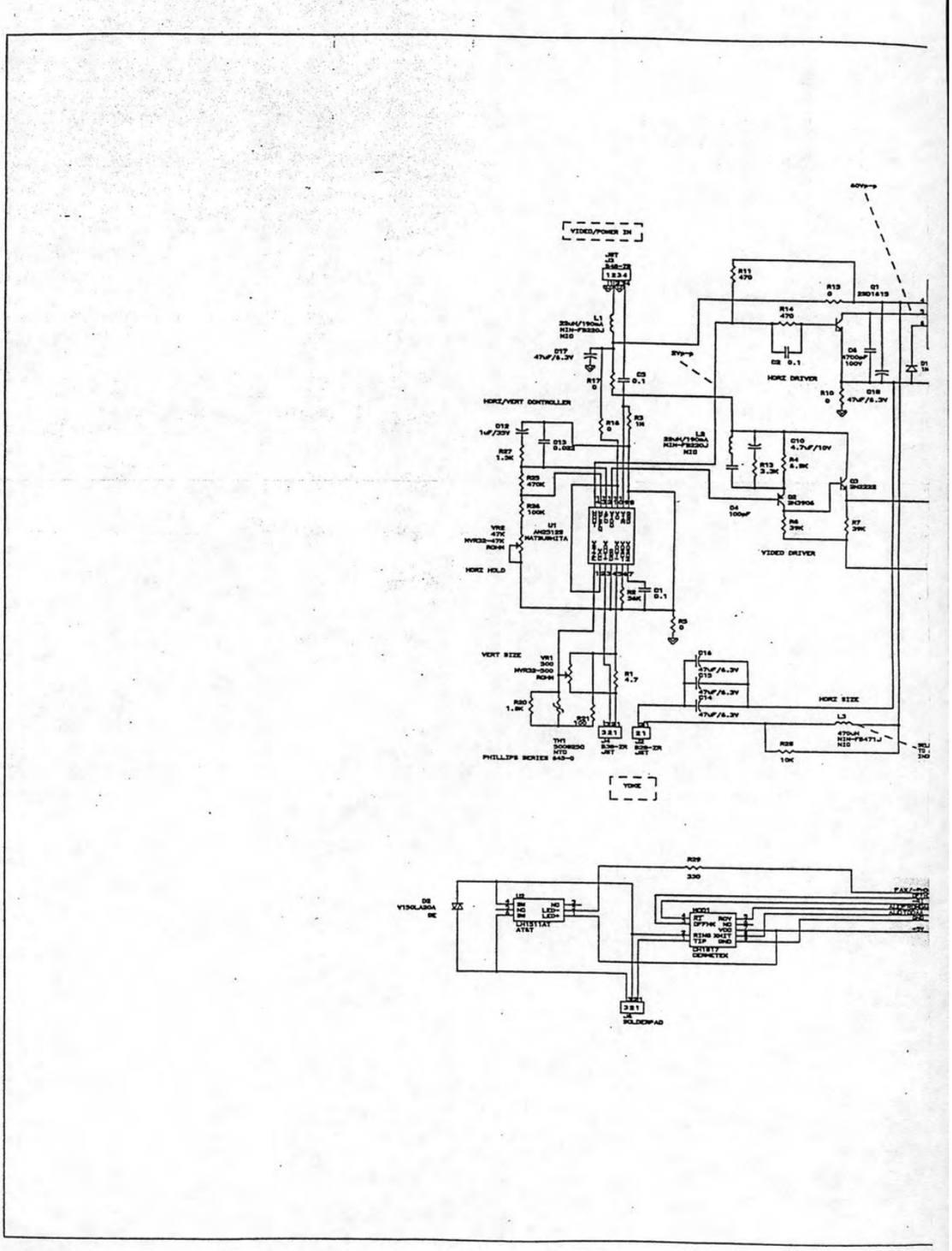
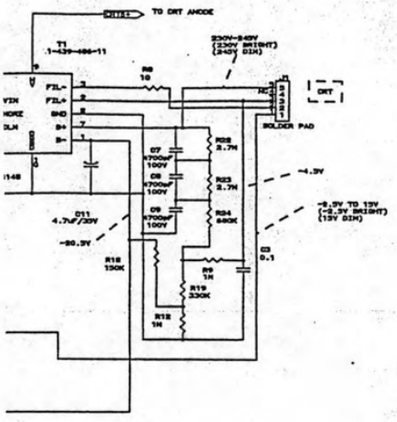
BATT+
DPU POWER
TO CPU PCB
VIDEO POWER
TO VIDEO PCB

Fig. 8
Part I


VIDEO/POWER IN
HORZ/VERT CONTROLLER
HORZ DRIVER
VIDEO DRIVER
HORZ HOLD
VERT SIZE
HORZ SIZE
YOKE
PHILLIPS SERIES 640-0
HOLDEMPAD



462

ITIVE COMPONENT
CL/HORZ SIZE
EASING INDUCTANCE TO REDUCE HORZ SIZE

460

Fig. ~~8~~ 8
Part J

PHOTOTELESIS CORPORATION	
Remote Image Transmission Systems Copyright (C) 1999 Created: AS0/30/1991 Last: M. Nick	
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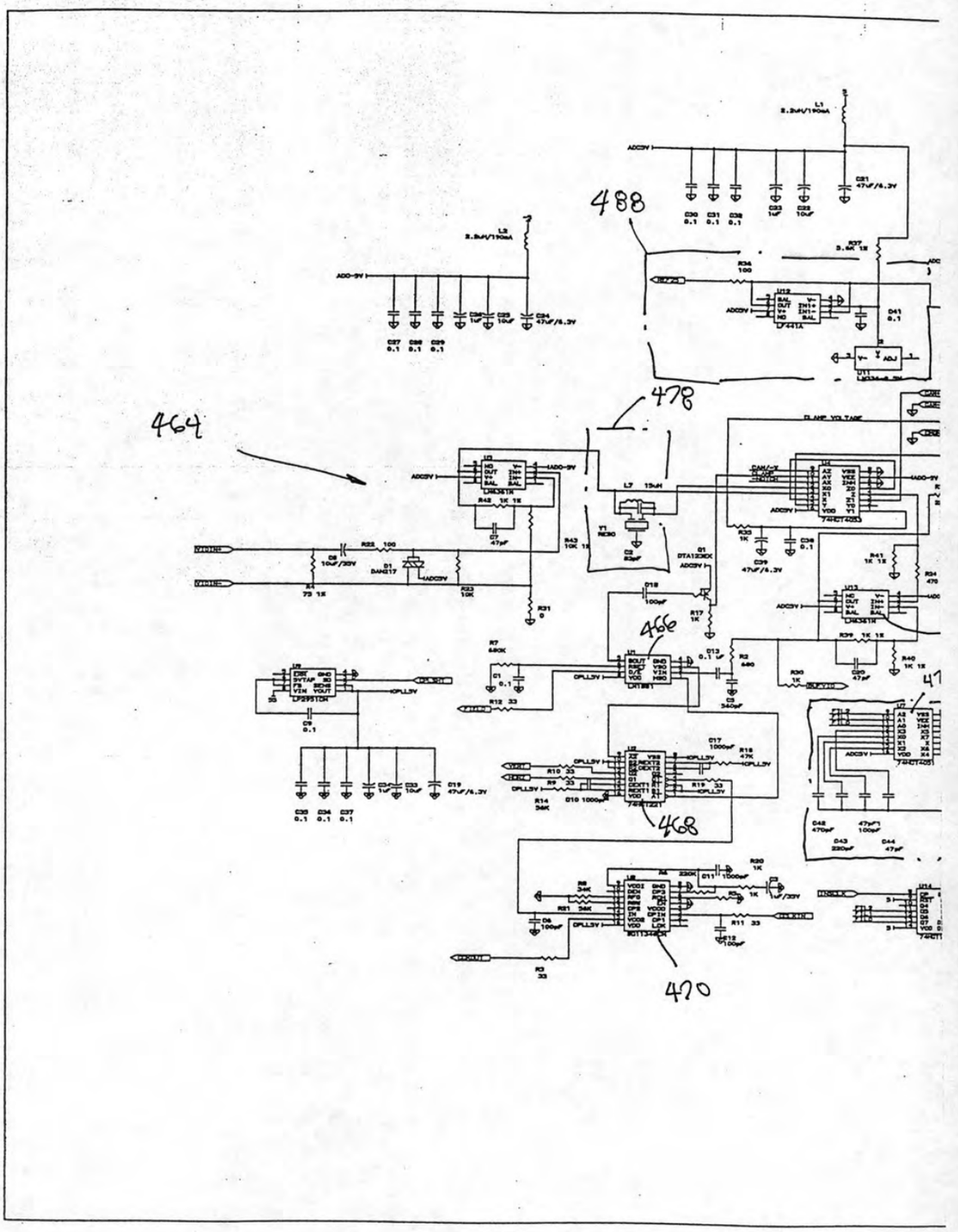
Size: D	Document Number:
Date: February 19, 1992	Sheet 1 of 1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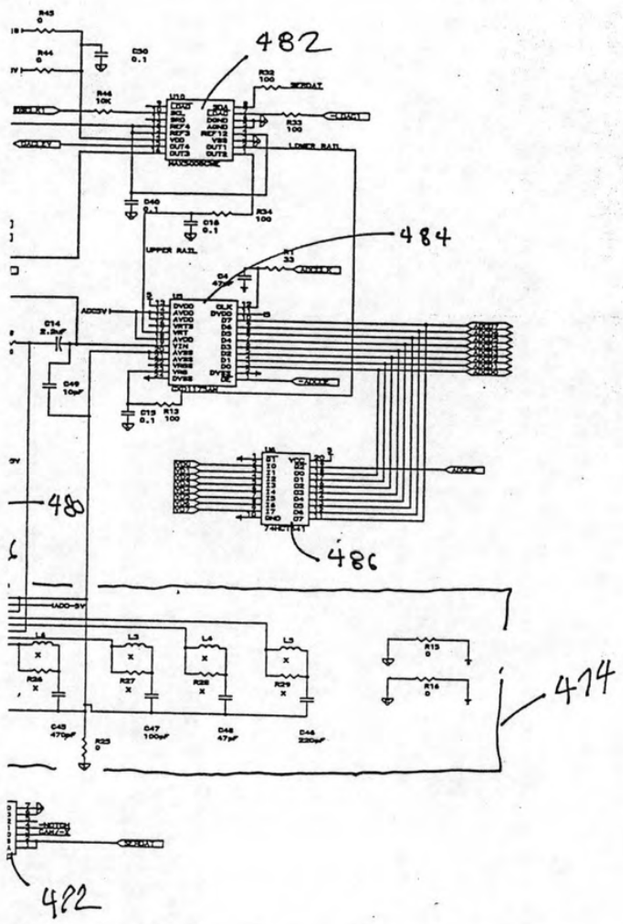
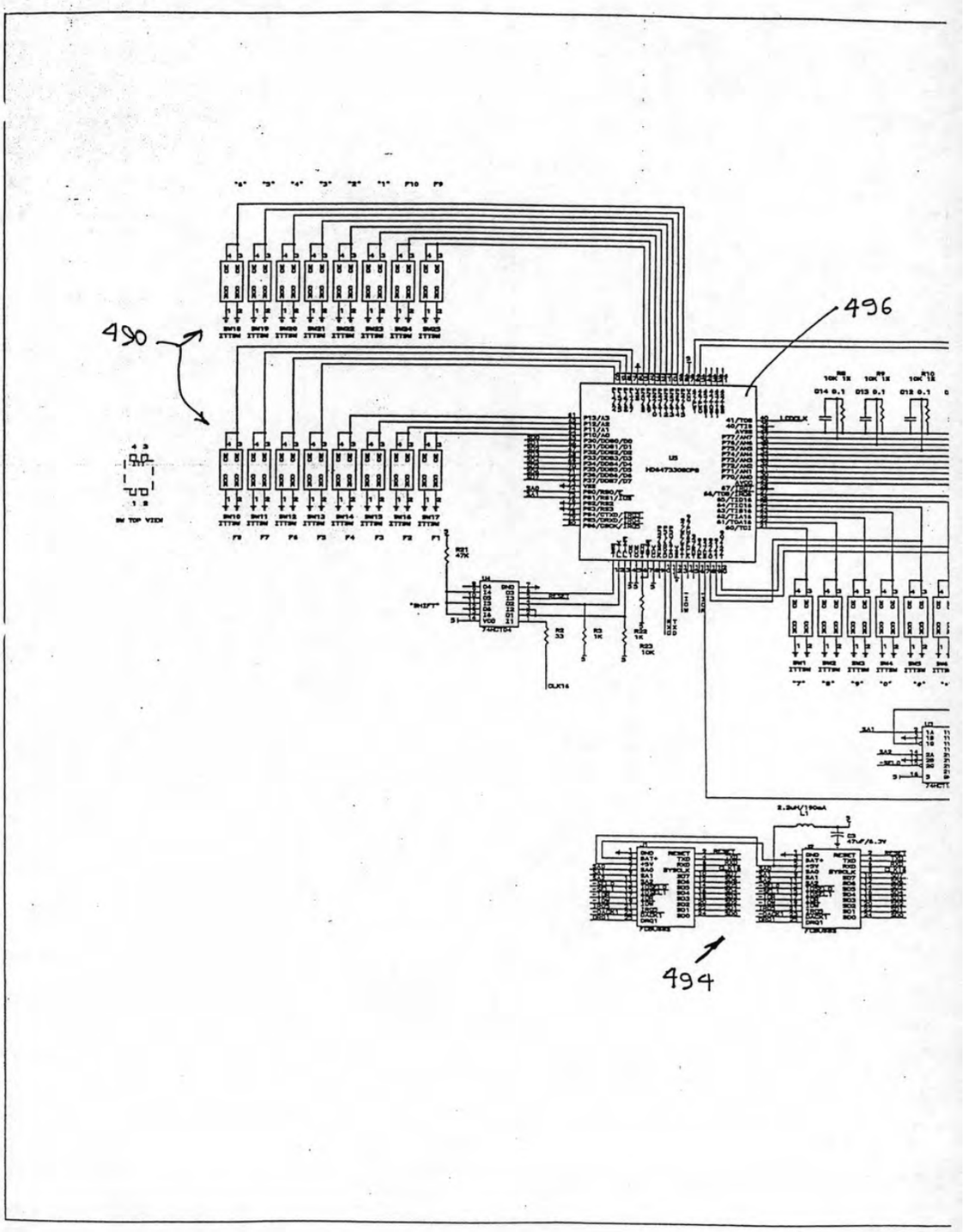


Fig. 8
Prior Art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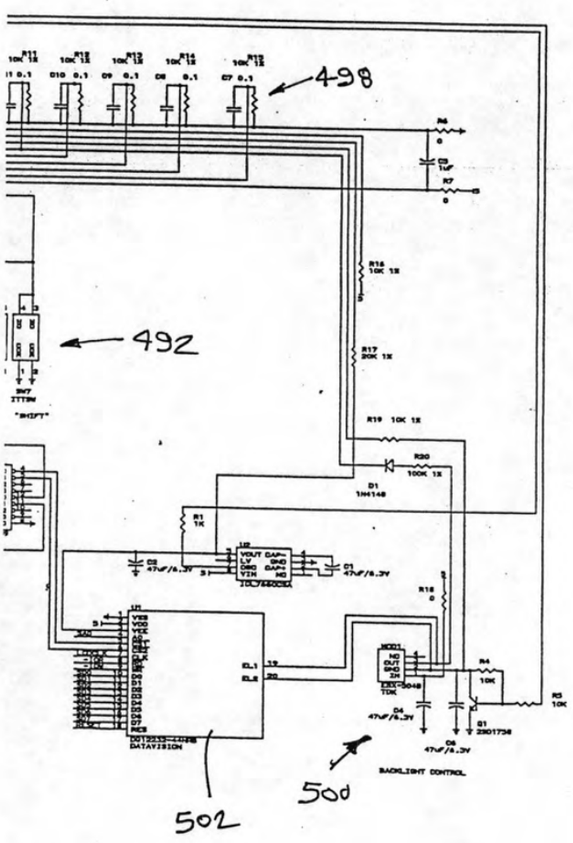
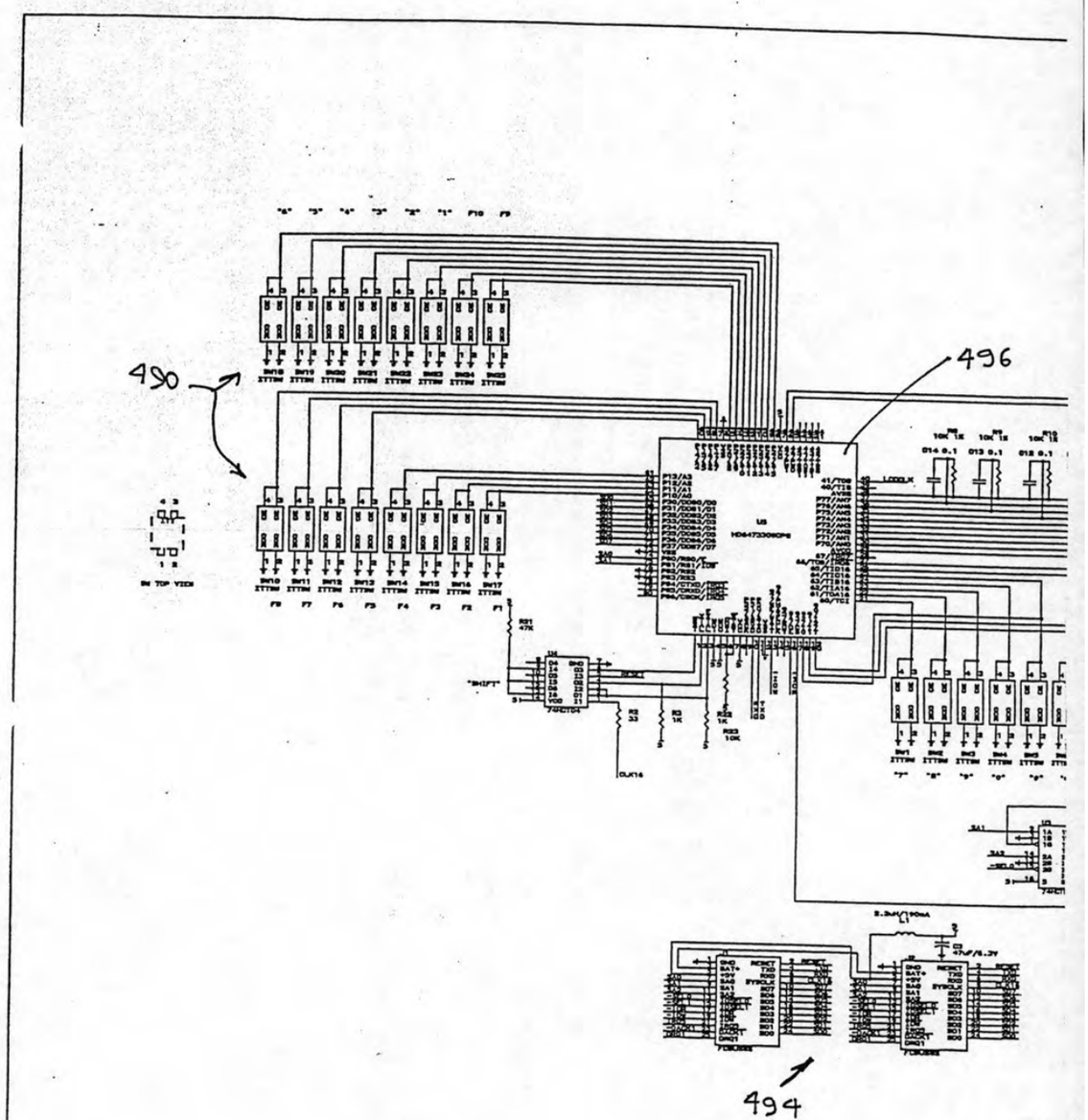


Fig. ~~8~~ 8
Part L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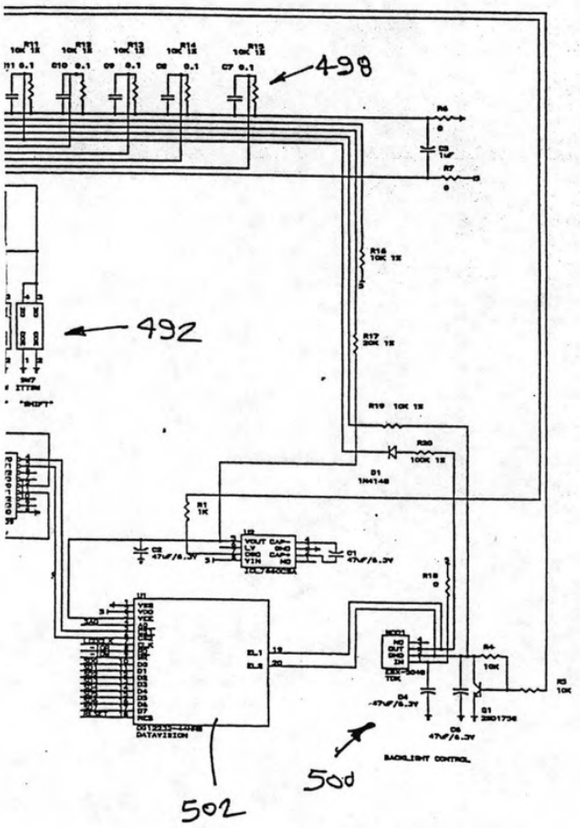

Fig. 8
Part L

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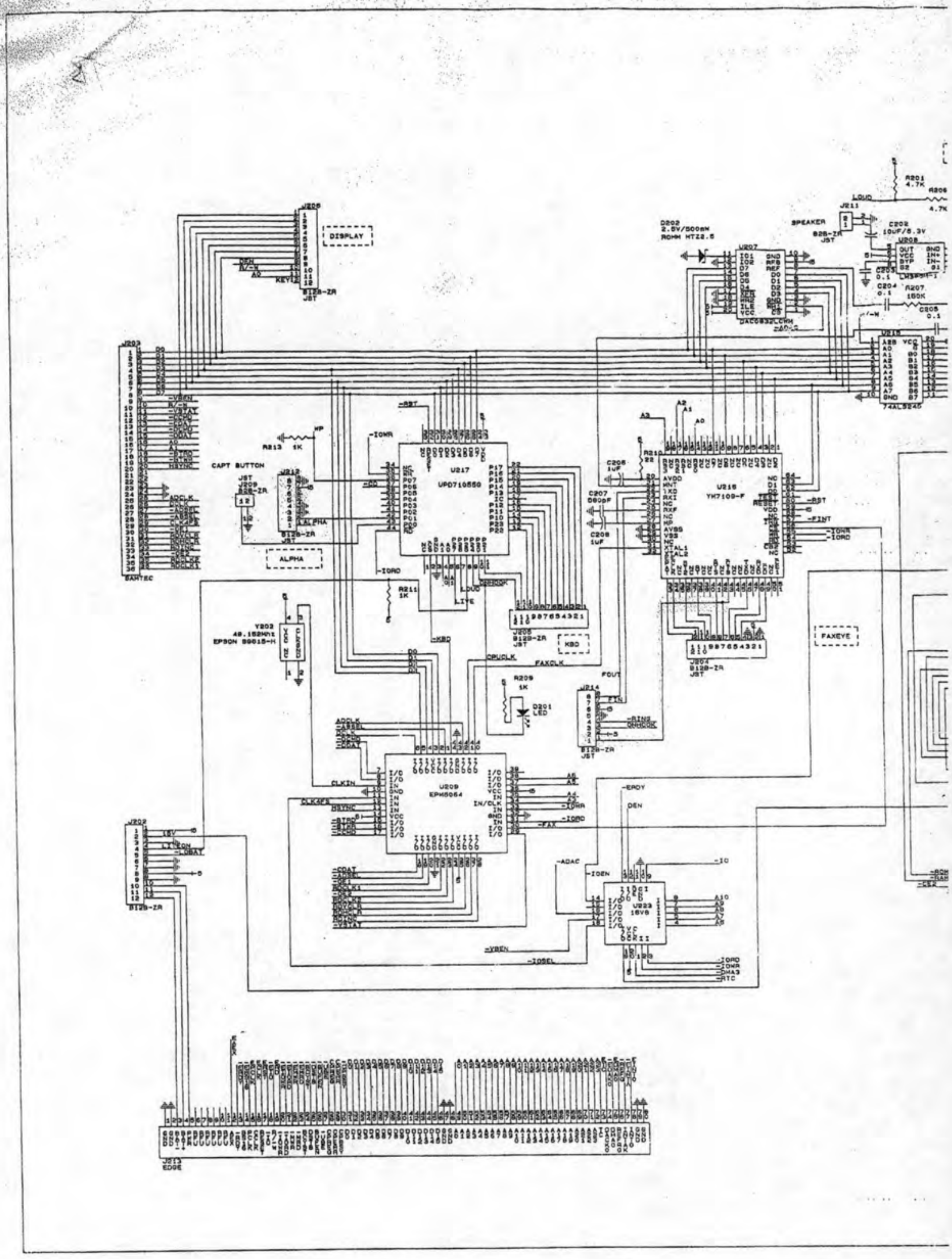

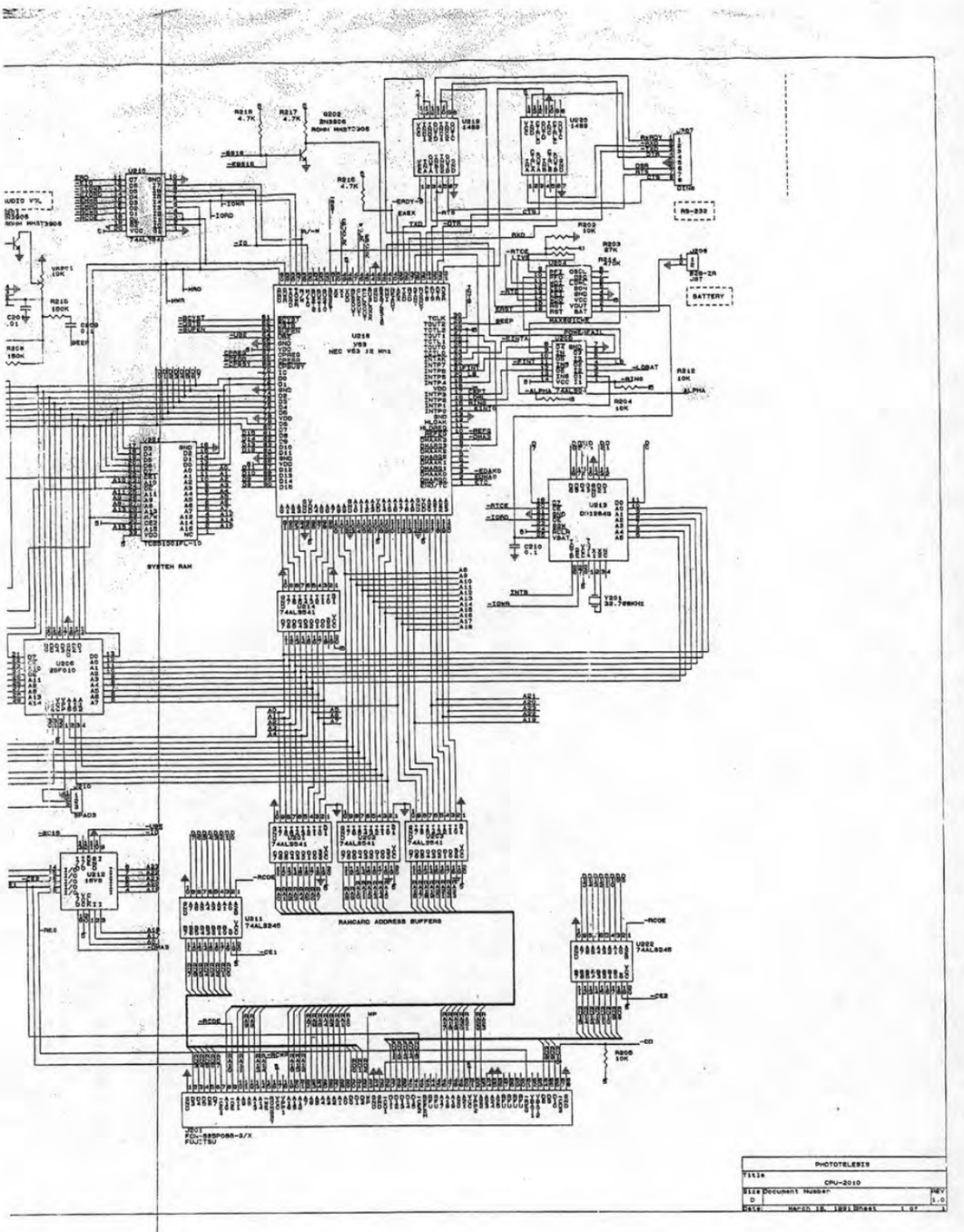
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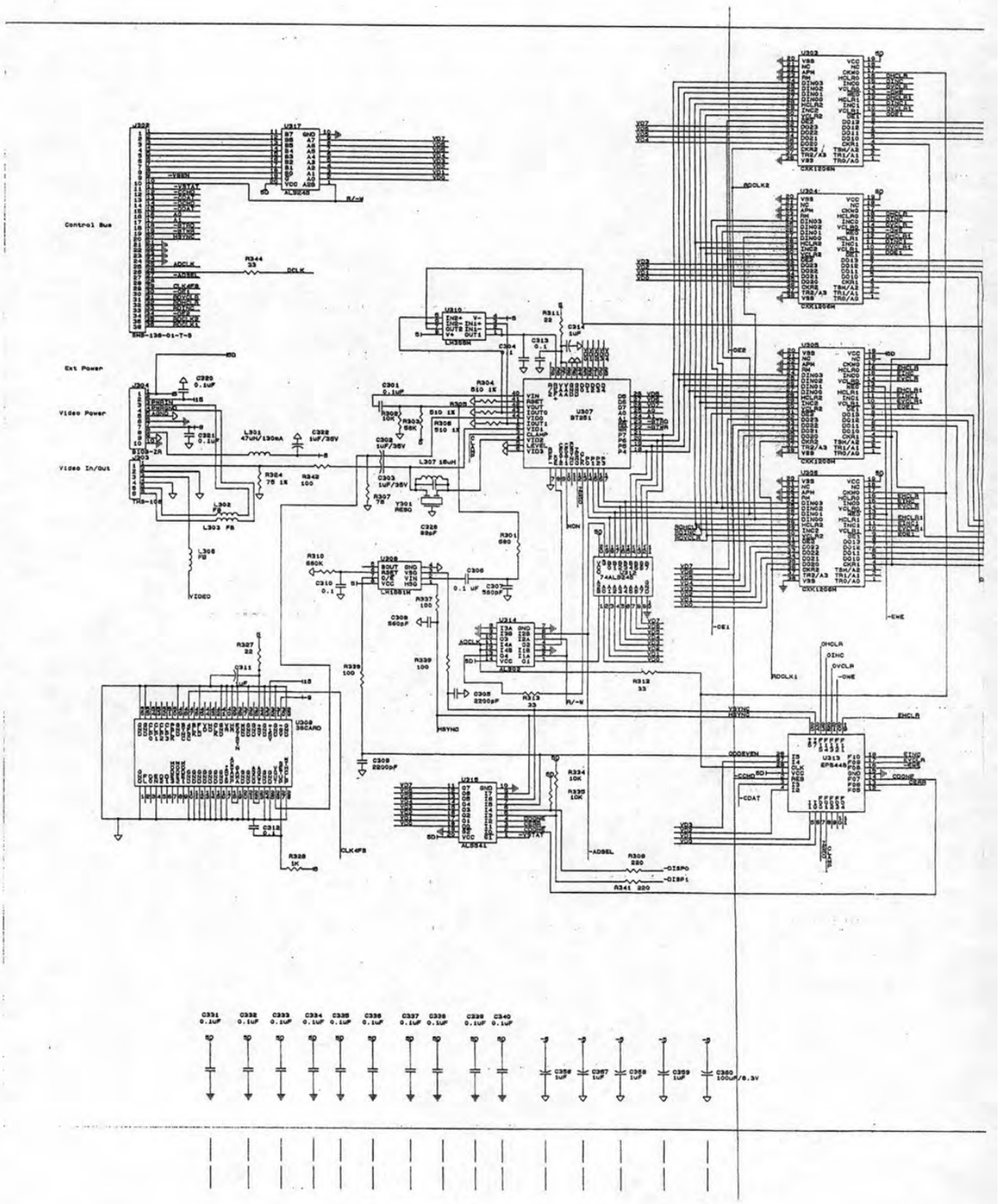

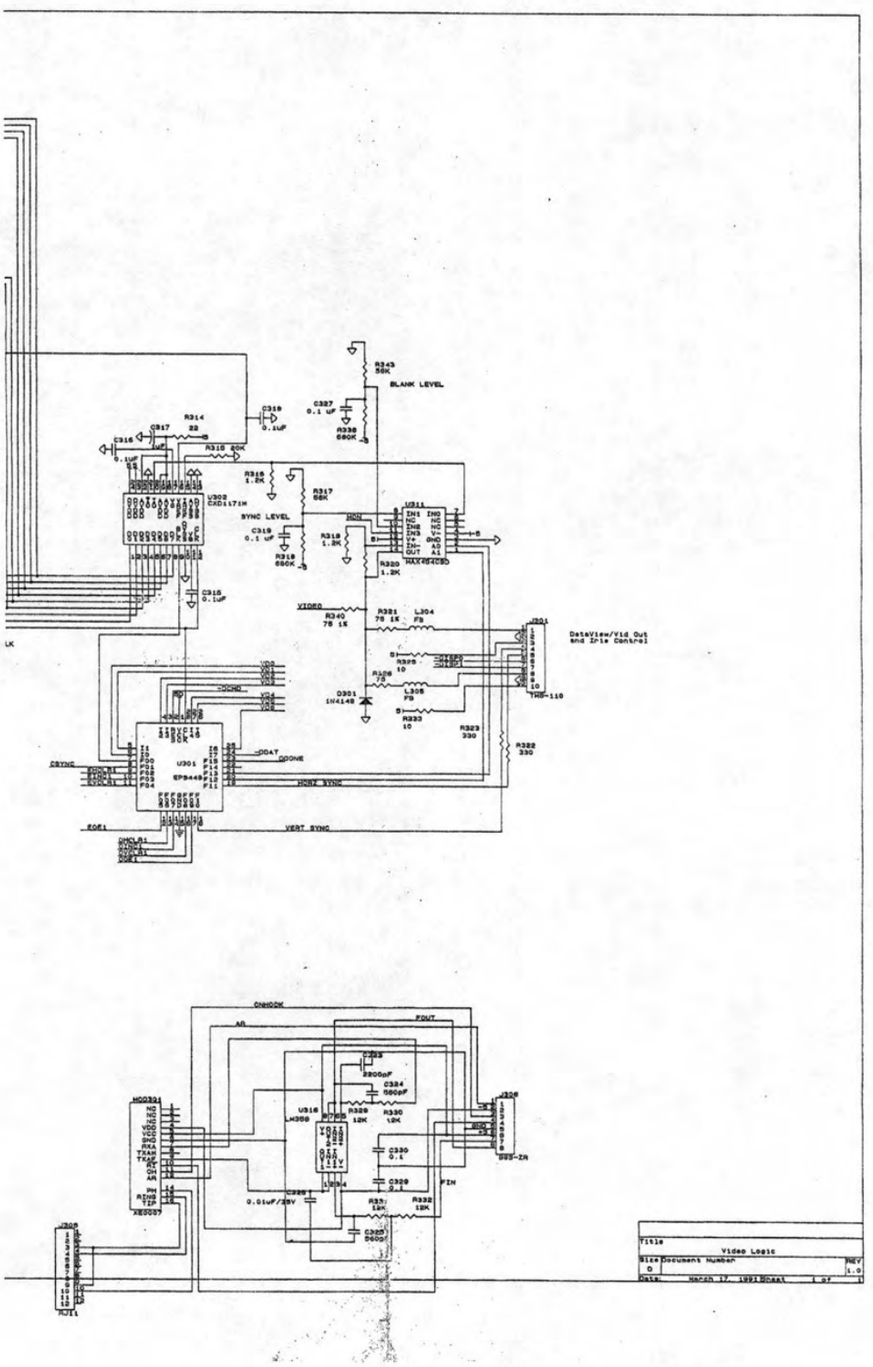
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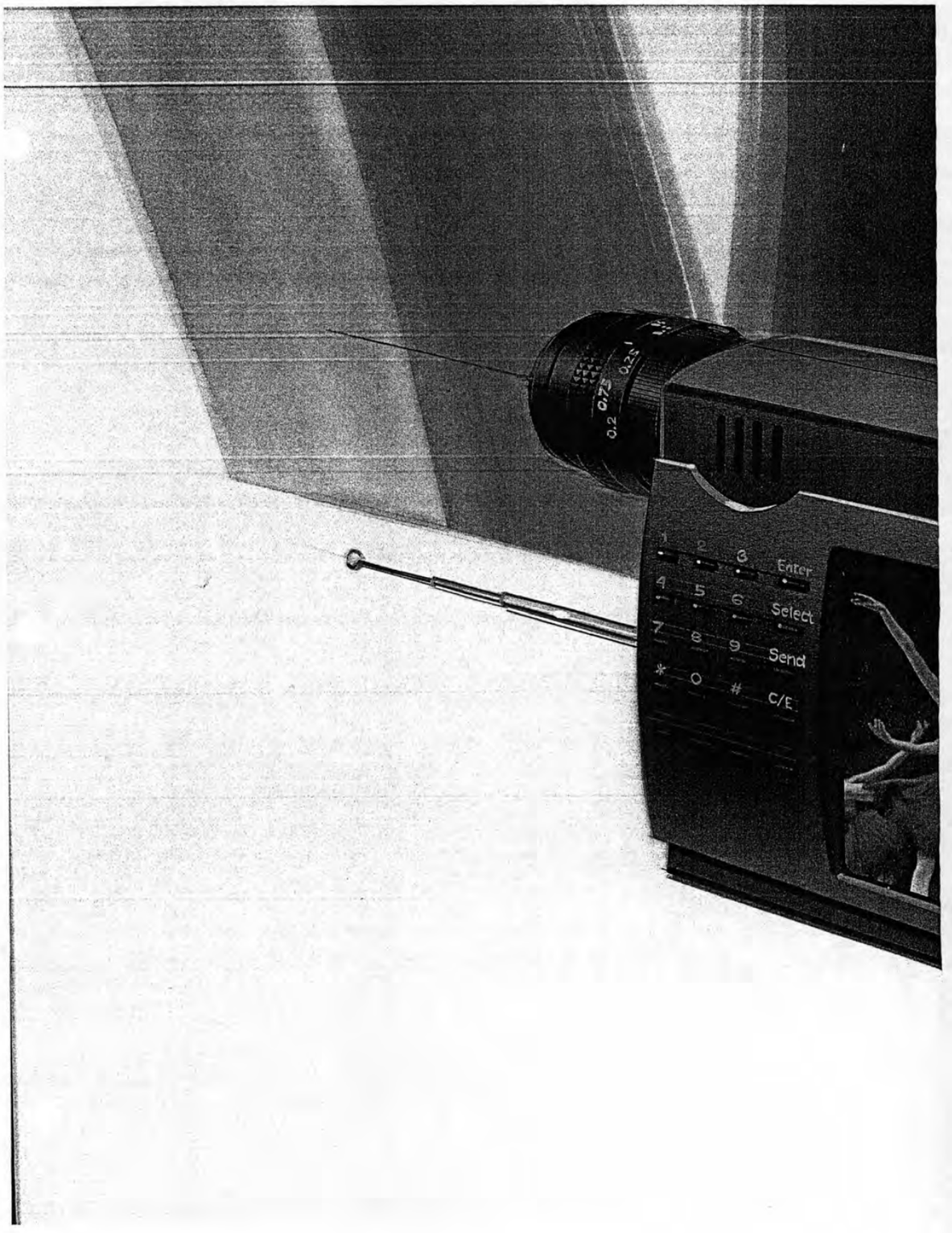
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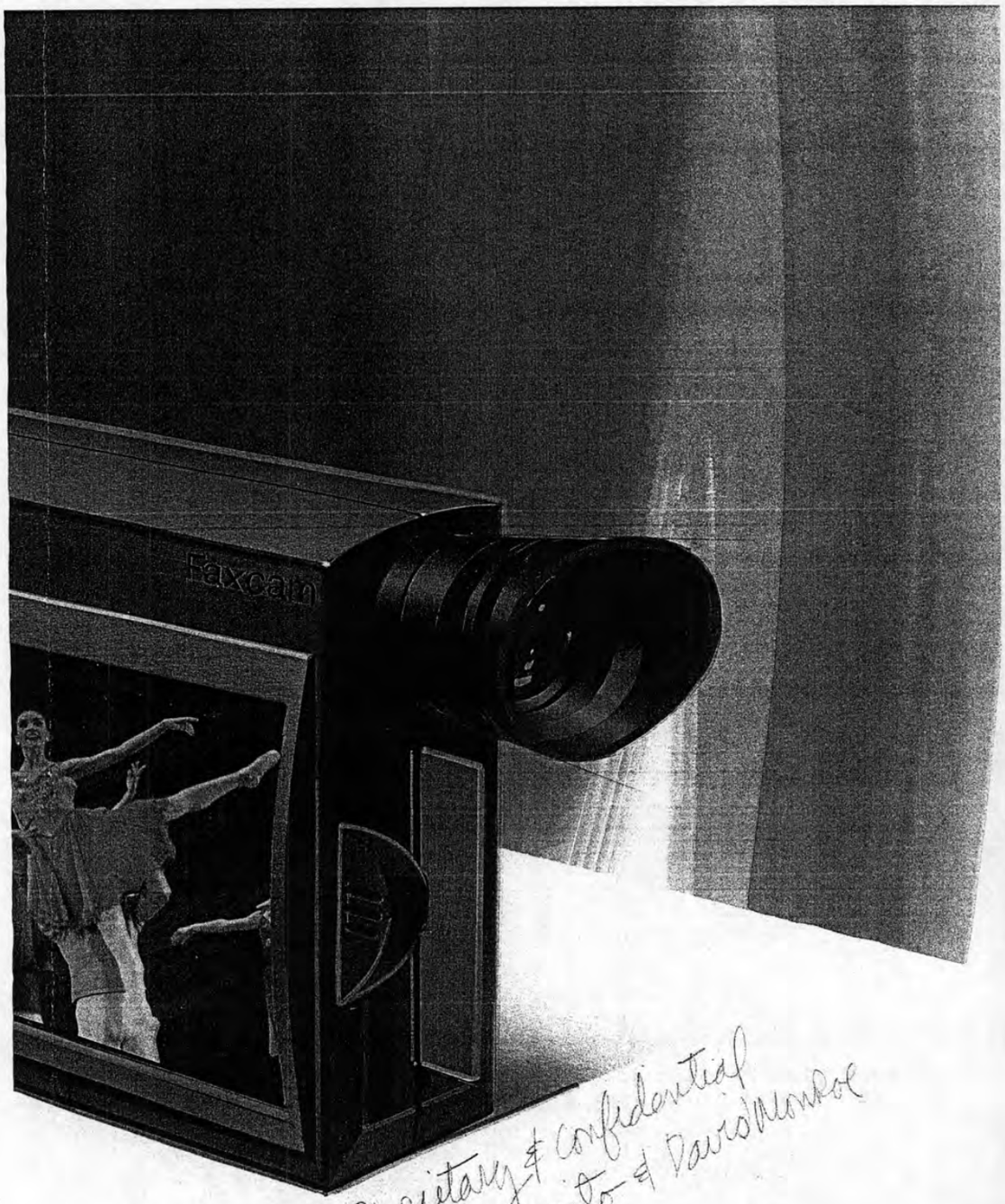

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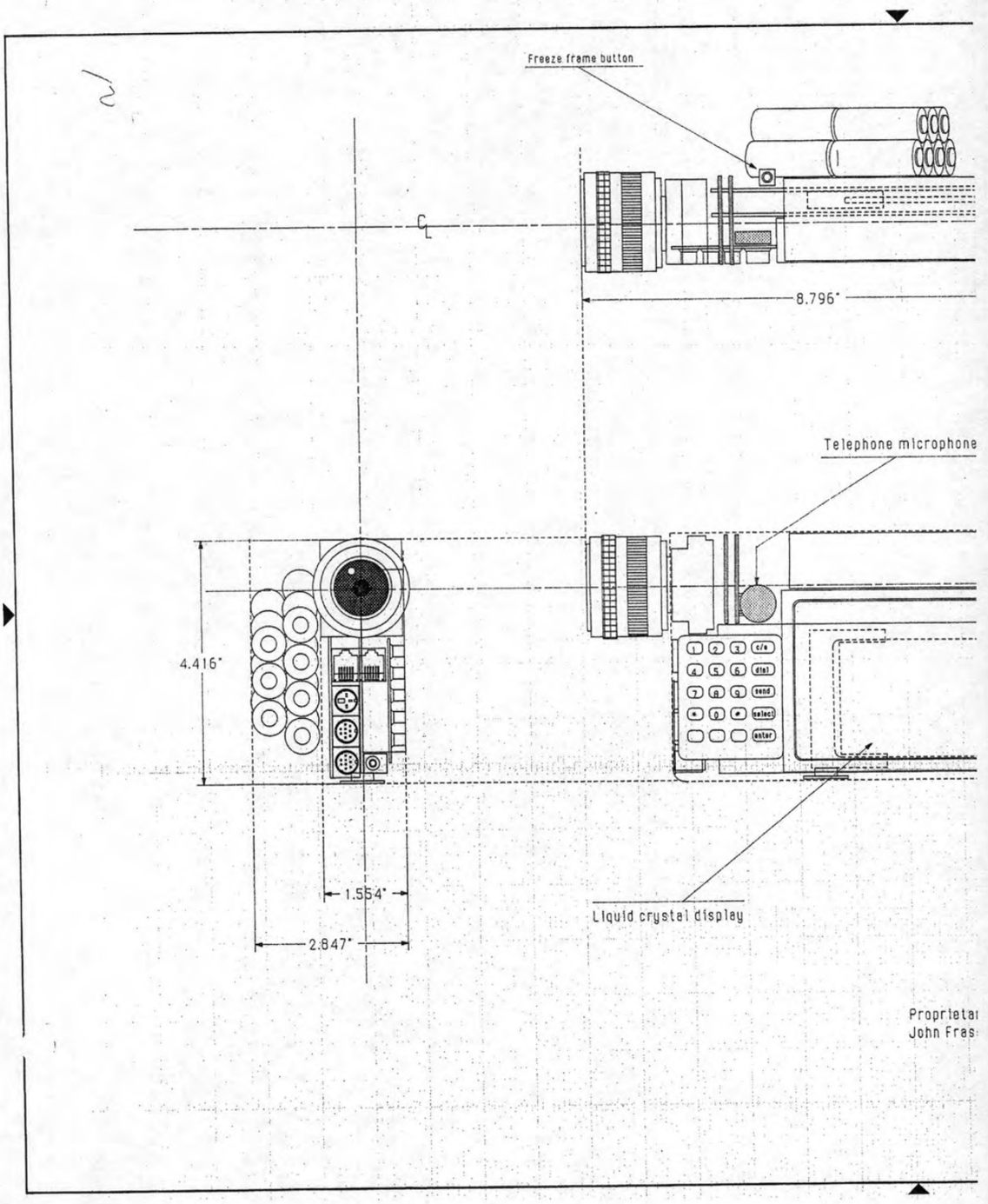
John Frassanito & Associates
June 1, 1991



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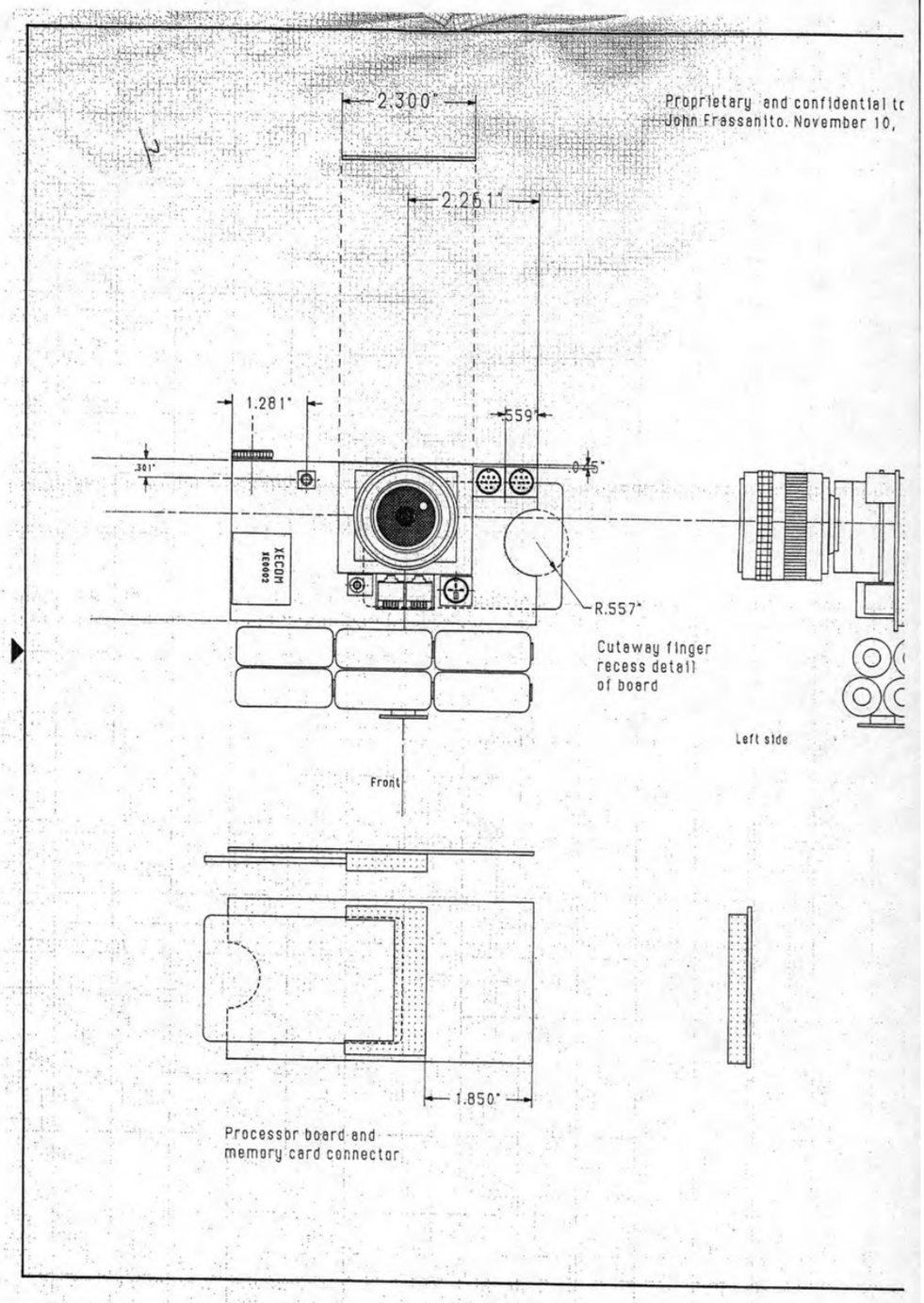
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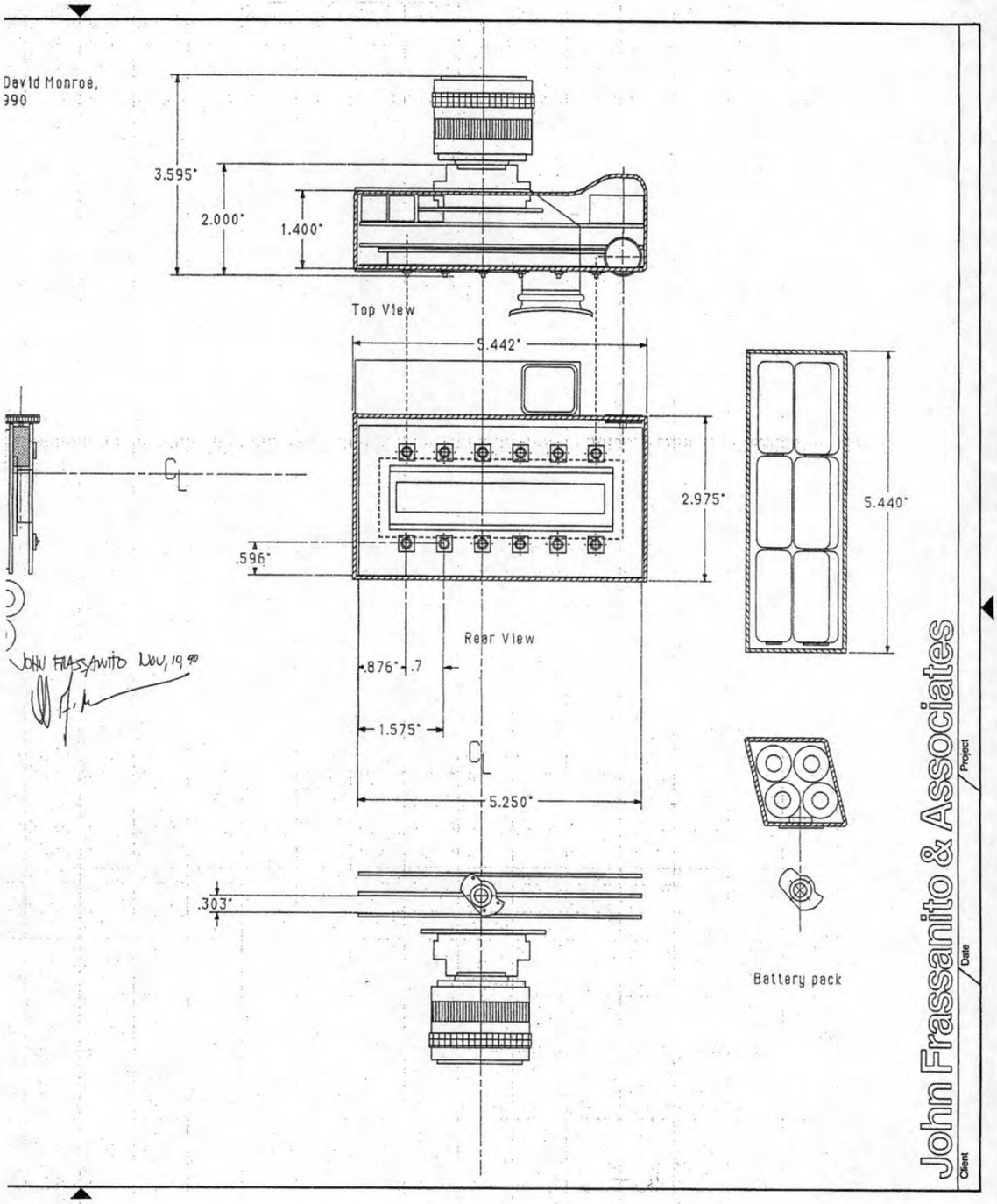
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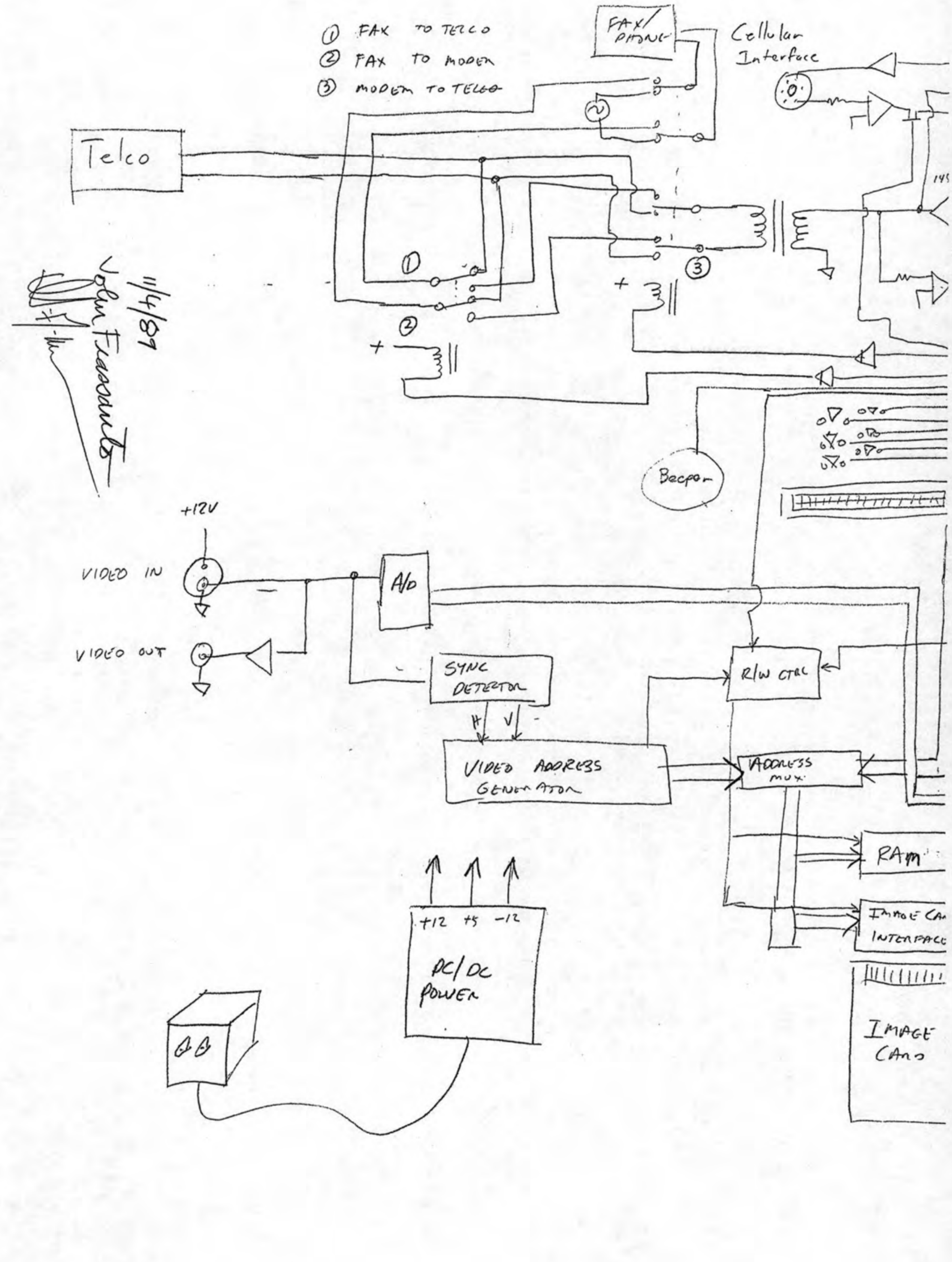
John Frassanito & Associates
Project
Date
Client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③ MODEM TO TELCO
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John Frassanito
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R/W CTRL
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RAM
IMAGE CARD INTERFACE
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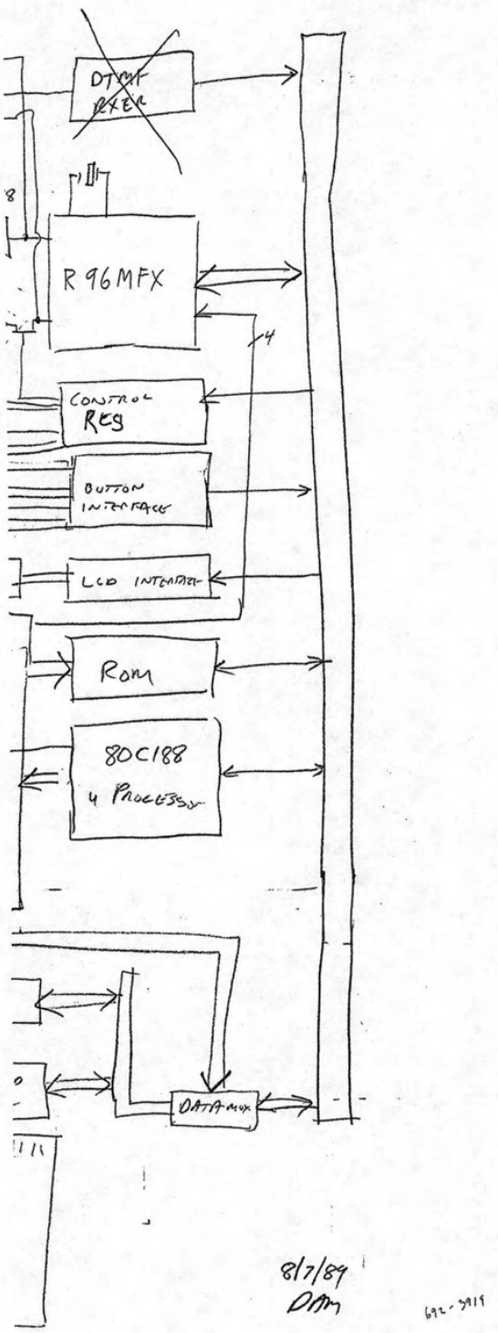
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CONTROL
REG
BUTTON
INTERFACE
LCD INTERFACE
ROM
80C188
4 PROCESSOR
DATA MUX
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DAM

PHOTOTELESIS
Business Plan

1987

PHOTOTELESIS Business Overview Copy #_____

January 27, 1987

The information contained in this memorandum concerning image transmission products for government applications is furnished to the recipient on a confidential basis for the recipient's exclusive use. By acceptance of this confidential memorandum the recipient agrees not to transmit, divulge, reproduce, or make available to anyone other than himself, this confidential memorandum and any exhibits and documents supplied in connection therewith. *Violation of this confidentiality requirement may place the recipient and the preparers of this document in violation of the Texas and Federal securities laws and the applicable securities laws of other states.*

Any decision to invest in this enterprise should be deferred until the recipient has had the opportunity to review a confidential private placement memorandum now in the process of completion which will describe the specific terms under which an investment may be made and the substantial risks involved in any such investment in addition to any risks which may be described herein.

Prior to the sale of any securities related to the corporation described herein, the preparers of this memorandum will undertake to make available to the recipient hereof the same kind of information that is specified in Schedule A of the Securities Act of 1933, to the extent such persons possess such information or can acquire it without unreasonable effort or expense.

Signature

PHOTOTELESIS Business Overview Copy #_____

January 27, 1987

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Signature

CONTENTS

EXECUTIVE SUMMARY

Overview

The charter of PHOTOTELESIS is to provide advanced image communications and processing systems to the U.S. Federal Government market. These systems are being developed using proprietary technology and integration of industry-standard components. The company provides total solutions to its customers including development, integration, manufacturing, marketing, support and training, using resources within the company as well as external contract resources.

The PHOTOTELESIS product line permits the capture, manipulation, storage and communication of images, documents and graphics using advanced techniques which permit communication to take place over ordinary voice grade telephone lines or specialized radio or satellite circuits.

The company specializes in providing products which may be connected to U.S. Government approved encryption devices, permitting secure (scrambled) operation over a variety of existing equipment designed for secure voice communications. PHOTOTELESIS also provides specialized packaging of its products to meet needs in desktop, airborne, naval and vehicular environments.

The company's objective is to develop its business to achieve annual revenues of over $7 million by the end of fiscal 1991, with pre-tax earnings of $1.6 million.

Company Background

PHOTOTELESIS was founded in September, 1985 to address specific vertical markets with image communications product needs. The company conducted extensive test marketing before selecting the Federal Government sector as the most promising area to develop. After consulting many high-level users within policy-making groups, the company generated product requirements which it felt would address broad needs within selected government departments and agencies.

The products developed from these requirements were announced at a major trade conference in May of 1986, and active marketing began. Initial product shipments commenced in June of 1986.

In the fall of 1986 the company completed development of its business strategy, assembled the executive team, and began work on a business plan to solicit funding for a significant expansion of marketing and manufacturing activities.

EXECUTIVE SUMMARY

The PHOTOTELESIS management team brings together broad skills in the management of high technology companies, as well as specific expertise in the development and marketing of image communications and processing systems. The company intends to focus its personnel on the key activities of marketing, product development, and administration, while utilizing outside contractors for manufacturing, certain specialized engineering, contract development and technical publications.

Market Potential

PHOTOTELESIS conducted intensive market research in 1986 in selected segments of the Federal Government market, and concluded that a significant opportunity exists for the company's products. Key indicators in forming this conclusion include:

- An identified and unfulfilled need for low cost image communications to support the development of major program-level initiatives in Communications, Command, Control and Intelligence systems (known as C^3I) for defense-related applications. The current budget calls for expenditures of $17.4 billion in fiscal 1987 to support major programs.

- The planned deployment of a new generation of secure and mobile communications equipment for the D.O.D. arena, with program-level expenditures on the order of billions of dollars in the next five years.

- The burgeoning market for products designed to government standards for handling classified information, called TEMPEST, presently estimated at $350 million and expected to double or triple in size by 1990.

- The absence of significant entrenched competition in providing packaged image systems to Department of Defense and related markets.

- The trend toward use of commercial equipment as opposed to high cost procurement of MIL-SPEC components.

The above indicators prompted PHOTOTELESIS management to test market reaction to its image communications technology and determine the applications, feature requirements and price points necessary for success in the targeted markets.

These activities resulted in the identification of highly receptive user groups in the following government departments:

- Department of Defense
- Executive Office of the President
- Department of Energy
- Department of Justice
- Department of Treasury
- NASA

PHOTOTELESIShas made revenue shipments of evaluation quantities to target customers during 1986 and has received orders for additional equipment for delivery in 1987. In addition, high-level user groups have been identified in each of the above departments who are prospects for sale in 1987.

Marketing Strategy

PHOTOTELESIS sells its products directly to major accounts in its target markets through government purchasing contracts, and plans to offer its products on the G.S.A. (General Services Administration) price lists. The company will also develop indirect marketing channels through Prime Contractors, Sales Representatives, and Value Added Resellers who specialize in government electronics marketing.

The company markets "top down" by identifying major program initiatives in high-level policy-making groups, and selling "seed units" to elite users who can set requirements for large volume contracts in the future.

PHOTOTELESIS management believes that rapid deployment of its image communications technology in high-level user groups will lead to the company's products becoming a defacto standard, as new users develop who require compatible technology. This strategy will provide a significant barrier to future competition in the image communications arena.

EXECUTIVE SUMMARY

Product Line Overview

The PHOTOTELESIS products are known as Remote Image Transceivers, or R.I.T.'s. The RIT is based on technology and components purchased on an O.E.M. basis from Image Data Corporation, who markets their product as The Photophone™.

The company has developed three versions of the RIT which are specialized for its target markets:

Desktop Products The company provides desktop RIT's which offer specialized communications options for secure, radio, or cellular operation, and provides an advanced high-resolution camera and shipping cases as standard features. A version of the desktop secure product is being developed for use in classified applications which require special design features and certification by the National Security Agency.

ATR-RIT Products This product is a repackaging of the desktop technology into an industry standard Aircraft Transport Racking (ATR) form factor suitable for mounting in aircraft, marine or mobile environments. The ATR-RIT is offered with both secure and non-secure communications options and may be powered by an optional battery pack or available DC power. The ATR-RIT permits image communications to take place from field locations such as battlefields, airspace or intelligence monitoring sites where conventional packaging techniques would be impractical.

Briefcase Products Test marketing has uncovered a great interest in a portable or "briefcase" version of the RIT for both secure and non-secure applications where portability is a necessity. The packaging technology for the ATR-RIT will be adapted for the briefcase products, yielding a package that will fit inside a standard briefcase form factor, including display, keypad, electronics, battery pack and communications interface. This product will siignificantly increase the market potential of the RIT technology and push the product into applications in which image communications has not heretofore been available. Target field applications include infantry, disaster recovery, paramedic, construction, surveilliance and security.

EXECUTIVE SUMMARY

Financial Overview

PHOTOTELESIS anticipates that revenues from its presently identified markets will be in excess of $13 million over the next three years, with near break-even profitability achieved during 1987 on revenue of $1.6 million. Pretax profits are planned to grow to $1.6 million by the end of calendar 1989 on revenues of $7.2 million. These forecasts assume penetration of presently identified markets only and do not include substantial potential for the company's products in other markets which have been tested.

The company's financial projections assume that the corporation is funded with $750,000 by the end of May, 1987. The funds will be used to expand marketing and product development activities, and to ramp up volume manufacturing through a subcontractor.

Notes

The Company

ABOUT THE COMPANY

History

Founded
PHOTOTELESIS was founded in SEPTEMBER 1985 and was chartered as a Texas Corporation in January 1987. The business purpose of the corporation is to address specific vertical markets with customized video transmission products.

Test Marketing
Specific product concepts were successfully test marketed at policy-making levels within NASA, the Pentagon, and Federal law enforcement agencies. User groups within each market sector were also consulted, and specific product specifications were derived.

Product Announcement
The first products were announced at the Armed Forces Communication & Electronics Association (AFCEA) 1986 International Conference & Exhibition in Washington, D.C. in May of 1986.

Development
The first product prototypes, Sec-RIT and ATR-RIT, were completed in January of 1987.

Orders and Shipments
Shipment of the Com-RIT product to the FBI occurred in June of 1986. Initial orders for Sec-RIT and ATR-RIT were taken in October and November of 1986, respectively.

Organization
Additional marketing and financial expertise were added when it became apparent the business opportunity was there. In December of 1986, a corporate strategy and business plan were developed.

NOTE: See product literature in this package for more details about specific products.

ABOUT THE COMPANY

Strategy

Our business strategy
Our business strategy is to take commercially available, "off-the-shelf" products, add our own technology, packaging, and marketing expertise, then sell to our customers. We will make use of contract personnel when appropriate to keep overhead costs down. Here's how it works:

Suppliers
Suppliers provide us with commercially available products, such as

- Image communication subassemblies
- Video equipment
- PC's and PC peripheral equipment.

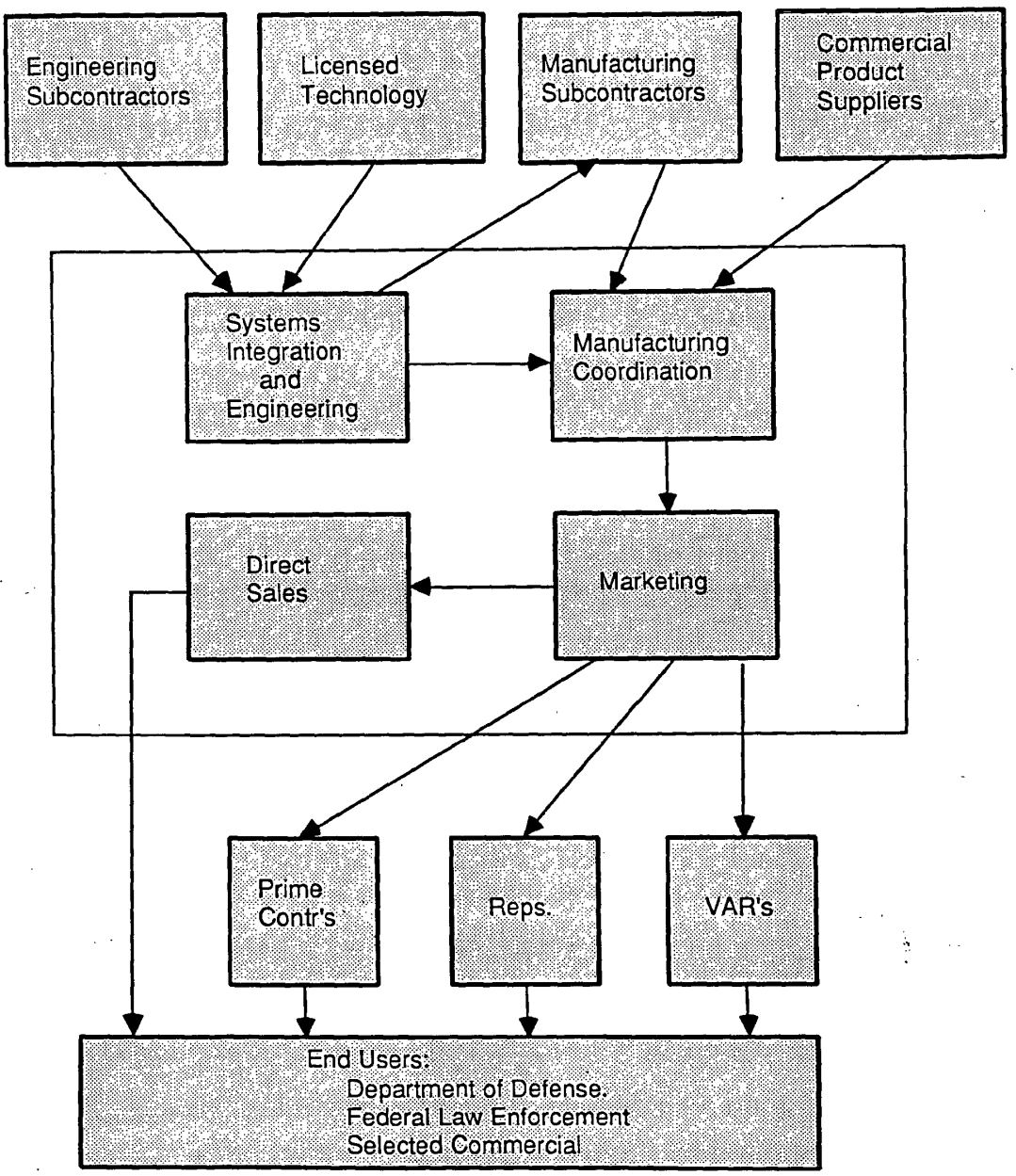
PHOTOTELESIS
Then we add our own technology and packaging to create our product. And we market these products to our vertical market sector.

Contract Personnel
We use contract professionals where possible. In particular, this is appropriate for legal work, certain engineering work, technical publications, documentation, advertising, and manufacturing.

As a result, we can produce specialized products from off-the-shelf products at very competitive prices. We offer these products through a variety of distribution channels. By using contractors where possible for our needs, we greatly reduce overhead costs.

ABOUT THE COMPANY

Strategy Illustration



ABOUT THE COMPANY

Organization

Present Organization
Presently our staff includes:

- David Monroe, President
- Larry Glidewell, Marketing and Sales
- George Leonard, Marketing and Sales
- Mike Huffman, Finance and Administration
- Eric Schweppe, Engineering

Planned Expansion
During 1987, we plan to add these staff functions:

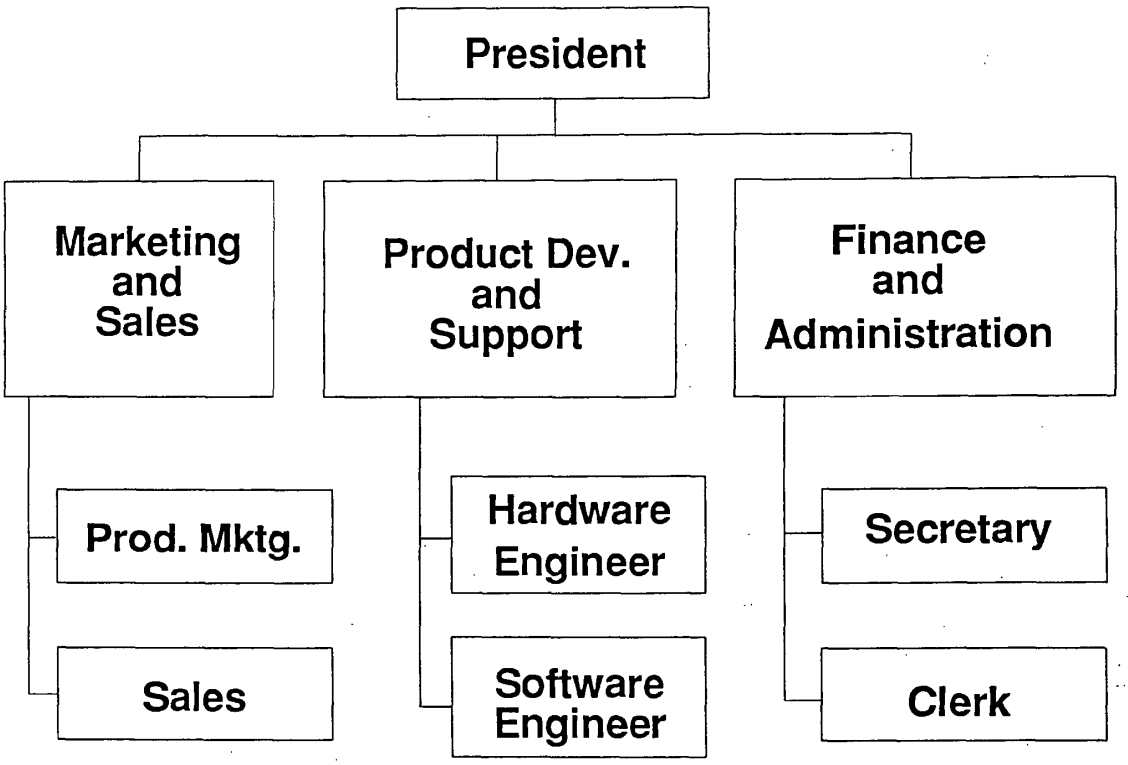
- Hardware Engineer
- Software Engineer
- Secretary
- Clerk

External Functions
These functions will be handled by contract personnel:

- Manufacturing
- Government Contract Development
- Customer Service
- Accounting and Legal
- Technical Publications and Documentation
- Engineering Services

ABOUT THE COMPANY

Organization Chart



ABOUT THE COMPANY

Management Profiles

The PHOTOTELESIS executive team contains the key strengths in management, finance, engineering and marketing that are required for success in the high technology systems field. This section presents brief profiles of each individual on the team.

David A. Monroe
David Monroe, 34, has worked as an engineer and scientist throughout his career, from individual contributor positions progressing to President and Founder of PHOTOTELESIS Corporation.

Prior to starting PHOTOTELESIS, Mr. Monroe was Vice President and Co-Founder of Image Data Corporation, where he developed the PHOTOPHONE video telephone product from concept through manufacturing startup and product introduction.

Mr. Monroe was previously Vice President of Office Graphics Systems of Datapoint Corporation, where he was responsible for the management of several of Datapoint's most complex development programs, including the company's Laser Printer, Color Graphics System, Impact Printers and Facsimile products. Prior to Datapoint, Mr. Monroe was Principal Engineer with Mnemonics, Inc., a San Antonio and Sunnyvale-based startup in the field of solid state memory systems.

As President, Mr. Monroe brings vital skills in management of high-technology startups, including research and development, product and market strategy, and general management of electronics and computer products companies.

Mr. Monroe's educational background includes Undergraduate curricula in Physics and Computer Science, University of Kansas, 1970-1973, Wharton Short Course on Finance, 1979, and AMA Management Course, 1980.

ABOUT THE COMPANY

Management Profiles

Larry P. Glidewell

Mr. Glidewell, 35, has a varied professional background in communications, organizational development, training, and marketing. Mr. Glidewell created the marketing function at PHOTOTELESIS to conduct the market research and test marketing required to define the business opportunities for the company's technology.

Prior to PHOTOTELESIS, Mr. Glidewell was a partner in Interactive Video Solutions in San Antonio, where he developed the marketing opportunity for computer controlled laser videodisc technology in the military and goverment markets. Mr. Glidewell previously was Founder and President of MAP Development in Houston, which was a pioneer in the use of interactive video and computer aided instruction for the oil and gas industry. Prior to this, Mr. Glidewell held management positions at NL Industries and Modern Management Methods in industrial and business training and development.

Mr. Glidewell's background provides the company with key strengths in management, business and marketing, as well as specific expertise in the application of high technology videodisk and teleconferencing systems in business.

Mr. Glidewell's educational background includes a B.S. in Communication, 1973, and an M.A. in Organizational Development, 1975, both from Oklahoma State University.

ABOUT THE COMPANY

Management Profiles

Michael L. Huffman
Mr. Huffman, 37, has an extensive background in finance, accounting, administration, and planning. Mr. Huffman joined PHOTOTELESIS to assume the management of the financial and administrative operations for the company.

Prior to this, he was Director of Finance and Administration for Network Standards Corporation in San Antonio, where he managed all financial, accounting and administrative operations for the company. Previously, Mr. Huffman held management positions in finance and administration at Datapoint Corporation, where he was actively involved in both marketing and product development functions. Prior to this, he held positions in financial analysis and business development with Duncan Smith Co. and Electronic Data Systems.

Mr. Huffman brings excellent credentials and experience to the company in the management of finance, accounting and planning functions, with specific expertise in high technology businesses.

Mr. Huffman's educational background includes a Bachelor of Arts and a Bachelor of Science in Civil Engineering from Bucknell University, 1972, and an MBA in Finance and Management from the University of Texas, 1978.

ABOUT THE COMPANY

Management Profiles

George L. Leonard

Mr. Leonard, 37, has a varied background in high technology electronic systems that includes product development, product management, marketing and sales. He joined PHOTOTELESIS to provide additional emphasis in the marketing and sales of the company's products.

Prior to joining the company, Mr. Leonard was Director of Marketing and Sales, Advanced Products Division, for Datapoint Corporation, where he managed the market research, introduction and marketing activities for a new generation of desktop networked video conferencing equipment. Previously, Mr. Leonard held various management positions in product marketing, product development and planning for Datapoint's office automation product line. Prior to this, Mr. Leonard was engaged in product development and engineering management at Basic Four Corporation, Panhandle Eastern Pipeline, and GeoSource International.

Mr. Leonard brings key skills to the company in sales, marketing, and product management, with specific expertise in the field of desktop video conferencing.

Mr. Leonard's educational background includes a Bachelor of Science, Electrical Engineering, 1972, and a Master of Electrical Engineering, 1973, both from Rice University.

Notes

The Market

THE MARKET

Background

Initial Marketing Contacts

In the fall of 1985 PHOTOTELESIS became interested in the possible application of video telephone technology in the Department of Defense. Through an association with General Doyle Larson, USAF (Ret.), introductions were made to Donald Latham, Assistant Secretary of Defense, Communication, Command, Control, and Intelligence.

After an initial briefing on the product in Washington, Mr. Latham was sufficiently impressed with the product that he arranged a briefing with General Rice, Chief of Joint Special Operations Command, and General Perroots, Director of the Defense Intelligence Agency, and their staffs, to introduce them to the image transmission capabilities that PHOTOTELESIS had to offer. This meeting, although scheduled for only twenty minutes, lasted for two and a half hours.

What We Learned

The need for image transmission was well known at the policy levels represented in the briefings, and there was significant interest expressed for products which could provide this need. Mr. Latham was a strong proponent for the military buying and, if necessary, modifying existing commercial equipment rather than incurring the time and expense of developing specifications for bid with large companies that specialize in custom government products. Our product not only fit his model of acquisition and cooperation with the corporate sector, but also fulfilled a need within the C3I (Communication, Command, Control, and Intelligence) community, which is involved in communications across all branches of the military.

We learned that several changes to the standard desktop product would be necessary for widespread use within the C3I arena. First, the unit would have to be made compatible with standard encryption devices (known as COMSEC, for Secure Communications), already in use in the military. Second, the product would have to be modified to meet a government standard known as TEMPEST, in order to permit it to handle classified information in a manner that could not be detected electronically by enemy groups.

We also presented a prototype of a portable image transceiver which fit in a briefcase. There was a great deal of interest in this product for use in the field where small size, battery power and radio or satellite communications is required.

THE MARKET

Background

Results

Based on the positive reception to our product concept, we were given points of contact within specific user groups and encouraged to discuss our capabilities and their requirements for image transmission products. We concluded that discussions and demonstrations with these groups would allow us to test whether there was indeed a market opportunity for our products.

THE MARKET

Test Marketing

Objectives

The enthusiastic reception to our products in the C3I market convinced us that a project should be initiated to test the overall market firsthand. The use of image transmission technology in this market was so new that there was no market research data readily available, but we determined that collecting primary market data from potential users would be even more valuable. The objectives of the market test were to determine

- the user needs and potential volume for image transmission products
- how the government would go about purchasing the products
- what competitive products might already exist
- what features and pricing would be required

Initial Product Demonstrations

Initial user groups that were contacted within the C3I community included the National Security Agency, Joint Chiefs of Staff, Special Operations Command Atlantic (SOCLANT), FBI, NASA, Secret Service, White House Communications, Defense Communications Agency, Defense Intelligence Agency, and groups from the Department of the Army. We held additional briefings in Washington with Army Intelligence, Drug Enforcement Administration, U.S. Postal Investigation Service, Voice of America, Joint Special Operations Agency, and Army Psychological Operations.

The information that was collected from presenting the product to these user groups confirmed that there was a substantial market opportunity for off-the-shelf image transmission equipment. The requirements for COMSEC compatibility and TEMPEST certification were also validated by these groups. We also collected additional information on the need for units that could operate in mobile or portable applications, communicating imagery back to a central "base station" Many groups indicated that the product concept and price range was superior to other imaging products available to the government, and that in fact there was no incumbent product in widespread use.

THE MARKET

Test Marketing

Placement of First Units

The test marketing activities led directly to purchases of initial units from the FBI and Army groups located at Ft. Eustis and Ft. Belvoir. Ft. Bragg SOCLANT, who provided valuable information in defining product features and assistance in compatibility testing, took delivery of the first two prototype encryption-compatible units, which would later become the Sec-RIT. The FBI purchased two units for evaluation, including the first delivery of a unit later called the Com-RIT that could transmit images from a vehicle over cellular telephone. An Army group awarded us a contract for a unit that could be mounted on an aircraft and transmit images over satellite-based secure voice equipment to a distant command center.

Conclusions - the Opportunity

Several conclusions were evident from the market test. First, there appeared to be a substantial immediate market opportunity in the groups that were sampled for a relatively low-cost, off the shelf image transceiver. Although the purpose of our test marketing was to gather information, we received orders in addition. There did not appear to be substantial entrenched competiton for encryption-compatible image transceivers that could operate over existing voice communications facilities. Although more market data was needed to properly measure the total opportunity, there was enough primary data available from talking to prospects and initial customers to justify moving ahead with a major product announcement.

Conclusions - Product Requirements

Second, specific product modifications in the packaging and communications areas were mandatory to allow interested groups to use even evaluation quantities of units. We concluded that three product families would be required:

- desktop units, for command centers and other stationary installations
- mobile units, for use in vehicle, aircraft or marine platforms
- portable units, for personal use anywhere in the field

Each of these families had to operate over existing secure voice communications systems, and at least the desktop units would have to meet TEMPEST standards to address the broad market. We also saw needs for networking these products together, to allow for multi-site briefings or access to remote image databases.

THE MARKET

Test Marketing

We concluded that this product line could meet broad-based needs in defense or federal law enforcement markets, where, combined with existing communications, complete image networks could be constructed. This concept is illustrated in the accompanying diagram.

Conclusions - Applications

Many of the applications that we found for our products are in the intelligence community for use by analysts who deal with image-based information on a daily basis. While the specific applications of our users are classified, some of the areas of use include :

- real-time collection and dissemination of reconnaissance imagery from video or radar-based sources
- remote access to documents, drawings, maps, or technical illustrations
- multi-site briefings with graphic support
- communication of images from stationary imaging systems to remote sites
- remote access to image archives for personnel identification, medical records, or intelligence files
- real-time visual access for remote expert consultation and problem solving

Conclusions - Marketing

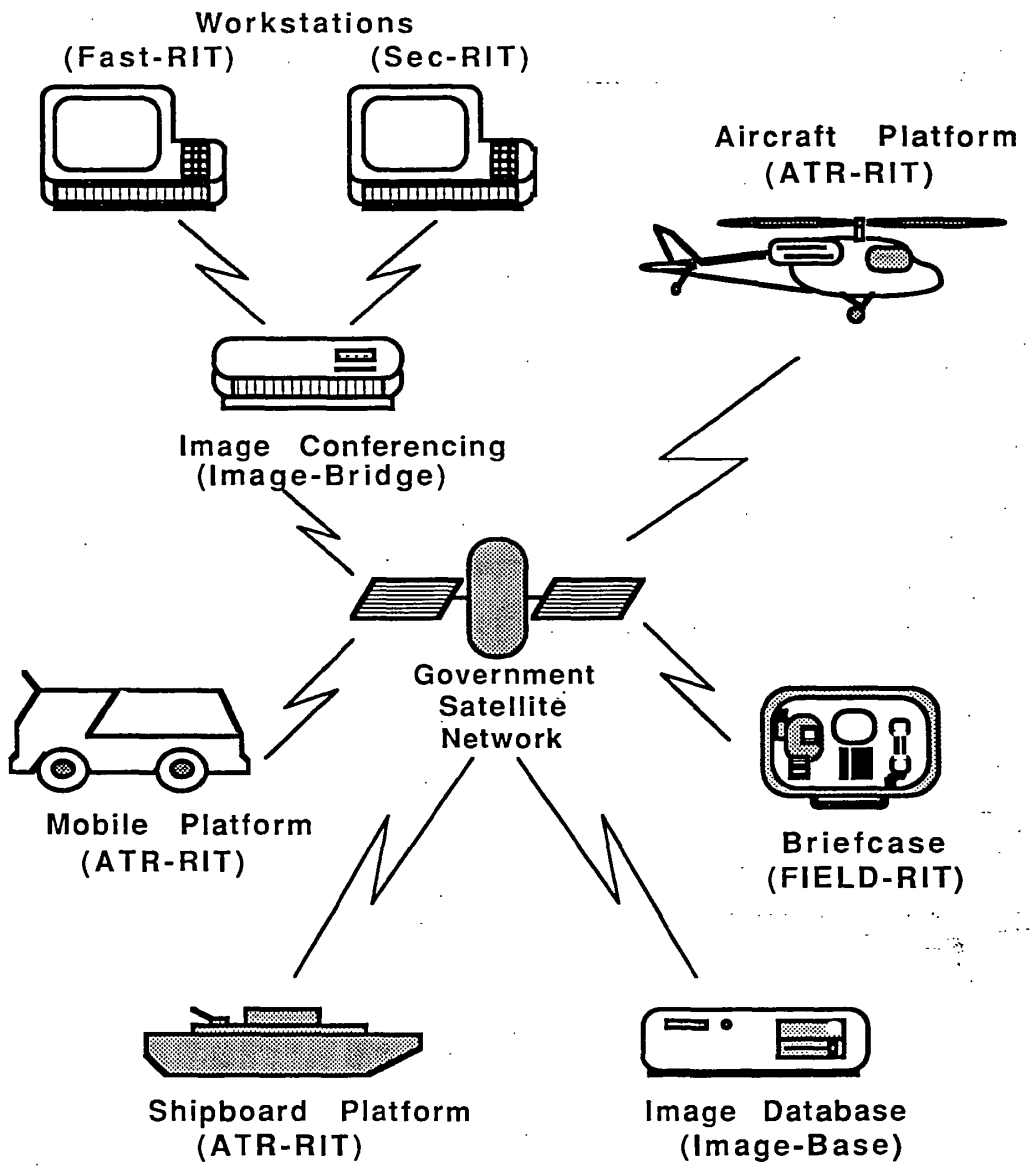
We discovered that the user community that was interested in our products was tightly knit because of common requirements, so that initial success in one group could spread by word of mouth to other groups with similar needs. *As a result, it looked like a small but highly focused marketing effort could be highly productive.*

We also discovered that interoperability, a term for the ability of different communications or computer equipment to work together, is a key factor for market success. Because of the different custom imaging systems we found installed, there is no widespread interoperability in place between groups. *We concluded that marketing*

THE MARKET

Test Marketing

This diagram illustrates our products in a typpical customer appiication.



success with one group could lead to requirements for new groups to have compatible equipment.

We also concluded that our marketing success depended on working through a triangular relationship of policy makers, user groups, and contracting officers or acquisition groups. Understanding the overall direction of government programs and gaining the support of the policy makers allows us to select key user groups to address. Placing evaluation, or "seed" units in these groups gains us influence in the development of specifications for future volume contracts. Finally, working through the acquisition groups to win major contracts for our products can create substantial barriers to future competition.

In short, we had found a market niche that had immediate requirements, had funds available to spend, and could be successfully penetrated by a small, aggressive company that could be more responsive to user needs than the established government contractors.

During the test marketing project we demonstrated our products to over thirty user groups who have an application which they are interested in pursuing. These groups form the basis for our 1987 forecast, which is detailed in the Marketing section that follows.

Announcement

In May of 1986, PHOTOTELESIS announced the Sec-RIT and Com-RIT product lines, as well as future directions in portable and TEMPEST qualified units. The products were announced at a major military trade show known as AFCEA (Armed Forces Communications and Electronics Association). There was strong user interest at the show, resulting in over fifty qualified leads for future business. Press releases were published in magazines targeted at both defense and communications audiences which have to date resulted in over 250 leads for Com-RIT and Sec-RIT products. Copies of our press releases may be found in the Appendix.

THE MARKET

Market Statistics

Introduction

During the test marketing campaign, we concluded that additional data should be gathered on the size of the markets we were interested in, and on major policy directions in the Department of Defense that were influencing the market and might be advantageous to us in the future. Since no research reports on image communications equipment in the military was readily available to us, we began to collect statistics through a variety of sources, including books, articles, newspaper stories and personal interviews with highly placed individuals in the military.

Our primary focus remained the C3I market: Command, Control, Communications and Intelligence. Within that umbrella term for all D.O.D. communications programs, we identified three major government programs that were relevant to our market thrust:

- TEMPEST qualified products
- STU-III Secure Telephone Units
- Mobile Subscriber Equipment

Each of these programs is described on the following pages, including forecasts of future market opportunity. Then we will draw conclusions about their importance to our marketing direction.

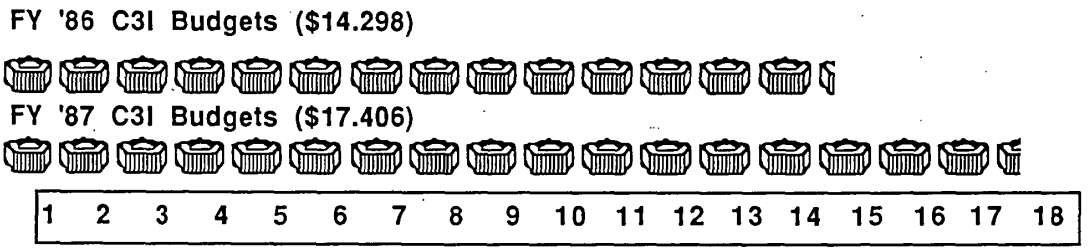
THE MARKET

Market Statistics

Command, Control, Communications and Intelligence (C3I)
Programs that involve D.O.D secure communications in all branches of the Military are grouped into this classification for administrative control. The Assistant Secretary for C3I reports to the Secretary of Defense, and oversees all policies and budgets regarding agencies, programs, and acquisitions of equipment.

Deployment is accomplished through the Joint Chiefs of Staff to all Military service Command, Control, Communications and Intelligence branches through their world-wide organizational structure composed of CINC's (Commanders in Chief) representing regional and strategic commands. Departments of Army, Navy, Air Force, and Marines may have individual programs, but C3I seeks to ensure inter-service and NATO compatibility.

The growth of budgets for C3I programs provides a broad market opportunity for adding our secure image communications products to D.O.D.secure communications systems.



Source: C3I Handbook, P. 262, Defense Electronics, 1986.

THE MARKET

Market Statistics

TEMPEST

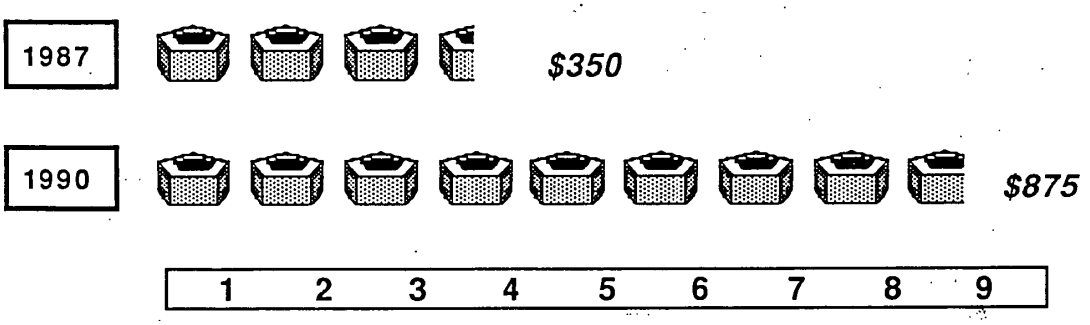
TEMPEST is the Federal government's word for the countermeasures taken on electronic and data processing equipment to prevent them from emitting electronic signals that can be detected by unauthorized persons. TEMPEST requirements are quite common in the Federal government, thus creating an opportunity for TEMPEST qualified image transmission systems.

TEMPEST equipment is required in many office environments in the U.S. Federal government which deal with classified information, and for almost all non-tactical applications outside the U.S. TEMPEST-qualified products command a high price premium in the market compared to comparable commercial versions.

"Government and industry officials are forecasting a steady demand for TEMPEST equipment and services over the next five to ten years.

Current expenditures are $350 million, a number that might easily double or triple by the end of the decade."

We will provide TEMPEST-compatible desktop and portable Remote Image Transceivers to take advantage of the tremendous growth in this market area.



Source: C3I Handbook, Pp 181-200, Defense Electronics, 1986.

THE MARKET

Market Statistics

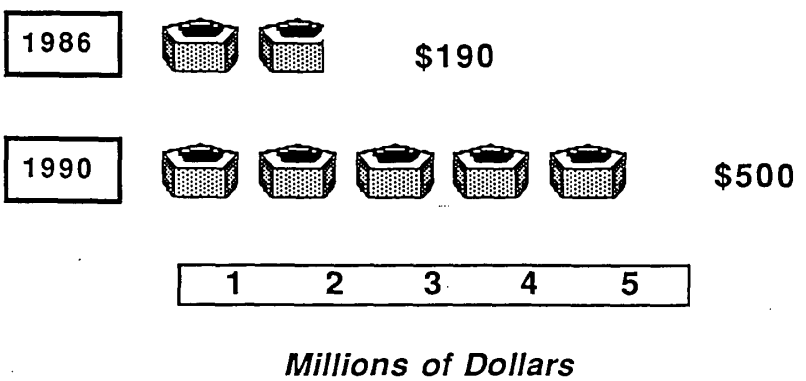
Secure Telephone Units

STU-III is the acronym for the third-generation Secure Telephone Unit program. This program extends to all Federal agencies and contractors, creating a tremendous market opportunity for encryption-compatible desktop image transceivers.

Special Secure Telephone Units (STU's) are being developed and produced under a National Security Agency sponsored program. Initial contracts let in 1986 worth $190 million will allow the secure telephone market to expand from the current STU-II's to up to 50,000 new STU-III's. Ten thousand units will be produced per month and will sell for around $2000. Initial contracts were let to RCA ($84.7M), AT&T ($55.2M) and Motorola ($50.1M). Industry estimates forecast a market size of $500 million by 1990, resulting in an installed base of up to 500,000 units over the next ten years.

Our Sec-RIT product is designed for compatibility with STU-III, opening a vast new market for us as these telephone systems come into use. ***For example, if five percent of the expected STU-III desktops are candidates for image transmission, that represents a total available market of 25,000 units over the next ten years.***

Contracts in Place and Future Growth



Source: The NewYork Times, Tuesday, July 8, 1986
Defense Electronics, March, 1987.

THE MARKET

Market Statistics

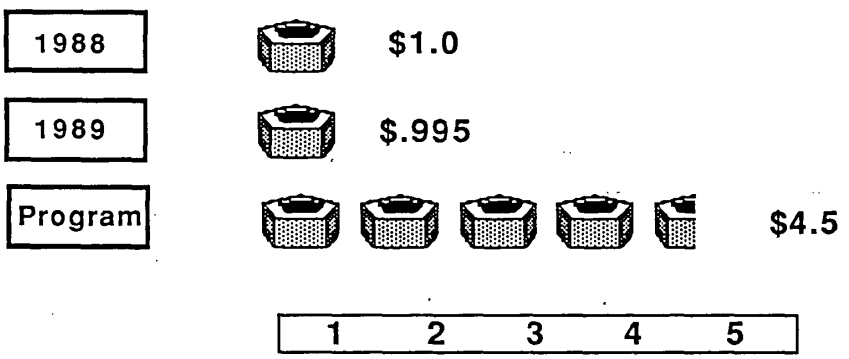
Mobile Subscriber Equipment

The Mobile Subscriber Equipment (MSE) program is a new U.S. Army program which provides vehicular and man-portable communications equipment.

The largest procurement of tactical communications equipment in history, MSE is often described as "the Army's Cellular System". With initial operation scheduled for 1988, the program will provide a worldwide secure switched network for voice, data, teletype, and facsimile communications for digital radio telephone users, switched system subscribers, information processing facilities, and combat-net radio users. This program is slated for expenditures of $1.0 billion in Fiscal 1988 and $995 million in Fiscal 1989. Total program expenditures are expected to top $4.5 billion.

Our ATR-RIT and briefcase product families will be compatible with these new cellular systems. ***If the market for image transmission is only one percent the size of the totoal MSE market, it represents a $10 million opportunity for us in 1988 alone.***

MSE Program Expenditures



Source: C3I Handbook, P.119, Defense Electronics, 1986; Microwave Journal, February1987.

THE MARKET

Market Statistics

Conclusions

Our investigation into these major programs has yielded several important conclusions:

First, the overall C3I market is receiving major funding for communications equipment and is projected to have strong future growth. We have developed direct contacts to policy makers in this arena who are enthusiastic supporters for our products. Moreover, C3I has the organizational focus across all branches to allow us to market our products using a top-down approach without needing a large direct sales force.

Second, the market for TEMPEST equipment is growing at a rapid pace and is projected to continue to do so over the next five to ten years. This indicates a ready market for TEMPEST-compatible versions of our products, important because the broad market opportunities for us are in applications which demand TEMPEST certification.

Third, the STU-III market indicates a major shift in thinking about COMSEC, or Secure Communications, in the Federal Government, from a few expensive units in limited locations to a broad deployment across all branches of the government that deal in classified information. Since these units are just now beginning to appear in the market and are being manufactured in very large quantities, we are well positioned with our COMSEC and future TEMPEST-compatible product line on the leading edge of an important new market.

Fourth, the projected growth in the Mobile Subscriber Equipment market points to a vastly increased emphasis on world-wide military communications in the field. We are well positioned to take advantage of this new market with our secure mobile and portable products.

Taken in total, we have concluded that these programs point to a major market being formed for products which are compatible with the new generation of secure communications equipment. Our research points to strong growth in this market over the next five years, creating a total available market measured in the billions of dollars, and tens of thousands of "sockets" into which we can plug our products. We have already made significant strides in developing compatible products for this market and have focused our marketing resources on tracking and penetrating major contract opportunities for our image-based product line.

Notes

Competition

COMPETITION

Products

Introduction

A key factor in assessing the market opportunity for the PHOTOTELESIS product line is the presence of competition, particularly in the areas of image transmission systems that offer COMSEC compatibility, can operate over existing voice communications facilities, and are offered in TEMPEST versions. One of our best sources of competitive information is our own customers, who have consistently told us that our product concept is unique in the market.

We realize, however, that there are many communications products and systems in the federal government that are competing for contract dollars, even though they may cover a wide diversity of features and price points. This section takes a look at the competitive environment that currently exists and draws several conclusions that influence our marketing strategy.

Video Conferencing Products

Currently, video transmission in the Federal arena is primarily confined to full-motion (i.e. closed circuit television) systems. These systems are installed in expensive, custom conference rooms for use between high-level management groups. The cost per room is usually in the range of $100-250 thousand, and the cost per hour of use ranges from $250-750. Communications lines which can handle the high speed video information between rooms are highly specialized and in short supply. Although some of these rooms operate over encrypted circuits, security remains a significant problem. Some rooms utilize lower-cost freeze-frame equipment which can send still pictures over standard telephone lines, but the equipment is customized for each installation and, like the full-motion systems, complex to operate.

Tactical Imaging Requirements

Many groups within the Federal government deal with image-based information on a routine basis. Military and law enforcement groups who collect images in the field often record the images on video tape, which must then be delivered by courier. Alternately, they use conventional camera technology, which must be developed and printed before the images can be couriered to their destination or sent by facsimile.

The advantages of video transmission are that any image, whether it be a document, object, person, or scene, can be captured instantly from any video camera source. Once captured, the image, now in digital form, is compressed and sent over a standard voice-grade communications circuit.

COMPETITION

Products

Key factors in applying this technology are:

- the resolution, or clarity, of the image received, including documents, objects, persons, or scenes
- the speed at which an image can be transmitted
- the ability of the transmission device to achieve error-free communication
- the ability to use all types of voice communications circuits, including telephone, radio, and satellite, in both secure and non-secure modes
- the ability to operate the device in fixed, mobile and portable environments
- the ability to transmit classified information without risk of electronic detection
- ease of use to minimize training time
- low cost to acquire and operate
- reliability
- off-the-shelf availability

Freeze-Frame Video Transmission Systems

There are two principal vendors providing commercial video image transmission systems to the Federal Government: Interrand Corportation and Colorado Video. There are also two main vendors providing military equipment: Dalmo-Victor (division of Singer), and E-Systems. Detailed comparisons of these products against the PHOTOTELESIS products are presented in tabular form at the end of this section. A few salient points are worth noting here:

- The commercial products, which have been used mainly in conference room applications, are not known to have government-supplied encryption interface capabilities, operate only on standard telephone circuits, are not offered in TEMPEST form, and are not available in versions which can be used in mobile or portable applications.

- The military products are very expensive, not available off-the-shelf, do not operate in a network which permits multi-point briefings or remote image database retrieval, are difficult to use, and are not offered in compatible desktop versions.

In short, although some competitive features are offered by each product, no one product meets all the required characteristics defined above.

Facsimile Products

Facsimile technology provides a way to electronically scan flat images, such as documents or photographs, and send them over ordinary telephone lines. Facsimile technology is capable of high resolution, or image clarity, for black and white images, but suffers in comparison to video techniques where the image has many intermediate levels of gray, such as images of objects, people, or scenes. Facsimile devices attempt to accomodate for this deficiency by using a technique called *half-toning,* which uses closely spaced patterns of black and white dots to simulate shades of gray.

Two military facsimile devices currently in use are the Tactical Field Fax, available from various manufacturers under D.O.D. contract, and the MDFT, manufactured under federal contract by Video Masters. These devices are compared to the PHOTOTELESIS products in a table at the end of this section. The main conclusions of this comparison are as follows:

- Facsimile devices are the preferred alternative for the transmission of documents only, where their high resolution and low cost are significant advantages.

- Facsimile is poorly suited to other kinds of imagery, since the image must first be captured and printed by some other means before it can be fed into the facsimile scanner, a time-consuming process which also degrades the image. Facsimile transfer does not faithfully reproduce the shades of gray in an image, which is vital in many tactical applications including personnel identification, reconnaissance imagery, etc. Therefore, video techniques will be preferred when one device must be usable with a variety of image sources.

- Facsimile protocols are sensitive to communications line quality; "drop-outs" on the line can cause portions of the image to be destroyed, necessitating resending the entire image. The PHOTOTELESIS products use a coding technique known as forward error correction for error-free transmission over a wide range of line quality.

COMPETITION

Products

Desktop Products

Feature	PHOTOTELESIS	INTERRAND	COLORADO VID.
Resolution (pixels)	592x440x128	640X480X256	512x480x256
Speed (seconds)	10-40	10 for partial resolution 80 for full resolution	25
Error Correction	block transmission forward error correction	error checked	no
Transmission	telephone, radio, cellular, satellite	telephone	telephone
Encryption Compatible	yes, programmable	unknown	unknown
Packaging	desktop,mobile, portable	desktop or console	rack mount
Ease of Use	menu based, helps	manual controls	manual controls
Cost	$10,000-24,500	$11,000-75,000	$15,000 est.
Availability	off-the-shelf	off-the-shelf	off-the-shelf

Note: Data sheets are included in the Appendices.

COMPETITION

Products

Military Products

Feature	PHOTOTELESIS	DALMO-VICTOR	E-SYSTEMS
Resolution (pixels)	592x440x128	256x256X256	512X480X256
Speed (seconds)	10-40	3-180	120
Error Correction	block transmission forward error correction	yes	none specified
Transmission	telephone, radio, cellular, satellite	radio, satellite	radio, satellite
Encryption Compatible	yes, programmable	yes	yes
Packaging	desktop,mobile, portable	mobile	two man portable
Ease of Use	menu, help screens	manual controls	manual controls
Cost	$18,500-24,500	$50-100,000	unknown
Availability	off-the-shelf	special order	unknown

Note: Data sheets are included in the Appendices.

COMPETITION
Products

Facsimile Products

Feature	PHOTOTELESIS	FIELD FAX	MDFT
Resolution (pixels)	592x440 per image	204x19per inch	75-300 per inch
Gray Scale	128 levels	4-16 levels	5-33 levels
Input Medium	high res. camera	flat scanner	flat scanner
Speed (seconds)	10-40	7-15	15
Error Correction	block transmission forward error correction	none	none
Transmission	telephone, radio, cellular, satellite	radio, satellite	radio, satellite
Encryption Compatible	yes, programmable	yes	yes
Packaging	desktop,mobile, portable	rack mount, 110v.	two suitcase portable
Ease of Use	menu, help screens	manual controls	manual controls
Cost	$18,500-24,500	$7800-16,800	unknown
Availability	off-the-shelf	D.O.D. contract	unknown

Note: Data Sheets are included in the Appendices.

COMPETITION

Conclusions

We have drawn several conclusions from our analysis of the competition:

First, the PHOTOTELESIS approach to image transmission is clearly different and superior to other solutions on the market. We believe that we uniquely meet all the requirements for success stated earlier:

- we offer high resolution combined with full gray-scale capability that gives excellent image clarity with a variety of subject material
- our transmission protocols achieve error-free communication even with marginal communications channel quality
- we can send a typical image over encrypted circuits in 20-30 seconds, and over standard telephone lines in under 10 seconds
- we use a wide variety of voice communications circuits and encryption devices
- we can operate in fixed, mobile and portable environments
- our TEMPEST version will permit us to transmit classified information without risk of electronic detection
- we offer ease of use through simplified control panels and menu-based operation
- our products are low cost to acquire and operate
- our design has proven reliability
- we offer off-the-shelf availability

Second, although there are different, incompatible products available which meet some of the needs above, our product line meets them all in one family of interoperable products.

COMPETITION

Conclusions

Third, we believe that we can minimize competitive threats from other companies with substantially greater resources than ours by

- offering products which are tailored to meet specific user needs by providing compatibility with a wide range of communications systems and encryption devices
- offering a range of compatible product solutions which can work together
- providing products at attractive price points
- concentrating on penetrating key applications early and establishing our products as the standard, thus locking out competition with incompatible communications protocols

Notes

Marketing

MARKETING

Sales Process

Customer Model

We view our customers and prospects in groups which may be represented as a market pyramid. In an emerging market, penetration occurs at the top of the pyramid where there are a limited number of innovative groups who are eager to purchase state-of-the-art technology. Moving down the pyramid we find larger groups of users, but they are more risk-averse and depend on a more established market before they will commit to purchase. Relating this model to our own customers, we see the market pyramid in four broad groupings:

Advocates

Product advocates are willing to take standard products for Test & Evaluation, then upgrade to meet full requirements. Purchase volumes: 2 units per order.

Early initiators

These users must have encryption-compatible units, but do not need to meet all feature requirements initially. Their applications are limited to CONUS (Continental U.S.) operations, since TEMPEST qualification is required for most work off-shore. Purchase volumes: 2-6 units per order

Test bed users

These groups must prove their products through their own testing and evaluation. Then they will use them in a "test bed" or representative tactical application. They will do their own TEMPEST testing if required. Purchase volumes: 6-30 units per order.

Large groups with established requirements

Volume orders (30-500 units) over a period of time on open contract, through GSA schedule, or in conjunction with a large contract for other equipment. Many applications will require full TEMPEST certification. Contracts are usually associated with a major program, e.g. STU III, MSE etc.

MARKETING

Sales Process

The Role of Product Advocates

The product advocates mentioned at the top of the market pyramid are extremely important to us as we penetrate new application areas for our products. These users are well known for their expertise in communications and have sufficient "clout" to purchase test and evaluation units. They make their reputation by being the first to use a product in a new area, and are eager to participate in product demonstrations to other user groups. They become "inside salesmen" for the product and are invaluable in establishing early successes. We have developed such champions in each of the initial user groups we have sold into and view their role as an important element of our marketing strategy.

Sales Process

We have found that successful sales of our products follow this pattern:

- We identify a potential user group through referrals from policy makers or other user groups. They might be identified by their function within a service group or their association with a major communications program.

- Our customers must meet the following qualifications:

    - funds presently budgeted for imaging systems, either on a line-item or discretionary basis
    - defined requirements in place which either fit our products or can be influenced
    - a high priority assigned to the project
    - active involvement of a contracting officer or acquisition group
    - a visible product advocate

- After initial contact by telephone, and assuming the group meets our qualification criteria, we send out a letter and documentation package tailored to their application.

- A follow-up call after the literature is delivered tests interest and identifies specific applications and requirements. A demonstration and briefing is arranged, at headquarters or the customer site.

- The demonstration briefing is held, with participation from key decision makers and their staff. The demonstration is tailored to their applications. We ask for an order for test and evaluation (T&E) units.
- Based on immediate funds availability, the T&E units are purchased and used internally to evaluate the group's broader requirements.

- Based on use of the T&E units, the user groups develop written requirements and assign a contracting officer to develop the contract. Key issues involving contract type, price, quantitiy, contract options for future purchases, and options for other groups to purchase from the same contract are negotiated. More information about contract development is contained in a later section.

Our strategy is to use the above process as a model for our direct marketing activities, tracking the progress of each account through the steps outlined above. In this way we plan to minimize unproductive use of our marketing resources and maximize our focus on accounts that can be developed into volume contracts for our products.

Pricing

Pricing Strategy

We have set our product pricing based on a value-added premium to the commercial PHOTOPHONE product offered by Image Data Corporation, and our analysis of the competition in our market segment. Our goal is to achieve high product gross margins while offering our products at a substantial price advantage to present competition. Our ability to achieve these opposing goals of high margins and price leadership reflects our belief that we have developed and can defend a market niche that has very attractive potential profitability.

Our financial model assumes that our pricing declines by 10% in the second year after product introduction, and 5% per year thereafter, to account for the effects of emerging competition and continued price reductions in the commercial market. We believe that our gross margins will not be eroded by this price reduction due to manufacturing cost efficiencies as our shipment volumes increase.

Commercial Product

Our Fast-RIT product is priced competitively with the PHOTOPHONE at $10,000, including high-resolution solid state camera and shipping case.

Secure Desktop Products

Our Sec-RIT product is priced at $18,500. We do not offer the secure interface as an optional upgrade to the Fast-RIT since the price premium is greater than the market would bear for an encryption interface alone. We estimate that the TEMPEST Sec-RIT, when introduced in 1988, will have a list price of $28,000, reflecting the substantial premium that TEMPEST products command in the marketplace.

Mobile Products

The ATR Sec-RIT carries a list price of $24,480. Although a high margin product, this price is much lower than anything presently offered in today's market.

Briefcase Products

We estimate that the Field Sec-RIT, when introduced in 1988, will have a list price of $18,500, slightly higher than the 1988 price for the Sec-RIT of $16,650. We believe that offering this product at only a slight price premium to our desktop product, while providing substantial additional functionality, will serve to stimulate this new segment

of our market. This product will be introduced in a TEMPEST version in 1989 for $28,000.

Options and Spare Parts

Each of our products are offered with optional features such as encryption interface cables and video printers. Many of our customers also require on-site quantities of spare parts. While these contribute to our revenues and profitability, our financial model does not include them.

Discounting

Our published pricing does not include discounts for volume purchases. We anticipate that all volume purchases of our units will be by contract, and prefer to negotiate these on a case-by-case basis. We believe we can minimize volume discounting in the initial years due to the lack of substantial direct competition and the relatively small size of anticipated purchase contracts during the Test and Evaluation and Test Bed phases of our market development.

Price and Gross Margin Summary

Product	List Price	Gross Margin %
Fast-RIT	$10,000	41
Sec-RIT	$18,500	67
ATR *Sec*-RIT	$24,480	81
Field *Sec*-RIT	$18,500 (est.)	75
TEMPEST *Sec*-RIT	$28,000 (est.)	70
TEMPEST Field *Sec*-RIT	$28,000 (est.)	70

MARKETING

Sales Status

Background
During our test marketing project we demonstrated our products to a number of user groups, some of whom became customers or placed orders in 1986. We started 1987 with a sales backlog and a growing list of groups who are interested in purchasing our products now that they have reached production status. We also have a list of groups who are interested in our products and are waiting for a product demonstration. Additional prospects have been identified who have received our literature, read a press release, or seen us at a conference. We are well positioned as our marketing activities expand in 1987 with an exisiting customer base and a database of qualified prospects to address.

This is our sales status as of the end of March, 1987:

Current Customers
We have three customer accounts presently in our target markets.

Groups with Orders Pending
A total of five customers have orders presently in progress, one of which is presently booked.

Qualified Prospects
We have demonstrated our products to 42 user groups who have applications for and interest in our products.

Target Organizations
Our database contains over 70 organizations in our target market known to have applications for imaging products. We believe that many of these organizations will yield multiple interested user groups as we address them.

Press Release Responses
We presently have 67 responses from our ***Sec*-RIT** press release to pursue.

MARKETING

Forecasts

Introduction
In this section we will discuss our model of the sales cycle for our products, how we develop our forecasts from this model, the prospect list we are targeting, and our detailed forecasts. We will present our a monthly forecast by product for 1987 and yearly for 1988-1991.

Sales Cycle Model
Purchasing practices in the Federal Government market differ substantially from the commercial market. We have already described the sales process in a previous section. The sales cycle model takes each step of this process and maps it against an approximate timeframe to complete each step. This model has been tested against our experience over the last year and by consultation with individuals who are experienced with government procurement, both on the user and vendor sides:

Prospect Identification
We have at present over 70 groups identified in the Department of Defense, Executive Office of the President, Department of Energy, Department of Justice, Department of the Treasury, and NASA.

Step 1: Prospect Qualification
We qualify the prospect through an initial telephone call before and after sending our product literature. *Elapsed time: one to two weeks.*

Step 2: Demonstration Briefing
Setting up and conducting the demonstration for the key decision makers and their staffs. *Elapsed time: two to four weeks.*

Note: In many cases the first two steps may occur without our direct involvement, as present custmers interest related user groups in our products.

Step 3: Test and Evaluation Units
We close an order for two test and evaluation units and ship to the customer. *Elapsed time: three months.*

Step 4: Contract for Test Bed
Once the test and evalution units are in place, we work with the user group to define their requirements, begin a dialog with the acquisition group who issues the contract, and then go through the contract submission and evaluation process. During this step

we strive to influence the requirements and work toward a streamlined method of contracting (sole source or limited competition). *Elapsed time: five months.*

Step 5: Delivering Test Bed Units

This step involves our lead times and the delivery schedule specified on the contract. *Elapsed time: three months.*

Step 6: Volume Contract
A large contract, or Basic Ordering Agreement, is a lengthy process that results in a competitive contract. This type of contract may involve volumes in the hundreds of units. *Elapsed time: one year.*

In summary, we plan on a four month process with a new account to close and ship our first order for two units, and an additional five months to turn on a contract for ten additional units. A year later we have the opportunity to win a large contract for volumes in the hundreds of units.

Forecast Development Assumptions
We have made the following assumptions in the development of our forecasts:

- We have developed our forecasts by mapping the sales cycle model defined above against our prospect list.
- We expect that approximately forty percent of our revenues for 1987 will come from "test bed" contracts from a few key customers who presently have test and evaluation units in place. We expect that the other sixty percent will come from initial shipments of test and evaluation units to new customers.
- During 1988 we expect the initial seed units to develop into test beds, and additional test and evaluation units for new accounts.
- We have not forecasted large contract volumes until 1989.
- Our forecasts assume that our first year revenues are entirely generated through direct sales.
- During 1987 we will develop indirect channels of distribution which we expect to contribute to our revenues in 1988-1991.

MARKETING
Forecasts

- Our forecasts are for our primary encryption-compatible image transceivers for the government market. Sale of networking products, or sale of non-secure versions of our products into the commercial market, are not included. Spare parts and options, such as cables or video printers, are also not included. Therefore we believe that there is upside potential in our forecasts.

Prospect List

Although we have a large prospect list already generated, we expect from past history that we will add many new prospects through customer referrals, trade shows, advertising, and future marketing partnerships with companies who will represent or resell our products. During our test marketing, we developed a list of over thirty qualified prospects for our products, by agency, department, and contact point.This list is highly proprietary and is therefore not presented here.

The following organizations within the Federal Government represent the market from which our present and future prospects are taken:

- **Department of Defense**
  - Joint Chiefs of Staff
  - National Military Command System
  - Joint Special Operations Agency
  - Joint Special Operations Command
  - Joint Tactical Command, Control, & Communications Agency
  - Unified and Specified Commands (Commanders in Chief)
    - CINCLANT
    - CINCPAC
    - CINCEUR
    - US SOUTHCOM
    - NORAD
    - Space Command
    - Strategic Air Command
    - Tactical Air Command
    - Military Airlift Command
  - National Security Agency
  - Defense Intelligence Agency
  - Defense Communications Agency
  - **Department of the Army**
    - Army Intelligence
    - Army Special Operations
    - Information Systems Command
    - Training & Doctrine Command
    - CECOM

MARKETING

Forecasts

- **Department of the Navy**
  - Navy Intelligence
  - Information Systems Command
  - SEALS
- **Department of the Air Force**
  - Information Systems Command
  - Command, Commmunications, Control and Computers
  - Air Force Intelligence
  - Air Force Special Operations
- **Department of the Marine Corps**
  - Marine Intelligence

- **Executive Office of the President**
  - White House Communications Agency
  - Central Intelligence Agency
- **Department of Energy**
  - Los Alamos Labs
  - Sandea Labs
- **Department of Justice**
  - Federal Bureau of Investigation
  - Drug Enforcement Adminstration
- **Department of the Treasury**
  - Secret Service
- **N A S A**
  - N A S A Headquarters
  - Johnson Space Center
  - Goddard Space Flight Center
  - Jet Propulsion Laboratories
  - Kennedy Space Center
  - Vandenberg AF
  - White Sands Test Facility
  - Ames Research Center
  - International Tracking Stations
    - Goldstone Tracking Station
    - Madrid Tracking Station
    - Australia Tracking Station

MARKETING

Forecasts

Shipment Forecast - 1987

The accompanying chart presents our forecast for 1987. We have made additional assumptions in developing this forecast:

- Shipments for January-May reflect units to present customers and prospects who have been waiting for test and evaluation units. No active marketing occurs during this interval, pending availability of funding to expand marketing activities.
- Shipments of 10 units per month for June-August assume that we are awarded a contract for a "test bed" for our **ATR-RIT**.
- Shipments of 8 units per month for August-November are test and evaluation units placed in 20 user groups that are presently identified. It is assumed that active marketing to these groups begins in May, 1987 after the corporation is funded to expand marketing activities.
- Shipment volumes are forecasted for two products only: the ***Sec*-RIT** and the **ATR-RIT**.

MARKETING

Forecasts

PHOTOTELESIS 1987 SHIPMENT FORECAST

Prod.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Sec RIT	0	1	2	2	1	3	3	7	8	8	18	0	53
ATR RIT	0	1	0	1	0	7	7	11	0	0	0	0	27
Total	0	2	2	3	1	10	10	18	8	8	18	0	80
Cum.	0	2	4	7	8	18	28	46	54	62	80	80	80

MARKETING

Forecasts

Shipment Forecast for 1987-1991

Our five-year shipment forecast is presented in the accompanying chart, including the summary from the 1987 results. Assumptions specific to this forecast are as follows:

- In 1988 we assume that the test and evalution units placed in 1987 grow into test bed units, yielding approximately 200 units from the initial 20 customers. In addition, we develop 20 new customers who order initial test and evaluation units.

- No major contract volumes are forecasted for 1988, but it is assumed that contracts are bid starting in 1988 which will account for significant growth in volumes from 1989 through 1991.

- We begin shipments of our **Field *Sec*-RIT**, or military briefcase product, the first quarter of 1988.

- Our TEMPEST desktop units begin shipments mid-year in 1988. This is followed by our briefcase TEMPEST unit in the first quarter of 1989. Shipments of our non-TEMPEST ***Sec*-RIT** declines as the TEMPEST units become dominant.

- Shipments of the ***Fast*-RIT** product are flat over the forecast period, reflecting a modest level of non-secure product demand, predominately through listing on the Government Services Administration price lists.

MARKETING

Forecasts

PRODUCT SHIPMENTS 1987-1991

Product/Year	87	88	89	90	91	Total
Fast-RIT	0	50	50	50	50	200
Sec-RIT	53	150	100	50	0	353
ATR Sec-RIT	27	100	250	500	700	1577
Field Sec-RIT	-	70	150	300	500	1020
TEMPEST Sec-RIT	-	30	150	500	1000	1680
TEMPEST Field-RIT	-	-	100	200	300	600
Total Shipments	80	400	800	1600	2550	5783

MARKETING

Distribution

Distribution Strategy
Our distribution strategy combines direct sales methods using our own personnel and indirect methods using resellers.

Direct Sales
PHOTOTELESIS personnel are responsible for direct sales. We intend for direct sales to provide the bulk of our business in 1987 because

- our technology is new and complex
- we can provide closer customer contact and better support
- we realize greater profits

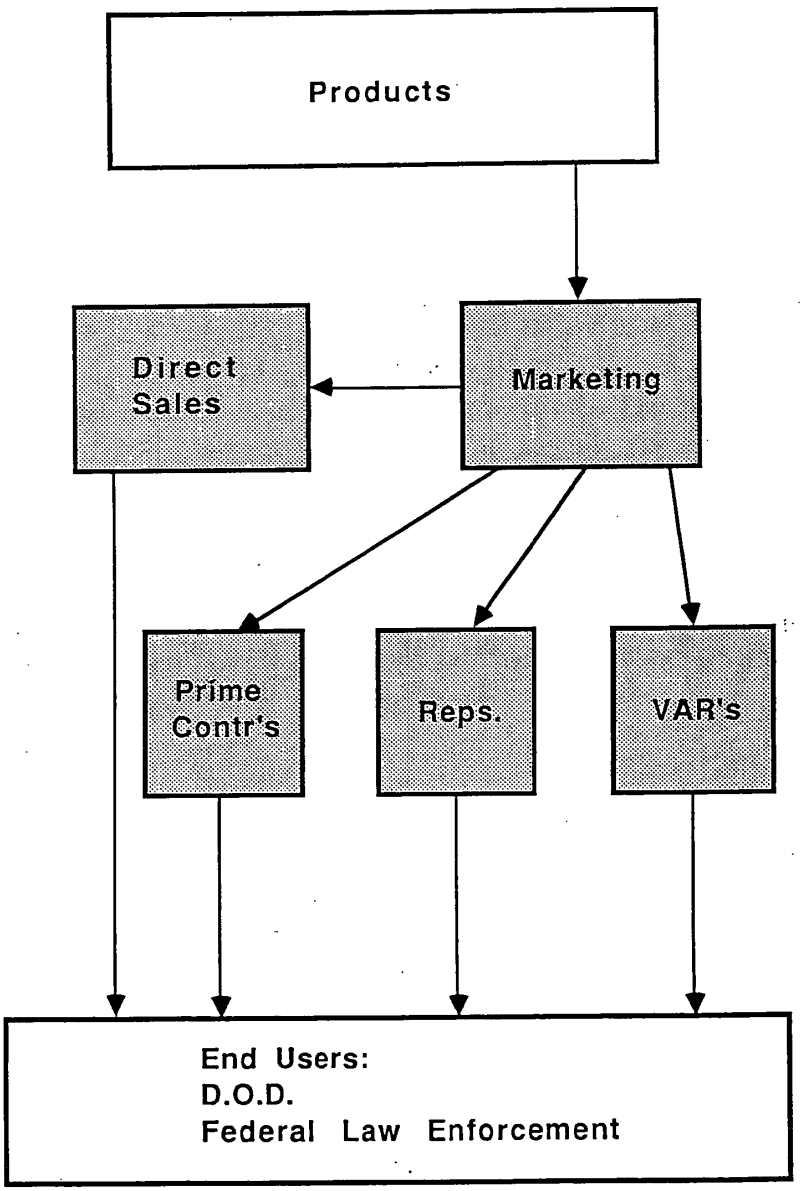
Indirect Sales
We will use indirect sales channels to increase our market penetration without a large increase in marketing and sales overhead. We will select resellers who are well known in our markets, can support our volume requirements, and are willing to provide the level of support and service our customers demand. These indirect channels include

- Manufacturers Representatives
- Value-Added Resellers
- Prime Contractors

MARKETING

Distribution

This diagram illustrates our distribution strategy:



MARKETING

Government Contracts

Small Department of Defense Contracts
Department of Defense purchases for $25,000 or less are handled through oral or brief written requests, known as Request for Quotations (RFQ's). The successful quoter is issued a purchase order, and compliance with the order constitutes contract acceptance and fulfillment. The contracting officer has the discretion to choose how widely the RFQ is solicited.

This procedure can be used by our prospects and customers on a limited basis when purchasing test and evaluation units, although two of our encrypted Sec-RIT or ATR-RIT products exceed the $25,000 order maximum.

Bids and Proposals
However, although these purchase orders represent nearly 98 percent of DOD's contract actions, they are only 20 percent of the procurement dollars spent. The other 80 percent involve formal solicitation procedures that require written offers called sealed bids or competitive proposals. Sealed bids are sought by means of **Invitations for Bids (IFBs)**; competitive proposals are sought by **Requests for Proposals (RFPs)**.

Because major RFPs and IFBs are complex to administer, it may take up to a year for a large contract to be awarded. Shortcuts have been developed which permit the timeframe to be shortened for situations where there is only one source or a limited number of sources for the product or service.

Competitive Unpublished Contracts: Some contracts which have a value under $1 million can avoid publishing the proposed procurement in the government's Commerce Business Daily newspaper. This shortens the procurement cycle and also limits the number of possible responses.

Sole Source Contracts: In very limited circumstances, where a contract requirement can only be filled by one vendor, the contracting office can greatly speed up the puchase by soliciting only one contractor. This method is usually restricted to contracts of $125,000 or less.

We expect that most contracts for our products will be IFBs or RFPs; based on experience, we believe that our product uniqueness will allow many contracts for test and evaluation units or test beds to use a streamlined process.

MARKETING

Government Contracts

Unsolicited Proposals

Some contracts result from unsolicited proposals submitted by groups who feel they have an innovative and unique method or approach to accomplish a DOD mission. We have used this approach in one instance during our test marketing and plan to continue its use as our marketing activities expand.

General Services Administration Contracts

A special type of contract is administered through the General Services Administration (GSA), which provides catalog purchasing abilities on a pre-negotaited basis to government and government-related groups. Many groups who are interested in our products have expressed a desire to be able to purchase limited quantities through the GSA. Orders under GSA are typically limited to $50,000, although this ceiling can be waived under selected circumstances. We plan to introduce our product on the GSA's New Products Listing this year and have applied for a new listing category for image transmission products for future use.

The following chart summarizes the types of contracts described above, the approximate contract lead time, and the typical per order dollar ceiling.

MARKETING

Government Contracts

This chart summarizes the types of contracts that the government will use to purchase our products.

Contract Type	Lead Time	Per Order Limit
Purchase Order	2-3 months	$25,000
Bid and Proposal -SoleSource	3-6 months	$125,000
Bid and Proposal -Competitive Unpublished	3-6 months	$1 million
Bid and Proposal - Competitive Published	up to 1 year	no limit
General Services Administration	none - prenegotiated	$50,000

Notes

Technology

TECHNOLOGY

PHOTOTELESIS Proprietary

Proprietary Technology

We have developed proprietary technology which enables us to meet the needs of our customers for image communications products. Our investment in market research, and our products which reflect that research, represent our uniqueness in the market and the principal barrier to future competition.

We presently own the following proprietary technology:

- COMSEC (secure communicatons) interface designs which enable us to connect with government-supplied encryption devices
- RF-shielded packaging, which enables us to work in environments which process sensitive information
- Radio interface designs, which enable us to connect to non-secure radios and cellular telephones
- Low-power-consumption electronics designs, which enable us to work with DC and battery power
- ATR (Aircraft Transport Racking) packaging, which enables us to work in vehicular environments such as aircraft, ships, and land vehicles.

We are presently developing technology for...

- briefcase packaging
- image database systems
- TEMPEST qualification.

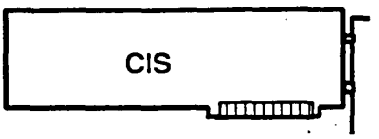
TECHNOLOGY

PHOTOTELESIS Proprietary

Our proprietary technology is contained in these subsystems and products:

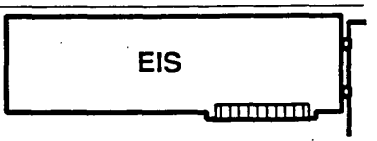
Communication Interface Subsystem

Cellular
Satellite
Two-way Radio



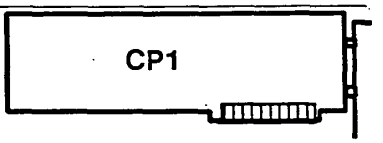
Encryption Interface Subsystem

Ground to Air
Satellite
Line of Sight



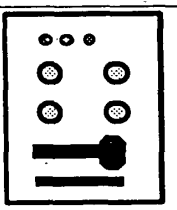
Control Processor I

Forward Error Correction
Custom communications software
Remote control capability



ATR Package

Aircraft Transport Racking spec.
DC or battery power
Ruggedized
Cellular or
Secure



Field Package

Briefcase Portable
Battery powered
Cellular or
Secure

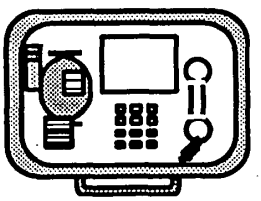
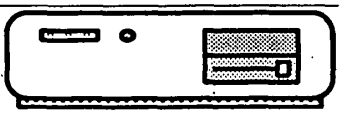


Image Data Base

Software Database
Multi-user
Telephone or Secure



TECHNOLOGY

Licensed

We buy certain off-the-shelf equipment and license certain technology from Image Data Corporation.

Specific technology we presently license from Image Data includes:

- Processor design
- Video subsystem design
- Software design.

Our unique value added lies in:

- Communications subsystems
- Packaging
- Specialized software.

Notes

Products

PRODUCTS

Introduction

In this section of the business plan we will introduce our products. We will provide a rationale as to how we arrived at our product mix. Then we will give you specific information about each of the products. Finally, we will provide a product availablility schedule showing our product timetable.

Promotional literature containing further information about our products is included in this package for your information.

About our products

Basically, our products consist of a matrix of packaging and communications options. Not all combinations are offered because not all combinations make sense. Essentially, we provide configurations to suit the practical requirements of the government's various combinations of applications and communications requirements.

PRODUCTS

Strategy

Our product strategy
Our product strategy begins with commercially available products, to which we add significant proprietary value. These enhanced products become our product line.

Core Technology
We begin with standard, "off-the-shelf" technology from Image Data Corporation:

- PHOTOPHONE™
- PHOTOBRIDGE™
- PHOTOGATE™

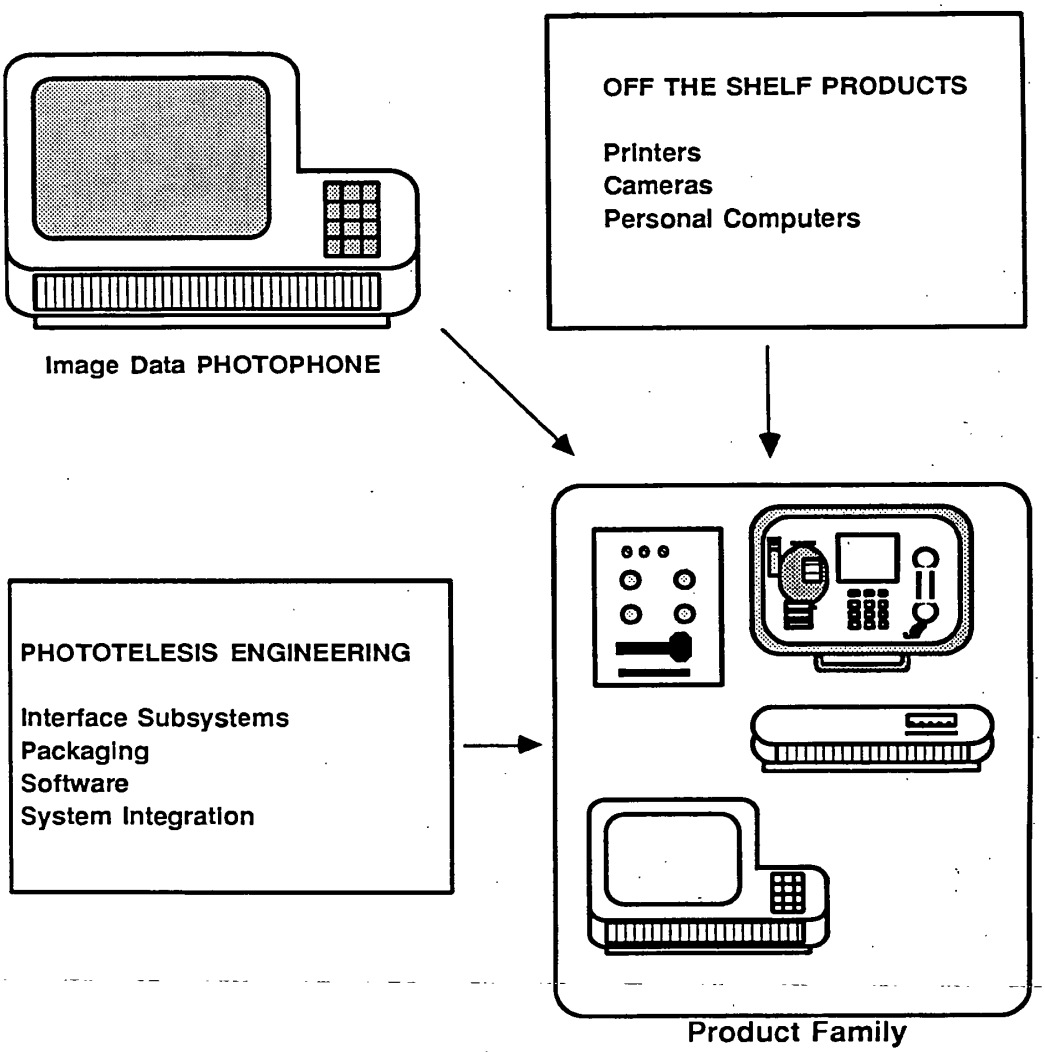
Added Technology
Then, after acquiring off the shelf base units, we develop new designs based on technology licensed from Image Data, integrate off-the-shelf OEM components, and then add our proprietary technology.

Result
The resulting products and systems comprise the PHOTOTELESIS product family. This strategy is illustrated on the facing page.

PRODUCTS

Strategy Illustration

Here, in graphic form, is the product strategy discussed on the previous page.

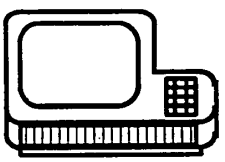


PRODUCTS

Packaging Options

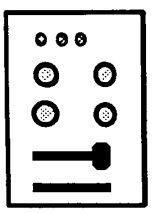
Different appications require different packages; our product line meets those requirements.

Desktop Products:



Our desktop family allows image communications in the office, acting as a "base station" for remote units located in the field.

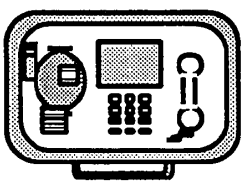
ATR *Products*



Our ATR family puts image communications to work in the field, where it may be mounted on:
- aircraft,
- shipboard, or
- in a vehicle.

We offer both secure and non-secure versions for many types of existing communications systems.

Briefcase Products

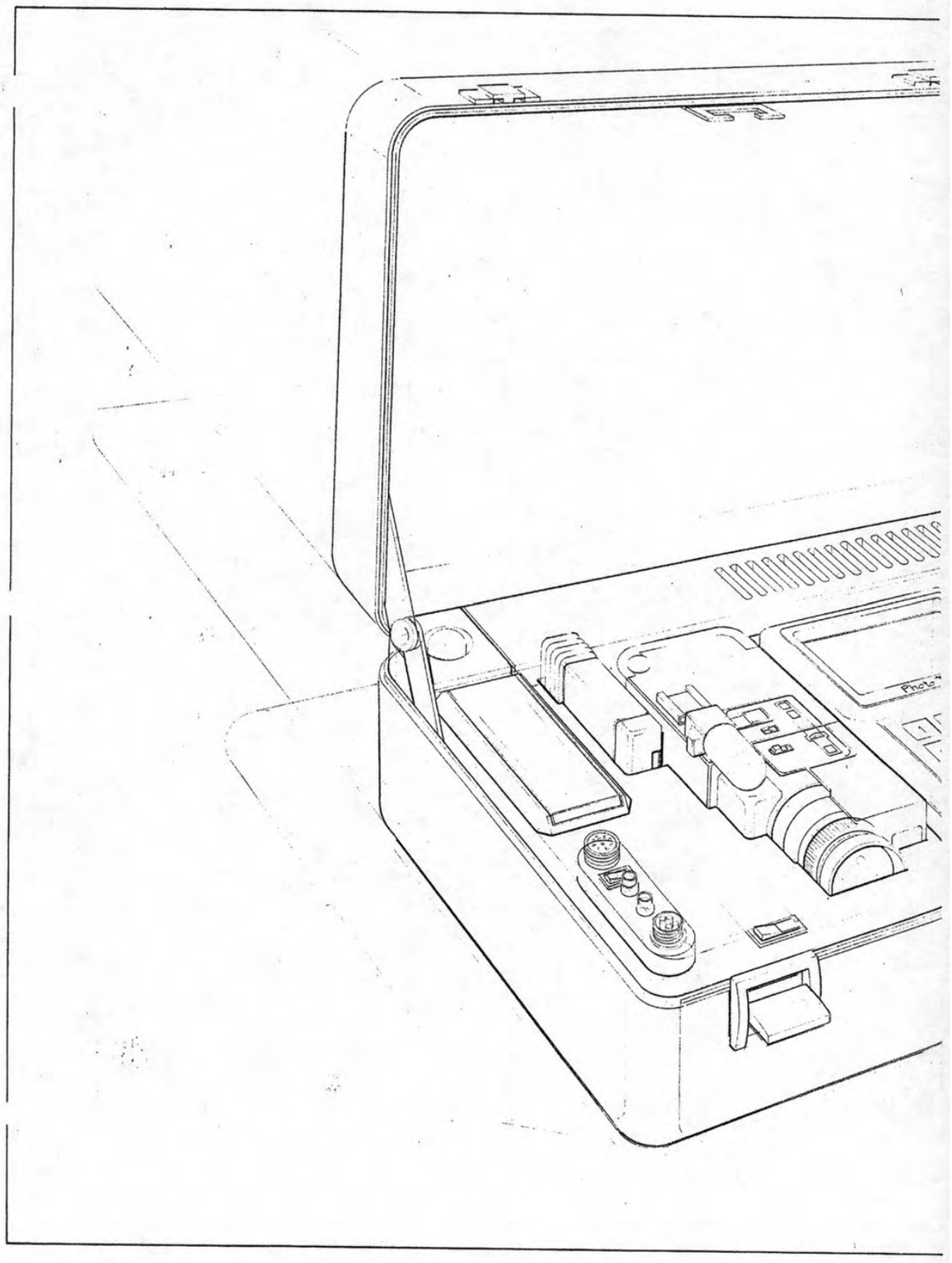


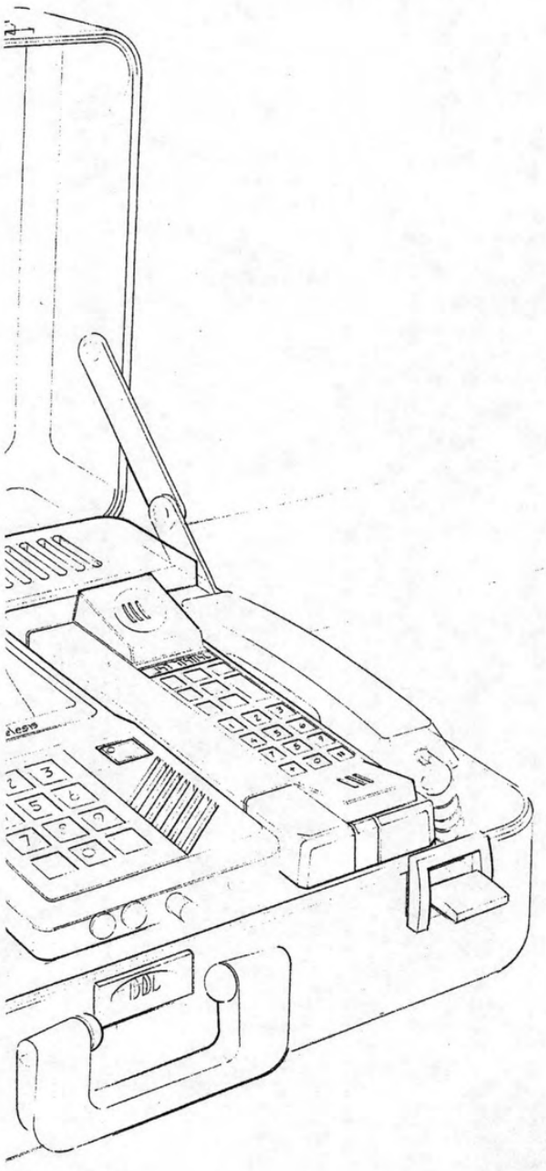
Our briefcase family is the ultimate in portable image communications, with battery operation and a full range of secure and non-secure communications options.

Network Products

We meet needs for networking images with:

- ImageBridge, for image conferencing, and
- ImageBase, for remote image storage and retrieval.





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PHOTOTELESIS

Remote Image Transmission Systems

OK DM

OK

Press Release
For Immediate Release

PhotoTelesis and Image Data Sign Agreement

Secure Remote Image Transmission over Telephone & Tactical Transceivers

May 26, 1986. San Antonio, TX. Secure video image transmission between any remote sites over telephone, wireless radio and satellite circuits are now possible through an agreement between Image Data Corporation, makers of the commercial Photophone, and PhotoTelesis.

PhotoTelesis is a San Antonio based video systems integration company supplying video teleconferencing rooms, video teleconferencing equipment and specializing in image transmission equipment for government applications. The agreement makes PhotoTelesis the official vendor of Photophones specially adapted for Government applications.

PhotoTelesis introduced three new product lines at the Armed Forces Communcation and Electronics Association annual Convention and Exposition May 27, 28, and 29 at the Washington D.C. Convention Center. Three special versions of the commercially successful Photophone are produced and marketed by PhotoTelesis. All enable freeze frame monochrome video pictures to be transmitted in seconds over various carriers. They are called RITs - for Remote Image Transceivers.

Tac-RIT™ transmits images over secure tactical line of sight and satellite receivers. Since the units are compatible with current standard military radio transceivers, fast reliable visual communication can now be added to tactical communication and command centers.

Sec-RIT™ is compatible with secure (encrypted) COMSEC gear, including STU II, STU III, and PSV (Personal Secure Voice) secure telephones over common dial-up lines.

801 Lincoln Center 7800 IH 10 West San Antonio, Texas 78230 (512) 349-2020

The PhotoTelesis units offer the additional advantages of allowing voice and video over the same channel, enabling discussion of the picture. An interactive pointer controlled by either party allows discussion of the document as though the two parties were across the table from each other rather than half-way around the world.

PhotoTelesis will introduce three new product lines of RITs at the Armed Forces Communication and Electronics Association annual Convention and Exposition May 27, 28, and 29 at the Washington D.C. Convention Center.

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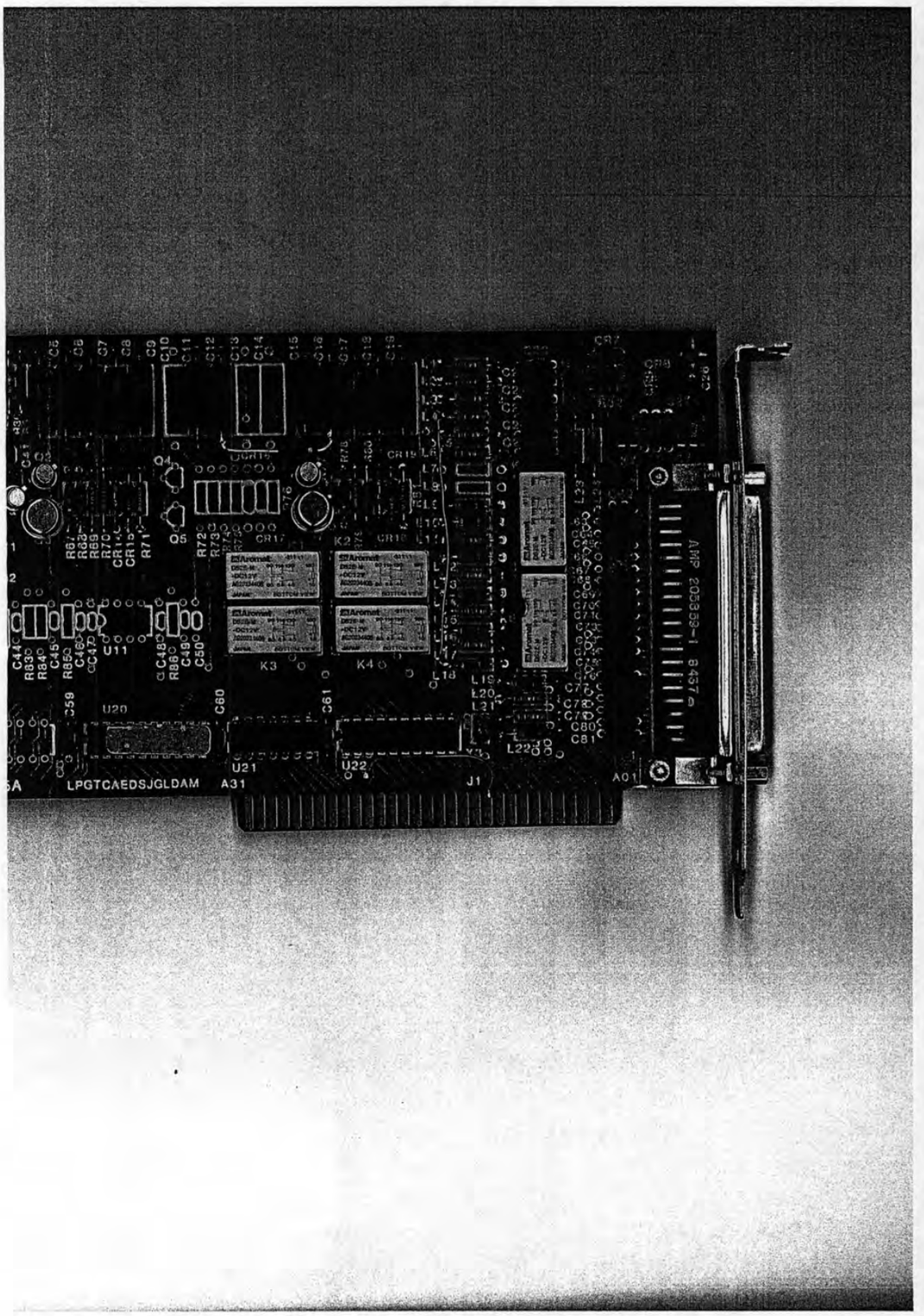
Com-RIT™ provides compatibility with non-secure mobile cellular telephones and private portable carrier satellite communication systems.

PhotoTelesis is a San Antonio based video systems integration company supplying video teleconferencing rooms, video teleconferencing equipment and specializing in image transmission equipment for government applications.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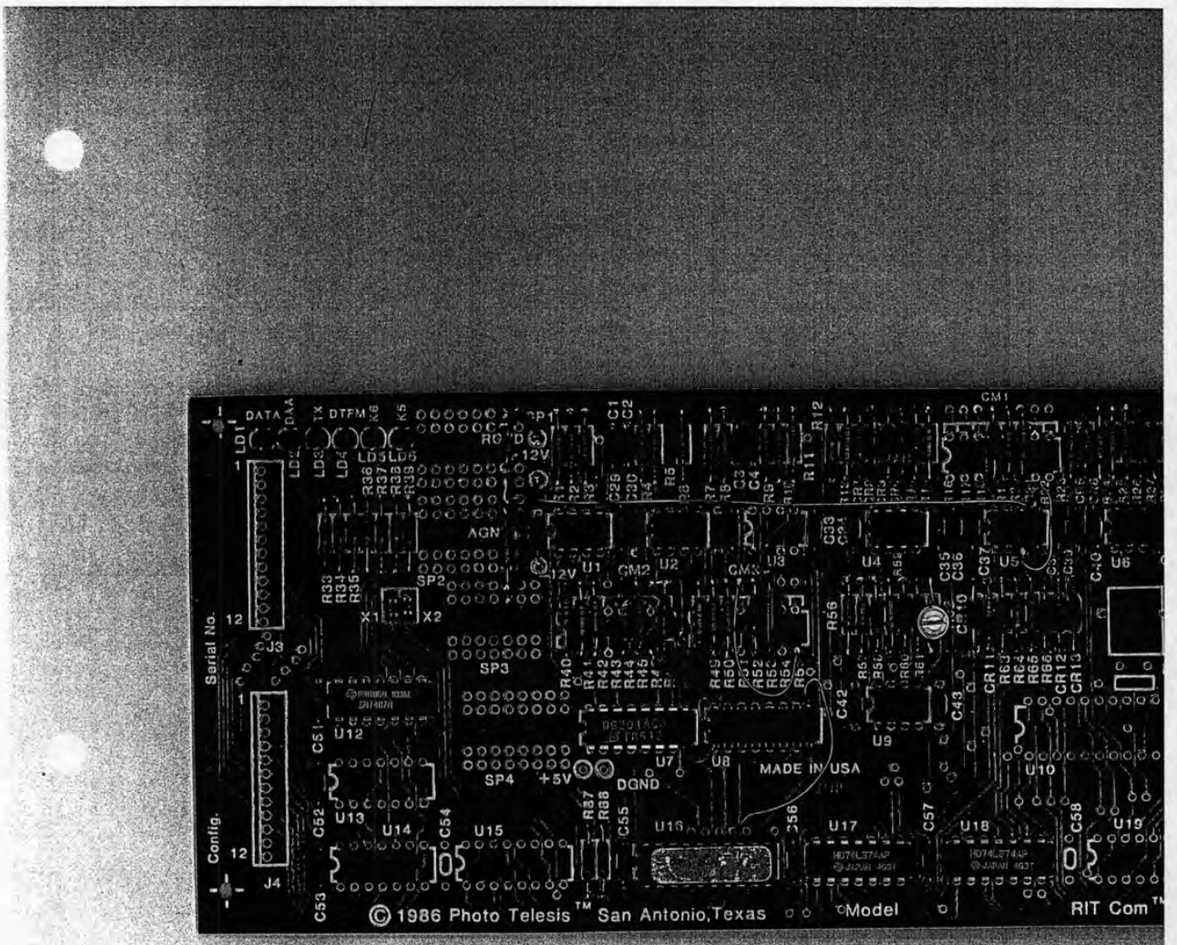
DATA
DTFM
AGN
SP2
SP3
SP4
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