

THIS MANUAL IS A GUIDE FOR INSTALLING THE 1130 MOD 4 COMPUTING SYSTEM. THE MANUAL CONTAINS MECHANICAL INSTALLATION PROCEDURES, CABLING INSTRUCTIONS, AND SYSTEM TEST PROCEDURES FOR MAKING THE SYSTEM OPERATIONAL FOR A CUSTOMER.

THE MANUAL, INCLUDES INSTALLATION INSTRUCTIONS FOR THE FOLLOWING UNIT WHICH IS BASIC TO THE SYSTEM.

IBM 1131 PROCESSING UNIT MODELS 4A OR 4B.

FOR NON-BASIC UNITS, THERE ARE UNIT INSTALLATION MANUALS SUPPLIED WITH THE UNIT. THE SYSTEM MANUAL TOGETHER WITH THE UNIT MANUALS, PROVIDE THE CUSTOMER ENGINEER WITH A COMPLETE INSTALLATION PACKAGE FOR A PARTICULAR CONFIGURATION.

INSERT THE INSTALLATION INSTRUCTIONS FOR ALL UNITS ATTACHED TO THE 1131, AND THE UNPACK INSTRUCTIONS FOR ALL UNITS (INCLUDING THE 1131) IN THIS MANUAL FOR USE IF THE SYSTEM IS RE-INSTALLED.

THE FOLLOWING BRANCH OFFICE TOOLS SHOULD BE AVAILABLE FOR POSSIBLE USE TO COMPLETE INSTALLATION.

1. OSCILLOSCOPE
2. PRECISION METER WESTON 901 WITH 5V SCALE
3. A MULTIMETER CAPABLE OF MEASURING 5 MEGOHMS.
4. A C.E. DISK (P/N 220000)



**SAFETY**

ALL CUSTOMER ENGINEERS ARE THOROUGHLY INDOCTRINATED IN IBM SAFETY PRACTICES DURING THE EARLY PHASES OF THEIR TRAINING. IT IS EXPECTED THAT THIS TRAINING HAS BECOME A PART OF ROUTINE PRACTICE. HOWEVER, PERSONAL SAFETY CANNOT BE OVER-EMPHASIZED. FOLLOW THE SAFETY PRACTICES OUTLINED IN THE CE SAFETY PRACTICES CARD, IBM FORM 124-0002, ISSUED TO ALL CUSTOMER ENGINEERS. THIS SECTION CONTAINS SOME REMINDERS OF GENERAL SAFETY PRACTICES.

NO CE SHOULD WORK ALONE WHEN PERFORMING ANY MAINTENANCE OR REPAIR OF EQUIPMENT THAT HAS POWER ON. AT LEAST TWO MEN SHOULD BE PRESENT IN THE ROOM WHENEVER ANY WORK IS DONE ON A MACHINE.

EVERY CE SHOULD WEAR SAFETY GLASSES DURING ANY MAINTENANCE OR REPAIR OPERATION.

MAKE SURE THAT THERE ARE FIRE EXTINGUISHERS AVAILABLE IN EACH ROOM WHERE THERE ARE SYSTEM COMPONENTS. EXTINGUISHERS SHOULD BE OF THE CO<sub>2</sub> TYPE, WHICH ARE RECOMMENDED FOR ELECTRICAL FIRES.

IN SOME INSTANCES, DANGEROUS VOLTAGES ARE STILL PRESENT INSIDE THE UNIT, EVEN WITH POWER OFF. IF IT IS NECESSARY TO WORK NEAR LIVE POWER CONNECTORS, CONVENIENCE OUTLETS, OR INSIDE POWER SUPPLIES, USE EXTREME CAUTION.

ALWAYS DISCHARGE CAPACITORS BEFORE WORKING ON DC POWER SUPPLIES.

TURN OFF POWER BEFORE REPLACING ANY FUSE.

REPLACE ANY SAFETY COVERS THAT HAVE BEEN REMOVED, BEFORE GOING ON TO ANOTHER OPERATION. HAZARDOUS VOLTAGES ARE PRESENT IN THIS EQUIPMENT; FORGETFULNESS COULD BE FATAL.

DON'T USE UNGROUNDED TOOLS OR TEST EQUIPMENT.  
THEY CAN KILL!



FIGURE 1. RELATIVE SEQUENCE OF INSTALLATION PROCESS - IBM 1130 MOD 4

SECTION	OPERATION		REMARKS	OPER COMPLETED
1  PREPARATION OF MACHINE AREA	1	CHECK FACILITIES		
	2	SET UP CE ROOM		
	3	INVENTORY AND STORE SPARE PARTS		
	4	CHECK AND CALIBRATE TEST EQUIP.		
	5	INVENTORY AND STORE TEST EQUIP. & TOOLS		
	6	SET UP RECORD SYSTEM		
	7	MARK FLOORS		
2  SYSTEM PLACEMENT AND ASSEMBLY	1	RECEIVING AND PLACEMENT		
	2	REMOVAL OF PACKING MATERIALS		
	3	INSTALL LEVELING PADS		
	4	LEVEL UNIT		
	5	CONNECT SIGNAL & PWR CABLES		
	6	KICK PLATE ASSEMBLY		
	7	FINAL GROUND CHECK		
3 & 4  ADJUSTMENTS AND TESTING	1	D.C. VOLTAGE CHECK		
	2	CORE STORAGE CHECK		
	3	DISK STORAGE HEAD ALIGN		
	4	TESTING		

NOTE: CHART SHOWS RELATIVE PERMISSIVE STARTING POINT AND POSSIBLE OVERLAP FOR VARIOUS OPERATIONS, BUT DOES NOT REFLECT LENGTH OF TIME FOR VARIOUS OPERATIONS SINCE TIME IS DEPENDENT UPON NUMBER OF MEN ASSIGNED TO A PARTICULAR OPERATION.

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SECTION 1: 1131 CENTRAL PROCESSING UNIT MODEL 4  
SPECIFICATIONS

1. WEIGHT:  
790 POUNDS MAXIMUM

2. DIMENSIONS:

<u>LENGTH</u>	<u>DEPTH</u>	<u>*HEIGHT</u>
58-1/2 INCHES	29 INCHES	44-1/8 INCHES

\*THE BASE OF THE PROCESSOR IS 31-1/2 INCHES HIGH; THE  
CONSOLE ADDS ANOTHER 12-5/8 INCHES FOR A TOTAL  
HEIGHT OF 44-1/8 INCHES.

3. SERVICE CLEARANCE:

<u>FRONT</u>	<u>REAR</u>	<u>RIGHT SIDE</u>	<u>LEFT SIDE</u>
42 INCHES	42 INCHES	30 INCHES	NONE

4. ENVIRONMENTAL REQUIREMENTS (POWER ON):

AMBIENT AIR CONDITIONS

THE 1131 UNIT USES AIR FOR INTERNAL COOLING. COOL  
AIR IS INTRODUCED THROUGH THE BOTTOM OF THE UNIT,  
INTERNALLY CIRCULATED BY FANS, AND EXHAUSTED TO  
THE ROOM FROM THE TOP. THE FOLLOWING LIMITS SHOULD  
BE MAINTAINED FOR AMBIENT AIR TO ENSURE NORMAL  
OPERATION OF THE SYSTEM.

TEMPERATURE 60°F to 90°F  
RELATIVE HUMIDITY 10% TO 80%

DUST AND DIRT CONTROL

THE AMOUNT OF CONTAMINATION IN THE OFFICE  
ATMOSPHERE WILL NOT NORMALLY INTERFERE WITH THE  
OPERATION OF THE 1131. NORMAL PRECAUTIONS SHOULD  
BE TAKEN, HOWEVER, TO KEEP DUST, DIRT, AND OTHER  
FOREIGN MATTER AWAY FROM THE MACHINE AREA.





5. ELECTRICAL REQUIREMENTS:

POWER SOURCE

THE IBM 1130 MODEL 4 COMPUTING SYSTEM OPERATES ON THE FOLLOWING ELECTRICAL POWER SOURCES:

1. 115 VAC  $\pm$  10%; 60 HZ  $\pm$  0.5 HZ; SINGLE-PHASE;  
3 WIRE (TWO POWER AND ONE GROUNDING).
2. 208/230 VAC  $\pm$  10%; 60 HZ  $\pm$  0.5 HZ; SINGLE-PHASE  
3 WIRE (TWO POWER AND ONE GROUNDING).

POWER DISTRIBUTION

ALL POWER TO THE 1130 SYSTEM SHOULD BE SUPPLIED THROUGH A SINGLE FEEDER, PROTECTED BY A MAINLINE CIRCUIT BREAKER. INDIVIDUAL BRANCH CIRCUITS FROM THE DISTRIBUTION PANEL SHOULD BE PROTECTED BY CIRCUIT BREAKERS SUITABLE FOR THE MOTOR LOAD APPLICATION AND DERATED ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.

THE DISTRIBUTION PANEL SHOULD BE LOCATED IN AN UNOBSTRUCTED AND WELL-LIGHTED AREA WITHIN THE COMPUTER ROOM. AS A SAFETY PRECAUTION, A REMOTE CIRCUIT BREAKER, WHICH CAN REMOVE ALL POWER FROM THE COMPUTER SYSTEM, SHOULD BE PROVIDED IN THE MACHINE ROOM.

GROUNDING

A GREEN WIRE GROUNDING CONDUCTOR IS SUPPLIED IN EACH POWER CORD. EACH CUSTOMER-SUPPLIED BRANCH CIRCUIT SHOULD HAVE A WIRE CONDUCTOR FOR THE PURPOSE OF GROUNDING EQUIPMENT. ALL BRANCH CIRCUIT GROUNDING WIRES SHOULD BE TIED TO A COMMON GROUND POINT AT THE DISTRIBUTION PANEL, AND A SINGLE-GROUNDING WIRE SHOULD BE RUN FROM THE DISTRIBUTION PANEL TO THE NEAREST GROUNDING STATION. CONDUIT MUST NOT BE USED AS THE ONLY GROUNDING MEANS.

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SECTION 2: INSTALLATION INSTRUCTIONS

1. REMOVE PACKAGING AS INDICATED IN THE PACKAGING INSTRUCTIONS. INSPECT EACH UNIT FOR PHYSICAL DAMAGE. INVENTORY SHIPPING GROUP PARTS AND SUPPLIES AGAINST THE CHECK LIST. LOCATE THE UNITS IN THEIR PROPER LOCATION IN THE ROOM. NECESSARY SERVICE CLEARANCES ARE LISTED IN SECTION 1 OF THIS MANUAL.
2. VERIFY THAT THE CUSTOMER'S POWER OUTLET HAS A GREEN WIRE GROUND AND THE CORRECT VOLTAGE AT EACH TERMINAL OF THE OUTLET AND THAT EACH UNIT IS WIRED FOR THIS VOLTAGE. VERIFY THAT ALL EQUIPMENT IN THE SYSTEM GROUP ARE CONNECTED TO AC GROUND. CHECK FOR CONTINUITY FROM GROUND TERMINAL ON MAINLINE PLUG TO FRAMES OF PIECES OF EQUIPMENT.
3. LEVEL THE UNIT BY EXTENDING THE LEVELING SCREWS LOCATED BY THE CASTERS ON THE MACHINE FRAME.
4. CONNECT SIGNAL AND POWER CABLES AS PER FIGURES 2 AND 3.
5. INSTALL CABLE ENTRY COVER PLATE 842612 ON 1131 S/N 21027 AND ABOVE. COVER PLATE MOUNTS TO FRAME IN FRONT OF POWER CORD, PARTIALLY COVERING CABLE ENTRY. USE SCREW 332620 AND LOCKWASHER 9092 TO MOUNT PLATE.
6. INSTALL KICK STRIP ASSEMBLIES AS PER REFERENCE DRAWINGS (P/N 2190552) IN SHIPPING GROUP.
7. CHECK THAT PADDLE CARDS AND SLT CARDS ARE SECURELY PLUGGED IN THE GATES.
8. ALL I/O DEVICES WILL BE INSTALLED AS PER THE UNIT INSTALLATION MANUAL FOR THE DEVICE. (NOTE: CONSOLE PRINTER PLATEN KNOB SET SCREWS CAN BE EASILY STRIPPED-EXERCISE CAUTION).
9. REFER TO LOGIC PAGE AD000 FOR JUMPER AND TIE DOWN LIST AND VERIFY MACHINE IS CORRECT PER FEATURES INSTALLED.



FIGURE 2. 1130 MOD 4 EXTERNAL CABLE CONNECTIONS

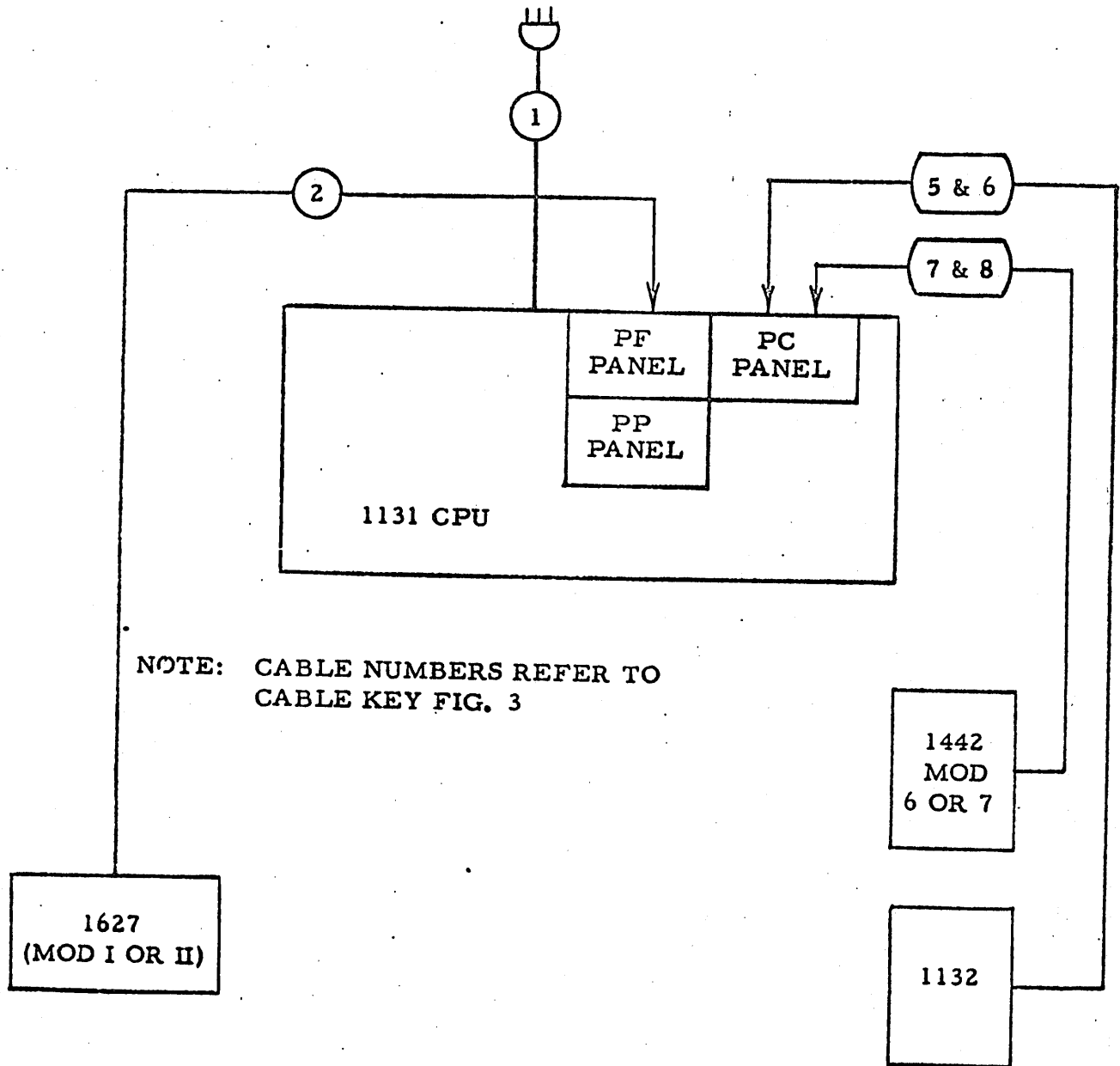




FIGURE 3. CABLE INSTALLATION

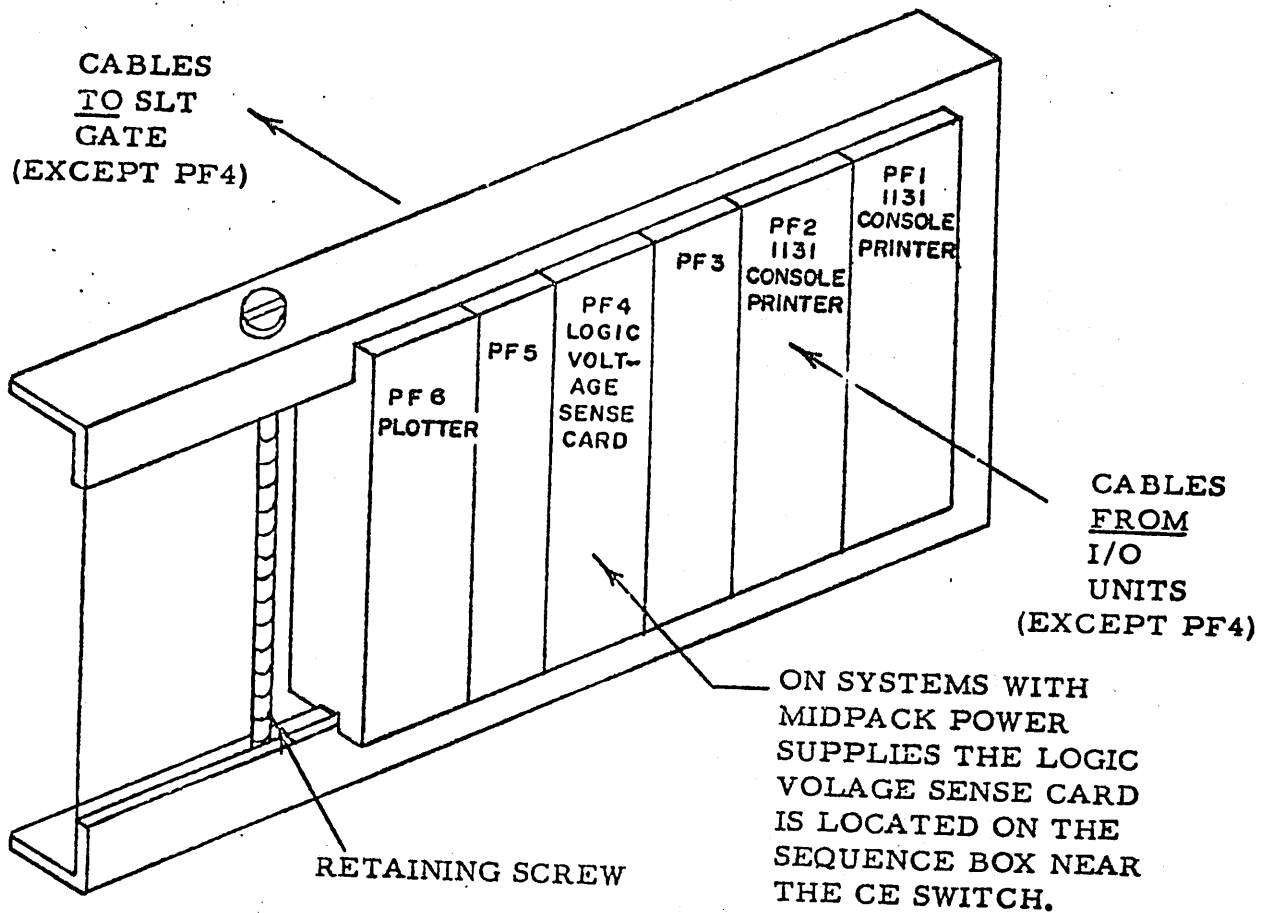
**CAUTION:** ON THE PP PANEL BE SURE THE PADDLES ARE PLUGGED EXACTLY AS CALLED OUT SINCE DIFFERENT VOLTAGE BUSSING EXISTS IN EACH POSITION.

CABLE KEY	DESCRIPTION	FROM	TO
1	MAIN POWER CORD	1131 - PHYSICALLY ATTACHED TO 1131	WALL OUTLET
2	POWER & SIGNAL IN ONE CABLE	1627 - CANNON CONNECTOR - P5	1131 (SIGNAL) PF-6 1131 (POWER) PP-2
5	SIGNAL CABLE	1132 - PHYSICALLY ATTACHED TO 1132	1131 PC-7
6	POWER CABLE	1132 - PHYSICALLY ATTACHED TO 1132	1131 PC-2
7	SIGNAL CABLE	1442 - PHYSICALLY ATTACHED TO 1442	1131 PC-6
8	POWER CABLE	1442 - PHYSICALLY ATTACHED TO 1442	1131 PC-1





FIGURE 4. SMS I/O PANEL (PF) CABLE INSTALLATION INSTRUCTIONS



NOTE: POSITIONS PF1 AND 2 ARE BASIC AND PROVIDE CONNECTIONS TO THE 1131 CONSOLE PRINTER. PF4 IS BASIC AND HOLDS THE LOGIC VOLTAGE SENSE CARD. POSITIONS PF3, 5 AND 6 ARE FEATURE CONNECTORS.

IF A PARTICULAR FEATURE IS NOT ON THE SYSTEM, THE POSITION ASSIGNED TO IT WILL CONTAIN A SPACER BLOCK.

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SECTION 3: ADJUSTMENTS

*Start Here*

1. DISK STORAGE CHECK

- A. TURN OFF DISK STORAGE DRIVE SWITCH
- B. BASEPLATE GROUNDING CHECK
  - 1. REMOVE WIRES FROM DISK TB1-4
  - 2. REMOVE GROUND WIRE ON VOICE COIL.
  - 3. IF INSTALLED, REMOVE HEAD CABLE GROUND WIRES MOUNTED ON HEAD CABLE CLAMP.
  - 4. MEASURE THE RESISTANCE BETWEEN THE BASE OF THE FILE AND THE CPU FRAME. THE READING SHOULD BE 5 MEGOHMS OR HIGHER.
  - 5. RECONNECT THE WIRES REMOVED IN THE ABOVE STEPS.
- C. REFER TO SDS INSTALLATION INSTRUCTIONS (P/N 2219161) AND PERFORM MECHANICAL CHECKS.

2. TURN ON MAIN LINE SWITCH

3. CHECK GATE AND POWER SUPPLY BLOWERS

4. VERIFY THAT PROPER DC VOLTAGES ARE PRESENT.

<u>VOLTAGE</u>	<u>MEASURE AT</u>	<u>RANGE OF VOLTAGE</u>
-3V	B GATE TB1-1	-2.94 TO -3.06
+3V	B GATE TB2-12	+2.94 TO +3.06
+6V	B GATE TB1-12	+5.88 TO +6.12
+12V	B GATE TB2-17	+11.04 TO +12.96
+48V	A GATE TB2-18	+44.16 TO +51.84

5. PERFORM REMAINING SDS INSTALLATION INSTRUCTIONS.



SECTION 4: TESTING

*Done*

1. A. CHECK CE SWITCHES - DO FOLLOWING IN SEQUENCE.

LAMP TEST

INTERRUPT DELAY

WITH SWITCH ON, DEPRESS RESET THEN PROG STOP, THE INTERRUPT LEVEL 5 LIGHT WILL NOT COME ON UNTIL INT. DELAY IS TURNED OFF. DEPRESS RESET TO TURN INT. LEVEL 5 OFF.

STORAGE LOAD

TURN SWITCH ON - SET ALTERNATE ODD BIT SWITCHES ON - DEPRESS PROG. START AND THEN IMM. STOP. TURN OFF STOR. LOAD SWITCH.

STORAGE DISPLAY

TURN ON - DEPRESS START - ALTERNATE ODD BIT PATTERN WILL BE DISPLAYED - TURN OFF SWITCH.

NON-STORAGE LOAD

TURN ON - SET ALTERNATE EVEN BIT SWITCHES ON - TURN STOR. LOAD ON - DEPRESS PROG START - IMM. STOP - TURN OFF NON-STOR. DISPLAY AND DEPRESS START. ALTERNATE ODD BIT PATTERN WILL BE DISPLAYED.

1. B. CHECK OPERATION OF MODE SWITCH FUNCTIONS

1. FOR SYSTEMS REQUIRING A FIELD MERGE OF A 1442, REFER TO LOGIC PAGE AD000 AND CHECK THE ADJUSTMENT OF THE PUNCH GATE SINGLE SHOT.
2. RUN THE IBM 1130 SYSTEM DIAGNOSTIC TESTS.
3. FILE INSTALLATION INSTRUCTIONS AND PACK/UNPACK INSTRUCTIONS IN INSTALLATION INSTRUCTIONS BINDER.

C. CHECK MEMORY STORAGE CAPACITY

THE MEMORY STORAGE FUNCTION TEST IS UNABLE TO DIFFERENTIATE BETWEEN HIGH CORE AND LOW CORE FOR SYSTEMS WITH MEMORY CAPACITY GREATER THAN 4K. THAT IS, THE MEMORY FUNCTION TEST IS UNABLE TO DETERMINE IF ADDRESS BIT 3 IS PERFORMING PROPERLY IN ADDRESSING THE UPPER AND LOWER HALVES OF MEMORY.

1. LOAD CORE STORAGE LOCATION /0000 WITH /0F0F.
2. LOAD CORE STORAGE LOCATION /1000 WITH /F0F0.
3. DISPLAY CORE STORAGE LOCATION /0000. IF /F0F0 IS PRESENT INSTEAD OF /0F0F, THE HIGH ORDER ADDRESS BIT IS FAILING.

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