2231W:

There are four domestic versions of the 7160:

1. 7160-A - Used in -31W-1 paralled printer (10 pitch) 2200/VS
   - L1, 2, 3, 4, and R8 not loaded
   - L11 = 378-0517, L13 = 378-2041
   - Jumper A-B/D-E/F-G/N-P/U-V/X-Y
   2200
2. 7160-1A - Used in a -31W-2 paralled printer (12 pitch)
   2200VS
   - L15, 16, 24, 25, and R12-19 not loaded
   - L11 = 378-0517, L13 = 378-2041
   - Jumper A-B/D-E/F-G/N-P/U-V/X-Y
   2200 -
3. 7160-D - Used in a -31W-1 serial printer (10 pitch)
   VS/WP
   - L1, 2, 3, 4, and R8 not loaded
   - L11 = 378-0521 (R2), L13 - 378-2050 (R2)
   - Jumper A-C/F-H/J-K/N-P/V-W

4. 7160-1D - Used in a -31W-2 serial printer (12 pitch)
   VS/WP
   - L15, 16, 24, 25, and R12-19 not loaded.
   - L11 = 378-0521 (R2), L13 = 378-2050 (R2)
   - Jumper A-C/F-H/J-K/N-P/V-W

MODEL 61 AND 62 PRINTERS

PCB	2231W	2231V	5531
6756	NO CHANGE	NO CHANGE	NO CHANGE
6761	JUMPER A TO B and D TO F	JUMPER B TO C and E TO F	JUMPER B TO C and E TO F
6760	FOR MODEL 62	FOR MODEL 62	USE 7160-1D JUMPER A TO C, F TO G, J TO M N TO P, and U TO W
7060	FOR MODEL 61	FOR MODEL 61	USE 7160D JUMPERS SAME AS 7160-1D
KEYBOARD	USE 6762	USE 6762	USE 6762-1
CHASSIS	NO CHANGE	NO CHANGE	USE MODIFIED CHASSIS WITH CANNON CONNECTOR

SEE WPNL #30 FOR
ADDITIONAL INFORMATION

2231-1/-2 Underscore

To enable the underscore function on the 31W-1/-2 printer the following boards must be as stated below:

210-6761-Timing and Format Control Board for 10 and 12 Pitch
E-REV level must be at least 4 up to latest, E-REV 9

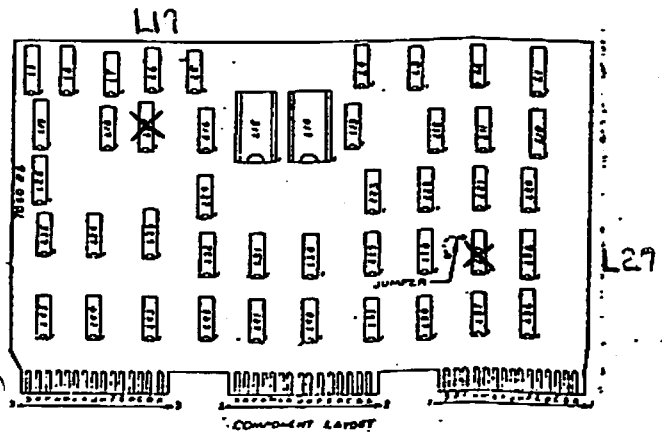
210-7060-10 Pitch Data Storage, I/O Control and Char Generator Board
E-REV level must be at least 3 up to latest, E-REV 7.
Solder wire from L17 pin 9 to L27 pin 10

210-6760-12 Pitch Data Storage, I/O Control and Char Generator Board
E-REV level must be at least 2 up to latest, E-REV 7.
Solder wire from L17 pin 8 to L28 pin 10

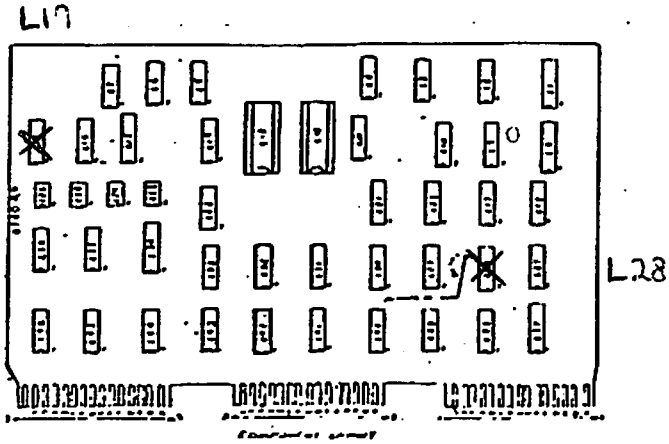
Some new 31W printers are being sent out with 210-7160A boards for 10 pitch and 210-7160-1A for 12 pitch replacing the 7060 and 6760 respectively. If you have a problem with underscoring with these boards, try reverting back to the 7060 and 6760. The 7160A and the 7160-1A are universal boards for parallel printers for 2200 and VS and should be capable of underscoring. There are jumpers on the 7160A and 7160-1A which should be set as follows:

A to B, D to E, F to G, N to P, U to V, X to Y

7060



6760



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C
E
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WANG

TECHNICAL INFORMATION NOTICE

Date Issued: April 17, 1984	Notice Number: US.0038
Product: VS/OS	Component/Version: 6.11.55

5531-2/224651/552

VS Operating System Individual Fix 6.11.55 (Uppercase)

This memo announces the availability of U.S. Individual fix version 6.11.55. It fixes two important problems affecting specific devices. Update 6.11.55 consist of one module:

DEVLIST Version 6.11.54 (Device Parameter file)

Update 6.11.55 includes the device support in updates 6.11.51 and 6.11.52, since DEVLIST 6.11.54 is a superset of DEVLIST versions 6.11.46 and 6.11.49. In addition, update 6.11.55 is compatible with all other 6.11.50 individual fixes. Therfore, you may overlay 6.11.55 on top of an unmodified 6.11.50 Operating System or on top of a 6.11 OS that contains any other individual fix (6.11.51 through 6.11.54). Do not overlay 6.11.55 on any Operating System earlier than 6.11.50.

The 6.11.55 update will have no effect on the Operating System Version number which is displayed through "System Status" function of the Operator's Console screen.

Since these changes do not effect any workstation or printer microcode or any WP code, it does not have any foreign language dependencies.

PROBLEMS FIXED:

1. PROBE # F003978:
   5531-2 Printer did not print Lower case characters.

2. Informally Reported:
   Proper microcode was not being loaded to two Ideographic devices -- 224651 workstation and 55211 printer.

To receive this software you should contact your ATOM and he will request it from the CESS VS/PC/2200 Group.

Queries concerning this information should be referred to: C.E. Software Support

2231W3

TOPIC: TOP OF FORM PROBLEM ON THE 2231W-3

The top of form problem that has been plaguing the 2231W-3 has been resolved. The problem was that the top of form would not always stop at the same distance from the top of form. Most customers primarily used the 2231W-3 as a graphics printer and the top of form problem is not usually noticed.

The problem is corrected by redesign of the 210-6794 PC board to incorporate a strobe pulse from the vertical format control unit along with a channel 7 strobe to stop the paper. In doing this, an addition to the board is required.

The way they differentiated between the new and old at first was to replace 210-6794 R0 and 210-6794 R1 with 210-6794 R2 M3. The boards with R2 M3 on them caused problems in Logistics so they finally changed the board number to 210-7894.

A few boards with the number 210-6794 R2 M3 went to the field before the remainder were pulled from stock and re-numbered 210-7894. The old boards 210-6794 R0 and 210-6794 R1 are all to be scrapped.

When the 210-7894 (and the few 210-6794 R2 M3) boards are used in the 2231W-3, a new format control unit 279-5060-38 must also be used. The old format control unit 279-5060-29 does not have provision for the strobe channel. The new format control unit also plugs into the 210-7894 PC board, not into the chassis as the old unit did.

When ordering the new board 210-7894, the new format control unit 279-5060-38 should also be ordered.

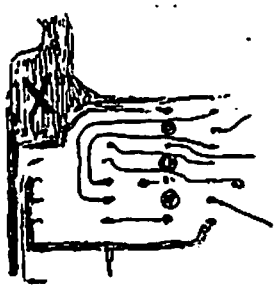
ECN 6125

3/W

FOR LITES ON PANEL BURNING OUT

CONNECT 3 220Ω RESISTOR FROM L20, PINS 2, 4, & 6 TO ± OV.

BACK OF L20 ON 7060



CONNECT 3 RED OR CIRCLED PTS. TO X.

Service Newsletter NO. 54

PERIPHERALS #15 July 14, 1976

This Newsletter contains the following:

A. MODEL 2231W PRINTER PROBLEM CORRECTIONS
B. ASSEMBLY DIRECTIONS FOR WANG MODEL 61/62/72 PRINTER STANDS

A. MODEL 2231W PRINTER PROBLEM CORRECTIONS

As a result of 2231W printer problem areas experienced by field service personnel, the following solutions are recommended.

1) PRINTER RIBBON BREAKING - Ribbon cartridge was loaded with too much ribbon causing ribbon jams. Manufacturing has solved the problem by reducing length of ribbon loaded in cartridge.

2) PAPER CATCHING ON RIBBON & PRINTHEAD RIBBON GUIDE - Perforations in paper catch on bottom of ribbon guide or ribbon as paper is advanced. The print head ribbon guide has been redesigned and can be ordered from the Home Office (WL #449-0131).

3) JERKING CARRIAGE MOVEMENT - Excessive play between the main drive belt and the plate on the bottom of the carriage assembly may result in jerking carriage motion. An .010 shim of plastic or paper inserted between the belt and plate (spanning the entire length of the plate) will cure this problem.

4) SHIPPING BOLTS BROKEN THROUGH THE PLYWOOD BASE - Future shipments will use thicker plywood base.

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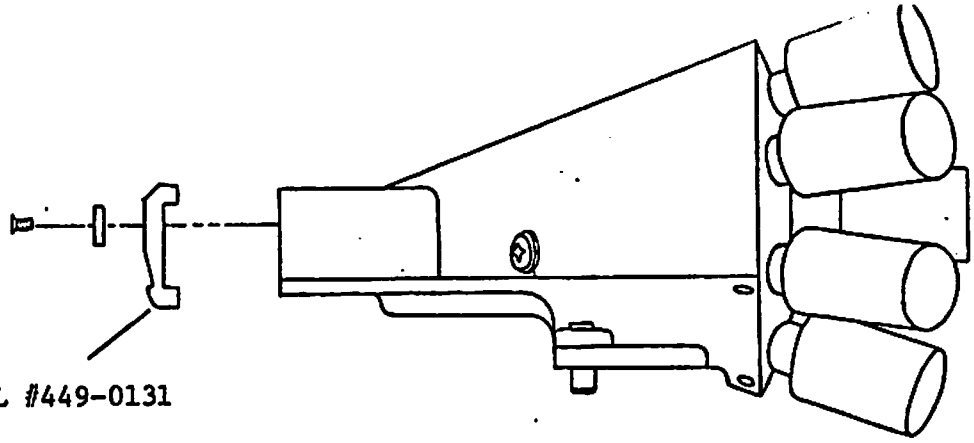
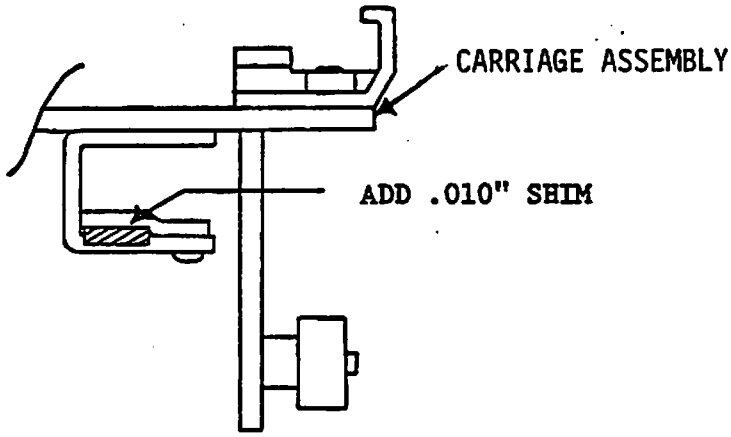
1.3-26



PAPER CATCHING ON PRINTHEAD RIBBON GUIDE



JERKING CARRIAGE MOVEMENT

B. ASSEMBLY DIRECTIONS FOR WANG 61/62/72 PRINTER STANDS

1) Insert grommets (7) and bumpers (9) in leg stiffener (8) and modesty panel (3) respectively. The hole in the bumper should be on the indented side of the modesty panel.

2) Attach modesty panel (3) with slots for paper rack (10) on the bottom of the panel to vertical leg assemblies [vertical leg assembly consists of lower leg support (11) and vertical leg (1)] with allen head cap screw and black flat washer (2), the hole in the bumper (9) facing the back.

3) Place leg stiffener (8) on top of vertical leg assemblies and align the holes with the tapped holes in the vertical leg (1). The grommets (7) should be towards the back with the bend in the leg stiffener down.

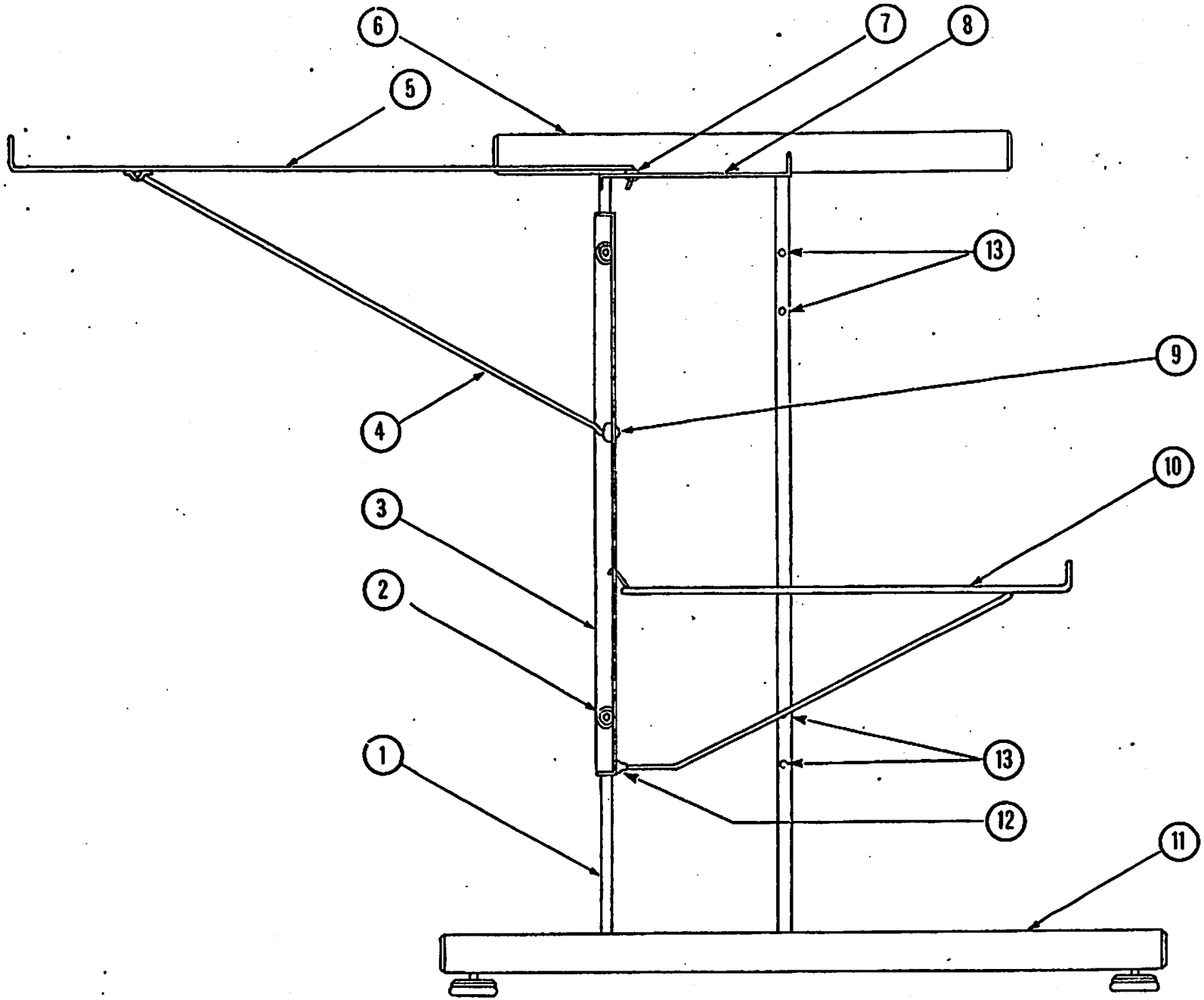
4) Attach upper leg support (6) to the vertical leg through the holes in the leg stiffener with hex head stove bolts and split lock washers.

5) Insert the eight plugs into the spare screw holes (13) located in the front inside edges of the legs.

6) Place bumpers on input paper rack (12).

7) Place the tabs of the paper rack (10) in slots in the modesty panel allowing bumpers to rest against the bottom of the panel.

8) Put the hooked ends of the output paper rack (5) through the grommets (7) in the leg stiffener and place the ends of the paper rack lower support (4) in the bumpers (9) in the modesty panel.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Service Newsletter

NO. 61

PERIPHERALS #17

This Newsletter contains the following:

A. MODEL 2231W/120W PRINTER MOTHERBOARD
B. 2231W I/O CABLE

A. MODEL 2231W/120W PRINTER MOTHERBOARD

The Model 2231W motherboard (6757 PC) has been replaced by the 7157 PC motherboard. The new motherboard has two 44 pin connectors, instead of three 30 pin connectors, to allow the insertion of an RS-232 interface board (7077 PC).

The Model 120W printer also has a RS-232 I/O Dataphone connector mounted on the rear of the printer (in addition to the standard Wang I/O Amphenol connector). When the RS-232 Option is installed, the Wang I/O connector can still be used to operate the printer or to connect the printer exerciser. (See Figure 1.)

B. 2231W I/O CABLE

The Model 2231W I/O cable is terminated on the printer end with a 90 degree strain relief connector to prevent the cable from interfering with paper movement. The I/O cable can be modified by replacing the standard connector cover with a 90 degree strain relief connector (WL #350-4231).

To prevent accidentally disconnecting I/O cable, a cable clamp is shipped on the I/O cable which should be mounted under the rear chassis mounting screw. This cable clamp (WL #654-1255) should be added to all 2231W matrix printers that have an I/O cable with a 90 degree strain relief connector. (See Figure 2.)

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13-266

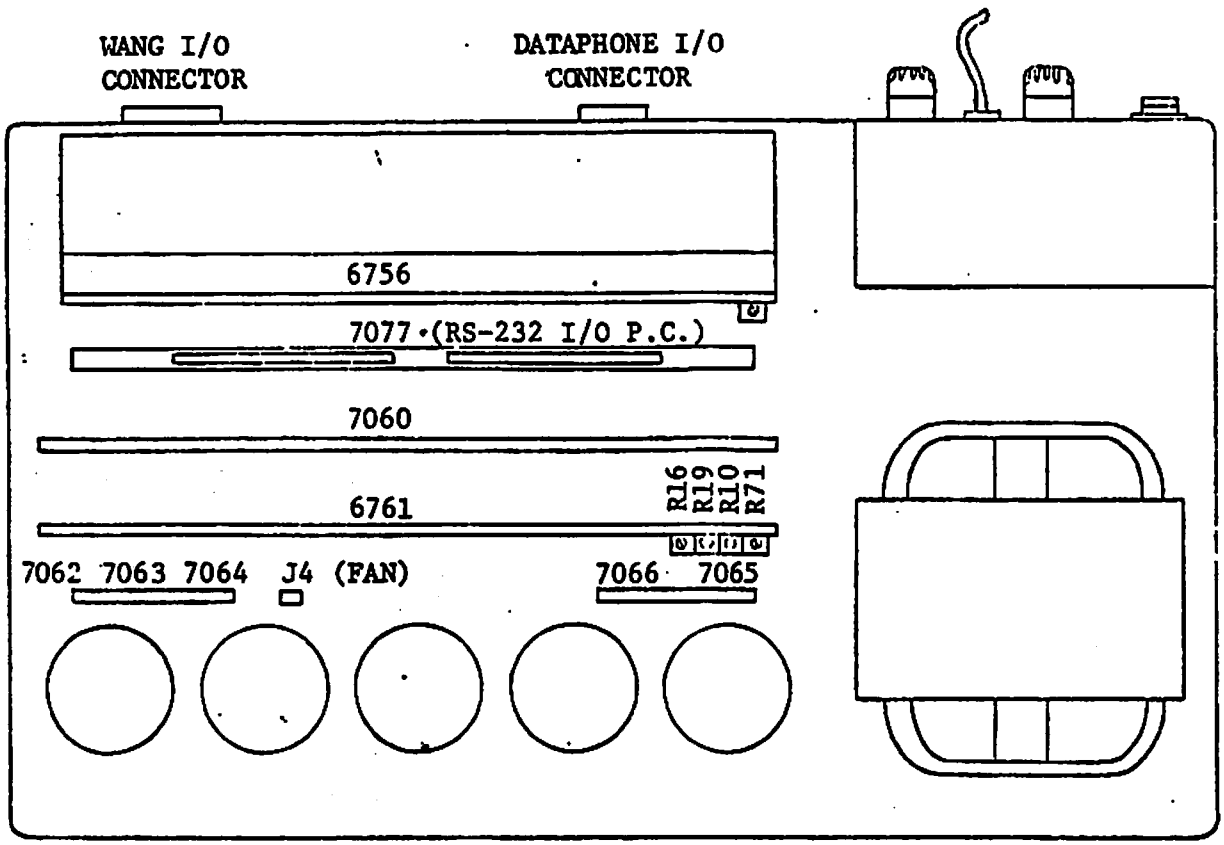

FIGURE 1 2231W PRINTER CHASSIS

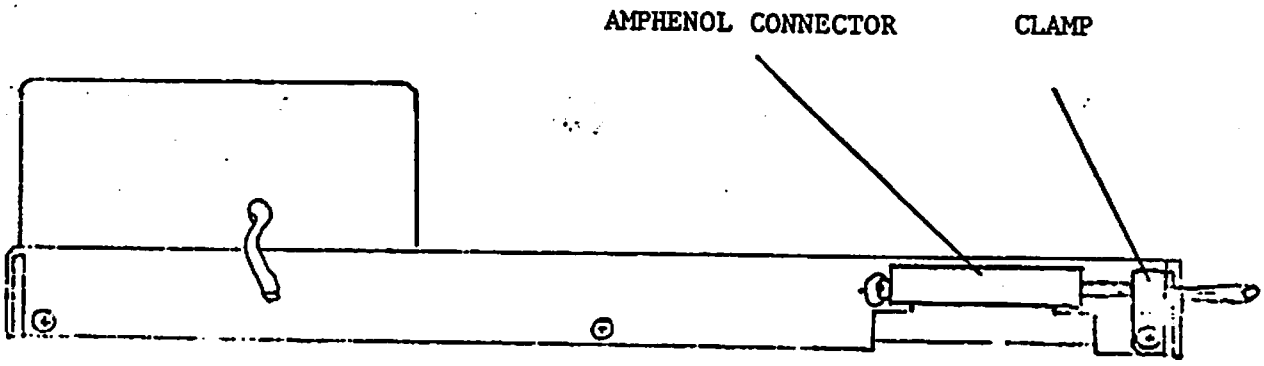

FIGURE 2 2231W I/O CABLE CLAMP LOCATION

Service Newsletter NO. 71

November 3, 1976

PERIPHERALS #20

MODEL 61/62 DIFFERENCES

This Newsletter documents the differences between the Model 61 Matrix Printer (10 pitch, marketed as Model 2231W1) and the Model 62 Matrix Printer (12 pitch, marketed as Model 2231W2).

There are only three parts which differ between the Model 61 and the Model 62 Matrix Printers. These parts are listed below:

PART	MODEL 61	MODEL 62
PRINTHEAD	279-5060-22	279-5060-12*
TIMING WHEEL	461-2020	461-2021
CHARACTER GEN PCB	210-7060	210-6760

*The Model 62 (12 pitch) printhead has a dot punched on the face of the printhead bearing for identification purposes.

Except as listed below, all adjustments are the same for both models of the printer (refer to Section 5 of the MODEL 61 MATRIX PRINTER MAINTENANCE MANUAL).

5.2 (b) (1) WS ADJUSTMENT

with the carriage moving in the forward direction, adjust R71 on the 6761 PCB to 1600 usec ±25 usec for the Model 61 and to 1800 usec ±25 usec for the Model 62.

5.2 (b) (3) To properly phase the signals from the two magnetic reluctance pickups, pivot the mounting plate for the magnetic pickup that senses the index hole of the timing disk (Figure 5-17 in the manual) for a difference of 800 usec ±50 usec for the Model 61 and for a difference of 900 usec ±50 usec for Model 62. The signal timing difference is measured between the positive edge of the signal at L3 pin 12 and the positive edge of L3 pin 13. The positive edge of L3 pin 13 is used to trigger the scope sweep.

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13-26

CUSTOMER ENGINEERING
TECHNICAL ASSISTANCE CENTER
NEWSLETTER

#20112

III.C.4
PERIPHERALS-PRINTERS/PLOTTERS-WANG MATRIX 61/62 (31W).

TOPIC: 210-7160-Z. PROMS FOR 2231W PRINTER

210-7160-Z HAS THE LATEST ASCII PROMS. PROMS ARE L11=378-0630; L13=378-2522.

CUSTOMER ENGINEERING
TECHNICAL ASSISTANCE CENTER
NEWSLETTER

#10804

III.C.4
PERIPHERALS-PRINTERS/PLOTTERS-WANG MATRIX 61/62 (31W).

TOPIC: TOP OF FORM PROBLEM ON THE 2231W-3

The top of form problem that has been plaguing the 2231W-3 has been resolved. The problem was that the top of form would not always stop at the same distance from the top of form. Most customers primarily used the 2231W-3 as a graphics printer and the top of form problem is not usually noticed.

The problem is corrected by redesign of the 210-6794 PC board to incorporate a strobe pulse from the vertical format control unit along with a channel 7 strobe to stop the paper. In doing this, an addition to the board is required.

The way they differentiated between the new and old at first was to replace 210-6794 R0 and 210-6794 R1 with 210-6794 R2 M3. The boards with R2 M3 on them caused problems in Logistics so they finally changed the board number to 210-7894.

A few boards with the number 210-6794 R2 M3 went to the field before the remainder were pulled from stock and re-numbered 210-7894. The old boards 210-6794 R0 and 210-6794 R1 are all to be scrapped.

When the 210-7894 (and the few 210-6794 R2 M3) boards are used in the 2231W-3, a new format control unit 279-5060-38 must also be used. The old format control unit 279-5060-29 does not have provision for the strobe channel. The new format control unit also plugs into the 210-7894 PC board not into the chassis as the old unit did.

When ordering the new board 210-7894 the new format control unit 279-5060-38 should also be ordered.

CUSTOMER ENGINEERING
TECHNICAL ASSISTANCE CENTER
NEWSLETTER

#20330

III.C.4
PERIPHERALS-PRINTERS/PLOTTERS-WANG MATRIX 61/62 (31W).

TOPIC: DEFAULT VALUE FOR 2231W-3 LINE COUNT PER PAGE

Switch settings for 31W-3 printers for lines per page on the 210-6795 I/O data storage & character generator are as follows:

Switch #'s on, all others off	Approximate lines per page
5, 4, 3, 2	50
All OFF	53
5	56
4	61
5, 4 — 6 lines per inch	66
3	72
5, 3	80
4, 3 — 8 lines per inch	88
5, 4, 3	100
2	112
5, 2	132
4, 2	156
5, 4, 2	198
3, 2	260
5, 3, 2	370
4, 3, 2	704

Switch one is not acting in either position. The above chart was developed by changing the switch bank one, configuration on the 210-6795 PCA in the 2231W-3¿ using an MVP as central processor. Some of the high density lines overlap so much that they may vary several lines from the published number of lines. But, 6 lines per inch, and 8 lines per inch are exact values, for a standard 11" vertical printer form. Once the SW bank 1 is set, it will retain this default line count on all printed lines except when using the vertical format tape, or software statement hex (09xx) XX = number of times 1/72 of an inch per line feed. XX may vary from (1 to 15) = "01 to "0F". All subsequent lines (not VFU or software controlled) will default to the LPI default value as set above on the switch bank. So if a customer wants other than the default value, he will have to software control each line.

2231W-3

→ NEW MAJOR SUBASSEMBLYS + ACCESSORIES

NEW SPARES THAT ARE NEEDED TO MAINTAIN A 2231W-3 IN ADDITION TO SPARES USED ON 2231W-1+2

1. EA. 1. I/O DATA STORAGE AND PROM CHARACTER GENERATOR P.C.B. 210-6714
REPLACES E7060 NEW CHARACTER SET PROM

1. EA. 2. TIMING AND FORMAT CONTROL 210-6714
REPLACES E6761
REPLACES 210-6751

1 EA. 3. 2231-W-1 PROM ON I/O BOARD 378-2154
CHARACTER SET

1 EA. 4. VERNIER AND FORMAT ASSEMBLY 279-5060-
REPLACES 279-5060-37

1 EA. 5. MOTOR AND PULLEY ASSY. (P.F) 279-5060-
REPLACES 279-5060-37

1 EA. 6. HEAD ASSY (-61) (66656-51) 279-
REPLACES 279-5060-22

1 EA. 7. CARRIAGE MOTOR + ENCODER ASSY 279-5060
REPLACES 279-5060-15

1 EA. 8. BELT (STEP MOTOR TO CLUSTER PULLEY
656-023

1 EA. 9. BELT (VERNIER TO CLUSTER PULLEY
656-0221

1 EA. 10. PLATE ASSY CLUSTER PULLEY
279-5060-

NAME OF NEW MACHINE:

MODEL 63 PRINTER-PLOTTER, (SAME AS THE PRESENT MODEL 62 EXCEPT AS FOLLOWS:

NEW PARTS:

20 TOOTH, .080 PITCH PULLEY, 478-0377 (1 REQD) (DWG. NO. B6636-405) GETS PINNED TO PAPER FEED MOTOR SHAFT, REPLACES THE 1/5 PITCH, 10 TOOTH PULLEY. 3/32 DIA. PART NO. 451-1509

PINNING DRAWING INFORMATION STORE [illegible] DRAWING.

ADD'L CLUSTER IDLER PULLEY (DWG. NO. B6636-402) 478-0378 (1 REQD)

82 TOOTH, .080" PITCH, 3/16" .188" WIDE BELT (1 REQD) 656-0234

60 TOOTH, 1/5 PITCH, .188 WIDE BELT (120XL) (1 REQD) REPLACES BELT THAT GOES FROM VERNIER PULLEY TO PAPER FEED PULLEY 655-0221

ENCODER GEAR 216 TOOTH, 80 PITCH, 14½° P.A. (1 REQD) 461-2027 (DWG NO. C6636-197) (REPLACES PRESENT 10 OR 12 PITCH GEAR) (IS NOW 7183 ON ECN)

STUD, CLUSTER PULLEY MTG (DWG NO. B6636-403) (1 REQD) 461-3355

PLATE ASSY CLUSTER PULLEY BRACKET TOGETHER 279-5000-80

PLATE, CLUSTER PULLEY STUD MTG (DWG. NO. C6636-404) (1 REQD) 452-0096

B45 NEEDLE BPSS, PRESS INTO CLUSTER PULLEY (2 REQD)

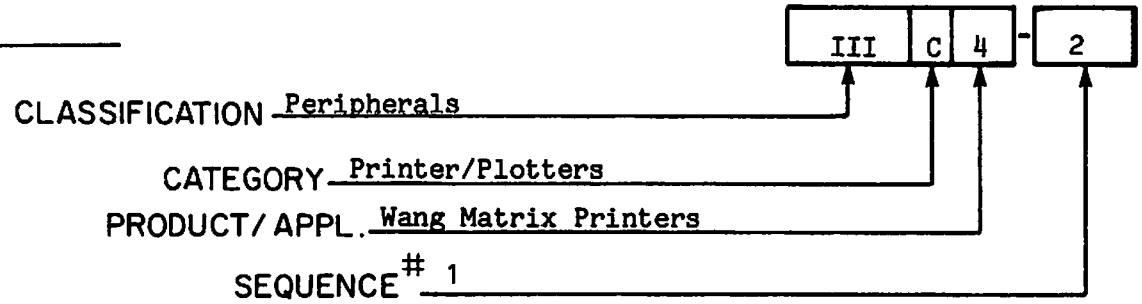
RETAINING RING 5133-25 (1 REQD) TRU ARC.

ADD TWO (2) #8-32 TAPPED HOLES TO FORMAT CONTROL
MTG. BRKT. (IS NOW ON ECN #7184) (DWG. NO. D6536-134)
452-0044

CUSTOMER ENGINEERING

PRODUCT SERVICE NOTICE

DATE: 4/1/81



TITLE:

MATRIX PRINTER HEAD SHIELD INSTALLATION PROCEDURE

I. INTRODUCTION

A new printer head shield (WLI #452-3575) has been designed to prevent smudge marks on multi-sheet forms printed on Wang Matrix Printers 2231W-1, 2231W-2, 2231W-3 and 2231W-6. Multi-sheet forms having as many as six sheets maximum thickness 0.02 inches (0.05 mm) are used in these printers. For the print wire to imprint on the final sheet the printer head must be adjusted as close as possible to the striker plate. This causes the small section of ribbon surrounding the printer head bearing to rub against the printing surface. As the printer head moves back and forth a smudge mark forms across the face of the document.

These smudge marks can be eliminated by installing a new printer head assembly (see section 2.0 for WLI#) with an attached head shield. The head shield becomes a barrier between the paper and ribbon, preventing the ribbon from rubbing the printing surface. A small round hole in the shield is aligned with the print wires allowing them to strike the ribbon.

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Printed in U.S.A.
REORDER NO.
729-0893

The head shield will not be factory installed, instead all new printer heads will be modified to accept head shields. Head shield installation will be required only when a problem is detected.

II. PARTS REQUIRED

PART NAME	MODEL NO.	PART NO.
Printer Head Assembly	2231W-1	WLI #279-5060-22
Printer Head Assembly	2231W-2	WLI #279-5060-12
Printer Head Assembly	2231W-3	WLI #279-5060-59
Printer Head Assembly	2231W-6	WLI #279-5060-88
Two 4-40 X 1/4 Phillips-head screws	All Models	WLI #650-2087
Printer Head Shield	All Models	WLI #452-3575

III. PRINTER HEAD SHIELD INSTALLATION PROCEDURE

1. Power-down printer.

2. Lift open printer cover.

3. Remove ribbon cartridge as described in section 3.3.1, of the Matrix Printer Manual (03-0077, III.C.4) for models 2231W-1, -2 and -3. For the 2231W-6 Matrix Printer see section 2.6 of the 2231W-6 Matrix Printer Manual.

4. Remove existing print head assembly from carriage assembly by unplugging fingerboard from connector and removing the two mounting screws holding printer head assembly to carriage assembly (see Figure 1). Save the two mounting screws for installing the new printer head.

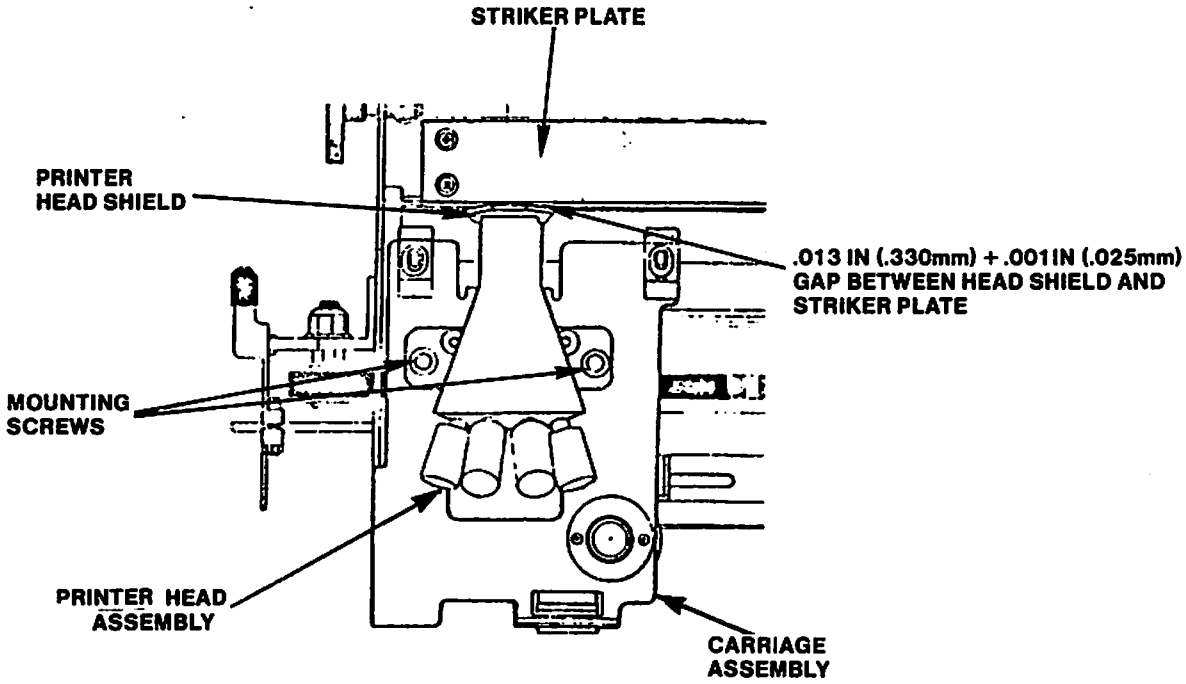


FIGURE 1

5. Using two 4-40 X 1/4 Phillips-head screws attach the printer head shield to the bottom of new printer head assembly (see Figure 2).

NOTE
Each new printer head assembly is easily identified by its underside which has two drilled holes for mounting the printer head shield.

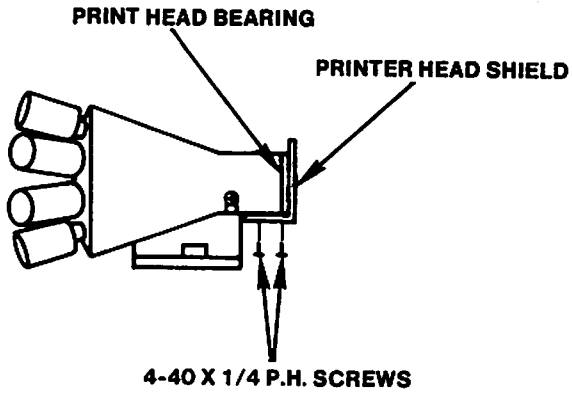


FIGURE 2

6. Install new printer head assembly on carriage assembly by plugging fingerboard into connector and attaching it to carriage assembly. Use the two mounting screws removed from the existing printer head (see Figure 1).

7. Adjust printer head assembly so the printer head shield is flush against the print head bearing (see Figure 2).

8. Refer to Matrix Printer Maintenance Manual (729-0339, III.C.4) and perform STRIKER PLATE AND PLATEN BRACKET ADJUSTMENT (paragraph 5.3.3) and PRINTER HEAD ADJUSTMENT (paragraph 5.3.5) on models 2231W-1,-2 and -3. For the 2231W-6 Matrix Printer refer to model 2231W-6 Matrix Printer Manual (729-0340, III.C.4) and perform STRIKER PLATE AND PLATEN BRACKET ADJUSTMENT (paragraph 6.3.6) and PRINTER HEAD ADJUSTMENT (paragraph 6.3.10).

NOTE
After performing the STRIKER PLATE AND PLATEN BRACKET ADJUSTMENT verify that a 0.013 in. ±0.001 in. (0.33mm ±0.25mm) clearence exists between the striker plate and head shield. Use the gauge (WLI #726-9487) that is supplied in the Customer Engineering Standard Tool Kit to check this measurement.

9. Using a multi-sheet form, perform the diagnostics in paragraph 7.2 of the 2231W-6 Matrix Printer Maintenance Manual (729-0340, III.C.4). These diagnostics enables the Print Consistency Test to be performed on the 2231W-1, -2, -3 and -6 Matrix Printers, thus, verifying that the head shield has corrected the smudging problem.

Mike B.

WANG LABORATORIES, INC.

TO: ALL CUSTOMER ENGINEERS

FROM: JOE McDERMOTT, EASTERN AREA

DATE: MAY 1, 1979

SUBJECT: 2231W-6 FAILURES

The numerous problems that have been encountered in the field with the 2231W-6 are being corrected through recent ECN's. These problems encompass intermittent deselecting of printer, frequent burning of servo fuse, excessive 7379 failure, unit line feeding and beeping when reset from keyboard, intermittent loss of data when printing, and excessive solenoid failures.

The following ECN's should rectify all the above problems. All ECN's should be done in order to eliminate any possibility of other design problems. In addition to the ECN's the new type of solenoid called Chamfered should be used when replacing solenoids. These solenoids have a much longer printing life than previous solenoids. The part number is still 279-5060-14.

If there are any questions concerning the 2231W-6 and the recent changes, please let me know.

Regards,

Joe McDermott

JOE McDERMOTT
EASTERN AREA TECHNICAL SPECIALIST

JM:rb
#2646A

cc: A.T.O.M.'s

20 SOUTH AVENUE, BURLINGTON, MASSACHUSETTS 01803 • TEL. (617) 851-4111 • TWX 710-343-6769 • TELEX 94-7421

WANG

ECN

ECN No. 1463

SHEET 1 OF 1
DATE 4-24-79
RFA NO. (REF)

ORIGINATOR Robin Lo 2231W-5 DEPT. 15 EXT. 3012 DATE 4/18/79
MODEL NO. TITLE

PART NO.	PART NAME	REV. F	REV. T	P.C. REV. FROM	P.C. REV. TO	ELEC. REV. FROM	ELEC. REV. TO
210-7333-A & -1A	12 Solenoid Memory	-	-	-	-	-	-
DWG. NO. 7333	(DWG. TITLE)						
ASSY. PART NO.	ASSY. TITLE					EFFECTED ☐ NO EFFECT ☐	

ECN NO. 1463

DESCRIPTION OF CHANGE

Change schematic, software loading chart and BOM as follows:

FROM	TO
378-4002-R6	378-4002-R7
378-4003-R6	378-4003-R7
378-4004-R6	378-4004-R7
378-4005-R6	378-4005-R7

Qty remains the same

No other documentation changes required

RECEIVED
APR 25 1979
PRINT ROOM

REASON FOR CHANGE

To correct microcode error that caused printer to blow fuses and fast speed switch response

2969J/49

50

NEW PURCHASE REQ'D. ☐ SHOP REWORK REQ'D. ☐ VENDOR REWORK REQ'D. ☐

CUSTOMER ENGINEERING
- ☒ IMMEDIATE CUST.
- ☐ CUST. PER NEXT CALL
- ☐ INFORMATION ONLY
- ☐ NONE

ACKNOWLEDGE
BY:
DATE:

- ☒ MANDATORY CHANGE
- [X] DOCUMENTATION CHANGE (PL, BOM, DWG)
- [ ] EASE OF MFG., COST REDUCTION
- [ ] PRODUCT IMPROVEMENT

DISPOSITION	Bonded	FINAL ASSY AREA	SUB ASSY AREA	PARTS IN House	PARTS Outside Vendor	Future MFG.
USE AS IS TO PREVIOUS REV.						
TO CONFORM	X	X	X			X
TO CONFORM IF NOT BEYOND OPERATIONS EFFECTED						

FINAL APPROVAL S R. Ho
APPROVED DESIGN ENGRG. Robin S. B. Lo
APPROVED MFG. ENGRG. D. Levi RP
WRITTEN BY Paul Richer

WANG

ECN

CE # 160

SHEET 1 OF 2
DATE 4-02-79
RFA NO. (REF)

ORIGINATOR Richard Therrian DEPT. 15 EXT. 3019 DATE 3/27/79
MODEL NO. 31W-6 TITLE

ECN NO. 11232

PART NO.	PART NAME (DWG. TITLE)	REV. F	REV. T	P.C. REV. FROM	P.C. REV. TO	ELEC. REV. FROM	ELEC. REV. TO
209-7332	12 Sol CPU	-	-	-	-	4	5
DWG. NO. 7332							

ASSY. PART NO.	ASSY. TITLE	EFFECTED ☐ NO EFFECT ☐

DESCRIPTION OF CHANGE

Change artwork, assembly drawing and schematic per attached print — see other side

Change BOM as follows:

	WL#	QTY	DESCRIPTION
Change:	330-1010-4B	from 2 to 4	10 Ohm Res
	330-3047-4B	from 21 to 23	4.7K Ohm Res
Add:	300-1904	2	.02 uf Cer Cap

RECEIVED
APR 03 1979
PRINT ROOM

REASON FOR CHANGE

To give select F/F circuit more noise immunity

2799J/46.

(4c)

NEW PURCHASE REQ'D. ☐ | SHOP REWORK REQ'D. ☐ | VENDOR REWORK REQ'D. ☐

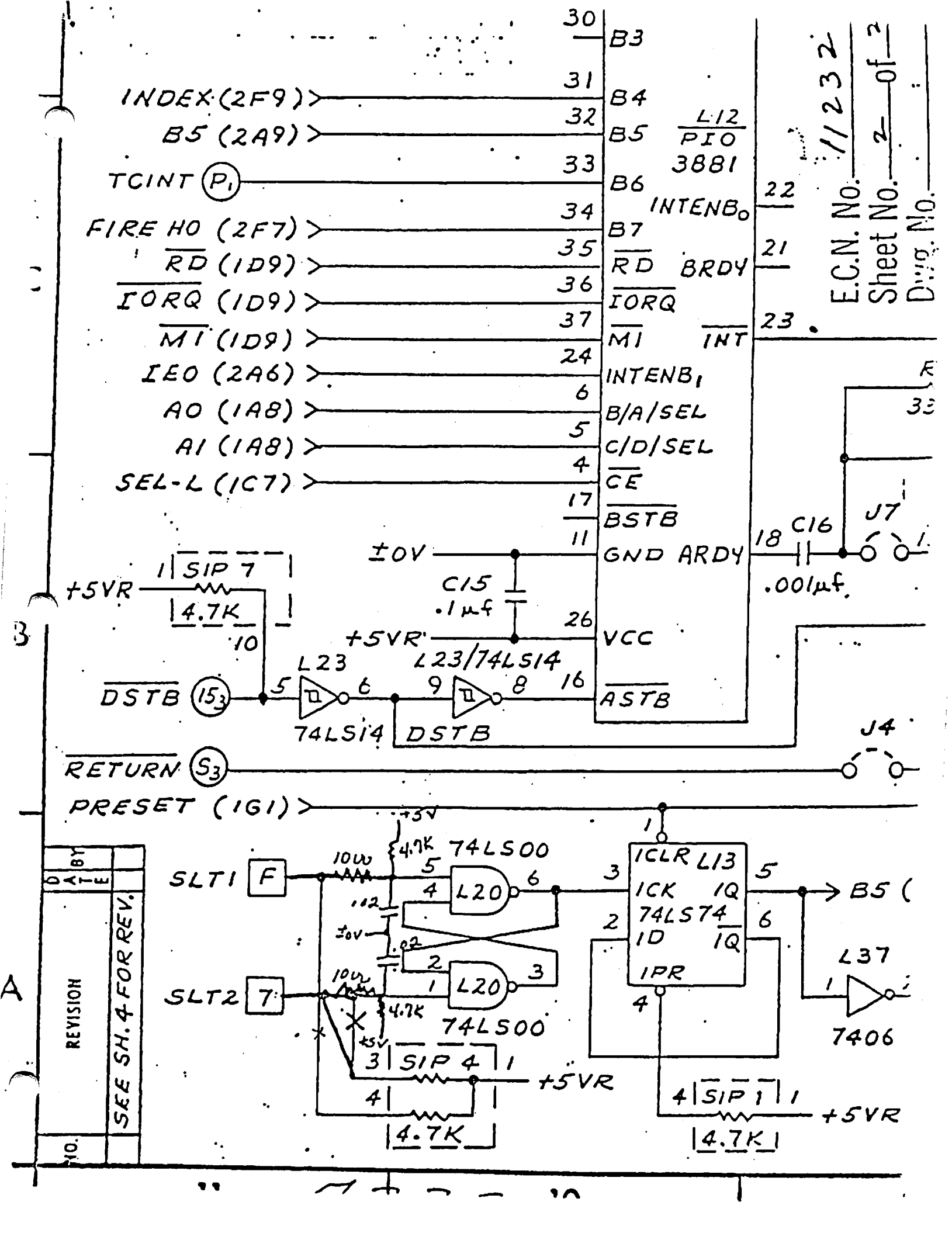
CUSTOMER ENGINEERING
☐ IMMEDIATE CUST.
☐ CUST. PER NEXT CALL
☐ INFORMATION ONLY
☐ NONE

ACKNOWLEDGE
BY:
DATE:

[X] MANDATORY CHANGE
[ ] DOCUMENTATION CHANGE (PL, BOM, DWG)
[ ] EASE OF MFG., COST REDUCTION
[ ] PRODUCT IMPROVEMENT

DISPOSITION	Bonded	FINAL ASSY AREA	SUB ASSY AREA	PARTS IN House	PARTS Outside Vendor	Future MFG.
USE AS IS TO PREVIOUS REV.						
TO CONFORM						X
TO CONFORM IF NOT BEYOND OPERATIONS						

FINAL APPROVAL S.K. HO
APPROVED DESIGN ENGRG.
APPROVED MFG. ENGRG. R.P
WRITTEN BY


E.C.N. No. 11232
Sheet No. 2 of 2
Dwg. No.
L12
PIO
3881
30 B3
31 B4
INDEX (2F9)
32 B5
B5 (2A9)
33 B6
TCINT P1
34 B7
FIRE H0 (2F7)
35 RD
RD (1D9)
36 IORQ
IORQ (1D9)
37 M1
M1 (1D9)
24 INTENB1
IEO (2A6)
6 B/A/SEL
A0 (1A8)
5 C/D/SEL
A1 (1A8)
4 CE
SEL-L (1C7)
17 BSTB
11 GND
22 INTENB0
21 BRDY
23 INT
18 ARDY
C16
.001µf
J7
C15
.1µf
±0V
+5VR
26 VCC
L23/74LS14
SIP 7
4.7K
10
DSTB
15
L23
74LS14
ASTB
16
J4
RETURN
S3
PRESET (1G1)
+5V
4.7K
74LS00
10W
SLT1
F
SLT2
7
.02
L20
ICLR
ICK
74LS74
ID
IPR
IQ
L13
L37
7406
B5 (
SIP 4
SIP 1
REVISION
DATE
BY
SEE SH. 4 FOR REV.
NO.

WANG

ECN

ECN NO. 1318

SHEET 1 OF 1
DATE 4-09-79
RFA NO. (REF)

ORIGINATOR S K Ho DEPT. 15 EXT. 3000 DATE 4/4/79
MODEL NO. 2231W-6 TITLE

PART NO.	PART NAME (DWG. TITLE)	REV. F	REV. T	PC.REV. FROM	PC.REV. TO	ELEC.REV FROM	ELEC.REV TO
210-7379	12 Sol PS Regulator	-	-	-	-	0	1
DWG. NO. 7379							
ASSY. PART NO.	ASSY. TITLE					EFFECTED ☐ NO EFFECT ☐	

DESCRIPTION OF CHANGE

Change artwork, assembly drawing and schematic as follows:

Add .25 Ohm 3W Res between Q2 emitter and +18V
Add .25 Ohm 3W Res between Q3 emitter and -32V

Change BOM as follows:

	WL#	QTY	DESCRIPTION
Add:	334-0017	2	.25 Ohm 3W Res

NOTE: To affect all 2231W series

REASON FOR CHANGE

1) To prevent transistor burnout of Q2 and Q3
2) To prevent high failure rate in field

2877J/47

NEW PURCHASE REQ'D. ☐ | SHOP REWORK REQ'D. ☐ | VENDOR REWORK REQ'D. ☐

CUSTOMER ENGINEERING
☐ IMMEDIATE CUST.
☒ CUST. PER NEXT CALL
☐ INFORMATION ONLY
☐ NONE

ACKNOWLEDGE
BY:
DATE:

☒ MANDATORY CHANGE
☒ DOCUMENTATION CHANGE (PL, BOM, DWG)
[ ] EASE OF MFG., COST REDUCTION
[ ] PRODUCT IMPROVEMENT

DISPOSITION	Bonded	FINAL ASSY AREA	SUB ASSY AREA	PARTS IN House	PARTS Outside Vendor	Future MFG.
USE AS IS TO PREVIOUS REV.						
TO CONFORM	X	X	X	X		X
TO CONFORM IF NOT BEYOND OPERATIONS						

FINAL APPROVAL S. K. Ho
APPROVED DESIGN ENGRG.
APPROVED MFG. ENGRG. RP
WRITTEN BY 4/6

WANG

ECN

ECN NO. 11C

SHEET 1 OF

DATE

RFA NO. (REF)

ORIGINATOR Dick Therrian DEPT. 15 EXT. 3019 DATE 4/2/79

MODEL NO. 2231W-5 TITLE

PART NO	209-7332	PART NAME (DWG TITLE)	12 Solenoid CP	REV. F	REV. T	P.C. REV. FROM	P.C. REV. TO	ELEC. REV. FROM
DWG. NO	D 7332			-	-	-	-	-
ASSY PART NO.		ASSY. TITLE					EFFECTED / NO EFFECT	

ECN NO

DESCRIPTION OF CHANGE

Change artwork, assembly drawing and schematic per attached print

Change BOM as follows:

	W/L#	QTY	DESCRIPTION
Change:	330-2047-4B	from 2 to 3	470 Ohm 1/4W Res
Add:	300-1010	1	10 pf Cer Cap

REASON FOR CHANGE

To improve the printer's noise immunity

2852J/47

NEW PURCHASE REQ'D ☐ | SHOP REWORK REQ'D. ☐ | VENDOR REWORK REQ'D. ☐

CUSTOMER ENGINEERING
- ☐ IMMEDIATE CUST.
- ☐ CUST. PER NEXT CALL
- ☒ INFORMATION ONLY
- ☐ NONE

ACKNOWLEDGE
BY:
DATE:

- [X] MANDATORY CHANGE
- [X] DOCUMENTATION CHANGE (PL, BOM, DWG)
- [ ] EASE OF MFG., COST REDUCTION
- [ ] PRODUCT IMPROVEMENT

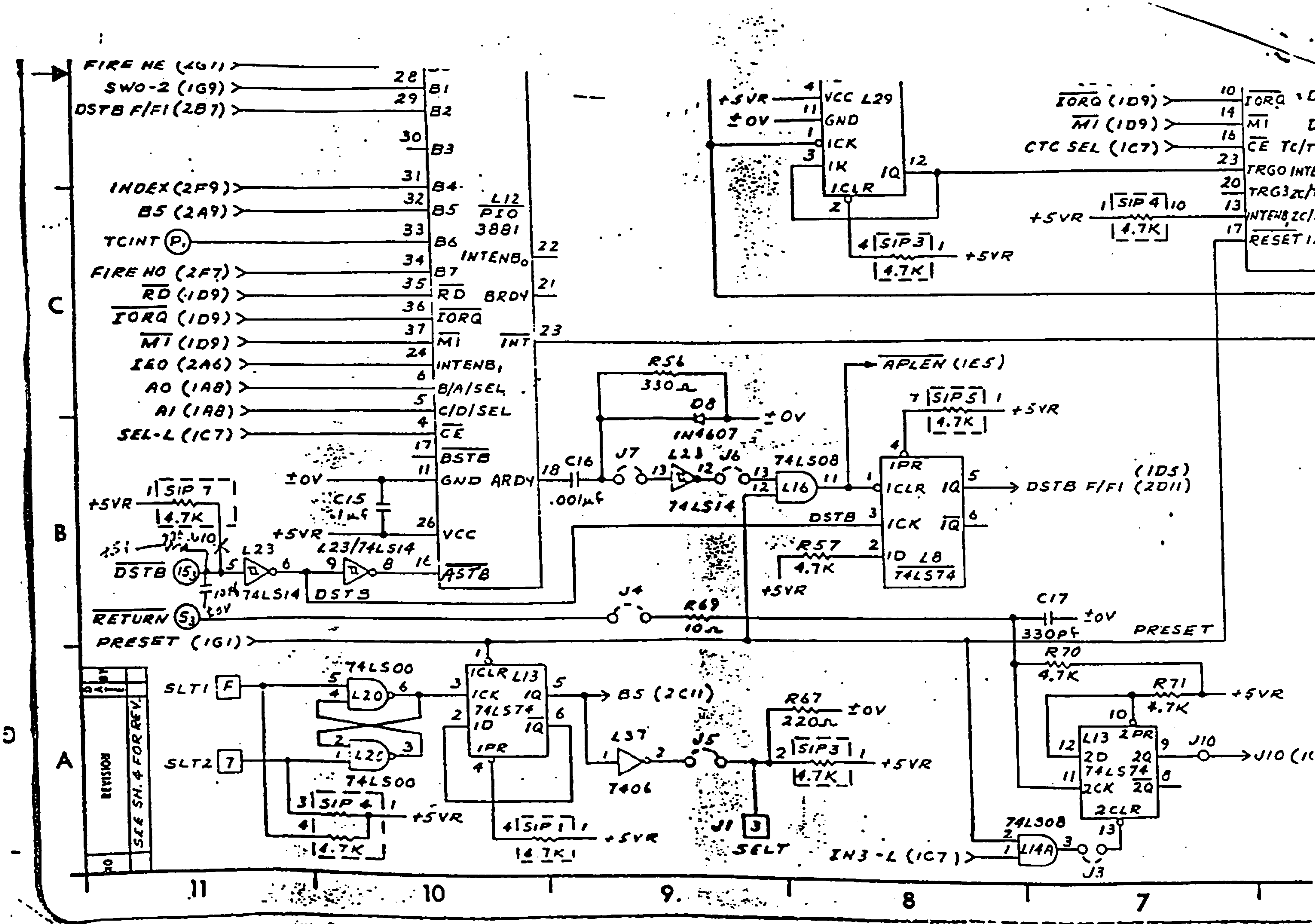
DISPOSITION	Bonded	FINAL ASSY AREA	SUB ASSY AREA	PARTS: IN House	PARTS: Outside Vendor	Future MFG.
USE AS IS TO PREVIOUS REV.						
TO CONFORM						X
TO CONFORM IF NOT BEYOND OPERATIONS EFFECTED						

FINAL APPROVAL

APPROVED DESIGN ENGRG. Richard T Therrian

APPROVED MFG. ENGRG.

WRITTEN BY


FIRE NE (2G1)
SWO-2 (1G9)
DSTB F/FI (2B7)
INDEX (2F9)
B5 (2A9)
TCINT
FIRE NO (2F7)
RD (1D9)
IORQ (1D9)
M1 (1D9)
IEO (2A6)
A0 (1A8)
A1 (1A8)
SEL-L (1C7)
L12
PIO
3881
INTENB0
BRDY
INT
ARDY
GND
VCC
ASTB
BSTB
CE
C/D/SEL
B/A/SEL
INTENB1
+5VR
±0V
SIP 7
4.7K
DSTB
RETURN
PRESET (1G1)
L23
74LS14
L23/74LS14
C15
C16
.001µf
J7
J6
J4
R69
10Ω
RS6
330Ω
D8
1N4607
74LS08
L16
APLEN (1E5)
SIP 5
IPR
ICLR
ICK
1D
1Q
L8
74LS74
DSTB F/FI (2D11)
(1D5)
R57
4.7K
C17
330pf
PRESET
R70
R71
VCC L29
GND
1K
IQ
SIP 3
IORQ (1D9)
M1 (1D9)
CTC SEL (1C7)
SIP 4
TRGO INT
TRG3
INTENB
RESET
SLT1
SLT2
74LS00
L20
L2C
L13
SIP 4
SIP 1
BS (2C11)
L37
7406
J5
R67
220Ω
J1
SELT
IN3-L (1C7)
L14A
J3
2D
2Q
2CK
2CLR
2PR
J10
REVISION
SEE SH. 4 FOR REV.
A
B
C
11
10
9
8
7

WANG

ECN

ECN NO.

SHEET 1 OF
DATE
RFA NO. (REF)

ORIGINATOR Dick Therrian DEPT. 15 EXT. 3019 DATE 4/18/79
MODEL NO. 2231W-6 TITLE 12 Sol Printer

PART NO.	PART NAME (DWG. TITLE)	REV. F	REV. T	P.C. REV. FROM	P.C. REV. TO	ELEC. REV. FROM	ELEC. REV. TO
209-7332	12. Solenoid CPU	-	-	-	1.-	6	7
DWG. NO 7332							

ASSY. PART NO.	ASSY. TITLE	EFFECTED ☐ NO EFFECT ☐

DESCRIPTION OF CHANGE

Change artwork, assembly drawing and schematic per attached print and as follows:

1) Add filter circuit as shown in attached sketch, to non-maskable interrupt line

2) Delete SW-2

3) Change L23 from 74LS14 to 7414

Change BOM per attached Sheet

REASON FOR CHANGE

Filter is to improve noise immunity on printer
SW-2 is deleted because it is not used

2968J/49

NEW PURCHASE REQ'D. ☐ | SHOP REWORK REQ'D. ☐ | VENDOR REWORK REQ'D. ☐

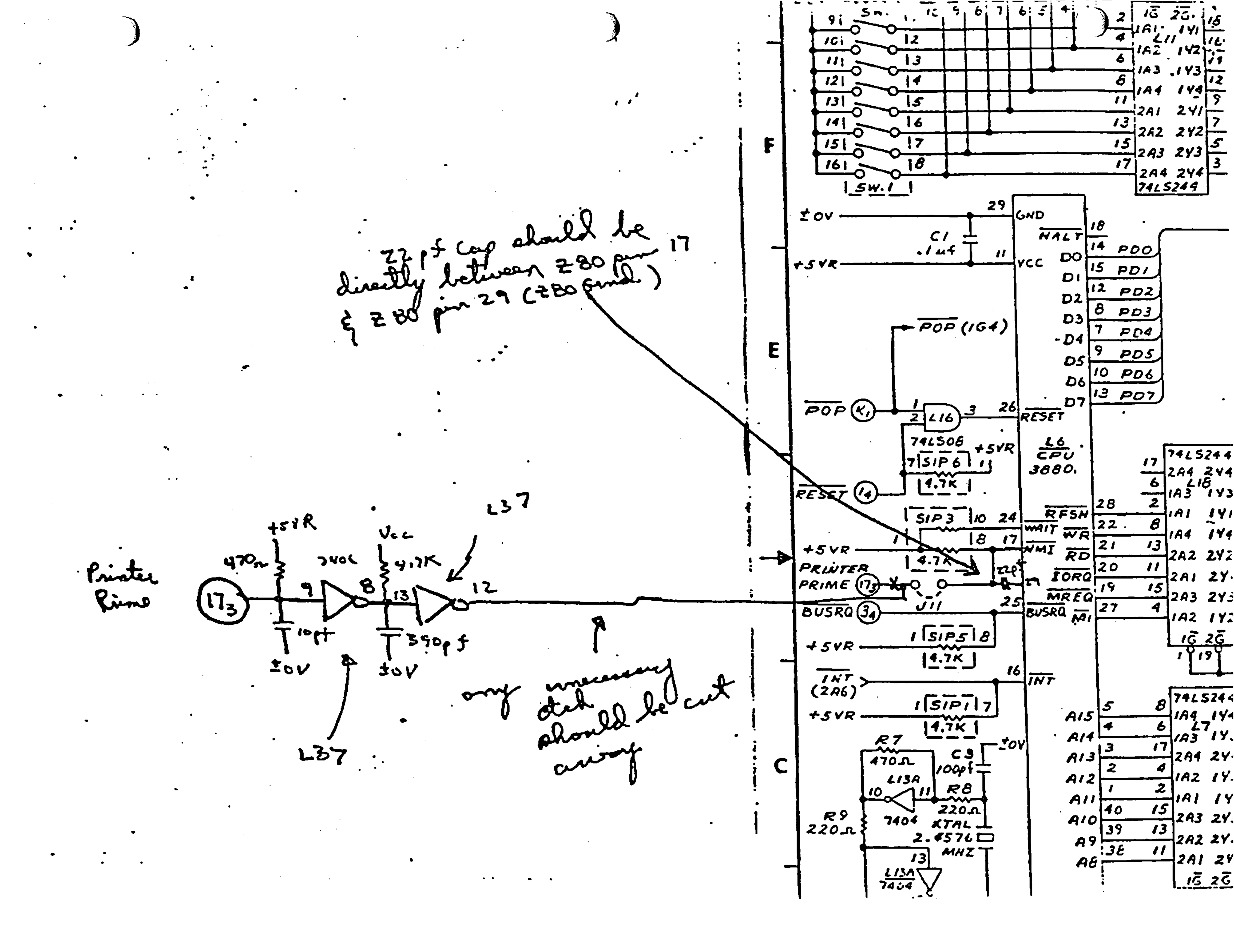
CUSTOMER ENGINEERING
☐ IMMEDIATE CUST.
☐ CUST PER NEXT CALL
☐ INFORMATION ONLY
☐ NONE

ACKNOWLEDGE
BY:
DATE:

[ ] MANDATORY CHANGE
[ ] DOCUMENTATION CHANGE (PL, BOM, DWG)
[ ] EASE OF MFG., COST REDUCTION
[ ] PRODUCT IMPROVEMENT

DISPOSITION	Bonded	FINAL ASSY AREA	SUB ASSY AREA	PARTS IN House	PARTS Outside Vendor	Future MFG.
USE AS IS TO PREVIOUS REV.						
TO CONFORM						
TO CONFORM IF NOT BEYOND OPERATIONS EFFECTED						

FINAL APPROVAL
APPROVED DESIGN ENGRG.
APPROVED MFG. ENGRG.
WRITTEN BY


22 pf cap should be directly between Z80 pin 17 & Z80 pin 29 (Z80 gnd.)
Printer Prime
L37
any unnecessary etch should be cut away
Vcc
4.7K
470Ω
+5VR
10pf
390pf
±0V
L6 CPU 3880.
74LS244
74LS08
SW.1
C1 .1uf
SIP6 4.7K
SIP3 4.7K
SIP5 4.7K
SIP1 4.7K
R7 470Ω
R8 220Ω
R9 220Ω
C3 100pf
XTAL 2.4576 MHZ
L13A 7404
PRINTER PRIME
BUSRQ
POP (1G4)
RESET
INT (2A6)
J11

MBOOEC-A MULTI-LEVEL BILL OF MATERIAL AS OF RUN D

ASSEMBLY PART NUMBER 209-7332- - - LEGEND
ASSEMBLY DESCRIPTION PCA 31W-5/6 12 SOL CPU 1: P=PHANTOM; 2: ITEM MASTER ASSY CODE;

POSITION IN STRUCTURE	LEGEND 1	2	3	COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY	U/M
1		IN		376-0010- - -	IC 7404N HEX INVERTER		2.0000	EACH
1		IN		376-0055- - -	IC 7406 HEX INV BUF DRIVERS HV OUT	EC9538	3.0000	EACH
1		IN		376-0092- - -	IC 7425 2-4 IN NOR GATE-/STROBE	PATREL	1.0000	EACH
1		IN		376-0093- - -	IC 7432 4 2 IN OR GATE	PATREL	1.0000	EACH
1		IN		376-0104- - -	IC 9602 2 RETRIG RESET MONOSTBL MVB		2.0000	EACH
1		IN		376-0153- - -	IC 74LS08 4 2 IN POS AND GATE	EC9805	2.0000	EACH
1		IN		376-0155- - -	IC 74LS74 2 D TYPE EDGE TRIG FF	EC9805	3.0000	EACH
1		IN		376-0158- - -	IC 74LS155 2 2 4 LINE DECODER MX		1.0000	EACH
1		IN		376-0167- - -	IC 72747 2 GEN PURPOSE OPER AMP	PATREL	2.0000	EACH
1		IN		376-0207- - -	IC 74LS00 4 2 IN POS NAND GATE	PATREL	1.0000	EACH
1		IN		376-0212- - -	IC 74LS42 BCD TO DEC DECODER	PATREL	2.0000	EACH
1		IN		376-0286- - -	IC 74LS374 8 LATCHES W/TR ST OUTP		5.0000	EACH
1		IN		376-0288- - -	IC 74LS244 OCTUAL BUF/LINE DR 3-OUT	PATREL	7.0000	EACH
1		IN		376-0304- - -	IC 74LS73 DUAL J-K MASTER SLAVE F/F	PATREL	1.0000	EACH
1		IN		376-0322- - -	74LS14 LOW POWER SCHOTTKY	EC9166	1.0000	EACH
1		IN		376-9011- - -	IC 40 PIN SOCKET BURNDY # DILE40P1		2.0000	EACH
1		IN		376-9015- - -	IC 28 PIN SOCKET BURNDY	PATREL	1.0000	EACH
1	P	FS	*	380-1001-4E- -	D035 SIL DIODE 30V, 100MA AT 1V .4B	EC9538	6.0000	EACH
1		IN		380-1005- - -	DIO 1N4607 70 V 200 MA S/G S	EC9155	1.0000	EACH
1		IN		380-2039- - -	D10 ZEN 1N748 A 3.9V 400MW S DO-7	PATREL	1.0000	EACH
1		IN		380-2051- - -	D10 ZEN 1N751 A 5.1V 400MW S DO-7	PATREL	1.0000	EACH
1		IN		510-7332- - -	PCB 31W-5/6 12 SOL CPU		1.0000	EACH

Add: 376-0139 1.0000

300-1010 RAW MATERIAL 44.8320
MAT. OVERHEAD 10% 4.4832 1.0000

300-1022 SPOILAGE 5% 2.4658
ASSEMBLIES .0000 1.0000

300-1390 SUBTOTAL 51.7810- 1.0000

DIRECT LABOR 26.7879
OVERHEAD 170% 45.5394

TOTAL COST 124.1083

DRIPTION: PCA 314-5/6 12 SCL CPL - 1: P=PHANTOM; 2: ITEM PASTED ...

IN:	LEGEND 1 2 3	COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASS
	IN	000-0001-	LABOR SUB-SYSTEMS		5.193
	IN	000-0011-	LABOR QUALITY CONTROL		1.039
	IN	300-1330-	CAP 330 PF 10% 500 V CERAMIC DISC	EC9805	1.000
	IN	300-1680-	CAP 680 PF 10% 500 V CERAMIC DISC	EC9805	1.000
	IN	300-1900-	CAP .05 UF +80-20% 12 V CERAMIC D	EC9155	18.000
	IN	300-1904-	CAP .02 UF +80-20% 25 V CERAMIC D	E11232	2.000
	IN	300-1906-	CAP .001 UF 10% 500 V CERAMIC DISC	EC9156	1.000
	IN	300-1910-	CAP .0047 UF 20% 500 V CERAMIC DISC		2.000
	IN	300-1930-	.1 UF 50V +80-20% CERAMIC CAP(HIFRG	PATREL	3.000
	IN	300-1931-	1 UF CERAMIC CAPACITOR(HIGH FREQ)		5.000
	IN	300-2147-	CAP .047 UF 10% 100 V MYLAR	PATREL	2.000
	IN	300-4004-	CAP .15 UF 35 V 10% TANT AXIAL		2.000
	IN	300-4014-	CAP 2.2 UF 20 V 10% TANT AXIAL		1.000
	IN	300-4017-	CAP 5.6 UF 35 V 10% TANT AXIAL		1.000
	IN	300-4021-	CAP 100.0 UF 15 V 10% TANT AXIAL		2.000
	IN	300-4022-	CAP 15.0 UF 20 V 10% TANT AXIAL		2.000
	IN	300-5006-	CAP 1000 PF 5% 100 V MICA DIPPED	EC9155	1.000
	IN	321-0027-	CRYSTAL 2.4576 5 % QUARTZ HC-18/U		1.000
	IN	325-1503-	SWITCH SLICE SPST 6 POS DIL	PATREL	1.000
P	FS	330-1010-4E-	RES 10 OHM 1/4W 10% FIXED COMP	E11232	4.000
P	FS	330-2010-4E-	RES 100 OHM 1/4W 10% FIXED COMP		1.000
P	FS	330-2015-4E-	RES 150 OHM 1/4W 10% FIXED COMP		1.000
P	FS	330-2022-4E-	RES 220 OHM 1/4W 10% FIXED COMP	EC9538	5.000
P	FS	330-2033-4E-	RES 330 OHM 1/4W 10% FIXED COMP	EC9155	3.000
P	FS	330-2047-4E-	RES 470 OHM 1/4W 10% FIXED COMP		3 2.000
P	FS	330-2056-4E-	RES 560 OHM 1/4W 10% FIXED COMP		1.000
P	FS	330-3010-4E-	RES 1K OHM 1/4W 10% FIXED COMP	EC9538	2.000
P	FS	330-3022-4E-	RES 2.2K OHM 1/4W 10% FIXED COMP	PATREL	2.000
P	FS	330-3047-4E-	RES 4.7K OHM 1/4W 10% FIXED COMP	E11232	24 23.000
P	FS	330-3056-4E-	RES 5.6K OHM 1/4W 10% FIXED COMP		1.000
P	FS	330-3082-4E-	RES 8.2K OHM 1/4W 10% FIXED COMP	EC9155	1.000
P	FS	330-4010-4E-	RES 10K OHM 1/4W 10% FIXED COMP	PATREL	4.000
P	FS	330-4012-4E-	RES 12K OHM 1/4W 10% FIXED COMP	EC9155	3.000
P	FS	330-4015-4E-	RES 15K OHM 1/4W 10% FIXED COMP	EC9155	3.000
P	FS	330-4018-4E-	RES 18K OHM 1/4W 10% FIXED COMP	EC9155	1.000
P	FS	330-4022-4E-	RES 22K OHM 1/4W 10% FIXED FILM	PATREL	4.000
P	FS	330-4034-4E-	RES 33K OHM 1/4W 5% FIXED COMP		1.000
P	FS	330-4048-4E-	RES 47K OHM 1/4W 5% FIXED COMP		2.000
P	FS	330-5018-4E-	RES 180K OHM 1/4W 10% FIXED COMP		1.000
	IN	331-1022-	RES 22 OHM 1/2W 10% FIXED COMP		1.000
	IN	333-0054-	RES 75 OHM 1/8W 1% FIXED FILM		2.000
	IN	333-0062-	RES 249K OHM 1/8W 1% FIXED FILM		1.000
	IN	333-0812-	RES 4.7K OHM SIP 5/PKG	PATREL	7.000
	IN	336-1012-	RES 50K OHM VAR TRIM TOP ADJ RO	EC9155	1.000
	IN	336-1019-	RES 100K OHM VAR TRIM SIDE ADJ SG		1.000
	IN	350-0028-	225-21021-110 PC CONN 10 POS.	PATREL	1.000
	IN	350-4118-	POLARIZING KEY BETWEEN CONTACTS PK2	E10484	1.000
	IN	375-0017-	TSTR 2N3014 360MW 40V SI NPN S 52		1.000
	IN	375-1005-	XSTR 2N2222A SIL NPN TO-18		1.000
	IN	375-1050-	TRANSISTOR SPS6551		1.000
	IN	375-5004-	TRANSIPAD TO-18 (SMALL)	PATREL	3.000
	IN	376-0003-	IC 7410N 3 3 IN POS NAND GATE	PATREL	1.000

HARDWARE

CAN NOT CON

2231W-1-2-3-6

279-5060-14	SOLENOID ASSY
655-0167	PAPER MARGIN KNOB
465-0730	SPROCKET BUSHING
325-2417	MAGNETIC PICK UP
VFU ASSEMBLY	279-5060-29
VFU TAPE	615-0376
RIBBON	279-0181
REED SWITCH	325-2416
HEAD CABLE	420-1017
PCB DIFFERENCE 2231W-1 10P	210-7060
2231W-2 12P	210-6760

2231W-1	10P HEAD MODEL 61	279-5060-22
2231W-2	12P HEAD MODEL 62	279-5060-12
2231W-3	14.4P HEAD MODEL 63	279-5060-59
2231W-6	12P HEAD MODEL 66	279-5060-88

MOTORS

PAPER FEED MOTOR (VFU)	279-5060-37
SERVO DRIVE MOTOR 2231W-1	279-5060-15
SERVO DRIVE MOTOR 2231W-2-3	279-5060-16

PULLEYS

ENCODER PICK UP - 10P	461-2021
ENCODER PICK UP - 12P	461-2020
ENCODER PICK UP - 14.4P	461-2027
PAPER DRIVE	449-0126
VERNIER SHAFT ASSY	279-5060-32
CLUSTER PULLEY ASSY 2231W-3	279-5060-80

TRANSISTORS

WHERE USED -		FUNCTION
HEAT SINK	2N6103 - 375-1035	+ or - 17V
HEAT SINK	2N6292 - 375-1051	SOLENOID DRIVER
HEAT SINK	2N6387 - 375-1052	SOLENOID DRIVER
HEAT SINK	2N8203A - 375-1053	+ or - 18V CKT
HEAT SINK	2N4037 - 375-0018	- 12V, - 17V CKT
HEAT SINK 2231W-6	2N6107 - 375-1058	+ 17V CKT
HEAT SINK 2231W-6	2N6488 - 375-1054	+ 5V CKT
HEAT SINK	2N2906A - 375-1016	5V DRIVER

DIODES

H/S and POWER SUPPLY	1N403	380-4000
POWER SUPPLY RECTIFIER	1N4719	380-3002

CAPACITORS

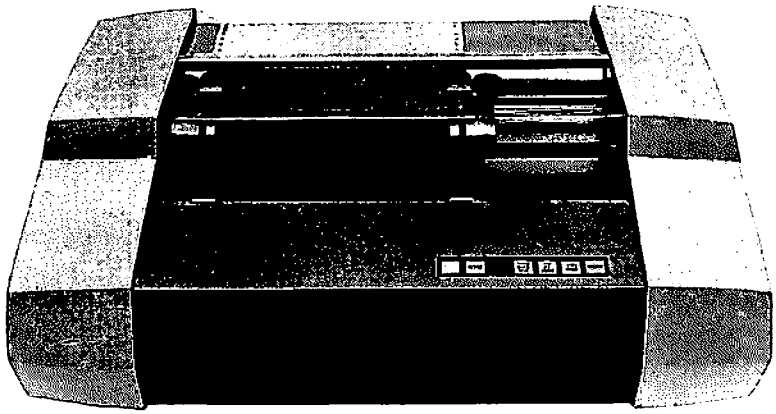
MOTHERBOARD

C1	14000MFD 12V	300-3045
C2-C4	12000MFD 25V	300-3073
C3-C5	7300MFD 40V	300-3074

Master

PRODUCT BULLETIN NO.164

THE MODEL 2231W-6 LINE PRINTER



Wang Laboratories, Inc., announces a truly excellent addition to its family of matrix impact printers - The Model 2231W-6 Line Printer. The microprocessor controlled Model 2231W-6 represents a breakthrough in high-quality output from a matrix printer. By utilizing a high-density 12 x 20 dot matrix array, the Model 2231W-6 can deliver printed output that is practically indistinguishable from typewriter output (see sample below). This quality character registration is produced by impacting the dot matrix head twice at each character position. The first impaction forms the dotted character; the second impaction fills in the spaces between the dots.

SAMPLE OUTPUT

The Model 2231W-6 Line Printer provides a high quality printed output to the System 2200. The printer uses a 12x20 dot matrix to print a full ASCII set of 96 characters containing both upper and lowercase letters, numbers and symbols, with rapid yet quiet operation.

The printer prints its full character set under program control, automatic formatting including both horizontal and vertical tabs is fully programmable to accommodate pre-printed and fixed-format output forms. An expanded character size (where dots of each character in the symbol matrix are each printed twice) is fully programmable to provide highlighted printing where desirable.

WANG LABORATORIES, INC.
ONE INDUSTRIAL AVENUE, LOWELL, MASSACHUSETTS 01851, TEL. (617) 851-4111, TWX 710 343-6769, TELEX 94-7421

Printed in U.S.A.

The printer prints at a rate of 70 characters per second and can output 30 to 153 lines per minute depending on line length. It can print output up to 132 characters per line in a standard 12-pitch format. An expanded character size (dots of each character matrix are printed twice, horizontally) is fully programmable, providing highlighted output when desirable. The Model 2231W-6 prints an ASCII set of 96 characters containing both upper- and lowercase letters, numbers and symbols. The printer uses continuous form paper of widths from 3.5 in. (8.9 cm) to 13.5 in. (34.3 cm) edge-to-edge.

WHAT ARE ITS SPECIAL FEATURES?

The Model 2231W-6 Line Printer provides full alphanumeric printing capability to the 2200 System. Its features include:

- Typewriter-like registration
- 132 characters per line
- 12 x 20 dot matrix
- 70 characters per second print speed
- Full-line buffer
- 96-character set, both upper- and lowercase characters
- Audio alarm
- Front-load and bottom-load paper feed
- Character underscoring
- Quarter-line feed
- Line feed suppression
- Expanded print

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WHAT SWITCHES AND PANEL CONTROLS DOES IT HAVE?

The Model 2231W-6 control panel has a number of switches and indicators that make it easier to operate the printer:

- ON/OFF switch (back of printer)
- SELECT/deselect switch with status lamp
- CLEAR switch to clear line buffer
- LINE FEED switch
- TOP-OF-FORM switch
- FORMS OVERRIDE switch
- Paper out indicator lamp
- Power indicator lamp
- Alarm lamp with one second audio tone

WHAT FORMATS CAN IT PRINT?

Formats are fully programmable from the System 2200 with Wang BASIC statements such as PRINT, LIST, PRINT TAB, HEXPRINT, and PRINTUSING. In addition, all BASIC-2 output formatting instructions (such as LIST D, PRINT HEXOF) can be used with the 2200VP System. The Model 2231W-6 can have printed lines automatically formatted, and can use both horizontal and vertical tabs. Character underscoring is accomplished under program control at the same time the character is printed, thus removing the necessity for a separate head traverse. Expanded character size and line feed suppression are also programmable to highlight headings or important items. A programmable quarter-line feed feature can be used for printing subscripts or superscripts in equations or text.

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WHAT ARE THE PROGRAMMABLE CONTROL FUNCTIONS?

The Model 2231W-6 uses the following programmable control functions:

FUNCTION	DESCRIPTION
Line Feed	Advances paper one line (6 lines/in.).
Vertical Tab	Advances the paper the number of lines specified in the Vertical Tab code.
Form Feed	Advances the paper to the top of the next form.
Carriage Return	Prints the current contents of the line buffer. An automatic line feed occurs after the line has been printed and the print head returns to the left side of the printer carriage.
Expanded Character	Causes all subsequent characters on a line to be printed as expanded (double-width) characters.
Quarter-line Feed	Advances paper one quarter of the standard 6 lines/in. line feed. It can be used when super or subscripting is required. For example: $K_0 = -\left((r_1-r_2)s_x-(d_1-d_2)s \right)^2$
Delete Printer Buffer	Clears buffer of a partial line.
Suppression of Line Feed	Suppresses the normal line feed. This feature can be used for text highlighting or for inserting accent marks over characters. For example: SUPPRESSION OF LINE FEED
Audio Alarm	Generates an audible tone about one second in duration. This feature can be used to alert the operator.

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WHAT IS THE COMPETITION?

With its very dense matrix, the Model 2231W-6 offers the customer the capability of using a dot matrix printer for his high-quality print applications. These applications have previously been dominated by the slower, more expensive solid font printers such as the IBM selectric, Typebar or Diablo daisy wheel printers. The Model 2231W-6 printer gives Wang a considerable competitive edge because of our lower price and higher speed. Also, add to this the inherent flexibility of the dot matrix printer with its comprehensive character set and double size print capability and you have an unbeatable combination. No longer need a customer have two printers, one for his high quality applications such as customer letters or policies, and one for his data processing work. The following table shows the salient features of the main competition and how the Model 2231W-6 compares to some low-cost, low-quality printers.

Characteristic	Wang 2231W-6*	Wang 2281P*	Wang 2231W-2	H.P. 9871A*	IBM 5100	Terminent 1200*	Datapoint*	Centronics 701	DEC LA35
Speed	70cps	30cps Bidirectional	120cps	30cps Bidirectional	80cps Bidirectional	10-120cps	30cps Bidirectional	60cps	30cps
Number of Columns	132@ 12-pitch	132@ 10-pitch 157@ 12-pitch	132	132	132	80/120	132	132	132
Font	12X20 Matrix	Daisy Wheel	7 X 9 Matrix	Solid Font	Matrix	Belt	Solid Font	5 X 7 Matrix	7 X 7 Matrix
Character Set	96	96	96	96	64 + specials	94	96	64/128	96
Price	$3,300	$4,500	$3,100	$3,400	$3,975	$4,000	$6,300	$1,815**	$2,260

* HIGH QUALITY PRINT
**OEM PRICES

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MODEL 2231W-6 Features and Benefits

FEATURES	BENEFITS
. 12 x 20 dot matrix, nominal	. Quality characters are highly readable.
. 96 character set, ASCII	. Both upper- and lowercase characters plus special symbols are available to support a wide variety of applications.
. Up to 153 lines/min can be printed	. Excellent performance in its price range.
. Full-line buffer	. CPU and printing operations can fully overlap to accelerate throughput.
. Audio alarm	. Alarm tone is programmable and can be used to warn operator of paper out condition.
. Expanded print capability	. Enlarged titles and headings for highlighting documents are programmable and easily produced.
. Removable cartridge-ink ribbon	. Snap-on cartridge-ribbon can be easily inserted and removed.
. Deselection without data loss	. Forms can be changed and aligned without losing data in the print buffer.
. Front-load and bottom-load paper feed	. Insertion of paper is handled quickly and easily.
. Line feed suppression	. Titles and a complete line of characters can be highlighted for special effects.
. One-quarter line feed spacing	. Superscripts and subscripts can be easily printed in equations or text.
. Character underscoring	. Characters can be underscored as they are printed.

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SPECIFICATIONS

Printer Size

Height	10 in. (25 cm)
Depth	18 in. (46 cm)
Width	24 in. (61 cm)

Net Weight

60 lb (27 kg)

Speed

70 characters/sec, 30 to 153 lines/min

Character Configuration

12-pitch font:
12 x 20 dot matrix
24 x 20 dot matrix (for expanded print)

Character Set

ASCII 96 characters, both upper- and lowercase.

Line Width

132 characters, max (66 characters, expanded)

Line Density

6 lines/in. (nominal).

Ribbon

Cartridge - ink ribbon; endless, recirculating, Moebius loop.

Switches/lamps

ON/OFF, SELECT, LINE FEED, TOP-OF-FORM, CLEAR, FORMS OVERRIDE, paper out alarm and lamp, power on lamp, select lamp, and alarm tone.

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Paper Size (edge-to-edge)

3.5 in. (8.9 cm) min, 13.5 in. (34.3 cm) max
Paper width settings adjustable; up to four copies plus original can be printed.

Vertical Format Control

Vertical Tab, Top-Of-Form (programmable)

Programmable Operations

Audio Alarm	Form Feed
Line Feed	Expanded Print
Vertical Tab	Delete Buffer
Carriage Return	Quarter-Line Feed
Line Feed Suppression	Underscore

Cable

12 ft (3.66 m) cable with connector to the CPU.

Controller

Standard Wang Printer Controller/CPU interface.

Power Requirements

115 or 230 VAC $\pm$ 10%
50 or 60 Hz $\pm$ 1 Hz
1.25/0.65 amps, 150 watts

Fuses

AC line: 1.5 amps (SB) for 115 VAC,
0.8 amps (SB) for 230 VAC

DC carriage motor: 2.5 amps (SB)

Operating Environment

50° to 90°F (10° to 32°C)
20% to 80% relative humidity, allowable
35% to 65% recommended

Accessories

Optional stand

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PRODUCT BULLETIN NO. 164

Character Set and Expanded Print

!"#$%&'()*+,-./0123456789:;<=>?@

ABCDEFGHIJKLMNO PQRSTUVWXYZ[\]

↑_`abcdefghijklmnopqrstuvwxyz{|}~

EXPANDED PRINT

PRODUCT STATISTICS

Model Number	2231W-6
Part Number	177-2231W-6
Release	April 1, 1978
Available	90 days ARO
Classification	Mechanical

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