

MATRIX PRINTERS

SPEED (120 - 275 CHAR/SEC) - CENTRONICS (101, 102, & 306) WANG (72 & 61)

PRINT HEAD - HAVE SOLENOIDS WHICH THROW WIRE AGAINST A RIBBON

ORDER OF FIRING ~~ON~~ DIFFERENT SOLENOIDS MAKES UP CHARACTERS BY DOT MATRIX

HEAD IS BELT DRIVEN BACK & FORTH BY A SERVO MOTOR (WANG) OR AC MOTOR (CENTRONICS)

2200 OR 1200 SYS SENDS INFO TO LP, 1 CHAR WDS AT TIME CLOCKED INTO SHIFT

REG UNTIL COMPLETE LINE RECEIVED, THEN LINE PRINTED.

LINE FEED - WANG (STEPPING MOTOR) CENTRONICS (SOLENOID RELEASING SWITCH GIVING POWER TO C

FORM FEED & VERT TAB DOING SAME AS LINE FEED S

400 TRANSISTOR NETWORK W/ PUNCH PAPER TAPE USED TO END FORM FEED (HOLE IN CH. 7) OR VERT. TAB (HOLE IN CH. 5) VFU V

SYS. MALFUNCTION LAMP ON FRONT PANEL - LITES ONLY WHEN SERVO CIRC. BREAKS — POWER STILL TO REST OF MP F

END OF DOCUMENT (CH. 2) - VFU STARTS ADVANCING

MORE THAN 1 LINE LENGTH & DEVICE MAY BE USED IN 1 SELECT STMT

WANG MODEL 72 (2221)

72 - 200W, 621W, 721W, 2221W, & 1222 LP OPTION (LPO)

CHARACTERS - MADE BY 9x10 MATRIX, 132 CHAR. LINES, 96 CHAR. SET

200 CHAR/SEC & 65 TO 300 LINES/MIN. USASCII

6 LINES & 10 CHAR./INCH W/ EXPAND FEATURE WHICH DOUBLES WIDTH OF CHAR.

OPERATING TEMP 50°-90°F 40%-80% RH

50/60 Hz ± 1 AT 115V OR 230VAC $\pm 10\%$

2 DIFFERENT STANDS - D6641 (TOP FEED) & D6641-200 (BOTTOM FEED)

INSPECTION - (1) INSPECT WIRING TO ALL 3 REED SW. (2) INSURE TIMING

FENCES & PHOTOCOUPLED PICKUP DON'T MAKE CONTACT BY MOVING CARRIAGE

LEFT TO RIGHT WHILE OBSERVING. (3) CHECK FOR DAMAGED OR LOOSE PARTS

KB SURS RIBBON CABLE NOT TOUCHING ANY PART OF SERVO DRIVE MCH.

CHECK FOR LOOSE PC BRDS. ⑤ MAKE SURS CABLE CONN. FIRMLY IN PLUGS.

CONTROLS & INDICATORS

SELECT SWITCH - ENABLES INPUT TO MP

LINE FEED SW. - ADVANCES PAPER 1 LINE, IF HELD DOWN ADVANCES CONTINUOUSLY

PAPER OUT SW. - TELLS WHEN 8" OF PAPER LEFT w/ ALARM

FORM ADVANCE SW. - ALLOWS COMPLETION OF FINAL 8", LITES w/ PAPER OUT SW. OPEN

CLR SW. - CLEARS BUFFER

SERVO CIRC. BRKR. - RESETTABLE

MAIN FUSE - 4A(SB) 250V FOR 115V OR 2A(SB) FOR 230VAC FOR ENTIRE UNIT

COARSE KNOB - LEFT OR RIGHT FINE ADJ.

PAPER ADVANCE KNOB - DEPRESS & TURNED, MOVES PAPER MANUALLY w/OUT MOVING

STEPPING MOTOR OR VFU.

FEED ADJ. KNOB - ADJ. SPROCKETS FOR PAPER WIDTH

FORMS THICKNESS CONTROL - LOOSEN LOCK KNOB (CCW) & ADJ. FOR AMT OF FORMS

DYNAMIC CHECKOUT

1. CHECKING FOR SPECIFIED V PLUG IN. 2. CONNECT I/O CABLE FROM CONTROL CARD 1079 OR 1042 TO MP 3. TURN POWER ON & SELECT UNIT.

4. CHECK BOTH FANS. 5. DEPRESS MAINT SW. WHICH CAUSES CARRIAGE DRIVE ASSY.

RIBBON, & INDEX MECHANISMS TO OPERATE. CARRIAGE ADVANCES TO RIGHT LIMIT

SW. THIS RETURNS TO ORIGINAL START POSITION. MAKE SURE CARRIAGE DECELERATES NEAR END CAUSED BY REED SW. RIBBON SHOULD MOVE EA. TIME

MAINT. SW. HIT, TEST RIBBON REVERSE ACTUATOR BY PUSHING 1 THEN

OTHER WHILE CARRIAGE MOVING, RIBBON SHOULD REVERSE DIRECTION.

.. LOAD PAPER - LOOSEN LOCK KNOBS OF FEED SPROCKETS, SLIDE PAPER IN SLOT AT TOP, ADJ.

SPROCKET COVERS, PUT PAPER ON SPROCKET, TIGHTEN KNOBS, ADJ. PAPER

CENTRONICS 102A

HIGH SPEED IMPACT LP 9X7 DOT MATRIX

2 PRINT HEADS WORKING IN UNISON & PRINT IN BOTH FORW. & REV

EA. HEAD ONLY TRAVELS $\frac{1}{2}$ WIDTH OF PAPER

330 CHAR/SEC. 125 LPM AT 132 CHAR. 4"-14 $\frac{7}{8}$ " PAPER

10 CHAR & 6 LINE/INCH 5 PART PAPER MAX.

HIGH "1" 2.4 TO 5.5V LOW "0" 0 TO .4V ?

PRINT ACTION INITIATED WHEN LP LINE BUFFER FULL OR CR CHAR REC'D

PRINT HEAD ^{CARRIAGE} THEN MOVES EITHER DIRECTION AT CONSTANT SPEED, PRINTING CHAR.

FROM THE BUFFER UNTIL CARRIAGE REACHES RIGHT OR LEFT LIMIT SW.

1 HEAD PRINTS 1ST 66 CHAR & OTHER 2ND 66 CHAR.

AFTER PRINTING FULL LINE, PRINTER ADVANCES PAPER & BUFFER RELOADED

BOTH HEADS THEN MOVE IN OTHER DIRECTION - NO CR

WHEN PRINT COMPLETED CARR. ALWAYS AT OPPOSITE END OF WHERE STARTED ^{LAST} LINE

PAPER MOVEMENT DONE BY LF, VERT TAB, OR FORM FEED FUNCTION

* WILL NOT PRINT A SINGLE ELONGATED CHAR W/IN A LINE

* WHEN USING OCTAL 16 TO SPECIFY FULL LINE OF ELONGATED CHAR, LINE OF DATA MUST BE SENT ① 1ST 33 CHAR, ② 33 SPACES (OCTAL 40), ③ NEXT 33 CHAR,

④ 33 SPACES

TO MOVE PAPER - ELECTRONICS ACTIVATES LF SOLENOID ACTIVATING CLUTCH MECHANICALLY,
LINKING MOTOR TO TRACTORS

SINGLE LF - LF SOLENOID ENERGIZED 15 m SEC.

UPON COMPLETION OF LF COMMAND, 60-90 m SEC DELAYED LINE FEED TO ALLOW PAWL
& CLUTCH MECHANISM TO RETURN HOME BEFORE NEXT LF

CENTRONICS 101

CARRIAGE MOVES ACROSS PAGE PRINTING UNTIL CR DECODED OR REACH 132 COL.
PRINT HEAD

CONSIST OF JEWEL, CASTING, 7 SOLENOIDS w/ WIRES

SOLENOIDS ARRANGED RADIALY

w/ SOLENOIDS DE-ENERGIZED PRINT WIRES FLUSH w/ SURFACE OF PRINTHEAD

PAPER MOVEMENT

TO MOVE PAPER - LP ELECTRONICS ACTIVATE LF SOLENOID WHICH ACTIVATES CLUTCH MECHANICALLY LINKING MOTOR TO TRACTORS

LF SOLENOID ENERGIZE 20 msec TO ^{INITIATE} MOVE PAPER

AFT LF COMPLETED, 60 msec. DELAY LF GENERATED TO ALLOW CLUTCH PAWL & MECHANISM TO RETURN HOME BEFORE NEXT LF

VERT FORM MOVE - APPLY DC LEVEL TO PAPER FEED SOLENOID UNTIL HOLE IN PAPER TAPE FOUND, DEACTIVATING DC LEVEL

TAPE - 2 TRACKS FOR FORM FEED + VERT TAB

PAPER TAPE DIRECTLY MECHANICALLY LINKED TO GEAR TRAIN FOR TRACTORS

* SELECT BUTTON SHOULD BE DEPRESSED BEFORE & AFT REPLENISHING PAPER SUPPLY

OPTIONAL FEATURE

AUTO. MOTOR CONTRA - AUTO. TURNS OFF MOTOR IF NO PAPER MOVEMENT OR PRINT COMMANDS FOR 9 sec., & AUTO POWER UP IF COMMAND RECEIVED SO NO DELAY BEFORE PRINTING INITIATED.

* COVER INTERLOCK REMOVES +30V FROM DRIVE BOARD WHEN COVER OPEN

REPLACING RIBBON - PLACE PARTIALLY WOUND SPOOL OF NEW RIBBON ON RIGHT AXLE

* LOW (-.6 TO +.4V) 0" HIGH (2.4 TO 5.5V) 1"

OVER

REPLACE RIBBON - REMOVE FRONT COVER & LOOSEN LOCK KNOB LEFT OF PRINT HEAD

NOTE PENETRATION CONTROL KNOB & SET TO 5. REMOVE CAPS FROM RIBBON REVERSING GUIDES. SWING TENSION ARMS CLEAR & LIFT SPOOLS.
- PLACE EMPTY SPOOL ON RIGHT AXLE & THREAD THRU RIGHT GUIDE, IDLER & THEN LEFT GUIDES & IDLER & PUT FULL SPOOL ON LEFT.

REPLACE REVERSING GUIDE CAPS & SET BACK PENETRATION, TIGHTEN LOCK KNOB & REPLACE COVER.

*** PAPER RUNAWAY INHIBIT** - TERMINATES MOTION AFTER 6-9 SEC.

SPEC. OPTIONS

MOTOR CONTROL - SHUTS OFF PRINTER MOTOR WHEN NOT USED, ACTIVATED W/PRINT OR PAPER MOTION COMMAND

SINGLE CHAR. ELONGATION - BIT 8 IN EA CHAR. REG. CAN BE USED TO ELONGATE SINGLE CHAR W/IN LINE

DSC - CAUSE LP TO 1ST PRINT LINE THEN PAPER MOTION W/PAPER MOTION COMMAND.

CENTRONICS 101

MEDIUM SPEED IMPACT PRINTER W/ 5X7 DOT MATRIX

165 CHAR/SEC W. 132 CHAR/SEC + RET/SEC AVG

PAPER 4" - 14 3/4"

10 CHAR & 6 LINES/INCH

60 LPM ^{12/24mm}

200 LPM ^{20-30 CHAR}

132 COLUMNS

5 PART PAPER MAX

PRINT METHOD

PRINT SOLENOIDS SELECTIVELY FIRED AS PRINT HEAD MOVES RIGHT

PRINT WIRBS FORM COLUMN AT ENDS

SOLENOIDS CAN FIRE UP TO 5 TIMES INDEPENDENTLY FOR ANY 1 CHAR.

PRINT CARRIAGE

DURING AUTO. OPER., CARRIAGE TRAVELS LEFT-RIGHT CONSTANT RATE OF 16 1/4" / SEC

RETURNS 65" / SEC 800 MILLI-SEC TO PRINT FULL LINE 200 msec CR

PRINT ACTION STARTS - INPUT BUFFER FULL OR CR REC.

CENTRONICS 300 LP's

MEDIUM SPEED, IMPACT PRINTERS USING DOT MATRIX

SELF CONTAINED INCLUDING MECH & ELEC-MECH COMPONENTS, CONTROL LOGIC, CHAR GENERATOR,
SINGLE LINE BUFFER, & PS

OPERATING NOTES - 3 WIRE GROUNDED OUTLET

ALL COVERS CLOSED & SECURE FOR OPERATION.

NEVER USE W/OUT PAPER

AVOID LEANING OR PLACING THINGS ON LP

POWER OFF BEFORE ADJUSTING PRINT HEAD OR REPLACING RIBBON

PLATEN KNOB - ADJ. PAPER MANUALLY BY PULLING OUT & ROTATING

FORMS THICKNESS CONTROL - 2 KNOBS ON EITHER SIDE OF PRINT HEAD CONTROL

CLEARANCE BETWEEN PLATEN & FACE OF PRINT HEAD

* CLEARANCE ADJ. ACCORDING TO THICKNESS OF FORMS, NUMBER OF KNOBS DON'T
CORRESPOND TO NUMBER OF COPIES

1. LOOSEN LOCK KNOB ON LEFT SIDE OF PRINT HEAD
2. INCREASE PENETRATION BY TURNING PENETRATION CONTROL KNOB UNTIL
WHILE MOVING PRINT HEAD ^{ACROSS} ~~BACK~~ PAPER SMUDGING OCCURS.
3. BACK OFF PENETRATION CONTROL KNOB TO POINT OF NO SMUDGING
4. TIGHTEN LOCK KNOB TO SECURE PRINT HEAD.

VFU - STANDARD 1", 8 CH, BLACK OPAQUE PAPER TAPE

VERT TAB - CHAN. 5 (013_s) TOP OF FORM - CHAR 7 (014_p)

TAPE READER LINKED TO PAPER FEED MECH. SO EA. LF ADVANCES PAPER ONE LINE &

PAPER TAPE ONE SPROCKET HOLE ON 6 LINE/INCH LP

VERT TAB (OCTAL 013) CODE - ADVANCES PAPER TO NEXT HOLE IN CH 5

FORM FEED (OCTAL 014) CODE OR SW. - ADV. PAPER TO NEXT HOLE IN CH 7

* OPTION - HOLE IN BOTH CH. 5 & 7 INDICATES BOTTOM OF FORM (BOF) ADVANCE TO CH 7

* EA. SOLENOID CAN FIRE INDEPENDENTLY UP TO 5 TIMES FOR ANY 1 CHARACTER

PRINT HEAD - CONSISTS OF THE JEWEL, CASTING, & 7 SOLENOIDS w/ ATTACHED PRINT WIRES

7 PRINT SOLENOIDS ARRANGED RADIALLY AROUND PRINT HEAD

FREE END OF PRINT WIRES GO THRU WIRE GUIDE TO INSURE CORRECT WIRE TO CORRECT HOLE IN JEWEL

* PRINTING ACTION INITIATED WHEN INPUT BUFFER FILLED OR CR CODE RECEIVED

PRINT HEAD THEN SWEEPS ACROSS PAGE UNTIL CR CODE DECODED AT BUFFER

OUTPUT OR HEAD REACHES 80 COL. SW.

PRINT HEAD THEN RETURNS TO LEFT MARGIN & AUTO LF DONE (AUTO LF MAY BE DISABLED AS OPTION)

PAPER MOVEMENT

MAIN MOTOR VIA O-RING BELT TO FORM FEED MECH VIA PAPER DRIVE SHAFT TO

PAPER TRACTORS 4"/SEC

FORM FEED MECHANISM - FORM FEED OR RELEASE CLUTCH, LINE FEED SOLENOID w/

SLIDE UNIT, & GEAR TRAIN MECHANICALLY LINKING MOTOR TO TRACTORS

INITIATE LF - LF SOLENOID ENERGIZED 15 msec. & AFTER LF COMMAND COMPLETE

60-90 msec. DELAYED LF INTERVAL GENERATED SO CLUTCH PAWL &

CLUTCH MECH. CAN RETURN HOME BEFORE ANOTHER LF

VERTICAL FORMS MOVEMENT DONE BY DC COIL TO PAPER FEED SOLENOID &

KBPS MOVING TILL TERMINATED BY DELETE CODE, INPUT PRIME SIGNAL AT INTERFACE,

OR PAPER TIME OUT CONDITION

IF VFU USED, PAPER STOPS WHEN HOLE IN RIGHT CH. OF PAPER TAPE DETECTED

AS PAPER MOVES - EA LINE CAUSES LINE COUNT SW. IN FORM FEED MECH TO OPEN & CLOSE

WIRES FROM SW. GOTO INTERFACE & LINE COUNT LEVEL FROM INPUT DEVICE

SWITCH ON & OFF BY PRINTER FOR EA. LINE

* IF NO VFU, USER'S SOFTWARE CONTROLS VERT. FORMAT BY COUNTING THESE LINES

SPECIAL FUNCTIONS

DELETE (OCTAL 177) BELL (OCTAL 007) SELECT (021₈) DE-SELECT (023₈) ELONGATED BOLD FACE CHAR (016₈)

DIFFERENCES BETWEEN WANG & CENTRONICS PRINTER

WANG - PAPER MOVED BY STEPPING MOTOR - 72-4 PHASE 1 LINE/8 PULSES - 61-2 PHASE 1 LINE/4 PULSES

CENTRONICS - PAPER MOVED BY FEED PULSE ENERGIZES SOLENOID RELEASING CLUTCH TO RUNNING AC MOTOR

W-9 STAGGERED SOLENOIDS WHICH USED TO FIRE ON LEADING AND TRAILING EDGES OF TIMING MARK FOR STRAIGHT LINE

C-7 SOLENOIDS IN STRAIGHT VERTICAL LINE

W-VFU LITE SOURCE ARE INFRARED LED'S & CAN'T BE SEEN

C- USES REGULAR BULB FOR LITE SOURCE

CENTRONICS 306 (22

5X7 OR OPTIONAL 9X7 DOT MATRIX

USASCII

64 CHAR SET

120 CHAR/SEC. = 1 FULL 80 CHAR LINE + CR/SEC

4"-9 1/2" PAPER

1-5 COPIES

10 CHAR. & 6 LINES/INCH

PAPER 4"/SEC.

80 CHAR BUFFER - WILL REC. PARALLEL DATA UP TO 75,000 CHAR/SEC.

OPTIONAL SERIAL DATA INPUT AT RATES FROM 100-9600 BAUD

* ONCE LINE OF PRINTABLE CHAR. STORED IN BUFFER,

HEAD MOTION STARTS BY ACTIVATING FORWARD CLUTCH, MOVING HEAD LEFT TO RIGHT.

WITH HEAD IN MOTION, DATA SENT FROM BUFFER TO CHAR GENERATOR

THEN CHAR WRITE PULSES SENT TO DRIVER CIRC ENERGIZING PRINT SOLENOIDS CAUSING

PRINT WIRES TO PUT CHAR. ON PAPER

PAPER MOVEMENT INITIATED BY LF, VERT TAB, OR FORM FEED FUNCTION

FORM MOVEMENT CONTROLLED BY SOFTWARE BY MEANS OF LINE COUNT PULSES

OPTIONAL VFU IS AVAILABLE

HAS BELL, DELETE & ELONGATED CHAR CONTROL CODES

CHARACTER PRINTING

ACCOMPLISHED BY SELECTIVELY FIRING PRINT WIRES AS PRINT HEAD MOVES

LEFT TO RIGHT.

61 or 2231 - AUTO. INDSX AFTER CR

DEVICE TYPE 0 - DOUBLE SPACE 2 - SINGLE SPACE

4 - INDIVIDUAL STMT LONGER THAN 112 CHAR SINGLE SPACED, REST DOUBLE

DEVICE ADDRESS - 15 or 16

EXPAND FUNCTION - HEX(0E) - 5 CHAR/" - ONLY WILL PRINT 1 LINE OF EXPANDED CHAR., MOST 56 CHAR.

61 or 2231 - 7 ZONES OF 16 CHAR. COL. 0-15, 16-31, 32-47, 48-63, 64-79, 80-95, 96-111

* IF COMMAS USED TO SEPARATE ELEMENTS IN PRINT STMT, EA ELEMENT STARTS IN NEW ZONE SEMICOLONS GIVE PACKED FORMAT

WHEN HEX CODES COMBINED CONTROL CODES EXECUTED FIRST

ALARM	HEX(07)	CARRIAGE RETURN	HEX(0D)
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LINE FEED	HEX(0A)	ELONGATED CHAR	HEX(06)
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VBKT. TAB	HEX(0B)	DELETE	HEX(7F)
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FORM FEED	HEX(0C)
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* NOT AS FAST BECAUSE OF NEW TYPE PRINT SOLENOID

STEPPING MOTOR ^{- 2 PHASE DRIVE PROVIDED BY L4 JK F/F} ~~FOR LINE FEED ALSO~~ CALLED STATE GENERATOR

BUSY - INDICATES TO SYS OPERATION IN PROCESS

5V - HI GRD - LO OPEN - HI

DIFFERENCES BETWEEN WANG & CENTRONICS PRINTERS

WANG - CARR. DRIVEN BY SERVO MOTOR, +V FORWARD & -V REVERSE

CENTRONICS - CARR. DRIVEN BY AC MOTOR - BY GEARS & BELTS & FWD & REV. CLUTCHES ENGAGED BY ^{MODEL 306 USES LARGE SPRING INSTEAD OF CLUTCH}

W - USES REED SW. TO MANIPULATE CARRIAGE

C ^{306 & 101} NEEDS DASH POT BECAUSE OF SPEED / MODEL 102 HAS COIL ACTS LIKE BRAKE

W - RIBBON USES 2 MOTORS & MOVES ENTIRE TIME PRINT HEAD MOVES

C - RIBBON MOVES VIA MECH. LINKAGE THEN FWD. DR. UNIT ONLY WHEN HEAD PRINTING

* IF SPECIAL INTERFACE USED, INTERFACE CABLE INCLUDED W/ PRINTER WHEN SHIPPED

MODEL 64 (2231)

SERVO ALARM LAMP - LITES WHEN SERVO FUSE OPEN & SERVO LOGIC ACTIVE

SERVO MOTOR FUSE - 2.5A SLO BLO - PROTECTS MOTOR DURING PAPER JAM OR LOGIC FAILURE

MAIN FUSE - 2A SLO BLO/115V 1A (SB)/230V

HEAD ADJ. ARM - ADJ. DISTANCE BETWEEN PRINTHEAD BEARING & STRIKER BAR

ADJUST FOR BEST PRINT QUALITY (1-9 POSITIONS)

* MOVE TO POSITION "L" TO INSTALL NEW RIBBON CARTRIDGE

DYNAMIC CHECKOUT

CHECK V & PLUG INTO V SPECIFIED

CONN. I/O CABLES TO REAR OF UNIT & CONTROL CARD 6379 IN CPU

PUT LP PARALLEL TO FRONT OF TABLE HANGING OVER & LOAD PAPER

POWER ON & CHECK FAN

SELECT UNIT & RUN 2231W DIAGNOSTIC

VFU - 2 CH. TAPE READER, READS STANDARD 1" W, 8 CH. BLACK OPAQUE PAPER OR MYLAR TAPE

DIRECTLY LINKED TO STEPPING MOTOR

STANDARD TAPE - VERT. TAB 1" APART, TOP OF FORM 11" APART

VERT TAB - ADV. TAPE TO NEXT HOLE IN CH. 5

TOP OF FORM - ADV. TAPE TO NEXT HOLE IN CH. 7

IGNORES ANY HOLES NOT IN CH. 5 OR 7

PAPER TAPE GOES THRU VFU IN UP DIRECTION

RIBBON CARTRIDGE REMOVAL - OPEN COVER & MOVE HEAD ADJ. ARM TO "L"

- PULL UP VERTICALLY RIGHT SIDE OF CARTRIDGE UNTIL OFF SPINDLE

- REMOVE RIBBON FROM PRINT HEAD GUIDE & REMOVE

INSTALL - MOVE HEAD ADJ. ARM TO "L" - TURN RIBBON ADV. KNOB CCW TO TAKE UP SLACK

- TILT RIBBON TO BOTTOM REAR SO LIP AT LEFT & RIGHT CORNERS SLIP INTO

CARTRIDGE GUIDES. PUSH DOWN CARTRIDGE TILL CARR. SPRING SEATS - TAKE UP SLACK BY
MOVE HEAD ADJ. ARM

* R38 OF 6577 BOARD ADJUSTS SPEED OF LP (WS ADJUSTMENT)

1 MAINT. SW. - SWEEPS CARRIAGE FORW. & BACK w/OUT PRINTING & TESTS SW

* IF 6577 OR 6728/BOARD ¹⁰²⁸ CHANGED PERFORM WS & RELATED ADJUSTMENTS

* TIMING POTS SHOULD BE SECURED w/ GLYPHAL

FORM FEED - CH 2 VERT TAB - CH 5 LINE FEED - CH 7

9 SOLENOIDS CAN FIRE AT ANY OF THE TEN COUNTS

MODEL 61 (2231)

USASCII

MATRIX IMPACT PRINTING TECHNIQUE 112 CHAR. LINE 96 CHAR SET.

CHAR. 7w X 9h MATRIX 120 CHAR/SEC. 40-250 LINES/MIN

6 LINES 10 CHAR/INCH w/ EXPAND FEATURE CHAR. 14w X 9h

- PRINT HEAD & CARRIAGE ASSY, INKING MEDIUM, PAPER MOVEMENT MECH, VFU, & CONTROL ELEC.

PRINTING - SOLENOIDS FIRED AS CARR. MOVES TO RIGHT, EXTENDING A PRINT WIRE AGAINST A RIBBON & PAPER FOR A DOT.

2 MAG PICKUPS & TIMING DISK PROVIDE SIGNALS FOR HEAD MOTION & PRINT TIMING

INKING - MOBIUS LOOP FABRIC RIBBON CARTRIDGE - RIBBON ONLY MOVES WHEN PRINT HEAD MOVING RIGHT, MOVED BY PULLEY MOUNTED UNDER CARRIAGE ENGAGED WHEN MOVING RIGHT & INVERTED INSIDE RIBBON CARTRIDGE

PAPER MOVEMENT - PAPER WIDTHS OF 4" - 12.8" w/ ADJ. PIN FEED UNIT

STEPPING MOTOR DRIVES PINFEED UNITS, ACTIVATED BY CR OR PROG. CONTROL

- WILL STEP 1 LINE OR CAN USE VFU

VFU - 2 CHANNELS FOR VERT TAB OR TOP OF FORM

CONTROL ELECTRONICS - LINE BUFFER, FUNCT. DECODER LOGIC, CHAR. GENERATOR,

& POWER DRIVE CIRCUITS

INSPECTION - INSPECT WIRING FOR 3 RIBBON SW, CHECK TIMING DISK & MAG.

PICKUP MAKING SURE THEY DON'T TOUCH, CHECK FOR LOOSE OR DAMAGED PARTS, CHECK

RIBBON ADVANCE CABLE PROPERLY SEATED & DRIVE PULLEY FOR PROPER OPER., PE BOARD & CONNECTORS SEATED CORRECTLY & PAPER TAPS (IN VFU) SEATED RIGHT

MODEL 72 (2221)

6728 MEMORY & REGULATOR BOARD

L11 ONE SHOTS - ADJ. 425-435, MAX. PULSE FIRMS SOLENOIDS

L26 COL. COUNTER - ADDR. COL. FOR EA CHAR. MATRIX, 10 COL. / CHAR.

DURING POWER UP +5VR HELD AT +4.6V APPROX. DISABLING MOTORS & SOLENOIDS

UNTIL LOGIC ACHIEVES CONTROL

Power Down - +12V(SW), -12V(SW), & +9(SW) OFF WHEN +5V GOES BELOW +4.6V

WHICH ALLOWS FOR CAPACITOR DISCHARGE IN RESPECTIVE SUPPLIES

FUNCTION CODES NOT SHIFTED INTO 132 BIT REG. EXCEPT CR, ALSO TO TERMINATE PRINTING

6576 I/O CONTROL & DATA STORAGE BOARD

MARKER BIT - INDICATES POSITION IN BUFFER OF 1ST CHAR TO BE PRINTED

INDICATES WHEN BUFFER FULL (132 CHAR. TO PRINT)

* IN PRIME ROUTINE, MARKER BIT PLACED IN 1ST POSITION OF SHIFT REGISTER AFTER CLEAVING IT
LP READY TO RECEIVE INFO ONCE MK, MARKER BIT, IN 1ST POS. OF SHIFT REGISTER

BUSY - INDICATES TO SYS OPERATION IN PROGRESS

BUSY CONDITIONS ① FUNCT. DECODED AT INPUT ② PRIME CIRC. ACTIVE

③ BELL ACTIVE ④ COVER OPEN ⑤ $\overline{SL}$ - SELECT STATUS GATED w/ SLCTR

⑥ PAPER FEEDING ⑦ FORM-FEED OR VERTAD ⑧ PRINTING

⑨ BUFFER FULL ⑩ CR AT INPUT ⑪ OUT OF PAPER ⑫ SERVO BRK. OPEN

PRINT CYCLE - INITIATED BY BUFFER FULL OR DECODING CR AT INPUT

SW2 - RIGHT-MOST REED SW. - REVERSES SERVO LOGIC

AUDIO ALARM - CAUSED BY ① POWER ON ② H08(D7) ③ OUT OF PAPER ④ CB OPEN

RIBBON MOVES CONSTANTLY WHEN PRINTING & REMAINS OFF FOR 1.1 SEC. AFT. PRINTING

6576 & 6728 USABLE EXCEPT w/ 1222 LPO THEN USE 7076 & 7028

① 1222 LPO - UNDERSCORE FUNCTION

ONLY CR SHIFTED INTO SHIFT REGISTER.

STEPPING MOTOR - DRIVES PAPER FEED & VFU - EA. STEP IS 15° ROTATION - 8 STEPS / LINE FEED
2 PHASE MOTOR BECAUSE 2 OF 4 WINDINGS DRIVEN AT 1 TIME
DRIVEN BY RESETTABLE ASTABLE OSCILLATOR OF WHICH 1ST CYC. LONGER FOR
INITIAL DRIVE TO OVERCOME INERTIA OF STILL MOTOR
WHEN IDLE SOME I THRU COILS TO HOLD MOTOR IN POSITION SINCE MOTOR
IS VARIABLE RELUCTANCE TYPE STEPPING MOTOR

+18V PROVIDES TWICE I TO COILS FOR STEPPING

6728 MEMORY & REGULATOR BOARD

COLUMN COUNTER

CHARACTER GENERATOR ROM

OUTPUT LATCH

OUTPUT GATES

PULSE GENERATORS (PGs)

WHEN PRINTING CHAR. SHIFTED OUT OF 132 BIT SHIFT REG. OF 6576 PC₀₂₀

7 BITS ($b_1 - b_7$) USED TO ADDR. CHAR. GENERATOR

COL. COUNTER ALSO ADDR. ROM FOR COL. OF CHAR. MATRIX

DOT PATTERN OF CHAR. CLKED INTO OUTPUT LATCH & SENT TO SOLENOID

DRIVES AT RIGHT TIME THRU OUTPUT GATES

WINDOW STROBE GENERATES THE TIMING

P60 STROBES OUTPUT TO SOLENOIDS P61 - READ PULSE FOR ROM

P62 CLOCKS ROM OUTPUTS 1-9 TO OUTPUT LATCH & COL. COUNTER INCREMENTED

REPEATED 5 TIMES FOR EA. LEADING & TRAILING EDGE OF WS FOR NONEXPANDED CHAR.

SFM - NEG PULSE CAUSES CARRIAGE TO START MOVING FORW.

SFM - INCREMENTS COLUMN COUNTER TO 0001_2

WS - USED TO CLOCK PRINTING OF CHAR. 5 WS PULSES TO PRINT A CHAR.

WS - LEADING & TRAILING EDGE OF 1ST 5 PULSES INCREMENT COL. COUNTER
TO 1011_2 WHICH IS DECODED CAUSING SFL WHICH RESETS COL.

COUNTER TO 0000_2 & NEXT CHAR. SHIFTED TO OUTPUT OF 132 BIT REG.

* (WHEN COL. COUNTER IS 0000_2 ALL "1" READ FROM ROM TO SHIFT REG. & NO SOLENOIDS FIRED
SPACE BETWEEN CHAR. EVERY 10 PULSES

MODEL 12 (2221)

THEORY OF OPERATION

CARRIAGE MOVES PRINT HEAD, CHAR. FORMED BY SELECTIVELY FIRING SOLENOIDS AS HEAD MOVES RT.

OPTICAL PICKUP HEAD ON CARRIAGE - SYNCHRONIZES PRINT PROCESS

↳ MOVES ACROSS TIMING FENCE WHICH HAS VERT. BARS THAT INTERRUPT LIGHT TO PHOTOXISTOR GENERATING VIDEO SIGNAL WHICH GIVES STROBE FOR PRINT TIMING

CARRIAGE - DRIVEN BY SERVO MOTOR (FEWER PARTS + QUIETER) W/ TACHOMETER WHICH HELPS MOTOR MAINTAIN STABILITY & CONSTANT SPEED

3 REED SW. - ON FRAME OF CARRIAGE BLOCK, ACTIVATED BY MAGNET ON CARR., CONTROL ALONG W/ START/STOP LOGIC (6576) FORW/REV FOR SERVO MOTOR

PAPER MOVEMENT - 3 ORIGINS - LINE FEED, VERT TAB, FORM FEED

VFU - 3 CH. OPTICAL TAPE READER, CH. 2, 5, & 7, DIRECTLY LINKED TO GEAR OF PAPER FEED

LINE FEED - 3 WAYS - ① AUTO. AFTER CR ② HEX(OA) ③ LINE FEED KEY ON LP

VERT. TAB - 1 WAY - HEX(OB)

FORM FEED - 3 WAYS - ① HEX(OC) ② TOP OF FORM KEY ON LP ③ HOLE IN CH. 2 OF VFU TAPE

RIBBON MOVEMENT - 2 LOGIC CONTROLLED TRIAC DRIVEN 24 VAC GEAR MOTORS, ONLY 1

MOTOR ACTIVE AT A TIME,

END OF RIBBON - SENSED BY RIVET ON RIBBON MAKING SW., TOGGING FLIP-FLOP, REV. LOGIC

RIBBON MOTOR - CONSISTS OF GEAR MOTOR & HOLD-IN SOLENOID

W/ MOTOR OFF OR PRINTER IDLE MOTOR IS DISENGAGED.

W/ POWER TO MOTOR ACTION DRAWS ARMATURE UP TO ENGAGE GEARS, HOLD-IN SOLENOID

KEEPS MOTOR ENGAGED TO REDUCE WEAR

6577 PC BOARD - FORMAT & PRINTING CONTROL BOARD

CARRIAGE MOVEMENT - POWER ON, POWER ON PULSE GENERATED, INITIATES CARR. DRIVE & PAPER FEED

IF CARR. NOT HOME (SWO CLOSED) CR SEND

W/ CARR. HOME, ALL 3 RELAYS OPENED, NO V TO SUMMING JUNCT EXCEPT TACH FEEDBACK

SELECT STMT.

SELECT PRINT - USE LP FOR ALL OUTPUT FOR PRINT, PRINT USING, HEXPRINT

SELECT LIST - LP OUTPUTS PROGRAM LISTING

SELECT CO - LP PRINTS ALL CONSOLE OUTPUT, ALL INFO KEYED IN PRINTED ON LP UNTIL ANOTHER CONSOLE DEVICE SELECTED

2221W - LINE LENGTH OF 132 CHAR SYS HAS DEFAULT LINE LENGTH OF 64 FOR CRT

SELECT PRINT 215(132) - SAYS 132 CHAR. PRINTED BEFORE AUTO CR

* IF LINE OF 25, FOR EXPLE, GIVEN FOR 2221W, LIMITATION APPLIES TO ANY OUTPUT DEVICE - SELECTED AFTER 2221W W/OUT LIMITATION.

EXPAND FUNCTION: HEX(0E) - REG. CHAR. MAY BE EXPANDED FROM 10" TO 5" ALSO EXPANDS ZONES OF PRINTER (SEE BELOW)

WILL ONLY EXPAND 1 LINE OF PRINT W/ 66 MAX CHAR LENGTH

IF MORE THAN 66 CHAR ATTEMPTED TO EXPANDED, AFF 66 LOST

IF 66 OR LESS CHAR BUT NOT ALL 66 ON FIRST LINE,

WHATEVER CHAR. NOT ON 1ST LINE ARE NORMAL SIZE

2221W - 8 ZONES OF 16 CHAR. COL. 0-15, 16-31, 32-47, 48-63, 64-79, 80-95, 96-111, 112-127, 128-131

IF COMMAS IN PRINT STMT SEPARATE ELEMENTS, EA. ELEMENT BEGINS IN NEW ZONE

IF SEMICOLONS SEPARATE ELEMENTS, OUTPUT IN PACKED FORMAT

HEX FUNCTION - TO OUTPUT CHAR. ON PRINTER NOT ON STANDARD KYBD OR OUTPUT SPECIAL PRINTER CONTROL CODES.

HEX () MAY HAVE MORE THAN 1 HEX CODE IN 1 SET OF ()

SPECIAL PRINTER CONTROL CODES

ALARM - HEX(07)

CARRIAGE RETURN - (HEX 0D) PRINTS CONTENTS OF BUFFER & CR/LF

LINE FEED - HEX(0A)

ELONGATED CHARACTER - (HEX 0E) DOUBLE WIDTH

VERTICAL TAB - HEX(0B) ^{GO TO CH 5}

DELETE - HEX(7F) CLR. BUFFER OF PARTIAL LINE

FORM FEED - HEX(0C) ^{GO TO CH 1}

HEX CODES COMBINED - CONTROL CODES EXECUTED FIRST

MODEL 72 (2221)

VFU - 3 CH. TAPE READER WHICH READS STANDARD 1", 8 CH, BLACK OPAQUE OR MYLAR TAPE

- DIRECTLY LINKED TO STEPPER MOTOR FOR MOVING PAPER 1 LINE & PAPER TAPE

1 SPROCKET HOLE FOR 6 LINES/INCH

* VFU PAPER TAPE SHIPPED SHIPPED W/ MACH. HAS VERT. TAB⁶ HOLES 1" APART & TOP OF FORM 66 HOLES, 11" APART.

EA. VERT. TAB ADVANCES TAPE TO NEXT HOLE ON CH. 5

EA. TOP OF FORM ADVANCES TAPE TO NEXT HOLE ON CH 7

END OF DOCUMENT FEATURE - NON-PROGRAMMABLE - USE CH. 2 & IF SENSED

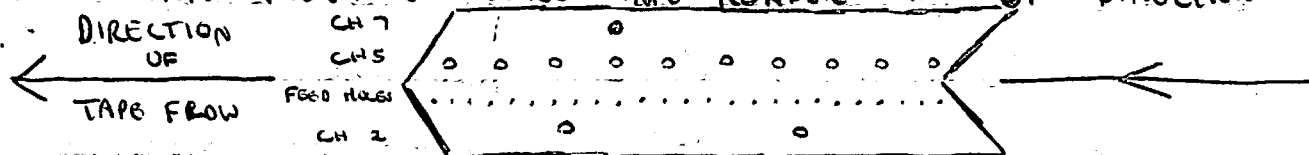
PAPER ADVANCES TO NEXT HOLE IN CH 7

FORMAT TABS - CAN BE PUNCHED ON TELETYPE - VARY IN LENGTH ACCORDING TO PAPER SIZE

* HOLES PUNCHED OTHER THAN IN CH 2, 5, & 7 IGNORED

SPLICE PAPER TAPE ON BOTH SIDES W/ SPLICING SQUARES, PART # 660-0176

* PAPER TAPE MUST GO THRU TAPE READER IN UP DIRECTION



DEVICE CODE - TYPE ADDRESS
XXX

1ST DIGIT HEX 0 - USED W/ DEVICES WHICH DON'T AUTO LF AFTER CR

2200 WILL LF AFTER CR

1ST DIGIT HEX 2 - IF DEVICE AUTO LF AFTER CR

1ST DIGIT HEX 4 - NORMALLY WHEN # OF CHAR. = LINE LENGTH, CR

THIS SUPPRESSES CR WHEN # OF CHAR. = LINE LENGTH

CR NOT EXECUTED UNTIL CR COMMAND GIVEN OR BUFFER FILLED

* THIS CAUSE SINGLE STMT LINES TO BE SINGLE SPACED WHILE NEW LINES DOUBLE SPACED

2 DEVICE ADDR. FOR 2221W-15₁₆ ALWAYS USED FOR 1ST LP

16₁₆ - 2ND LP CONNECTED TO SYS

WANG

TECHNICAL SERVICE BULLETIN
SECTION: HardWare Technical

NUMBER: HWT 5154 REPLACES: _____ DATE: 10/29/85 PAGE 1 OF 1

MATRIX ID. 7202 PRODUCT/RELEASE# 22V67 RF IOP

TITLE: MDL Switch Settings (VS 90/100)

PURPOSE:

To eliminate hangs on the 5521 printer when attached to a VS 90/100 which has the 5 MHz MDL installed.

EXPLANATION:

On WangNet (P-band), 5521 printers will fail when force cancel with a Halt I/O (HIO) when attached to a VS 90/100 that has an RF IOP with the 5 MHz clock installed (P/N 212-3046). An ECO is being generated to eliminate this problem. In the interim when installing the 5 MHz MDL in a VS 90/100, put switch seven (7) and eight (8) ON. With a 2 MHz MDL, switch seven (7) and eight (8) should be OFF.

GROUP: Telecommunications Networking Support Group MAIL STOP: 0115A

C O M P A N Y C O N F I D E N T I A L

WANG Laboratories, Inc.

WANG

LABORATORIES, INC.

MEMORANDUM

TO: ALL CUSTOMER ENGINEERS

FROM: GENE BARTOS

SUBJECT: 210-7076 PCB IDENTIFICATION

DATE: SEPTEMBER 14, 1978

A problem exists with identification and use of the three types of 210-7076 PCB's for the Model 72 Matrix Printer commonly known as the 2221W, 5521 and 200W.

The 2221W and 2221V requires a 210-7076 PCB, the 5521 requires a 210-7076-2 PCB, and the 200W, an OEM product, requires the 210-7076-1 PCB. Attached you will find two variation charts and two component layouts of the 7076 PCB. The first variation chart identifies the differences between the 7076 and the 7076-1 PCB's. Please refer to FIGURE 1 component layout for the locations of these differences. The second variation chart identifies the differences between the 7076 and 7076-2 PCB's. Please refer to FIGURE 2 component layout for the locations of these differences.

It is suggested, you use this information for identifying these boards rather than changing the board for use in a different application as you could generate more problems and confusion. Most of the 7076-1 and 7076-2 PCB's have a 1 or 2 stamped in ink next to the board number. However, many 7076-2 were changed back to 7076 and the ink stamp is still visible, even though, efforts were made to erase it. Therefore, check the boards as described in the above paragraph rather than relying on the ink stamp.

You will notice on boards that are being returned from repair have an additional white label on them to help you identify these boards. There are three different types of labels being used and they read as follows:

1. "7076 For 2221W only"
2. "7076-1 For 200W only"
3. "7076-2 For 928 only"

If you have any further questions please call me.

Regards,



GENE BARTOS
AREA TECHNICAL SPECIALIST

GB:rb

cc: Area Staff
Utility Clerks
D.T.S.'s
B.S.'s

VARIATION CHART FOR 7076 AND 7076-2

<u>PCB P/N</u>	<u>MODEL</u>	<u>COMPONENT</u>	<u>W.L.I. P/N</u>
7076	2221W	JUMPER A	LOADED
		DT8	LOADED
		D22	NOT LOADED
		D23	NOT LOADED
		R80	NOT LOADED
		ADDITIONAL JUMPERS AND ETCH CUTS	NOT LOADED
7076-2	5521	JUMPER A	LOADED
		DT8 JUMPER	NOT LOADED
		D22	380-1001
		D23	380-1001
		R80 - 4.7K ohm	330-3047
		ADDITIONAL JUMPERS AND ETCH CUTS	LOADED

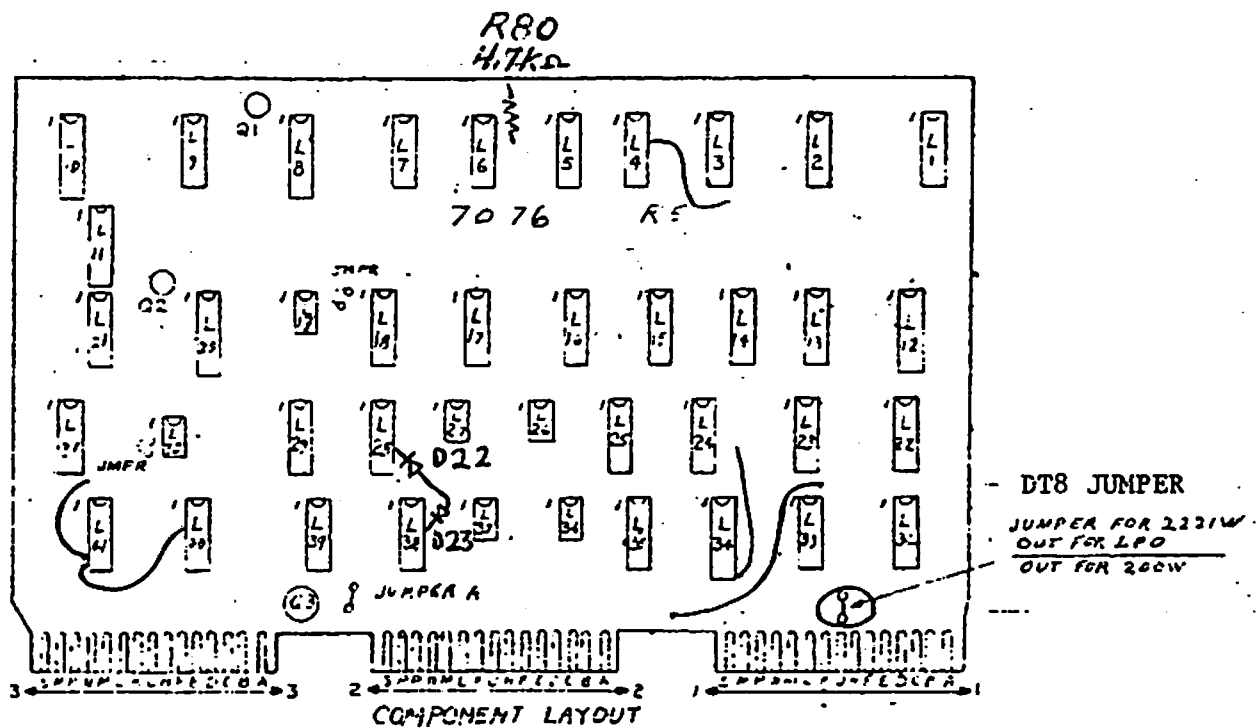


FIGURE 2

VARIATION CHART FOR 7076 AND 7076-1

<u>PCB P/N</u>	<u>MODEL</u>	<u>COMPONENT</u>	<u>W.L.I. P/N</u>
7076	2221W	JUMPER A	LOADED
		DT8 JUMPER	LOADED
		C7 - 820 pf	300-1820
		C41 - 270 pf	300-1270
		C44 - .001 mf	300-1906
		C45 - .001 mf	300-1906
		C46 - .001 mf	300-1906
		R21 - 4.7K ohm	330-3047
		R30 - 10K ohm	330-4010
		R78	NOT LOADED
7076-1	200W	JUMPER A	NOT LOADED
		DT8 JUMPER	NOT LOADED
		C7	NOT LOADED
		C41 - 47 pf	300-1047
		C44 - 10 pf	300-1010
		C45	NOT LOADED
		C46	NOT LOADED
		R21	NOT LOADED
		R30 - 2.7K ohm 2%	333-0008
		R78 - 4.7K ohm	330-3047

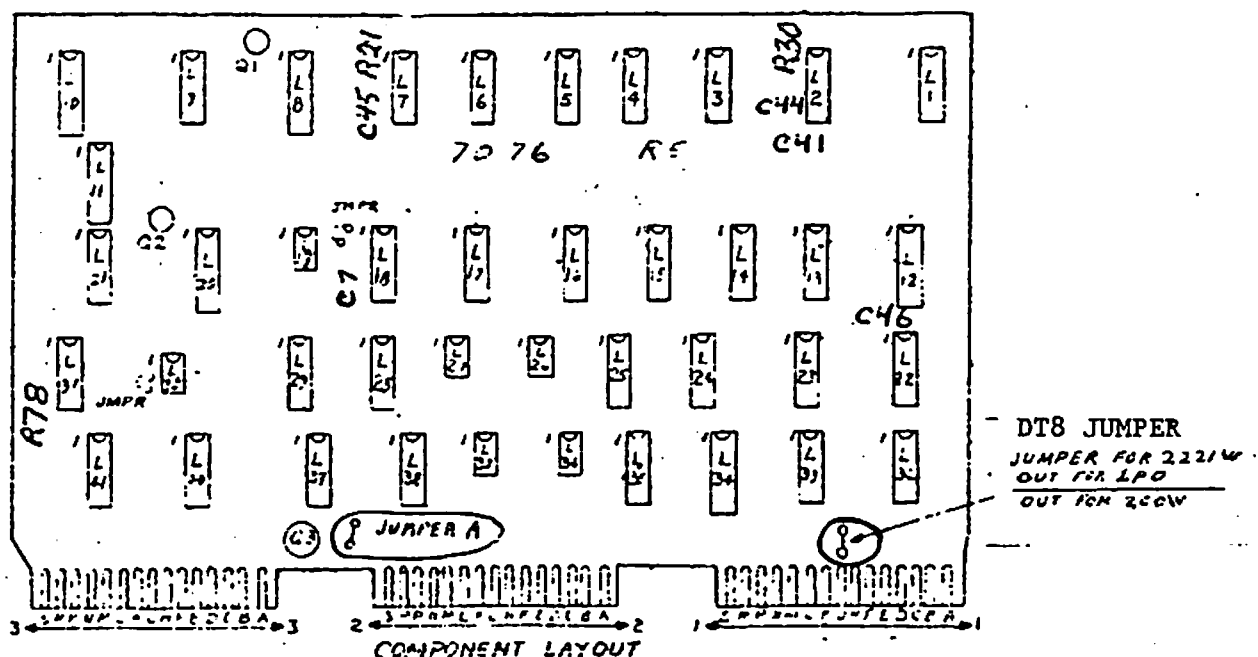


FIGURE 1

WANG

LABORATORIES, INC.

TO: ALL D.T.S.s and BENCH TECHS

Also attached are prints depicting ECMs 5510 and 6371
and changes required for the 7076-1 and 7076-2, respectively.

WANG

TECHNICAL INFORMATION NOTICE

page 1 of 2

Date Issued: April 17, 1984	Notice Number: OS.0035 --
Product: VS/OS	Component/Version: 6.11.51 --

VS Operating System Individual Fix 6.11.51 (Uppercase)

This memo announces the limited availability (Controlled Release) of U.S. Individual fix version 6.11.51. It fixes several problems related to heavy SHARER processing loads (reported by EL Passo Gas) and fixes the inability of 5521 printers to print both upper and lower case.

This fix should be layered over ONLY a 6.11.50 Operating System. Since there are no dependencies between the fixes for the SHARER problem (modules: @SYS003@, @SYS004@, @SYS005@, @SYSSVC@ and @SHARER@) and the fix for the 5521 problem (module DEVLIST), these two fixes may be applied independently. Upon IPL after installation of SHARER fix, a check of the U.S. version number should indicate a 6.11.51 Operating System. If only the 5521 update is installed there will be no change to the Operating System Version number.

The 6.11.51 Individual fix consist of the following modules:

@SYS003@	Version 6.11.51	(OS Nucleus for CP3)
@SYS004@	Version 6.11.51	(OS Nucleus for CP4)
@SYS005@	Version 6.11.51	(OS Nucleus for CP5)
@SYSSVC@	Version 6.11.51	(Segment One SVCs)
@SHARER@	Version 6.11.51	(SHARER)
DEVLIST	Version 6.11.48	(Device Parameter File)

PROBLEMS FIXED:

1. SHARER: R&D is reasonably certain that they have found and fixed the causes of various "Sharer Problems" affecting EL Passo Gas. However, due to the nature of these problems, they cannot guarantee that they have found and fixed all causes that exhibit the symptom reported. The fixes included in U.S. 6.11.51 eliminate problems that could cause a variety of SHARER related problems -- including, but not limited to, those reported. This fix has been running at El Paso Gas with no problems being reported.

WANG

TECHNICAL INFORMATION NOTICE

page 2 of 2

Date Issued:	April 17, 1984	Notice Number:	OS.0035-
Product:	VS/US	Component/Version:	6.11.51-

- a. PROBE # F002755: SHARER CANCELLED
- b. PROBE # F002895, F002964, and others: System entered Control Mode with the message: "WS75 - Invalid Page Frame from unmapping from DTI"
- c. PROBE # F003165, F003201: System entered Control Mode with the message: "WS75 - FLUB not SHARER's or user's releasing page"

- 2. PROBE # F003978: 5521 Matrix Printer does not print Lower Case.

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

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

WANG

TECHNICAL INFORMATION NOTICE

page 1 of 1

Date Issued: April 17, 1984
Product: VS/OS

Notice Number: US.0038-
Component/Version: 6.11.55

5531-2/2246S1/5521

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 6.11.48 and 6.11.49. In addition, update 6.11.55 is compatible with all other 6.11.50 individual fixes. Therefore, 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 -- 2246S1 workstation and 55211 printer.

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

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

PRODUCT SERVICE NOTICE

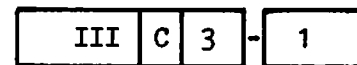
DATE : 03/14/80

CLASSIFICATION PERIPHERALS

CATEGORY PRINTERS PLOTTERS

PRODUCT/APPL. WANG MATRIX 72 (21W)

SEQUENCE #1



TITLE:

210-6579 Motherboard: ECN's #9647 (E-REV 6) and #13982 (E-REV 7)

210-7076 I/O Control, Data Storage, and Underscore: ECN's #9647 (E-REV 5), #10619 (E-REV 6), and #13984 (E-REV 7)

210-7076-1 I/O Control, Data Storage, and Underscore: ECN's #9647 (E-REV 3) and #10619 (E-REV 4)

210-7076-2 I/O Control, Data Storage, and Underscore: ECN's #9647 (E-REV 2) and #10619 (E-REV 3)

210-7231 2221V Converter Board: ECN 13983 (E-REV 1)

NOTES

This PSN document supersedes CSNL #91, which should be discarded.

Any prior performance of CSNL #91 on 2221W/2221V printers will have accomplished 210-6579 Motherboard modification steps F.2.a through F.2.e and 210-7076 board modification steps F.5.a through F.5.d of this procedure, except as follows:

1. The $\overline{\text{MKR}}$ signal on the 210-6579 Motherboard will not have been jumper-connected between connector pins 9₂ and K₁₃, which is required (refer to step F.2.c).
2. The $\overline{\text{SFM}}$ signal on that same 210-6579 Motherboard will have been jumper-connected between connector pins 10₂ and L₁₃, which is undesirable.

Similarly, performance of a preliminary procedure, distributed as a VS Field Support memorandum to enable field incorporation of ECN #9647, will have produced these same results but will also have removed a necessary open-collector device pull-up resistor, R28 on the 210-7076 board (or its 210-7076-1 or 210-7076-2 counterpart, depending on model of Matrix Printer).

This PSN document provides the full modification procedure for all versions (2221V, 2221W, 200W, 5521, and LPO) of the Model 72 Wang Matrix Printer, hereafter called simply the Matrix Printer unless one or more of those different versions must be specified. The document assumes that neither of those preliminary procedures has been performed--but includes notes in the appropriate places to direct the reader to confirm necessary conditions if those preliminary procedures may have been performed and/or to bypass any steps that do not apply to specific models.

A. REASON FOR CHANGE

The unmodified Matrix Printer can cause severe degradation of response time on any parallel workstation tied to the IOP used by the printer (especially when full-buffer lines of more than 132 characters are being processed).

B. CORRECTION/SOLUTION

Modify the handling of carriage return, busy signal, and initiation of the print cycle by the printer electronics.

C. PREREQUISITES

1. The 210-6579 Motherboard must be at E-Rev 5 (ECN's #04765, #04801, #04829, #04860, and #05123 incorporated).
2. The I/O Control, Data Storage, and Underscore board must have ECN's #05227, #05351A, #05535, and #06728 incorporated:
 - a. If a WLI P/N 210-7076 board (2221V or 2221W), must be E-REV 4 or higher (interim modifications will be confirmed or changed).
 - b. If a WLI P/N 210-7076-1 board (200W), must be E-REV 2 or higher (interim modifications will be confirmed or changed).
 - c. If a WLI P/N 210-7076-2 board (5521 or LPO), must be E-REV 1 or higher (interim modifications will be confirmed or changed).

D. TIME REQUIRED

Two hours, maximum.

E. PARTS REQUIRED

NOTE

Except for approximately half of the designated length of P/N 600-3004 insulated jumper wire, all required parts listed in the following table pertain only to modifications needed for 2221V Printers. If the unit under repair is a 2221W, 200W, 5521, or LPO Printer, therefore, the listed parts are not required.

<u>CATALOG NO.</u>	<u>NOMENCLATURE</u>	<u>QUANTITY/EXPLANATION</u>
210-7231	2221V Converter Board (E-REV "0" presumed)	One (2221V Printer, only). (Initial E-REV "0" version <u>may</u> have been installed by preliminary incorporation of ECN #9647)
300-1906	Capacitor, 0.001 microfarad	One (2221V Printer, only).
330-3047	Resistor, 4.7 kilohms	One (2221V Printer, only).
330-4010	Resistor, 10 kilohms	One (2221V Printer, only).
376-0104	IC, dual one-shot (Type 9602)	One (2221V Printer, only).
600-3004	Wire, solid, 26-gauge, plastic-coated	Six feet, max.

F. PROCEDURE

1. Gain access to the underside of the #210-6579 Motherboard on the Matrix Printer's #270-0260 Chassis Assembly for wiring changes, as follows:
 - a. Facing the printer from the front, remove the left side cover by sliding it left until the holding rods become clear.
 - b. Remove the right side cover by sliding it right until the holding rods become clear. Be careful not to damage the attached wiring, which must be removed as follows:
 - (1) Disconnect the signal harness from the bottom of the control panel.

- (2) Pull both AC-power leads from the ON/OFF power switch, and then remove the associated Motherboard power lines from the cable clamps.
- c. Remove the rear cover by lifting it away from the unit, disconnecting the ground wire attached to that cover by loosening the attaching phillips-head screw on the rear of the #210-6579 Motherboard heat-sink assembly.

NOTE

This procedure presumes that the original #210-6576 and #210-6728 printed circuit boards have been previously replaced by #210-7076/-7076-1/-7076-2 and #210-7028 boards, respectively. If not, make that replacement at this time.

- d. Remove the following printed-circuit cards from the Motherboard assembly:
 - (1) #210-7076 (or its -1 or -2 counterpart) I/O Control, Data Storage, and Underscore card (from "6576" connectors).
 - (2) #210-6577 Format and Printing Control card (from "6577" connectors).
 - (3) #210-7028 EA Memory & Regulators and Underscore card (from "6728" connectors).
 - (4) #210-7231 2221V Converter Board (from Motherboard connectors J12 and J13), if applicable (this card will have been installed only if the printer under repair is a Model 2221V and a preliminary incorporation of ECN #9647 has been made).
- e. Remove the signal-harness connector plugs from Motherboard connectors J2, J3, J4, J5, J6, and J8 (leaving the connector plugs in place at Motherboard connectors J1, J9, J10, and J11).
- f. Remove the I/O interface finger-board connector from Motherboard connector J12.

- g. To obtain fan assembly clearance space, remove the format tape guide from the format control assembly on the left side of the unit by removing two phillips-head fastening screws (see Figure 1).
 - h. To obtain clearance for extraction of the #270-0260 Chassis Assembly, release the #451-4359 lefthand support bracket from the #279-5070-35 lefthand side subassembly frame by removing two phillips-head screws (see Figure 1).
 - i. To obtain chassis assembly freedom, release the #270-0262 resistor bracket assembly from the #279-5070-34 format paper feed frame assembly by removing two phillips-head screws and washers (see Figure 2).
 - j. Release the #270-0260 Chassis Assembly by removing the four tie-down bolts that fasten the Chassis Assembly to the frame.
 - k. Slide the #270-0260 Chassis Assembly to the rear and then lift it away from the Printer frame to remove that assembly away from the unit. Stand the assembly on its back edge to gain access to the connector terminals on the underside (i.e., noncomponent side) of the #210-6579 Motherboard.
2. Using 26-gauge solid wire (WLI #600-3004 or equivalent), add three jumpers to the noncomponent side of the #210-6579 Motherboard, as follows (see Figure 3):

NOTE

If an earlier effort to correct slowdown of parallel workstations was attempted by performance either of a preliminary VS Field Support memorandum for ECN #9647 or of CSNL #91A, an unwanted SFM jumper connection will have been added to the #210-6579 Motherboard from pin 9₂ to pin L₁₃, and both of substeps a and b, following, will have been completed. If so, remove that jumper connection from the board (and from documentation records) and then proceed directly to substep c.

- a. Connect the $\overline{\text{CRd}}$ output from pin L of "6576" (i.e., the 7076-type I/O Control card location) connector 1 (10th pin from the left end of the bottom row, because no G or I pins exist) to pin D of connector J12 (4th pin from the left end of the bottom row).

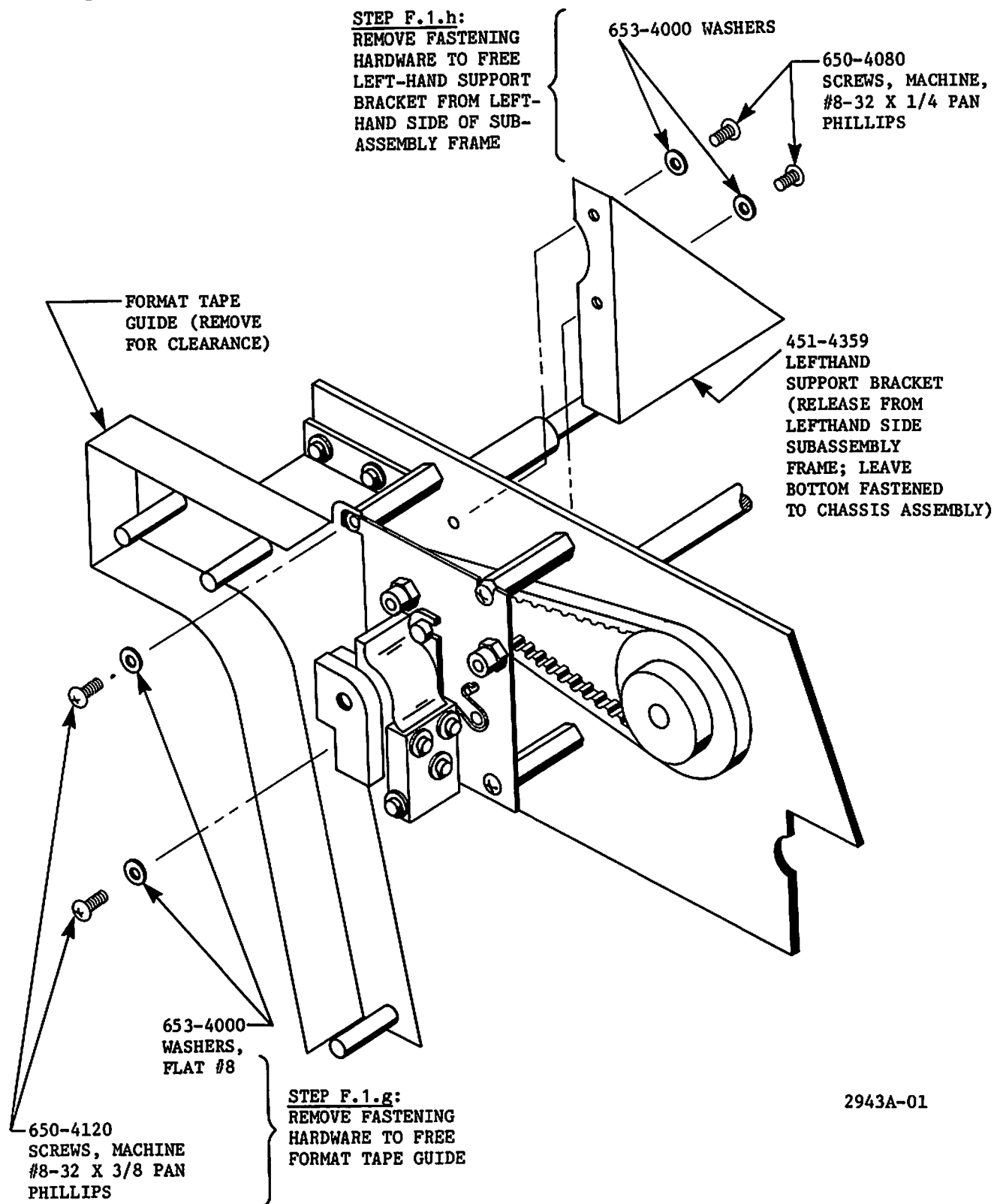
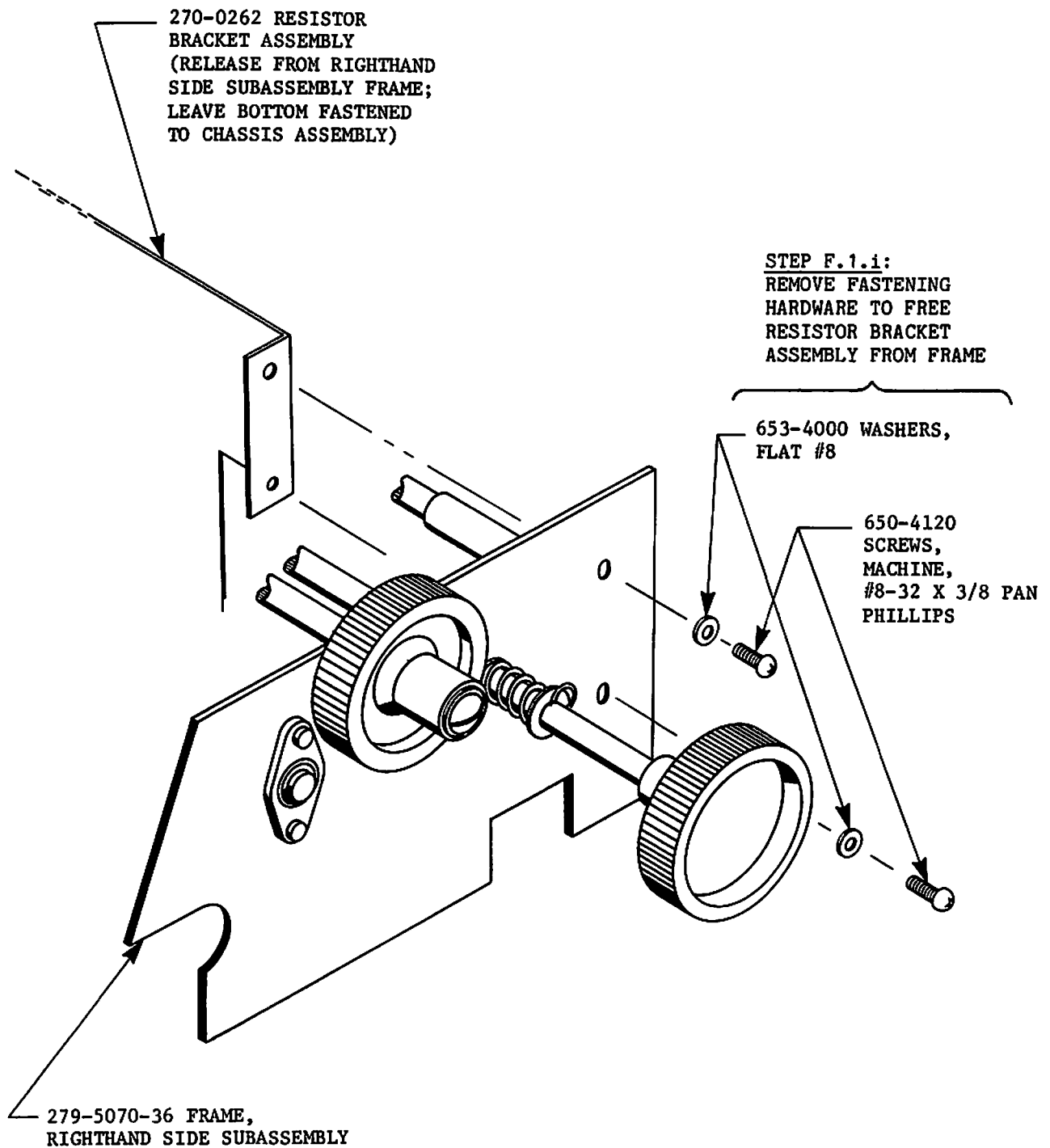


Figure 1. Obtaining Left-side Clearance for
Removal of #270-0260 Chassis Assembly.



2943-02

Figure 2. Obtaining Right-side Clearance for
Removal of #270-0260 Chassis Assembly

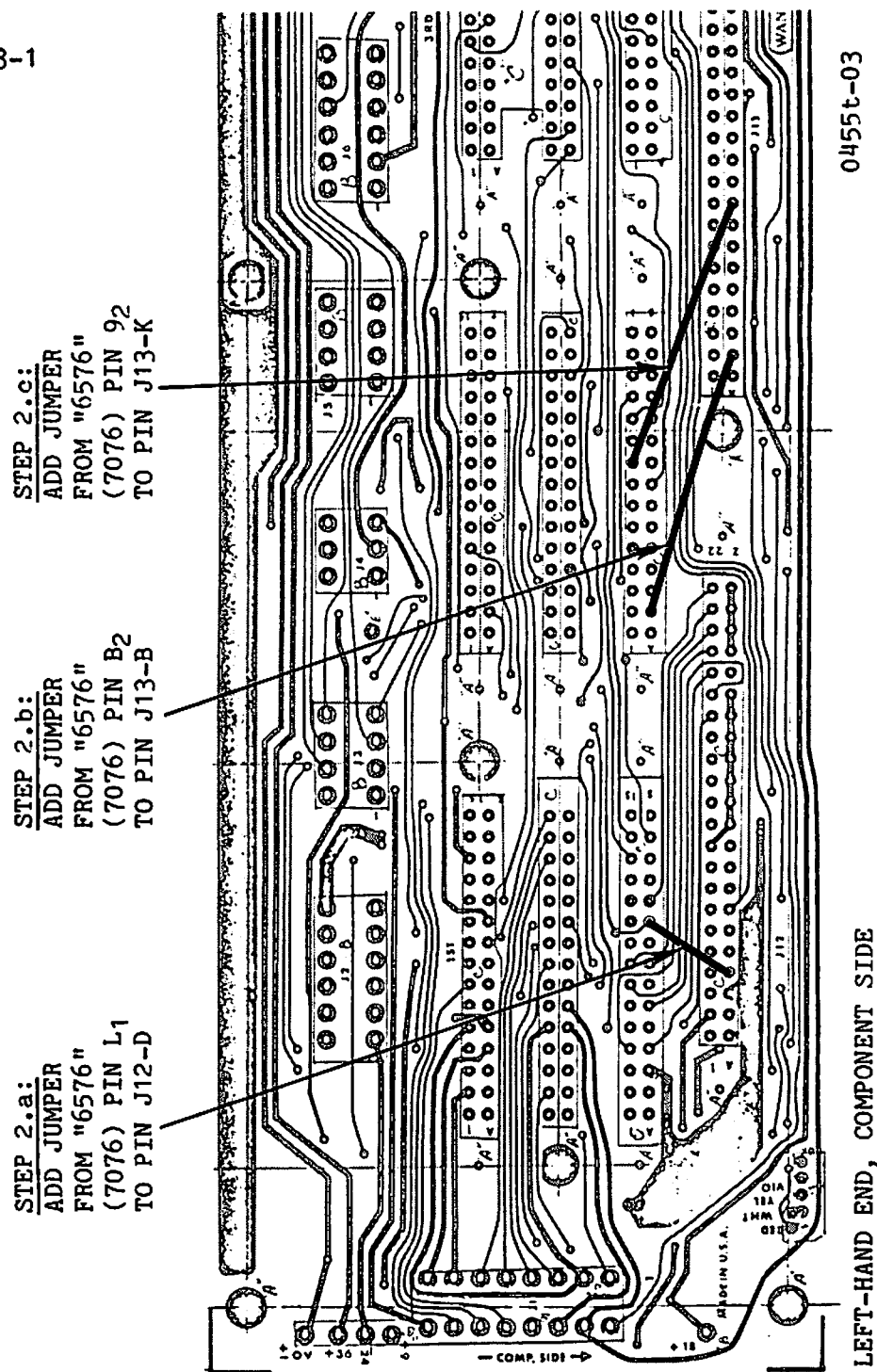


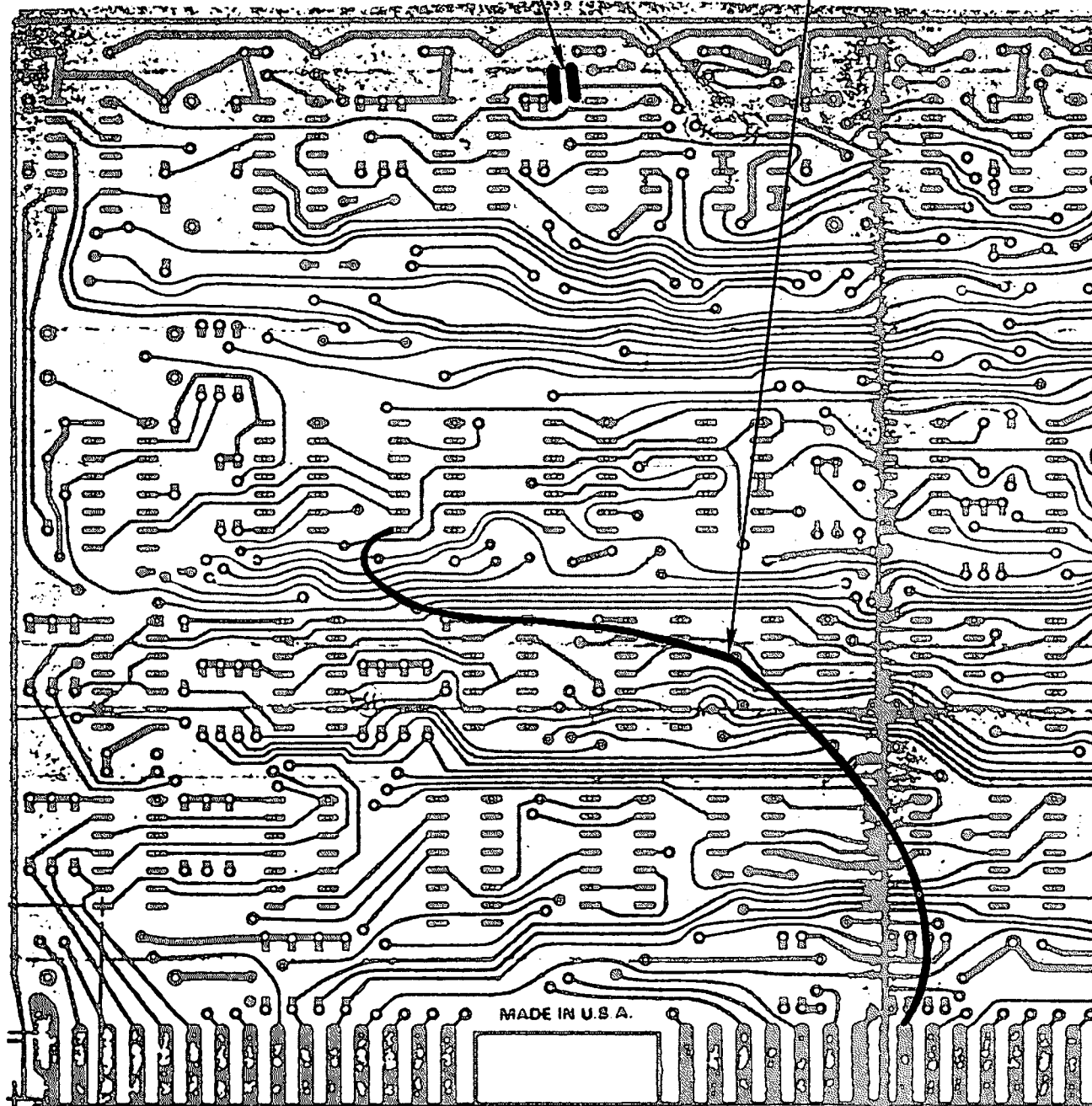
Figure 3. Jumper Connections to be Added to #210-6579
Motherboard's Noncomponent Side

- b. Connect the $\overline{\text{CLR}}$ output from pin B of "6576" connector 2 (2nd pin from the left end of the bottom row) to pin B of connector J13 (2nd pin from the left end of the bottom row).
 - c. $\overline{\text{MKR}}$ output from pin 9 of "6576" connector 2 (9th pin from the left end of the top row) to pin K of connector J13 (9th pin from the left end of the bottom row).
 - d. Increment the E-REV level sticker number to a value of 7 (ECN #13982 incorporated).
 - e. Add the just-installed connections to the Signal Run List, Sheet 1, on page 7-22 of the system documentation copy of the Model 72 Matrix Printer Maintenance Manual (03-0027-0), as follows:
 - (1) Add "D" to J12 column as the $\overline{\text{CRd}}$ entry.
 - (2) Add "B" to J13 column as the $\overline{\text{CLR}}$ entry.
 - (3) Add " $\overline{\text{MKR}}$ " as a new row, with a 9_2 entry in the "6576" (i.e., 7076) column and a K entry in the J13 column.
3. Slide the modified #270-0260 Chassis Assembly back into its normal position on the Matrix Printer's frame, and secure that assembly in place by replacing all fastening hardware previously removed during performance of steps F.1.g through F.1.j.
 4. Replace the Matrix Printer signal harness connector plugs to Mother-board connectors J2, J3, J4, J5, J6, and J8, and then install the unmodified 210-7028 card in the "6728" slot of that assembly and install the unmodified #210-6577 card in its "6577" slot.
 5. Modify the #210-7076 I/O Control, Data Storage, and Underscore circuit card assembly (or its #210-7076-1 counterpart if a 200W Printer, its #210-7076-2 counterpart if a 5521 or LPO Printer) as follows, using 26-gauge solid wire (WLI #600-3004 or the equivalent) for the required jumpers (see Figures 4 & 5):

UPPER LEFT-HAND CORNER
(NONCOMPONENT SIDE)

STEP 5.a:
OPEN ETCH-PATH
FROM PIN L29-11
TO PIN L3-1

STEP 5.g:
CONNECT PIN L15-8 TO
PIN 9 OF CONNECTOR 2



CONNECTOR 2

0445t-04

Figure 4. Modifications to be Made on Drill Side of #210-7076
I/O Control, Data Storage, and Underscore Board.

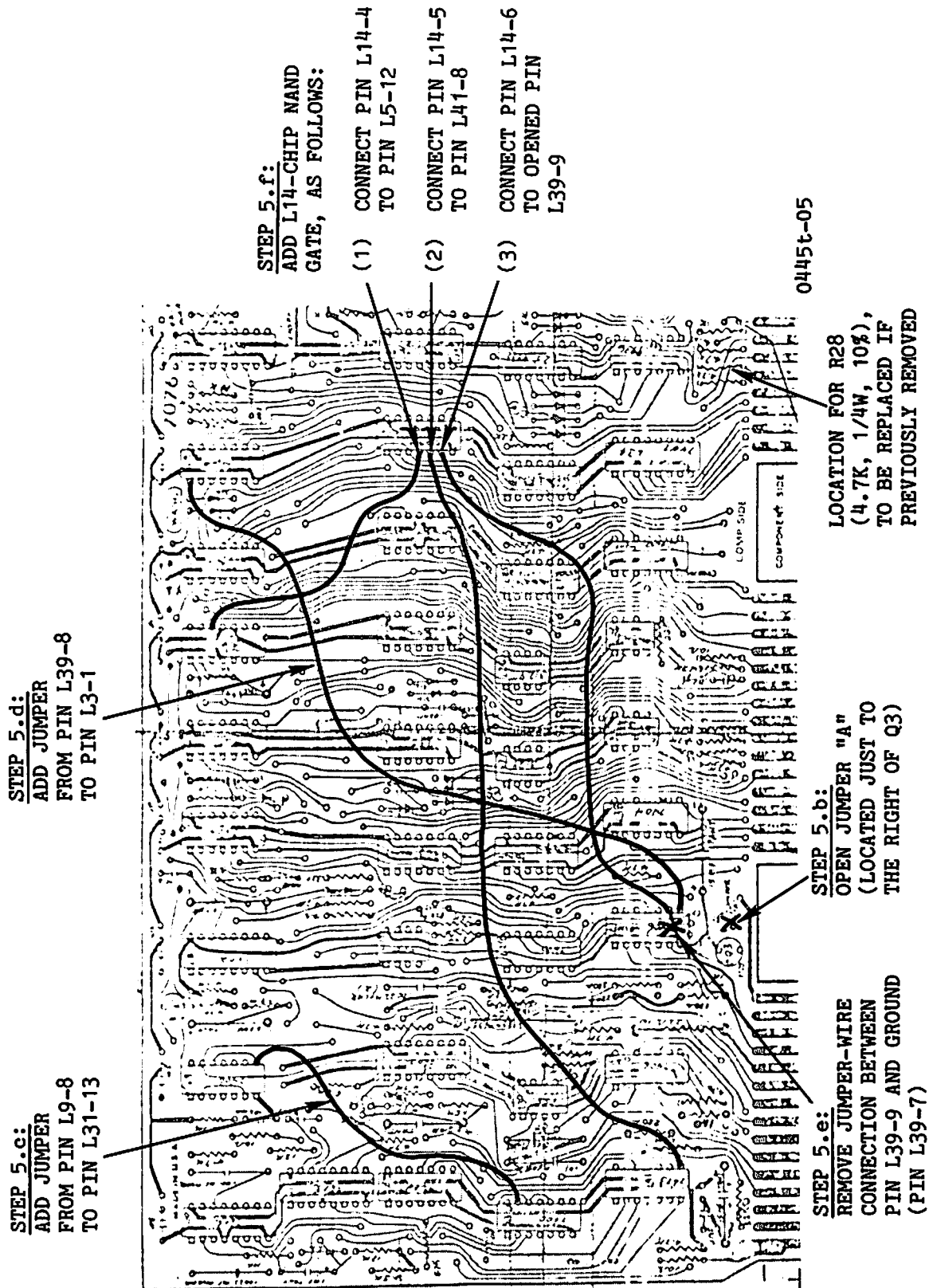


Figure 5. Modifications to be Made on Component Side of #210-7076
I/O Control, Data Storage, and Underscore Board.

NOTE

If an earlier effort to correct slowdown of parallel workstations was attempted by performance of CSNL #91A, substeps a through d, following, will have already been accomplished. If such correction was attempted by performance of a preliminary VS Field Support memorandum for ECN #9647, those same substeps will have been accomplished but a necessary open-collector device pull-up resistor, R28 on the 210-7076 board, will have been removed. In either case:

- (1) Confirm that a 4.7-kilohm, 1/4W, 10% resistor (WLI P/N #330-3047-4B or the equivalent) is connected between pin L39-8 (open-collector inverter output) and the +5VR bus on the 210-7076 board.
- (2) Confirm that the system schematic for the 7076-type card (whatever version) includes that component as pull-up resistor R28, connected between +5V and pin L39-8, which should be designated as the output of an open collector 7406 inverter (not a 7404 inverter, as originally designated).
- (3) Then proceed directly to substep e, following, bypassing substeps a through d.
 - a. On the noncomponent side of the card, cut (open) the etch-path connection from pin L29-11 to pin L3-1 (see Figure 4).
 - b. On the component side of the card, cut or remove jumper "A" (located directly to the right of Q3), opening the SLCTR input at pin 1 of connector 3 (see Figure 5).
 - c. Add a jumper connection from pin L9-8 to pin L31-13 as a substitute for the discarded SLCTR input.
 - d. Add a jumper connection from pin L39-8 to pin L3-1 as a substitute for the discarded L29-11 gate output.

NOTE

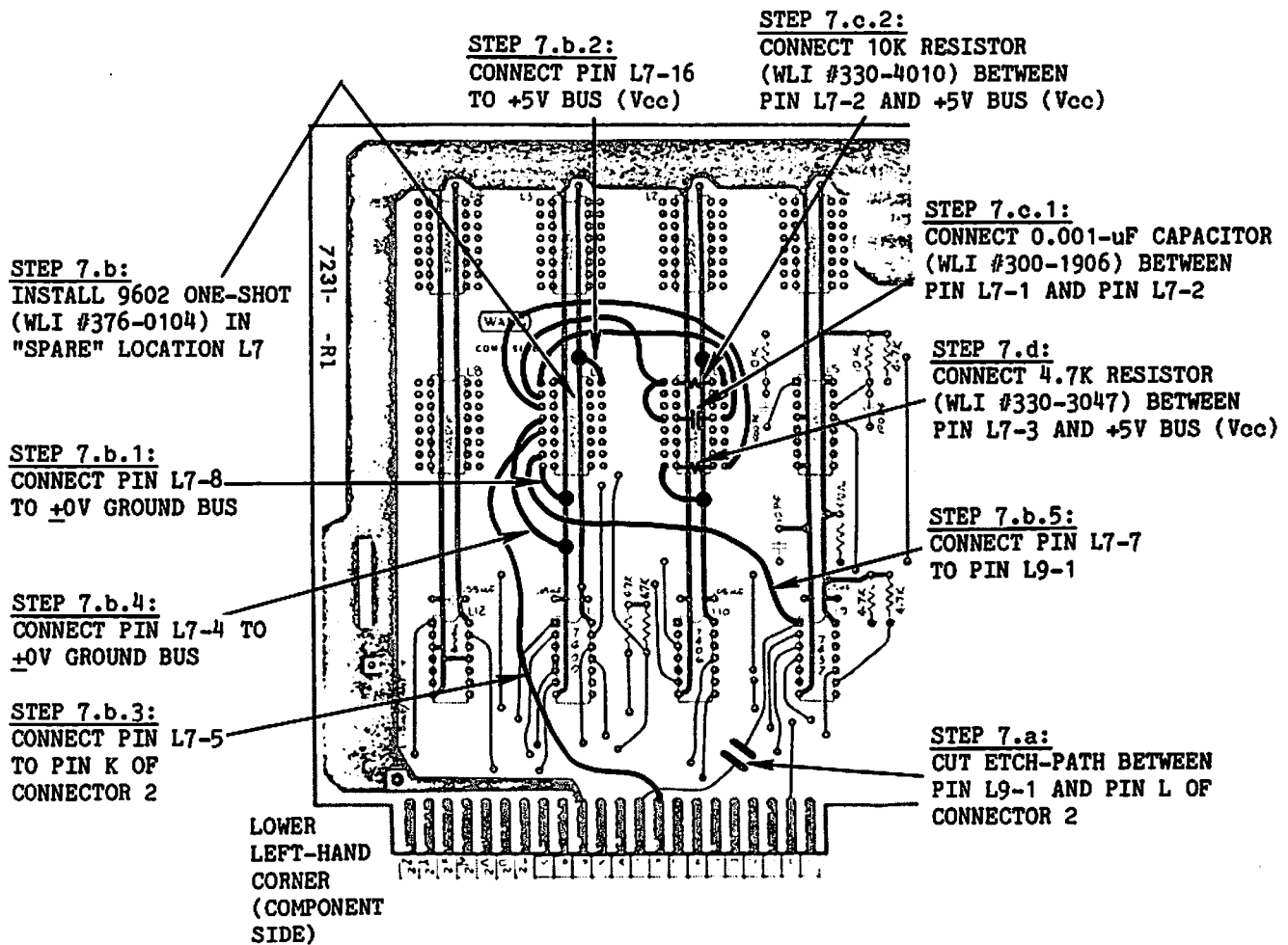
If the card being modified is a #210-7076-1 card (for 200W Printer) or a #210-7076-2 card (for 5521 or LPO Printer), bypass substeps e through g, following (which pertain only to serial operation), and proceed directly to substep h.

- e. Remove the jumper-wire connection between pin L39-9 and ground (pin L39-7).
 - f. Incorporate a hitherto-unused NAND gate from the L14 SN7400 chip to the circuit as follows to enable the SLCT output and the L3-6 NAND gate output when pin L5-12 (FF Q) and pin L41-8 are both high (i.e., when the printer is selected and no paper-out condition has been detected):
 - (1) Connect a jumper between gate input pin L14-4 and SL signal source at pin L5-12.
 - (2) Connect a jumper between gate input pin L14-5 and PO complementary output pin L41-8.
 - (3) Connect a jumper between just-opened pin L39-9 and gate output pin L14-6.
 - g. On the noncomponent side, add a jumper wire between the MKA signal at pin L15-8 and pin 9 of connector 2 (see Figure 4).
 - h. Update the E-REV level sticker on the noncomponent side of the card as follows:
 - (1) If a #210-7076 card (2221V or 2221W Printer), raise sticker to a value of 7 (ECN's 9647, 10619, and 13984 incorporated).
 - (2) If a #210-7076-1 card (200W Printer), raise sticker to a value of 4 (ECN's 9647 and 10619 incorporated).
 - (3) If a #210-7076-2 card (5521 or LPO Printer), raise sticker to a value of 3 (ECN's 9647 and 10619 incorporated).
 - i. Add the just-installed changes to the system documentation copy of the 7076-board schematic.
6. Install the just-modified #210-7076 circuit card (or its #210-7076-1 or #210-7076-2 counterpart, as applicable) in the "6576" slot of the Motherboard assembly.

NOTE

Perform steps 7 and 8, following, only if printer under repair is a 2221V Printer. For all other models (2221W, 200W, 5521, or LPO), proceed directly to step 9, bypassing these steps.

7. Modify the #210-7231 Converter Board circuit card assembly as follows (see Figure 6), using 26-gauge solid wire (WLI #600-3004 or the equivalent) for the required jumpers:
 - a. Cut an opening in the component-side etch path between pin L9-1 and pin L of connector 2.
 - b. Install a 9602 one-shot IC (WLI P/N #376-0104) in "spare" location L7, incorporating the following jumpers:
 - (1) A circuit-ground connection between pin L7-8 and the $\pm 0V$ ground etch path passing vertically through the left-hand side of location L7.
 - (2) A V_{cc} connection between pin L7-16 and the +5V etch path passing vertically through the right-hand side of location L7.
 - (3) A trigger-input connection between pin L7-5 and pin K of connector 2.
 - (4) A trigger-input bias connection between pin L7-4 and the $\pm 0V$ ground-circuit etch path passing vertically through the left-hand side of location L7.
 - (5) A complementary-output connection from pin L7-7 to pin L9-1.
 - c. Install new components C10 and R10 as a 3.41-microsecond (approx.) pulse-timing circuit for the new L7 one-shot as follows, mounting these components in the unused L6 location:
 - (1) Connect an 0.001-uF capacitor (WLI P/N #300-1906) between pin L7-1 and pin L7-2.



0445t-06

Figure 6. Modifications to be Made on #210-7231
2231 Converter Board.

- (2) Connect a 10-kilohm resistor (WLI P/N #330-4010) between the capacitor connection to pin L7-2 and the +5V etch path passing vertically through the right-hand side of location L6.
 - d. Install a 4.7-kilohm resistor (R9, WLI P/N #330-3047) as a CLEAR input pullup path in that same vacant L6 location, connecting that resistor between pin L7-3 and the +5V etch path passing vertically through the right-hand side of location L6.
 - e. Install an E-REV level 1 sticker (ECN #13983 incorporated) on the circuit side of the #210-7231 Converter board.
 - f. Add the just-installed changes to the system documentation copy of the 7231-board schematic.
8. Install the just-modified, dual-connector #210-7231 Converter circuit card in Motherboard connectors J12 and J13, with the component side facing to the rear of the Printer.
 9. If the printer under repair is a Model 2221V Parallel Printer, install the fingerboard connector (originally removed from Motherboard connector J12) in connector 3 on the just-installed #210-7231 2221V Converter circuit card. For all other models, simply reinstall the fingerboard connector in Motherboard connector J12.
 10. Reconnect the rear-cover grounding wire, and then replace the rear cover in its normal position.
 11. Reconnect the control panel AC-power and signal connectors, and then replace both side covers.
 12. Test the modified Matrix Printer for on-line compatibility, including a checkout of response time for all workstations connected to the same IOP.

Service Newsletter #52

PERIPHERALS #14

This Service Newsletter contains the following:

- A. Model 2221W Loss of Window Signal
- B. SN #41 Peripherals #12 Item C Correction
- C. Filter Shaft Magnet Model 601/701/602/702/611/711

A. Model 2221W Loss of Window Signal

The 2221W Printer may intermittently fail to print one or more characters due to loss of Window Signal. This problem is caused by movement between the two ribbon cables from the printhead fingerboard connector. A temporary solution is to strap the two ribbon cables together along their length either using several rubberbands or several loops of tape.

B. SN #41 Peripherals #12 Item C Correction

Add the following to item C: Due to the construction of the new timing fence, the photocell assembly must be reversed to place the slit mask as close as possible to the timing marks.

C. Filter Shaft Magnet Model 601/701/602/702/611/711

The filter shaft magnet is adjusted for 72 to 75 ms using a scope. If the screw on the magnet collar is lined up with the end plug on the compensator tube, the adjustment should be correct.

The gap between the reed switch and magnet should be:

601/701	.100" to .125"
602/702	.126"
611/711	.220"

Service Newsletter

NO. 83

PERIPHERALS #22

February 8, 1977

ILLUSTRATED PARTS DIAGRAMS FOR MODEL 2221W AND 2231W MATRIX PRINTER STANDS

MATRIX PRINTER (2221W) MECHANICAL STAND ASSEMBLY

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
-	279-8005	PRINTER STAND ASSEMBLY FRONT LOADING	REF
- 1	451-0228	LEG, MACHINING (VERTICAL)	2
- 2	650-9035	SCREW, 1/4-20 x 1/2 ALLEN CAP	4
- 3	653-0034	WASHER, FLAT 11/32 x 5/8 x 1/16 BLACK	4
- 4	451-3841	PANEL, MODESTY	1
- 5	458-0344	SUPPORT, (PAPER RACK) LOWER	1
- 6	458-0343	RACK, (OUTPUT) PAPER	1
- 7	451-0231	LEG SUPPORT, UPPER	2
- 8	654-1201	GROMMET, 1/4 I.D.	2
- 9	452-2559	STIFFENER, LEG	1
-10	655-0239	BUMPER, GREEN #308	2
-11	458-0117	RACK, PAPER (MOD. 702)	1
-12	451-0204	LEG SUPPORT, LOWER	2
-13	655-0228	RUBBER BUMPER	2
-14	655-0233	PLUG (HEYCO P187) BLACK, HOLE	8
-15	655-0010	CASTER GLIDE 1/4-20 THREADED	4
-16	650-9007	BOLT, STOVE 5/16-18 x 1 1/2 HEX HD	8
-17	653-6008	WASHER, LOCK 5/16 SPLIT	8

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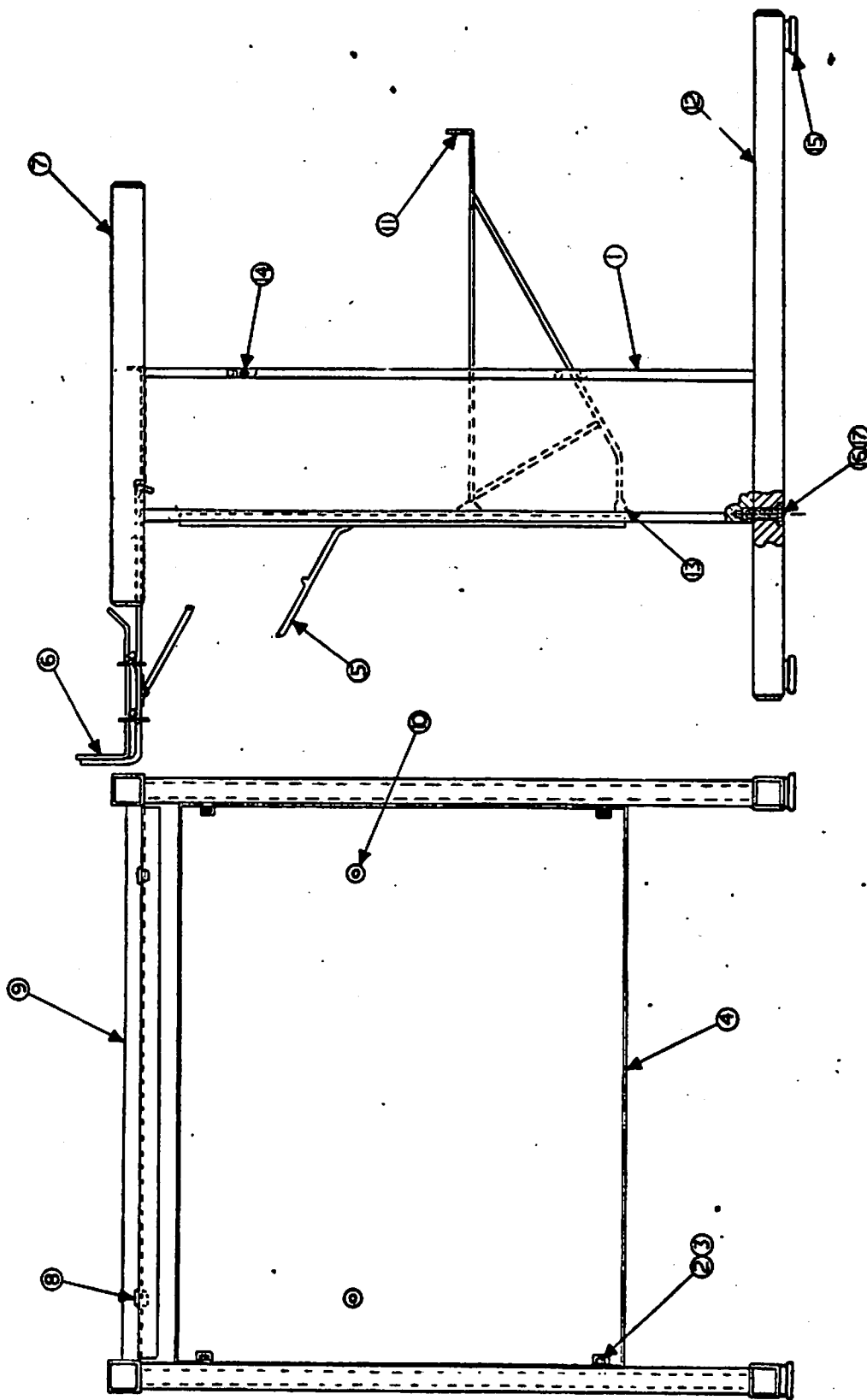
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13-266

.. MATRIX PRINTER (2231W1 & 2) MECHANICAL STAND ASSEMBLY

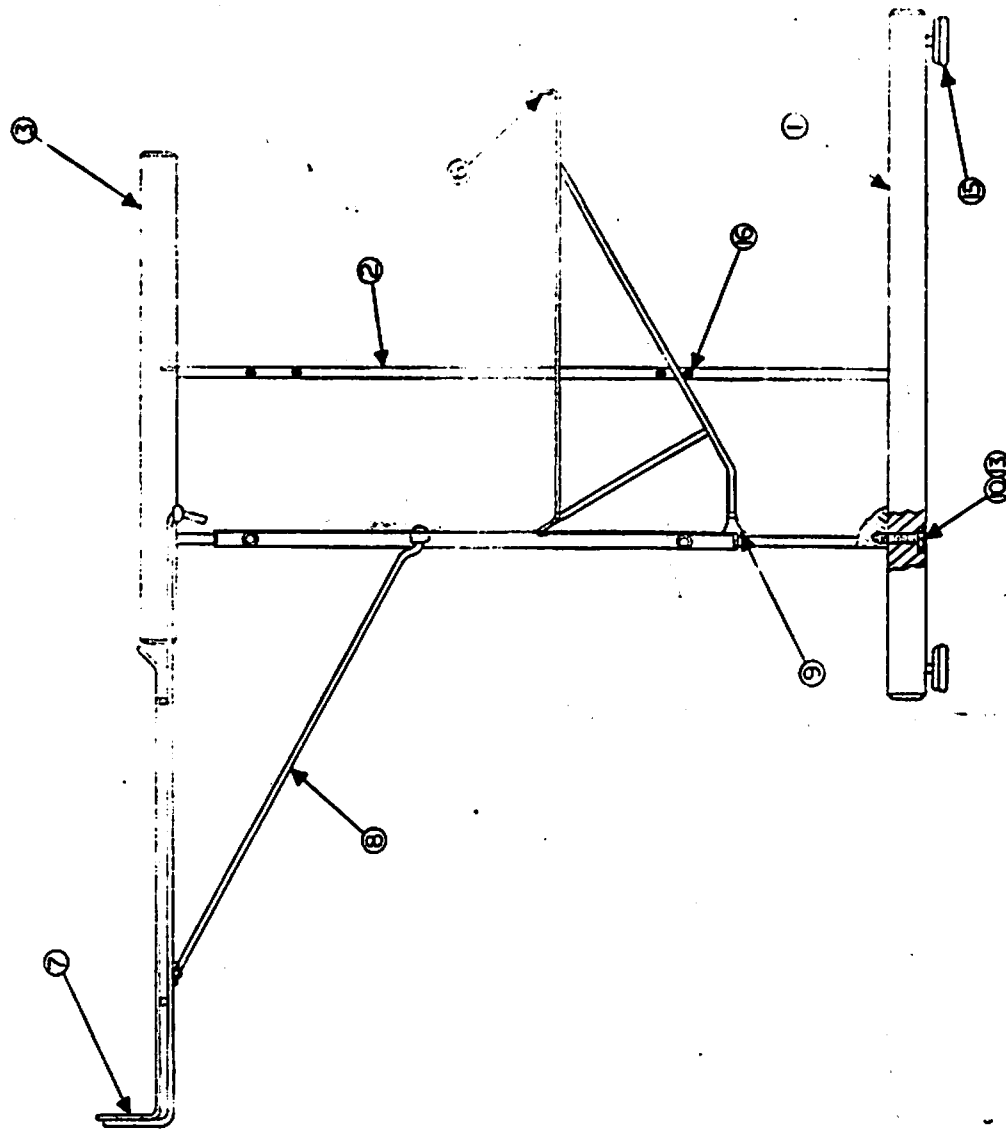
ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
-	279-8006	PRINTER STAND ASSEMBLY	REF
- 1	451-0216	SUPPORT, LOWER LEG	2
- 2	451-0228	LEG, VERTICAL	2
- 3	451-0231	SUPPORT, UPPER LEG	2
- 4	451-3847	PANEL, MODESTY	1
- 5	452-2566	STIFFENER, LEG	1
- 6	458-0117	RACK, PAPER (MOD. 702)	1
- 7	458-0343	RACK, (OUTPUT) PAPER	1
- 8	458-0344	SUPPORT, (PAPER RACK) LOWER	1
- 9	655-0228	RUBBER BUMPER	2
-10	650-9007	BOLT, 5/16-18 x 1 1/2 HEX HD STOVE	8
-11	650-9035	SCREW, 1/4-20 x 1/2 ALLEN HD CAP	4
-12	653-0034	WASHER, 5/8 x 11/32 x 1/16 BLK FLAT	4
-13	653-6008	WASHER, 5/16 SPLIT LOCK	8
-14	654-1201	GROMMET, 1/4 I.D. FOR 3/8 HOLE	2
-15	655-0010	GLIDE, 1/4-20 CASTER (CG293LD7746)	4
-16	655-0233	PLUG, (HEYCO P187) BLACK, HOLE	8
-17	655-0239	BUMPER, (GREENE #308)	2



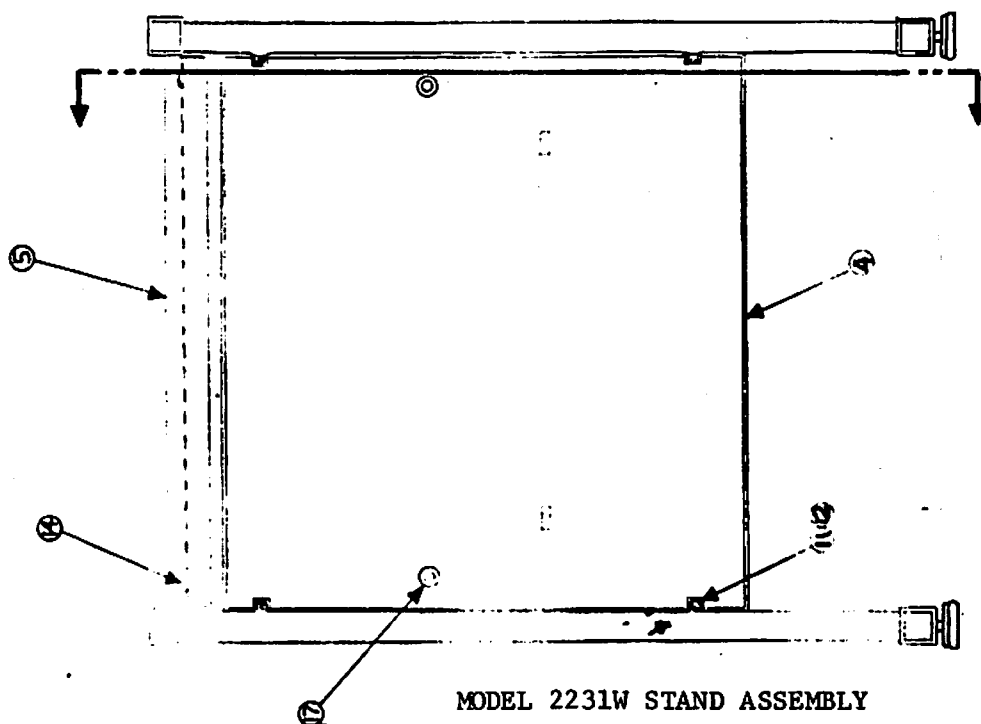
MODEL 2221W STAND ASSEMBLY

FIG. "A"

MODEL 2221W STAND ASSEMBLY



MODEL 2231W STAND-ASSEMBLY
FIG "B"



MODEL 2231W STAND ASSEMBLY

Service Newsletter

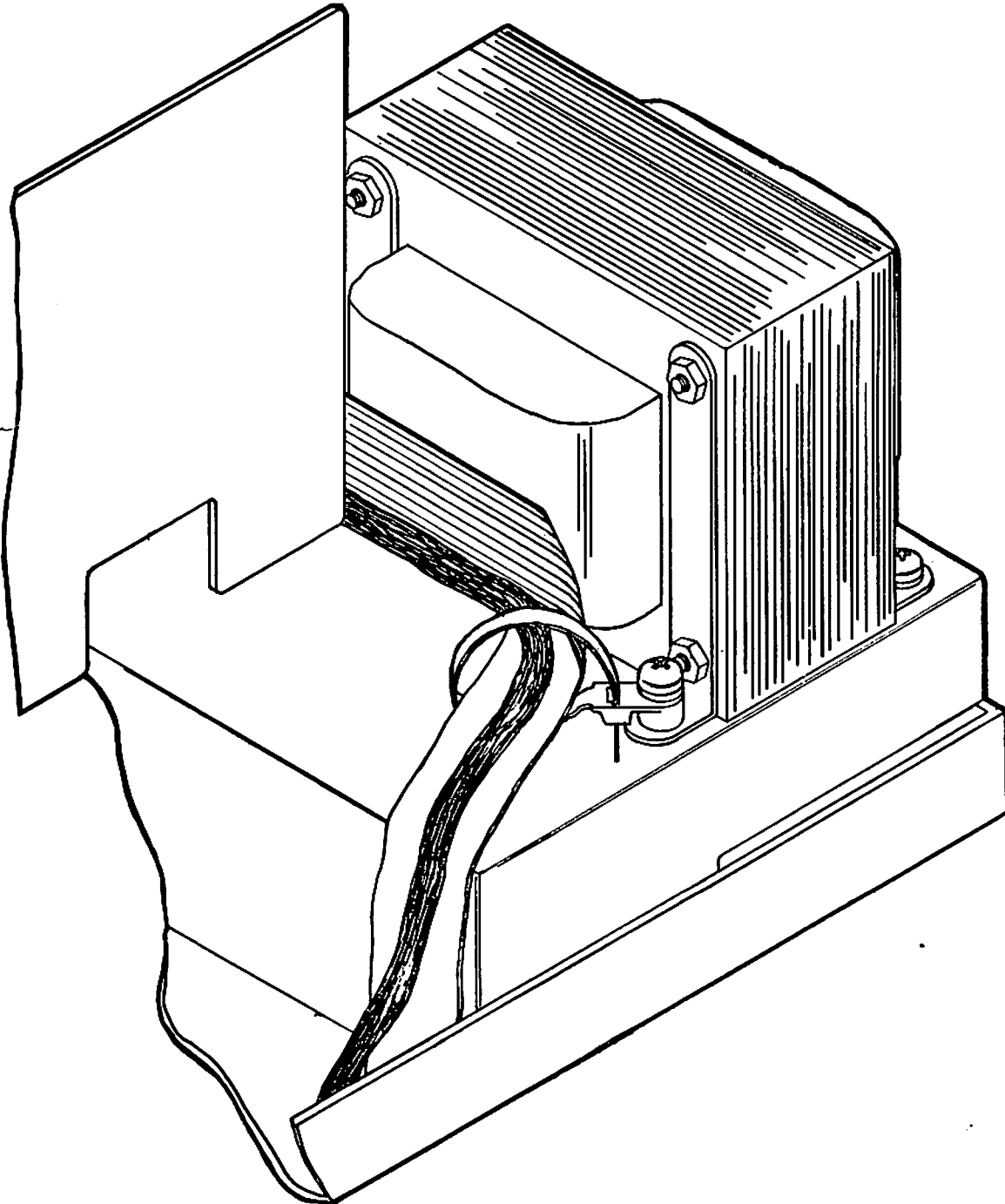
No. 115

PERIPHERALS #31

June 6, 1978

PREVENTING CABLE HARNESS DAMAGE IN THE MODEL 72

Damage to the cable harness in the Model 72 Matrix Printer can be avoided by installing a new pan tye (WL #726-8014) now in stock. The pan tye can be wrapped around the harness assembly and drawn away from the pulley and fastened under one of the transformer bracket screws as shown.



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Service Newsletter

NO. 172

NOVEMBER 13, 1979

PERIPHERALS #48

Early Model Top Feed Assembly Part Numbers

The Carriage assembly, as well as the Carriage Drive Motor and Tach Assembly used in early Top Feed 2221W printers, are different from the versions of these assemblies used in the current Model 2221W printers.

In the past, it was not possible to order the early versions of the Carriage Assembly or the Carriage Drive Motor and Tach assembly because there were no available Wang part numbers. Now, however, the early versions of the assemblies may be ordered using the following part numbers:

Carriage Assembly, Top Feed, 279-5070-42

Carriage Drive Motor & Tach Assembly, Top Feed, 279-5070-54

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MODEL 72 PRINTER

PCB	2221W	2221V	5521
6577	JUMPER A TO B and D TO E	JUMPER B TO C and E TO F	JUMPER B TO C and E TO F
6728 7028	NO CHANGE	NO CHANGE	USE 6727D SWITH SETTINGS 1 OFF 2 ON 3 ON 4 ON 5 OFF
6576 7076	NO CHANGE	NO CHANGE	USE 7076-2
CONTOL PANEL	USE 210-6734	USE 210-6734	USE 210-7038
CHASSIS	NO CHANGE	ADD FOLLOWING JUMPERS I/O SLOT PIN D1 TO 7076 SLOT L1 I/O SLOT PIN B2 TO 7076 SLOT B2 I/O SLOT PIN L2 TO 7076 SLOT 102	MODIFIED CHASSIS WITH CANNON CONNECTOR
OTHER		MUST USE 210-7231 PCB IN I/O CONNECTOR SLOT J12	

Note: 200W - use 7076-1