

WANG

5102

Preliminary Installation Notes

Models:

OIS 125

OIS 130

PREFACE

This document is a compilation of Word Processing Newsletters (WPNL's) 72, 72.1, 72.2, and 72.3. WPNL 72 serves as a base document containing all updated information originally issued through WPNL's 72.1, 72.2, and 72.3. The purpose of this document is to provide the Wang-trained Customer Engineer (CE) with preliminary installation and setup information for the OIS 125/130.

Second Edition (October 1984)

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**WORD
PROCES-
SING
NEWS-
LETTER
NO.72**

CUSTOMER ENGINEERING WORD PROCESSING NEWSLETTER NO. 72

CONFORM/EXECUTE	
INFORMATION ONLY	X
NECESSARY FOR INSTALLATION	X

OFFICE INFORMATION SYSTEM 130

MAY 15, 1979

OIS 130

PRELIMINARY INSTALLATION INFORMATION

This Newsletter contains the following information:

- SECTION I. General information, installation, configuration, inspection, checkout, etc, concerning the OIS 125/130.
- SECTION II. How to upgrade to OIS 130.
- SECTION III. Installation of disk operating system software - including a glossary of terms and representative CRT representations.
- SECTION IV. General theory of operation for the Master Memory PCB - 210-7511-2A and differences between the old (7347) and new (7547) printer memory boards.
- APPENDICES.
- A. Memory PCB Schematics
 - B. Bill of Material
 - C. Engineering Change Notices
 - D. Block Diagram For The New Memory Boards

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**SECTION
I
GENERAL
INFOR-
MATION**

1.3 COPY/DELETE DOCUMENTS

System 30 Each document to be copied or deleted must be individually selected.

NOTE

System 30 possesses "Batch Filing"; therefore, delete is permitted.

System 130 To copy or delete a complete volume (many libraries), either a complete library (many documents) or a single document may be selected.

1.4 TYPICAL MODEL NUMBERS

<u>CONFIGURATION(s)</u>	<u>MODEL NUMBERS</u>
Master CPU OIS 130	6530
Serial Workstation	5526A or 5536-2 (32K Memory PCB)*
Printers or BLACK BOX	6581
	5531-2 } (16K Memory PCB)
	5521 }
	6581W }
	6581WC }

1.5 BASIC OIS 130 SYSTEM CONFIGURATION

The basic system consists of one Master CPU with one or two floppy disk drives (refer to page 3-3) and one or two HAWK disk drives along with workstations and printers.

1.6 SYSTEM PHYSICAL CHARACTERISTICS AND OPERATING SPECIFICATIONS

A. MASTER CPU WITH ONE OR TWO FLOPPY DRIVES

Height 12.00" (30.5cm)
Depth 21.4" (54.36cm)

*Horizontal Scroll, Math-Pack, and sort are standard

1.7 INCOMING INSPECTION

For the basic incoming inspection procedure refer to the System 30 Maintenance Manual 03-0034-P1 pages 2-2 through half of page 2-7.

1.8 SYSTEM CHECKOUT

Use the procedures contained in the 928 Field Level Maintenance Guide #3 (03-0075) for basic system checkout. The FLMG covers all units used in the OIS 130 System.

1.9 CABLE CONNECTIONS

If the system only has one disk drive (Hawk), then only one regular disk cable (Part #220-0108-3 or 4) is needed. One end of the cable has finger boards and the other end has a winchester connector with terminator. Plug the winchester connector to the back of the disk drive on the winchester I/O board (located at the rear of the HAWK DRIVE) and connect the finger boards to the rear of the master CPU.

If the system has two disk drives (Hawk), then two disk cables (Part No.'s 220-0187-1 and 220-0226) are required. One cable has finger boards at one end and the other end has a winchester connector without terminator. The second cable has a winchester connector at each end (one end without terminator and the other end with a terminator).

1.10 SYSTEM CONFIGURATION

Master CPU	48K of Memory minimum
Workstation	32K of Memory minimum
Archiving W/S	48K of Memory minimum
Printers	16K of Memory minimum
Disk Drive (Hawk)	One or two Disk Drives

A. SYSTEM WITH ONE DISK DRIVE

Power Requirement at the CPU site:

- a. One 20-Amp dedicated line with one duplex plug (with Master CPU table).
- b. One 20-Amp dedicated line with two duplex plugs (without Master CPU table).

System Configuration, single drive:

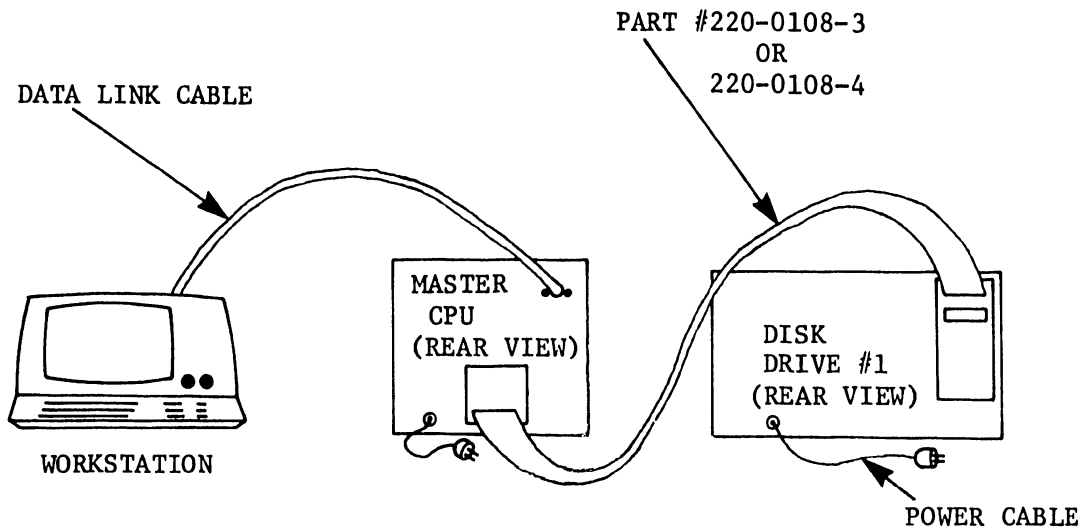


FIGURE A
SYSTEM CONFIGURATION - SINGLE HAWK DRIVE

B. SYSTEM WITH TWO DRIVES:

Power Requirement at the CPU site:

One 20-Amp dedicated line with two duplex plugs (with/or without Master CPU table).

System Configuration, two drives:

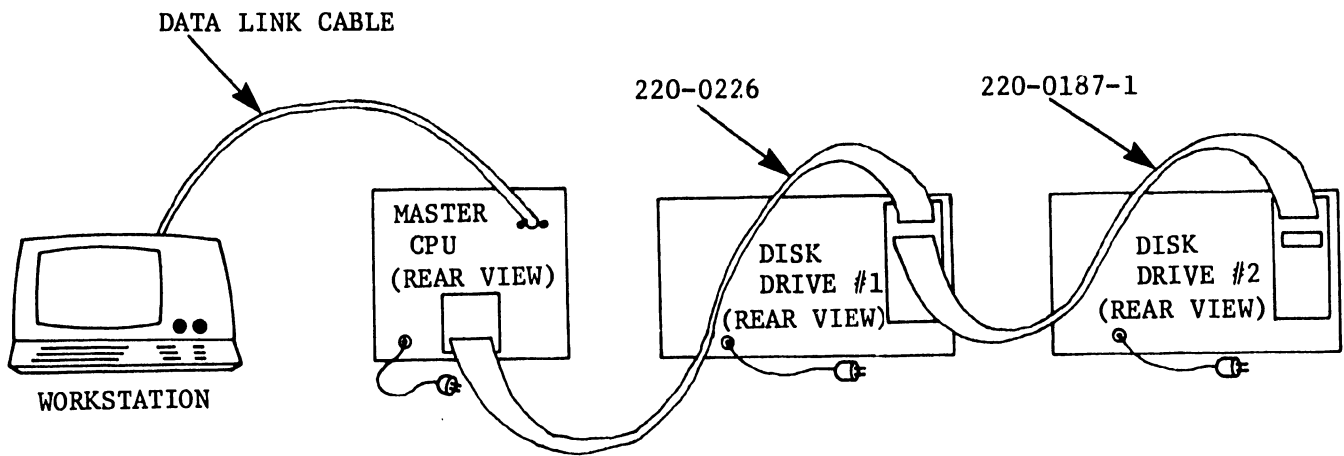


FIGURE B
SYSTEM CONFIGURATION - DUAL HAWK DRIVES

GENERAL DESCRIPTION OF THE OIS 125

The OIS 125 system is the smallest of the Office Information systems. It consists of a 48K memory, an 8080 Master Microprocessor, 32K memory workstations, and a 5 MByte sealed system disk drive. It has the option of an additional 5 MByte Disk Drive (Also known as Archive Drive on OIS systems), however there is a maximum of only one optional 5 MByte Disk Drive per system. The OIS system 125 can have a maximum of 14 peripherals (any combination of printers or workstations.) The Disk Drives are not connected to the I/O ports of the OIS Master and therefore do not use a port which could be used for a potential peripheral.

The optional disk drive has two volumes each with a 2.5 MByte capacity. One 2.5 MByte is a fixed disk and the other is a 2.5M Byte removable disk cartridge which is also used as the archiving disk.

The system disk drive (non-removable) also has two volumes each with a 2.5M Byte capacity.

The P.C. Boards used in the OIS 125 Master CPU are the same as those used in the OIS 130 Master CPU.

The number and function of these boards is as follows:

210-7511-2A	Master Memory 48K
210-7202A	CPU
210-7214-2A	Datalink
210-7203	Disk Controller
210-7206	P.S. Regulator
220-0108-3/-4	Disk Cable Assembly -- for one disk drive
220-0226	Disk Cable Assembly -- for two disk drives
220-0187-1	Disk Cable Assembly -- for two disk drives

The basic configuration of the OIS 125 is the same as the OIS 130 system.

POTENTIAL PROBLEM AREA

When using the Archiving Workstation on OIS 125/130, if more than 42 documents are archived to the diskette, the archive diskette will not function properly.

RESOLUTION FOR POTENTIAL PROBLEM AREA

By using the special utility, select "File ZAP" program and "ZAP" the file name as follows:

```
WPSCRT.OBJECT (File Name)
EXECUTE
Go to Sector 64, Byte A1
Change Byte A1 from F6 to FC & "ZAP"
```

If the archive diskette has already been damaged, take it to a WPS System 20, 25 or 30 and recover the document using normal WPS document recovery procedures.

**SECTION
II
UPGRAD-
ING TO
AN
OIS 130**

SECTION II - UPGRADING TO AN OIS 130

2.1 UPGRADING THE W.P. 30 TO AN OIS 30 (WITH ONE DISK DRIVE)

A. MASTER:

- a. Upgrade Data Link Board 7214-1A to 7214-2A or order a new 7214-2A. (Refer to Appendix C, ECN's 10312 and 10901).
- b. Increase the memory capacity by replacing Memory Board 7201A (16K) with 7511-2A (48K).
- c. On the CPU Board, set switches as follows:

Switches 1 - 6 (OFF)

Switch 7 ON for systems with BASIC Compiler
 OFF for systems without BASIC Compiler to prohibit
 loading BASIC COMPILER Option

Switch 8 ON for OIS 130
 OFF for OIS 125

B. WORKSTATION:

- a. Replace either the 16K Memory Board (7226A) or the 24K Memory Board (7236A) with a 32K Memory Board (7236-1A).
- b. Upgrade the Data Link Board to Device Type #5 as follows:

WORKSTATION HARDWARE SETTINGS - FOR DIFFERENT DEVICE TYPES

Different Device Type on W/S (5526 or 5526A Model #'s).

Device type #1 (All W.P. 20, 25, 30 NO OIS Systems).

L33-3 connect to +5V thru pullup resistor.

L33-6 connect to +0V.

L33-10 connect to +0V.

L33-13 connect to +0V.

(This is typical W/S with no horizontal scroll.)

WORKSTATION HARDWARE SWITCH SETTINGS - CONT'D

Device type #2 (all W.P. 20, 25, 30 NO OIS Systems).

L33-3 connect to +0V.

L33-6 connect to +5V thru pullup resistor.

L33-10 connect to +0V.

L33-13 connect to +0V.

(This is typical W/S with horizontal scroll.)

Device type #5 (ONLY FOR OIS SYSTEMS).

L33-3 connect to +5V thru pullup resistor.

L33-6 connect to +0V.

L33-10 connect to +5V thru pullup resistor.

L33-13 connect to +0V.

This is typical 32K W/S with horizontal scroll.

C. PRINTER

Replace the 7347A Memory Board (12K) with a 7547A (16K) Memory Board.

D. INSTALLATION/PRELIMINARY CHECKS

Install the upgrade system in the same manner as a W.P. System 30. (The cable connections are as shown in Figure A)

NOTE:

Only energize the unit being checked i.e.,
If checking the voltage on the CPU, only
energize the CPU.

- a. Energizing each unit in turn, check the voltage of the following: (Refer to Field Level Maintenance Guide No. No. 3, 03-0075 and the below listed pages)

<u>Page#</u>	<u>Unit</u>
<u>2-3 to 2-6</u>	MASTER CPU
<u>3-20 to 3-22</u>	WORKSTATIONS
<u>4-3, 4-5 & 4-7</u>	PRINTERS

- b. Energize the complete system and perform the necessary diagnostics. (Use Diagnostic Disk 702-0008B Rev. E13.2, for system checkout)

NOTE

REV. E13.2 will check a 32K Workstation, a 48K Master, and a 16K Printer.

2.2 HOW TO UPGRADE A W.P. 30 TO AN OIS 130 WITH TWO DRIVES

Follow the procedures for upgrading and installation with one drive. (The cable connections are as shown in Figure B)

A. WINCHESTER I/O BOARD - SWITCH NO. 1

- a. First Drive, Winchester I/O Board-Switch #1. Configure as follows:

NOTE:

Location of switch is in accordance with Figure D.

ON	S1	OFF
	5	X
	4	X
	3	X
	2	X
X	1	

FIRST DRIVE
SWITCH #1.

- b. Dual Drive, Winchester I/O Board-Switch #1. Configure as follows:

NOTE:

Location of switch is in accordance with Figure D.

ON	S1	OFF
	5	X
	4	X
	3	X
X	2	
	1	X

SECOND DRIVE
SWITCH #1.

WINCHESTER I/O BOARD

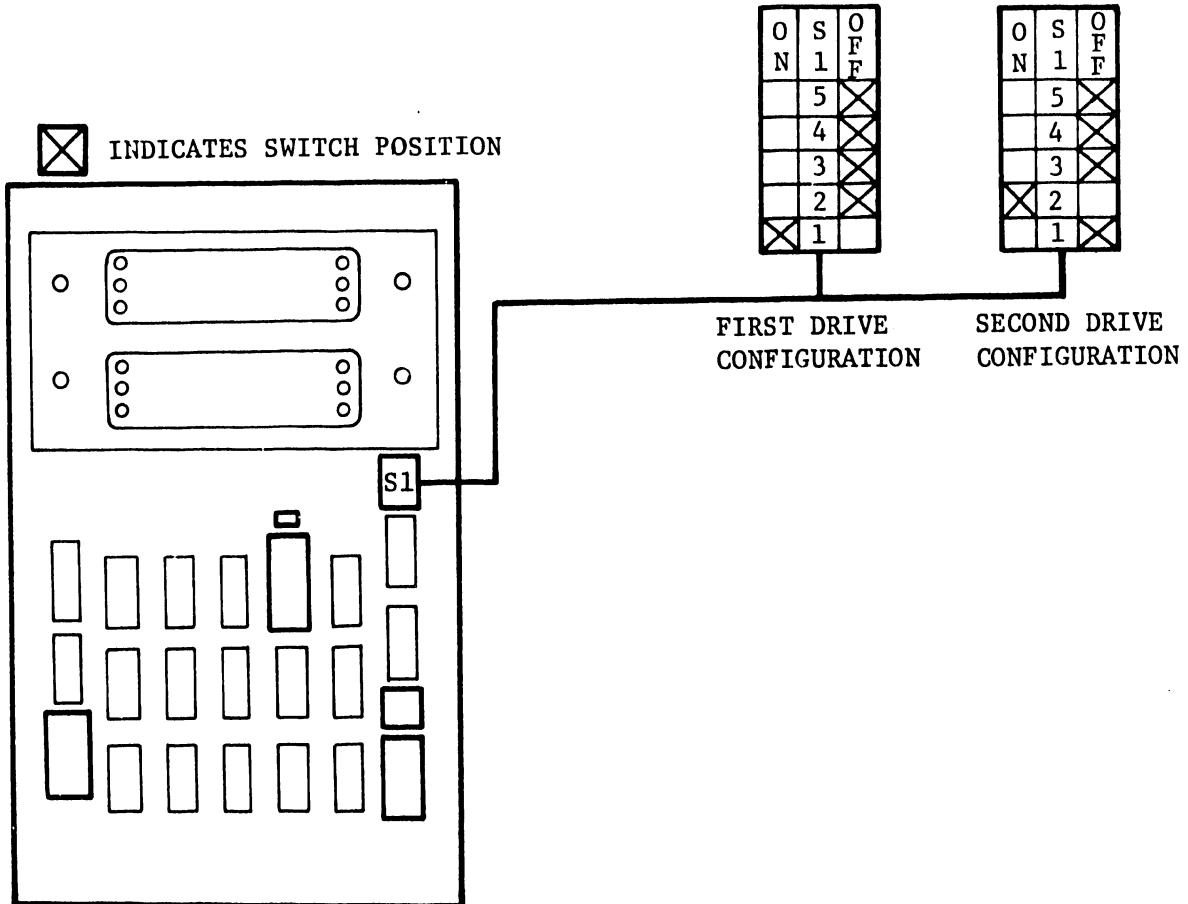


FIGURE D. REAR I/O BOARD - (S1 LOCATION)

SECTION

III

INSTALLATION

OF DISK

OPERATING

SYSTEM

SOFTWARE

SECTION III - INSTALLATION OF DISK OPERATING SYSTEM SOFTWARE

3.1 INTRODUCTION

The complete installation of a functioning Disk Operating System on a WANG 100 Series Word Processing System is carried out in three steps:

- . Initialization of a System Disk
- . Configuration of the System
- . Installation of Software Packages

The initialization step involves the formatting (and possible surface analysis of the system disk), the initialization of the DOS catalog on the disk, and the copying of master and slave software onto the disk. The configuration operation involves the specification of the hardware configuration of the particular system.

The operating system itself is distributed on a single floppy diskette called a "STARTER" system. This is a regular DOS system disk with the special "System Generation" package included. This disk may be IPLed directly and used to generate system disks on any type disk on any 100 Series Model hardware. It may also be used to configure or reconfigure a system disk, to update operating system software on an existing system disk.

Once a system disk has been generated and configured using the "STARTER" diskette, it may itself be IPLed. This newly-generated system contains only the bare DOS software: Menus and Control Functions.

Each software package is distributed on a separate floppy file diskette, the volume name of which corresponds with the order number (part number) for that particular package.

3.2 GLOSSARY OF TERMS

Listed below are terms that will be found throughout the installation procedure. A brief description of each and an explanation of the type of information required is given.

A. **VOLUME NAME** - A volume is an independent physical storage unit such as a diskette or disk cartridge. The Volume Name is assigned to the disk when it is installed to provide the user with a means of identifying that specific disk. Once a diskette or disk cartridge has been assigned a Volume Name, it can be mounted in any available disk drive and accessed by name without reference to the disk unit itself.

<u>B. DISK TYPE</u>	<u>DRIVE ADDRESS</u>	<u>DESCRIPTION</u>
Floppy	02	Second floppy drive
Hawk-5	04	Fixed disk (5 Meg.)
Hawk-2	06	Fixed disk (2.5 Meg)

C. **PASSWORD:** A password may be assigned to a disk when it is initialized. When a password has been assigned to a disk, it must be known from then on if the disk is to be re-initialized. There is a way, however, of obtaining the password through a utility called Password Displayer.

D. **VAU. (Volume Allocation Unit):** The sectors per VAU parameter specifies the number of sectors which are to be allocated to a file at a time. This is usually specified as 8 for Floppy diskettes and Hawk disk cartridges. However, this may vary depending on the system application. If the VAU is 8, then the files on the system will contain blocks of 8 sectors and there is the possibility that some sectors in the file will not be used.

E. CONFIGURING THE SYSTEM: The parameters which comprise the system configuration are:

- . Number of disk drives attached to a system (of each type).
- . Number of devices attached to system.
- . Number of devices which are experimental.
- . Size of Master Memory.
- . Master Debugging Level.

a. Number of Disk Units

This is actually broken down into two fields as shown by 1 and 2 below:

1) Number of Floppy Drives

NOTE

The drive which is plugged into the System's slot on the Master CPU is drive address 01 and the drive plugged into the Archive Slot on the Master CPU is drive address 02.

This is a one-digit number which tells the number of floppy drives supported by the master. It may be 0, 1 or 2. If there is one drive, it must be at drive address 01. If there are two they must be at addresses 01 and 02.

NOTE

System 130 will only have one floppy drive.

2) Number of Hawk Units

This is restricted to a one-digit number which tells the number of Hawk drives which are supported by the master. It may be 0 through 2. Note that each Hawk Disk Unit contains two Hawk Drives (fixed and removable). The following table gives the implicit drive addresses for each setting of this parameter:

<u>Drive Unit</u>	<u>Drive Addresses</u>	<u>Comment</u>
0	No Drive	N/A
1	04, 84	04=Fixed Disk of Drive #1 84=Removable Disk of Drive #1 08=Fixed Disk of Drive #2
2	04, 84, 08, 88	88=Removable Disk of Drive #2

NOTE

The OIS System 130 can have one or two disk drive units. e.g., If the system has only one disk drive unit then the number of the HAWK Unit is 1. If the system has two disk drive units the number of the HAWK Unit is 2.

c. Number of Devices

Number of Devices is restricted to a two-digit decimal number which indicates the number of slaves which is supported by the system. It may take on a value of 1 to 14. The unit numbers of the supported slaves must be 1 to N or 2 to N+1 (where N is the value entered) depending on the setting of the Debug Level parameter.

d. Number of Experimental Devices

Number of Experimental Devices is restricted to a two-digit number which must be between 0 and the Number of Devices selected in para. (c.) above.

Regardless of the total number of Devices, (Experimental and Non-experimental), the Experimental Devices will always occupy the highest numbered channels (PORTS).

EXAMPLE: Number of Devices in para. (c.) Value = 14

The number of Experimental Devices is specified by N slaves (where N is the value entered). For example, if N = 5, then channels 10-14 will be considered Experimental Devices as opposed to all the remaining (9) Devices.

Experimental mode means two things:

- 1) The slave is not IPL'ed automatically when it goes into the parity state or has an unrecoverable data-link error; it is only IPL'ed when the software running in it requests a TERMINATE operation or when it is powered-on.
- 2) The slave is IPLed by loading the file name "DOS STARTnn" (where nn is the unit number of the slave) if that file exists on the system disk. If the file does not exist, the slave is loaded in the same way as non-experimental slaves. This "DOS STARTnn" file is used for W.P. default Workstation option. See NOTE.

NOTE: If the W.P. default Workstation option is to be used, the Workstation must be connected to one of the experimental channels as described above.

e. Size of Master Memory

This field is a two-digit hexadecimal number which specifies the number of pages of master memory which are to be used by the master software. It must be within the range of 50-FF.

e.g. 48K - C0 (for OIS -125/130)

f. Master Debug Level

This is a one-digit number which may take on the value 0, 1 or 2. It indicates the residency and disposition of the master debugger. The three allowable settings have the following meaning:

0 = The master debugger is not kept resident while the operating system is running. The master memory which is normally occupied by it, is used for system buffers and control blocks.

1 = The master debugger is kept resident and may be started at any time by either a hardware interrupt or by striking the EXECUTE key on the "Master Debugger Workstation".

2 = The master debugger is kept resident and is started upon IPL of the master before the operating system itself gets control. After the system is given control from the debugger, the debugger may be restarted at any time as above.

Whenever the debug state is set to 1 or 2, the master software assumes that the slave attached to data-link channel 1 is a workstation of some kind and is to be dedicated to the debugger. Thus, the operating system treats channel 1 as if it does not exist.

F. INSTALL SOFTWARE PACKAGES

Unlike the previous operations, software-package installation is not performed with the STARTER system. It is done under control of the system on which the package is being installed. Each software package is distributed on a separate floppy diskette. The diskette contains all files and control information needed to install the package on a system disk.

G. QUEUE CONTROL:

Found in the Control Functions Menu, is the printer device number the print request is being sent to.

H. SLAVE CONTROL:

Found on the Control Functions Menu, refers to the state of activity of all the slaves on each channel of the Master C.P.U., such as "RUNNING", "POWER OFF" or "IDLE".

I. DISK CONTROL:

Found on the Control Functions Menu, refers to the state of activity of all the drives attached to master CPU such as "IN USE", "MOUNTED, NOT IN USE" or "UNLABELLED VOLUME".

J. MESSAGE CONTROL:

Found on the Control Functions Menu, you can send or receive message to or from any W/S on the system.

K. BATCH PROCESSING:

Found on the Control Functions Menu.(Not available at present time)

L. INSTALL SOFTWARE PACKAGE:

Found on the Control Functions Menu; allows the user to install the different software packages.

NOTE

THE FOLLOWING REPRESENTATIVE TWENTY CRT
SCREENS OF INFORMATION ARE DIVIDED INTO
THE FOLLOWING CATEGORIES

- o SCREENS 1 THROUGH 9 INITIALIZING THE SYSTEM DISK
- o SCREENS 9A THROUGH 13A CONFIGURING THE SYSTEM
- o SCREENS 14 THROUGH 20 INSTALLING THE SOFTWARE PACKAGE

SYSTEM 130

A. DISK INTIALIZATION

Insert the STARTER diskette into archive drive (Floppy Drive) with the Utility Load Transfer Switch (ULTS) located on the front of the MCPU in the Floppy (UP) position. Press the RED reset button. The following menu will appear on the Workstation (screen 1).

NOTE:

DO NOT follow the Prompts on the illustrated CRT screen displays. During the execution of the procedures, the operator is directed to press certain keys. This PROMPT, however, is also on the screen presentation. The operator must, therefore, fill in the screen with the requested information or select the appropriate item and only perform the PROMPTS outside the CRT screens.

Release 3.3	System "STARTER"
WANG 928	
Disk Operating System	
I N I T I A L P R O G R A M L O A D P R O C E D U R E	
Enter Date: mm/dd/yy	
Enter time: hh:mm	
PRESS EXECUTE OR CANCEL	
SCREEN 1	
(Ignore Prompts on CRT screen)	

SYSTEM 130

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Release 3.3	System "STARTER"
WANG 928	
Disk Operating System	
INITIAL PROGRAM LOAD PROCEDURE	
Enter Date: mm/dd/yy	
Enter time: hh:mm	
PRESS EXECUTE OR CANCEL	
SCREEN 1	
(Ignore Prompts on CRT screen)	

Enter DATE and TIME

To start the procedure press the EXECUTE key. To terminate the procedure press the CANCEL key.

If the EXECUTE key is pressed, the screen will appear as follows (Screen 2):.

NOTE

Refer to Screen 2.

- o The definition of "Unit 4" is as follows:
This particular Workstation is connected to Channel 4. i.e., if it was connected to Channel 3 it would reflect Unit 3 on Screen 2.

- o The definition of "Type 501" is as follows:
The 5 stands for device number 5 and the number 01 stands for the telecommunications option. If there was no telecommunications option the number would be reflected as 500; therefore "Type 500".

12/03/79	Wang Distributed System	10:57:XX
Unit 4	D I S K O P E R A T I N G S Y S T E M	TYPE 501
Release 3.3	System is "STARTER"	
Press EXECUTE to Select Indicated Choice		
<u> </u> System Generation	<u> </u> Control Functions	
SCREEN 2		
(Ignore PROMPTS on CRT screen)		

Select the System Generation and press the EXECUTE key. The screen will appear as follows (Screen 3):

Office Information System-System Generation
SYSGEN FUNCTION SELECTION

Select Function and Disk Type

Press EXECUTE or CANCEL

._	Initialize System Disk	Hawk-5
__	Update System software	Hawk-2
__	Configure System	

SCREEN 3

(Ignore PROMPTS on CRT screen)

Select "Initialize System Disk"; press RETURN key and you will notice that the cursor moves to the right. Select the appropriate disk drive with the space bar.

NOTE

Select Hawk-5 for OIS 130

Select Hawk-2 for OIS 125

Select Hawk-5 by moving the cursor to the "Hawk-5" selection point by use of the space bar.

After making the proper selection, press the EXECUTE key.

Screen 4 or Screen 4A will appear.

Office Information Systems-System Generation
INITIALIZE SYSTEM DISK

Fill in All Fields

Press EXECUTE or CANCEL

Initialize Hawk-5 Disk on Drive 04
Formatting is Required.

New Volume Name: _____

New Password: _____

New Sectors Per Value: ____

SCREEN 4

(Ignore PROMPTS on CRT screen)

Fill in the appropriate information:

e.g. Add "VOL1" to "New Volume Name"
Add new Password (lower case "vol1")
Add desired VAU to "New Sectors Per VAU"
(Recommended Sectors per VAU is "8" for HAWK Drives)

Press the RETURN key after each insertion.

Press the EXECUTE key and screen 5 will appear. (Ignore screens
4A and 4B)

Office Information Systems-System Generation
INITIALIZE SYSTEM DISK

Press EXECUTE to continue
or CANCEL for previous menu

VOLUME XX on Drive 04

PASSWORD Required _____

SCREEN 4A

(Ignore screen PROMPTS)

If operator does not know the PASSWORD, then by the use of Password Displayer Utility, the Password can be obtained.

WANG's manufacturing and shipping department uses VOLUME NAME upper case (VOL1) and PASSWORD lower case (vol1) when initializing all system disks prior to shipment.

Press EXECUTE key after entering PASSWORD.

Screen will appear as follows:

Office Information System-System Generation I N I T I A L I Z E S Y S T E M D I S K	
Fill in all fields Press EXECUTE or CANCEL	
Initialize Hawk-5 Disk on Drive 04	
Disk has Volume Name: <u>XX</u>	Initialization Operation
	Format and Initialize ●
	Reinitialize
New Volume Name: _____	
New Password: _____	
New Sectors Per VAU: _____	
SCREEN 4B (Ignore screen PROMPTS)	

Select Format and Initialize

Press RETURN key

Fill in the appropriate information:

e.g. Add "VOL1" to "New Volume Name

Add new Password (lower case "vol1")

Add desired VAU to "New Sector Per VAU"

(Recommended Sectors Per VAU is "8" for HAWK Drives)

Press EXECUTE key

Screen 5 will appear, proceed as follows:

<p style="text-align: center;">Office Information System-System Generation I N I T I A L I Z E S Y S T E M D I S K</p> <p>Press EXECUTE to ***BEGIN INITIALIZATION***</p> <p style="text-align: center;">Initialize Hawk-5 Disk on Drive 04 Formatting is Required.</p> <p>New Volume Name: <u>XX</u> New Sectors Per VAU: <u>8</u></p> <p style="text-align: center;">SCREEN 5 (Ignore PROMPTS on CRT screen)</p>
--

Press EXECUTE key

The screen now changes to the following (Screen 6):

Office Information System-System Generation
I N I T I A L I Z E S Y S T E M D I S K

INITIALIZATION IN PROGRESS
(Formatting)

Initialize Hawk-5 Disk on Drive 04
Formatting is Required.

New Volume Name: XX

New Sectors Per VAU: 8

SCREEN 6

During the Initialization period the screen presentation could change indicating the following problem:

Disk Contains Bad Sector(s)
Press EXECUTE to continue

One or more sectors could have a soft error or a Hard (damaged surface) error. When executed the system will flag bad sector(s), but will not effect normal operations.

NOTE

In Screen 7 the "initializing Catalog" appears replacing "Formatting" (Screen 6) in approximately 3 minutes and then the "Installing Master" and "Installing Device Software" will appear in approximately 1 1/2 minutes.

The screen changes to Screen 8:

Office Information System- System Generation
I N I T I A L I Z E S Y S T E M D I S K

INITIALIZATON IN PROGRESS

(Initializing Catalog) Installing Master.

..... (Installing Device Software)

Initialize Hawk-5 Disk on Drive 04
Formatting is Required.

New Volume Name: XX

New Sectors Per VAU: 8

SCREEN 7

The following screen appears (Screen 8):

Office Information System-System Generation
I N I T I A L I Z E S Y S T E M D I S K

INITIALIZATON COMPLETE

Please press CANCEL

Initialize Hawk-5 Disk on Drive 04
Formatting is Required.

New Volume Name: XX

New Sectors Per Value: 8

SCREEN 8

(Ignore screen PROMPTS)

Press CANCEL key.

The screen presents the following (Screen 9):

<p>Office Information System-System Generation SYSTEM FUNCTION SELECTION</p> <p>Select function and Disk Type Press EXECUTE or CANCEL</p> <table><tr><td><input checked="" type="checkbox"/></td><td>Initialize System Disk</td><td>Hawk-5</td></tr><tr><td><input type="checkbox"/></td><td>Update System software</td><td>Hawk-2</td></tr><tr><td><input type="checkbox"/></td><td>Configure System</td><td></td></tr></table>	<input checked="" type="checkbox"/>	Initialize System Disk	Hawk-5	<input type="checkbox"/>	Update System software	Hawk-2	<input type="checkbox"/>	Configure System	
<input checked="" type="checkbox"/>	Initialize System Disk	Hawk-5							
<input type="checkbox"/>	Update System software	Hawk-2							
<input type="checkbox"/>	Configure System								
<p>SCREEN 9 (Ignore screen PROMPTS)</p>									

B. SYSTEM CONFIGURATION

Select "Configure System" by using the Space Bar.

Press the RETURN key and by using the space bar, select "Hawk-5".

Press the EXECUTE key.

<p>Office Information System-System Generation CONFIGURE SYSTEM</p> <p>Press EXECUTE to Continue or CANCEL for Previous Menu</p> <p>Volume " XX " on Drive 04 Password Required _____</p>
<p>SCREEN 9A (Ignore screen PROMPTS)</p>

Enter Password

(Use same PASSWORD which was entered during Initialization)

Press EXECUTE key.

The screen will appear as follows (Screen 10):

Office Information System-System Generation	
C O N F I G U R E S Y S T E M	
Modify Configuration	
Press EXECUTE or CANCEL	
Configure Hawk-5 Disk on Drive 04	Software Release 3.3
Disk has Volume Name: <u>XX</u>	Last IPLed on: 00/00/00
Floppy Drives: 1	Devices (Dec.):14
Hawk Units : 2	Experimental Devices (Dec.) :14
	Memory Pages (HEX): C0
	Debug Level: 0
SCREEN 10 (Ignore screen PROMPTS)	

NOTE

Change the presented screen as necessary
to reflect the configuration of the system
being used.

Press the EXECUTE key and the screen will change as follows
(Screen 11):

Office Information System-System Generation	
C O N F I G U R E S Y S T E M	
Press EXECUTE to	
WRITE TO DISK	
Configure Hawk-5 Disk on Drive 04	Software Release 3.3
Disk has Volume Name: <u>XX</u>	Last IPLed on: 00/00/00
Floppy Drives: 1	Devices (Dec.): 4
Hawk Units : 2	Experimental Devices (Dec.) : 4
	Memory Pages (Hex): C0
	Debug Level: 0
SCREEN 11 (Ignore screen PROMPTS)	
3-20	

Press the EXECUTE key-Screen will change to (Screen 12):

Office Information System-System Generation	
C O N F I G U R E S Y S T E M	
New configuration written to disk	
Please Press CANCEL	
Configure Hawk-5 on Disk 04	Software Release 3.3
Disk has Volume Name: <u>XX</u>	Last IPLed on: 00/00/00
Floppy Drives: 1	Devices (Dec.): 04
Hawk Units: 1	Experimental Devices (Dec): 04
	Memory Pages (Hex): C0
	Debug Level: 0
SCREEN 12	
(Ignore screen PROMPTS)	

Press the CANCEL key-Screen will appear as (Screen 13):

Office Information System-System Generation	
S Y S G E N F U N C T I O N S E L E C T I O N	
Select Function and Disk type	
Press EXECUTE or CANCEL	
<u>.</u> Initialize System Disk	<u>—</u> Hawk-5
<u>—</u> Update System software	<u>—</u> Hawk-2
<u>—</u> Configure System	
SCREEN 13	
(Ignore screen PROMPTS)	

At this point in time the System Disk Initialization and Configuration of the system is complete. Remove the STARTER diskette from the floppy drive.

Put the Utility Load Transfer Switch (ULTS) located on the front of the MCPU to the DOWN position and press the red RESET button. The CRT will display the data required as illustrated in Screen 13A.

RELEASE 3.3	SYSTEM <u>XX XX</u>
Office Information System	
DISK OPERATING SYSTEM	
INITIAL PROGRAM LOAD PROCEDURE	
Enter Date: <u>mm/dd/yy</u>	
Enter Time: <u>hh:mm</u>	
SCREEN 13A	

C. SOFTWARE LOADING

The following procedures are used to install the software into the System 130.

After the Screen 13A data has been entered and the EXECUTE key is pressed, the screen will appear as follows (Screen 14):

12/03/79 Office Information System 11:45:28
Unit 4 DISK OPERATING SYSTEM TYPE 501
Release 3.3 System is "XX"

Press EXECUTE to
Select Indicated Choice

___ Control Functions

SCREEN 14

Press the EXECUTE key and the screen will be as follows (Screen 15):

12/03/79 Office Information System 11:50:28
Unit 4 DISK OPERATING SYSTEM TYPE 501
Release 3.3 System is "XX"

Press EXECUTE to
Select Indicated Choice

Control Functions: ___ Queue Control
___ Device Control
___ Disk Control
___ Message Control

___ Start Batch Processing
___ Install Software Package

SCREEN 15 (Ignore screen PROMPTS)

Select "Install Software Package" by using the space bar or by
pressing the "I" key.

Press the EXECUTE key and the screen will change to the following
(Screen 16):

<p>Office Information System I N S T A L L S O F T W A R E P A C K A G E</p> <p>Specify Package ID and Destination Press EXECUTE or CANCEL</p> <p>Package ID: SP _____</p> <p>Destination Volume: <u>XX</u></p>
<p>SCREEN 16 (Ignore PROMPTS on CRT screen)</p>

Press the EXECUTE key and the screen will change to the following
(Screen 17):

NOTE: READ ALL REMAINING INSTRUCTIONS PRIOR TO LOADING ALL
SOFTWARE DISKETTES

<p>Office Information System I N S T A L L S O F T W A R E P A C K A G E</p> <p>Mount Disk in Drive 01 Press EXECUTE when drive is Ready.</p> <p>Package ID: SP _____</p> <p>Destination Volume: <u>XX</u></p>
<p>SCREEN 17 (Ignore PROMPTS on CRT screen)</p>

CAUTION

The sequence of floppy diskette usage must be followed as indicated to prevent any congruency between the "Word Processing" and the "Word Processing Utility" diskette. Under NO circumstances shall the Word Processing Utility diskette be installed before the Word Processing diskette.

Mount the Word Processing Diskette into the Floppy Drive

Press the EXECUTE key and the screen will change to Screen 18:

DISKETTE SEQUENCE TABLE

This diskette sequence of loading/usage shall be as follows:

1. Word Processing
2. *Word Processing Utility
3. *Peripherals
4. Supervisory Utility
5. Volume Utility
6. File Utility
7. Basic
8. Demonstration

*WP UTILITY and PERIPHERALS will not appear on the DOS menu.

NOTE

All Systems may not have the same number of diskettes as listed in the Sequence Table, however, with a lesser number, the sequence of usage must still be maintained.

Office Information Systems
I N S T A L L S O F T W A R E P A C K A G E

SP004025--Mounted in Drive 01

Press EXECUTE to run

Package ID: SP004025

Destination Volume: XX

SCREEN 18 (Ignore PROMPTS on screen)

Press the EXECUTE key and Screen 19 will appear.

Office Information System
I N S T A L L S O F T W A R E P A C K A G E

Installation in Progress

Package ID: SP004025

Destination Volume: XX

SCREEN 19

In a minute or two, the screen will change to that as shown on
Screen 19A.

Office Information System
I N S T A L L S O F T W A R E P A C K A G E

Press EXECUTE to run again
or CANCEL to terminate

Package ID: SP004025

Destination Volume XX

SCREEN 19A
(Ignore screen PROMPT)

Press EXECUTE key-(CRT display returns to Screen 16)

After returning to Screen 16, fill in the requested information and proceed to Screen 17. The only time the installation sequence of software diskettes can be performed is at (Screen 17). Remove the Word Processing Diskette and install the next diskette in sequence as indicated by the Diskette Sequence Table.

Repeat this process covering all steps and screens given after Screen 16 until all disks have been processed. Software ID's will be displayed on screens 18, 19 and 19A as each Diskette is loaded.

After processing the final disk at Screen 19A, press the CANCEL key and 19B will appear.

Office Information System
I N S T A L L S O F T W A R E P A C K A G E

To Dismount Installation Disk
Remove Disk from Drive 01 then
Press EXECUTE

Package ID: XX

Destination Volume XX

SCREEN 19B

(Ignore screen PROMPT)

Press EXECUTE key
Screen 15 will appear
Press CANCEL key

The main (DOS) menu will appear as follows (Screen 20).

DATE	Office Information System	TIME
Unit 4	D I S K O P E R A T I N G S Y S T E M	TYPE 501
Release #3.3	System is <u>XX</u>	
Word Processing	___ Control Functions	
Supervisory Utilities		
File Utilities		
Volume Utilities		
Basic		
Demonstration		

SCREEN 20

REFER TO WPNL 76 AND 76.1 FOR OPERATION OF THE (DOS) MENU
UTILITIES

SECTION

IV

GENERAL THEORY

OF OPERATION

SECTION IV - GENERAL THEORY OF OPERATION

4.1 MASTER MEMORY/210-7511-2A

4.1.1 GENERAL DESCRIPTION:

The Master Memory PCB contains 48K of RAM and 3K of PROM memory. There is a provision for an additional 1K of PROM Memory and also for 12K of RAM memory. The 48K of RAM memory is divided into three banks of 16K. Both RAM and PROM memories are bank selectable. The addressing of RAM memory is controlled by the Priority Function Decoder by the sharing of the following three functions (listed in order of priority):

- DMA (Direct Memory Access)
- 8080 (Microprocessor Addressing)
- REFRESH (A periodic recharge of RAM memory)

The master memory board includes the following:

- 8080 READ/WRITE decoder
- Memory data access buffers and registers with associated enabling clocks and FIFO control.

FIFO Control is a logic timing arrangement for internal DMA, bidirectional, 256-byte data transfers between the system disk, master memory, and slave memory write. The 256 byte FIFO (RAM) memory is an intermediate temporary storage area in the master data-link board during data transfers. FIFO control furnishes the address control and I/O buffer clocks for FIFO when storing and accessing the 256 bytes of data being transferred.

4.1.2 8080 ADDRESS BUS - PROM

The 8080 address bits (A_0 - A_{11}) are used to access PROM memory. Single 1K PROM chips are presently being used in L101, L100, and L99 locations. The total storage capacity of the PROMs is 3K X 8-bit bytes and each PROM is 1K X 8 bit bytes. Each PROM address requires 10 address bits (A_0 through A_9). A_{10} and A_{11} address bits are used for bank decoding. L77 is used for PROM Bank selection (L107 is Bank 0, L100 is Bank 1, L99 is Bank 2). Address bits A_{10} and A_{11} are connected to the A and B input respectively of the L77 decoder. The C and D inputs of L77 are tied together and controlled by the DRENABL* signal. This signal is decoded at L84-3. The inputs to this NAND gate are PROMSEL and O1A*, and both signals will produce a low at L84-3. L84-3 is tied back to L77-12 and 13. The PROMs contain the start-up BOOTSTRAP program required to bring the Word Processing System to its READY state.

4.1.3 8080A ADDRESS BUS - RAM

The access to the master RAM memory, using the 8080 address bus, is enabled when the PRIORITY FUNCTION DECODER output from L75-8 is low to the 8080. This signal is applied to Pin 2 of L4, L21, L39, L57 and O2*. REF signal is applied to Pin 14 of L4, L21, L39, L57 (L4, L21, L39, L57 are 4 line-to-1 line selections/multi-plexers). When Pin 2 and Pin 14 of these chips are low, this selects the low order address bits A_0 - A_6 and latches the RAM chips. When Pin 2 is low and pin 14 is high, this selects the high-order address bits A_7 - A_{13} and also latches at the RAM chips. A total of fourteen address lines can access 16K bytes of data with parity from any one of the three selected banks. The decoder for selecting one of the three RAM memory banks is located in the 8080/DMA address-multiplexer-logic (L38, L37, L33, L32, L31)

4.1.4 8080/DMA ADDRESS MULTIPLEXER

One quadruple, 2 line-to-1 line, multiplexer (L38) is used to select the desired RAM memory bank and enable the selected bank for a READ or WRITE. The multiplexed high-address bits for the 8080 bus (A12, A13, A14, A15) and DMA bus (A12M, A13M, A14M, A15D) are selected by signal 8080/DMA. When the selected signal is low, the outputs represent the A inputs. And when it is high, the outputs represent the B inputs. The outputs of L38 are connected to L37 A-inputs. The L37 B-inputs are tied high with the pull-up resistor. By the use of 4-bit binary full address with fast carry (L37) and decoder (L33), the system is enabled to select one of the three RAM or PROM banks. The READ/WRITE (WR*) command for RAM memory is applied to all banks simultaneously from the 4 line-to-1 line multiplexer L50-7. The READ/WRITE signal from L50-7 is decoded from the DMA disk signal (RGA) and the 8080 signal MEMWO*. If the output at L50-7 is low, a WRITE is selected and READ operation is selected if a high is present.

4.1.5 PRIORITY FUNCTION DECODER

The priority of the DMA, 8080 and REFRESH functions for accessing RAM memory are as stated. For 8080 functions, the READ/WRITE decoder will be pertinent to this discussion. An explanation of the decoder follows:

A dual, D-type triggered F/F (L108) latches either the DMA or the REFRESH requests by resetting the previously preset F/Fs, making either output active low. An asynchronous DMA request (at L88-pins 1 and 2) requires inputs *SLT0 (Master Select) and *SRR (Disk Read Request). The request is latched on the trailing edge of the input signal. A REF signal also clocks its request on the trailing edge. These requests, once set, will remain set until processed and reset. The request is synchronized by a *PHASE 2 clock at the input of D-type F/F (L94) with an override reset of a permanently wired preset gate. The output of L94 is active low for either DMA or REFP for the duration of *PHASE 2. At the input of L93 (8 line-to-3 line priority decoder), the 8080 function from the 8080 R/W decoder L106-6 joins the DMA and REF inputs at pin 6 for priority selection at outputs A0 and A1 (outputs are active low).

The selected priority function is then clocked into L75 latch at PHASE 1A-time which is 58.5 ns after PHASE 2 goes active. The output pins 5 and 9 are select bits used by L38 and L50 for address and R/W multiplexing as well as for function-decode outputs at L86. The dual 2 line-to-4 line decoder L86 receives inputs from L75 which are decoded into (two outputs) active low control signals which provide the following:

- DMA--The output at L86-7 increments the 256-byte DMA address counter L36, and L86-9 output clocks the data read into the 4-bit, D-type, 3-state registers L67, L104 and L105 onto the DMA out bus.

If the decode is a DMA write, buffers L79 and L67 are enabled for data in from the DMA bus. Three gates L49, L52 and L79 are logically arranged to control the DMA data in and out. Parity is checked in the data link for all bytes to and from master memory. The DMA out of L86-7 is used to reset the original DMA request which is a preset.

- 8080 READ/WRITE DECODER - A15 and SLTO* are NAND gated to access above 32K in master. The 8080 R/W decoder utilizes address bit A15, SLTO* and the READ or WRITE status byte to initiate a R/W function. The address bit A15 or SLTO* must be low for accessing master memory. A WRITE status word will gate a low output from L9-6 to L92-2. When L92 is clocked by PHASE 2 and SYNC from gate L106-8, a reset of the WRITE F/F produces an active low at L92-5 for a period of 585 ns, gating a low output at L106-6. This low is the 8080 write request at L93-6. The same procedure for an 8080 read occurs when a READ status byte and address bit A15 or SLTO* enable an active low at gate L90-8. The 8080 R/W request is inverted twice to generate RDMY at L76-4. RDMY* (READ MEMORY) is active low and forces the 8080 into a busy WAIT state to insure that the accessed data from memory is stable on the data bus. An 8080 R/W function at the dual output of L75-8 of the priority function decoder enables the 8080

address multiplexers L4, L21, L39 and L57. The output at L6-6 resets the 8080 R/W request and also presents a positive-going delayed-clock through L83 to L69-3. L69-6 is set low inhibiting PHASE 1A from resetting the 8080 function until the next SYNC pulse and PHASE 1A pulse are coincident at gate L84-6 clearing the inhibit. This is a cycle steal to guarantee the access of good data. A preset of L69 F/F #2 is used to inhibit a parity check of PROM data in the Master CPU during start-up and reset. A low signal from L84-3 to L49-5 sets PROM. PROM is also cleared by the same clear gate that clears F/F #1.

- REFRESH--The REF request is always present when there is no DMA or 8080 activity and processed identical to the DMA. REF is lowest on the priority list. REF at the output of L88-11 enables all four drivers for all RAM banks to allow the same row in each bank to be refreshed simultaneously during each CE. This method provides all 128 rows of each bank to be refreshed a minimum of every 1.2 ms. Maximum time allotted for REF is approximately 2 ms. The L75-6 REF signal gates the row address onto the address bus from multiplexers L2 and L19. Signal REF from L86-5 resets the REF request F/F.

4.1.6 DMA ADDRESS BUS

The 8080 address bus is split into 8 HIGH-ORDER and 8 LOW-ORDER bits for all DMA addressing functions. DMA addressing is multiplexed for controlling 1-BYTE and 256-BYTE transfers. The scheme for DMA addressing of MASTER MEMORY is identical to the 8080. Fourteen address bits (A0m-A13m) are used for accessing the same number of addresses and A12m-A14m and A15D for bank selection. the DMA high-order and low-order byte address bits are routed to the data link for addressing the slave units. The DMA addressing of master memory for a WRITE command will require a data transfer from the disk controller whereas a READ of master memory would be a data transfer to the disk controller. The DMA low-order address bus is multiplexed for 1-byte and 256-byte transfers using L1 and L18. The output bits (A0m-A7m)

are routed to the 7214-2 data link board. If the select is 1-byte, the actual low-order address goes to data link. If the select is 256-byte, the low-order address output to the data link is all zeroes. L36 and L54 are binary counters that are not presettable but are cleared by signal OB/C* prior to any 256-byte transfers. The counters are incremented during each DMA priority decode providing sequential 256-byte low-order addresses to memory for each R/W command. High-order address bits (CA₇, A8M-A13M) are routed from the master CPU to permit 16K addressing. Each byte of data is addressed to-or-from memory while under DMA control of the PRIORITY FUNCTION DECODER.

4.1.7 ROW REFRESH CIRCUITS

A REF signal from L107-11 is sent to L3 and L20 every fifteenth count of O1A; providing a clock for latching the refresh request into L108-11. When the DMA or 8080 request is not present, then the refresh request is processed. Two 4-bit binary counters L3 and L20, are clocked by the REF pulse for 128 counts and this process continues to repeat the count incrementing the 128 row addresses and recharging each row approximately every 1.2 ms. The low address count REF₀ - REF₆ is multiplexed at L7, L21, L39 and L57, and presented at the RAM chips. These new 16K X 1 RAM chips require only low-order address bits for the refresh process.

4.2 PRINTER MEMORY/210-7547

The printer memory board 7547 has a memory capacity of 32K divided into two 16K banks. At present only 16K (bottom bank only) is used. The printer is a slave and must have a memory unit that can be accessed by its own processor (8080) and the master processor via the DMA (Processor Communication Channel). The logic for accessing printer memory is almost the same as the old 12K printer memory board (7347).

The 16Kx9 Bit Printer Memory Board (7547) is used in all new Word Processing 100 Series products. This board is capable of 32Kx9 bit maximum memory (7547-1).

NOTE:

The 16Kx9 Bit Printer Memory Board functions in the old word processing products (e.g., WP10, WP20, WP30, etc.) but the old 12K memory board (7347) does not function in the new WP 100 series, because of the software.

Both boards are pin to pin compatible, facillitating installation.

The following chart presents the main differences between the old 12K memory (7347) board and the new 16K memory (7547) board.

12K Memory Board (7347)

16K Memory Board (7547)

- | | |
|--|--|
| 1. Uses 4K RAM chips.
WLI #377-0314 (4050)
for 12K memory. | 1. Uses 16K RAM chips.
WLI #377-0345 (4116). One bank
of RAM chips (Total 9) for 16K
and two banks of RAM chips
(Total 18) for 32K. |
| 2. The four high order address
bits ($A_{12}-A_{15}$) are
selected for enabling one
of the three RAM memory
banks. The signals are
designated as (A_0-A_{11})
CE_1, CE_2, CE_3 . | 2. The two high order address bits
($A_{14}-A_{15}$) are selected for
enabling one of the two RAM
memory bank. The signals are
designated as CAS_1 and CAS_2 . |
| 3. The chip enable signal
is common for RAMS and is
used to select the bank of
chips. | 3. RAS is common for RAMS.
CAS is used to select the
bank of chips. |

12K Memory Board (7347)

4. The 12 address bits are used to select the address locations.
5. The REF signal required for refreshing the memory. The complete refresh of RAM memory is required at least every 2 ms.
6. There are no series damping resistors.
7. (Input/Output) I/O at the RAM chips is used on the same pin.
8. The PROM socket is provided on the old memory board to test the 8080 path of the board.

*CAS - column address strobe.

RAS - row address strobe.

INSTALLATION:

The new printer memory (16K) board does not require any changes. It directly replaces the 12K memory board.

16K Memory Board (7547)

4. The 14 address bits (A_0-A_{13}) multiplexed into two 7 bits to select the address locations.
5. The 14 address bits (A_0-A_{13}) This board is designated in such a way that refresh is always on. The refresh counter will come on as soon as we apply the power and as long as five volts is present.
6. The series damping resistors are used on address, CAS*, RAS* and data lines due to minimize the undershooting. The undershooting of more than one volt is not recommended for RAM (4116) chips.
7. The new memory board uses separate pins for each (input/output) data lines.
8. The PROM socket is not provided on the new memory board.

APPENDIX

A

MEMORY

PCB

SCHE-

MATICS

THE SCHEMATICS, WHEN AVAILABLE, ARE ON THE LAST FICHE IN THIS SET.

APPENDIX

B

BILL

OF

MATER-

IALS

APPENDIX "B"

OIS 130

BILL OF MATERIALS

ASSEMBLY PART NUMBER 177-3037- - -
 ASSEMBLY DESCRIPTION 019 140 MASTER

LEGEND
 1: PHANTOM; 2: ITEM MASTER DELY CODE; 3: *-TAGGED OUT OF KIT(PROD STR)

B-2

POSITION IN STRUCTURE	LEGEND	COMPONENT PART NUMBER	DESCRIPTION	P C A	QUANTITY PER ASSY	U/M	IML
1		IN 177-3037- - -	019 140 MASTER		1.0000	EACH	
2	F	IN 210-7014- - -	FCA 500 14170 CHAL MASTER DATA LINK		1.0000	EACH	
3		IN 209-7014- - -	FCA 500 14170 CHAL MASTER DATA LINK		1.0000	EACH	
4		IN 000-0001- - -	LAPOR SELF-SYSTEMS		2.0070		
4		IN 000-0011- - -	LAPOR QUALITY CONTROL		4.9970		
4		IN 300-1100- - -	CAP 100 PF 10% 500 V CERAMIC DISC	E10501	1.0000	EACH	
4		IN 300-1000- - -	CAP .005 LF +50-20% 32 V CERAMIC D	EC6502	50.0000	EACH	
4		IN 300-1000- - -	CAP .001 LF 10% 500 V CERAMIC DISC	EC7291	1.0000	EACH	
4		IN 300-2115- - -	CAP .0015 LF 10% 100 V MYLAR	EC6502	1.0000	EACH	
4		IN 300-4010- - -	CAP 15.0 LF 20 V 10% TANT AXIAL	EC6502	11.0000	EACH	
5	FS	300-4002-R - -	CAP 15.0 LF 20V 10% TANT AXIAL T&R		1.0000	EACH	
4		IN 300-4012- - -	CAP .0022LF FS 500 V MICA DIPPED	ER246A	1.0000	EACH	
4	FS	* 330-1002- - -	RES 5% 100 OHM 1/4W 5% FIXED COMP		14.0000	EACH	
4	FS	* 330-2011- - -	RES 100 OHM 1/4W 5% FIXED COMP		13.0000	EACH	
4	P FS	* 330-2011-4E- - -	RES 100 OHM 1/4W 5% FIXED COMP		1.0000	EACH	
5	FS	* 330-2011- - -	RES 100 OHM 1/4W 5% FIXED COMP		1.0000	EACH	
4	FS	* 330-2028- - -	RES 170 OHM 1/4W 5% FIXED COMP		14.0000	EACH	
4	FS	* 330-2040- - -	RES 350 OHM 1/4W 5% FIXED COMP		14.0000	EACH	
4	P FS	* 330-3010-4E- - -	RES 1K OHM 1/4W 10% FIXED COMP		1.0000	EACH	
5	FS	* 330-3010- - -	RES 1K OHM 1/4W 10% FIXED COMP		1.0000	EACH	
4	FS	* 330-3022- - -	RES 2.0K OHM 1/4W 10% FIXED COMP		44.0000	EACH	
4	P FS	* 330-3047-4E- - -	RES 4.7K OHM 1/4W 10% FIXED COMP		1.0000	EACH	
5	IN	* 330-3047- - -	RES 4.7K OHM 1/4W 10% FIXED COMP		1.0000	EACH	
4	P FS	* 330-4011-4E- - -	RES 10K OHM 1/4W 5% FIXED COMP		1.0000	EACH	
5	IN	* 330-4011- - -	RES 10K OHM 1/4W 5% FIXED COMP		1.0000	EACH	
4	P FS	* 330-4044-4E- - -	RES 47K OHM 1/4W 5% FIXED COMP	E8246A	1.0000	EACH	
5	IN	* 330-4044- - -	RES 47K OHM 1/4W 5% FIXED COMP		1.0000	EACH	
4		IN 376-0021- - -	225-02221-110 SOL TYPE		1.0000	EACH	
4		IN 376-0002- - -	IC 7400A 4 2 IN POS NAND GATE		4.0000	EACH	
4		IN 376-0003- - -	IC 7410N 2 3 IN POS NAND GATE	EC6502	3.0000	EACH	
4		IN 376-0004- - -	IC 7474N 2 0 EDGE TRIG FLIP-FLOP		7.0000	EACH	
4		IN 376-0009- - -	IC 7492N 4 LINE-10 LINE DECODER		2.0000	EACH	
4		IN 376-0010- - -	IC 7404N HEX INVERTER	E10312	4.0000	EACH	
4		IN 376-0016- - -	IC 7402N 4 2 IN POS NOR GATE		6.0000	EACH	
4		IN 376-0041- - -	IC 74265 2 IN 4 BIT EGTG MX	EC6502	1.0000	EACH	
4		IN 376-0045- - -	IC 7404N HEX INVERTER		1.0000	EACH	
4		IN 376-0047- - -	IC 74151 DATA SELECTOR MULTIPLEXER		2.0000	EACH	
4		IN 376-0081- - -	IC 7400 4 2 IN POS NAND GATE	EC6502	3.0000	EACH	
4		IN 376-0082- - -	IC 74157 4 2 IN MX	EC6502	2.0000	EACH	
4		IN 376-0093- - -	IC 7412 4 2 IN OR GATE		9.0000	EACH	
4		IN 376-0074- - -	IC 74161 SYNCHRONOUS 4 BIT COUNTER		6.0000	EACH	
4		IN 376-0097- - -	IC 74105 4 BIT PAR ACCESS SHIFT REG		4.0000	EACH	
4		IN 376-0104- - -	IC 9402 2 METRIC RESET MONOSTPL MVR		1.0000	EACH	
4		IN 376-0135- - -	IC 7425P 4 2 IN FX W/STORAGE		2.0000	EACH	
4		IN 376-0135- - -	IC 7414 HEX SCHMITT TRIGGER	E10507	2.0000	EACH	
4		IN 376-0146- - -	IC 75107 2 LINE RECEIVER	EC6502	7.0000	EACH	

ASSEMBLY PART NUMBER 171-3237- - -
 ASSEMBLY DESCRIPTION 019 130 MASTER

LEGEND
 1: REFPHANTOM; 2: ITEM MASTER ONLY CODE; 3: *TAGGED CUT OF KIT(PROD STR)

POSITION IN STRUCTURE	LEGEND 1 2 3	COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY	U/M	IML
4	IN	376-0176-	IC 74367 HEX BUFFER		3.0000	EACH	
4	IN	376-0179-	IC 74368 HEX BUS OP W/3 STATE OUT		6.0000	EACH	
4	IN	376-0183-	IC 74173 4 BIT D TYPE REG 3 STATE		2.0000	EACH	
4	IN	376-0194-	IC 7411 3 3 IN POS AND GATE		3.0000	EACH	
4	IN	376-0199-	IC 74002 4 2 IN POS NOR GATE		1.0000	EACH	
4	IN	376-0200-	IC 74908 4 2 IN POS AND GATE	EC6502	1.0000	EACH	
4	IN	376-0202-	IC 74874 2 0 TYPE F F W PRESET CLR		3.0000	EACH	
4	IN	376-0205-	IC 74872 4 0 IN POS OR GATE	EC6502	1.0000	EACH	
4	IN	376-0217-	IC 74S157 4 2-1 LINE DATA SELC MX	EC6502	2.0000	EACH	
4	IN	376-0237-	IC 74S11 3 3 IN POS AND GATE		1.0000	EACH	
4	IN	376-0238-	IC 74S10 3 3 IN POS NAND GATE		2.0000	EACH	
4	IN	376-0246-	IC 74S280 4 5 1T ODD EVEN PARITY GEN	EC6502	1.0000	EACH	
4	IN	376-0256-	IC 75113 2 DIF LINE REG 3 STATE CUT		14.0000	EACH	
4	IN	376-0010-	IC 22 PIN SOCKET FLURRY # CILB222P1		2.0000	EACH	
4	IN	377-0069-	2102 1K BY 1 BIT STAT RAM (450 NS)		1.0000	EACH	
4	IN	510-7214-	PCE 508 6 1/0 CHAL MASTER DATA LINK		1.0000	EACH	
3	IN	377-0208-	2101-1 RAM I.C.		2.0000	EACH	
2	IN	210-7511-2B-	PCA 528 4BK MASTER MEMORY		1.0000	EACH	
3	IN	209-7511-2	PCA 528 4BK MASTER MEMORY NC		1.0000	EACH	
4	IN	300-1000-	CAP .05 UF +PC-20% 12 V CERAMIC D		36.0000	EACH	
4	IN	300-1930-	.1 LF 50V +A0-20% CERAMIC CAP(HFRG	E11465	66.0000	EACH	
4	IN	300-4017-	CAP 5.6 UF 35 V 10% TANT AXIAL	E11465	8.0000	EACH	
5	FS	300-4017-R	CAP 5.6 UF 35V 10% TANT AXIAL TR		1.0000	EACH	
7	P FS	330-1012-4E-	RES 12 OHM 1/4W 10% FIXED CCMP		1.0000	EACH	
5	IN *	330-1012-	RES 12 OHM 1/4W 10% FIXED CCMP		1.0000	EACH	
4	P FS	330-1033-4E-	RES 33 OHM 1/4W 10% FIXED CCMP		8.0000	EACH	
5	IN *	330-1033-	RES 33 OHM 1/4W 10% FIXED CCMP		1.0000	EACH	
4	P FS	330-1047-4E-	RES 47 OHM 1/4W 10% FIXED CCMP		4.0000	EACH	
5	FS *	330-1047-	RES 47 OHM 1/4W 10% FIXED CCMP		1.0000	EACH	
4	P FS	330-2012-4E-	RES 120 OHM 1/4W 10% FIXED CCMP		9.0000	EACH	
5	FS *	330-2012-	RES 120 OHM 1/4W 10% FIXED CCMP		1.0000	EACH	
4	P FS	330-3022-4E-	RES 2.2K OHM 1/4W 10% FIXED CCMP		26.0000	EACH	
5	FS *	330-3022-	RES 2.2K OHM 1/4W 10% FIXED CCMP		1.0000	EACH	
4	IN	376-0002-	IC 74004 4 2 IN POS NAND GATE		4.0000	EACH	
4	IN	376-0006-	IC 74744 2 0 EDGE TRIG FLIP-FLOP		6.0000	EACH	
4	IN	376-0008-	IC 74424 4 LINE-10 LINE DECODER		1.0000	EACH	
4	IN	376-0010-	IC 74044 HEX INVERTER		3.0000	EACH	
4	IN	376-0016-	IC 74024 4 2 IN POS NOR GATE		2.0000	EACH	
4	IN	376-0018-	IC 7493 4 BIT BINARY FULL ADDER		1.0000	EACH	
4	IN	376-0041-	IC 74266 2 IN 4 BIT DCTL MX		2.0000	EACH	
4	IN	376-0042-	IC 74153 2 4-1 LINE DATA SEL MX		5.0000	EACH	
4	IN	376-0061-	IC 7400 4 2 IN POS AND GATE		2.0000	EACH	
4	IN	376-0062-	IC 74157 4 2 IN MX		3.0000	EACH	
4	IN	376-0063-	IC 74157 PRESET BINARY COUNTER LAT		2.0000	EACH	

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ASSEMBLY PART NUMBER 177-3037- - -
 ASSEMBLY DESCRIPTION DIS 130 MASTER

LEGEND
 1: PHANTOM; 2: ITEM MASTER (ELY CODE); 3: *TAGGED OUT OF KIT (PROD STR)

POSITION IN STRUCTURE	LEGEND			COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY	U/P	IML
	1	2	3						
4				IN 376-0093-	IC 7482 4 2 IN OR GATE		2.0000	EACH	
4				IN 376-0094-	IC 74161 SYNCHRONOUS 4 BIT COUNTER		3.0000	EACH	
4				IN 376-0125-	IC 7427 3 3 IN AND GATE		2.0000	EACH	
4				IN 376-0171-	IC 74148 4-3 LINE PRIORITY ENCODER		1.0000	EACH	
4				IN 376-0183-	IC 74173 4 BIT 7 TYPE REG 3 STATE		4.0000	EACH	
4				IN 376-0194-	IC 7411 3 3 IN POS AND GATE		1.0000	EACH	
4				IN 376-0197-	IC 74504 HEX INVERTER		1.0000	EACH	
4				IN 376-0200-	IC 74506 4 3 IN POS AND GATE		1.0000	EACH	
4				IN 376-0202-	IC 74574 2 D TYPE F F W RESET CLR		2.0000	EACH	
4				IN 376-0228-	IC 74500 4 2 IN POS NAND GATE		1.0000	EACH	
4				IN 376-0235-	IC 74510 3 3 IN POS NAND GATE		1.0000	EACH	
4				IN 376-0249-	IC 74LS30 4 IN POS NAND GATE		1.0000	EACH	
4				IN 376-0257-	IC 74LS240 OCTAL BUFF/LINE DR/LN REC		4.0000	EACH	
4				IN 376-0258-	IC 74S138 3 TO 8 LINE DECODER/MPX		1.0000	EACH	
4				IN 376-0324-	74128 QUAD BUS BUFF W/TRI STATE O/P		1.0000	EACH	
4				IN 376-9002-	IC 16 PIN SOCKET FLANGY		27.0000	EACH	
4				IN 376-9003-	IC 24 PIN SOCKET FLANGY		4.0000	EACH	
4				IN 510-7511-	PCB 528 64K MASTER MEMORY		1.0000	EACH	
3				IN 377-0345-	16K BY 1 BIT DYNAMIC RAM		27.0000	EACH	
4		P	FS	376-2432-	TRI CHIP EVENT HANDLER #1 L101	E11150	1.0000	EACH	
4			FS	377-0317-	2708 INTEL PROM		1.0000	EACH	
3		P	FS	376-2433-	TRI CHIP EVENT HANDLER #2 L100	E11150	1.0000	EACH	
4			FS	377-0317-	2708 INTEL PROM		1.0000	EACH	
3		P	FS	376-2434-	TRI CHIP EVENT HANDLER #3 L55	E11150	1.0000	EACH	
4			FS	377-0317-	2708 INTEL PROM		1.0000	EACH	
2				IN 220-0188-3	DISK CABLE ASSY(CORP)06482-138		1.0000	EACH	
3				IN 000-0004-	SLF-SYSTEMS		2.1230	EACH	
3				IN 000-0011-	LABOR QUALITY CONTROL		.4250		
3				IN 300-4022-	CAP 15.0 UF 20 V 10% TANT AXIAL	EC7278	2.0000	EACH	
4			FS	300-4022-R	CAP 15.0 UF 20V 10% TANT AXIAL T&R		1.0000	EACH	
3				FS * 330-2010-	RES 100 OHM 1/4W 10% FIXED COMP	E8273A	20.0000	EACH	
3		P	FS	* 330-2022-4F-	RES 220 OHM 1/4W 10% FIXED COMP		2.0000	EACH	
4			FS	* 330-2022-	RES 220 OHM 1/4W 10% FIXED COMP		1.0000	EACH	
3		P	FS	* 330-2056-4F-	RES 560 OHM 1/4W 10% FIXED COMP		2.0000	EACH	
4			FS	* 330-2056-	RES 560 OHM 1/4W 10% FIXED COMP		1.0000	EACH	
3				IN 350-0401-E	36 PIN FLAT CABLE CONN BOTTOM 3378	E10024	4.0000	EACH	
3				IN 350-0401-C	36 PIN FLAT CABLE CONN COVER 3378		4.0000	EACH	
3				IN 350-2057-	50 PIN CONN PLCCK WITH MRAC50S	EC7278	1.0000	EACH	
3				FS 420-0043-	36 COND FLAT CABLE 3M 340F	EC5183	12.1700	FEET	
3				IN 462-0200-	1/4 X 1/2" L #4 SPEC RICHCO SS4-4	EC7278	4.0000	EACH	
3				IN 510-6527-	6527 PRINTED CIRCUIT BOARD		2.0000	EACH	
3				IN 510-7040-	PCB 2330/260 CABLE JCT R RES TERM	EC7278	1.0000	EACH	
3				FS 000-0133-	CABLE JACKET, FLAT 3M	EC5183	4.7500	FEET	
3				FS 605-1010-	CABLE TYP, PAN-TY TY-332M	E10842	1.0000	EACH	
3				IN 650-2293-	SCF 4-40 7/8 SUCT FIL F MS SS	EC7278	4.0000	EACH	

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ASSEMBLY PART NUMBER 177-3237- - -
 ASSEMBLY DESCRIPTION 015 1/0 MASTER

LEGEND

1: PHANTOM; 2: ITEM MASTER ONLY CODE; 3: *TAGGED OUT OF KIT(PROD STR)

POSITION IN STRUCTURE	LEGEND			COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY	U/M	IML
	1	2	3						
3		IN		652-2001-	NUT 4-40UNC HEX HEAD	NYLON EC7278	4.0000	EACH	
		FS *		620-0026-	TAPE,COPPER FOIL 3 1/4"X 41181	EC51P3	17.0000	FEET	
2		IN		270-0366-	14PR COILM PLT & CABLE ASSY C6P40-25		1.0000	EACH	
3		IN		000-0004-	SUP-SYSTEMS		2.0000	EACH	
3		IN		000-0011-	LAPCR QUALITY CONTROL		.4000		
3		IN		350-1036-	ENC SOCKET (F) CONN D81094A		14.0000	EACH	
3		IN		350-2078-	TAC BULKHEAD CONN(F)(PANEL)SL311403		14.0000	EACH	
3		IN		452-2158-	PLATE,CONN REAR 14 PAIR C6840-103		1.0000	EACH	
3		IN		510-6703-	6703 PRINTED CIRCUIT BOARD		1.0000	EACH	
3		P FS *		600-2000-	WIRE 24 GA BLACK UL		63.0000	FEET	
4		FS		600-2009-	WIRE 24 GA WHITE UL		1.0000	FEET	
4		P FS *		600-2002-	WIRE 24 GA RED UL		31.5000	FEET	
4		FS		600-2009-	WIRE 24 GA WHITE UL		1.0000	FEET	
3		P FS *		600-2005-	WIRE 24 GA GREEN UL	W/CFF-76	31.5000	FEET	
4		FS		600-2009-	WIRE 24 GA WHITE UL		1.0000	FEET	
3		FS *		605-1004-	CABLE TYE, PAN-TY PLT1M-M		25.0000	EACH	
3		IN		652-0010-	NUT 4-40 .056 .090 CLINCH	SS	6.0000	EACH	
3		IN		654-1011-	3/8" GROUND LUG FR SMITH 1497		26.0000	EACH	
2		IN		270-4003-	FLOPPY DISK DR 920 (60 HZ)		1.0000	EACH	
3		IN		000-0005-	LAPCR PRODUCTION SYSTEMS		.7440		
3		IN		000-0011-	LAPCR QUALITY CONTROL		.1530		
3		IN		220-2011-	FLOPPY DISK CABLE C6462-62		1.0000	EACH	
4		IN		000-0001-	LAPCR SUP-SYSTEMS		.2000		
4		IN		000-0011-	LAPCR QUALITY CONTROL		.0500		
4		IN		350-0021-	225-22221-110 SOL TYPE	EC5323	1.0000	EACH	
4		IN		350-0402-F	40 PIN FLAT CABLE CONNECTOR BOTTOM	EC5323	2.0000	EACH	
4		IN		350-611E-	POLARIZING KEY BETWEEN CONTACTS	EC6808	1.0000	EACH	
4		FS *		420-0045-	40 COND FLAT CABLE		2.3300	FEET	
4		IN		510-6766-	6766 PRINTED CIRCUIT BOARD	EC5323	1.0000	EACH	
4		IN		510-6767-	6767 PRINTED CIRCUIT BOARD	EC5323	1.0000	EACH	
3		IN		275-0284-	GUIDE ASSY,BOTTOM(ALLM FOIL C6840-17		1.0000	EACH	
4		IN		000-0011-	LAPCR QUALITY CONTROL		.0100		
4		IN		000-0024-	LAPCR PREF AREA		.0050	EACH	
4		IN		452-4032-	GUIDE,BOTTOM(FLOPPY)C6805-102		1.0000	EACH	
4		IN		660-0028-14-	TAPE,ST SHLD 1 3/4"X9 3/4"X66841-123	EC7391	2.0000	EACH	
3		IN		470-0204-	CATCH(FLOPPY DRIVE)F6P05-104		1.0000	EACH	
3		IN		650-2001-	SCR 4-40 1/4 PHIL FLAT F MS SS		5.0000	EACH	
3		IN		650-4320-	SCR 4-32 1 PHIL PH MS SS		2.0000	EACH	
3		IN		650-4401-	SCR 4-32 1 1/4 PHIL FLAT F MS SS		1.0000	EACH	
3		IN		651-0011-	WSPR 11/32 ID X 1-1/2 OD X 5/64 THK		2.0000	EACH	
3		IN		653-4001-	WASH 7 .176 ID .3300 INT T ST		2.0000	EACH	
3		IN *		650-0301-	STORAGE BAG POLY 15X10Y34	EC8434	1.0000	EACH	
3		IN		725-0053-	PH FLPY DISK DR IC (IFM COMP) SA510		1.0000	EACH	
3		IN		725-0053-91-	COOP,FLOPPY DISK (SHUGART)		1.0000	EACH	

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ASSEMBLY PART NUMBER 177-3237- - -
 ASSEMBLY DESCRIPTION 018 130 MASTER

LEGEND
 1: PHANTOM; 2: ITEM MASTER (ELY COFS); 3: *TAGGED OUT OF KIT (PROD STR)

POSITION IN STRUCTURE	IN LEGEND			COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY	L/M	IML
	1	2	3						
5	IN			376-0155-	IC 7414 HEX SCHMITT TRIGGER		1.0000	EACH	
5	IN			376-0171-	IC 74148 4-3 LINE PRIORITY ENCODER		1.0000	EACH	
5	IN			376-0176-	IC 74367 HEX BUFFER		6.0000	EACH	
5	IN			376-0178-	IC 75322 3 TTL TO MOS DRIVER		1.0000	EACH	
5	IN			376-0179-	IC 74368 HEX BUS DR W/3 STATE CLT	EC5832	4.0000	EACH	
5	IN			376-0185-	IC 7498 P OFFD HEX 3 STATE INVERT	EC5832	2.0000	EACH	
5	IN			376-0194-	IC 7411 3 3 IN POS AND GATE		1.0000	EACH	
5	IN			376-0197-	IC 74504 HEX INVERTER	EC5832	2.0000	EACH	
5	IN			376-0199-	IC 74502 4 2 IN POS NCF GATE		1.0000	EACH	
5	IN			376-0205-	IC 74532 4 2 IN POS OR GATE		1.0000	EACH	
5	IN			376-0228-	IC 74500 4 2 IN POS NAND GATE	EC5832	1.0000	EACH	
5	IN			376-9011-	IC 40 PIN SOCKET PLURDY # DILE24GP1		1.0000	EACH	
5	IN			510-7222-	PCB 528 MASTER CPU PC		1.0000	EACH	
4	FS			377-0265-	8080A MICROPROCESSOR		1.0000	EACH	
3	IN			210-7203-	PCB 528 MASTER DISK CTRL		1.0000	EACH	
4	IN			800-0001-	LAPCF CPU-SYSTEMS		1.5110		
4	IN			000-0011-	LAPCR QUALITY CONTROL		.3320		
4	IN			300-1570-	CAP 560 PF 10% 50V CERAMIC DISC	E7292A	2.0000	EACH	
4	IN			300-1500-	CAP .05 LF +80-20% 12 V CERAMIC D	PCBFNL	36.0000	EACH	
4	IN			300-1930-	.1 LF 50V +80-20% CERAMIC CAP(HIFRG	EC6276	1.0000	EACH	
4	IN			300-2010-	CAP .001 LF 10% 100 V MYLAR	EC6276	1.0000	EACH	
5	FS			300-2010-R	CAP .001 LF 10% 100V MYLAR TRR		1.0000	EACH	
4	IN			300-2068-	CAP .0068 LF 10% 100 V MYLAR		1.0000	EACH	
5	FS			300-2068-R	CAP .0068 LF 10% 100V MYLAR T&R		1.0000	EACH	
4	IN			300-4022-	CAP 15.0 LF 20 V 10% TANT AXIAL		2.0000	EACH	
5	FS			300-4022-R	CAP 15.0 LF 20V 10% TANT AXIAL TRR		1.0000	EACH	
4	P FS *			330-2010-4E-	RES 100 OHM 1/4W 10% FIXED CCMP		2.0000	EACH	
5	FS *			330-2010-	RES 100 OHM 1/4W 10% FIXED CCMP		1.0000	EACH	
4	P FS *			330-2018-4E-	RES 180 OHM 1/4W 10% FIXED CCMP		1.0000	EACH	
5	FS *			330-2018-	RES 180 OHM 1/4W 10% FIXED CCMP		1.0000	EACH	
4	FS *			330-2022-	RES 220 OHM 1/4W 10% FIXED CCMP		13.0000	EACH	
4	P FS *			330-2022-4E-	RES 220 OHM 1/4W 10% FIXED CCMP		1.0000	EACH	
5	FS *			330-2022-	RES 220 OHM 1/4W 10% FIXED CCMP		1.0000	EACH	
4	FS *			330-2033-	RES 330 OHM 1/4W 10% FIXED CCMP		7.0000	EACH	
4	P FS *			330-2033-4E-	RES 330 OHM 1/4W 10% FIXED CCMP		5.0000	EACH	
5	FS *			330-2033-	RES 330 OHM 1/4W 10% FIXED CCMP		1.0000	EACH	
4	FS *			330-3010-	RES 1K OHM 1/4W 10% FIXED CCMP		7.0000	EACH	
4	P FS *			330-3010-4E-	RES 1K OHM 1/4W 10% FIXED CCMP		1.0000	EACH	
5	FS *			330-3010-	RES 1K OHM 1/4W 10% FIXED CCMP		1.0000	EACH	
4	FS *			330-3022-	RES 2.2K OHM 1/4W 10% FIXED CCMP		24.0000	EACH	
4	P FS *			330-3047-4E-	RES 4.7K OHM 1/4W 10% FIXED CCMP		1.0000	EACH	
5	IN *			330-3047-	RES 4.7K OHM 1/4W 10% FIXED CCMP		1.0000	EACH	

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ASSEMBLY PART NUMBER 177-3237- - -
 ASSEMBLY DESCRIPTION 015 170 MASTER

LEGEND

1: PHANTOM; 2: ITEM MASTER ONLY CODE; 3: *TAGGED OUT OF KIT(PROD STR)

POSITION IN STRUCTURE	LEGEND 1 2 3	COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY	U/M	IML
2	P IN	274-0309- - -	52P MASTER COMMON MECH ASSY 60HZ		1.0000	EACH	
3	P IN	210-7202-A - -	PCA 52P MASTER CPU PC		1.0000	EACH	
4	IN	204-7002- - -	PCA 52P MASTER CPU PC		1.0000	EACH	
5	IN	000-0001- - -	LAFCR SUP-CYSTEMS		1.6130		
5	IN	000-0011- - -	LAFCR QUALITY CONTROL		.7430		
5	IN	300-10P2- - -	CAP 20 PF 10% 500 V CERAMIC DISC	RF2254	1.0000	EACH	
5	IN	300-10B0- - -	CAP 500 PF 10% 500 V CERAMIC DISC		1.0000	EACH	
5	IN	300-1900- - -	CAP .05 UF +EO-20% 12 V CERAMIC D	EC5832	31.0000	EACH	
5	IN	300-1903- - -	CAP .01 UF +FG-20% 25 V CERAMIC D		1.0000	EACH	
5	IN	300-1906- - -	CAP .001 UF 10% 500 V CERAMIC DISC	EC6068	1.0000	EACH	
5	IN	300-4022- - -	CAP 15.0 UF 20 V 10% TANT AXIAL		5.0000	EACH	
6	FS	300-4022-R - -	CAP 15.0 UF 20V 10% TANT AXIAL T&R		1.0000	EACH	
5	IN	321-0008- - -	CRYSTAL 10.0 5% QUARTZ HC-18/U		1.0000	EACH	
5	IN	321-0018- - -	CRYSTAL 17.1 5% QUARTZ HC-18/U		1.0000	EACH	
5	IN	325-1502- - -	SWITCH SLIDE SPST P POS DIL		1.0000	EACH	
6	P FS *	330-1011-4F- - -	RES 10 OHM 1/4W 5% FIXED CCMP		2.0000	EACH	
6	FS *	330-1011- - -	RES 10 OHM 1/4W 5% FIXED CCMP		1.0000	EACH	
5	P FS *	330-2033-4E- - -	RES 330 OHM 1/4W 10% FIXED CCMP		2.0000	EACH	
6	FS *	330-2033- - -	RES 330 OHM 1/4W 10% FIXED CCMP		1.0000	EACH	
5	P FS *	330-2082-4E- - -	RES 820 OHM 1/4W 10% FIXED CCMP		2.0000	EACH	
6	FS *	330-2082- - -	RES 820 OHM 1/4W 10% FIXED CCMP		1.0000	EACH	
5	FS *	330-3010- - -	RES 1K OHM 1/4W 10% FIXED CCMP		5.0000	EACH	
5	P FS *	330-3010-4P- - -	RES 1K OHM 1/4W 10% FIXED CCMP	E8246A	2.0000	EACH	
6	FS *	330-3010- - -	RES 1K OHM 1/4W 10% FIXED CCMP		1.0000	EACH	
5	FS *	330-3022- - -	RES 2.2K OHM 1/4W 10% FIXED CCMP	EC8696	41.0000	EACH	
5	FS *	330-3082- - -	RES 3.2K OHM 1/4W 10% FIXED CCMP		8.0000	EACH	
5	FS *	330-4010- - -	RES 10K OHM 1/4W 10% FIXED CCMP		9.0000	EACH	
5	IN	375-1050- - -	TRANSISTOR SPSE651		2.0000	EACH	
5	IN	376-0002- - -	IC 7400N 4 2 IN POS NAND GATE	EC5832	3.0000	EACH	
5	IN	376-0003- - -	IC 7410N 3 3 IN POS NAND GATE		2.0000	EACH	
5	IN	376-0004- - -	IC 7420N 2 4 IN POS NAND GATE		2.0000	EACH	
5	IN	376-0005- - -	IC 7473N 3 J-K MA-SLAVE FLIP-FLOP		1.0000	EACH	
5	IN	376-0006- - -	IC 7474N 2 D FDCP TRIG FLIP-FLOP		11.0000	EACH	
5	IN	376-0008- - -	IC 7442N 4 LINE-10 LINE DECODER		4.0000	EACH	
5	IN	376-0010- - -	IC 7404N HEX INVERTER		4.0000	EACH	
5	IN	376-0016- - -	IC 7402N 4 2 IN POS NOR GATE		2.0000	EACH	
5	IN	376-0076- - -	IC 7406N 4 2 IN EXCLUSIVE OR GATE		1.0000	EACH	
5	IN	376-0041- - -	IC 7436N 2 IN 4 BIT DCTL MX		2.0000	EACH	
5	IN	376-0050- - -	IC 74180 8 BIT ODD/EVEN PARITY GEN		1.0000	EACH	
5	IN	376-0053- - -	IC 74193 8 BIT UP/DOWN COUNTER		2.0000	EACH	
5	IN	376-0061- - -	IC 7408 4 2 IN POS AND GATE	EC5832	6.0000	EACH	
5	IN	376-0063- - -	IC 74157 PRESET BINARY COUNTER LAT		1.0000	EACH	
5	IN	376-0053- - -	IC 7432 4 2 IN OR GATE		3.0000	EACH	
5	IN	376-0054- - -	IC 74161 SYNCHRONOUS 4 BIT COUNTER		6.0000	EACH	
5	IN	376-0058- - -	IC 74174 HEX D TYPE FLIP FLOP		3.0000	EACH	
5	IN	376-0119- - -	IC 74175 4 D TYPE EDGE TRIG F/F		2.0000	EACH	
5	IN	376-0125- - -	IC 7407 3 3 IN NOR GATE		1.0000	EACH	

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ASSEMBLY PART NUMBER 177-3037- - -
 ASSEMBLY DESCRIPTION 01S 170 MASTER

LEGEND

1: P=PHANTOM; 2: ITEM MASTER ONLY (CODE); 3: *=TAGGED OUT OF KIT(PROD STR)

POSITION IN STRUCTURE	LEGEND 1 2 3	COMPONENT PART NUMBER	DESCRIPTION	E C A	QUANTITY PER ASSY	U/M	IML
4	P FS *	330-4010-4E- -	RES 10K OHM 1/4W 10% FIXED COMP		2.0000	EACH	
5	FS *	330-4010- - -	RES 10K OHM 1/4W 10% FIXED COMP		1.0000	EACH	
4	IN	375-1009- - -	2N2270 SILICON TRANSISTOR		1.0000	EACH	
4	IN	375-9001- - -	TRANSIFAD 9977867-1 LARGE	EC5829	1.0000	EACH	
4	IN	376-0007- - -	IC 7400N 4 0 IN POS NAND GATE		6.0000	EACH	
4	IN	376-0002- - -	IC 7410N 3 3 IN POS NAND GATE	EC5835	5.0000	EACH	
4	IN	376-0004- - -	IC 7400N 2 4 IN POS NAND GATE		1.0000	EACH	
4	IN	376-0006- - -	IC 7474N 2 0 DCGF TRIG FLIP-FLOP		17.0000	EACH	
4	IN	376-0010- - -	IC 7404N HEX INVERTER		4.0000	EACH	
4	IN	376-0011- - -	IC 7493N 4 BIT BINARY COUNTER		2.0000	EACH	
4	IN	376-0016- - -	IC 7402N 4 2 IN POS NCR GATE		3.0000	EACH	
4	IN	376-0040- - -	IC 74242N 4 BIT 8GTL COMPARTOR		2.0000	EACH	
4	IN	376-0048- - -	IC 7404N HEX INVERTER		1.0000	EACH	
4	IN	376-0048- - -	IC 74153 2 4-1 LINE DATA SEL MUX		4.0000	EACH	
4	IN	376-0053- - -	IC 74153 SYN 4 BIT UP DOWN COUNTER		2.0000	EACH	
4	IN	376-0081- - -	IC 7408 4 2 IN POS AND GATE	RF226P	8.0000	EACH	
4	IN	376-0092- - -	IC 7432 4 2 IN OR GATE		5.0000	EACH	
4	IN	376-0094- - -	IC 74161 SYNCHRONOUS 4 BIT COUNTER		3.0000	EACH	
4	IN	376-0097- - -	IC 74159 4 BIT PAR ACCESS SHIFT REG	FCRFFAL	2.0000	EACH	
4	IN	376-0104- - -	IC 9602 2 RETRIC RESET MONOSTPL MVB		1.0000	EACH	
4	IN	376-0119- - -	IC 74175 4 0 TYPE EDGE TRIG F/F		3.0000	EACH	
4	IN	376-0128- - -	IC 7428 4 2 IN NAND BUFFER		8.0000	EACH	
4	IN	376-0176- - -	IC 74267 HEX BUFFER		2.0000	EACH	
4	IN	376-0183- - -	IC 74173 4 BIT 0 TYPE REG 3 STATE		2.0000	EACH	
4	IN	376-0194- - -	IC 7411 3 3 IN POS AND GATE	EC5829	7.0000	EACH	
4	IN	376-0250- - -	IC MCR503F CYCLIC REDUNDANCY CK GEN		1.0000	EACH	
4	IN	376-5001- - -	IC 14 PIN SOCKET SOLDER TAIL	EC6513	1.0000	EACH	
4	IN	380-2120- - -	D10 ZFN 1N759 A 12.0V 400MW S CO-7		1.0000	EACH	
4	IN	510-7203- - -	PCP 928 MASTER DISK CNTL		1.0000	EACH	
3	IN	210-7206- - -	FCA 428 MASTER PS REGULATOR		1.0000	EACH	
4	IN	000-5559- - -	OTHER DIRECT COST		14.6400	EACH	
4	IN	300-1100- - -	CAP 100 PF 10% 500 V CERAMIC DISC		1.0000	EACH	
4	IN	300-1330- - -	CAP 330 PF 10% 500 V CERAMIC DISC		1.0000	EACH	
4	IN	300-1900- - -	CAP .05 UF 10% 20V 12 V CERAMIC D		1.0000	EACH	
4	IN	300-1906- - -	CAP .001 UF 10% 300 V CERAMIC DISC		1.0000	EACH	
4	IN	300-2147- - -	CAP .047 UF 10% 100 V MYLAR		1.0000	EACH	
4	IN	300-3058- - -	2500 UF 20V ELECTROLYTIC CAPACITOR		1.0000	EACH	
4	IN	300-4022- - -	CAP 15.0 UF 20 V 10% TANT AXIAL		3.0000	EACH	
5	FS	300-4022-R - -	CAP 15.0 UF 20V 10% TANT AXIAL T&R		1.0000	EACH	
4	IN	300-4032- - -	CAP 10.0 UF 35 V 10% TANT AXIAL		2.0000	EACH	
4	P FS *	330-1027-4E- -	RES 27 OHM 1/4W 10% FIXED COMP		1.0000	EACH	
5	IN *	330-1027- - -	RES 27 OHM 1/4W 10% FIXED COMP		1.0000	EACH	
4	P FS *	330-2010-4E- -	RES 100 OHM 1/4W 10% FIXED COMP		2.0000	EACH	
5	FS *	330-2010- - -	RES 100 OHM 1/4W 10% FIXED COMP		1.0000	EACH	
4	P FS *	330-2022-4E- -	RES 220 OHM 1/4W 10% FIXED COMP		1.0000	EACH	
5	FS *	330-2022- - -	RES 220 OHM 1/4W 10% FIXED COMP		1.0000	EACH	

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ASSEMBLY PART NUMBER 177-3237- - -
 ASSEMBLY DESCRIPTION 01S 130 MASTER

LEGEND

1: P=PHANTOM; 2: ITEM MASTER (FLY CODE); 3: *=TAGGED OUT OF KIT(PROD STR)

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POSITION IN STRUCTURE	LEGEND 1 2 3	COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY	U/M	IML
4	P FS	330-2048-4F- -	RES 470 OHM 1/4W 5% FIXED COMP	EC5837	4.0000	EACH	
5	FS *	330-2048- - -	RES 470 OHM 1/4W 5% FIXED COMP		1.0000	EACH	
4	P FS *	330-2068-4F- -	RES 680 OHM 1/4W 10% FIXED COMP	E10018	1.0000	EACH	
5	FS *	330-2068- - -	RES 680 OHM 1/4W 10% FIXED COMP		1.0000	EACH	
4	P FS *	330-3010-4F- -	RES 1K OHM 1/4W 10% FIXED COMP		1.0000	EACH	
5	FS *	330-3010- - -	RES 1K OHM 1/4W 10% FIXED COMP		1.0000	EACH	
4	P FS *	330-3018-4F- -	RES 1.8K OHM 1/4W 10% FIXED COMP		2.0000	EACH	
5	FS *	330-3018- - -	RES 1.8K OHM 1/4W 10% FIXED COMP		1.0000	EACH	
4	P FS	330-3023-4F- -	RES 2.2K OHM 1/4W 5% FIXED COMP	EC5837	3.0000	EACH	
5	FS *	330-3023- - -	RES 2.2K OHM 1/4W 5% FIXED COMP		1.0000	EACH	
4	P FS *	330-3028-4F- -	RES 2.7K OHM 1/4W 5% FIXED COMP		2.0000	EACH	
5	IN *	330-3028- - -	RES 2.7K OHM 1/4W 5% FIXED COMP		1.0000	EACH	
4	P FS *	330-3047-4F- -	RES 4.7K OHM 1/4W 10% FIXED COMP		2.0000	EACH	
5	IN *	330-3047- - -	RES 4.7K OHM 1/4W 10% FIXED COMP		1.0000	EACH	
4	P FS *	330-4010-4F- -	RES 10K OHM 1/4W 10% FIXED COMP		2.0000	EACH	
5	FS *	330-4010- - -	RES 10K OHM 1/4W 10% FIXED COMP		1.0000	EACH	
4	P FS *	330-4018-4F- -	RES 18K OHM 1/4W 5% FIXED COMP		1.0000	EACH	
5	IN *	330-4018- - -	RES 18K OHM 1/4W 5% FIXED COMP		1.0000	EACH	
4	IN	331-0010- - -	RES 1 OHM 1/2W 10% FIXED COMP	EC5849	2.0000	EACH	
5	FS	331-0010-R - -	RES 1 OHM 1/2W 10% FIXED COMP TRR		1.0000	EACH	
4	IN	331-0022- - -	RES 2.2 OHM 1/2W 10% FIXED COMP	EC5849	1.0000	EACH	
5	FS	331-0022-R - -	RES 2.2 OHM 1/2W 10% FIXED COMP TRR		1.0000	EACH	
4	IN	331-2068- - -	680 OHM 1/2W 10% RESISTOR	E10018	1.0000	EACH	
5	FS	331-2068-R - -	RES 680 OHM 1/2W 10% FIXED COMP TRR		1.0000	EACH	
4	IN	331-3020- - -	RES 3.2K OHM 1/2W 10% FIXED COMP		1.0000	EACH	
5	FS	331-3020-R - -	RES 3.2K OHM 1/2W 10% FIXED COMP TRR		1.0000	EACH	
4	IN	332-2052- - -	RES 420 OHM 1W 10% FIXED COMP		1.0000	EACH	
4	IN	332-3012- - -	RES 1.2K OHM 1W 10% FIXED COMP		1.0000	EACH	
4	IN	332-3018- - -	RES 1.8K OHM 1W 10% FIXED COMP		1.0000	EACH	
4	IN	333-0053- - -	RES 3.37K OHM 1/2W 1% FIXED FILM	EC7526	1.0000	EACH	
5	FS	333-0053-R - -	RES 3.37K OHM 1/2W 1% FIX FILM TR		1.0000	EACH	
4	IN	334-0012- - -	DISC 3 OHM 11 W RESISTOR		1.0000	EACH	
4	IN	334-0025- - -	7.5 OHM 7W 5% RESISTOR		1.0000	EACH	
4	IN	336-1014- - -	RES 1K OHM VAR TRIM SIDE ADJ SG		4.0000	EACH	
4	IN	360-1154- - -	1 AMP 125V FICOFUSE LITTLEFL 275001	EC6743	1.0000	EACH	
4	IN	360-1155- - -	2 AMP 125V FICOFUSE LITTLEFL 275002	EC6743	1.0000	EACH	
4	IN	360-1156- - -	4 AMP 125V FICOFUSE LITTLEFL 275004	EC6743	1.0000	EACH	

ASSEMBLY PART NUMBER 177-3237- - -
 ASSEMBLY DESCRIPTION 01S 130 MASTER

LEGEND

1: P=PHANTOM; 2: ITEM MASTER DELY CODE; 3: *=TAGGED OUT OF KIT(PROD STR)

POSITION IN STRUCTURE	LEGEND 1 2 3	COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY	U/M	IML
5	FS *	654-0084-R	TERMINAL FASTON .250X.032 PG14R258M		1.0000	EACH	
4	IN	220-1096-	PO50 WIRE & LUG ASSY(928M1)B6482-12		1.0000	EACH	
5	IN	000-0004-	SUB-SYSTEMS		.0110	EACH	
5	IN	000-0011-	LABOR QUALITY CONTROL		.0020		
5	P FS	600-7000-	16 GA BLACK STRANDED WIRE		.5000	FEET	
6	FS	600-7009-	16 GA WHITE STRANDED WIRE		1.0000	FEET	
5	FS	654-0084-R	TERMINAL FASTON .250X.032 PG14R258M EC6131		1.0000	EACH	
4	IN	220-1095-	PO53 WIRE & LUG ASSY(928M1)B6482-12		1.0000	EACH	
5	IN	000-0004-	SUB-SYSTEMS		.0070	EACH	
5	IN	000-0011-	LABOR QUALITY CONTROL		.0010		
5	P FS	600-7004-	16 GA YEL STRANDED WIRE		.5800	FEET	
6	FS	600-7009-	16 GA WHITE STRANDED WIRE		1.0000	FEET	
5	FS *	654-1163-R	SOCKET 20-14 GA(REFL)AMP 61117-4		1.0000	EACH	
4	IN	220-1100-	POWER CORD CABLE(928M1)B6482-116		1.0000	EACH	
5	IN	000-0004-	SUB-SYSTEMS		.1700	EACH	
5	IN	000-0011-	LABOR QUALITY CONTROL		.0340		
5	IN	420-1022-	POWER CORD 10 FT W/MALE PLUG	E10773	1.0000	EACH	
5	P FS	600-7006-	16 GA BLUE STRANDED WIRE	E10773	.7500	FEET	
6	FS	600-7009-	16 GA WHITE STRANDED WIRE		1.0000	FEET	
5	FS	605-0117-	P.V.C. TUBING 3/8ID CLEAR	EC9356	.4600	FEET	
5	FS *	654-0017-R	TERMINAL FASTON .250X.032 PG10R258M EC8495		2.0000	EACH	
5	FS *	654-0052-R	#6 RING TANGLE FLU FA14-6M(2K/REEL)		1.0000	EACH	
5	FS *	654-0084-R	TERMINAL FASTON .250X.032 PG14R258M EC6131		2.0000	EACH	
4	IN	220-1225-	WIRE & LUG ASSY TYPE P104 B6482-317 EC9384		1.0000	EACH	
5	IN	000-0004-	SUB-SYSTEMS		.0450	EACH	
5	IN	000-0011-	LABOR QUALITY CONTROL		.0090		
5	P FS	600-7000-	16 GA BLACK STRANDED WIRE		1.4200	FEET	
6	FS	600-7009-	16 GA WHITE STRANDED WIRE		1.0000	FEET	
5	FS	605-0132-	TUBING,3/8 ID HEATSHRINK	E10503	.1000	FEET	
5	FS	654-0017-R	TERMINAL FASTON .250X.032 PG10R258M		1.0000	EACH	
5	FS	654-0134-R	FASTON TERM 14-16 BLU AMP3-350819-2	E10503	1.0000	EACH	
4	IN	220-1227-	AC CABLE 52PM1 B6482-318 EC9384		1.0000	EACH	
5	IN	000-0004-	SUB-SYSTEMS		.0540	EACH	
5	IN	000-0011-	LABOR QUALITY CONTROL		.0150		
5	P FS	600-7000-	16 GA BLACK STRANDED WIRE		.7500	FEET	
6	FS	600-7009-	16 GA WHITE STRANDED WIRE		1.0000	FEET	
5	FS	600-7009-	16 GA WHITE STRANDED WIRE		.8200	FEET	
5	FS	605-0015-	#3 CLEAR TUBING		.3700	FEET	
5	FS	654-0134-R	FASTON TERM 14-16 BLU AMP3-350819-2	E10503	2.0000	EACH	
4	IN	270-0551-	HEATSINK & HARNESS ASSY 6F40-18	EC7494	1.0000	EACH	

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ASSEMBLY PART NUMBER 177-3277- - -
 ASSEMBLY DESCRIPTION 01S 120 MASTER

LEGEND

1: P=PHANTOM; 2: ITEM MASTER DELY CODE; 3: *=TAGGED OUT OF KIT(PROD STR)

POSITION IN STRUCTURE	LEGEND			COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY	U/P	IHL
	1	2	3						
4		IN		375-1052- - -	TRANSISTOR 2N63H7 (PLASTIC)		2.0000	EACH	
4		IN		375-1053- - -	TRANSISTOR RCA8203A (PLASTIC)		2.0000	EACH	
4		IN		375-9016- - -	MICA INSL*DF103E FOR 375-1034/1035		4.0000	EACH	
4		IN		376-0066- - -	IC 723 VOLTAGE REGULATOR		3.0000	EACH	
4		IN		376-0134- - -	IC LM304 NEG VCLTAGE REGULATOR		1.0000	EACH	
4		IN		376-0240- - -	IC LM339 4 COMPARATOR		1.0000	EACH	
4		P FS	*	380-0000-4E- - -	.4E GERMANIUM DIODE		1.0000	EACH	
5		FS		380-0000-R - - -	GERMANIUM DIODE (.200 REEL)		1.0000	EACH	
4		P FS		380-1001-4E- - -	003E SIL DIODE 30V, 100MA AT 1V .4B	E10753	3.0000	EACH	
5		FS		380-1001-R - - -	003E SIL DIODE 30V, 100MA AT 1V T&R		1.0000	EACH	
4		IN		380-2048- - -	DIC ZEN 1N5230C 4.7V 500MW S D0-7	EC5775	2.0000	EACH	
4		IN		380-2111- - -	DIC ZFN 1N5241C 11.0V 500MW S D0-7	EC5775	1.0000	EACH	
4		IN		380-2113- - -	D10 ZEN 1N4743 13.0V 1 W S D041		1.0000	EACH	
4		IN		380-2002- - -	DIC 1N4719 50V 3A RECT S C60	EC7289	4.0000	EACH	
4		IN		380-2008- - -	A15A RECTIFIER		2.0000	EACH	
4		IN		47P-0226- - -	HEATSINK,PEG RD(928M1/M2)C6840-105		1.0000	EACH	
4		IN		510-7206- - -	PCF 52M MASTER PS REGULATOR		1.0000	EACH	
4		IN		650-3080- - -	6-32 X 1/4 PAN HD PHL MS SS SEMS		2.0000	EACH	
4		IN		650-3131- - -	6-32 X 3/8 NYLON COVERED FIL PD SLT	EC5827	4.0000	EACH	
3		IN		270-0335- - -	52RN1 CHASSIS ASSY(60H7)		1.0000	EACH	
4		IN		000-0004- - -	SUP-SYSTEMS		5.1380	EACH	
4		IN		000-0011- - -	LAPGR QUALITY CONTRCL		1.0000	EACH	
4		IN		210-7205- - -	PCA 52R MASTER MOTHERPC		1.0000	EACH	
5		IN		000-0004- - -	SUE-SYSTEMS		.8990	EACH	
5		IN		000-0011- - -	LAEGR QUALITY CONTRCL		.1800	EACH	
5		IN		350-0011- - -	225-21521-110 FC CONN SOLDER TYPE	EC6330	7.0000	EACH	
5		IN		350-0021- - -	225-22221-110 SCL TYPE	EC6939	4.0000	EACH	
5		IN		350-0027- - -	261-10022-2 PC CONN WIREWRAP 44 POS	EC6575	2.0000	EACH	
5		IN		350-0039- - -	44 POS P.C.CONN SOLDER TYPE (CINCH)	EC6939	8.0000	EACH	
5		FS		380-4000- - -	DIC 1N4004 400V 1A RECT S D041	RF2251	1.0000	EACH	
6		FS		380-4000-R - - -	EM403 / 1N4004 RECTIFIER (REEL)		1.0000	EACH	
5		IN		510-7205- - -	PCF 52R MASTER MOTHERPC		1.0000	EACH	
5		IN		654-3196- - -	2 PCF FIA HEADER ASSY AMP 350205-1	RF2251	1.0000	EACH	
4		IN		220-1042- - -	PC22 WIRE & LUG ASSY(2LCRT)C6482-12		2.0000	EACH	
5		IN		000-0004- - -	SUP-SYSTEMS		.0000	EACH	
5		IN		000-0011- - -	LAPGR QUALITY CONTROL		.0020	EACH	
5		P FS		600-7004- - -	16 GA GREEN/YELLOW STRANDED WIRE	EC6755	.3300	FEET	
6		FS		600-7009- - -	16 GA WHITE STRANDED WIRE		1.0000	FEET	
5		FS		654-0002-R - - -	#6 RING TONGUE BLU FA14-6M(2K/REEL)	EC6755	1.0000	EACH	
5		FS		654-0008-P - - -	#6 FORK LUG BLUE FA14-6M (2K/REEL)	EC6755	1.0000	EACH	
4		IN		220-1095- - -	PO49 WIRE & LUG ASSY(528M1)B6482-12		1.0000	EACH	
5		IN		000-0004- - -	SUE-SYSTEMS		.0120	EACH	
5		IN		000-0011- - -	LAPGR QUALITY CONTROL		.0020	EACH	
5		P FS		600-7000- - -	16 GA BLACK STRANDED WIRE		.2900	FEET	
6		FS		600-7009- - -	16 GA WHITE STRANDED WIRE		1.0000	FEET	

ASSEMBLY PART NUMBER 177-3237- - -
 ASSEMBLY DESCRIPTION 01S 13C MASTER

LEGEND
 1: P=PHANTOM; 2: ITEM MASTER DELY CODE; 3: *=TAGGED OUT OF KIT(PROD STR)

POSITION IN STRUCTURE	LEGEND 1 2 3	COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY	U/M	IML
5	IN	000-0004-	SUB-SYSTEMS		.5350	EACH	
5	IN	000-0011-	LABOR QUALITY CONTROL		.1070		
5	IN	270-3063-	HEATSINK HARNESS(92PM1)D6482-117		1.0000	EACH	
6	IN	000-0004-	SUB-SYSTEMS		.1450	EACH	
6	IN	000-0011-	LABOR QUALITY CONTROL		.0300		
6	P FS	600-0002-	WIRE 18 GA RED UL	EC8289	1.4200	FEET	
7	FS	600-0009-	WIRE 18 GA WHITE UL		1.0000	FEET	
6	P FS	600-6004-	14 GA YELLOW STRANDED WIRE	EC8289	1.0420	FEET	
7	FS	600-6009-	14 GA WHITE STRANDED WIRE		1.0000	FEET	
6	P FS	600-6006-	14 GA BLUE STRANDED WIRE	EC8583	1.7500	FEET	
7	FS	600-6009-	14 GA WHITE STRANDED WIRE		1.0000	FEET	
6	FS	600-6009-	14 GA WHITE STRANDED WIRE	EC8289	1.4200	FEET	
6	FS	605-0014-	TUEING #5 CLEAR	EC9006	.2100	FEET	
6	FS	605-0015-	#3 CLEAR TUBING	EC9006	.2100	FEET	
6	FS	605-1004-	CAELE TYE, PAN-TY PLTIM-M		3.0000	EACH	
6	IN	654-1148-	SCCKET HOUSING 1-480318-0		1.0000	EACH	
6	IN	654-1149-	PIN HOUSING 1-480305-0		1.0000	EACH	
6	FS *	654-1163-R	SCCKET 20-14 GA(REEL)AMP 61117-4		2.0000	EACH	
6	FS *	654-1164-R	PIN TRFM 20-14 GA(REFL)AMP 61118-4		3.0000	EACH	
5	IN	375-1048-	TSTR 2N5301 200W 40V AP NPN S T03		1.0000	EACH	
5	IN	375-9014-	INSULATOR XTOR MOUNT WECKESSER TM-1		1.0000	EACH	
5	IN	375-9020-	MICA WSHR (LARGE) FOR POWER XISTORS		1.0000	EACH	
5	IN	380-3000-	DIC 1N1200A 100V 12A RECT S D04		2.0000	EACH	
5	IN	380-9003-	HARDWARE ACCESSORY KIT FOR 380-3000		2.0000	EACH	
5	IN	476-0327-	HEATSINK(928 MASTER)C6840-107		1.0000	EACH	
5	FS	600-9015-	WIRE 14 GA TINNED COPPER BUS (UL)		.2500	FEET	
5	IN	650-3160-	E-32 X 1/2 PAN HD PHL MS SS SEMS		2.0000	EACH	
5	IN	652-3004-	KUT E-32UNC HEX SMALL PAT SS		2.0000	EACH	
5	IN	653-3000-	WASH E .149ID .375OD .016 FL SS		2.0000	EACH	
5	IN	653-3001-	WASH E .150ID .280OD INT T ST		2.0000	EACH	
5	IN	654-1006-	#6 GROUND LUG		2.0000	EACH	
4	IN	270-3069-	XFMR HARNESS 928M1+2 60HZ C6482-146		1.0000	EACH	
5	IN	000-0004-	SUB-SYSTEMS		.1470	EACH	
5	IN	000-0011-	LABOR QUALITY CONTROL		.0250		
5	IN	410-0111-	MFC 5855 CVT 60HZ(M1/M2)C5068-107		1.0000	EACH	
5	FS *	654-0048-R	TERMINAL FASTON .250X.032 PQ18R258M		2.0000	EACH	
5	FS *	654-1163-R	SOCKET 20-14 GA(REFL)AMP 61117-4		2.0000	EACH	
4	IN	270-0301-	PLUNGER GUIDE ASSEMBLY 6815-01	EC7554	1.0000	EACH	
5	IN	000-0011-	LABOR QUALITY CONTROL		.0010		
5	IN	000-0024-	LABOR PREP AREA		.0070	EACH	
5	IN	451-4066-	301 MICRO-SW BRACKET C5933-116 (2		1.0000	EACH	
5	IN	476-0068-	301 PLUNGER GUIDE P5933-117 (2		1.0000	EACH	
4	IN	300-3050-	124K UF 15V ELECTROLYTIC CAPACITOR		1.0000	EACH	
4	IN	300-3067-	12K UF 50V ELECTROLYTIC CAPACITOR		1.0000	EACH	
4	IN	300-3065-	27000 UF 30V ELECTROLYTIC CAP		1.0000	EACH	

B-12

ASSEMBLY PART NUMBER 177-3237- - -
 ASSEMBLY DESCRIPTION 01S 130 MASTER

LEGEND

1: P=PHANTOM; 2: ITEM MASTER ONLY CDEF; 3: *=TAGGED OUT OF KIT(PROD STR)

POSITION IN STRUCTURE	LEGEND 1 2 3	COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY	L/M	IML
4	IN	300-9004-	CAP CLAMP 1 3/4" 3 LUG SC#115-058-13		1.0000	EACH	
4	IN	300-9006-	CAP CLAMP 2 1/2 INCH 3 LUG		1.0000	EACH	
4	IN	300-9021-	CAP CLAMP C TYPE 2 INCH 2 LUG WOFF74		1.0000	EACH	
4	IN	300-9022-	CAP CLAMP 2 1/16 INCH 3 LUG		1.0000	EACH	
4	IN	300-9024-	CAP FOOT FOR #300-3042 GE #614	EC8654	1.0000	EACH	
4	IN	310-0010-	10 TERMINAL STRIP		1.0000	EACH	
4	IN	325-0021-	SWITCH, ROCKER SPST		1.0000	EACH	
4	IN	325-2305-	115PI MICRO SWITCH FOR CP-1	EC7554	1.0000	EACH	
4	IN	325-9034-	PLSM PUTTON RED ALCC#C12	EC7554	1.0000	EACH	
4	IN	331-3012-	RES 1.2K OHM 1/2W 10% FIXED COMP		2.0000	EACH	
5	FS	331-3012-R	RES 1.2K OHM 1/2W 10% FIXD COMP T&R		1.0000	EACH	
4	IN	331-3022-	RES 2.2K OHM 1/2W 10% FIXED COMP		1.0000	EACH	
5	FS	331-3022-R	RES 2.2K OHM 1/2W 10% FIXD COMP T&R		1.0000	EACH	
4	IN	360-0000-	FUSE HOLDER 90 DEGREE CONTACT		1.0000	EACH	
4	IN	360-9000-	RUEBER WSHR FOR 360-0000 / 360-0001		1.0000	EACH	
4	IN	360-9002-	HEX NUT FOR 360-0000 / 360-0001		1.0000	EACH	
4	IN	360-9003-	LOCK WSHR LF#905023(FOR 360-0000/1)		1.0000	EACH	
4	IN	370-0027-	LAMP, CRANGE(LED)PV5154	EC7554	1.0000	EACH	
4	IN	380-5000-	130 VOLT VARISTOR V130LA10		1.0000	EACH	
4	IN	400-1003-	FAN MUFFIN #747 MARK IV	EC7102	1.0000	EACH	
4	IN	410-2005-	LINE FILTER 5 AMP CORCOM 5K1		1.0000	EACH	
4	IN	420-1005-	POWER CORE ROTRON FAN 16415		1.0000	EACH	
4	IN	420-1021-	3 PCS PWR CORE ASSY 520 0117 M/CLOED	E11500	2.0000	EACH	
4	IN	449-0101-	FAN GUARD 4"XFLACK)D5300-108E		1.0000	EACH	
4	IN	451-1103-	CHASIS(928M1/M2)E6840-118		1.0000	EACH	
4	IN	451-2146-	REAR COVER(928M1/M2)E6840-11E		1.0000	EACH	
4	IN	452-2E69-	PLATE, CLAMP(928M1/M2)E6840-10C		1.0000	EACH	
4	IN	461-3056-	301 SWITCH FLUNGER E5933-114	EC7554	1.0000	EACH	
4	IN	461-3273-	ROD, CLAMP(928M1/M2)E6840-101		1.0000	EACH	
4	IN	461-3274-	STUD, LOCKING(928M1/M2)E6840-102		2.0000	EACH	
4	IN	462-0057-	SPCR .115 ID .250 CD .375 L RD F		16.0000	EACH	
4	IN	462-0141-	SPCR, PHENCLIC CURRENT 4-250		4.0000	EACH	
4	IN	478-0061-	700 PROGRAM CLAMP NUTS R5500-27 (2		2.0000	EACH	
4	P FS *	600-0000-	WIRE 18 GA BLACK UL		2.0000	FEET	
4	P FS *	600-0004-	WIRE 18 GA YFELLOW UL		1.0000	FEET	
5	FS	600-0009-	WIRE 18 GA WHITE UL		1.0000	FEET	
4	FS *	600-9018-	WIRE 18 GA TINNED COPPER BUS (UL)		.3000	FEET	
4	FS *	605-0015-	#3 CLEAR TUBING		2.5000	FEET	
4	FS *	605-1004-	CARLF TYE, PAN-TY PLTIM-P		15.0000	EACH	
4	IN	650-0200-	SCR 2-56 5/8 SLCT PH MS SS	EC7554	2.0000	EACH	
4	IN	650-2400-	SCR 4-40 1 1/4 PHIL FLAT F MS SS		4.0000	EACH	
4	IN	650-3120-	6-32 X 3/8 PAN HD PHL MS SS SEMS	EC7039	21.0000	EACH	
4	IN	650-3169-	6-32 X 1/2 TRUSS HD MS PARKERIZE	EC8275	4.0000	EACH	
4	IN	650-3240-	SCR 6-32 3/4 PHIL PH MS SS		3.0000	EACH	
4	IN	650-6160-	10-32 X 1/2 PAN HD PHL MS SS SEMS		4.0000	EACH	
4	IN	651-1005-	STUD 4-40 .375 CL FLUSH HEAD SS	EC7039	4.0000	EACH	
4	IN	651-1006-	STUD 6-32 .375 CL FLUSH HEAD SS	EC7039	2.0000	EACH	
4	IN	651-1016-	STUD 6-32 .625 CL FLUSH HEAD SS		2.0000	EACH	
4	IN	651-1020-	STUD 10-32 .375 CL FLUSH HEAD SS		2.0000	EACH	

B-13

ASSEMBLY PART NUMBER 177-3237- - -
 ASSEMBLY DESCRIPTION 01S 130 MASTER

LEGEND

1: P-PHANTOM; 2: ITEM MASTER DFLY CODE; 3: *-TAGGED CUT OF KIT(PROD STR)

B-14

POSITION IN STRUCTURE	LEGEND			COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY	U/M	IML
	1	2	3						
4				IN 651-1024-	STUD 6-32 .750 CL FLUSH HEAD SS		2.0000	EACH	
4				IN 651-1030-	THRED STUD 4-40X1" 77-16-104-13		12.0000	EACH	
4				IN 652-000R-	NLT 6-32 .056 UP CLINCH	ST EC7039	27.0000	EACH	
4				IN 652-0032-	6-32 LOCK-NUT KEFS 511-061800-00		7.0000	EACH	
4				IN 652-0590-	NUT 2-56UNC HEX REG PAT	SS EC7554	2.0000	EACH	
4				IN 652-2000-	NLT 4-40LAC HFX REG PAT	SS	2.0000	EACH	
4				IN 652-2004-	NLT 4-40LAC HEX SMALL PAT	SS	16.0000	EACH	
4				IN 652-2005-	4-40 LOCK-NUT KEFS SS	EC7039	2.0000	EACH	
4				IN 652-3004-	NUT 6-32UNC HEX SMALL PAT	SS EC7039	7.0000	EACH	
4				IN 653-0590-	NO. 2 INT T LK WASHER	EC7554	2.0000	EACH	
4				IN 653-0591-	#2 FLAT WASHER	EC7554	2.0000	EACH	
4				IN 653-0592-	WASH 2 .093 ID .25000 .032 FL NYL	EC7554	2.0000	EACH	
4				IN 653-2000-	NO. 4 FLAT WASHER		16.0000	EACH	
4				IN 653-2002-	WASH 4 .123 ID .26500 INT T	ST	18.0000	EACH	
4				IN 653-3000-	WASH 6 .149 ID .37500 .016 FL	SS	5.0000	EACH	
4				IN 653-3001-	WASH 6 .150 ID .28800 INT T	ST	1.0000	EACH	
4				IN 653-3003-	WASH 6 .141 ID .25300 SPLIT	SS EC7039	7.0000	EACH	
4				IN 654-0074-	A.C.RECEPTACLE F 1540MS		2.0000	EACH	
4				IN 654-1006-	#6 GROUND LUG	EC9613	2.0000	EACH	
4				IN 654-1010-	#10 GROUND LUG		9.0000	EACH	
4				IN 654-1150-	SOCKET HOUSING 1-480303-0	EC7730	1.0000	EACH	
4				IN 654-1214-	GRCPMFT. HEVCC 6P3-4 (70,80,F		1.0000	EACH	
4				IN 654-1289-	SNAP PUSHING SR-500-6(1/2HOLE3/8ID)		2.0000	EACH	
4				IN 654-1290-	SNAP BUSH SB-1.000-12(1"MOLEX3/4ID)	EC6967	1.0000	EACH	
3				IN 279-1014-	BOTTOM PAN ASSY(928M1/M2) 6840-12		1.0000	EACH	
4				IN 000-0011-	LABOP QUALITY CONTROL		.0100		
4				IN 000-0024-	LABOP PRFP AREA		.0500	EACH	
4				IN 451-1226-	POTTOM PAN(928M1/M2)6840-119		1.0000	EACH	
4				IN 452-2558-	STIFFENER,CHASSIS(M1/M2)0680E-104		1.0000	EACH	
4				IN 651-0402-	RIVET AVDEL 11210615 3/16 X 7/16 LG		4.0000	EACH	
4				IN 655-0205-	PUMPER,WHITE #2095SW		4.0000	EACH	
3				IN * 350-4118-	POLARIZING KEY BETWEEN CONTACT50PK2		2.0000	EACH	
3				IN 360-1031-SF-	FUSE 3.0 AMP 250V SR CERAMC 3AG		1.0000	EACH	
3				IN 450-0504-	WANG NAME TAG C6P15-97	EC9908	1.0000	EACH	
3				IN 451-2145-	TOP COVER(928M1/M2)06840-117	EC9908	1.0000	EACH	
3				IN 451-307E-	PANEL,FRONT DRESS(928M1/2)06840-112	EC9908	1.0000	EACH	
3				IN 451-307A-	PANEL,INNER FRONT(928M1/2)06840-114	EC9908	1.0000	EACH	
3				IN 451-4505-	PRKT,STAT GNC LH DISK DR 06840-120	EC9908	1.0000	EACH	
3				IN 461-3275-	STUD,6-32 X 3.75 06840-120	EC9908	2.0000	EACH	
3				IN 462-0063-	SPCR 6-32UNC .250 CD .375 L HX B	EC9908	2.0000	EACH	
3				IN 462-0172-	SPCR 6-32LAC .250 CD .312 L HX B	EC9908	2.0000	EACH	
3				IN 462-0255-	SPACER,PC BOARDIE/FY06815-13	EC9908	10.0000	EACH	
3				IN 650-2120-	4-40 X 3/8 PAN HD PHL MS SS SEMS	EC9908	6.0000	EACH	
3				IN 650-3120-	6-32 X 3/8 PAN HD PHL MS SS SEMS	EC9908	6.0000	EACH	
3				IN 650-4161-B	8-32X1/2 FL HD PHL MS (BLACK)	EC9908	6.0000	EACH	
3				IN 650-6160-	10-32 X 1/2 PAN HD PHL MS SS SEMS	EC9908	2.0000	EACH	
3				IN 652-0032-	6-32 LOCK-NUT KEFS 511-061800-00	EC9908	4.0000	EACH	
3				IN 652-0041-	6-32 ACCRN NUT NICKEL FLT.	EC9908	2.0000	EACH	
3				IN 652-3006-	6-32 WING NUT CAD PLATE	EC9908	2.0000	EACH	
3				IN 650-0317-	PCLY BAG,5"X6.5"X1.5" 2.5 MIL THK	EC9908	1.0000	EACH	

ASSEMBLY PART NUMBER 177-3237- - -
 ASSEMBLY DESCRIPTION 01S 13C MASTER

LEGEND

1: F=PHANTOM; 2: ITEM MASTER DELY CODE; 3: *=TAGGED OUT OF KIT(PROD STR)

POSITION IN STRUCTURE	LEGEND			COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY	U/M	IML
	1	2	3						
2		IN		325-0006- - -	11ED SPRT TOGGLE SWITCH		1.0000	EACH	
2		IN		451-3079- - -	PANEL, OUTER FRONT(52EM2)C6840-250		1.0000	EACH	
2		IN		451-4518- - -	BRKT, SWITCH C6840-130		1.0000	EACH	
2		P	FS	600-2000- - -	WIRE 24 GA BLACK UL		.7500	FEET	
3			FS	600-2009- - -	WIRE 24 GA WHITE UL		1.0000	FEET	
2		P	FS	600-2005- - -	WIRE 24 GA GREEN UL W/OFF-76		.7500	FEET	
3			FS	600-2009- - -	WIRE 24 GA WHITE UL		1.0000	FEET	
2		IN		650-4123- - -	6-32X3/8 TRUSS HD PPL MS SS		3.0000	EACH	
2		IN		650-5012- - -	1/4-20 X 3/4 FLANGE WHIZ LOCK MS		2.0000	EACH	
2		IN		651-0401- - -	RIVET, FGF 1/8 X 3/16 AC42ABS		2.0000	EACH	
2		IN		654-1274- - -	CABLE CLAMP ADH. BACK PKLSP 021-0375		1.0000	EACH	

END OF REPORT MB0080-A

B-15

APPENDIX

C

ENGIN-

EERING

CHANGE

NOTICES

APPENDIX "C"

OIS 130

ENGINEERING CHANGE NOTICES

WANG

ECN

ECN No. 10312

SHEET 1 OF 2
DATE 12-27-78
RFA NO. (REF)

ORIGINATOR Sherwin Jeffers DEPT. 16 EXT. 2236 DATE 12/15/78
MODEL NO. 928 TITLE _____

ECN NO. 10312

PART NO. 209-7214 & -1	PART NAME I/O Channel Master Data Link	REV. F T	PC.REV. FROM TO	ELEC.REV. FROM TO
DWG. NO. 7214	(DWG. TITLE)	- -	- -	- -
ASSY. PART NO.	ASSY. TITLE	EFFECTED <input type="checkbox"/> NO EFFECT <input type="checkbox"/>		

DESCRIPTION OF CHANGE

Change artwork, assembly drawing and schematic per attached print
Change BOM's 209-7214 and 209-7214-1 as follows

WL#	QTY	DESCRIPTION
Change: 376-0010	from 5 to 4	7404 IC
Add: 376-0139	1	7414 IC

RECEIVED
JAN 03 1979
PRINT ROOM

NOTE: This ECN must be done to 7214 and 7214-1 if used with 7511 Master Memory

REASON FOR CHANGE

To increase noise immunity on signals SCG, DCG and FICK

1757J/38

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

CUSTOMER ENGINEERING <input type="checkbox"/> IMMEDIATE CUST. <input type="checkbox"/> CUST. PER NEXT CALL <input checked="" type="checkbox"/> INFORMATION ONLY <input type="checkbox"/> NONE	ACKNOWLEDGE BY: _____ DATE: _____	<input checked="" type="checkbox"/> MANDATORY CHANGE <input checked="" type="checkbox"/> DOCUMENTATION CHANGE (PL, BOM, DWG) <input type="checkbox"/> EASE OF MFG., COST REDUCTION <input type="checkbox"/> PRODUCT IMPROVEMENT
---	---	--

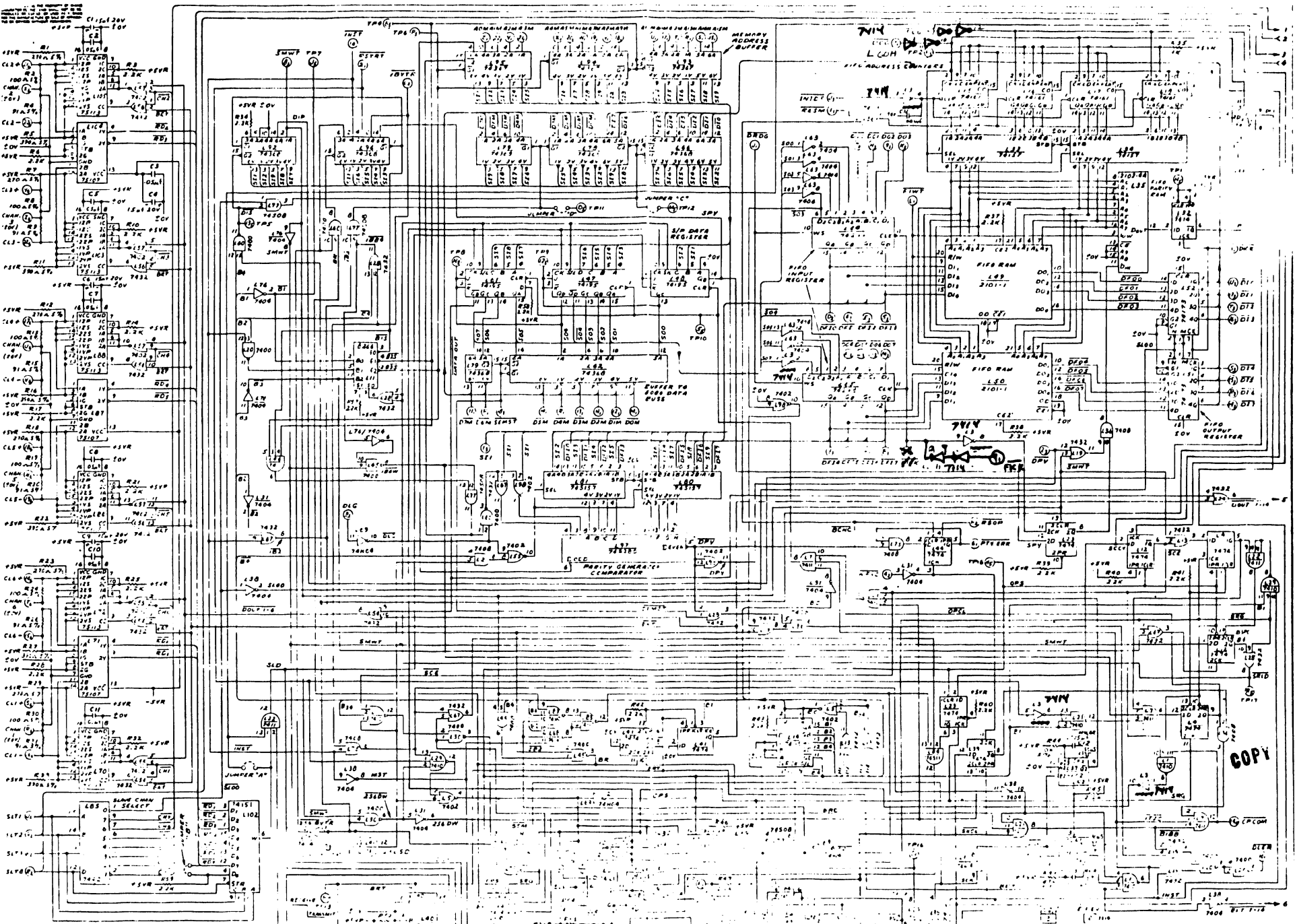
DISPOSITION	Bonded	FINAL ASSY AREA	SUB ASSY AREA	PARTS		Future MFG.
				IN House	Outside Vendor	
USE AS IS TO PREVIOUS REV.	X	X	X			
TO CONFORM						X
TO CONFORM IF NOT BEYOND OPERATIONS EFFECTED						

FINAL APPROVAL *M. Louie 12/20*
 APPROVED DESIGN ENGRG. *SPD* 12/18/78
 APPROVED MFG. ENGRG. *RP*
 WRITTEN BY *Paul Richer, D. Reid*

SUMMARY OF EC10312 & 10901

Upgrade 7214-1 to 7214-2 as follows, refer to schematics included in this appendix:

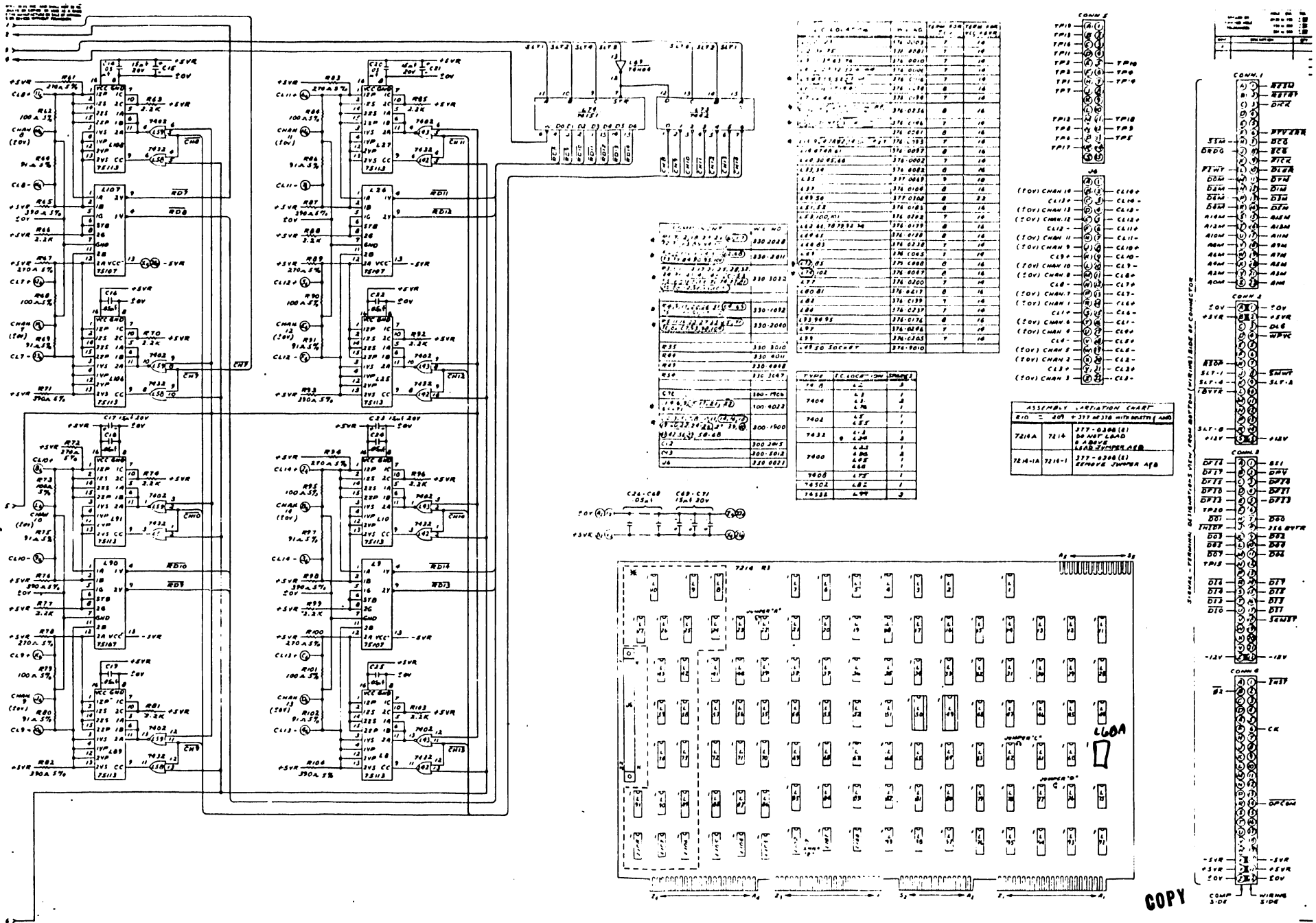
- a) Change IC at location L3 from a 7404 (376-0010) to a 7414 (276-0139)
- b) Add IC 7414 (376-0139) at location L60A
- c) Cut signal track from Connector 1 pin 9 to L3-9, L65-11, L64-11 close to connector.
- d) Add jumper from pin 9 of Connector 1 to L60A-5
- e) Add jumper from L60A-6 to L60A-9
- f) Add jumper from L60A-8 to L65-11
- g) Cut signal track (DCG) at pin 7 of Connector 1 close to Connector.
- h) Add jumper from pin 7 of Connector 1 to L60A-3
- j) Add jumper from L60A-4 to L60A-11
- k) Add jumper from L60A-10 to L33-1
- l) Cut signal track (SCG) at pin 8 of Connector 1 close to Connector
- m) Add jumper from pin 8 of Connector 1 to L60A-1
- n) Add jumper from L60A-2 to L60A-13
- o) Add jumper from L60A-12 to L16-2
- p) Add 100 pf capacitor (300-1100) between L64-10 and \pm 0V



COPY

NO.	DATE	APPROVED BY	REVISION
1			
2			
3			
4			
5			
6			

WANG



ITEM NO	DESCRIPTION	QTY	UNIT
1	RELAY	1	EA
2	RELAY	1	EA
3	RELAY	1	EA
4	RELAY	1	EA
5	RELAY	1	EA
6	RELAY	1	EA
7	RELAY	1	EA
8	RELAY	1	EA
9	RELAY	1	EA
10	RELAY	1	EA
11	RELAY	1	EA
12	RELAY	1	EA
13	RELAY	1	EA
14	RELAY	1	EA
15	RELAY	1	EA
16	RELAY	1	EA
17	RELAY	1	EA
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22	RELAY	1	EA
23	RELAY	1	EA
24	RELAY	1	EA
25	RELAY	1	EA
26	RELAY	1	EA
27	RELAY	1	EA
28	RELAY	1	EA
29	RELAY	1	EA
30	RELAY	1	EA
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32	RELAY	1	EA
33	RELAY	1	EA
34	RELAY	1	EA
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36	RELAY	1	EA
37	RELAY	1	EA
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88	RELAY	1	EA
89	RELAY	1	EA
90	RELAY	1	EA
91	RELAY	1	EA
92	RELAY	1	EA
93	RELAY	1	EA
94	RELAY	1	EA
95	RELAY	1	EA
96	RELAY	1	EA
97	RELAY	1	EA
98	RELAY	1	EA
99	RELAY	1	EA
100	RELAY	1	EA

ASSEMBLY VARIATION CHART

ITEM	DESCRIPTION	QTY	UNIT
7214	RELAY	1	EA
7214A	RELAY	1	EA
7214B	RELAY	1	EA
7214C	RELAY	1	EA
7214D	RELAY	1	EA
7214E	RELAY	1	EA
7214F	RELAY	1	EA
7214G	RELAY	1	EA
7214H	RELAY	1	EA
7214I	RELAY	1	EA
7214J	RELAY	1	EA
7214K	RELAY	1	EA
7214L	RELAY	1	EA
7214M	RELAY	1	EA
7214N	RELAY	1	EA
7214O	RELAY	1	EA
7214P	RELAY	1	EA
7214Q	RELAY	1	EA
7214R	RELAY	1	EA
7214S	RELAY	1	EA
7214T	RELAY	1	EA
7214U	RELAY	1	EA
7214V	RELAY	1	EA
7214W	RELAY	1	EA
7214X	RELAY	1	EA
7214Y	RELAY	1	EA
7214Z	RELAY	1	EA

NOTE: LOAD ALL RELAYS ABOVE FROM BATTERY
 BEFORE THE ENGINE IS RUN.

WANG

DATE	BY	REVISION
12/15/71	J. WANG	1
12/15/71	J. WANG	2
12/15/71	J. WANG	3
12/15/71	J. WANG	4
12/15/71	J. WANG	5
12/15/71	J. WANG	6
12/15/71	J. WANG	7
12/15/71	J. WANG	8
12/15/71	J. WANG	9
12/15/71	J. WANG	10
12/15/71	J. WANG	11
12/15/71	J. WANG	12
12/15/71	J. WANG	13
12/15/71	J. WANG	14
12/15/71	J. WANG	15
12/15/71	J. WANG	16
12/15/71	J. WANG	17
12/15/71	J. WANG	18
12/15/71	J. WANG	19
12/15/71	J. WANG	20
12/15/71	J. WANG	21
12/15/71	J. WANG	22
12/15/71	J. WANG	23
12/15/71	J. WANG	24
12/15/71	J. WANG	25
12/15/71	J. WANG	26
12/15/71	J. WANG	27
12/15/71	J. WANG	28
12/15/71	J. WANG	29
12/15/71	J. WANG	30
12/15/71	J. WANG	31
12/15/71	J. WANG	32
12/15/71	J. WANG	33
12/15/71	J. WANG	34
12/15/71	J. WANG	35
12/15/71	J. WANG	36
12/15/71	J. WANG	37
12/15/71	J. WANG	38
12/15/71	J. WANG	39
12/15/71	J. WANG	40
12/15/71	J. WANG	41
12/15/71	J. WANG	42
12/15/71	J. WANG	43
12/15/71	J. WANG	44
12/15/71	J. WANG	45
12/15/71	J. WANG	46
12/15/71	J. WANG	47
12/15/71	J. WANG	48
12/15/71	J. WANG	49
12/15/71	J. WANG	50
12/15/71	J. WANG	51
12/15/71	J. WANG	52
12/15/71	J. WANG	53
12/15/71	J. WANG	54
12/15/71	J. WANG	55
12/15/71	J. WANG	56
12/15/71	J. WANG	57
12/15/71	J. WANG	58
12/15/71	J. WANG	59
12/15/71	J. WANG	60
12/15/71	J. WANG	61
12/15/71	J. WANG	62
12/15/71	J. WANG	63
12/15/71	J. WANG	64
12/15/71	J. WANG	65
12/15/71	J. WANG	66
12/15/71	J. WANG	67
12/15/71	J. WANG	68
12/15/71	J. WANG	69
12/15/71	J. WANG	70
12/15/71	J. WANG	71
12/15/71	J. WANG	72
12/15/71	J. WANG	73
12/15/71	J. WANG	74
12/15/71	J. WANG	75
12/15/71	J. WANG	76
12/15/71	J. WANG	77
12/15/71	J. WANG	78
12/15/71	J. WANG	79
12/15/71	J. WANG	80
12/15/71	J. WANG	81
12/15/71	J. WANG	82
12/15/71	J. WANG	83
12/15/71	J. WANG	84
12/15/71	J. WANG	85
12/15/71	J. WANG	86
12/15/71	J. WANG	87
12/15/71	J. WANG	88
12/15/71	J. WANG	89
12/15/71	J. WANG	90
12/15/71	J. WANG	91
12/15/71	J. WANG	92
12/15/71	J. WANG	93
12/15/71	J. WANG	94
12/15/71	J. WANG	95
12/15/71	J. WANG	96
12/15/71	J. WANG	97
12/15/71	J. WANG	98
12/15/71	J. WANG	99
12/15/71	J. WANG	100

COPY

WANG

ECN

ECN No. 10724

SHEET 1 OF 3
DATE 2-6-79
RFA NO. (REF)

ORIGINATOR Paul Ricker DEPT. 12 EXT. 2259 DATE 2/5/79
MODEL NO. 928 TITLE

PART NO. <u>209-7214-2</u>	PART NAME <u>Sys 130 Data Link Board</u>	REV. FROM	PC REV. TO	ELEC. REV. FROM TO
DWG. NO. <u>7214</u>	(DWG. TITLE)	-	-	See Below
ASSY. PART NO.	ASSY. TITLE			EFFECTED <input type="checkbox"/> NO EFFECT <input type="checkbox"/>

DESCRIPTION OF CHANGE

Change assembly drawing and schematic as follows:

210-7214	L3 - 7404 (376-0010)
210-7214-1	L60A - not loaded
210-7214-2	L3 - 7414 (376-0139)
	L60A - 7414 (376-0139)

Create BOM's for 209-7214-2 and 210-7214-2A per attached sheets

RECEIVED
FEB 21 1979
PRINT ROOM

NOTE: ECN 10507 should not have incremented the E-Rev; the correct E-Rev for the 7214 and 7214-1 will be 2

REASON FOR CHANGE

To create a Data Link Board for System with more than 16K memory

2439J/42

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		Future MFG.
				IN House	Outside Vendor	
USE AS IS TO PREVIOUS REV.						
TO CONFORM						X
TO CONFORM IF NOT BEYOND OPERATIONS EFFECTED						

FINAL APPROVAL
 APPROVED DESIGN ENGR. Paul Ricker
 APPROVED MFG. ENGR. R.P.
 WRITTEN BY Judy M...

ASSEMBLY PART NUMBER 209-7214-2 - - LEGEND
 ASSEMBLY DESCRIPTION PCA 928 1/10 CHNL MASTER DATA LINK 1: P=PHANTOM; 2: ITEM MASTER DELY CODE; 3: *

Sys 130 Data Link Bd

POSITION IN STRUCTURE	LEGEND			COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY	U/M	IM
	1	2	3						
1		IN		000-0001-	LABOR SUB-SYSTEMS		1.9430		
1		IN		000-0011-	LABOR QUALITY CONTROL		.3890		
1		IN		300-1900-	CAP .05 UF +80-20% 12 V CERAMIC D	EC6502	58.0000	EACH	
1		IN		300-1906-	CAP .001 UF 10% 500 V CERAMIC DISC	EC7291	1.0000	EACH	
1		IN		300-2115-	CAP .015 UF 10% 100 V MYLAR	EC6502	1.0000	EACH	
1		IN		300-4022-	CAP 15.0 UF 20 V 10% TANT AXIAL	EC6502	11.0000	EACH	
1		IN		300-5012-	CAP .0022UF 5% 500 V MICA DIPPED	E8246A	1.0000	EACH	
1		FS	*	330-1092-	RES 91 OHM 1/4W 5% FIXED COMP		14.0000	EACH	
1		FS	*	330-2011-	RES 100 OHM 1/4W 5% FIXED COMP		13.0000	EACH	
1		P FS	*	330-2011-48-	RES 100 OHM 1/4W 5% FIXED COMP		1.0000	EACH	
1		FS	*	330-2028-	RES 270 OHM 1/4W 5% FIXED COMP		14.0000	EACH	
1		FS	*	330-2040-	RES 390 OHM 1/4W 5% FIXED COMP		14.0000	EACH	
1		P FS	*	330-3010-48-	RES 1K OHM 1/4W 10% FIXED COMP		1.0000	EACH	
1		FS	*	330-3022-	RES 2.2K OHM 1/4W 10% FIXED COMP		44.0000	EACH	
1		P FS	*	330-3047-48-	RES 4.7K OHM 1/4W 10% FIXED COMP		1.0000	EACH	
1		P FS	*	330-4011-48-	RES 10K OHM 1/4W 5% FIXED COMP		1.0000	EACH	
1		P FS	*	330-4048-48-	RES 47K OHM 1/4W 5% FIXED COMP	E8246A	1.0000	EACH	
1		IN		350-0021-	225-22221-110 SOL TYPE		1.0000	EACH	
1		IN		376-0002-	IC 7400N 4 2 IN POS NAND GATE		4.0000	EACH	
1		IN		376-0003-	IC 7410N 3 3 IN POS NAND GATE	EC6502	3.0000	EACH	
1		IN		376-0006-	IC 7474N 2 D EDGE TRIG FLIP-FLOP		7.0000	EACH	
1		IN		376-0008-	IC 7442N 4 LINE-10 LINE DECODER		2.0000	EACH	
1		IN		376-0010-	IC 7404N HEX INVERTER	E10312	5.0000	EACH	
1		IN		376-0016-	IC 7402N 4 2 IN POS NOR GATE		6.0000	EACH	
1		IN		376-0041-	IC N82668 2 IN 4 BIT DGTL MX	EC6502	1.0000	EACH	
1		IN		376-0045-	IC 74H04N HEX INVERTER		1.0000	EACH	
1		IN		376-0047-	IC 74151 DATA SELECTOR MULTIPLEXER		2.0000	EACH	
1		IN		376-0081-	IC 7408 4 2 IN POS AND GATE	EC6502	3.0000	EACH	
1		IN		376-0082-	IC 74157 4 2 IN MX	EC6502	2.0000	EACH	
1		IN		376-0093-	IC 7432 4 2 IN OR GATE		9.0000	EACH	
1		IN		376-0094-	IC 74161 SYNCHRONOUS 4 BIT COUNTER		6.0000	EACH	
1		IN		376-0097-	IC 74195 4 BIT PAR ACCESS SHIFT REG		4.0000	EACH	
1		IN		376-0104-	IC 9602 2 RETRIG RESET MONOSTBL MVB		1.0000	EACH	
1		IN		376-0138-	IC 74298 4 2 IN MX W/STORAGE		2.0000	EACH	
1		IN		376-0139-	IC 7414 HEX SCHMITT TRIGGER	E10507	2.0000	EACH	
1		IN		376-0146-	IC 75107 2 LINE RECEIVER	EC6502	7.0000	EACH	
1		IN		376-0176-	IC 74367 HEX BUFFER		3.0000	EACH	
1		IN		376-0179-	IC 74368 HEX BUS DR W/3 STATE OUT		6.0000	EACH	
1		IN		376-0183-	IC 74173 4 BIT D TYPE REG 3 STATE		2.0000	EACH	
1		IN		376-0194-	IC 7411 3 3 IN POS AND GATE		3.0000	EACH	
1		IN		376-0199-	IC 74S02 4 2 IN POS NOR GATE		1.0000	EACH	
1		IN		376-0200-	IC 74S08 4 2 IN POS AND GATE	EC6502	1.0000	EACH	
1		IN		376-0202-	IC 74S74 2 D TYPE F F W PRESET CLER		3.0000	EACH	
1		IN		376-0205-	IC 74S32 4 2 IN POS OR GATE	EC6502	1.0000	EACH	
1		IN		376-0217-	IC 74S157 4 2-1 LINE DATA SELC MX	EC6502	2.0000	EACH	
1		IN		376-0237-	IC 74S11 3 3 IN POS AND GATE		1.0000	EACH	
1		IN		376-0238-	IC 74S10 3 3 IN POS NAND GATE		2.0000	EACH	
1		IN		376-0246-	IC 74S280 9 BIT ODD EVEN PARITY GEN	EC6502	1.0000	EACH	
1		IN		376-0256-	IC 75113 2 DIF LINE REC 3 STATE OUT		14.0000	EACH	
1		IN		376-9010-	IC 22 PIN SOCKET BURNDY # DILB222P1		2.0000	EACH	
1		IN		377-0069-	2102 1K BY 1 BIT STAT RAM (450 NS)		1.0000	EACH	
1		IN		510-7214-	PCB 928 6 1/0 CHNL MASTER DATA LINK		1.0000	EACH	

C-6

E.C.N. No. 10724 (43)
 SHEET No. 2 of 3
 DWG. No.

ASSEMBLY PART NUMBER 210-7214-2A - -
 ASSEMBLY DESCRIPTION 7214-1 MODULE

LEGEND
 1: P=PHANTOM; 2: ITEM MASTER DELY CODE; 3:

POSITION IN STRUCTURE	LEGEND 1 2 3	COMPONENT PART NUMBER	DESCRIPTION	F C M	QUANTITY PER ASSY	U/M
1		IN * 209-7214-2 - -	7214-1 W/UNLOADED SOCKETS (5520/30)		1.0000	EACH
1		IN 377-0308 - -	2101-1 RAM I.C.		2.0000	EACH

RAW MATERIAL 3.2740
 MAT. OVERHEAD .10% .3274
 SPOILAGE .05% .1801
 ASSEMBLIES 121.3070
 SUBTOTAL 125.0885

DIRECT LABOR .0000 ***
 OVERHEAD 1.70% .0000 ***

TOTAL COST 125.0885

10724
 303
 (43)

DWG. NO.

WANG

ECN

ECN No. 10901

SHEET 1 OF 1
DATE 2-26-79
RFA NO. (REF)

ORIGINATOR Sherwin Jeffers DEPT. 16 EXT. 2236 DATE 2/20/79
MODEL NO. 928 TITLE

PART NO. 209-7214/-1/-2 PART NAME Data Link Board REV. F T PC REV. FROM TO ELEC. REV. FROM TO
DWG. NO. 7214 (DWG. TITLE) SEE BE OW
ASSY. PART NO. ASSY. TITLE EFFECTED
NO EFFECT

DESCRIPTION OF CHANGE

Change artwork, assembly drawing and schematic as follows:

Add 100 pf Cer Cap from L64 Pin 10 to +0V

Change BOM's 209-7214, 209-7214-1 and 209-7214-2 as follows:

WL#	QTY	DESCRIPTION
Add: 300-1100	1	100 pf Cer Cap

Change E-Rev of 7214 board from 2 to 3
Change E-Rev of 7214-1 board from 2 to 3
Change E-Rev of 7214-2 board from 1 to 2

RECEIVED
MAR 02 1979
PRINT ROOM

NOTE: This ECN must be done if 7214 is used with the 7511

REASON FOR CHANGE

To improve noise immunity on signal DRDG

2534J/43

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		Future MFG.
				IN House	Outside Vendor	
USE AS IS TO PREVIOUS REV.						
TO CONFORM						X
TO CONFORM IF NOT BEYOND OPERATIONS EFFECTED						

FINAL APPROVAL
APPROVED DESIGN ENGRG. DP 2/22/79
APPROVED MFG. ENGRG.
WRITTEN BY Paul Ricker RP

ECN NO. 10901

APPENDIX

D

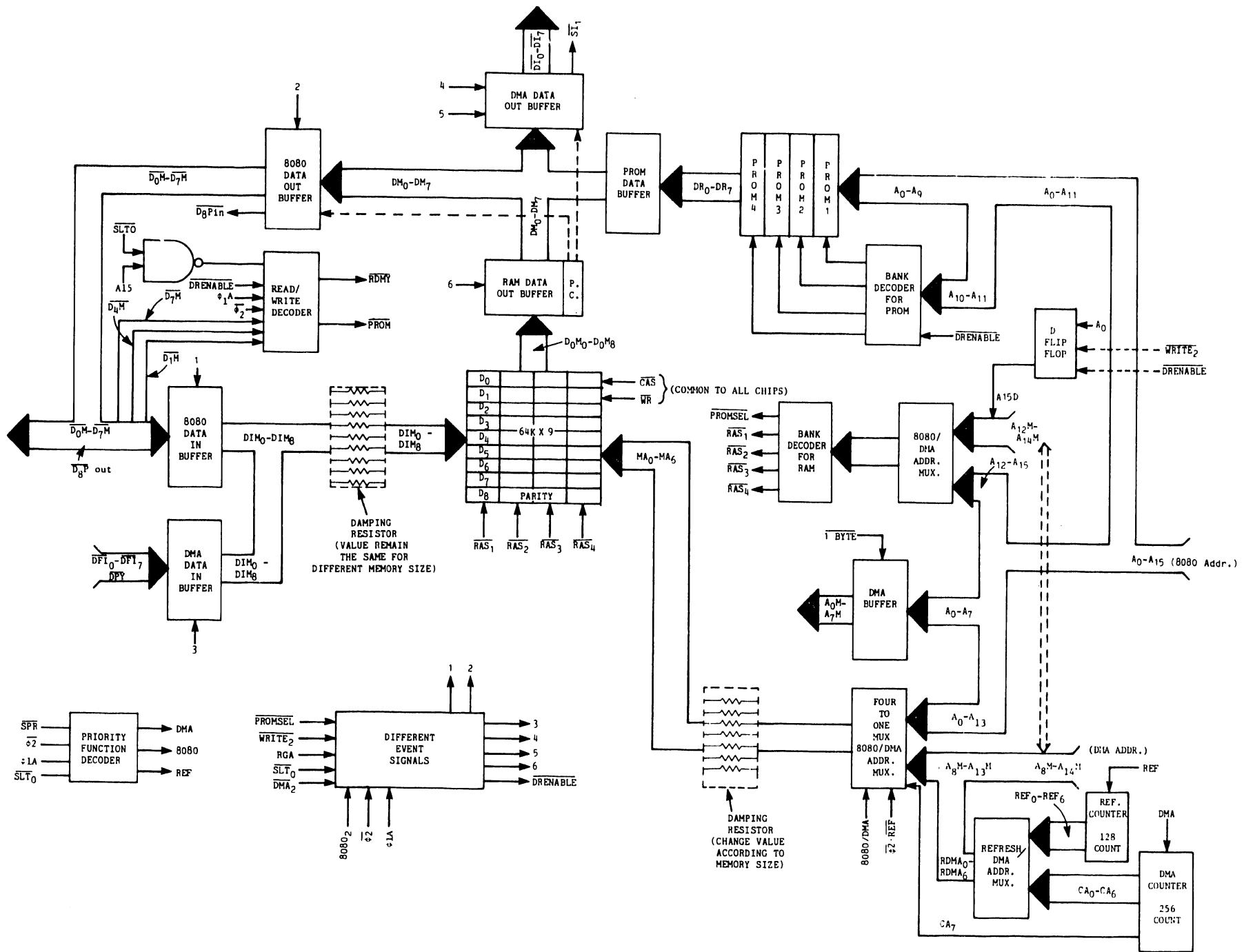
BLOCK DIAGRAM

FOR THE NEW

MEMORY BOARDS

APPENDIX D

BLOCK DIAGRAM FOR THE NEW MEMORY BOARDS



MASTER CPU MEMORY PCB 7511 - FLOW CHART

APPENDIX

A

MEMORY

PCB

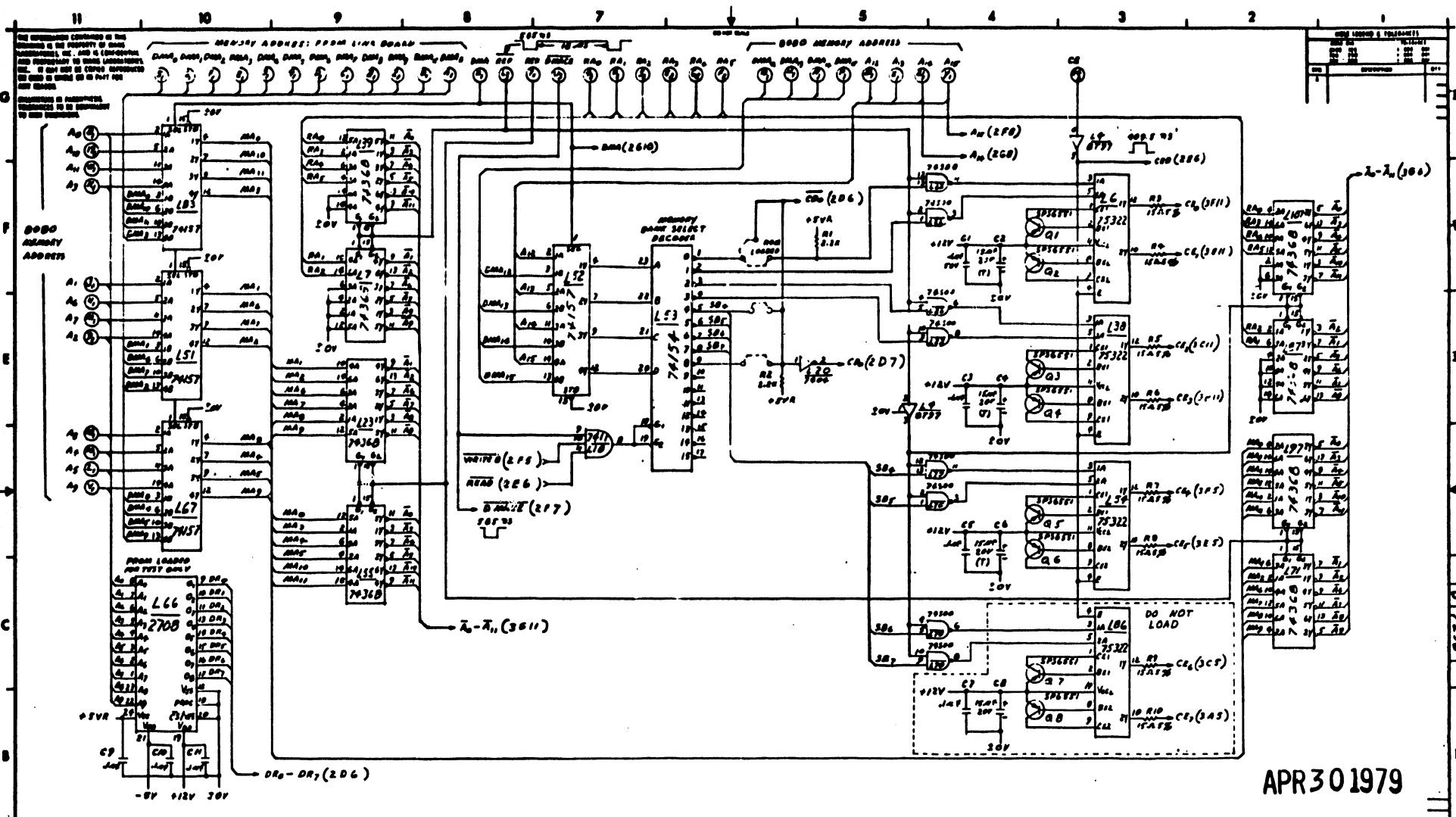
SCHE-

MATICS

APPENDIX "A"

OIS 130

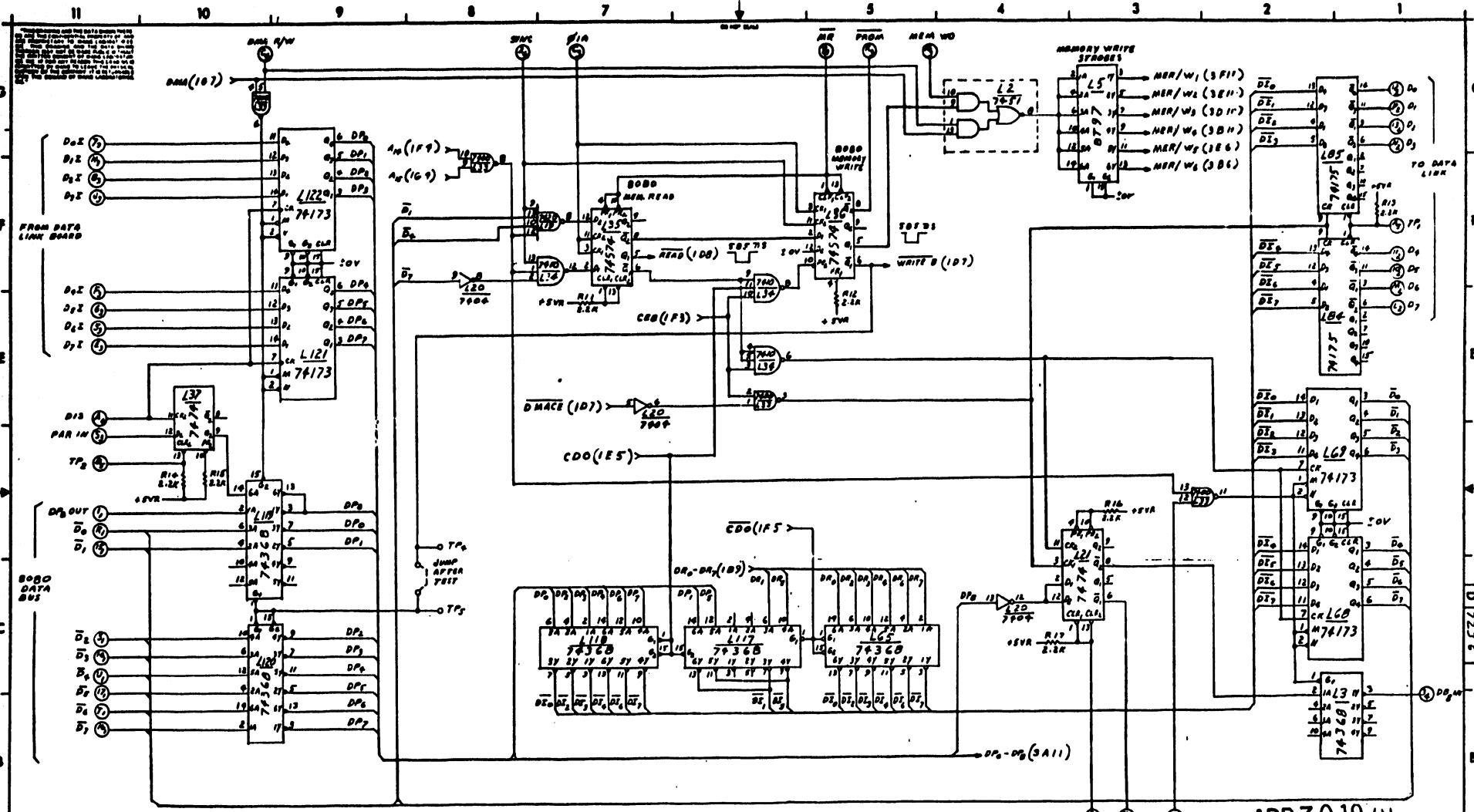
MEMORY PCB SCHEMATICS



APR 30 1979

NOTE: THIS UNIT HAS BEEN FULLY LOADED FOR 32K TO SATISFY THE OIS SYSTEM 130.

QTY	REV	ISSUE PART NO	ISSUE NO	DESCRIPTION	BY	DATE	APPROVED BY	DATE
				WANG LABORATORIES, INC. ELECTRONIC GROUP				
				MODEL NO 92B				
				TITLE WORK STATION - 1K MEMORY				
				210-7236 D 7236				



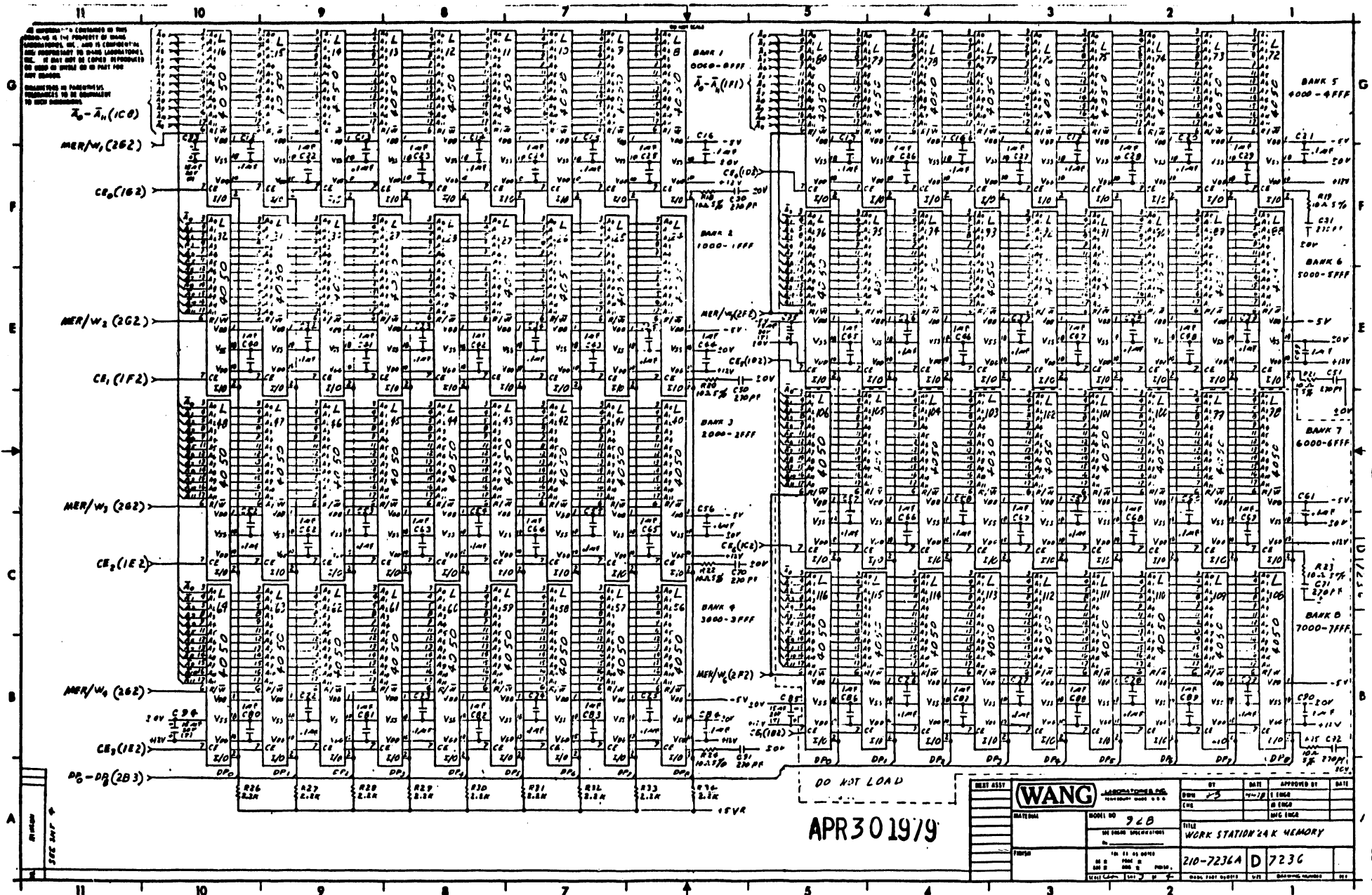
NOTE: THIS UNIT HAS BEEN FULLY LOADED FOR 32K TO SATISFY THE OIS SYSTEM 130.

APR 30 1974

TP3 MEM PAR MEM IN

(WANG)		DATE	APPROVED BY	DATE
		DATE	DATE	DATE
MODEL NO 928		TITLE WORK STATION - 4K MEMORY		
SERIAL NO		DRAWING NUMBER		
2N-7236A		D 7236		

NOTE: THIS UNIT HAS BEEN FULLY LOADED FOR 32K TO SATISFY THE OIS SYSTEM 130.



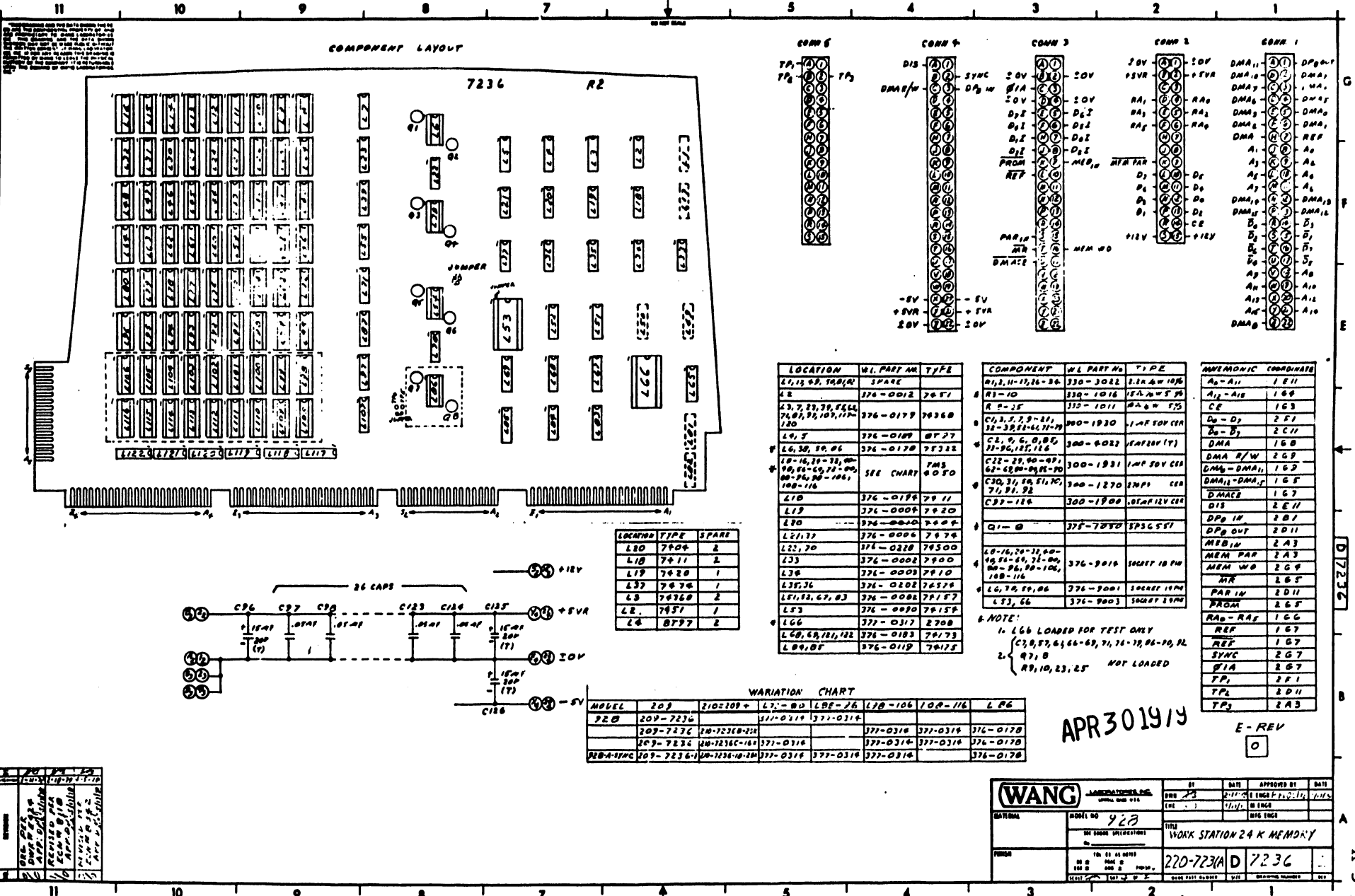
DO NOT LOAD

APR 30 1979

WANG LABORATORIES INC.		BY	DATE	APPROVED BY	DATE
MATERIAL		DRW	3	1	1
PART NO		REV		BY	
BOOK NO		DATE		BY	
TITLE		BY		BY	
WORK STATION 24K MEMORY		BY		BY	
210-7236A		D	7236		

NOTE: THIS UNIT HAS BEEN FULLY LOADED FOR 32K TO SATISFY THE OIS SYSTEM 130.

COMPONENT LAYOUT



LOCATION	WL PART NO	TYPE
L1, 15, 20, 24, 26, 28	SPARE	
L2	376-0012	7451
L3, 7, 23, 29, 34, 36, 38, 41, 101, 117, 118, 120	376-0179	7436B
L4, 5	376-0189	8727
L6, 30, 39, 46	376-0178	7432E
L8-16, 21-23, 25, 27, 31-33, 35, 37, 39, 40, 42-44, 45, 47-50, 52-54, 56-100, 102-116	SEE CHART	74150
L10	376-0189	7411
L19	376-0004	7420
L20	376-0004	7420
L21, 22	376-0004	7420
L22, 20	376-0228	74300
L23	376-0002	7400
L26	376-0003	7410
L28, 26	376-0202	7427B
L31, 32, 67, 83	376-0084	74157
L33	376-0090	74157
L34	376-0317	2708
L40, 48, 121, 122	376-0183	74123
L49, 87	376-0119	74123

LOCATION	TYPE	SPARE
L80	7404	2
L18	7411	2
L19	7420	1
L37	7424	1
L3	7436B	2
L2	7451	1
L4	8727	2

VARIATION CHART

MODEL	209	210-100+	L7-80	L8E-76	L78-106	10R-116	L86
720	209-7236		377-0319	377-0314			
	209-7236	20-7236B-22			377-0316	377-0314	376-0178
	209-7236	20-7236C-167			377-0314	377-0314	376-0178
209-7236		20-7236D-28			377-0314	377-0314	376-0178

COMPONENT	WL PART NO	TYPE
R1, 11-13, 16-24	330-3022	1.2K 1/4W 10%
R1-10	330-1016	1K 1/4W 5% 5%
R 5-25	330-1011	1/4W 5% 5%
C1, 3, 7, 9-21, 23-25, 28-41, 71-79	900-1930	1-1/2 50V CER
C2, 6, 8, 0, 8, 5, 11-20, 125, 126	300-4022	1/4 50V (T)
C12-23, 40-49, 62-68, 88-94, 95-99	300-1931	1-1/2 50V CER
C30, 31, 74, 81, 70, 73, 81, 82	300-1270	1MFD CER
C32-124	300-1900	10MFD 15V CER
Q1-8	375-7070	SP3C 55T
L6-16, 20-23, 40-48, 71-84, 72-80, 82-84, 86, 88-100, 102-116	376-9016	1600T 18 PM
L6, 7, 20, 86	376-9001	1600T 15 PM
L33, 66	376-9003	1600T 20 PM

MEMORIC COORDINATE

A ₂ -A ₁	1 E 11
A ₁₂ -A ₁₅	1 G 9
CE	1 G 3
D ₀ -D ₂	2 F 1
D ₃ -D ₇	2 E 11
DMA	1 G 8
DMA R/W	2 G 8
DMA ₀ -DMA ₁	1 G 5
DMA ₂ -DMA ₃	1 G 5
DMA ₄	1 G 7
DMA ₅	2 E 11
DMA ₆	2 E 11
DMA ₇	2 E 11
DMA ₈	2 A 3
DMA ₉	2 A 3
DMA ₁₀	2 A 3
DMA ₁₁	2 A 3
DMA ₁₂	2 A 3
DMA ₁₃	2 A 3
DMA ₁₄	2 A 3
DMA ₁₅	2 A 3
DMA ₁₆	2 A 3
DMA ₁₇	2 A 3
DMA ₁₈	2 A 3
DMA ₁₉	2 A 3
DMA ₂₀	2 A 3
DMA ₂₁	2 A 3
DMA ₂₂	2 A 3
DMA ₂₃	2 A 3
DMA ₂₄	2 A 3
DMA ₂₅	2 A 3
DMA ₂₆	2 A 3
DMA ₂₇	2 A 3
DMA ₂₈	2 A 3
DMA ₂₉	2 A 3
DMA ₃₀	2 A 3
DMA ₃₁	2 A 3
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DMA ₃₃	2 A 3
DMA ₃₄	2 A 3
DMA ₃₅	2 A 3
DMA ₃₆	2 A 3
DMA ₃₇	2 A 3
DMA ₃₈	2 A 3
DMA ₃₉	2 A 3
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DMA ₉₄	2 A 3
DMA ₉₅	2 A 3
DMA ₉₆	2 A 3
DMA ₉₇	2 A 3
DMA ₉₈	2 A 3
DMA ₉₉	2 A 3
DMA ₁₀₀	2 A 3

NOTE:
 1. L66 LOADED FOR TEST ONLY
 2. C3, 8, 57, 64, 66-69, 71, 74-78, 86-90, 92, 97, 8 NOT LOADED

APR 30 1974

E-REV
 0

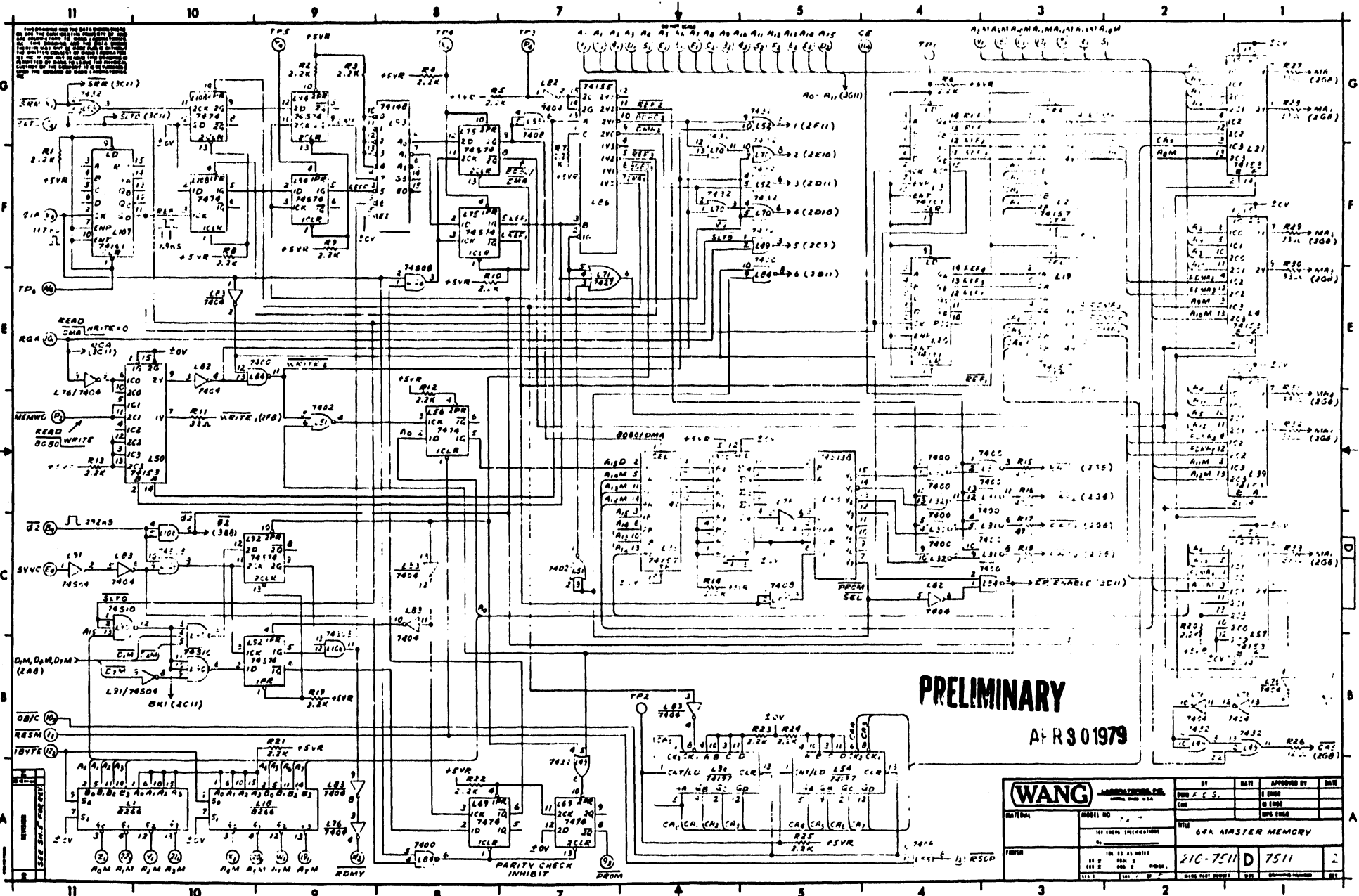
NO.	REV.	DATE	BY	DESCRIPTION
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				

(WANC) WORK STATION 24 K MEMORY

MODEL NO 420

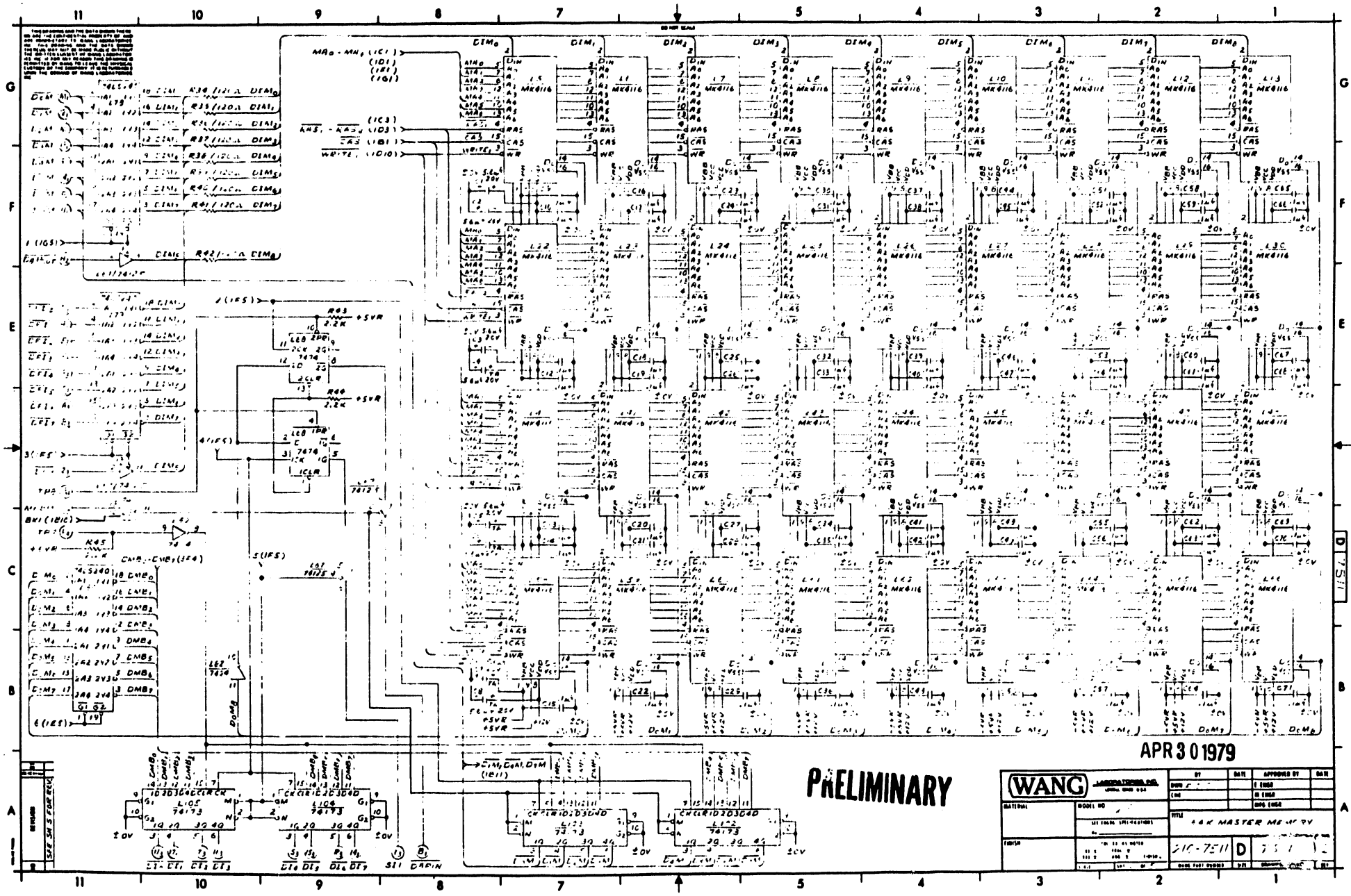
TITLE WORK STATION 24 K MEMORY

NO 220-7236A D 7236



PRELIMINARY
A-R 3 01979

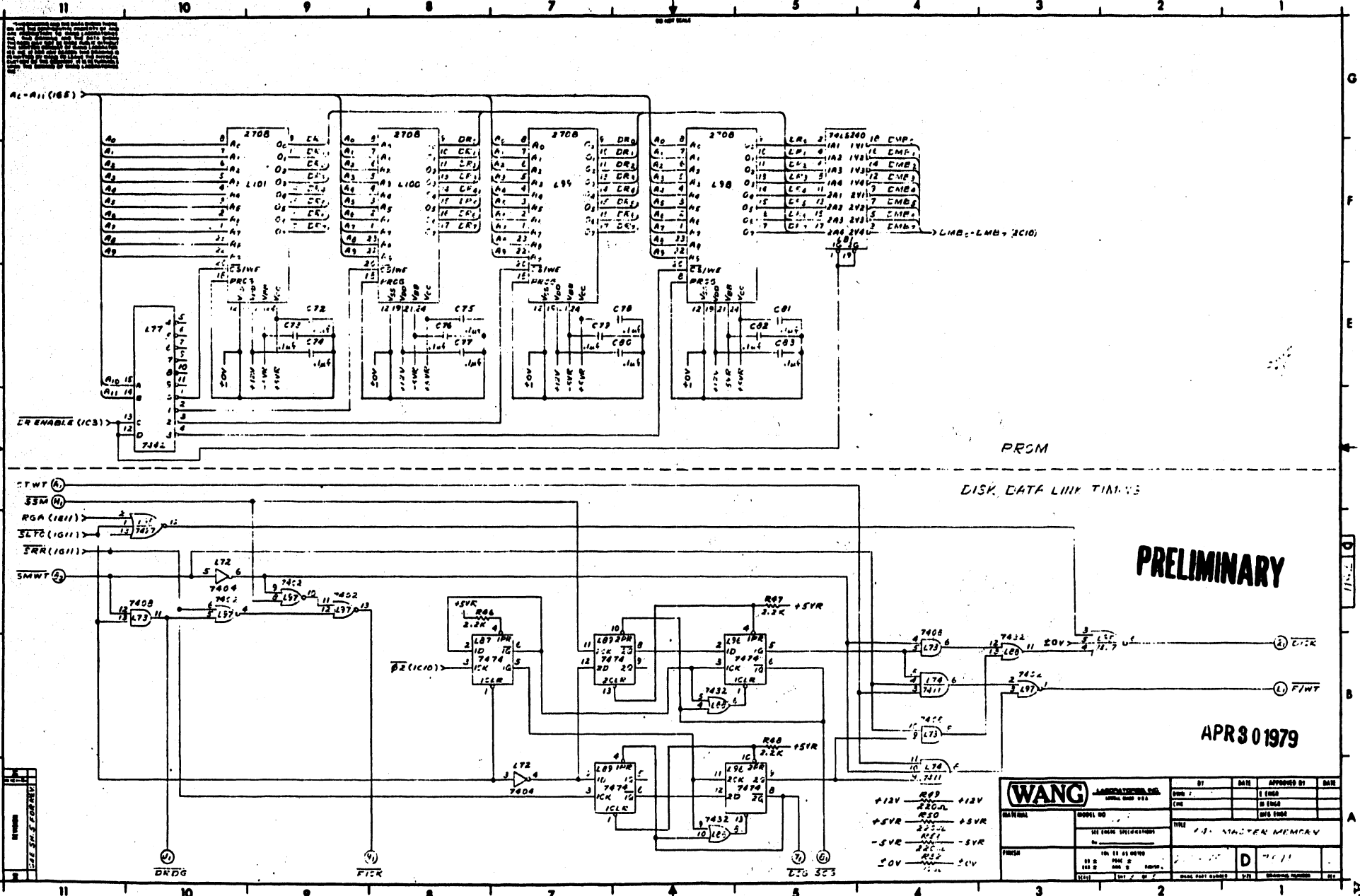
WANG		DATE	BY	APPROVED BY	DATE
PROJECT NO. 210-7511		DATE	BY	APPROVED BY	DATE
TITLE		68A MASTER MEMORY			
DRAWN		210-7511 D 7511			
CHECKED		DATE			
APPROVED		DATE			



APR 3 0 1979

PRELIMINARY

WANG		DATE	BY	APPROVED BY	BAR
PROJECT NO.		DATE	BY	APPROVED BY	BAR
REV. NO.		DATE	BY	APPROVED BY	BAR
DESCRIPTION		4K MASTER MEMORY			
DRAWN BY		DATE	BY	APPROVED BY	BAR
CHECKED BY		DATE	BY	APPROVED BY	BAR
DESIGNED BY		DATE	BY	APPROVED BY	BAR

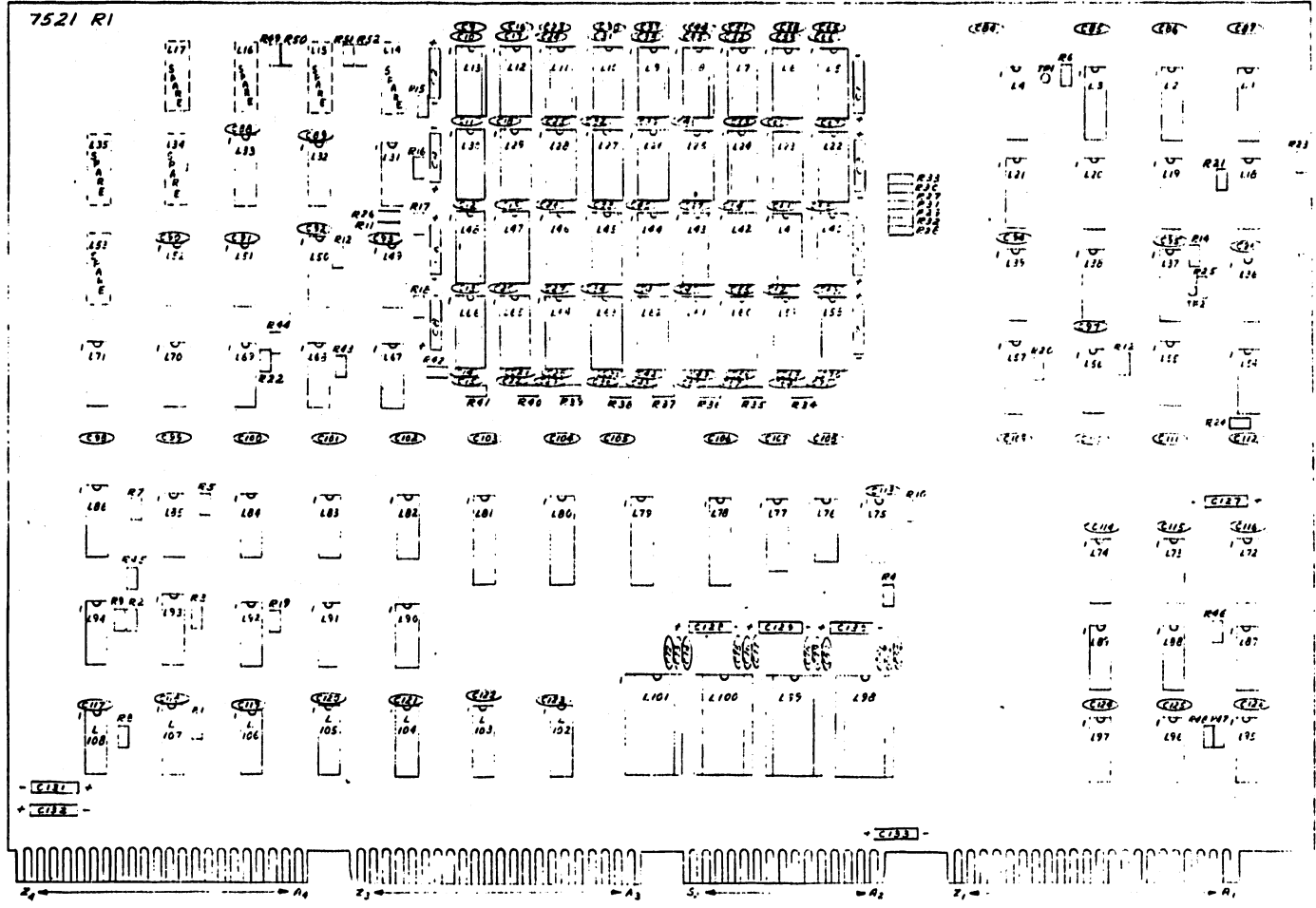


PRELIMINARY

APR 30 1979

WANG LABORATORIES, INC. JANUARY 1979		BY	DATE	APPROVED BY	DATE
MODEL NO.		CHKD	11/88		
REV		ENG	11/88		
		DES	11/88		
SEE LOGIC DISCREPANCY		TITLE: 11. MASTER MEMORY			
NO. 11 21 0010		D		11/88	
ISS	REV	ISS	REV	ISS	REV
100	2	100	2	100	2
DATE	REV	DATE	REV	DATE	REV
11/88	2	11/88	2	11/88	2

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PRELIMINARY

APR 3 0 1979

WANG COMMUNICATIONS, INC.
 175 S. FORT ST.
 NEW YORK, N.Y. 10038

WANG COMMUNICATIONS, INC.		BY	DATE	APPROVED BY	DATE
MODEL NO.		DRN /		ENGR	
MATERIAL		CHK		ENGR	
FINISH				ENGR	
TITLE		7521 R1 PRELIMINARY			
NO. OF SHEETS		1			
DATE OF SHEET		7/79			
BY					
CHECKED BY					
DATE OF CHECK					
SCALE					

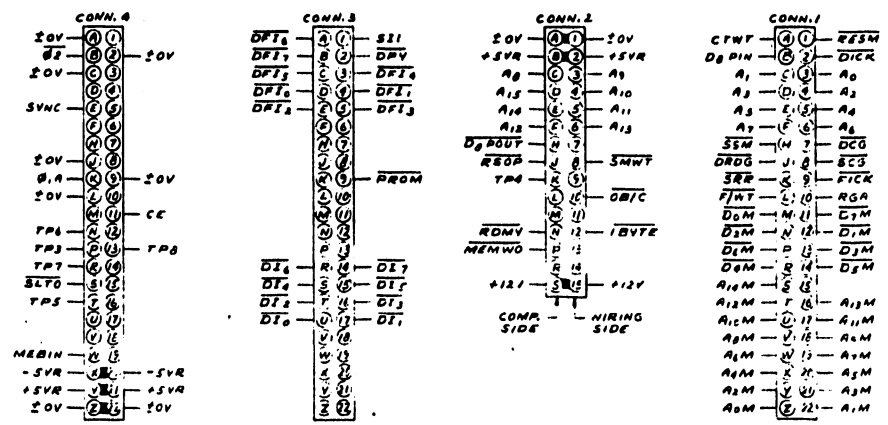
THE INFORMATION CONTAINED HEREIN IS UNCLASSIFIED EXCEPT WHERE SHOWN OTHERWISE. DATE 05-08-2001 BY 60322 UCBAW/STP

I.C. LOCATION	TYPE	W.L. NO.
L1,10	8266	376-0091
L2,19,30	74157	376-0082
L3,30,107	74161	376-0094
L4,21,31,50,57	74153	376-0080
L5-18,22-30,40-48,58-65	MK4116	SEE CHART
L31,04,35	7400	376-0022
L32	74500	376-0230
L33	74513B	376-0396
L34,34	74197	376-0093
L37	7483	376-0010
L49,52,76,88	7432	376-0093
L51,57	7402	376-3016
L52,73	7408	376-1181
L56,89,97,99,94,100	7474	376-0006
L67	74125	376-0324
L71,95	7427	376-0125
L72,74,82,83	7406	376-0010
L74	7411	376-0194
L75,82,94	74574	376-0202
L77	7442	376-0006
L78-81	74125	376-0324
L86	74155	376-0299
L90	74810	376-0230
L91	74804	376-0157
L93	74108	376-0171
L98-101	8708	377-0317
L102-105	74173	376-0153
L106	74808	376-0220
L-4-17,34,35,53	SPARES	
L5-13,22-30,40-48,58-65	16 PW SKY	376-0002 SEE CHART
L58-101	24 PW SKY	376-0003

I.C. LOCATION	TYPE	SPARES
L52	7432	2
L57	7402	2
L55		1
L73	7408	1
L55		3
L56	7474	1
L77	7427	2
L74	7411	1
L74	7411	1
L74	7411	1
L74	7411	1

W.L. NO.	DESCRIPTION	QTY
330-3022	12-11	1
330-1033	12-22	1
330-1097	12-18	1
330-1012	12-20	1
330-2012	12-42	1
330-2022	12-51	1
330-3010	12-52	1
300-4017	12-18	1
300-1930	12-63	1
300-4030	12-126	1
300-4030	12-132	1
300-4018	12-132	1
300-4018	12-133	1

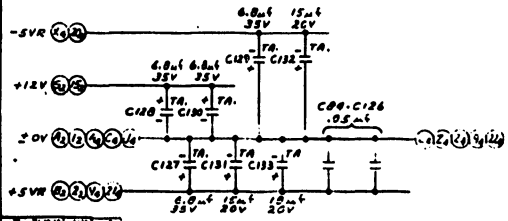
MNEMONIC	COORDINATE
A1-A15	106
A2M-A2M	1A10
A3M-A3M	1G3
CE	104
CTWT	3D11
D2M-D2M	2B11
D3M-D3M	2A8
D4M-D4M	2F11
D5M-D5M	2A9
DCB	JAS
DF1a-DF1a	2E11
DF2a-DF2a	2A10
DF3a	3B11
DF4	2D11
DRDG	3A10
FICK	3A9
FJMT	3B1
MEBIN	2C11
MEMWO	1D11
OBIC	1B11
FROM	1A7
RDV	1A9
RSM	1B11
RGA	1E11
RSDP	1A4
SCG	3A5
S2	2A8
SLTO	1G11
SMWT	3C11
SRR	1G11
SEM	3D11
SYNC	1C11
TP3	1G7
TP4	1G8
TP5	1G9
TP6	1E11
TP7	2C11
TP8	2D11
1A7E	1B11
0, A	1F11
02	1C11



SIGNAL-TERMINAL DESIGNATIONS, VIEW FROM BOTTOM (HIRING) SIDE OF CONNECTOR

LOADING CHART

	L5-L13	L22-L30	L40-L49	L58-L66
TS11	377-0345	377-0345	377-0345	377-0345
TS11-2	377-0345	377-0345	377-0345	377-0345
TS11-2A	377-0345	377-0345	377-0345	377-0345



PRELIMINARY

APR 3 0 1979

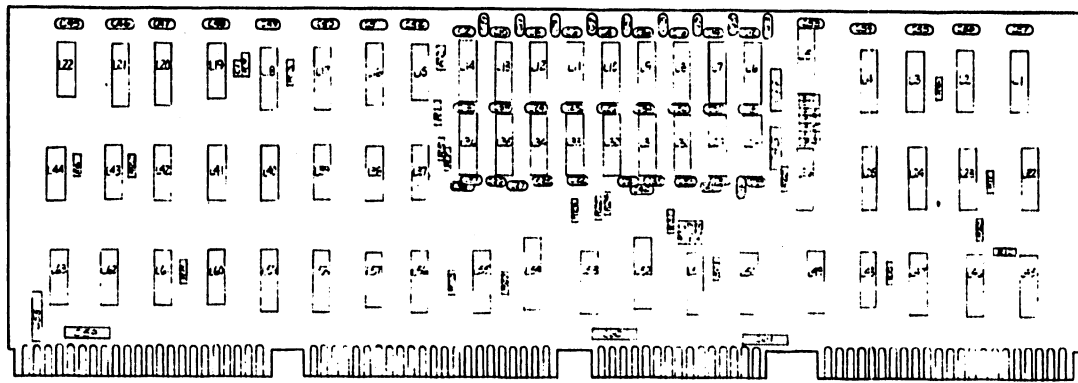
E-REV.
C

(WANG)	DATE	BY	DATE	APPROVED BY	DATE
	210-7511	2/27/79	ENG		
MODEL NO.	2	DATE	2/27/79	BY	ENG
DATE	2/27/79	BY	ENG		
210-7511 D 7511					

D 7511

A-10

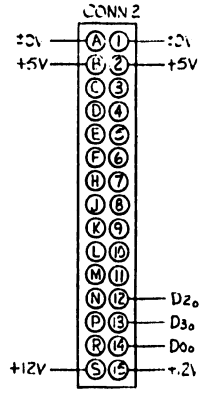
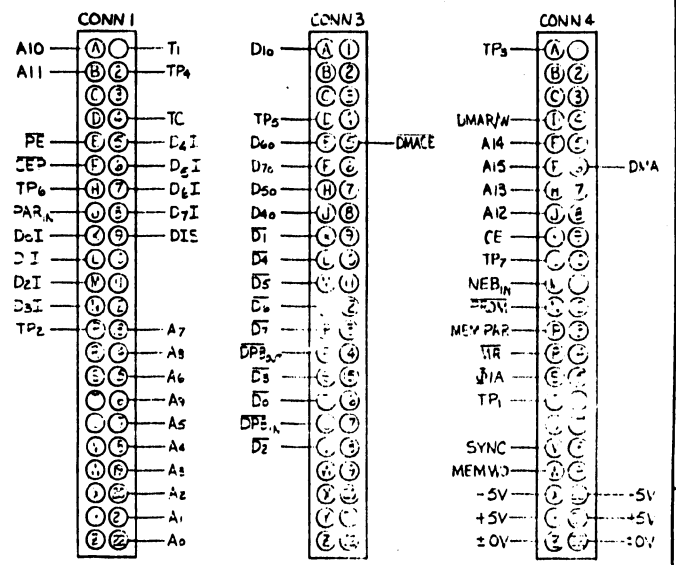
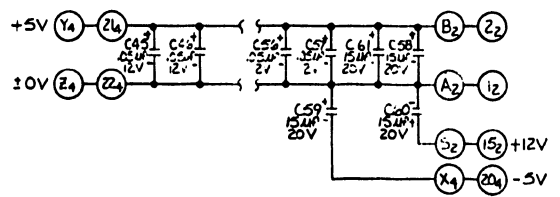
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
 DIMENSIONS ARE TO CENTER UNLESS OTHERWISE SPECIFIED.
 DIMENSIONS ARE TO CENTER UNLESS OTHERWISE SPECIFIED.
 DIMENSIONS ARE TO CENTER UNLESS OTHERWISE SPECIFIED.



COMPONENT	WL #1	TYPE
C1	300-5016	33PF, 50V, 500V
C2-42	300-1880	100PF, 50V
C43-57	300-1880	100PF, 50V
C58-61	300-4322	200PF, 50V (7)
C25-29	300-4017	50PF, 50V
R12, 17	330-1022-4B	22K, 1/4W
R13, 18	330-1022-4B	22K, 1/4W
R9	300-3045-4B	50K, 1/4W
R25-3	330-2015-4E	100K, 1/4W
L4-L14	SEE LEAD 16 CHART	200UH, 1/4W
R18-19	SEE LEAD 16 CHART	100K, 1/4W

LOCATION	WL PART NO.	TYPE
L37, 63	376-001-2	7402
L2	376-002	7402
L3, 63	376-003	7402
L41	376-0081	7405
L39	376-0030E	7405
L40	376-0004	7405
L5, 22	376-0098	7405
L16	376-0008	7402
L42, 44, 46, 48	376-0008	7402
L9	376-000E	7405
L57	376-0024	7405
L5, 26, 27	376-0048	7405
L125, 59	376-0082	7405
L23, 19, 23, 24	376-0094	7405
L49, 50, 53, 56	376-0110	74172
L45, 46, 51, 55	376-0119	74175
L52, 54	376-0297	740000
L6-14, L28-36	SEE LEAD 16 CHART	SPARES
L17, 20, 21, 47, 58		SPARES

MEMORIES	COORDINATE
A0-A15	2G1
A4, A5	2F11
CE	2E11
CEP	2A5
D0-D7	3C11
D0-D7D	3C1
DIS	3A5
DMA	3B11
DSPACE	2E11
DMA PIV	2F1
D0-D7	2D6
DPB IN	3C11
DPB OUT	3B11
MEM IN	3E1
MEM WD	2F11
MEM PAR	3E1
MR	2B11
PIA	2C11
PAR IN	3A5
PE	2A4
PRDM	2A10
TC	2A3
TI	2A6
SYNC	2B11



MODEL	209	210	211	212	213	214	215	216	217	218	219
BW 32K	7547	7547									33-16548
BW 32K	7547	7547									33-1748

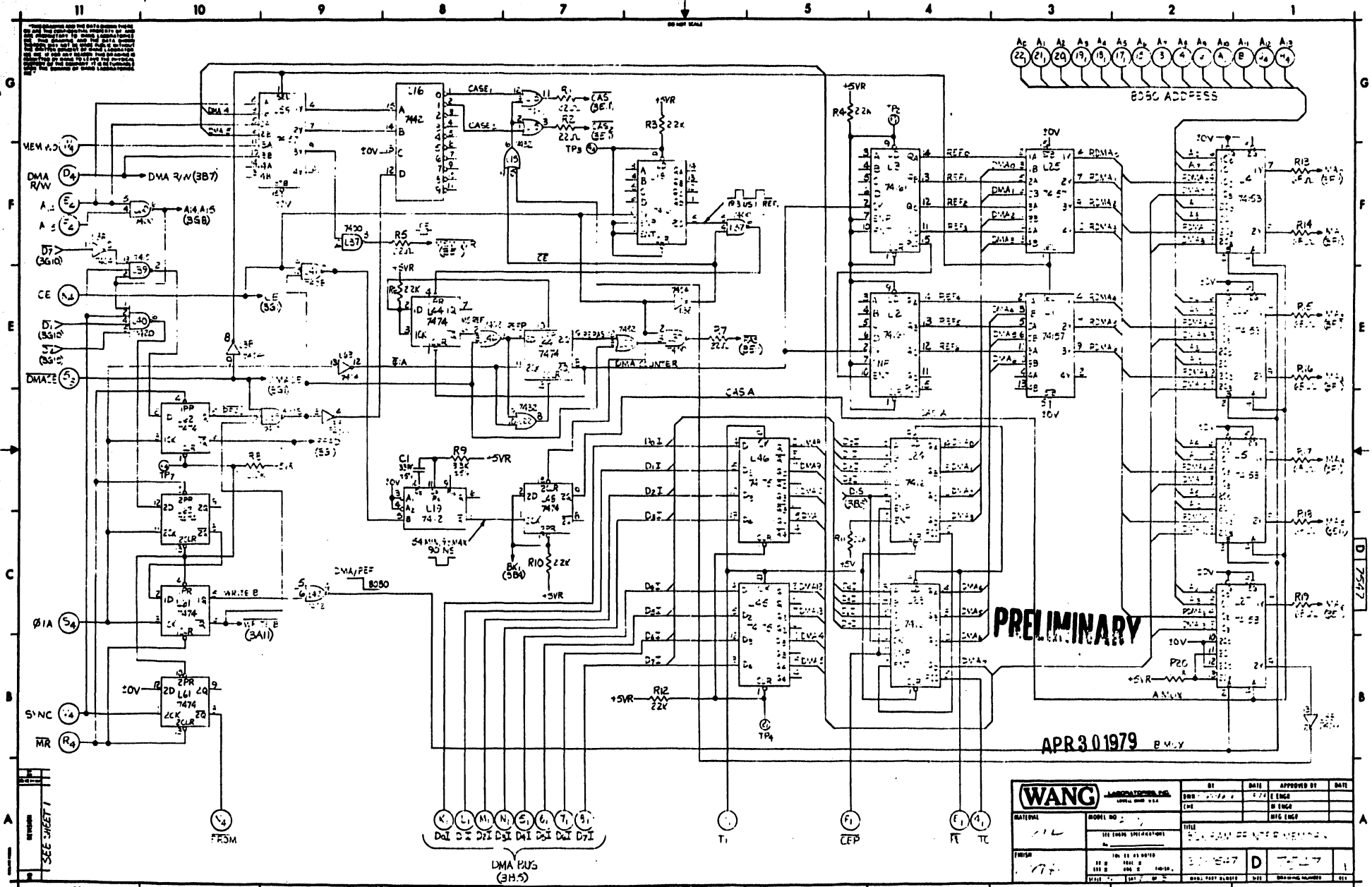
PRELIMINARY

EREV 7547
 EREV 7547

APR 30 1979

WANG INTERNATIONAL, INC.		BY	DATE	APPROVED BY	DATE
DRAWN BY: [Signature]		CHKD BY: [Signature]	DATE: 4/27/79	DATE: [Signature]	DATE: [Signature]
MATERIAL		TITLE		DATE	
[Signature]		32A RAM PRINTER MEMORY		4/27/79	
FORMS		DATE		DATE	
[Signature]		4/27/79		4/27/79	

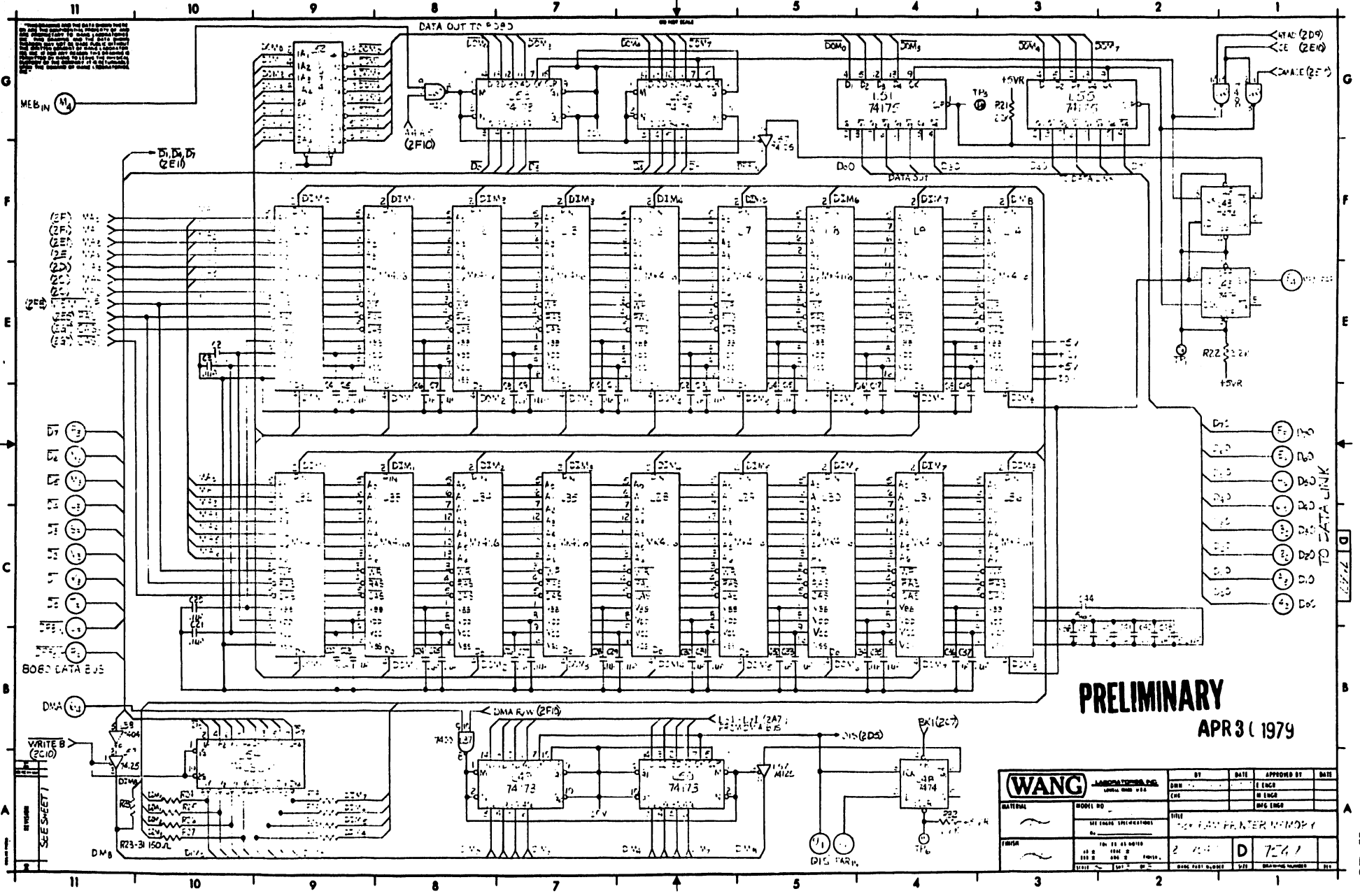
Check the schematic and the data sheets for the components used in this circuit. The components used in this circuit are listed in the parts list. The components used in this circuit are listed in the parts list. The components used in this circuit are listed in the parts list.



PRELIMINARY

APR 30 1979 B.M.V.

WANG LABORATORIES, INC. LITTLE ROCK, AR		BY	DATE	APPROVED BY	DATE
NATURAL	MODEL NO.	ENG	11/79	E. ENGA	
	SEE OTHER SPECIFICATIONS	CHK		D. ENGA	
		TITLE		DIG. ENGA	
		DMA BUS CONTROL LOGIC			
FRISK	REV. 10 23 1978	REV. 10 23 1978	D		
	100 B	1000 B			
	100 D	1000 D			
	1000 T	10000 T			
	10000 T	100000 T			



PRELIMINARY
APR 3 (1979)

WANG LANGUAGES, INC.		BY	DATE	APPROVED BY	DATE
MODEL NO.		DWG NO.	REV	DATE	BY
REVISIONS		TITLE			
1		DATA PAPER MINORITY			
2		D 7261			
3		PAGE 1 OF 1			



LABORATORIES, INC.

ONE INDUSTRIAL AVENUE, LOWELL, MASSACHUSETTS 01851. TEL. (617) 459-5000. TWX 710 343-6769. TELEX 94-7421

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END