


MASTER DRAWING LIST

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DWG. NO.	REV. LET.	NO. OF SHEETS	TITLE
C-UA-LT19-A-0	A	1	TELETYPE CONTROL (LT19-A)
A-PL-LT19-A-0	A	1	TELETYPE CONTROL (LT19-A)
D-BS-LT19-A-1	A	1	I/O BUS INTERFACE LOGIC
D-BS-LT19-A-2	A	1	I/O BUS INTERFACE
D-MU-LT19-A-3	A	1	MODULE UTILIZATION
A-PL-LT19-A-3	A	1	MODULE UTILIZATION
D-AD-7006040-0-0		1	WIRED ASSY
A-PL-7006040-0-0		1	WIRED ASSY
K-WL-LT19-A-4	B	1	WIRE LIST LT19
A-CP-LT19-A-5		1	EXTERNAL COMPONENT LIST
A-SP-LT19-A-6		17	LT19A,B(C) MULTI-STATION TELETYPE CONTROL AND INTERFACE
D-DI-LT19-A-7		1	DRAWING INDEX LIST LT19

REVISIONS				DRN.	DATE	 DIGITAL EQUIPMENT CORPORATION <small>MAYNARD, MASSACHUSETTS</small>		
REV.	DATE	CHG. NO.	APP'D.	JACKSON	10/14/69			
A	9/69	LT19A-01	R.D.	CHK'D.	DATE			
B	10/70	Misc. 81	D.V.	PFYFFER	10/22/69			
C	11/9/71	LT19A-3	J.M.	ENG.	DATE	TITLE		
				<i>L. G. G. Jr.</i>	11/24/69	MULTI-STATION TELETYPE CONTROL		
				PROJ. ENGR.	DATE			
				<i>D. D. G. Jr.</i>	11/11/69			
				PROD.	DATE			
				<i>R. Call</i>	11/16/69			
FIRST USED ON				SIZE		CODE	NUMBER	REV.
PDP-9				A		ML	LT19-A	C
SCALE				SHEET		OF	.DIST.	
SHEET 1				OF 1		.DIST.		

DIGITAL EQUIPMENT CORPORATION

MAYNARD, MASSACHUSETTS

PARTS LIST

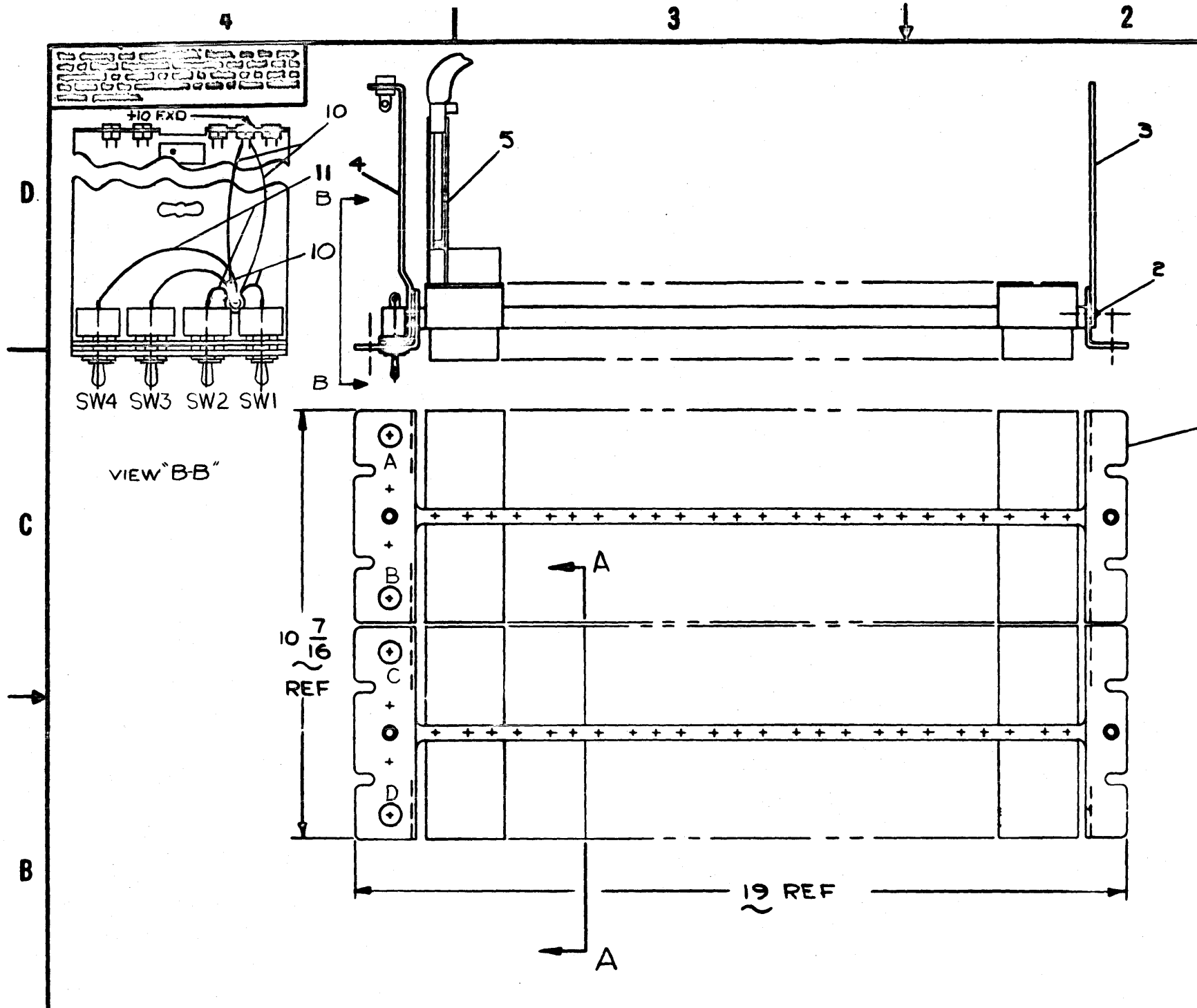
MADE BY W. JACKSON		CHECKED AL PFYFFER	SECTION
DATE 10/4/68		DATE 10/21/68	1
ENG <i>R. D. Tu</i>		PROD <i>D. Call</i>	ISSUED SECT.
DATE 11-11-68		DATE 11/6/68	1

QUANTITY / VARIATION

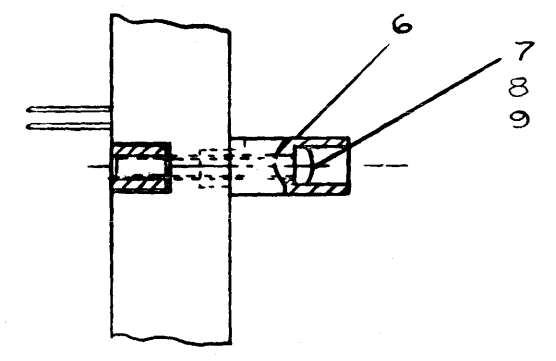
ITEM NO.	DWG NO. / PART NO.	DESCRIPTION	LT19-A	LT19-B (1)	LT19-B (2)	LT19-B (3)	LT19-B (4)	LT19-B (5)	LT19-C (1)	LT19-C (2)	LT19-C (3)	LT19-C (4)	LT19-C (5)
1	D-AD-7006040-0-0	WIRED ASSY (LT19-A)	1	1	1	1	1	1	1	1	1	1	1
2	9006460	POP RIVETS #AD43ABS	8	8	8	8	8	8	8	8	8	8	8
3	C-MD-5302486-0-0	PANEL, RIGHT END	2	2	2	2	2	2	2	2	2	2	2
4	D-AD-5402526-0-0	MARGINAL CHECK PANEL ASSY	2	2	2	2	2	2	2	2	2	2	2
5	D-UA-BC09A-0-0	BC09A CABLE ASSY	4	4	4	4	4	4	4	4	4	4	4
6	D-SC-1209850-0-0	RET BLOCK	2	2	2	2	2	2	2	2	2	2	2
7	9006045-1	SCR PHL HD #8-32 x 1 1/2 SST	2	2	2	2	2	2	2	2	2	2	2
8	9006634	WASH INT TOOTH #8	2	2	2	2	2	2	2	2	2	2	2
9		WASH, FLAT #8	2	2	2	2	2	2	2	2	2	2	2
10	9107278-3	#18 TUBING, TEELON, RED	A/RA	RA/RA	RA/RA	RA/RA	RA/RA	R	A/RA	RA/RA	RA/RA	RA/RA	R
11	9107278-7	#18 TUBING, TEFLON, BLU	A/RA	RA/RA	RA/RA	RA/RA	R	A/R	A/RA	RA/RA	RA/RA	RA/RA	R
	D-AD-7005288-0-0	#915 TO W070 CABLE		1	1	1	1	1					
	C-IA-7005717-0-0	DATA SET CABLE							1	1	1	1	1
	0913	JUMPER, 4" (RED)							2	2	2	2	2

TITLE TELETYPE CONTROL (LT19A)	ASSY NO. C-UA-LT19-A-0	SIZE CODE A PL	NUMBER LT19-A-0	REV. A	ECONO. MISC NO. 00081
SHEET 1 OF 1	DIST. G				





WIRE TABLE				
ITEM NO.	AWG	COLOR	FROM	TO
10	#18	RED	SW1	AO1A
11		BLU	SW2	AO1B
10		RED	SW3	BO1A
11		BLU	SW4	BO1B
		BARE	GND	BO1C
10		RED	SW1	CO1A
11		BLU	SW2	CO1B
10		RED	SW3	DO1A
11		BLU	SW4	DO1B
		BARE	GND	DO1C
10,12		RED	+10 FXD	AO3A
10,12		RED	AO3A	A11A
10,12		RED	A11A	A19A
10,12		RED	+10 FXD	C14A
10,12	#18	RED	C14A	C22A



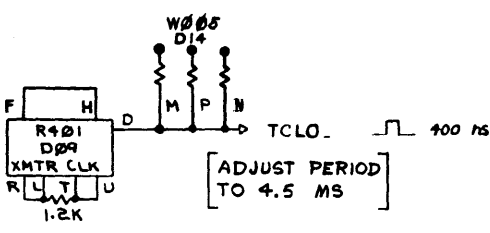
REV. A
 MISC-0081
 T. G. Walker 10-20-70
 VONADA
 D. J. Lynch 10-21-70

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
PDP-9				
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES TOLERANCES DECIMALS ± .008 FRACTIONS ± 1/64 ANGLES ± .007 FINISH SURFACE QUALITY REMOVE BURRS AND CHAMF SHARP		W. F. Jackson 10/9/68 10-3-68 11-2-68 11-2-68 11-3-68		
MATERIAL		EQUIPMENT CORPORATION LAWRENCE, MASSACHUSETTS		
FINISH		TITLE TELETYPE CONTROL (LT19A)		
NEXT HIGHER ASSY		NUMBER LT19-A-0		
		REV. A		

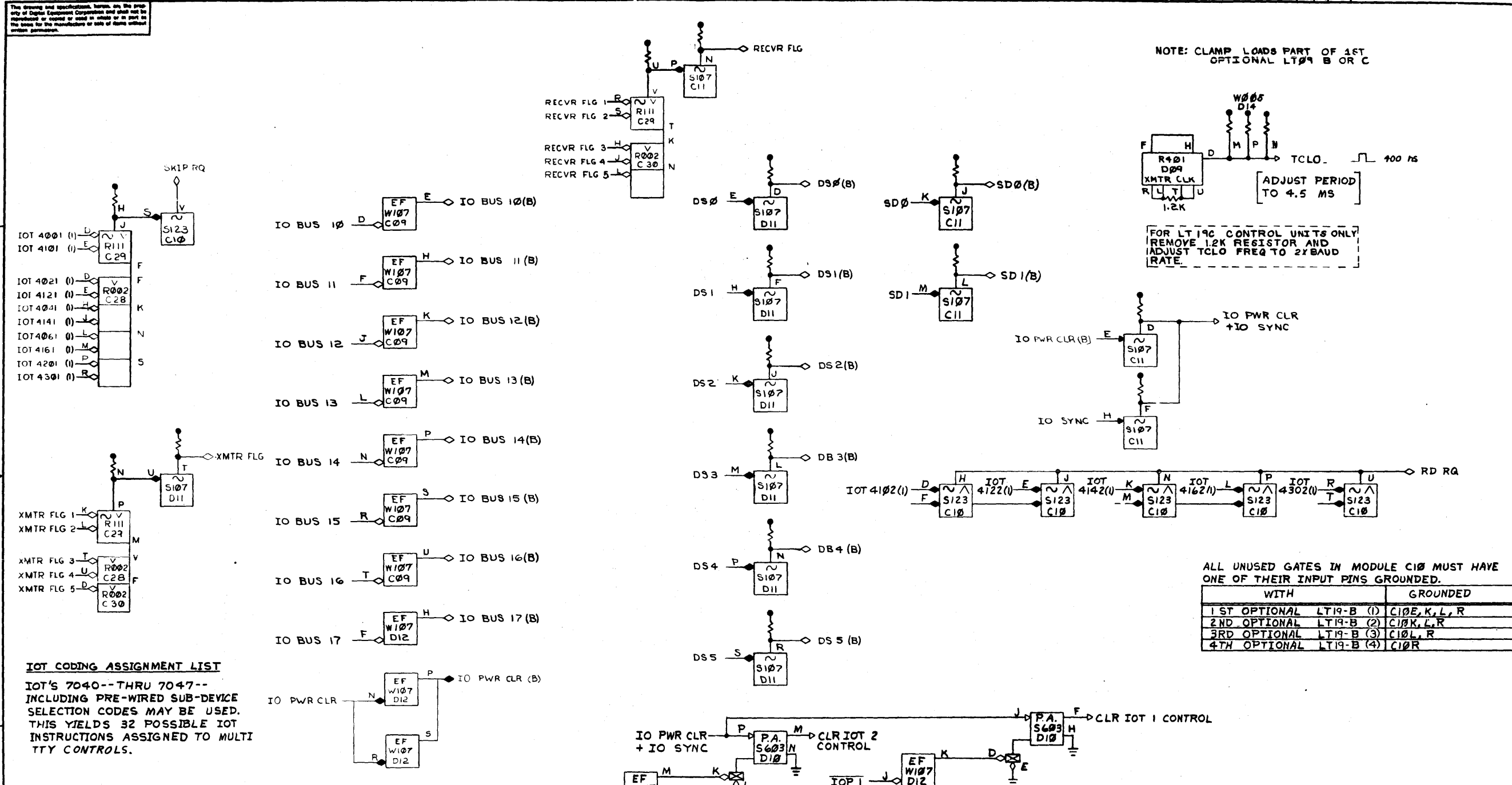
LT19-A-0
 CUA
 B

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NOTE: CLAMP LOADS PART OF 1ST OPTIONAL LT19-B OR C



FOR LT 19C CONTROL UNITS ONLY REMOVE 1.2K RESISTOR AND ADJUST TCLO FREQ TO 2X BAUD RATE.



IOT CODING ASSIGNMENT LIST
 IOT'S 7040--THRU 7047-- INCLUDING PRE-WIRED SUB-DEVICE SELECTION CODES MAY BE USED. THIS YIELDS 32 POSSIBLE IOT INSTRUCTIONS ASSIGNED TO MULTI TTY CONTROLS.

ALL UNUSED GATES IN MODULE C10 MUST HAVE ONE OF THEIR INPUT PINS GROUNDED.

	WITH	GROUNDED
1ST OPTIONAL LT19-B (1)	C10E, K, L, R	
2ND OPTIONAL LT19-B (2)	C10K, L, R	
3RD OPTIONAL LT19-B (3)	C10L, R	
4TH OPTIONAL LT19-B (4)	C10R	

REV	CHG	NO	DATE
1		A	9-12-61

R. DIETER

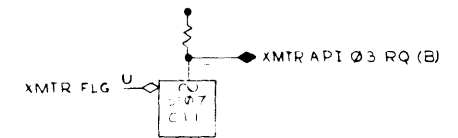
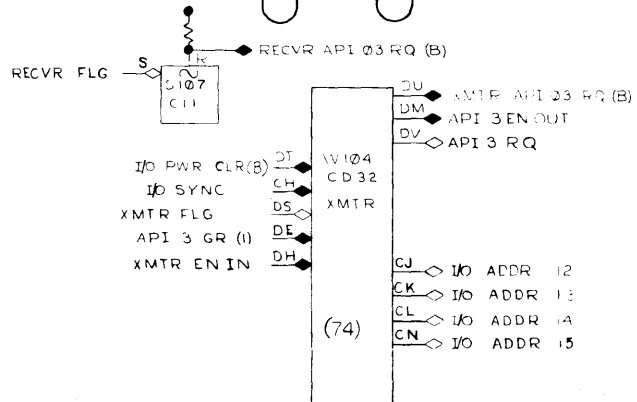
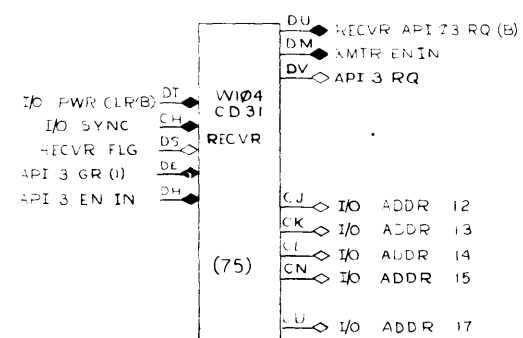
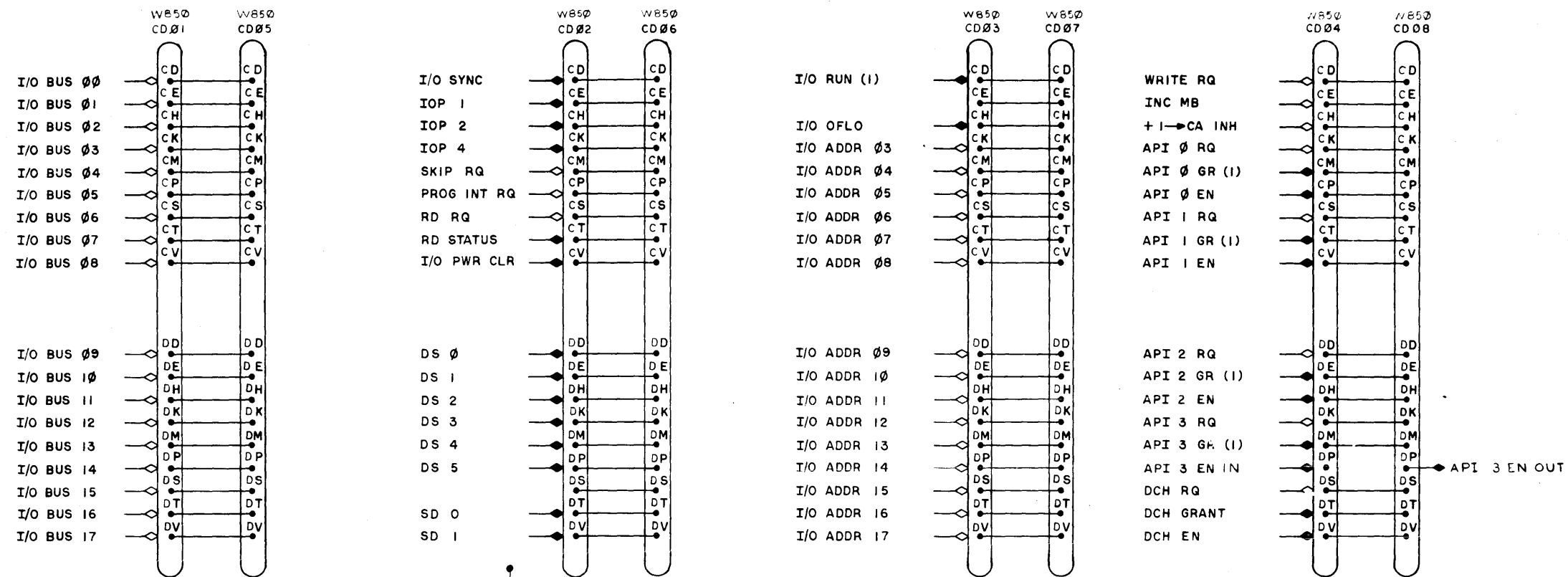
FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
PDP-9				

UNLESS OTHERWISE SPECIFIED	DATE	TITLE
UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES	10/2/68	I/O BUS INTERFACE LOGIC

FINISH	SCALE	SHEET	OF	DIST.
		1	1	

REV. A
LT19-A-1

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REV	CHANGE NO.	DESCRIPTION
A	1	ISSUED
B	1	REVISION
C	1	REVISION
D	1	REVISION

FIRST USED ON OPTIC MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
PDP-9				
PARTS LIST				
UNLESS OTHERWISE SPECIFIED				
DIMENSION IN INCHES				
TOLERANCES				
DECIMALS FRACTIONS ANGLES				
= .005 ± .164 ± 0°30'				
FINAL SURFACE QUALITY				
REMOVE BURRS AND BREAK SHARP CORNERS				
MATERIAL				
NEZ-HIGHER ASSY				
SCALE				
SHEET 1 OF 1				
TITLE			SIZE CODE	NUMBER
I/O BUS INTERFACE			DBS	LT19-A-2
DATE			REV.	
10/9/68			A	
DATE				
11/8/68				
DATE				
11/8/68				
DATE				
11/8/68				
DATE				
11/8/68				

DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS
PARTS LIST

MADE BY W. JACKSON	CHECKED AL PFYFFER	SECTION
DATE 10/19/68	DATE 10/22/68	1
ENG X. J. Decker	PROD W. Call	ISSUED SECT.
DATE 11/14/68	DATE 11/6/68	1

QUANTITY / VARIATION

ITEM NO.	DWG NO. / PART NO.	DESCRIPTION	QUANTITY / VARIATION											
			LT19-A	LT19-B (1)	LT19-B (2)	LT19-B (3)	LT19-B (4)	LT19-B (5)	LT19-C (1)	LT19-C (2)	LT19-C (3)	LT19-C (4)	LT19-C (5)	
	R401	VARIABLE CLOCK	1	1	1	1	1	1		1	1	1	1	1
	R002	DIODE NETWORK	2											
	R111	NAND GATE	1											
	S107	INVERTER	2											
	S123	INPUT BUS GATE	1											
	S203	TRIPLE FLIP FLOP		1	1	1	1	1		1	1	1	1	1
	S603	PULSE AMPLIFIER	1											
	W005	CLAMPED LOADS		1	1	1	1	1		1	1	1	1	1
	W103	DEVICE SELECTOR		2	2	2	2	2		2	2	2	2	2
	W104	I/O BUS MULTIPLEXER	2											
	W107	I/O BUS RECEIVER CKT	2											
	W511 *	NEG INPUT CONVERTER								1		1		1
	W602 *	BI-POLAR OUTPUT CONVERTER								1			1	
	W705	3.6 VOLT POWER SUPPLY		1	1	1	1	1		1	1	1	1	1
	W706	TELETYPE RECEIVER		1	1	1	1	1		1	1	1	1	1
	W707	TELETYPE TRANSMITTER		1	1	1	1	1		1	1	1	1	1
	*WHEN ASSIGNING CHANNELS, THE LT19C OPTIONS SHALL BE ASSIGNED TO THE LOWEST CHANNEL NUMBERS.													

TITLE MODULE UTILIZATION	ASSY NO. D-MU-LT19-A-3	SIZE	CODE	NUMBER	REV.	ECO NO.
		A	PL	LT19-A-3	A	LT19A-00001
SHEET	1	OF	1	DIST.		

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44																
	W785	W787	W183	W183	W786	S283			W785	W787	W183	W183	W786	S283		W785	W787	W183	W183	W786	S283																																						
	③	③	③	③	③	③			④	④	④	④	④	④	④		⑤	⑤	⑤	⑤	⑤	⑤																																					
		+3.8V	TTY XMTR	XMTR DS	RECVR DS	TTY RECVR	10T 4141			+3.8V	TTY XMTR	XMTR DS	RECVR DS	TTY RECVR	10T 4161		+3.8V	TTY XMTR	XMTR DS	RECVR DS	TTY RECVR	10T 4391																																					
							10T 4142								10T 4162																																												
	W878	W885				R481			W878	W885				R481		W878	W885								W882	W682	W511	W511	W511																														
	③	③				⑤			④	④				④		⑤									①*	④*	①*	③*	⑤*																														
	TSO PSM RRE	4841(1)	4141(1)	4142(1)	RCLQ	RCLQ			TSO PSM RRE	4861(1)	4161(1)	4162(1)	RCLQ	RCLQ		TSO PSM RRE	4284(1)	4281(1)	4381(1)	4382(1)	RCLQ	RCLQ		DPI	DPI	TSO	TSO	TSO																															
						RCLQ								RCLQ								RCLQ			②*	⑤*																																	
																									②*					②*																													
																									③*					TSO	TSO																												

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44																			
W858	W858	W858	W858	W858	W858	W858	W858	W187	S123	S187			W785	W787	W183	W183	W786	S283		W785	W787	W183	W183	W786	S283		R002	RT11	R002	W104	W104																															
								10 BUS	RD RQ	10 PWR CLR			①	①	①	①	①	①	①		②	②	②	②	②		②		SKIP RQ	SKP RQ	XMTR FLAG																															
10 BUS IN						10 BUS OUT			RD RQ	SD0 B		+3.8V																																																		
								10 BUS	RD RQ	SD1 B				TTY XMTR	XMTR DS	RECVR DS	TTY RECVR	10T 4181																																												
								10 BUS	RD RQ	RECVR FLG																																																				
								10 BUS	RD RQ	RECVR API 0 3																																																				
								10 BUS	RD RQ	XMTR API 0 3																																																				

REVISIONS
 1. CHANGE NO. 00001 A
 2. R. DIETER
 3. R. DIETER 9-12-69

NOTE:
 ① DESIGNATES 1ST OPTIONAL LT098 (1)
 ② DESIGNATES 2ND OPTIONAL LT098 (2)
 ③ DESIGNATES 3RD OPTIONAL LT098 (3)
 ④ DESIGNATES 4TH OPTIONAL LT098 (4)
 ⑤ DESIGNATES 5TH OPTIONAL LT098 (5)
 * LT19-C ONLY (B ORC)

MATERIAL SPECIFICATIONS
 UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES
 DECIMALS FRACTIONS ANGLES
 .250 3/16 2 0/0 1/8
 FINAL SURFACE QUALITY REMOVE BURRS AND BREAK SHARP CORNERS

DATE 10/1/68
DRM. W. E. JACKSON JR.

TITLE
 MODULE UTILIZATION

SUB-CODE D.MU
NUMBER LT19-A-3
REV. A

PDP-9
FIRST USED ON OPTIG4/MODEL

SHEET 1 OF 1

REV. A
 NUMBER LT19-A-3
 DATE CODE D.M.


DRWG NO

K-WL-LT19-A-4

REVLTR

B

REVISIONS			
REV LTR	ECONO	DATE	ENG
A	00001	9-11-69	AK
B	00003	11-9-71	AK

<table border="1"> <tr> <td>DRAWN</td> <td>DATE</td> </tr> <tr> <td>W.E. JACKSON</td> <td>10/14/68</td> </tr> <tr> <td>CHECKED</td> <td>DATE</td> </tr> <tr> <td><i>[Signature]</i></td> <td>11-4-68</td> </tr> <tr> <td>ENG</td> <td>DATE</td> </tr> <tr> <td><i>[Signature]</i></td> <td>11-7-68</td> </tr> <tr> <td>PROJ. ENG.</td> <td>DATE</td> </tr> <tr> <td><i>[Signature]</i></td> <td>11-8-68</td> </tr> <tr> <td>PROD.</td> <td>DATE</td> </tr> <tr> <td><i>[Signature]</i></td> <td>11/6/68</td> </tr> </table>	DRAWN	DATE	W.E. JACKSON	10/14/68	CHECKED	DATE	<i>[Signature]</i>	11-4-68	ENG	DATE	<i>[Signature]</i>	11-7-68	PROJ. ENG.	DATE	<i>[Signature]</i>	11-8-68	PROD.	DATE	<i>[Signature]</i>	11/6/68	 <p>DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS</p>	<table border="1"> <tr> <td colspan="2">TITLE</td> </tr> <tr> <td colspan="2">WIRE LIST LT19</td> </tr> <tr> <td>FOR</td> <td>TAPE # FILE *</td> </tr> <tr> <td>SIZE</td> <td>CODE</td> </tr> <tr> <td>K</td> <td>WL</td> </tr> </table>	TITLE		WIRE LIST LT19		FOR	TAPE # FILE *	SIZE	CODE	K	WL	<table border="1"> <tr> <td>DWG. NO.</td> <td>REV LTR</td> </tr> <tr> <td>LT19-A-4</td> <td>B</td> </tr> </table>	DWG. NO.	REV LTR	LT19-A-4	B
DRAWN	DATE																																				
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ASSY NO.	SCALE	SHEET 1 OF 1	DIST.																																		

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COMPONENT NAME	VALUE	POL.	FROM PIN	TO PIN	POL.
RESISTOR	1.2K OHM 1/4W 10%		D09R	D09T	
RESISTOR	10K OHM 1/4W 10%		B28E	B28A	
RESISTOR	1.2K OHM 1/4W 10%		D19R	D19T	
913 JUMPER *			D14S	D13D	
913 JUMPER *			D14R	D13H	
RESISTOR	10K OHM 1/4W 10%		B28N	C28A	
RESISTOR **	1.2K OHM 1/4W 10%		D27R	D27T	
913 JUMPER *			D22N	D21D	
913 JUMPER *			D22P	D21H	
RESISTOR	10K OHM 1/4W 10%		B29E	B29A	
RESISTOR **	1.2K OHM 1/4W 10%		B08R	B08T	
913 JUMPER *			B03N	B02D	
913 JUMPER *			B03P	B02H	
RESISTOR	10K OHM 1/4W 10%		B29N	C29A	
RESISTOR **	1.2K OHM 1/4W 10%		B16R	B16T	
913 JUMPER *			B11N	B10D	
913 JUMPER *			B11P	B10H	
RESISTOR	10K OHM 1/4W 10%		B30E	B30A	
RESISTOR **	1.2K OHM 1/4W 10%		B24R	B24T	
913 JUMPER *			B19N	B18D	
913 JUMPER *			B19P	B18H	
NOTE:					
*= LT19-C ONLY (SEE UNIT ASSY PARTS LIST FOR PART NO)					
**=LT19-B ONLY					

REVISIONS				DRN.	DATE	DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	
REV.	DATE	CHG. NO.	APP'D.	CHK'D.	DATE	TITLE	
				JACKSON	10/17/68	EXTERNAL COMPONENT LIST	
				PFYFFER	10/22/68	FOR	
				ENG. <i>R. D. ...</i>	DATE 11-4-68	LT19-A	
				PROJ. ENG. <i>B. ...</i>	DATE 11-8-68		
				PROD. <i>D. Call</i>	DATE 11/6/68		
FIRST USED ON				A-ML-LT19-A		SIZE	CODE
						A	CP
SCALE				HALF		NUMBER	
						LT19-A-5	
SHEET				1 OF 1		REV.	

DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

ENGINEERING SPECIFICATION

DATE 10/8/68

TITLE LT19A,B(C) Multi-Station Teletype Control and Interface

REVISIONS

REV	DESCRIPTION	CHG NO	ORIG	DATE	APPD BY	DATE

ENG	APPD	SIZE	CODE	NUMBER	REV
	<i>B. J. Conda</i>	A	SP	LT19-A-6	

DEC FORM NO. DRA 107

SHEET 1 OF 17

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ENGINEERING SPECIFICATION

CONTINUATION SHEET

TITLE LT19A,B (C) Multi-Station Teletype Control and Interface

1.0 Multi-Station Teletype Interface (Type LT19A)

Addition of the LT19A option to the PDP-9 expands the machine's teletype facility to accommodate up to five optional teletype control units. The LT19A consists of the following:

- a. Two standard 19" DEC Type 1943 mounting panels (completely bussed and prewired for PDP-9 IO Bus interfacing and the insertion of up to five independent teletype controls, LT19B'S or LT19C'S defined below).

All of the logic modules necessary to interface the control units to the standard PDP-9 IO Bus.

Optional Teletype Control (Type LT19B)

The LT19B is a group of standard DEC logic modules which, when inserted into the appropriate locations of an LT19A, constitute a single independent teletyped control with the following specifications:

- a. five or eight * bit character codes.
- b. one unit start code.
- c. 1, 1.5 or 2 * unit stop codes.
- d. Full * or half duplex operation.
- e. Speed of 110 baud.
- f. Maximum signal transmission distance is 2000 feet.
- g. LT19B teletype controls may be used with ASR, KSR, RO or SO teletype units.

* Standard unit

SIZE	CODE	NUMBER	REV
A	SP	LT19-A-6	

DEC FORM NO. DRA 108

SHEET 3 OF 17

ENGINEERING SPECIFICATION

CONTINUATION SHEET

TITLE LT19A,B (C) Multi-Station Teletype Control and Interface

Each LT19A added to a PDP-9 will accommodate up to five teletype control units (LT19B'S). These LT19B control units contain logical elements which are functionally similar to those of the PDP-9 standard teletype control. Instructions and programming considerations are, therefore, similar to those of the standard unit.

Optional Teletype Control with Standard EIA Level Converters (Type LT19C)

The LT19C is a group of standard DEC logic modules which, when inserted into the appropriate locations of an LT19A, constitute a single independent teletype control (exactly the same as the LT19B specified above) with standard EIA level converters. Thus the LT19C may be directly connected to input/output devices using standard EIA logic levels, i.e. dataphone.

SIZE	CODE	NUMBER	REV
A	SP	LT19-A-6	

DEC FORM NO. DRA 108

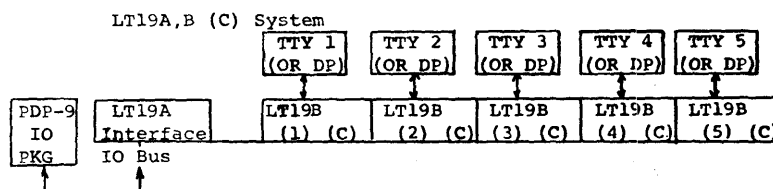
SHEET 2 OF 17

ENGINEERING SPECIFICATION

CONTINUATION SHEET

TITLE LT19A,B (C) Multi-Station Teletype Control and Interface

- 1.1 The LT19A,B (C) system consists of an interface to the processor (LT19A) and up to five teletype control units. (LT19B(C)).



One to five optional LT19B(C) teletype control units may be added to each LT19A interface.

- 1.2 Each of the LT19B(C) control units (up to five may be added) is optional - directly pluggable into the LT19A interface.

- 1.3 The LT19A is packaged in two standard DEC #1943-19" logic mounting racks. Up to five LT19B (C) control units may be plugged into the LT19A logic racks. (10 1/2" of mounting space is required).

When the LT19A,B (C) options are added to a PDP-9 system, these 1943 logic mounting racks must be added to the system as shown in section 4.0 and all necessary cable connectors and power wiring should then be added.

- 1.4 The LT19A,B (C) options operate reliably over the temperature and humidity range specified for the processor. Each LT19A,B (C) optional system is powered from one standard DEC #728 Power Supply mounted on the back door of the bay in which the LT19A,B (C) system is mounted. No special power controls or fan assemblies (other than those necessary for the multi-bay system) are necessary.

SIZE	CODE	NUMBER	REV
A	SP	LT19-A-6	

DEC FORM NO. DRA 108

SHEET 4 OF 17

TITLE LT19A,B (C) Multi-Station Teletype Control and Interface

1.5 General Performance

A general description of the LT19A,B option is given on page 4-31 of the PDP-9 Users Handbook (F-95)

- a. Teletype operational characteristics
 - (1) five or eight* bit character code.
 - (2) one* unit start code.
 - (3) 1, 1.5 or 2* units stop code.
 - (4) Full duplex operation.
 - (5) Up to five teletype units per LT19A.
 - (6) Speed = 10,000 Baud. Maximum
 - (7) Maximum signal transmission distance-2000 feet.

*Standard unit

SIZE	CODE	NUMBER	REV
A	SP	LT19-A-6	

DEC FORM NO

SHEET 5 OF 17

TITLE LT19A,B (C) Multi-Station Teletype Control and Interface

3.0 IOT Instructions

The following device selection codes have been assigned for use with optional teletype units:

Teleprinters	Keyboards
7040--	7041--
7042--	7043--
7044--	7045--
7046--	7047--

In addition to these device selection codes the standard PDP-9 sub device selection lines (SDO,SDI) are also available for assignment. As a result, the device selection codes listed above represent 32 possible device codes.

Teleprinter IOTS

- 1 Skip on teleprinter flag e.g., 704001
- 2 Clear teleprinter flag e.g., 704002
- 4 Load teleprinter buffer and transmit character e.g. 704004

Keyboard IOTS

- 1 Skip on keyboard flag e.g. 704101
- 2 Clear keyboard flag and read the keyboard buffer e.g. 704102
- 4 Not used

3.2 Special Maintenance Instructions

The LT19A,B (C) system uses no special maintenance instructions.

- 3.3 No special data formats,programming considerations
- 3.6 operator controls, or indicators are necessary for the LT19A,B (C) system.

SIZE	CODE	NUMBER	REV
A	SP	LT19-A-6	

DEC FORM NO
DRA 108

SHEET 7 OF 17

TITLE LT19A,B (C) Multi-Station Teletype Control and Interface

2.0 Vendor-Supplied Equipment Specifications

The LT19A,B (C) system may use standard teletype units (ASR's,KSR's,RO's,SO's)and/or standard EIA level operated input/output devices i.e., dataphone interface. All of the above teletype equipment and EIA level operated equipment are standard DEC peripheral devices which have DEC Purchase Specifications. Therefore, if specifications are required for any standard DEC input/output unit, it may be obtained from the Purchasing Specifications List.

SIZE	CODE	NUMBER	REV
A	SP	LT19-A-6	

DEC FORM NO
DRA 108

SHEET 6 OF 17

TITLE LT19A,B (C) Multi-Station Teletype Control and Interface

- 3.7 No status bits are assigned to the LT19A,B (C) system.
- 3.8 Timing diagrams for LT19B(C) teletype control are presented on pages 3-9 (receiver) and 3-7 (transmitter) of the LT19 Instruction Manual

SIZE	CODE	NUMBER	REV
A	SP	LT19-A-6	

DEC FORM NO
DRA 108

SHEET 8 OF 17

TITLE LT19A,B (C) Multi-Station Teletype Control and Interface

4. Installation Data

The LT19A,B (C) system is packaged in a standard PDP-9 19" optional cabinet. The standard LT19 system operates at very slow frequencies and, therefore, may be located at any place along the standard PDP-9 IO bus.

No special action need be taken (either in shipment or during site installation) to install on LT19 system other than that required for the basic processor and standard teletype units.

General information on the physical locating of noncritical options (when assigned to a PDP-9 system) is contained in Chapter 4 (Mechanical) of the PDP-9 Sales Notebook.

SIZE	CODE	NUMBER	REV
A	SP	LT19-A-6	

TITLE LT19A,B(C) Multi-Station Teletype Control and Interface

6.0 Master Drawing Lists

LT19A		No. of	Title
Drawing No.	Sheets		
A-ML-LT19-A	1		Multi-Station Teletype Control
C-UA-LT19-A-0	1		Teletype Control
A-PL-LT19-A-0	1		Teletype Control
D-BS-LT19-A-1	1		I/O Bus Interface Logic
D-BS-LT19-A-2	1		I/O Bus Interface
D-MU-LT19-A-3	1		Module Utilization
A-PL-LT19-A-3	1		Module Utilization
D-AD-7006040-0-0	1		Wired Assy
A-PL-7006040-0-0	1		Wired Assy
K-WL-LT19-A-4	1		Wire List LT19
A-CP-LT19-A-5	1		External Component List

LT19B		No. of	Title
Drawing No.	Sheets		
A-ML-LT19-B	1		Teletype Interface LT19-B
D-BS-LT19-B-1	1		Teletype Control Unit Channel 1
D-BS-LT19-B-2	1		Teletype Control Unit Channel 2
D-BS-LT19-B-3	1		Teletype Control Unit Channel 3
D-BS-LT19-B-4	1		Teletype Control Unit Channel 4
D-BS-LT19-B-5	1		Teletype Control Unit Channel 5

LT19C		No. of	Title
Drawing No.	Sheets		
A-ML-LT19-C	1		Teletype Interface LT19-C
D-BS-LT19-C-1	1		Teletype Control Unit Channel 1
D-BS-LT19-C-2	1		Teletype Control Unit Channel 2
D-BS-LT19-C-3	1		Teletype Control Unit Channel 3
D-BS-LT19-C-4	1		Teletype Control Unit Channel 4
D-BS-LT19-C-5	1		Teletype Control Unit Channel 5

Note: LT19-B(C)-1 1st optional teletype control
 LT19-B(C)-2 2nd optional teletype control
 LT19-B(C)-3 3rd optional teletype control
 LT19-B(C)-4 4th optional teletype control
 LT19-B(C)-5 5th optional teletype control

SIZE	CODE	NUMBER	REV
A	SP	LT19-A-6	

TITLE LT19A,B (C) Multi-Station Teletype Control and Interface

5.0 Interface Specifications

All connections from the LT19A,B (C) system to the basic processor are made through the standard PDP-9 IO Bus. No special cabling is needed for the system. The optional teletype units (or EIA standard level units) are interfaced to LT19A,B (C) system as stated in Section 7 (System Components). The single control cable and its termination module are standard units which are delivered with the optional input/output unit.

SIZE	CODE	NUMBER	REV
A	SP	LT19-A-6	

TITLE LT19A,B(C) Multi-Station Teletype Control and Interface

7.0 System Components

Basic system components consist of the LT19A,B(C) control logic (located in an optional bay) and up to 5 teletype units or EIA level operated units for each LT19A control. The optional teletype units or EIA units are located remotely from the PDP-9 system. A single control cable interfaces the remote unit to its control in the PDP-9 system. This control cable is terminated with a standard DEC W070 cable connector module which is inserted in its assigned location in the LT19A mounting panels (see module utilization print D-MU-LT19-A-3).

7.1 Modules needed to implement the multi-teletype control are as follows:

LT19A (PDP-9 interface only)

1 -R401	2 -R002
2 -S107	1 -R111
1 -S123	2 -W104
1 -S603	
2 -W107	

LT19B (Single teletype control only)

1 -R401
2 -S203
1 -W005
1 -W070 (part of teletype or EIA device)
2 -W103
1 -W705
1 -W706
1 -W707

LT19C (Single EIA level operated device control)

Same as LT19B plus

1 -W511
1 -W602

SIZE	CODE	NUMBER	REV
A	SP	LT19-A-6	

TITLE LT19A,B(C) Multi-Station Teletype Control and Interface

- 7.2 No special power controls are necessary due to the addition of an LT19A,B(C) system other than those required for the optional bay configuration. One 728 power supply must be added to the back door of the optional bay for each LT19A,B,C system interfaced to a PDP-9. See table below.
- 7.3 An LT19A,B(C) system is interfaced to the PDP-9 processor through the IO Bus and to input/output devices through connector cables supplied with the optional unit. As a result, no special cabling is needed for the system.
- 7.4 As stated in Section 2.0 vendor-supplied equipment which interfaces to the LT19A,B(C) system is standard and DEC purchase specifications for all units are available from Drafting.

LT19A With	1-LT19B	2-LT19B	3-LT19B	4-LT19B	5-LT19B
+10V	1.47A	2.88	4.30	5.72	7.14
-15V	1.58A	1.86	2.14	2.42	2.70

LT19C
 +10 .075A } Maximum LT19C Configuration
 -15 .134A }
 Maximum Possible Load: +10V-7.2A,-15V-2.8A

SIZE	CODE	NUMBER	REV
A	SP	LT19-A-6	

TITLE LT19A,B(C) Multi-Station Teletype Control and Interface

9.0 Acceptance Test Procedure

The Acceptance Test operator must successfully rerun all Checkout Test Procedures as stated in Section 8.

In addition, the following documentation list must be complete before the unit is accepted.

- a. MAINDEC-9A-D8CS-PH Program Tape
- b. MAINDEC-9A-D8CA-D Write-up

- 9.1 No special test equipment is needed for acceptance of this option.
- 9.2 Field-installed LT19A,B(C) options should be tested and accepted under the same stipulations stated for in-house installations.

SIZE	CODE	NUMBER	REV
A	SP	LT19-A-6	

TITLE LT19A,B(C) Multi-Station Teletype Control and Interface

8.0 Acceptance Test Procedure

Each LT19A,B(C) unit will be tested using Test Procedure MAINDEC-9A-D8AA-D both under normal operating conditions and under voltage margins as specified below:

Test No.	Aggravation Conditions	Margins			
		+10V		-15V	
1	None	+	-	+	-
2	Margin LT19A (Rack A)	6V	6V	2.5	2.5
3	Margin LT19A (Rack B)	6V	6V	2.5	2.5
4	Margin LT19A (Rack C)	6V	6V	2.5	2.5
5	Margin LT19A (Rack D)	6V	6V	2.5	2.5

SIZE	CODE	NUMBER	REV
A	SP	LT19-A-6	

TITLE LT19A,B(C) Multi-Station Teletype Control and Interface

10.0 Spare Parts

Spare modules necessary for the LT19A

- 1 S123* 1 S107*
- 1 S603* 1 W107
- 1 R401* 1 W104

*These modules are already included in the basic processor spare parts list.

Spare modules necessary for the LT19B:

- 1 R401* 1 W005*
- 1 S203* 1 W070
- 1 W103

*These modules are already included in the basic processor spare parts list.

Spare modules necessary for the LT19C:

Same as LT19B plus:

- 1 W511
- 1 W602

10.1 No special component spares are necessary for the LT19A,B(C) system,

10.3 Special mechanical spare parts and tools which should be supplied with each optional teletype unit are listed in the PDP-9 Sales Notebook, Section 7.6.

SIZE	CODE	NUMBER	REV
A	SP	LT19-A-6	

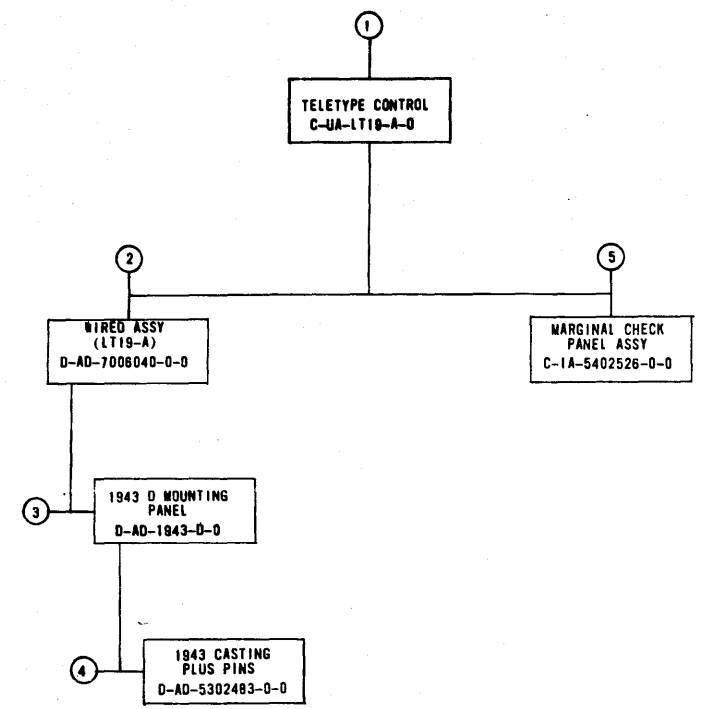
TITLE LT19A,B(C) Multi-Station Teletype Control and Interface

11.0 Preventative Maintenance Procedures

To insure reliable operation of the LT19A,B(C) system, standard processor maintenance procedures (for both logic and the teletype units) must be followed. All additional KSR'S, ASR'S, SO'S, or RO'S which are added to the PDP-9 system must follow standard field service maintenance procedures to insure proper operation.

SIZE	CODE	NUMBER	REV
A	SP	LT19-A-6	

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MECHANICAL			DEPT USAGE		
FIND NO	DESCRIPTION	PART NO	PROD	CUST	F/C
1	TELETYPE CONTROL TELETYPE CONTROL P.L. PANEL, RIGHT END I/O CABLE ASSY RET BLOCK 4815 TO WD7B CABLE DATA SET CABLE	C-UA-LT19-A-0 A-PL-LT19-A-0 C-MD-5302483-0-0 D-UA-SCCGA-0-0 B-MD-7408047-0-0 D-AD-7005288-0-0 C-IA-7005717-0-0			
2	WIRED ASSY (LT19-A) WIRED ASSY (LT19-A) P.L.	D-AD-7006040-0-0 A-PL-7006040-0-0			
3	1943D MOUNTING PANEL 1943D MOUNTING PANEL P.L.	D-AD-1943-0-0 A-PL-1943-0-0			
4	1943 CASTING PLUS PINS 1943 CASTING PLUS PINS P.L. 1943 FRAME CASTING	D-AD-5302483-0-0 A-PL-5302483-0-0 E-MD-1202885-0-0			
5	MARGINAL CHECK PANEL ASSY MARGINAL CHECK PANEL (P.L.) PANEL, MARGINAL CHECK SCOTCHCAL	C-IA-5402526-0-0 A-PL-5402526-0-0 C-MD-5302484-0-0 SS-C-10801			

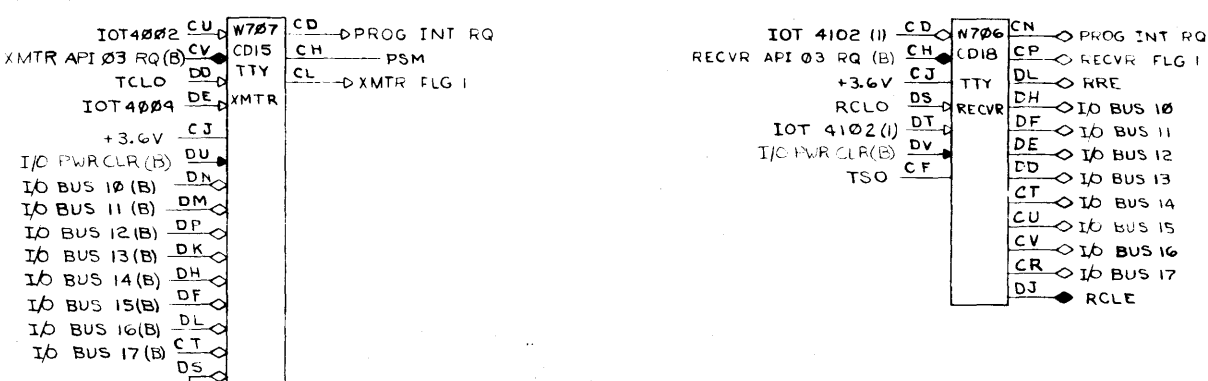
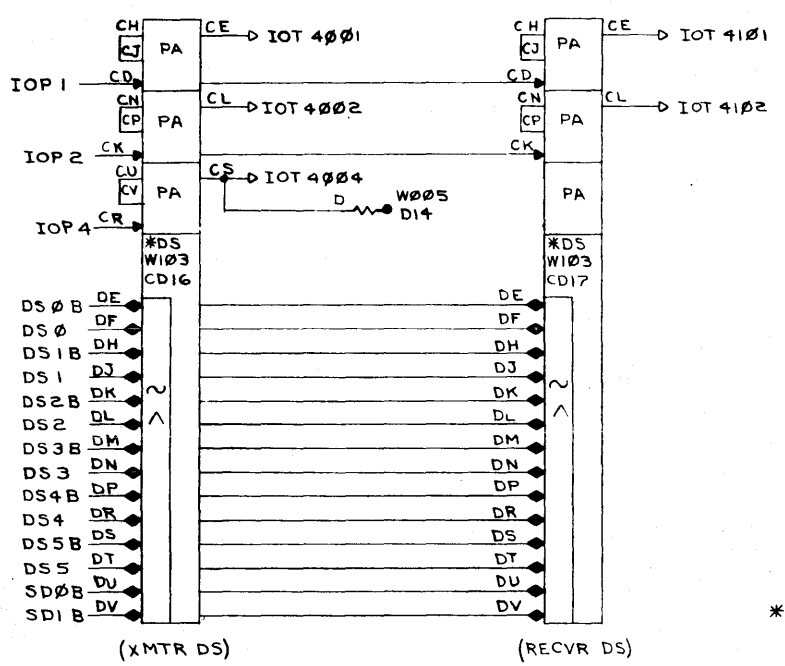
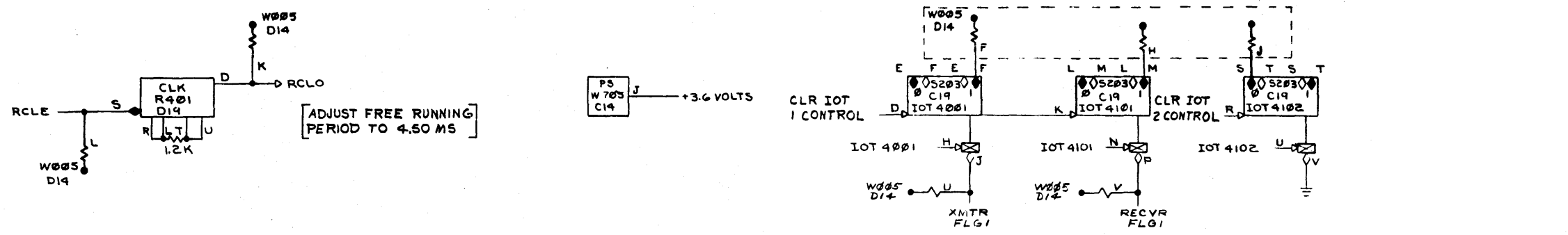
ELECTRICAL			DEPT USAGE		
FIND NO	DESCRIPTION	PART NO	PROD	CUST	F/C
1	MULTI-STATION TELETYPE CONTROL I/O BUS INTERFACE LOGIC I/O BUS INTERFACE MODULE UTILIZATION MODULE UTILIZATION P.L. WIRE LIST LT19 EXTERNAL COMPONENT LIST LT19 ENGINEERING SPECIFICATION -OPTIONS- TELETYPE INTERFACE LT19-B TELETYPE CONTROL UNIT CHANNEL 1 TELETYPE CONTROL UNIT CHANNEL 2 TELETYPE CONTROL UNIT CHANNEL 3 TELETYPE CONTROL UNIT CHANNEL 4 TELETYPE CONTROL UNIT CHANNEL 5 TELETYPE INTERFACE LT19-C TELETYPE CONTROL UNIT CHANNEL 1 TELETYPE CONTROL UNIT CHANNEL 2 TELETYPE CONTROL UNIT CHANNEL 3 TELETYPE CONTROL UNIT CHANNEL 4 TELETYPE CONTROL UNIT CHANNEL 5	A-ML-LT19-A D-BS-LT19-A-1 D-BS-LT19-A-2 D-MU-LT19-A-3 A-PL-LT19-A-3 K-WL-LT19-A-4 A-CP-LT19-A-5 A-SP-LT19-A-6 A-ML-LT19-B D-BS-LT19-B-1 D-BS-LT19-B-2 D-BS-LT19-B-3 D-BS-LT19-B-4 D-BS-LT19-B-5 A-ML-LT19-C D-BS-LT19-C-1 D-BS-LT19-C-2 D-BS-LT19-C-3 D-BS-LT19-C-4 D-BS-LT19-C-5			
2	WIRED ASSY (LT19-A)	D-AD-7006040-0-0			
5	MOUNTING PANEL 1943 MARGINAL CHECK PANEL ASSY	B-CS-1943-0-1 C-IA-5402526-0-0			

FIRST USED ON OPTION/ MODEL PDP-9L	QTY.	DESCRIPTION	PART NO.	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED				
DRN	DATE	DATE	EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	
CHKD	DATE	DATE	TITLE DRAWING INDEX LIST LT19	
ENG	DATE	DATE	SIZE CODE D DI LT19-A-7	
PROJ	DATE	DATE	NUMBER REV	
MATERIAL	NEXT HIGHER ASSY A-ML-LT19-A		SCALE NONE	
FINISH	SCALE NONE		SHEET 1 OF 1	

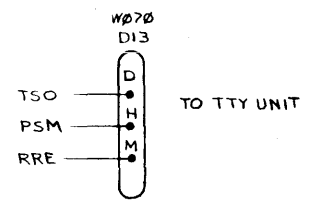
REV.	NO.	DATE	BY
CHG	NO.	DATE	BY

REV. LT19-A-7

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* NOTES:
 APPROPRIATE DIODES MUST BE
 REMOVED FROM W103 DEVICE
 SELECTOR MODULES TO OBTAIN PROPER
 SELECTOR CODES.

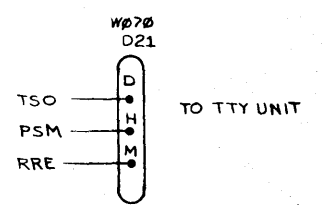
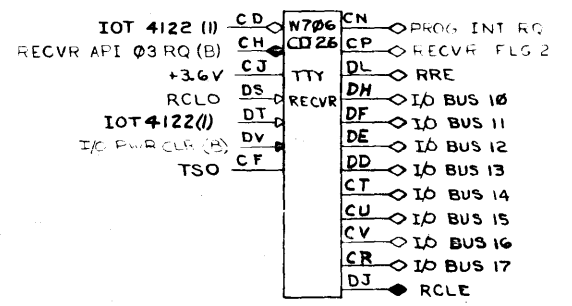
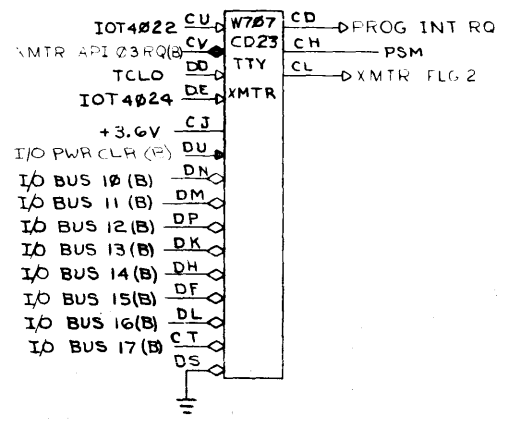
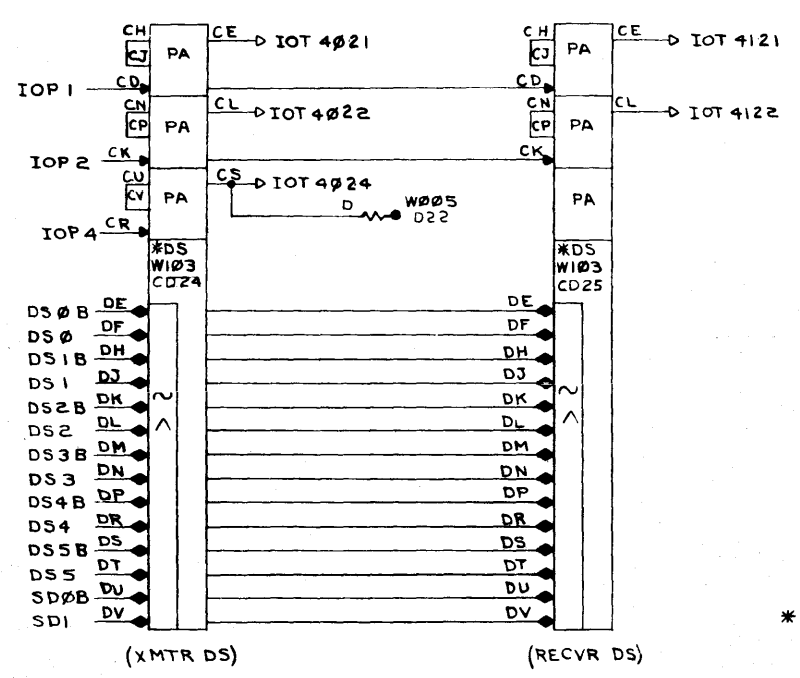
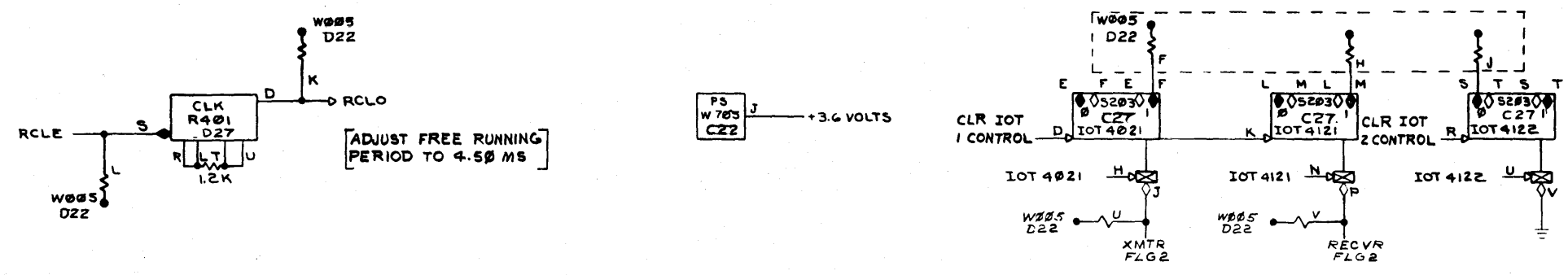


REV	REV
LT19A-00001	A
H. DIETER	
LT19A-00003	B
11-10-71	
J. MILTON	
11-16-71	

FIRST USED CN OPTION/MODEL LT19-A	QTY.	DESCRIPTION	PART NO.	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED	DRN	DATE	EQUIPMENT CORPORATION	
UNLESS OTHERWISE SPECIFIED	WE Jackson Jr	10/10/68	MAYNARD, MASSACHUSETTS	
DIMENSION IN INCHES	DATE	11-1-68	TITLE	
TOLERANCES	DATE	11-1-68	TTY CONTROL	
DECIMALS FRACTIONS ANGLES	DATE	11-1-68	UNIT	
± .005 ± .001 ± .030	DATE	11-1-68	CHANNEL 1	
FINAL SURFACE QUALITY	DATE	11-1-68	SIZE CODE NUMBER REV	
REMOVE BURRS AND BREAK SHARP CORNERS	DATE	11-1-68	DES LT19-B-1 B	
MATERIAL	NEXT HIGHER ASSY	SCALE		
FINISH	A - ML - LT19-B	SHEET OF		

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LT19-B-2 2



* NOTES:
 APPROPRIATE DIODES MUST BE REMOVED FROM W103 DEVICE SELECTOR MODULES TO OBTAIN PROPER SELECTOR CODES.

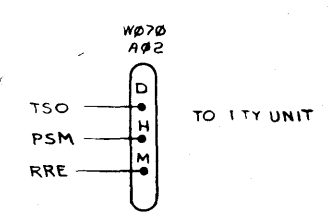
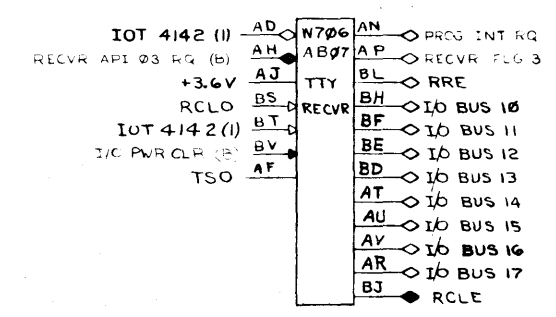
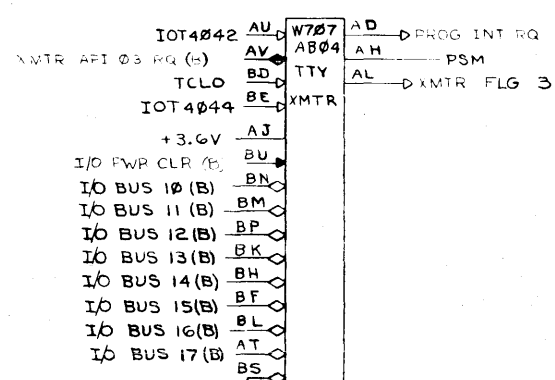
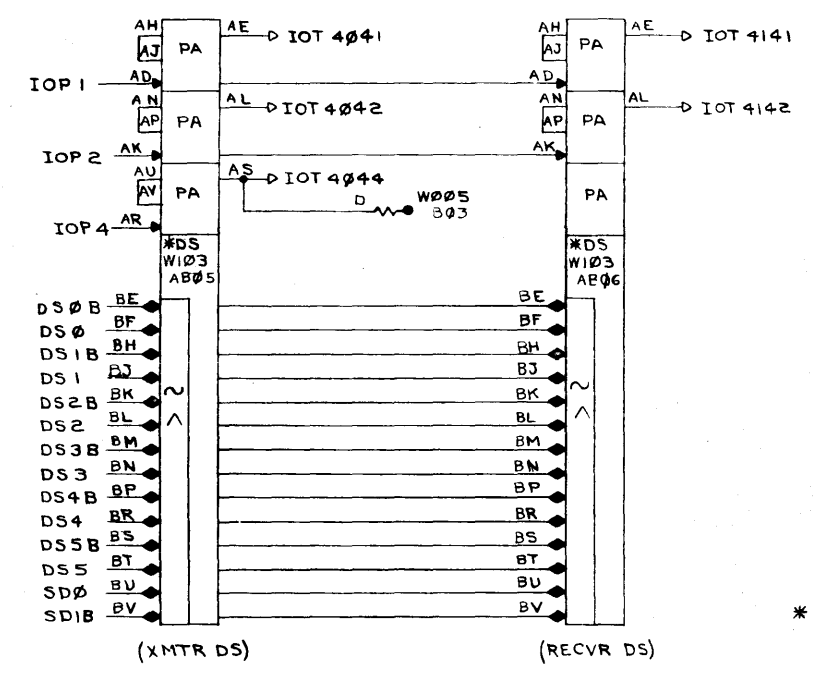
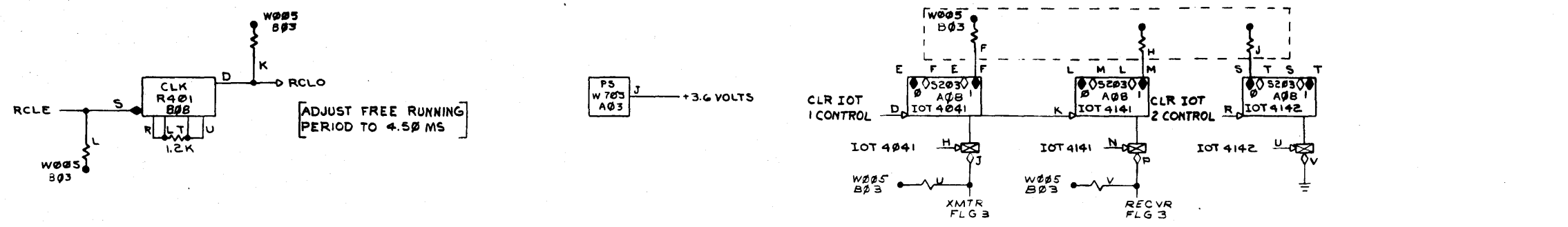
REVISIONS	CHANGE NO.	REV.
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2	LT19A-00003	B

DATE: 11-10-71
 J. MILLON
 R. DIETER

FIRST USED ON OPTION MODEL LT19-A	QTY.	DESCRIPTION	PART NO.	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES	DATE 10/10/68	EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS		
TOLERANCES DECIMALS FRACTIONS ANGLES ± .008 ± 1/64 ± 0°30'	DATE 11-11-68	TITLE TTY CONTROL UNIT CHANNEL 2		
MATERIAL	DATE 11-11-68	SIZE/CODE DPS		
FINISH	DATE 11-11-68	NUMBER LT19-B-2		
	SCALE	REV. B		
	SHEET 1 OF 1	DIST.		

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DBS LT19-B-3 2



* NOTES:
APPROPRIATE DIODES MUST BE REMOVED FROM W103 DEVICE SELECTOR MODULES TO OBTAIN PROPER SELECTOR CODES.

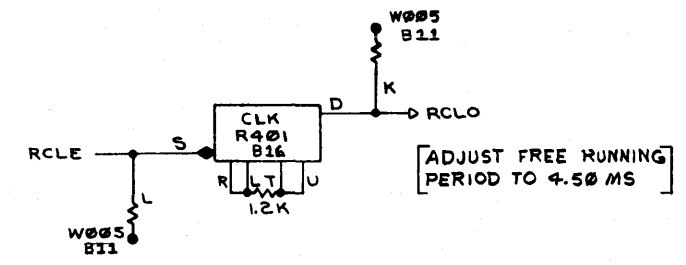
REV	CHANGE NO	DATE	BY
A			

LT19A-00003 B
J. MILTON
11-16-71

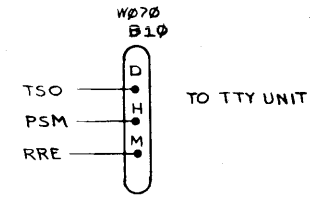
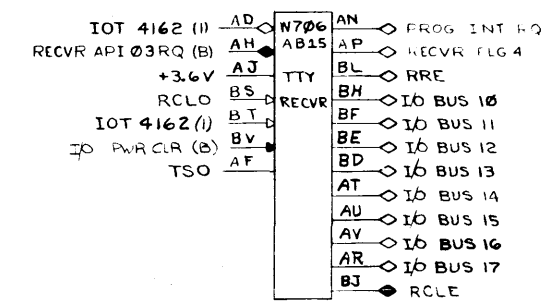
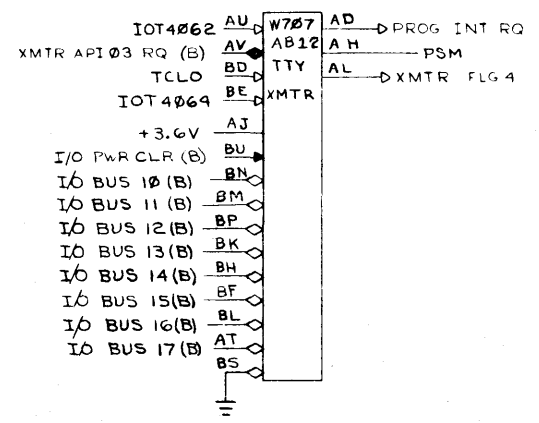
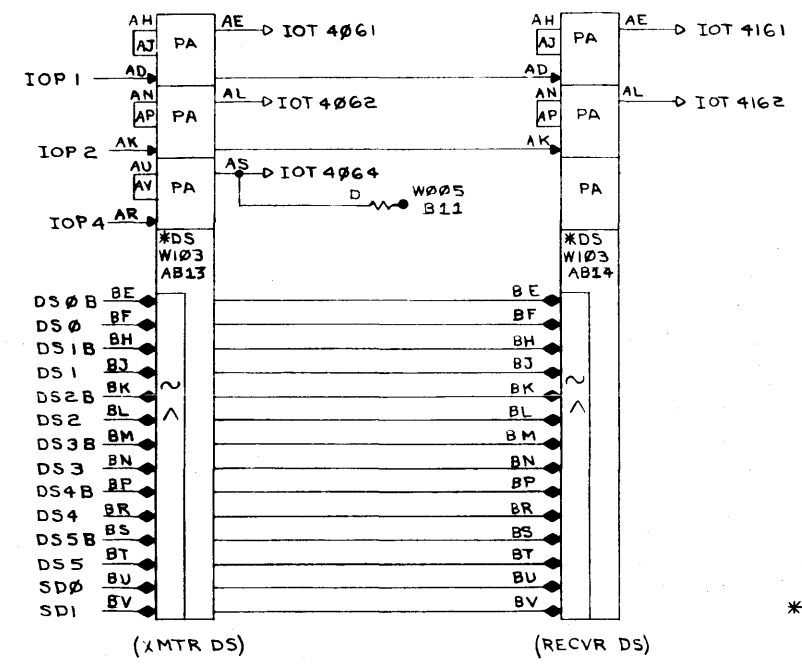
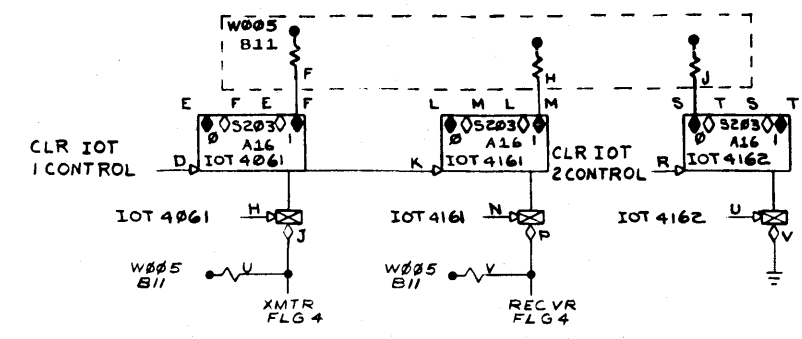
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LT19-A						
UNLESS OTHERWISE SPECIFIED			EQUIPMENT CORPORATION			
UNLESS OTHERWISE SPECIFIED			TITLE			
DIMENSION IN INCHES			TTY CONTROL UNIT CHANNEL 3			
TOLERANCES			SIZE CODE			
DECIMALS FRACTIONS ANGLES			NUMBER			
± .008 ± .004 ± .020			LT19-B-3			
FINAL SURFACE QUALITY			REV			
REMOVE BURRS AND DEBurr SHARP CORNERS			B			
MATERIAL			NEXT HIGHER ASSY			
FINISH			SCALE			
			SHEET OF 1			

REV B
NUMBER
DBS LT19-B-3

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PS W703 A11 +3.6 VOLTS

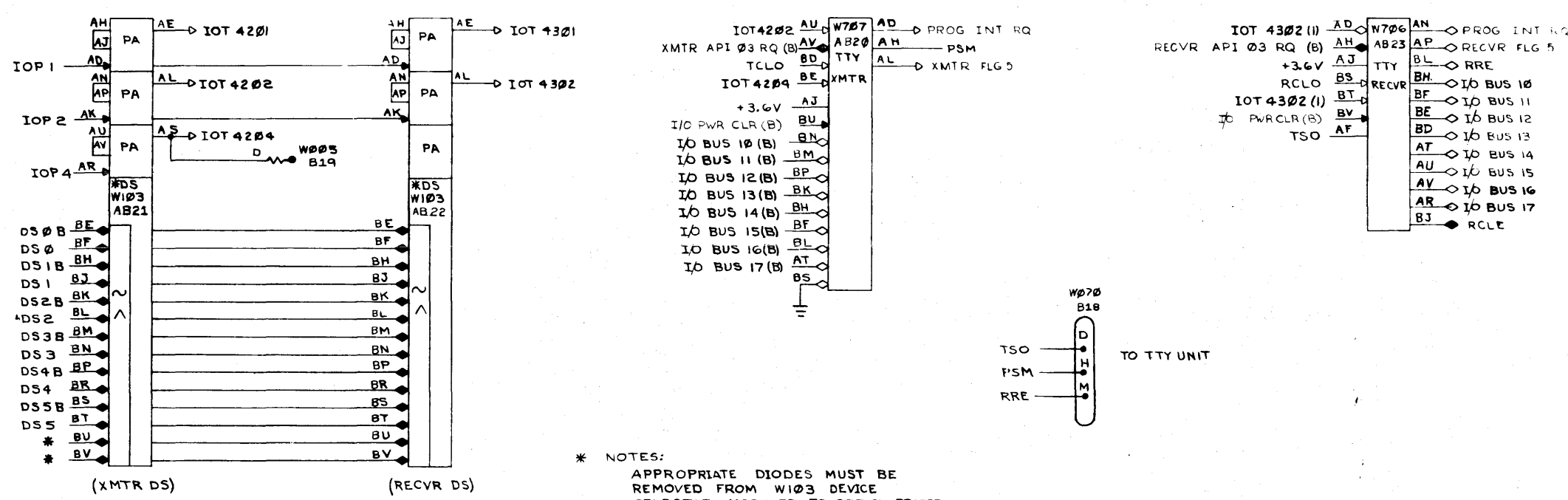
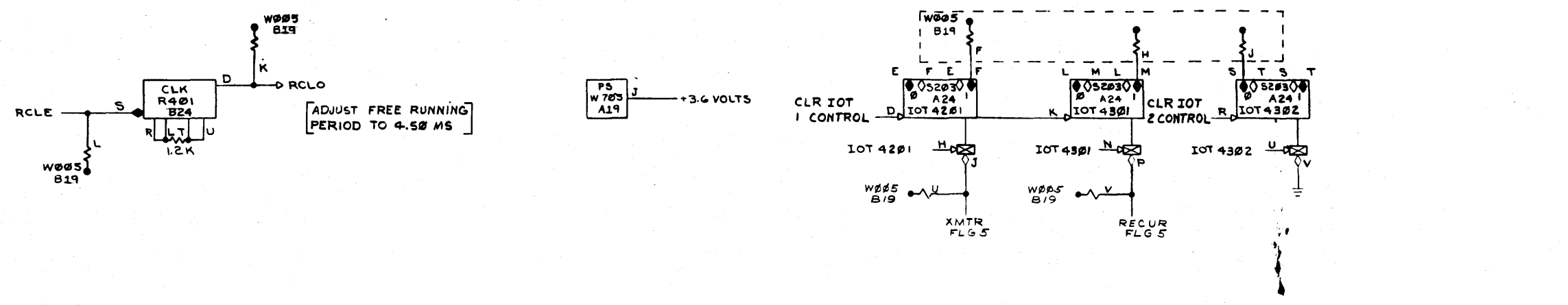


* NOTES:
 APPROPRIATE DIODES MUST BE REMOVED FROM W103 DEVICE SELECTOR MODULES TO OBTAIN PROPER SELECTOR CODES.

REV	CHANGE NO.	DATE	BY
A	00001	11-16-71	J. MILTON
B	00003	11-16-71	J. MILTON

FIRST USED OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
LT19-A				
PARTS LIST				
UNLESS OTHERWISE SPECIFIED		DRN	EQUIPMENT CORPORATION	
UNLESS OTHERWISE SPECIFIED		W.F. JACKSON JR.	CORPORATION	
DIMENSION IN INCHES		DATE	MAYNARD, MASSACHUSETTS	
TOLERANCES		ENG.	TITLE	
DECIMALS	FRACTIONS	DATE	TTY CONTROL UNIT CHANNEL 4	
± .008	± 1/64	DATE	SIZE CODE	
FINAL SURFACE QUALITY		DATE	NUMBER	
REMOVE BURRS AND BREAK SHARP EDGES		DATE	REV.	
MATERIAL		DATE	B	
FINISH		DATE	LT19-B-4	
SCALE		DATE	DIST.	
DINSET		DATE		

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 SUB DEVICE SELECTION CODE IS NOT ASSIGNED TO THIS UNIT AND MUST BE JUMPED IN IF REQUIRED.

REV	A
CHANGE NO.	119A-00001
DATE	11-10-71
BY	J. MILLON
DATE	11-16-71

FIRST USE/OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
LT19-A				
PARTS LIST				
UNLESS OTHERWISE SPECIFIED	DRN	DATE	EQUIPMENT CORPORATION	
UNLESS OTHERWISE SPECIFIED	DATE	DATE	MAYNARD, MASSACHUSETTS	
DIMENSION IN INCHES	DATE	DATE	TITLE	
TOLERANCES	DATE	DATE	TTY CONTROL	
DECIMALS FRACTIONS ANGLES	DATE	DATE	UNIT	
± .008 ± 1/64 ± 0°30'	DATE	DATE	CHANNEL 5	
FINAL SURFACE QUALITY	DATE	DATE	SIZE CODE	NUMBER
REMOVE BURRS AND BREAK SHARP CORNERS	DATE	DATE	D.B.S.	LT19-B-5
MATERIAL	NEXT HIGHER ASSY	SCALE	DIST.	
	A-ML-LT19-B			
FINISH		SHEET	OF	
		1	1	

REV. DATE LT19-B-5

MASTER DRAWING LIST

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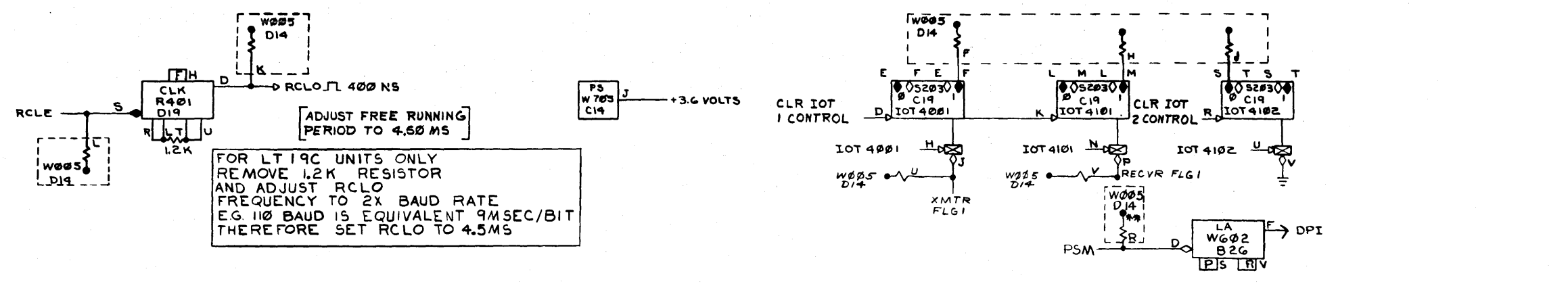
DWG. NO.	REV. LET.	NO. OF SHEETS	TITLE
A-ML-LT19-A	REF	1	MULTI-STATION TELETYPE CONTROL
D-BS-LT19-C-1	B	1	TELETYPE CONTROL UNIT CHANNEL 1
D-BS-LT19-C-2	B	1	TELETYPE CONTROL UNIT CHANNEL 2
D-BS-LT19-C-3	B	1	TELETYPE CONTROL UNIT CHANNEL 3
D-BS-LT19-C-4	B	1	TELETYPE CONTROL UNIT CHANNEL 4
D-BB-LT19-C-5	B	1	TELETYPE CONTROL UNIT CHANNEL 5

REVISIONS				DRN. JACKSON DATE 10/14/68 CHK'D PFYFFER DATE 10/22/68 ENG. <i>R. Di...</i> DATE 11-4-68 PROG ENR. <i>W. Florida</i> DATE 11-8-68 PROD <i>W. Call</i> DATE 11/6/68		digital EQUIPMENT CORPORATION <small>MAYNARD, MASSACHUSETTS</small>	
REV.	DATE	CHG. NO.	APP'D.			TITLE TELETYPE INTERFACE LT19-C	
A	9/11/68	LT19A-1	R. D.				
B	11/9/71	LT19A-3	J. M.				
				FIRST USED ON	SIZE	CODE	NUMBER
				LT19-A	A	ML	LT19-C
				SCALE			REV.
				SHEET 1 OF 1	DIST.		B

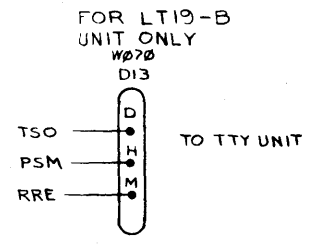
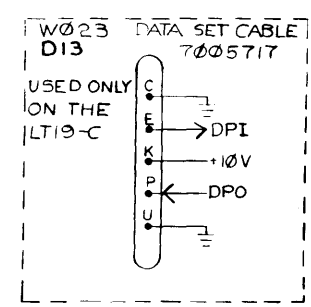
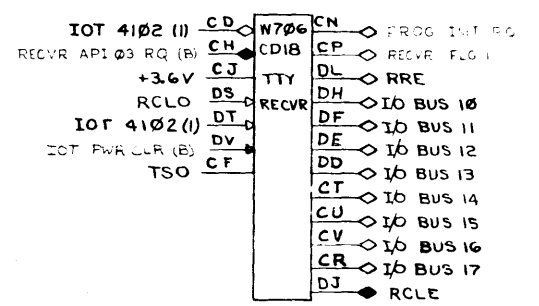
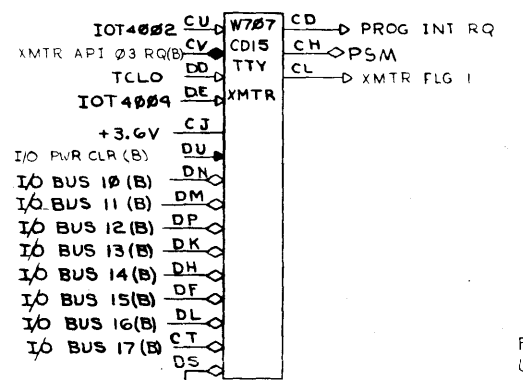
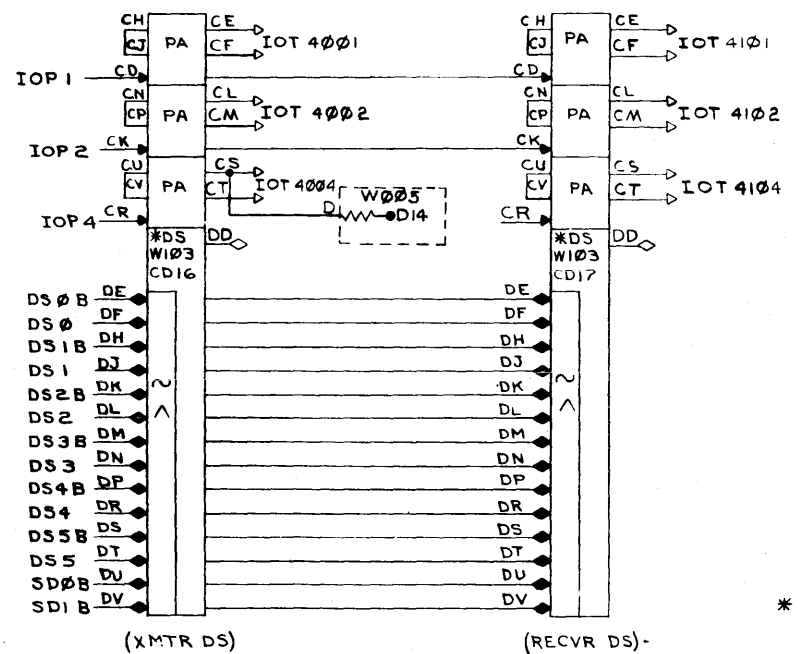


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1-0-6117 2



FOR LT19C UNITS ONLY
REMOVE 1.2K RESISTOR
AND ADJUST RCLO
FREQUENCY TO 2X BAUD RATE
E.G. 110 BAUD IS EQUIVALENT 9MSEC/BIT
THEREFORE SET RCLO TO 4.5MS



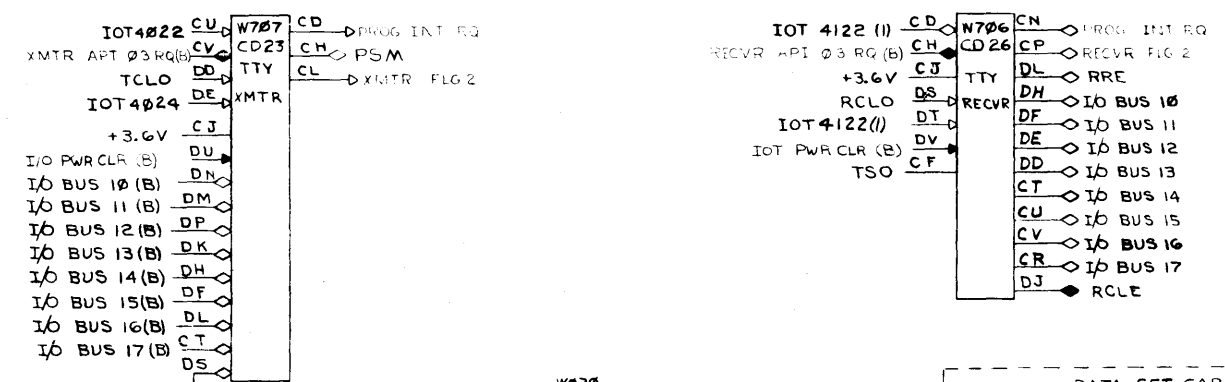
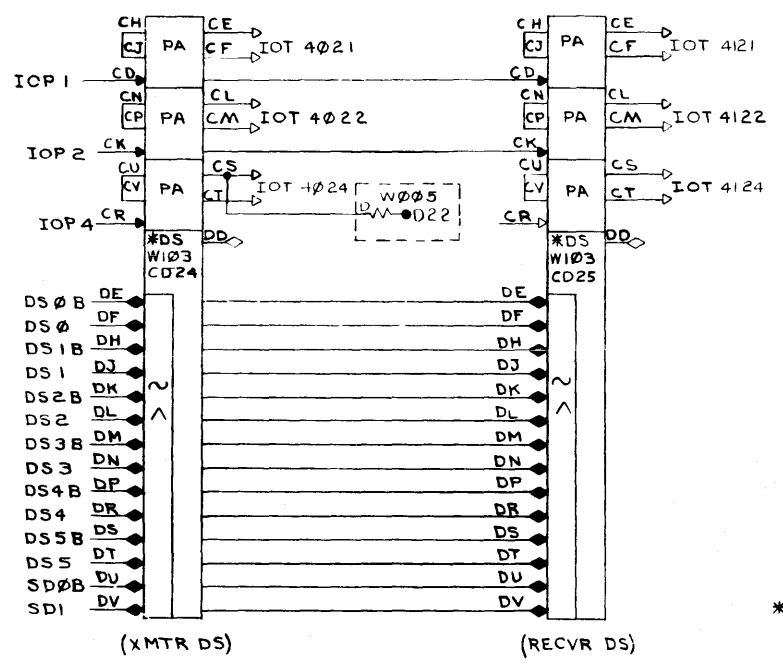
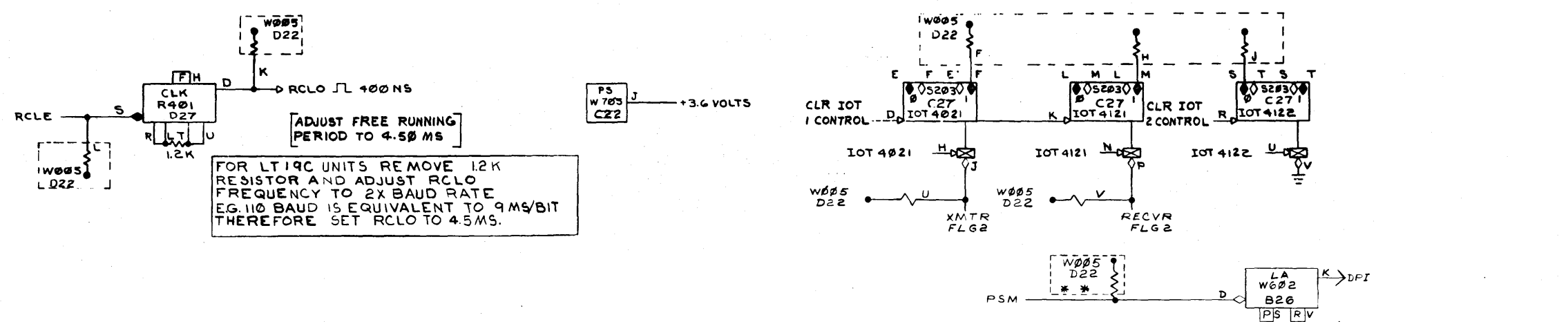
* NOTES:
APPROPRIATE DIODES MUST BE
REMOVED FROM W103 DEVICE
SELECTOR MODULES TO OBTAIN PROPER
SELECTOR CODES.

** THESE CLAMPED LOADS ARE JUMPED
IN FOR C UNITS ONLY NOT WIRE WRAPPED

REV	CHANGE NO	DATE	BY	CHK
A				
B				

FIRST USED OR OPTION MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
LT19-A				
UNLESS OTHERWISE SPECIFIED				
DIMENSION IN INCHES				
TOLERANCES				
DECIMALS	FRACTIONS	ANGLES		
± 0.08	± 1/64	± 0°30'		
FINAL SURFACE QUALITY				
REMOVE BURRS AND BREAK SHARP CORNERS				
MATERIAL				
NEXT HIGHER ASSY				
FINISH				
SCALE				
SHEET OF 1				
TITLE			NUMBER	REV.
TTY CONTROL UNIT CHANNEL 1			LT19-C-1	B
SIZE CODE			DBS	
DIST.				

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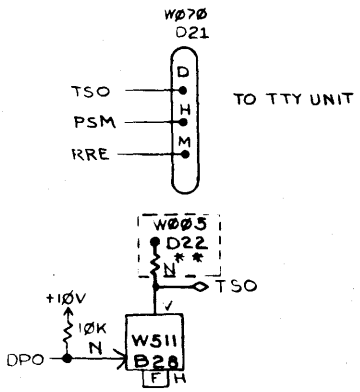
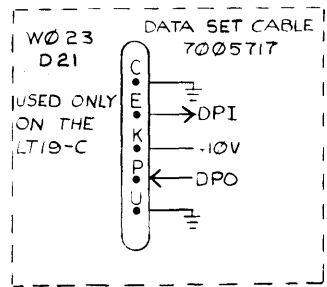


ADJUST FREE RUNNING PERIOD TO 4.50 MS

FOR LT19C UNITS REMOVE 1.2K RESISTOR AND ADJUST RCLO FREQUENCY TO 2X BAUD RATE. EG. 110 BAUD IS EQUIVALENT TO 9MS/BIT THEREFORE SET RCLO TO 4.5MS.

* NOTES:
APPROPRIATE DIODES MUST BE REMOVED FROM W103 DEVICE SELECTOR MODULES TO OBTAIN PROPER SELECTOR CODES.

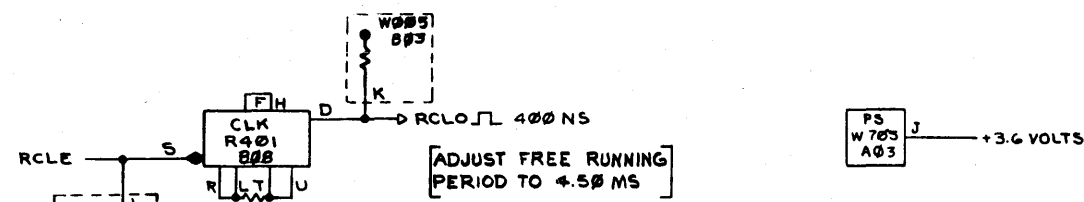
** THESE CLAMPED LOAD ARE JUMPED IN FOR "LT09C" UNIT ONLY (NOT WIRE WRAPPED).



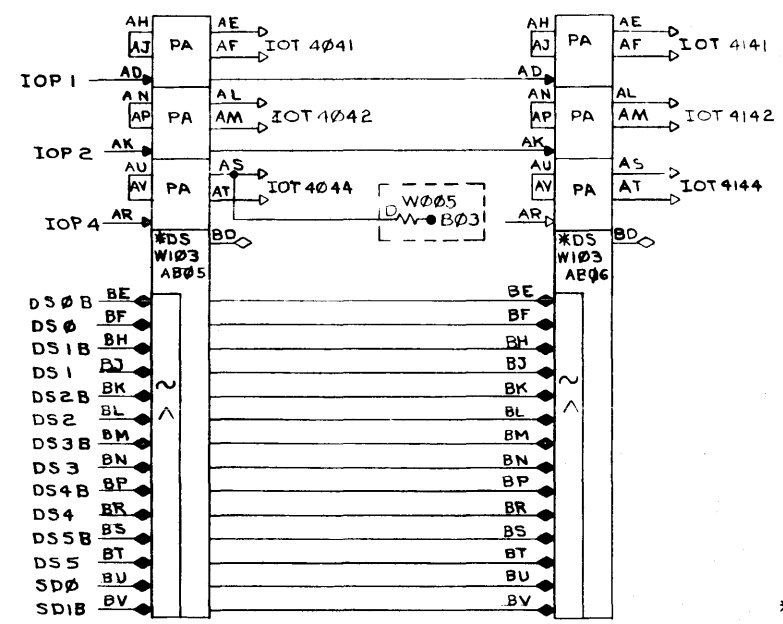
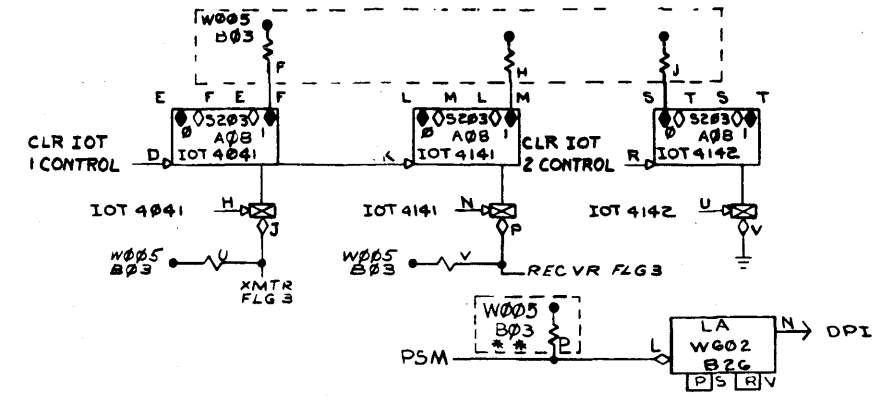
REV	CHANGE NO	REV
A	1	11-10-71
B	2	11-16-71

FIRST USED ON OPTIO MODEL	QTY	DESCRIPTION	PART NO.	ITEM NO.
LT19-A				
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DRN. DATE 12/15/68				
UNLESS OTHERWISE SPECIFIED CHECKED. DATE 12/15/68				
DIMENSION IN INCHES				
TOLERANCES				
DECIMALS FRACTIONS ANGLES				
± .008 ± .004 ± .030				
FINAL SURFACE QUALITY REMOVE BURRS AND BREAK SHARP CORNERS				
MATERIAL				
NEXT HIGHER ASSY				
A-ML-LT19-C				
FINISH				
SCALE				
SHEET 1 OF 1				
TITLE			NUMBER	REV.
TTY CONTROL UNIT CHANNEL 2			LT19-C-2	B

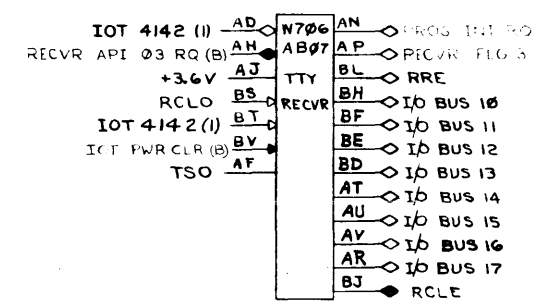
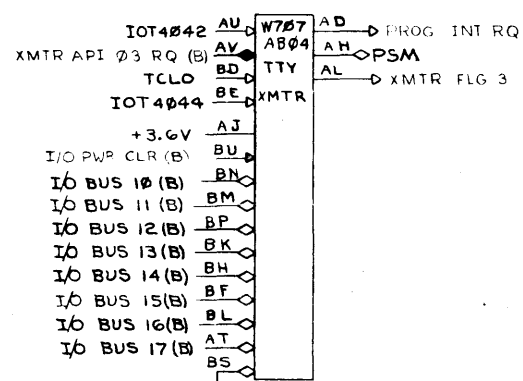
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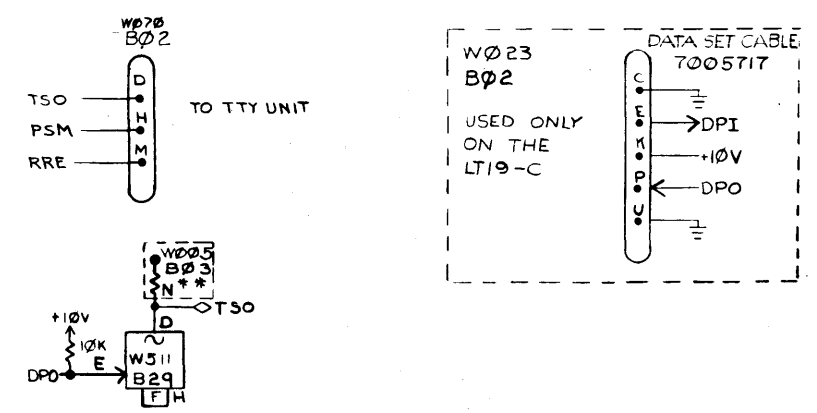
FOR LT19C UNITS ONLY REMOVE 12K RESISTOR AND ADJUST RCLO FREQUENCY TO 2X BAUD RATE. EG. 110 BAUD IS EQUIVALENT TO 9 MS/BIT THEREFORE SET RCLO TO 4.5 MS.



(XMT DS) (RECVR DS)
 ** THESE CLAMPED LOAD ARE JUMPED IN FOR C UNITS ONLY (NOT WIRE WRAPPED).



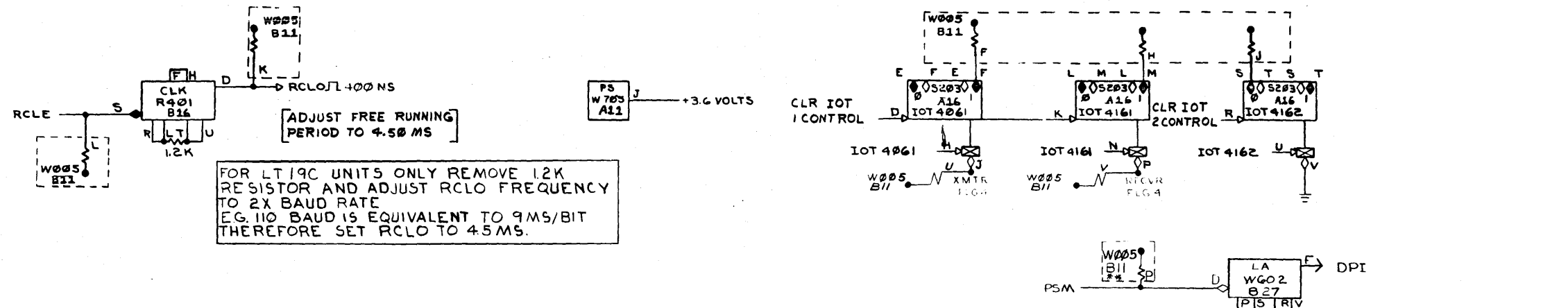
* NOTES:
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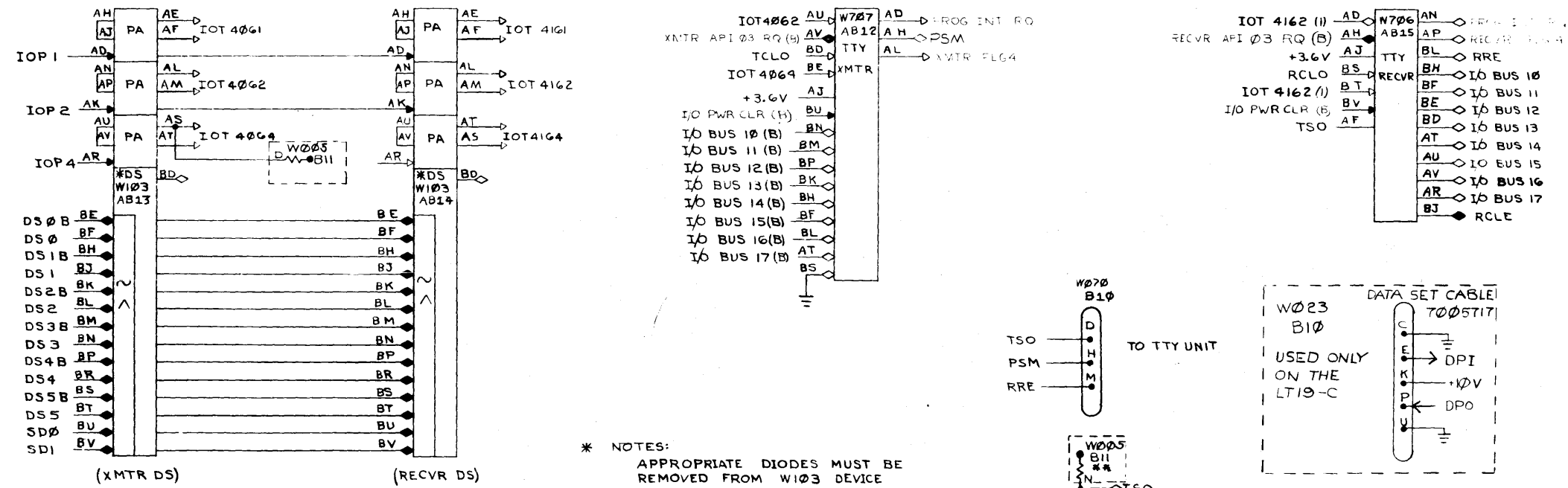
REV	CHANGE NO	BY	DATE
1	LT19A-00001	A	
2	LT19A-00002	R. DIETER	
3	LT19A-00003	B	
4	LT19A-00004	J. MILTON	11-11-71
5	LT19A-00005	J. MILTON	11-16-71

FIRST USED OR OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
LT19-A				
PARTS LIST				
UNLESS OTHERWISE SPECIFIED	DRN. W.F. JACKSON JR.	DATE 10/7/68	EQUIPMENT CORPORATION	
UNLESS OTHERWISE SPECIFIED	DATE	DATE	MAYNARD MASSACHUSETTS	
DIMENSION IN INCHES	DATE	DATE	TITLE	
TOLERANCES	DATE	DATE	TTY CONTROL UNIT CHANNEL 3	
DECIMALS FRACTIONS ANGLES	DATE	DATE	SIZE CODE	
* .005 ± 1/64 ± 0.005	DATE	DATE	DBS LT 9-C-3	
FINAL SURFACE QUALITY	DATE	DATE	REV B	
REMOVE BURRS AND BREAK SHARP CORNERS	DATE	DATE	SCALE	
MATERIAL	DATE	DATE	SHEET OF	
NEXT NUMBER ASS.	DATE	DATE	DIST.	
A-ML-LT19-C	DATE	DATE		
FINISH	DATE	DATE		

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FOR LT19C UNITS ONLY REMOVE 1.2K RESISTOR AND ADJUST RCLO FREQUENCY TO 2X BAUD RATE. E.G. 110 BAUD IS EQUIVALENT TO 9MS/BIT THEREFORE SET RCLO TO 4.5MS.



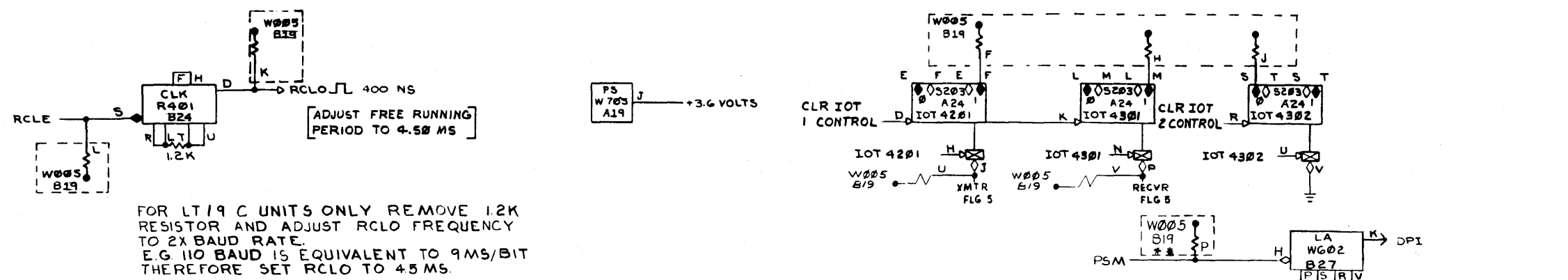
** THESE CLAMPED LOAD ARE JUMPED IN FOR C UNITS ONLY (NOT WIRE WRAPPED)

* NOTES:
APPROPRIATE DIODES MUST BE REMOVED FROM W103 DEVICE SELECTOR MODULES TO OBTAIN PROPER SELECTOR CODES.

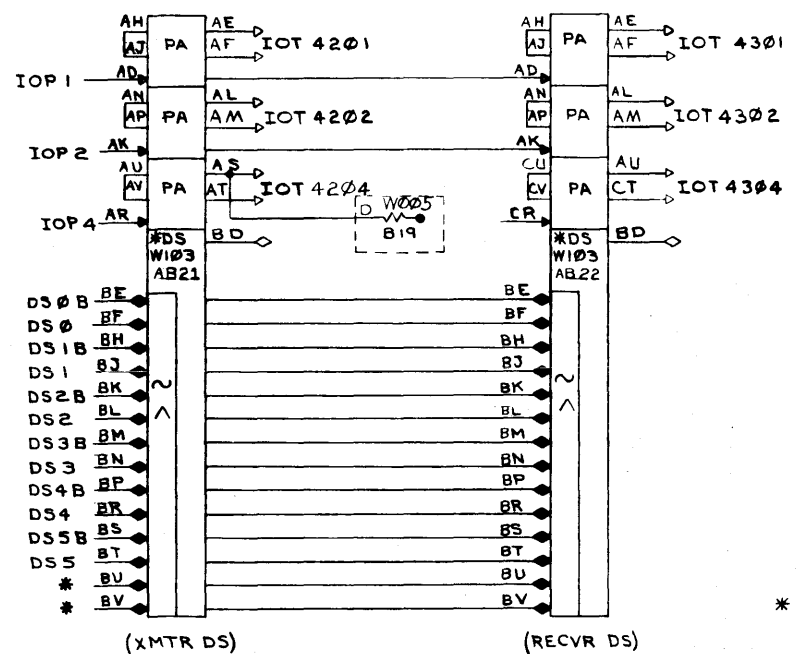
REV	CHANGE NO.	DATE	BY
1	LT19A-00001	A	R. DIETER
2	LT19A-00003	B	J. MILTON

FIRST USED ON OPTION MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
LT19-A				
PARTS LIST				
EQUIPMENT CORPORATION				
TITLE: TTY CONTROL UNIT CHANNEL 4				
SIZE CODE: DIBS				
NUMBER: LT19-C-4				
REV: B				

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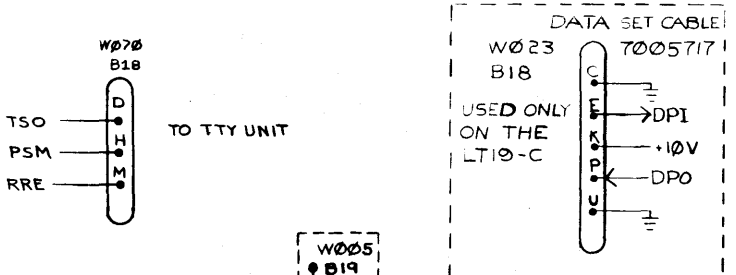


FOR LT19 C UNITS ONLY REMOVE 1.2K RESISTOR AND ADJUST RCLO FREQUENCY TO 2X BAUD RATE. E.G 110 BAUD IS EQUIVALENT TO 9MS/BIT THEREFORE SET RCLO TO 4.5 MS.



** THESE CLAMPED LOAD ARE JUMPED IN FOR "C" UNIT ONLY (NOT WIRE WRAPPED).

* NOTES:
 APPROPRIATE DIODES MUST BE REMOVED FROM W103 DEVICE SELECTOR MODULES TO OBTAIN PROPER SELECTION CODES. IOT DEVICE SELECTION CODES ARE OPTIONALLY ASSIGNABLE FROM STANDARD PDP-9 DESIGNATION LIST. (SEE LT19-A FOR ASSIGNABLE LISTING)
 SUB DEVICE SELECTION CODE IS NOT ASSIGNED TO THIS UNIT AND MUST BE JUMPED IN IF REQUIRED.



FIRST USED ON OPT. CV/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
LT19-A				
PARTS LIST				
UNLESS OTHERWISE SPECIFIED	DRN	DATE	EQUIPMENT CORPORATION	
UNLESS OTHERWISE SPECIFIED	DATE	MAYNARD MASSACHUSETTS		
DIMENSION IN INCHES	DATE	TITLE		
TOLERANCES	DATE	TTY CONTROL		
DECIMALS FRACTIONS ANGLES	DATE	UNIT		
± .005 ± 1/64 ± 0°30'	DATE	CHANNEL 5		
FINAL SURFACE QUALITY	DATE	SIZE CODE		
REMOVE BURRS AND BREAK SHARP CORNERS	DATE	D BS		
MATERIAL	NEXT HIGHER ASSY	NUMBER		
	A-ML-LT19-C	LT19-C-5		
FINISH	SCALE	DIST.		
	SHEET 1 OF 1			

REV.	CHANGE NO.	DATE	BY
A	0001	11-9-71	R. DIETER
B	0003	11-16-71	J. MILTON

MASTER DRAWING LIST

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DWG. NO.	REV. LET.	NO. OF SHEETS	TITLE
C-GA-LT19-D-0	C	1	TELETYPE CONTROL (LT19-D)
A-PL-LT19-D-0	C	1	TELETYPE CONTROL (LT19-D)
D-BE-LT19-D-1	B	1	I/O BUS INTERFACE LOGIC
D-BE-LT19-D-2		1	I/O BUS INTERFACE
D-MU-LT19-D-3	C	1	MODULE UTILIZATION
A-FL-LT19-D-3	C	1	MODULE UTILIZATION
D-AD-7006452-1-0		1	WIRED ASSY
A-FL-7006452-2-0		1	WIRED ASSY
K-WL-LT19-D-4	C	1	WIRE LIST LT19
A-CE-LT19-D-5	A	1	EXTERNAL COMPONENT LIST
A-SP-LT19-D-6	B	19	LT19 D.E.F.H MULTI-STATION TELETYPE CONTROL AND INTERFACE
D-DI-LT19-D-7	A	1	DRAWING INDEX LIST LT19
A-CE-LT19-D-8		1	BAUD RATE TABLE
A-SP-LT19-D-9		6	ACCEPTANCE PROCEDURE

REVISIONS				DRN	J.	DATE	digital EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS												
REV.	DATE	CHG. NO.	APP'D.	FERGUSON	B/6/69	DATE	<div style="border: 1px solid black; padding: 5px;"> <p style="font-size: 24px; margin: 0;">digital</p> <p style="font-size: 18px; margin: 0;">EQUIPMENT CORPORATION</p> <p style="font-size: 10px; margin: 0;">MAYNARD, MASSACHUSETTS</p> <hr/> <p style="font-size: 14px; margin: 0;">MULTI-STATION TELETYPE CONTROL</p> <hr/> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">SIZE</td> <td style="width: 10%;">CODE</td> <td style="width: 40%;">NUMBER</td> <td style="width: 10%;">REV.</td> </tr> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">ML</td> <td style="text-align: center;">LT19-D</td> <td style="text-align: center;">E</td> </tr> </table> </div>					SIZE	CODE	NUMBER	REV.	A	ML	LT19-D	E
SIZE	CODE	NUMBER	REV.																
A	ML	LT19-D	E																
A	12/30/69	00001	R.D.	CHK'D.	PFYFFER	11/59													
B	7/70	00002	B.D.	ENG.															
C	10/70	MISC. 81	B.D.	PROJ. ENG.															
D	8/71	00003	R.D.	PROD.															
E	8/71	00004	R.D.	FIRST USED ON	PDP-9	DATE	9/4/69												
SCALE				SHEET 1 OF 1			DIST.												



DIGITAL EQUIPMENT CORPORATION

MAYNARD, MASSACHUSETTS

PARTS LIST

QUANTITY / VARIATION

MADE BY	J. FERGUSON	CHECKED	PFYFFER	SECTION	1
DATE	8/6/69	DATE	8/12/69	ISSUED SECT.	1
ENG		PROD	<i>60/69</i>	ISSUED SECT.	
DATE	7/27/69	DATE	9/11/69		1

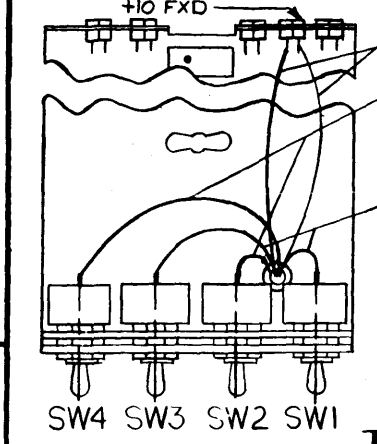
	LT19-D	LT19-E (1)	LT19-E (2)	LT19-E (3)	LT19-E (4)	LT19-E (5)	LT19-F (1)	LT19-F (2)	LT19-F (3)	LT19-F (4)	LT19-F (5)
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ITEM NO.	DWG NO. / PART NO.	DESCRIPTION
1	D-AD-7004452-0-0	WIRED ASSY (LT19-D)
2	9006460	POP RIVETS #AD43ABS
3	C-MD-5302485-0-0	PANEL, RIGHT END
4	D-AD-5402525-0-0	MARGINAL CHECK PANEL ASSY
5	D-UA-BC09A-0-0	BC09A CABLE ASSY
6	D-SC-1209850-0-0	RET BLOCK
7	9006035-1	SCR PLT. HD #8-32 x 1 1/2 SST
8	9006634	WGR INT TOOTH #8
9	9006600	WASH. PLAT #2
10	9107278-3	#18 TUBING, TEFLON, RED
11	9107278-7	#18 TUBING, TEFLON, BLU
12		
13		
14		
15	D-AD-7005238-0-0	4915 TO W070 CABLES
16	C-IA-7005717-0-0	DATA SET CABLE
17	0913	JUMPER, 4" (RED)
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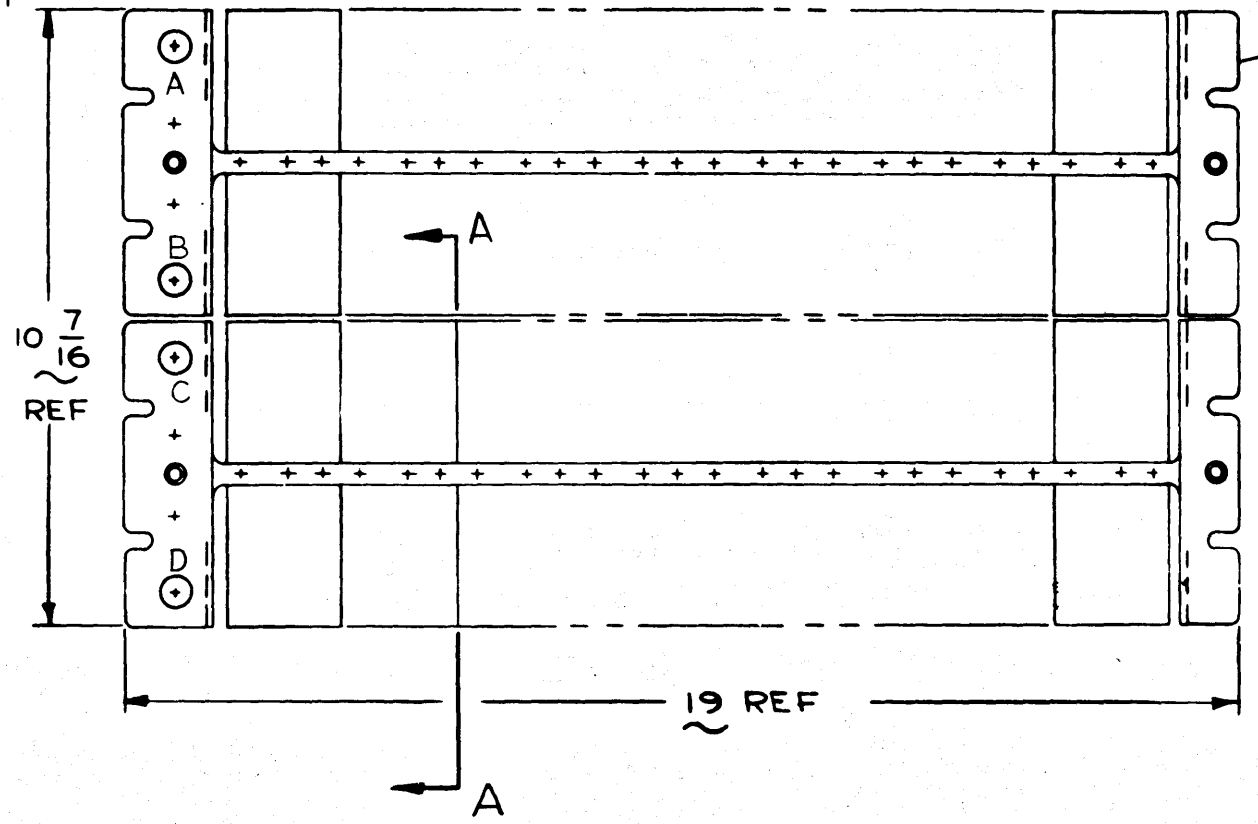
TITLE	ASSY NO.	SIZE	CODE	NUMBER	REV	ECO NO. MISC
TELETYPE CONTROL (LT19-D)	C-UA-LT19-D-0	A	PL	LT19-D-0	C	00081
SHEET 1	OF 1	DIST.	G			



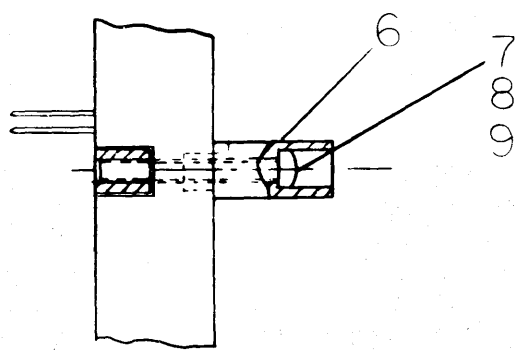
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VIEW "B-B"



WIRE TABLE				
ITEM NO.	AWG	COLOR	FROM	TO
10	*18	RED	SW1	AO1A
11		BLU	SW2	AO1B
10		RED	SW3	BO1A
11		BLU	SW4	BO1B
		BARE	GND	BO1C
10		RED	SW1	CO1A
11		BLU	SW2	CO1B
10		RED	SW3	DO1A
11		BLU	SW4	DO1B
		BARE	GND	DO1C
10,12		RED	+10 FXD	A03A
10,12		RED	A03A	A11A
10,12		RED	A11A	A19A
10,12		RED	+10 FXD	C14A
10,12	*18	RED	C14A	C22A



SECTION "A-A"
SCALE 1/1

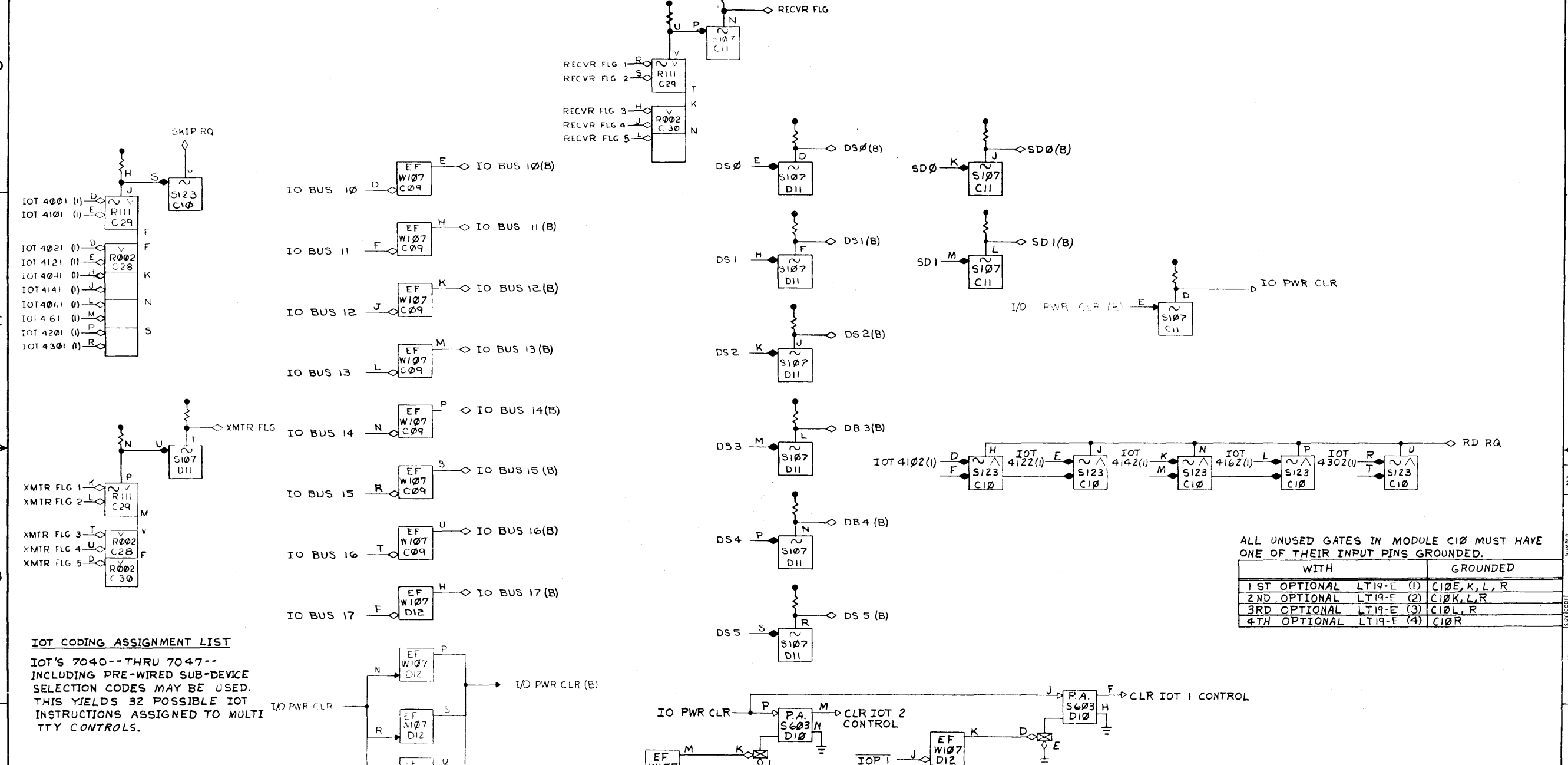
REV.	CHANGE NO.	DESCRIPTION
A	1	LT19D-00001
B	2	DIETER
C	3	DIETER

REV.	CHANGE NO.	DESCRIPTION
A	1	DIETER
B	2	DIETER
C	3	DIETER

FIRST USED ON OPTION/MODEL PDP-9	QTY.	DESCRIPTION	PART NO.	ITEM NO.
UNLESS OTHERWISE SPECIFIED				
DIMENSION IN INCHES				
TOLERANCES				
DECIMALS ± .005	FRACTIONS ± 1/64	ANGLES ± 0°30'		
FINAL SURFACE QUALITY REMOVE BURRS AND BREAK SHARP CORNERS				
MATERIAL	FINISH	PARTS LIST		
11	11	DRN. <i>R.T. Heller</i> DATE 7/30/69 CHK'D. <i>R.T. Heller</i> DATE 7/30/69 ENG. <i>R.T. Heller</i> DATE 7/30/69 PROJ. ENG. <i>R.T. Heller</i> DATE 7/30/69 DESIG. <i>W. Call</i> DATE 9/11/69 NEXT HIGHER ASSY		
SCALE		SIZE CODE		NUMBER
SHEET 1 OF 1		C UA		LT19-D-0
DIST. 6		REV. C		

SIZE CODE C UA
 NUMBER LT19-D-0
 REV. C

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IOT CODING ASSIGNMENT LIST
 IOT'S 7040--THRU 7047--
 INCLUDING PRE-WIRED SUB-DEVICE
 SELECTION CODES MAY BE USED.
 THIS YIELDS 32 POSSIBLE IOT
 INSTRUCTIONS ASSIGNED TO MULTI
 TTY CONTROLS.

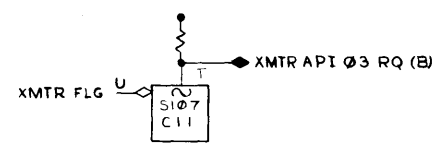
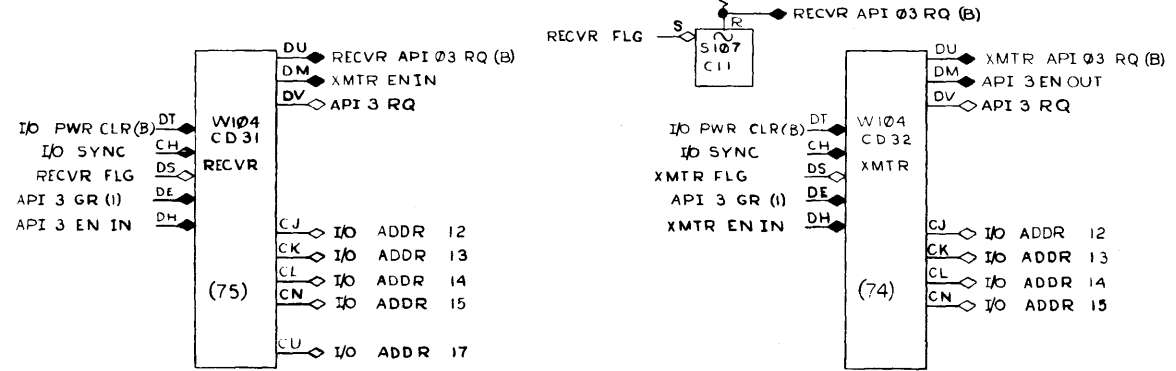
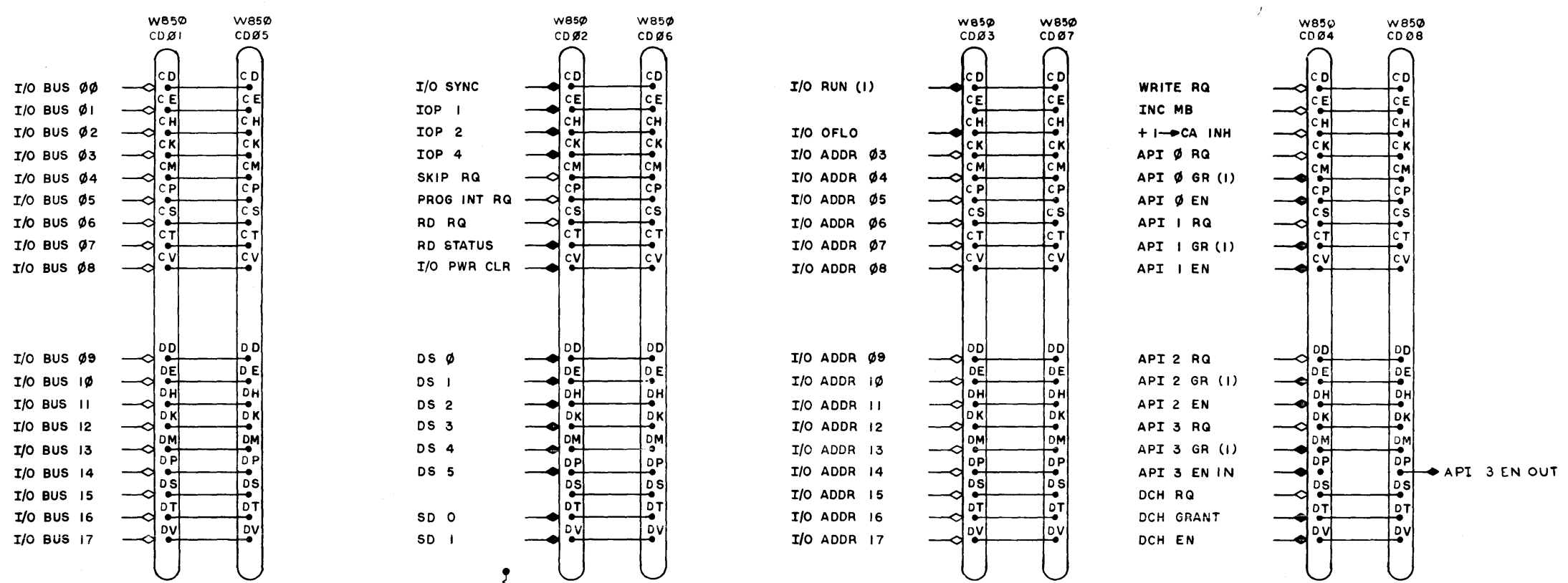
ALL UNUSED GATES IN MODULE C10 MUST HAVE ONE OF THEIR INPUT PINS GROUNDED.

	WITH	GROUNDED
1ST OPTIONAL LT19-E (1)	C10E, K, L, R	
2ND OPTIONAL LT19-E (2)	C10K, L, R	
3RD OPTIONAL LT19-E (3)	C10L, R	
4TH OPTIONAL LT19-E (4)	C10R	

REV	CHG	NO	DATE	BY
1				
2				
3				
4				
5				
6				
7				
8				

FIRST USED ON OPTION/MODEL	QTY	DESCRIPTION	PART NO	ITEM NO
PDP-9				
PARTS LIST				
UNLESS OTHERWISE SPECIFIED				
DRN DATE				
CHK'D DATE				
ENG DATE				
PROJ/ENG DATE				
PRQD DATE				
MATERIAL				
FINISH				
NEXT HIGHER ASSY				
SCALE				
SHEET 1 OF 1				
TITLE			SIZE CODE	NUMBER
I/O BUS INTERFACE LOGIC			D8S	LT19-D-1
			DIST	REV

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FIRST USED ON OPTION MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
PDP-9				
PARTS LIST				
UNLESS OTHERWISE SPECIFIED	DRN	DATE	EQUIPMENT CORPORATION	
UNLESS OTHERWISE SPECIFIED	CLK/D	DATE	MAYNARD MASSACHUSETTS	
TOLERANCES				
DECIMALS	FRACTIONS	ANGLES	TITLE	
± .008	± 1/64	± 0°30'	I/O BUS INTERFACE	
FINAL SURFACE QUALITY / REMOVE BURRS AND BREAK SHARP CORNERS				
MATERIAL	NEXT HIGHER ASSY	DATE	SIZE/CODE	NUMBER
	A-ML-LT19-D	8/1/69	DBS	LT19-D-2
FINISH	SCALE	SHEET	DIST.	REV
	1 OF 1			

REV. NUMBER DBS LT19-D-2

REV.	
CHG.	
CHK.	
REVISIONS	

DIGITAL EQUIPMENT CORPORATION

MAYNARD, MASSACHUSETTS

PARTS LIST

MADE BY	CHECKED	SECTION
DATE	DATE	1
ENG	PROD	ISSUED SECT.
DATE	DATE	1

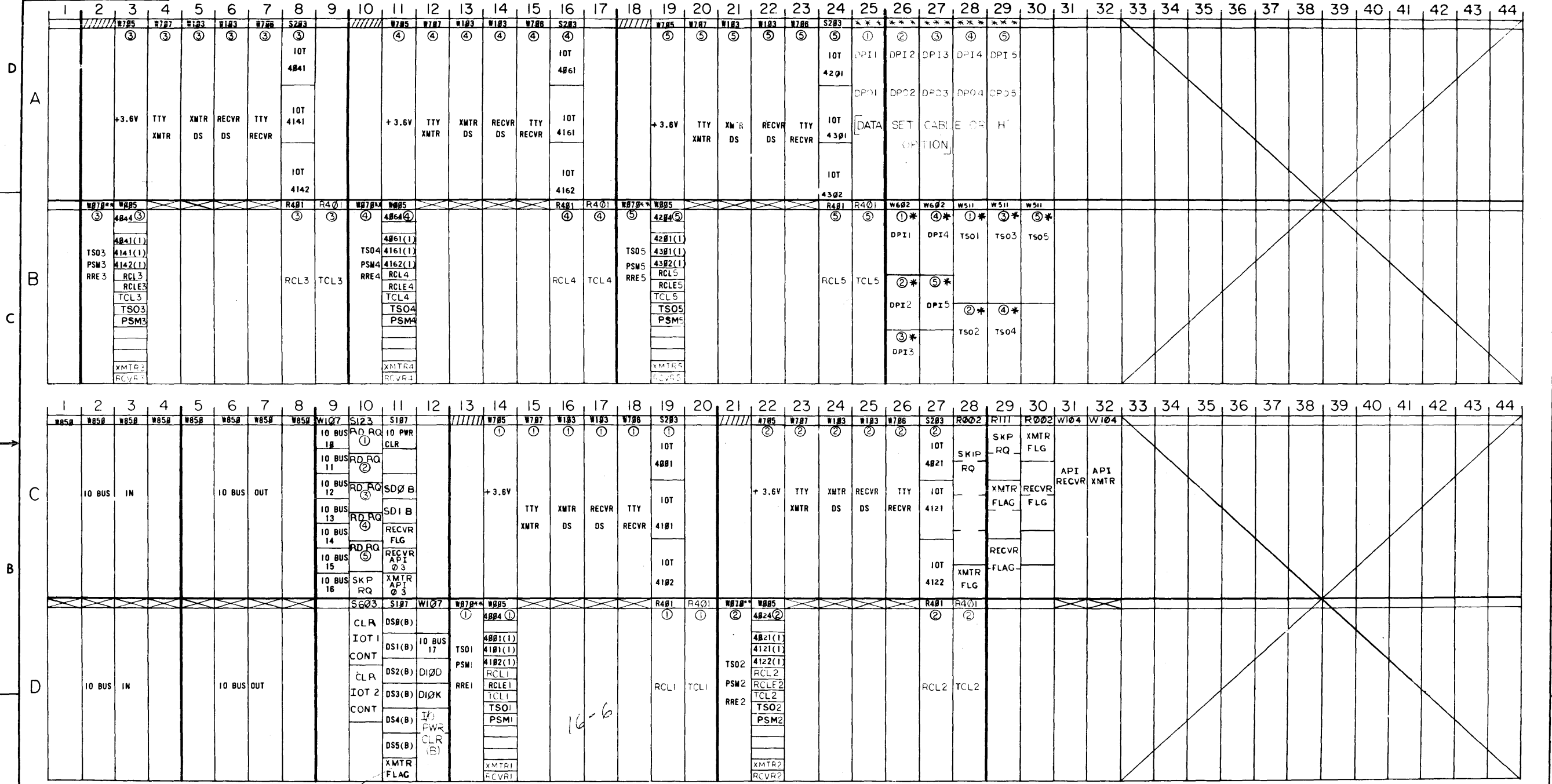
QUANTITY / VARIATION

ITEM NO.	DWG NO. / PART NO.	DESCRIPTION	LT19-D	LT19-E (1)	LT19-E (2)	LT19-E (3)	LT19-E (4)	LT19-E (5)	LT19-F (1)	LT19-F (2)	LT19-F (3)	LT19-F (4)	LT19-F (5)
	R401	VARIABLE CLOCK		2	2	2	2	2					
	R002	DIODE NETWORK	2										
	R111	NAND GATE	1										
	S107	INVERTER	2										
	S123	INPUT BUS GATE	1										
	S203	TRIPLE FLIP FLOP		1	1	1	1	1					
	S603	PULSE AMPLIFIER	1										
	W005	CLAMPED LOADS		1	1	1	1	1					
	W103	DEVICE SELECTOR		2	2	2	2	2					
	W104	I/O BUS MULTIPLEXER	2										
	W107	I/O BUS RECEIVER CKT	2										
	W511 *	NEG INPUT CONVERTER							1		1		1
	W602 *	BI-POLAR OUTPUT CONVERTER							1			1	
	W705	3.6 VOLT POWER SUPPLY		1	1	1	1	1					
	W706	TELETYPE RECEIVER		1	1	1	1	1					
	W707	TELETYPE TRANSMITTER		1	1	1	1	1					
	W078	TELETYPE CONNECTOR		1	1	1	1	1					
	*WHEN ASSIGNING CHANNELS, THE LT19F OPTIONS SHALL BE ASSIGNED TO THE LOWEST CHANNEL NUMBERS.												

TITLE MODULE UTILIZATION	ASSY NO. D-MU-7,LT19-D-3	SIZE A	CODE PL	NUMBER LT19-D-3	R.V. C	ECO NO. LT19D 00003
	SHEET 1 OF 1	DIST.				

K

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REV	DATE	BY	CHK
1	11/15/69
2	11/15/69
3	11/15/69
4	11/15/69
5	11/15/69

NOTE:
 ① DESIGNATES 1ST OPTIONAL LT09E (1)
 ② DESIGNATES 2ND OPTIONAL LT09E (2)
 ③ DESIGNATES 3RD OPTIONAL LT09E (3)
 ④ DESIGNATES 4TH OPTIONAL LT09E (4)
 ⑤ DESIGNATES 5TH OPTIONAL LT09E (5)
 * LT19-F ONLY
 ** W070 OR W076D OR W27F
 *** W023 OR W028

UNLESS OTHERWISE SPECIFIED		DRN: T.L. ...	DATE: 11/15/69
DIMENSION IN INCHES		CHKD: ...	DATE: ...
TOLERANCES		ENG: ...	DATE: ...
DECIMALS FRACTIONS ANGLES		PROD: ...	DATE: ...
± .005 ± 1/64 ± 0'30"		PROJ: ...	DATE: ...
FINAL SURFACE QUALITY		PROD: ...	DATE: ...
REMOVE BURRS AND BREAK SHARP CORNERS		PROD: ...	DATE: ...
MATERIAL: //		NEXT HIGHER ASSY: A-ML- LT19-D	
FINISH: //		SCALE: //	
FIRST USED ON OPTION/MODEL: PDP-9		SHEET: 1 OF 1	

DIGITAL EQUIPMENT CORPORATION
 MODULE UTILIZATION
 SIZE CODE: DMU NUMBER: LT19-D-3
 DIST.:


DRWG NO

K-WL-LT19-D-4

REVLTR

C

REVISIONS			
REV LTR	ECO NO	DATE	ENG
A	LT19D-00001	12/30/69	RD
B	LT19D-00002	8-4-70	RD
C	LT19D-00003	9/11/69	RD


DRAWN <i>R.T. Dellen</i>	DATE 7/31/69	 DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	TITLE WIRE LIST LT19		
CHECKED <i>[Signature]</i>	DATE 9-11-69		FOR TAPE # FILE #		
ENG	DATE		SIZE	CODE	DWG. NO.
PROJ ENG	DATE		K WL LT19-D-4		REV LTR C
PROD <i>W. Call</i>	DATE 9/11/69		ASSY NO	SCALE	SHEET
			OF	DIST.	

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COMPONENT NAME	VALUE	POL.	FROM PIN	TO PIN	POL.
RESISTOR	7.5 K 1/4 W 10%		B28E	B28A	
RESISTOR	* * *		D19R	D19T	
RESISTOR	* * *		D20R	D20T	
RESISTOR	7.5 K 1/4 W 10%		B28N	C28A	
RESISTOR	* * *		D27R	D27T	
RESISTOR	* * *		D28R	D28T	
RESISTOR	7.5 K 1/4 W 10%		B29E	B29A	
RESISTOR	* * *		B08R	B08T	
RESISTOR	* * *		B09R	B09T	
RESISTOR	7.5 K 1/4 W 10%		B29N	C29A	
RESISTOR	* * *		B16R	B16T	
RESISTOR	* * *		B17R	B17T	
RESISTOR	7.5 K 1/4 W 10%		B30E	B30A	
RESISTOR	* * *		B24R	B24T	
RESISTOR	* * *		B25R	B25T	

NOTES:

* * * = REFER TO BAUD RATE TABLE FOR RESISTOR VALUE AND PIN LETTERS. (A-CP-LT19-D-8)

REVISIONS				DRN.	DATE	 DIGITAL EQUIPMENT CORPORATION <small>300 HAYWARD, MASSACHUSETTS</small>
REV.	DATE	CHG. NO.	APP'D.	G. MARINI	7-21-69	
A	1-6-70	LT19D-00001	<i>AG</i>	AL PEYFFER	8-12-69	
				ENG. R. DIETER	9-11-69	
				PROJ. ENG. R. DIETER	9-11-69	
				PROD. D. CALL	9-11-69	
				FIRST USED ON		
				A-ML-LT19-D		
				SCALE NONE		
				SHEET 1 OF 1		
				TITLE		EXTERNAL COMPONENT LIST FOR LT19-D
				FOR		
				SIZE CODE	NUMBER	REV.
				A CP	LT19-D-5	A
				DIST		



DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

ENGINEERING SPECIFICATION

DATE 7/14/69

TITLE LT19 D, E, F, H Multi-Station Teletype Control and Interface

REVISIONS

REV	DESCRIPTION	CHG NO	ORIG	DATE	APPD BY	DATE
A		LT19D-00001	DIETER	1-6-70	R. Dieter	1-6-70
B		LT19D-00002		8-4-70	RO	1-5-70

ENG R. Dieter	APPD R. Dieter	SIZE A	CODE SP	NUMBER LT19-D-6	REV B
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DEC FORM NO. DRA 107

SHEET 1 OF 19

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ENGINEERING SPECIFICATION

CONTINUATION SHEET

TITLE LT19 D, E, F, H, Multi-Station Teletype Control and Interface

Each LT19D added to a PDP-9 will accommodate up to five teletype control units (LT19E's). These LT19D control units contain logical elements which are functionally similar to those of the PDP-9 standard teletype control. Instructions and programming considerations are, therefore, similar to those of the standard unit.

Optional Teletype Control with Standard EIA Level Converters (Type LT19F)

The LT19F is a group of standard DEC logic modules which, when inserted into the appropriate locations of an LT19D constitute a single independent teletype control (exactly the same as the LT19E specified above) with standard EIA level converters. Thus the LT19F may be directly connected to input/output devices using standard EIA logic levels, i.e. dataphone.

SIZE A	CODE SP	NUMBER LT19-D-6	REV B
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DEC FORM NO. DRA 108

SHEET 2 OF 19

ENGINEERING SPECIFICATION

CONTINUATION SHEET

TITLE LT19 D,E,F,H Multi-Station Teletype Control and Interface

1.0 Multi-Station Teletype Interface (Type LT19D)

Addition of the LT19D option to the PDP-9 expands the machine's teletype facility to accommodate up to five optional teletype control units. The LT19D consists of the following:

- a. Two standard 19" DEC Type 1943 mounting panels (completely bussed and prewired for PDP-9 IO Bus interfacing and the insertion of up to five independent teletype controls, LT19E's or LT19F's defined below).

All of the logic modules necessary to interface the control units to the standard PDP-9 IO Bus.

Optional Teletype Control (Type LT19E)

The LT19E is a group of standard DEC logic modules which, when inserted into the appropriate locations of an LT19D, constitute a single independent teletype control with the following specifications:

- a. five or eight * bit character codes.
- b. one unit start code.
- c. 1, 1.5 or 2 * unit stop codes.
- d. Full duplex operation
- e. Speed variable to 30 K baud.
- f. Maximum signal transmission distance is 2000 feet with teletype units, 250 feet on LT19F units with LT19H option.
- g. LT19E teletype controls may be used with ASR, KSR, RO or SO teletype units.

* Standard unit

SIZE A	CODE SP	NUMBER LT19-D-6	REV B
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DEC FORM NO. DRA 108

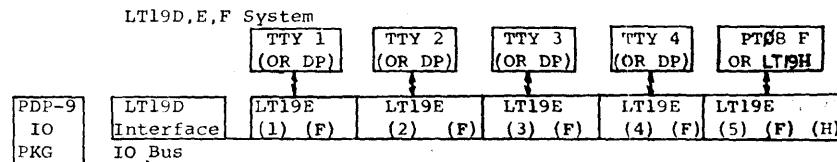
SHEET 3 OF 19

ENGINEERING SPECIFICATION

CONTINUATION SHEET

TITLE LT19 D,E,F,H Multi-Station Teletype Control and Interface

- 1.1 The LT19 D,E,F system consists of an interface to the processor (LT19 D) and up to five teletype control units. (LT19E,F).



One to five optional LT19E(F) teletype control units may be added to each LT19D interface.

- 1.2 Each of the LT19E(F) control units (up to five may be used) is optional - directly pluggable into the LT19D interface.
 - 1.3 The LT19D is packaged in two standard DEC #1943-19" logic mounting racks. Up to five LT19E(F) control units may be plugged into the LT19D logic racks. (10 1/2" of mounting space is required).
- When the LT19D, E (F) options are added to a PDP-9 system, these 1943 logic mounting racks must be added to the system as shown in section 4.0 and all necessary cable connectors and power wiring should then be added.
- 1.4 The LT19D,E,F,H options operate reliably over the temperature and humidity range specified for the processor. Each LT19D,E,F,H optional system is powered from one standard DEC #728 Power Supply mounted on the back door of the bay in which the LT19D,E,F,H system is mounted. No special power controls or fan assemblies (other than those necessary for the multi-bay system) are necessary.

SIZE A	CODE SP	NUMBER LT19-D-6	REV B
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DEC FORM NO. DRA 108

SHEET 4 OF 19

TITLE LT19 D,E,F,H Multi-Station Teletype Control and Interface

1.5 General Performance

A general description of the LT19D,E option is given on page 4-31 of the PDP-9 Users Handbook (F-95)

a. Teletype operational characteristics

- (1) five or eight* bit character code.
- (2) one* unit start code.
- (3) 1, 1.5 or 2* units stop code.
- (4) Full duplex operation.
- (5) Up to five teletype units per LT19D.
- (6) Speed = 30,000 baud maximum.
- (7) Maximum signal transmission distance- 2000 feet for teletype units, 250 feet for LT19H.

*Standard unit

1.6 Overall Speed

A limitation has been placed on the overall speed of all channels combined so that normal service routines may handle all channels simultaneously. The limit is 30,000 baud for all N channels combined, where N = 1 to 16.

1.7 The highest speed channels should be assigned to the first channels in a system to keep the skip chain short and in a multiple LT19D system, all the high speed channels MUST come first to prevent a low speed channel from locking out a high speed unit.

SIZE	CODE	NUMBER	REV
A	SP	LT19-D-6	B

TITLE LT19D,E,F,H Multi-Station Teletype Control and Interface

2.0 Vendor-Supplied Equipment Specifications

The LT19D,E,F,H system may use standard teletype units (ASR's, KSR's, RO's, SO's) and/or standard EIA level operated input/output devices i.e., dataphone interface. All of the above teletype equipment and EIA level operated equipment are standard DEC peripheral devices which have DEC Purchase Specifications. Therefore, if specifications are required for any standard DEC input/output unit, it may be obtained from the Purchasing Specifications List.

SIZE	CODE	NUMBER	REV
A	SP	LT19-D-6	B

TITLE LT19 D, E, F, H Multi-Station Teletype Control and Interface

3.0 IOT Instructions

The following device selection codes have been assigned for use with optional teletype units:

Teleprinters	Keyboards
7040--	7041--
7042--	7043--
7044--	7045--
7046--	7047--

In addition to these device selection codes the standard PDP-9 sub device selection lines (SD0, SD1) are also available for assignment. As a result, the device selection codes listed above represent 32 possible device codes.

Teleprinter IOTS

1 Skip on teleprinter flag e.g.,	704001
2 Clear teleprinter flag e.g.,	704002
4 Load teleprinter buffer and transmit character e.g.,	704004

Keyboard IOTS

1 Skip on keyboard flag e.g	704101
2 Clear keyboard flag and read the keyboard buffer e.g.	704102
4 Not used	

3.2 Special Maintenance Instructions

The LT19 D, E, F, H system uses no special maintenance instructions.

- 3.3 No special data formats, programming considerations
- 3.6 operator controls, or indicators are necessary for the LT19 D, E, F, H system.

SIZE	CODE	NUMBER	REV
A	SP	LT19-D-6	B

TITLE LT19 D, E, F, H Multi-Station Teletype Control and Interface

3.7 No status bits are assigned to the LT19 D, E, F, H system.

3.8 Timing diagrams for LT19 E F teletype control are presented on pages 3-9 (receiver) and 3-7 (transmitter) of the LT19 Instruction Manual (Note that the manual refers to the LT19 A, B, & C - The timing is correct for the LT19 D, E & F).

3.9 The LT19-E/F Channel assignments should be made according to the following tables:

TABLE 1: 1 to 5 UNITS; 1 LT19D

UNIT #	TRANSMITTER CODE	RECEIVER CODE	LOGICAL UNIT#
1	xx400x	xx410x	1
LT19D #1 2	xx402x	xx412x	2
3	xx404x	xx414x	3
4	xx406x	xx416x	4
5	xx420x	xx430x	5

TABLE 2: 6 to 10 Units; 2 LT19D'S

UNIT #	TRANSMITTER CODE	RECEIVER CODE	LOGICAL UNIT #
1	xx400x	xx410x	1
LT19D #1 2	xx402x	xx412x	2
3	xx404x	xx414x	3
4	xx406x	xx416x	4
5	xx440x	xx450x	11
LT19D #2 1	xx420x	xx430x	5
2	xx422x	xx432x	6
3	xx424x	xx434x	7
4	xx426x	xx436x	10
5	xx442x	xx452x	12

SIZE	CODE	NUMBER	REV
A	SP	LT19-D-6	B

TITLE LT19 D, E, F, H, Multi-Station Teletype Control and Interface

TABLE 3: 11 to 15 UNITS; 3 LT19D'S

UNIT #	TRANSMITTER CODE	RECEIVER CODE	LOGICAL UNIT #
LT19D #1	1 xx400x	xx410x	1
	2 xx402x	xx412x	2
	3 xx404x	xx414x	3
	4 xx406x	xx416x	4
	5 xx408x	xx418x	15
LT19D #2	1 xx420x	xx430x	5
	2 xx422x	xx432x	6
	3 xx424x	xx434x	7
	4 xx426x	xx436x	10
	5 xx428x	xx438x	16
LT19D #3	1 xx440x	xx450x	11
	2 xx442x	xx452x	12
	3 xx444x	xx454x	13
	4 xx446x	xx456x	14
	5 xx448x	xx458x	17

TABLE 4: 16 UNITS; 4 LT19D'S

The setup for the first three LT19D'S would be as in TABLE 3.

UNIT #	TRANSMITTER CODE	RECEIVER CODE	LOGICAL UNIT #
LT19D #4	1 UNUSED	UNUSED	-
	2 UNUSED	UNUSED	-
	3 UNUSED	UNUSED	-
	4 UNUSED	UNUSED	-
	5 xx466x	xx476x	20

Note: When the system includes an LT15, it becomes logical unit #1.

SIZE A	CODE SP	NUMBER LT19-D-6	REV B
--------	---------	-----------------	-------

TITLE LT19 D, E, F, H Multi-Station Teletype Control and Interface

4. Installation Data

The LT19 D, E, F, H system is packaged in a standard PDP-9 19" optional cabinet. The standard LT19 system operates at very slow frequencies and, therefore, may be located at any place along the standard PDP-9 IO bus.

No special action need be taken (either in shipment or during site installation) to install on LT19 system other than that required for the basic processor and standard teletype units.

General information on the physical locating of noncritical options (when assigned to a PDP-9 system) is contained in Chapter 4 (Mechanical) of the PDP-9 Sales Notebook.

SIZE A	CODE SP	NUMBER LT19-D-6	REV B
--------	---------	-----------------	-------

TITLE LT19 D, E, F, H Multi-Station Teletype Control and Interface

5.0 Interface Specifications

All connections from the LT19 D, E, F, H system to the basic processor are made through the standard PDP-9 IO bus. No special cabling is needed for the system. The optional teletype units (or EIA standard level units) are interfaced to LT19 D, E, F, H system as stated in Section 7 (System Components). The single control cable and its termination module are standard units which are delivered with the optional input/output unit.

SIZE A	CODE SP	NUMBER LT-19-D-6	REV B
--------	---------	------------------	-------

TITLE LT19 D, E, F, H Multi-Station Teletype Control and Interface

6.0 Master Drawing Lists

Drawing No.	No. of sheets	Title
6.1 LT19D		
A-ML-LT19-D	1	Multi-Station Teletype Control
C-UA-LT19-D-0	1	Teletype Control
A-PL-LT19-D-0	1	Teletype Control
D-BS-LT19-D-1	1	I/O Bus Interface Logic
D-BS-LT19-D-2	1	I/O Bus Interface
D-MU-LT19-D-3	1	Module Utilization
A-PL-LT19-D-3	1	Module Utilization
D-AD-7006452-0-0	1	Wired Assy
A-PL-7006452-0-0	1	Wired Assy
K-WL-LT19-D-4	1	Wire List LT19
A-CP-LT19-D-5	1	External Component List
A-CP-LT19-D-8	1	Baud Rate Table
6.2 LT19E		
Drawing No.	No. of sheets	Title
A-ML-LT19-E	1	Teletype Interface LT19-E
D-BS-LT19-E-1	1	Teletype Control Unit Channel 1
D-BS-LT19-E-2	1	Teletype Control Unit Channel 2
D-BS-LT19-E-3	1	Teletype Control Unit Channel 3
D-BS-LT19-E-4	1	Teletype Control Unit Channel 4
D-BS-LT19-E-5	1	Teletype Control Unit Channel 5
6.3 LT19F		
Drawing No.	No. of sheets	Title
A-ML-LT19-F	1	Teletype Interface LT19-F
D-BS-LT19-F-1	1	Teletype Control Unit Channel 1
D-BS-LT19-F-2	1	Teletype Control Unit Channel 2
D-BS-LT19-F-3	1	Teletype Control Unit Channel 3
D-BS-LT19-F-4	1	Teletype Control Unit Channel 4
D-BS-LT19-F-5	1	Teletype Control Unit Channel 5
Note: LT19-E(F)-1 1st optional teletype control		
LT19-E(F)-2 2nd optional teletype control		
LT19-E(F)-3 3rd optional teletype control		
LT19-E(F)-4 4th optional teletype control		
LT19-E(F)-5 5th optional teletype control		
6.4 LT19H		
Drawing No.	No. of sheets	Title
A-ML-LT19-H	1	Data Communications Interface
C-IA-7005891-0-0	1	Data Communications Cable

SIZE A	CODE SP	NUMBER LT19-D-6	REV B
--------	---------	-----------------	-------

TITLE LT19 D, E, F, H Multi-Station Teletype Control and Interface

7.0 System Components

Basic system components consist of the LT19 D, E, F, H control logic (located in an optional bay) and up to 5 teletype units or EIA level operated units for each LT19D control. The optional teletype units or EIA units are located remotely from the PDP-9 system. A single control cable interfaces the remote unit to its control in the PDP-9 system. This control cable is terminated with a standard DEC cable connector module which is inserted in its assigned location in the LT19D mounting panels (see module utilization print D-MU-LT19-D-3).

7.1 Modules needed to implement the multi-teletype control are as follows:

LT19D (PDP-9 interface only)

- 2 -S107 2 -R002
- 1 -S123 1 -R111
- 1 -S603 2 -W104
- 2 -W107

LT19E (Single teletype control only)

- 2 -R401
- 2 -S203
- 1 -W005
- 1 -W070 or W076D or W028 (part of teletype or EIA device)
- 2 -W103
- 1 -W705
- 1 -W706
- 1 -W707

LT19F (Single EIA level operated device control)

Same as LT19E plus

- 1 -W511
- 1 -W602

LT19H Same as LT19F Plus Inter Unit Cable C-IA-7005891-0-0

SIZE	CODE	NUMBER	REV
A	SP	LT19-D-6	B

TITLE LT19 D, E, F, H Multi-Station Teletype Control and Interface

- 7.2 No special power controls are necessary due to the addition of an LT19 D, E, F, H system other than those required for the optional bay configuration. One 728 power supply must be added to the back door of the optional bay for each LT19 system interfaced to a PDP-9. See table below.
- 7.3 An LT19 D, E, F, H system is interfaced to the PDP-9 processor through the IO Bus and to input/output devices through connector cables supplied with the optional unit.
- 7.4 As stated in Section 2.0 vendor-supplied equipment which interfaces to the LT19 D, E, F, H system is standard and DEC purchase specifications for all units are available from Drafting.

LT19D With	1-LT19E	2-LT19E	3-LT19E	4-LT19E	5-LT19E
+10V	1.47A	2.88	4.30	5.72	7.14
-15V	1.58A	1.86	2.14	2.42	2.70

LT19F
 +10 .075A } Maximum LT19 Configuration
 -15 .134A }

Maximum Possible Load: +10V-7.2A, -15V-2.8A

LT19H No Additional Power Req.

SIZE	CODE	NUMBER	REV
A	SP	LT19-D-6	B

TITLE LT19 D, E, F, H Multi-Station Teletype Control and Interface

8.0 Check out Test Procedure

Each LT19 D, E, F, H unit will be tested using Test Procedure MAINDEC-9A-D8CC-D both under normal operating conditions and under voltage margins as specified below:

Test No.	Aggravation Conditions	Margins			
		+10V		-15V	
1	None	±	=	±	=
2	Margin LT19D (Rack A)	6V	6V	2.5	2.5
3	Margin LT19D (Rack B)	±3V	±3V	2.5	2.5
4	Margin LT19D (Rack C)	6V	6V	2.5	2.5
5	Margin LT19D (Rack D)	6V	6V	2.5	2.5

* -15V Margins for racks A and B, C and D must be run in pairs, i.e., A&B together.

8.1 LT19F Checkout

The "F" option (EIA level converter) is intended to drive a Dataset Cable or an "H" option. To simulate the cable and perform tests, add the following temporary jumpers to slots A25, A26, A27, A28, or A29: S to H and T to V - this simulates the jumpers on the cables. Jumper pin E to pin P to tie output to input. Run appropriate sections of the Diagnostic 09-D8CC

8.2 See LT19H for special Test procedure

SIZE	CODE	NUMBER	REV
A	SP	LT19-D-6	B

TITLE LT19 D, E, F, H Multi-Station Teletype Control and Interface

9.0 Acceptance Test Procedure

The Acceptance Test operator must successfully rerun all Checkout Test Procedures as stated in Section 8.

In addition, the following documentation list must be complete before the unit is accepted.

- a. MAINDEC-9A-D8CS-PH Program Tape
- b. MAINDEC-9A-D8CC-D Write-up

- 9.1 No special test equipment is needed for acceptance of this option.
- 9.2 Field-installed LT19 D, E, F, H options should be tested and accepted under the same stipulations stated for in-house installations.
- 9.3 See LT19H For Special Acceptance Procedure.
- 9.4 Performance for Acceptance purposes will be demonstrated at the speed specified on the P.O./Const. Req. Unless otherwise specified this will be 110 baud.

SIZE	CODE	NUMBER	REV
A	SP	LT19-D-6	B

TITLE LT19 D, E, F, H Multi-Station Teletype Control and Interface

10.0 Spare Parts

Spare modules necessary for the LT19D:

1 S123*	1 S107*
1 S503*	1 W107
	1 W104

*These modules are already included in the basic processor spare parts list.

Spare modules necessary for the LT19E:

1 R401*	1 W005*
1 S203*	1 W070
	1 W103

*These modules are already included in the basic processor spare parts list.

Spare modules necessary for the LT19F:

Same as LT19E plus:

1 W511
1 W602

10.1 No special component spares are necessary for the LT19 D, E, F, H system.

10.3 Special mechanical spare parts and tools which should be supplied with each optional teletype unit are listed in the PDP-9 Sales Notebook, Section 7.6.

SIZE	CODE	NUMBER	REV
A	SP	LT19-D-6	B

DEC FORM NO
DRA 108

SHEET 17 OF 19

TITLE LT19 D, E, F, H Multi-Station Teletype Control and Interface

11.0 Preventative Maintenance Procedures

To insure reliable operation of the LT19 D, E, F, H system, standard processor maintenance procedures (for both logic and the teletype units) must be followed. All additional KSR'S, ASR'S, SO'S, or RO'S which are added to the PDP-9 system must follow standard field service maintenance procedures to insure proper operation.

SIZE	CODE	NUMBER	REV
A	SP	LT19-D-6	B

DEC FORM NO
DRA 108

SHEET 18 OF 19

TITLE LT19 D, E, F, H Multi-Station Teletype Control and Interface

12.0 Set-Up Procedure

12.1 Set up all 110 Baud Teletype channels with the required Machine (KSR 33 or 35) and checkout with the current version of the diagnostic (LT0919).

12.2 Set up all channels with Level Converter options (LT19F) and run the self checking test as directed in the diagnostic addendum, D8CC-DN.

12.3 LT19H Set up. Refer to the spec. LT19H.

12.4 Recommendations for setting up R401 clocks for each channel.

- a. Set up the Transmit clock first since it is free-running.
- b. Remove the W706 Receiver Module, this will allow the receive clock to free run. Set the scope to ALTERNATE Sweep, INT. Trigger, do NOT trigger on CH1. This will allow the pulses from the receive clock to be matched to the transmit clock.

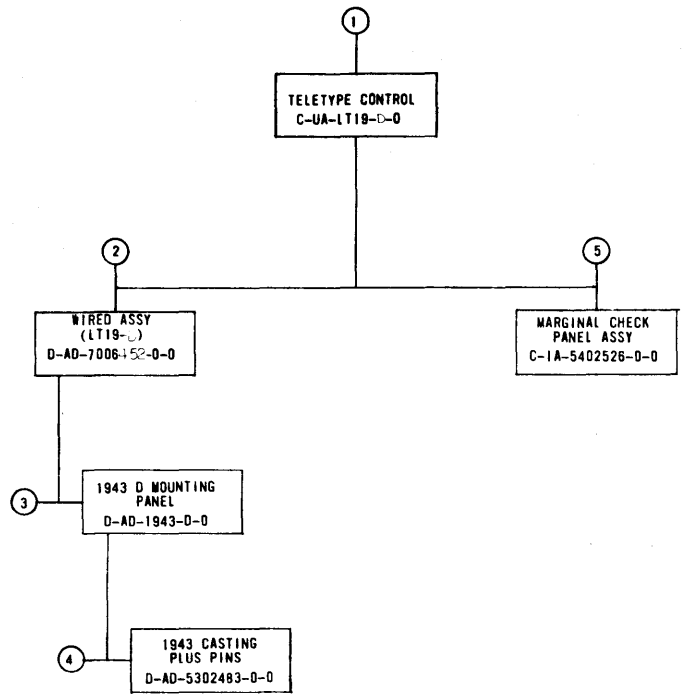
Additional notes for 110 Baud Channels. At 110 Baud each data bit is 9.09 MS long, this requires the R401 clock to be set to 4.545 MS rate. There are 11 bits of 9.09 MS in each character, therefore a character is 100 MS long. Since it would be very difficult to measure a clock interval of 4.545 MS on a scope, set up to measure an entire character (100MS). The scope calibration can be easily checked by putting six (6) complete cycles of 60 cycle waveform in exactly 10CM. With the scope calibrated to 100 MS, fine tune the R401 to give 23 clock pulses in 10CM (22 clock pulses plus the first pulse of the next character.)

SIZE	CODE	NUMBER	REV
A	SP	LT19-D-6	B

DEC FORM NO
DRA 108

SHEET 19 OF 19

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MECHANICAL			DEPT USAGE		
FIND NO	DESCRIPTION	PART NO	PRD	CUST	F.C
1	TELETYPE CONTROL P.L. TELETYPE CONTROL P.L. PANEL, RIGHT END I/O CABLE ASSY RET BLOCK 4915 TO MD78 CABLE DATA SET CABLE	C-UA-LT19-D-0 A-PL-LT19-D-0 C-MD-5302488-D-0 D-UA-8C09A-D-0 B-MD-7408047-D-0 D-AD-7005288-D-0 C-IA-7005717-D-0 A-SP-LT19-D-0			
2	WIRED ASSY (LT19-D) WIRED ASSY (LT19-D) P.L.	D-AD-7006452-D-0 A-PL-7006452-D-0			
3	1943D MOUNTING PANEL 1943D MOUNTING PANEL P.L.	D-AD-1943-D-0 A-PL-1943-D-0			
4	1943 CASTING PLUS PINS 1943 CASTING PLUS PINS P.L. 1943 FRAME CASTING	D-AD-5302483-D-0 A-PL-5302483-D-0 E-MD-1202885-D-0			
5	MARGINAL CHECK PANEL ASSY MARGINAL CHECK PANEL (P.L.) PANEL, MARGINAL CHECK SCOTCHCAL	C-IA-5402526-D-0 A-PL-5402526-D-0 C-MD-5302484-D-0 SS-C-10901			

ELECTRICAL			DEPT USAGE		
FIND NO	DESCRIPTION	PART NO	PRD	CUST	F.C
1	MULTI-STATION TELETYPE CONTROL I/O BUS INTERFACE LOGIC I/O BUS INTERFACE MODULE UTILIZATION MODULE UTILIZATION P.L. WIRE LIST LT19 EXTERNAL COMPONENT LIST LT19 ENGINEERING SPECIFICATION -OPTIONS- TELETYPE INTERFACE LT19-1 TELETYPE CONTROL UNIT CHANNEL 1 TELETYPE CONTROL UNIT CHANNEL 2 TELETYPE CONTROL UNIT CHANNEL 3 TELETYPE CONTROL UNIT CHANNEL 4 TELETYPE CONTROL UNIT CHANNEL 5 TELETYPE INTERFACE LT19-2 TELETYPE CONTROL UNIT CHANNEL 1 TELETYPE CONTROL UNIT CHANNEL 2 TELETYPE CONTROL UNIT CHANNEL 3 TELETYPE CONTROL UNIT CHANNEL 4 TELETYPE CONTROL UNIT CHANNEL 5 DATA COMMUNICATIONS INTERFACE DATA COMMUNICATIONS INTERFACE DATA COMMUNICATIONS CABLE ACCEPTANCE PROCEDURE	A-ML-LT19-D D-BS-LT19-D-1 D-BS-LT19-D-2 D-MU-LT19-D-3 A-PL-LT19-D-3 K-WL-LT19-D-4 A-CP-LT19-D-5 A-SP-LT19-D-6 A-ML-LT19-E D-BS-LT19-E-1 D-BS-LT19-E-2 D-BS-LT19-E-3 D-BS-LT19-E-4 D-BS-LT19-E-5 A-ML-LT19-F D-BS-LT19-F-1 D-BS-LT19-F-2 D-BS-LT19-F-3 D-BS-LT19-F-4 D-BS-LT19-F-5 A-ML-LT19-H A-SP-LT19-H-1 C-UA-LT19-H-0 A-PL-LT19-H-0			
2	WIRED ASSY (LT19-D)	D-AD-7006452-D-0			
5	MOUNTING PANEL 1943 MARGINAL CHECK PANEL ASSY	B-CS-1943-0-1 C-IA-5402526-D-0			

REV	DATE	DESCRIPTION
1	11/17/64	INITIAL
2	11/17/64	INITIAL
3	11/17/64	INITIAL
4	11/17/64	INITIAL
5	11/17/64	INITIAL
6	11/17/64	INITIAL
7	11/17/64	INITIAL
8	11/17/64	INITIAL

FIRST USED ON OPT/NO./MODEL PDP-9L	QTY.	DESCRIPTION	PART NO.	ITEM NO.
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSION IN INCHES TOLERANCES DECIMALS FRACTIONS ANGLES ± .005 ± .001 ± .030 FINAL SURFACE QUALITY REMOVE BLUES AND BREAK SHARP CORNERS	DRN DATE	DATE	EQUIPMENT CORPORATION	
MATERIAL + +	ENG. DATE	DATE	TITLE DRAWING INDEX LIST LT19	
FINISH + +	PROD. DATE	DATE	SCALE NONE	
			SHEET 1 OF 1	
			SIZE CODE NUMBER REV DDI LT19-D-7	

DIGITAL EQUIPMENT CORPORATION

MAYNARD, MASSACHUSETTS

DATE 7-31-69

TITLE Baud Rate Table

REVISIONS

REV	DESCRIPTION	CHG NO	ORIG	DATE	APPD BY	DATE

Find the BAUD RATE nearest the desired value in the table below. Add the indicated jumper from pin R to pin L, M, N, or P. Add the external resistor (Rx) across pins T and R. Fine tune to the desired frequency by adjusting the internal pot on the R401.

Note that the table calls out values which give a frequency that is twice the Baud rate, eg., 110 Baud uses 1.2K for Rx and pins R to L, which gives a frequency of 220 CPS. The double frequency is required by the W706/W707 which divides the clock by 2.

Some examples of common Baud rates are:

- 110 Baud - Jumper Pin R to L Rx = 1.2K
- 200 Baud - Jumper Pin R to M Rx = 750
- 240 Baud - Jumper Pin R to M Rx = 470
- 1100 Baud - Jumper Pin R to N Rx = 3.3K
- 3000 Baud - Jumper Pin R to P Rx = open

Values of Rx Jumper Pin R to one of the following pins on the R401 Modules (pins L, M, N or P are designated as Pin(X) on the prints)

470	155 - 151	2270-2400	22.7K-24K	
560	146 - 155	2150-2265	21.5K-22.6K	
680	137 - 146	2010-2150	20.1K-21.5K	
750	133 - 142	1910-2084	19.1K-20.84K	
1K	116 - 146	1710-1910	17.1K-19.1K	
1.2K	106 - 122	1560-1795	15.6K-17.95K	
3.3K	59 - 106	860-1297	8.6K-12.97K	
Open		159- 860	1.59K-8.6K	18.6K - 98K

Note that the above values are for design center values, with 10% capacitor and resistor tolerances other values of Rx may be required, and may be used. Use the lowest value of Rx which allows adjustment to the required frequency.

ENG Ralph Dieter	APPD <i>R. Dieter</i>	SIZE A	CODE CP	NUMBER I/T19-D-8	REV
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ENGINEERING SPECIFICATION

DATE 3/23/71

TITLE ACCEPTANCE PROCEDURE FOR THE LT19D, F, H MULTI-STATION TTY CONTROL

REVISIONS

REV	DESCRIPTION	CHG NO	ORIG	DATE	APPD BY	DATE

ENG	APPD	SIZE	CODE	NUMBER	REV
A. Dieter	A. Dieter	A	SP	LT19-D-9	

DEC FORM NO. 16-1022
DRA 107

ENGINEERING SPECIFICATION

CONTINUATION SHEET

TITLE

accepting the LT19D Control and Multi-Station channels in order to insure their quality.

A. Make a visual inspection of the LT19D Control and associated wiring. Insure that:

1. There are no loose connections or wires.
2. All modules are properly seated.
3. All margin switches are in the fixed position (down)
4. There is a device connected properly to each LT19E or F channel.

B. Apply power to the system by turning on the PLS-15.

C. Load the LT19 Diagnostic, Maindec-15-3CB

D. Run the diagnostic in accordance with the instructions found in Maindec 15-3CB-B. Each channel must be exercised, and the outputs of TTY checked by the operator to insure proper operation.

E. Run the diagnostic under voltage margins. Appendix III contains instructions and required margins for LT19.

F. When margins have been completed, run at least (2) two complete passes of the LT19 Diagnostic, using the Diagnostic Write-Up as a reference. Insure LT19 runs on both API and FI (switch options on LT19 Diagnostic). If option is add on it must be checked out on a system with API.

If the LT19H option is included, the following steps shall be performed:

G. Insert one end of LT19H cable (length A, B, C, or E) under channel being tested. Insert the other end of cable in unused slot A32.

H. Install jumper between pins A32E and A32P.

I. Run LT09C option Echo Test, as per instruction, in Maindec-15-3CB-D page 16.

At the completion of this step, the acceptance will be complete except for insuring the LT19 is touched up properly and all paper-work and shipping tags are completed.

Refer to Appendix II for a paper work summary checklist.

SIZE	CODE	NUMBER	REV
A	SP	LT19-D-9	

DEC FORM NO 16-1022
DRA 108

SHEET 3 OF 6

ENGINEERING SPECIFICATION

CONTINUATION SHEET

TITLE

I SCOPE:

The following steps will be followed to accept the LT19D Multi-Station Teletype Control, associated LT19E or F channels and the LT19H option.

II PRELIMINARY CHECKS:

The following items will be checked on the LT19D Multi-Station Control and LT19E or F channels before acceptance can begin.

- A. Test and inspection record envelope will be with the control
- B. The ECU status sheet will be updated and the control will contain the latest ECU's.
- C. The QC Inspection Report will be filled out and all calls corrected.
- D. A corrected key sheet will contain the serial number of the LT19D.
- E. The LT19D Control and LT19E channels will be ready to ship i.e., all cables will be dressed only final touch up will remain to be done.
- F. The construction requisition will be checked to insure that the control and channels are the exact configuration ordered by the customer.

III HARDWARE AND SOFTWARE

Refer to appendix I for a complete list of necessary hardware and software.

IV TEST HARDWARE

- A. One PLS-15 with:
 1. API
 2. FI
 3. Low In Voltage Supply

V TEST SOFTWARE

- A. LT19-D-9 Diagnostic Maindec-15-3CB-B-FS
Maindec-15-3CB-D

VI PROCEDURES

The purpose of this section is to give a step by step method of

SIZE	CODE	NUMBER	REV
A	SP	LT19-D-9	

DEC FORM NO 16-1022
DRA 108

SHEET 4 OF 6

ENGINEERING SPECIFICATION

CONTINUATION SHEET

TITLE

APPENDIX I

LT19 HARDWARE CHECKLIST

JOB NUMBER _____ LT19 SERIAL NUMBER _____

CUSTOMER NAME: _____

- A. (1) One set LT19E prints
- B. (1) One set LT19F prints (if required)
- C. (1) One set LT19H prints (if required)
- D. (1) One LT19 Maintenance Manual
- E. (1) One Maindec-15-3CB-BH
- F. (1) One Maindec-15-3CB-B
- G. (2) Two 1/2 Bus Cable BCC9A (70-1591-3)
- H. (1) One Remote Power cord (70-08123)
- I. (1) One LT19H cable (if required)

1. LT19HA 70-05891-1 50' cable
2. LT19HB 70-05891-2 100' cable
3. LT19HC 70-05891-3 150' cable
4. LT19HD 70-05891-4 200' cable
5. LT19HE 70-05891-5 250' cable

SIZE	CODE	NUMBER	REV
A	SP	LT19-D-9	

DEC FORM NO 16-1022
DRA 108

SHEET 4 OF 6

TITLE

APPENDIX II

SUMMARY CHECKLIST:

A. Q.C. Envelope shall contain:

1. Key Sheets
2. ECO Status Sheets (blue copy)
3. Waiver (yellow copy)
4. Margin Sheets (yellow copy)
5. Construction Requisition
6. Assorted other paperwork

B. Customer Envelope should contain:

1. Copy of Key Sheet
2. Pink copy of ECO Status
3. Pink copy of Margin Sheets
4. Customer Acceptance Forms

C. Attached to Log

1. Key Sheet
2. ECO Status (white copy)
3. Margin Sheets (white copy)

SIZE	CODE	NUMBER	REV
A	SP	LT19-D-9	

SHEET 5 OF 6

TITLE

APPENDIX III

LT19 MARGINS

A. Each LT19 B,E,F,H unit will be tested under Marginal Voltage conditions

B. Use Maindec-16-BCLR-5B.

C. Run -15V Margins on rack A and B together. When complete run C and E together. Racks may be run separately for +10V Margins.

Refer to the chart below for required margins.

TEST #	Aggravation Conditions	+10V	-15V
1	Margin LT19 Rack A	$\pm 6V$	$\pm 2.5V$
2	Margin LT19 Rack B	$\pm 5V$	$\pm 2.5V$
3	Margin LT19 Rack C	$\pm 6V$	$\pm 2.5V$
4	Margin LT19 Rack E	$\pm 6V$	$\pm 2.5V$

-15V do C + B
together

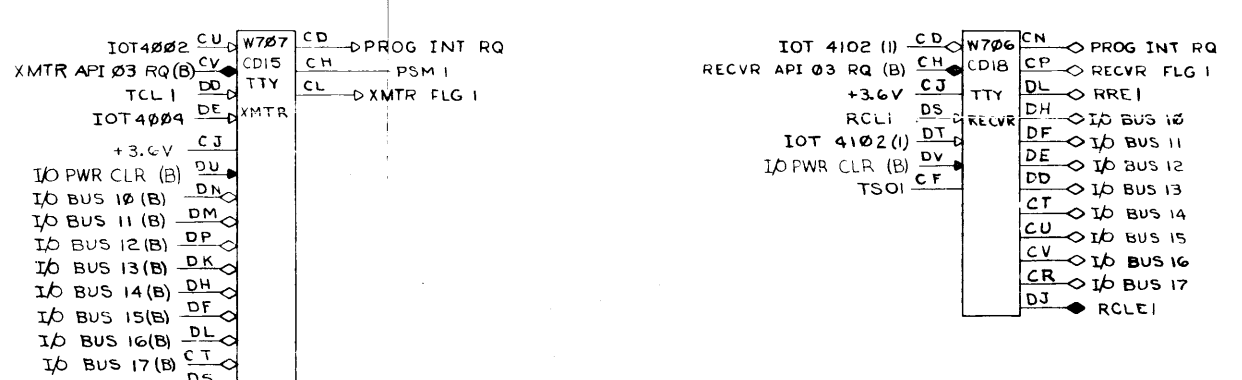
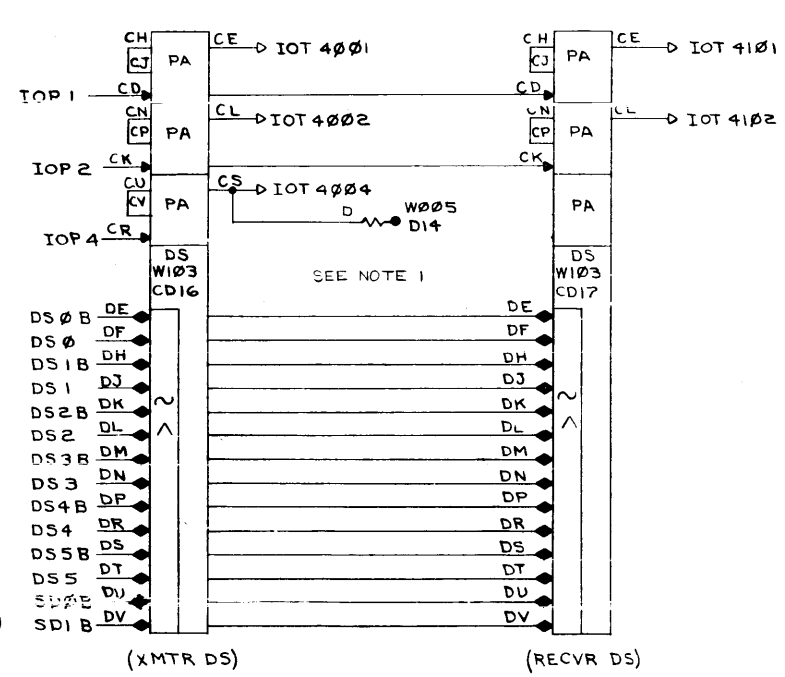
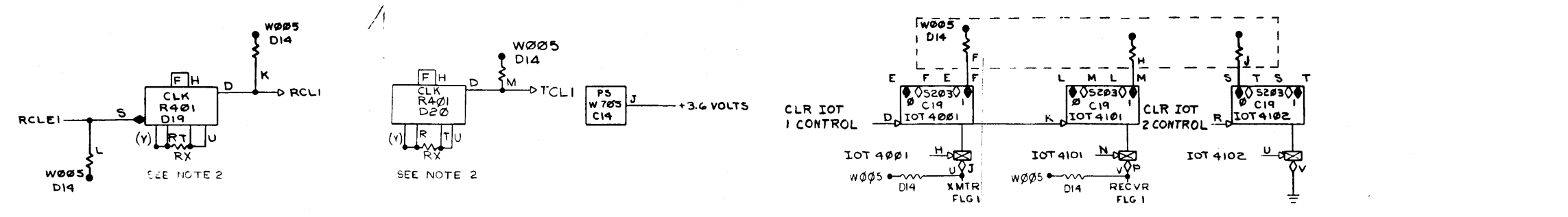
-15V do C + E
together

SIZE	CODE	NUMBER	REV
A	SP	LT19-	

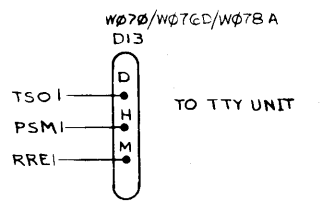
SHEET _____ OF _____

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1-3-6117 2



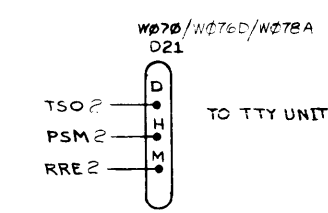
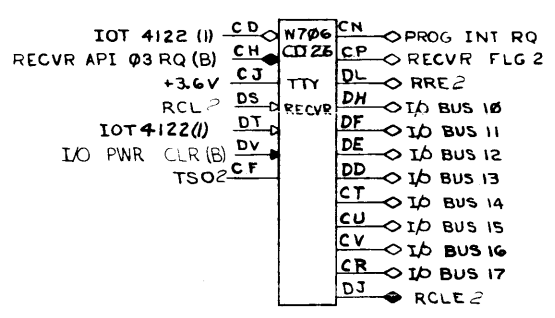
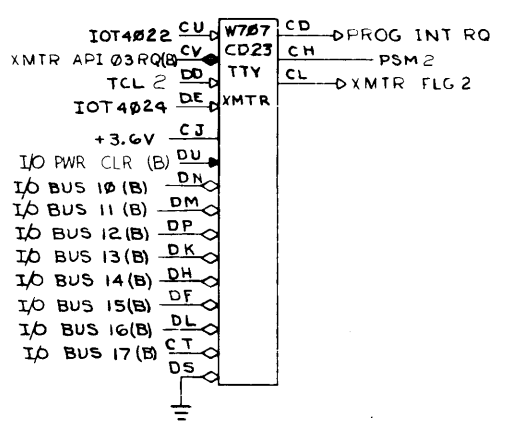
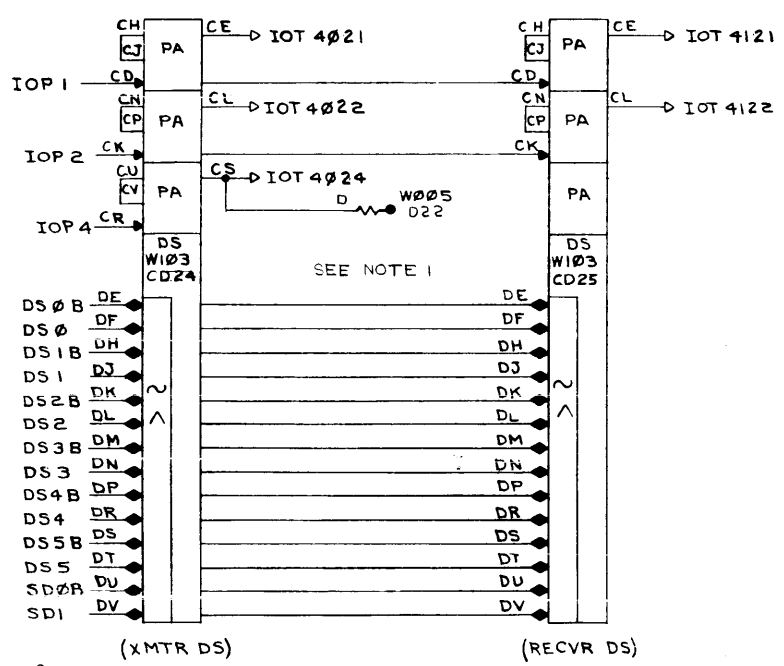
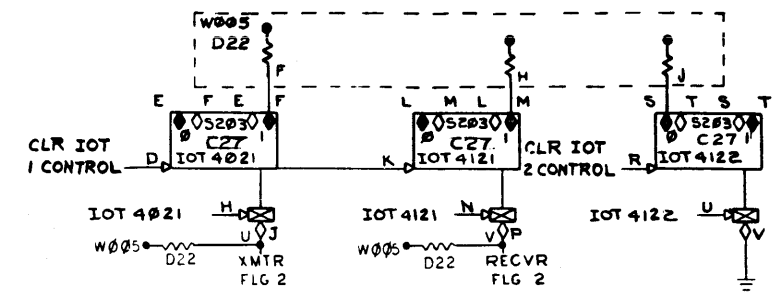
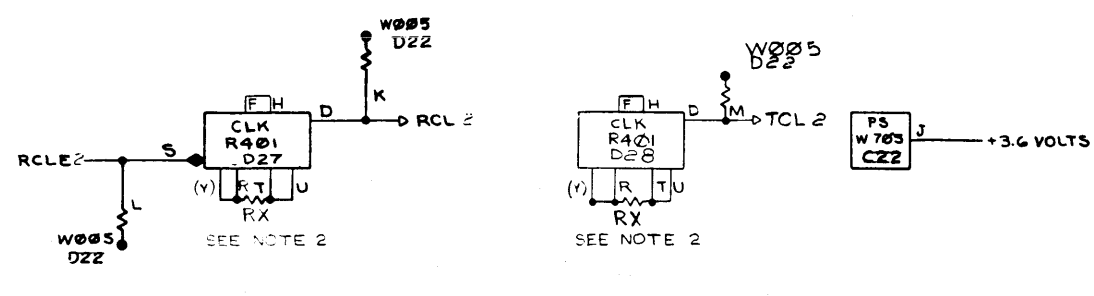
NOTES:
 1. APPROPRIATE DIODES MUST BE REMOVED FROM W103 DEVICE SELECTOR MODULES TO OBTAIN PROPER SELECTOR CODES.
 2. SEE BAUDRATE TABLE (DWG# A-CP-LT19-D-8) FOR SELECTION OF EXTERNAL RESISTOR (RX) AND TIMING CAPACITOR JUMPER PIN (Y).



REV	CHANGE NO.	DATE
1		11/6/69
2		1/1/70
3		2-5-70

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
LT19-D				
PARTS LIST				
UNLESS OTHERWISE SPECIFIED	DRN.	DATE	EQUIPMENT CORPORATION	
UNLESS OTHERWISE SPECIFIED	CHK'D	DATE	MAYNARD MASSACHUSETTS	
DIMENSION IN INCHES	ENG.	DATE	TITLE	
TOLERANCES	PROJ.	DATE	TTY CONTROL UNIT CHANNEL I	
DECIMALS FRACTIONS ANGLES	PROD.	DATE	SIZE CODE	
= .005 ± .004 ± 0°30'	NEXT HIGHER ASSY		DBS	
FINAL SURFACE QUALITY / REMOVE BURRS AND BREAK SHARP CORNERS	A-ML-LT19-E		NUMBER	
MATERIAL			LT19-E-1	
FINISH	SCALE	SHEET	REV	
	1 OF 1	DIS1	B	

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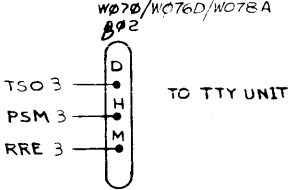
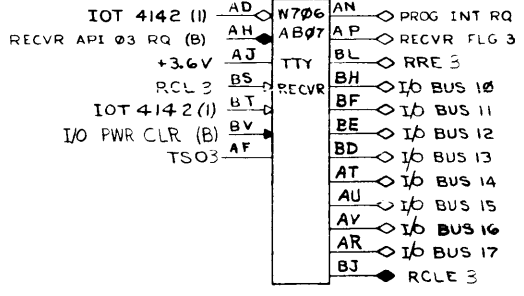
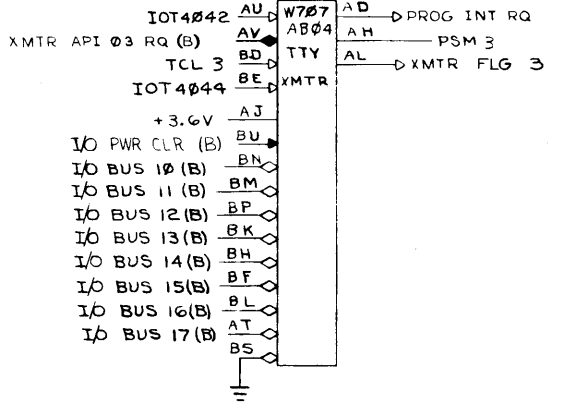
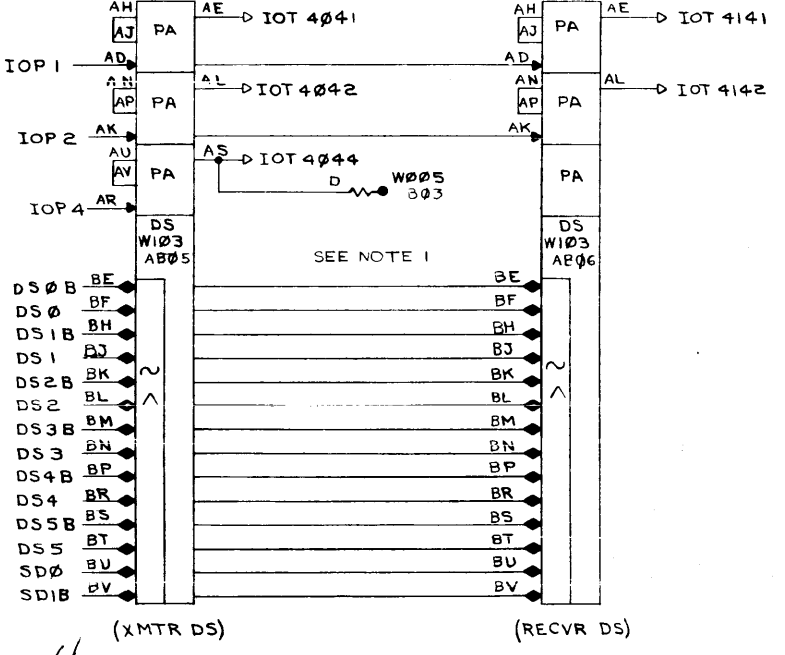
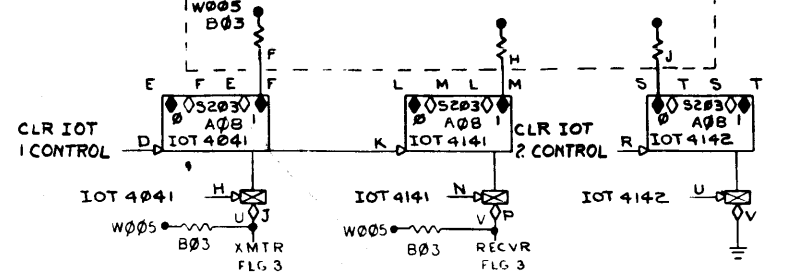
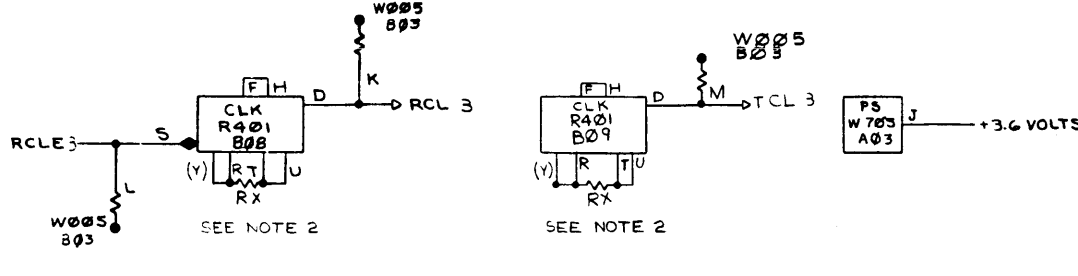


- NOTES:
 1. APPROPRIATE DIODES MUST BE REMOVED FROM W103 DEVICE SELECTOR MODULES TO OBTAIN PROPER SELECTOR CODES.
 2. SEE BAUD RATE TABLE FOR SELECTION OF EXTERNAL RESISTOR (RX) AND TIMING CAPACITOR JUMPER PIN (Y). (A-CP-LT19-D-B)

REV	CHANGE NO	DATE
A		
B		
C		

FIRST USED ON OPTION MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
LT19-D				
PARTS LIST				
UNLESS OTHERWISE SPECIFIED				
DIMENSION IN INCHES				
TOLERANCES				
DECIMALS FRACTIONS ANGLES				
± .005 ± 1/64 ± .005				
FINAL SURFACE QUALITY REMOVE BURRS AND BREAK SHARP EDGES				
MATERIAL				
NEXT HIGHER ASSY				
A-ML-LT19-E				
FINISH				
SCALE				
SHEET 1 OF 1				
TITLE			SIZE CODE	NUMBER
TTY CONTROL UNIT CHANNEL 2			DBS	LT19-E-2
REV. B				

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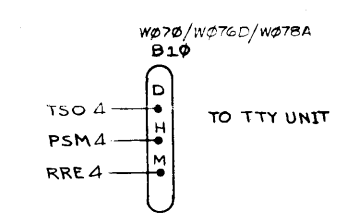
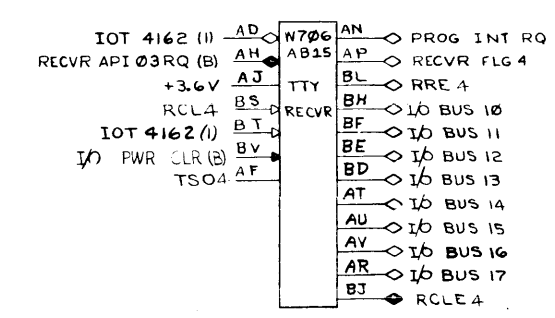
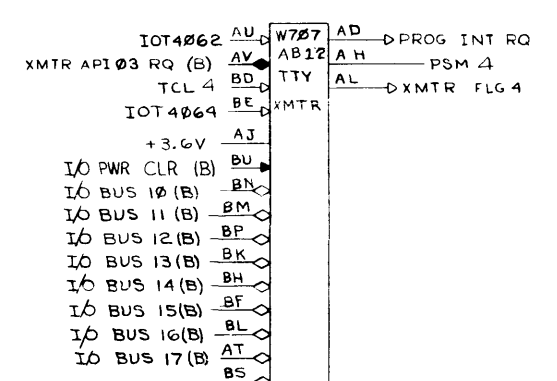
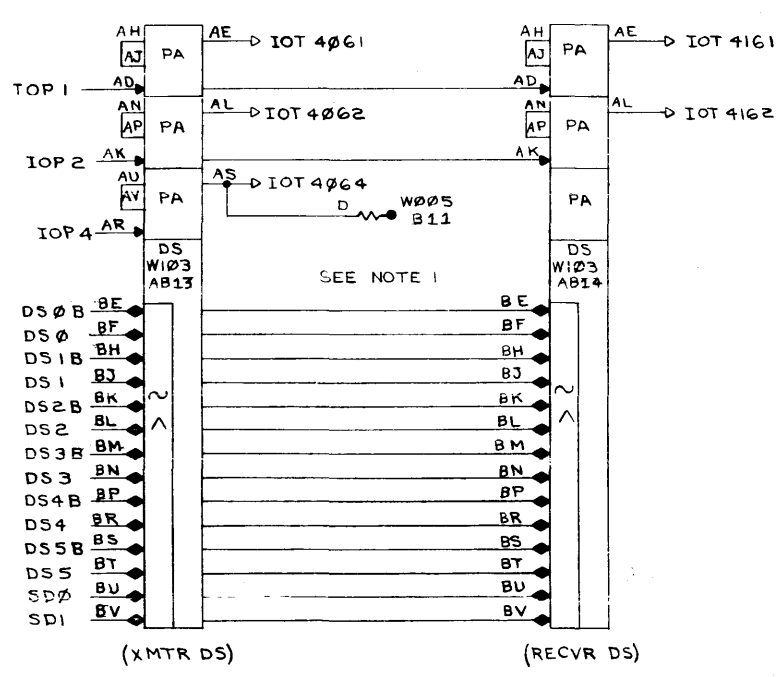
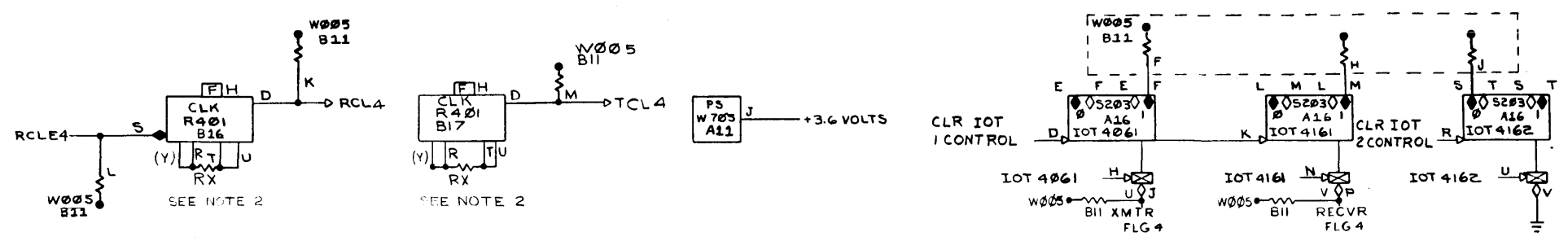
- NOTES:
1. APPROPRIATE DIODES MUST BE REMOVED FROM W103 DEVICE SELECTOR MODULES TO OBTAIN PROPER SELECTOR CODES.
 2. SEE BAUDRATE TABLE FOR SELECTION OF EXTERNAL RESISTOR (RX) AND TIMING CAPACITOR, JUMPER, PIN (Y). (A-CP-LT19-D-8)

REV.	CHANGE NO.	DESCRIPTION
1	1	LT19-D-8
2	2	LT19-D-8
3	3	LT19-D-8
4	4	LT19-D-8
5	5	LT19-D-8
6	6	LT19-D-8
7	7	LT19-D-8
8	8	LT19-D-8

FIRST USED OR OPTION MODEL	QTY	DESCRIPTION	PART NO.	ITEM NO.
LT19-D				
PARTS LIST				
EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS				
TITLE TTY CONTROL UNIT CHANNEL 3				
MATERIAL		NEXT HIGHER ASSY A-ML-LT19-E		
FINISH		SCALE		
SHEET		OF 1		
SIZE CODE		NUMBER		
DBS		LT19-E-3		
REV.		B		

DBS LT19-E-3

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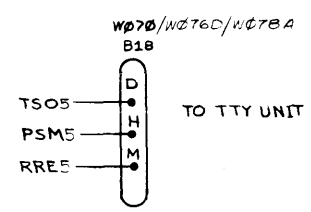
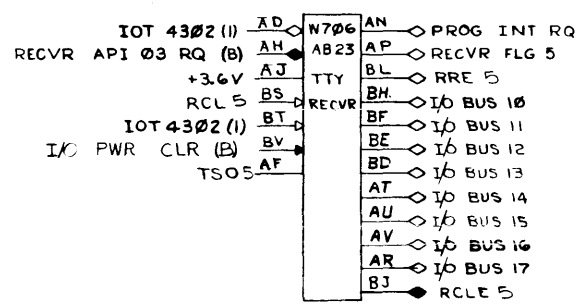
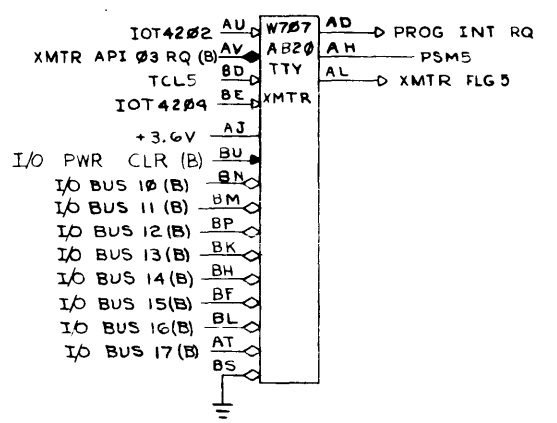
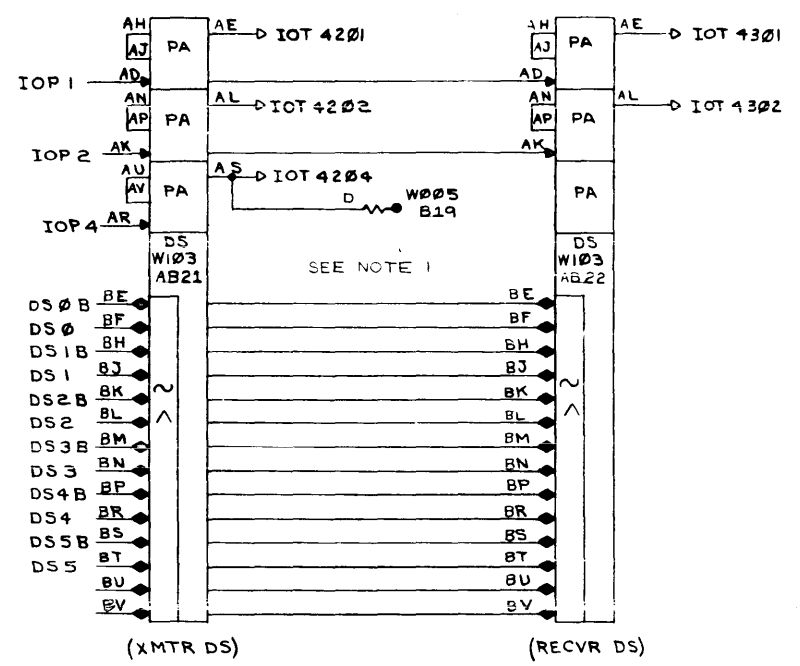
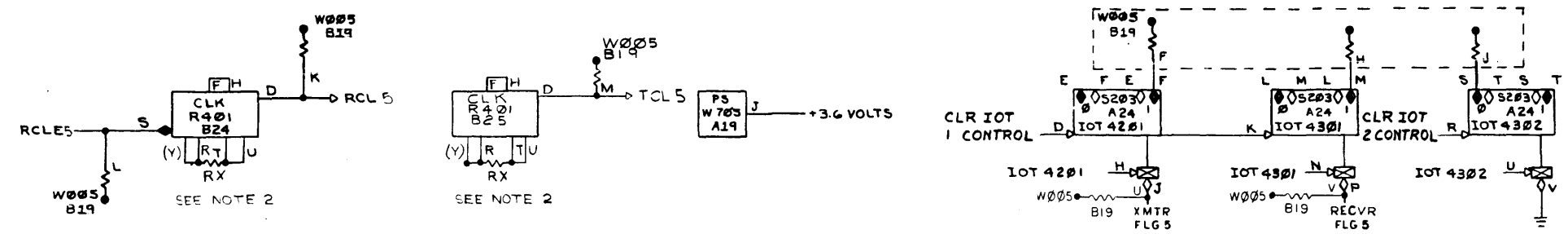


NOTES:
 1. APPROPRIATE DIODES MUST BE REMOVED FROM W103 DEVICE SELECTOR MODULES TO OBTAIN PROPER SELECTOR CODES.
 2. SEE BAUD RATE TABLE FOR SELECTION OF EXTERNAL RESISTOR (RX) AND TIMING CAPACITOR JUMPER PIN (Y).
 (A-CP-LT19-D-8)

REV.	CHANGE NO.	DATE	BY
1			
2			
3			
4			
5			
6			
7			
8			

FIRST USED OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
LT19-D				
PARTS LIST				
EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS				
TITLE TTY CONTROL UNIT CHANNEL 4				
NEXT HIGHER ASSY A-ML-LT19-E			SIZE CODE DBS	NUMBER LT19-E-4
SCALE			SHEET	OF
FINISH			DIST.	

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- NOTES:
1. APPROPRIATE DIODES MUST BE REMOVED FROM W103 DEVICE SELECTOR MODULES TO OBTAIN PROPER SELECTION CODES. IOT DEVICE SELECTION CODES ARE OPTIONALLY ASSIGNABLE FROM STANDARD PDP-9 DESIGNATION LIST. (SEE LT19-D FOR ASSIGNABLE LISTING) SUB DEVICE SELECTION CODE IS NOT ASSIGNED TO THIS UNIT AND MUST BE JUMPED IN IF REQUIRED.
 2. SEE BAUDRATE TABLE FOR SELECTION OF EXTERNAL RESISTOR (RX) AND TIMING CAPACITOR JUMPER PIN (Y) (A-CP-LT19-D-E)

REV	CHANGE NO.	DATE	BY	CHK
A				
B				
C				
D				
E				

FIRST USE/OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
LT19-D				
UNLESS OTHERWISE SPECIFIED				
DIMENSION IN INCHES				
TOLERANCES				
DECIMALS FRACTIONS ANGLES				
± .005 ± 1/64 ± 0°30'				
FINAL SURFACE QUALITY				
REMOVE BURRS AND BREAK SHARP CORNERS				
MATERIAL				
NEXT HIGHER ASSY				
A-ML-LT19-E				
FINISH				
SCALE				
SHEET 1 OF 1				
DISTRIBUTION				

DATE	BY	DATE	BY	DATE	BY
1-2-69	F. Ferguson				

EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

TITLE
TTY CONTROL UNIT CHANNEL 5

SIZE CODE DBS NUMBER LT19-E-5

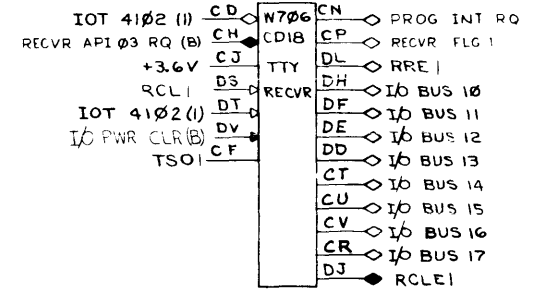
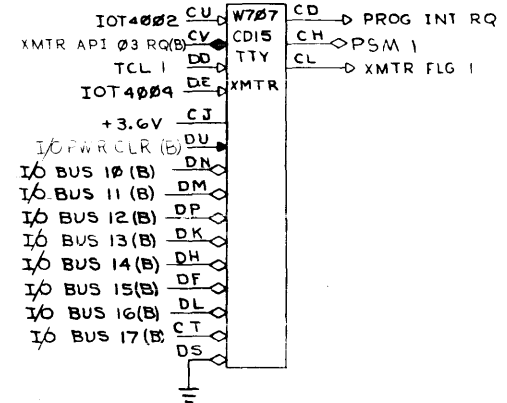
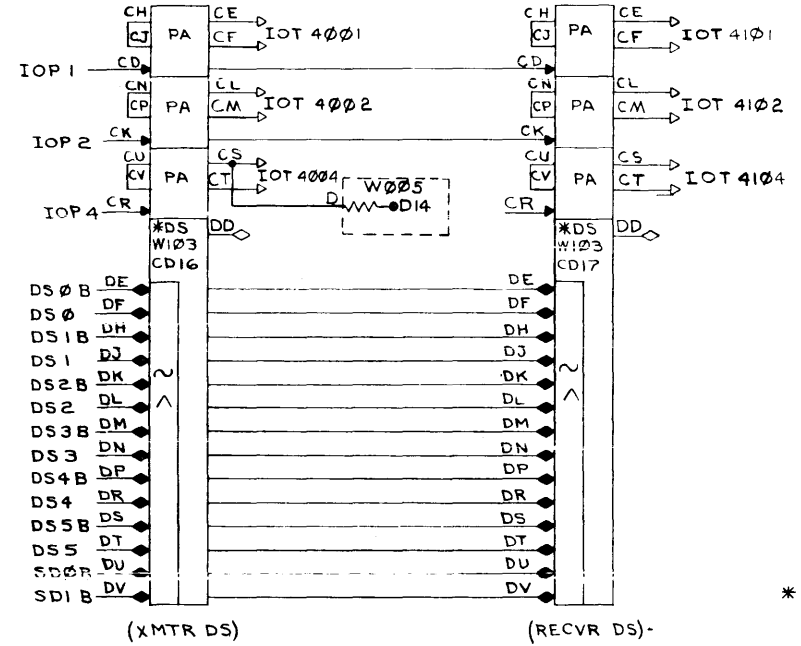
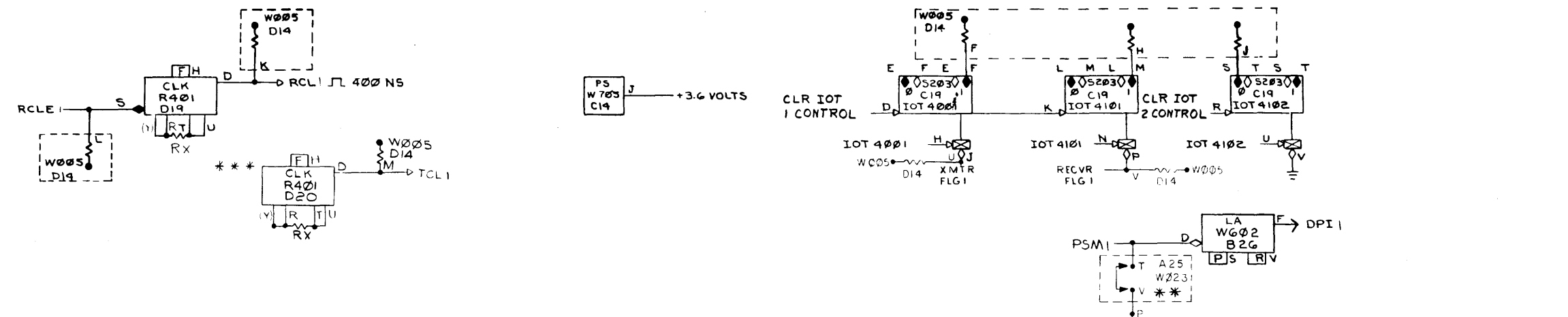
MASTER DRAWING LIST

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DWG. NO.	REV. LET.	NO. OF SHEETS	TITLE
A-ML-LT19-D	RFF	1	MULTI-STATION TELETYPE CONTROL
D-BS-LT19-F-1	UUF	1	TELETYPE CONTROL UNIT CHANNEL 1
D-BS-LT19-F-2	UUF	1	TELETYPE CONTROL UNIT CHANNEL 2
D-BS-LT19-F-3	UUF	1	TELETYPE CONTROL UNIT CHANNEL 3
D-BS-LT19-F-4	UUF	1	TELETYPE CONTROL UNIT CHANNEL 4
D-BS-LT19-F-5	UUF	1	TELETYPE CONTROL UNIT CHANNEL 5

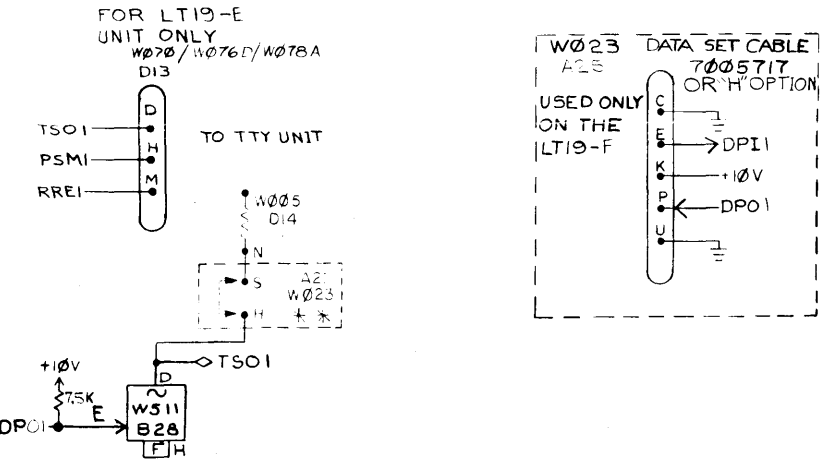
REVISIONS				DPN J CHK'D FERGUSON AL PFYFFER ENG. PROJ. ENG. PROD. <i>R. O'Neil</i> FIRST USED ON LT19-D SCALE SHFET 1 OF 1	DATE 8/6/69 DATE 8/12/69 DATE DATE DATE 9/14/67	 EQUIPMENT CORPORATION <small>MAYNARD, MASSACHUSETTS</small>	TITLE TELETYPE INTERFACE LT19-F			
REV.	DATE	CHG. NO.	APP'D.				SIZE	CODE	NUMBER	REV.
A	12/69	LT19D-1	R.D.				A	ML	LT19-F	B
B	7/70	LT19D-2	R.D.							

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* NOTES:
APPROPRIATE DIODES MUST BE REMOVED FROM W103 DEVICE SELECTOR MODULES TO OBTAIN PROPER SELECTOR CODES.

** THESE CLAMPED LOADS ARE JUMPED IN FOR F UNITS ONLY WHEN CABLE IS INSERTED.
*** SEE BAUD RATE TABLE (DWG A-CP-LT19-D-B) FOR SELECTION OF EXTERNAL RESISTOR (RX) AND TIMING CAPACITOR JUMPER PIN (Y).

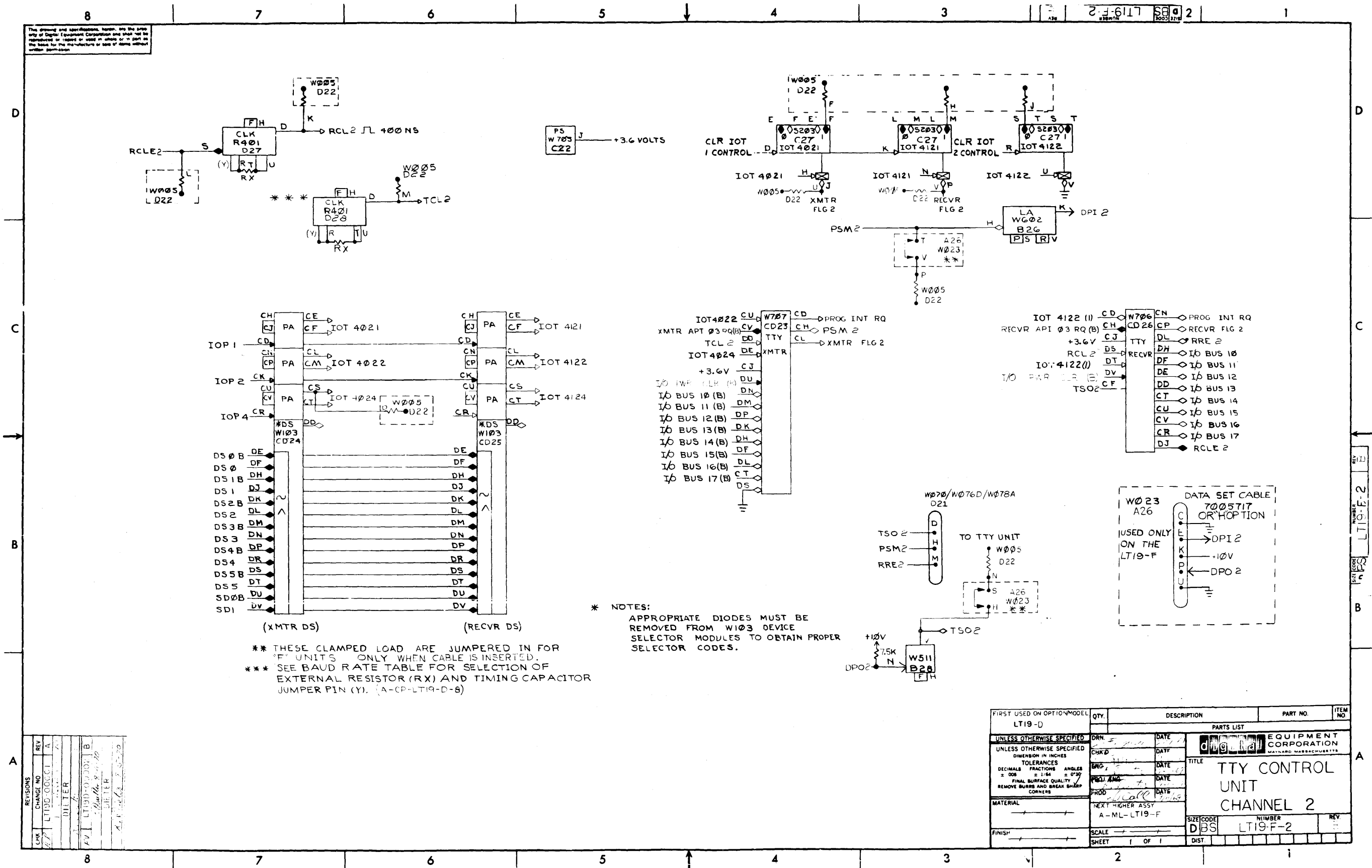


REV	DATE	BY	CHK
1	11/19/68	DBS	DBS
2	1/10/69	DBS	DBS
3	1/10/69	DBS	DBS
4	1/10/69	DBS	DBS

DEC FORM NO. 010 102

FIRST USED ON OPTION/MODEL	QTY	DESCRIPTION	PART NO.	ITEM NO.
LT19-D				
PARTS LIST				
UNLESS OTHERWISE SPECIFIED	DRN	DATE	EQUIPMENT CORPORATION	
UNLESS OTHERWISE SPECIFIED	CHK'D	DATE	MAYNARD, MASSACHUSETTS	
TOLERANCES	QNG	DATE	TITLE	
DECIMALS FRACTIONS ANGLES	PROD/ENG	DATE	TTY CONTROL	
± 0.001 ± 1/64 ± 0°30'	PROD	DATE	UNIT	
FINAL SURFACE QUALITY	DATE		CHANNEL 1	
REMOVE BURRS AND BREAK SHARP CORNERS				
MATERIAL	NEXT HIGHER ASSY		SIZE CODE	NUMBER
	A-ML-LT19-F		DBS	LT19-F-1
FINISH	SCALE		DIST.	REV
	SHEET 1 OF 1			F

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Pin	Label	Function
CH	PA	CE IOT 4021
CJ	PA	CF IOT 4121
CK	PA	CL IOT 4022
CL	PA	CM IOT 4122
CM	PA	CS IOT 4024
CN	PA	CT IOT 4124
CP	PA	DD
CQ	PA	DE
CR	PA	DF
CS	PA	DH
CT	PA	DJ
CU	PA	DK
CV	PA	DL
CD	PA	DM
CE	PA	DN
CF	PA	DP
CG	PA	DR
CH	PA	DS
CI	PA	DT
CJ	PA	DU
CK	PA	DV
CL	PA	SD
CM	PA	SD1

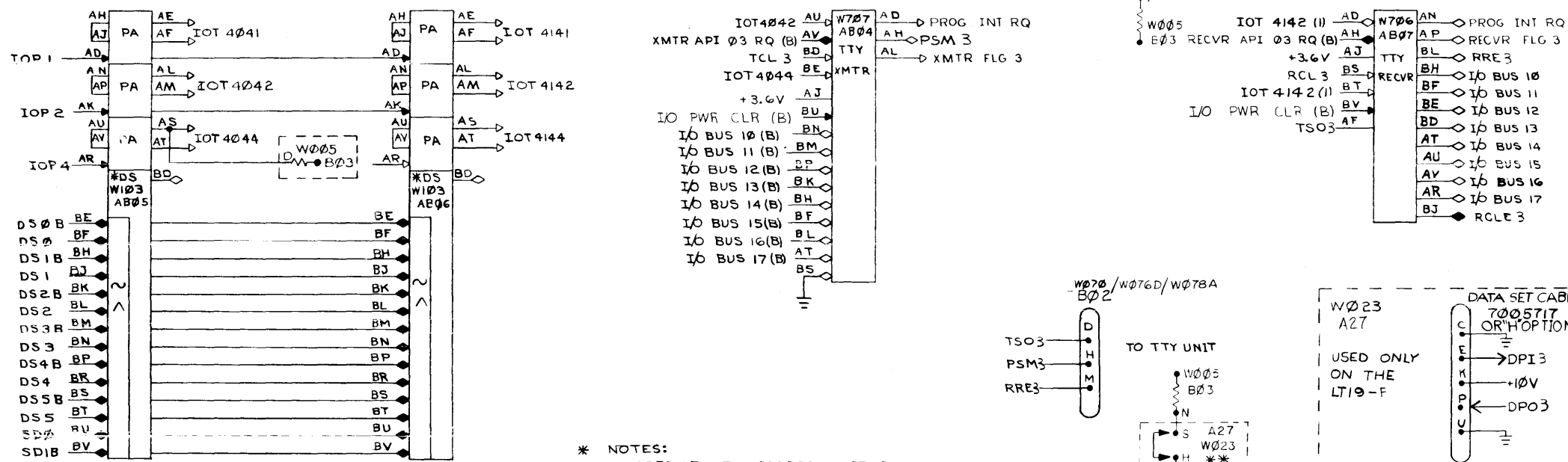
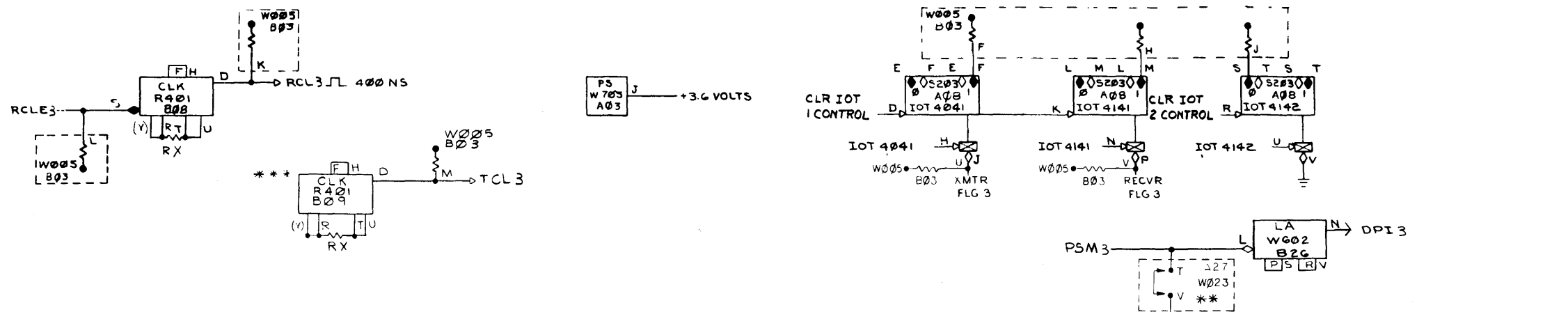
** THESE CLAMPED LOAD ARE JUMPED IN FOR "F" UNITS ONLY WHEN CABLE IS INSERTED.
 *** SEE BAUD RATE TABLE FOR SELECTION OF EXTERNAL RESISTOR (RX) AND TIMING CAPACITOR JUMPER PIN (Y). (A-CP-LT19-D-8)

* NOTES:
 APPROPRIATE DIODES MUST BE REMOVED FROM W103 DEVICE SELECTOR MODULES TO OBTAIN PROPER SELECTOR CODES.

FIRST USED ON OPTION MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
LT19-D				
PARTS LIST				
UNLESS OTHERWISE SPECIFIED	DRN	DATE	DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	
UNLESS OTHERWISE SPECIFIED	CHK'D	DATE	TITLE	
TOLERANCES	ENG	DATE	TTY CONTROL UNIT CHANNEL 2	
DECIMALS FRACTIONS ANGLES	PROJ. AND	DATE	SIZE CODE	
± 0.05 ± 0.125 ± 0.125	PROD.	DATE	DDB	
FINAL SURFACE QUALITY	NEXT HIGHER ASSY		NUMBER	
REMOVE BURRS AND BREAK SHARP CORNERS	A-ML-LT19-F		LT19-F-2	
MATERIAL	SCALE		REV	
	SHEET 1 OF 1			

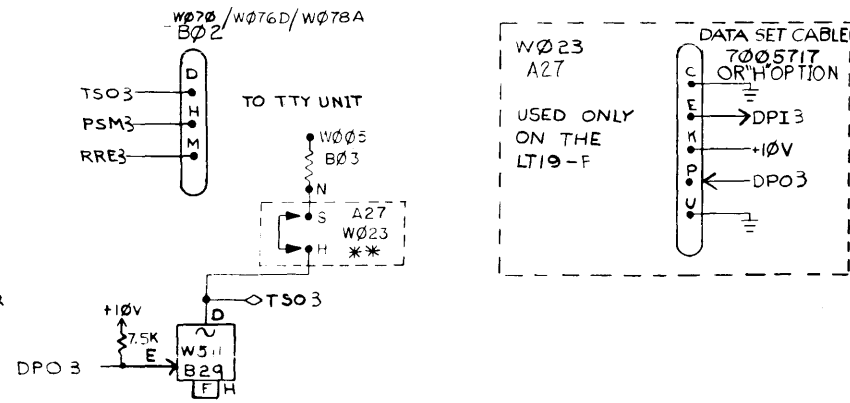
REV.	CHANGE NO.	BY	DATE
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8

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* NOTES:
 APPROPRIATE DIODES MUST BE REMOVED FROM W103 DEVICE SELECTOR MODULES TO OBTAIN PROPER SELECTOR CODES.

(XMTR DS) (RECVR DS)
 ** THESE CLAMPED LOAD ARE JUMPERED IN FOR 'F' UNITS ONLY WHEN CABLE IS INSERTED.
 *** SEE BAUD RATE TABLE FOR SELECTION OF EXTERNAL RESISTOR (RX) AND TIMING CAPACITOR, JUMPER, PIN (Y).
 (A-CP-LT19-D-8)

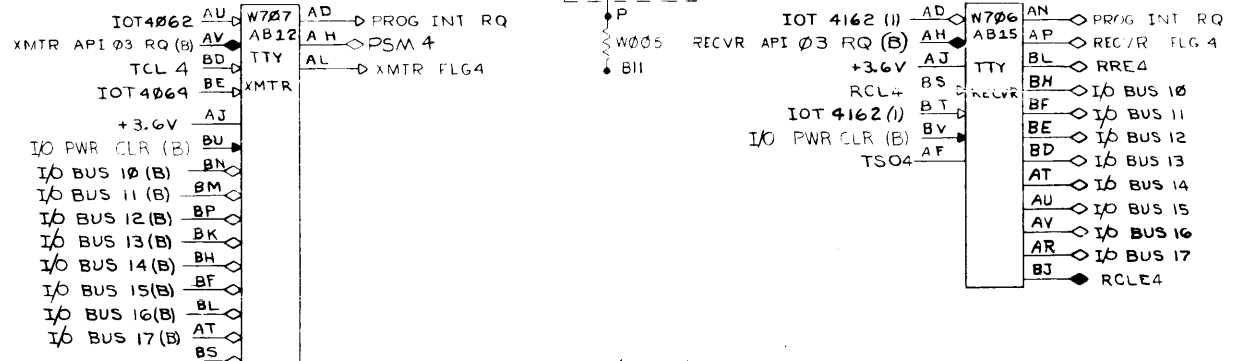
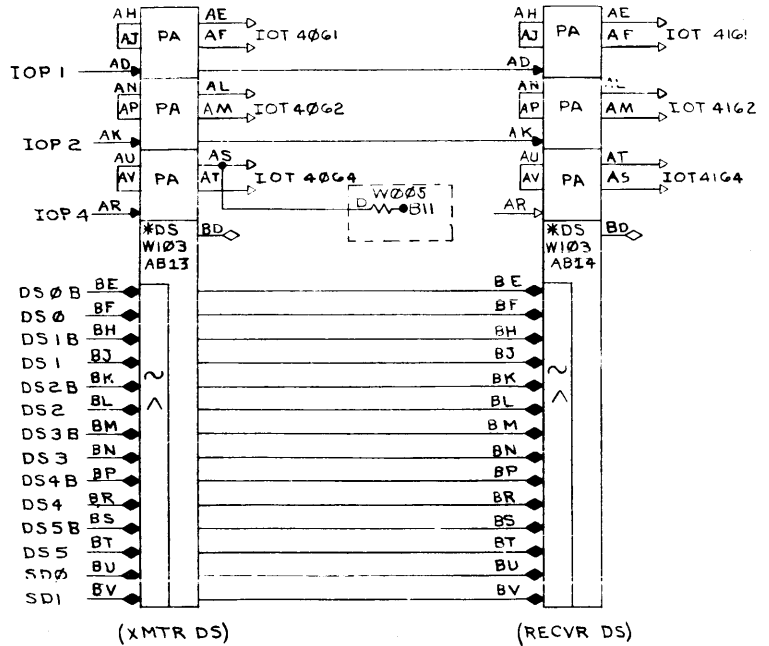
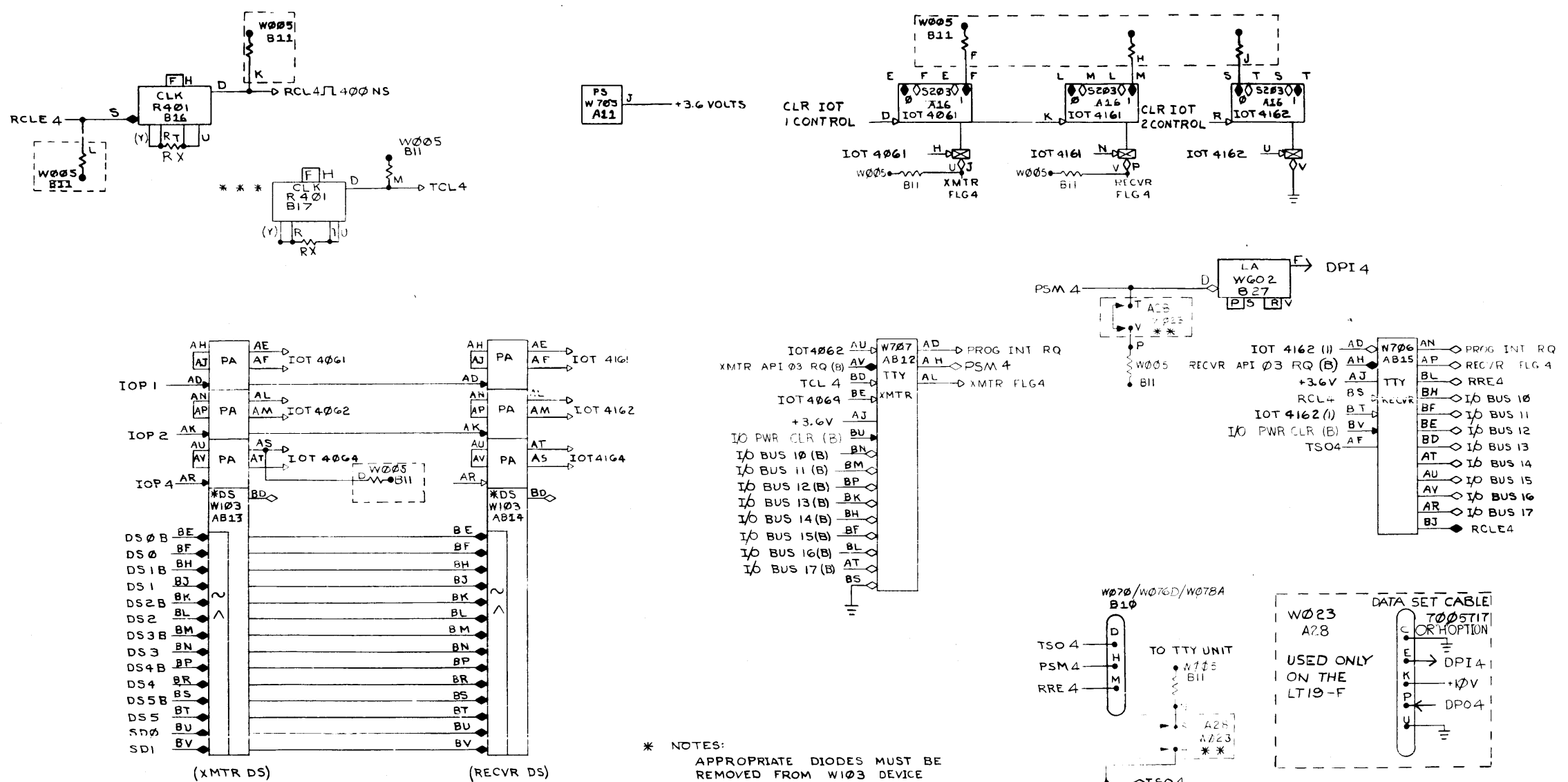


REV	CHANGE NO.	DATE
1	1190-C0001 A	1-5-70
2	1190-C0001 B	1-5-70
3	1190-C0001 C	1-5-70
4	1190-C0001 D	1-5-70

QTY.	DESCRIPTION	PART NO.	ITEM NO.
	UNLESS OTHERWISE SPECIFIED	DRN	DATE
	UNLESS OTHERWISE SPECIFIED	CHK'D	DATE
	TOLERANCES	ENG	DATE
	DECIMALS FRACTIONS ANGLES	PROT ENGR	DATE
	± .008 ± .184 ± 0°30'	PROD	DATE
	FINAL SURFACE QUALITY		
	REMOVE BURRS AND BREAK SHARP CORNERS		
	MATERIAL	NEXT HIGHER ASSY	
	FINISH	A-ML-LT19-F	
	SCALE	SIZE CODE	NUMBER
	SHEET	DBS	LT19-F-3
	OF	DIST.	REV
			B

EQUIPMENT CORPORATION
 WATYARD MASSACHUSETTS
 TITLE
 TTY CONTROL UNIT CHANNEL 3

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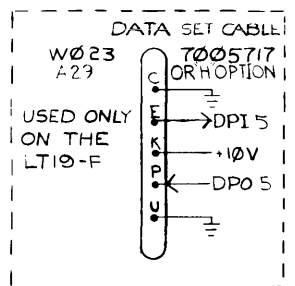
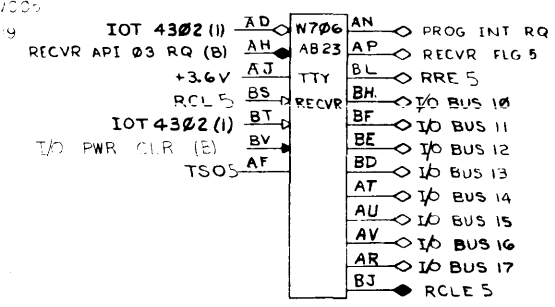
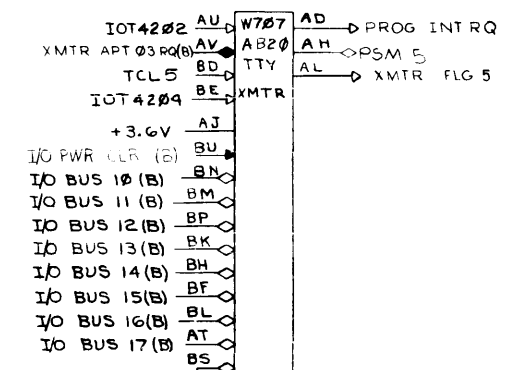
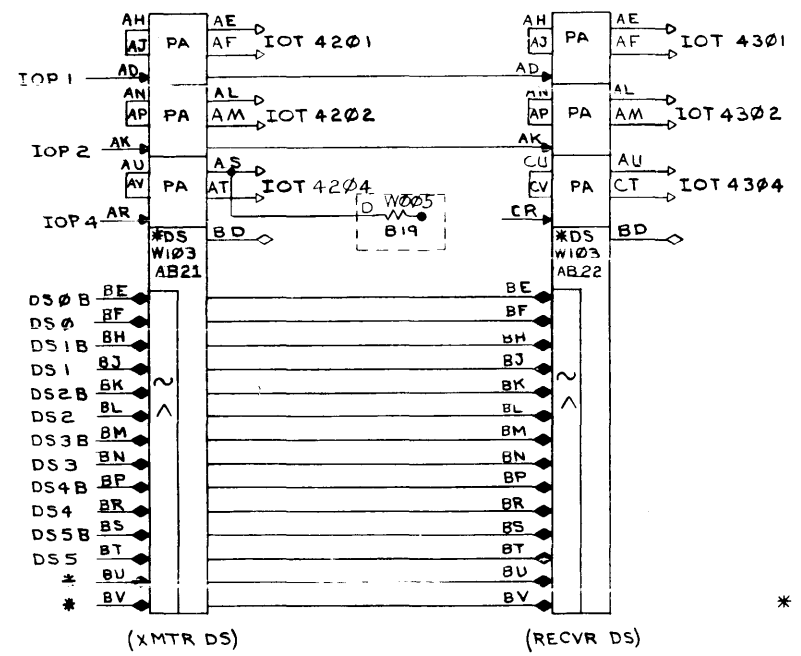
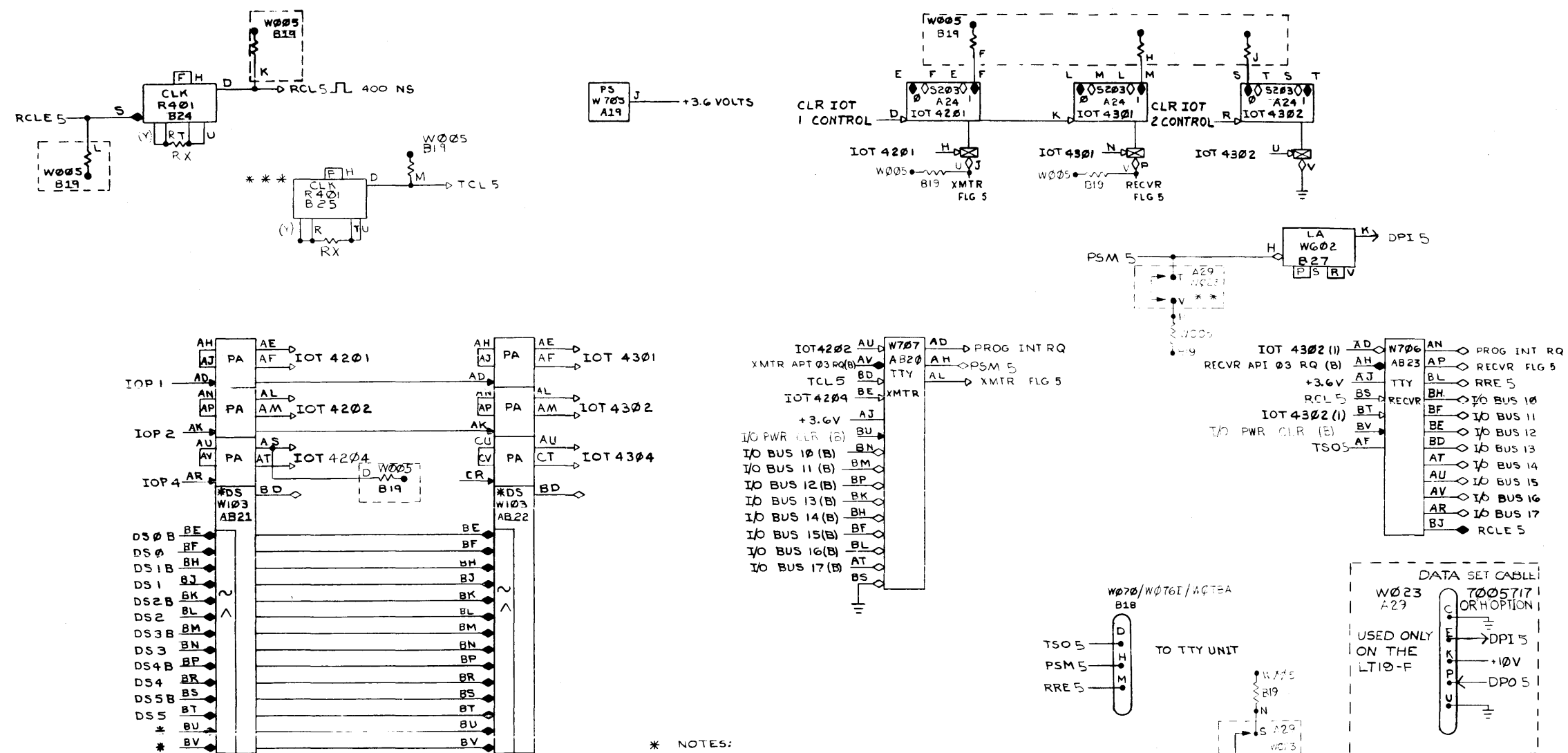
* NOTES:
APPROPRIATE DIODES MUST BE REMOVED FROM W103 DEVICE SELECTOR MODULES TO OBTAIN PROPER SELECTOR CODES.

** THESE CLAMPED LOAD ARE JUMPED IN FOR F UNITS ONLY WHEN CABLE IS INSERTED.
*** SEE BAUD RATE TABLE FOR SELECTION OF EXTERNAL RESISTOR (RX) AND TIMING CAPACITOR, JUMPER, PIN (Y). A-(P-LT19-D-8)

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
LT19-D				
PARTS LIST				
UNLESS OTHERWISE SPECIFIED	DRN	DATE	 EQUIPMENT CORPORATION MAYNARD MASSACHUSETTS	
UNLESS OTHERWISE SPECIFIED	CHK'D	DATE		
DIMENSION IN INCHES	QTY	DATE		
TOLERANCES	PROJ/EMP	DATE		
DECIMALS FRACTIONS ANGLES	PROD	DATE	TITLE TTY CONTROL UNIT CHANNEL 4	
± .008 ± 1/64 ± 0°30'				
FINAL SURFACE QUALITY			SIZE/CODE NUMBER REV DBS LT19-F-4	
REMOVE BURRS AND BREAK SHARP CORNERS				
MATERIAL	NEXT HIGHER ASSY		SCALE SHEET OF DIST.	
FINISH	A-ML-LT19-F			

REV	CHG	NO	DATE	BY
1				
2				
3				
4				
5				
6				
7				
8				

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* NOTES:
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 SUB DEVICE SELECTION CODE IS NOT ASSIGNED TO THIS UNIT AND MUST BE JUMPED IN IF REQUIRED.

** THESE CLAMPED LOAD ARE JUMPED IN FOR 'F' UNIT ONLY WHEN CAR - 11000000
 *** SEE BAUD RATE TABLE FOR SELECTION OF EXTERNAL RESISTOR (RX) AND TIMING CAPACITOR, JUMPER, PIN (Y). (A-CP-LT19-D-8)

REV	NO	DATE	BY	CHK
1				

FIRST USED ON OPT ON/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
LT19-D				
PARTS LIST				
UNLESS OTHERWISE SPECIFIED	DRN	DATE	 DIGITAL EQUIPMENT CORPORATION MAYNARD, MASSACHUSETTS	
UNLESS OTHERWISE SPECIFIED	CHWD	DATE		
TOLERANCES	ENG	DATE		
DECIMALS FRACTIONS ANGLES	PROJ	DATE		
± 0.008 ± 1/64 ± 0°30'	PROD	DATE	TITLE TTY CONTROL UNIT CHANNEL 5	
FINAL SURFACE QUALITY REMOVE BURRS AND BREAK SHARP CORNERS				
MATERIAL	NEXT HIGHER ASSY		SIZE CODE	NUMBER
	A-ML-LT19-F		D/BS	LT19-F-5
FINISH	SCALE	SHEET	DIST.	REV.
		OF		

DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

ENGINEERING SPECIFICATION

DATE 9-3-69

TITLE Data Communications Interface - LT19H

REVISIONS

REV	DESCRIPTION	CHG NO	ORIG	DATE	APPD BY	DATE
A		LT19D-00001		1-6-70	DIETER	1-6-70
B		LT19D-00002		8-4-70	<i>R.D.</i>	8-5-70

The LT19H consists of a special cable and a method of providing low-cost data communications between a PDP-9 and a PDP-8 or another PDP-9

ENG	R. DIETER	APPD	<i>R. Dieter</i>	SIZE	A	CODE	SP	NUMBER	LT19-H-1	REV	B
-----	-----------	------	------------------	------	---	------	----	--------	----------	-----	---

SHEET 1 OF 4

ENGINEERING SPECIFICATION

CONTINUATION SHEET

TITLE Data Communications Interface - LT19H

- 1.0 LT19 Data Communications (Type LT19H)
The LT19H is primarily a special cable which, when added to the LT19F (Level Converter option), provides communications capability with another LT19H (for PDP-9) or PT08F (for PDP-8).
- 1.1 The timing and operational characteristics for the LT19E and F also apply to the LT19H.
- 1.2 The option designation suffix letter defines the data communications cable length:

700589I-1	=	LT19-HA	50' Cable
" "	-2	LT19-HB	100' Cable
" "	-3	LT19-HC	150' Cable
" "	-4	LT19-HD	200' Cable
700589I-5	=	LT19-HE	250' Cable
- 1.3 In operation the LT19H appears to its control to be an EIA level device, e.g. a DataPhone.
- 1.4 The LT19H plugs into slots in the LT19D and has as prerequisites, the LT19E and F. The specifications for the LT19 D, E, & F also apply to the LT19H.
- 1.5 There are two independent communications channels in each LT19H. In each link the transmit and receive baud rates must be identical.

DEC FORM NO	DRA 108	SIZE	A	CODE	SP	NUMBER	LT19-H-1	REV	B
-------------	---------	------	---	------	----	--------	----------	-----	---

SHEET 2 OF 4

ENGINEERING SPECIFICATION

CONTINUATION SHEET

TITLE Data Communications Interface - LT19H

2.0 There is no vendor supplied equipment for the LT19H

3.0 Same as specification for LT19D

3.0 Checkout Test Procedure

The LT19H will be checked out in two parts. Part one is to check each channel as an LT19F (EIA Level Converter) with output jumpered to input and program run according to procedures in Maindec - 09-D8CC-DN (Addendum to LT19/PT08 Diagnostic). See LT19D Eng. Spec. Section 8.0. Part two is to insert one end of the LT19H Cable (length A, B, C, D, or E) in appropriate output slot for the channel being tested then insert the other end into the unused slot at A32. Remove the output to input jumper used in part one and install between pins A32E and A32P, rerun tests as in part one.
Perform parts one and two for each LT19H channel using the baud rates called for in the purchase order. Const. Req.

3.0 Acceptance Test Procedure

The Acceptance Test operator must successfully rerun the Checkout Test Procedures stated in Section 8. The following documents and tapes are required for acceptance:

- a. Maindec-9A-D8CS-FH Program Tape
- b. Maindec-9A-D8CC-D Write-up
- c. Maindec-09-D8CC-DN Addendum

3.1 The purpose of the LT19H is to send/receive data to another LT19H or PT08F, since the other device (LT19H or PT08F) will rarely be available at the time of checkout the Acceptance of the LT19H must be performed on a "stand alone" basis.

SIZE	A	CODE	SP	NUMBER	LT19-H-1	REV	B
------	---	------	----	--------	----------	-----	---

SHEET 3 OF 4

ENGINEERING SPECIFICATION

CONTINUATION SHEET

TITLE Data Communications Interface - LT19H

10.0 System Verification

To verify system operation in the field, the following information may be used.

- a. Insure that the channel works both directions as outlined in section 8.0
- b. Insure that the channel on the "otherend" also works, this should be another LT19H or PT08-F (use maindec -08-D8FA).
- c. Verify that the baud rates for both ends are identical.
- d. Plug the LT19-H Cable into each end of the communications link.
- e. Load the latest version of the LT09/19 Diagnostic into the PDP-9/15 and prepare to check the channel as described in section 3.0. To add the output to input "Jumper", a "Turnaround Program" will be required in the "otherend". Samples of "Turnaround Programs" for the PDP-8 and PDP-9/15 are given below:

PDP - 8		PDP - 9/15	
20/6401	Skip on R Flag	200/704101	Skip on R Flag
21/5020	Jmp. - 1	201/603200	Jmp. - 1
22/6406	Read	202/703112	Read
23/3340	DCA 40	203/700300	NOP
24/1040	TAD 40	204/700306	XMIT
25/7000	NOP	205/600200	JMP 200
26/6416	XMIT		
27/5020	JMP 20		

Both programs assume channel 1, adjust IOT codes as required by channel used.

SIZE	A	CODE	SP	NUMBER	LT19-H-1	REV	B
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SHEET 4 OF 4