



VX4802
Programmable Digital I/O Module
Service Manual

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Table of Contents

Section 1	
Introduction	1
Section 2	
Adjustment and Calibration	3
Section 3	
Assembly And Disassembly	5
Section 4	
Parts List	7

VX4802

Programmable Digital I/O Module

Section 1

Introduction

The VX4802 Programmable Digital I/O Module provides 80 TTL- or CMOS-compatible bidirectional digital I/O lines. The 80 programmable I/O signal lines are organized as ten 8-bit bytes.

Each of the ten bytes can be independently configured under full program control. All commands and responses are in ASCII hex notation for ease of programming, and to insure compatibility with the widest range of systems controllers. Program controlled parameters include:

- ▶ selection of any byte as either input or output,
- ▶ definition of masks for input and output data,
- ▶ control on command basis or on external handshake,
- ▶ logic sense of input, output, and handshake lines, and
- ▶ full reporting of operating parameters at any time.

The data output can be controlled as bits, as individual bytes, and as groups of bytes. Output is controlled on a command basis, or on a qualified basis using external handshakes.

Data input is also fully under program control. The module can report the state of all input bytes, groups of input and/or output bytes, and single bits of a byte. Input data can be updated on a command request basis, or on a qualified basis using external handshakes.

User-defined masks can be overlaid on the data prior to output. Masks may also be applied to individual input bytes before they are returned to the system controller to improve data post-processing speed and ease of data interpretation.

The sense of inputs, outputs, and handshake lines can be set to either active high or active low under program control. The active edge can also be programmed for handshake lines. All I/O lines are both TTL- and CMOS-compatible, with up to 24 mA of sink current provided for each output.

External (handshake) control signals are provided for output and input data control. Output data control signals are Ready For Data (RFD), Data Available (DAV), and External Tri-State control (ETS0, ETS5 - ETS9). Input data control signals are Data Ready (DRD) and Data Acknowledge (DAK).

The VX4802 provides full access to system status information, which is especially helpful during system trouble-shooting, software de-bugging, and operational system checks. At any time, the system controller can read the state of the external handshake lines, the programmed I/O configuration, the programmed active edges of all handshake signals, which handshake signals are active, the programmed logic sense of each I/O byte, the tri-state condition of each output byte, and up-to-date error data.

Built-in-Test-Equipment (BITE) is provided by an internal loop-back path that allows the module to be tested with its outputs tri-stated, verifying I/O paths for each byte. A self test is automatically performed on power-up, and can also be commanded. Front panel LEDs indicate the status of power, assertion of the VMEbus signal SYSFAIL*, backplane cycles, data handshake signals, and individual I/O bits. In addition, the Query command can be used to determine the current state of the module during operation.

Refer to the Operating Manual for information on programming the module.

Section 2

Adjustment and Calibration

The module is fully calibrated and adjusted before shipment.

Section 2

Section 3

Assembly And Disassembly

The VX4802 is shipped fully assembled. A schematic diagram that may also be used as a reference is included with this manual.

Section 3

Section 4 Parts List

The following lists give the name and part number for all field replaceable parts of the VX4802. To order replacement parts, call your Tektronix representative.

SERVICE MANUAL

VX4802

DIGITAL IO MODULE

REFERENCE DESIGNATOR	CDS PART NUMBER	QTY.	PART DESCRIPTION	MFG. NUM.	MFG. PART NUMBER
	96000-00015	1	1 IN WHT FRONT AND SPINE VXI BUS MANUAL	0546	96000-00015
FOR USE WITH S40	42050-12671	1	SWITCH CAP WHITE FOR 8125A	0024	8018-1
FOR USE WITH S4,S5	45008-20418	4	SCREW LOCK ASSEMBLY FOR D CONNECTOR	0108	D-20418-2
C00,02,03,04,07,08,11,1111,1141 1161,1251,1281,13,1391,1411,1441 1481,1521,1531,1561,1591,17,21 29,30,32,41,53,57,63,74,76,77,79 81,90	20128-10006	36	CAP FXD CER .1UF 20% 50VDCW	0058	C322C104M5U5CA
C031,1091,1191,1192,1392,1511 1592,1393	22022-22008	8	CAP FXD TA 22UF 10-20% 35WVDC	0106	199D226X0035EE2
C1171	22022-22007	1	CAP FXD TA 2.2UF 10-20% 16-25VDCW	0106	199D225X9016AA1
C35,55	21528-10002	2	CAP FXD MICA 10PF 5% 100VDCW	0012	DM15-100D
CR1491	32000-04001	1	DIODE SILICON 50V 1A 5%	0357	1N4001
CR89	32000-04148	1	DIODE SILICON 75V 1A 5%	0078	1N4148
DCL1	40408-14802	1	LABEL VX4802 DRW 03322 REV 910	0026	40408-14802
DCL2	40409-14802	1	LABEL VX4802 DRW 03307 REV 910	0026	40409-14802
DS001	32000-03120	1	DIODE LED BI-LEVEL RED GRN 15 MA WITH RES	0039	553-0312
DS002,101,102,103,201,202,203 301,302,303,401	32000-03220	11	DIODE LED BI-LEVEL GRN GRN 15 MA WITH RES	0039	553-0322
E40,43,51,54	92301-00440	4	SCREW PHIL PNHD 4-40X5-16 BRITIZINC	0137	4-40X5-16 PHIL PNH
E41,44,48,49,52,55	92302-00440	6	WASHER STAR NUMBER 4 INTERNAL ZINC	0137	4 IN STAR WASH ZIN
E42,45,50,53,56	92303-00440	5	HEX MACHINE NUT 4-40 ZINC	0137	HEX MACH NUT 4-40
E46	47000-74065	1	BRACKET 73A FRONT PANEL CENTER DRW 01676 REV 890	0026	47000-74065

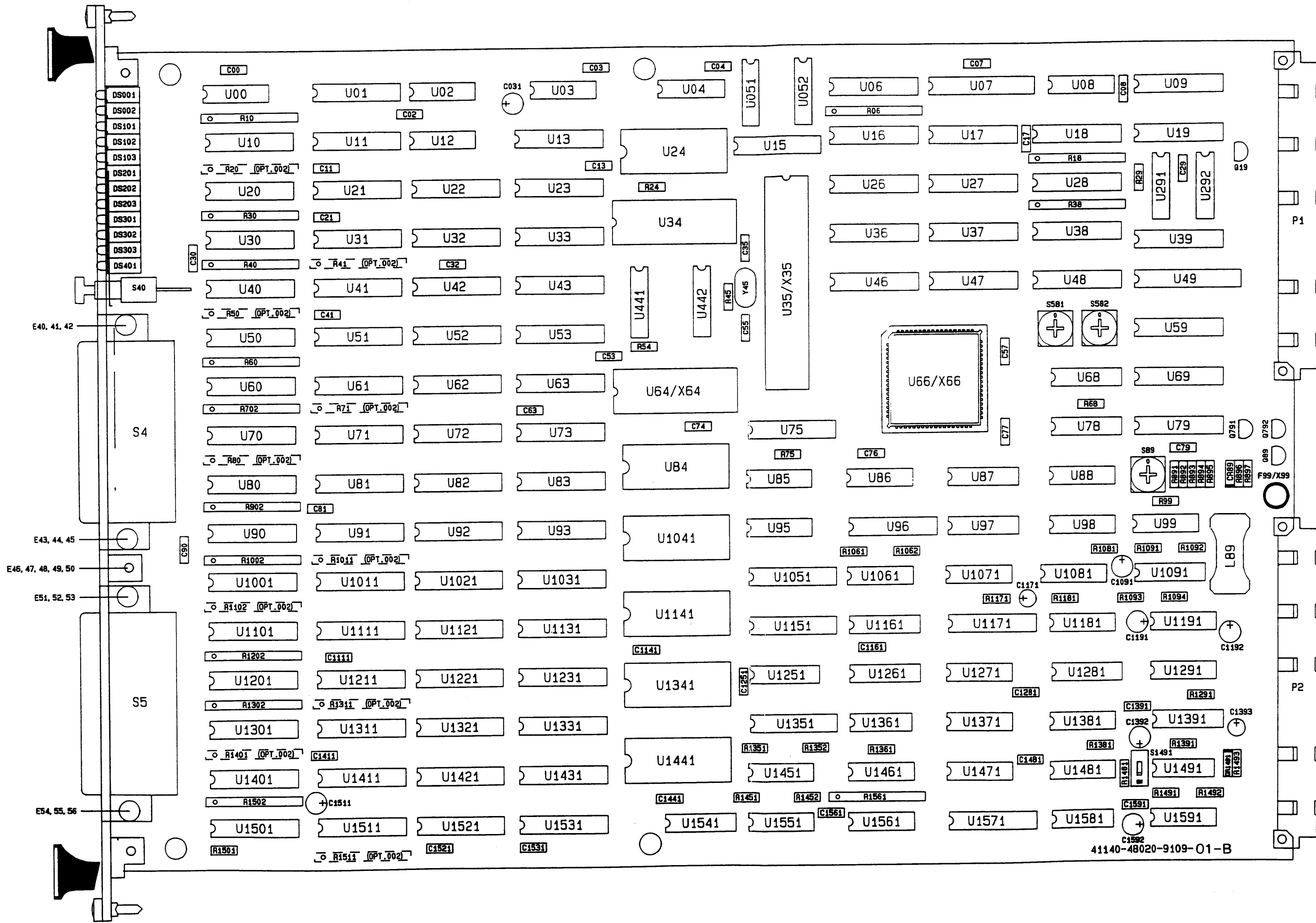
REFERENCE DESIGNATOR	CDS PART NUMBER	QTY.	PART DESCRIPTION	MFG. NUM.	MFG. PART NUMBER
E47	92301-10440	1	SCREW PHIL PNHD 4-40 X .1875 BRITE ZINC	0137	4-40X3-16 PHIL PMH
F99	42202-73040	1	FUSE MICRO 4AMP 125V FAST PLUG IN CLEAR CAP	0061	273 004
FP1	47006-14802	1	FACE PLATE VX4802 DRW 02358 REV 910	0026	47006-14802
FP10,11	92505-25005	2	WASHER WAVY 2.7MM	0026	92505-25005
FP12,13	92501-25010	2	SCREW M2.5X10 CHEESEHEAD	0026	92501-25010
FP18,20	92500-25011	2	COLLAR SCREW M 2.5 X 11 SL NICKEL	0266	21100-379
FP19,21	92510-00464	2	SLEEVE CAPTIVE SCREW GRAY	0266	21100-464
FP2,22,4,8	40406-00140	1	EJECTOR HANDLE C-TOP VX1400	0266	20817-328
FP23,3,5,9	40406-00141	1	EJECTOR HANDLE C-BOTTOM VX1400	0266	20817-327
FP6,7	92500-25005	2	SCREW 2.5MM PHIL CSK 5MM	0026	92500-25005
L89	27051-50007	1	INDUCTOR 5 UH 5A .015 OHMS 50MHZ FR	0037	IHA-501
P1,2	45003-09600	2	CONNECTOR DIN 96 PIN MALE RT ANGLE SOLDER	0265	10-8457-096-002097
PCB1	41140-48020	1	P.C. BOARD VERSION 6L 9109	0498	41140-48020
Q19,791	51100-00300	2	TRANSISTOR VMOS N-FET	0102	VN0300L
Q792,89	51100-03906	2	TRANSISTOR PNP SWITCHING	0107	2N3906
R06,18,38	12008-33004	3	3.3K RES NETWORK SIP 5% 1.5W 9-PKG	0027	750-101-R3.3K
R10,1002,1202,1302,1502,1561,30 40,60,702,902	12008-22005	11	22K RES NETWORK SIP 5% 1.5W 9-PKG	0027	750-101-R22K
R1061,1062,1171,896,897	10117-10005	5	10K RES COMP 1-4W 5%	0087	R25J-10K-5%
R1081,1093,1391,24,29,54,75	10117-18005	7	18K RES COMP 1-4W 5%	0087	R25J-18K-5%
R1091,1092,1094,1181,1291,1381 1491,99	10117-10004	8	1K RES COMP 1-4W 5%	0087	R25J-1K-5%
R1351,1352,1361,1451,1452,1501	10117-22005	6	22K RES COMP 1-4W 5%	0087	R25J-22K-5%

REFERENCE DESIGNATOR	CDS PART NUMBER	QTY.	PART DESCRIPTION	MFG. NUM.	MFG. PART NUMBER
R1481,1493,68,891,892,893	10117-47004	6	4.7K RES COMP 1-4W 5%	0087	R25J-4.7K-5%
R1492	14024-82503	1	825 OHM RES FILM 1-4W 1% 100PPM	0069	RN55D8250F
R45	10117-10007	1	1M RES COMP 1-4W 5%	0087	R25J-1M-5%
R894,895	10117-33004	2	3.3K RES COMP 1-4W 5%	0087	R25J-3.3K-5%
S1491	42050-10101	1	SWITCH DIP 1POS SPST	0093	JS-8794-01
S4,5	45008-50004	2	RT ANGLE DD-50 SOCKET PC MOUNT	0193	147-1150S-02-4338
S40	42050-12672	1	SWITCH MOM SPDT PC BRD VERT MT	0024	8125AV2
S581,582	42050-10301	2	SWITCH DIP ROTARY HEX	0007	DRW-16C
S89	42050-10300	1	SWITCH DIP ROTARY BCD ENCODED	0007	DRW-10C
SH1	47007-14802	1	SHEILD FRONT VX4802 DRW 02658 REV 910	0026	47007-14802
SH10,11,13,14,17,2,20,31,4,5,7,8	92500-25010	12	SCREW M 2.5 X 10 CSK OVAL PHIL NIK PL	0266	21100-500
SH12,3,6,9	92519-25019	4	STANDOFF HEX M2.5 X 19.5MM DRW 01801 REV 900	0026	92519-25019
SH15,18,21,33	92201-19451	4	STANDOFF HEX M2.5 THRU X .538L DRW 01673 REV 920	0026	92201-19451
SH16,19,30,34	92500-25017	4	SCREW 2.5MM X 16MM 90 DEG CSK FLHD PHIL STAINLS	0420	DIN965M2.5X16
SH22	47007-74002	1	SHIELD BACK CONN MTG CONFIG -01816 REV 9207	0026	47007-74002
SH23,24,25,26,27,28,29,32	92519-25004	8	REAR SHIELD SPACER 73A DRW 01807 REV 890	0212	19501-A-0029
U00,12,95	73303-07404	3	IC HCMOS HEX INVERTER	0107	74HC04
U01,15,1571,96	77825-74832	4	IC TTL ALS HEX 2-INPUT OR DRIVER	0107	74ALS832
U02	73306-07404	1	IC TTL AS HEX INVERTER	0107	74AS04
U03	76603-07410	1	IC TTL AS 3-INPUT NAND GATE	0107	74AS10
U04	76500-07420	1	IC TTL LS DUAL 4-INPUT NAND GATE	0107	74LS20

REFERENCE DESIGNATOR	CDS PART NUMBER	QTY.	PART DESCRIPTION	MFG. NUM.	MFG. PART NUMBER
U051,052,1191,1471,86	76510-07411	5	IC TTL ALS TRIPLE 3-INPUT AND GATE	0107	74ALS11
U06,13,1331,1351,37,73	73005-74273	6	IC HCT OCTAL D-TYPE FLIP FLOP W RESET	0088	74HCT273N
U07	79814-00439	1	PAL PROGRAMMED 5AC312 REV A 73A-SUPER 8	0000	
U08,292	77203-07430	2	IC TTL ALS 8-INPUT NAND GATE	0107	74ALS30
U09,19	73308-74645	2	IC TTL ALS OCTAL BUS TRANSCEIVER	0107	74ALS645-1
U10,1001,1201,1301,1501,30,40,60,70,90	73400-74245	10	IC AHCT OCTAL BUS TRANSCEIVER	0078	74ACT245
U1011,11,1101,1111,1131,1211,1231,1311,1401,1411,1431,1511,1531,17,18,20,21,23,31,33,41,50,51,53,61,63,71,80,81,83,91,93	73005-74574	32	IC HCT OCTAL TRISTATE LATCH NON-INVERT	0107	74HCT574
U1021,1121,1221,1321,1421,1521,22,32,42,52,62,82,92	73003-74573	13	IC TTL ALS OCTAL D-TYPE EDGE TRIG FLIP-FLOP	0107	74ALS573
U1031	73000-74273	1	IC TTL OCTAL D-TYPE FLIP-FLOP	0107	74273
U1041,1141,1441,84	79000-09311	4	IC TTL 1-OF-16 DIGITAL DECODER	0107	9311 OR 74154
U1051,1151,1171	77203-74808	3	IC TTL ALS HEX 2-INPUT NOR DRIVER	0107	74ALS808
U1061	76603-07400	1	IC TTL AS 2-INPUT NAND GATE	0107	74AS00
U1071,1271	73304-07474	2	IC HCMOS DUAL D-TYPE FLIP-FLOP	0107	74HC74
U1081,1291,1381,1591	73005-07474	4	IC HCT DUAL D-TYPE FLIP FLOP	0092	74HCT74N
U1091,1391	74200-09602	2	IC TTL DUAL RETRIGGERABLE MONOSTABLE	0078	9602
U1161	71202-74161	1	IC TTL SYNCHRONOUS BINARY 4-BIT COUNTER	0078	74161A NAT ONLY
U1181,1461,1551,1561	76606-07400	4	IC HCT QUAD 2-INPUT NAND GATE	0088	74HCT00
U1251,1541	73005-74174	2	IC HCT HEX D-TYPE FLIP-FLOP	0088	74HCT174
U1261	73000-74174	1	IC TTL HEX D-TYPE FLIP-FLOP	0107	74174

REFERENCE DESIGNATOR	CDS PART NUMBER	QTY.	PART DESCRIPTION	MFG. NUM.	MFG. PART NUMBER
U1281,97	79911-74157	2	IC TTL LS QUAD 2-TO-1 LINE DATA SEL-MUX	0107	74LS157
U1341,24	79004-74150	2	IC TTL 1-OF-16 DATA SELECTOR-MUX	0107	74150
U1361,1581	73300-74126	2	QUAD BUFFER WITH TRI-STATE	0107	SN74LS126A
U1371,1451,1481,85	77816-07486	4	IC HCT QUAD EXCLUSIVE OR	0107	74HCT86
U1491	78403-07414	1	IC HCT HEX SCHMITT INVERTING BUFFER	0088	74HCT14
U16	73308-74245	1	IC TTL ALS OCTAL BUS TRANSCEIVER	0107	74ALS245
U26,36	73309-74244	2	IC HCT OCTAL BUFFER NON-INVERTING	0107	74HCT244
U27	76603-74645	1	IC TTL AS OCTAL BUS TRANSCEIVER	0107	74AS645
U28	73003-74574	1	IC TTL ALS OC TRI LATCH NON INV TI ONLY	0107	74ALS574
U291	76602-07438	1	IC TTL S QUAD 2-INPUT NAND BUFFER W-OC	0107	74S38
U34	79805-06264	1	IC CMOS 8K X 8 SRAM 150NS	0401	HY6264LP-10
U35	79825-88002	1	IC SUPER 8 CPU ROMLESS 20 MHZ	0117	Z08800A20PSC
U38,39,79,46	73308-74246	4	IC TTL ALS OCTAL BUFFER NON INV 48MA IOL	0107	SN74ALS244A-N
U43	73606-74574	1	IC TTL AS OCTAL TRI-STATE LATCH	0107	74AS574
U441,68	79008-74138	2	IC HCT 3-TO-8 LINE DECDR DEMULTIPLEXER	0107	74HCT138
U442	79008-74238	1	IC HCT 3-TO-8 LINE DECDR DEMULTIPLEXER	0107	74HCT238
U47	73006-74573	1	IC TTL AS OCTAL D-TYPE LATCH	0107	74AS573
U48	79814-00374	1	PAL PROGRAMMED C16L8 REV A 73A-332	0000	
U49	79814-00368	1	PAL PROGRAMMED 20L8 REV B 73A-332	0000	

REFERENCE DESIGNATOR	CDS PART NUMBER	QTY.	PART DESCRIPTION	MFG. NUM.	MFG. PART NUMBER
U59	71701-74682	1	IC TTL LS 8-BIT COMPARATOR	0107	74LS682
U64	79813-00246	1	PROGRAMMED PROM U64 VX4812	0000	
U66	79814-00467	1	PAL PROGRAMMED EP1810 REV A	0000	
U69	73313-74760	1	IC TTL AS OCTAL BUFFER NON-INV	0107	74AS760
U72	73003-74563	1	IC TTL ALS OCTAL LATCH WITH 3T INVERTING	0107	74ALS563
U75	79814-00350	1	PAL PROGRAMMED 18P8 REV B 73A-411	0000	
U78,87	73001-07431	2	IC LS DELAY ELEMENT	0107	74LS31
U88	77825-07432	1	IC TTL ALS QUAD 2-INPUT OR GATE	0107	74ALS32
U98	76510-07410	1	IC TTL ALS TRIPLE 3-INPUT NAND GATE	0107	74ALS10
U99	77203-07408	1	IC TTL ALS QUAD 2-INPUT AND GATE	0107	74ALS08
X35	45010-48100	1	SOCKET 48-PIN DIP	0089	ICN-486-S5-G
X64	45012-28128	1	SOCKET 28-PIN DIP MACHINED	0089	ICA-286-S-TG30
X66	45010-80186	1	SOCKET 68 PIN PLCC	0243	QILE68P-410T
X99	42300-28105	1	FUSE SOCKET MICRO VERTICAL .025 LEADS .1 CNT	0061	281 005
Y45	89500-20000	1	CRYSTAL 20.000 MHZ 50 PPM	0062	MP-1 20.000



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