



VX4521
Advanced Resource Manager
Service Manual

07/28/92

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Tektronix

WARRANTY

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W A R N I N G

These servicing instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so.

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VX4521

Advanced Resource Manager

Section 1

Introduction

The VX4521 Advanced Resource Manager Module is a printed circuit board assembly for use in the slot 0 position of a mainframe conforming to the VXIbus Specification, such as the VX1400 C size mainframe used in the Tektronix IAC System. It conforms to the VXIbus System Specification for a Resource Manager, Slot 0 Device, and IEEE-488 Interface Device for a C size module. The VX4521 performs three functions critical to the proper operation of a VXIbus system:

- 1) it is the VMEbus system controller required by the VMEbus Specification;
- 2) it provides both the VXIbus Resource Manager and Slot 0 functions required by the VXIbus Specification;
- 3) it acts as the communications interface between the station computer and the VXIbus chassis (VX1400 Mainframe) using the IEEE-488 General Purpose Interface Bus.

The VX4521 also has extensive trigger control capabilities. Under user control, the trigger control circuitry can:

- ▶ transparently pass trigger signals from one trigger line to another,
- ▶ route trigger signals to and from the front panel external trigger spigots,
- ▶ generate trigger events,
- ▶ force the synchronization of an output trigger event to the rising edge of the VXIbus CLK10 signal,
- ▶ convert an input trigger event to a single output signal of a different pulse width,
- ▶ convert a single input trigger event to a delayed output signal or a pulse train of variable frequency, with each output pulse 200 ns wide, and
- ▶ convert a single input trigger event into a continuous square wave of variable frequency.

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

Section 1

Section 2 Adjustment and Calibration

No adjustment or calibration is required for this maodule.

Section 2

Section 3

Assembly And Disassembly

The VX4521 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 VX4521. To order replacement parts, call your Tektronics representative.

SERVICE MANUAL

VX4521

ENHANCED SLOT 0-RESOURCE MAN

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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 S60	42050-12674	1	SWITCH CAP FOR SMALL RED	0024	7089-3
C001,052,1452,1492,1493,501,701 703,891	20128-10005	9	CAP FXD CER .01UF 20% 50VDCW	0106	1C2525U103M050B
C002,602	22022-10007	2	CAP FXD TA 1UF 10-20% 16-35DWC	0106	199D105X0025AA1
C04,06,10,1001,1011,1031,1041 1091,11,1161,1171,1191,12,1201 1221,1231,1251,13,1321,1381,1401 1441,1461,1481,1491,16,17,19,20 24,32,33,35,39,402,41,43,44,48 502,52,55,57,603,71,72,74,782,80 82,87,981,992	20128-10006	53	CAP FXD CER .1UF 20% 50VDCW	0058	C322C104M5U5CA
C051,1451,601,892,991,993	22020-10009	6	CAP FXD TA 100UF 20% 6-10VDCW	0106	199D107X96R3DA1
C401	20128-10004	1	CAP FXD CER .001UF 10% STABLE 100VDCW	0058	CK05BX102K
C702	20128-47006	1	CAP FXD CER .47UF 20% 50VDCW	0075	RPE12325U474M50V
C982	22024-10004	1	CAP CHIP CER 1000PF 10%	0289	500R15N102KP
CR1061,1062,501,502,70,97	32000-04148	6	DIODE SILICON 75V 1A 5%	0078	1N4148
CR1081,1082,981,982	32000-02811	4	DIODE SILICON SCHOTTKY 15V 20 MA	0050	5082-2811
DCL1	40408-14521	1	LABEL VX4521 DRW 03216 REV 910	0026	40408-14521
DCL2	40409-14521	1	LABEL VX4521 -03217 REV 9106	0026	40409-14521
DS001,003,101	32000-02303	3	DIODE LIGHT EMITTING GREEN WITH RESISTOR	0039	547-2303
DS002	32000-02003	1	DIODE LIGHT EMITTING RED WITH RESISTOR 0	0039	547-2003
DS20	32050-01414	1	DISPLAY 4 CHAR LED WITH MEMORY GREEN	0101	DLG1414
E80,82	45002-55285	2	JACKSCREW FOR GPIB CONNECTOR	0273	78069-001

REFERENCE DESIGNATOR	CDS PART NUMBER	QTY.	PART DESCRIPTION	MFG. NUM.	MFG. PART NUMBER
E81,83	92300-01000	2	WASHER 10 SPLIT RING HI COLLAR SS	0137	BY DESCRIPTION
E90,93	92301-40037	2	SCREW PHIL PNHD 4-40 X 3-8 ZINC SILVER	0137	4-40X3-8 PHIL PNHD
E91,94	92300-00440	2	WASHER SPLITRING 4-40 3-16 OD	0137	4R
F89	42202-73040	1	FUSE MICRO 4AMP 125V FAST PLUG IN CLEAR CAP	0061	273 004
F991,992	42202-73010	2	FUSE MICRO 1AMP 125V FAST PLUG IN CLEAR CAP	0061	273 001
FP1	47006-14521	1	FACE PLATE VX4521 DRW 02239 REV 910	0026	47006-14521
FP10,11	92505-25005	2	WASHER WAVY 2.7MM	0026	92505-25005
FP12,13	92501-25010	2	SCREW M2.5X10 CHEESEHEAD	0026	92501-25010
FP14	92502-25008	1	SCREW PHIL M 2.5 X 8 CSK BRITE ZINC	0137	PHIL M 2.5 X 8 CSK
FP15	92500-25008	1	SCREW M 2.5 X 8 SELF TAP	0266	21100-710
FP16	92520-00183	1	VME PCB-FRONT PANEL HOLDER	0266	60807-183
FP17	92500-25025	1	HEX NUT M2.5 ZINC	0266	21100-144
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	40406-00140	1	EJECTOR HANDLE C-TOP VX1400	0266	20817-328
FP23,3,5	40406-00141	1	EJECTOR HANDLE C-BOTTOM VX1400	0266	20817-327
FP30	47000-74100	1	KEY PLATE 151 ALUMINUM 01639 REV 9003	0026	47000-74100
FP31,32,6,7	92500-25005	4	SCREW 2.5MM PHIL CSK 5MM	0026	92500-25005
J1	45002-55277	1	CONNECTOR IEEE 488 PC MNT W THREADED INSERT	0273	68277-001
J401,402,50	45002-51521	3	CONNECTOR SMB RT ANGLE PC BD AND PANEL MOUNT	0302	2110-7511-000

REFERENCE DESIGNATOR	CDS PART NUMBER	QTY.	PART DESCRIPTION	MFG. NUM.	MFG. PART NUMBER
K70	83500-20012	1	RELAY SPDT 5VDC 125 OHM	0013	DS1E-S-DC5V
L79	27051-50007	1	INDUCTOR 5 UH 5A .015 OHMS 50MHZ FR	0577	LFB47G
L991,992	27051-00200	2	INDUCTOR WIDE-BAND FERRITE CHOKE	0042	VK 200 10-3B
P1,2	45003-09600	2	CONNECTOR DIN 96 PIN MALE RT ANGLE SOLDER	0265	10-8457-096-002097
PCB1	41140-45210	1	P.C. BOARD VERSION 6L 9207	0498	41140-45210
Q00,70	51100-03646	2	TRANSISTOR NPN HIGH SPEED SWITCH	0074	MPS3646
Q27,50	51100-03904	2	TRANSISTOR NPN SWITCHING	0078	2N3904
R001,602,65	10117-10007	3	1M RES COMP 1-4W 5%	0087	R25J-1M-5%
R002,1022,12,14,407,409,42,431 432,44,45,90	10117-33004	12	3.3K RES COMP 1-4W 5%	0087	R25J-3.3K-5%
R003,004,405,47,504,701,702,72 78,93,977,978	10117-10004	12	1K RES COMP 1-4W 5%	0087	R25J-1K-5%
R005	10117-51006	1	510K RES COMP 1-4W 5%	0087	R25J-510K-5%
R061,062,971,972,973,974,975	10117-51002	7	51 OHM RES COMP 1-4W 5%	0087	R25J-51-5%
R07,08,1051,1071,1381,1481,18,69 84,96	12008-33004	10	3.3K RES NETWORK SIP 5% 1.5W 9-PKG	0027	750-101-R3.3K
R1021,89	12004-33004	2	3.3K RES NETWORK SIP 5% .9W 5-PKG	0027	750-61-R3.3K
R1191,1192,1193,1194,1195,1281 1282,1291,1292,1293,1294,1295 1391	14024-16905	13	16.9K RESISTOR FILM 1-4W 1% 100 PPM	0069	RN55D1692F
R1491	10117-22004	1	2.2K RES COMP 1-4W 5%	0087	R25J-2.2K-5%
R1492,704	10117-12005	2	12K RES COMP 1-4W 5%	0087	R25J-12K-5%
R27,29	12004-10004	2	1K OHM RES NETWORK SIP 5% .9W 5-PKG	0027	750-61-R1K
R401,402	10000-00000	2	USER INSTALLED RESISTOR	0026	10000-00000
R403	10117-47003	1	470 OHM RES COMP 1-4W 5%	0087	R25J-470-5%

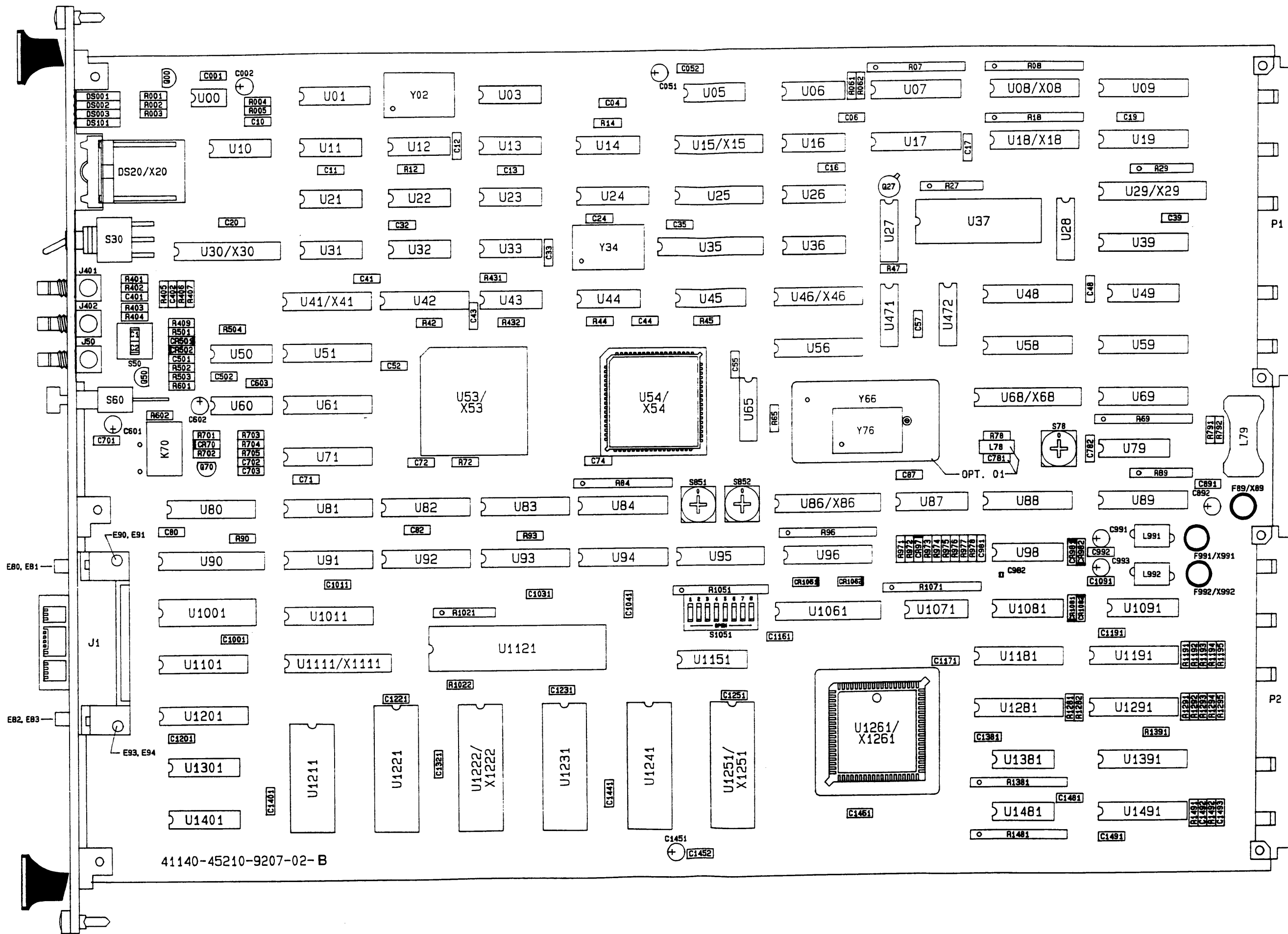
REFERENCE DESIGNATOR	CDS PART NUMBER	QTY.	PART DESCRIPTION	MFG. NUM.	MFG. PART NUMBER
R404	10117-68003	1	680 OHM RES COMP 1-4W 5%	0087	R25J-680-5%
R406	10117-10006	1	100K RES COMP 1-4W 5%	0087	R25J-100K-5%
R501	10117-51003	1	510 OHM RES COMP 1-4W 5%	0087	R25J-510-5%
R502	10117-10003	1	100 OHM RES COMP1-4W 5%	0087	R25J-100-5%
R503	10117-20004	1	2K RES COMP 1-4W 5%	0087	R25J-2K-5%
R601	14024-26103	1	261 OHM RES FILM 1-4W 1% 100PPM	0069	RN55D2610F
R703	10117-18006	1	180K RES COMP 1-4W 5%	0087	R25J-180K-5%
R705,791	10117-47004	2	4.7K RES COMP 1-4W 5%	0087	R25J-4.7K-5%
R792	10117-68004	1	6.8K RES COMP 1-4W 5%	0087	R25J-6.8K-5%
R976	10117-15004	1	1.5K RES COMP 1-4W 5%	0087	R25J-1.5K-5%
S1051	42050-10108	1	SWITCH DIP 8POS SPST	0048	76S808S
S30	42050-17207	1	SWITCH DPDT-MOM PC BD MOUNT	0024	7207-P4-D9-A-B-E
S50	42050-10121	1	SWITCH DIP 1POS DPDT	0048	76SD01S
S60	42050-12672	1	SWITCH MOM SPDT PC BRD VERT MT	0024	8125AV2
S78	42050-10300	1	SWITCH DIP ROTARY BCD ENCODED	0007	DRW-10C
S851,852	42050-10301	2	SWITCH DIP ROTARY HEX	0007	DRW-16C
SH1	47007-74155	1	SHIELD FRONT 155 CARD DRW 01830 REV 900	0026	47007-74155
SH12,3,6,9	92519-25019	4	STANDOFF HEX M2.5 X 19.5MM DRW 01801 REV 920	0026	92519-25019
SH15,18,21,33	92201-19451	4	STANDOFF HEX M2.5 THRU X .538L DRW 01673 REV 920	0026	92201-19451
SH2,5,8,11,14,17,20,31	92500-25010	8	SCREW M 2.5 X 10 CSK OVAL PHIL NIK PL	0266	21100-500
SH22	47007-74002	1	SHIELD BACK CONN MTG CONFIG DRW 01816 REV 920	0026	47007-74002
SH23,24,25,26,27,28,29,32	92519-25002	8	REAR SHIELD SPACER DR 01843 REV 9111	0026	92519-25002
SH4,7,10,13,16,19,30,34	92500-25003	8	SCREW M2.5X4 90 DEG CSK DIN965 FLHD PHIL STAINLS	0420	BY DESCRIPTION

REFERENCE DESIGNATOR	CDS PART NUMBER	QTY.	PART DESCRIPTION	MFG. NUM.	MFG. PART NUMBER
U00	79606-00555	1	IC TTL TIMER	0092	NE555
U01	73001-07431	1	IC LS DELAY ELEMENT	0107	74LS31
U03,10,11,21,22,36	73001-07474	6	IC TTL LS DUAL D-TYPE EDGE TRIG FLIP-FLOP	0107	74LS74A
U06,28	76602-07438	2	IC TTL S QUAD 2-INPUT NAND BUFFER W-OC	0107	74S38
U07,93	73305-74244	2	IC TTL F OCTAL BUFFER 74F244	0074	74F244
U08	79814-00445	1	PAL PROGRAMMED 16L8 REV A	0000	
U09,19,71,82	73308-74245	4	IC TTL ALS OCTAL BUS TRANSCEIVER	0107	74ALS245
U1001	73406-00162	1	IC TTL OCTAL INTERFACE BUS TRANSCEIVER	0107	75162
U1011,1191,1291,25,51,81,83,88,91	73005-74574	9	IC HCT OCTAL TRISTATE LATCH NON-INVERT	0107	74HCT574
U1061,35	73002-74652	2	IC TTL LS OCTAL TRANSCEIVER WITH REGISTERS	0107	74LS652
U1071,1381,1481	77204-07408	3	IC TTL AS QUAD 2-INPUT AND GATE	0107	74AS08
U1081	73315-10123	1	IC ECL TRIPLE BUS DRIVER	0074	MC 10123
U1091,87	73315-10124	2	IC ECL QUAD TTT TO ECL TRANSLATOR	0074	MC10124
U1101	73406-00160	1	IC TTL OCTAL BUS TRANSCEIVER	0107	75160
U1111	79814-00394	1	PAL PROGRAMMED 22V10 REV A 73A-155	0000	
U1121	79800-09914	1	IC MOS IEEE-488 BUS I F	0107	TMS9914ANL
U1151,45	79008-74138	2	IC HCT 3-TO-8 LINE DECDR DEMULTIPLEXER	0107	74HCT138
U1181,1281,84,89,94	73309-74244	5	IC HCT OCTAL BUFFER NON-INVERTING	0107	74HCT244
U12,05	73300-07407	2	IC TTL HEX BUFFER	0107	7407
U1201,56,96	73309-74245	3	IC HCT OCTAL BUS TRANSCEIVER	0107	74HCT245

REFERENCE DESIGNATOR	CDS PART NUMBER	QTY.	PART DESCRIPTION	MFG. NUM.	MFG. PART NUMBER
U1211	79801-08254	1	IC CMOS PROGRAMMABLE INTERVAL TIMER	0051	CP82C54
U1221	79801-08259	1	IC CMOS PROGRAMMABLE INTERRUPT CONTROLLER	0051	P82C59A
U1222	79813-00211	1	PROGRAMMED PROM U1222 VX4521	0000	
U1231,1241	79805-58256	2	IC CMOS 32K X 8 SRAM 120NS	0052	HM62256P-12
U1251	79813-00212	1	PROGRAMMED PROM U1251 VX4521	0000	
U1261	79811-23042	1	IC CMOS LCA 12X12 70MHZ 84 PIN PLCC	0404	XC3042-70PC84C
U13,26	73300-74125	2	IC TTL QUAD BUFFER TRI-STATE OUTPUTS	0107	74125
U1301,1401	79805-74289	2	IC TTL LS 64-BIT RAM	0002	27LS03
U1391,95	73310-74244	2	IC TTL LS OCTAL BUFFER NON-INVERTING	0107	74LS244N
U14	75401-74164	1	IC TTL LS 8-BIT SERIAL SHIFT REGISTER	0107	74LS164
U1491	73313-74760	1	IC TTL AS OCTAL BUFFER NON-INV	0107	74AS760
U15	79814-00398	1	PAL PROGRAMMED 16L8L REV A 73A-155	0000	
U16	76500-07410	1	IC TTL LS TRIPLE 3-INPUT NAND GATE	0107	74LS10
U17	73311-74241	1	IC TTL S OCTAL BUFFER NONINVERT OUTPUT	0107	74S241
U18	79814-00446	1	PAL PROGRAMMED 16L8 REV A VX4521	0000	
U23,27,44	73301-07404	3	IC TTL LS HEX INVERTER	0107	74LS04
U24,49	73011-74174	2	IC TTL FAST HEX D FLIP-FLOP	0078	74F174PC
U29	79814-00390	1	PAL PROGRAMMED 20L8 REV A 73A-155	0000	
U30	79814-00397	1	PAL PROGRAMMED 22V10 REV C 73A-155	0000	

REFERENCE DESIGNATOR	CDS PART NUMBER	QTY.	PART DESCRIPTION	MFG. NUM.	MFG. PART NUMBER
U31,33	77815-07432	2	IC TTL LS QUAD 2-INPUT OR GATE	0107	74LS32
U32	76500-07400	1	IC TTL LS QUAD 2-INPUT NAND GATE	0107	74LS00
U37	79800-68172	1	IC VMEBUS CONTROLLER	0092	SCB-68172C2N28
U39	73312-74240	1	IC TTL AS OCTAL BUFFER	0107	74AS240
U41	79814-00395	1	PAL PROGRAMMED EP320 REV A 73A-155	0000	
U42,61,92	73003-74573	3	IC TTL ALS OCTAL D-TYPE EDGE TRIG FLIP-FLOP	0107	74ALS573
U43,471	76500-07430	2	IC TTL LS 8-INPUT NAND GATE	0107	74LS30
U46	79814-00389	1	PAL PROGRAMMED 16L8L REV A 73A-155	0000	
U472	77203-07427	1	IC TTL ALS TRIPLE 3-INPUT NOR GATE	0107	74ALS27
U48,58	73606-74574	2	IC TTL AS OCTAL TRI-STATE LATCH	0107	74AS574
U50	76602-74140	1	IC TTL S DUAL 4-INPUT NAND GATE 50-OHM DRVR	0107	74S140
U53	79801-80191	1	IC CMOS 80186 CPU 16MHZ PLCC	0118	N80C186XL-16
U54	79814-00399	1	PAL PROGRAMMED 5C180-75 REV D 73A-155	0000	
U59,69	73006-74573	2	IC TTL AS OCTAL D-TYPE LATCH	0107	74AS573
U60	79606-00556	1	IC TTL DUAL TIMER	0107	NE556A
U65	73303-07404	1	IC HCMOS HEX INVERTER	0107	74HC04
U68	79814-00391	1	PAL PROGRAMMED 20L8 REV A 73A-155	0000	
U79	79005-74151	1	IC TTL LS 1-OF-8 DIGITAL DATA SELECTOR	0107	74LS151
U80	73310-74240	1	IC TTL LS OCTAL BUFFER	0107	74LS240
U86	79814-00388	1	PAL PROGRAMMED 20L8 REV B 73A-155	0000	
U90	73003-74841	1	IC TTL ALS 10-BIT PARALLEL LATCH	0107	74ALS841

REFERENCE DESIGNATOR	CDS PART NUMBER	QTY.	PART DESCRIPTION	MFG. NUM.	MFG. PART NUMBER
U98	73315-10125	1	IC ECL QUAD ECL TO TTL TRANSLATOR	0074	MC10125
X08,15,18,41,46	45012-20128	5	SOCKET 20-PIN DIP NO SUB	0089	ICA-203-S-TG30
X1111,29,30,68,86	45012-24032	5	SOCKET 24 PIN SKINNY DIP	0004	2-641932-1
X1222,1251	45012-28100	2	SOCKET 28-PIN DIP LOW PRO	0089	ICO-286-S8A-TG
X1261	45010-00084	1	SOCKET 84 PIN PLCC	0243	QILE84P-410-T
X20	45014-00000	1	SOCKET VERTICAL 14 PIN DIP	0268	14-6810-90C
X53,54	45010-80186	2	SOCKET 68 PIN PLCC	0243	QILE68P-410T
X89,991,992	42300-28105	3	FUSE SOCKET MICRO VERTICAL .025 LEADS .1 CNT	0061	281 005
Y02	89499-32000	1	INSULATOR MYLAR VXI BACKSHIELD -02291 9207	0573	92000-14000
Y02	89499-32000	1	CRYSTAL OSC 32.000MHZ 50PPM	0233	KXO-01-0-32.000
Y34	89499-16000	1	CRYSTAL OSC 16.000MHZ 50PPM	0037	XO-43A-16.000
Y76	89499-20000	1	CRYSTAL OSC 20.000MHZ 50 PPM	0037	XO-43A-20.000



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C1451
C1452