

WANG

1501

CUSTOMER ENGINEERING SERVICE HANDBOOK

2200 SYSTEMS WORKSTATIONS

MODELS: 2236D/DW
2336DE/DW
2876DE/DW
2886DE/DW

Company Confidential

741-1541-A

CUSTOMER ENGINEERING SERVICE HANDBOOK

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Preface

This Service Handbook provides concise information for Customer Engineers servicing 2200 Systems Workstations at customer sites.

Second Edition (September 1986)

This edition of 741-1641 technically updates the previous edition of the 2200 Systems Workstations Service Handbook, part no. 741-1641.

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2200 SYSTEMS WORKSTATIONS

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Sheet No. 3 reversed

2200 SYSTEMS WORKSTATIONS

MODEL DIFFERENCES

2236D/DE/DW & 2336DE

Model	2200 System Application ⁽¹⁾	Features
2236D PART #5	MVP, LVP, SVP, VP	Interactive, two-board workstation with fan; no display highlighting or built-in power-up diagnostics. ALL ENCLOSED IN ONE UNIT.
2236DE	MVP, LVP, SVP, VP	Interactive workstation (no fan included); power-up diagnostics; does box graphics and controls all printers except 2232B flatbed plotters; replaces 2236D for VP and MVP systems. ALL ENCLOSED IN ONE UNIT.
2236DW	MVP, LVP, SVP, VP	Integrated workstation (no fan included); power-up diagnostics; has added software for data processing/word processing; has all 2236DE features plus extra keys. ALL ENCLOSED IN ONE UNIT.
2336DE	MVP, LVP, SVP, VP	Interactive workstation (no fan included); power-up diagnostics; does box graphics and controls all printers except 2232B flatbed plotters; replaces 2236D and 2236DE for VP and MVP systems. ERGO DESIGNS W/ SEPARATE KYBD.

MVP/LVP/MICROUP
⁽¹⁾ All system applications except SVP use 2236MXD/2236MXE Four-Port Terminal Controller, OR THE 212-3012 TRIPLE CONTROLLER FOR TERMINAL SUPPORT.
 The SVP system uses 210-7789-A Terminal/Printer (ITEM) Controller or option W board, part no. 210-7846-A (ITEM).
 THE VP SUPPORTS ONLY 1 TERMINAL. IF MORE THAN 1 TERMINAL IS USED THE 212-3012 TRIPLE CONTROLLER WOULD BE REQUIRED.
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2200 SYSTEMS WORKSTATIONS

MODEL DIFFERENCES

2336DW, 2876DE/DW & 2886DE/DW

Model	2200 System Application ⁽¹⁾	Features
2336DW PART # 5	MVP, LVP, SVP, VP	Has all 2236DW features; is low-cost version that replaces 2236DW. ERGO DESIGN w/ DETACHED KYBRD.
2876DE/DW	MVP, LVP, SVP, VP	European version with choice of four expanded keyboards; is reconfigured 2236DE/DW. (SAME DESIG AS 2236) ERGO DESIGN w/ DETACHED KYBRD.
2886DE	MVP, LVP, SVP, VP	Reconfigured 2236DE; has tilt screen, standard keyboard, and screen dump. (SAME DESIG AS 2236) ERGO DESIGN w/ DETACHED KYBRD.
2886DW	MVP, LVP, SVP, VP	Reconfigured 2236DW with standard keyboard; has tilt screen and supports 2200/WP software for word processing. (SAME DESIG AS 2236DW) ERGO DESIGN w/ DETACHED KYBRD.

MVP/DWP/MICROVP
⁽¹⁾ All system applications except SVP use.
 2236MXD/2236MXE Four-Port Terminal Controller, or the 212-7012 TRIPLE CONTROLLER FOR TERM SUPPORT
 The SVP system uses 210-7789-A Terminal/Printer (1-Term)
 Controller or option W board, part no. 210-7846-A. (3-Term)
 The VP supports only 1 terminal. If using a 2236/2336/2886 TYPE TERMINAL A 212-7012 TRIPLE CONTROLLER (TERM/PRINTER/DISK) WOULD BE REQUIRED.

2200 SYSTEMS WORKSTATIONS

PCB COMPLEMENTS

2876DE/DW, 2886DE/DW

TERMINAL ELECTRONICS PCB
PCB 210-7592A (DE) ①
PCB 210-7592-1A (DW)

TILT SCREEN
W/WANG CRT CHASSIS

MONITOR
ELECTRONICS
PCB 210-7456

WHERE'S THE KEYBOARD

2876DW 725-2637

2886DE 725-2618

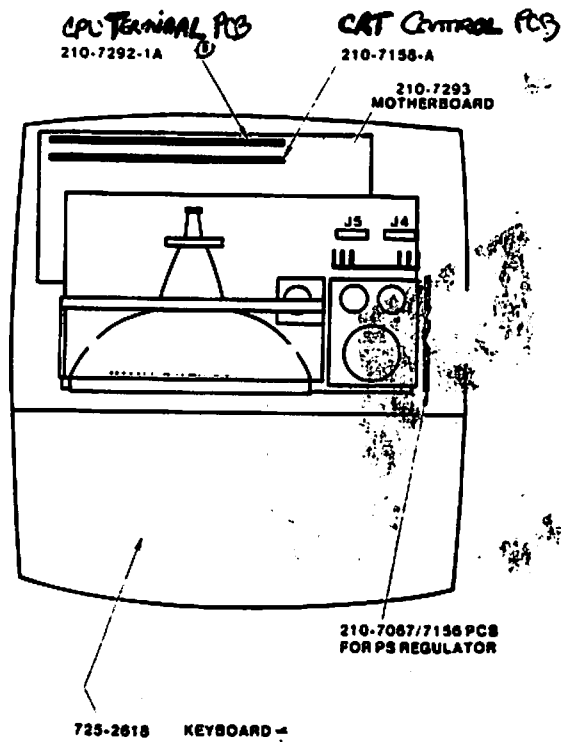
Notes:

① U.S. only; other suffixes for other countries.

2200 SYSTEMS WORKSTATIONS

PCB COMPLEMENTS

22360

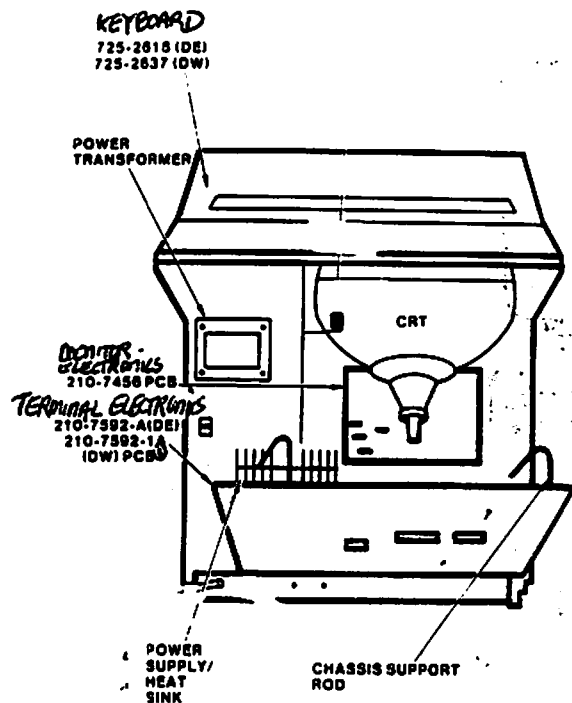


NOTES:
"US ONLY" OTHER OFFICES FOR OTHER COUNTRIES.

2200 SYSTEMS WORKSTATIONS

PCB COMPLEMENTS

2236DE/DW



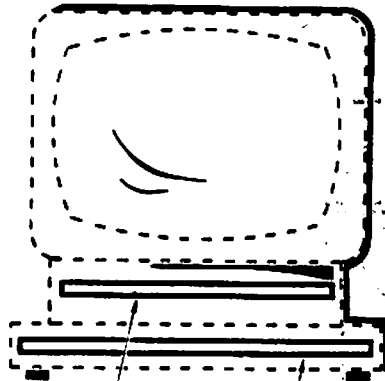
NOTES:

- ① U.S. ONLY; OTHER SUPPLIES FOR OTHER COUNTRIES.

2200 SYSTEMS WORKSTATIONS

PCB COMPLEMENTS

2336DE/DW



PCB 210-7456
(IN PEDESTAL)

PCB 210-7743
(IN BASE)

7743-A

NOTES: 7743-A

① 210-7743 CANNOT BE ORDERED. ORDER
270-0753 (2336DW) OR 270-0817 (2336DE).

REAR PANEL
ASSEMBLY

REAR PANEL
ASSEMBLY

WHEELS - THE KEYBOARD

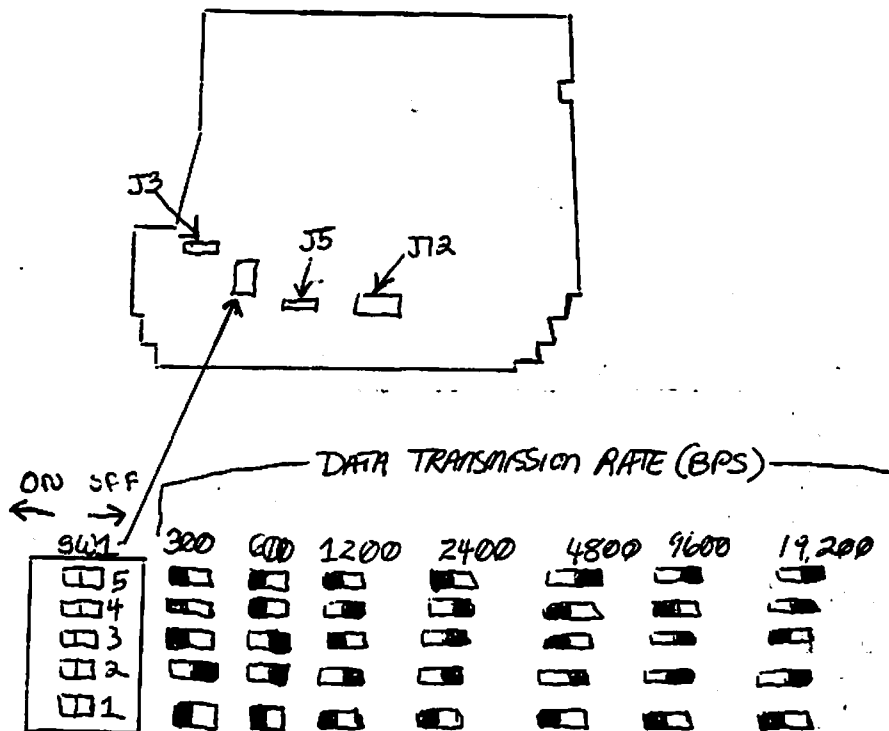
725-2637 DW KEYBOARD
725-2618 DE KEYBOARD

2200 SYSTEMS WORKSTATIONS

SWITCH SETTINGS/JUMPERS

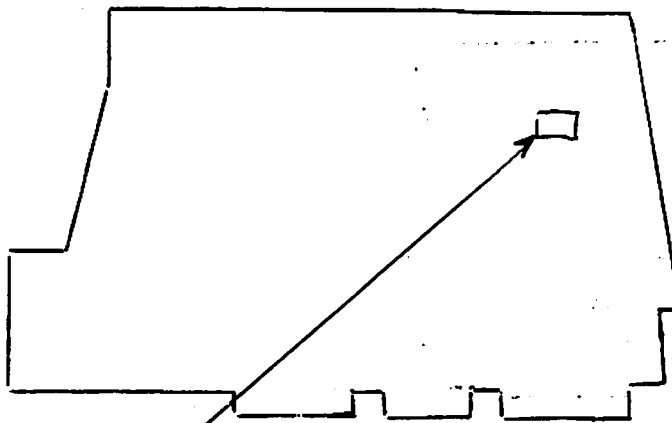
2236DE/DW, 2886DE/DW

TERMINAL ELECTRONICS PCB
WLI NO. 210-7592-A/-1A



SWITCH SETTINGS/JUMPERS

CPU TERMINAL PCB
WLI NO. 210-7292-1A



DATA

TRANSMISSION
RATE(BPS)

801-

	ON ↑	OFF ↓
3000	[][][][]	
6000	[][][][] X	ON ON OFF OFF OFF
12000	[][][][] X	ON ON OFF OFF ONE
24000	[][][][] X	ON ON OFF ON OFF
48000	[][][][] X	N/A
96000	[][][][]	OR ON ON ON OFF OFF
192000	[][][][]	

E-REV 3 OR LOWER

ON	ON	OFF	OFF	OFF
ON	ON	OFF	OFF	ON
ON	ON	OFF	ON	OFF
ON	ON	ON	ON	ON
ON	ON	ON	OFF	OFF
ON	ON	ON	OFF	ON

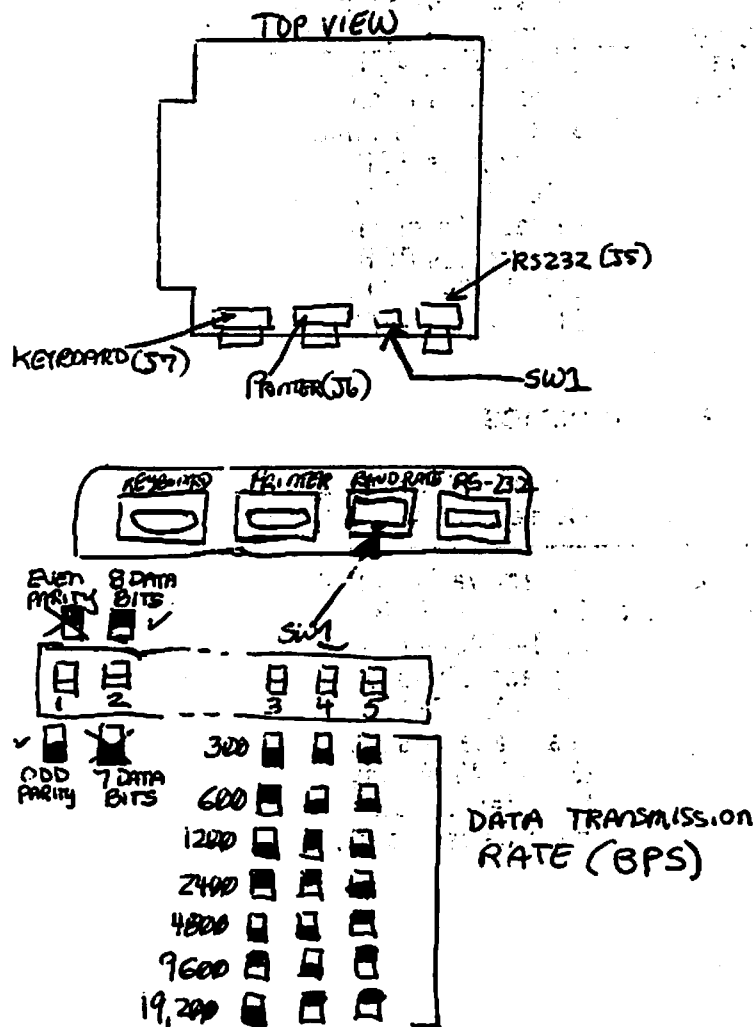
N/A

2200 SYSTEMS WORKSTATIONS

SWITCH SETTINGS/JUMPERS

2336DE/DW

REAR PANEL ASSEMBLY
WLI NO. 270-0753 (DW)/270-0817 (DE)⁽¹⁾



⁽¹⁾Rear panel assembly includes Terminal Controller PCB (210-7743-A); 210-7743-A PCB may not be ordered separately; order the assembly.

ERROR CODES

2236DE/DW, 2336DE/DW

2236DE/DW; POWER-UP DIAGNOSTICS

SYMP-TOM Code	Description	Possible Problem(s)/ Corrective Action(s)
Audio alarm activated, failure pound sign (#) appears on ter- minal screen.	Failure of a power-up test. <i>TO COME UP BY POWER UP MESSAGE MODE - # BAUD RATE</i>	Check for proper baud rate switch settings on terminal Electronics PCB (210-7592-A/-1A) -- replace Terminal Electronics PCB -- 210-7592-A (DE)/ 210-7592-1A (DW).

BLANK SCREEN - CHECK VOLTAGES, CHECK SCREEN
RASTER PRESENT, REAR CRT, BRO, CRT, REAR 1592

MATCH BAUD RATE ON TERMINAL CONTROLLER.

2336DE/DW; POWER-UP DIAGNOSTICS

Code	Description	Possible Problem(s)/ Corrective Action(s)
Audio alarm activated, error message appears on terminal screen SCREEN BLANK, * SIGN: ON SCREEN	Failure of a power-up test.	Defective Terminal Controller PCB (210-7743-A) -- replace 270-0753 (DW)/270-0817 (DE) rear panel assembly. (210-7743-A may not be ordered; assembly must be replaced.)

SAME AS ABOVE
EXCEPT FOR BRO #

ERROR CODES

2236DE/DW

2200 KEYBOARD SELF-TEST

During execution of keyboard self-test, the character on keycap of alphabetical or numerical key should appear on CRT screen. For non-alphabetical/numerical keys, refer to following table for character that should show on screen when key is pressed.

2236DE/DW DISPLAY CHARACTERS FOR NON-ALPHABETICAL/NON-NUMERICAL KEYS

Key	Display Character
2236DE	
SF '0	e
SF '1	e (return)
SF '2	e
SF '3	e (erase)
SF '4	e
SF '5	e
SF '6	e
SF '7	e (beep)
SF '8	e (no space)
SF '9	e (double space)
SF '10	e (down diagonal right)
SF '11	e
SF '12	e (up diagonal right)
SF '13	e (return)
SF '14	(highlight) e
SF '15	(highlight removed) e
SF '16	ea
SF '17	ea
SF '18	ea
SF '19	ea
SF '20	ea
RESET	ix
SF '21	ea
SF '22	ea
SF '23	ea
SF '24	ea
SF '25	ea
SF '26	ea

LOOPBACK CONN

2-3

4-5

6-20

2336DW MM
PG. 7-5
ON A 2336 THERE IS A SELF-TEST WHICH
KEYBOARD. BY SETTING ALL BAUD RATE SW UP (ON)
& INSTALLING LOOPBACK CONN TERM WILL RUN
BURN-IN. KEY LOWER CASE & FOR HYBRD
TEST. PRESSING A KEY WILL THEN CAUSE
A KEY CODE TO BE DISPLAYED.

IF THESE DIAGS
EXIST ON A 2236
THEY MUST BE ON-LINE.
THERE IS NO KEYBOARD
SELF-TEST THAT I AM
AWARE OF & NOTHING IS
DOCUMENTED
IN THE MAINTENANCE
MANUAL.

2200 SYSTEMS WORKSTATIONS

ERROR CODES

2236D E/DW

2200 KEYBOARD SELF-TEST (CONT)

2236DE/DW DISPLAY CHARACTERS FOR NON-ALPHABETICAL/NON-NUMERICAL KEYS (CONT)

Key	Display Character
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
A	A
B	B
C	C
D	D
E	E
F	F
G	G
H	H
I	I
J	J
K	K
L	L
M	M
N	N
O	O
P	P
Q	Q
R	R
S	S
T	T
U	U
V	V
W	W
X	X
Y	Y
Z	Z
[	[
\	\
]	]
^	^
_	_
`	`
{	{
}	}
~	~
DEL	DEL
ESC	ESC
SPC	
CR	
LF	
VT	
FF	
BS	
HT	
STX	
ETX	
END	

2236DE (Cont)

SF '27
SF '28
SF '29
SF '30
SF '31
ERASE
CONTINUE
CLEAR
EDIT
LOAD
FN
RUN
UNDERSCORE

$$\begin{array}{c} \hat{e} \\ e \\ \bar{e} \\ A \\ O \\ U \\ e \\ e \\ e \\ = \\ e! \\ e^c \\ e^c \end{array}$$

2236DW

INSERT
 PREV SCRN
 HALT
 ERASE
 D TAB
 CANCEL
 EAST ARROW
 SOUTH ARROW
 DELETE
 NEXT SCRN
 CONTINUE
 RECALL
 RESET
 WEST ARROW.
 NORTH ARROW

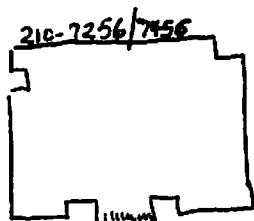
$$\begin{array}{c} \frac{e}{e} \frac{J}{B} \\ \frac{e}{e} \frac{H}{P} \leftarrow \\ \frac{e}{e} \frac{L}{E} \\ \frac{e}{e} \frac{C}{C} \\ \frac{e}{e} \frac{O}{O} \rightarrow \\ \frac{e}{e} \frac{M}{F} \end{array}$$

2200 SYSTEMS WORKSTATIONS

ADJUSTMENTS/TEST POINTS

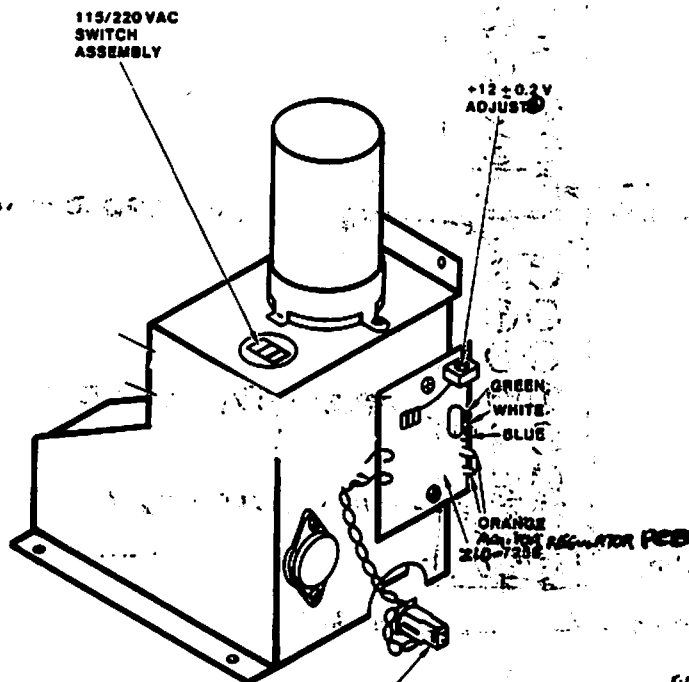
2236D

CRT +12-VOLT CHECK



Pins 8,9 (Wiring Side) = +12V, $\pm 0.2V$

CRT +12-VOLT ADJUSTMENT



741-1641-A

13

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NOTES:

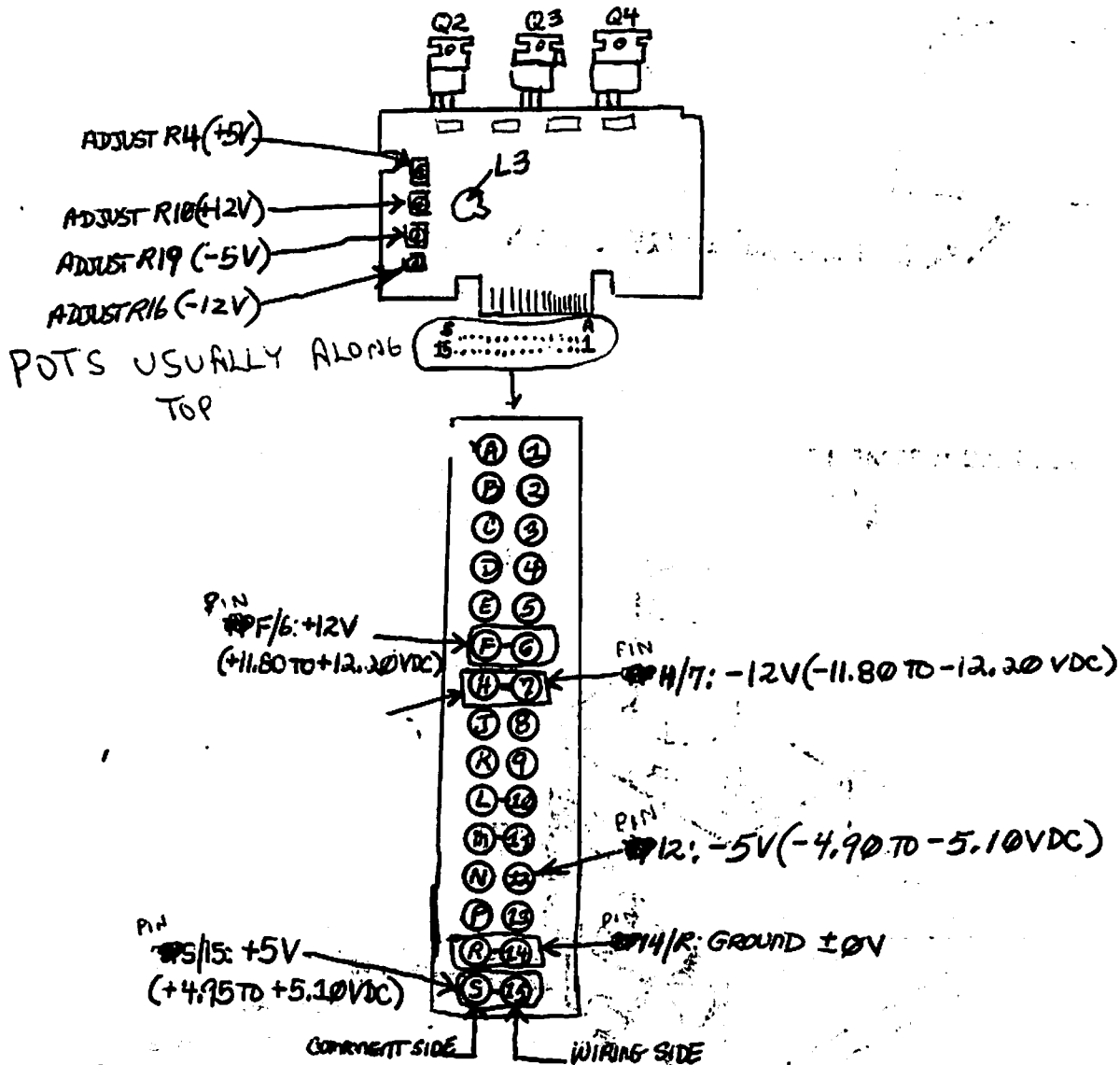
① +12-VOLT TEST POINTS
LOCATED AT PINS 8,9
(Wiring Side) OF
210-7256/7456.

2200 SYSTEMS WORKSTATIONS

ADJUSTMENTS/TEST POINTS

2236D

POWER SUPPLY REGULATOR PCB (210-7067) VOLTAGE CHECKS/ADJUSTMENTS



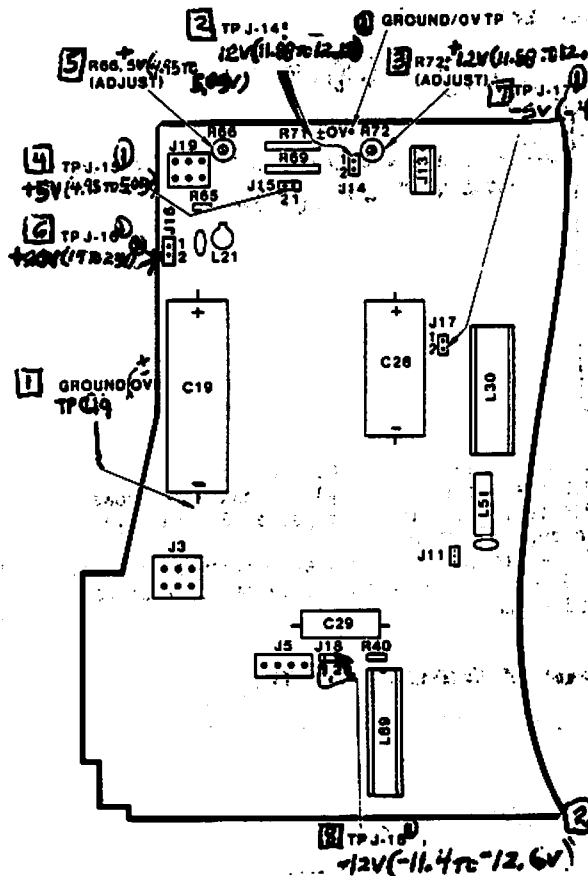
ADJUSTMENTS/TEST POINTS

2236DE/DW, 2876DE/DW, 2886DE/DW

TERMINAL ELECTRONICS PCB (210-7592-A/-1A)
VOLTAGE CHECKS/ADJUSTMENTS

WARNING

Use only one hand when working inside a powered-up electronic chassis. This precaution helps prevent receiving an electrical shock.



1. Connect common lead to 0V test point.
2. Check pin 1 of J14 for +12V $\pm 0.12V$.
3. Adjust R72 for +12V $\pm 0.12V$ at pin 1, J14.
4. Check pin 1 of J15 for +5V $\pm 0.05V$.
5. Adjust R66 for +5V $\pm 0.05V$ at pin 1, J15.
6. Check pin 2 of J16 for +20V $\pm 3.0V$.
7. Replace PCB if voltage at J16 outside limits.
8. Check pin 2 of J17 for -5V $\pm 0.25V$.
9. Replace PCB if voltage at J17 outside limits.
10. Check voltage across pins 1 and 2 of J18 for -12V $\pm 0.60V$.
11. Replace PCB if voltage at J18 outside limits.

NOTES:

① J14, J15, J16, J17, AND J18
JUMPERS MUST BE REMOVED
PRIOR TO PERFORMING
VOLTAGE CHECKS AND ADJUSTMENTS.

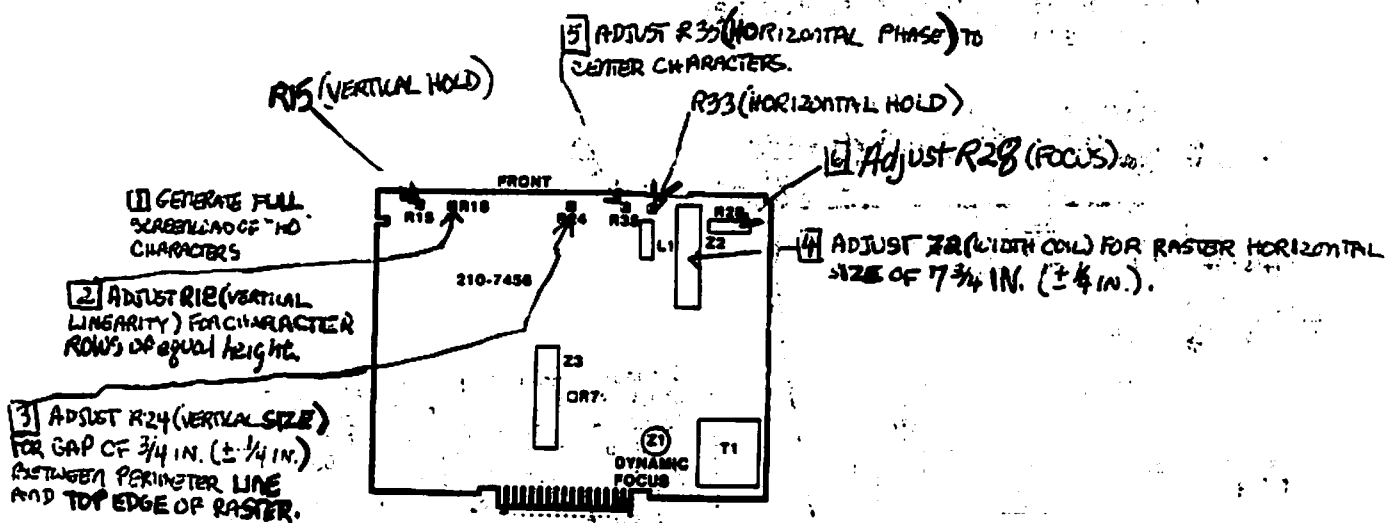
② VOLTAGE IS NOT ADJUSTABLE;
REPLACE PCB IF VOLTAGE IS NOT
WITHIN TOLERANCE. (Non-adjustable
voltages are: +20V, -5V, and -12V.)

ADJUSTMENTS/TEST POINTS

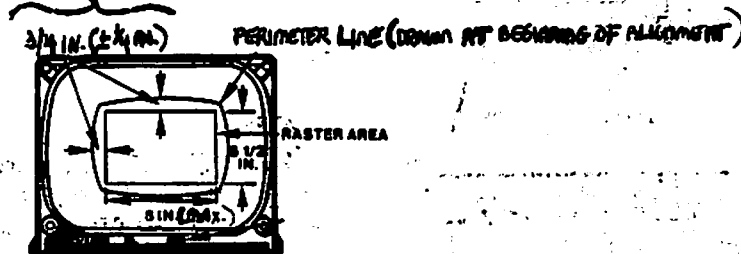
2236DE/DW, 2876DE/DW, 2886DE/DW

MONITOR ELECTRONICS PCB
WLI NO. 210-7456
VIDEO DISPLAY ADJUSTMENT

WARNING
Use non-metallic tool when performing checks/adjustments.



1. Generate full screenload of "HO" characters.
2. Adjust R18 (vertical linearity) for character rows of equal height.
3. Adjust R24 (vertical size) for gap of 3/4 in. ($\pm 1/4$ in.) between perimeter line and top edge of raster.
4. Adjust Z2 (width coil) for raster horizontal size of 7 3/4 in. ($\pm 1/4$ in.).
5. Adjust R33 (horizontal phase) to center characters.
6. Adjust R28 (focus).



2200 SYSTEMS WORKSTATIONS

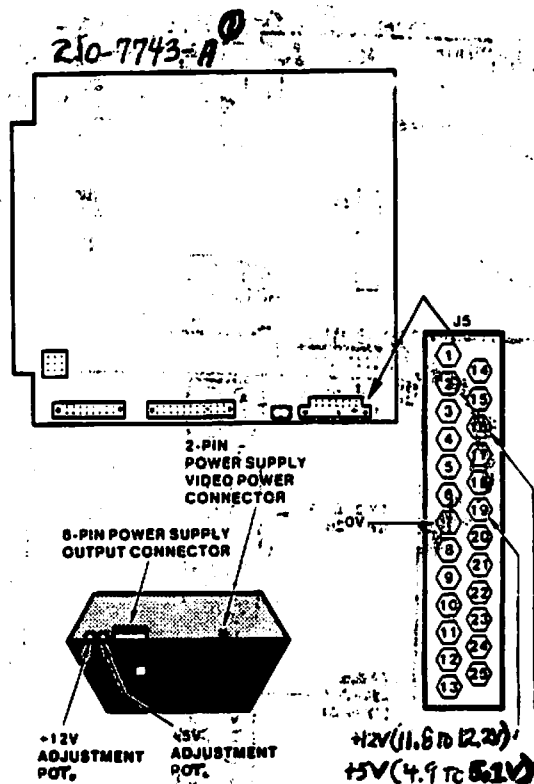
ADJUSTMENTS/TEST POINTS

2336DE/DW

TERMINAL CONTROLLER PCB (210-7743-A) AND SWITCHING POWER SUPPLY (270-0734) VOLTAGE CHECKS/ADJUSTMENTS

WARNING

Do not attempt to open the switching
power supply. The supply contains
dangerous voltage and current levels.



NOTES:

① TERMINAL CONTROLLER PCB (210-7743-A) IS PART OF
REAR PANEL ASSEMBLY AND MAY NOT BE ORDERED
SEPARATELY; ORDER 270-0753 (2336DW) OR 270-0817 (2336DE)
REAR PANEL ASSEMBLY.

ADJUSTMENTS/TEST POINTS

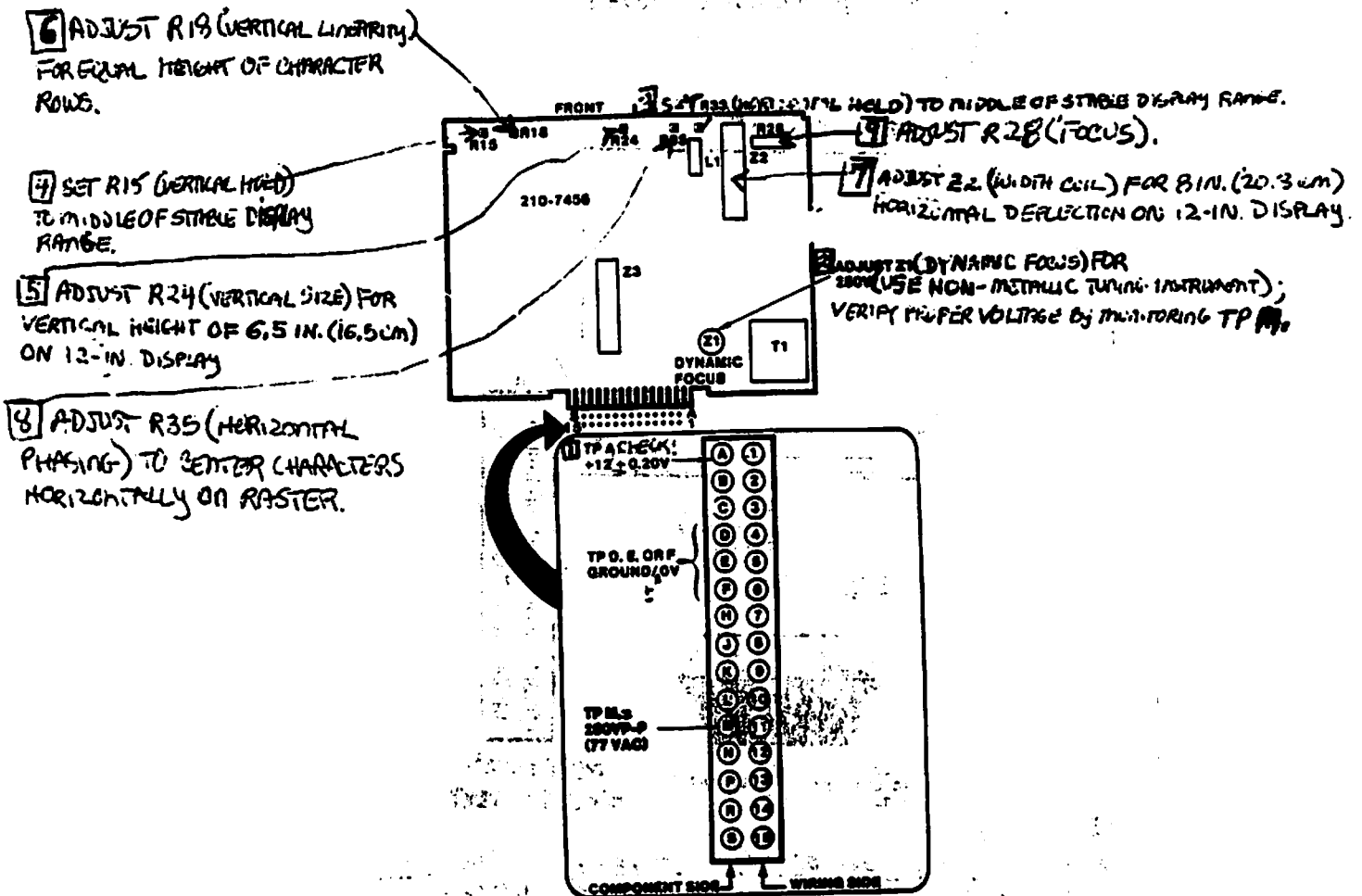
2336DE/DI

MONITOR ELECTRONICS PCB (210-7456) VOLTAGE
CHECKS/ADJUSTMENTS AND CRT DISPLAY
ALIGNMENT

WARNING

Use non-metallic tool when performing
adjustments.

1. Adjust +12V pot on switching power supply so test point A on 210-7456 shows +12V $\pm 0.2V$.
2. Use non-metallic tool to adjust Z1 (dynamic focus) for 250V p-p. Verify by monitoring test point M on 210-7456.
3. Set R33 (horizontal hold) to middle of stable display range.
4. Set R15 (vertical hold) to middle of stable display range.
5. Adjust R24 (vertical size) for vertical height of 6.5 in. (16.5cm) on 12-in. display.
6. Adjust R18 (vertical linearity) for equal height of character rows.
7. Adjust Z2 (width coil) for 8 in. (20.3 cm) horizontal deflection on 12-in. display.
8. Adjust R35 (horizontal phasing) to center characters horizontally on raster.
9. Adjust R28 (focus).



2200 SYSTEMS WORKSTATIONS

USER COMMENTS AND FEEDBACK

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