



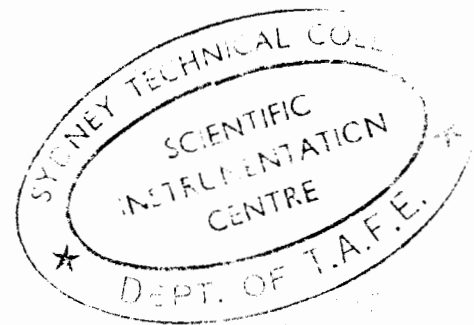
**HP 12966A**

**BUFFERED ASYNCHRONOUS**

**DATA COMMUNICATIONS INTERFACE**

**Installation and Reference Manual**

**Card Assembly: 12966-60001**  
**Date Code: 2216**



# PRINTING HISTORY

The Printing History below identifies the Edition of this Manual and any Updates that are included. Periodically, update packages are distributed which contain replacement pages to be merged into the manual, including an updated copy of this Printing History page. Also, the update may contain write-in instructions.

Each reprinting of this manual will incorporate all past updates; however, no new information will be added. Thus, the reprinted copy will be identical in content to prior printings of the same edition with its user-inserted update information. New editions of this manual will contain new information, as well as all updates.

To determine what manual edition and update is compatible with your current software revision code, refer to the appropriate Software Numbering Catalog, Software Product Catalog, or Diagnostic Configurator Manual.

First Edition ..... January 1979  
Update 1 ..... July 1982

## NOTICE

The information contained in this document is subject to change without notice.

HEWLETT-PACKARD MAKES NO WARRANTY OF ANY KIND WITH REGARD TO THIS MATERIAL, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Hewlett-Packard shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance or use of this material.

Hewlett-Packard assumes no responsibility for the use of its software on equipment that is not furnished by Hewlett-Packard.

This document contains proprietary information which is protected by copyright. All rights are reserved. No part of this document may be photocopied, reproduced or translated to another program language without the prior written consent of Hewlett-Packard Company.

**HP Computer Museum**  
**[www.hpmuseum.net](http://www.hpmuseum.net)**

**For research and education purposes only.**

# CONTENTS

Section		Page
I	INTRODUCING THE HP 12966A	
1-1.	Features .....	1-1
1-2.	Kit Contents .....	1-2
1-3.	Standard Version .....	1-2
1-4.	Option 001 .....	1-2
1-5.	Option 002 .....	1-2
1-6.	Option 003 .....	1-2
1-7.	Option 004 .....	1-2
1-8.	Option 005 .....	1-2
1-9.	System Configuration .....	1-2
1-10.	Specifications .....	1-3
II	PRINCIPLES OF OPERATION	
2-1.	Transmit Mode .....	2-2
2-2.	Receive Mode .....	2-2
2-3.	CPU — Device Interface Description .....	2-4
2-4.	CPU Interface .....	2-4
2-5.	Device Interface .....	2-4
III	PROGRAMMING	
3-1.	Software Interface Characteristics .....	3-1
3-2.	Word Formats .....	3-2
3-3.	CPU Output Word Format .....	3-2
3-4.	Transmit Data Word (Word 0) .....	3-2
3-5.	Enable Device Status Interrupt Word (Word 1) .....	3-3
3-6.	Device Status Reference Word (Word 2) .....	3-4
3-7.	Character Frame Control Word (Word 3) .....	3-5
3-8.	Interface Control Word (Word 4) .....	3-6
3-9.	Interrupt Status Reset Word (Word 5) .....	3-7
3-10.	Special Character Word (Word 6) .....	3-8
3-11.	CPU Input Word Format .....	3-8
3-12.	Received Data Word (Control Set) .....	3-9
3-13.	Status Word (Control Clear) .....	3-10
3-14.	Effects of I/O Instructions .....	3-11
3-15.	Master Reset .....	3-11
3-16.	Set Control (STC) Instruction .....	3-12
3-17.	Clear Control (CLC) Instruction .....	3-13
3-18.	Output A (OTA) Instruction .....	3-13
3-19.	Load Into A (LIA) Instruction .....	3-13
3-20.	Sample Program .....	3-13
IV	INSTALLATION AND SERVICING	
4-1.	Unpacking and Inspection .....	4-1
4-2.	Preparation for Use .....	4-1
4-3.	Baud Rate Jumpers .....	4-1

# CONTENTS (continued)

Section		Page
4-4.	Installation .....	4-1
4-5.	Printed Circuit Assembly .....	4-1
4-6.	Cable Installation .....	4-2
4-7.	Performance Test .....	4-3
4-8.	Driver Configuration/Installation .....	4-3
4-9.	Servicing .....	4-3
V	DIAGRAMS	
5-1.	Introduction .....	5-1
VI	REPLACEABLE PARTS	
6-1.	Introduction .....	6-1
6-2.	Replaceable Parts .....	6-1
6-3.	Ordering Information .....	6-1
VII	INDEX	

# ILLUSTRATIONS

Title	Page
System Configuration Block Diagram .....	1-3
Data Transfer and Control Words .....	2-1
Transmit Mode Data Transfer .....	2-3
Receive Mode Data Transfer .....	2-3
Sample Program Flowchart .....	3-14
Sample Program Listing .....	3-17
Baud Rate Jumper Instructions .....	4-2
HP 12966A Buffered Asynchronous Data Communications Interface Assembly Diagram .....	5-2
HP 12966A Buffered Asynchronous Data Communications Interface Block Diagram .....	5-3
HP 12966A Buffered Asynchronous Data Communications Interface Schematic Diagram .....	5-5
HP 12966A Buffered Asynchronous Data Communications Interface Timing Diagram .....	5-11

Title	Page
Specifications .....	1-3
Transmit Data Word (Word 0) .....	3-2
Enable Device Status Interrupt Word (Word 1) .....	3-2
Device Status Reference Word (Word 2) .....	3-4
Character Frame Control Word (Word 3) .....	3-5
Interface Control Word (Word 4) .....	3-6
Interrupt Status Reset Word (Word 5) .....	3-7
Special Character Word (Word 6) .....	3-8
Receive Data Word .....	3-9
Status Word .....	3-10
Jumper Connections for Baud Transfer Rates .....	4-2
Interface Cable (HP 2600 and HP 2615 Terminals), part no. 12966-60004, Wire List .....	4-4
Interface Cable (HP 264X Terminal), part no. 12966-60008, Wire List .....	4-5
Interface Cable (Modem), part no. 12966-60006, Wire List .....	4-6
Interface Cable (HP 2749B Teleprinter), part no. 12966-60007, Wire List .....	4-7
Interface Cable (HP 2621 Terminal), part no. 12966-60010, Wire List .....	4-8
Interface Cable (HP 7221A Plotter), part no. 12966-60011, Wire List .....	4-9
Interface Cable (HP 264X Terminal to HP 7221A Plotter), part no. 12966-60012, Wire List .....	4-10
Replaceable Parts .....	6-2



**3-9. Interrupt Status Reset Word (Word 5)**

Word 5 permits the software driver to individually clear the source(s) of an interrupt. Once a condition on the interface results in an interrupt, the interrupt will remain until it is cleared by a specific bit in Word 5, even if the causal condition may no longer be present. The format of Word 5 is as follows:

15	14	12	11	6	5	4	3	2	1	0	
MAST RST	1	0	1	NOT USED		CLR SPEC CHAR	CLR BUFF HALF	CLR BUFF FULL	CLR BUFF EMPY	CLR BRK	CLR OVR PE

**Interrupt Status Reset Word (Word 5)**

BIT	DESIGNATION	DESCRIPTION
0	Clear Overrun/Parity Error Status Flag	"0" = do not clear the flag. "1" = clear the flag.
1	Clear Break Status Flag	"0" = do not clear the flag. "1" = clear the flag.
2	Clear Buffer Empty Status Flag	"0" = do not clear the flag. "1" = clear the flag.
3	Clear Buffer Full Status Flag	"0" = do not clear the flag. "1" = clear the flag.
4	Clear Buffer Half-Full Status Flag	"0" = do not clear the flag. "1" = clear the flag.
5	Clear Special Character Status Flag	"0" = do not clear the flag. "1" = clear the flag.
12 - 14	Word Type	Bits are set to octal "5" to specify the Interrupt Status Reset Word (Word 5).
15	Master Reset	"0" = do not execute master reset. "1" = execute master reset.

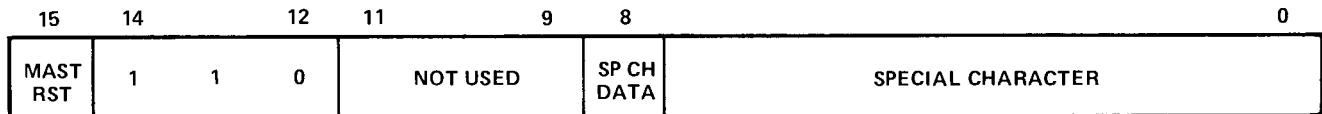


### 3-10. Special Character Word (Word 6)

Word 6 adds or removes the designated character from the special character list. If a designated special character is received while the interface is in the receive mode, an interrupt is generated. The card must be in Transmit Mode to alter the contents of the Special Character RAM.

Note: Every character must be either cleared or identified as a special character at interface initialization.

The format of Word 6 is as follows:



#### Special Character Word (Word 6)

BIT	DESIGNATION	DESCRIPTION
0 - 7	Special Character	This is the character which is to be added, or removed, from the special character list.
8	Special Character Data	"0" = the character in bits 0 thru 7 is not a special character; remove from list.  "1" = the character in bits 0 thru 7 is a special character; add to list.
12 - 14	Word Type	Bits are set to an octal "6" to specify the Special Character Word (Word 6).
15	Master Reset	"0" = do not execute master reset.  "1" = execute master reset.

### 3-11. CPU Input Word Format

Information transfer from the interface to the CPU is implemented with two words. The Received Data Word is available whenever the Control FF is set, and the Status Word is available whenever the Control FF is clear. The interface formats these two words, and the formats are described below.

## 5-1. INTRODUCTION

This section provides the component location, block, schematic and timing diagrams to aid in verifying the operational status of the hardware. This assembly is not field repairable, if a hardware problem exists, call the nearest Hewlett-Packard Sales and Service Office to arrange for a board exchange.



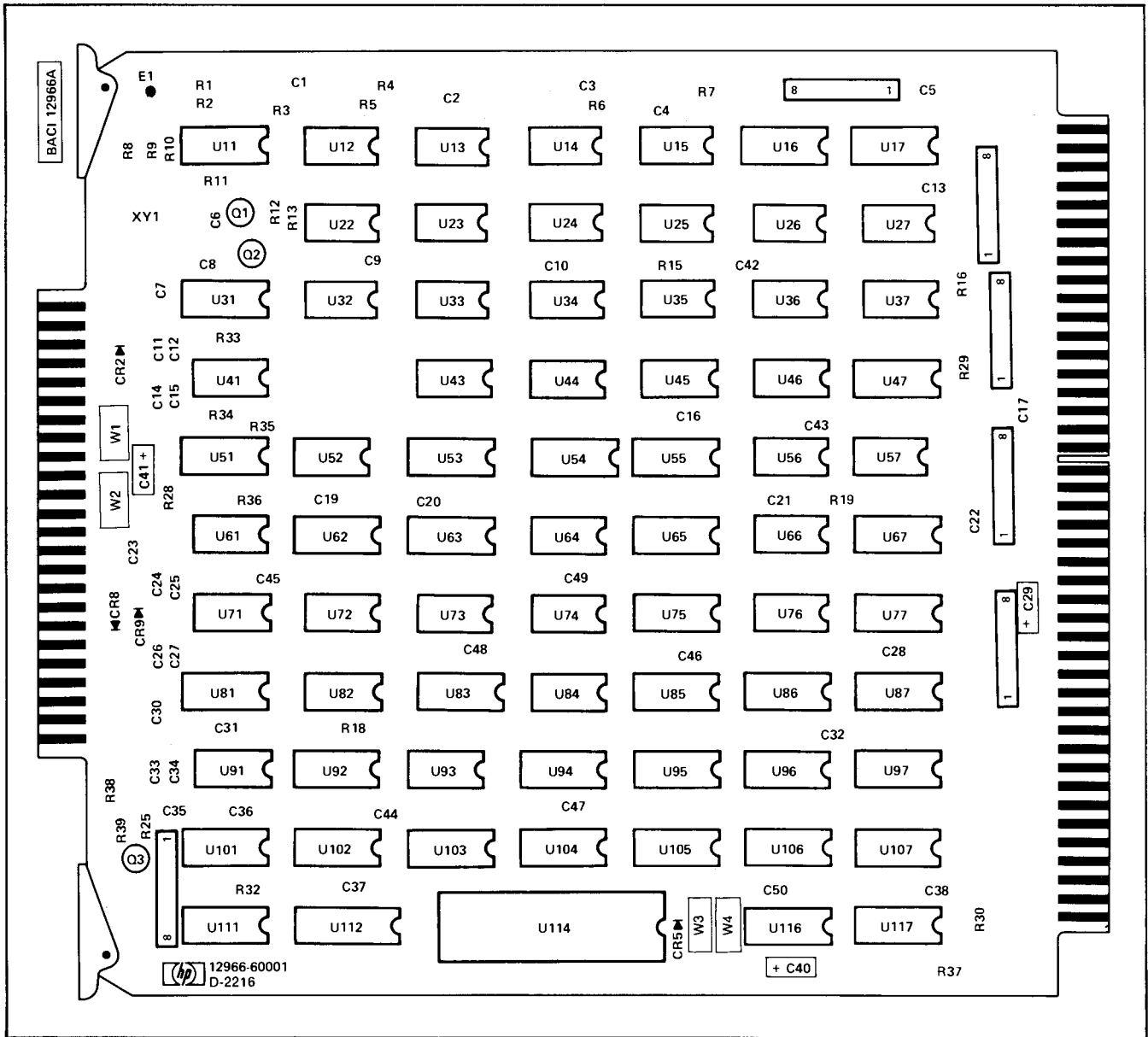


Figure 5-1. HP 12966A Buffered Asynchronous Data Communications Interface Assembly Diagram

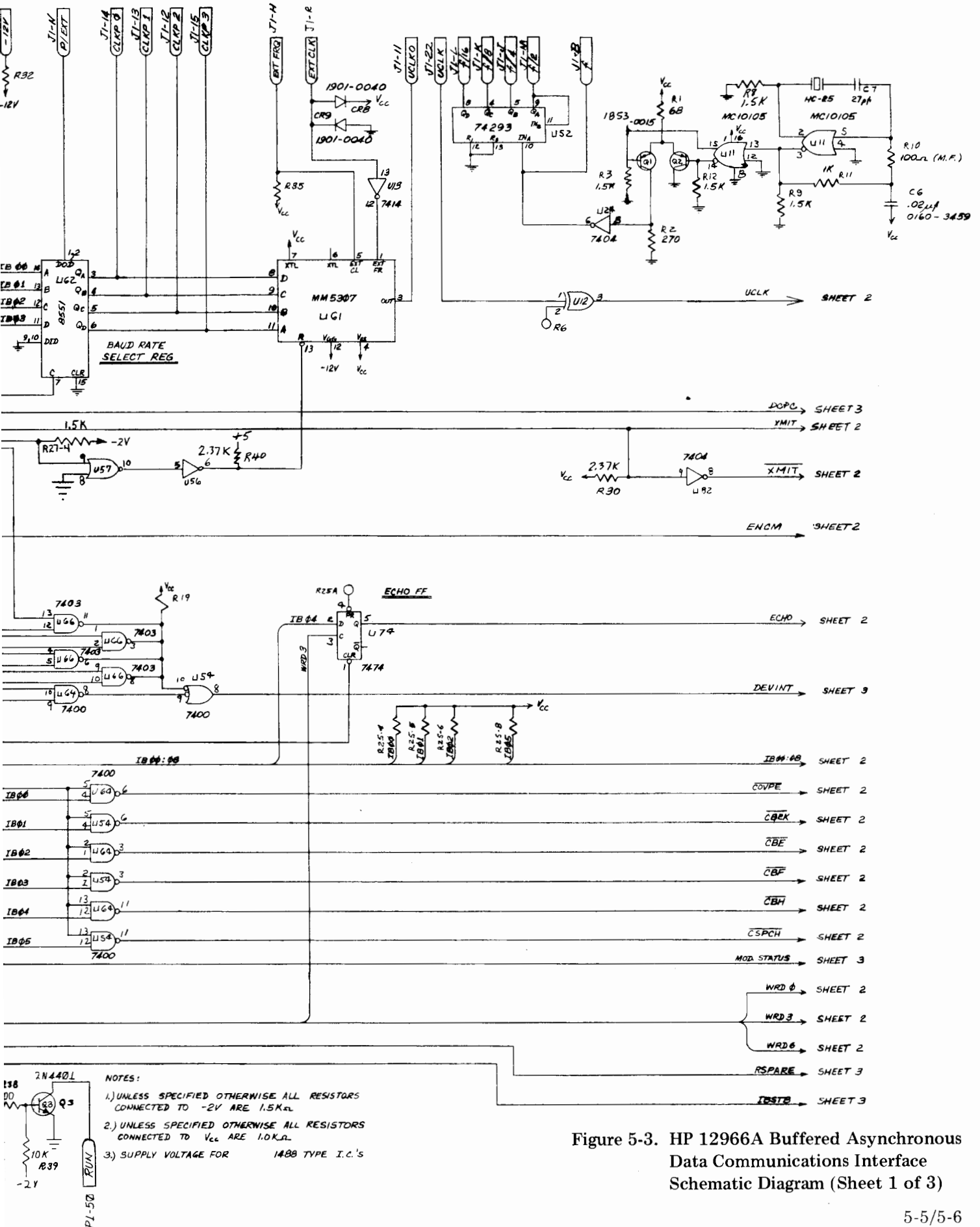


Figure 5-3. HP 12966A Buffered Asynchronous Data Communications Interface Schematic Diagram (Sheet 1 of 3)



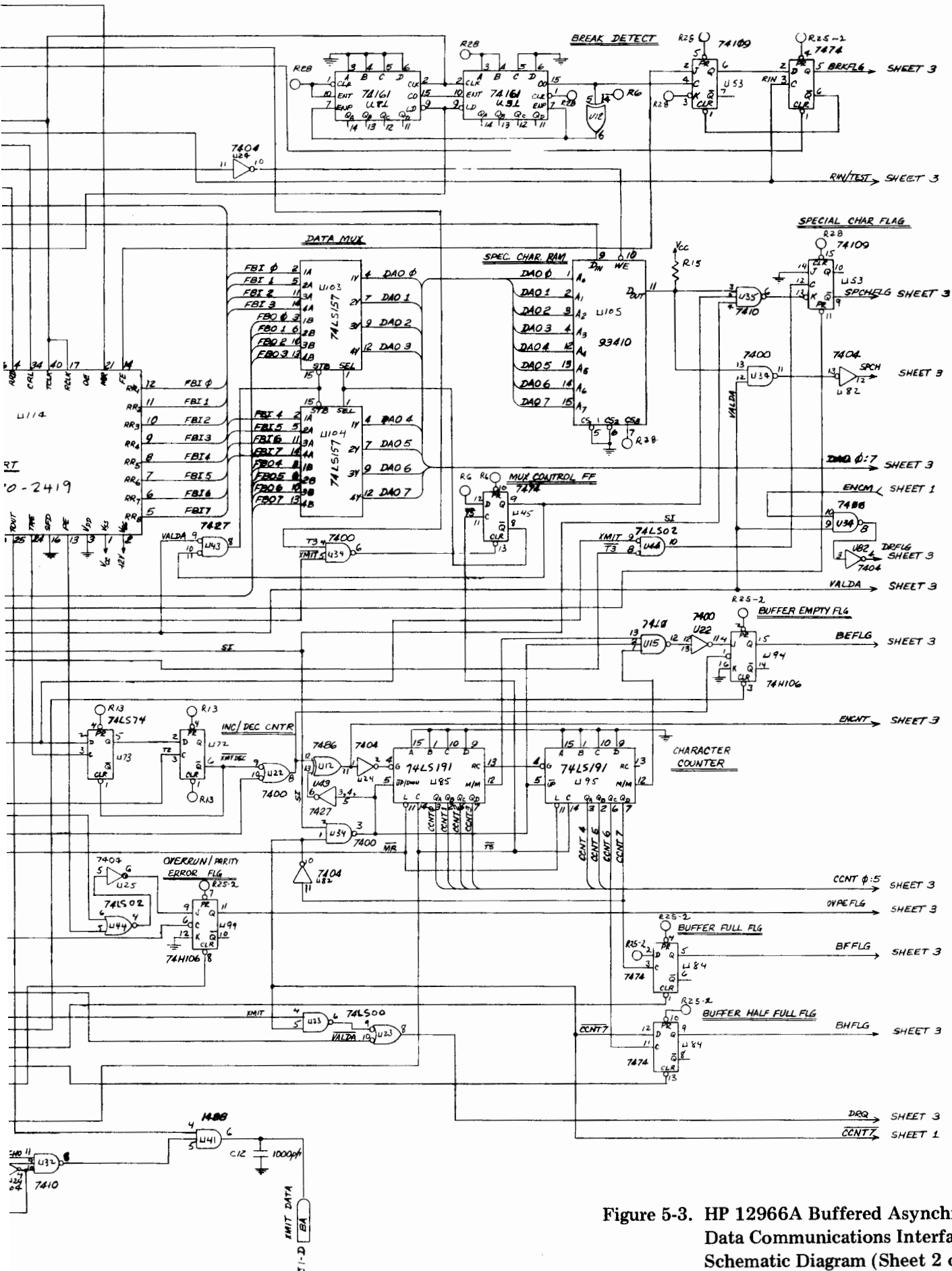
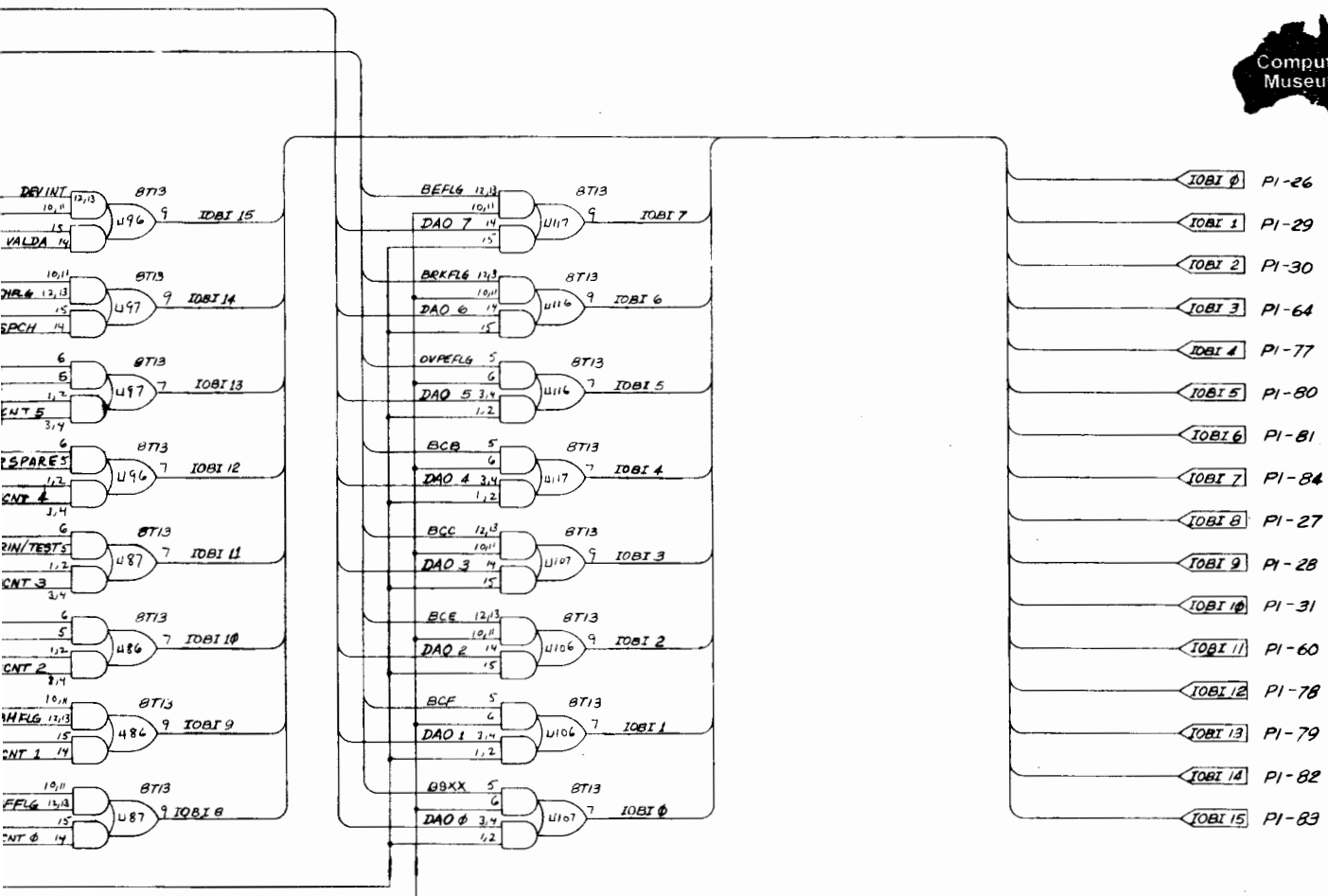


Figure 5-3. HP 12966A Buffered Asynchronous Data Communications Interface Schematic Diagram (Sheet 2 of 3)





IOOG → SHEET 1  
RDATA → SHEET 2

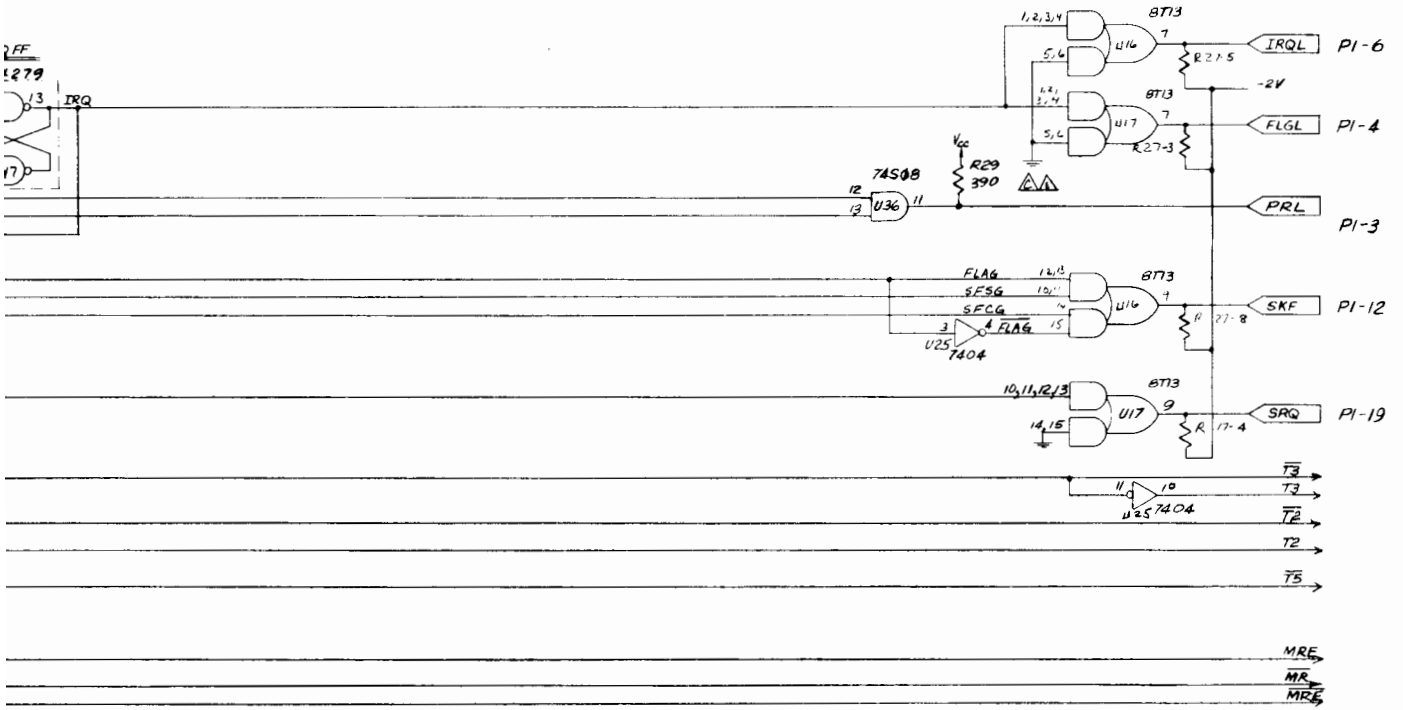
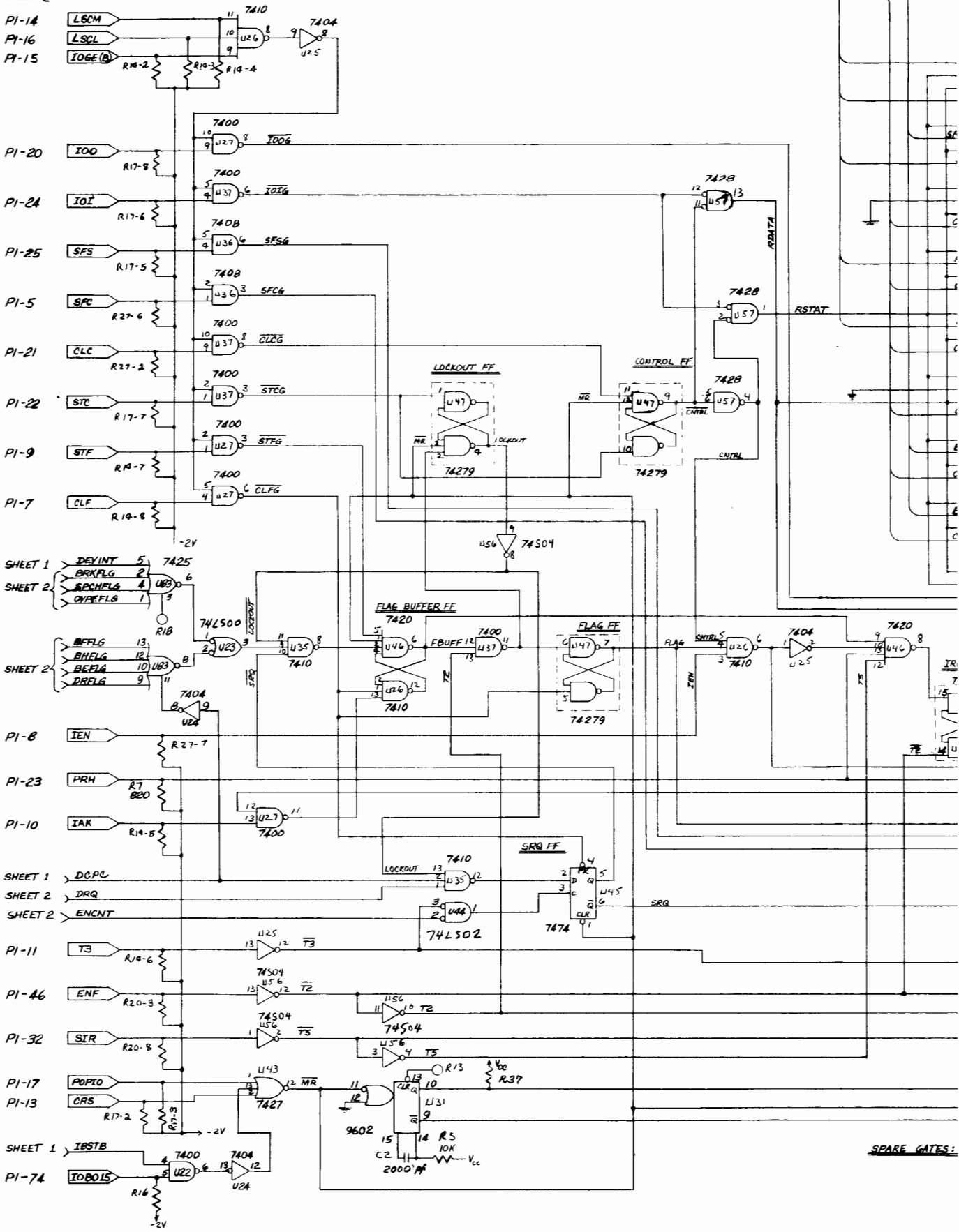


Figure 5-3. HP 12966A Buffered Asynchronous Data Communications Interface Schematic Diagram (Sheet 3 of 3)



SHEET 2 > DAQ 0:7  
 MOD STATUS, OVPFLG, BRKFLG, BFLG, BHFLG, BEFLG, SPCHFLG  
 SHEET 1,2 >  
 SHEET 1,2 > VALDA, SPCH, SPARE, RIN/TEST, DEVINT  
 SHEET 2 > CCNT 0:5



# REPLACEABLE PARTS

SECTION

VI



## 6-1. INTRODUCTION

This chapter contains information for ordering replaceable parts for the HP 12966A assembly. Table 6-1 gives a list of replaceable parts, while table 6-2 cross references the names and address of manufacturers indexed by code number in table 6-1.

## 6-2. REPLACEABLE PARTS

Table 6-1 contains a list of replaceable parts in reference designation order. The following information is listed for each part:

1. Reference designation of the part.
2. The Hewlett-Packard part number.
3. Part number check digit (CD).
4. Total quantity.
5. Description of the part.
6. A five-digit manufacturer's code number of a typical manufacturer of the part. Refer to table 6-2 for a cross reference of manufacturers.
7. The manufacturer's part number.

## 6-3. ORDERING INFORMATION

To order replacement parts or to obtain information on parts, address the order or inquiry to the local Hewlett-Packard Sales and Service Office (Sales and Service Offices are listed at the back of this manual).

To order a part, quote the Hewlett-Packard part number (with the check digit), and indicate the quantity required. The check digit will insure accurate and timely processing of your order.

**Table 6-1. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
DEA1	12966-60001	5	1	BUFFER ASYNCHRONOUS IF BOARD ASSEMBLY	28480	12966-60001
C2	0160-3457	7	1	CAPACITOR-FXD 2000PF +-10% 250VDC CER	28480	0160-3457
C3	0160-2055	9	27	CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
C4	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
C5	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
C6	0160-3459	9	1	CAPACITOR-FXD .02UF +-20% 100VDC CER	28480	0160-3459
C7	0160-2366	3	1	CAPACITOR-FXD 27PF +-5% 300VDC MICA	28480	0160-2366
C8	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
C9	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
C10	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
C11	0160-3456	6	4	CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
C12	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
C13	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
C14	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
C15	0160-3456	6		CAPACITOR-FXD 1000PF +-10% 1KVDC CER	28480	0160-3456
C16	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
C17	0180-0374	3	1	CAPACITOR-FXD 10UF+-10% 20VDC TA	56289	150D106X9020B2
C19	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
C20	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
C21	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
C22	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
C23	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
C24	0160-3455	5	2	CAPACITOR-FXD 470PF +-10% 1KVDC CER	28480	0160-3455
C25	0160-5107	8	6	CAPACITOR-FXD 2.2UF +-20% 50VDC CER	28480	0160-5107
C26	0160-3455	5		CAPACITOR-FXD 470PF +-10% 1KVDC CER	28480	0160-3455
C27	0160-5107	8		CAPACITOR-FXD 2.2UF +-20% 50VDC CER	28480	0160-5107
C28	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
C29	0180-0197	8	3	CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
C30	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
C31	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
C32	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
C33	0160-5107	8		CAPACITOR-FXD 2.2UF +-20% 50VDC CER	28480	0160-5107
C34	0160-5107	8		CAPACITOR-FXD 2.2UF +-20% 50VDC CER	28480	0160-5107
C35	0160-5107	8		CAPACITOR-FXD 2.2UF +-20% 50VDC CER	28480	0160-5107
C36	0160-5107	8		CAPACITOR-FXD 2.2UF +-20% 50VDC CER	28480	0160-5107
C37	0160-0127	2	1	CAPACITOR-FXD 1UF +-20% 25VDC CER	28480	0160-0127
C38	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
C40	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
C41	0180-0197	8		CAPACITOR-FXD 2.2UF+-10% 20VDC TA	56289	150D225X9020A2
C42	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
C43	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
C44	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
C45	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
C46	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
C47	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
C48	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
C49	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
C50	0160-2055	9		CAPACITOR-FXD .01UF +80-20% 100VDC CER	28480	0160-2055
CR2	1901-0029	6	2	DIODE-PWR RECT 600V 750MA DO-29	28480	1901-0029
CR5	1901-0029	6		DIODE-PWR RECT 600V 750MA DO-29	28480	1901-0029
CR8	1901-0040	1	2	DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
CR9	1901-0040	1		DIODE-SWITCHING 30V 50MA 2NS DO-35	28480	1901-0040
Q1	1853-0015	7	2	TRANSISTOR PNP SI PD=200MW FT=500MHZ	28480	1853-0015
Q2	1853-0015	7		TRANSISTOR PNP SI PD=200MW FT=500MHZ	28480	1853-0015
Q3	1854-0467	5	1	TRANSISTOR NPN 2N4401 SI TO-92 PD=310MW	0350B	2N4401
R1	0757-0397	3	1	RESISTOR 68.1 1% .125W F TC=0+-100	24546	C4-1/8-T0-68R1-F
R2	0683-2715	6	1	RESISTOR 270 5% .25W FC TC=-400/+600	01121	CR2715
R3	0757-1094	9	5	RESISTOR 1.47K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1471-F
R4	0757-0438	3	1	RESISTOR 5.11K 1% .125W F TC=0+-100	24546	C4-1/8-T0-5111-F
R5	0757-0442	9	2	RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
R6	0757-0280	3	11	RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
R7	0683-8215	3	1	RESISTOR 820 5% .25W FC TC=-400/+600	01121	CR8215
R8	0757-1094	9		RESISTOR 1.47K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1471-F
R9	0757-1094	9		RESISTOR 1.47K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1471-F
R10	0757-0401	0	2	RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-101-F
R11	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
R12	0757-1094	9		RESISTOR 1.47K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1471-F
R13	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
R14	1810-0020	4	5	NETWORK-RES 8-SIP1.5K OHM X 7	28480	1810-0020
R15	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
R16	0757-1094	9		RESISTOR 1.47K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1471-F
R17	1810-0020	4		NETWORK-RES 8-SIP1.5K OHM X 7	28480	1810-0020
R18	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
R19	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
R20	1810-0020	4		NETWORK-RES 8-SIP1.5K OHM X 7	28480	1810-0020

**Table 6-1. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
R21	1810-0020	4		NETWORK-RES 8-SIP1.5K OHM X 7	28480	1810-0020
R25	1810-0030	6	1	NETWORK-RES 8-SIP1.0K OHM X 7	28480	1810-0030
R27	1810-0020	4		NETWORK-RES 8-SIP1.5K OHM X 7	28480	1810-0020
R28	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
R29	0683-3915	0	1	RESISTOR 390 5% .25W FC TC=-400/+600	01121	CR3915
R30	0698-3150	6	3	RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
R32	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
R33	0757-0416	7	1	RESISTOR 511 1% .125W F TC=0+-100	24546	C4-1/8-T0-511R-F
R34	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
R35	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
R36	0757-0280	3		RESISTOR 1K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
R37	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
R38	0757-0401	0		RESISTOR 100 1% .125W F TC=0+-100	24546	C4-1/8-T0-1001-F
R39	0757-0442	9		RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-T0-1002-F
R40	0698-3150	6		RESISTOR 2.37K 1% .125W F TC=0+-100	24546	C4-1/8-T0-2371-F
U11	1820-0803	2	1	IC GATE ECL OR-NOR TPL	04713	MC10105P
U12	1820-0202	1	2	IC GATE TTL EXCL-OR QUAD 2-INP	01295	SN7486N
U13	1820-1053	6	1	IC SCHMITT-TRIG TTL INV HEX	01295	SN7414N
U14	1820-0077	2	6	IC FF TTL D-TYPE POS-EDGE-TRIG CLEAR	01295	SN7474N
U15	1820-1202	7	1	IC GATE TTL LS NAND TPL 3-INP	01295	SN74LS10N
U16	1820-1080	9	10	IC DRVR TTL LINE DRVR DUAL 6-INP	01295	SN75121N SELECTED
U17	1820-1080	9		IC DRVR TTL LINE DRVR DUAL 6-INP	01295	SN75121N SELECTED
U22	1820-0054	5	7	IC GATE TTL NAND QUAD 2-INP	01295	SN7400N
U23	1820-1197	9	1	IC GATE TTL LS NAND QUAD 2-INP	01295	SN74LS00N
U24	1820-0174	0	3	IC INV TTL HEX	01295	SN7404N
U25	1820-0174	0		IC INV TTL HEX	01295	SN7404N
U26	1820-0068	1	3	IC GATE TTL NAND TPL 3-INP	01295	SN7410N
U27	1820-0054	5		IC GATE TTL NAND QUAD 2-INP	01295	SN7400N
U31	1820-0515	3	1	IC MV TTL MONOSTBL RETRIG/RESET DUAL	04713	MC8602P
U32	1820-0068	1		IC GATE TTL NAND TPL 3-INP	01295	SN7410N
U33	1820-0054	5		IC GATE TTL NAND QUAD 2-INP	01295	SN7400N
U34	1820-0054	5		IC GATE TTL NAND QUAD 2-INP	01295	SN7400N
U35	1820-0068	1		IC GATE TTL NAND TPL 3-INP	01295	SN7410N
U36	1820-1367	5	1	IC GATE TTL S AND QUAD 2-INP	01295	SN74S08N
U37	1820-0054	5		IC GATE TTL NAND QUAD 2-INP	01295	SN7400N
U41	1820-0509	5	1	IC DRVR DTL LINE DRVR QUAD	04713	MC1488L
U43	1820-0782	6	1	IC GATE TTL NOR TPL 3-INP	01295	SN7427N
U44	1820-0328	6	1	IC GATE TTL NOR QUAD 2-INP	01295	SN7402N
U45	1820-0077	2		IC FF TTL D-TYPE POS-EDGE-TRIG CLEAR	01295	SN7474N
U46	1820-0069	2	1	IC GATE TTL NAND DUAL 4-INP	01295	SN7420N
U47	1820-1089	8	1	IC LCH TTL QUAD	01295	SN74279N
U51	1820-0716	6	2	IC CNTR TTL BIN SYNCHRO POS-EDGE-TRIG	01295	SN74161N
U52	1820-1264	1	1	IC CNTR TTL BIN ASYNCHRO NEG-EDGE-TRIG	01295	SN74293N
U53	1820-1116	2	1	IC FF TTL J-K BAR POS-EDGE-TRIG	01295	SN74109N
U54	1820-0054	5		IC GATE TTL NAND QUAD 2-INP	01295	SN7400N
U55	1820-0788	2	3	IC FF TTL D-TYPE POS-EDGE-TRIG CLEAR HEX	01295	SN74174N
U56	1820-0683	6	1	IC INV TTL S HEX 1-INP	01295	SN74S04N
U57	1820-1184	4	1	IC BFR TTL NOR QUAD 2-INP	01295	SN7428N
U61	1820-1348	2	1	IC GEN PHOS	27014	HM5307N
U62	1820-0574	4	1	IC RCTR TTL D-TYPE 4-BIT	01295	SN74173N
U63	1820-0788	2		IC FF TTL D-TYPE POS-EDGE-TRIG CLEAR HEX	01295	SN74174N
U64	1820-0054	5		IC GATE TTL NAND QUAD 2-INP	01295	SN7400N
U65	1820-1196	8	2	IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS174N
U66	1820-0269	4	1	IC GATE TTL NAND QUAD 2-INP	01295	SN7403N
U67	1820-0833	8	1	IC LCH TTL COM CLEAR 8-BIT	07263	9334PC
U71	1820-0990	8	2	IC RCVR DTL NAND LINE QUAD	01295	SN75189AJ
U72	1820-0077	2		IC FF TTL D-TYPE POS-EDGE-TRIG CLEAR	01295	SN7474N
U73	1820-1112	8	1	IC FF TTL LS D-TYPE POS-EDGE-TRIG	01295	SN74LS74AN
U74	1820-0077	2		IC FF TTL D-TYPE POS-EDGE-TRIG CLEAR	01295	SN7474N
U75	1820-1196	8		IC FF TTL LS D-TYPE POS-EDGE-TRIG COM	01295	SN74LS174N
U76	1820-0282	1		IC GATE TTL EXCL-OR QUAD 2-INP	01295	SN7486N
U77	1820-0788	2		IC FF TTL D-TYPE POS-EDGE-TRIG CLEAR HEX	01295	SN74174N
U81	1820-0716	6		IC CNTR TTL BIN SYNCHRO POS-EDGE-TRIG	01295	SN74161N
U82	1820-0174	0		IC INV TTL HEX	01295	SN7404N
U83	1820-0655	2	1	IC GATE TTL NOR DUAL 4-INP	01295	SN7425N
U84	1820-0077	2		IC FF TTL D-TYPE POS-EDGE-TRIG CLEAR	01295	SN7474N
U85	1820-0545	9	2	IC CNTR TTL BIN UP/DOWN SYNCHRO	01295	SN74191N
U86	1820-1080	9		IC DRVR TTL LINE DRVR DUAL 6-INP	01295	SN75121N SELECTED
U87	1820-1080	9		IC DRVR TTL LINE DRVR DUAL 6-INP	01295	SN75121N SELECTED
U91	1820-0990	8		IC RCVR DTL NAND LINE QUAD	01295	SN75189AJ
U92	1816-1536	1	4	IC-FIFO SC67401	28480	1816-1536
U93	1820-0077	2		IC FF TTL D-TYPE POS-EDGE-TRIG CLEAR	01295	SN7474N
U94	1820-0715	5	1	IC FF TTL H J-K NEG-EDGE-TRIG	01295	SN74H106N
U95	1820-0545	9		IC CNTR TTL BIN UP/DOWN SYNCHRO	01295	SN74191N
U96	1820-1080	9		IC DRVR TTL LINE DRVR DUAL 6-INP	01295	SN75121N SELECTED

See introduction to this section for ordering information  
 \*Indicates factory selected value

**Table 6-1. Replaceable Parts**

Reference Designation	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
U97	1820-1080	9		IC DRVR TTL LINE DRVR DUAL 6-INP	01295	SN75121N SELECTED
U101	1816-1536	1		IC-FIFO SC67401	28480	1816-1536
U102	1816-1536	1		IC-FIFO SC67401	28480	1816-1536
U103	1820-1470	1	2	IC MIXR/DATA-SEL TTL LS 2-TO-1-LINE QUAD	01295	SN74LS157N
U104	1820-1470	1		IC MIXR/DATA-SEL TTL LS 2-TO-1-LINE QUAD	01295	SN74LS157N
U105	1820-0988	4	1	IC TTL 256-BIT STAT RAM 60-NS 0-C	07263	93410DC
U106	1820-1080	9		IC DRVR TTL LINE DRVR DUAL 6-INP	01295	SN75121N SELECTED
U107	1820-1080	9		IC DRVR TTL LINE DRVR DUAL 6-INP	01295	SN75121N SELECTED
U111	1816-1536	1		IC-FIFO SC67401	28480	1816-1536
U112	1820-0755	3	1	IC DRVR TTL OCTL	28480	1820-0755
U114	1820-2419	0	1	IC UART PMOS	52840	TR1863A
U116	1820-1080	9		IC DRVR TTL LINE DRVR DUAL 6-INP	01295	SN75121N SELECTED
U117	1820-1080	9		IC DRVR TTL LINE DRVR DUAL 6-INP	01295	SN75121N SELECTED
W1	8159-0005	0	4	RESISTOR-ZERO OHMS 22 AWG LEAD DIA	28480	8159-0005
W2	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	28480	8159-0005
W3	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	28480	8159-0005
W4	8159-0005	0		RESISTOR-ZERO OHMS 22 AWG LEAD DIA	28480	8159-0005
XY1	1200-0546	6	1	SOCKET-XTAL 2-CONT HC-25/U DIP-SLDR	28480	1200-0546
Y1	0410-0587	9	1	CRYSTAL- 7.373 MHZ	28480	0410-0587
MISCELLANEOUS PARTS						
	0360-0294	0	2	TERMINAL-STUD SGL-TWR SWGRM-MTG	28480	0360-0294
	1480-0116	8	2	PIN-GRV .042-IN-DIA .25-IN-LG STL	28480	1480-0116
	1810-0072	6	1	NETWORK-RES 8-SIP2.37K OHM X 7	28480	1810-0072
	1820-1144	6	1	IC GATE TTL LS NOR QUAD 2-INP	01295	SN74LS02N
	1820-1278	7	2	IC CNTR TTL LS BIN UP/DOWN SYNCHRO	01295	SN74LS191N
	5040-6001	4	1	EXTRACTOR-P.C BOARD	28480	5040-6001
	5040-6065	0	1	EXTRACTOR-P.C. BOARD (RED)	28480	5040-6065

See introduction to this section for ordering information  
 \*Indicates factory selected value

**Table 6-2. Manufacturer's Code List**

MFR NO.	MANUFACTUER NAME	ADDRESS		ZIP CODE
01121	ALLEN-BRADLEY CO	MILWAUKEE	WI	53204
01295	TEXAS INSTR INC SEMICOND CMPNT DIV	DALLAS	TX	75222
03508	GE CO SEMICONDUCTOR PROD DEPT	AUBURN	NY	13201
04713	MOTOROLA SEMICONDUCTOR PRODUCTS	PHOENIX	AZ	85008
07263	FAIRCHILD SEMICONDUCTOR DIV	MOUNTAIN VIEW	CA	94042
24546	CORNING GLASS WORKS (BRADFORD)	BRADFORD	PA	16701
27014	NATIONAL SEMICONDUCTOR CORP	SANTA CLARA	CA	95051
28480	HEWLETT-PACKARD CO CORP HQ	PALO ALTO	CA	94304
52840	WESTERN DIGITAL CORP	NEWPORT BEACH	CA	92626
56289	SPRAGUE ELECTRIC CO	NORTH ADAMS	MA	01247