

TEST EQUIPMENT M825, 8085(A) SYSTEM ANALYZER

The M825 System Analyzer is a portable, cost-effective instrument which supports the design, development, production, and field service of 8085 and 8085A Microprocessor-based systems. The unit functions as a program monitor, program-to-hardware integrator and provides many of the display functions of a computer control panel.

FEATURES:

- Tests Systems using the 8085 or 8085A Microprocessor
- Displays Address, Data, Machine Cycle, and Status
- Static and Dynamic Display Modes
- System Run/Step Control
- System Reset Push Button
- Connects to Processor Chip Via Clip-On or Low-Profile Connector
- Oscilloscope Trigger at Address Compare or Data Display Time
- Delayed Data Capture
- Memory or I/O Address Select
- Non-Maskable Interrupt Capability at Address Compare
- External Control of Data Display
- Address Stop
- Interrupt Trap and Display
- Interface Buffer to Minimize Microprocessor Loading
- High-Impact Attache Case
- UL Listed



M825, System Analyzer in Case

The M825 is self-contained and easily connected to your system microprocessor by means of a single DIP clip or low-profile connector. It is useful as an alternative or complement to software techniques for program development or debugging of 8085-based microprocessor systems. Since it is easily attached, the M825 System Analyzer, together with adequate program documentation, is an ideal tool for field service or production.

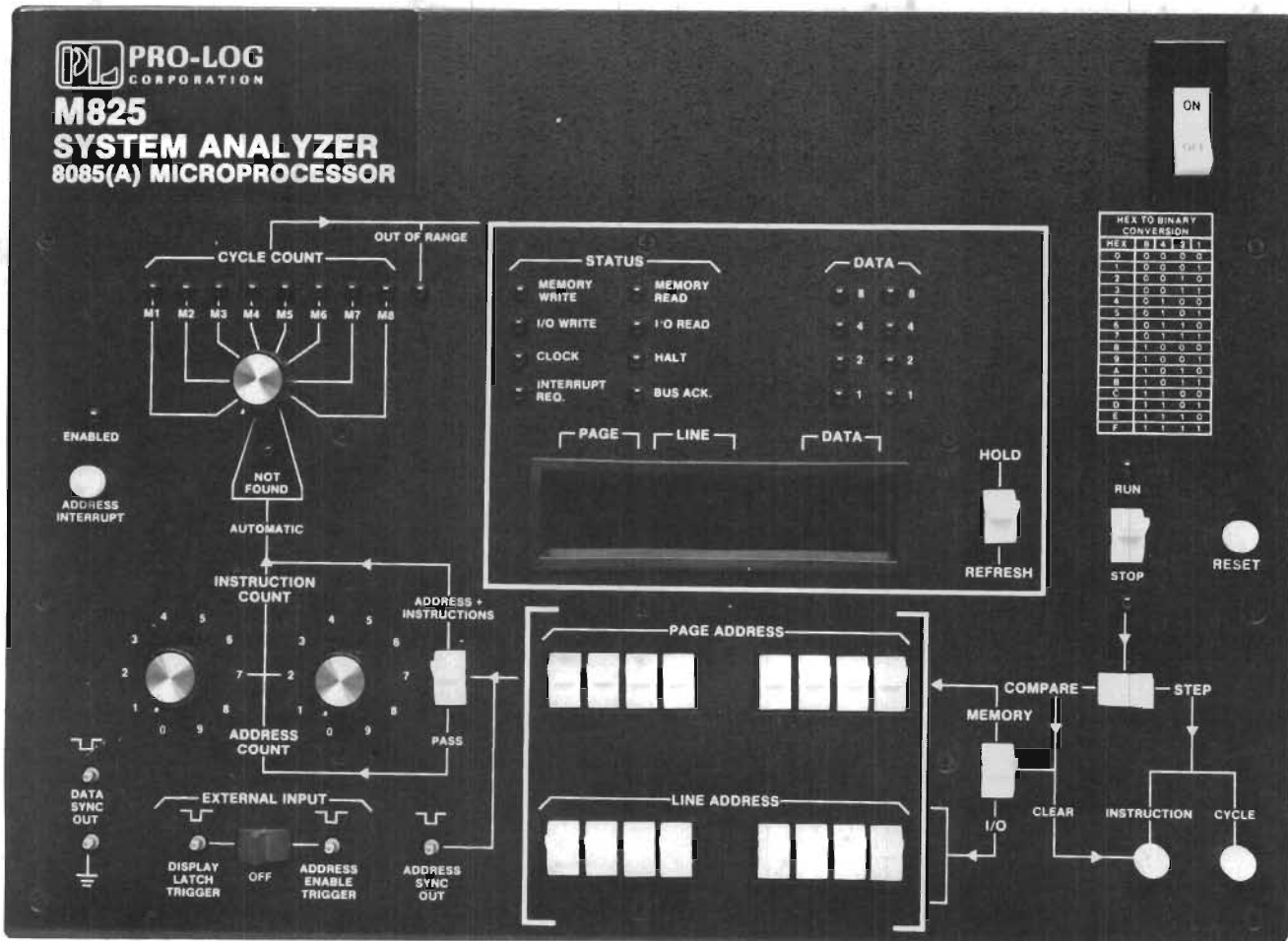
The Analyzer allows examination of the system (address, data, and status) during a user-specified machine cycle at the desired Compare Address. Observation of the system is possible at full system speed or by single-step by instruction or machine cycle. The possible display modes are dynamic mode, in which the processor continues to run without analyzer interference, and static mode, in which the analyzer controls the processor WAIT line.

Delayed Data Capture affords the capability of observing a particular machine cycle up to 99 instructions past a chosen reference address. The feature also allows observing the reference address after a user-defined number of passes over that address. A two-decade address counter, coupled with a single machine cycle counter, provides the operator with the capability of simply "dialing" his way through the program under investigation. This delay capability may be extended to any number by utilizing Stop/Compare mode.

The M825 provides Memory or I/O Address selection and Interrupt Trap and/or Stop on Interrupt, along with Hex address, Hex and Binary Data, and Status Displays. The analyzer also features an oscilloscope synchronization output pulse during Address Compare and Data Display Latch time. DATA SYNC OUT can be utilized to trigger an oscilloscope at any selectable instruction cycle.

Operator-initiated functions include microprocessor push button Reset, Latch Display or Latch Display and Stop at the next T2 state after trigger, Stop on Next Address Compare after trigger, and generation of non-maskable interrupt at Address Compare time.

M825, 8085(A) SYSTEM ANALYZER



M825, Front Panel

ADDRESS CONTROLS

ADDRESS Switches: Sixteen address (bit) select toggle switches, broken into two groups: Page Address (high order address - A8 thru A15) and Line Address (low order address or I/O - A0 thru A7); used to establish the trigger reference address.

RUN/STOP Switch: Selects dynamic mode (microprocessor continues to run) or static mode (microprocessor is stopped at Data Latch time and may be stepped through the program).

COMPARE/STEP Switch: Is only functional in stop mode and selects Stop on Address Compare and single Step on cycle or instruction.

MEMORY I/O Switch: Selects examination of data flow to/from memory location defined by Page and Line Address switches, or I/O device defined by the low-order (Line) address switches.

HOLD/REFRESH Switch: Controls latching of the data display. In HOLD, the display is frozen the first time the selected compare condition is met. In REFRESH, the display is refreshed each time the selected compare condition is met.

DELAYED DATA CAPTURE CONTROLS

ADDRESS + INSTRUCTION/PASS Toggle Switch: Address + Instruction mode allows data selection and display at an address up to 99 instructions beyond Compare Address. Pass mode allows up to 99 passes through a selected address before data is displayed.

ADDRESS COUNT/INSTRUCTION COUNT Rotary Switch: Controls the number of address passes in Pass mode, the number of additional instruction in Address + Instruction mode.

CYCLE COUNT Rotary Switch: Selects machine cycle of interest.

ADDRESS INTERRUPT PUSH BUTTON

ADDRESS INTERRUPT: Activation of this push button will set an Address Compare latch and the next occurrence of Address Compare will generate a Non-Maskable Interrupt. Appropriate interrupt service routines must be supplied by the user and located at the required memory location. If the Analyzer is stopped by Address Compare, the interrupt will be generated at the next Address Compare time.

DISPLAYS

ADDRESS: Displays 16-bit address as 4 Hex digits within a range of 0000-FFFF.

DATA: a 2-digit Hex display and two groups of 8 (bit) indicators, providing binary and hex data representation.

STATUS: Eight individual indicators showing Data and Machine Status.

MEMORY READ/WRITE AND I/O READ/WRITE: Indicate the function associated with the data being displayed.

CLOCK: Indicates the processor clock is operational.

INTERRUPT REQ: Indicates a System Interrupt has occurred.

HALT: Indicates the processor is in the HALT state.

BUS ACK: Indicates the processor has acknowledged and responded to a Bus Request.

RUN/STOP: Indicates status of the Machine READY line; RUN for program execution, STOP for processor idle (WAIT state).

CYCLE COUNT: Machine cycle indicator showing the cycle of the instruction with which the displayed data is associated.

NOT FOUND: Indicates that the selected machine cycle was not found.

ENABLED: Indicates the Address Interrupt feature is enabled.

OUT OF RANGE: Indicates a Machine Cycle greater than 8 is being displayed.

SYNC POINTS

ADDRESS SYNC OUT: Provides a negative pulse out for oscilloscope triggering each time the selected address compares with the system address lines.

DATA SYNC OUT: Provides a delayed negative pulse out for oscilloscope triggering each time the Analyzer data display is latched. The delay is a function of the setting of Address/Instruction + Machine Cycle Count selectors.

DISPLAY LATCH TRIGGER IN: Each negative input edge causes the Analyzer to latch data at the next T2 time. If the display selector is in the Hold mode, Address and Data are latched for each negative edge and all Address Compare Data is locked out. If the Analyzer is in the Stop mode, the system can thus be halted by the external event.

ADDRESS ENABLE TRIGGER IN: For each negative input edge an Address Compare latch will be set and the next Address Compare occurring will stop the system via the WAIT line whether or not the Analyzer is in the Run mode. Depressing CLEAR will release the system and reset the latch.

GROUND Pin: Ground provided for all outputs and triggers.

USER SYSTEM REQUIREMENTS

The READY, RESET IN and TRAP lines must be capable of being wire-ORed. All interrupt lines must be strapped inactive if not used. A gate isolation resistance of 100 Ω to 220 Ω is recommended.

M825, 8085(A) SYSTEM ANALYZER

SPECIFICATIONS

MAXIMUM μ P CLOCK FREQUENCY: 3.2 MHz

LOADING SPECIFICATIONS

Inputs:

Address, Data, Clock and System Control Lines
INTR, RST 7.5, RST 6.5, and RST 5.5
READY, RESET IN
TRAP
Display Latch and Address Enable Trigger

0.125 TTL Loads @ 50 pf
0.25 TTL Loads @ 50 pf
1.6 TTL Loads @ 100 pf
0.125 TTL Loads @ 100 pf
1.6 TTL Loads @ 50 pf

Outputs:

READY, RESET IN
TRAP

8 TTL Loads
ON: Source 40 mA (min) to +5V
OFF: Open Circuit
1 TTL Load

Address and Data Sync Out

POWER REQUIREMENTS

50/60 Hz 115 VAC @ 0.75 amp or
50/60 Hz 230 VAC @ 0.300 amp

PHYSICAL CHARACTERISTICS

Analyzer Control Unit

Height - 4.5"
Width - 21"
Length - 12"
Total product weight is less than 15 pounds.

Buffer Module and Cables

Height - 1.125"
Width - 2.5"
Length - 4.5"

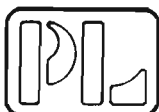
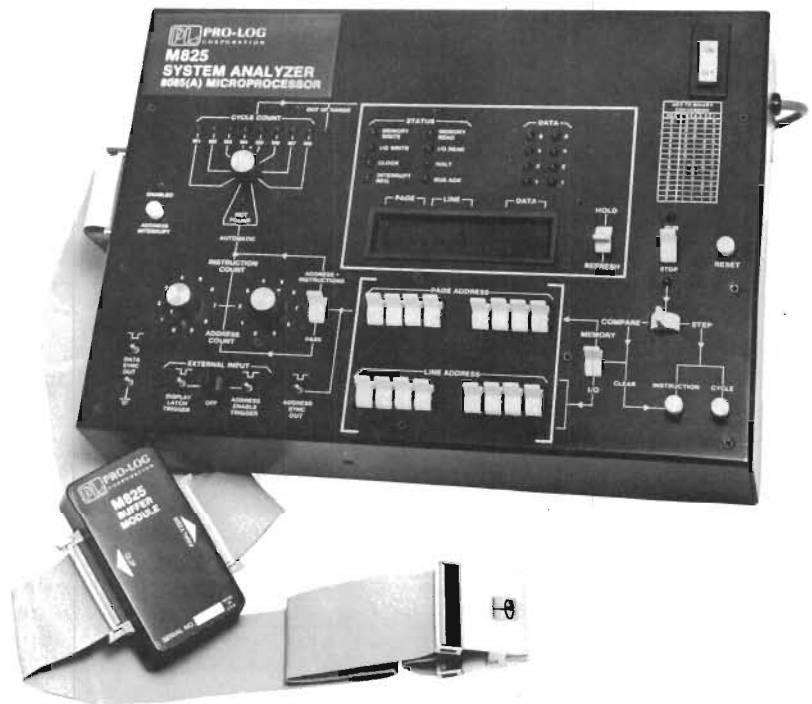
Attache Case

Height - 6.5"
Width - 12.5"
Length - 23"

OPERATING TEMPERATURE: 0°C to +45°C

M825 INCLUDES:

- Analyzer Control Unit
- Plug-in Buffer Module and Cable
- 40 Pin DIP Clip Connector Assembly
- 40 Pin Low-Profile Connector Assembly
- Attache Case
- Two Copies of Operating Manual



REV	DESCRIPTION	DATE	APPR
A	CHANGED ITEM 24 FROM 74LS74 TO 74s74 . PART NO. IS 901625 WAS 900756. AS PER PCR 0449. CHANGED ITEM 33 SCREW #2-56x5/8" TO 1/2", PART NO. IS 901390 WAS 902107. AS PER PCR 0434.		

<p style="text-align: center; font-size: 2em; font-weight: bold;">PRO-LOG CORPORATION</p>	<small>THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION OF PRO-LOG CORPORATION, AND SUCH INFORMATION MAY NOT BE DISCLOSED TO OTHERS. REPRODUCED, COPIED OR USED WITHOUT WRITTEN AUTHORITY FROM AN OFFICER OF PRO-LOG CORPORATION.</small>		<p style="font-size: 1.2em;">PARTS LIST, M825 BUFFER BOARD</p>			
	<p style="text-align: center;">D. CUSICK</p>	<p style="text-align: center;">3-29-79</p>				A
	<p style="text-align: center;"><i>D. Cusick</i></p>	<p style="text-align: center;">4/2/79</p>				

PRO-LOG CORPORATION

A

105015

REV A

ITEM NO.	QTY.	PRO-LOG NUMBER	REFERENCE IDENTIFIER	DESCRIPTION	SPECIFICATION NUMBER
1	REF	105013		ASSEMBLY, M825 BUFFER BOARD	
2	REF	104879		FABRICATION, ANALYZER, CABLE BUFFER P.C.B. DRAWING <small>OUTLINE</small>	
3	REF	105014		SCHEMATIC, M825 BUFFER BOARD	
4					
5					
6	1	105012		PWB, M825 BUFFER BOARD	
7					
8					
9	1	900015	1.0 μ f 25V	CAPACITOR, ALUM	102086
10	6	900024	0.1 μ f 50V	CAPACITOR, CER	102098
11	1	901348	390pf 2%	CAPACITOR, PRECISION TIMING	101953
12	1	901092	200pf 2%	CAPACITOR, PRECISION TIMING	101953
13					
14	2	902077	CONNECTOR	40 PIN RIGHT ANGLE HEADER W/EJECTOR LATCHES	104944
15					
16	6	902079	100 Ω , 5%, 1/8W	RESISTOR NETWORK	105088
17	1	900242	10K Ω , 5% 1/8W	RESISTOR NETWORK	100164
18	2	900175	220 Ω , 5% 1/4W	RESISTOR CC	103005
19	1	901959	147 Ω , 1% 1/4W	RESISTOR MF	103006

TITLE:
PARTS LIST,
M825 BUFFER BOARD

SHT 2
OF 3

102973 11/77

PRO-LOG CORPORATION	ITEM NO.	QTY.	PRO-LOG NUMBER	REFERENCE IDENTIFIER	DESCRIPTION	SPECIFICATION NUMBER
	20	1	901185	215 Ω, 1% 1/4W	RESISTOR MF	103006
	21					
	22	1	900931	74LS08	I.C., LOW PWR, QUAD 2 INPUT NAND	103464
	23	1	900934	74LS32	I.C., LOW PWR, QUAD 2 INPUT OR	103464
	24	1	901625	74S74	I.C., LOW PWR, DUAL φ TYPE FLIP FLOP	
	25	1	901088	74LS240	I.O., OCTAL BUFFER TRI STATE INV.	103464
	26	3	901090	74LS244	I.C., OCTAL BUFFER TRI STATE INV.	103464
	27					
	28	3	900249	SOCKET	14 PIN DIP	
29	4	901077	SOCKET	20 PIN DIP		
30						
31	A/R			LOCKTITE COMPOUND		
A	32					
105015	33	4	901390	SCREW #2-56 x 1/2"	PN. HD., CAD. PHIL	
	34	4	902110	SPACER #2-56 x 1/2"	ROUND NYLON THREADED	
REV A	TITLE: PARTS LIST, M825 BUFFER BOARD					
SHT 3 OF 3						

100073 11/77

REV	DESCRIPTION	DATE	APPR
A	UPDATE PER PCR. #0492		

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PARTS LIST: SYSTEM MODEL M825

PRO-LOG CORPORATION

C.A. CLARK

5-10-79

J. W. ...

5/29/79

A

105263

REV
A

SHT 1
OF 2

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105263

REV
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OF
2

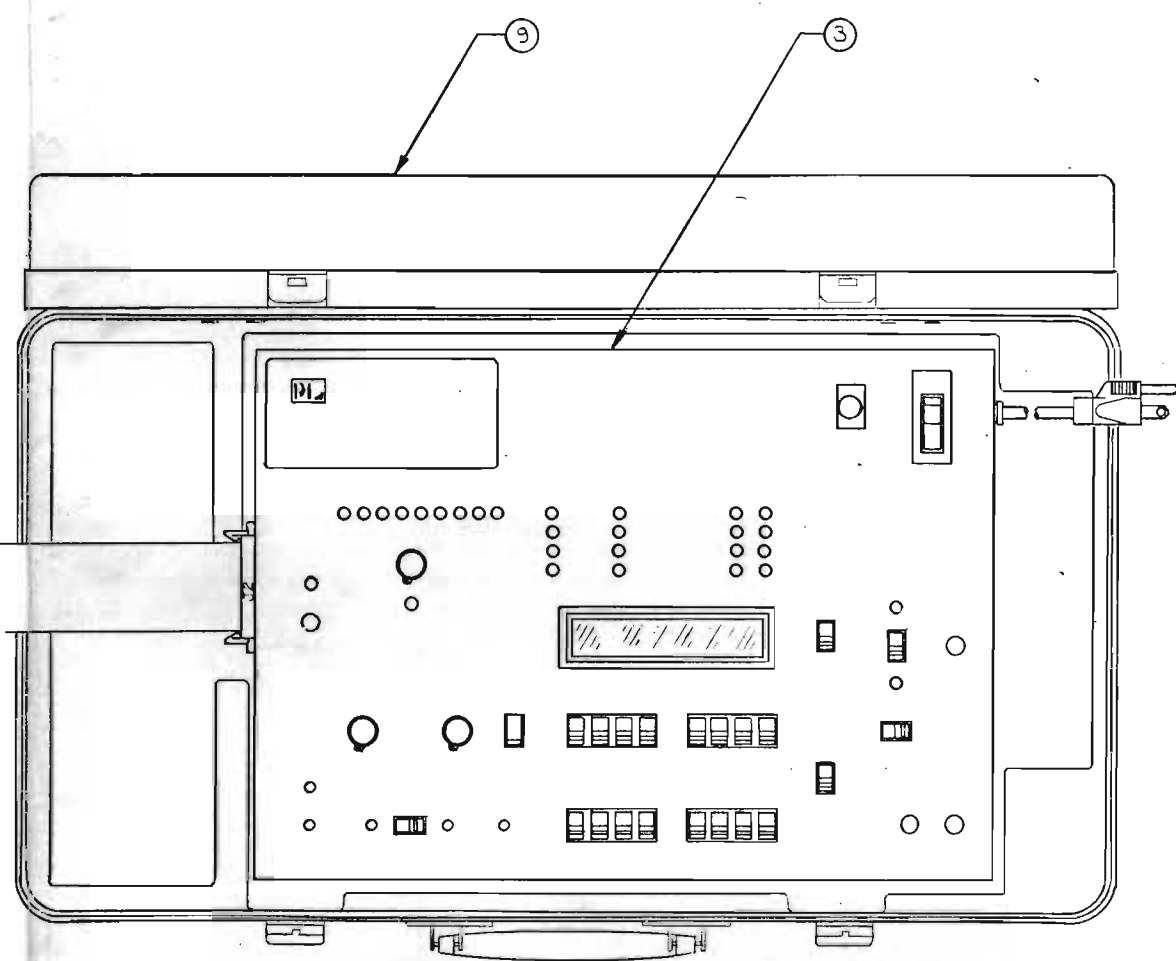
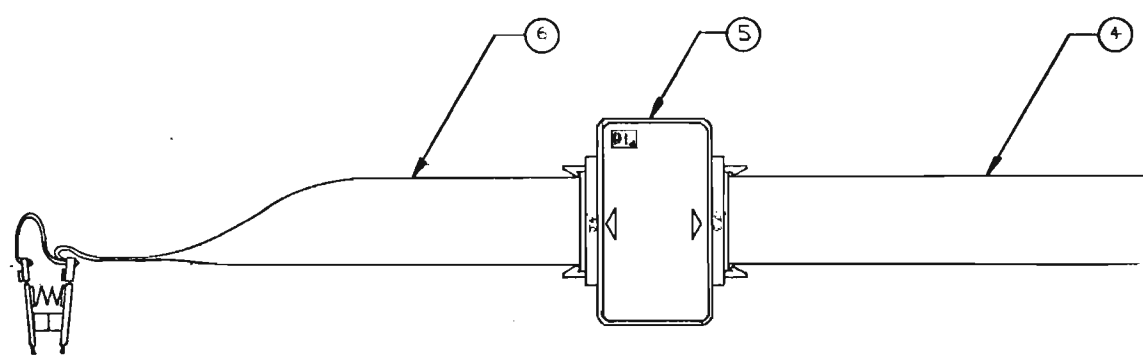
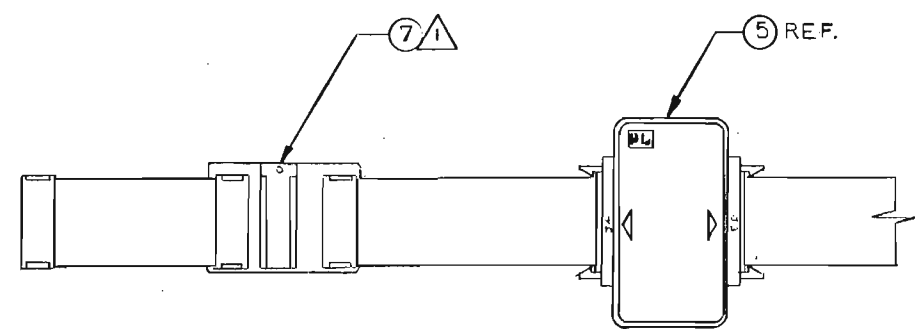
ITEM NO.	QTY.	PRO-LOG NUMBER	REFERENCE IDENTIFIER	DESCRIPTION	SPECIFICATION NUMBER
1	REF	105262		ASSEMBLY, SYSTEM MODEL M825	
2	REF	105312		SCHEMATIC, M824/M825 SYSTEM ANALYZER POWER AND INTERCONNECT	
3	1	105258		M825 SYSTEM ANALYZER	
4	1	104901		RIBBON CABLE 40 CONDUCTOR	
5	1	105239		M825 BUFFER MODULE-SYSTEM ANALYZER	
6	1	105074		M825 DIP CLIP RIBBON CABLE	
7	1	105292		ASSEMBLY, M825 SYSTEM ANALYZER LOWER PROFILE CONNECTOR BOARD	
8					
9	1	900001		CARRING CASE	105373
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					

TITLE: PARTS LIST, SYSTEM MODEL M825

REVISIONS				
REV	DOC REV	DESCRIPTION	DATE	APPR
	A	UPDATE PER PCR 0492		

NOTES: UNLESS OTHERWISE SPECIFIED.

⚠ ITEM 7 CONNECTOR BOARD ASSEMBLY SUPPLIED AS A SEPERATE ITEM. OPTIONAL INSTALLATION SHOWN.



ITEM NO.	QTY	PRO-LOG NUMBER	DESCRIPTION	SPEC.
9	1	900001	CARRING CASE	105373
8				
7	1	105232	M825 LOWER PROFILE CONNECTOR ED.	
6	1	10507	M825 DIP CLIP RIBBON CABLE	
5	1	105239	M825 BUFFER MODULE-SYS. ANALYZER	
4	1	104901	ASSEMBLY, RIBBON CABLE 40 CONDUCTOR	
3	1	105255	M825 SYSTEM ANALYZER	

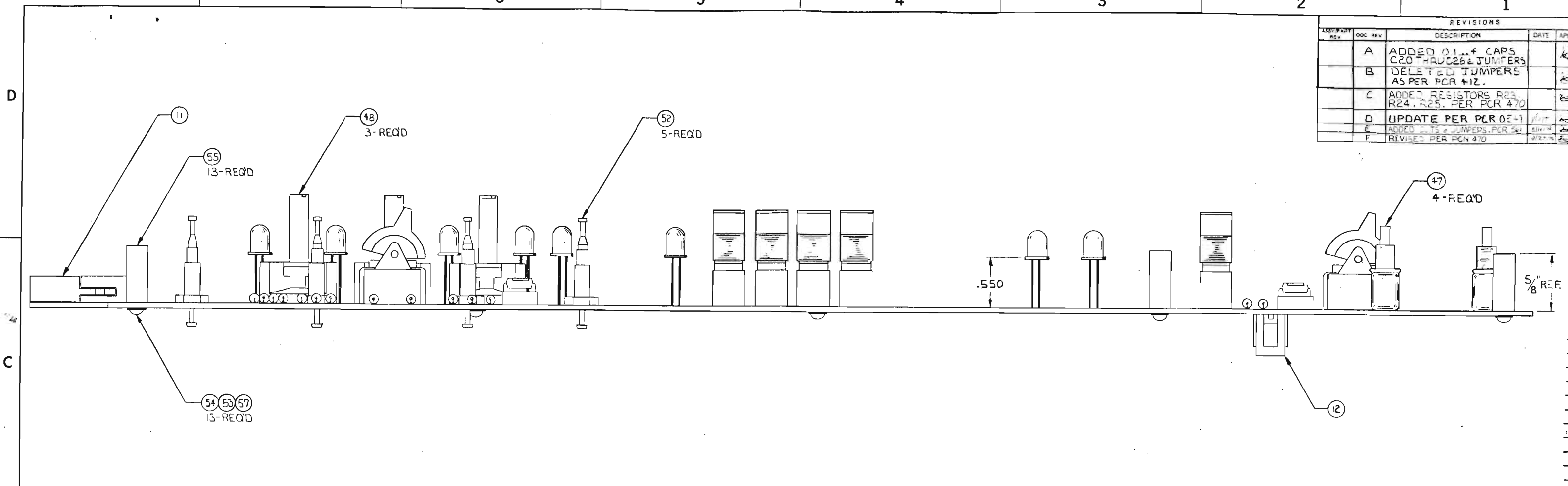
PARTS LIST NO 105263
SCHEMATIC POWER AND
INTERCONNECT #105312

PRO-LOG CORPORATION
ASSEMBLY SYSTEM
MODEL M825

C.A. CLARK 5-479

D 105262 REV A SWT 1 OF 1

REVISIONS				
REV	DOC REV	DESCRIPTION	DATE	APPR
A		ADDED 0.1µF CAPS C20 THRU C26 & JUMPERS		ko
B		DELETED JUMPERS AS PER PCR 412.		ko
C		ADDED RESISTORS R23, R24, R25. PER PCR 470		ko
D		UPDATE PER PCR 02-1		ko
E		ADDED 2.2K JUMPERS. PER PCR 561		ko
F		REVISED PER PCR 470		ko

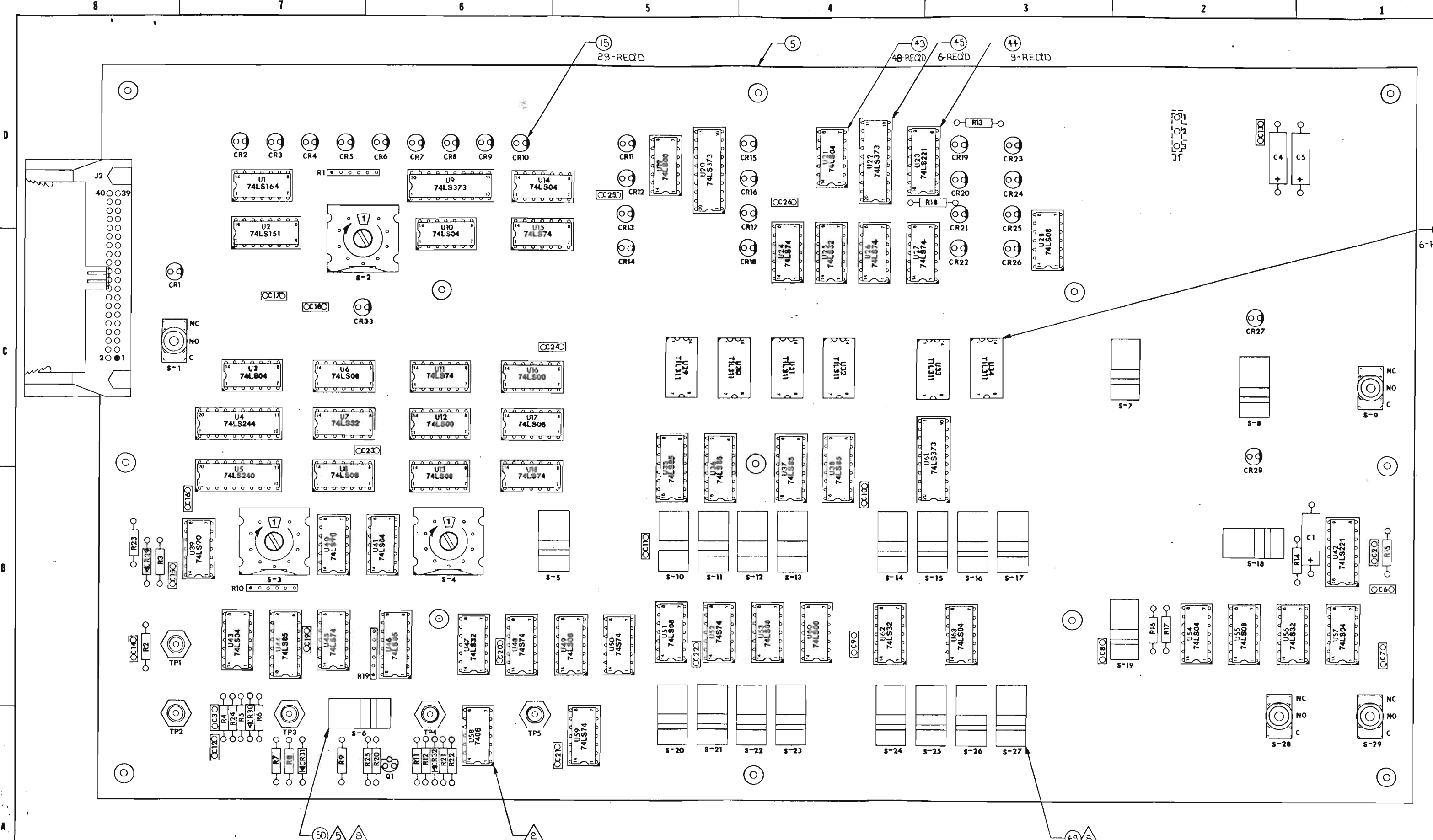


46	21.5Ω 1% 1/4W	RESISTOR, MF, R25
56	2N4125	TRANSISTOR, Q1
55	4-40 X 5/8"	SPACER NYLON THREADED
54	4-40 X 1/4"	SCREW, PN. HD. CAD
53		
52	TEST POINT	TIP JACK, TR1, THR, TR5
51		
50	ON-OFF-ON	TOGGLE SWITCH S-6
49	ON-NONE-ON	TOGGLE SWITCH S-5 S-7, S-8, S10, THRU, S-27
48	BCD CODE	POTARY SWITCH, S25, S35+
47	MOMENTARY	P.B. SWITCH S-15, S23, S28
42	178Ω 1% 1/4W	RESISTOR, MF, R23, R24
41	10K 5% 1/4W	R-NETWORK, R1, R10, R19
40	4.7K	RESISTOR, CC, R4
39	2.2K	CC, R2, R3, R7 R11, R13, R15, R18
38	10K	CC, R9, R16, R17, R20
37	220Ω	CC, R3, R6
36	470Ω 5% 1/4W	RESISTOR, CC, R4, R8, R12
35	1.0K 5% 1/4W	RESISTOR, CC, R21, R22
15	RLC-201	DIODE, CR1, THRU, CR22 & CR33
14	IN4002 100V	DIODE, CR29, CR30, CR31, CR32
10		
9	100PF 50V	CAP, CER, C2, C3
8	0.1µF 50V	CAP, CER, C6, THRU, C26
7	1.0µF 25V	CAP, ALUM, C1, C4, C5

- 8. AT TIME OF ASSEMBLY TOGGLE SWITCHES TO BE MOUNTED PERPENDICULAR (90°) TO PCB ± 0.5° DEGREES.
- 7. INSTALL ITEM #12 ON CIRCUIT SIDE OF BOARD.
- 6. ALL SWITCHES AND ITEM #12 SHOULD BE INSTALLED AFTER FLOW SOLDER AND HAND CLEANED. SWITCHES MUST NOT BE EMERGED IN DEGREASER FLUID.
- 5. ITEM 50 SWITCH S-6, IS COLORED BLACK, ALL OTHERS WHITE.
- 4. SOME ITEMS OMITTED ON SIDE VIEW FOR CLARITY.
- 3. SOME HIDDEN LINES OMITTED FOR CLARITY.
- 2. INDICATES PIN NO. 1 OF SOCKETS (TYP).
- 1. FOR ASSY. PROCEDURES SEE AS 1004.

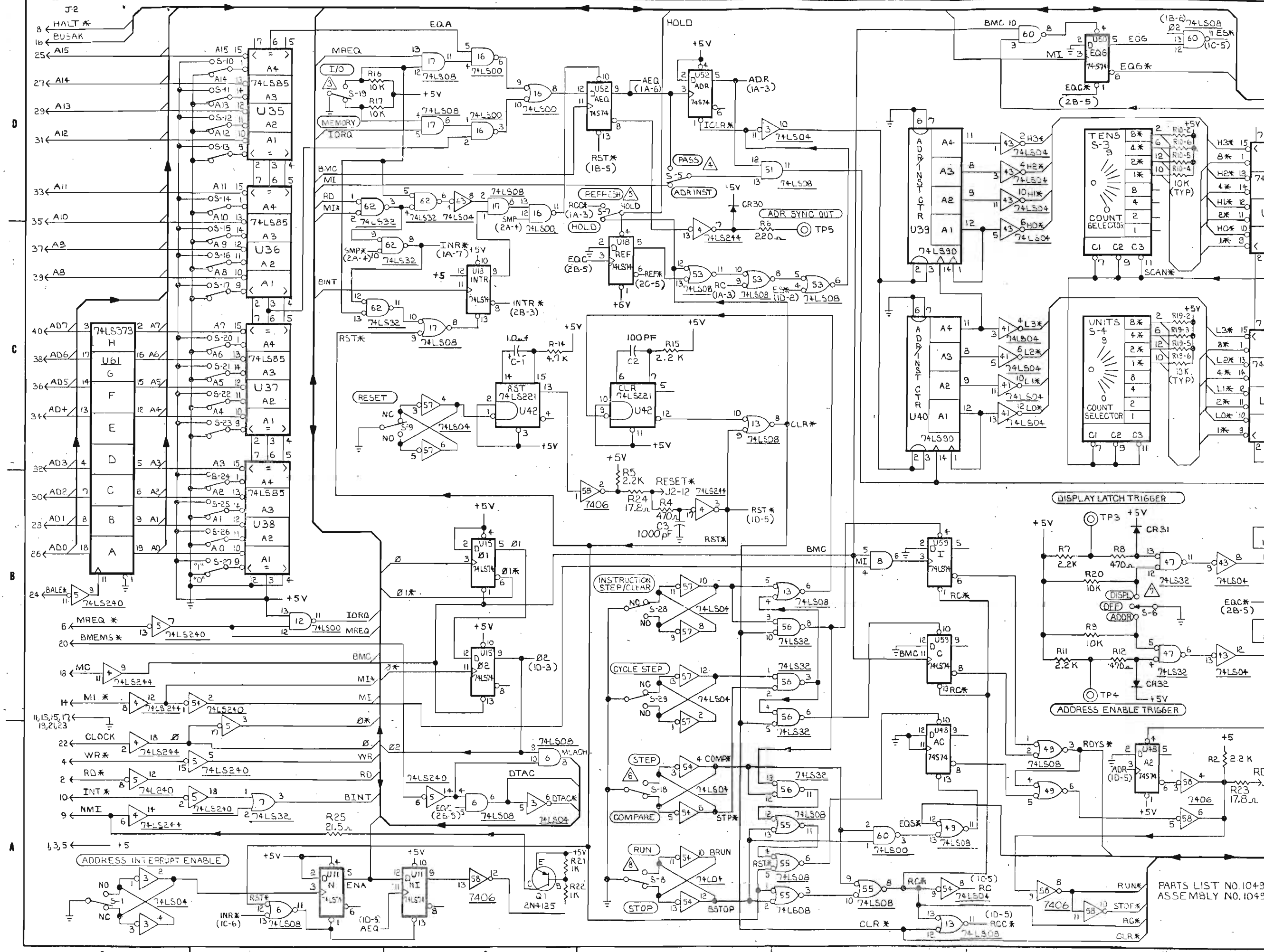
NOTES: UNLESS OTHERWISE SPECIFIED

PRO-LOG CORPORATION			
ITEM	DESCRIPTION	REF. DESIGNATION	
ASSEMBLY, N1B25 SYSTEM ANALYZER BOARD			
104997	104999	G.A. CLARK	3-6-73
SCHEMATIC PARTS LIST			
APPLICATION			



PRO-LOG CORPORATION
 ASSEMBLY, M825
 SYSTEM ANALYZER
 BOARD.
 C.A. CLARK 3-16-79
 H/2/79
 D 104998 F 1/2

REV	DOC REV	DESCRIPTION	DATE	APP
A		ADDED CAPS C20-26 PER PCS 412		
B		ADDED RESISTORS R23-25 PER U70		
C		ADDED U28 P 45 11 12 13 PER 561		



- AD7
- AD6
- AD5
- AD4
- AD3
- AD2
- AD1
- AD0
- A15
- A14
- A13
- A12
- A11
- A10
- A9
- A8
- A7
- A6
- A5
- A4
- A3
- A2
- A1
- A0
- HALT*
- BUSAK
- B1*
- MLACH
- DTAC*
- DTAC
- ENA
- IORQ
- MREQ
- RD
- VR
- EQI
- BMC
- MI*
- MI*
- Ø2
- HOLD
- N/C
- DL*
- RDYS*
- CLR*
- STOP*
- RUN*
- RC*
- N/C
- EQS*
- EQS*
- SCAN*

TO SHEET 20F2

PRO-LOG CORPORATION

PARTS LIST NO. 104999
ASSEMBLY NO. 104998

SCHEMATIC, M825
SYSTEM ANALYZER
BOARD.

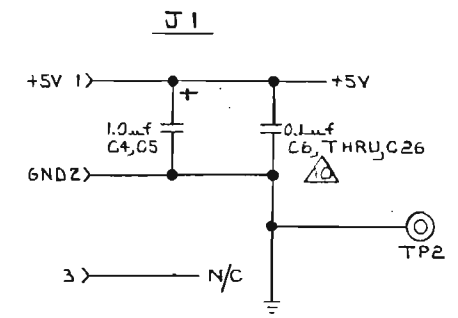
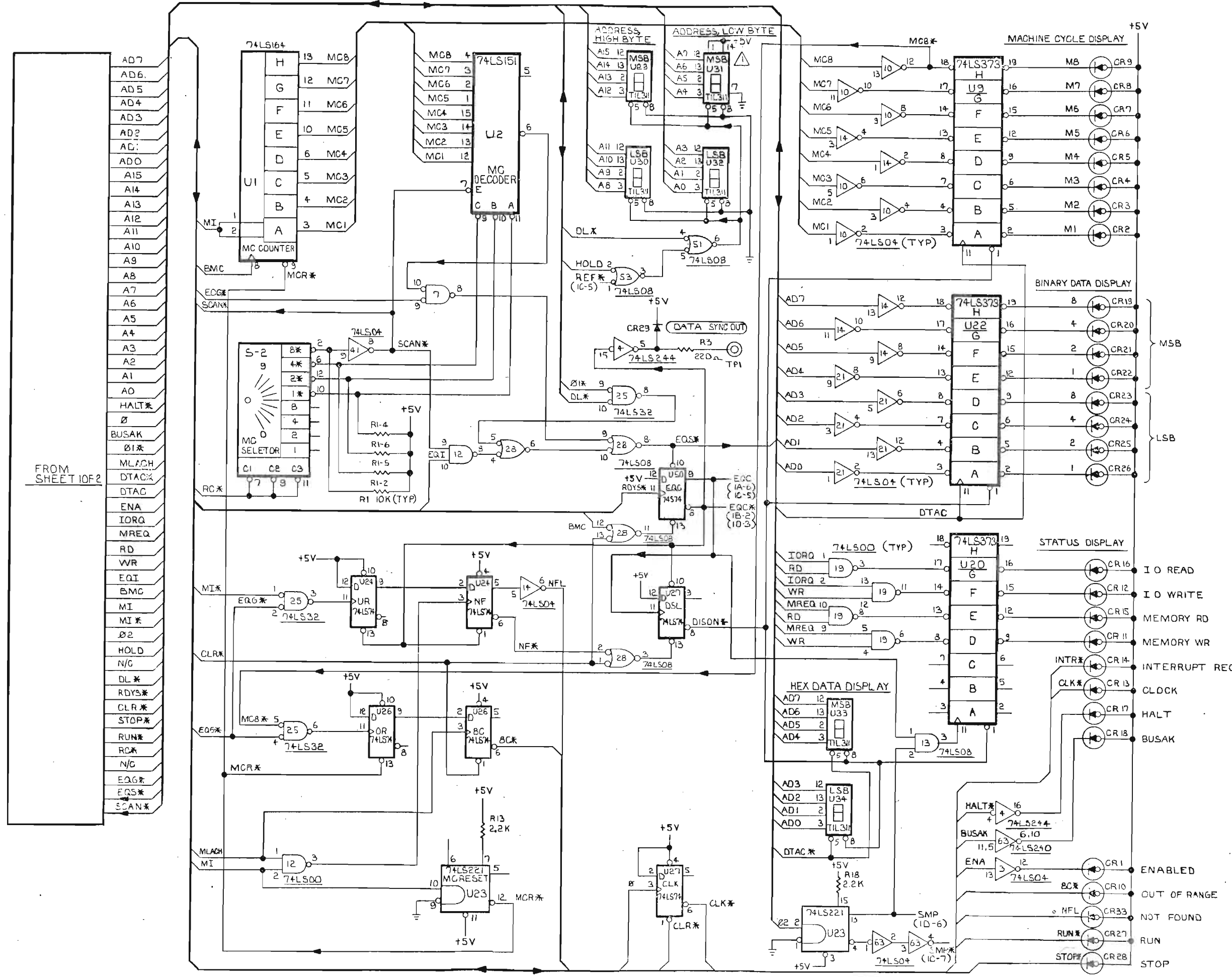
C.A. CLARK 2/26/77
1/12/79

D 104997 c

REVISIONS			
ASSEMBLY REV	DOC REV	DESCRIPTION	DATE

USE SHEET 10F1 FOR REVISIONS & DESCRIPTION.

- NOTES: UNLESS OTHERWISE SPECIFIED.
- 1. POWER #6 GROUND TYPICAL 6-PLACES FOR TIL 311 DISPLAYS.
 - 2. THE NOTATION (NX-Y) UNDER A SIGNAL NAME IS THE COORDINATE LOCATION OF THE ASSOCIATED SOURCE OR DESTINATION. E.G. (2B-1) INDICATES THE COORDINATE: PAGE 2, ON THE B-1 GRIDS.
 - 3. SWITCH SHOWN IN MEMORY POSITION. E.G. BAT HANDLE UP (TOP OF PCB).
 - 4. SWITCH SHOWN IN ADDRESS/INSTRUCTION POSITION. E.G. BAT HANDLE UP (TOP OF PCB).
 - 5. SWITCH SHOWN IN HOLD. E.G. BAT HANDLE UP (TOP OF PCB).
 - 6. SWITCH SHOWN IN COMPARE MODE (BAT TO THE LEFT).
 - 7. SWITCH IN THE LEFT POSITION SHOULD GROUND DSPL.
 - 8. SWITCH SHOWN IN STOP POSITION (BAT DOWN).
 - 9. ALL DIODES IN 4002.
 - 10. 0.1µf BYPASS CAPACITOR DISTRIBUTED THROUGHOUT BOARD.



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SCHEMATIC, M825 SYSTEM ANALYZER BOARD.

C.A. CLARK 2/20/79

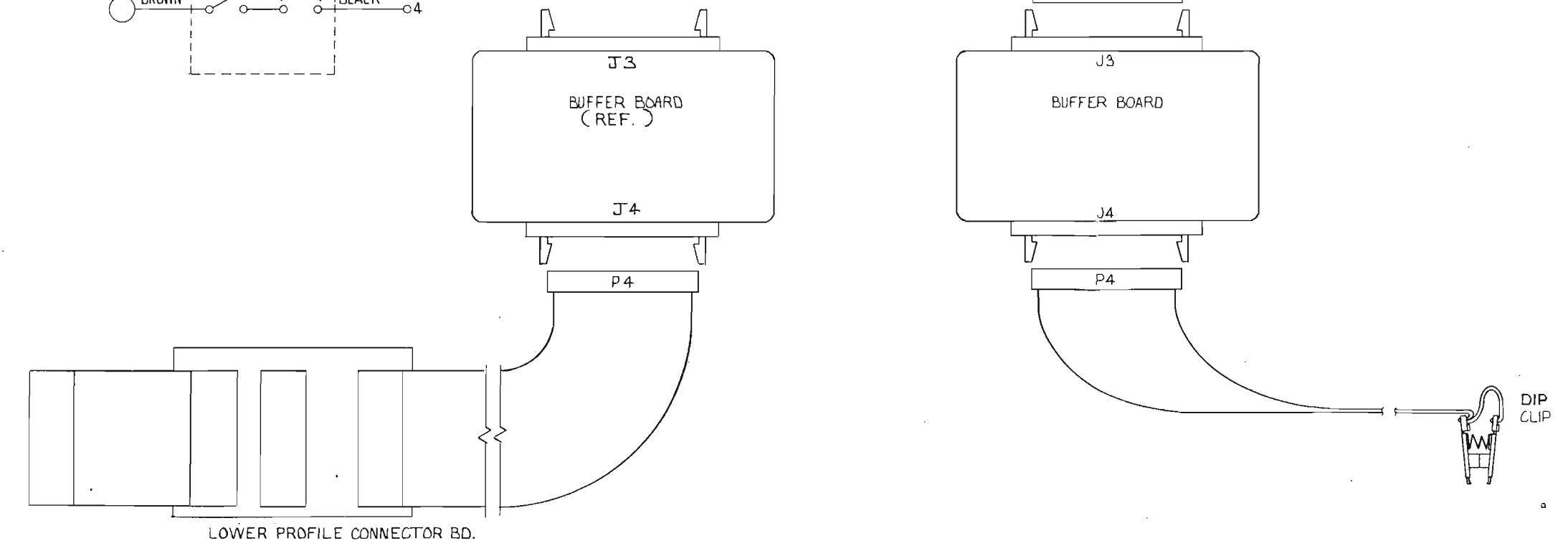
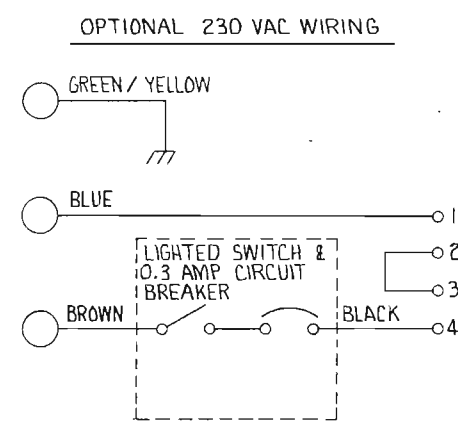
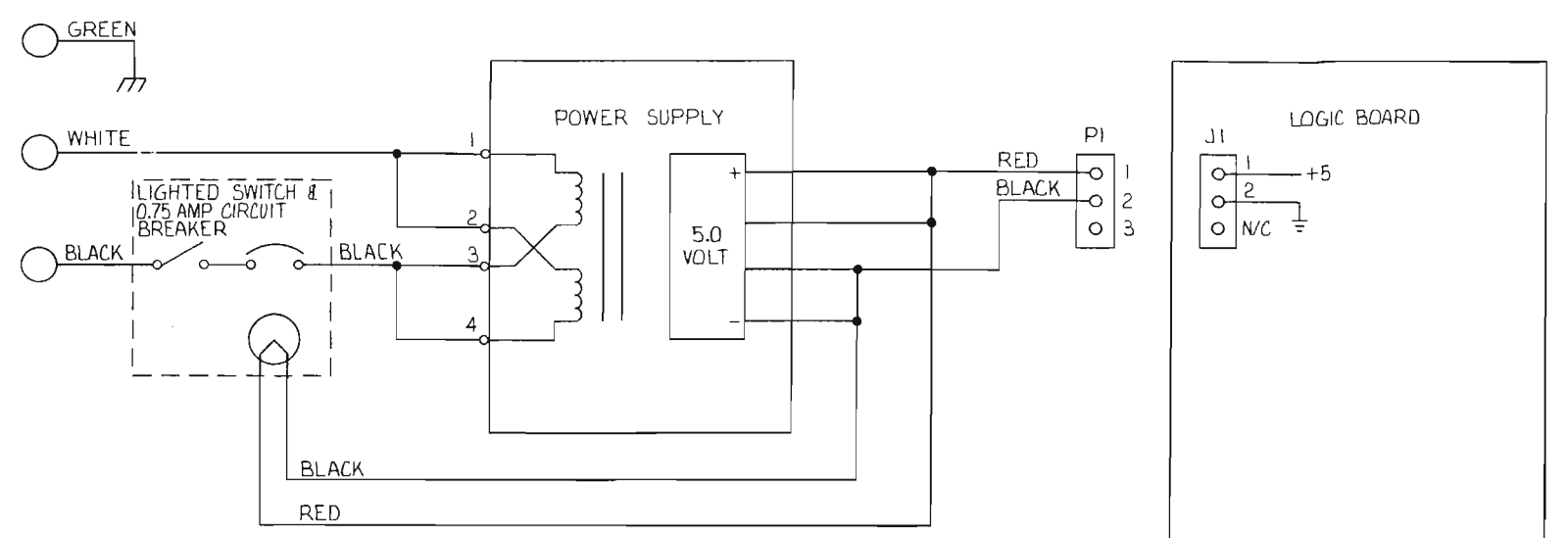
D 104997

D
C
B
A

FROM SHEET 10F2

REVISIONS				
ASSEMBLY REV	DOC REV	DESCRIPTION	DATE	APP
	A	UPDATE PER PCR 0480 AND PCR 0492.		K
	B	REVISED PER PCN 0622	11/14/77	K

D
C
B
A



M824 { PARTS LIST NO. 105261
ASSEMBLY NO. 105260

M825 { PARTS LIST NO. 105263
ASSEMBLY NO. 105262

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SCHEMATIC: M824, M825, E-SYSTEM ANALYZER POWER AND INTERCONNECT

GENE PAPPE 5-24-79

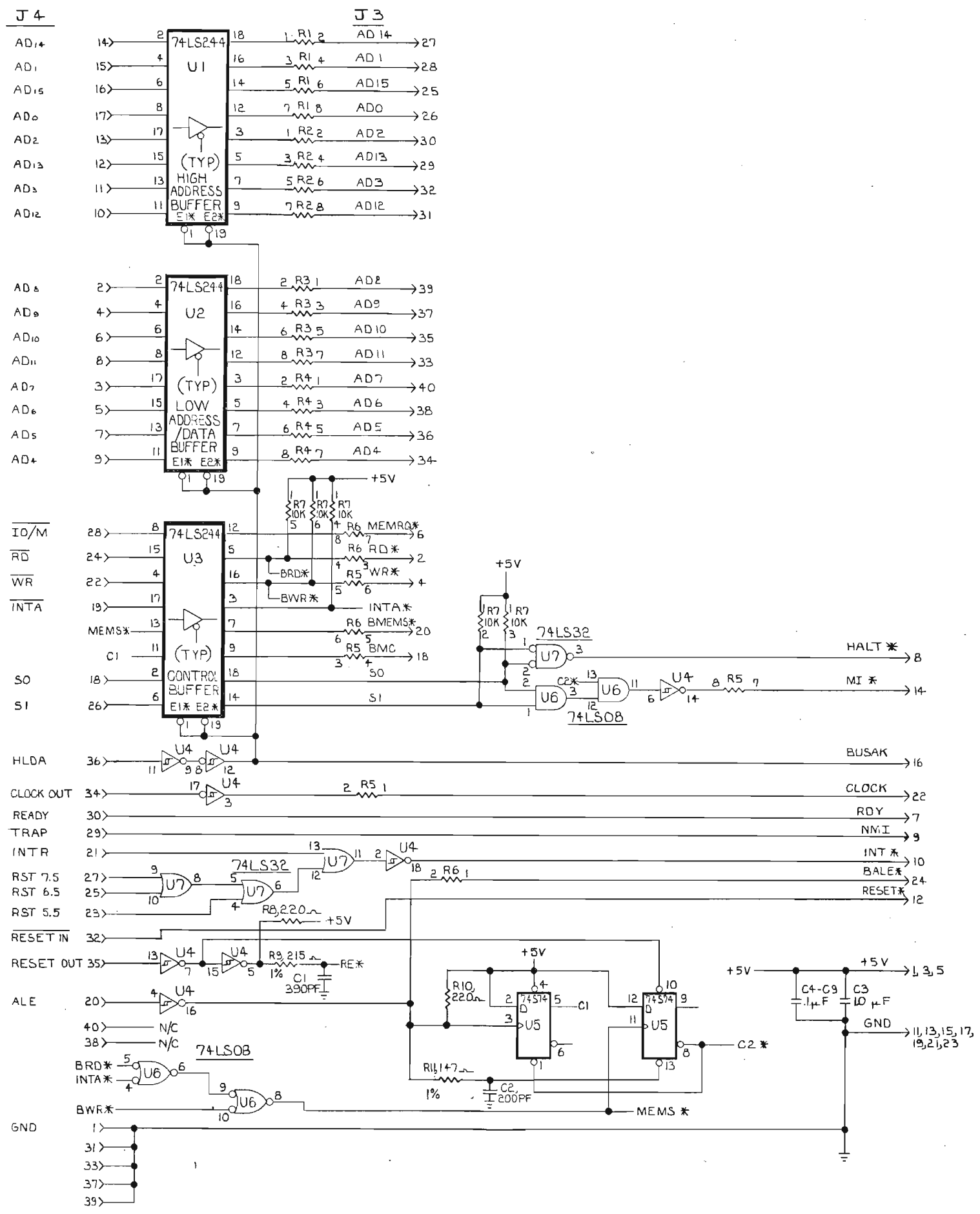
11/14/77

D 105312 REV B SMT OF

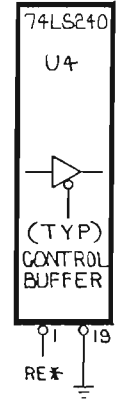
REVISIONS			
ASSEMBLY PART REV	DOC REV	DESCRIPTION	DATE
	A	CHANGED J5 FROM 74LS74 TO 74S74 AS PER PCR449	
	B	UPDATE PER PCR 0543	

PIN ASSIGNMENT BY FUNCTIONAL GROUPING

SIGNAL	J4 CLIP	J3 ANALYZER
ADD	17	26
AD1	15	28
AD2	13	30
AD3	11	32
AD4	9	34
AD5	7	36
AD6	5	38
AD7	3	40
AD8	2	39
AD9	4	37
AD10	6	35
AD11	8	33
AD12	10	31
AD13	12	29
AD14	14	27
AD15	16	25
MREQ*	28	6
RD*	24	2
WR*	22	4
BMEMS*	-	20
BMC	-	18
HALT*	-	8
MI*	-	14
BUSAK	36	16
CLOCK	34	22
RDY	30	7
INT*	-	10
INTR	21	-
RST 7.5	27	-
RST 6.5	25	-
RST 5.5	23	-
BALE	20	24
RESET*	32	12
INTA*	19	-
SD	18	-
SI	26	-
NMI	29	9
RESET OUT	35	-



5. U4 TYPICAL 7 PLACES, ONE SPARE RE* CONTROLS INPUTS 2,4,6,8.



△ EACH IC, U1 THRU U5 HAS A 0.1µF CAP BETWEEN POWER AND GROUND.
 3. U4 THRU U7, GND IS PIN 10, AND +5V IS PIN 14.
 2. U1 THRU U5, GND IS PIN 10, AND +5V IS PIN 20.
 1. ALL RESISTORS ARE 100Ω, 1/8W, 5% S.I.P.
 NOTES: UNLESS OTHERWISE SPECIFIED.

ASSEMBLY NO. 105013
 PARTS LIST NO. 105015

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 C.A. CLARK 12-22-73
 Schematic, M 825
 BUFFER - 8085