

SENSe:CORRection:EEPROM:CALFactor?

Syntax:	SENSe < sensor 1 or 2 > :CORRection:EEPROM:CALFactor?	
Example:	OUTPUT @PWR_MTR;SENS1:CORR:EEPROM:CALF?	! QUERIES SENSOR 1 EEPROM CAL FACTOR TABLE
Response:	Typically, 5.000e7,2.000e9,.....	
Description:	Provides a listing of calibration factors in the sensor, sorted in frequency order, to match previous command. The number of items matches the sum of the number at standard frequencies, and the number of special frequencies reported by DIAG:SENS1:EEPROM:CALFR?	

SENSe:CORRection:EEPROM:FREQuency?

Syntax:	SENSe < sensor 1 or 2 > :CORRection:EEPROM:FREQuency?	
Example:	OUTPUT @PWR_MTR;SENS1:CORR:EEPROM:FREQ?	! QUERIES SENSOR 1 EEPROM FREQUENCY TABLE
Response:	Typically, 5.000e7,2.000e9,.....	
Description:	Provides a listing of calibration frequencies in the sensor, sorted by frequency, so that both standard and special frequencies are listed. The number of items matches the sum of the number at standard frequencies, and the number of special frequencies.	

2.5.33 Self-Test

■ *TST?

*TST?

Syntax:	*TST?	
Example:	OUTPUT @PWR_MTR;*TST?	! QUERIES SELF-TEST RESULT
Response:	0 if all is OK, otherwise, it returns a value of 1.	

Table 2-5 lists the indications and limitations that will occur when the Self-Test command is applied to the 58542 instrument. The Result, Minimum and Maximum indications are all given in millivolts.

Table 2-5: Self-Test Error Indication & Limitations

Error Number	Result	Minimum	Maximum	Test Description
100	0	0	50	OUTPUT DAC This test steps the analog output DAC from 0 volts to 10 volts in 1 volt steps, and measures the resultant output voltage with the system ADC. It then compares the results with the limits shown to the left and, if it is outside any limit, it will set the error number corresponding to that voltage level.
101	1000	950	1050	
102	2000	1900	2100	
103	3000	2850	3150	
104	4000	3800	4200	
105	5000	4750	5250	
106	6000	5700	6300	
107	7000	6650	7350	
108	8000	7600	8400	
109	9000	8550	9450	
110	10000	9500	10500	
200	0	0	50	OFFSET DAC This test steps the sensor input amplifier offset DAC from 0 volts to 5 volts in 1 volt steps, and measures the resultant output voltage with the system ADC. It then compares the results with the limits stated to the left and, if outside any limit, it will set the error number corresponding to that voltage level.
201	1000	950	1050	
202	2000	1900	2100	
203	3000	2850	3150	
204	4000	3800	4200	
205	5000	4750	5250	

Table 2-5: Self-Test Error Indication & Limitations (Continued)

Error Number	Result	Minimum	Maximum	Test Description
400	0	0	50	CALIBRATOR DAC This test steps the calibrator control DAC from 0 to 10 volts in 1 volt steps and measures the resultant output voltage with the system ADC. It then compares the results with the limits shown to the left and if outside any limit it will set the error number corresponding to that voltage level.
401	1000	950	1050	
402	2000	1900	2100	
403	3000	2850	3150	
404	4000	3800	4200	
405	5000	4750	5250	
406	6000	5700	6300	
407	7000	6650	7350	
408	8000	7600	8400	
409	9000	8550	9450	
410	10000	9500	10500	
600	0	50	50	OFFSET AMP 1 This test steps the sensor input amplifier offset DAC from 0 to 5 volts in 1 volt steps and measures the resultant output voltage from the first amplifier stage with the system ADC. It then compares the results with the limits shown to the left and if outside any limit it will set the error number corresponding to that voltage level.
601	1000	950	1050	
602	2000	1900	2100	
603	3000	2850	3150	
604	4000	3800	4200	
605	5000	4750	5250	
800	0	0	50	GAIN AMP 2 This test steps the sensor input amplifier offset DAC from 0 volts to 5 volts in 1 volt steps, sets the second stage gain to 1 and measures the second stage output voltage with the system ADC. It then compares the results with the limits shown to the left and if outside any limit it will set the error number corresponding to that voltage level.
801	1000	950	1050	
802	2000	1900	2100	
803	3000	2850	3150	
804	4000	3800	4200	
805	5000	4750	5250	
1000	0	0	50	THRU FILTER This test steps the sensor input amplifier offset DAC from 0 to 5 volts in 1 volt steps, and measures the filter amplifier output voltage with the system ADC. It then compares the results with the limits shown to the left and if outside any limit it will set the error number corresponding to the voltage level.
1001	1000	950	1050	
1002	2000	1900	2100	
1003	3000	2850	3150	
1004	4000	3800	4200	
1005	5000	4750	5250	

Table 2-5: Self-Test Error Indication & Limitations (Continued)

Error Number	Result	Minimum	Maximum	Test Description
Gain = 1, Amp 2: 1200	1000	950	1050	GAIN = 1, AMP 2 This test sets the sensor input amplifier offset DAC to 1 volt and measures the output of the second stage amplifier with its gain set to 1. It then compares the results with the limits shown to the left and if outside any limit it will set the error number corresponding to that voltage level. Then it sets the gain of the second stage to 8 and measures the output of that stage. Any out of tolerance voltage will be indicated by a corresponding error number. This checks the gain of this stage at a gain of 8.
Gain = 8, Amp 2: 1201	8000	7200	8800	
Gain = 1, Amp 2: 1400	100	90	110	GAIN = 1, AMP 2 This test sets the sensor input amplifier offset DAC to 0.1 volt and measures the output of the second stage amplifier with its gain set to 1. It then compares the results with the limits shown to the left and if outside any limit it will set the error number corresponding to that voltage level. Then it sets the gain of the second stage to 64 and measures the output of that stage. Any out of tolerance voltage will be indicated by a corresponding error number. This checks the gain of the second stage at a gain of 64.
Gain = 64, Amp 2: 1401	6400	5760	7040	
1600	9000	8000	10000	TOO HIGH This test checks the upper limit for the auto-range system by applying a voltage from the offset DAC. The output of the second stage is monitored while also monitoring the ! too-high comparator output. If the comparator output comes true outside of the voltage limits specified to the left the corresponding error number is set.
1800	1000	700	1100	TOO LOW This test checks the lower limit for the auto-range system by applying a voltage from the offset DAC. The output of the second stage is monitored while also monitoring the ! too-low comparator output. If the comparator output comes true outside of the voltage limits specified to the left the corresponding error number is set.
2000	7000	6300	7700	CAL HEATER This measures the calibrator thermistor heater voltage. This is half of the actual voltage on the heater transistor collector which will be about 0.5 volts below the level of the 15 volt supply after the heater is stable. Since this takes about a minute after power on the POST does not check this. However the command *TST? does.
2100	0	0	500	SW +5 OFF This test measures the switched 5 volt logic supply applied to the sensor when it is switched off. Whenever a peak power sensor (8034X or 8035XA) is connected, this test will be bypassed.

Table 2-5: Self-Test Error Indication & Limitations (Continued)

Error Number	Result	Minimum	Maximum	Test Description
2101	5000	4500	5500	SW +5 ON This test measures the switched 5 volt logic supply applied to the sensor when it is switched on. Whenever a peak power sensor (8034X or 8035XA) is connected, this test will be bypassed.
3000		0x3c0000	0x3fffff	RAM BANK 1 This does a byte by byte check of the optional extra 128K RAM at addresses 3c0000 to 3fffff hex. An error at any address will result in an error number of 3000. If the optional RAM is not present (which is tested by checking the first byte for write/read cycle ability), then this test is aborted without an error flag.
3001		0x400000	0x43ffff	RAM BANK 2 This does a byte by byte check of the standard RAM at addresses 400000 to 43ffff hex. This is done in a non-destructive manner by saving the data that is present and then writing a pattern, reading it back, checking it for validity, and then restoring the original. An error at any address will result in an error number of 3001.
3100		0x300000	0x37ffff	ROM This does a complete checksum of the program ROM at addresses 300000 to 37ffff hex and compares it with the correct value stored in the ROM. Any error will result in an error number of 3100.

2.5.34 Error Messages

■ SYSTem:ERRor?

SYSTem:ERRor?

Syntax:	SYSTem:ERRor?	
Example:	OUTPUT @PWR_MTR;SYST:ERR?	! QUERIES SYSTEM ERROR MESSAGE
Description:	This command reads error messages from the error buffer. Use *CLS and CLEAR @PM_address to clear the SYST:ERR buffer just prior to entering measurement configurations and measurement routines. A listing of compatible standard SCPI error and device-specific errors follows.	

Table 2-6: SCPI Standard Error Messages

Error Number	Description
0	No Error
-7	Invalid Error Number
-108	Parameter Not Allowed
-111	Header Separator Error
-113	Undefined Header;- - -
-120	Numeric Data Error
-200	Execution Error
-211	Trigger Ignored
-213	Init Ignored
-214	Trigger Deadlock
-230	Data Corrupt or Stale
-300	Device-specific errors (See Table 2-7)

Table 2-7: Device Specific Error Messages

Command	Error Message	Example of Problem
ABORt		
CALCulate1:DATA?	Burst mode is off	Not burst mode; Command requires BURSt mode
CALCulate1:DIFFerence 1,1 CALCulate1:RATio 1,1	Conflict in channel configuration	Same sensor
CALCulate1:LIMit:LOWer:UPPer	Conflict between upper and lower limits	Upper is smaller than lower or lower is greater than upper
CALCulate1:MAXimum:STATe	Channel is not valid	No sensor or sensor not calibrated
CALCulate1:MINimum:STATe	Channel is not valid	No sensor or sensor not calibrated
CALCulate1:MODE	No valid sensor Channel is not valid	No sensor No sensor or sensor not calibrated
CALCulate1:REFerence:COLlect	Normal mode is off Channel is not valid	Burst mode setup No sensor or sensor not calibrated
CALibrate1	No sensor Sensor not connected to calibrator Sensor calibration error	No sensor Calibration error
CALibrate1:ZERO	No sensor Sensor zeroing error	Zeroing error
DIAGnostic:SENSe1:EEPROM:CORRection	No valid sensor sensor eeprom data:correction factor number does not match	No sensor
DIAGnostic:SENSe1:EEPROM:READ	No valid sensor	No sensor
DIAGnostic:SENSe1:EEPROM:CALFSpecial DIAGnostic:SENSe1:EEPROM:CALFSTandard	No valid sensor Sensor eeprom data is over space Sensor eeprom data:cal factor number does not match	No sensor Too much data
DIAGnostic:SENSe:EEPROM:FREQStandard?	No valid sensor Sensor eeprom data is over space	No sensor Too much data
DIAGnostic:SENSe1:EEPROM:CALFRange DIAGnostic:SENSe1:EEPROM:TYPE	No valid sensor	No sensor
DIAGnostic:SENSe1:EEPROM:FREQSPecial	No valid sensor Sensor eeprom data is over space Sensor eeprom data:freq is above upper freq limit Sensor eeprom data:freq is below lower freq limit Sensor eeprom data:freq number do not match	No sensor Too much data
DIAGnostic:SENSe1:EEPROM:TYPE	No valid sensor Sensor eeprom data:upper freq should be larger than lower freq	No sensor
DIAGnosticSENSe1:EEPROM:WRITe	No valid sensor Sensor eeprom data:write error Password is incorrect	No sensor Sensor eeprom error Password is activated

Table 2-7: Device Specific Error Messages (Continued)

Command	Error Message	Example of Problem
FETCh1?	Data corrupt or stale TTL trigger mode not applicable	No valid sensor Normal mode
INITiate:IMMediate	Init ignored	Continuous is on
MEASure1?	Data corrupt or stale Normal mode is off	No valid sensor Burst or swift mode
MEMory:TABLE:FREQuency	No valid sensor V _{PROP} F Table is not selected V _{PROP} F Table freq data error	No sensor Select others Start freq is greater than sensor maximum
MEMory:TABLE:POWer	Analog out Table is not selected Analog out Table data input error	Other table Lower power is greater than upper power
MEMory:TABLE:SLOPe	No valid sensor V _{PROP} F Table is not selected	Select others No sensor
MEMory:TABLE:UNIT	Analog out Table is not selected	Other table
MEMory:TABLE:VOLTagE	Analog out Table is not selected Analog out Table data input error	Other table Lower voltage is greater than upper voltage
READ1?	Data corrupt or stale Normal mode is off Trigger deadlock	No valid sensor Burst or swift mode is on TRIG:SOUR is not in IMM mode
SENSe1:EEPROM:CALFactor? SENSe1:EEPROM:FREQuency?	No valid sensor Sensor eeprom data is over space	No sensor Too much data
SENSe1:CORRection:VPROpf:STATe	No valid sensor	No sensor
SENSe1:TRIGger:DELay SENSe1:TRIGger:LEVel	No valid sensor Sensor is in CW source mode	No pulse sensor
SENSe1:TRIGger:DELay:STATe ON	No valid sensor	No pulse sensor
TRIGger:COUNter	Normal mode is on Counter has to be one in Swift immediate source No valid sensor Channel is not valid	Not in burst or swift mode Swift mode, imm source No sensor Ratio mode setup
TRIGger:IMMediate	Init ignored	Source is in immediate mode
TRIGger:MODE PRE	No PRE mode for trigger immediate source	
TRIGger:SOURce:IMMediate	Counter has to be one in Swift immediate source No valid sensor Channel is not valid	Swift mode is on No sensor Ratio mode setup

Theory of Operation

3.1 Introduction

This chapter contains a functional description of the electrical circuits contained on the PC board assemblies of the 58542 VXI Universal Power Meter. Table 3-1 lists the circuit assemblies by their reference designations and includes the assembly part number and schematic drawing number for each board.

Table 3-1: VXI Power Meter Circuit Assemblies

Ref #	Title	Assembly P/N	DWG
A1	Analog PC Assembly	21359	21360
A2	Digital PC Assembly	21356	21357
A3	VXI Processor PC Assembly	This PCA is an OEM item	

3.2 Circuit Description

The 58542 Power Meter's electrical circuitry resides mainly on three PC boards; the Analog PC Board (A1), the Digital PC Board (A2) and the VXI Processor PC Board (A3). The Processor contains the microprocessor, some ROM and RAM and the VXI interface chip. The remainder of the required ROM and RAM is contained on the Digital board.

Two cables interface to the meter through the VXI Bus Interface connections on the rear panel. The Bus Interface goes to the Processor board through connectors P1 and P2. Three front panel BNCs connect to the Analog board. See DWG 21406 in Chapter 7 for specific interconnect information.

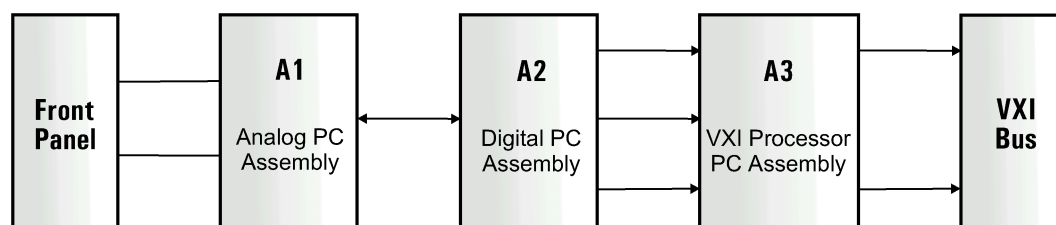


Figure 3-1: VXI Power Meter System Block Diagram

3.3 Analog PC Board (A1)

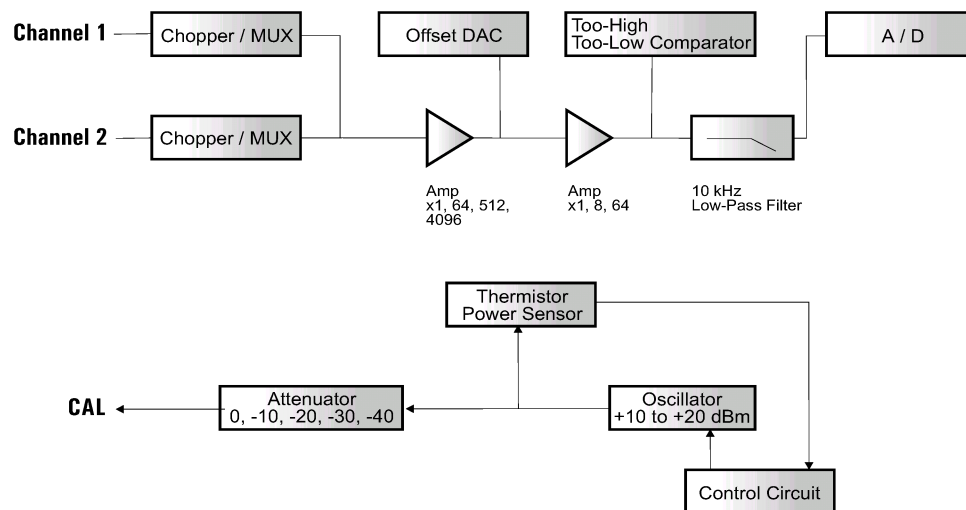


Figure 3-2: Analog PC Assembly Block Diagram

The sensors are connected from the front panel through W3 and W2 which are connected to the Analog Board through W2P1 and W2P2 for sensor 1 and W3P1 and W3P2 for sensor 2. The detected DC voltage from the sensor is a differential voltage applied to pins 3 and 4 of J7 or J9. This differential voltage goes to the U28 or U29 FET chopping circuit. The outputs are pins 8 and 9 of the chopper. An incoming signal can either be fed straight through or inverted. The signal is fed straight through when A1 and A0 are both low. It is fed through in the inverted mode when A1 is low and A0 is high. When A0 is low and A1 is high the signal is shorted together and grounded, and when A0 and A1 are both high, the input is open (floating). This provides chopper stabilized amplification when low power signals are being received by switching the FET switch from the inverting to non-inverting mode and back again at a rate of 300 times per second.

U31 is the 1st stage amplifier, and has programmable gain. The programmable gain is provided by U30 and the resistor ladder composed of R6 through R12 which will program gains of 1, 64, 512 and 4096. U32A is the 2nd stage amplifier that provides programmed gains of 1, 8 and 64 using FET switch U33 and resistor ladder R16, R17 and R18. C167 (though shown on the schematic) is not loaded on the board.

U32B/C/D and associated components provide a 6-pole bessel filter in the low pass configuration -10 kHz with a 120 μ s settling time. In normal operation, the signal will always go through this filter. Other paths such as unfiltered, TP8, and 1st amp signals are provided for testing only and not used in normal operation.

The 1st amplifier, U31, has an offset voltage injected into it via pin 7. This offset voltage comes from the 12-bit DAC, U15. Offset voltages range from +5 V to -5 V which can effectively remove about a ± 1.2 mV offset at the detector. U34A&B are comparators which monitor the input signal for a too high or too low condition. The too low comparator, U34B, will fire if the voltage is below 1 V, and the too high comparator, U32A will fire if the voltage is above 9 V. This provides an A/D conversion range of 1 to 9 V. The too high and too low signals are used by the software to determine whether or not a range change should be made. There are 7 ranges. Four ranges are processed by U31 (1st Amp), and three ranges by U32A. Appropriate gains are set to keep voltages at the A/D conversion point between 1 V and 9 V. R45 and R46, divide the 12 V regulated voltage to 1 V such that the too low comparator will fire below 1 V to assert the too low signal. R36 and R37, divide the 12 V signal to 3 V, and R40 and R41 divide the incoming signal by 3 so that the too high comparator will always fire at 9 V.

Each detector has a thermistor included in its housing so that the power meter can read the temperature of the sensor. The voltage from that thermistor is applied through J7-6 (for channel 1) and amplified by a gain of 2 by U35C (shown on Sheet 2). Channel 2 sensor's thermistor voltage comes in through J9-6 and is amplified by 2 at U35A. The thermistor voltages are also routed to U35D and U36A&B. This circuit is used to detect whether a sensor has been attached or disconnected. The connection or disconnection of a sensor causes a transient voltage which is passed through C10 (for channel 2) or C11 (for channel 1). This is detected by a window comparator consisting of U35D and U36A&B. Whenever the voltage is outside the normal DC bias range, the detector change will cause either a rise or a fall in the voltage that will be detected by the comparator. The comparator will output an interrupt to the processor, IRQ, which will be the output of U36A&B.

U16A and U9A provide a latch for the interrupt so that the processor will have time to respond. Pin 2 of U9A is used to enable or disable interrupts. U36C buffers the interrupt signal. The interrupt 1 signal goes to the CPU board.

The sensors also have EEPROMs that connect to the system through a serial interface. Channel 1 uses J8-6 for the clock and J8-5 for the data. This is a bi-directional device wherein data needs to be written to the sensor and also read from the sensor. U24E buffers incoming data, and U24F buffers outgoing data. Q3 provides the necessary open collector interface. U26 supplies the clock during a read or write action. The clock signal is buffered by U24D. Channel 2 has a duplicate circuit consisting of U24A/B/C and Q2. DC supplies of +5 V and ± 15 V are also routed to the sensors. The 15 V supplies are routed through solid state fuses to provide protection in case of any shorts. These are resettable solid state fuses which do not need to be replaced. The +5 V can be switched on and off. This is controlled by U26, and buffered by Q8 and Q1.

To recap the preliminary actions of the incoming signals; they first go through the chopper, the 1st stage amplifier, the 2nd stage amplifier, and then the filter. The signals are then sent to U23, a 16:1 multiplexer. U23 can select one signal to route to U25, the A/D converter. Most of the other signals are used for testing purposes only. During normal operation, the signal path will be through the Bessel filter.

Thermistor voltages enter on pins 24 and 25 for channels 1 and 2. The only other signal that is used for normal operation is the V_{PROF} input that enters through J3 on the front panel. CR15 provides input protection, and U21A is a $\times 1$ amplifier/buffer. The V_{PROF} signal can be read at pin 26 of the multiplexer. U25 is a 14-bit A/D converter which operates at an 11 μs conversion time. The input is via pin 6 on TP13. This device can measure between 0 and 10 V. U25 operating power supplies are limited to ± 12 V (pins 11 and 5). Those voltages are derived from U39 and U43 which regulate the ± 15 V to ± 12 V.

R105, R104 and C31 configure U33 to measure from 0 to 10 V. Pin 4 of U33 provides the start convert signal, and the processor asserts this signal to start an A/D conversion. After the conversion has completed, pin 3 can be asserted to output the data to the bus. These two functions are supplied by chip select ACS7 and ACS1. ACS1 is the output enable and ACS7 is the start convert. EOC is end of convert, which occurs at pin 2 of U33, and is routed to data byte 15 so that the process can interrogate if the data conversion is complete. D15 will be asserted if the A/D has completed its conversion.

U15 is the offset 12-bit D/A converter which provides the 1st stage amplifier with ± 5 V offset voltage. U17 is similar but configured for 0 to 10 V. The output of U17 is buffered by U21B, current limited by R108, and available at J4 for analog output.

U23 has a number of signals available for testing purposes. Offset voltage is available on pin 5. Output DAC voltage is available on pin 4, and switched 5 V signals on pin 7.

Sheet 5 of DWG 21360 details the interconnections for the Calibrator circuitry and will be discussed in Section 3.4, but U27 also provides three 8-bit ports for control of the multiplexers in the Analog section, and an input port for the Too High and Too Low comparators.

3.4 Calibrator Module

The Calibrator Module is located on the Analog PC Board. It is the heart of the 58542 Power Meter in that it is a patented system that allows the power sensors to be calibrated against an internal thermistor power standard (See Figure 3-3). In contrast to the conventional fixed-level calibrators, the 58542 calibrator produces a range of power levels over a 50 dB dynamic range to an accuracy of a few thousandths of a dB.

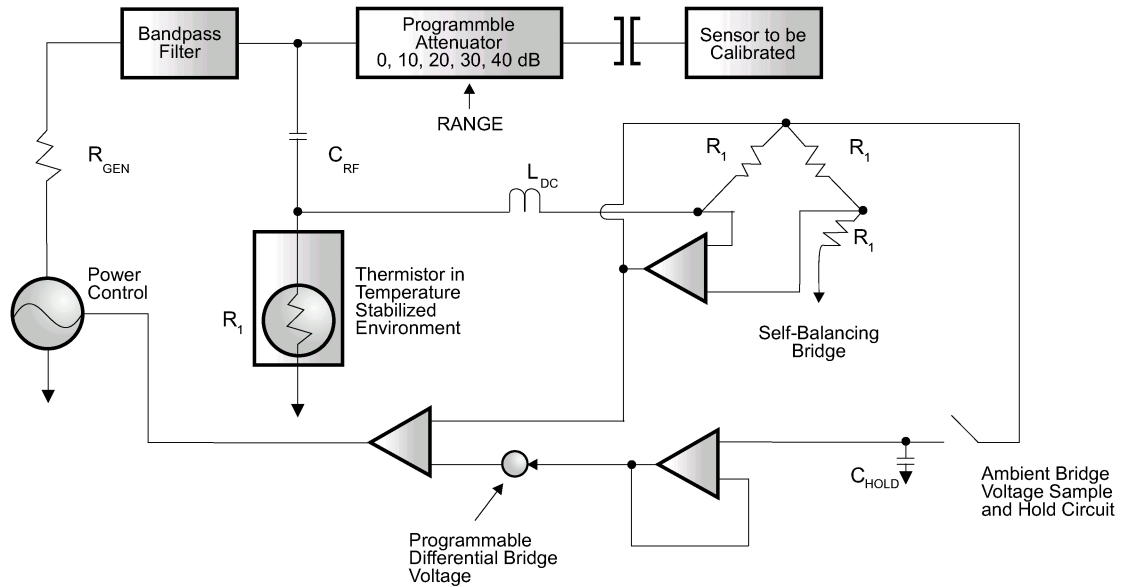


Figure 3-3: Calibrator Internal Power Standard Configuration

The thermistor is mounted in a self-balancing bridge configuration using DC substitution in the bridge. The thermistor is maintained at a fixed operating point and the DC power (P_{DC}) in the thermistor is related to the RF power (P_{RF}) by the simple relationship:

$$P_{DC} + P_{RF} = P_{AMBIENT} = \text{constant}$$

The constant, $P_{AMBIENT}$, is found by turning the RF power off and measuring the ambient voltage, $V_{AMBIENT}$ to which the self-balancing bridge settles. The advantage of this approach is that the linearity of the thermistor-leveled oscillator is limited only by the accuracy with which DC voltages can be measured and the stability of the RF calibrator. To ensure exceptional stability, the thermistor assembly is enclosed in a temperature-stabilized environment and a low drift sampling circuit is used to hold the ambient bridge voltage. The RF power can then be programmed by controlling a difference voltage, δV , at the summing node. The power is related to the voltage by:

$$P_{RF} = \frac{V_{AMBIENT} \delta V \cdot \delta V^2}{R_1} = \frac{\delta V^2}{2R_1}$$

This permits the RF power to be precisely controlled over a dynamic range of about 12 to 15 dB. The dynamic range is extended using a switched attenuator, the properties of which are determined using the thermistor-leveled oscillator itself. The effective attenuation (including all mismatch effects) of each attenuator relative to the next is measured by finding a pair of powers, one for each attenuator, that produces identical signals from the sensor under test. Because the sensor under test is used at a fixed operating point, no knowledge of its detection law is required.

The operation of the various functions of the Calibrator Module can be understood more easily if the circuits are discussed individually. The functional sections of this module include the following:

1. The 50 MHz oscillator (Q4) and its current control circuit consisting of U4D, Q5 and U2C.
2. The RF output circuit consisting of the low pass filter, the stepped attenuator, and the connector and cable to the front panel of the power meter.
3. The oven to maintain the control thermistor at a constant 60 °C. It is located on the small board attached to the bottom of the Q1 heater transistor. The board contains the RT1 and RT2 thermistors and the Q7 control transistor.
4. The thermistor bridge to measure the RF power by DC substitution. It consists of RT1, U1 and Q6.
5. The track and hold circuit that remembers the ambient bridge voltage, using U2B, U8D and U3A.
6. The 14-bit DAC and reference supply to measure the ambient bridge voltage and control the RF output level, made up of U11, U7, U8C&D, U4, U14A, U2A&B, U3A, U5, U10, U16B&C, U13B&C and U9B.
7. The correction circuit to measure the temperature of the PIN diode attenuator so that a correction for the temperature dependent loss of the diodes can be corrected, consisting of RT2 and U14C.
8. Calibrator NVRAM control circuit, U26 and U18.

3.4.1 50 MHz Oscillator

The first section of the Calibrator Module consists of a colpits oscillator circuit with a controllable power output. The output power is measured by the thermistor bridge and set by varying the DC current through Q4. This current is supplied by a voltage to current converter consisting of U14D, Q5 and U4. The power generated by Q4 is linearly related to the current through it. Thus, the voltage from U4 that is converted to current by U14D and Q5 is linearly related to the RF power generated. When the calibrator is set for 0 dBm, the voltage at U4-6 is near 0 volts.

3.4.2 RF Output

The 50 MHz oscillator output is capacity coupled to the low pass filter, L13, L14, L15 and associated capacitors. The resultant harmonic-free RF is applied to the switched PIN attenuator, CR8 - 14 and associated resistors and control amplifiers U19 and U14B. The first section is 10 dB, the output section is 20 dB, and a resistor between sections adds another 10 dB. Thus, the output power can be programmed from +20 to -30 dBm.

3.4.3 Oven

The measuring thermistor is maintained at a constant 60 °C by being mounted on the Q1 heater transistor, which is driven from the sensing thermistor RT2 by way of the Q7 current amplifier. RT2 is mounted very close to RT1 so that both are maintained at the same temperature. When RT2 reaches 60 °C, the voltage across it is just enough to maintain drive to the heater. This condition will be maintained regardless of the ambient temperature.

3.4.4 Thermistor Bridge

RT1 is connected in a self-balancing bridge circuit which delivers just enough power to the thermistor to keep it at 500 Ω . Thus, if part of the power delivered to it is from the RF generated by the oscillator and the rest is from the DC current of the bridge, then by reducing the amount of DC power, the circuit will increase the drive to the oscillator as needed to keep the total power in RT1 constant. It is necessary to measure only the amount of DC power reduction to know the amount of RF power present. In this way, a precisely known RF output level can be established.

3.4.5 Track & Hold and DAC

In order to know how much power is being added by the oscillator, it is necessary to measure the power delivered to the thermistor with no RF present. This is done by turning off the oscillator power (closing switch U2C), and then measuring the voltage out of the control bridge. This is known as the ambient bridge voltage. To make this measurement, the following conditions are established: U8D and U2B are switched open, and U8A & C are switch closed. By using the U13 DAC, a successive approximation measurement of the voltage is made. The output of the DAC is connected to one input of U4 and the bridge is connected to the other. Thus, it becomes a comparator that makes it possible for the computer to tell when the output voltage of the DAC is greater than the bridge voltage, and so complete the successive approximation. Once this is done, the DAC is set for 0 V output, U8A is opened, U8B, U8D and U2B are closed, and the track and hold capacitor, C39 will charge up to the voltage which represents the zero RF power condition of the bridge. When the oscillator is turned on by U9C, then the sampling switch, U2B, will open and allow C39 to supply this "RF Off" condition to the measuring circuit. Any voltage from the DAC will now reduce the amount of DC power being delivered to the thermistor bridge, and the control circuit will add just enough current to the oscillator to cause its output to add back that much RF power into the bridge.

3.4.6 Correction Thermistor Circuit

The compensation thermistor is mounted near CR13 to sense the temperature of the 20 dB attenuator section that produces the 0 dBm output. This is the only absolute power specified. All other power levels are measured by the software relative to 0 dBm.

3.4.7 Calibrator NVRAM Control Circuit

The calibrator serial number and the correction constant for the 0 dBm output level, as well as the date of calibration and password for rewrite access, is contained in a Non-Volatile RAM. The read and write for it is provided by the parallel peripheral interface (PPI) U26. Before allowing access to the NVRAM, the software looks for a logic 1 on port A, bit zero of the PPI and, if that is present, it asks the operator for the password. If the correct password is supplied, the collected data will be written into U18. If the jumper W1 is set to supply a logic 0 to the PPI, the operator will have write-access to U18 without needing a password.

3.4.8 Sensor NVRAM

Each sensor has a NVRAM to store all of the calibration constants, the date of calibration, place of calibration, etc. This NVRAM is also password protected but has no hardware switch to defeat it. The read/write control for it is furnished by U24A/B/C, U24D/E/F, Q2 and Q3. Q1 and Q8 control the 5 V supply to reduce the amount of heat in the sensor, as well as reducing the noise from the supply.

3.4.9 Sensor Interrupt

Each time a sensor is connected or disconnected from the 58542, a CPU interrupt is generated by causing the thermistor voltage change to set a latch, which signals the CPU that it needs to check for a sensor change. The latch is driven from a “window” comparator, U35D and U36A & B. This comparator is driven from capacitors which are connected to each of the thermistor lines from the sensors. The latch is enabled or cleared by a signal from the PPI, U26.

3.4.10 Digital Control Circuit

The digital control circuit is the interface between the CPU and the preceding functions.

3.5 Digital PC Board (A2)

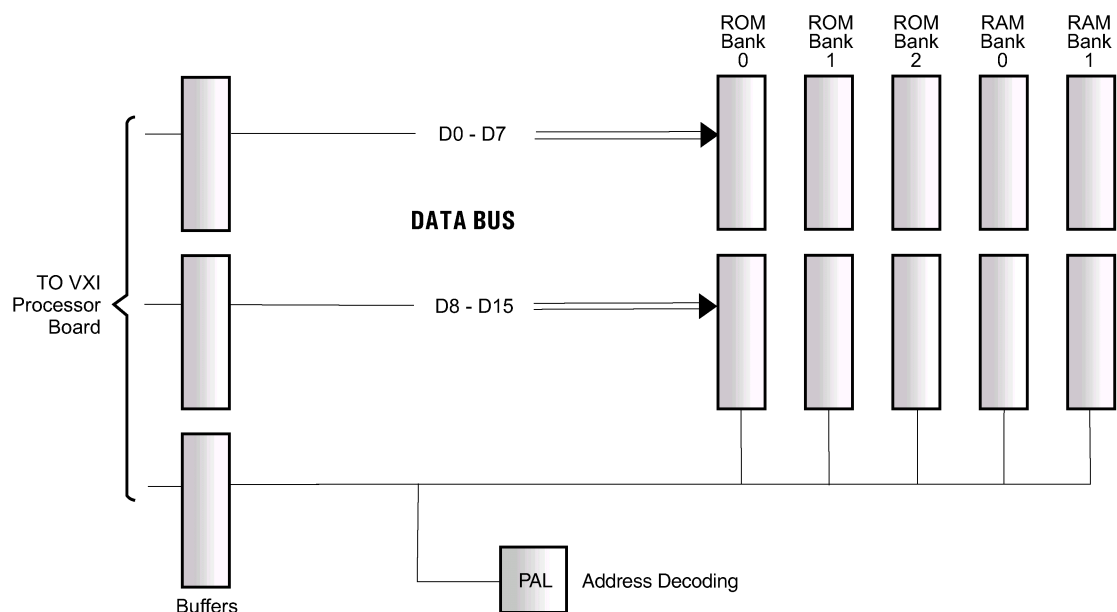


Figure 3-4: Digital PC Assembly (A2) Block Diagram

I/O address decoding is done first in the PAL (U10), and secondarily in U2. During valid I/O addressing, wait states are generated. The PAL monitors a clock cycle count (from U7A) to hold off DTACK on the CPU. W1 is jumpered to four wait states. During ROM and RAM accesses, the PAL asserts DTACK immediately with no wait states.

DTACK is passed back to the VXI Processor board. U12A provides an open collector signal.

RAM bank 1 is connected to the battery. When power is lost, U6 de-selects RAM bank 1 and connects Vcc to the battery. This bank is then non-volatile and can be used for data storage. C24 is in parallel with the battery and allows it to be replaced without losing data. Battery current can be measured at R1, TP1 and TP2. At 2 μ A, the voltage across the test points should measure about 2 mV.

U8 acts as an 8-bit input port addressed at CSTRG to monitor the eight TTL trigger lines on the VXI bus. The 58542 can trigger measurements either from these eight lines or from the TTL trigger BNC input on the front panel.

The Digital board interfaces with the Analog board at J1. All digital lines are buffered (U3, U4 and U5), and additional analog chip select decoding is done with U1.

U9A and U9B generate the upper data byte and lower data byte write signals. U11 buffers the R/*W and Reset signals.

W2 jumpers the three interrupt signals from the Analog board to the VXI Processor board. These jumpers should only be removed for troubleshooting.

3.6 VXI Processor PC Board (A3)

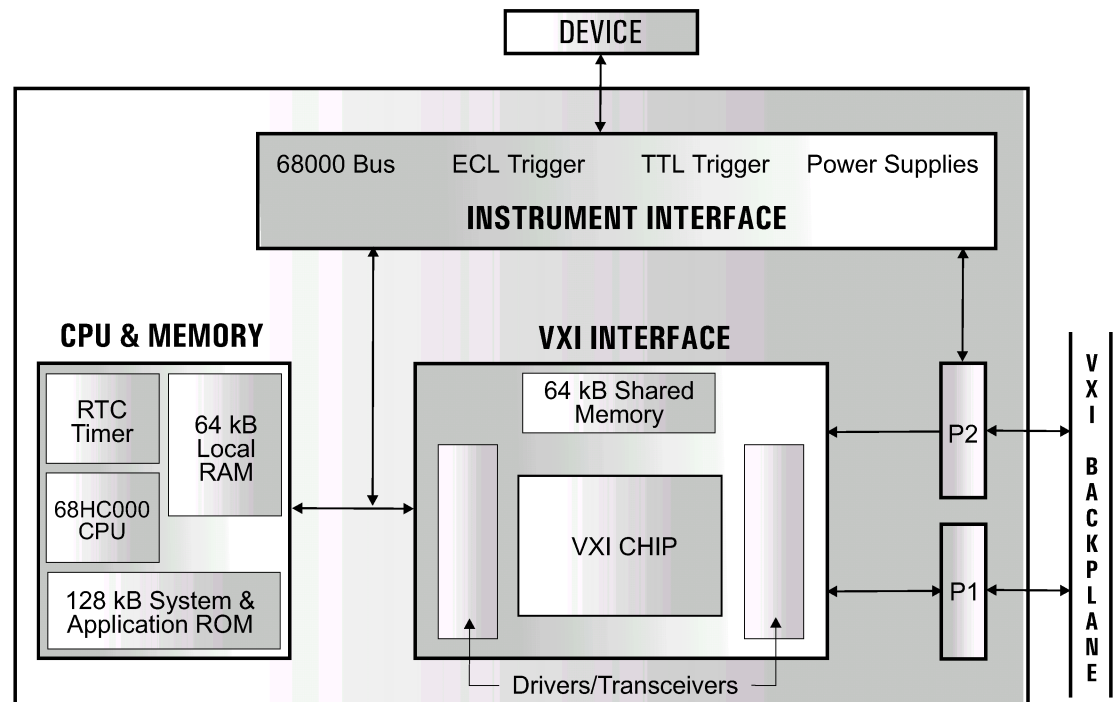


Figure 3-5: VXI Processor (A3) Block Diagram

The following circuit description is given for information only. The VXI Processor and Memory PC boards are OEM assemblies. If these boards are not functioning properly, the problem will usually be indicated by the instrument not responding to an Identification query (*IDN? - See Section 2.5.30). See Section 5.3 for replacement instructions.

The VXI Processor PC Board circuit functions are divided into three main sections:

- VXI Interface
- CPU and Memory
- LEDs and Drivers

3.6.1 VXI Interface

The VXI interface contains 64 kB of Shared Memory, a VXI interface gate array, and the drivers and transceivers to enable the VME and CPU to access the Shared Bus.

3.6.1.1 VXI Gate Array

U28 is a 120-pin gate array, packaged in a 13x13-pin grid array. The gate array generates the necessary signals that control the flow of data from the processor section through the shared bus, and to the VXI bus, and vice versa.

The gate array also controls the LEDs that indicate whether the VXI is accessing the VXI A16 or the A24/A32 registers, and the FAIL LED, which indicates whether the VXI A16 registers have been initialized.

3.6.1.2 Shared Memory

U29 and U30 are 32 k x 8 static RAM chips located on the Shared Bus for the development of VXI Shared Memory Protocols.

3.6.1.3 Shared Memory Decoders

U33 generates the necessary strobes and control signals to the Shared Memory static RAMs.

3.6.1.4 Drivers & Transceivers

U36 and U37 transceivers enable the data lines from the VXI bus onto the shared bus, and vice versa.

The A1 through A15 address lines are latched by U38 and U39 latching transceivers from the VXI bus onto the shared bus to implement address pipe-lining. The address lines are not latched going the other way.

The U40 transceiver buffers the address modifier lines.

The VXI chip controls the direction, and enables the transceivers.

U23 and U24 latch the processor data lines D00 to D15 to drive the upper 16 address lines of the VXI A32 space to implement A32 bus mastership.

The A24 through A31 address lines are buffered by U45 from the VXI bus P2 connector to the gate array.

U35 is a GAL which controls the direction of the data strobes, data transfer acknowledge, and the bus error from the VXI bus to the gate array and vice versa.

3.6.1.5 Logical Address Switch

U19 buffers the outputs of the address switch SW1 to enable the processor to read the logical address from the switch.

3.6.1.6 TTL Triggers & Local Bus

The TTL triggers and local bus are not used by the Processor board, but are made available to be used on the Digital board through the P7 pin connector.

3.6.2 CPU & Memory

3.6.2.1 Processor

The Interface circuitry of the Processor board uses an 8 MHz 68HC000 CMOS processor (U7). See the latest Motorola data sheet for further information on this chip.

3.6.2.2 Real Time Clock/Timer

U1 generates the system tick for a pSOS kernel operating system. It also adds time and event capabilities to the application code. For further information, see the latest Hitachi 146818 data sheet.

3.6.2.3 Interrupt Controller

The processor uses seven levels of auto vectored interrupts. U6 encodes the priority levels for the processor. Three levels of auto vectored interrupts are available to the user. These are signals AVINT4, AVINT3 and AVINT2. The higher numbered interrupt signal has the higher priority. The user accesses these signals from the P5 pin connector on the Processor board.

3.6.2.4 Bus Error Timer

U2A divides down the VXI 16 MHz clock for the 8 MHz processor. U2B is used to generate a bus error signal if timeout occurs before data transfer acknowledgement. The timer generates this signal if a processor access cycle exceeds 16 microseconds.

3.6.2.5 Local Address Decoders

U17 and U18 are address decoding GALs. These circuits generate the chip selects and the control lines for access to the RAM, ROM and other functions.

3.6.2.6 Drivers & Transceivers

U26 and U27 transceivers drive the local data from the processor bus to the shared bus and vice versa.

The processor address lines are driven by U21 and U22 to the shared bus.

The VXI gate array, U28, enables these buffers.

3.6.2.7 Local Memory

U9 and U11 are two 32K X 8 static RAM chips on the processor bus.

3.6.2.8 LED Drivers

The actual LEDs are located on the Analog PC Board. U32 is a one-shot used to widen the pulse of the VME A16 and A24/A32 signals. U34 is used to drive the RUN, HALT, MODID, A16 and A24/A32 LEDs. The FAIL LED is driven directly from the VXI chip. The TRIGGER LED is driven under software control.

Calibration & Testing

4.1 Introduction

Information in this chapter is useful for periodic calibration and testing of the 58542 VXIbus Universal Power Meter and its power sensors. These tests can also be used for incoming inspection testing when the instrument is first received. If the 58542 power meter has not been previously used, please review Section 2.3.

4.2 Equipment Required

The following equipment is required to complete the performance test procedures:

Description	Representative Model	Key Characteristics
CW Thermistor Power Meter	HP432A	V_{RF} and V_{COMP} available externally
Thermistor Mount	HP 478A-H75	≤ 1.07 VSWR @ 50 MHz (30 dB return loss)
Digital Voltmeter (DVM)	Fluke 8842A	$\pm 0.05\%$ accuracy and 1 μV resolution
Directional Coupler, 10 dB	Mini Circuits ZFDC-10-1 10dB	≤ 1.15 SWR @ 50 MHz
Step Attenuator, 0 to 90 dB in 10 dB increments	Weinschel AC 118A-90-33	≤ 1.15 SWR @ 50 MHz ± 0.1 dB attenuation
RF Source (Signal Generator) (High Power)	Wavetek 2405 Option XP	+ 22 dBm @ 50 MHz
Low Pass Filter	Integrated Microwave 904 881	> 30 dB attenuation @ 100 MHz
GPIO Controller for IBM PC	National PC2/2A	With driver software

4.3 Calibration Procedures

Perform the Calibrator Output Power Reference Level check. If the unit fails to meet the power output specification within 0.981 mW (minimum) to 1.019 mW (maximum) limits, then proceed with the following steps:

4.3.1 Calibrator Output Power Reference Level

The Calibrator Output power reference is factory adjusted to 1 mW $\pm 0.7\%$. To achieve this accuracy, Giga-tronics uses a precision measurement system with accuracy to $\pm 0.5\%$ (traceable to the NIST) and allows for a transfer error of $\pm 0.2\%$ for a total of $\pm 0.7\%$. If an equivalent measurement system is used for verification, the power reference oscillator output can be verified to 1mW $\pm 1.9\%$ ($\pm 1.2\%$ accuracy + $\pm 0.5\%$ verification system error + $\pm 0.2\%$ transfer error = $\pm 1.9\%$ maximum error).

This test procedure is valid for an ambient temperature range between +15 °C and +35 °C (+59 °F to +95 °F).

To ensure maximum accuracy in verifying the Calibrator Output power reference, the following procedure provides step-by-step instructions for using specified test instruments of known capability. If equivalent test instruments are substituted, refer to the Key Characteristics in Table 4-1.

4.3.1.1 Equipment Required

HP 432A Power Meter • DVM • Thermistor Power Meter • Thermistor Mount

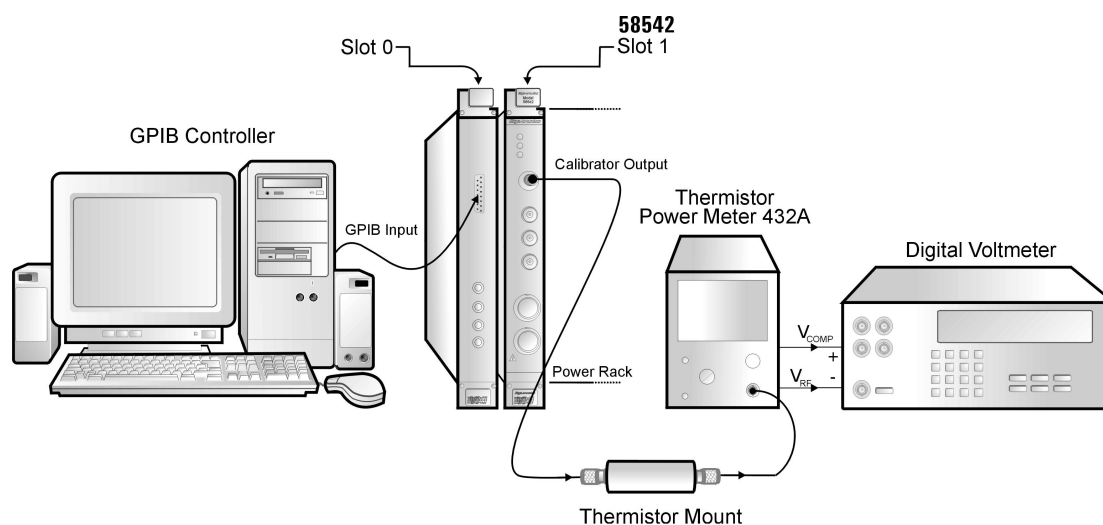


Figure 4-1: Calibrator Reference Level Test Setup

4.3.1.2 Procedure

In the following steps, precision power measurements will be made using the HP 432A Power Meter. Refer to the HP 432A manual for detailed operating information.

1. Connect the HP 432A to the Calibrator Output on the power meter as shown in Figure 4-1.
2. Turn on all equipment and wait 30 minutes for the thermistor mount to stabilize before proceeding to the next step.
3. Set the 432A Range switch to COARSE ZERO, and adjust the front panel COARSE ZERO control to obtain a zero ($\pm 2\%$ FS) meter indication.



NOTE: Ensure that the DVM input leads are isolated from chassis ground when performing the next step.

4. Set the DVM to a range that results in a resolution of 1 μ V. Connect the positive lead to the V_{COMP} connector, and the negative lead to V_{RF} connector, both on the rear panel of the HP 432A.
5. Fine zero the HP 432A on the most sensitive range, then set the HP 432A range switch to 1 mW.
6. Record the DVM indication as V_0 .
7. Turn on the power meter Calibrator RF power by sending

OUTP:ROSC ON

8. Record the reading shown on the DVM as V_1 .



NOTE: The V_1 reading must be taken within 15 seconds after entering the command. Otherwise, turn off REF POWER as shown in Step 9 and repeat Steps 6 and 7.

9. Disconnect the DVM negative lead from V_{RF} on the HP 432A and connect it to the 432A chassis ground. Record the new DVM indication as V_{COMP} .
10. Send **OUTP:ROSC OFF** to turn off REF POWER.
11. Calculate the Calibrator Output level (P_{CAL}) using the following formula:

$$P_{CAL}(\text{Watts}) = \frac{2V_{COMP} \left(\frac{V_1 - V_0}{V_0} \right) + \frac{V_1^2 - V_0^2}{V_0}}{4R \text{ (Calibration Factor)}}$$

where:

P_{RF} = calibrator output power reference level

V_{COMP} = previously recorded value in Step 9

V_1 = previously recorded value in Step 8

V_0 = previously recorded value in Step 6

$R = 200\Omega$ (assuming HP478A-H75 mount)

Calibration Factor = value for the thermistor mount at 50 MHz (traceable to NIST)

12. Verify that the P_{CAL} is within the following limits:

1 mW $\pm$ 0.019 mW (0.981 to 1.019 mW)

For record purposes, the measured value of P_{CAL} can be entered on the Performance Verification Test Data Sheet at the end of this chapter.

4.3.2 Calibrator Output Power

To correct the setting of the power output of the calibrator, the password must be known if it has been set, or defeat it by setting jumper A1W1 to position A. This jumper is located and indicated on the Analog PC Board. If a password has not been set, proceed with the jumper in position B. Calculate the percent error in power (as described in the Performance Verification Linearity check in Section 4.4.2), and change the CALFAC by that amount. For example, if the power output is low by 0.5%, increase the CALFAC by that amount.

The following is a sample program (written in Turbo-Basic) that sets the Calibrator correction. After this program has been run, the password enable link, A1W1, can be set to **B** and a password can be assigned.

```
PRINT IT IS NECESSARY TO DEFEAT PASSWORD PROTECTION TO DO THIS TASK.
INPUT IS THE PASSWORD PROTECTION TURNED OFF (W1 ON POSITION A);A$
PRINT:PRINT Connect the Power Meter sensor to the DUT calibrator output.
INPUT Press ENTER when ready to set the calibrator correction;A$
PRINT
```

MEAS ROUTINE TURNS ON THE CALIBRATOR, MEASURES THE POWER OUTPUT IN mW AND CALCULATES CAL FACTOR AND TURNS THE CALIBRATOR OFF AGAIN. SENDIT ROUTINE SENDS THE STRING C\$ TO THE DUT.

Fields in the CALFAC from EEPROM? : calfac, sernum, min, hr, day, mo, yr, enab, pswd

Note that the password is not sent. enab is the password enable bit.

```
C$ = DIAG:CAL:EEPROM?
GOSUB SENDIT          ! Send the command
GOSUB DAT             ! GET THE EEPROM DATA
! TO PROCESS IN R$
PRINT R$              ! SEE FIELDS ABOVE
LAST = 1
FOR 1=1 TO 8P=INSTR(LAST,R$, ,)      ! Separate the result into array elements
IF P=0 THEN B$[] = MID$(R$,LAST):ELSE B$[] = MID$(R$,LAST,P-LAST)
LAST=P+1
NEXT |                ! Now the data fields have been put into an array B$
B$[8] = 0              ! DISABLE THE PASSWORD
C$ = *CLS              ! Clear the status byte
GOSUB SENDIT
B$[1] = 100.00          ! SET THE CAL FACTOR TO 100%
GOSUB MKCS             ! MAKE THE STRING TO SEND TO THE DUT
GOSUB SENDIT
C$ = *ESR?
GOSUB SENDIT
GOSUB DAT:PRINT EVENT STATUS IS:;R$ ! MUST BE 0
PRINT
! PRINT Connect the Power Meter sensor to the DUT calibrator output.
! INPUT Press ENTER when ready to set the calibrator correction;A$
GOSUB MEAS MEASURE POWER OUTPUT IN mW AND RETURN CAL FACTOR IN %
B$[1] = STR$(INT(100*CF)/100)        ! CF IS CAL FACTOR
PRINT:PRINT CAL CORRECTION IS:;B$[1]
INPUT ENTER THE SERIAL NUMBER;B$[2]
INPUT ENTER THE TIME AS H,M[4],B$[3]
INPUT ENTER THE DATE AS M,D,Y (e.g. 5,9,93);b$[6],b$[5],b$[7]
C$ = *CLS                ! CLEAR THE STATUS BYTE
GOSUB SENDIT
```

```
GOSUB MKCS                ! CONVERT THE NEW DATA
GOSUB SENDIT              ! SEND TO DUT (did it understand and execute properly?)
C$ = *ESR?
GOSUB SENDIT
GOSUB DAT:PRINT EVENT STATUS IS;R$ ! MUST BE 0
GOSUB MEAS                ! VERIFY THAT THE POWER OUTPUT IS NOW CORRECT
END

MKCS:                    ! CONVERT THE ARRAY TO A STRING OF COMMA SEPARATED
VALUES
C$ = DIAG:CAL:EEPROM
FOR | = 1 TO 8:C$=C$+B$[|];IF | <8 THEN C$=C$+,:NEXT |
C$=C$+,000000            ! APPEND THE DEFAULT PASSWORD
PRINT:PRINT EEPROM DATA;C$
RETURN
MEAS:
C$ = OUTP:ROSC ON        ! Turn on the Calibrator
GOSUB SENDIT
INPUT Enter the power output in mW;m    ! Enter the measured power here either by a call to a
                                         ! subroutine or from the keyboard

CF = 100/m:print The power is;m
C$ = OUTP:ROSC OFF
GOSUB SENDIT            ! Turn off the calibrator
Return
```

The sensor(s) can now be calibrated by connecting to the calibrator output and entering the command **CAL1 (or 2)**. If the calibration does not complete satisfactorily, refer to the calibrator voltage and frequency checks starting in Section 4.3.3.

The Linearity test can now be performed as described in Section 4.4.2. This is a complete procedure and must be performed in the exact order given to produce accurate results. If this test fails, try it again with a different sensor. If it still fails, refer to the calibrator voltage and frequency checks in Section 4.3.3.

The following tests require that the power meter side cover be removed. Remove the two flat head screws from the right side cover and slide the cover about $\frac{1}{4}$ inch to the rear and lift it off.

The same test equipment that was used for the Performance Verification Tests can be used for these tests.

Refer to the Analog PC Board description in Section 3.3 for further help in defining the problem. If the fault cannot be located to the component level, the PC board can be removed and replaced with a different one with no further calibration required except to set the calibrator output power to 0 dBm.

4.3.3 Calibrator Voltages

To measure the calibrator voltages, first make sure that neither side of the DVM is grounded. The following measurements should find most of the problems that can occur in the calibrator circuitry.

1. Connect the DVM across the large resistor, A1R174. Measure 0.4 to 0.9 volts depending on the room temperature and how long the unit has been operating. This voltage is proportional to the current in the thermistor heater transistor which maintains the calibrator thermistor in a 60 °C (140 °F) environment. The voltage measured in the next step is dependent on this being correct.



NOTE: *The exact ambient temperature and power-on time of the instrument in Step 1 are not specific factors, but do have some effect on the reading taken across A1R174. If there is a problem in the circuit, the measured voltage will usually be some amount outside of the 0.4 to 0.9 volts specification (such as 0, +4, or +5 volts).*

2. Connect the low side of the DVM to A1TP3 and the high side to A1TP1. Measure +7 to +8.5 volts. This is the voltage applied to the thermistor bridge that is used to measure the calibrator power. This voltage will vary as the calibrator provides different amounts of RF power. This measurement assumes that the calibrator is OFF. To verify that the calibrator is off, send **OUTP:ROSC OFF**.
3. Turn the calibrator ON by sending **OUTP:ROSC ON**. Now connect the high side of the DVM to A1U3, pin 7. Measure +2 to +11 volts, which should change less than 2 mV per minute. If the voltage is incorrect or drifts excessively, troubleshoot the sample and hold circuit surrounding A1U3A.

4.3.4 Calibrator Frequency Check

To measure the frequency of the calibrator:

1. Connect a 50 MHz counter to the calibrator output connector.
2. Turn ON the calibrator according to the procedure given in Step 3, above.
3. Measure 49 to 51 MHz.
4. Turn OFF the calibrator by sending **OUTP:ROSC OFF**.

4.4 Performance Tests

It is recommended that the performance tests be done in the order described as some of the steps use the configuration from a previous step.

The Performance Verification Test Data Sheet is at the end of this chapter. These sheets can be copied and used for recording results each time testing is performed on the power meter.

4.4.1 GPIB Port Check

This procedure confirms that the GPIB port is functional.

4.4.1.1 Equipment Required

GPIB Controller

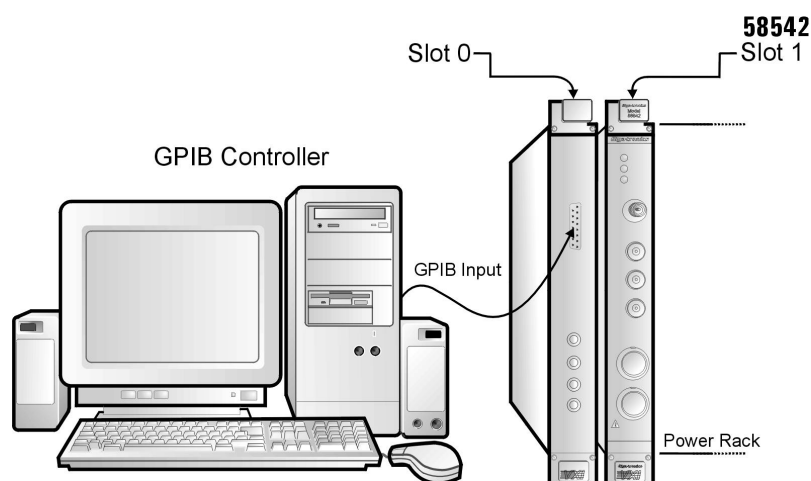


Figure 4-2: GPIB Port Test Setup

4.4.1.2 Procedure

1. Set the power meter's logical address (See Section 2.3 for instructions on how to set the address).
2. Connect the GPIB controller to the GPIB port of the SLOT 0 plug-in next to the power meter (See Figure 4-2).
3. Send the command:

***IDN?**

This is the standard COMMON identify query command defined by IEEE 488.2 1988. When talk addressed after receiving the command, the power meter will output a string that identifies itself as the 58542 VXIbus Universal Power Meter.

4. Display the response on the controller. It should be similar to:

Giga-tronics 58542, 0, 1.10

(The last number is the current software revision number)



NOTE: *If the instrument will not respond to the *IDN? command, see the note in Section 2.5.28.*

4.4.2 Power Sensor Linearity

This procedure tests the power sensor linearity over the range +20 dBm to -60 dBm. At low power levels, the linearity measurement will include the uncertainty due to the zero set specification. The procedure should be repeated for each sensor used with the power meter.

The instrument plus power sensor linearity test is valid when the sensor has been calibrated using the front panel calibrator at a temperature between 0 °C and +50 °C (+32 °F to +122 °F), and if operating within ± 5 °C (± 9 °F) of that calibration temperature.

When measuring the linearity of a Low VSWR (Series 8031XA) or a High Power (Series 8032XA) sensor, the power output of the source must be increased from 10 dB to either 16 or 20 dB respectively (See Figure 4-3). The power coefficient of the step attenuator will also have to be considered. The specification of power coefficient for the Weinschel attenuator cited in the Equipment List is: <0.005 dB/dB/W. The latter will effect the linearity of each 10 dB segment, and make it necessary to expand the overall linearity specification by this quantity.

Connect the test setup shown in Figure 4-3. In assembling the test setup, keep in mind that if testing is to be conducted with Low VSWR or High Power sensors, the optional RF Amplifier must have frequency and bandwidth to match the sensor's characteristics (See the Sensor Selection Guide in Appendix B), and the Directional Coupler must be increased as stated above for the particular series of sensors. All Standard (Series 8030XA) and True RMS (Series 8033XA) sensors are tested without the optional RF Amplifier, and with a 10 dB Directional Coupler.

Refer to the Linearity Data section of the Performance Verification Test Data Sheet at the end of this chapter. The tolerance is already entered for the various steps and includes an allowance for specified zero-set errors at low power levels.

4.4.2.1 Setup Parameters

The following setup parameters should be accomplished prior to performing the Power Linearity test:

4.4.2.2 Equipment Required

GPIB Controller • Digital Voltmeter • RF Signal Generator • Thermistor Power Meter • Directional Coupler • Step Attenuator • Power Sensor

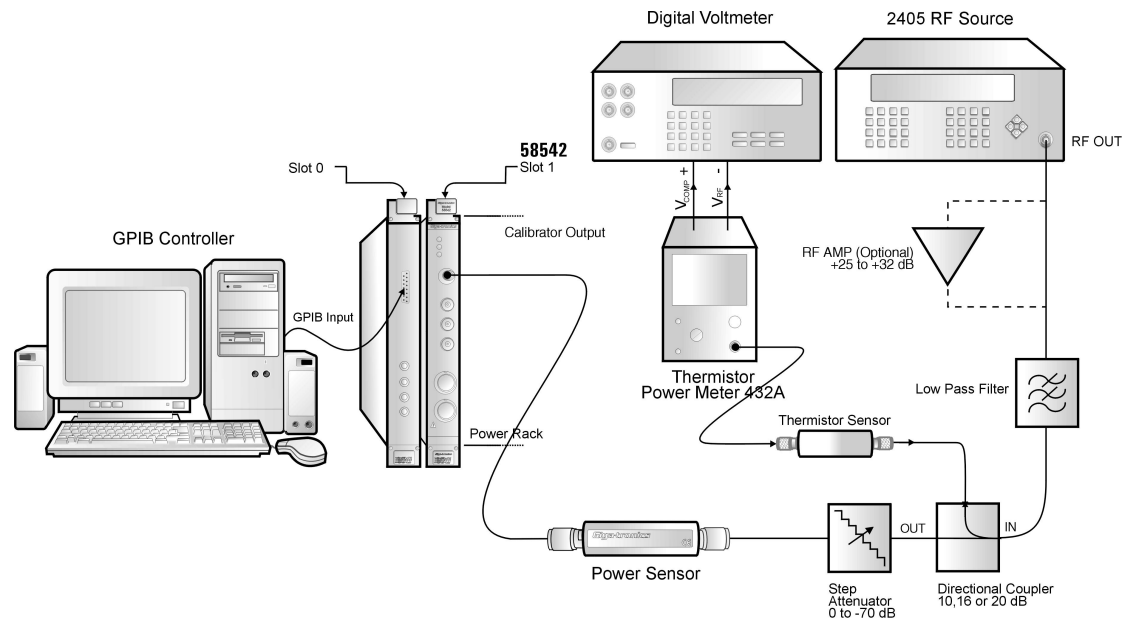


Figure 4-3: Power Sensor Linearity Test Setup

1. The power meter and sensor should be calibrated by following the instructions in Section 4.3 of this publication.
2. The Averaging is set to AUTO by entering:

SENS1:AVER:COUN:AUTO ON

(Enter SENS2 for channel 2)

CAUTION

Extreme care is required in the following procedure since the accuracy requirements are critical to ensure the most accurate test results.

Power readings are determined using the thermistor power meter in the same general way as given in the Power Reference Level test. That is, P1 and P2 in the Power Meter reading column of the Performance Verification Test Data Sheet tables are calculated each time for the respective values of V_{COMB} , V_0 , and V_1 as read on the DVM.

3. To ensure accurate and repeatable measurements, the HP 432A power meter should be zeroed just before taking each reading that will be used to calculate P1 in the Power Meter column of the Performance Verification Test Data Sheet.

4.4.2.3 Test Procedure

1. Set the step attenuator to 70 dB. Turn the source power output off, and then zero the power meter (the power meter is zeroed by sending **CAL1:ZERO**)
2. Set the step attenuator to 0 dB after the power meter has zeroed.
3. Set the power output of the RF source so that the thermistor power meter indicates $1.00 \text{ mW} \pm 0.025 \text{ mW}$.
4. Record the calculated power meter reading and the power meter reading at the end of this chapter. The power meter data is obtained by sending **MEAS1? (or MEAS2?)** and then receive the data.
5. Set the power output of the RF source so that the thermistor power meter indicates $3.98 \text{ mW} \pm 0.10 \text{ mW}$.
6. Record the new calculated power meter reading and the new power meter reading in the correct columns of the Linearity Data section of the data sheet.
7. Set the power output of the RF Source so that the thermistor power meter indicates $3.98 \text{ mW} \pm 0.10 \text{ mW}$.
8. Record the calculated power meter reading and the power meter reading in the correct columns of the Linearity Data section of the data sheet.
9. Set the power output of the RF Source so that the thermistor power meter indicates $5.01 \text{ mW} \pm 0.13 \text{ mW}$.
10. Record the new calculated power meter reading and the new power meter reading in the correct columns of the Linearity Data section of the data sheet.
11. Repeat using the power meter indications in the Test Data sheet. Note that the Step Attenuator generates the remaining 70 dB range of 10 dB steps for a total range of 80 dB. Repeat Step 1 between each 10 dB step shown on the Linearity Data section of the data sheet.
12. Make the calculations indicated on the Linearity Data section of the test data sheet and enter the values in the appropriate blank spaces.

This completes the performance tests for the power meter and its sensors. If the meter has performed as described in this chapter, it is correctly calibrated and within specifications.

58542 VXIBUS UNIVERSAL POWER METER

Performance Verification Test Data Sheet (1 of 2)

Date:	
Operator:	
Test Number:	
Power Meter S/N:	
Power Sensor S/N:	

Calibrator Output Power Reference

Minimum	Actual Reading	Maximum
0.981 mW		1.019 mW

Linearity Data (+16 dBm to +20 dBm)

Step Attenuator Value	Power Set Point	Power Meter Reading (P)	58542 (DUT) Reading (R)	Reference Power Ratio	58542 (DUT) Reading Ratio	Linearity Error (%) ¹	
						Linearity Specification	Accumulated Linearity Error ²
0 dB	1.00 mW ±0.025 mW	P1 =	R1 =	P1/P2 =	R1/R2 =		
	3.98 mW ±0.10 mW	P2 =	R2 =			± 1%	Same as Lin. error above
0 dB	3.98 mW ±0.10 mW	P1 =	R1 =	P1/P2 =	R1/R2 =		
	5.01 mW ±0.13 mW	P2 =	R2 =			+ 1% -1.6%	
0 dB	5.01 mW ±0.13 mW	P1 =	R1 =	P1/P2 =	R1/R2 =		
	6.31 mW ±0.16 mW	P2 =	R2 =			+ 1% -2.7%	
0 dB	6.31 mW ±0.16 mW	P1 =	R1 =	P1/P2 =	R1/R2 =		
	7.94 mW ±0.2 mW	P2 =	R2 =			+ 1% -3.8%	
0 dB	7.94 mW ±0.2 mW	P1 =	R1 =	P1/P2 =	R1/R2 =		
	10 mW ±0.25 mW	P2 =	R2 =			+ 1% -4.9%	

60 dBm to +16 dBm Linearity Data are on the next page.

NOTES:

- Linearity Error (%) = $[(R1/R2) / (P1/P2) - 1] \times 100$
- Accumulated error is the sum of the current dB segment linearity error plus the previous accumulated error.

58452 VXIBUS UNIVERSAL POWER METER Performance Verification Test Data Sheet (2 of 2)

Linearity Data (+16 dBm to +60 dBm)

Step Attenuator Value	Power Set Point	Power Meter Reading (P)	58542 (DUT) Reading (R)	Reference Power Ratio	58542 (DUT) Reading Ratio	Linearity Error (%) ¹	
						Linearity Specification	Accumulated Linearity Error ²
0 dB						See Note 3	
						±1%	Same as Lin. error above
10 dB	1.00 mW ±0.025 mW	P1 =	R1 =	P1/P2 =	R1/R2 =		
	10.00 mW ±0.25 mW	P2 =	R2 =			±1%	
20 dB	1.00 mW ±0.025 mW	P1 =	R1 =	P1/P2 =	R1/R2 =		
	10.00 mW ±0.25 mW	P2 =	R2 =			±1%	
30 dB	1.00 mW ±0.025 mW	P1 =	R1 =	P1/P2 =	R1/R2 =		
	10.00 mW ±0.25 mW	P2 =	R2 =			±1%	
40 dB	1.00 mW ±0.025 mW	P1 =	R1 =	P1/P2 =	R1/R2 =		
	10.00 mW ±0.25 mW	P2 =	R2 =			±1%	
50 dB	1.00 mW ±0.025 mW	P1 =	R1 =	P1/P2 =	R1/R2 =		
	10.00 mW ±0.25 mW	P2 =	R2 =			±1%	
60 dB	1.00 mW ±0.025 mW	P1 =	R1 =	P1/P2 =	R1/R2 =		
	10.00 mW ±0.25 mW	P2 =	R2 =			±1.5%	
70 dB	1.00 mW ±0.025 mW	P1 =	R1 =	P1/P2 =	R1/R2 =		
	10.00 mW ±0.25 mW	P2 =	R2 =			±6%	

NOTES:

- Linearity Error (%) = $[(R1/R2) / (P1/P2) - 1] \times 100$
- Accumulated error is the sum of the current dB segment linearity error plus the previous accumulated error.
- Use the first CW Linearity error value entered in the +16 dBm to +20 dBm Linearity Data on page 4-13.

Maintenance

5.1 Introduction

This chapter defines maintenance practices and calibration and troubleshooting checks that assist in fault isolation. Problems can occur that might be produced by peripheral equipment or components. Preliminary checks should be made to ensure that peripheral equipment or components are not causing what appears to be a malfunction within the power meter.

The maintenance and calibration procedures in this chapter should be performed at least once each year unless the power meter is operated in an extremely dirty or chemically contaminated environment, or is subject to severe abuse (such as being dropped). In such cases, more frequent maintenance (immediate, if the unit is dropped or severely abused in some way) is required. The unit's front panel and housing can be cleaned using a cloth dampened in a mild detergent. Do not use abrasive cleaners, scouring powders, or any harsh chemicals. Wipe the soap residue off with a clean, damp cloth, then dry with a clean dry cloth.

Make a performance verification check in accordance with the procedures given in Section 4.4 of this publication. If the unit will pass all of the performance tests, there is no need for calibration.

5.2 Power Supply Voltage Checks

There are six power supplies. They are all located on the A1 Analog PC board. In case there is a regulated voltage failure, check the corresponding unregulated supply with reference to schematic diagram 21360 on page 7-6. The unregulated voltage must be at least 2 volts more than the required regulated output. To measure the supplies, turn the unit on and let it stabilize for a minute or so. Then proceed as follows:

1. Connect the DVM from A1TP3 (ground) to A1TP2 (+) on the Analog assembly. Measure +14.25 V to +15.75 V.
2. Connect the high side of the DVM to A1TP4. Measure -14.25 V to -15.75 V.
3. Connect the high side of the DVM to A1TP5. Measure +4.75 V to +5.25 V.
4. Connect the high side of the DVM to A1TP9. Measure +11.4 V to +12.6 V.
5. Connect the high side of the DVM to A1TP10. Measure -11.4 V to -12.6 V.
6. Connect the high side of the DVM to A1U14, pin 1. Measure -9.1 V to -10.9 V.

5.3 Lithium Battery

The power meter contains a 3.6 V lithium battery to maintain the test setups and calibration data when the unit is turned off. This battery should last in excess of five years. To check the battery, connect a voltmeter between A2TP1 and the frame of the instrument.

Battery replacement is recommended every three years or sooner if the battery voltage drops below 3.1 V. The lithium battery should be removed if the instrument is to be placed in long-term storage of two years or more.

The battery can be replaced without losing the data stored in RAM if the old battery is removed and the new battery installed in less than 10 seconds with main power off, or if power is left on while changing the batteries.

CAUTION

Since this procedure requires removing the cover from the instrument and restoring power before removing the battery, it should be performed only by qualified personnel.

Lithium batteries can supply substantial current and depending on factors such as the state of charge, can overheat when shorted.

The following replacement procedure is intended for users knowledgeable in the use and care of equipment using non-rechargeable lithium batteries.

Recommended Replacement Battery: Tadiran Type TL-5242, Giga-tronics P/N 21212.

5.3.1 Replacement Procedure: D

1. Turn OFF the 58542.
2. Remove the cover.
3. Note the orientation of the battery, which is located on the side of the analog input cover. The battery is held in place with a hook and loop fastener. Peel the battery free of the PC board.
4. Turn the 58542 on to maintain memory power while replacing the battery. The 58542 can be turned off while changing the battery, but install the new battery within ten seconds to avoid losing RAM data.
5. Disconnect the battery wires. The connector is polarized so it can be inserted only one way, with the red wire toward the rear of the instrument.
6. Install the new battery and connect the wires.
7. Turn the 58542 off and measure the battery voltage between TP13 (common) and TP17 (bat). It must be at least 3.6 V.
8. Connect a voltmeter between A2TP1 & TP2. The voltage must settle to <3 mV. If above this level, the battery life will be shortened. The only load on the battery is the static RAM. It might be necessary to find out which chip is drawing too much current, and replace it if the current is excessive.
9. Replace the cover and secure.

10. If desired, attach a label indicating when the next battery replacement is due.
11. Test for satisfactory operation of the new battery. Turn on the 58542 and calibrate a sensor. Turn the 58542 off, wait ten seconds, and turn on the 58542. The sensor calibration should still be valid as indicated by proper measurement of a power level.

5.4 GPIB Test Functions

If the unit will not calibrate its sensors, there are some test functions available through the GPIB. Using these functions, it is possible to check out the operation of the different parts of the calibrator system.

1. If the calibrator output power as measured in Chapter 4 is within tolerance but the unit will still not complete a sensor calibration, perform the following test to determine if the calibrator is operating correctly:
 - a. Send **DIAG:CAL:SOUR 10** from the controller, followed by **DIAG:CAL:ATTEN 0**.
 - b. The calibrator output should be $+20 \text{ dBm} \pm 0.8 \text{ dB}$.
 - c. Send **DIAG:CAL:ATTEN 10**.
This will insert the 10 dB attenuator into the calibrator output. The power should measure a decrease of $10 \text{ dB} \pm 1 \text{ dB}$.
 - d. Repeat Step b, substituting 20, 30 and 40 successively in the command. The power should be attenuated by the attenuation level specified in the command $\pm 1 \text{ dB}$. This will verify the condition of all attenuators.
2. This step verifies the oscillator power control circuits. This is done by setting the power to higher and lower levels and measuring the results.
 - a. Send the command **DIAG:CAL:ATTEN 0**, followed by **DIAG:CAL:SOUR X** where X is -3 to +13. The resulting power output should range between -13 dB from the first reading taken in Step 1.a to at least +21 dBm.
 - b. This checks the calibrator control circuits completely. If the unit still will not calibrate a sensor, the problem is in the measurement circuits, not the calibrator. Proceed to Section 5.4.1.

5.4.1 58542 Channel 2 Troubleshooting

If only one channel will calibrate, troubleshoot the circuits associated with the channel that fails. The separate channels are shown on Sheet 1 (Ch 2) and Sheet 2 (Ch 1) of Schematic DWG 21360. If the unit will calibrate Channel 1 but not Channel 2, proceed as follows:

1. If the unit fails to turn on the TRIGGER LED when the sensor is connected, the problem is in the temperature sensing thermistor circuit which connects to U39-3.

Measure the voltage at U5-12. It should be about 2 or 3 volts. If it is above 5 or below 0.3 volts, the thermistor circuit is faulty.
2. Reverse the two sensors to determine if one of them is bad.

5.4.2 Diagnostic Test Commands

Table 5-1 lists the VXI Diagnostic commands for testing and adjusting the 58542 VXIbus Universal Power Meter. A typical example is shown after the command syntax. Some commands are described in the maintenance/calibration section.

It is necessary to disable channels 1 and 2 from taking measurements before using these diagnostic commands. This is accomplished with the following commands:

CALC1:STAT OFF
CALC2:STAT OFF

Table 5-1: Diagnostic Commands

Command Syntax	Function
DIAGnostic:ADC? OUTPUT @PWR_MTR;DIAG:ADC?	Query analog to digital converter reading (Return: 0 – 32767)
DIAGnostic:AVADC?space16 OUTPUT @PWR_MTR;DIAG:AVADC? 16	Query analog to digital reading with 16 average (Average from 1 to 512) (Return: 0 – 32767)
DIAGnostic:AVOLT?space16 OUTPUT @PWR_MTR;DIAG:AVOLT? 16	Query analog to digital reading in volts with 16 average (Average from 1 to 512) (Return: 0 – 10)
DIAGnostic:BNC:ANALogspace5.5 OUTPUT @PWR_MTR;DIAG:BNC:ANA 5.5	Set analog BNC port output to 5.5 V (-10 – 10)
DIAGnostic:BNC:TRIGger? OUTPUT @PWR_MTR;DIAG:BNC:TRIG?	Query EXT trigger input high, 5 V or low, 0.00 V, status (1: Triggered, 0: No trigger)
DIAGnostic:BNC:VPROpf? OUTPUT @PWR_MTR;DIAG:BNC:VPRO?	Query V_{PROP} port reading (0 – 32767)
DIAGnostic:CALibrator:ATTenuator?space10 OUTPUT @PWR_MTR;DIAG:CAL:ATT 10	Set calibrator attenuator to 10 dB (0 – 40)
DIAGnostic:CALibrator:ATTenuator? OUTPUT @PWR_MTR;DIAG:CAL:ATT?	Query calibrator attenuator value
DIAGnostic:CALibrator:EEPROM?space100 OUTPUT @PWR_MTR;DIAG:CAL:EEPROM 1800123,30,9,23,6,92,0,123456	Set calibrator EEPROM data: cal fac, s/n, min, hr, day, month, yr, password flag (0:Disable, 1:Enable), password
DIAGnostic:CALibrator:EEPROM? OUTPUT @PWR_MTR;DIAG:CAL:EEPROM?	Query calibrator eeprom data
DIAGnostic:CALibrator:POWerspace-23.5 OUTPUT @PWR_MTR;DIAG:CAL:POW-23.5	Set calibrator power to -23.5 dBm
DIAGnostic:CALibrator:PTEmperature? OUTPUT @PWR_MTR;DIAG:CAL:PTem?	Query calibrator temperature (in Celsius)
DIAGnostic:CALibrator:SOURcespace9.5 OUTPUT @PWR_MTR;DIAG:CAL:SOUR 9.5	Set calibrator internal power to 9.5 dBm (Power output in dBm assuming perfect 10 dB pad)
DIAGnostic:CALibrator:VAMB? OUTPUT @PWR_MTR;DIAG:CAL:VAMB?	Query calibrator bridge volts (0 – 10)
DIAGnostic:CTABLE?space < Sensor 1 or 2 > OUTPUT @PWR_MTR;DIAG:CTAB? 1	Query sensor 1 calibration data

Table 5-1: Diagnostic Commands (Continued)

Command Syntax	Function
DIAGnostic:GAINspaceA-B,0-1,-2-3-4-5-6,N-I-G-O OUTPUT @PWR_MTR;DIAG:GAIN	Set gain circuit; Channel, Gain, Mode, A,B Channel, Gain 0 to 6; N: Non_invert, I: Invert, G:Ground, O:Option
DIAGnostic:LEDspaceON-OFF OUTPUT @PWR_MTR;DIAG:LED ON	Turn trigger led on
DIAGnostic:MULTiplexerspaceMA-MB-MC MO-MP OUTPUT @PWR_MTR;DIAG:MUL MA	Set multiplexer
DIAGnostic:MEASurementspaceSTART-STOP OUTPUT @PWR_MTR;DIAGMEAS STAR	Resume measurement process
DIAGnostic:OFFSetspace3.5 OUTPUT @PWR_MTR;DIAG:OFFS 3.5	Set ADC offset to 3.5 V (-5 to +5)
DIAGnostic:RAM? OUTPUT @PWR_MTR;DIAG:RAM?	Query ram destructive test result (0 = Pass; 1 = Fail)
DIAGnostic:ROM? OUTPUT @PWR_MTR;DIAG:ROM?	Query rom test result (0 = Pass; 1 = Fail)
DIAGnostic:RAWdataspace < ON or OFF > OUTPUT @PWR_MTR;DIAG:RAW ON	Enable measurement raw data output
DIAGnostic:SENS < sensor 1 or 2 > :EEPROM:READ OUTPUT @PWR_MTR;DIAG:SENS1:READ	Read eeprom table data from sensor 1 into editor memory
DIAGnostic:SENS < sensor 1 or 2 > :EEPROM:WRITE 123456 OUTPUT @PWR_MTR;DIAG:SENS1:EEPROM:WRIT 123456	Write eeprom sensor 1 editor data into sensor (Using password)
DIAGnostic:SENS < sensor 1 or 2 > :EEPROM:TYPE 80301,0,59,9,22,12,92,0 OUTPUT @PWR_MTR;DIAG:SENS2:TYPE 80301,0,59,9,22,12,92,0	Edit sensor 2 eeprom type table data: model, s/n, cal location, min, hour, day, month, year, password flag (0:Disable, 1:Enable)
DIAGnostic:SENS < sensor 1 or 2 > :EEPROM:SPEC 1e7,18e9,4100,3900 OUTPUT @PWR_MTR;DIAG:SENS2:SPEC 1E7,18E9,4100,3900	Lower frequency, upper frequency video R+, R-
DIAGnostic:SENS < sensor 1 or 2 > :EEPROM:TYPE? OUTPUT @PWR_MTR;DIAG:SENS1:EEPROM:TYPE?	Query sensor 1 eeprom type table data
DIAGnostic:SENS < sensor 1 or 2 > :EEPROM:CORRection OUTPUT @PWR_MTR;DIAG:SENS1:EEPROM:CORR "1.1,2.1,3.1,4.1,5.1,6.1,7"	Edit sensor 1 eeprom correction table: A,B,C,D,E,H
DIAGnostic:SENS < sensor 1 or 2 > :EEPROM CORRection? OUTPUT @PWR_MTR;DIAG:SENS1:EEPROM:CORR?	Query sensor 1 eeprom correction table
DIAGnostic:SENS < sensor 1 or 2 > :EEPROM:CALFRRange 2e9,1e9,17,1 OUTPUT @PWR_MTR;DIAG:SENS1:EEPROM:CALFR 2E9,1E9,17,1	Edit sensor 1 eeprom cal factor range table:standard:start:cf freq, step cf freq, cf number, special cf number
DIAGnostic:SENS < sensor 1 or 2 > :EEPROM:CALFRRange? OUTPUT @PWR_MTR;DIAG:SENS1:EEPROM:CALFR?	Query sensor 1 eeprom cal factor range table
DIAGnostic:SENS < sensor 1 or 2 > :EEPROM:FREQStandard? OUTPUT @PWR_MTR;DIAG:SENS1:EEPROM:FREQST?	Query sensor 1 eeprom cal factor standard freq table
DIAGnostic:SENS < sensor 1 or 2 > :FREQSPecial? OUTPUT @PWR_MTR;DIAG:SENS1:EEPROM:FREQSP?	Query sensor 1 eeprom cal factor special freq table

Table 5-1: Diagnostic Commands (Continued)

Command Syntax	Function
DIAGnostic:SENS < sensor 1 or 2 > :EEPROM:FREQSPeals <i>space double quote</i> <i>one or more frequencies 1e7 to 40e9double quote</i> OUTPUT @PWR_MTR;DIAG:SENS1 :EEPROM:FREQSP "1E9,2.2E9"	Add special cal factors at 1 GHz and 2.2 GHz
DIAGnostic:SENS < sensor 1 or 2 > :EEPROM:CALFSTandard? OUTPUT @PWR_MTR;DIAG:SENS1:EEPROM:CALFST?	Query sensor eeprom cal factor standard table
DIAGnostic:SENS < sensor 1 or 2 > :EEPROM:CALFSTandard <i>space quote</i> 0.20,0.30,0.40,0.50,0.60,0.70,0.80,0.90,0.0.10,0.11,0.12,0.13,0.14, 0.15,0.16,0.17,0.18 <i>quote</i> OUTPUT @PWR_MTR;DIAG:SENS1:CALFST "0.20,0.30,0.40,0.50,0.60,0.70,0.80,0.90,0.0.10,0.11,0.12,0.13,0.14,0.15.0.16 ,0.17,0.18"	Edit sensor 1 eeprom cal factor standard table: 2,3,4,5,6,7,8,9,10,11,12,13,14,15, 16,17,18. Standard Cal Factor frequencies Match Start,Step and #
DIAGnostic:SENS < sensor 1 or 2 > :EEPROM:CALFSPeals <i>space double quote</i> one or more calfactor values-99.9 <i>double quote</i> OUTPUT @PWR_MTR;DIAG:SENS1:EEPROM:CALFSP "0.03,-0.04"	Added sensor 1 cal factors, # of items matches # of Frequencies
DIAGnostic:SENS < sensor 1 or 2 > :EEPROM:CALFSPeal? OUTPUT @PWR_MTR;DIAG:SENS1:EEPROM:CALFSP?	Query sensor 1 special frequency cal factor
DIAGnostic:SENVolts <i>space</i> < ON or OFF > OUTPUT @PWR_MTR;DIAG:SENV ON	Turn on sensor 5 volt line
DIAGnostic:VOLT? OUTPUT @PWR_MTR;DIAG:VOLT?	Query ADC reading in volts
DIAGnostic:ZTABLE? <i>space</i> < sensor 1 or 2 > OUTPUT @PWR_MTR;DIAG:ZTAB? 1	Query sensor 1 zeroing data

Parts Lists

6.1 Introduction

This chapter contains the parts lists for all assemblies in the 58542 VXIbus Universal Power Meter. Each parts list includes the CAGE identifier. A list of manufacturers is in Section 6.3.

6.2 58542 VXIbus Universal Power Meter Parts Lists

58542 VXI POWER METER, REV: E					
Item	P/N	Qty	Cage	Mfr's P/N	Description
	32273	REF	58900	32273	MODEL 58542 LAB WINDOWS
1	21383-A00	1	58900	21383-A00	58542,VXI CHASSIS ASSY
2	21555	1	58900	21555	MANUAL,MODEL 58542
3	21373	1	58900	21373	COVER,RT SIDE
4	21461	1	58900	21461	INSULATOR,RIGHT SIDE
5	20954-001	2	54516	20954-001	DET EXT CABLE ASSY 1.5M (5 FT)
6	21556	2	58900	21556	LABEL, ESD
7	PS00-00005	1	0GAA9	3001418	STATIC SHIELDING BAG
8	32442	REF	58900	32442	OUTLINE DRAWING FOR 58542 VXI

21383-A00 58542, VXI CHASSIS ASSY, REV: H					
Item	P/N	Qty	Cage	Mfr's P/N	Description
	30008	REF	58900	30008	58542 PRETEST PROCEDURE
1	21375	1	58900	21375	FRT PNL,MODEL 58542 (VXI)
2	30009	REF	58900	30009	58542 CAL PROCEDURE
3	30010	REF	58900	30010	58542 SYSTEM TEST PROC
4	30018	REF	58900	30018	58542 SERIES JIT FLOW CHART
5	21374	1	58900	21374	COVER,LT SIDE
6	10129	1	58900	10129	LABEL, CODE AND SERIAL NUMBER
7	21462	1	58900	21462	INSULATOR,LEFT SIDE
8	HEH0-00001	1	58900	HEH0-00001	EXTRACTOR HANDLE
9	HEH0-00002	1	58900	HEH0-00002	EXTRACTOR HANDLE
10	21414	2	58900	21414	LABEL,VXI LOGO
11	20192	1	58900	20192	SHELL,OBLONG
12	20259	1	58900	20259	COVER,CALIBRATOR HOUSING

58542 VXIbus Universal Power Meter

21383-A00 58542, VXI CHASSIS ASSY, REV: H (Continued)

Item		P/N	Qty	Cage	Mfr's P/N	Description
	13	20800	1	58900	20800	LABEL,US PATENT 4,794,325
	14	20112	1	58900	20112	CALIB THERM OVEN PCB ASSY
	101	HNKS-44004	4	58900	HNKS-44004	4-40 KEP NUT
	102	HWSS-40300	10	58900	HWSS-40300	#4 X 3/16 SPLIT LOCK
	103	HBFP-44003	4	26233	NS139CR440R3	4-40 X 3/16 FLAT
	104	HCTX-02511	2	62559	21100-464	GRAY COLLAR SCREW SLEEVE
	105	HBPP-44004	10	26233	NS137CR440R4	4-40 X 1/4 PAN
	106	21587	3	58900	21587	RING NUT,BNC
	107	HBPC-02510	2	58900	HBPC-02510	M2.5 X 10 CHEESE HEAD
	108	HCTS-02511	2	58900	HCTS-02511	M2.5 x 11 COLLAR SCREW
	109	HWFS-02507	2	58900	HWFS-02507	M2.5 FLAT WASHER
	110	HBFP-02508	2	58900	HBFP-02508	M2.5 X 8 RAISED C'SINK
	111	70564	REF	58900	70564	VXI ASSEMBLY WORK INSTRU
	112	32023	REF	58900	32023	CODE LABEL
A	1	21359	1	58900	21359	PCB ASSY,ANALOG VXI
A	2	21356	1	58900	21356	PCB ASSY,DIGITAL
A	3	21418	1	58900	21418	PCB ASSY,VXI PROCESSOR
BT	1	VB00-00360	1	68630	TL-5242/W	3.6 VOLT LITHIUM BATTERY
U	13	21371	1	58900	21371	PROM SET, VXI DIGITAL
U	14	21371	REF	58900	21371	PROM SET, VXI DIGITAL
U	15	21371	REF	58900	21371	PROM SET, VXI DIGITAL
U	16	21371	REF	58900	21371	PROM SET, VXI DIGITAL
W	1	21442	1	58900	21442	CABLE ASSY,CAL
W	2	21405	1	58900	21405	CABLE ASSY,SENSOR INPUT
W	3	21405	1	58900	21405	CABLE ASSY,SENSOR INPUT

21359 PCB ASSY, ANALOG VXI, REV: R

Item		P/N	Qty	Cage	Mfr's P/N	Description
	1	21358	1	58900	21358	PCB,ANALOG
	2	21360	REF	58900	21360	SCHEMATIC,ANALOG
	3	JIA0-01443	4	58900	JIA0-01443	CONTACT POST
	4	10091-008	3	58900	10091-008	4-40 X 9/16 SWAGE SPACER
	5	10091-007	2	58900	10091-007	STANDOFF,SWAGE,4-40,.750 LG
	7	HQH0-00000	2	05820	274-2AB	HEATSINK
	9	GFU0-01204	0	53387	4504-3/4"	3/4 X 1/4 FOAM TAPE
	10	21385	1	58900	21385	COVER,BTM,SENSOR INPUT
	11	WTT0-22001	0	16428	#22AWG-TFE/TW	#22 CLEAR TFE SLVNG
	101	HWSS-40300	8	58900	HWSS-40300	#4 X 3/16 SPLIT LOCK
	102	HBPP-44004	12	26233	NS137CR440R4	4-40 X 1/4 PAN
	103	16718	0	05AJ8	COMPOUND 340	THERMAL GREASE
	104	HNKS-44004	1	58900	HNKS-44004	4-40 KEP NUT
	105	HBPP-44005	1	26233	NS137CR440R5	4-40 X 5/16 PAN
	106	GFU0-01204	1	53387	4504-3/4"	3/4 X 1/4 FOAM TAPE

21359 PCB ASSY, ANALOG VXI, REV: R (Continued)

Item	P/N	Qty	Cage	Mfr's P/N	Description
107	HSCS-40204	3	-----	BR6921B-0.156-34	4-40 x 5/32 SWAGE SPACER
112	20260	1	-----	20260	HOUSING,CALIBRATOR
114	21384	1	58900	21384	COVER,TOP,SENSOR INPUT
C 10	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C 11	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C 12	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C 13	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C 14	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C 15	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C 17	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C 18	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C 19	CD00-02100	1	-----	CM05E102	1000 PF DIP MICA
C 20	CD00-02100	1	-----	CM05E102	1000 PF DIP MICA
C 21	CD00-02100	1	-----	CM05E102	1000 PF DIP MICA
C 22	CD00-02100	1	-----	CM05E102	1000 PF DIP MICA
C 23	CD99-01820	1	-----	DM15821F	820 PF 300V DIP MICA
C 24	CD99-01820	1	-----	DM15821F	820 PF 300V DIP MICA
C 25	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C 26	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C 27	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C 28	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C 29	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C 30	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C 31	CE50-06100	1	55680	TVX1H100MAA	10UF 50V AXIAL
C 33	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C 34	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C 35	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C 36	CC98-00330	1	-----	CCD-330	33 PF 1KV CERAMIC NPO
C 37	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C 38	CC50-04220	1	31433	C330C224MSU5CA	.22 UF CERAMIC Z5U
C 39	CF00-04470	1	58900	CF00-04470	.47UF 100V POLYPROPYLENE
C 40	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C 41	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C 42	CT20-R6150	1	04222	TAP156K020CCS	15UF 20V TANTALUM
C 43	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C 44	CT20-R6150	1	04222	TAP156K020CCS	15UF 20V TANTALUM
C 45	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C 46	CE50-R5470	1	74840	475PGM050M	4.7UF 50V RADIAL
C 47	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C 48	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R

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21359		PCB ASSY, ANALOG VXI, REV: R (Continued)				
Item		P/N	Qty	Cage	Mfr's P/N	Description
C	49	CC50-02220	1	04222	SR151C222KAA	2200PF CERAMIC X7R
C	50	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	51	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	52	CD99-01150	1	-----	DM15-151F	150 PF DIP MICA
C	53	CD99-01240	1	-----	DM15-241F	240 PF DIP MICA
C	54	CC50-02220	1	04222	SR151C222KAA	2200PF CERAMIC X7R
C	55	CD99-00620	1	-----	CMO5FD620F03	62 PF DIP MICA
C	56	CD99-01120	1	-----	CMO6FD121J03	120 PF DIP MICA
C	57	CD99-00620	1	-----	CMO5FD620F03	62 PF DIP MICA
C	58	CD00-02100	1	-----	CM05E102	1000 PF DIP MICA
C	59	CC50-02220	1	04222	SR151C222KAA	2200PF CERAMIC X7R
C	60	CC50-02220	1	04222	SR151C222KAA	2200PF CERAMIC X7R
C	61	CC00-02220	1	04222	SR201A222KAA	2200 PF CERAMIC COG
C	62	CC00-02220	1	04222	SR201A222KAA	2200 PF CERAMIC COG
C	63	CD00-02100	1	-----	CM05E102	1000 PF DIP MICA
C	64	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	65	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	66	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	67	CC00-02220	1	04222	SR201A222KAA	2200 PF CERAMIC COG
C	68	CC00-02220	1	04222	SR201A222KAA	2200 PF CERAMIC COG
C	69	CC00-02220	1	04222	SR201A222KAA	2200 PF CERAMIC COG
C	70	CC00-02220	1	04222	SR201A222KAA	2200 PF CERAMIC COG
C	71	CC00-02220	1	04222	SR201A222KAA	2200 PF CERAMIC COG
C	72	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	73	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	74	CC00-02220	1	04222	SR201A222KAA	2200 PF CERAMIC COG
C	75	CC50-04220	1	31433	C330C224MSU5CA	.22 UF CERAMIC Z5U
C	76	CC50-?????	1	58900	CC50-?????	COMPONENT SELECTED IN TEST
C	77	CC50-02220	1	04222	SR151C222KAA	2200PF CERAMIC X7R
C	78	CC50-02100	1	04222	SR155C122MAT	.001 UF CERAMIC Y5P
C	79	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	80	CC50-02220	1	04222	SR151C222KAA	2200PF CERAMIC X7R
C	81	CC50-02220	1	04222	SR151C222KAA	2200PF CERAMIC X7R
C	82	CC50-02220	1	04222	SR151C222KAA	2200PF CERAMIC X7R
C	83	CC50-02220	1	04222	SR151C222KAA	2200PF CERAMIC X7R
C	84	CC50-03470	1	04222	SR205C473KAA	.047 UF CERAMIC X7R
C	85	CC50-02220	1	04222	SR151C222KAA	2200PF CERAMIC X7R
C	86	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	87	CC50-02100	1	04222	SR155C122MAT	.001 UF CERAMIC Y5P
C	88	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R

21359 PCB ASSY, ANALOG VXI, REV: R (Continued)

Item		P/N	Qty	Cage	Mfr's P/N	Description
C	90	CC50-02100	1	04222	SR155C122MAT	.001 UF CERAMIC Y5P
C	91	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	92	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	93	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	94	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	100	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	101	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	102	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	103	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	104	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	105	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	106	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	107	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	108	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	109	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	110	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	112	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	114	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	115	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	124	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	126	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	127	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	128	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	129	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	130	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	131	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	132	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	133	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	134	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	135	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	136	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	137	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	138	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	139	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	140	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	141	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	142	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	143	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	144	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	145	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R

21359 PCB ASSY, ANALOG VXI, REV: R (Continued)						
Item		P/N	Qty	Cage	Mfr's P/N	Description
C	14	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	147	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	148	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	149	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	150	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	151	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	152	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	153	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	154	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	155	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	156	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	157	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	158	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	161	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	162	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	163	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	167	CD99-02250	1	-----	DM19F252J500V	2500 PF 500 V DIP MICA
C	171	CE50-06100	1	55680	TVX1H100MAA	10UF 50V AXIAL
C	173	CE50-06100	1	55680	TVX1H100MAA	10UF 50V AXIAL
C	174	CE50-06100	1	55680	TVX1H100MAA	10UF 50V AXIAL
C	175	CE50-R6100	1	55680	UVX1H100MDA	10 UF 50V RADIAL LEAD
C	176	CE50-R6100	1	55680	UVX1H100MDA	10 UF 50V RADIAL LEAD
C	177	CC50-B4470	1	04222	SR305C474KAA	.47 UF CERAMIC X7R
C	178	CC50-B4470	1	04222	SR305C474KAA	.47 UF CERAMIC X7R
C	179	CC50-B4470	1	04222	SR305C474KAA	.47 UF CERAMIC X7R
C	180	CC50-B4470	1	04222	SR305C474KAA	.47 UF CERAMIC X7R
C	185	CE50-R7100	1	0H1N5	CEUSM1H101M	100UF 50V RADIAL
C	186	CE50-R7100	1	0H1N5	CEUSM1H101M	100UF 50V RADIAL
C	187	CC50-B4470	1	04222	SR305C474KAA	.47 UF CERAMIC X7R
C	188	CC50-B4470	1	04222	SR305C474KAA	.47 UF CERAMIC X7R
C	189	CC50-B4470	1	04222	SR305C474KAA	.47 UF CERAMIC X7R
C	190	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	191	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	192	CC50-04220	1	31433	C330C224MSU5CA	.22 UF CERAMIC Z5U
CR	1	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE
CR	2	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE
CR	3	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE
CR	4	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE
CR	5	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE
CR	6	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE

21359 PCB ASSY, ANALOG VXI, REV: R (Continued)

Item		P/N	Qty	Cage	Mfr's P/N	Description
CR	7	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE
CR	8	13618	1	58900	13618	DIODE,uWAVE PIN SW,,3PF,100ns
CR	9	13618	1	58900	13618	DIODE,uWAVE PIN SW,,3PF,100ns
CR	10	13618	1	58900	13618	DIODE,uWAVE PIN SW,,3PF,100ns
CR	11	13618	1	58900	13618	DIODE,uWAVE PIN SW,,3PF,100ns
CR	12	13618	1	58900	13618	DIODE,uWAVE PIN SW,,3PF,100ns
CR	13	13618	1	58900	13618	DIODE,uWAVE PIN SW,,3PF,100ns
CR	14	13618	1	58900	13618	DIODE,uWAVE PIN SW,,3PF,100ns
CR	15	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE
CR	16	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE
CR	17	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE
CR	20	DZAB-00751	1	04713	1N751A	1N751A 5.1V ZENER
CR	21	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE
CR	22	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE
CR	23	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE
CR	24	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE
DS	1	ILYR-00200	1	83330	550-0306	RIGHT ANGLE YELLOW LED
DS	2	ILGR-10200	1	08MU3	5300H5	RIGHT ANGLE GREEN LED
DS	3	ILRR-20200	1	83330	550-0406	RIGHT ANGLE RED LED
J	3	JRDF-00008	1	09769	413524-1	BNC F RT ANG PC MOUNT
J	4	JRDF-00008	1	09769	413524-1	BNC F RT ANG PC MOUNT
J	5	JRBM-00100	1	58900	JRBM-00100	SMB M PC MOUNT
J	6	JRDF-00008	1	09769	413524-1	BNC F RT ANG PC MOUNT
J	7	JIA1-07118	1	58900	JIA1-07118	7 PIN STRIPLINE PLUG
J	8	JIA1-07118	1	58900	JIA1-07118	7 PIN STRIPLINE PLUG
J	9	JIA1-07118	1	58900	JIA1-07118	7 PIN STRIPLINE PLUG
J	10	JIA1-07118	1	58900	JIA1-07118	7 PIN STRIPLINE PLUG
L	11	LAB0-05680	1	58900	LAB0-05680	6.8 UH INDUCTOR
L	12	19203	1	OB3G8	19203	.1 UH RF COIL
L	13	15293	1	58900	15293	.17 UH INDUCTOR
L	14	15293	1	58900	15293	.17 UH INDUCTOR
L	15	15293	1	58900	15293	.17 UH INDUCTOR
L	16	LAB0-05680	1	58900	LAB0-05680	6.8 UH INDUCTOR
L	17	LAB0-05680	1	58900	LAB0-05680	6.8 UH INDUCTOR
L	18	LAB0-05680	1	58900	LAB0-05680	6.8 UH INDUCTOR
P	1	JIA2-50318	1	09769	2-87227-5	50 PIN STRIPLINE PLUG
Q	1	QBPP-00170	1	04713	MJE 170	MJE 170 3A 40V 12.5W PNP
Q	2	QBNS-03904	1	04713	2N3904	2N3904 .2A 40V NPN
Q	3	QBNS-03904	1	04713	2N3904	2N3904 .2A 40V NPN
Q	4	QBNP-00231	1	58900	QBNP-00231	BFQ231 1W 1GHZ NPN

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21359 PCB ASSY, ANALOG VXI, REV: R (Continued)						
Item		P/N	Qty	Cage	Mfr's P/N	Description
Q	5	QBPS-03644	1	55464	2N3645	2N3644 .3 A 45 V PNP
Q	6	QBNS-03569	1	4U751	2N3569	PN3569 .5A 40V NPN
Q	7	QBNS-03569	1	4U751	2N3569	PN3569 .5A 40V NPN
Q	8	QBNS-03904	1	04713	2N3904	2N3904 .2A 40V NPN
R	1	RN55-31000	1	91637	RN55C1003F	100 K OHMS 1% MET FILM
R	2	RN55-31000	1	91637	RN55C1003F	100 K OHMS 1% MET FILM
R	4	RN55-22000	1	91637	RN55C2002F	20 K OHMS 1% MET FILM
R	5	RN55-22000	1	91637	RN55C2002F	20 K OHMS 1% MET FILM
R	6	RN55-21960	1	91637	RN55C1962F	19.6 K OHMS 1% MET FILM
R	7	RN55-02740	1	91637	RN55C2740F	274 OHMS 1% MET FILM
R	8	RN55-00340	1	58900	RN55-00340	34.0 OHMS 1% MET FILM
R	9	RN55-00097	1	91637	RN55D 9.76 OHM 1%	9.76 OHM 1% MET FILM
R	10	RN55-00340	1	58900	RN55-00340	34.0 OHMS 1% MET FILM
R	11	RN55-02740	1	91637	RN55C2740F	274 OHMS 1% MET FILM
R	12	RN55-21960	1	91637	RN55C1962F	19.6 K OHMS 1% MET FILM
R	15	RN55-22870	1	91637	RN55C2872F	28.7 K OHMS 1% MET FILM
R	16	RN57-27000	1	91637	MFF 1/8 T2	70.0 K OHM .1 % MET FILM
R	17	RN57-18750	1	91637	MFF 1/8 T2	8.75 K OHM .1 % MET FILM
R	18	RN57-11250	1	58900	RN57-11250	1.25 K OHM .1% MET FILM
R	19	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	20	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	21	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	22	RN55-04020	1	91637	RN55C4020F	402 OHMS 1% MET FILM
R	23	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	24	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	25	RN55-13650	1	91637	RN55C3651F	3.65 K OHMS 1% MET FILM
R	26	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	27	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	28	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	29	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	30	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R	31	RN55-03320	1	91637	RN55C3320F	332 OHMS 1% MET FILM
R	32	RN55-03320	1	91637	RN55C3320F	332 OHMS 1% MET FILM
R	33	RN55-11820	1	91637	RN55C1821F	1.82 K OHMS 1% MET FILM
R	34	RN55-31000	1	91637	RN55C1003F	100 K OHMS 1% MET FILM
R	35	RN55-14750	1	91637	RN55C4751F	4.75 K OHMS 1% MET FILM
R	36	RN55-23010	1	91637	RN55C3012F	30.1 K OHMS 1% MET FILM
R	37	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	38	RN55-31740	1	91637	RN55C1743F	174 K OHMS 1% MET FILM
R	39	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM

21359 PCB ASSY, ANALOG VXI, REV: R (Continued)

Item		P/N	Qty	Cage	Mfr's P/N	Description
R	40	RN55-22000	1	91637	RN55C2002F	20 K OHMS 1% MET FILM
R	41	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	42	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	43	RN55-33920	1	91637	RN55C3923F	392 K OHMS 1% MET FILM
R	44	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	45	RN55-31100	1	91637	RN55C1103F	110 K OHMS 1% MET FILM
R	46	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	77	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	78	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	79	RN55-22210	1	91637	RN55C2212F	22.1 K OHMS 1% MET FILM
R	80	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	81	RN55-24750	1	91637	RN55C4752F	47.5 K OHMS 1% MET FILM
R	82	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	83	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	84	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	96	RN55-31000	1	91637	RN55C1003F	100 K OHMS 1% MET FILM
R	97	RN55-11820	1	91637	RN55C1821F	1.82 K OHMS 1% MET FILM
R	98	RN55-14750	1	91637	RN55C4751F	4.75 K OHMS 1% MET FILM
R	99	RN55-00274	1	91637	RN55C27R4F	27.4 OHMS 1% MET FILM
R	100	RN57-25000	1	58900	RN57-25000	50.0 K OHM .1 % MET FILM
R	101	RN57-25000	1	58900	RN57-25000	50.0 K OHM .1 % MET FILM
R	102	RN57-25000	1	58900	RN57-25000	50.0 K OHM .1 % MET FILM
R	103	RN57-25000	1	58900	RN57-25000	50.0 K OHM .1 % MET FILM
R	104	RN55-02000	1	91637	RN55C2000F	200 OHMS 1% MET FILM
R	105	RN55-00511	1	91637	RN55C51R1F	51.1 OHMS 1% MET FILM
R	107	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	108	RN55-03920	1	91637	RN55C3920F	392 OHMS 1% MET FILM
R	113	RN55-24750	1	91637	RN55C4752F	47.5 K OHMS 1% MET FILM
R	114	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R	115	RN55-11130	1	1E4C5	RN 1/4 T2 1.13K 1%	1.13 K OHMS 1% MET FILM
R	116	RN55-?????	1	58900	RN55-?????	COMPONENT SELECTED IN TEST
R	117	RN57-21500	1	58900	RN57-21500	15.0 K OHM .1 % MET FILM
R	118	RN57-11290	1	58900	RN57-11290	1.29K OHM .1% MET FILM
R	119	RN57-21250	1	60393	GP 1/4-TC50-12.5-.1%	12.5 K OHM .1% MET FILM
R	120	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	121	RN55-41000	1	91637	RN55C1004F	1 M OHMS 1% MET FILM
R	122	RN55-14750	1	91637	RN55C4751F	4.75 K OHMS 1% MET FILM
R	123	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	124	RN55-14750	1	91637	RN55C4751F	4.75 K OHMS 1% MET FILM
R	125	RN55-14750	1	91637	RN55C4751F	4.75 K OHMS 1% MET FILM

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21359 PCB ASSY, ANALOG VXI, REV: R (Continued)						
Item		P/N	Qty	Cage	Mfr's P/N	Description
R	126	RN57-21333	1	58900	RN57-21333	13.33 K OHM .1 % MET FILM
R	127	12449-129	1	58900	12449-129	40.0 K OHM .1 % MET FILM
R	128	RN55-12210	1	91637	RN55C2211F	2.21 K OHMS 1% MET FILM
R	131	RN55-12000	1	91637	RN55C2001F	2.00 K OHMS 1% MET FILM
R	132	RN55-12000	1	91637	RN55C2001F	2.00 K OHMS 1% MET FILM
R	133	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R	134	RN55-13010	1	91637	RN55C3011F	3.01 K OHMS 1% MET FILM
R	135	RN55-22210	1	91637	RN55C2212F	22.1 K OHMS 1% MET FILM
R	136	RN55-23160	1	91637	RN55C3162F	31.6 K OHMS 1% MET FILM
R	137	RN55-21330	1	91637	RN55C1332F	13.3 K OHMS 1% MET FILM
R	138	RN55-13320	1	91637	RN55C3321F	3.32 K OHMS 1% MET FILM
R	139	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R	140	RN55-14990	1	91637	RN55C4991F	4.99 K OHMS 1% MET FILM
R	141	RN57-18000	1	58900	RN57-18000	8.00 K OHM .1 % MET FILM
R	142	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	143	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	144	RN55-00274	1	91637	RN55C27R4F	27.4 OHMS 1% MET FILM
R	146	RN55-12490	1	91637	RN55C2491F	2.49 K OHMS 1% MET FILM
R	147	RN55-12490	1	91637	RN55C2491F	2.49 K OHMS 1% MET FILM
R	148	RN55-21210	1	91637	RN55C1212F	12.1 K OHMS 1% MET FILM
R	149	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	150	RN55-03740	1	91637	RN55C3740F	374 OHMS 1% MET FILM
R	151	RN55-03740	1	91637	RN55C3740F	374 OHMS 1% MET FILM
R	152	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R	153	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R	154	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R	155	RN55-04990	1	91637	RN55C4990F	499 OHMS 1% MET FILM
R	156	RN55-04990	1	91637	RN55C4990F	499 OHMS 1% MET FILM
R	157	RN55-00619	1	91637	CCF55-2-61.9*1%T2T/R	61.9 OHMS 1% MET FILM
R	158	RN55-00953	1	91637	RNC55H95R3FP	95.3 OHM 1% MET FILM
R	159	RN55-00953	1	91637	RNC55H95R3FP	95.3 OHM 1% MET FILM
R	160	RN55-11500	1	91637	RN55C1501F	1.5 K OHMS 1% MET FILM
R	161	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R	162	RN55-00287	1	91637	CCF55-2-28.7*1%T2T/R	28.7 OHMS 1% MET FILM
R	163	RN55-00110	1	91637	RN55C11R0F	11.0 OHMS 1% MET FILM
R	164	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R	165	RN55-04990	1	91637	RN55C4990F	499 OHMS 1% MET FILM
R	166	RN55-00619	1	91637	CCF55-2-61.9*1%T2T/R	61.9 OHMS 1% MET FILM
R	167	RN55-02430	1	91637	RN55C2430F	243 OHMS 1% MET FILM
R	168	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM

21359 PCB ASSY, ANALOG VXI, REV: R (Continued)

Item		P/N	Qty	Cage	Mfr's P/N	Description
R	169	RN55-04990	1	91637	RN55C4990F	499 OHMS 1% MET FILM
R	170	RN55-00619	1	91637	CCF55-2-61.9 ¹ %T2T/R	61.9 OHMS 1% MET FILM
R	171	RN55-23010	1	91637	RN55C3012F	30.1 K OHMS 1% MET FILM
R	172	RN55-31100	1	91637	RN55C1103F	110 K OHMS 1% MET FILM
R	173	RN55-12740	1	91637	RN55C2741F	2.74K OHMS 1% MET FILM
R	174	RG03-00150	1	91637	FP215R0 5%	15 OHM 10% METAL GLAZE
R	175	RN55-11500	1	91637	RN55C1501F	1.5 K OHMS 1% MET FILM
R	176	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	177	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	178	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	179	RN55-22210	1	91637	RN55C2212F	22.1 K OHMS 1% MET FILM
R	180	RN55-21500	1	91637	RN55C1502F	15 K OHMS 1% MET FILM
R	181	RN55-14750	1	91637	RN55C4751F	4.75 K OHMS 1% MET FILM
R	182	RN55-14750	1	91637	RN55C4751F	4.75 K OHMS 1% MET FILM
R	183	RN55-02490	1	91637	RN55C2490F	249 OHMS 1% MET FILM
R	184	RN55-34750	1	91637	RN55C4753F	475 K OHMS 1% MET FILM
R	185	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R	186	RN55-12000	1	91637	RN55C2001F	2.00 K OHMS 1% MET FILM
R	187	RN55-00100	1	91637	RN55C10R0F	10 OHMS 1% MET FILM
R	190	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R	191	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R	194	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	195	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	196	RN55-21540	1	91637	RN55C1542F	15.4 K OHMS 1% MET FILM
R	199	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	204	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	205	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	206	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	207	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	228	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	229	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	232	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	233	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	234	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	235	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	240	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	241	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	242	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	243	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	246	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM

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21359		PCB ASSY, ANALOG VXI, REV: R (Continued)				
Item		P/N	Qty	Cage	Mfr's P/N	Description
R	247	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	248	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	249	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	250	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	251	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	252	RN55-04750	1	91637	RN55C4750F	475 OHMS 1% MET FILM
R	253	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	256	RN55-02740	1	91637	RN55C2740F	274 OHMS 1% MET FILM
R	257	RN55-02740	1	91637	RN55C2740F	274 OHMS 1% MET FILM
R	258	RN55-02740	1	91637	RN55C2740F	274 OHMS 1% MET FILM
R	259	RN57-21000	1	58900	RN57-21000	10K OHM .1% MET FILM
R	260	RN57-21000	1	58900	RN57-21000	10K OHM .1% MET FILM
R	261	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R	262	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R	263	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
RP	1	RM9S-21001	1	58900	RM9S-21001	10K OHM X 9 SIP NETWORK
RP	2	RM9S-21001	1	58900	RM9S-21001	10K OHM X 9 SIP NETWORK
RP	3	RM9S-21001	1	58900	RM9S-21001	10K OHM X 9 SIP NETWORK
RT	2	RTC2-21000	1	56866	QTMC-14	10 K OHM THERMISTOR
RT	3	FSS0-00050	1	06090	RXE050	.5A RES CIRCUIT BREAKER
RT	4	FSS0-00050	1	06090	RXE050	.5A RES CIRCUIT BREAKER
RT	5	FSS0-00050	1	06090	RXE050	.5A RES CIRCUIT BREAKER
TP	1	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	2	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	3	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	4	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	5	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	6	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	7	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	8	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	9	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	10	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	11	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	12	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	13	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	14	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	15	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
U	1	UFN0-05135	1	01295	OP-07/CP	HA5135-5 PRECISION OP AMP
U	2	ULN0-00411	1	2M881	DG411DJ	DG411DJ QUAD SPST SWITCH
U	3	UFN0-03240	1	34371	CA3240E	CA3240E DUAL OP AMP

21359 PCB ASSY, ANALOG VXI, REV: R (Continued)

Item		P/N	Qty	Cage	Mfr's P/N	Description
U	4	UFN0-05135	1	01295	OP-07/CP	HA5135-5 PRECISION OP AMP
U	5	ULN0-00393	1	01295	LM393P	LM393N VOLT COMPARATOR
U	6	UVG0-00070	1	64155	LM199H	LM399H 7V PRECISION ZENER
U	7	UFN0-05135	1	01295	OP-07/CP	HA5135-5 PRECISION OP AMP
U	8	ULN0-00411	1	2M881	DG411DJ	DG411DJ QUAD SPST SWITCH
U	9	UTN0-00322	1	01295	74HC32N	74HC32 QUAD 2 INPUT OR
U	10	UFN0-05135	1	01295	OP-07/CP	HA5135-5 PRECISION OP AMP
U	11	UFN0-05135	1	01295	OP-07/CP	HA5135-5 PRECISION OP AMP
U	12	UIN0-07534	1	24355	AD7534JN	AD7534JN 14 BIT DAC
U	13	UTN0-00042	1	01295	SN74HC04N	74HC04 HEX INVERTER
U	14	UFN1-00324	1	01295	LM324N	LM324AN QUAD OP AMP
U	15	UIN0-07245	1	24355	AD7245JN	AD7245JN 12 BIT D/A
U	16	UTN0-00082	1	01295	SN74HC08N	74HC08N QUAD AND
U	17	UIN0-07245	1	24355	AD7245JN	AD7245JN 12 BIT D/A
U	18	UMN0-02444	1	60395	X2444P	X2444P 256 BIT NV RAM
U	19	UFN1-00324	1	01295	LM324N	LM324AN QUAD OP AMP
U	20	UTN0-00143	1	34371	CD74HCT14E	74HCT14N HEX SCHMITT TRIGGER
U	21	UFN1-00358	1	01295	LM358AP	LM358AN DUAL OP AMP
U	22	UTN0-00742	1	34371	SN74HC74D	74HC74 DUAL D FLIP FLOP
U	23	ULN0-00506	1	2M881	DG406DJ	DG506ACJ 16 CHANNEL SW
U	24	UTN0-00143	1	34371	CD74HCT14E	74HCT14N HEX SCHMITT TRIGGER
U	25	UIN0-00779	1	24355	AD779JD	AD779JN 14 BIT A/D
U	26	UGN1-08255	1	4T165	8255AC-2	8255A-5 PROG PIA
U	27	UGN1-08255	1	4T165	8255AC-2	8255A-5 PROG PIA
U	28	ULN0-00409	1	17856	DG409DJ	DG409DJ 2X 4IN SWITCH
U	29	ULN0-00409	1	17856	DG409DJ	DG409DJ 2X 4IN SWITCH
U	30	ULN0-00409	1	17856	DG409DJ	DG409DJ 2X 4IN SWITCH
U	31	UFN0-00625	1	24355	AD625JN	AD625JN PROG INST AMP
U	32	UFN0-01014	1	64155	LT1014DN	LT1014DN QUAD OP AMP
U	33	ULN0-00409	1	17856	DG409DJ	DG409DJ 2X 4IN SWITCH
U	34	ULN0-00339	1	04713	LM339N	LM339N COMPARATOR
U	35	UFN1-00324	1	01295	LM324N	LM324AN QUAD OP AMP
U	36	ULN0-00339	1	04713	LM339N	LM339N COMPARATOR
U	37	URC0-07815	1	01295	L7815C	MC7815CT 1A 15V REG
U	38	URC0-07915	1	04713	MC7915CT	MC7915CT 1A -15V REG
U	39	URP0-78120	1	04713	MC78L12ACP	MC78L12CP .1A 12V REG
U	43	URP0-79120	1	04713	MC79L12CP	MC79L12 .1A -12V REG
W	1	JIA0-01443	1	58900	JIA0-01443	CONTACT POST
W	2	JIA0-01443	1	58900	JIA0-01443	CONTACT POST
XU	2	JSP0-10016	1	09769	2-614610-2	16 PIN DIP SOCKET

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21359 PCB ASSY, ANALOG VXI, REV: R (Continued)						
Item		P/N	Qty	Cage	Mfr's P/N	Description
XU	3	JSP0-10008	1	09769	390261-2	8 PIN DIP SOCKET
XU	8	JSP0-10016	1	09769	2-614610-2	16 PIN DIP SOCKET
XU	15	JSP2-10024	1	09769	390261-8	24 PIN DIP SOCKET
XU	17	JSP2-10024	1	09769	390261-8	24 PIN DIP SOCKET
XU	23	JSP0-10028	1	09769	2-641615-1	28 PIN DIP SOCKET
XU	28	JSP0-10016	1	09769	2-614610-2	16 PIN DIP SOCKET
XU	29	JSP0-10016	1	09769	2-614610-2	16 PIN DIP SOCKET
XU	30	JSP0-10016	1	09769	2-614610-2	16 PIN DIP SOCKET
XU	31	JSP0-10016	1	09769	2-614610-2	16 PIN DIP SOCKET
XU	32	JSP0-10014	1	09769	2-641609-1	14 PIN DIP SOCKET
XU	33	JSP0-10016	1	09769	2-614610-2	16 PIN DIP SOCKET
XU	34	JSP0-10014	1	09769	2-641609-1	14 PIN DIP SOCKET
XU	36	JSP0-10014	1	09769	2-641609-1	14 PIN DIP SOCKET
XW	1	17240-001	1	27264	15-38-1024	JUMPER,INSULATED,2 POS

21359-A00 PCB ASSY PRE-WAVE, ANALOG VXI, REV: N						
Item		P/N	Qty	Cage	Mfr's P/N	Description
	1	21358	1	58900	21358	PCB,ANALOG
	2	21360	REF	58900	21360	SCHEMATIC,ANALOG
	3	JIA0-01443	4	58900	JIA0-01443	CONTACT POST
	4	10091-008	3	58900	10091-008	4-40 X 9/16 SWAGE SPACER
	5	10091-007	2	58900	10091-007	STANDOFF,SWAGE,4-40,.750 LG
C	10	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	11	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	12	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	13	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	14	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	15	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	17	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	18	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	19	CD00-02100	1	-----	CM05E102	1000 PF DIP MICA
C	20	CD00-02100	1	-----	CM05E102	1000 PF DIP MICA
C	21	CD00-02100	1	-----	CM05E102	1000 PF DIP MICA
C	22	CD00-02100	1	-----	CM05E102	1000 PF DIP MICA
C	23	CD99-01820	1	-----	DM15821F	820 PF 300V DIP MICA
C	24	CD99-01820	1	-----	DM15821F	820 PF 300V DIP MICA
C	25	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	26	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	27	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R

21359-A00 PCB ASSY PRE-WAVE, ANALOG VXI, REV: N (Continued)

Item		P/N	Qty	Cage	Mfr's P/N	Description
C	28	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	29	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	30	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	31	CE50-06100	1	55680	TVX1H100MAA	10UF 50V AXIAL
C	33	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	34	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	35	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	36	CC98-00330	1	-----	CCD-330	33 PF 1KV CERAMIC NPO
C	37	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	38	CC50-04220	1	31433	C330C224MSU5CA	.22 UF CERAMIC Z5U
C	39	CF00-04470	1	58900	CF00-04470	.47UF 100V POLYPROPYLENE
C	40	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	41	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	42	CT20-R6150	1	04222	TAP156K020CCS	15UF 20V TANTALUM
C	43	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	44	CT20-R6150	1	04222	TAP156K020CCS	15UF 20V TANTALUM
C	45	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	46	CE50-R5470	1	74840	475PGM050M	4.7UF 50V RADIAL
C	47	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	48	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	49	CC50-02220	1	04222	SR151C222KAA	2200PF CERAMIC X7R
C	50	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	51	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	52	CD99-01150	1	-----	DM15-151F	150 PF DIP MICA
C	53	CD99-01240	1	-----	DM15-241F	240 PF DIP MICA
C	54	CC50-02220	1	04222	SR151C222KAA	2200PF CERAMIC X7R
C	55	CD99-00620	1	-----	CMO5FD620F03	62 PF DIP MICA
C	56	CD99-01120	1	-----	CMO6FD121J03	120 PF DIP MICA
C	57	CD99-00620	1	-----	CMO5FD620F03	62 PF DIP MICA
C	58	CD00-02100	1	-----	CM05E102	1000 PF DIP MICA
C	59	CC50-02220	1	04222	SR151C222KAA	2200PF CERAMIC X7R
C	60	CC50-02220	1	04222	SR151C222KAA	2200PF CERAMIC X7R
C	61	CC00-02220	1	04222	SR201A222KAA	2200 PF CERAMIC COG
C	62	CC00-02220	1	04222	SR201A222KAA	2200 PF CERAMIC COG
C	63	CD00-02100	1	-----	CM05E102	1000 PF DIP MICA
C	64	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	65	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	66	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	67	CC00-02220	1	04222	SR201A222KAA	2200 PF CERAMIC COG
C	68	CC00-02220	1	04222	SR201A222KAA	2200 PF CERAMIC COG

21359-A00 PCB ASSY PRE-WAVE, ANALOG VXI, REV: N (Continued)						
Item		P/N	Qty	Cage	Mfr's P/N	Description
C	69	CC00-02220	1	04222	SR201A222KAA	2200 PF CERAMIC COG
C	70	CC00-02220	1	04222	SR201A222KAA	2200 PF CERAMIC COG
C	71	CC00-02220	1	04222	SR201A222KAA	2200 PF CERAMIC COG
C	72	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	73	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	74	CC00-02220	1	04222	SR201A222KAA	2200 PF CERAMIC COG
C	75	CC50-04220	1	31433	C330C224MSU5CA	.22 UF CERAMIC Z5U
C	77	CC50-02220	1	04222	SR151C222KAA	2200PF CERAMIC X7R
C	78	CC50-02100	1	04222	SR155C122MAT	.001 UF CERAMIC Y5P
C	79	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	80	CC50-02220	1	04222	SR151C222KAA	2200PF CERAMIC X7R
C	81	CC50-02220	1	04222	SR151C222KAA	2200PF CERAMIC X7R
C	82	CC50-02220	1	04222	SR151C222KAA	2200PF CERAMIC X7R
C	83	CC50-02220	1	04222	SR151C222KAA	2200PF CERAMIC X7R
C	84	CC50-03470	1	04222	SR205C473KAA	.047 UF CERAMIC X7R
C	85	CC50-02220	1	04222	SR151C222KAA	2200PF CERAMIC X7R
C	86	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	87	CC50-02100	1	04222	SR155C122MAT	.001 UF CERAMIC Y5P
C	88	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	90	CC50-02100	1	04222	SR155C122MAT	.001 UF CERAMIC Y5P
C	91	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	92	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	93	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	94	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	100	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	101	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	102	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	103	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	104	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	105	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	106	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	107	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	108	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	109	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	110	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	112	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	114	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	115	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	124	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	126	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R

21359-A00 PCB ASSY PRE-WAVE, ANALOG VXI, REV: N (Continued)

Item		P/N	Qty	Cage	Mfr's P/N	Description
C	127	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	128	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	129	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	130	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	131	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	132	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	133	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	134	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	135	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	136	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	137	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	138	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	139	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	140	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	141	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	142	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	143	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	144	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	145	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	146	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	147	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	148	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	149	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	150	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	151	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	152	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	153	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	154	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	155	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	156	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	157	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	158	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	161	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	162	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	163	CC51-04100	1	04222	SR205C-104KAA	.1 UF CERAMIC X7R
C	167	CD99-02250	1	-----	DM19F252J500V	2500 PF 500 V DIP MICA
C	171	CE50-06100	1	55680	TVX1H100MAA	10UF 50V AXIAL
C	173	CE50-06100	1	55680	TVX1H100MAA	10UF 50V AXIAL
C	174	CE50-06100	1	55680	TVX1H100MAA	10UF 50V AXIAL
C	175	CE50-R6100	1	55680	UVX1H100MDA	10 UF 50V RADIAL LEAD

21359-A00 PCB ASSY PRE-WAVE, ANALOG VXI, REV: N (Continued)						
Item		P/N	Qty	Cage	Mfr's P/N	Description
C	176	CE50-R6100	1	55680	UVX1H100MDA	10 UF 50V RADIAL LEAD
C	177	CC50-B4470	1	04222	SR305C474KAA	.47 UF CERAMIC X7R
C	178	CC50-B4470	1	04222	SR305C474KAA	.47 UF CERAMIC X7R
C	179	CC50-B4470	1	04222	SR305C474KAA	.47 UF CERAMIC X7R
C	180	CC50-B4470	1	04222	SR305C474KAA	.47 UF CERAMIC X7R
C	185	CE50-R7100	1	0H1N5	CEUSM1H101M	100UF 50V RADIAL
C	186	CE50-R7100	1	0H1N5	CEUSM1H101M	100UF 50V RADIAL
C	187	CC50-B4470	1	04222	SR305C474KAA	.47 UF CERAMIC X7R
C	188	CC50-B4470	1	04222	SR305C474KAA	.47 UF CERAMIC X7R
C	189	CC50-B4470	1	04222	SR305C474KAA	.47 UF CERAMIC X7R
C	190	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	191	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
CR	1	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE
CR	2	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE
CR	3	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE
CR	4	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE
CR	5	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE
CR	6	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE
CR	7	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE
CR	8	13618	1	58900	13618	DIODE,uWAVE PIN SW,,3PF,100ns
CR	9	13618	1	58900	13618	DIODE,uWAVE PIN SW,,3PF,100ns
CR	10	13618	1	58900	13618	DIODE,uWAVE PIN SW,,3PF,100ns
CR	11	13618	1	58900	13618	DIODE,uWAVE PIN SW,,3PF,100ns
CR	12	13618	1	58900	13618	DIODE,uWAVE PIN SW,,3PF,100ns
CR	13	13618	1	58900	13618	DIODE,uWAVE PIN SW,,3PF,100ns
CR	14	13618	1	58900	13618	DIODE,uWAVE PIN SW,,3PF,100ns
CR	15	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE
CR	16	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE
CR	17	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE
CR	20	DZAB-00751	1	04713	1N751A	1N751A 5.1V ZENER
CR	21	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE
CR	22	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE
CR	23	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE
CR	24	DSA0-04148	1	58900	DSA0-04148	1N4148 G.P. DIODE
J	5	JRBM-00100	1	58900	JRBM-00100	SMB M PC MOUNT
L	11	LAB0-05680	1	58900	LAB0-05680	6.8 UH INDUCTOR
L	12	19203	1	OB3G8	19203	.1 UH RF COIL
L	13	15293	1	58900	15293	.17 UH INDUCTOR
L	14	15293	1	58900	15293	.17 UH INDUCTOR
L	15	15293	1	58900	15293	.17 UH INDUCTOR

21359-A00 PCB ASSY PRE-WAVE, ANALOG VXI, REV: N (Continued)

Item		P/N	Qty	Cage	Mfr's P/N	Description
L	16	LAB0-05680	1	58900	LAB0-05680	6.8 UH INDUCTOR
L	17	LAB0-05680	1	58900	LAB0-05680	6.8 UH INDUCTOR
L	18	LAB0-05680	1	58900	LAB0-05680	6.8 UH INDUCTOR
P	1	JIA2-50318	1	09769	2-87227-5	50 PIN STRIPLINE PLUG
Q	1	QBPP-00170	1	04713	MJE 170	MJE 170 3A 40V 12.5W PNP
Q	2	QBNS-03904	1	04713	2N3904	2N3904 .2A 40V NPN
Q	3	QBNS-03904	1	04713	2N3904	2N3904 .2A 40V NPN
Q	4	QBNP-00231	1	58900	QBNP-00231	BFQ231 1W 1GHZ NPN
Q	5	QBPS-03644	1	55464	2N3645	2N3644 .3 A 45 V PNP
Q	6	QBNS-03569	1	4U751	2N3569	PN3569 .5A 40V NPN
Q	7	QBNS-03569	1	4U751	2N3569	PN3569 .5A 40V NPN
Q	8	QBNS-03904	1	04713	2N3904	2N3904 .2A 40V NPN
R	1	RN55-31000	1	91637	RN55C1003F	100 K OHMS 1% MET FILM
R	2	RN55-31000	1	91637	RN55C1003F	100 K OHMS 1% MET FILM
R	4	RN55-22000	1	91637	RN55C2002F	20 K OHMS 1% MET FILM
R	5	RN55-22000	1	91637	RN55C2002F	20 K OHMS 1% MET FILM
R	6	RN55-21960	1	91637	RN55C1962F	19.6 K OHMS 1% MET FILM
R	7	RN55-02740	1	91637	RN55C2740F	274 OHMS 1% MET FILM
R	8	RN55-00340	1	58900	RN55-00340	34.0 OHMS 1% MET FILM
R	9	RN55-00097	1	91637	RN55D 9.76 OHM 1%	9.76 OHM 1% MET FILM
R	10	RN55-00340	1	58900	RN55-00340	34.0 OHMS 1% MET FILM
R	11	RN55-02740	1	91637	RN55C2740F	274 OHMS 1% MET FILM
R	12	RN55-21960	1	91637	RN55C1962F	19.6 K OHMS 1% MET FILM
R	15	RN55-22870	1	91637	RN55C2872F	28.7 K OHMS 1% MET FILM
R	16	RN57-27000	1	91637	MFF 1/8 T2	70.0 K OHM .1 % MET FILM
R	17	RN57-18750	1	91637	MFF 1/8 T2	8.75 K OHM .1 % MET FILM
R	18	RN57-11250	1	58900	RN57-11250	1.25 K OHM .1% MET FILM
R	19	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	20	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	21	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	22	RN55-04020	1	91637	RN55C4020F	402 OHMS 1% MET FILM
R	23	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	24	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	25	RN55-13650	1	91637	RN55C3651F	3.65 K OHMS 1% MET FILM
R	26	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	27	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	28	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	29	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	30	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R	31	RN55-03320	1	91637	RN55C3320F	332 OHMS 1% MET FILM

58542 VXIbus Universal Power Meter

21359-A00 PCB ASSY PRE-WAVE, ANALOG VXI, REV: N (Continued)						
Item		P/N	Qty	Cage	Mfr's P/N	Description
R	32	RN55-03320	1	91637	RN55C3320F	332 OHMS 1% MET FILM
R	33	RN55-11820	1	91637	RN55C1821F	1.82 K OHMS 1% MET FILM
R	34	RN55-31000	1	91637	RN55C1003F	100 K OHMS 1% MET FILM
R	35	RN55-14750	1	91637	RN55C4751F	4.75 K OHMS 1% MET FILM
R	36	RN55-23010	1	91637	RN55C3012F	30.1 K OHMS 1% MET FILM
R	37	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	38	RN55-31740	1	91637	RN55C1743F	174 K OHMS 1% MET FILM
R	39	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	40	RN55-22000	1	91637	RN55C2002F	20 K OHMS 1% MET FILM
R	41	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	42	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	43	RN55-33920	1	91637	RN55C3923F	392 K OHMS 1% MET FILM
R	44	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	45	RN55-31100	1	91637	RN55C1103F	110 K OHMS 1% MET FILM
R	46	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	77	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	78	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	79	RN55-22210	1	91637	RN55C2212F	22.1 K OHMS 1% MET FILM
R	80	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	81	RN55-24750	1	91637	RN55C4752F	47.5 K OHMS 1% MET FILM
R	82	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	83	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	84	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	96	RN55-31000	1	91637	RN55C1003F	100 K OHMS 1% MET FILM
R	97	RN55-11820	1	91637	RN55C1821F	1.82 K OHMS 1% MET FILM
R	98	RN55-14750	1	91637	RN55C4751F	4.75 K OHMS 1% MET FILM
R	99	RN55-00274	1	91637	RN55C27R4F	27.4 OHMS 1% MET FILM
R	100	RN57-25000	1	58900	RN57-25000	50.0 K OHM .1 % MET FILM
R	101	RN57-25000	1	58900	RN57-25000	50.0 K OHM .1 % MET FILM
R	102	RN57-25000	1	58900	RN57-25000	50.0 K OHM .1 % MET FILM
R	103	RN57-25000	1	58900	RN57-25000	50.0 K OHM .1 % MET FILM
R	104	RN55-02000	1	91637	RN55C2000F	200 OHMS 1% MET FILM
R	105	RN55-00511	1	91637	RN55C51R1F	51.1 OHMS 1% MET FILM
R	107	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	108	RN55-03920	1	91637	RN55C3920F	392 OHMS 1% MET FILM
R	113	RN55-24750	1	91637	RN55C4752F	47.5 K OHMS 1% MET FILM
R	114	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R	115	RN55-11130	1	1E4C5	RN 1/4 T2 1.13K 1%	1.13 K OHMS 1% MET FILM
R	116	RN55-?????	1	58900	RN55-?????	COMPONENT SELECTED IN TEST
R	117	RN57-21500	1	58900	RN57-21500	15.0 K OHM .1 % MET FILM

21359-A00 PCB ASSY PRE-WAVE, ANALOG VXI, REV: N (Continued)

Item	P/N	Qty	Cage	Mfr's P/N	Description
R 118	RN57-11290	1	58900	RN57-11290	1.29K OHM .1% MET FILM
R 119	RN57-21250	1	60393	GP 1/4-TC50-12.5-.1%	12.5 K OHM .1% MET FILM
R 120	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R 121	RN55-41000	1	91637	RN55C1004F	1 M OHMS 1% MET FILM
R 122	RN55-14750	1	91637	RN55C4751F	4.75 K OHMS 1% MET FILM
R 123	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R 124	RN55-14750	1	91637	RN55C4751F	4.75 K OHMS 1% MET FILM
R 125	RN55-14750	1	91637	RN55C4751F	4.75 K OHMS 1% MET FILM
R 126	RN57-21333	1	58900	RN57-21333	13.33 K OHM .1 % MET FILM
R 127	12449-129	1	58900	12449-129	40.0 K OHM .1 % MET FILM
R 128	RN55-12210	1	91637	RN55C2211F	2.21 K OHMS 1% MET FILM
R 131	RN55-12000	1	91637	RN55C2001F	2.00 K OHMS 1% MET FILM
R 132	RN55-12000	1	91637	RN55C2001F	2.00 K OHMS 1% MET FILM
R 133	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R 134	RN55-13010	1	91637	RN55C3011F	3.01 K OHMS 1% MET FILM
R 135	RN55-22210	1	91637	RN55C2212F	22.1 K OHMS 1% MET FILM
R 136	RN55-23160	1	91637	RN55C3162F	31.6 K OHMS 1% MET FILM
R 137	RN55-21330	1	91637	RN55C1332F	13.3 K OHMS 1% MET FILM
R 138	RN55-13320	1	91637	RN55C3321F	3.32 K OHMS 1% MET FILM
R 139	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R 140	RN55-14990	1	91637	RN55C4991F	4.99 K OHMS 1% MET FILM
R 141	RN57-18000	1	58900	RN57-18000	8.00 K OHM .1 % MET FILM
R 142	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R 143	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R 144	RN55-00274	1	91637	RN55C27R4F	27.4 OHMS 1% MET FILM
R 146	RN55-12490	1	91637	RN55C2491F	2.49 K OHMS 1% MET FILM
R 147	RN55-12490	1	91637	RN55C2491F	2.49 K OHMS 1% MET FILM
R 148	RN55-21210	1	91637	RN55C1212F	12.1 K OHMS 1% MET FILM
R 149	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R 150	RN55-03740	1	91637	RN55C3740F	374 OHMS 1% MET FILM
R 151	RN55-03740	1	91637	RN55C3740F	374 OHMS 1% MET FILM
R 152	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R 153	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R 154	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R 155	RN55-04990	1	91637	RN55C4990F	499 OHMS 1% MET FILM
R 156	RN55-04990	1	91637	RN55C4990F	499 OHMS 1% MET FILM
R 157	RN55-00619	1	91637	CCF55-2-61.9^1%T2T/R	61.9 OHMS 1% MET FILM
R 158	RN55-00953	1	91637	RNC55H95R3FP	95.3 OHM 1% MET FILM
R 159	RN55-00953	1	91637	RNC55H95R3FP	95.3 OHM 1% MET FILM
R 160	RN55-11500	1	91637	RN55C1501F	1.5 K OHMS 1% MET FILM

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21359-A00 PCB ASSY PRE-WAVE, ANALOG VXI, REV: N (Continued)						
Item		P/N	Qty	Cage	Mfr's P/N	Description
R	161	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R	162	RN55-00287	1	91637	CCF55-2-28.7^1%T2T/R	28.7 OHMS 1% MET FILM
R	163	RN55-00110	1	91637	RN55C11R0F	11.0 OHMS 1% MET FILM
R	164	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R	165	RN55-04990	1	91637	RN55C4990F	499 OHMS 1% MET FILM
R	166	RN55-00619	1	91637	CCF55-2-61.9^1%T2T/R	61.9 OHMS 1% MET FILM
R	167	RN55-02430	1	91637	RN55C2430F	243 OHMS 1% MET FILM
R	168	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R	169	RN55-04990	1	91637	RN55C4990F	499 OHMS 1% MET FILM
R	170	RN55-00619	1	91637	CCF55-2-61.9^1%T2T/R	61.9 OHMS 1% MET FILM
R	171	RN55-23010	1	91637	RN55C3012F	30.1 K OHMS 1% MET FILM
R	172	RN55-31100	1	91637	RN55C1103F	110 K OHMS 1% MET FILM
R	173	RN55-12740	1	91637	RN55C2741F	2.74K OHMS 1% MET FILM
R	174	RG03-00150	1	91637	FP215R0 5%	15 OHM 10% METAL GLAZE
R	175	RN55-11500	1	91637	RN55C1501F	1.5 K OHMS 1% MET FILM
R	176	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	177	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	178	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	179	RN55-22210	1	91637	RN55C2212F	22.1 K OHMS 1% MET FILM
R	180	RN55-21500	1	91637	RN55C1502F	15 K OHMS 1% MET FILM
R	181	RN55-14750	1	91637	RN55C4751F	4.75 K OHMS 1% MET FILM
R	182	RN55-14750	1	91637	RN55C4751F	4.75 K OHMS 1% MET FILM
R	183	RN55-02490	1	91637	RN55C2490F	249 OHMS 1% MET FILM
R	184	RN55-34750	1	91637	RN55C4753F	475 K OHMS 1% MET FILM
R	185	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R	186	RN55-12000	1	91637	RN55C2001F	2.00 K OHMS 1% MET FILM
R	187	RN55-00100	1	91637	RN55C10R0F	10 OHMS 1% MET FILM
R	190	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R	191	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R	194	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	195	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	196	RN55-21540	1	91637	RN55C1542F	15.4 K OHMS 1% MET FILM
R	199	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	204	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	205	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	206	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	207	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	228	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	229	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	232	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM

21359-A00 PCB ASSY PRE-WAVE, ANALOG VXI, REV: N (Continued)

Item		P/N	Qty	Cage	Mfr's P/N	Description
R	233	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	234	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	235	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	240	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	241	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	242	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	243	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	246	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	247	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	248	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	249	RN55-00475	1	91637	RN55C47R5F	47.5 OHMS 1% MET FILM
R	250	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	251	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	252	RN55-04750	1	91637	RN55C4750F	475 OHMS 1% MET FILM
R	253	RN55-21000	1	1E4C5	RN 1/4 T2 10K 1%	10 K OHMS 1% MET FILM
R	256	RN55-02740	1	91637	RN55C2740F	274 OHMS 1% MET FILM
R	257	RN55-02740	1	91637	RN55C2740F	274 OHMS 1% MET FILM
R	258	RN55-02740	1	91637	RN55C2740F	274 OHMS 1% MET FILM
R	259	RN57-21000	1	58900	RN57-21000	10K OHM .1% MET FILM
R	260	RN57-21000	1	58900	RN57-21000	10K OHM .1% MET FILM
R	261	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R	262	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
RP	1	RM9S-21001	1	58900	RM9S-21001	10K OHM X 9 SIP NETWORK
RP	2	RM9S-21001	1	58900	RM9S-21001	10K OHM X 9 SIP NETWORK
RP	3	RM9S-21001	1	58900	RM9S-21001	10K OHM X 9 SIP NETWORK
RT	2	RTC2-21000	1	56866	QTMC-14	10 K OHM THERMISTOR
RT	3	FSS0-00050	1	06090	RXE050	.5A RES CIRCUIT BREAKER
RT	4	FSS0-00050	1	06090	RXE050	.5A RES CIRCUIT BREAKER
RT	5	FSS0-00050	1	06090	RXE050	.5A RES CIRCUIT BREAKER
TP	1	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	2	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	3	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	4	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	5	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	6	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	7	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	8	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	9	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	10	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	11	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN

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21359-A00 PCB ASSY PRE-WAVE, ANALOG VXI, REV: N (Continued)						
Item		P/N	Qty	Cage	Mfr's P/N	Description
TP	12	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	13	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	14	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	15	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
U	1	UFN0-05135	1	01295	OP-07/CP	HA5135-5 PRECISION OP AMP
U	4	UFN0-05135	1	01295	OP-07/CP	HA5135-5 PRECISION OP AMP
U	5	ULN0-00393	1	01295	LM393P	LM393N VOLT COMPARATOR
U	6	UVG0-00070	1	64155	LM199H	LM399H 7V PRECISION ZENER
U	7	UFN0-05135	1	01295	OP-07/CP	HA5135-5 PRECISION OP AMP
U	9	UTN0-00322	1	01295	74HC32N	74HC32 QUAD 2 INPUT OR
U	10	UFN0-05135	1	01295	OP-07/CP	HA5135-5 PRECISION OP AMP
U	11	UFN0-05135	1	01295	OP-07/CP	HA5135-5 PRECISION OP AMP
U	12	UIN0-07534	1	24355	AD7534JN	AD7534JN 14 BIT DAC
U	13	UTN0-00042	1	01295	SN74HC04N	74HC04 HEX INVERTER
U	14	UFN1-00324	1	01295	LM324N	LM324AN QUAD OP AMP
U	16	UTN0-00082	1	01295	SN74HC08N	74HC08N QUAD AND
U	18	UMN0-02444	1	60395	X2444P	X2444P 256 BIT NV RAM
U	19	UFN1-00324	1	01295	LM324N	LM324AN QUAD OP AMP
U	20	UTN0-00143	1	34371	CD74HCT14E	74HCT14N HEX SCHMITT TRIGGER
U	21	UFN1-00358	1	01295	LM358AP	LM358AN DUAL OP AMP
U	22	UTN0-00742	1	34371	SN74HC74D	74HC74 DUAL D FLIP FLOP
U	24	UTN0-00143	1	34371	CD74HCT14E	74HCT14N HEX SCHMITT TRIGGER
U	25	UIN0-00779	1	24355	AD779JD	AD779JN 14 BIT A/D
U	26	UGN1-08255	1	4T165	8255AC-2	8255A-5 PROG PIA
U	27	UGN1-08255	1	4T165	8255AC-2	8255A-5 PROG PIA
U	35	UFN1-00324	1	01295	LM324N	LM324AN QUAD OP AMP
U	39	URP0-78120	1	04713	MC78L12ACP	MC78L12CP .1A 12V REG
U	43	URP0-79120	1	04713	MC79L12CP	MC79L12 .1A -12V REG
W	1	JIA0-01443	1	58900	JIA0-01443	CONTACT POST
W	2	JIA0-01443	1	58900	JIA0-01443	CONTACT POST
XU	2	JSP0-10016	1	09769	2-614610-2	16 PIN DIP SOCKET
XU	3	JSP0-10008	1	09769	390261-2	8 PIN DIP SOCKET
XU	8	JSP0-10016	1	09769	2-614610-2	16 PIN DIP SOCKET
XU	15	JSP2-10024	1	09769	390261-8	24 PIN DIP SOCKET
XU	17	JSP2-10024	1	09769	390261-8	24 PIN DIP SOCKET
XU	23	JSP0-10028	1	09769	2-641615-1	28 PIN DIP SOCKET
XU	28	JSP0-10016	1	09769	2-614610-2	16 PIN DIP SOCKET
XU	29	JSP0-10016	1	09769	2-614610-2	16 PIN DIP SOCKET
XU	30	JSP0-10016	1	09769	2-614610-2	16 PIN DIP SOCKET
XU	31	JSP0-10016	1	09769	2-614610-2	16 PIN DIP SOCKET

21359-A00 PCB ASSY PRE-WAVE, ANALOG VXI, REV: N (Continued)

Item		P/N	Qty	Cage	Mfr's P/N	Description
XU	32	JSP0-10014	1	09769	2-641609-1	14 PIN DIP SOCKET
XU	33	JSP0-10016	1	09769	2-614610-2	16 PIN DIP SOCKET
XU	34	JSP0-10014	1	09769	2-641609-1	14 PIN DIP SOCKET
XU	36	JSP0-10014	1	09769	2-641609-1	14 PIN DIP SOCKET

21356 PCB ASSY, DIGITAL, REV: K1

Item		P/N	Qty	Cage	Mfr's P/N	Description
	1	21355	1	58900	21355	PCB,DIGITAL
	2	21357	REF	58900	21357	SCHEMATIC,DIGITAL PCB
	3	WTT0-24001	1	29005	#24AWG-TFE/TW	#24 TEFLON SLEEVE
	4	XAR0-03140	REF	05AJ8	3140	RTV SEALANT
	5	WSB0-22000	REF	16428	8021-C1000-22AWG	22 GAUGE BUS WIRE
C	1	CE25-R7100	1	00656	AMR101M025	100 UF 25V RADIAL LEAD
C	2	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	3	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	4	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	5	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	6	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	7	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	8	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	9	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	10	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	11	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	12	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	13	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	14	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	15	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	16	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	17	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	18	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	19	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	20	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	21	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	22	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	23	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	24	CE25-07100	1	55680	TVX1E101MAA	100UF 25V ELECTROLYTIC
C	25	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	26	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	27	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	28	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	29	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	30	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	31	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	32	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	33	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO

21356		PCB ASSY, DIGITAL, REV: K1 (Continued)				
Item		P/N	Qty	Cage	Mfr's P/N	Description
C	34	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	35	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	36	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	37	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	38	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	39	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	40	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	41	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	42	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	43	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	44	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	45	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	46	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	47	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	48	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	49	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	51	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	52	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	53	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	54	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	55	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	56	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	57	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	58	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	59	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	61	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	66	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	67	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	68	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	69	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	70	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	71	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	72	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	73	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	74	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	75	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	77	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	81	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	82	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
J	1	JSE0-20050	1	55322	ESW-125-37-S-D	50 PIN ELEVATED SOCKET
J	2	JIB2-40100	1	91506	A015-040-YE-0013	40 PIN STRIPLINE SOCKET
J	3	JIB2-40100	1	91506	A015-040-YE-0013	40 PIN STRIPLINE SOCKET
J	4	JIB2-36100	1	91506	A015-036-YE-001	36 PIN STRIPLINE SOCKET
J	6	JIR1-04295	1	09769	640453-4	4 PIN RT ANG STRPLN PLUG
L	1	LCC0-00000	1	19701	WBC 2.5/A- 3S4	WIDE-BAND CHOKE
L	2	LCC0-00000	1	19701	WBC 2.5/A- 3S4	WIDE-BAND CHOKE
L	3	LCC0-00000	1	19701	WBC 2.5/A- 3S4	WIDE-BAND CHOKE

21356 PCB ASSY, DIGITAL, REV: K1 (Continued)

Item		P/N	Qty	Cage	Mfr's P/N	Description
R	1	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R	2	RN55-03920	1	91637	RN55C3920F	392 OHMS 1% MET FILM
RP	1	RM9S-11000	1	58900	RM9S-11000	1 KOHM X 9 SIP NETWORK
RP	2	RM9S-11000	1	58900	RM9S-11000	1 KOHM X 9 SIP NETWORK
RP	3	RM9S-11000	1	58900	RM9S-11000	1 KOHM X 9 SIP NETWORK
RP	4	RM9S-11000	1	58900	RM9S-11000	1 KOHM X 9 SIP NETWORK
RP	5	RM9S-11000	1	58900	RM9S-11000	1 KOHM X 9 SIP NETWORK
RP	6	RM9S-11000	1	58900	RM9S-11000	1 KOHM X 9 SIP NETWORK
TP	1	ETIO-10018	1	58900	ETIO-10018	BLACK TEST POINT
TP	2	ETIO-10018	1	58900	ETIO-10018	BLACK TEST POINT
U	1	UTN0-01382	1	01295	74HC138N	74HC138 DECODER/DEMUL TIP
U	2	UTN0-01382	1	01295	74HC138N	74HC138 DECODER/DEMUL TIP
U	3	UTN0-02443	1	01295	SN74HCT244N	SN74HCT244N BUFFER
U	4	UTN0-02453	1	01295	SN74HCT245N	74HCT245 OCTAL BUSXCVR
U	5	UTN0-02453	1	01295	SN74HCT245N	74HCT245 OCTAL BUSXCVR
U	6	UIN0-01210	1	0B0A9	DS1210	DS1210 NONVOL CONTROLLER
U	7	UTN0-03932	1	01295	SN74HC393N	74HC393 BINARY DIVIDE
U	8	UTN0-05402	1	01295	SN74HC540N	SN74HC540N OCTAL BUFFER
U	9	UTN0-00322	1	01295	74HC32N	74HC32 QUAD 2 INPUT OR
U	10	21379	1	58900	21379	PAL,PROG,VXI DIGITAL
U	11	UTN0-00042	1	01295	SN74HC04N	74HC04 HEX INVERTER
U	12	UTN0-00052	1	01295	SN74HC05N	74HC05, HEX INVERTER
U	21	UMN0-51001	1	4T165	UPD431000ACZ-70L	TC551001BPL-10 1M RAM
U	22	UMN0-51001	1	4T165	UPD431000ACZ-70L	TC551001BPL-10 1M RAM
XU	10	JSP0-10020	1	09769	2-641612-1	20 PIN DIP SOCKET
XU	13	JSP0-10032	1	09769	390263-2	32 PIN DIP SOCKET
XU	14	JSP0-10032	1	09769	390263-2	32 PIN DIP SOCKET
XU	15	JSP0-10032	1	09769	390263-2	32 PIN DIP SOCKET
XU	16	JSP0-10032	1	09769	390263-2	32 PIN DIP SOCKET
XU	17	JSP0-10032	1	09769	390263-2	32 PIN DIP SOCKET
XU	18	JSP0-10032	1	09769	390263-2	32 PIN DIP SOCKET

21356-A00 PCB ASSY, PRE-WAVE, DIGITAL VXI, REV: D

Item		P/N	Qty	Cage	Mfr's P/N	Description
	1	21355	1	58900	21355	PCB,DIGITAL
	2	21357	REF	58900	21357	SCHEMATIC,DIGITAL PCB
C	1	CE25-R7100	1	00656	AMR101M025	100 UF 25V RADIAL LEAD
C	2	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	26	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	27	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	28	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	29	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	3	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	30	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	31	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO

21356-A00 PCB ASSY, PRE-WAVE, DIGITAL VXI, REV: D (Continued)						
Item		P/N	Qty	Cage	Mfr's P/N	Description
C	32	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	33	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	34	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	35	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	36	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	37	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	38	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	39	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	4	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	40	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	41	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	42	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	43	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	44	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	45	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	46	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	47	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	48	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	49	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	5	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	51	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	52	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	53	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	54	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	55	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	56	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	57	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	58	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	59	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	6	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	61	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	66	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	67	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	68	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	69	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	7	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	70	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	71	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	72	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	73	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	74	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	75	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	77	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	8	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	81	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	82	CC50-01100	1	04222	SR151A101JAA	100 PF CERAMIC NPO
C	9	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R

21356-A00 PCB ASSY, PRE-WAVE, DIGITAL VXI, REV: D (Continued)

Item		P/N	Qty	Cage	Mfr's P/N	Description
C	10	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	11	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	12	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	13	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	14	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	15	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	16	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	17	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	18	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	19	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	20	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	21	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	22	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	23	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
C	24	CE25-07100	1	55680	TVX1E101MAA	100UF 25V ELECTROLYTIC
C	25	CC50-03100	1	54583	RD30HX7R103K	.01 UF CERAMIC X7R
J	1	JSE0-20050	1	55322	ESW-125-37-S-D	50 PIN ELEVATED SOCKET
J	2	JIB2-40100	1	91506	A015-040-YE-0013	40 PIN STRIPLINE SOCKET
J	3	JIB2-40100	1	91506	A015-040-YE-0013	40 PIN STRIPLINE SOCKET
J	4	JIB2-36100	1	91506	A015-036-YE-001	36 PIN STRIPLINE SOCKET
J	6	JIR1-04295	1	09769	640453-4	4 PIN RT ANG STRPLN PLUG
L	1	LCC0-00000	1	19701	WBC 2.5/A- 3S4	WIDE-BAND CHOKE
L	2	LCC0-00000	1	19701	WBC 2.5/A- 3S4	WIDE-BAND CHOKE
L	3	LCC0-00000	1	19701	WBC 2.5/A- 3S4	WIDE-BAND CHOKE
R	1	RN55-11000	1	91637	RN55C1001F	1 K OHMS 1% MET FILM
R	2	RN55-03920	1	91637	RN55C3920F	392 OHMS 1% MET FILM
RP	1	RM9S-11000	1	58900	RM9S-11000	1 KOHM X 9 SIP NETWORK
RP	2	RM9S-11000	1	58900	RM9S-11000	1 KOHM X 9 SIP NETWORK
RP	3	RM9S-11000	1	58900	RM9S-11000	1 KOHM X 9 SIP NETWORK
RP	4	RM9S-11000	1	58900	RM9S-11000	1 KOHM X 9 SIP NETWORK
RP	5	RM9S-11000	1	58900	RM9S-11000	1 KOHM X 9 SIP NETWORK
RP	6	RM9S-11000	1	58900	RM9S-11000	1 KOHM X 9 SIP NETWORK
TP	1	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
TP	2	ETT0-00001	1	63345	330.100W/ TIN PLATE	TEST JACK PIN
U	1	UTN0-01382	1	01295	74HC138N	74HC138 DECODER/DEMUL TIP
U	2	UTN0-01382	1	01295	74HC138N	74HC138 DECODER/DEMUL TIP
U	3	UTN0-02443	1	01295	SN74HCT244N	SN74HCT244N BUFFER
U	4	UTN0-02453	1	01295	SN74HCT245N	74HCT245 OCTAL BUSXCVR
U	5	UTN0-02453	1	01295	SN74HCT245N	74HCT245 OCTAL BUSXCVR
U	6	UIN0-01210	1	0B0A9	DS1210	DS1210 NONVOL CONTROLLER
U	7	UTN0-03932	1	01295	SN74HC393N	74HC393 BINARY DIVIDE
U	8	UTN0-05402	1	01295	SN74HC540N	SN74HC540N OCTAL BUFFER
U	9	UTN0-00322	1	01295	74HC32N	74HC32 QUAD 2 INPUT OR
U	11	UTN0-00042	1	01295	SN74HC04N	74HC04 HEX INVERTER
U	12	UTN0-00052	1	01295	SN74HC05N	74HC05, HEX INVERTER
U	21	UMN0-51001	1	4T165	UPD431000ACZ-70L	TC551001BPL-10 1M RAM
U	22	UMN0-51001	1	4T165	UPD431000ACZ-70L	TC551001BPL-10 1M RAM

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21356-A00 PCB ASSY, PRE-WAVE, DIGITAL VXI, REV: D (Continued)

Item		P/N	Qty	Cage	Mfr's P/N	Description
XU	10	JSP0-10020	1	09769	2-641612-1	20 PIN DIP SOCKET
XU	13	JSP0-10032	1	09769	390263-2	32 PIN DIP SOCKET
XU	14	JSP0-10032	1	09769	390263-2	32 PIN DIP SOCKET
XU	15	JSP0-10032	1	09769	390263-2	32 PIN DIP SOCKET
XU	16	JSP0-10032	1	09769	390263-2	32 PIN DIP SOCKET
XU	17	JSP0-10032	1	09769	390263-2	32 PIN DIP SOCKET
XU	18	JSP0-10032	1	09769	390263-2	32 PIN DIP SOCKET

21418 PCB ASSY, VXI PROCESSOR, REV: B

Item		P/N	Qty	Cage	Mfr's P/N	Description
	1	21404	1	58900	21404	VXI PROCESSOR/INTERFACE
	2	21419	1	58900	21419	PROM SET, VXI PROCESSOR
C	1	CT20-R6150	1	04222	TAP156K020CCS	15UF 20V TANTALUM

6.3 List of Manufacturers

The names and addresses of manufacturers cited in the preceding parts lists are shown in Table 6-1. Each manufacturer is listed under its CAGE number (COMMERCIAL AND GOVERNMENT ENTITY), as noted in the parts lists. In a few cases, no CAGE number has been assigned; these manufacturers are referenced by Giga-tronics codes which are shown at the end of the list.

Table 6-1: List of Manufacturers

Cage	Supplier	Name	Address	City	State
53387	3M	3M Electronics Products Division	6801 River Place Blvd.	Austin	TX
53387	ITWPAN	3M Electronics Products Division	309 E. Crossroads Parkway	Bolingbrook	IL
-----	A&J	A&J Manufacturing Company Inc.	11121 Hindry Ave.	Los Angeles	CA
53387	APWELE	APW Electronic Solutions	14100 Danielson Street	Poway	CA
53387	ARC	ARC Technology, Inc.	11 Chestnut Street	Amesbury	MA
-----	ATP	ATP Technologies, Inc.			
04222	AVX	AVX Ceramics	19th Ave. South	Myrtle Beach	SC
30161	AAVID	Aavid	1 Kool Path	Lacona	NH
-----	ADVPWR	Advance Power, Inc.	11035 Switzer Ave.	Dallas	TX
61638	ADVANC	Advanced Interconnections	5 Energy Way	West Warwick	RI
34335	AMD	Advanced Micro Devices	910 Thompson Place	Sunnyvale	CA
4U751	ADV/SE	Advanced Semiconductor, Inc.	7525 Ethel Ave. Unit G	North Hollywood	CA
00656	AEROVO	Aerovox	740 Belleville Ave.	New Bedford	MA
0H379	AEROWA	Aerowave Inc.	344 Salem Street	Medford	MA
9Y422	AIR	Air Filtration Products Inc.	707 North Main Ave.	Tucson	AZ
52750	ALAN	Alan Industries	745 Greenway Drive	Columbus	IN
56563	ALATEC	Alatec Products	21123 Nordhoff Street	Chatsworth	CA
-----	ALCO	Alco Electronics Products Inc.	1551 Osgood Street	North Andover	MA
0EUK7	ALLAME	All American Transistor Corp.	369 VanNess Way	Torrance	CA
01121	ALLEN	Allen Bradley Company	1201 South Second Street	Milwaukee	WI
-----	ALLIED	Allied Electronics, Inc.	2105 Lundy Lane	San Jose	CA
-----	ALLSWI	Allied Swiss Screw Products, Inc.	2636 Vista Pacific Drive	Oceanside	CA
-----	ALLSTR	Allstar Magnetics			
-----	ALMAGU	Almaguer Precision Manufacturing	1240 Yard Court, Bldg. J	San Jose	CA
17540	ALPIND	Alpha Industries	20 Sylvan Road	Woburn	MA
92194	ALPSEM	Alpha Semiconductor Inc.	1031 Serpentine Lane	Pleasanton	CA
92194	ALPHA	Alpha Wire Corp.	711 Lidgerwood Ave.	Elizabeth	NJ
67183	ALTERA	Altera Corp.	2610 Orchard Parkway	San Jose	CA
06540	AMATOM	Amatom Division of New Haven Mfg Co	446 Blake Street	New Haven	CT
99800	DELEVA	American Precision Ind. Delevan Div.	270 Quaker Road	East Aurora	NY

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Table 6-1: List of Manufacturers

Cage	Supplier	Name	Address	City	State
1HY41	AMER R	American Relays Inc.	10306 Norwalk Blvd.	Sante Fe Springs	CA
84411	AM SHI	American Shizuki Corp.	301 West O Street	Ogallaia	NE
-----	SKYNET	American Skynet Electronic	1474 Gladding Court	Milpitas	CA
29990	ATC	American Technical Ceramics	1 Norden Lane	Huntington Station	NY
09769	AMP	Amp Inc.	2800 Fulling Road	Harrisburg	PA
34553	AMPERE	Amperex Electronics Corp.		Hauppauge	NY
74868	AMPHEN	Amphenol Corp.	One Kennedy Ave.	Danbury	CT
24355	ANALOG	Analog Devices, Inc.	1 Technology Way	Norwood	MA
04ZM0	APPLIE	Applied Thin-Film Products	3439 Edison Way	Fremont	CA
-----	ARCO	Arco Electronics	400 Moreland Road	Commack	NY
1HYW5	ARDIN	Ardin Frequency Control, Inc.	150 Paularino Ave # 166	Costa Mesa	CA
51167	ARIES	Aries Electronics Inc.	62 Trenton Ave.	Frenchtown	NJ
61529	AROMAT	Aromat Corp.	629 Central Ave.	New Providence	NJ
46467	AROW	Arow Fasteners Inc.	31012 Huntwood Ave.	Hayward	CA
-----	ASSOCC	Associated Components Technology	11576 Trask Ave.	Garden Grove	CA
4J995	ASSOCS	Associated Spring	401 East Stadium Blvd.	Ann Arbor	MI
62277	ATLAS	Atlas Wire and Cable Corp.	133 S. Van Norman Road	Montebello	CA
1FN41	ATMEL	Atmel	2325 Orchard Parkway	San Jose	CA
91506	AUGAT	Augat Inc.	452 John Dietsch Blvd.	Attleboro Falls	MA
24539	AVANTE	Avantek, Inc. (HP Components)	3175 Bowers Ave.	Santa Clara	CA
65517	AYER	Ayer Engineering	1250 West Roger Road	Tucson	AZ
21604	BRDE00	Brothers Electronics	438 SO. Military Trail	Deerfield Beach	FL
53387	BROTHER	Brothers Electronics		Deerfield Beach	FL
1E584	BAY	Bay Associates	150 Jefferson Drive	Menlo Park	CA
52683	BAYTRO	Baytron Company Inc.	344 Salem Street	Medford	MA
13150	BEAU	Beau Interconnect	4 Aviation Drive	Gilford	NH
5Y491	BECKMA	Beckman Industrial	4141 Palm Street	Fullerton	CA
16428	BELDEN	Belden Corp.	350 NW 'N' Street	Richmond	IN
55285	BERQUI	Berquist Company Inc.	5300 Edina Industrial Blvd.	Minneapolis	MN
0Y1C7	BIPOLA	Bipolarics Inc.	108 Albright Way	Los Gatos	CA
32559	BIVAR	Bivar Inc.	4 Thomas Street	Irvine	CA
71034	BLILEY	Bliley Electric Company	2545 West Grandview Blvd.	Erie	PA
32997	BOURNS	Bourns Inc.	1200 Columbia Ave.	Riverside	CA
57834	BRIM	Brim Electronics Inc.	120 Home Place	Lodi	NJ
21604	BUCKEY	Buckeye Stamping	555 Marion Road	Columbus	OH
71218	BUD	Bud Industries	4605 East 355th Street	Willoughby	OH

Table 6-1: List of Manufacturers

Cage	Supplier	Name	Address	City	State
09922	BURNDY	Burndy Corp.	1 Richards Ave.	Norwalk	CT
13919	BURR B	Burr Brown Research Corp.	6730 South Tucson Blvd.	Tucson	AZ
-----	BUSSMA	Bussmann Manufacturing	114 Old Street Road	Street Louis	MO
ORF16	C&D	C&D Electronics	28 Appleton Street	Holyoke	MA
09353	C&K	C&K Components	57 Stanley Ave.	Watertown	MA
46381	CALRAD	California Radomes	364 Reed Street	Santa Clara	CA
53387	CAPLUG	Caplugs	2150 Elmwood Ave.	Buffalo	NY
53387	CENSEM	Central Semi			
-----	CLIPPR	Clipper			
53387	COMPAS	Compass Components	48502 Kato Road	Fremont	CA
53387	CPCLAI	CP Claire			
71450	CTS	CTS Corp.	1201 Cumberland Ave.	West Lafayette	IN
16733	CABLEW	Cablewave Systems Inc.	60 Dodge Ave.	North Haven	CT
09CW5	CALCHP	Cal Chip Electronics	59 Steamwhistle Drive	Ivyland	PA
56427	CALMIC	California Micro Devices	215 Topaz Street	Milpitas	CA
0NOK0	CALOGI	Calogic Corp.	237 Whitney Place	Fremont	CA
53387	CAPAX	Capax Technologies, Inc.	24842 Ave. Tibbitts	Valencia, CA	CA
65664	CATAMO	Catamount Manufacturing Inc.	158 Governor Drive	Orange	MA
2J873	CELERI	Celeritek Inc.	3236 Scot Blvd.	Santa Clara	CA
51642	CENTRE	Centre Capacitor Inc.	2820 East College Ave.	State College	PA
56988	CENTRY	Century Spring Corp.	P.O Box 15287 222 E 16th St.	Los Angeles	CA
01963	CHERRY	Cherry Electrical Products	3600 Sunset Ave.	Waukegan	IL
8W262	CHOMER	Chomerics Inc.	16 Flagstone Drive	Hudson	NY
52072	CIR AS	Circuit Assembly Corp.	18 Thomas Street	Irvine	CA
-----	CIREXX	Cirexx Corp.	3391 Keller StreetS	Santa Clara	CA
12697	CLAROS	Clarostat Sensors and Controls	12055 Rojas Drive Ste. K	El Paso	TX
-----	CODI/S	Codi Semiconductor	144 Market Street	Kenilworth	NJ
02113	COILCR	Coilcraft Inc.	1102 Silver Lake Road	Cary	IL
ONFLO	COILTR	Coiltronics Inc.	6000 Park of Commerce Blvd.	Boca Raton	FL
62839	COMLIN	Comlinear	4800 Wheaton Drive	Fort Collins	CO
-----	COMPAR	Compar Corp.	85 Spy Court	Markham, Ontario	
55801	COMP D	Compensated Devices	166 Tremont Street	Melrose	MA
0ABX4	COMPTE	Comptec International LTD	7837 Custer School Road	Custer	WA
18310	CONCOR	Concord Electronics Corp.	30 Great Jones Street	New York	NY
08MU3	CONDUC	Conductive Rubber Technology, Inc.	22125 17th Ave.	Bothell	WA
26923	CONTRO	Control Master Products	1062 Shary Circle	Concord	CA

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Table 6-1: List of Manufacturers

Cage	Supplier	Name	Address	City	State
05245	CORCOM	Corcom Inc.	1600 Winchester Road	Libertyville	IL
14655	CORNEL	Cornell Dublier Electronics	1605 East Rodney French Blvd.	New Bedford	MA
14674	CORNIN	Corning Glass Works	Houghton Park	Corning	NY
34808	CUSTCO	Custom Coils Inc.	109 South Iowa Street	Alcester	SD
65786	CYPRES	Cypress Semiconductor Corp.	3901 North First Street	San Jose	CA
-----	DCELEC	DC Electronics	1870 Little Orchard Street	San Jose	CA
53387	DCSU00	DC Machine	220 Humboldt Crt.	Sunnyvale	CA
53387	DIALAC	DialAct Corp.	45979 Warm Springs Blvd. Ste. 1	Fremont	CA
57032	DADEN	Daden Associates Inc.	1001 Calle Amanacer	San Clemente	CA
91637	DALE	Dale Electronics Inc.	1122 Twenty Third Street	Columbus	NE
0B0A9	DALLAS	Dallas Semiconductor Corp.	6350 Beltwood Pkwy. South	Dallas	TX
-----	DATCIR	Data Circuits Systems, Inc.			
50721	DATEL	Datel Inc.	11 Cabot Blvd.	Mansfield	MA
34785	DEK	Dek Inc.	3480 Swenson Ave.	Street Charles	IL
0JBU8	DELNET	Delnetics	521 Wilbur Ave.	Antioch	CA
1JB33	DEXTER	Dexter Corp.	1 Dexter Drive	Seabrook	NH
83330	DIALIG	Dialight Corp.	1913 Atlantic Ave.	Manasquan	NJ
55153	DIEL L	Dielectric Laboratories	69 Albany Street	Cazenovia	NY
18041	DIODEI	Diode Inc.	21243 Ventura Blvd.	Woodland Hills	CA
0AX52	DITOM	Ditom Microwave Inc.	1180 Coleman Ave. #103	San Jose	CA
05AJ8	DOW	Dow Corning Corp.	Wolverine Building	Midland	MI
0JNR4	DUPONT	Dupont Electronics	825 Old Trail Road	Wilmington	DE
2J899	DYNAWA	Dynawave Inc.	94 Searle Street	Georgetown	MA
74970	EFJOHN	E. F. Johnson Company	299 Johnson Ave.	Waseca	MN
72825	EBY	EBY Company	4300 H Street	Philadelphia	PA
53387	ECMETL	EC Metal Plating	3005 Copper Road	Santa Clara	CA
-----	EDT	EDT	2680 Walnut Ave., Unit C	Tustin	CA
05820	WAKEFI	EG&G Wakefield Engineering	60 Audubon Road	Wakefield	MA
-----	EL CAP	EL Cap	116 Depot Ave.	Elgin	TX
2J899	EXCELF	Excelfab	1020 Morse Ave.	Sunnyvale	CA
78553	EATON	Eaton Corp.	1060 West 130th Street	Brunswick	OH
0GUG6	ECLIPT	Ecliptek	18430 Bandilier Circle	Fountain Valley	CA
31781	EDAC	Edac Inc.	40 Tiffield Road	Scarborough, Ontario	
91662	ELCO	Elco Corp.	801 Seventeenth Ave. South	Myrtle Beach	SC
-----	ELEFIL	Electro-Films Inc.	111 Gilbane Street	Warwick	RI
-----	EE&I	Electronic Eyelet & Interconnect	911 Bern Court	San Jose	CA

Table 6-1: List of Manufacturers

Cage	Supplier	Name	Address	City	State
14604	ELMWOOD	Elmwood Sensors Inc.	500 Narragansett Park Drive	Pawtucket	RI
64013	ELNA	Elna America, Inc.	5770 Warland Drive	Cypress	CA
0JMR7	EMERSON	Emerson & Cuming	61 Holton Street	Worburn	MA
.....	ENVIRO	Enviro Tech International	P.O. Box 5052	Alameda	CA
33246	EPOTEK	Epoxy Technology Inc.	14 Fortune Drive	Billerica	MA
0HAF7	EPSON	Epson America, Inc.	20770 Madrona Ave.	Torrance	CA
72982	ERIE	Erie Technological	645 West Eleventh Street	Erie	PA
8B808	EVAPOR	Evaporated Coatings, Inc.	2365 Maryland Road	Willow Grove	PA
65964	EVOX	Evov-Rifa Inc.	100 Tri-State International	Lincolnshire	IL
52063	EXAR	Exar Integrated Systems	2222 Qume Drive	San Jose	CA
53387	FOSCOO	Force Electronics	477 Gianni Street	Santa Clara	CA
73734	FED SC	Federal Screw Products Inc.	3917 North Kedzie Ave.	Chicago	IL
1BH13	FENWAL	Fenwal Electronics Inc.	64 Fountain Street	Framingham	MA
02114	FERROX	Ferroxcube/Division of Amperex	5083 Kings Highway	Saugerties	NY
60204	FLECK	Fleck Company	3410 A Street S.E.	Auburn	WA
61429	FOX	Fox Electronics Inc.	5570 Enterprise Parkway	Ft. Myers	FL
26629	FREQ S	Frequency Sources, Inc.	15 Maple Road	Chelmsford	MA
.....	FUJI P	Fujipoly	365 Carnegie Ave.		
9Z397	FUJITS	Fujitsu Component of America	3320 Scott Blvd.	Santa Clara	CA
0HFH6	FUTABA	Futaba Corp. of America	555 West Victoria Street	Compton	CA
14936	GENERA	General Instrument Corp.	10 Melville Park Road	Melville	NY
0J9P9	GEROME	Gerome Manufacturing Co, Inc.	403 N. Main Street	Newburg	OR
58900	GIGA	Giga-tronics Inc.	4650 Norris Canyon Road	San Ramon	CA
3T059	GILWAY	Gilway Technical Lamps Inc.	800 West Cummings Park	Woburn	MA
1BX85	GLOBAL	Global Computer Supplies	2318 E. Del Amo Blvd., Dept 75	Compton	CA
.....	GOLDEN	Golden Pacific Quality Products	23585 Connecticut Street #18	Hayward	CA
95348	GORDOS	Gordos Corp.	1000 North 2nd Street	Rogers	AZ
17217	GORE	Gore & Associates Inc., W.L.	1901 Barksdale Road	Newark	DE
81073	GRAYHI	Grayhill Inc.	561 Hillgrove Ave.	La Grange	IL
2R182	SMITH	H.H. Smith Company	325 North Illinois Street	Indianapolis	IN
63542	HAMILT	Hamilton Hallmark			
9Z740	HNL	HNL Inc.	3250 Victor Street, Bldg C	Santa Clara	CA
4F708	HAMMON	Hammond Manufacturing Company	1690 Walden Drive	Buffalo	NY
2M881	HARRIS	Harris Semiconductor	883 Sterling Road, Ste. 8120	Mountain View	CA
67297	HEROTE	Herotek Inc.	222 North Wolfe Road	Sunnyvale	CA
28480	HP	Hewlett Packard Company	3000 Hanover Street	Palo Alto	CA

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Table 6-1: List of Manufacturers

Cage	Supplier	Name	Address	City	State
28520	HEYCO	Heyco Molded Products	750 Blvd.	Kenilworth	NJ
0AG18	HIROSE	Hirose Electric	2688 West Hills Court	Simi Valley	CA
61485	HITACH	Hitachi Denshi America Ltd.	175 Crossways Parkway West	Woodbury	NY
-----	HITECH	Hitech Die Casting, Inc.	2245 S. Vasco Road	Livermore	CA
-----	SUHNER	Hubner Suhner Ltd.	Tumleinstrass 20	Pfaffikon, Switz	
55536	HUNTER	Hunter Technology Corp.	3305 Kifer Road	Santa Clara	CA
58558	ICS	ICS Electronics	473 Los Coches Street	Milpitas	CA
32293	INTER	Interconnect System	2501 Mission Street	Santa Cruz	CA
4J532	IOTECH	IOtech, Inc.	25971 Cannon Road	Cleveland	OH
71468	ITT CA	ITT Cannon Electric	666 East Dyer Road	Santa Anna	CA
98291	ITT SE	ITT Cannon RF Products	585 East Main Street	New Britain	CT
05276	ITT PO	ITT Pomona Electronics	1500 East Ninth Street	Pomona	CA
31918	ITT SH	ITT Schadow Inc.	8081 Wallace Road	Eden Prairie	MN
04426	ITW SW	ITW Switches	6615 West Irving Park Road	Chicago	IL
51705	ICO RL	Ico-Rally Corp.	2575 East Bayshore Road	Palo Alto	CA
0FY98	IDAHO	Idaho Circuit Technologies	401 East 1st Street	Glenns Ferry	ID
74840	ILLCAP	Illinois Ccpacitor Inc.	3757 West Touhy Ave.	Lincolnwood	IL
-----	INDUIM	Induim Corp. of America	1676 Lincoln Ave.	Utica	NY
64671	INMET	Inmet Corp.	300 Dino Drive	Ann Arbor	MI
58202	INNOWA	Innowave Inc.	955/975 Benecia Ave.	Sunnyvale	CA
92890	INTCIR	Integrated Circuit Systems	525 Race Street	San Jose	CA
61772	IDT	Integrated Device Technology, Inc.	2975 Stender Way	Santa Clara	CA
34649	INTEL	Intel Corp.	2200 Mission College Blvd.	Santa Clara	CA
ORMV0	INTELL	Intelligent Instrumentation	6550 S. Bay Colony Dr., MS 130	Tucson	AZ
5J927	INT.TE	Interface Technology Inc.	300 South Lemon Creek Drive	Walnut	CA
4S177	IMS	International Mfg Services	50 Schoolhouse Lane	Portsmouth	RII
59993	INT RE	International Rectifier	233 Kansas Street	El Segundo	CA
32293	INTERS	Intersil Inc.	2450 Walsh Ave.	Santa Clara	CA
-----	ITEM	Item	1249 Quarry Lane Ste. 150	Pleasanton	CA
-----	J&J	J&J Electronics Inc.	6 Faraday	Irvine	CA
0K971	JAE	JAE Electronics	142 Technology Dr., Ste. 100	Irvine	CA
91293	JOHANS	Johanson Mfg. Company	400 Rockway Valley Road	Boonton	NJ
30035	JOLO I	Jolo Industries Inc.	13921 Nautilus Drive	Garden Grove	CA
05236	JONATH	Jonathan Manufacturing Company	1101 South Acacia Ave.	Fullerton	CA
23499	JUDD	Judd Wire and Cable	870 Los Vallecitos Road	San Marcos	CA
66126	KDI	KDI Precision Products	3975 McMann Road	Cincinnati	OH

Table 6-1: List of Manufacturers

Cage	Supplier	Name	Address	City	State
-----	KINKOS	KINKOS			
08EW3	KMW	KMW Inc.	9970 Bell Ranch Drive	Santa Fe Springs	CA
-----	KOA	KOA SPEER	6801 River Place Blvd.	Austin	TX
59124	KOASPE	KOA Speer Electronics Inc.	Bolivar Drive	Bradford	PA
3M918	KANEMA	Kanematsu-Gosho USA, Inc.	3335 Hope Street, Ste. 2800	Los Angeles	CA
31433	KEMET	Kemet Electronics Corp.	2835 Kemet Way	Simpsonville	SC
75263	KEYSTO	Keystone Carbon Company	1935 State Street	Street Marys	PA
91836	KING E	Kings Electronics	40 Marbledale Road	Tuckahoe	NY
62331	KRYTAR	Krytar Inc.	1292 Anvilwood Court	Sunnyvale	CA
2P953	LEMO	Lemo USA Inc.			
8Z313	LMS	LMS Electronics	34101 Monroe Road	Charlotte	NC
55261	LSI SY	LSI Computer Systems	1235 Walt Whitman Road	Melville	NY
4J674	LEADER	Leader Tech	14100 McCormick Drive	Tampa	FL
24759	LENOX	Lenox-Fugal Electronics Inc.	1071 North Grandview Ave.	Nogales	AZ
24759	LENXFU	Lenox-Fugle International, Inc.	P.O. Box 1448	Nogales	AZ
34333	LINFIN	Linfinity Microelectronics, Inc.	11861 Western Ave.	Garden Grove	CA
64155	LIN TE	Linear Technology Corp.	1630 McCarthy Blvd.	Milpitas	CA
75915	LITTLE	Littelfuse Tracor Inc.	800 East Northwest Hwy.	Des Plaines	IL
93459	LUCAS	Lucas Weinschel Inc.	5305 Spectrum Drive	Frederick	MD
0C7W7	MPULSE	M-Pulse Microwave	576 Charcot Ave.	San Jose	CA
96341	M/A CO	M/A Com	1011 Pawtucket Blvd.	Lowell	MA
53387	MICROO	Micro-Ohm Corporation	1088 Hamilton Road	Duarte	CA
53387	MILL-M	Mill-Max	190 Pine Hollow Road		NY
2T737	MOUSER	Mouser Electronics			
53387	MULTIF	Multiflex Inc.	282 Browkaw Road	Santa Clara	CA
94696	MAGCRA	Magnecraft	1910 Techny Road	Northbrook	IL
90201	MALLOR	Mallory Capacitor Company	4760 Kentucky Ave.	Indianapolis	IN
0H1N5	MARCON	Marcon America Corp.	998 Forest Edge Drive	Vernon Hills	IL
0UC32	MARKI	Marki Microwave	2320 B Walsh Ave.	Santa Clara	CA
1ES66	MAXIM	Maxim Integrated Products	510 North Pastoria Ave.	Sunnyvale	CA
00136	MCCOY	McCoy/Oak Frequency Control Group	100 Watts Street	Mount Holly Springs	PA
63058	MCKENZ	McKenzie Technology	44370 Old Warm Springs Blvd.	Fremont	CA
3A054	MCMAS	McMaster-Carr Supply Company	9630 Norwalk Blvd.	Santa Fe Springs	CA
65249	MEMORY	Memory Protection Devices Inc.	320 Broad Hollow Road	Farmingdale	NY
0D3V2	MENLO	Menlo Industries Inc.	44060 Old Warm Springs Blvd.	Fremont	CA
12457	MERRIM	Merrimac Industries Inc.	41 Fairfield Place	West Caldwell	NJ

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Table 6-1: List of Manufacturers

Cage	Supplier	Name	Address	City	State
59365	METELI	Metelics Corp.	975 Stewart Drive	Sunnyvale	CA
ORN63	MICRLA	Micro Lambda, Inc.	4037 Clipper Court	Fremont	CA
-----	MICROC	Micro-Chem Inc.			
00929	MICROL	Microlab/FXR	10 Microlab Road	Livingston	NJ
54487	MICRNE	Micronetics	26 Hampshire Drive	Hudson	NH
0HFJ2	MICPLA	Microplastic Inc.	9180 Gazette Ave.	Chatsworth	CA
54186	MICROP	Micropower Systems Inc.	48720 Kato Road	Fremont	CA
14552	MICRSE	Microsemi Corp.	2830 South Fairview Street	Santa Ana	CA
66449	MICROS	Microsource Inc.	1269 Corporate Center Parkway	Santa Rosa	CA
6Y341	MTI	Microwave Technology Inc.	4268 Solar Way	Fremont	CA
34078	MIDWES	Midwest Microwave Inc.	6564 South State Road	Saline	MI
0S5P0	MILLWA	Milliwave Technology Corp.	6425-C Capital Ave.	Diamond Springs	CA
15542	MINI C	Mini Circuits Laboratory	13 Neptune Ave.	Brooklyn	NY
33592	MITEQ	Miteq Inc.	100 Davids Drive	Huappauge	NY
0D2A6	MITSUB	Mitsubishi Electronics Inc.	5665 Plaza Drive	Cypress	CA
27264	MOLEX	Molex, Inc.	2222 Wellington Court	Lisle	IL
54331	MONITO	Monitor Products Company Inc.	502 Via Del Monte	Oceanside	CA
-----	MOTION	Motion Industries, Inc.	2705 Lafayette Street	Santa Clara	CA
04713	MOT	Motorola Semiconductor Products	5005 East McDowell Road	Phoenix	AZ
04713	MOTO	Motorola Semiconductor Products	5005 East McDowell Road	Phoenix	AZ
0YP31	MULTIC	Multicore Solders	1751 Jay Ell Drive	Richardson	TX
72982	MURATA	Murata Erie North America	645 West 11th Street	Erie	PA
4T165	NEC	NEC Electronics USA Inc.	401 Ellis STreet	Mountain View	CA
-----	NIC	NIC			
0D1M6	NMB	NMB Technologies Inc.	9730 Independence Ave.	Chatsworth	CA
7T184	NTE	NTE EElectronics	44 Farrand Street	Bloomfield	NJ
60583	NARDA	Narda Microwave Corp.	11040 White Rock Road Ste 200	Rancho Cordova	CA
54516	NATCAB	National Cable Molding Company	136 San Fernando Road	Los Angeles	CA
58377	NATELE	National Electronics	11731 Markon Drive	Garden Grove	CA
64667	NATINS	National Instruments Corp.	6504 Bridge Point Parkway	Austin	TX
27014	NATION	National Semiconductor Corp.	2900 Semiconductor Drive	Santa Clara	CA
04569	NATWIR	National Wire & Cable	136 San Fernando Road	Los Angeles	CA
55680	NICHIC	Nichicon America Corp.	927 East State Parkway	Schaumburg	IL
-----	NIDEC	Nidec	152 Will Drive	Canton	MA
0LU72	NORITA	Noritake, Electronics Division	23820 Hawthorne Blvd. #100	Torrance	CA
3K718	NOVATR	Nova-Tronix Inc.	4781 Patrick Henry Drive	Santa Clara	CA

Table 6-1: List of Manufacturers

Cage	Supplier	Name	Address	City	State
65238	NOVACA	Novacap	25111 Anza Drive	Valencia	CA
26233	NYLOK	Nylok Fastener Corp.	1161 Sandhill Ave., Bldg. D	Carson	CA
72259	NYTRON	Nytronics Inc.	475 Park Ave. South	New York	NY
5W060	OLANDE	Olander Company, Inc.	144 Commercial Street	Sunnyvale	CA
61964	OMRON	Omron Electronics Inc.	1E Commerce	Schaumburg	IL
12020	OVENAI	Ovenaire Division	100 Watts Street	Mount Holly Springs	PA
63345	OVERLA	Overland Products Company	1867 Airport Road	Fremont	NE
61964	PHASE	PHASE II			
0DJ29	PSELEC	PSElect	520 Mercury Drive	Sunnyvale	CA
OHS44	PAC MI	Pacific Millimeter	169 Linbrook Drive	San Diego	CA
55387	PAMTEC	Pamtech	4053 Calle Tesoro	Camarillo	CA
61058	PANSON	Panasonic Industrial Division	2 Panasonic Way	Secaucus	NJ
06383	PANDUI	Panduit Corp.	17301 Ridgeland	Tinley Park	IL
-----	PAPST	Papst Mechatronic Corp.	Aquidneck Industrial Park	Newport	RI
53919	PASTER	Pasternack Enterprises	P.O. BOX 16759	Irvine	CA
-----	PEGASU	Pegasus Electronics, Inc.	2240 Lundy Ave.	San Jose	CA
46384	PENN	Penn Engineering and Mfg Company	5190 Old Easton Road	Danboro	PA
-----	PERFOR	Performance Semiconductor Corp.	610 E. Weddell Drive	Sunnyvale	CA
3W023	PHILLI	Phillips Components	5083 Kings Highway	Saugerties	NY
5Z179	PLANAR	Planar Systems Inc.	1400 N.W. Compton Drive	Beaverton	OR
82199	POLARA	Polarad Electronics Inc.	5 Delaware Drive	Lake Success	NY
60046	POWDY	Power Dynamics, Inc.	59 Lakeside Ave.	West Orange	NJ
60393	PRECIS	Precision Resistive Products	202 Mack Lane	Mediapolis	IA
57177	PROMPT	Promptus Electronic Hardware	520 Homestead Ave.	Mount Vernon	NY
53387	QRM	Quick Reponse Mfg. Inc.	793 Ames Ave.	Milpitas	CA
1DN14	QUALCO	Qualcomm Inc.	6455 Lusk Blvd.	San Diego	CA
56866	QTI	Quality Thermistor Inc.	2147 Centurion Place	Boise	ID
-----	RFMICR	R.F. Micro Devices, Inc.	7625 Thorndike Road	Greensboro	NC
55566	RAF EL	RAF Electronic Hardware	95 Silvermine Road	Seymour	CT
53387	RICHO	Richo Inc.	5825 N Tripp Ave.	Chicago	IL
53387	RLCU00	RLC Elect. C/O Dura	21710 Stevens Creek, Bldg. 240	Cupertino	CA
0GP12	RADIAL	Radiall Inc.	150 Long Beach Blvd.	Stratford	CT
0VUE0	RALTRO	Raltron Electronics Corporation	10651 NW 19th Street	Miami	FL
06090	RAYCHE	Raychem Corp.	300 Constitution Drive	Menlo Park	CA
06915	RICHCO	Richco Plastic Company	5825 North Tripp Ave.	Chicago	IL
06776	ROBINS	Robinson Nugent Inc.	800 East Eighth Street	New Albany	IN

Table 6-1: List of Manufacturers

Cage	Supplier	Name	Address	City	State
34576	ROCKWE	Rockwell International Corp.	4311 Jamboree Road	Newport Beach	CA
4U402	ROEDER	Roederstein Electronics	2100 West Front Street	Statesville	NC
86797	ROGAN	Rogan Corp.	3455 Woodhead Drive	Northbrook	IL
65032	ROGERS	Rogers Corp.	100 North Dobson Road	Chandler	AZ
65940	ROHM	Rohm Corp.	111 Pacifica	Irvine	CA
82877	ROTRON	Rotron Inc.	7 Hasbrouck Lane	Woodstock	NY
98159	RUB-CR	Rubber Craft	15627 South Broadway	Gardena	CA
98159	RUB-TE	Rubber Teck	15627 South Broadway	Gardena	CA
0FB81	SMOS	S-MOS Systems Inc.	2460 North First Street	San Jose	CA
31586	SAFT	SAFT America Inc.	107 Beaver Court	Cockeysville	MD
53387	SEI	SEI Electronics	P.O. Box 58789	Raleigh	NC
66958	SGS	SGS Thompson Microelectronics	1000 East Bell Road	Phoenix	AZ
53387	STMICR	ST Microelectronics			
53387	SYNSEM	Synergy Semiconductor	3250 Scott Blvd.	Santa Clara	CA
07180	SAGE	Sage Laboratories Inc.	East Natick Industrial Park	Natick	MA
55322	SAMTEC	Samtec Inc.	810 Progress Blvd.	New Albany	IN
96733	SAN FE	San Fernando Electric Mfg	1501 First Street	San Fernando	CA
62559	SCHROF	Schroff Inc.	170 Commerce Drive	Warwick	RI
70561	SCITEQ	Sciteq Communications, Inc.	9990 Mesa Rim Road	San Diego	CA
7U905	SEASTR	Seastrom Inc.	2351 Kentucky Ave.	Indianapolis	IN
61394	SEEQ	Seeq Technology Inc.	47131 Bayside Parkway	Fremont	CA
59270	SELCO	Selco Products	7580 Stage Road	Buena Park	CA
55989	SEMICO	Semicon Inc.	8810 Frost Ave.	Street Louis	MO
4W070	SHARP	Sharp Electronics Corp.	Sharp Plaza Blvd.	Memphis	TN
0B549	SIEMEN	Siemens Components	10950 North Tantau Ave.	Cupertino	CA
1CY63	SMT	Sierra Microwave Technology Inc.	One Sierra Way	Georgetown	TX
17856	SILICO	Siliconix Inc.	2201 Laurelwood Road	Santa Clara	CA
5L401	SSI	Solid State, Inc.	46 Farrand Street	Bloomfield	NJ
95077	SOLITR	Solitron/Vector Microwave	3301 Electronics Way	West Palm Beach	FL
66049	SWMICR	Southwest Microwave	2922 South Roosevelt	Tempe	AZ
1W232	SPACEK	Spacek Labs	528 Santa Barbara Street	Santa Barbara	CA
24931	SPECIA	Speciality Connector Company, Inc.	2100 Earlywood Drive	Franklin	IN
56289	SPRAGU	Sprague Electric Company	68 Main Street	Sanford	ME
51791	STATEK	Statek Corp	512 North Main Street	Orange	CA
0GAA9	STATIC	Static Control Components	330 Wicker Street	Sanford	NC
OKA21	STETCO	Stetco Inc.	3344 Schierhorn Court	Franklin Park	IL

Table 6-1: List of Manufacturers

Cage	Supplier	Name	Address	City	State
57771	STIMPS	Stimpson Company	900 Sylvan Ave.	Bayport	NY
29005	STORM	Storm Products Company	112 South Glasglow Ave.	Inglewood	CA
1U930	SUPER	Supertex	2231 Colby Ave.	Los Angeles	CA
63155	SYNERG	Synergy Microwave Corp.	483 McLean Blvd.	Patterson	NJ
54583	TDK	TDK of America	12 Harbor Park Drive	Port Washington	NY
-----	TEMIC	TEMIC			
2W053	TARGET	Target Electronics	715A Pastoria Ave.	Sunnyvale	CA
3Z990	TECH P	Tech Pro Inc.	6243 East US Highway 98	Panama City	FL
52814	TECH-E	Tech-Etch	45 Adlrin Road	Plymouth	MA
00RB0	TECHNI	Techni-tool	1575 University Drive	Tempe	AZ
15818	TELCOM	TelCom Semiconductor	1300 Terra Bella Ave.	Mountain View	CA
11532	TELEDY	Teledyne Relays	12525 Daphne Ave.	Hawthorne	CA
15915	EPRO	Tepro of Florida Inc.	2608 Enterprise Road	Clearwater	FL
01295	TI	Texas Instruments	8505 Forrest Lane	Dallas	TX
13103	THRMLL	Thermalloy Co, Inc.	2021 W. Valley View Lane	Dallas	TX
58090	THERMO	Thermometrics	808 US Highway #1	Edison	NJ
56501	T&B	Thomas & Betts Corp.	1555 Lynnfield Road	Memphis	TN
0HHH5	THUNDE	Thunderline Z, Inc.	11 Hazel Drive	Hampstead	NH
0B3G8	TOKIN	Tokin America Inc.	2261 Fortune Drive	San Jose	CA
06049	TOPAZ	Topaz Inc.	1660 Scenic Ave.	Costa Mesa	CA
61802	TOSHIB	Toshiba International	13131 West Little York Road	Houston	TX
82152	TRANSC	Transco Products Inc.	200 West Los Angeles Ave.	Simi Valley	CA
59660	TUSONI	Tusonix Inc.	7741 N. Business Park Drive	Tucson	AZ
53421	TYTON	Tyton Corp.	7930 North Faulkner Road	Milwaukee	WI
53387	UNITED	United Mfg. Assy.	42680 Christy St.	Fremont	CA
0TAZ2	UNION	Union Carbide	39 Old Ridgebury Road	Danbury	CT
62643	UNCHEM	United Chemicon Inc.	9806 Higgins Street	Rosemont	IL
52847	USCRYS	United States Crystal Corp.	3605 McCart Street	Fort Worth	TX
3S125	UNITRO	Unitrode Corp.	5 Forbes Road	Lexington	MA
95275	VISION	Vision Electronics	1175 Spring Ctr. S BLVB	Altamont Springs	FL
53387	VPR	VPR			
27802	VECTRO	Vectron Laboratories, Inc.	166 Gover Ave.	Norwalk	CT
95275	VITRAM	Vitramon Inc.	10 Route 25	Monroe	CT
18736	VOLTRO	Voltronics Corp.	100-10 Ford Street	Denville	NJ
53387	WARDDBA	Ward Bagby	1360 Piper Drive	Milpitas	CA
66579	WAFER	WaferScale Integration	47280 Kato Road	Fremont	CA

58542 VXIbus Universal Power Meter

Table 6-1: List of Manufacturers

Cage	Supplier	Name	Address	City	State
00443	WAVELI	Waveline Inc.	160 Passaic Ave.	Fairfield	NJ
0AN50	WESTEC	Westec Plastics Corp.	2044 Concourse Drive	San Jose	CA
52840	WEST.D	Western Digital Corp.	3128 Red Hill Ave.	Costa Mesa	CA
16453	WEST/M	Western Microwave Inc.	495 Mercury Drive	Sunnyvale	CA
20944	WILTRO	Wiltron Company	685 Jarvis Drive, Ste. F	Morgan Hill	CA
68919	WIMA	Wima (Intertechnical Group)	2269 Saw Mill River Road	Elmsford	NY
60395	XICOR	Xicor Inc.	1151 Buckeye Drive	Milpitas	CA
68994	XILINX	Xilinx Inc.	2100 Logic Drive	San Jose	CA
58758	ZAMBRE	Zambre Company	2134M Old Middlefield Way	Mountain View	CA
79963	ZIERIC	Zierick Manufacturing Company	Radio Circle	Mt. Kisco	NY
.....	ZOLTAR	Zoltar Engineering, LLC	32 Galli Drive, Ste. A	Novato	CA