

**BREWER
OZONE SPECTROPHOTOMETER
Maintenance Manual**

 **SCI-TEC**
INSTRUMENTS INC.

**BREWER
OZONE SPECTROPHOTOMETER
Maintenance Manual**

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1526 Fletcher Road
Saskatoon, Sask., Canada
S7M 5M1
Ph. 306-934-0101
Fax. 306-978-2339
scitec@eagle.wbm.ca

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PREFACE

This document has been developed to aid an operator when a Brewer Ozone Spectrophotometer stops working or has changed in operating specifications after leaving SCI-TEC Instruments Inc. (SCI-TEC). It has been developed from the experience of SCI-TEC and present users. The most likely electronic failures and ones which can be repaired in the field have been documented in this manual. Any suggestions on improvements to this manual would be appreciated by SCI-TEC.

1.0 PURPOSE AND APPLICATION

The purpose of this manual is to help the operator trouble-shoot a Brewer Ozone Spectrophotometer (for both MKII and MKIV models) down to an assembly level, though not necessarily to a component level. The reason is that some components in the assemblies will affect the calibration done at SCI-TEC, and replacement of these may require instrument realignment or re-calibration.

The information in this manual may be applied by reading the procedures and referring to the corresponding drawing located in the back half of this document. For MKIV Brewers it is recommended that all trouble-shooting be done in the Ozone/SO₂ mode. The major difference between MKII and MKIV is the additional Filterwheel and motor in front of the Photomultiplier Tube. This must setup properly at the end of a Reset for proper Ozone/SO₂ operation.

There should be no potentiometers adjusted or set screw removal without completely defining the problem area. If the information in this document is not sufficient, it is recommended that the user contact SCI-TEC before dismantling of main and sub assemblies is undertaken.

2.0 EQUIPMENT REQUIRED

- 1) Voltmeter, either analog or digital, capable of measuring from 1 millivolt to 2000 volts DC.
- 2) Ohmmeter primarily used for checking continuity of cables.
- 3) A clip on or in line current meter.
- 4) A digital VOM with in line current capabilities of 2 amps will be sufficient, rather than items 1,2, and 3. e.g. The DVM supplied with an external UVB Lamp is good and can be removed.
- 5) An oscilloscope may be required (1 millivolt; 20 megahertz).
- 6) An external UVB lamp can be very useful when the internal standard lamp appears at fault.
- 7) A second computer is handy to have available in case the control computer is suspect.

3.0 MAJOR EQUIPMENT FAILURES

A major equipment failure is defined as being a condition where the operator finds there is no communication between the Brewer Spectrophotometer and the external computer (IBM). No commands will go to the Brewer and no information is received by the IBM. This can be defined as a "no operation" condition.

It is assumed the BREWER has power as indicated by the GREEN LED light on the instrument. If the light is out, check that AC power connections to the BREWER (reference Sections 7.1 and 7.2), are proper. If OK, then remove the BREWER top cover and check if MAIN power supply cover is warmer than ambient, if not, then perhaps the fuse requires replacement, (reference fig. 7.1-3 and 7.2-2). To check the fuse, first disconnect AC power to the Brewer and then remove the MAIN power supply cover (four 6-32 screws) and measure or visually inspect the fuse and replace if necessary. When re-installing the cover, ensure the connectors P1 and P3 remain connected.

If the power supply appears to be ON, then perhaps the LED is defective or the connections to it. The main power supply voltages are best checked at testpoints on Secondary Power Supply (S.P.S.) cover bracket, (reference fig. 7.3-3).

When the control computer is given a RESET (RE) command then the Brewer should respond with the following message to the IBM or printer:

BREWER OZONE SPECTROPHOTOMETER

#0XX

AES SCI-TEC

CANADA

VERSION 39.5 NOV 22, 1982

If the instrument will not reset, the problem is normally in the Brewer. However the IBM software can get corrupted so it may be necessary to check that the proper software is installed.

NOTE 1: "SOFTWARE RESET" is used to indicate that the reset instruction (RE) should be issued to the Brewer microprocessor from the control computer. This instruction causes a hardware reset to be generated, (a very long "break" on the line).

NOTE 2: The Brewer RS232 is set to 300 Baud on a reset and the IBM program changes the speed to 1200 Baud soon after communication is established.

3.1 Trouble Shooting Sequence for "No Operation" Condition

- a. It has been established at this point that there is absolutely no communication between the IBM and the Brewer.
- b. A software reset should be attempted after the message "Brewer Failed to Respond" appears on the IBM monitor. This is done by pressing RETURN key on the IBM. If this fails to establish communications the IBM should be re-booted by turning the power off and on.
- c. If there is still no response, the cables should be inspected to ensure that a connector has not been inadvertently removed or accidentally pulled out of place. The Data cable to the Brewer from the IBM as well as the power cable to the Brewer should be checked. All cables involving the linking of peripherals should be checked to ensure they are plugged in as well.
- d. After this has been done another software reset can be done as indicated on the IBM.
- e. There is a possibility that the computer internal to the Brewer (RCA Cosmac) has gone into a "loop" and cannot get out unless it receives a reset. To reset the internal computer turn the Brewer power off and then on. There should be some indication of a reset when the shutter hits it's stops internally. This shutter indication should be heard each time the Brewer power is turned on and off.
- f. Does the Brewer reset? (As determined by the audible click)
 - f1. If the audible click is heard, but there is no message sent to the IBM, then there is a possibility that, even though the cables between the IBM and the Brewer are connected, there may be a line broken or separated in the cables or connectors. Check these cables in the following way. Disconnect the data cable from the Brewer. Measure the voltages on PBD101 at pins 2 and 3 with 7 as ground. (Ref. Fig. 7.1-7). While doing this, attempt a reset of the Brewer by turning the power off and on. The voltmeter should be set to 10 volts full scale, and upon a reset command it should read approximately 4 volts. If there is no voltage measured at this point, there may be a break somewhere in the cables themselves. Each line can be measured point to point with a ohmmeter. It should then be repaired or replaced if there is a problem. Note a Cannon crimp connector pin removal tool is provided with the basic spare kit.
 - f2. A software reset should be attempted after insuring all connections have been made and Brewer power is on.
 - f3. If there is still no operation, there may be a hardware failure on the RS232 output circuit of the RCA Cosmac or on the input to the IBM.
- g. If there was no audible click heard from the shutter, there is an indication that a failure has occurred within the Brewer itself so at this point the cover should be removed.
- h. There is also a manual pushbutton reset switch located with the test points (S.P.S. bracket). This should be pressed and should cause the Brewer to reset.

- i. In the previous step, the Brewer should have reset.
 - i1. If it did, a software reset should be done and the system should start operating.
 - i2. If not, then there is still an indication of an internal failure.
- j. At this point, the acceptance test records should be consulted, and the main power supply voltages should be measured and compared to those shown on the acceptance test records.
- k. If they have changed, or are missing altogether, the power connections should be checked. If they look as though they are in order, and the voltages are still not at proper levels, replacement should be considered. However there may a short circuit in one of the assemblies causing the power supply to be loaded. Shut the power off and disconnect the Card Rack, Heat Sink and S.P.S. board. Repeat the voltage measurements and see if there are any changes. If there are then determine which assembly is at fault by installing connectors or S.P.S. board one at a time. Replace the main power supply if necessary, and ensure when first turned on that the assemblies are dis-connected to allow setup of voltages to correct values. The main 5 volts should be set to 5.1 volts with the single potentiometer on the main power supply.
- l. If the power supply appears to be operating correctly, the power should be shut off, as there is still an indication of an internal failure elsewhere in the system.
- m. All connections internal to the Brewer should be checked to see if they are mating properly. This includes the flat cables as well as the connections made to the Card Rack motherboard, main power supply and the data cable connection between the RCA Cosmac board and the Brewer case.
- n. All cards in the Card Rack should be removed and the contacts at the motherboard end should be inspected for corrosion and cleaned if necessary. They should be put back into the card rack and care should be taken to insure they are seated properly.
- o. At this point power can be turned on and a manual reset done.
- p. If the Brewer resets at this point, the problem has been located.
 - p1. If a reset did occur, a software reset should be done.
 - p2. The system should be up and working.
- q. If the shutter did not reset, there is still an internal problem, and power should be shut off.
- r. All printed circuit boards except the RCA Cosmac should be removed. This is done to eliminate the possibility that one of the boards in the Card Rack other than the RCA Cosmac board has failed and is holding up the motherboard so the computer cannot communicate, because it is being held up.

s. Power on and manual reset can be done, when the RE is in progress press the pushbutton at 1-2 seconds of the 7 second countdown sequence.

t. If one of the other boards was holding up the bus, a reset should have occurred at this point. There will not be an audible indication at this point because the shutter I/O board has been removed. The only way to tell is to watch for the message on the IBM, or monitor the communications line with a meter or oscilloscope.

t1. If a reset did occur power should be turned off and the photon counter board (4th board from top) should be plugged in, after which power is turned on again and now the software reset should work and the message appear on the IBM as normal.

t2. If the Brewer does reset, another board (starting with the top I/O board) can be inserted by the same procedure as the previous step.

t3. If the Brewer does not reset, it can be assumed that the last board put into the card rack has failed, and it should be replaced, if a spare is available.

t4. If after the defective board is replaced and the Brewer does not reset, SCI-TEC should be consulted.

t5. If the Brewer does reset after this board replacement has occurred, the software should be reset and the system should be operational.

u. If there was no reset in item t, the Cosmac board should be replaced and the test repeated. If there is still no reset the continuity of the internal RCA Cosmac to chassis connector should be checked with an ohmmeter, using the drawing available in section 6.3.

v. After either the Cosmac has been replaced, or the cable has been repaired, power should be reapplied and another reset attempted.

w. At this point the Brewer should reset. If it does power can be turned off and all boards can be replaced after which power can be turned on and another manual reset should be done.

w1. If there was an audible reset, a software reset should cause the system to start working.

w2. If there was not an audible reset, there is still an indication of another board failure.

x. Board replacement procedures should begin as described in item t.

y. Another manual reset should be attempted.

y1. If there was an audible reset, a software reset should be all that is required to bring the system up.

y2. If there is still no reset after all previous steps have been completed, SCI-TEC should be consulted before continuing.

4.0 OPERATING TEST FAILURES

In the Brewer Ozone Spectrophotometer most of the operating tests are done using either the mercury lamp or the standard lamp. If any of the other tests fail, the user should proceed immediately to a mercury lamp test (HG) or a standard lamp test (SL).

A mercury lamp test failure or a standard lamp test failure are two major failures which can occur. In both cases calibration of the instrument may be affected. For the purpose of troubleshooting, these two sections have been separated from the main part of the instrument which is the Light Detection System. It is made up of the zenith prism, foreoptics, spectrometer, shutter and shutter electronics, PMT, High Voltage Circuitry, High Speed Amp (considered to be part of the PMT) interconnecting harnesses between these units, and finally the photon counter board. Without this section being operational, no testing, or measuring can be done.

4.1 Preliminary Information

There are a few points to remember in the event there is a major failure somewhere in the system, whether it be the Mercury Lamp, Standard Lamp, or Light Detection System.

- a. The error message "lamp not on test terminated" is an indication of a failure, either in the lamps or in the Light Detection System.
- b. Changes in dark count may be symptomatic of a number of problems which may occur in the Brewer. If it begins to increase or becomes erratic, the shutter may be causing the fault. Note the dark count increases with temperature. It may also indicate motor power supply problems. It can also be used as a monitor for PMT performance. If the dark count changes, there may be a changing optical condition in the Light Detection System. A higher dark count can also be the result of a poor ground somewhere in the system or high humidity inside the instrument. Grounding connections should be checked especially at the heat sink to IBM strip and change and add more desiccant for high humidity locations. These items are more applicable in the next section (5.0) but they may be useful in this instance as well.

4.2 Description of Mercury Lamp Circuit

See Section 7.4 for schematic. Diodes D704 and D703 provide a reference voltage when the lamp is turned on. The voltage across the sense resistor, R709, is controlled by Q703. Q702 varies the lamp current in response to the amplified signal provided by Q703. The circuit is configured in a current shunt feedback configuration. When the lamp current increases, current through R709 increases causing the transistor to pass less current (because of reverse biasing). This increases the voltage at R702 which effectively causes the current through the lamp to be reduced. In this way the lamp circuit is regulated.

4.3 Trouble shooting Procedures for Mercury Lamp Circuit

- a. Test Fails and software responds with "lamp not on test terminated".
- b. Retry test and look through each viewing tube to see if lamp is on. Ensure zenith prism and the filter wheels are in the correct position. Observe temperature of instrument. If Brewer temperature is less than - 20 degrees Celsius, the lamp is too cold and may not come on even with the warming current provided. All that may be required is to turn on the Standard Lamp which will warm the Mercury lamp in extremely cold environments.
- c. If lamp is on, check filter wheel positions (1,0).
 - c1. If lamp is not on there is a possibility of lamp failure, secondary power supply board mercury lamp regulator failure, or shutter, wavelength I/O board failure. The shutter wavelength board also has control circuitry required to operate both the mercury lamp and the standard lamp. The first step is to perform an AP (A/D voltages printout) test and compare the results with previous tests. Pay particular attention to Power Supply and HT voltage. The second step is to measure the voltage across the lamp at pins 6 and 9 on P111. (Reference Section 7.4.1). The voltage should be approximately 3 volts with lamp off and 13 volts with lamp on.

If the voltage is approximately equal to 24 volts, the lamp should be replaced.

4.3.c2 Mercury Lamp Replacement

Before starting disassembly, measure that the lamp is definitely open circuit with an ohmmeter across pins 6 and 9 of J111 (lamp connector), ensure P111 is disconnected. To replace bulb, loosen the two thumb screws (item 6, Fig 7.6.2-2) and carefully withdraw the lamp holder. Inspect lamp and replace if defective or has blackened in color. Do not touch lamp with bare hands, use a tissue or soft cloth. Ensure lamp is tight in its socket and cleaned with alcohol after assembly. Re-assemble the lamp by reversing above steps and test the lamp with B1 and HG commands.

If there is no voltage across lamp in the initial measurement, the next step is to monitor test point TP701 and from the status (ST) menu in the software attempt to turn the lamp on and off. TP701 should have a voltage swing of about 0.8 volts as the lamp is turned on and off. If not, the I/O board, or the connection I/O cable may be at fault and if a spare is available, they should be replaced one at a time, after which another mercury lamp test is attempted. If one is not available, or this fails, SCI-TEC should be consulted. There is information available in Section 4.9 (Description of I/O Board) and drawings in Section 7.5.2).

- d. Remove top cover and spectrometer cover and check to see micrometer has not shifted (refer to acceptance test record for the calibrated setting) or sheet attached to cover. A manual check to ensure micrometer setting is in the correct position is to set filters to position 0,0 (filters out position). Connect a voltmeter across RATE test point to ground and manually scan the micrometer from 0 mm to 10mm. Assuming the shutter is in HG position (0), HG lamp on, and zenith prism is to the lamps then the voltmeter should indicate peaking counts at 3

positions which are the mercury lines. The micrometer should be left in the position of the second largest peak; from the 0mm end of the micrometer. This is the proper position to start a HG test for Ozone/SO₂ measurements and which should have a successful conclusion.

e. At this time another complete mercury lamp test should be attempted. If this test is successful the problem has been located and test results should be accurate. If not there is still a possibility of a PMT failure, shutter failure or optics failure.

f. Next, attempt a standard lamp test. The standard lamp has a much higher intensity and does not depend on the position of the micrometer and shutter as much as the mercury lamp test.

fi. If the standard lamp test works, the printout should be examined carefully to see if any characteristics have changed. If the dark count has increased significantly, this may be an indication that the alignment has changed and may require a mirror adjustment. Check to see if any of the intensities or ratios have changed, which may indicate, that the optics have deteriorated, or the PMT performance or counting has degraded. If the standard lamp test appears to be alright, it is advised the user contact SCI-TEC before proceeding.

f2. If the standard lamp test does not work, then it can be assumed that, either there is an optical failure, or a PMT failure.

g. The high voltage should be measured using a voltmeter and looking at test point TP202 on the secondary power supply board (reference Section 7.4.1). There should be a voltage of between 6 and 8 volts, which has been factory set (see acceptance test record for setting), and should not be adjusted. This voltage is equivalent to the actual high voltage divided by 200 and should be similar to the voltage testpoint TP201. There may be a difference of a volt or two, the voltage at testpoint TP201 is the actual voltage which feeds the high voltage power supply. If they are significantly different, or missing altogether, the high voltage circuit may have failed. This will require a skilled technician for repair or SCI-TEC should be contacted.

h. If the high voltage appears to be present from the monitor testpoints described in item g, there is a possibility that something has failed in the Light Detection System, reference Section 4.7.

4.4 Description of Standard Lamp Circuit

The standard lamp current regulator uses a bridge to monitor the voltage drop across a current sense resistor (reference fig. 7.4.1-3). The error voltage developed by the bridge is amplified and used to control the pass transistor and thus hold the lamp current steady. The pass transistor and current sense resistor are mounted on the heatsink. The sense resistor is used in the four terminal mode with a very small current passing through the connecting leads. The system has sufficient gain to hold the 1.6 amp current within 1 milliamp. The matching temperature coefficients of the bridge components and the very low temperature coefficients of the sense resistor, combined with a stable zener diode keeps the current within 3 milliamps over a range of -20 to + 40 degrees Celsius.

4.5 Description of Standard Lamp Failure

The standard lamp is the lamp most used in all of the tests called up by software. Without it, it is impossible to ensure calibration and proper operation of the Brewer Ozone Spectrophotometer. Therefore an external UVB lamp can be very useful in two areas: 1) As a reference to monitor any changes in the standard lamp itself. 2) In the event that the internal standard lamp stops working, the external standard lamp can be used as the reference.

The software for the standard lamp has been designed to give an error message in the event of a failure. The message is "Lamp not on test terminated". This may not necessarily be the case. There are other factors which can cause a standard lamp failure, even though the lamp remains on. These areas include PMT performance, filterwheel position, Zenith prism position and photon counting electronics as well as I/O electronics used to turn the lamp on and off.

4.6 Trouble-shooting Procedures for Standard Lamp Test Failure

- a. Error message, "Lamp not on test terminated".
- b. Retry test and observe viewing ports, ensure zenith prism is in the proper position. Perform an AP (A/D voltages printout) test and compare results with previous tests, paying particular attention to standard lamp current and voltage. The current channel 14 will go low and voltage channel 15 will go higher to 14 volts if lamp is unplugged or burnt out.
- c. Is lamp on, try just B2 command which turns lamp on and are filterwheels in proper position as well as the iris? Retry test.
- c1. Is test terminated again?
- c2. Try a mercury lamp test. If the mercury lamp test works, then the user will know that the Light Detection System is probably working properly. If not a mercury lamp calibration should be done and the Standard Lamp test repeated.
- c3. If the mercury lamp test works all right, the cover should be removed from the instrument, as well as the spectrometer cover and another standard lamp test done while observing the shutter. If the standard lamp fails again and the shutter is working properly, SCI-TEC should be consulted.
- c4. If the mercury lamp test did not work there is probably a failure in the counting electronics and section 4.7 of this manual should be consulted.

4.6.d Standard Lamp Replacement

Before starting disassembly, measure that the lamp is definitely open circuit with an ohmmeter across pins 1 and 5 of J111 (lamp connector). Reference fig. 7.6.2-2, the Standard Lamp is located above the mercury lamp attached to a removal plate. Remove the 4-40 flathead screw (item 16) and withdraw plate. Replace the bulb with a new one ensuring new bulb is not touched with fingers, use a tissue or soft cloth and clean with alcohol after installation.

Re-assemble and install connector and test lamp with the B2 command, B0 turns off the lamp.

After this another standard lamp test should be tried. If there is no success there is a possibility of circuit failure on the secondary power supply board, or the Shutter I/O board which provides the command to turn the Standard Lamp circuit on.

e. Next measured testpoint is TP104. Testpoint TP104 should switch on command as this circuit is turned on and off.

e1. If this point does not switch, the secondary power supply board should be replaced if there is a spare available. Otherwise SCI-TEC should be consulted, as this circuit has been set up at SCI-TEC with selected resistors, which could change the calibration of the instrument if changed.

e2. After the board has been replaced, another Standard Lamp test should be done.

e3. If this test is successful the system should be operating.

e4. If after replacement of the secondary power supply board the lamp does not come on, SCI-TEC should be consulted.

f. If there was no indication of a voltage swing at TP104, there is a possibility that either the I/O cable which connects J102 of the secondary power supply board, to the shutter-micrometer card is disconnected or has become defective. It should be checked for continuity, using a ohmmeter. If it checks out all right, the I/O board should be replaced with a spare if possible, or SCI-TEC should be consulted.

g. Power can be reapplied, and the Standard Lamp test can be re-attempted.

g1. If the test is again terminated and the voltage at testpoint TP104 did change on command, then the user should proceed to item c2 of this procedure.

h. If the test was successful, the system should be working.

4.7 Description of Light Detection System (Rate) Failure

A Light Detection System failure can show up in all of the tests that can be done by the user. In all cases it will be shown on the terminal as a "Lamp Not On Test Terminated" message. However there will be no error indicated if a direct sun is attempted, even though the Light Detection System has failed. The system will continue as though there were no problem.

The Light Detection System is the main section of the Brewer, and is made up of foreoptics, spectrometer, PMT including the high speed amp, photon counter board, and the shutter and micrometer subassemblies which are a part of the spectrometer. of any of these assemblies should not be attempted, unless they are specified in this section, because instrument calibration may be affected if they are taken apart.

4.8 Trouble-shooting Procedures of Light Detection System

a. If all tests fail, and the indication of "Lamp not on test terminated" is presented, the user should issue B2 command to turn the standard lamp on. With the lamp on, the user should inspect the zenith prism, filterwheels, iris and look through the viewing tube to ensure the lamp is on.

b. If the lamp is on, a complete Standard Lamp test should be done.

b1. If the test fails, there is a possibility of photon counter board failure, and the cover should be removed from the Brewer and this board replaced if a spare is available.

b2. If the test is all right, the system is probably working properly.

c. Check optics and shutter, is shutter working properly?

c1. If there is no operation, the covers should be removed from the Brewer and the spectrometer, and the micrometer inspected. It should be set as is shown on the acceptance test records. The optics should be given a visual inspection and the shutter position should be examined. It can be moved by hand and there should be a "tug" as it moves from one position to the next. If the shutter moves freely from one position to the next without any indication of a holding current, the I/O cable from the shutter to the shutter wavelength I/O board should be inspected and the continuity of this cable should be checked (reference Section 7.5.2). If it is alright, the I/O board or the secondary power supply board may be faulty. If an I/O board is available it should be inserted in place of the old one in the card rack, and another test attempted. If the shutter still does not have a definitive tug at each position on the slits, then the secondary power supply board should be replaced, if one is available, or SCI-TEC should be consulted before an attempt is made to repair it.

c2. If the shutter does "pull" into position on each alternate position of the slits and appears to be aligned to the slits, and there is still no indication of counting after attempting another standard lamp test, a failure in the PMT or pre-amplifier board, or optics in the foreoptics or photon counter board is possible.

d. The cover should be removed from the secondary power supply board and testpoints TP201 and TP202 should be measured with a voltmeter. They should be similar and approximately 7.0 volts (see acceptance test record). Testpoint TP201 is an indication of the voltage feeding the DC-DC converter on the heatsink, and TP202 is the actual high voltage divided by 200. If these voltages are significantly different, there is a possibility of a circuit on the secondary power supply, or the heatsink failing. They should be swapped out one at a time if there are spares available.

d1. Another standard lamp test should be attempted. Ensure the spectrometer cover has been replaced.

d2. If this test is successful the high voltage test point TP202 should be measured and R202 can be adjusted to the value given on the Acceptance Test Record. Also monitor high voltage values from an AP test.

d3. If this test is unsuccessful and the test points still are wrong, there may be a short in the high voltage line somewhere between the heatsink and the actual PMT dynode chain. Care should be taken when inspecting this area because there can be as much as 1800 volts at the connection points. The cable can be checked for continuity, the cover can be removed from the PMT and the actual high voltage can be measured at the connector internal to the cover and next to the high speed amp board.

d4. If the high voltage is still not as indicated on the acceptance test records, SCI-TEC should be contacted.

e. If the high voltage is working properly, there may be a failure in the high speed amp board. TP1 on the high speed amp board should read - 30 millivolts or what is recorded in the Acceptance Manual, (using the HV connector shield as ground). If it does not an adjustment of the on board potentiometer can be attempted. If this fails, the board should be replaced, if a spare is available.

e1. If this test point is alright the photon counter harness should be inspected to see that all connectors are in properly and there are no broken interconnecting wires. Finally if an oscilloscope is available it can be used to monitor testpoint TP4 on the high speed amp board, and then pins 1,2,3,4, and 12,13,14, and 15 of the SN75114N. If these are in order, SCI-TEC should be consulted before proceeding further.

e2. If any of the signals are missing or are not clean square waves, this board should be replaced.

f. Another area which should be monitored if an oscilloscope is available is the main gate inhibit. It's operation is described in Section 4.11. It should appear as a continuous switching square wave as discussed in this section.

g. If all of these tests fail, there is a probable optics fault in the system, and SCI-TEC should be consulted before proceeding.

4.9 Description of Shutter Micrometer I/O Board

A block diagram of the shutter micrometer I/O board can be found in section 7.5.2 of this manual. The I/O board provides input to the microprocessor from instrument sensors as well as output commands from the microprocessor through the I/O board to the secondary power supply circuits which drive stepping motors and provide on/off lamp control.

With the appropriate level and decoding along with a bus request the board outputs the input port on the data bus. The eight input lines are conditioned with schmitt triggers and resistive pull-ups. Four of the lines are inverting and four are non-inverting.

The board outputs data from the microboard bus onto its output lines. Three pairs of the output lines are inverted and the resulting signals are power boosted to drive three stepper motors with a current rating of 0.5 amp. The other two output lines drive floating transistors which are used as switches to control current to the motors. A matrix patch on the board allows the use of various options and the ability to use the floating transistors for off board switching.

4.10 Description of Photon Counter Board

A block diagram of the photon counter board is given in section 7.5.3. The photomultiplier signal which has been amplified, divided and driven by a line driver on the photomultiplier and pulse amplifier board is received by a line receiver on the photon counter board. This signal is fed to a binary counter. The three bytes are each connected to output ports which are in turn connected to the data bus of the system microprocessor.

The port select decodes the lines from the microprocessor as well as a combination of the four most significant bits from the data (the stored level). Thus under software control the three 8-bit binary signal words may be placed on the bus serially to be stored and treated by the microprocessor.

The main gate is generated by dividing the microprocessor crystal clock frequency. A pulse which lasts approximately 16 milliseconds is generated every 130 milliseconds. This pulse is used to interrupt the microprocessor to sequence the wavelength chopping motor and inhibit the photon count signal during motor movement.

4.11 Description of High Speed Amp Board

The photomultiplier and pulse amplifier board are enclosed inside the photomultiplier subassembly. The sub assembly is designed to allow access to the pulse amplifying circuitry without upsetting the alignment of the PMT or the optics.

The photomultiplier is an EMI 9789QA type. It is enclosed with a magnetic shield at the potential of the cathode. A small area on the shield is open to allow light to fall on the cathode. High voltage power supplies are provided to the photomultiplier by a resistor dividing circuit at the base of the tube. Because differential thermal expansion between the photomultiplier glass and the Teflon base may cause tube breakage under extreme temperature conditions, it is recommended that the photomultiplier housing never be subjected to temperatures of less than -50C or greater than +60C.

The pulse amplifier board is located directly behind the base of the photomultiplier tube. This circuitry accepts the photon pulse signal from the photomultiplier, amplifies the signal, discriminates the signal level from current leakage, divides the amplified photon pulses by four, and finally outputs the signal on a line driver, because the circuitry is extremely sensitive to feedback and RF noise, it is located in close proximity to the photomultiplier.

4.12 Description of Secondary Power Supply Board and Heatsink, Not Including Standard Lamp and Mercury Lamp Circuits

- a. See section 4.2 for description of Mercury lamp circuit.
- b. See section 4.5 for description of Standard lamp circuit.
- c. Shutter Motor Constant Current Source.

The current regulator for the shutter motor is identical to the standard lamp regulator except for the addition of a shunt resistor (R14) which

provides a holding current for the motor when the regulator is turned off. There are two additional resistors which are not a part of the control circuit. They are used to balance the current through the field winding of the shutter motor. The motor supply is also switched on and off under software control.

The motor does not require the precision of the standard lamp, therefore a standard wire wound resistor is used to sense current.

d. High voltage circuitry.

The high voltage (900-1800 volts) for the photomultiplier (PMT) is developed by a DC-DC converter. A 10 ohm resistor is mounted on the heatsink and is in series with the negative 12 volt power connection to the MC 1463 negative regulator to reduce the power dissipation in the regulator. This regulator operates from the negative power supply line because it is more convenient to use a PMT with its anode at ground potential. The reference voltage is developed as follows: The plus 5 volts from a three terminal regulator is split and applied to the inputs of an operational amplifier to a controllable -10 to 0 volt output. This output is used as the reference for the MC1463 regulator. Thus the input to the op-amp controls the HV for the PMT. This technique is used to permit the use of the automated version through a D/A converter.

e. Plus-Minus Regulator.

This regulator consists of two, three terminal regulators which reduce the generate +5 and -8 volts from the M volt supply for use by the circuits on the high speed amplifier board. This +5 volt regulator is separate from the one used as a reference for the High Voltage regulator.

f. Ratemeter.

The ratemeter circuit provides a voltage output of the photon count rate. It consists of three parts; 1, the transistor pump on the discriminator board, 2, the integrator-driver on the regulator board, 3, the test point on the S.P.S. bracket. A transistor is connected as a current pump and driven by one of the outputs of the J-K flip flop on the high speed amplifier board. The pulses are integrated by an RC network then scaled by the op-amp.

g. Temperature monitor

The temperature monitor is a temperature sensitive bridge using YSI linearized thermistors. The bridge output is amplified to produce a suitable scale on the analogue meter. A switch on the Control panel selects either the ratemeter or the temperature readout. There are three thermistor circuits available, one of which is located in a hole drilled in the side of the front flange of the PMT housing. Of the other two, they are used on the automated version, thermistor number 2 on the side of the card rack and thermistor number 3 is attached to the base of the Brewer Box.

4.13 Description of Clock/Monitor and A/D Board

The clock/monitor board provides A/D conditioning circuitry, battery backed up RAM, and battery backed up real time clock.

The specifications and schematic of the Clock/Monitor Board, of which the clock/RAM circuitry is a part, appears in Section 7.5.4. U1 latches the high order 8 bits of address from the COSMAC bus. These high order address bits are decoded by U2, U3, U4, U5 and U6 to generate the chip selects for the real-time clock chip and the RAM chip. The RAM and real-time clock are memory mapped and occupy 2K of address space. The real-time clock occupies the top eight addresses in the 2K and the RAM occupies the rest.

The battery backup circuitry provides power to the clock and RAM if the main 5V power is absent. Comparator U9 detects when the main +5V is present and a low output when it is not present. Voltage reference U13 and associated resistors provide stable reference points to the comparator so switching occurs at fixed voltages, otherwise the comparator could oscillate. The comparator output is used to switch the clock chip into the power down mode, disable the chip select circuitry to the clock and RAM chips, and turn on the battery backup power through the transistor switch consisting of Q1 and Q2 when the main +5V power fails. The reverse occurs when the main +5V power is restored.

Diode D1 isolates the battery backup supply line from the main +5V supply. Diodes D2, D3, D4, D5, D6 serve to drop the voltage supplied by the batteries to approximately 5 volts. Diodes D7 and D8 protect the batteries from voltage reversal. Switch SW1 is a three position switch which allows the selection of the on-board batteries, external batteries connected to J4, or turns battery backup off for shipping and/or storage.

External battery power should be provided by two Electrochem Industries, Inc. BCX or CSC type cells connected in series, as these cells are not position sensitive and they provide the optimum voltage for battery backup operation of the Clock/Monitor board. Alternatively, five 1.5 volt alkaline cells in series or any other source of 7.5 volts DC could be used, though the capacity of any backup source should be a prime concern. External batteries require a voltage of 7.5 $\pm$ 0.2 volts and a mating connector to J4. The mating connector is supplied with the Clock/Monitor board.

On-board battery power is provided by two lithium AA size cells. These cells should provide approximately 410 hours at 25 degrees Celsius or 375 hours at -20 degrees Celsius total backup time before replacement is required.

The A/D conditioning circuitry takes the voltages at the various monitor points and translates them into the 0 to +2.5V range required by the A/D converter. With all positive voltages, this is done with resistive voltage dividers. Inverting amplifiers are used for the negative voltages. The standard lamp current is translated through a differential amplifier from the voltage across a current sensing resistor.

Section 7.5.4 lists the names, A/D channel resolution, and nominal value for each channel when measured through the A/D.

The Clock/Monitor board provides two x2 amplifiers to amplify the 0 to +2.5V output of the D/A converter to 0 to +5V. At present, the software for the COSMAC does not support the D/A functions, but these may be implemented at a later time.

5.0 TEST RESULTS OUT OF SPECIFICATION

Whenever any tests are out of specification, (HG,DT,RS,Standard Lamp,) the following should be done or considered. Note if MKIV instrument then micrometer and Filterwheel #3 must zero and setup properly at the end of each Reset or FR command, check manual for offset constants. Also for MKIV the Ozone/SO₂ operation should be used for trouble shooting and after proper operation returns then checkout in NO₂ mode can start.

- a. If the deadtime has increased or decreased significantly, the shutter may have become misaligned, or a ground in the instrument wiring may have become resistive. In either case, both items should be carefully inspected. Also high humidity inside the instrument may show up in abnormal deadtime results.
- b. Lamp output may have deteriorated, and the lamps may require replacement. They can be inspected as mentioned in the previous sections and replaced if a spare assembly is available.
- c. The optical surfaces within the zenith prism may have become smudged with a fingerprint or may have become dusty over a period of time. It should be cleaned, without Celsius if possible.
- d. The micrometer may be "sticking" and not in its exact location after a Mercury Lamp test. It should be inspected and the driving gears may have to be carefully cleaned with tissue and a little alcohol.
- e. As previously mentioned, dark count (which is printed out in most tests), is a very good characteristic which is printed out in most tests. When the dark count of an instrument changes, or becomes erratic, a shutter Run-Stop test should be done to see if there are any changes in the shutter circuitry. If this does not give any indication of the problem, there may be a ground somewhere which has become resistive, and it should be checked. A good ground between the heatsink and the bottom cover to the terminal board is important. It should be inspected to see that good contact is being made.
- f. The High voltage test can be done, and the results compared to those in the Acceptance Test Records.
- g. In humid or wet environments, the top cover should be removed periodically, to check desiccant condition. The base and spectrometer desiccants can be removed and dried overnight at approximately 60 degrees C if necessary.
- h. If these fail, SCI-TEC should be consulted as to further investigation.

6.0 OPTICS CARE AND CLEANING (Refer to Fig. 7.6.1-1)

6.1 Optics Care

- Never touch the polished surface of optics.
- Hold an optic only by its edges.
- Reduce the need for cleaning optics as much as possible.

6.2 Optics Cleaning

- Always use latex gloves when handling or cleaning optics.
- Do not reuse cleaning materials.

SPECTROMETER MIRRORS, ND FILTERS, QUARTZ PRISMS AND LENSES: In the event of dust, blow off with rubber hand pump (avoid using your breath) or use bottled dry nitrogen to remove particles. In the event of grease or fingerprints, dampen a very soft cloth with methyl ethyl alcohol and wipe gently. NOTE: Wipe marks will almost certainly remain. To remove the wipe marks, dampen a soft tissue with a mixture of ether and isopropyl alcohol and wipe gently. The tissue should be dampened to the extent that while wiping, the mixture evaporates one to two millimeters behind the tissue.

QUARTZ DOME AND EXTERIOR QUARTZ WINDOW: Spray with window cleaner and wipe clean with a soft cloth.

LAMPS: Dampen a soft cloth with methyl ethyl alcohol and wipe gently.

POLARIZING FILTER: Use only a soft, dry cloth or tissue to remove dirt and finger marks. The filter should always be wiped gently to avoid marring the finish.

DIFFRACTION GRATINGS: Do NOT touch or attempt to clean.

BREWER REFERENCE DOCUMENTATION

Section 7.1 Overall Assembly and External Cables

- Configuration Control Diagrams	7.1-1
- Brewer Systems Drawing BS-C1000	7.1-2
- Brewer Assembly BA-C01(MKII); BA-C01/B(MKIV)	7.1-3
- Option B Kit C91 (Azimuth Tracker)	7.1-4
- Option C Kit UVB Installation C84	7.1-5
- Power Cable (External) W12	7.1-6
- Data Cable (External) W14	7.1-7
- Electronic Spares Kit C122	7.1-8
- Basic Spares Kit C112	7.1-9
- Tracker Stand Tie-Down Kit Installation	7.1-10

Section Overview

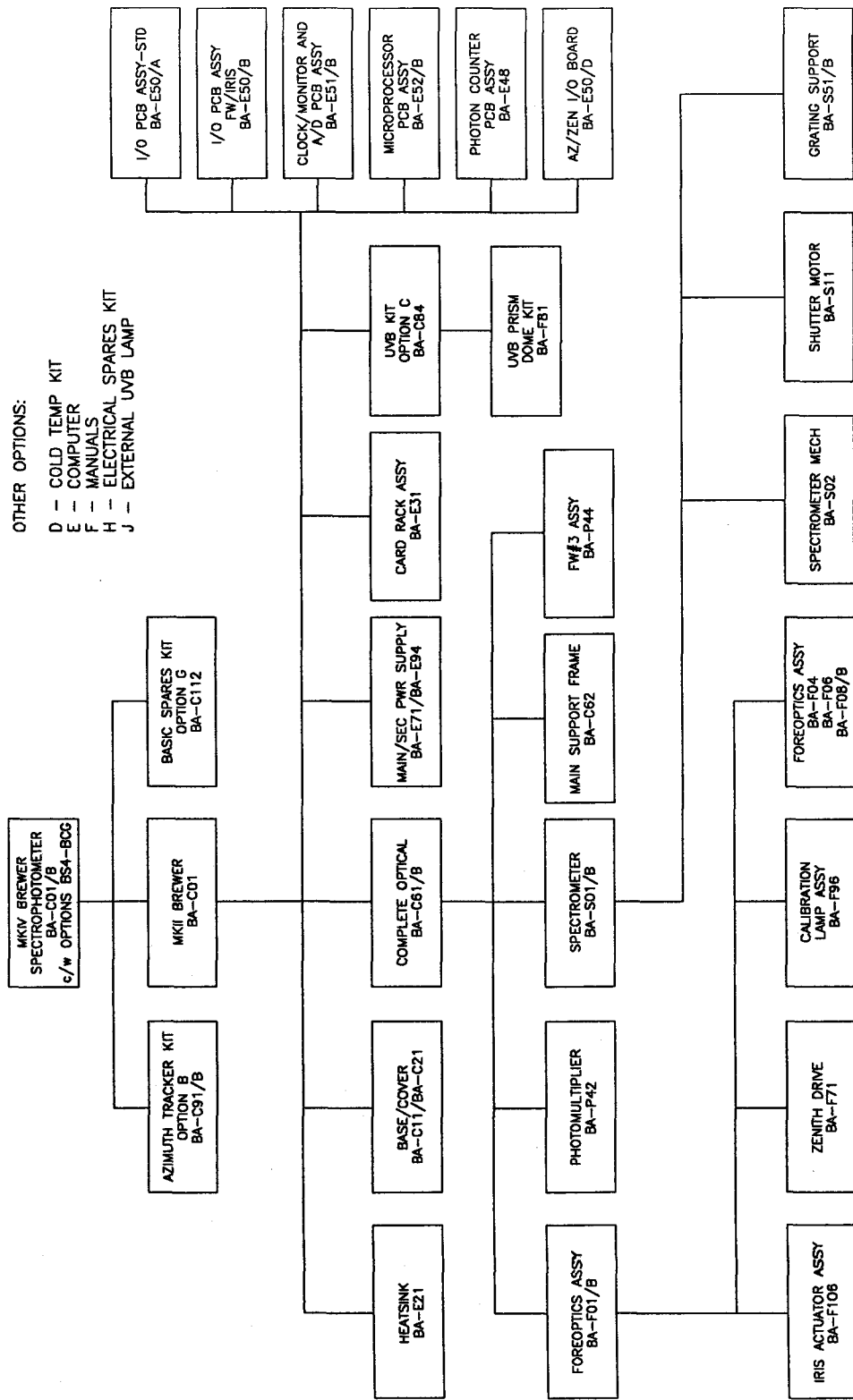
Fig 7.1-1, -2: Configuration Control Diagrams (Family Tree) for complete MKII and MKIV BREWER systems including all possible purchase options

Fig 7.1-3: Basic Brewer Assy (BA-C01 MKII; BA-C01/B MKIV). Reference item 7, under cover, is main power supply BM-E80 with replacable 5 Amp fuse (Ref Fig 7.2-2.4). Note Desicant Mounted on top of power supply cover, change if indicator is pink in color.

Fig 7.1-4: Option B Kit (Azimuth Tracker); For futher information see Sec 7.7-1.

Fig 7.1-6: AC Power cord, BA-W12/A (110V North American); BA-W12/B (220V European).

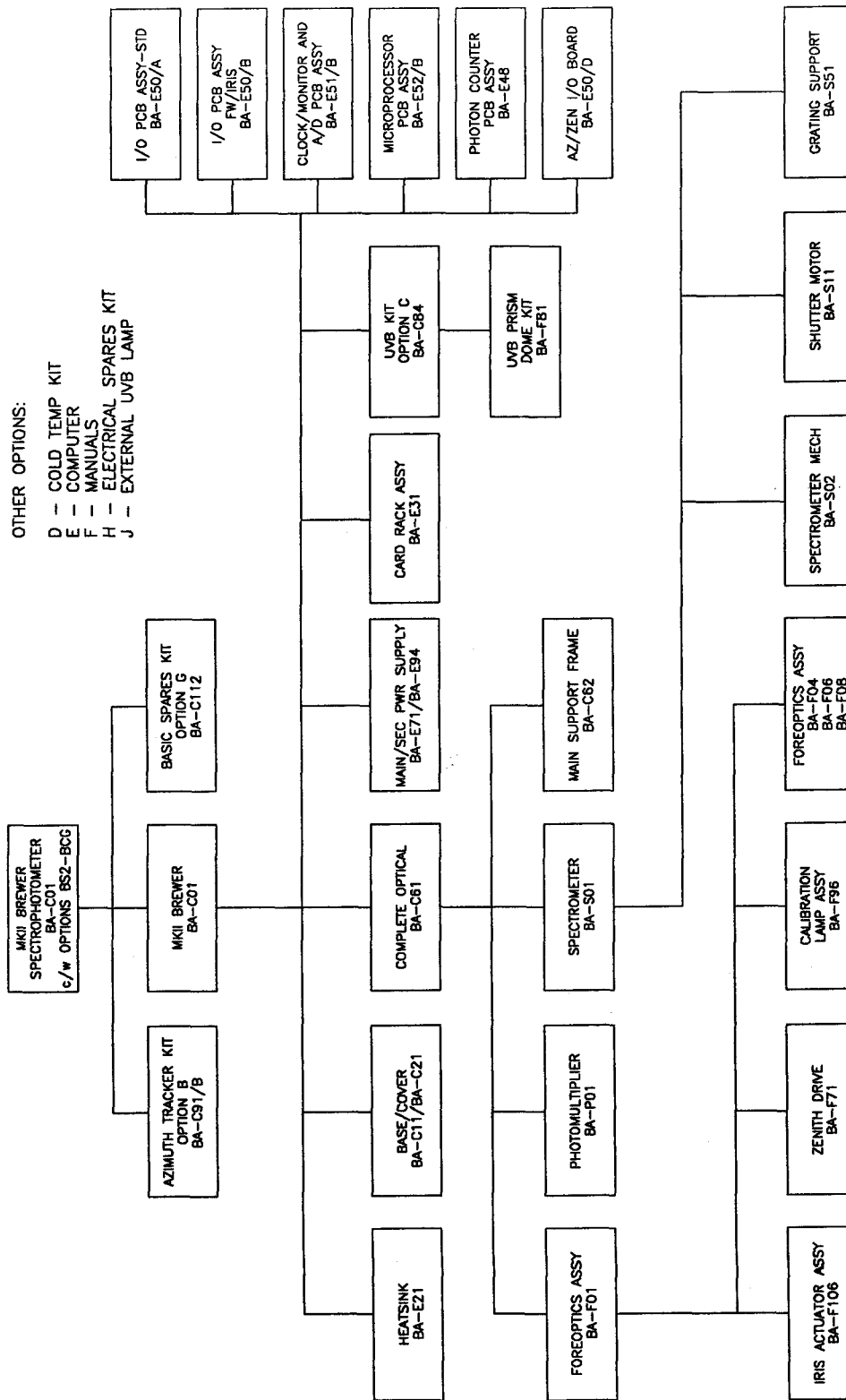
Fig 7.1-8, -9: Electronic and Basic Spares Kits include full set of electronic printed circuit boards, power supplys and spare lamps.



CONFIGURATION CONTROL DIAGRAM: BREWER OZONE SPECTROPHOTOMETER MKIV

BREWER SERIAL NUMBER _____
CUSTOMER _____
DATE MANUFACTURED _____
DATE DELIVERED _____
SCI-TEC INSTRUMENTS INC., SASKATOON CANADA

NO. _____
REVISION _____
APPD BY _____
DATE _____



CONFIGURATION CONTROL DIAGRAM: BREWER OZONE SPECTROPHOTOMETER MKII

BREWER SERIAL NUMBER _____
CUSTOMER _____
DATE MANUFACTURED _____
DATE DELIVERED _____
SCI-TEC INSTRUMENTS INC., SASKATOON CANADA

NO. _____
REVISION _____
APPD BY _____
DATE _____

BREWER SYSTEM COMPONENTS

STANDARD AVAILABLE OPTIONS

OPTION A
BREWER SPECTROPHOTOMETER

MODEL MARK II
03-S02
-110/220VAC
BA-C01

(OR)

MODEL MARK IV
03-S02-NO2
-110/220VAC
BA-C01/B

(OR)

MODEL MARK III
DOUBLE SPECTROMETER
BA-C190

BREWER MKIII
SHIPPING CRATE
BA-C208

OPTION B
AZIMUTH TRACKER/
MAN ZEN ADJ KIT

AZIMUTH TRACKER
110/220VAC
BA-C91/B

(OR)

MANUAL ZENITH
ADJ OPTION KIT
BA-C159

BREWER MKII/MKIV
SHIPPING CRATE
BA-C149

OPTION C
UVB KIT

UVB KIT
BA-C84

NOTE:
REFERENCE ONLY, UVB KIT INCLUDED
AS PART OF OPTION A

OPTION D
COLD TEMPERATURE
SERVICE KIT

COLD TEMPERATURE
SERVICE KIT
-110VAC
BA-C116/A

(OR)

COLD TEMPERATURE
SERVICE KIT
-220VAC
BA-C116/B

(OR)

COLD WEATHER COVER
BREWER MKII & MKIV
BA-C152

(OR)

COLD WEATHER COVER
BREWER MKIII
BA-C210

OPTION E
COMPUTER SYSTEM

COMPUTER SYSTEM
(CUSTOMIZED SYSTEM)
CK-***

NOTE:
SYSTEM INCLUDES OPERATING SOFTWARE,
AND MAY INCLUDE COMPUTER, DISPLAY,
PRINTER, CABLES, ETC.
SEE NOTE 2.

OPTION F
MANUALS

OPERATING AND
MAINTENANCE
MANUAL KIT, MKII
BA-C102

(OR)

OPERATING AND
MAINTENANCE
MANUAL KIT, MKIV
BA-C102/B

(OR)

OPERATING AND
MAINTENANCE
MANUAL KIT, MKIII
BA-C207

NOTE:
ACCEPTANCE MANUAL (AM-BA-C05)
IS INCLUDED WITH OPTION A.

OPTION G
BASIC SPARES KIT

STANDARD SPARES KIT
BA-C112

NOTE:
REFERENCE ONLY, KIT INCLUDED AS
PART OF OPTION A
INCLUDES DESSICANT, LAMPS, FUSES,
VARIOUS TOOLS, ETC.

OPTION H
ELECTRONICS
SPARES KIT

OPTIONAL ELECTRONICS
SPARES KIT, MKI/MKIV
BA-C122/D

(OR)

OPTIONAL ELECTRONICS
SPARES KIT, MKIII
BA-C122/E

NOTE:
INCLUDES CIRCUIT BOARD ASSY'S,
LAMPS, POWER SUPPLY, ETC.

OPTION J
EXTERNAL UVB
LAMP ASSY

EXTERNAL UVB
LAMP ASSY
BA-C126

SPECIAL ITEMS

MARK IV BREWER
CONVERSION KIT (FOR
USE WITH MK II BRWR)
BA-C120

LDOS (BS422)
110V: BA-C204
220V: BA-C204/B
(5'x 15m of cable, see note 5)

ALUM TRANSIT CASE
FOR MKII OR MKIV
BN-C205

ALUM TRANSIT CASE
FOR MKIII
BN-C206

MKII FILTERWHEEL
OPTION (2ND POLARIZER)
BA-F41/D

COMPUTER GENERATED DRAWING
FILENAME: BSC1000A.DWG

REV	DESCRIPTION	DCN NUMBER	DATE	DWN. APPD.
1	FIRST ISSUE		88.9.20	CW AM
2	ADD UVB EXT LAMP; SHIPPING CRATES	481	90.07.03	FV KL
3	SEE DCR	487	90.09.12	FV KL
4	CHG OPTION D; UPDATE SHT 2	530	91.03.19	FV KL
5	CHG OPTION B FR BA-C83 TO BA-C91	562	92.03.17	FV KL
6	CHG OPTION H TO ONE STANDARD KIT	581	92.09.03	FV KL
7	MAKE UVB KIT PART OF OPTION A	618	92.12.03	FV KL
8	ADD LDOS KIT (BA-C204)	655	93.06.23	FV KL
9	MAKE STD SPARES KIT PART OF OPTION A	662	94.01.10	FV KL
10	ADD MKII FW OPTION, MKIII INFO (TRANSIT CASE, MANUALS KIT, OUTSIDE DIM'S)	677	94.04.12	DM DS
11	REMOVE AZ TRACKER SHIPPING CRATES	712	94.09.01	FV DS
12	ADD 220V VERSION OF LDOS (BA-C204/B)	749	95.08.11	FV DS

NOTES:

- BREWER SYSTEM COMPONENTS MAY BE SPECIFIED INDIVIDUALLY BY THEIR PART NUMBERS SHOWN IN LOWER L.H. CORNER OF EACH BOX. OPTION 'A' COMPONENTS (BREWER SPECTROPHOTOMETERS) MUST ALSO HAVE OPERATING VOLTAGE SPECIFIED.
- A COMPLETE BREWER SYSTEM MAY BE SPECIFIED BY FORMULATING A CATALOGUE NUMBER AS SHOWN BELOW. OPTION 'E' (COMPUTER SYSTEM) TO BE SPECIFIED AT TIME OF ORDER. USE FORM CK-***.
- SPECIAL ITEMS TO BE ORDERED SEPARATELY.
- SEE SHT. 2 FOR GENERAL ARRANGEMENT, DIMENSIONS OF MAIN COMPONENTS.
- LDOS COMES STANDARD WITH A 15m LONG COMMUNICATIONS CABLE ASSY (BA-W6B). LONG LENGTHS OVER 15m SHALL BE THE RESPONSIBILITY OF THE CUSTOMER OR WILL BE A SPECIAL ORDER AND NOTED AS SUCH ON THE INSIDE SALES ORDER.

COMPLETE BREWER SYSTEM DESCRIPTION

EXAMPLE:

BS4 - 220 - BCDEFGHJ

SELECT MODEL OF SPECTROPHOTOMETER (OPTION 'A'):
BS2 = MARK II (03-S02)
BS3 = MARK III (OBL SPECTR)
BS4 = MARK IV (03-S02-NO2)

SELECT REQ'D OPERATING VOLTAGE:
110 = 110VAC 50/60HZ
220 = 220VAC 50/60HZ

SELECT ANY ADDITIONAL REQ'D OPTIONS (LIST IN ALPHA. ORDER):
B = AZ TRACKER/MANUAL ZEN ADJ KIT
C = UVB KIT
D = COLD TEMP SERVICE KIT
E = COMPUTER SYSTEM
F = OPER & SERVICE MANUAL SET
G = BASIC SPARES KIT
H = ELECTRONICS SPARES KIT
J = UVB EXTERNAL LAMP ASSY

QTY	UM	PART NO.	MFR'S NO.	DESCRIPTION	REMARKS	ITEM
-	-	-	-	-	-	-
SCALE	88-8-5	NEXT ASSY:				
DATE	88-8-5	DIMENSIONS IN				
DWN	CW	IF DUAL DIMS:				
CHKD		Tolerances (unless otherwise specified)				
APPD	AM	INCHES	MM			
FINISH		XXX ± .005 XXX ± .01 ANGLES ± 1°	XXX ± 0.15 XXX ± 0.25 ANGLES ± 1°			
				TITLE: BREWER SYSTEMS		
				REV. SHEET 1 of 2 DOCUMENT NUMBER BS-C1000		
				REV. 12		

REV	DESCRIPTION	DOC NUMBER	DATE	APP'D
1	WHS 507 351400-1E-200		82.05.13	
2	WHS 452 008222.R81		82.11.01	
3	AND CARD LOC GUIDE		82.12.18	
4	GENERAL REVISION		82.12.18	
5	REVISION - SEE 7/8 REVISION		82.12.18	
6	REVISION - SEE 7/8 REVISION		82.12.18	
7	REVISION - SEE 7/8 REVISION		82.12.18	
8	REVISION - SEE 7/8 REVISION		82.12.18	
9	REVISION - SEE 7/8 REVISION		82.12.18	
10	REVISION - SEE 7/8 REVISION		82.12.18	
11	REVISION - SEE 7/8 REVISION		82.12.18	
12	REVISION - SEE 7/8 REVISION		82.12.18	
13	REVISION - SEE 7/8 REVISION		82.12.18	
14	REVISION - SEE 7/8 REVISION		82.12.18	
15	REVISION - SEE 7/8 REVISION		82.12.18	
16	REVISION - SEE 7/8 REVISION		82.12.18	
17	REVISION - SEE 7/8 REVISION		82.12.18	

POSITION	PART NO.	FUNCTION	ITEM
1	BA-E50/A	I/O (MICROMETER-SHUTTER)	13
2	BA-E50/B	I/O (IRS-F/W #1 & #2)	14
3	BA-E50/D *	I/O (AZ TRIG/ZEN DRIVE)	12
4	BA-E48	PHOTON COUNTER	16
5	BA-E48	PHOTON COUNTER	16
6	BA-E51/B (PART OF)	CLOCK/MONITOR (BA-E55)	17
7	BA-E51/B (PART OF)	A/D (90-98-132)	17
8	BA-E51/B (PART OF)	A/D (90-98-132)	17
9	BA-E52/B	COSMIC MICROPROC	18
10	BA-E52/B	COSMIC MICROPROC	18

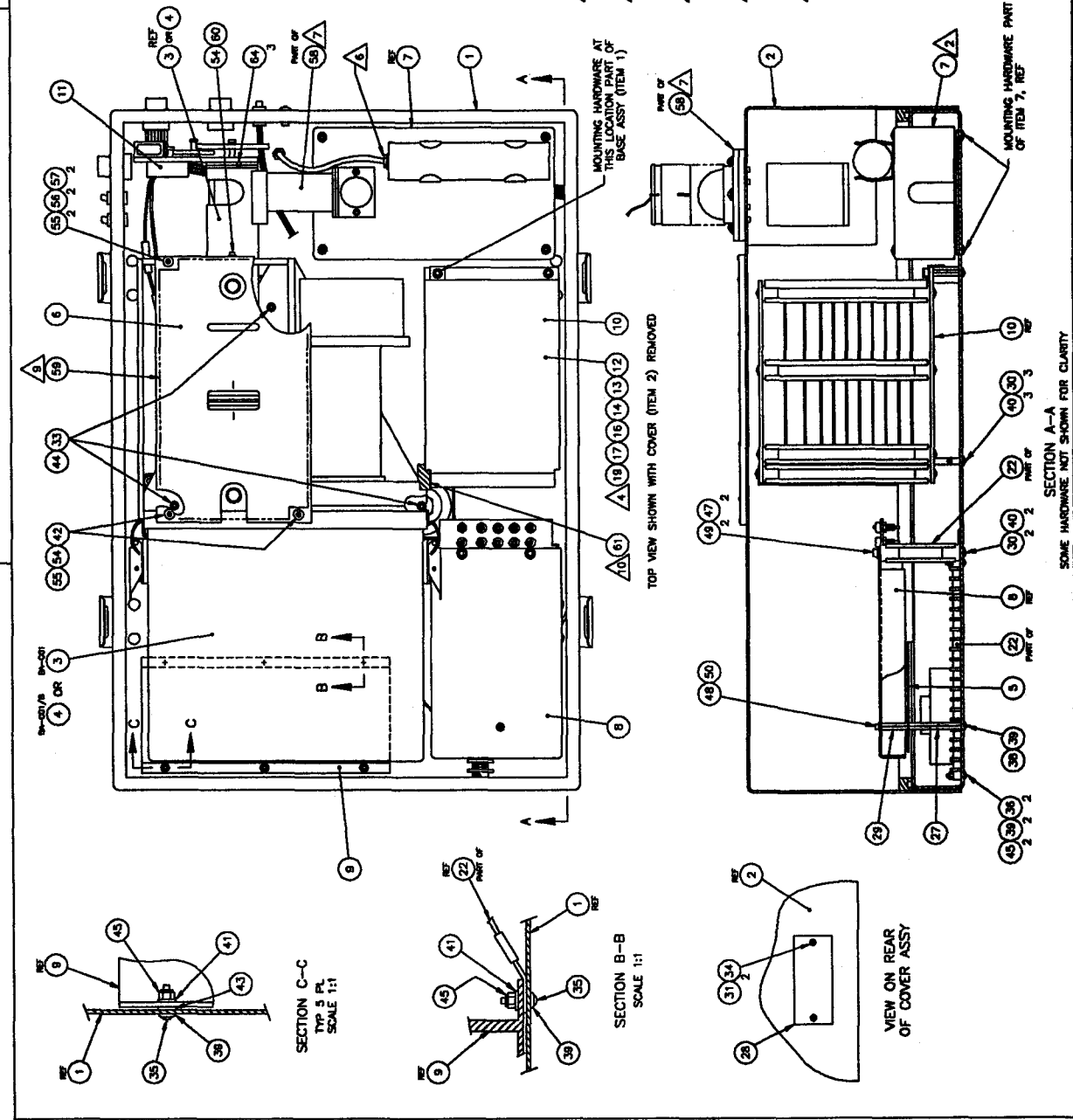
* I/O BOARD (ITEM 12) MAY BE REMOVED AND RETURNED TO STORES IF UNIT IS TO BE USED ALONE (WITHOUT AZ TRIG/ZEN DRIVE OPTION). BA-C01 ONLY.

NOTES

- STD SPARES KIT (ITEM 82) TO BE PACKED WITH BREWER PRIOR TO SHIPPING.
- REFER TO DWG BA-E71 FOR ASSEMBLY DETAILS OF MAIN POWER SUPPLY (ITEM 7).
- ADHERE DECAL (ITEM 63) AFTER FINAL TEST AS PER INSTRUCTIONS IN PACKING CHECK LIST.
- REFER TO CARD LOCATION TABLE FOR SLOT POSITION OF ITEMS 12-14, 16, 17 & 19.
- WIRING HARNESS AND CABLES (ITEM 22-26) NOT SHOWN FOR CLARITY. FASTEN I/O BOARD CABLES FROM BA-E50/D USING ITEMS 20 & 21.
- REMOVE BOTH RED PLUGS FROM DESCENDANT CONTAINER (PART OF ITEM 7). DRILL 1/8" DIA HOLE IN CONTAINER AT LOCATION SHOWN. INSERT TYGON TUBE (PART OF ITEM 1) THRU HOLE IN PLUG AND SECURE & SEAL TUBE WITH RTV (ITEM 31). DISCARD SECOND PLUG.
- INSTALL UNB KIT (ITEM 58) AS PER INSTALLATION DWG BA-C114.
- REFER TO OPTICAL AND ELECTRICAL CALIBRATION AND ACCEPTANCE TEST PROCEDURE BA-BA-C05.
- PRIOR TO SHIPPING, PLACE FOAM (ITEM 59) ON TOP OF CONTROL PANEL.
- ADHERE 1" OF NEOPRENE STRIP (ITEM 61) TO F.W. #3 ASSY, FLUSH WITH TOP EDGE.
- ENSURE CABLEING FROM F.W. #3 HSG & MOTOR ARE TIE-WRAPPED TOGETHER AS CLOSE TO THE WIRE EXIT ON THE HSG AS POSSIBLE TO ENSURE NO DAMAGE FROM CARD BACK.
- IF UNIT IS TO HAVE A HEATER KIT (BA-C116) INSTALLED PRIOR TO DELIVERY, ENSURE ALL WIRES IN THE UNIT ARE TIE-WRAPPED TOGETHER WITH THE HEATERS SO THEY DO NOT COME IN CONTACT.

REV	DESCRIPTION	DOC NUMBER	DATE	APP'D
1	WHS 507 351400-1E-200		82.05.13	
2	WHS 452 008222.R81		82.11.01	
3	AND CARD LOC GUIDE		82.12.18	
4	GENERAL REVISION		82.12.18	
5	REVISION - SEE 7/8 REVISION		82.12.18	
6	REVISION - SEE 7/8 REVISION		82.12.18	
7	REVISION - SEE 7/8 REVISION		82.12.18	
8	REVISION - SEE 7/8 REVISION		82.12.18	
9	REVISION - SEE 7/8 REVISION		82.12.18	
10	REVISION - SEE 7/8 REVISION		82.12.18	
11	REVISION - SEE 7/8 REVISION		82.12.18	
12	REVISION - SEE 7/8 REVISION		82.12.18	
13	REVISION - SEE 7/8 REVISION		82.12.18	
14	REVISION - SEE 7/8 REVISION		82.12.18	
15	REVISION - SEE 7/8 REVISION		82.12.18	
16	REVISION - SEE 7/8 REVISION		82.12.18	
17	REVISION - SEE 7/8 REVISION		82.12.18	

REV	DESCRIPTION	DOC NUMBER	DATE	APP'D
1	WHS 507 351400-1E-200		82.05.13	
2	WHS 452 008222.R81		82.11.01	
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4	GENERAL REVISION		82.12.18	
5	REVISION - SEE 7/8 REVISION		82.12.18	
6	REVISION - SEE 7/8 REVISION		82.12.18	
7	REVISION - SEE 7/8 REVISION		82.12.18	
8	REVISION - SEE 7/8 REVISION		82.12.18	
9	REVISION - SEE 7/8 REVISION		82.12.18	
10	REVISION - SEE 7/8 REVISION		82.12.18	
11	REVISION - SEE 7/8 REVISION		82.12.18	
12	REVISION - SEE 7/8 REVISION		82.12.18	
13	REVISION - SEE 7/8 REVISION		82.12.18	
14	REVISION - SEE 7/8 REVISION		82.12.18	
15	REVISION - SEE 7/8 REVISION		82.12.18	
16	REVISION - SEE 7/8 REVISION		82.12.18	
17	REVISION - SEE 7/8 REVISION		82.12.18	



VIEW ON REAR OF COVER ASSY

SECTION B-B SCALE 1:1

SECTION C-C TYP 3 PL SCALE 1:1

SOME HARDWARE NOT SHOWN FOR CLARITY

SECTION A-A

SCI-TEC Instruments Inc.												
Title: BREWER SPECTROPHOTOMETER ASSY (BA-C01: MKII; BA-C01/B: MKIV)								Rev Date: 94-01-17				
								Rev: 17				
DCN: 662, 669		Drawn: FV		Checked:		Approved:		QA App'd:		Dwg No.: BA-C01		
Item No.	Part/Ident No.	Title/Description				Qty	Qty /B	Qty /C	Qty /D	UofM	Ref Des	Remarks
1	BA-C11	Weatherproof Base Assy				1.00	1.00			EA		
2	BA-C21	Weatherproof Cover Assy				1.00	1.00			EA		
3	BA-C61	Complete Optical Assy, MKII				1.00	--			EA		
4	BA-C61/B	Complete Optical Assy, MKIV				--	1.00			EA		
5	BA-E94	Secondary Power Supply PCB Assy				1.00	1.00			EA		
6	BM-C82	Control Panel				1.00	1.00			EA		
7	BA-E71	Main Power Supply Assy				1.00	1.00			EA		
8	BM-E62	Secondary Power Supply Cover				1.00	1.00			EA		
9	BA-E21	Heat Sink Assy				1.00	1.00			EA		
10	BA-E31	Card Rack Assy				1.00	1.00			EA		
11	BA-F71	Zenith Drive Kit				1.00	1.00			EA		
12	BA-E50/D	I/O PCB Assy				1.00	1.00			EA		Az Tkr/Zen Dr
13	BA-E50/A	I/O PCB Assy				1.00	1.00			EA		Micro/Shutter
14	BA-E50/B	I/O PCB Assy				1.00	1.00			EA		Iris/Fitrwhl
15	BA-E99	Brewer MKII Operating S/W				1.00	--			EA		
16	BA-E48	Photon Counter Control PCB Assy				1.00	1.00			EA		
17	BA-E51/B	Clock/Monitor & A/D PCB Assy				1.00	1.00			EA		
18	BA-E98	Brewer MKIV Operating S/W				--	1.00			EA		
19	BA-E52/B	Microprocessor PCB Assy				1.00	1.00			EA		
20	81-90-630	Connector Slide Lock Retainer				1.00	1.00			EA		
21	81-90-610	Connector Screw Lock, Female				2.00	2.00			PR		
22	BA-W36	Main Interconnect Harness Assy				1.00	1.00			EA		Not Shown
23	BA-W34	Photon Counter Harness Assy				1.00	1.00			EA		Not Shown
24	BA-W38	High Voltage Cable Assy				1.00	1.00			EA		Not Shown
25	BA-W12	Power Cable Assy				1.00	1.00			EA		Not Shown
26	BA-W14	Data Cable Assy				1.00	1.00			EA		Not Shown
27	83-09-039	Spacer, Thd, 6-32 x 2"Lg, M/F				1.00	1.00			EA		
28	BM-C105	Nameplate, Altered				1.00	1.00			EA		
29	83-09-876	Spacer, Thd, 6-32 x 1"Lg, M/F				1.00	1.00			EA		
30	83-51-800	Screw, 8-32 x 1/4"Lg, Btn Hd Hex, SS				5.00	5.00			EA		
31	85-10-145	Adhesive, Sealant (Loctite 242)				0.50	0.50			ML		
32												
33	83-79-152	Screw, 1/4-28 x 1/2"Lg, Skt Hd Cap, SS				3.00	3.00			EA		
34	83-51-752	Screw, 2-56 x 1/4"Lg, Btn Hd Hex, SS				2.00	2.00			EA		
35	83-51-784	Screw, 6-32 x 1/2"Lg, Btn Hd Hex, SS				6.00	6.00			EA		
36	83-51-786	Screw, 6-32 x 5/8"Lg, Btn Hd Hex, SS				2.00	2.00			EA		
37												
38	83-51-782	Screw, 6-32 x 3/8"Lg, Btn Hd Hex, SS				1.00	1.00			EA		
39	83-95-785	Washer, #6, Sealing				9.00	9.00			EA		
40	83-95-786	Washer, #8, Sealing				5.00	5.00			EA		
41	83-95-013	Washer, #6, Flat, 3/8 OD x 1/32 Thk, SS				6.00	6.00			EA		
42	83-95-604	Washer, #4, Internal Tooth Lock, SS				2.00	2.00			EA		

SCI-TEC Instruments Inc.											
Title: BREWER SPECTROPHOTOMETER ASSY (BA-C01: MKII; BA-C01/B: MKIV)									Rev Date: 94-01-17		
									Rev: 17		
DCN: 662, 669		Drawn: FV	Checked:	Approved:	QA App'd:				Dwg No.: BA-C01		
Item No.	Part/Ident No.	Title/Description			Qty	Qty /B	Qty /C	Qty /D	UofM	Ref Des	Remarks
43	83-95-628	Washer, #8, External Tooth Lock, SS			5.00	5.00			EA		
44	83-95-609	Washer, 1/4", Internal Tooth Lock, SS			3.00	3.00			EA		
45	83-40-486	Nut, 6-32, Hex, Self Locking, SS			8.00	8.00			EA		
46	AM-BA-C05	Acceptance Manual			1.00	1.00			EA		
47	83-79-080	Screw, 8-32 x 1/4"Lg, Skt Hd Cap, SS			2.00	2.00			EA		
48	83-79-066	Screw, 6-32 x 1/4"Lg, Skt Hd Cap, SS			1.00	1.00			EA		
49	83-95-750	Washer, #8, Split Lock, SS			2.00	2.00			EA		
50	83-95-749	Washer, #6, Split Lock, SS			1.00	1.00			EA		
51											
52	85-80-440	Cable-Tie Mount			3.00	3.00			EA		
53	81-90-620	Connector Slide Lock			--	1.00			EA		
54	83-79-049	Screw, 4-40 x 3/8"Lg, Skt Hd Cap, SS			3.00	3.00			EA		
55	83-30-450	Bumper, Rubber, 1/8" Hole			4.00	4.00			EA		
56	83-51-762	Screw, 4-40 x 5/16"Lg, Btn Hd Hex, SS			2.00	2.00			EA		
57	83-40-485	Nut, 4-40, Reg S.L., Hex, Thin			2.00	2.00			EA		
58	BA-C84	UVB Kit (Option C)			1.00	1.00			EA		See Note 7
59	BM-C202	Shipping Foam, Brewer Control Panel			1.00	1.00			EA		
60	83-95-008	Washer, #4, Flat, Nylon			1.00	1.00			EA		
61	50-10-090	Neoprene Stripping, 1/4"Thk x 1"W, Adh Back			0.08	0.08			FT		
62	BA-C112	Brewer Standard Spares Kit			1.00	1.00			EA		Pack with Brewer after final test
63	12103081	Decal, SCI-TEC Logo			1.00	1.00			EA		Adhere to cover after final test
64	83-56-143	Set Screw, 6-32 x 1/4"Lg, Cup, SS			3.00	3.00			EA		

SCI-TEC Instruments Inc.										
Title:										

1	BM-C100	Nameplate, Altered, Azimuth Tracker			1.00	1.00				EA	
2	BS-C91	Azimuth Tracker Unit Wiring Diagram			--	--				REF	
3	BM-C92	Azimuth Tracker Enclosure			1.00	1.00				EA	
4	BM-C93	Adjusting Screw			3.00	3.00				EA	
5	BM-C94	Angle Bracket			4.00	4.00				EA	
6	BM-C95	Counter Bracket			1.00	1.00				EA	
7	BA-W57	RS232 Lightning Protector Assy			1.00	1.00				EA	
8	BA-C97	Drive Shaft Assy			1.00	1.00				EA	
9	BA-C98	Drive Motor Assy			1.00	1.00				EA	
10	BA-C99	PCB Assy			1.00	1.00				EA	
11	BA-W18	Power Connector Assy			1.00	1.00				EA	
12	BA-W19	Control Cable Assy			1.00	1.00				EA	
13	BA-W21	Safety Switch Assy			1.00	1.00				EA	
14	BA-W22	Power Switch Assy			1.00	1.00				EA	
15	BA-W23	Power Indicator Assy			1.00	1.00				EA	
16	BA-W24	Fuse Holder Assy			1.00	1.00				EA	
17	BA-W30/A	Power Cable, Azimuth Tracker, 110V			1.00	--				EA	
18	D2-1030-002	Azimuth Spindle			1.00	1.00				EA	
19	C2-1030-005	Bearing Housing, External			1.00	1.00				EA	
20	C2-1030-006	Bearing Housing, Internal			1.00	1.00				EA	
21	B2-1030-007/A	Plate Mounting Hub			1.00	1.00				EA	
22	C2-1030-008	Drive Plate			1.00	1.00				EA	
23	B2-1030-015	Spacer Ring, Short			1.00	1.00				EA	
24	BM-C88/B	Terminal Block Shield, 2-1/4" Lg			1.00	1.00				EA	
25	A2-1030-019	Drive Bearing Stop			1.00	1.00				EA	
26	B2-1030-028	Bottom Mounting Bar, PCB			1.00	1.00				EA	
27	B2-1030-029	Top Mounting Bar, PCB			1.00	1.00				EA	
28	D1-1030-045	Tracker Stand Assy			1.00	1.00				EA	
29	C1-1030-080/A	Short Tension Arm Assy, Azimuth Drive			1.00	1.00				EA	
30	C1-1030-081/A	Long Tension Arm Assy, Azimuth Drive			1.00	1.00				EA	
31	C1-1030-084	Cover Assy			2.00	2.00				EA	
32	BM-C88	Terminal Block Shield, 5-1/4" Lg			1.00	1.00				EA	
33	83-09-220	Spacer, Hex, 6-32 x 3/4" Lg			4.00	4.00				EA	
34	BA-W58	Accessory Power Cable Assy			1.00	1.00				EA	
35	BA-W30/B	Power Cable, Azimuth Tracker, 220V			--	1.00				EA	
36	B2-1030-101	Bearing, Altered			2.00	2.00				EA	
37	---	Foam Disc, 2-1/2"Dia x 1"Thk			1.00	1.00				EA	Make From Packing Mat'l
38	BA-C166	MOV Assy, 110V			1.00	--				EA	

SCI-TEC Instruments Inc.

Title: AZIMUTH TRACKER ASSY (BA-C91/A: 110V, BA-C91/B: 220V)									Rev Date: 95-08-01				
									Rev: 18				
DCN: 738, 739		Drawn: DF		Checked:		Approved:		QA App'd:		Dwg No.: BA-C91			
Item No.	Part/Ident No.		Title/Description				Qty /A	Qty /B	Qty /C	Qty /D	UofM	Ref Des	Remarks

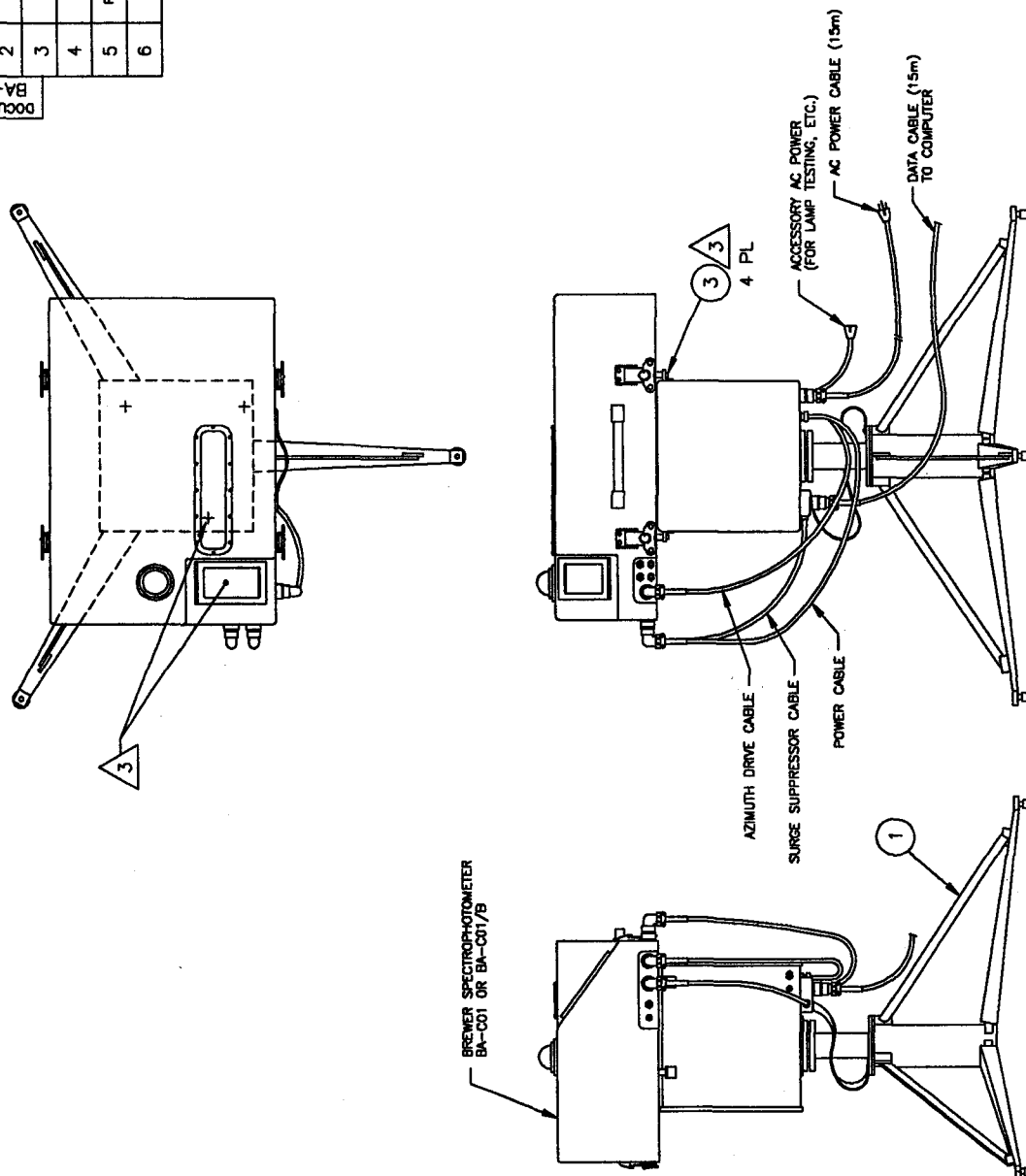
39	BA-C166/B	MOV Assy, 220V	--	1.00					EA		
40	91-15-257	Fuse, 2A, 125V, Slow-Blow	1.00	1.00					EA	Bag As Spare	
41	BM-C174	Azimuth Tracker Ground Strap	1.00	1.00					EA		
42	BA-C113	Option 'B' Kit Installation (Azimuth Tracker)	--	--					REF		
43	BM-C188	Terminal Shield, Azimuth Tracker P/S	1.00	1.00					EA		
44	BA-C150	Shipping Crate	1.00	1.00					EA		
45	85-80-440	Mount, Cable-Tie, Adhesive Back	3.00	3.00					EA		
46	82-20-383	Clamp, 'P', 1/2" x 1/2" x #10	1.00	1.00					EA		
47	88-99-780	Retaining Ring, Internal, Spiral Snap	2.00	2.00					EA		
48	76-99-445	Hose Clamp, 2-1/2" OD	1.00	1.00					EA		
49	83-10-651	O-Ring, 3/8"ID x 9/16"OD x 3/32"Thk	3.00	3.00					EA		
50	82-10-470	Terminal Strip, 4 Contact	1.00	1.00					EA		
51	87-50-088	Power Supply, Switching, 5VDC, 10A	1.00	1.00					EA		
52	82-10-450	Terminal Strip, 12 Contact	1.00	1.00					EA		
53	83-09-413	Spacer, 1/4"OD x 1/8"ID x 1/8"LG, AL	4.00	4.00					EA		
54	82-20-356	Clamp, 'P', 1/4" x 1/2" x 13/32"	2.00	2.00					EA		
55	83-08-100	Bushing, Strain Relief, Liq-Tite	3.00	3.00					EA		
56	85-10-150	Adhesive, Sealant (RTV 3145)	1.00	1.00					ML		
57	85-10-149	Adhesive, Sealant (RTV 738)	2.00	2.00					ML		
58	85-10-145	Adhesive, Sealant (Loctite 242)	2.00	2.00					ML		
59	81-15-154	Cap & Chain, For #18 Receptacle	1.00	1.00					EA		
60	85-10-147	Adhesive Sealant, Pipe Thread	1.00	1.00					ML		
61	82-10-484	Jumper, Terminal Block	5.00	5.00					EA	(See Schematic BS-C91)	
62	83-25-890	Term, Ring Tongue, #18-22AWG, #6, Insul	16.00	16.00					EA		
63	99-31-483	Wire, Hookup, #18AWG, IRR PVC, Red	1.00	1.00					FT		
64	99-31-482	Wire, Hookup, #18AWG, IRR PVC, Black	2.75	2.75					FT		
65	99-31-484	Wire, Hookup, #18AWG, IRR PVC, Green	1.58	1.58					FT		
66	99-31-481	Wire, Hookup, #18AWG, IRR PVC, White	1.00	1.00					FT		
67	83-51-752	Screw, 2-56 x 1/4"Lg, Btn Hd, Hex, SS	2.00	2.00					EA		
68	83-51-763	Screw, 4-40 x 3/8"Lg, Btn Hd, Hex, SS	4.00	4.00					EA		
69	83-51-762	Screw, 4-40 x 5/16"Lg, Btn Hd, Hex, SS	2.00	2.00					EA		
70	83-51-765	Screw, 4-40 x 1/2"Lg, Btn Hd, Hex, SS	1.00	1.00					EA		
71	83-79-152	Screw, 1/4-28 x 1/2"Lg, Skt Hd, Cap, SS	1.00	1.00					EA		
72	83-79-051	Screw, 4-40 x 1/2"Lg, Skt Hd, Cap, SS	5.00	5.00					EA		
73	83-79-068	Screw, 6-32 x 3/8"Lg, Skt Hd, Cap, SS	5.00	5.00					EA		
74	83-79-075	Screw, 6-32 x 1"Lg, Skt Hd, Cap, SS	1.00	1.00					EA		
75	83-79-073	Screw, 6-32 x 3/4"Lg, Skt Hd, Cap, SS	2.00	2.00					EA		
76	83-79-082	Screw, 8-32 x 3/8"Lg, Skt Hd, Cap, SS	3.00	3.00					EA		

SCI-TEC Instruments Inc.												
Title: AZIMUTH TRACKER ASSY (BA-C91/A: 110V, BA-C91/B: 220V)									Rev Date: 95-08-01			
									Rev: 18			
DCN: 738, 739		Drawn: DF		Checked:		Approved:		QA App'd:		Dwg No.: BA-C91		
Item No.	Part/Ident No.	Title/Description				Qty /A	Qty /B	Qty /C	Qty /D	UofM	Ref Des	Remarks

77	83-79-114	Screw, 10-32 x 1/2"Lg, Skt Hd, Cap, SS	12.00	12.00						EA		
78	83-79-077	Screw, 6-32 x 1-1/4"Lg, Skt Hd, Cap, SS	4.00	4.00						EA		
79												
80	83-79-116	Screw, 10-32 x 5/8"Lg, Skt Hd, Cap, SS	7.00	7.00						EA	(Bag 4 For Mounting Brewer)	
81												
82	83-87-165	Screw, 4-40 x 1/2"Lg, Flt Hd, Hex, SS	2.00	2.00						EA		
83	83-87-181	Screw, 6-32 x 5/8"Lg, Flt Hd, Hex, SS	4.00	4.00						EA		
84	83-87-182	Screw, 6-32 x 3/4"Lg, Flt Hd, Hex, SS	2.00	2.00						EA		
85	83-87-209	Screw, 10-32 x 1/2"Lg, Flt Hd, Hex, SS	4.00	4.00						EA		
86	83-87-211	Screw, 10-32 x 5/8"Lg, Flt Hd, Hex, SS	3.00	3.00						EA		
87	83-87-214	Screw, 10-32 x 1"Lg, Flt Hd, Hex, SS	3.00	3.00						EA		
88	83-87-233	Screw, 1/4-28 x 5/8"Lg, Flt Hd, Hex, SS	2.00	2.00						EA		
89	83-40-262	Nut, 6-32 x 5/16, Hex, Steel Plated	1.00	1.00						EA		
90	83-40-326	Nut, 1/4-28 x 7/16, Hex, Steel Plated	1.00	1.00						EA		
91												
92	83-40-278	Nut, 8-32 x 1/4 x 3/32 Thk, Hex, SS	4.00	4.00						EA		
93	83-40-486	Nut, 6-32, Self Locking, Hex, SS	1.00	1.00						EA		
94												
95												
96	BM-C121	Jamb Nut, Altered, 3/8-24, Hex	3.00	3.00						EA		
97												
98												
99	83-95-626	Washer, #4, External Tooth Lock, SS	1.00	1.00						EA		
100	83-95-604	Washer, #4, Internal Tooth Lock, SS	9.00	9.00						EA		
101	83-95-605	Washer, #6, Internal Tooth Lock, SS	2.00	2.00						EA		
102	83-95-631	Washer, 1/4, External Tooth Lock	2.00	2.00						EA		
103	83-95-749	Washer, #6, Split Lock, SS	5.00	5.00						EA		
104	83-95-752	Washer, #10, Split Lock, SS	10.00	10.00						EA		
105	83-95-750	Washer, #8, Split Lock, SS	4.00	4.00						EA		
106	83-95-013	Washer, #6, Flat, SS	1.00	1.00						EA		
107	83-95-019	Washer, #8, Flat, SS	3.00	3.00						EA		
108	83-95-028	Washer, 1/4, Flat, SS	1.00	1.00						EA		

REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	APPD.
1	FIRST ISSUE	—	88.9.20	CW	AM
2	REMOVED NOTE 6	DCN450	90.07.03	FV	KL
3	REMOVE FIG. 2, ZEN DRIVE KIT	DCN487	90.08.12	FV	KL
4	ADD SURGE SUPP	DCN538	91.03.19	FV	KL
5	REMOVE LOCK-WASHERS (ITEM 4)	DCN558	91.10.29	FV	KL
6	REMOVE REFERENCE TO BA-C83	DCN562	92.03.17	FV	

DOCUMENT NO.
BA-C113



NOTES:

1. REFER TO PARTS LIST BA-C113 FOR ITEMS LISTED ABOVE, OR MENTIONED IN THESE NOTES. ITEMS TO BE INSTALLED ARE LISTED FOR REFERENCE PURPOSES ONLY AND ARE PART OF OPTION B KIT, DWG NO. BA-C81.
2. REFER TO ACCEPTANCE MANUAL AM-BA-C85 PRIOR TO ASSEMBLY.
3. POSITION SPECTROPHOTOMETER ON TO AZIMUTH TRACKER AS SHOWN AND SECURE USING (4) #10 CAP SCREWS. NOTE THAT THE SPECTROPHOTOMETER IS POSITIONED SUCH THAT THE SIDE WITH THE QUARTZ WINDOW GOES TO THE SIDE OF THE AZIMUTH TRACKER WITH ONLY ONE ROUNDED 3/8" SCREW.
4. CONNECT ALL CABLES TO AZIMUTH TRACKER AND SPECTROPHOTOMETER AS SHOWN.

QTY	UM	PART NO.	MFR'S NO.	DESCRIPTION	REMARKS	ITEM
1	—	BA-C81	—	SCITEC INSTRUMENTS INC. 300-750 Instruments Inc.		
1	—	BA-C81	—	OPTION B KIT INSTALLATION		
1	—	BA-C113	—	DOCUMENT NUMBER		
1	—	BA-C113	—	REVISION		

SCALE	DATE	DWN	CHGD	APPD	FINISH
88.08.08	88.08.08	CW	RA	RA	—
88.08.08	88.08.08	CW	RA	RA	—
88.08.08	88.08.08	CW	RA	RA	—
88.08.08	88.08.08	CW	RA	RA	—
88.08.08	88.08.08	CW	RA	RA	—

1	—	BA-C113	—	DOCUMENT NUMBER		
1	—	BA-C113	—	REVISION		

SCI-TEC Instruments Inc.											
Title: OPTION 'B' KIT INSTALLATION								Rev Date: 92-03-17			
								Rev: 6			
DCN: 562		Drawn: FV		Checked: RA		Approved:		QA App'd:			
								Dwg No.: BA-C113			
Item No.	Part/Ident No.	Title/Description			Qty	Qty /B	Qty /C	Qty /D	UofM	Ref Des	Remarks

1	BA-C91	Azimuth Tracker Assy	1.00						EA	
2										
3	83-79-116	Screw, 10-32 x 5/8"Lg, Skt Hd, Cap, SS	4.00						EA	

SCI-TEC Instruments Inc.											
Title: OPTION C KIT (UVB)								Rev Date: 92-01-15			
								Rev: 4			
DCN: 568		Drawn: CW		Checked: RA		Approved:		QA App'd:			
								Dwg No.: BA-C84			
Item No.	Part/Ident No.	Title/Description			Qty	Qty /B	Qty /C	Qty /D	UofM	Ref Des	Remarks

1	BA-F81	UVB Prism Assy	1.00					EA	
2	BM-C175	UVB Dome Cap	1.00					EA	
3	BM-C37	UVB Adaptor	1.00					EA	
4	BM-C38	UVB Dome Light Diffuser Holder	1.00					EA	
5	BM-C39	UVB Retaining Ring	1.00					EA	
6	BM-C40	UVB Diffuser	1.00					EA	
7									
8									
9									
10	10-15-101	Quartz Hemisphere, 50mm MTD	1.00					EA	Eplab (Infrasil II)
11									
12	83-10-739	O-Ring, 2-1/4"ID x 2-1/2"OD x 1/8, #228	1.00					EA	
13	83-10-737	O-Ring, 2"ID x 2-1/4"OD x 1/8, #226	1.00					EA	
14	83-51-834	Screw, 10-32 x 1/2"Lg, Btn Hd Hex, SS	3.00					EA	
15	83-79-052	Screw, 4-40 x 9/16"Lg, Skt Hd Cap, SS	4.00					EA	
16									
17	83-95-787	Washer, #10, Sealing	3.00					EA	
18	83-95-748	Washer, #4, Split Lock, SS	4.00					EA	
19	83-95-023	Washer, #10, Flat, SS	3.00					EA	
20	BA-C114	Option C Kit Installation	--					REF	

NOTES:

1. BAG ALL ITEMS AND MARK WITH DWG NO. AND REV.
2. FOR INSTALLATION OF PARTS LISTED, SEE DWG NO. BA-C114.

BASE ASSY (PART OF
BA-C01 OR BA-C01/B)

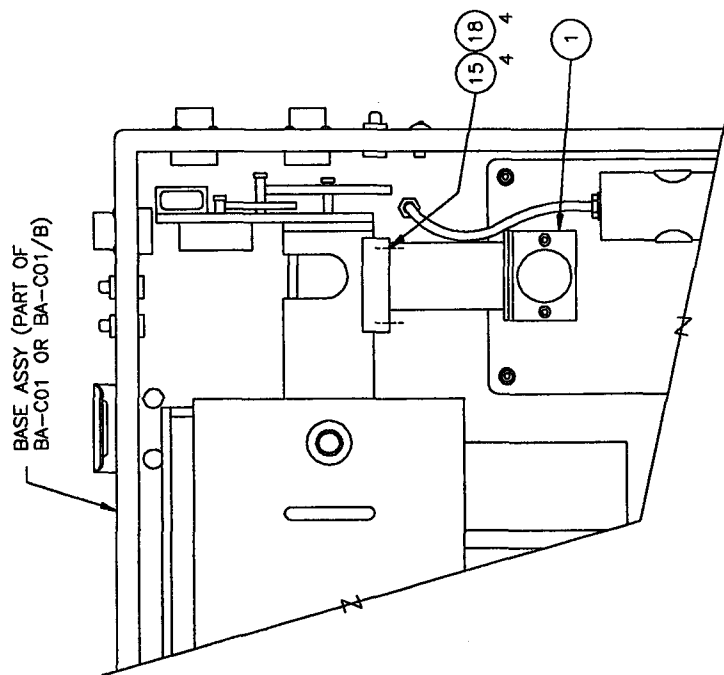
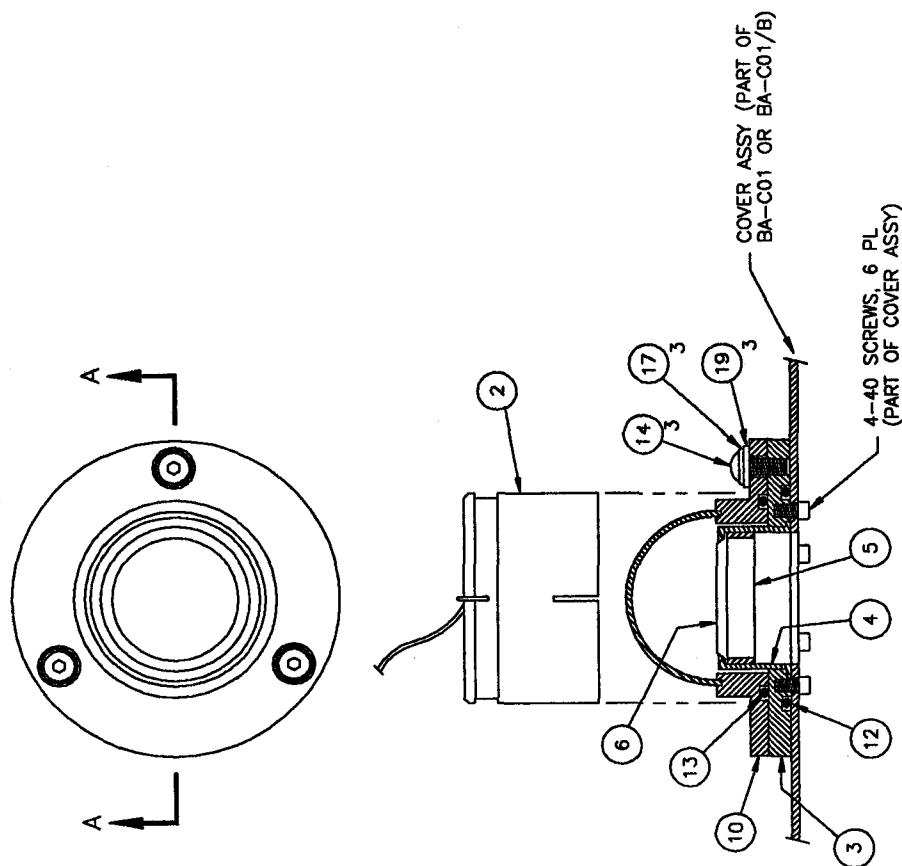


FIGURE 2
UVB PRISM INSTALLATION
SCALE 1:2



SECTION A-A

FIGURE 1
UVB DOME INSTALLATION
SCALE 1:1

- NOTES:
1. ITEMS TO BE INSTALLED FOR REFERENCE PURPOSES ONLY, AND ARE PART OF OPTION C KIT, DWG NO. BA-C84.
 2. UVB DOME INSTALLATION:
 - REFER TO FIGURE 1
 - REMOVE SEALING PLATE (ITEM 1) (CAUTION: QUARTZ DOME IS FRAGILE)
 - REMOVE SEALING PLATE (ITEM 2) FROM HOLES THRU SEALING PLATE. SPOT FROM EXISTING PILOT HOLES AND DE-BURR. BAG SEALING PLATE AND O-RING AND ATTACH TO BREWER ASSY.
 - ASSEMBLE ITEMS 4, 5 & 6 TOGETHER AS SHOWN. THIS PART IS NOW REFERRED TO AS "UVB DIFFUSER."
 - USING NEW O-RING (ITEM 12) AND 6 EXISTING 4-40 SCREWS, FASTEN UVB DIFFUSER AND ADAPTER (ITEM 3) TO COVER.
 - ASSEMBLE QUARTZ DOME (ITEM 10) AND O-RING (ITEM 13) USING ITEMS 14, 17 & 18.
 - NOTE: PROTECTIVE CAP (ITEM 2) SHOULD ALWAYS BE USED IF COVER IS REMOVED OR UNIT IS MOVED FOR ANY REASON.
 - ATTACH END OF CORD TO CARRYING HANDLE.
 3. UVB DOME REMOVAL:
 - REMOVAL OF THE UVB DOME IS NECESSARY. THE SPARE SEALING PLATE AND O-RING MAY BE USED TO RE-SEAL THE OPENING. FASTEN THESE TO THE UVB ADAPTER (ITEM 3) USING EXISTING HARDWARE USED TO MOUNT THE QUARTZ DOME. CAREFULLY WRAP QUARTZ DOME, UVB DIFFUSER & O-RING AND STORE FOR FUTURE USE.
 4. UVB PRISM INSTALLATION:
 - REFER TO FIGURE 2. INSTALL UVB PRISM ASSY USING ITEMS 15 AND 18.

QTY	UM	PART NO.	MFR'S NO.	DESCRIPTION	REMARKS	ITEM
-1	-1					
- NO.						
SCALE	NEXT ASSY:		BA-C84	 SCHTEC © 1994 This document is not to be disclosed outside the company without prior permission from INSTRUMENTS INC. 80-TEC instruments inc.		
DATE	DIMENSIONS IN		INCHES			
DWN	CW		mm			
CHKO	RA	Tolerances (unless otherwise specified)				
APPD	RA	INCHES				
FINISH			MM	TITLE: OPTION C KIT INSTALLATION (UVB)		
		.005				
		.01				
		ANGLES ± 1°				
		FRACTIONS ± 1/32				
				SHEET 1 of 1 DOCUMENT NUMBER BA-C114 REV. 2		

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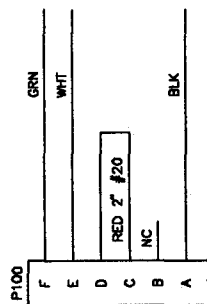
SCI-TEC Instruments Inc.												
Title: OPTION C KIT (UVB) INSTALLATION									Rev Date:	92-01-15		
									Rev:	2		
DCN: 568		Drawn: CW		Checked: RA		Approved: RP		QA App'd:		Dwg No.: BA-C114		
Item No.	Part/Ident No.	Title/Description				Qty	Qty /B	Qty /C	Qty /D	UofM	Ref Des	Remarks

1	BA-F81	UVB Prism Assy				1.00				EA		
2	BM-C175	UVB Dome Cap				1.00				EA		
3	BM-C37	UVB Adaptor				1.00				EA		
4	BM-C38	UVB Dome Light Diffuser Holder				1.00				EA		
5	BM-C39	UVB Retaining Ring				1.00				EA		
6	BM-C40	UVB Diffuser				1.00				EA		
7												
8												
9												
10	10-15-101	Quartz Hemisphere, 50mm MTD				1.00				EA		Eplab (Infrasil II)
11												
12	83-10-739	O-Ring, 2-1/4"ID x 2-1/2"OD x 1/8, #228				1.00				EA		
13	83-10-737	O-Ring, 2"ID x 2-1/4"OD x 1/8, #226				1.00				EA		
14	83-51-834	Screw, 10-32 x 1/2"Lg, Btn Hd Hex, SS				3.00				EA		
15	83-79-052	Screw, 4-40 x 9/16"Lg, Skt Hd Cap, SS				4.00				EA		
16												
17	83-95-787	Washer, #10, Sealing				3.00				EA		
18	83-95-748	Washer, #4, Split Lock, SS				4.00				EA		
19	83-95-023	Washer, #10, Flat, SS				3.00				EA		
20	BA-C84	Option C Kit				--				REF		

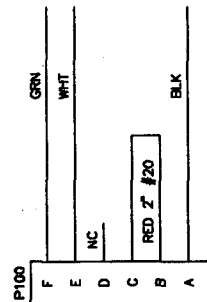
NOTE:

ALL ITEMS LISTED FOR REFERENCE PURPOSES ONLY. REFER TO OPTION 'C' KIT PARTS LIST (BA-C84).

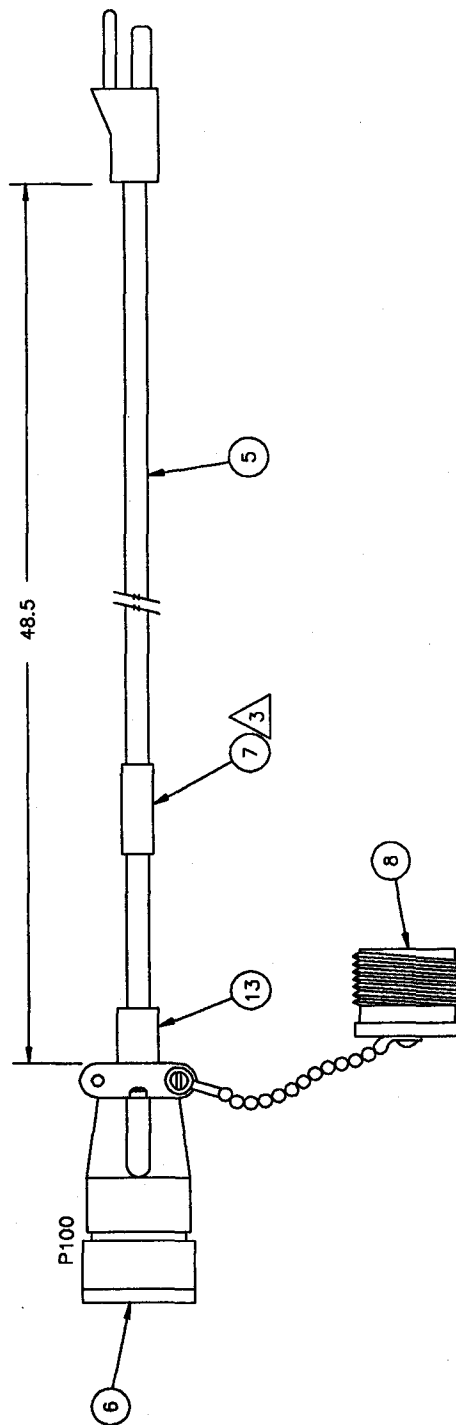
REV	DESCRIPTION	DCN NUMBER	DATE	DWN. APPD.
1	INITIAL RELEASE	8502-DCN-216	83.03.01	DF
2	SEE DCN	362		CW
3	SEE DCN	489		CW
4	REMOVE SMALL BUSHING (ITEM 14)	685	94.05.06	FV



SCHEMATIC DIAGRAM
BA-W12/B (220V)



SCHEMATIC DIAGRAM
BA-W12/A (110V)



NOTES:

1. REMOVE THE RUBBER INSULATOR FROM THE INSIDE OF ITEM 6 & DISCARD.
AFTER THE WIRES ARE SOLDERED TO THE CONNECTOR, USE ITEM 15 AND SEAL
AROUND ALL THE SOLDER CUPS. THEN INSTALL THE PLASTIC SHELL OVER IT.
2. CHECK THAT AN O-RING (#83-10-620) IS INSTALLED IN ITEM 6.
3. MARK CABLE WITH PART NO. WHERE SHOWN.

QTY	UM	PART NO.	MFR'S NO.	DESCRIPTION	REMARKS	ITEM
1	EA	BA-C01		POWER CABLE ASSY, BREWER		4

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INSTRUMENTS INC. 80-TEC Instruments Inc.

DATE	83.03.01	FEET	
DWN	DF	mm (inches)	
CHKD	DW	Tolerances (unless otherwise specified)	
APPD	RL	INCHES	MM
FINISH		IN ± .005	MM ± .13
		IN ± .01	MM ± .25
		ANGLES ± 1°	ANGLES ± 1°
		FRACTIONS ± 1/32	

COMPUTER GENERATED DRAWING
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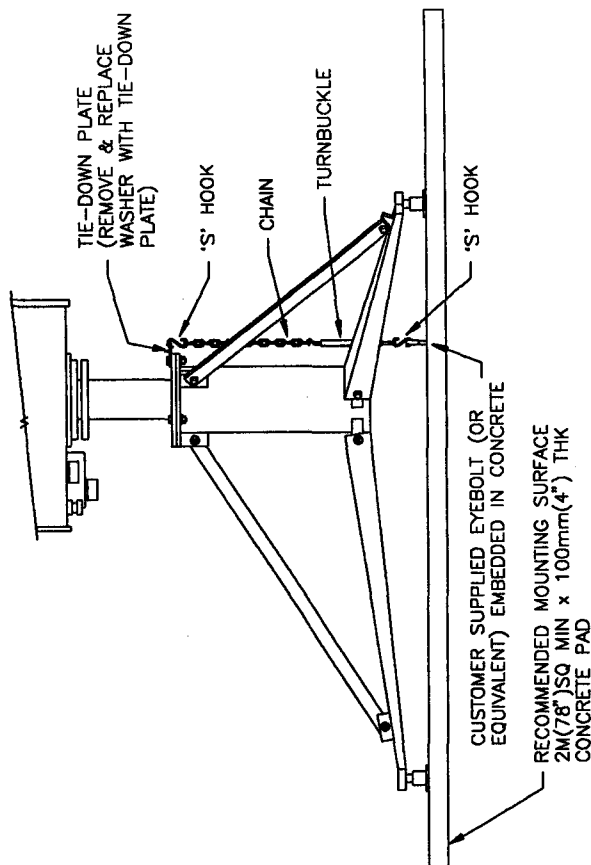
SCI-TEC Instruments Inc.												
Title: BREWER OPTIONAL ELECTRONICS SPARES KIT										Rev Date: 94-01-27		
										Rev: 6		
DCN: 659, 662, 672		Drawn: CW		Checked:		Approved:		QA App'd:		Dwg No.: BA-C122		
Item No.	Part/Ident No.	Title/Description				Qty /D	Qty	Qty	Qty	UofM	Ref Des	Remarks

1	BA-E103	Power Supply Assy				1.00					EA	
2	BA-E94	Secondary Power Supply PCB Assy				1.00					EA	
3	BA-E21	Heat Sink Assy				1.00					EA	
4	BA-E50/A	I/O PCB Assy (Micro/Shutter)				1.00					EA	
5	BA-E50/B	I/O PCB Assy (Iris/FW#1 & #2)				1.00					EA	
6	BA-C99	Azimuth Tracker PCB Assy				1.00					EA	
7	BA-E50/D	I/O PCB Assy (Az Trkr/Zen Dr/FW#3)				1.00					EA	
8	BA-E48	Photon Counter Control PCB Assy				1.00					EA	
9	BA-E51/B	Clock/Monitor & A/D PCB Assy				1.00					EA	
10	BA-P23	High Speed Amp PCB Assy				1.00					EA	
11	BA-E52/B	MicroProcessor PCB Assy				1.00					EA	
12	93-70-401	Standard Lamp				3.00					EA	
13	93-70-405	Mercury Lamp				3.00					EA	
14	87-50-088	Power Supply, Switching, 5VDC, 10A				1.00					EA	
15	70-10-014	Dessicant Cartridge				1.00					EA	
16	70-10-015	Dessicant Bag				1.00					EA	

SCI-TEC Instruments Inc.												
Title: BREWER STANDARD SPARES KIT								Rev Date: 95-08-02				
								Rev: 11				
DCN: 748		Drawn: CW		Checked: FV		Approved:		QA App'd:				
								Dwg No.: BA-C112				
Item No.	Part/Ident No.	Title/Description				Qty /A	Qty /B	Qty /C	Qty /D	UofM	Ref Des	Remarks

1	93-70-401	Lamp, Tungsten, Halogen, 20W, 12V	2.00							EA		
2	93-70-405	Lamp, Mercury, Type B	2.00							EA		
3	91-15-217	Fuse, 5A, 250V, Fast-Blow	2.00							EA		
4	91-15-257	Fuse, 2A, 125V, Slow-Blow	2.00							EA		
5	83-79-116	Screw, #10-32 x 5/8"Lg, Skt Hd Cap, SS	4.00							EA		
6	70-10-014	Dessicant Cartridge	1.00							EA		
7	92-90-020	Allen Wrench Kit, Ball Point	1.00							EA		
8												
9	92-22-050	Insertion/Extraction Tool, 'D' Connector	1.00							EA		
10												
11												
12	70-10-013	Humidity Indicator	2.00							EA		
13	70-10-015	Dessicant, 4 Unit, Type II, TYVEK Bag	3.00							EA		

REV	DESCRIPTION	DON NUMBER	DATE	DWN. APPD.
1	INITIAL RELEASE		93.02.22	FV
DOCUMENT NO. BA-C203				



STANDARD CONFIGURATION

NOTE:

1. ALL ITEMS LISTED ABOVE ARE SHOWN FOR INSTALLATION PURPOSES ONLY AND ARE PART OF KIT #A2-1030-135.

ALTERNATE CONFIGURATION

QTY	UM	PART NO.	MFR'S NO.	DESCRIPTION	REMARKS	ITEM
-	-	-	-	-	-	-
SCALE	DATE	93.02.22	INITIAL RELEASE	DATE	93.02.22	FV
DWN	FV					
CHKD						
APPD						
FINISH						
© 1994 ZSCH-TEC INSTRUMENTS INC. 50-100 Instruments Inc. TITLE: INSTALLATION DRAWING, TRACKER TIE-DOWN KIT 1 SHEET 1 OF 1 DOCUMENT NUMBER BA-C203						

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BREWER REFERENCE DOCUMENTATION

Section 7.2 Power Supply and Harness

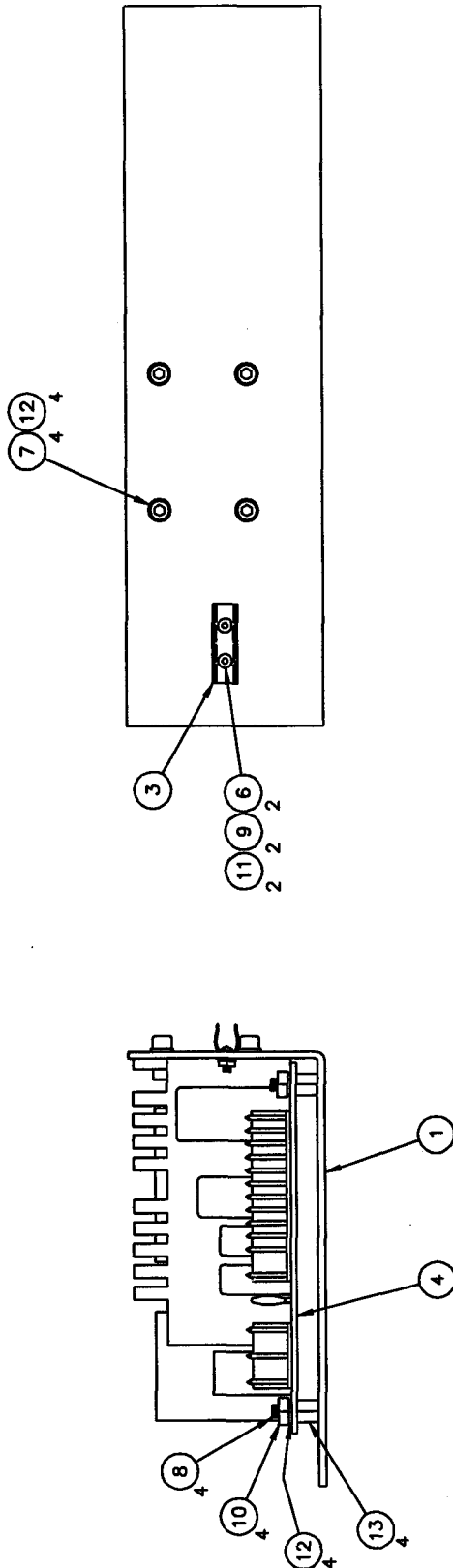
- | | |
|-----------------------------|-------|
| - Main Power Harness W32 | 7.2-1 |
| - Main Power Supply BM-E103 | 7.2-2 |

Section Overview

Fig 7.2-2.4: Note the 5A fuse. When Azimuth Tracker is installed, AC power first passes through a 2A Slo-Blo fuse in tracker.

REV	DESCRIPTION	DCN NUMBER	DATE	DWN. APPD.
1	INITIAL RELEASE	REF DCN672	94.01.27	FV

DOCUMENT NO.
BA-E103



QTY	UM	PART NO.	MFR'S NO.	DESCRIPTION	REMARKS	ITEM
1	1					
SCALE	1:1	NEXT ASSY:	BA-E71			
DATE	94.01.27	DIMENSIONS IN	INCHES			
DWN	FV	F DUAL DIMS:	mm (inches)			
CHKD		Tolerances (unless otherwise specified)				
APPD		INCHES	MM			
FINISH		mm ± .005	mm ± 0.13			
		mm ± .01	mm ± 0.25			
		mm ± .1	mm ± 1			
		FRACTIONS ± 1/28				
TITLE: POWER SUPPLY ASSEMBLY						
SHEET 1 OF 1						REV. 1
DOCUMENT NUMBER BA-E103						

COMPUTER GENERATED DRAWING
FILENAME: BA-E103.DWG

SCI-TEC Instruments Inc.												
Title: POWER SUPPLY ASSEMBLY									Rev Date: 94-01-27			
									Rev: 1			
DCN:		Drawn: FV		Checked:		Approved:		QA App'd:		Dwg No.: BA-E103		
Item No.	Part/Ident No.	Title/Description				Qty /A	Qty /B	Qty /C	Qty /D	UofM	Ref Des	Remarks

1	BM-E102	Mounting Bracket, Power Supply	1.00							EA		
2												
3	89-90-220	Mounting Clip, Axial Lead Resistor	1.00							EA		
4	87-50-098	Power Supply, 80 Watt, Switching	1.00							EA		
5												
6	83-51-752	Screw, #2-56 x 1/4"Lg, Btn Hd Hex, SS	2.00							EA		
7	83-79-068	Screw, #6-32 x 3/8"Lg, Skt Hd Hex, SS	4.00							EA		
8	83-85-724	Screw, #6-32 x 5/8"Lg, Flt Hd, 100Deg, SS	4.00							EA		
9	83-40-219	Nut, #2-56 x 3/16", Hex, SS	2.00							EA		
10	83-40-261	Nut, #6-32 x 5/16", Hex, SS	4.00							EA		
11	83-95-603	Washer, #2, Internal Tooth Lock, SS	2.00							EA		
12	83-95-605	Washer, #6, Internal Tooth Lock, SS	8.00							EA		
13	83-09-210	Spacer, Threaded, #6-32 x 1/4"Lg, Hex	4.00							EA		

NFS80 SERIES

80 Watt Universal Input Switching Power Supplies

- Balanced-current auxiliary outputs
- Universal input voltage
- Overvoltage protection
- Short circuit protection with auto-recovery
- 80 watts continuous, 110 watts peak output power
- Two year warranty
- Recommended for new designs

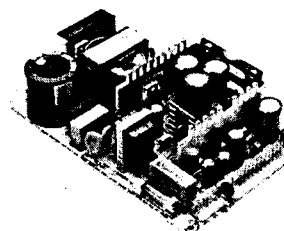
SCI-TEC # 87-50-098



**ELECTRO
SOURCE**

(604) 435-2533
6675 Royal Oak Ave.
Burnaby, B.C.
V5J 4J5
Fax: (604) 435-2538

NEW!



The NFS80 series consist of universal input, four output switching power supplies useful in motor or line driver applications. The equally rated or "balanced" outputs will each deliver up to 3A continuous and 6A peak output current. Furthermore, these supplies will deliver 80 total continuous watts with natural convection cooling, or 110 watts with forced air cooling. For starting loads such as disk

drives, they will deliver 110 peak watts.

Universal input allows the supply to operate from any line voltage throughout the world without a switch or jumper setting. The NFS80 series is approved by UL, CSA and VDE, and its built-in line filter reduces conducted noise below FCC and VDE limit B.

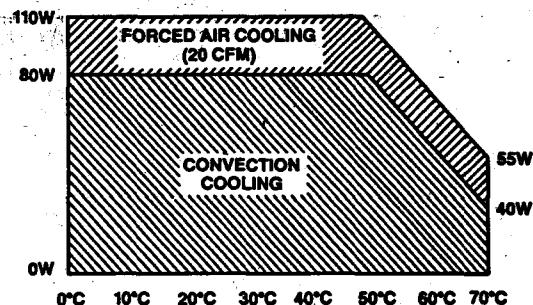
Model Number	Output Voltage ⁽¹⁾	Minimum	Output Currents Maximum ⁽²⁾	Maximum ⁽³⁾	Peak ⁽⁴⁾	Ripple P-P ⁽⁵⁾	Total Regulation ⁽⁶⁾
NFS80-7602	+5V (A)	1A	8A	1.2A	20A	50mV	±2%
	+24V (B)	0A	2A	2.5A	3A	240 mV	+10%-5%
	+12V (C)	0A	2.5A	3A	6A	120mV	±3%
	12V (D)	0A	2.5A	3A	6A	120mV	±3%
NFS80-7606	+5V (A)	1A	8A	12A	20A	50mV	±2%
	+24V (B)	0A	2A	2.5A	3A	240mV	+10%-5%
	+15V (C)	0A	2.5A	3A	6A	150mV	±3%
	15V (D)	0A	2.5A	3A	6A	150mV	±3%

Notes:

- (1) The floating fourth output (D) can be referenced as either positive or negative.
- (2) Natural convection cooling.
- (3) Forced air cooling, 20 CFM @ 1 atmosphere.
- (4) Peak output current lasting less than 60 seconds with duty cycle ≤ 10%. During peak loading, outputs may exceed total regulation limits.
- (5) 50 MHz bandwidth, peak-to-peak, measured differentially.
- (6) Total regulation is defined as the static output regulation at 25°C, including initial tolerance, line voltage within stated limits, load currents within stated limits, and output voltages adjusted to their factory settings. Also, for stated regulation on the +24V output, I(A)/I(B) ≤ 5.

Operating Temperature Limits and Output Power Range

For optimum reliability, no part of the heatsink should exceed 110°C, and no semiconductor case temperature should exceed 115°C. CAUTION: make primary circuit thermal measurements approximately one second after disconnecting line power to minimize shock hazard and damage to thermal measurement equipment.



COMPUTER PRODUCTS

A

7 Elkins Street • South Boston • MA 02127 • Phone 617-464-6600 • Fax 617-464-6612

Fig. 77-2 2

SPECIFICATIONS

SCI-TEL #87-50-098

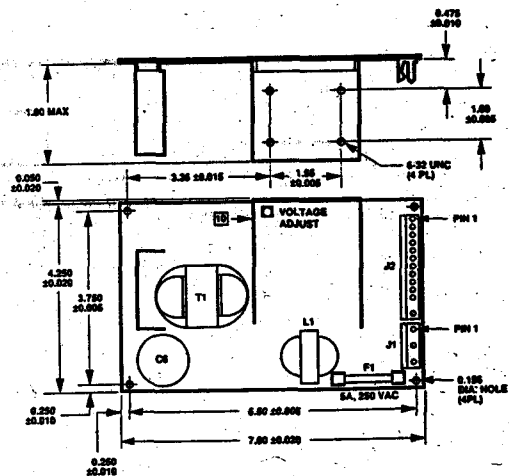
Parameter	Condition	Limits
Input Voltage		85VAC to 264VAC
Input Frequency Range		47Hz to 440Hz
Input Surge Current	Cold start 115VAC 230VAC	17A max 34A max
Conducted RFI		FCC limit B, VDE limit B
Safety Ground Leakage Current	110VAC, 60Hz 233VAC, 50Hz	0.2 mA maximum 0.4 mA maximum
Line Regulation	Low line to high line, full load	±0.1% max
Overshoot/Undershoot	Turn-on	None
Transient Response	+5V output, 2.5A to 5A load change	150mV transient, settling to 1% in 1mS
Temperature Coefficient	All outputs	0.02%/C
Overvoltage Protection Threshold	+5V output	6.25V ±0.75V
Output Voltage Adjustability	+5V output	±3%
Total Output Power	50°C ambient temperature Continuous, convection cooling forced air cooling Peak	80 watts 110 watts 110 watts
Holdup Time	220VAC input 180VAC input 115VAC input 90VAC input	80W 110W 140mS 100mS 80mS 50mS 35mS 17mS 12mS 8mS
Efficiency	115VAC input, 80W	70% typical
Operating Frequency	0W, 90 to 264VAC 110W, 90 to 264VAC	100 to 250 kHz 20 to 70 kHz
Altitude	Operating Non-operating	10,000 feet max 40,000 feet max
Temperature	Operating Non-operating	0°C to 50°C -40°C to +85°C
Relative Humidity	Non-condensing	5% to 95%
Vibration	Three orthogonal axes, random vibration, 10 minute test for each axis	2.4G rms (appx) 5Hz to 500Hz
MTBF	MIL-HDBK 217E, 25°C	125,000 hr
Weight		1.3 lb (0.6 Kg)

PIN CHART

CONNECTOR

J1			
Pin 1	AC Ground	AC Ground	Molex 09-50-3051 with second and fourth pins removed
Pin 2	AC Neutral	AC Neutral	
Pin 3	AC Hot	AC Hot	
J2			
Pin 1	+5.1V	+5.1V	Molex 09-50-3131 Mating connector: Molex 2139 series housing with 2878 series crimp terminal.
Pin 2	+5.1V	+5.1V	
Pin 3	+5.1V	+5.1V	
Pin 4	Return	Return	
Pin 5	Return	Return	
Pin 6	Return	Return	
Pin 7	Return	Return	
Pin 8	+12V	+15V	
Pin 9	+12V	+15V	
Pin 10	-12V Ret	-15V Ret	
Pin 11	-12V	-15V	
Pin 12	Removed for key		
Pin 13	+24V	+24V	

- (7) Pins 10 and 11 are a floating output, which can be referenced as either positive or negative. Pin 10 is positive with respect to pin 11. Either pin 10 or 11 must be connected to Return (pins 4-7) for proper operation.
- (8) All dimensions are in inches and (mm).
- (9) Either metallic or non-metallic standoffs can be used in all four mounting holes without affecting VDE safety approval. The diameter of metal standoffs, if used, must not exceed 0.012".
- (10) This heat sink is grounded, and allows system grounding when mechanically connected to the system chassis. Alternatively, the

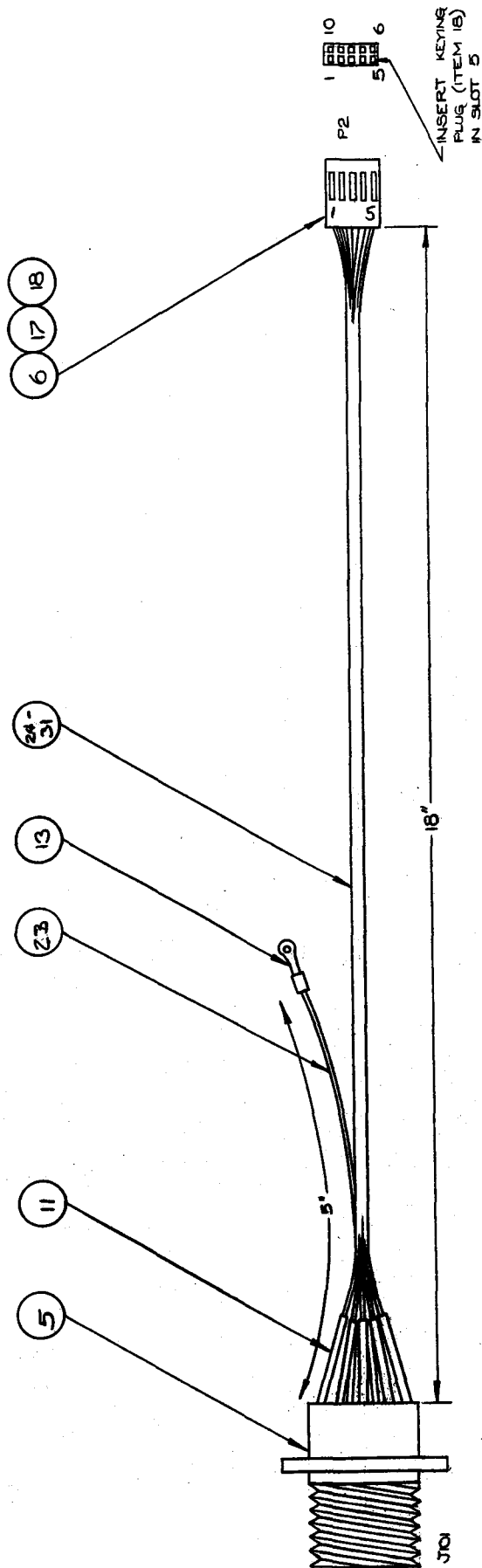


- ground pad encircling the mounting hole near J1 allows system grounding through a metal standoff to the system chassis.
- (11) It is always advisable to attach the power supply heat sink to another thermal dissipator (such as a chassis, a finned heat sink, etc.). The resulting temperature decrease of heat sink-mounted components will improve power supply lifetime.
- (12) The supply must be mechanically supported using the PCB mounting holes, and may be additionally supported by the heat sink mounting holes.

BREWER REFERENCE DOCUMENTATION

Section 7.3 Internal Cabling

- | | |
|---|-----------|
| - Data Cable W37 | 7.3-1 |
| - Azimuth Cable W31 | 7.3-2 |
| - Main Wiring Harness & Wiring Sheets W36 | 7.3-3, -4 |



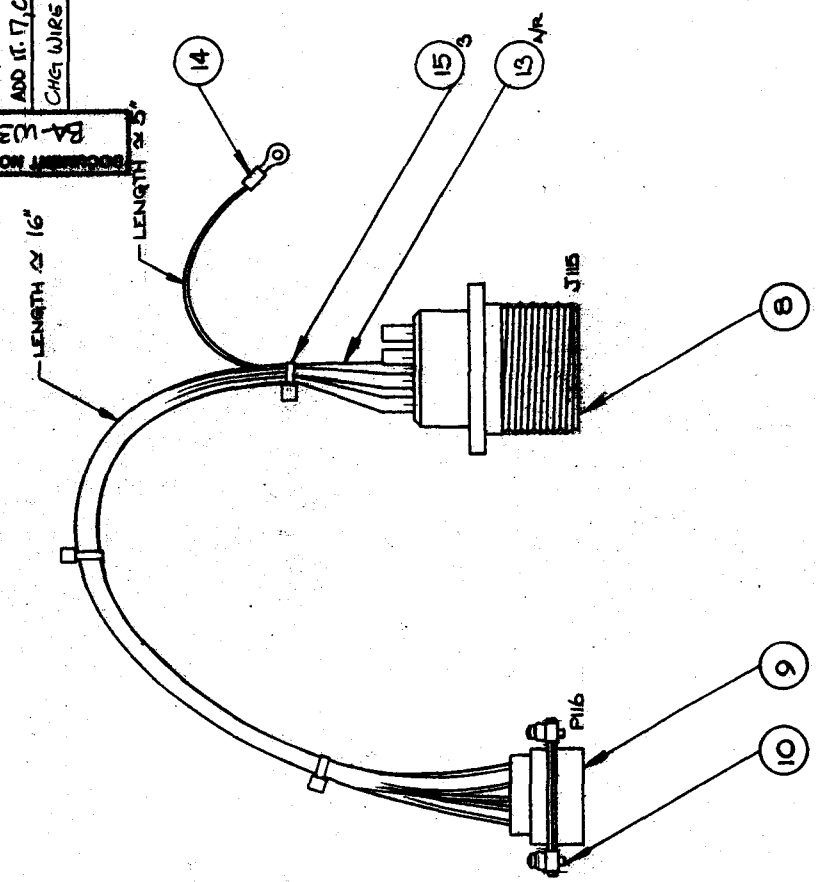
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NEXT ASSEMBLY BA-C11		DATA CABLE		COSMAC TO CHASSIS	
SCALE		DIMMS.		TOLS.	
MATERIAL		DATE MAR 83		OWN	
FINISH		SHT. SIZE 10x11 B		NUMBER BA-V37	
ISS.		1		APPD. V4	

1	2	3	4	5	6	7	8	9	10	P2 (COSMIC)
24 GA. RED	24 GA. ORN	24 GA. YEL	24 GA. BLU	24 GA. VIO	24 GA. GRN	24 GA. WHT	24 GA. BLK	24 GA. GND		
DATA IN	DATA OUT	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE		
KEY	KEY	KEY	KEY	KEY	KEY	KEY	KEY	KEY		
HIGH LEVEL	HIGH LEVEL	HIGH LEVEL	HIGH LEVEL	HIGH LEVEL	HIGH LEVEL	HIGH LEVEL	HIGH LEVEL	HIGH LEVEL		
LOW LEVEL	LOW LEVEL	LOW LEVEL	LOW LEVEL	LOW LEVEL	LOW LEVEL	LOW LEVEL	LOW LEVEL	LOW LEVEL		
SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE		
SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE		
SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE		
SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE		

DESCRIPTION	REV.	DCN NUMBER	DATE	DWN.	APPD.
ADD 11.17, CHG QTY 11's 19, 21.	2	DCN-373	88-2-18	C.W.	RA
CHG WIRE LENGTHS & P116 FINISH	3	DCN-622	93-01-20	7V	RA

BA-W31
OF 1111111111



	A	B	C	D	E	F	G	H	I	J
2	YEL 22.15"									
13	NC									
14										
15	RED 22.15"									
3	NC									
4										
5										
6										
8										
9										
10										
11										
12										
7										
1										

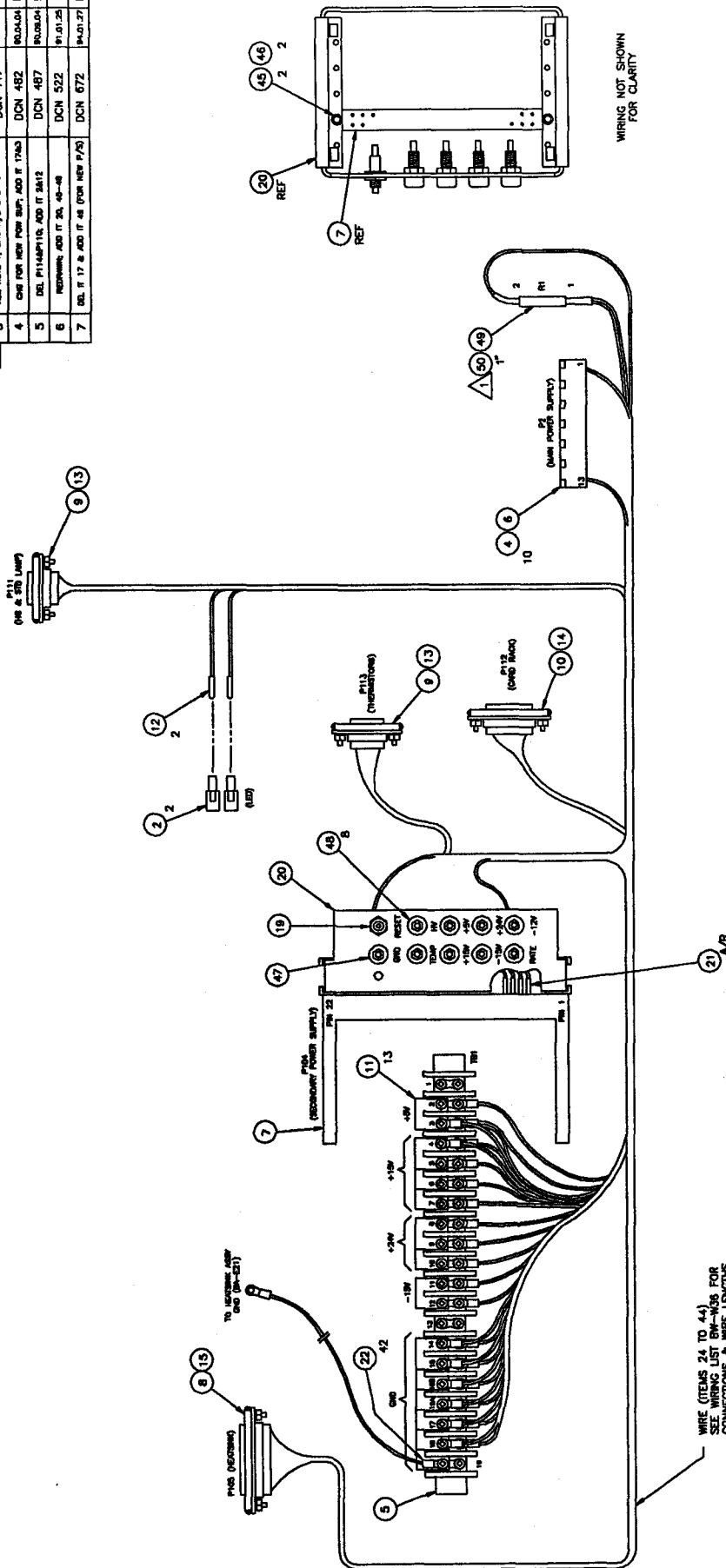
J115 (TO P116 - SEE BA-W19)

SCHEMATIC

SCF-TBC		INSTRUMENTS INC.		WIRE ASSEMBLY BA-C01	
SCALE 1:1	DATE 11.1	TOLLS		INTERNAL AZIMUTH DRIVE DATA CABLE	
MATERIAL		FINISH		BREWER SPECTROPHOTOMETER MK II	
DATE MAR 84		DWN. 1		CHKD. KL	
SMT. SIZE 1 of 1		NUMBER B		ISS. 3	
				BA-W31	

REV	DESCRIPTION	DOC NUMBER	DATE	OWN APPD
1	GEN REVISION	DCN 136	94.12.01	DF RL
2	SWG CLAMPED TO - ADD REF 470	DCN 362	97.12.14	CW RA
3	ADD NOTE 1; CDS 1/2 600 TO 180A	DCN 447	98.10.28	CW RA
4	CDS FOR NEW PWR SUP; ADD IT 17A2	DCN 482	98.04.04	FV RA
5	DEL P114MP110; ADD IT 2A12	DCN 487	98.04.04	FV RA
6	REWORKING; ADD IT 20, 45-48	DCN 522	99.01.26	FV RA
7	DEL IT 17 & ADD IT 48 (FOR NEW P/S)	DCN 672	99.01.27	FV

DOCUMENT NO. BA-W36



REV	DESCRIPTION	DOC NUMBER	DATE	OWN APPD
1	GEN REVISION	DCN 136	94.12.01	DF RL
2	SWG CLAMPED TO - ADD REF 470	DCN 362	97.12.14	CW RA
3	ADD NOTE 1; CDS 1/2 600 TO 180A	DCN 447	98.10.28	CW RA
4	CDS FOR NEW PWR SUP; ADD IT 17A2	DCN 482	98.04.04	FV RA
5	DEL P114MP110; ADD IT 2A12	DCN 487	98.04.04	FV RA
6	REWORKING; ADD IT 20, 45-48	DCN 522	99.01.26	FV RA
7	DEL IT 17 & ADD IT 48 (FOR NEW P/S)	DCN 672	99.01.27	FV

DOCUMENT NO. BA-W36

REV	DESCRIPTION	DOC NUMBER	DATE	OWN APPD
1	GEN REVISION	DCN 136	94.12.01	DF RL
2	SWG CLAMPED TO - ADD REF 470	DCN 362	97.12.14	CW RA
3	ADD NOTE 1; CDS 1/2 600 TO 180A	DCN 447	98.10.28	CW RA
4	CDS FOR NEW PWR SUP; ADD IT 17A2	DCN 482	98.04.04	FV RA
5	DEL P114MP110; ADD IT 2A12	DCN 487	98.04.04	FV RA
6	REWORKING; ADD IT 20, 45-48	DCN 522	99.01.26	FV RA
7	DEL IT 17 & ADD IT 48 (FOR NEW P/S)	DCN 672	99.01.27	FV

DOCUMENT NO. BA-W36

FIG 7.3-3

SCI-TEC**INSTRUMENTS INC.**INFORMATION
USED FOR PRODUCTION

INTERNAL DESTINATION

POSITION FUNCTION

+24V

-15V

GND

(SEE NEXT PAGE)

CABLE ASSEMBLY PART NUMBER

BA-W36

UNIT

TERMINAL BLOCK

CONNECTOR NUMBER

TBI (CONT)

CONNECTOR TYPE

CINCH 20-141

CONN. #

P2

P105

P104

P112

CONN. TYPE

SEE SH 1

ORIGINATION

EXT. DESTINATION

PIN	WIRE TYPE	GAUGE	COLOR	LENGTH	PIN	CONNECTOR
8		22	ORG	23 1/2"	10	P2
8		22	ORG	19 1/2"	1	P105
9		22	ORG	16"	2	P104
9		22	ORG	19 1/2"	22	P105
10		22	ORG	13 1/2"	15	P112
10		22	ORG	10"		TP7 +24V
11		22	BLU	34 3/4"	1	R1
11		22	BLU	14"	8	P112
12		22	BLU	17"	9	P104
12		22	BLU	11"		TP6 -15V
13		No CONNECTION				
14		20	BLK	24 3/4"	4	P2
14		22	BLK	19"	5	P104
14		22	BLK	22"	13	P105
15		22	BLK	18"	16	P104
15		22	BLK	18 1/2"	21	P104
15		22	BLK	16"	1	P112

DATE

JUNE '83

ISSUE NO.

1

2

3

4

5

6

7

DATE

DWN. DW

CN/RN

362

447

482

487

522

672

CHKD.

CERT.

RA

RA

RA

RA

RA

APPD. KCL

TITLE

MAIN POWER
HARNESS ASSY

SHEET NO.

2

DRAWING NUMBER

BW-W36

SHEET 2 OF 13

FIG 7.3-4.2

SCI-TEC**INSTRUMENTS INC.**INFORMATION
USED FOR PRODUCTION

INTERNAL DESTINATION

POSITION	FUNCTION
	SHUTTER MOTOR, 124V/R301
	" GND
	" R301/Q303B
	" Q303B
	SHUTTER MOTOR Q303C
	STD LAMP +15V
	" GND
	" Q103E/R101
	" Q103B
	" Q103C
	THERMISTOR 2
	" 2
	" 2
	" 3
	" 3
	" 3
	" 1
	" 1
	HT SUPPLY D/A
	HT SUPPLY GND

CABLE ASSEMBLY PART NUMBER

BA-W36

CONN. #

TBI

CONN. TYPE

CINCH
20-141

P105

CANNON
DBMA-25S

P113

CANNON
DEMA-9S

UNIT

SECONDARY POWER SUP.

CONNECTOR NUMBER

P104

CONNECTOR TYPE

EDAC

322-044-500-258

ORIGINATION

EXT. DESTINATION

PIN	WIRE TYPE	GAUGE	COLOR	LENGTH	PIN	CONNECTOR
A		22	BLU	30"	2	P105
B		22	BLK	23"	18	TBI
C		22	GRN	30 1/2	3	P105
D		22	GRN	30"	14	P105
E	No	CONNECTION				
F		22	GRN	31"	15	P105
H		22	RED	30 1/2	6	P105
J		22	BLK	21	17	TBI
K		22	VIO	31	7	P105
L		22	VIO	31	18	P105
M		22	VIO	31	19	P105
N		24	RED	14	4	P113
P		24	GRN	14	5	P113
R		24	BRN	14	6	P113
S		24	RED	14	7	P113
T		24	GRN	14	8	P113
U		24	BRN	14	9	P113
V		24	RED	14	1	P113
W		24	GRN	14	2	P113
X		22	RED	16 1/2	7	TBI
Y	No	CONNECTION				
Z		22	BLK	20 1/2	16	TBI
T		22	BLK	21	16	TBI

DATE

JUNE '83

ISSUE NO.

1

2

3

4

5

6

7

DATE

DWN. DW

CN/RN

362

447

482

487

522

672

CHKD.

CERT.

RA

RA

RA

RA

RA

APPD. KL

TITLE

MAIN POWER
HARNESS ASSY

SHEET NO.

5

DRAWING NUMBER

BW-W36

SHEET 5 OF 13

FIG 7.3-4.5

SCI-TEC

INSTRUMENTS INC.

INFORMATION
USED FOR PRODUCTION

INTERNAL DESTINATION

POSITION	FUNCTION
1	HG LAMP Q704B
2	" Q704C/24V
3	" Q704E
4	LAMP RTN
5	GND
7	HT Supply - VE IN
8	HT Supply FEEDBACK
9	+5, -8V REG +10V
10	RATEMETER O/P
11	+5, -8V REG +10V
12	TEMP & RATE +15V
16	TEMP MON GND
19	TEMP1 o/p
20	THERMISTOR 1
21	GND
22	HT SUPPLY -12V

CABLE ASSEMBLY PART NUMBER

BA-W36

UNIT

SECONDARY Power Supply

CONNECTOR NUMBER

P104

CONNECTOR TYPE EDAC

322-044-500-258

CONN. #

TB1

P105

P111

P113

CONN. TYPE

CINCH
20-141

CANNON
DEMA-255

CANNON
DEMA-95

CANNON
DEMA-95

ORIGINATION

EXT. DESTINATION

PIN	WIRE TYPE	GAUGE	COLOR	LENGTH	PIN	CONNECTOR
1		22	GRY	30"	9	P105
2		22	ORG	16	9	TB1
3		22	GRY	30	10	P105
4		20	GRN	4 1/2	6	P111
5		22	BLK	18	14	TB1
6	No CONNECTION					
7		22	WHT	30	12	P105
8		22	WHT	6		TP3 HV
8		22	WHT	30	25	P105
9		22	BLU	17	12	TB1
10		22	BLU	5		TP8 RATE
11		22	WHT	30	17	P105
12		22	RED	15	4	TB1
13	No CONNECTION					
14	No CONNECTION					
15	No CONNECTION					
16		22	BLK	19	15	TB1
17	No CONNECTION					
18	No CONNECTION					
19		22	RED	6		TP2 TEMP
20		24	BRN	14	3	P113
21		22	BLK	19 1/2	15	TB1
22		22	VIO	36 1/4"	2	R1
22		22	VIO	8		TP9 -12V

DATE

JUNE '83

ISSUE NO.

1

2

3

4

5

6

7

DATE

DWN. DW

CN/RN

362

447

482

487

522

672

CHKD.

CERT.

RA

RA

RA

RA

RA

APPD. KL

TITLE

MAIN Power
HARNESS ASSY

SHEET NO.

6

DRAWING NUMBER

BW-W36

SHEET 6 OF 13

FIG 7.3-4.6

SCI-TEC**INSTRUMENTS INC.**INFORMATION
USED FOR PRODUCTION

INTERNAL DESTINATION

POSITION	FUNCTION
	SHUTTER MOTOR +24V
	" " FEEDBACK
	" " Q303E
	+15V - 5V REG
	STD LAMP +15V
	" +15V
	" Q103E/R101
	HG LAMP Q704B
	" Q704E
	" LAMP
	HT SUPPLY VE I/P
	" GND
	SHUTTER MOTOR Q303B
	" Q303C
	+15V TO R8
	STD LAMP Q103B
	" Q103C
	" SOURCE
	+24V
	HG LAMP Q704C
	HT SUPPLY FEEDBACK

DATE

JUNE 83

ISSUE NO.

1

2

3

4

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6

7

DATE

DWN. DW

CN/RN

362

447

482

487

522

672

CHKD. KC

CERT.

RA

RA

RA

RA

RA

5

APPD.

TITLE

MAIN POWER
HARNESS ASSY

SHEET NO.

7

DRAWING NUMBER

BW-W36

SHEET 7 OF 13

CABLE ASSEMBLY PART NUMBER

BA-W36

CONN. #

TBI

CONN. TYPE

LINCH
20-141

P104

EDAC
322-044-501-258
CANNON
DEMA-95

P111

UNIT

HEATSINK

CONNECTOR NUMBER

P105

CONNECTOR TYPE

CANNON DBMA-25S

ORIGINATION

EXT. DESTINATION

PIN	WIRE TYPE	GAUGE	COLOR	LENGTH	PIN	CONNECTOR
1		22	ORG	19 1/2	8	TBI
2		22	BLU	31	A	P104
3		22	GRN	31 1/2	C	P104
4		22	RED	19	5	TBI
5		22	RED	19 1/2	4	TBI
6		22	RED	30 1/2	H	P104
7		22	VIO	31	K	P104
8	No	CONNECTION				
9		22	GRY	31	I	P104
10		22	GRY	31	3	P104
11		20	WHT	53 1/2	9	P111
12		22	WHT	31	7	P104
13		22	BLK	22	14	TBI
14		22	GRN	31	D	P104
15		22	GRN	31	F	P104
16	No	CONNECTION				
17		22	WHT	31	11	P104
18		22	VIO	31	L	P104
19		22	VIO	31	M	P104
20		20	RED	53 1/2	5	P111
21	No	CONNECTION				
22		22	ORG	19 1/2	8	TBI
23	No	CONNECTION				
24	No	CONNECTION				
25		22	WHT	31	8	P104

FIG 7.3-4.7

SCI-TEC

INSTRUMENTS INC.

INFORMATION
USED FOR PRODUCTION

INTERNAL DESTINATION

POSITION	FUNCTION
LED	GND
LED	+5V POWER

CABLE ASSEMBLY PART NUMBER

BA-W36

UNIT

LED

CONNECTOR NUMBER

LED

CONNECTOR TYPE

MOLEX
03-06-2011

CONN. #

TBI

CONN. TYPE

CINCH
20-141

ORIGINATION

EXT. DESTINATION

PIN	WIRE TYPE	GAUGE	COLOR	LENGTH	PIN	CONNECTOR
1		22	BLK	43"	18	TBI
2		22	YEL	28"	3	TBI

DATE

JUNE '83

ISSUE NO.

1

2

3

4

5

6

7

DATE

DWN. DW

CN/RN

362

447

482

487

522

672

CHKD.

CERT.

RA

RA

RA

RA

RA

APPD. KL

TITLE

MAIN POWER
HARNESS ASSY

SHEET NO.

9

DRAWING NUMBER

BW-W36

SHEET 9 OF 13

INFORMATION
USED FOR PRODUCTION

[illegible]

CANNON DEMA-9S

CONN. #	CONN. TYPE
P111	CANNON DEMA-95
P105	CANNON DEMA-255
P104	EDRC 372-044-500-255

[illegible]

BW-W36

FIG 7.3-4.13

BREWER REFERENCE DOCUMENTATION

Section 7.4 Secondary Power and Panel

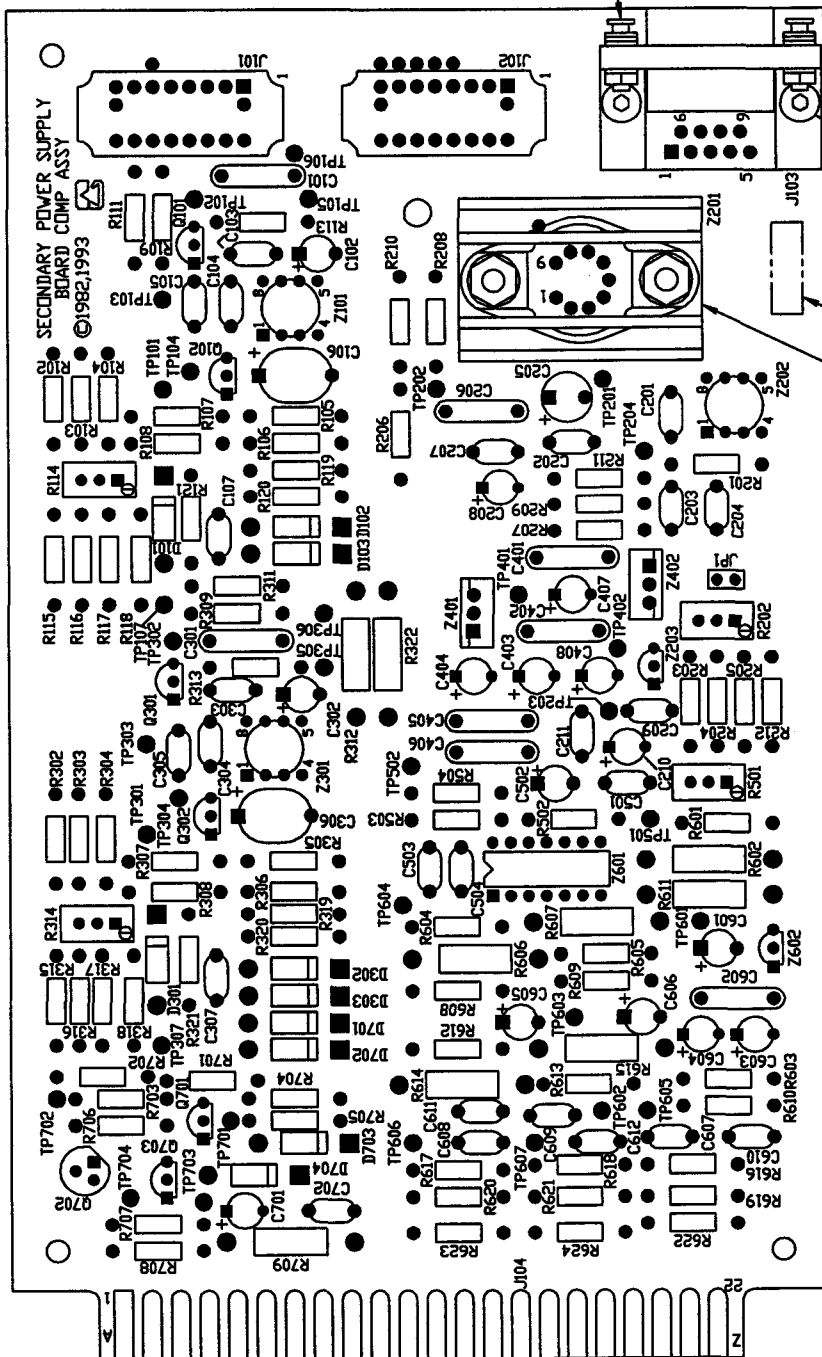
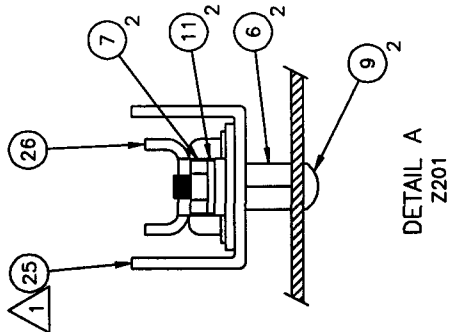
7.4.1 Secondary Power Supply Board E94	7.4.1-1
- Complete SL Schematic E64	7.4.1-3
- Other Reference Schematics	
7.4.2 Heat Sink E21	7.4.2-1
- H.V. Supply Spec E21	7.4.2-3
- High Voltage Cable W38	7.4.2-4
7.4.3 Control Panel C82	7.4.3-1

Section Overview

Fig 7.4.1-2: Secondary Power Supply board, E94, includes circuits for Standard Lamp, High Voltage Supply Regulator, Stepper Motor (Shutter) Regulator, HG (Mercury) Lamp Regulator, Plus-Minus (+5, -8V) Regulator and Temp Monitor.

Reference Sec 4.12 for description of these Regulators, Heatsink (E21) and high voltage circuitry. Most if these analog voltages are measured by AP command in the computer software.

REV	DESCRIPTION	DCN NUMBER	DATE	DWN. APPD.
1	INITIAL RELEASE	DCN698/659	93.11.30	FV



SEE DETAIL A

NOTES:

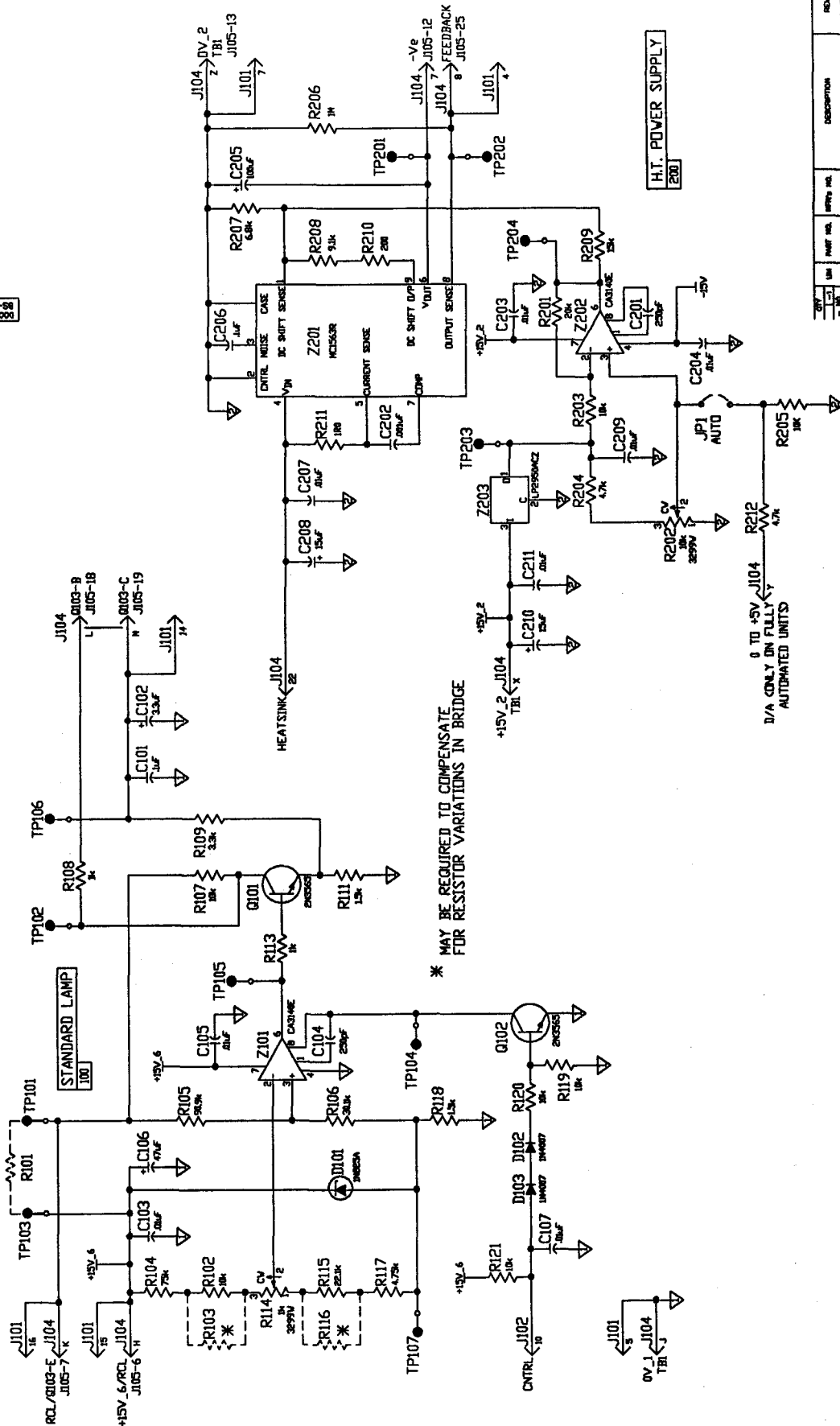
- 1 IF HEATSINKS (ITEMS 25 & 26) ARE SUPPLIED WITH BLACK ANODIZE FINISH, POLISH OFF ANODIZE WHERE HEATSINKS CONTACT THE IC CASE (Z201).
- 2 ASSEMBLE LOCKING POSTS (ITEM 5) WITH 2 FLAT WASHERS ON OUTSIDE AS SHOWN, AFTER MOUNTING CONNECTOR TO PCB.
- 3 LABEL FINISHED ASSY WITH DWG NO. & REV.

QTY	UM	PART NO.	MFR'S NO.	DESCRIPTION	REMARKS	ITEM
-1	NO.					
SCHTEC INSTRUMENTS INC. 305-100 Instruments Inc. © 1993 This document is not to be disclosed to others, copied or used for purposes other than those intended by the Instrument Inc.						
SCALE	2:1	NEXT ASSY:	BA-001			
DATE	93.11.30	DIMENSIONS IN	INCHES			
DWN	FV	F DUAL DIMS:	mm (inches)			
CHKD		Tolerances (unless otherwise specified)				
APPD		INCHES	MM			
FINISH						
SECONDARY POWER SUPPLY BOARD ASSY 1 of 1						
COMPUTER GENERATED DRAWING FILENAME: BA-E94.DWG						REV. 1

FIG 7.4.1-1

REV	DESCRIPTION	DOC NUMBER	DATE	DWN. APPD.
1	INITIAL RELEASE	DDHES/MS	12.11.50	TV

DOCUMENT NO.
BS-E94



REV	DESCRIPTION	DOC NUMBER	DATE	DWN. APPD.
1	INITIAL RELEASE	DDHES/MS	12.11.50	TV

DOCUMENT NO.
BS-E94

REV	DESCRIPTION	DOC NUMBER	DATE	DWN. APPD.
1	INITIAL RELEASE	DDHES/MS	12.11.50	TV

DOCUMENT NO.
BS-E94

REV	DESCRIPTION	DOC NUMBER	DATE	DWN. APPD.
1	INITIAL RELEASE	DDHES/MS	12.11.50	TV

DOCUMENT NO.
BS-E94

REV	DESCRIPTION	DOC NUMBER	DATE	DWN. APPD.
1	INITIAL RELEASE	DDHES/MS	12.11.50	TV

DOCUMENT NO.
BS-E94

REV	DESCRIPTION	DOC NUMBER	DATE	DWN. APPD.
1	INITIAL RELEASE	DDHES/MS	12.11.50	TV

DOCUMENT NO.
BS-E94

REV	DESCRIPTION	DOC NUMBER	DATE	DWN. APPD.
1	INITIAL RELEASE	DDHES/MS	12.11.50	TV

FIG 7.4.1-2

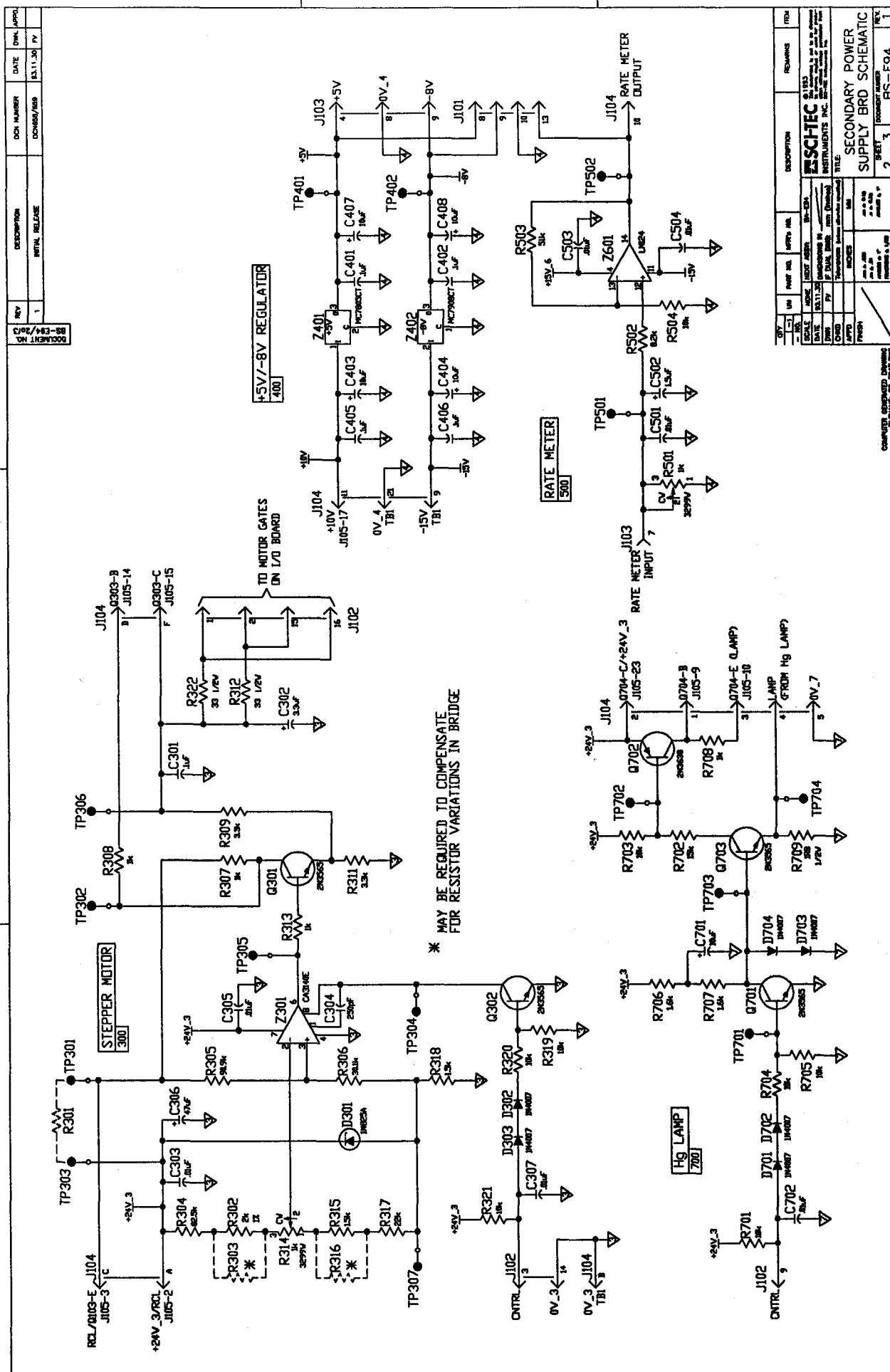
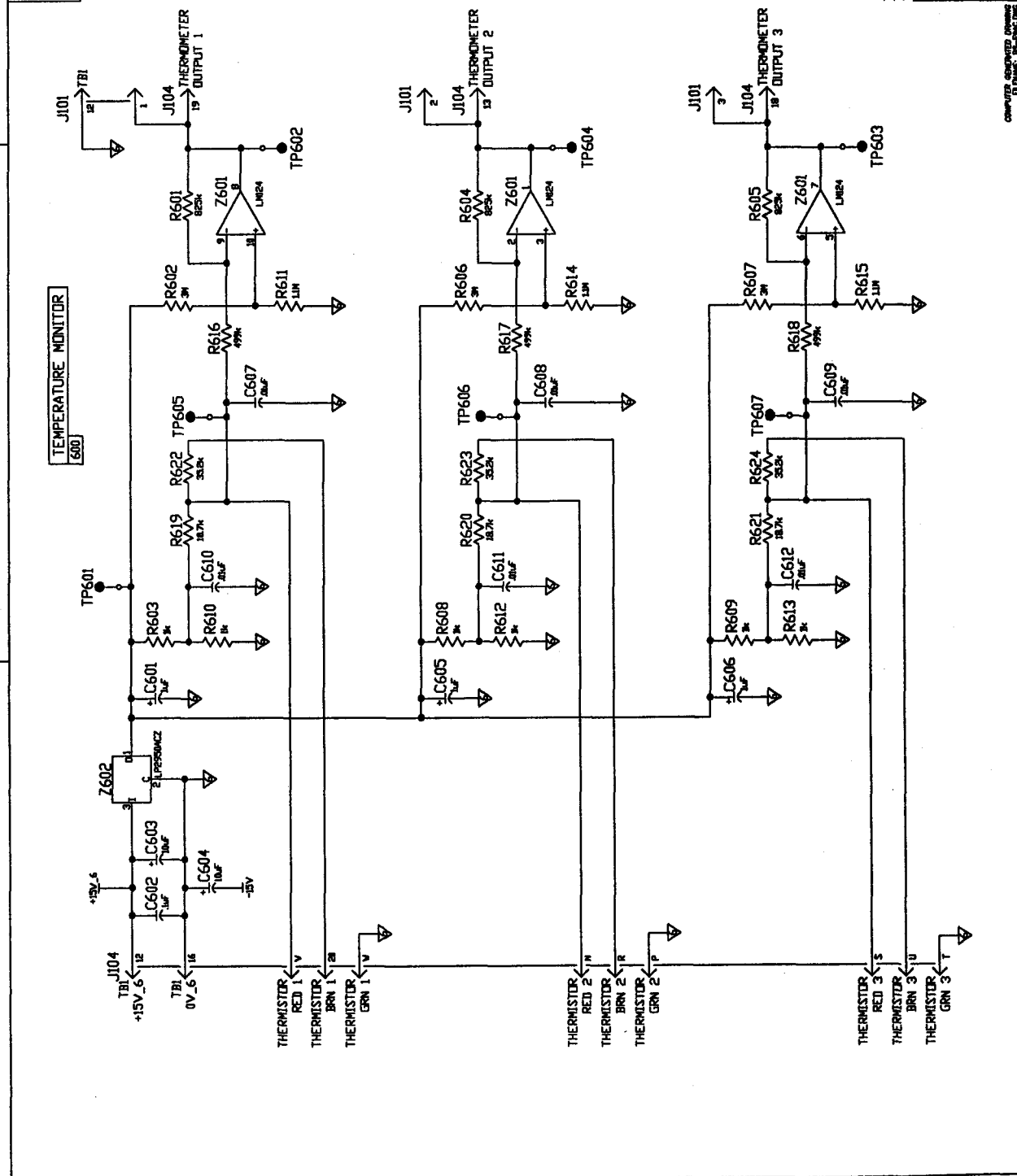


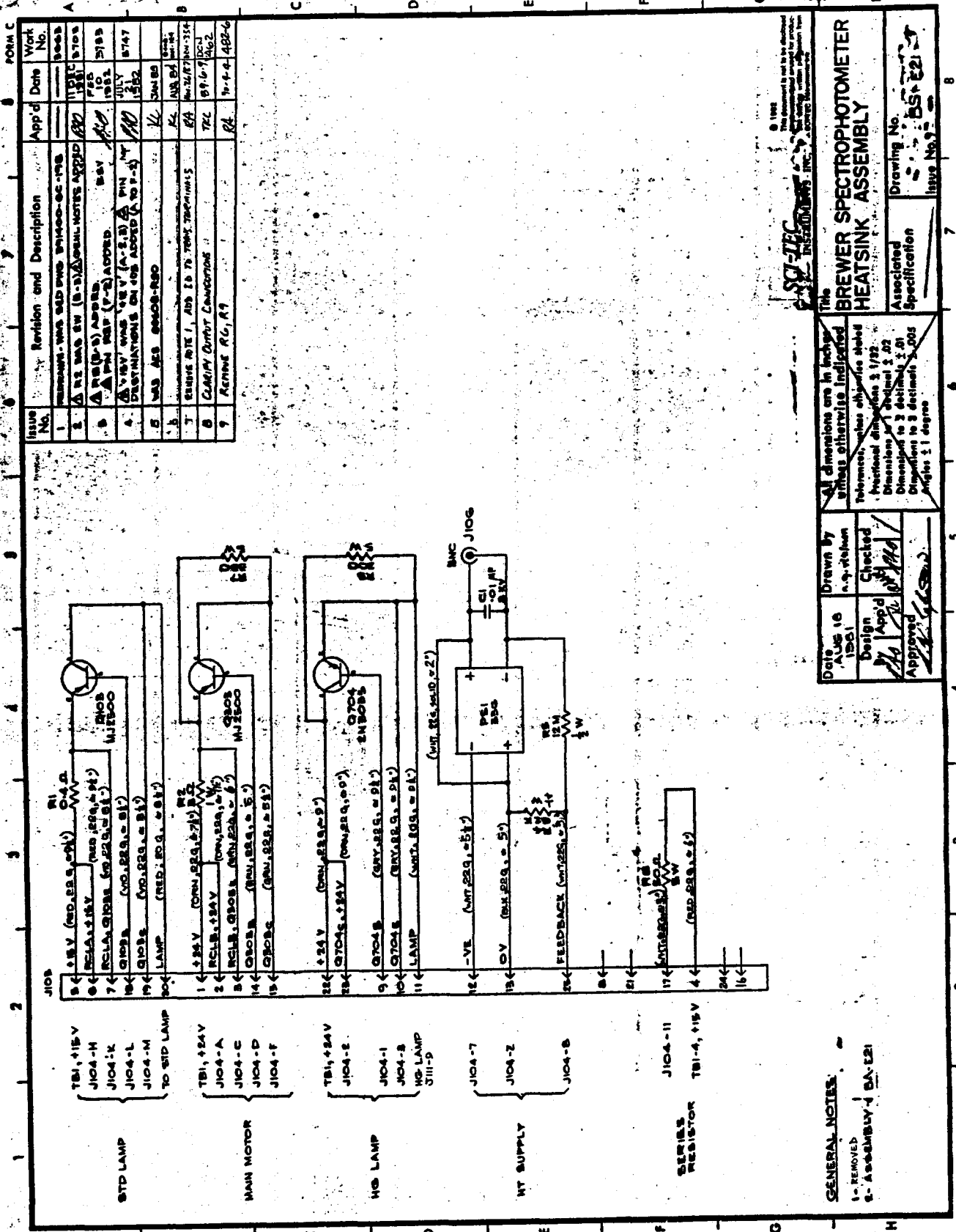
Fig 7.4.1-2

REV	DESCRIPTION	DATE	BY	CHK
1	INTN. RELEASE	11.1.80	DM	DM
1	DOC. NO. 3013			



REV	DESCRIPTION	DATE	BY	CHK
1	INTN. RELEASE	11.1.80	DM	DM
1	DOC. NO. 3013			

REV	DESCRIPTION	DATE	BY	CHK
1	INTN. RELEASE	11.1.80	DM	DM
1	DOC. NO. 3013			



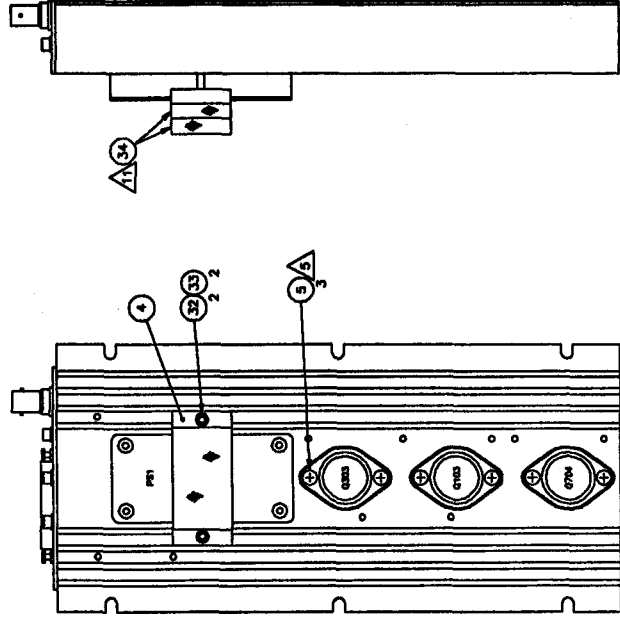
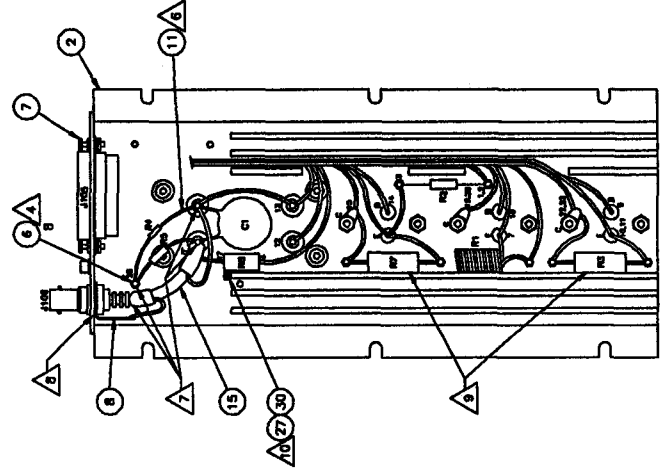
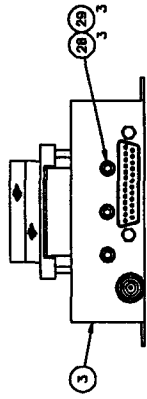
GENERAL NOTES:
 1- REMOVED
 2- ASSEMBLY 4 BA-121

Date is 1961	Drawn by a. q. stehman	all dimensions are in inches unless otherwise indicated
Design	Checked	tolerances, unless otherwise stated
By	App'd	Fractional dimensions 1/32
Approved		Dimensions to 3 decimals ± .01
		Dimensions to 3 decimals ± .005
		Angles ± 1 degree

© 1961
 BREWER SPECTROPHOTOMETER
 HEATSINK ASSEMBLY
 Drawing No. 55-121
 Issue No. 8

FIG. 7.4.2-1

REV	DESCRIPTION	DOC NUMBER	DATE	OWN APPR
11	REWORK WITH CIG - ITEM 34	620	06.01.15	PV
DOCUMENT NO. BA-E21				



- NOTES:
1. REFERENCE SCHEMATIC BS-E25.
 2. SEE WORKMANSHIP MANUAL 2011-PARA 4.6.1 FOR STRESS RELIEF OF COMPONENTS.
 3. NON-CORROSIVE RESIN FLUX ONLY TO BE USED WHERE SOLDERING IS REQUIRED.
 4. SOLDER LEADS TO TERMINAL POSTS AS HIGH OFF HEATSINK AS POSSIBLE.
 5. APPLY A THIN & UNIFORM FILM OF HEATSINK COMPOUND (ITEM 12) TO BOTTOM OF THE BODY OF TRANSISTORS (0103,0303,0704) AND MOUNTING KIT (ITEM 9).
 6. INSULATE BARE HIGH VOLTAGE LEADS WITH TEFLON HEATSHRINK (ITEM 14).
 7. APPLY RTV (ITEM 11) TO ALL BARE HIGH VOLTAGE LEADS.
 8. PLACE STAR LOCKWASHER (PART OF J108) BETWEEN LUG (ITEM 8) AND PLATE (ITEM 3). TIGHTEN NUT WHILE HOLDING CONNECTOR CAREFULLY WITH PLIERS.
 9. APPLY HEATSINK COMPOUND (ITEM 12) TO R3 & R7 ON ALL SIDES CONTACTING HEATSINK.
 10. CLIP UNUSED MOUNTING TAB OFF RB PRIOR TO MOUNTING TO HEATSINK.
 11. CUT 2 PIECES OF FOAM STRIP (ITEM 34), 1.75" LG AND ADHERE TO PLATE (ITEM 4) AS SHOWN.

REV	DESCRIPTION	DOC NUMBER	DATE	OWN APPR
11	REWORK WITH CIG - ITEM 34	620	06.01.15	PV
DOCUMENT NO. BA-E21				

REV	DESCRIPTION	DOC NUMBER	DATE	OWN APPR
11	REWORK WITH CIG - ITEM 34	620	06.01.15	PV
DOCUMENT NO. BA-E21				

SPECIFICATION CONTROL DRAWING

PS 336-10-2000-VD-F

1.0 INPUT

- 1.1 VOLTAGE NOMINAL _____ 10.0 VOLTS
- 1.2 VOLTAGE MAXIMUM _____ 11.5 VOLTS
- 1.3 CURRENT MAXIMUM _____ 0.60 AMPS

2.0 OUTPUT

- 2.1 OUTPUT VOLTAGE _____ 1940.00 TO 2060.00 VOLTS
- 2.2 CURRENT MAXIMUM _____ 0.0022 AMPS
- 2.3 THE OUTPUT RIPPLE AC PEAK TO PEAK WILL BE LESS THAN 7.2000

3.0 REGULATION

- 3.1 FROM 0.0022 AMPS TO 0.0002 AMPS THE OUTPUT VOLTAGE WILL INCREASE 200.00 VOLTS
- 3.2 THE OUTPUT VOLTAGE IS ALMOST DIRECTLY PROPORTIONAL TO THE INPUT
- 3.3 THE OUTPUT VOLTAGE WILL CHANGE 180.00 VOLTS PER INPUT VOLT

4.0 EFFICIENCY AT 10 VOLTS INPUT = 73 %

5.0 TEMPERATURE -30 C TO + 70 C DERATE TO 100 C

- 5.1 IT IS ASSUMED THAT THE ENGINEER USING THIS UNIT WILL PROVIDE ADEQUATE HEAT SINK TO MAINTAIN A TEMPERATURE OF LESS THAN 70 C AT THE MOUNTING SURFACE.
- 5.2 FOR TEMPERATURES GREATER THAN 70 C DERATE OUTPUT CURRENT BY 0.02 MA / DEGREE C.

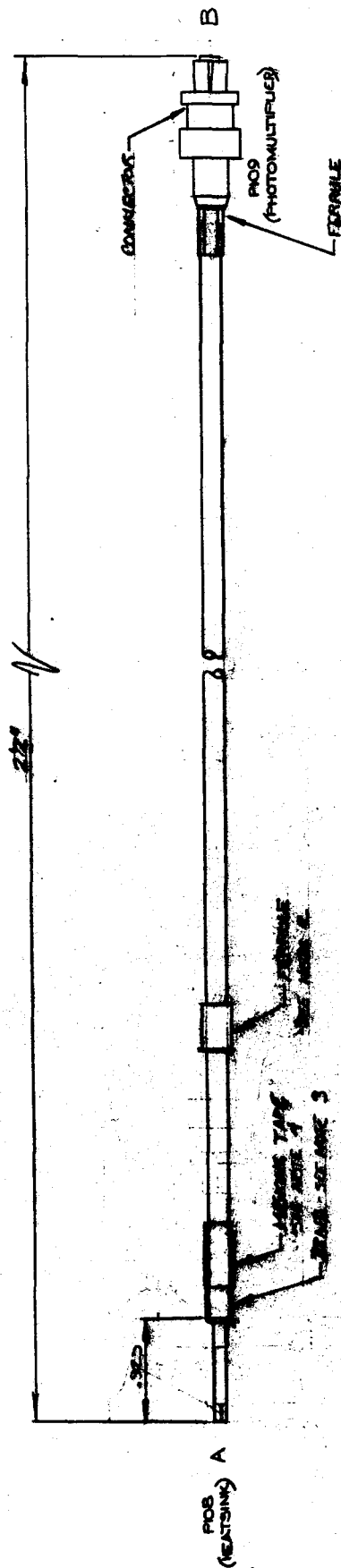
6.0 ISOLATION

- 6.1 INPUT TO CASE _____ 10K MEG. @ 100VDC
- 6.1.1 A NEON LAMP IS CONNECTED FROM NEGATIVE INPUT TO CASE.
- 6.2 INPUT TO OUTPUT _____ 10K MEG. @ 6000VDC

7.0 FILTERING

- 7.1 THE PRIMARY TO SECONDARY CAPACITY CAUSES SWITCHING SPIKES TO APPEAR ON THE OUTPUT. TO MINIMIZE THESE SPIKES A FILTER IS PUT INTO THE OUTPUT LEAD THAT IS NOT GROUNDED.
- 7.2 THE FILTER IS NORMALLY PUT INTO THE POSITIVE LEAD.
- 7.3 ON THIS UNIT THE FILTER IS IN THE NEGATIVE FOR A POSITIVE OUTPUT GROUND.

DOCUMENT NO.	DESCRIPTION	REV.	RVN/CN NUMBER	DATE	DWN	APPD
34-W38	ORIGINAL ISSUE	1	---	MAR 83	---	---
	ADD NOTES AND SHEET 2	2	---	MAR 83	---	---
	NET ASBY WAS BA-W31	3	DCN-373	88-2-2	C.W.	KA



1. Use a 2 1/2" length of cable (item 3).
2. Slide wire ferrules over cable as shown.
3. Trim outer conductor .025" from outer ferrule and fold back evenly over cable.
4. Temporarily cover with masking tape to prevent damage to conductors.

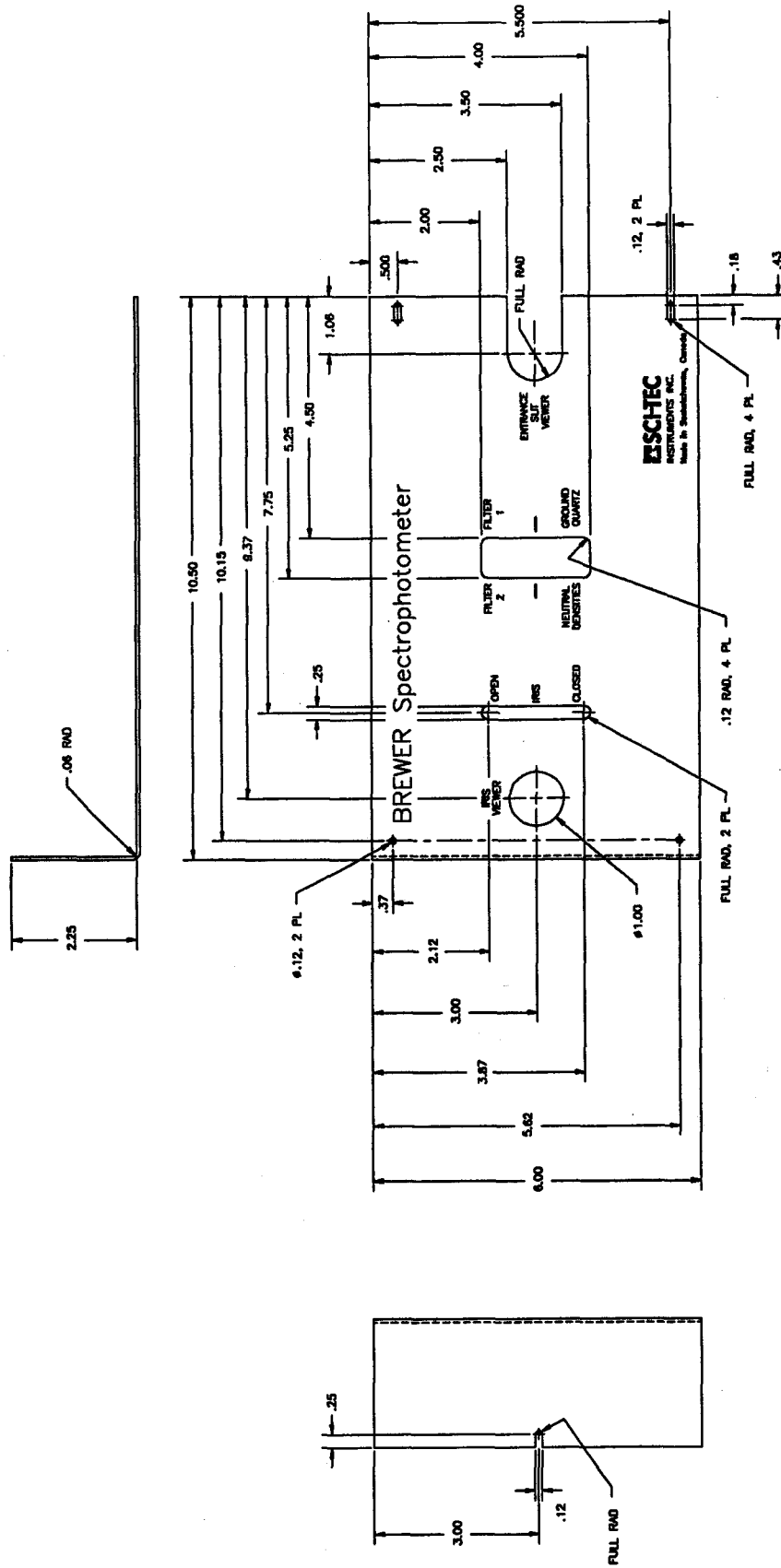
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SC-TEC Instruments Inc.

SC-TEC INSTRUMENTS INC.		NET ASSEMBLY		BA-W38	
HIGH VOLTAGE CABLE ASSY.		DATE		ISS	
FULL		DWN		3	
INCHES		MAR 83		BA-W38	
TOLERANCE		CHKD		APPD	
X ± .005		---		---	
X ± .01		---		---	
FINISH		SMT. SIZE		NUMBER	
---		D		BA-W38	

FIG 7.4.2-4.

REV	DESCRIPTION	DOC NUMBER	DATE	DWL APPD.
10	REVISION WITH CHG (SEE EDS)	487	10.08.15	PI
11	CHG VENT BEND FR 2.37 TO 2.25	525	11.02.27	PI
12	ADD 4.12 HOLE	614	12.03.26	PI

DOCUMENT NO. BM-C82



NOTES:

1. REMOVE ALL BURRS AND SHARP EDGES.
2. FINISH - PAINT ALL OVER WITH 1 COAT VENT WASH AND 2 COATS DUPONT IRON WHITE #1320 - SILK SCREEN IN BLACK USING A/WL BM-C82 SHT 2 of 2.

REV	DESCRIPTION	DOC NUMBER	DATE	DWL APPD.
10	REVISION WITH CHG (SEE EDS)	487	10.08.15	PI
11	CHG VENT BEND FR 2.37 TO 2.25	525	11.02.27	PI
12	ADD 4.12 HOLE	614	12.03.26	PI

REV	DESCRIPTION	DOC NUMBER	DATE	DWL APPD.
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12	ADD 4.12 HOLE	614	12.03.26	PI

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12	ADD 4.12 HOLE	614	12.03.26	PI

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10	REVISION WITH CHG (SEE EDS)	487	10.08.15	PI
11	CHG VENT BEND FR 2.37 TO 2.25	525	11.02.27	PI
12	ADD 4.12 HOLE	614	12.03.26	PI

REV	DESCRIPTION	DOC NUMBER	DATE	DWL APPD.
10	REVISION WITH CHG (SEE EDS)	487	10.08.15	PI
11	CHG VENT BEND FR 2.37 TO 2.25	525	11.02.27	PI
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10	REVISION WITH CHG (SEE EDS)	487	10.08.15	PI
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12	ADD 4.12 HOLE	614	12.03.26	PI

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11	CHG VENT BEND FR 2.37 TO 2.25	525	11.02.27	PI
12	ADD 4.12 HOLE	614	12.03.26	PI

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12	ADD 4.12 HOLE	614	12.03.26	PI

REV	DESCRIPTION	DOC NUMBER	DATE	DWL APPD.
10	REVISION WITH CHG (SEE EDS)	487	10.08.15	PI
11	CHG VENT BEND FR 2.37 TO 2.25	525	11.02.27	PI
12	ADD 4.12 HOLE	614	12.03.26	PI

BREWER REFERENCE DOCUMENTATION

Section 7.5 Card Rack Boards

7.5.1 Card Rack Motherboard E46	7.5.1-1
7.5.2 I/O Boards E50	7.5.2-1
- I/O Control Cables W43	7.5.2-4
- I/O Power Cable W42	7.5.2-5
7.5.3 Photon Counter Board E48	7.5.3-1
- PC Harness W34	7.5.3-4
7.5.4 Clock/Monitor Board & A/D Board E51/B	7.5.4-1
- Cables W51	7.5.4-5
- Clock Monitor Board E95	7.5.4-6
- A/D Board 18S644	7.5.4-8
7.5.5 COSMAC Microboard E52	7.5.5-1
- Specifications 18S601	7.5.5-2

Section Overview

The card rack contains 7 boards and are installed as shown in Fig 7.1-3.1 (BA-C01). The top 3 I/O boards are circuits for motors and lamp control. Basic operation is described in Sec 4.9.

Fig 7.5.2-1: BA-E50/A and BA-E50/B boards for Shutter/Micrometer, Filterwheels #1, #2 and Iris are the same for both MKII and MKIV. For Azimuth/Zenith and Sighting Switches, BA-E50/D is used. This board also includes motor control for Filterwheel #3 in front of PMT, on MKIV only. The Photon Counter board is the next one down and its operation is described in Sec 4.10. The Clock/Monitor and A/D boards are next and are described in Sec 4.13.

The Cosmos Microboard (BA-E52/B) is the same for both MKII and MKIV.

INSTRUMENTS INC.

INFORMATION ONLY
NOT USED FOR PRODUCTION

CABLE ASSEMBLY PART NUMBER

CONN. #

CONN.	TYPE
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16
17	17
18	18
19	19
20	20
21	21
22	22
23	23
24	24
25	25
26	26
27	27
28	28
29	29
30	30
31	31
32	32
33	33
34	34
35	35
36	36
37	37
38	38
39	39
40	40
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81	81
82	82
83	83
84	84
85	85
86	86
87	87
88	88
89	89
90	90
91	91
92	92
93	93
94	94
95	95
96	96
97	97
98	98
99	99
100	100

UNIT CARD RACK
MOTHERBOARD

CONNECTOR NUMBER

5112

CONNECTOR TYPE

DEC-25P

I 22
A 22

MOTHERBOARD
REAR VIEW

DEC-15P
(PC BOARD MOUNT)

(DEC-15P)

PIN 1

1	22
2	22
3	—
4	—
5	1
6	2
7	9
8	11
9	21, Y
10	X
11	20
12	19
13	18
14	—
15	12

DATE 1 June 83	ISSUE NO. 1								
DWN. DW	DATE								
CHKD.	CN/RN								
	CERT.								
APPD. KL	TITLE PREWER	SHEET NO.				DRAWING NUMBER BW-E 46			
SHEET 1 OF 2									

FIG 7.5.1-1

SCI-TEC

INSTRUMENTS INC.

INFORMATION ONLY
NOT USED FOR PRODUCTION

INTERNAL DESTINATION

POSITION FUNCTION

CABLE ASSEMBLY PART NUMBER

CONN. # CONN.

UNIT *MOTHER BOARD*
SIGNALS

CONNECTOR NUMBER

CONNECTOR TYPE

ORIGINATION

EXT. DESTINATION

PIN WIRE TYPE GAUGE COLOR LENGTH PIN CONNECTOR

Component Side

Wire Side

Pin	Mnemonic	Signal Flow	Description	Pin	Mnemonic	Signal Flow	Description
A	TPA-P	Out	System Timing Pulse 1	1	DMAI-N	In	DMA Input Request
B	TPB-P	Out	System Timing Pulse 2	2	DMAO-N	In	DMA Output Request
C	DB0-P	In/Out	Data Bus	3	RNU-P	—	Run Utility
D	DB1-P	In/Out	Data Bus	4	INT-P	In	Interrupt Request
E	DB2-P	In/Out	Data Bus	5	MRD-N	Out	Memory Read
F	DB3-P	In/Out	Data Bus	6	Q-P	Out	Programmed Output Latch
H	DB4-P	In/Out	Data Bus	7	SC0-P	Out	State Code
J	DB5-P	In/Out	Data Bus	8	SC1-P	Out	State Code
K	DB6-P	In/Out	Data Bus	9	CLEAR-N	In	Clear-Mode Control
L	DB7-P	In/Out	Data Bus	10	WAIT-N	In	Wait-Mode Control
M	A0-P	Out	Multiplexed Address Bus	11	-5 V -15 V	—	Auxiliary Power
N	A1-P	Out	Multiplexed Address Bus	12	+24V	—	
P	A2-P	Out	Multiplexed Address Bus	13	CLOCK OUT	Out	Clock from CPU Osc.
R	A3-P	Out	Multiplexed Address Bus	14	N0-P	Out	I/O Primary Address
S	A4-P	Out	Multiplexed Address Bus	15	N1-P	Out	I/O Primary Address
T	A5-P	Out	Multiplexed Address Bus	16	N2-P	Out	I/O Primary Address
U	A6-P	Out	Multiplexed Address Bus	17	EF1-N	In	External Flag
V	A7-P	Out	Multiplexed Address Bus	18	EF2-N	In	External Flag
W	MWR-N	Out	Memory Write Pulse	19	EF3-N	In	External Flag
X	EF4-N	In	External Flag	20	+12 V +15 V	—	Auxiliary Power
Y	+5 V	In	+5 volts dc	21	+5 V	In	+5 volts dc
Z	GND	In	Digital Ground	22	GND	In	Digital Ground

DATE

1 June 83

ISSUE NO.

DATE

DWN.

DW

CN/RN

CHKD.

CERT.

APPD.

KL

TITLE

BREWER

SHEET NO.

DRAWING NUMBER

SHEET *2* OF *2*

3W-E46

Fig 7.5.1-2

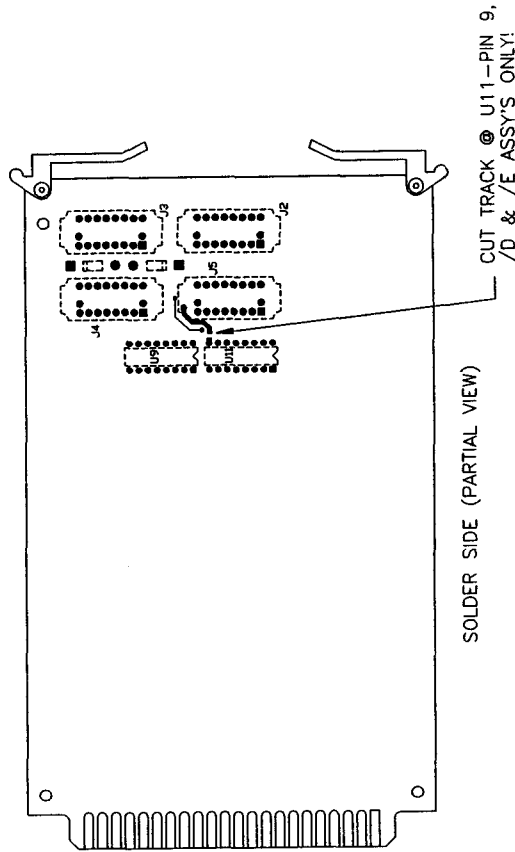
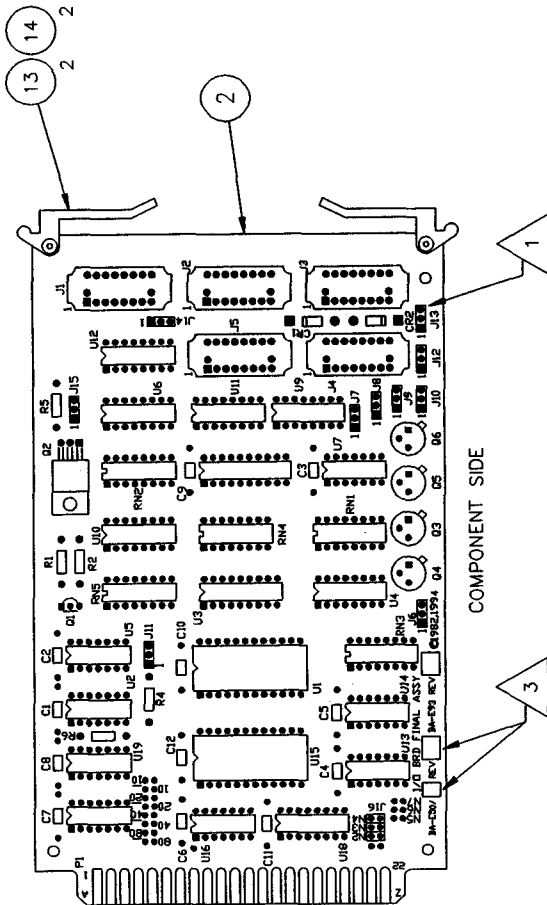
REV	DESCRIPTION	DCN NUMBER	DATE	DWN	APPD
2	SEE DCN	155	85.11.01	DF	KL
3	DWG CLARIFICATION, P/L CHG	362	87.12.15	CW	RA
4	REPLACE 'S' WITH S1-S4	409	88.06.06	CW	RA
5	ADD /D; RE-LABEL CUT-TRACKS & JUMPERS	433	88.08.11	CW	RA
6	ADD TRACK CUT 'Y'	593	92.08.10	FV	RA
7	ADD TRACK CUT 'W' & JUMPER 'X'	660	94.02.16	FV	DJS
8	REDRAWN: NEW BOARD LAYOUT	691	94.05.27	FV	DJS
9	ADD DETAIL FOR CUTTING TRACK @ U11	707	94.08.10	FV	DJS
10	CHG J3 TO BA-W43/C ON BA-E50/E	743	95.08.11	FV	

TABLE 1 - JUMPER CONFIGURATION

PART NO.	J6	J7	J8	J9	J10	J11	J12	J13	J14	J15	J16
BA-E50/A	1-2	NC	2-3	2-3	1-2	1-2	1-2	1-2	1-2	2-3	N2
BA-E50/B	2-3	2-3	1-2	1-2	1-2	1-2	1-2	1-2	1-2	2-3	N4
BA-E50/D	2-3	2-3	1-2	1-2	1-2	1-2	2-3	2-3	2-3	2-3	N3
BA-E50/E	1-2	2-3	1-2	1-2	1-2	1-2	2-3	2-3	2-3	2-3	N3

TABLE 2 - CONTROL CABLE LOCATIONS

PART NO.	J1	J2	J3	J4	J5	APPL
BA-E50/A	NC	BA-W43/C (MICRO#1)	BA-W43/A (SHUTTER)	BA-W42 (S.P.S.)	NC	MKII & MKIV
BA-E50/B	BA-W43/A (IRS)	BA-W43/A (FW#1)	BA-W43/A (FW#2)	NC	NC	MKII, MKIII & MKIV
BA-E50/D	BA-W43/A (ZEN)	BA-W43/B (AZ TRKR)	BA-W43/A (FW#3)	BA-W43/B (CONTROL)	NC	MKIV
BA-E50/E	BA-W43/A (ZEN)	BA-W43/B (AZ TRKR)	BA-W43/C (MICRO#2)	BA-W43/B (CONTROL)	NC	MKIII



NOTES:

1. SET JUMPERS (ITEM 15) FOR J6-J16 AS PER TABLE 1.
2. INSTALL CABLES (ITEMS 4,5,6,7) AS PER TABLE 2.
3. MARK ASSEMBLY WITH APPROPRIATE VERSION NO. (A,B,ETC.) AND CURRENT REV IN SPACE PROVIDED NEXT TO ASSY NO. "BA-E50/".

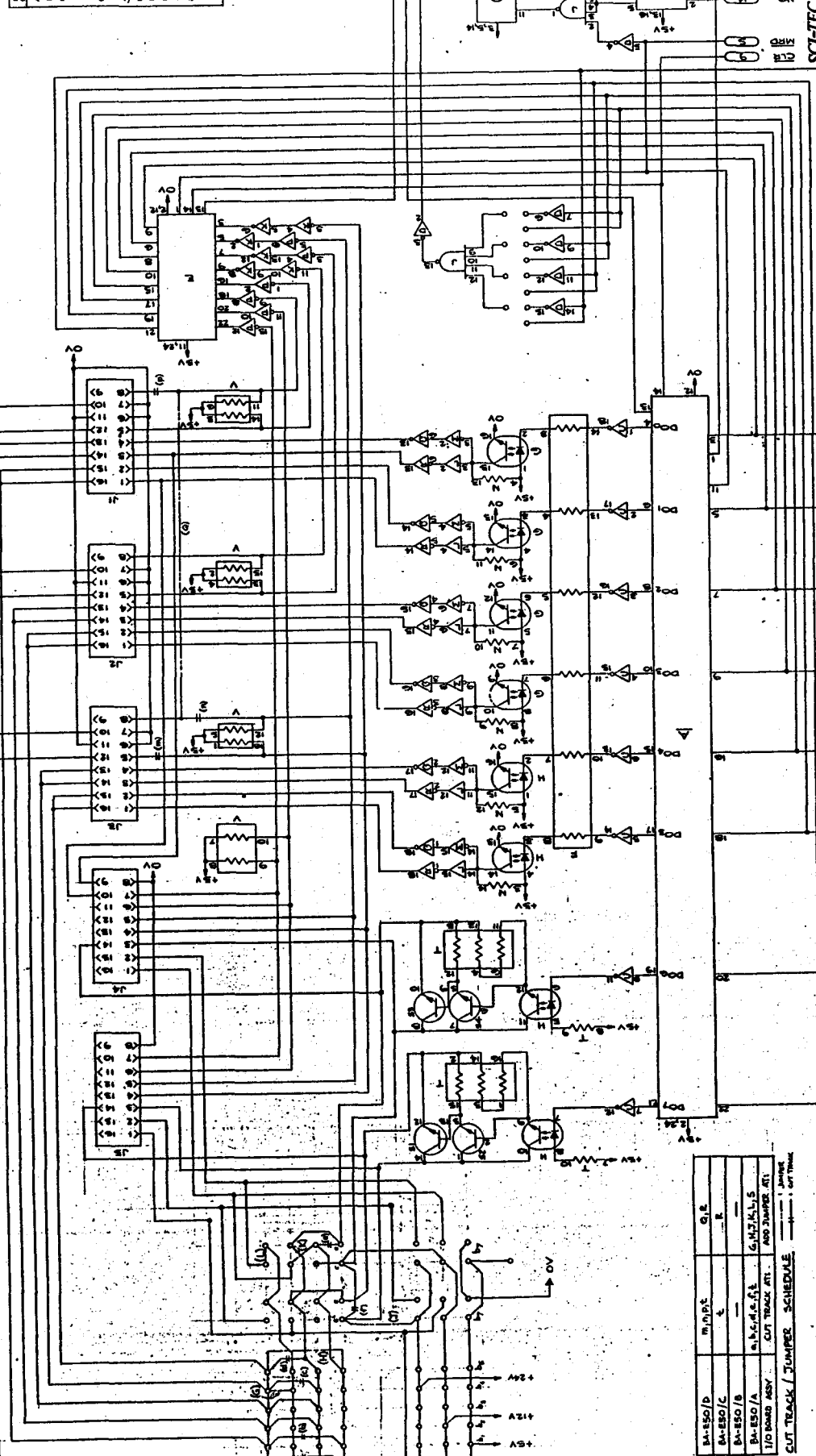
QTY	UM	PART NO.	MFR'S NO.	DESCRIPTION	REMARKS	ITEM
1	1					
SCALE 1:1 NEXT ASSY: BA-C01/BA-C190 DATE 94.05.25 DIMENSIONS IN mm (inches) DWN FV IF DUAL DIMS: mm (inches) CHKO Tolerances (unless otherwise specified) APPD FINISH						
INSTRUMENTS INC. 300-EC Instruments Inc. TITLE: I/O BOARD FINAL ASSY 1 OF 1 DOCUMENT NUMBER BA-E50 REV. 10						

COMPUTER GENERATED DRAWING
FILENAME: BA-E50.DWG

1 2 3 4 5 6 7 8 9 10 11 12 FORM D

Issue No.	Revision and Description	App'd Date	Work No.
1	NEW DWG		8020
2	WAS AES DOORS-HG		
3	ADD 6F INFO-UPDATE DNG		
4	DATE COMP'S (2.2) AND GAIN 51-54		
5	ADD INFO FOR BA-ESD/D, RE-LABEL COMPONENTS		

ELECT. DESIG.	COMPONENT
A, C	COMPRESSOR
B	UNIBUS
C, D, E	4000-00-181
F	4000-00-181
G, H	4000-00-181
I	4000-00-181
J	4000-00-181
K, L	4000-00-181
M	4000-00-181
N	4000-00-181
O	4000-00-181
P	4000-00-181
Q	4000-00-181
R	4000-00-181
S	4000-00-181
T	4000-00-181
U	4000-00-181
V	4000-00-181



BREWER SPECTROPHOTOMETER
INPUT/OUTPUT BOARD
Associated Specification: BS-ESD
Drawing No.: BS-ESD
Issue No.: 5

Date	Design	Checked	Approved
3 DEC 1981	A. J. P. / J. P. / J. P.		

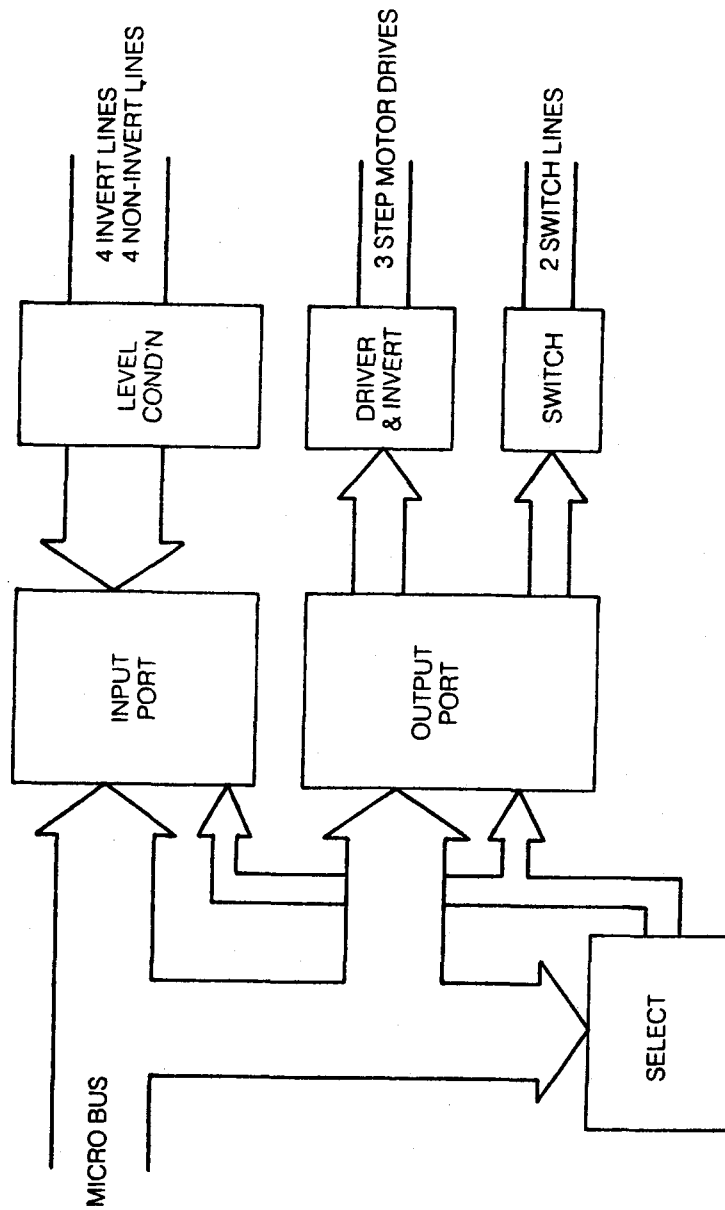
All dimensions are in inches unless otherwise indicated.
Tolerances unless otherwise stated:
Fractional dimensions: $\pm 1/32$
Dimensions to decimal: $\pm .02$
Dimensions to 3 decimal: $\pm .001$
Angles: ± 1 degree

BA-ESD/D	BA-ESD/C	BA-ESD/B	BA-ESD/A	BA-ESD/0
1/2 BOARD ONLY	CUT TRACK AT	CUT TRACK AT	CUT TRACK AT	CUT TRACK AT

GENERAL NOTES:

- 1- REFER TO PART LUT DMS 81-ESD.
- 2- REFER TO BA-ESD FOR LOCATION.
- 3- FOR 81-ESD, FOR 81-ESD TO 81-ESD.
- 4- FOR 81-ESD, FOR 81-ESD TO 81-ESD.

INPUT/OUTPUT Board



Block diagram of I/O Board BA-ESO

REV	DESCRIPTION	DCN NUMBER	DATE	DWN. APPD.
1				
2		8502-DCN-195		DF
3	CHG NEXT ASSY DWG NO.	DCN362	87.12.16	CW RA
4	ADD VIEW, NOTE 2, CABLE LGTH	DCN404	88.6.3	CW RA
5	REDRAWN, ADD TABLE FOR ESO/D	DCN540	91.6.4	FV RA

DOCUMENT NO. BA-W43

ESO	/A/D	OPT/STD	STD	A	A	A	B
ORIGIN	P2/P3	DESTINATION	P23	SH	F1	F2	RS ZE
1	F3	MOTOR COIL 3	1	1	1	1	1
2	F3	MOTOR COIL 4	2	2	2	2	2
3	F3	MOTOR COIL 1	3	3	3	3	3
4	F3	MOTOR COIL 2	4	4	4	4	4
5	F3	COLLECTOR 1	5	5	5	5	5
6	F3	EMITTER 1	6	6	6	6	6
7	F3	EMITTER 2	7	7	7	7	7
8	F3	COLLECTOR 2	8	8	8	8	8
9	F3	MOTOR COIL 3	9	9	9	9	9
10	F3	MOTOR COIL 4	10	10	10	10	10
11	F3	MOTOR COIL 1	11	11	11	11	11
12	F3	MOTOR COIL 2	12	12	12	12	12
13	F3	ANODE 1	13	13	13	13	13
14	F3	COM CATH	14	14	14	14	14
15	F3	ANODE 2	15	15	15	15	15
16	F3	NC	16	16	16	16	16

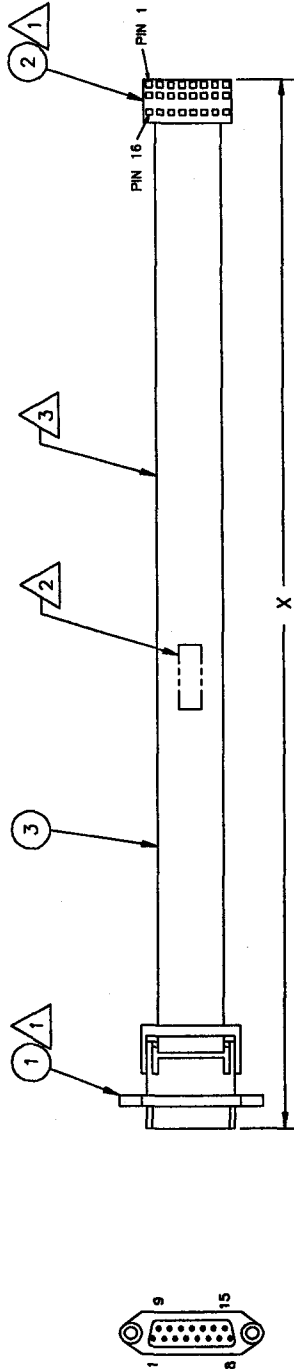
BA-W43/A 'X' = 20"

ESO	/A/B/B/B/C/D	OPT/STD	STD	A	A	A	B
ORIGIN	P2/P3/P1/P1/P3	DESTINATION	P23	SH	F1	F2	RS ZE
1	F1 F2 RS ZE F3	MOTOR COIL 1	1	1	1	1	1
2	F1 F2 RS ZE F3	MOTOR COIL 2	2	2	2	2	2
3	F1 F2 RS ZE F3	MOTOR COIL 3	3	3	3	3	3
4	F1 F2 RS ZE F3	MOTOR COIL 4	4	4	4	4	4
5	F1 F2 RS ZE F3	COLLECTOR 1	5	5	5	5	5
6	F1 F2 RS ZE F3	EMITTER 1	6	6	6	6	6
7	F1 F2 RS ZE F3	EMITTER 2	7	7	7	7	7
8	F1 F2 RS ZE F3	COLLECTOR 2	8	8	8	8	8
9	F1 F2 RS ZE F3	MOTOR COIL 1	9	9	9	9	9
10	F1 F2 RS ZE F3	MOTOR COIL 2	10	10	10	10	10
11	F1 F2 RS ZE F3	MOTOR COIL 3	11	11	11	11	11
12	F1 F2 RS ZE F3	MOTOR COIL 4	12	12	12	12	12
13	F1 F2 RS ZE F3	ANODE 1	13	13	13	13	13
14	F1 F2 RS ZE F3	COM CATH	14	14	14	14	14
15	F1 F2 RS ZE F3	ANODE 2	15	15	15	15	15
16	F1 F2 RS ZE F3	NC	16	16	16	16	16

BA-W43/B 'X' = 16"

ESO	/A/D	OPT/STD	STD	A	A	A	B
ORIGIN	P2/P3	DESTINATION	P23	SH	F1	F2	RS ZE
1	F3	MOTOR COIL 3	1	1	1	1	1
2	F3	MOTOR COIL 4	2	2	2	2	2
3	F3	MOTOR COIL 1	3	3	3	3	3
4	F3	MOTOR COIL 2	4	4	4	4	4
5	F3	COLLECTOR 1	5	5	5	5	5
6	F3	EMITTER 1	6	6	6	6	6
7	F3	EMITTER 2	7	7	7	7	7
8	F3	COLLECTOR 2	8	8	8	8	8
9	F3	MOTOR COIL 3	9	9	9	9	9
10	F3	MOTOR COIL 4	10	10	10	10	10
11	F3	MOTOR COIL 1	11	11	11	11	11
12	F3	MOTOR COIL 2	12	12	12	12	12
13	F3	ANODE 1	13	13	13	13	13
14	F3	COM CATH	14	14	14	14	14
15	F3	ANODE 2	15	15	15	15	15
16	F3	NC	16	16	16	16	16

BA-W43/C 'X' = 24"



NOTES:

- USE ANSELY HAND TOOL 779-2100
779-2166 DIE FOR ITEM 1
779-2162 DIE FOR ITEM 2
- MARK CABLE PART NO. WHERE SHOWN WITH INDELEIBLE INK.
- IDENTIFY EDGE SHOWN USING INDELEIBLE INK.
- PERFORM A CONTINUITY TEST AT INSPECTION TO ENSURE PROPER CONNECTOR INSTALLATION.

ESO	/D	OPT/STD	STD	A	A	A	B
ORIGIN	P3	DESTINATION	F3	SH	F1	F2	RS ZE
1	F3	MOTOR COIL 3	1	1	1	1	1
2	F3	MOTOR COIL 4	2	2	2	2	2
3	F3	MOTOR COIL 1	3	3	3	3	3
4	F3	MOTOR COIL 2	4	4	4	4	4
5	F3	NC	5	5	5	5	5
6	F3	NC	6	6	6	6	6
7	F3	EMITTER	7	7	7	7	7
8	F3	COLLECTOR	8	8	8	8	8
9	F3	MOTOR COIL 3	9	9	9	9	9
10	F3	MOTOR COIL 4	10	10	10	10	10
11	F3	MOTOR COIL 1	11	11	11	11	11
12	F3	MOTOR COIL 2	12	12	12	12	12
13	F3	NC	13	13	13	13	13
14	F3	CATHODE	14	14	14	14	14
15	F3	ANODE	15	15	15	15	15
16	F3	NC	16	16	16	16	16

ESO	/C/D	OPT/STD	STD	A	A	A	B
ORIGIN	P4/P3	DESTINATION	P114	SH	F1	F2	RS ZE
1	F3	FUNCTION	SW	1	1	1	1
2	F3	NC	NC	2	2	2	2
3	F3	NC	NC	3	3	3	3
4	F3	CW	4	4	4	4	4
5	F3	CCW	5	5	5	5	5
6	F3	UP	6	6	6	6	6
7	F3	DOWN	7	7	7	7	7
8	F3	NC	NC	8	8	8	8
9	F3	NC	NC	9	9	9	9
10	F3	NC	NC	10	10	10	10
11	F3	NC	NC	11	11	11	11
12	F3	NC	NC	12	12	12	12
13	F3	NC	NC	13	13	13	13
14	F3	NC	NC	14	14	14	14
15	F3	NC	NC	15	15	15	15
16	F3	NC	NC	16	16	16	16

QTY	UM	PART NO.	MFR'S NO.	DESCRIPTION	REMARKS	ITEM
1	EA			CONTROL CABLE		

SCI-TEC
INSTRUMENTS INC. 30-102 INSTRUMENT INC.

CONTROL CABLE

SHEET 1 OF 1
DOCUMENT NUMBER BA-W43
REV. 5

COMPUTER GENERATED DRAWING
FILENAME: BA-W43.DWG

NOTES
1. USE ANSLEY HAND TOOL 779-2100, DIE 779-2162

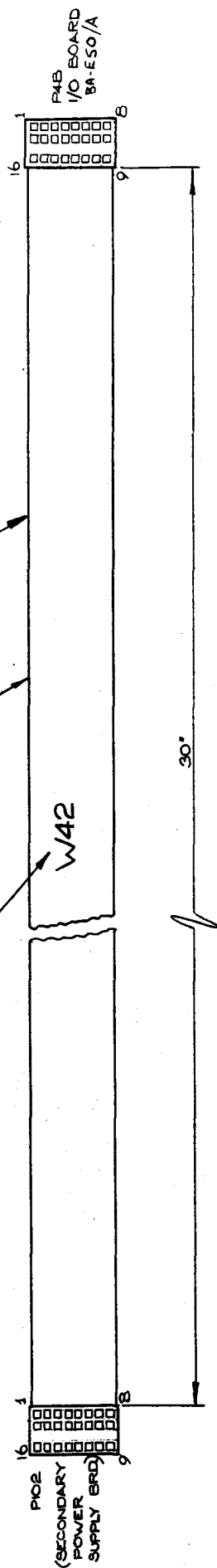
DESCRIPTION	QTY	DCN	DCN-157	85-2-1	D#	KL
SEE DCN	1					
CIGA. NEXT ASSY DWG.#	2		DCN-362	87-12-16	C.W.	RA

BA-W42

MARK INDELIBLY
 $\frac{1}{2}$ " LETTERS

IDENTIFY THIS EDGE
USING INDELIBLE INK OR EQUIV.

5



P4 (BRD)	FUNCTION	P02 (DEST)
1	MOTOR CURRENT	1
2	MOTOR CURRENT	2
3	SHUTTER MOTOR CONT	3
4	NC	4
5	NC	5
6	NC	6
7	NC	7
8	NC	8
9	HQ LAMP CONTROL	9
10	STD LAMP CONTROL	10
11	NC	11
12	NC	12
13	NC	13
14	MOTOR GND	14
15	NC	15
16	NC	16

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BA-ES0/A

SCI-TEC
INSTRUMENTS CO.

SCALE: FULL DIM: INCHES

MATERIAL: SEE P/L

FINISH: _____

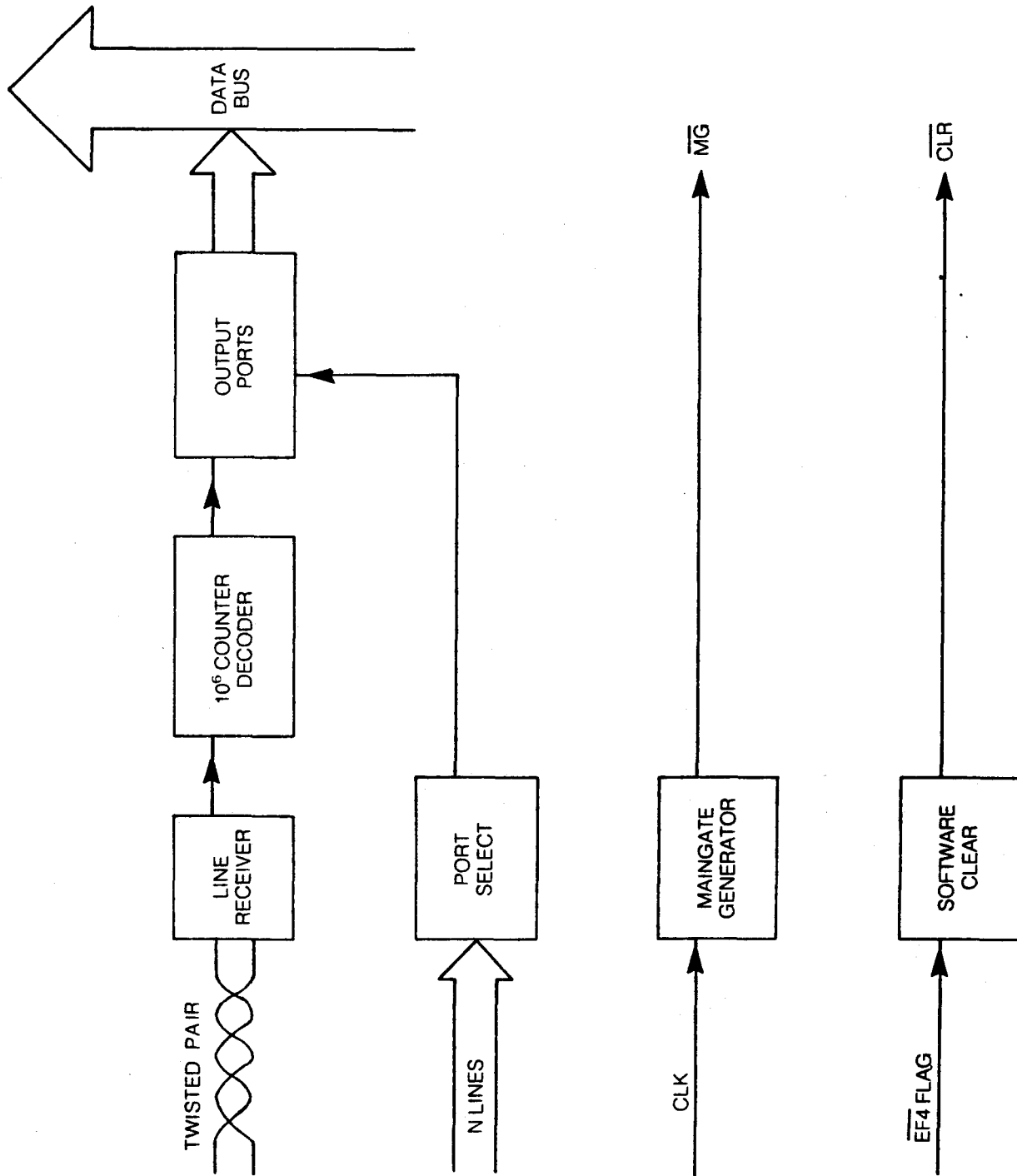
MAR 83

BA-W42

IO POWER CONTROL CABLE

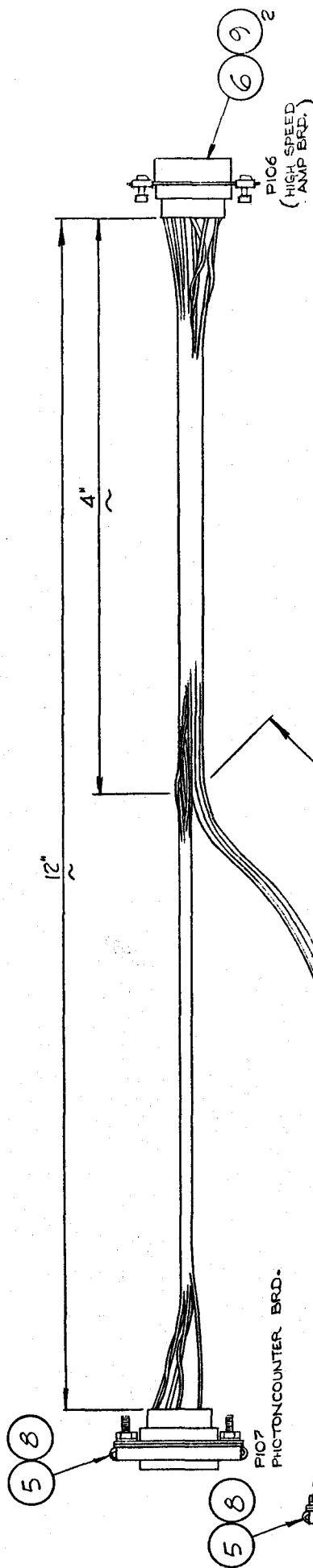
FIG 7.5.2-5

PHOTON COUNTER BOARD



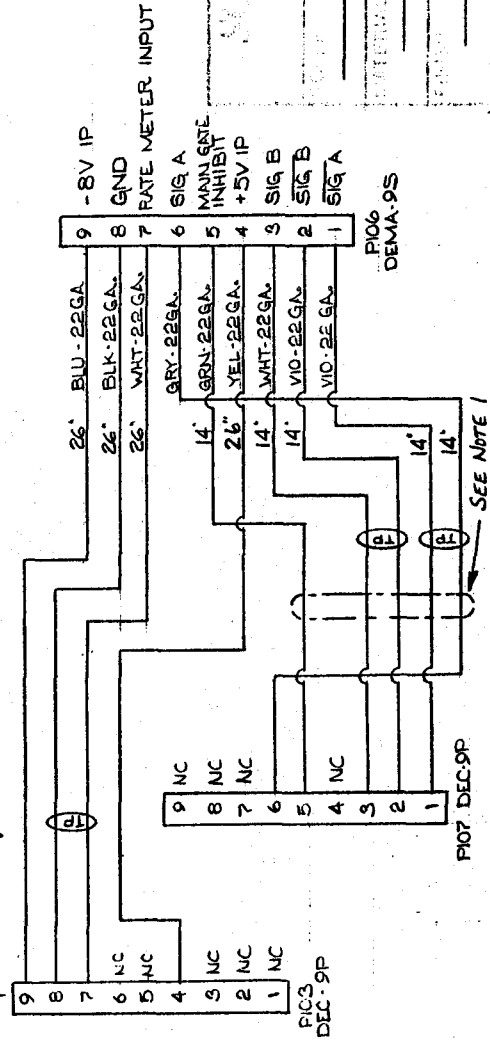
Block diagram of photon counter board, BA/E48.

DOC. NO./PART NO.	DESCRIPTION	ISS. REV.	RN/CN NUMBER ECN NUMBER	DATE	DWN. APPD.
BA-W34	FIRST ISSUE	1		MAR 83	DF KL
	SEE DCN	2	8412-DCN-140	APR 84	19
	CHG. LENGTH OF CABLE, ADD TWIST. PR.	3	DCN-362	07-12-14 C.W.	KL
	ADD NOTES	4	DCN-532	91-3-16	7U RA



NOTES:

1. AFTER MAKING TWISTED PAIRS WHT/VIO & GRN/VIO AS SHOWN, TWIST GRN WIRE (AN S) AROUND TWO TWISTED PAIRS. APPROX TEN TIMES PRIOR TO INSERTING IN CONNECTOR.



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BA-W34

PHOTONCOUNTER HARNESS ASSY.

MAR 17/83 *DF* KL

BA-W34

4

FIG 7.5.3-4

SCI-TEC INSTRUMENTS INC.
BREWER OZONE SPECTROPHOTOMETER
SPECIFICATIONS FOR
CLOCK MONITOR BOARD & A/D BOARD ASSEMBLY
P/N BA-E51/B

Power Supply Requirements

+12 V	25 mA
+ 5 V	50 mA
-12 V	25 mA

External Battery Requirements (Optional)

Voltage:	7.5 $\pm$ 0.2 Volts
Current:	0 ... 3 mA

Real-Time Clock Specs

Accuracy:	$\pm$ 5 seconds/month
Drift:	$\pm$ 2 seconds/year

A/D Specs

Analog Input Type:	Single Ended	
Range:	0 ... 2.5 Volts	(without conditioning)
Resolution:	8 bits	
Accuracy:		
without conditioning	$\pm$ 3/4 LSB	
with conditioning	$\pm$ 2%	
Number of Channels:	16	(See Figure 1)

Physical Requirements

Temperature Range: -20°C ... +40°C
Card Rack, 3 Adjacent Slots

Memory Address Map

(See Figure 2)

Battery Backup Specs

Battery Backup Time:	
<u>SW1</u>	<u>Time</u>
INT	500 hours (typical)
OFF	0
EXT	(Depends on External Battery)
Battery Type:	
2 Non-Rechargeable Lithium Cells, Size AA	
Board Mounted P/N BCX72-AA , Electrochem	

June 1, 1984

C14 7.5 4-2

<u>A/D Channel</u>	<u>Monitor Name</u>	<u>Typical Resolution</u>	<u>Nominal Reading</u>
0	Brewer Temp 1	0.3620°C/bit	173
1	Brewer Temp 2	0.3620°C/bit	173
2	Brewer Temp 3	0.3620°C/bit	173
3	H.T. Voltage + 200	54.7 mV/bit	200
4	+15V Power Supply	98.5 mV/bit	148
5	+5V Power Supply	24.4 mV/bit	205
6	-15V Power Supply	97.7 mV/bit	150
7	+24V Power Supply	117 mV/bit	212
8	Rate Meter	1950 pulses/bit	-
9	Not Used	-	-
10	Not Used	-	-
11	Not Used	-	-
12	+5V Secondary Supply	24.4 mV/bit	210
13	-8V Secondary Supply	38.8 mV/bit	213
14	Standard Lamp Current	10.68 mA/bit	150
15	Standard Lamp Voltage	48.5 mV/bit	220

A/D MONITOR INTERFACE

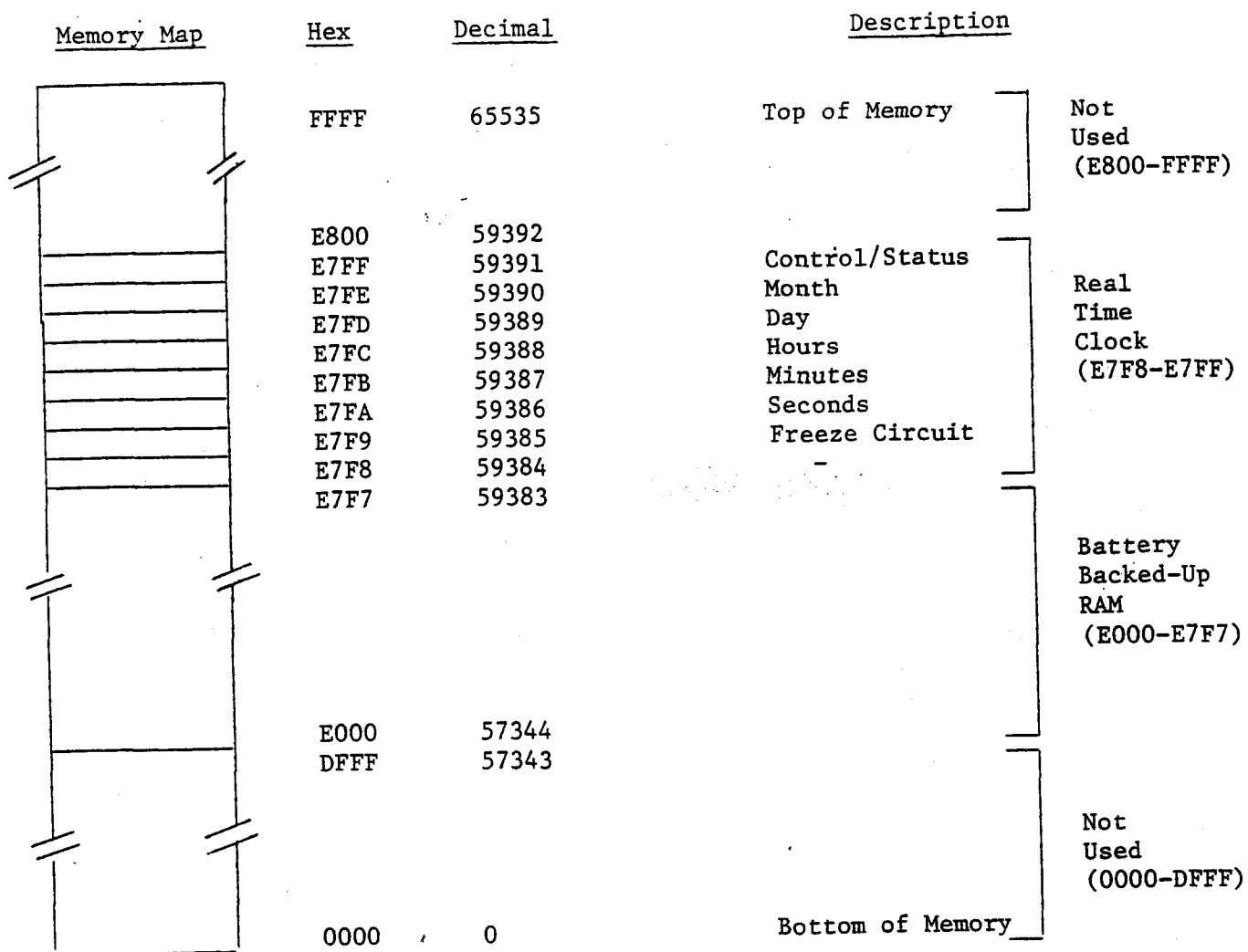


FIG 7.5.4 - MEMORY MAP FOR CLOCK/MONITOR BOARD

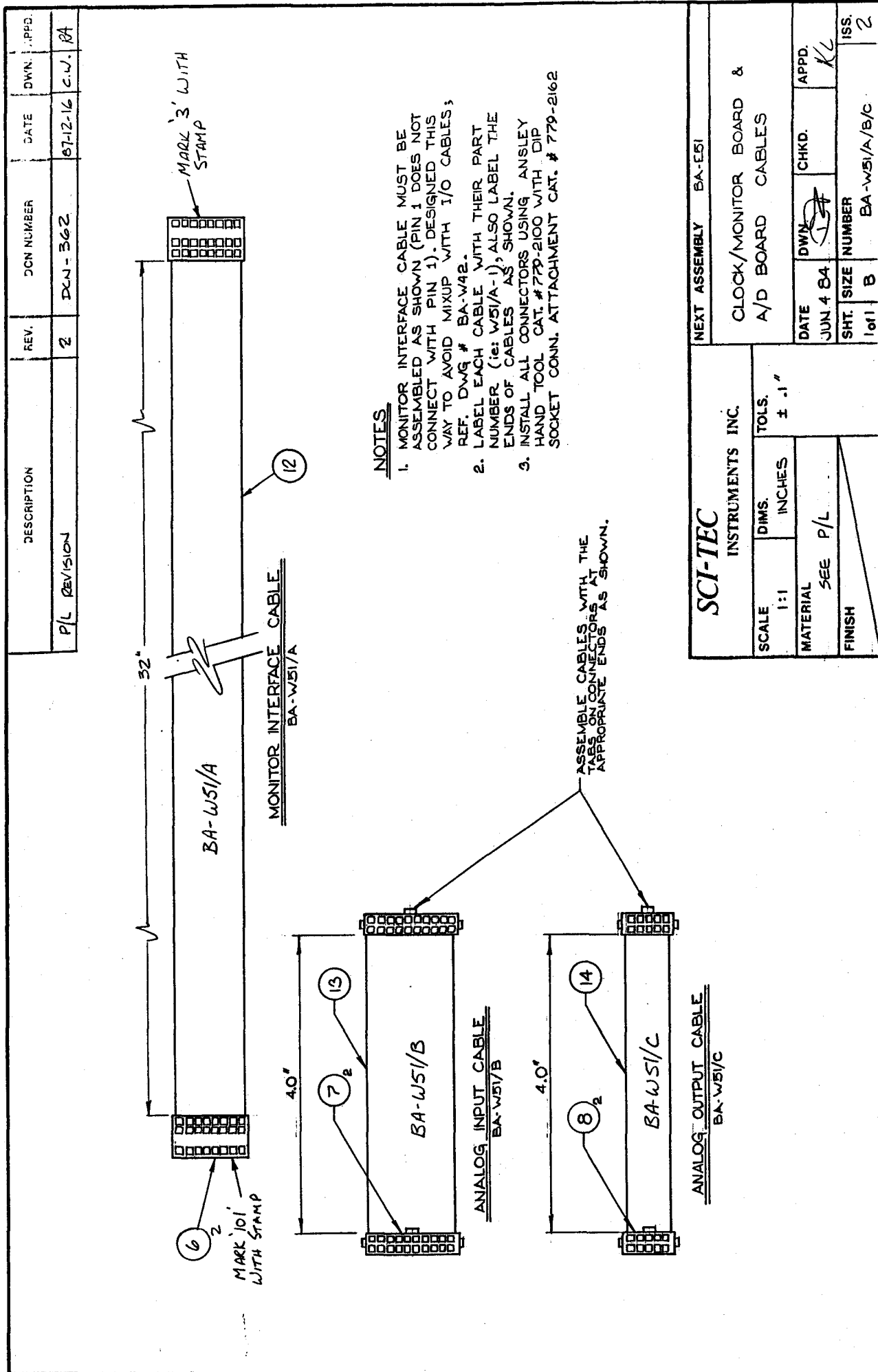
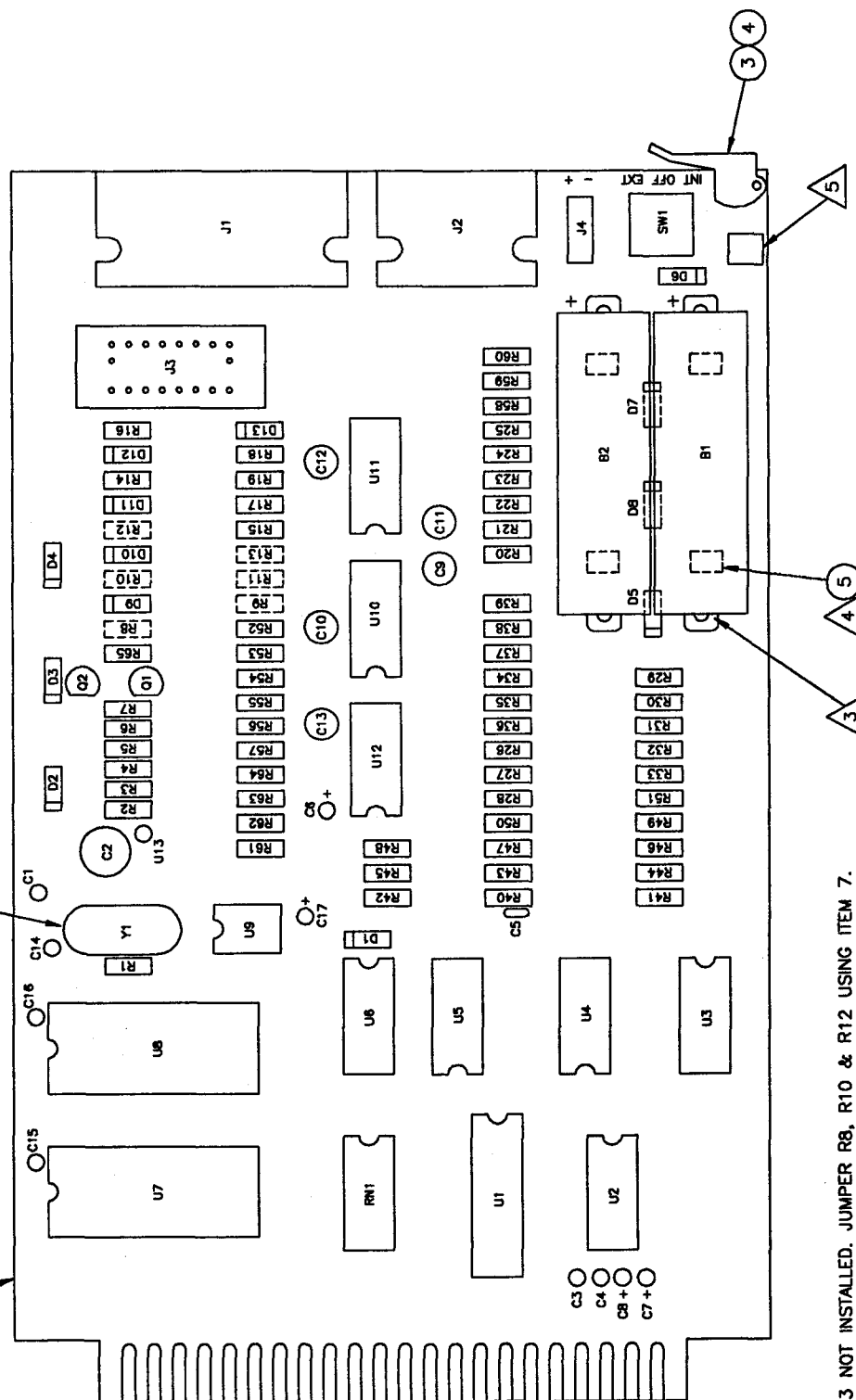


FIG 7.5.4-5

REV	DESCRIPTION	DCN NUMBER	DATE	DWN	APPD.
1	INITIAL RELEASE		83.12.01	DF	KL
2	SEE DCN	8701-DCN-297	87.06.01	DF	KL
3	ADD ASSY NOTES	DCN362	87.12.15	CW	RA
4	ADD NOTE 5, DEL NOTE TO TRIM ELECTOR	DCN421	88.06.21	CW	RA
5	REMOVE R8-R13, JUMPER R8,R10,R12	DCN659	93.10.06	FV	

INSTALL BETWEEN CRYSTAL (Y1) AND PCB

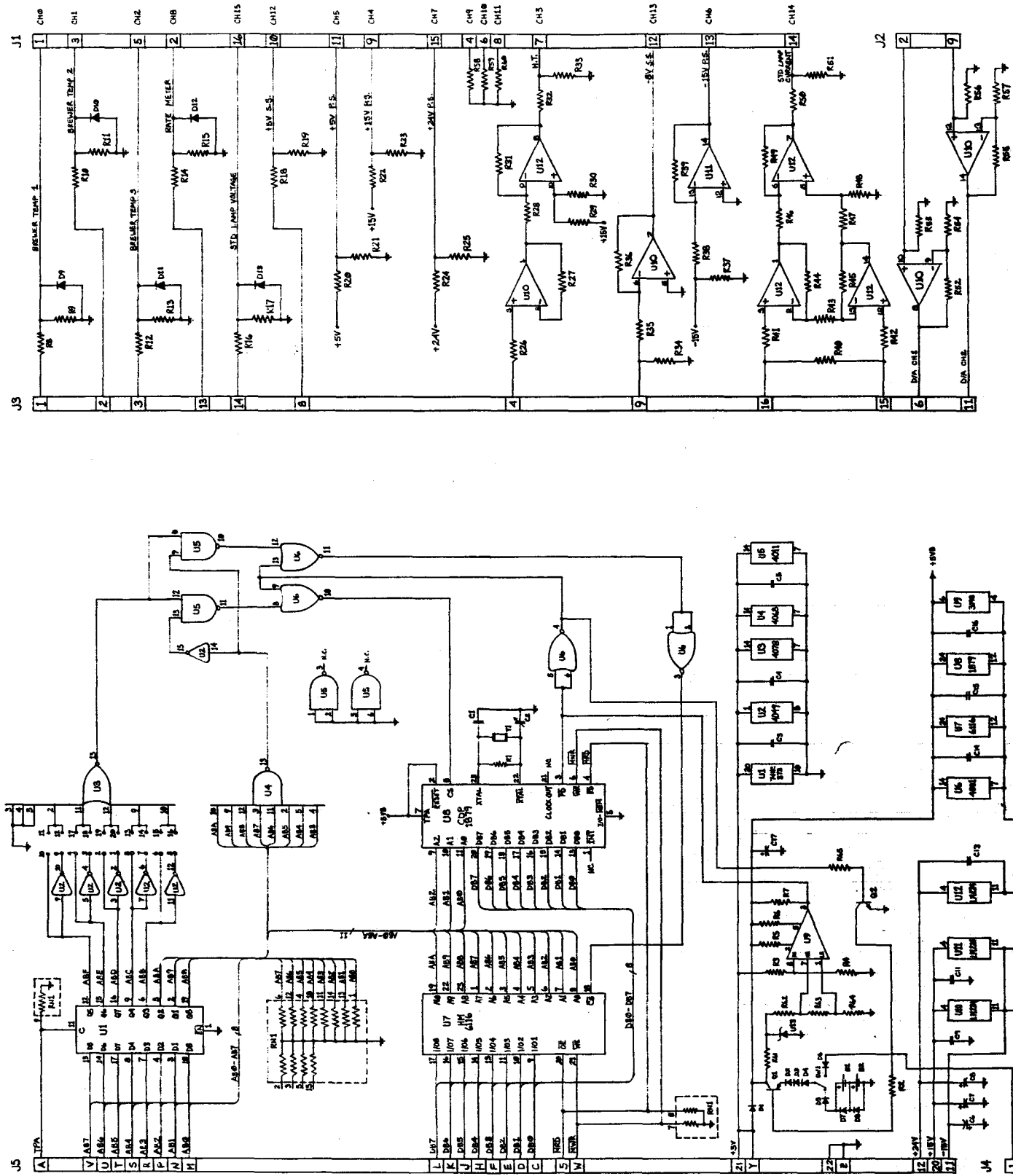


NOTES:

- R8 - R13 NOT INSTALLED. JUMPER R8, R10 & R12 USING ITEM 7.
- INSTALL BATTERY LAST (BEFORE TESTING), THEN PLACE IN ANTI-STATIC BAG AND SEAL.
- ENSURE SOLDER FILL ON PADS FOR BATTERIES (B1 & B2) DOES NOT TOUCH BATTERY CASE.
- DEPOSIT 1/16" THK LAYER OF ADHESIVE ON PCB TO ISOLATE BATTERY LEADS AND PROVIDE STRESS RELIEF, 4 PL AS SHOWN.
- COVER EXISTING ASSY NO. "BA-E49" AND IDENTIFY WITH DWG. NO. "BA-E95" AND CURRENT REV.

QTY	UM	PART NO.	MFR'S NO.	DESCRIPTION	REMARKS	ITEM
2:1						
SCALE	DATE	DWN	CHKO	APPD	FINISH	
83.12.01	DF	RA	KL			
SCHTEC 1993 This document is not to be disclosed to anyone outside of the production environment from INSTRUMENTS INC. 500-500 Instruments Inc. TITLE: CLOCK MONITOR BOARD ASSY 1 of 1 SHEET DOCUMENT NUMBER BA-E95 REV. 1						

COMPUTER GENERATED DRAWING
FILENAME: BA-E95.DWG



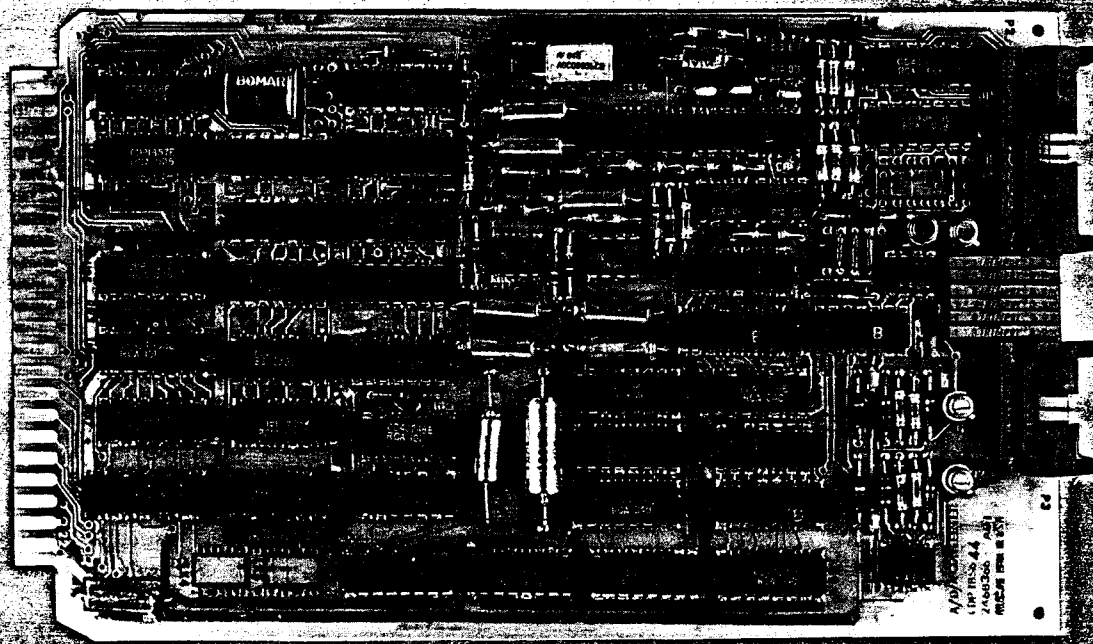
NOTE
1. R8 - R13 NOT INSTALLED.
2. JUMPER R8, R10, R12.

FIG. 7.5.4-7

RCA Solid
State

RCA CMOS Microboard A/D and D/A Converters

CDP18S644A, CDP18S654A SCI-TEC # 90-98-152



RCA Microboard
Milliwatt Computer Systems

MB-644A

751-2

RCA CMOS Microboard

A/D and D/A Converters

CDP18S644A, CDP18S654A

The RCA CMOS Microboard A/D and D/A Converters CDP18S644A and CDP18S654A both contain an analog-to-digital conversion system and two independent digital-to-analog conversion systems, each having 8-bits of resolution. The CDP18S644A is capable of both unipolar and bipolar operation. The CDP18S654A is capable of unipolar operation only.

These Microboards operate from a single 5-volt power supply, require minimal currents because of their primarily CMOS design, and feature two-level I/O address latching and decoding on board, with selectable addresses for flexible system configurations.

The CDP18S644A and CDP18S654A are designed for use in a Microboard computer system, are expandable by use of the Microboard Universal Backplane, and are plug-in compatible with the RCA Prototyping Systems CDP18S691 and CDP18S692, the RCA CMOS Development Systems CDP18S005 (CDSII) and CDP18S007 (CDSIII), and the RCA Microboard Computer Development Systems (MCDS) CDP18S-93 and CDP18S694 to facilitate hardware and software development.

The CDP18S644A and CDP18S654A differ from the CDP18S644 and CDP18S654 only in circuit improvements to assure proper operation at 5 MHz system clock.

Features

- Low power
- High noise immunity
- Wide operating temperature range -40°C to $+85^{\circ}\text{C}$

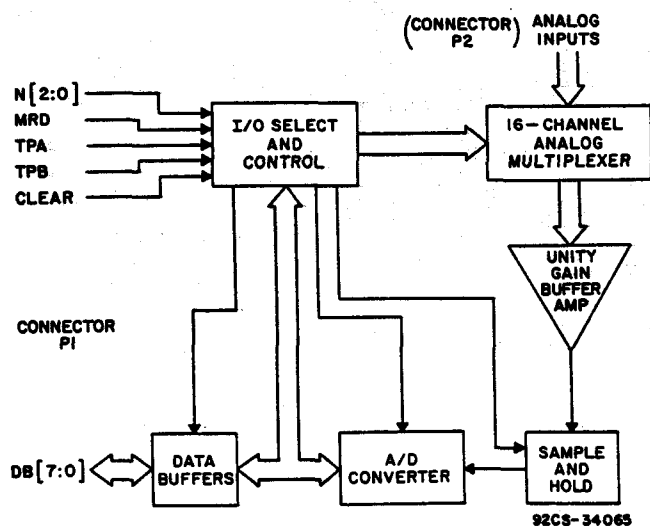


Fig. 1 — Block Diagram of A/D Section of RCA CMOS Microboard A/D and D/A Converters CDP18S644A and CDP18S654A

A/D Section:

- Multiplexed inputs — 16 single-ended or 8 differential
- Sample-and-hold circuitry
- 8 bits of resolution
- Scanned or fixed channel mode
- Straight binary or offset binary output codes (CDP18S644A)
- Straight binary output codes (CDP18S654A)
- Unipolar or bipolar input voltage (CDP18S644A)
- Unipolar input voltage (CDP18S654A)
- Ribbon-cable input connector

D/A Section:

- Two independent D/A channels with 8 bits of resolution
- Straight binary or offset binary input codes (CDP18S644A)
- Straight binary input codes (CDP18S654A)
- Unipolar or bipolar output voltage (CDP18S644A)
- Unipolar output voltage (CDP18S654A)
- Ribbon-cable output connector
- Operable from a single 5-volt supply
- Small board size (4.5 x 7.5 inches)
- Simple system interface
- Assignable I/O address
- Expandable by use of the Microboard Universal Backplane
- Compatible with CMOS Development Systems
- Member of extensive Microboard family
- 5 MHz capability

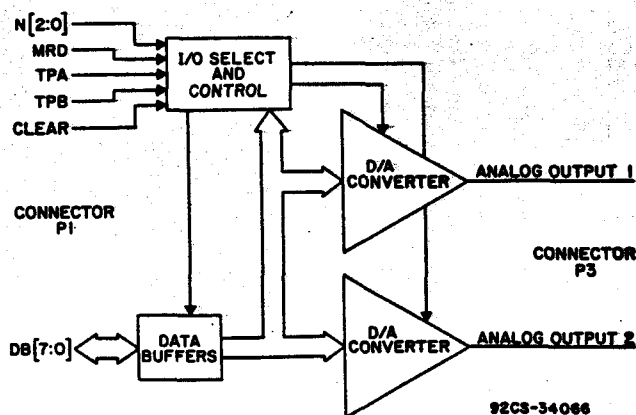


Fig. 2 — Block Diagram of D/A Section of RCA CMOS Microboard A/D and D/A Converters CDP18S644A and CDP18S654A.

Specifications

A/D Input

No. of Channels: 16 single-ended/8 differential
 Input Common Mode Range:
 0 V to +2.7 V (CDP18S654A)
 -2.7 V to +2.7 V (CDP18S644A)
 A/D Input Voltage Range:
 Unipolar operation 0 V to +2.5 V
 Bipolar operation -2.5 V to +2.5 V (CDP18S644A)

A/D Output

Unipolar operation: Straight binary
 Bipolar operation: Offset binary (CDP18S644A)

A/D Transfer Characteristics

Resolution: 8 bits
 Conversion Time: 215 μ s max
 Total Common-Mode Error Over A/D Input
 Range (Differential Input): $<1/4$ LSB

A/D Accuracy

Differential Linearity: $\pm 3/4$ LSB
 Power Supply Sensitivity: $\pm 0.16\%$ of full-scale
 range/% supply volts
 Gain Error: Adjustable to zero
 Offset Error: Adjustable to zero

D/A Output

Channels: 2 independent
 Output Range:
 Unipolar operation: 0 V to +2.5 V, 0 V to +2.56 V
 Bipolar operation: -2.5 V to +2.5 V, -2.56 V to
 +2.56 V (CDP18S644A)
 Output Drive Capability:
 Source: 50mA typical
 Sink: 10-k Ω pull-down resistor to V neg.
 (V neg. = 0 V on CDP18S654A, V neg. $\approx$ -3.0 V
 on CDP18S644A)
 Output impedance: 2 Ω

D/A Input

Unipolar Operation: Straight binary
 Bipolar Operation: Offset binary (CDP18S644A)

D/A Transfer Characteristics

Resolution: 8 bits
 Settling Time: (For any step size to within $1/2$ LSB)
 : 15 μ s

D/A Accuracy

Differential Linearity: $\pm 1/2$ LSB
 Power Supply Sensitivity: $\pm 0.08\%$ of full-scale
 range/% supply volts
 Gain Error: Adjustable to zero
 Offset Error: Adjustable to zero

Operating Temperature Range

-40°C to +85°C

Dimensions

4.5 inches x 7.5 inches (114.3 mm x 190.5 mm)
 Board Pitch: 0.5 inch (12.7 mm) minimum

Power Requirements

CDP18S644A: +5 V supply @ 50 mA typical
 CDP18S654A: +5 V supply @ 15 mA typical

Connectors

System Interface: Edge fingers, 44 pins on 0.156-
 inch centers
 Analog Input Interface: Right-angle 20-pin header.
 Berg part no. 65496-007 or equivalent. Mates
 with Berg part no. 65847-021/022 or equivalent
 Analog Output Interface: Right-angle 10-pin
 header. Berg part no. 65496-001 or equivalent.
 Mates with Berg part no. 65847-003/004 or
 equivalent

Microboard Bus Interface Signals (Connector P1)

The following signals are generated or received by the CMOS Microboards, CDP18S644A and CDP18S654A. For additional information on these signals, refer to the published data for the CDP1802A CMOS Microprocessor (File No. 1305) and to the **User Manual for the CDP1802 CMOS Microprocessor, MPM-201**. These signals are summarized in Table 1 which gives a list of the pins and the signals for the RCA Universal Backplane Connector (P1). The signals marked with an asterisk (*) are those used on RCA CMOS Microboards, CDP18S644A and CDP18S-654A.

DB7 through DB0 — Eight bidirectional data bus lines. Taken directly from the CPU bus, these lines transfer the data from the CPU to the converter and the control logic.

N0, N1, N2 — Taken directly from the CPU pins, these lines indicate that an I/O instruction is being executed. They are derived from the three low-order bits of the N-register and are valid only during an I/O instruction. These lines are decoded to control the transfer of data between the data bus and the RCA Microboards CDP18S644A and CDP18S654A.

MRD — Derived from the most significant bit of the N register, this signal defines the direction of the I/O data transfer. A low level indicates a transfer from memory to I/O; and a high level, a transfer from I/O to memory.

RCA CMOS

MICROSYSTEMS

Table VII — Digital Output as a Function of Input Voltage for CDP18S644A and CDP18S654A

Unipolar Operation, CDP18S644A and CDP18S654A			Bipolar Operation, CDP18S644A		
Analog Input +2.5V Full Scale	Fraction of Full-Scale Value	Digital Output (Straight Binary)	Analog Input +2.5V Full Scale	Fraction of Full-Scale Value	Digital Output (Offset Binary)
2.490234375 V	FS-1LSB	1111 1111	2.48046875 V	FS-1LSB	1111 1111
1.875 V	+3/4 FS	1100 0000	1.875 V	+3/4 FS	1110 0000
1.25 V	+1/2 FS	1000 0000	1.25 V	+1/2 FS	1100 0000
0.625 V	+1/4 FS	0100 0000	0.625 V	+1/4 FS	1010 0000
0.3125 V	+1/8 FS	0010 0000	0.3125 V	+1/8 FS	1001 0000
0.009765625 V	+1 LSB	0000 0001	0.01953125 V	+1 LSB	1000 0001
0 V	0	0000 0000	0 V	0	1000 0000
			-0.01953125 V	-1 LSB	0111 1111
			-0.3125 V	-1/8 FS	0111 0000
			-0.625 V	-1/4 FS	0110 0000
			-1.25 V	-1/2 FS	0100 0000
			-1.875 V	-3/4 FS	0010 0000
			-2.48046875 V	-FS-1LSB	0000 0001
			-2.5 V	-FS	0000 0000

Note: Analog input voltages given are theoretical center step values.

in Table VIII. Both Microboards are prelinked for straight binary output code and an input voltage range of 0 V to 2.5 V. The CDP18S644A is prelinked for offset binary output code and an input voltage range of -2.5 V to 2.5 V.

Table VIII
Digital Output/Analog Input Links

Output Mode	Input Voltage Range	Link LK2
Straight Binary	0 V to 2.5 V	2:7 Open
Offset Binary (CDP18S644A only)	-2.5 V to 2.5 V (CDP18S644A only)	2:7 Closed

The analog inputs, available at the right-angle connector P2, may be configured as 16 single-ended inputs or as 8 differential inputs. The input mode, which is determined by link LK1 (see Table IV), is prelinked for differential inputs. The pin assignments for the two modes are listed in Table IX.

A/D Adjustment Procedures

Potentiometers are provided on the CDP18S644A and the CDP18S654A Microboards for both gain and offset A/D adjustments. Adjusting the offset potentiometer, R1, moves the transfer function either up or

down. Adjusting the gain potentiometer R2, varies the slope of the transfer function (see Fig. 4). The objective of this adjustment procedure is to approach the ideal transfer function for an 8-bit A/D converter.

Table IX
Pin Assignments for Connector P2

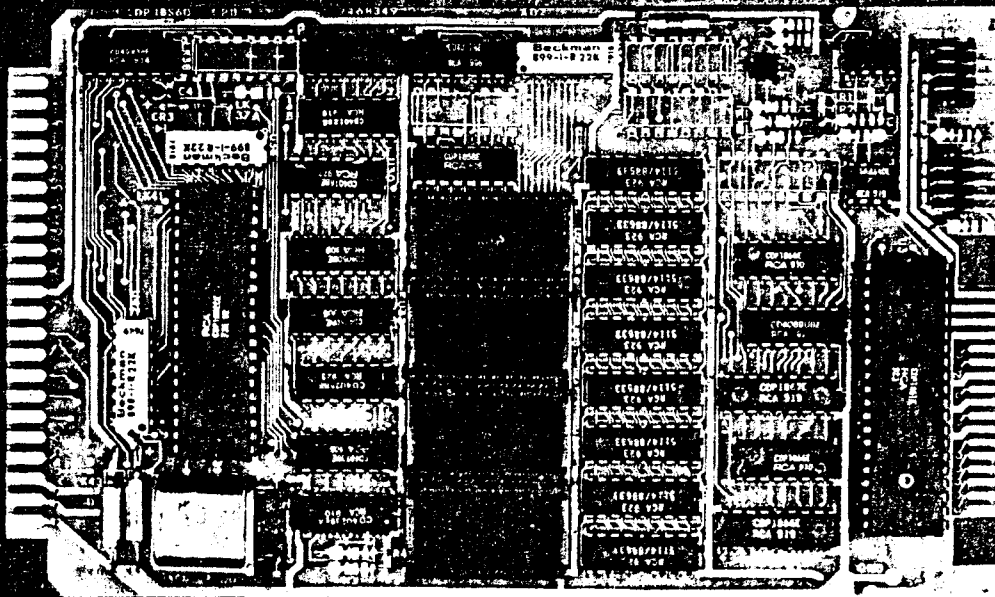
Pin	Channel	
	Single-Ended	Differential
1	0	0+
2	8	0-
3	1	1+
4	9	1-
5	2	2+
6	10	2-
7	3	3+
8	11	3-
9	4	4+
10	12	4-
11	5	5+
12	13	5-
13	6	6+
14	14	6-
15	7	7+
16	15	7-
17	GND	GND
18	GND	GND
19	GND	GND
20	SPARE	SPARE

SCI-TEC Instruments Inc.												
Title: MICROPROCESSOR (COSMAC) PCB ASSEMBLY									Rev Date: 94-02-14			
									Rev: 4			
DCN: 673		Drawn: DF		Checked:		Approved:		QA App'd:		Dwg No.: BA-E52		
Item No.	Part/Ident No.	Title/Description				Qty	Qty /B	Qty /C	Qty /D	UofM	Ref Des	Remarks

1	90-57-250	IC, Eprom, 2K x 8, CMOS	4.00		EA	U24,U25,U26, U27	Nat:MM2716Q-1
2	90-98-150	MicroProc PCB, 4K RAM, 4.8K ROM	1.00		EA		
3	77-22-050	Rivet, Dome Hd, 3/32"Dia x .24" Lg, Alum	2.00		EA		
4	82-10-163	PCB Ejector, 1/16", SS	2.00		EA		
5	88-09-096	Resistor, Carbon, 8.2K, 1/4W, 5%	1.00		EA	R15	
6	99-31-261	Wire, Hookup, #24AWG, Solid, Wht	0.08		FT		
7	BM-E105	Eprom Label, Micro Brd, U24	1.00		EA		
8	BM-E106	Eprom Label, Micro Brd, U25	1.00		EA		
9	BM-E107	Eprom Label, Micro Brd, U26	1.00		EA		
10	BM-E108	Eprom Label, Micro Brd, U27	1.00		EA		
11	BD-E109	Brewer RCA Firmware Source Code	--		REF		

RCA COSMAC Microboard Computer

CDP18S601 SCI-TEC # 90-98-150



RCA COSMAC Microboard
Military Computer System

RCA COSMAC Microboard Computer

CDP18S601

The RCA COSMAC Microboard Computer CDP18S601 is a versatile computer system on a single 4.5 x 7.5 inch card. The card contains a CDP1802 CPU, a crystal-controlled clock, read-write memory, parallel I/O ports, a serial communications interface, power-on reset, and expansion interface. Four on-board sockets are provided for read-only memory enabling the user to select 4 or 8 kilobytes of mask-programmable ROM or EPROM, depending on the applications. Because of its CMOS design and low current requirements, the power supply and cooling requirements are minimal. The CDP18S601 Microboard Computer is designed to provide the key hardware for various microcomputer applications allowing the designer to concentrate on the software and special requirements of his specific application. The CDP18S601 is plug-in compatible with the RCA COSMAC Development System II CDP18S005 and the RCA COSMAC CDOS Development System CDP18S007 facilitating prototype design and the debugging of both hardware and software.

Component Features

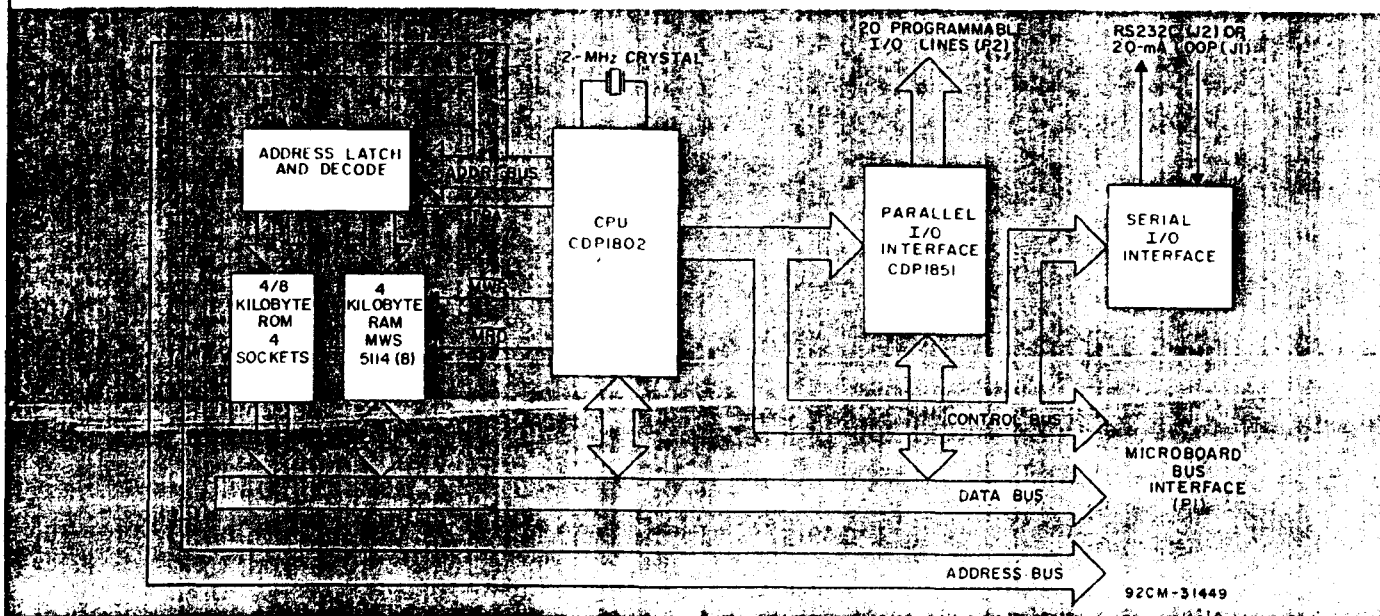
Central Processing Unit. The central processor for the CDP18S601 Microboard Computer is the 8-bit silicon-gate CMOS RCA COSMAC Microprocessor CDP1802. The CDP1802 has 16 general-purpose registers each 16 bits wide. Any one of these registers may be dynamically designated as the program counter

Features

- Low-power static CMOS
- Operable from single 5-volt supply
- Current required—10 mA (typ.)†
- High noise immunity
- 2-MHz crystal clock
- Compatible with COSMAC Development Systems
- Stand-alone capability
- 4 kilobytes of read/write memory
- Sockets for 4/8 kilobytes of ROM/PROM
- Power-on reset
- COSMAC Microprocessor architecture
- Flexible memory and I/O expansion
- 20 programmable parallel I/O lines
- 4 flag inputs
- Q serial data output
- RS232C or 20-mA serial I/O
- 65,536-byte memory space
- 44-pin system interface
- Temperature range -0°C to 70°C
- Small board size—4.5 x 7.5 inches

†With CMOS ROM and RS232C serial interface.

thereby giving the system multiple program states. Each register may also be used for data storage and as memory pointers for subroutines, I/O, stacks, and the like. One register each is designated for DMA and Inter-



Block diagram of RCA COSMAC Microboard Computer CDP18S601.

RCA 1800

MICROPROCESSORS

rupt pointers. The CDP1802 provides a serial data out connection, Q, and four external flag input pins, EF1 through EF4, which may be used as test and branch conditions independently.

Memory. By means of eight MWS5114 RAM's, the CDP18S601 provides 4 kilobytes of CMOS read-write memory. Four sockets are provided for four or eight kilobytes of non-volatile read-only memory. RCA CDP1834 mask-programmed CMOS ROM's or 2708, 2758, or 2716 EPROM's may be used in these sockets. Each of these memory types may be placed independently in the 65,536-byte memory space on one-kilobyte boundaries.

I/O. By means of the CMOS programmable I/O Interface CDP1851, the CDP18S601 provides twenty programmable I/O lines. The software customizes each of these lines as input, output, bidirectional, or bit-programmable with or without unique "handshaking" signals for each application. A serial communications interface, provided with both 20-milliampere loop and EIA RS232C capability, is driven by the Q and EF4 serial I/O lines of the CPU. The baud rate and the data format are determined by software. Edge connectors are provided for the parallel I/O lines and the Microboard bus interface. Right-angle header connections are provided for the serial communications interfaces.

Application

The COSMAC Microboard Computer CDP18S601 may stand alone and be operated as a complete system. Power may be supplied through the Microboard Bus Interface connector or the parallel I/O connector or wired directly to the board. It may also be operated in conjunction with other Microboard System components installed in any location in the five-card Microboard Chassis (CDP18S675) or in the 25-card Microboard Chassis (CDP18S670).

The low current requirements of the Microboard Computer and other Microboard Systems components permit operation from a simple, compact wall-type supply such as the CDP18S023. No cooling fans or heat sinks are required.

The CDP18S601 Microboard Computer may be installed in the card nest of the COSMAC Development System II CDP18S005 or the COSMAC CDOS Development System CDP18S007 in place of the CPU Module to facilitate software and hardware development. This feature substantially expands the designer's debugging capabilities by making it possible to debug

the software of a specific application concurrently with the use and testing of the hardware on the CDS. Other development systems allow only software debugging, leaving it to the user to transport the software to the hardware under test. With the final Microboard hardware configuration imbedded in the COSMAC Development System, the application software and hardware may be operated together in the optimum situation for analysis and improvement. For example, RAM may easily be allocated in place of ROM, thereby saving much time that might have been used in programming PROM's or EPROM's.

Specifications

Memory Capacity

On-board RAM: 4 kilobytes

On-board ROM/EPROM: 4 sockets for up to 8 kilobytes.

Off-board Expansion: Up to 65,536 bytes in any user-specified combination of RAM, ROM, and EPROM.

Memory Address Map

On-board RAM: Any even 4-kilobyte block.

On-board ROM/EPROM: Depending on type and quantity of ROM's, any 1-, 2-, 4-, or 8-kilobyte block.

I/O Capacity

Parallel: 20 lines each programmable as input, output, or bidirectional.

Serial: One input, one output, choice of 20-mA loop or RS232C. User-programmed baud rate and format.

Operating Temperature Range

0°C to 70°C.

Dimensions

4.5 inches × 7.5 inches (114.3 × 190.5 mm)

Board pitch 0.5 inch (12.7 mm) minimum.

Power Requirements

With CMOS ROM's, with RS232C: +5 V at 10 mA, typical operating

With CMOS ROM's and 20-mA loop: +5 V at 30 mA, typical operating

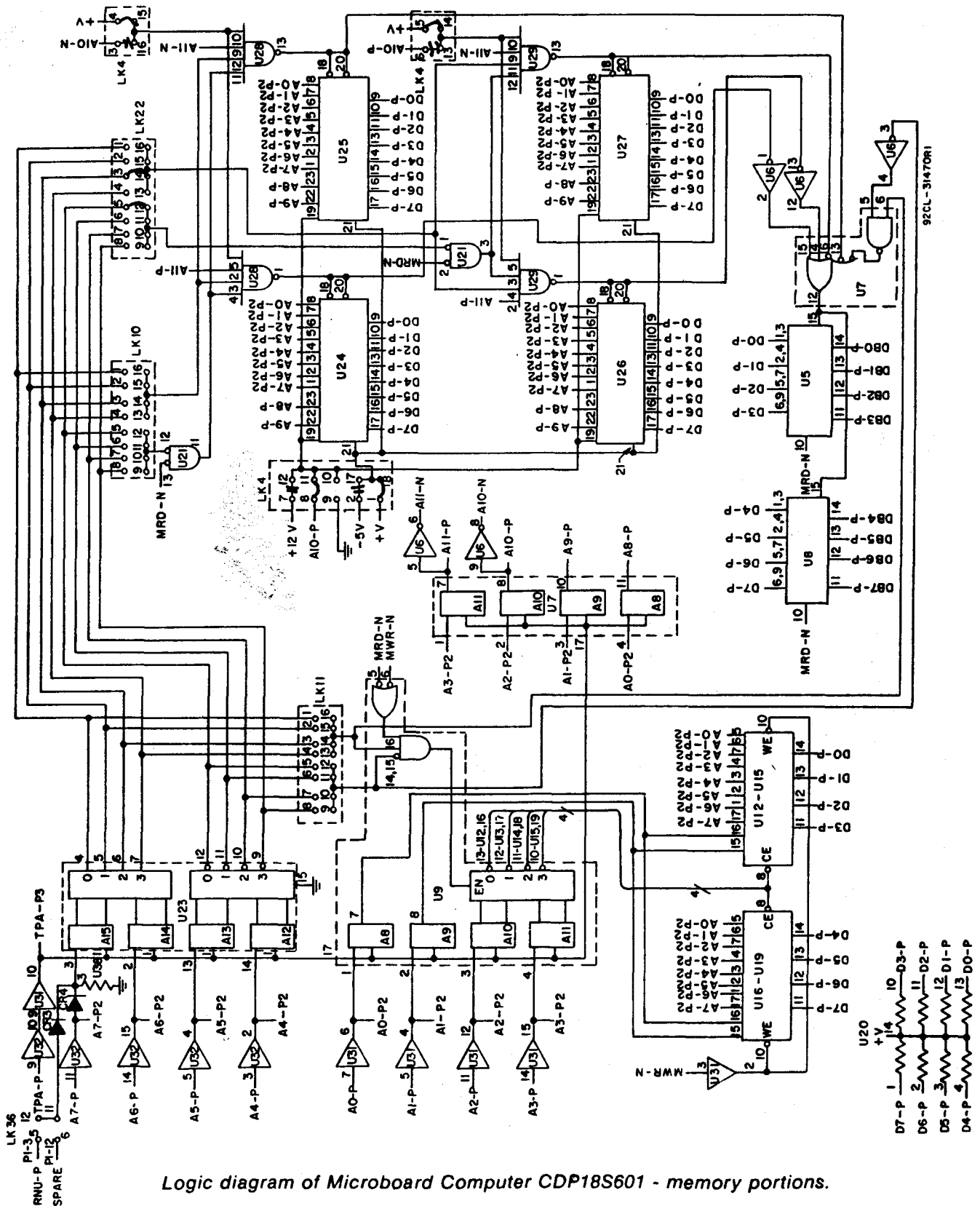
Optional voltages used only for RS232C interface:

+12 to +15 V at 8 mA, typical

-5 to -15 V at 8 mA, typical

RCA 1800

MICROPROCESSORS





- 14 -

BREWER REFERENCE DOCUMENTATION

Section 7.6 Optics

7.6.1 Instrument Optics C61	7.6.1-1
7.6.2 Foreoptics F01	7.6.2-1
- Lamp F96	7.6.2-2
- IRIS Actuator F106	7.6.2-3
- Zenith Drive F71	7.6.2-4
7.6.3 Spectrometer S01	7.6.3-1
- Shutter Motor S11	7.6.3-2
- Mechanical S02	7.6.3-3
7.6.4 Photomultiplier P01	7.6.4-1
- Tube Assembly P02	7.6.4-2
- High Speed Amp P23	7.6.4-3
- Dynode Chain P25	7.6.4-5
- Photomultiplier Housing Assy P42 (MKIV Only)	7.6.4-6

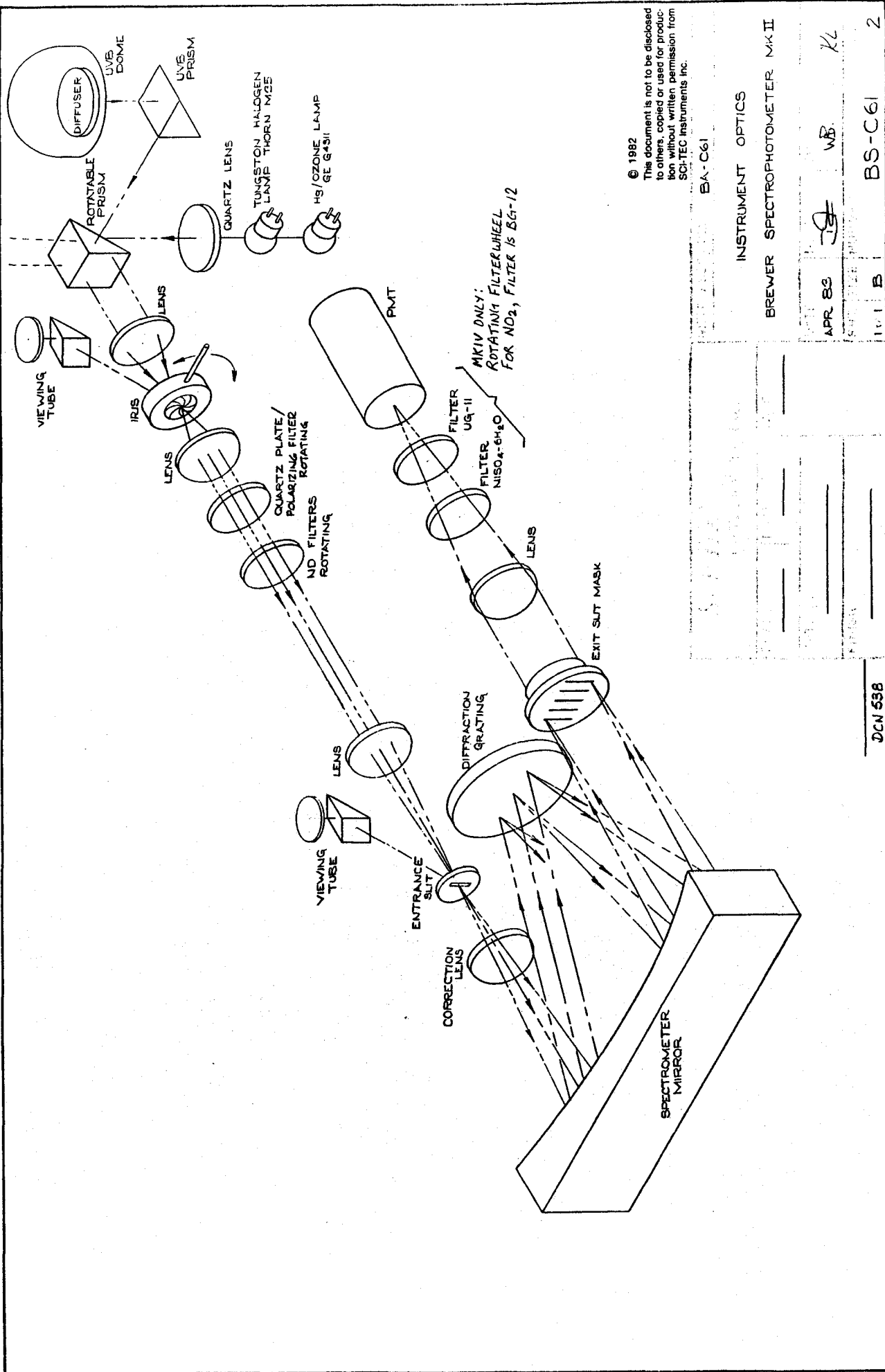
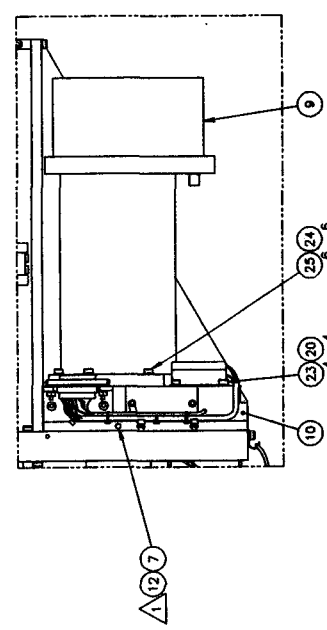
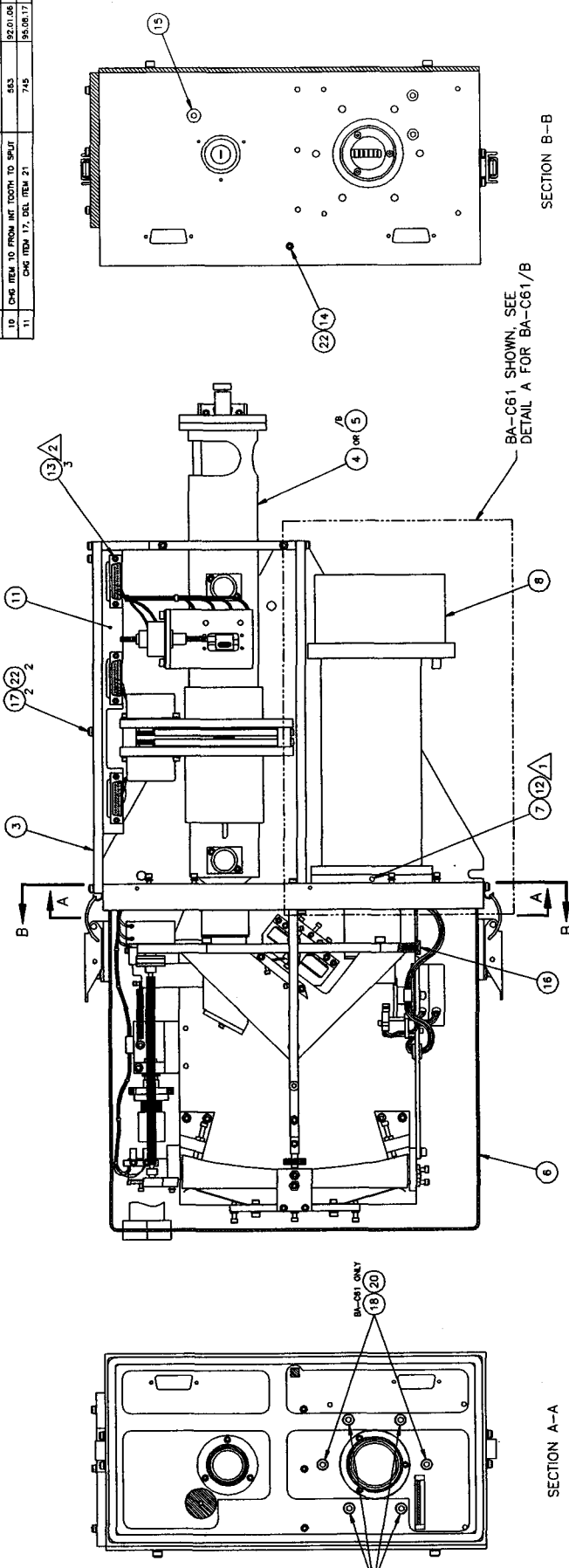


FIG 7.6.1-1

REV	DESCRIPTION	QCH NUMBER	DATE	DWN. APPD.
1	INITIAL RELEASE - WAS A/S D0022-441		82.10.01	ADN JW
2	ADD ITEM 21, REIN NOTE 1, AND NOTE 3	345	87.10.28	DF RL
3	P/A REV	346	87.10.28	MS BA
4	ADD ITEMS 2-4, 11, 13	359	87.12.08	MS BA
5	CHG ITEM 2, DEL ITEMS 17, 21	408	86.06.07	CW RP
6	DEL BA-443/W AND BA-C61/B	419	86.08.02	CW BA
7	ADD ITEMS 4, 5	457	90.03.28	PV BA
8	PICTORIAL CHG. STD LAMP	538	91.04.22	PV BA
9	CHG ITEM 25 TO 1/2" FROM 7/16"	546	91.08.20	PV RL
10	CHG ITEM 10 FROM INT TOOTH TO SPLT	563	92.01.06	PV RP
11	CHG ITEM 17, DEL ITEM 21	745	95.06.17	PV

DOCUMENT NO. BA-C191



- NOTES:
1. INSTALL THERMISTOR ASSY (ITEM 8) INTO HOLE AND SECURE IN PLACE USING ITEM 16. NOTE: THE POSITION OF THE HOLE MAY VARY BY ±.00 ON BA-C61.
 2. USE 1 FLAT WASHER ONLY WHEN MOUNTING CABLE CONNECTORS TO MOUNTING BRACKET.

QTY	UNIT	PART NO.	MFR. NO.	DESCRIPTION	REMARKS	ITEM
1	EA	BA-C61		COMPLETE OPTICAL ASSY, BREWER MKII/IV		1.1
1	EA	BA-C61/B		COMPLETE OPTICAL ASSY, BREWER MKII/IV		1.1

COMPUTER GENERATED DRAWING
FILE NAME: BA-C191.DWG

SCI-TEC Instruments Inc.											
Title: BREWER COMPLETE OPTICAL ASSY									Rev Date: 95-08-15		
BREWER MKII/MKIV									Rev: 11		
DCN:	Drawn:	Checked:	Approved:	QA App'd:				Dwg No.: BA-C61			
745	FV										
Item No.	Part/Ident No.	Title/Description			Qty	Qty /B	Qty /C	Qty /D	UofM	Ref Des	Remarks

1	BA-S01	Spectrometer Assy, MKII	1.00	--					EA	
2	BA-S01/B	Spectrometer Assy, MKIV	--	1.00					EA	
3	BA-C62	Main Support Frame	1.00	1.00					EA	
4	BA-F01	Foreoptics Assy, MKII	1.00	--					EA	
5	BA-F01/B	Foreoptics Assy, MKIV	--	1.00					EA	
6	BA-C71	Light Cover Assy	1.00	1.00					EA	
7	BA-W52	Thermistor Assy	1.00	1.00					EA	
8	BA-P01	Photomultiplier Housing Assy, MKII	1.00	--					EA	
9	BA-P42	Photomultiplier Housing Assy, MKIV	--	1.00					EA	
10	BA-P44	Filterwheel #3 Housing Assy	--	1.00					EA	
11	BM-C70	Options Connector Bracket	1.00	1.00					EA	
12	85-10-150	Adhesive, Sealant, RTV	1.00	1.00					ML	
13	81-90-620	Connector Slide Lock Post	3.00	3.00					PR	
14	83-79-072	Screw, 6-32 x 5/8"Lg, Skt Hd Cap, SS	1.00	1.00					EA	
15	83-87-211	Screw, 10-32 x 5/8"Lg, Flt Hd Hex, SS	1.00	1.00					EA	
16	83-87-194	Screw, 8-32 x 1/2"Lg, Flt Hd Hex, SS	1.00	1.00					EA	
17	83-79-070	Screw, 6-32 x 1/2"Lg, Skt Hd, Hex, SS	2.00	2.00					EA	
18	83-79-114	Screw, 10-32 x 1/2"Lg, Skt Hd Cap, SS	2.00	--					EA	
19	83-79-119	Screw, 10-32 x 1"Lg, Skt Hd Cap, SS	4.00	--					EA	
20	83-95-607	Washer, #10, Internal Tooth Lock, SS	6.00	4.00					EA	
21										
22	83-95-749	Washer, #6, Split Lock, SS	3.00	3.00					EA	
23	83-79-122	Screw, 10-32 x 1-1/2"Lg, Skt Hd Cap, SS	--	4.00					EA	
24	83-95-750	Washer, #8, Split Lock, SS	--	6.00					EA	
25	83-79-084	Screw, 8-32 x 1/2"Lg, Skt Hd Cap, Hex, SS	--	6.00					EA	

Dow Corning 3145

DOC. NO. PART NO. BA-FOI



- [illegible]

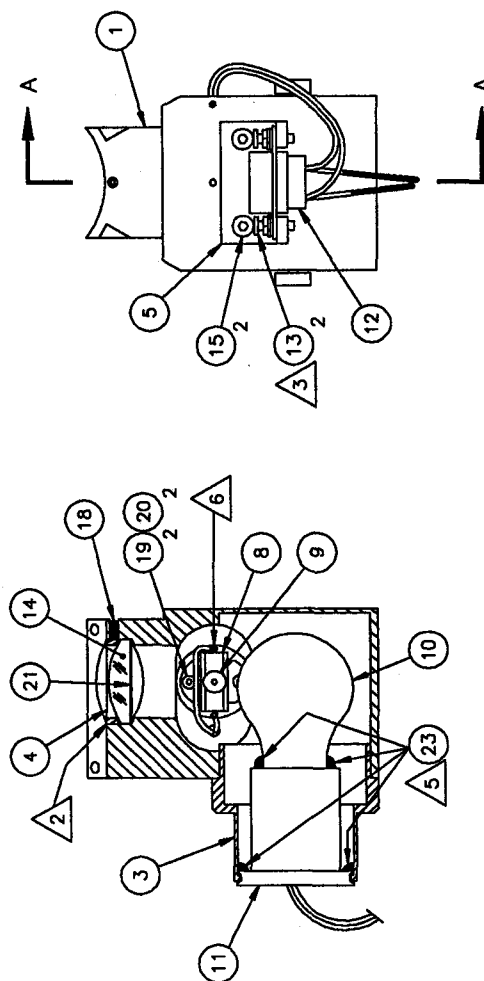
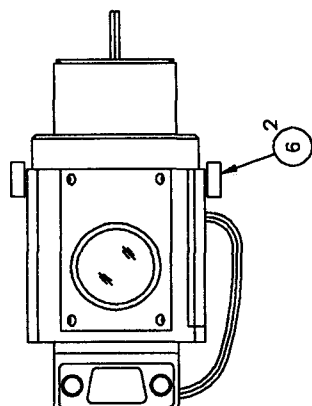
BA-FOI/B	BEANER NK IV	BA-CM/B
BA-FOI	BEG-EL NK II	BA-CM/A
PART AB.	USED ON	MULT ASST.

FIG 7.6.2-1.1

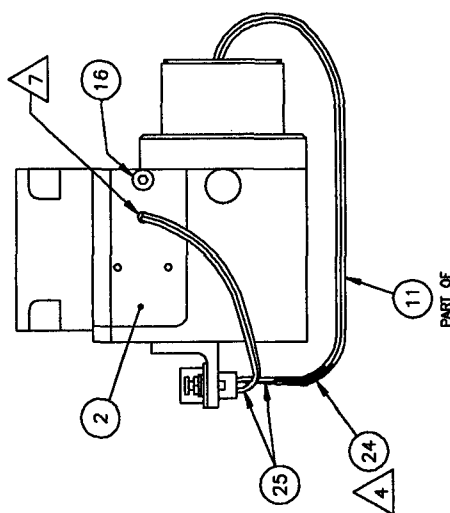
SCI-TEC Instruments Inc.											
Title: FORE OPTICS ASSY									Rev Date:	94-02-18	
									Rev:	8	
DCN:	Drawn:	Checked:	Approved:	QA App'd:					Dwg No.:	BA-F01	
674	RKF										
Item No.	Part/Ident No.	Title/Description			Qty	Qty /B	Qty /C	Qty /D	UofM	Ref Des	Remarks

1										
2	BA-F04	Front Optics Tube Assy			1.00	1.00				EA
3	BA-F06	Rear Optics Tube Assy			1.00	1.00				EA
4	BA-F08	Filter Wheel Housing Assy			1.00	--				EA
5	BA-F08/B	Filter Wheel Housing Assy			--	1.00				EA
6	BA-F96	Calibration Lamp Assy			1.00	1.00				EA
7	BA-F106	Iris Actuator Assy			1.00	1.00				EA
8										
9	81-90-630	Lock, Connector, Slide Retaing			2.00	2.00				EA
10	50-10-030	Stepper Motor			2.00	2.00				EA
11	88-85-653	Gear, 48P, 20Deg Pitch, Nylon			2.00	2.00				EA
12	81-46-124	Connector, 'D', 15 Pin			2.00	2.00				EA
13										
14										
15	83-79-048	Screw, #4-40 x 5/16"Lg, Skt Hd Cap, SS			4.00	4.00				EA
16	83-95-748	Washer, #4, Split Lock, SS			4.00	4.00				EA
17	83-79-047	Screw, #4-40 x 1/4"Lg, Skt Hd Cap, SS			4.00	4.00				EA
18	83-51-786	Screw, #6-32 x 5/8"Lg, Btn Hd Hex, SS			2.00	2.00				EA
19										
20	83-95-604	Washer, #4, Internal Tooth Lock, SS			4.00	4.00				EA
21	83-95-605	Washer, #6, Internal Tooth Lock, SS			2.00	2.00				EA

ITEM NO.	ITEM DESCRIPTION	ITEM NO.	ITEM DESCRIPTION
6	20 GA BLK 2'	11	18 GA BLK (PART OF ITEM 11)
7	20 GA BLK 2'	12	18 GA WHIT (PART OF ITEM 11)
8	NC		
9	NC		
10	NC		
11	NC		
12	NC		
13	NC		
14	NC		
15	NC		
16	20 GA BLK 6'		
17	20 GA BLK 6'		



PARTIAL SECTION A-A
SOME HARDWARE NOT
SHOWN FOR CLARITY



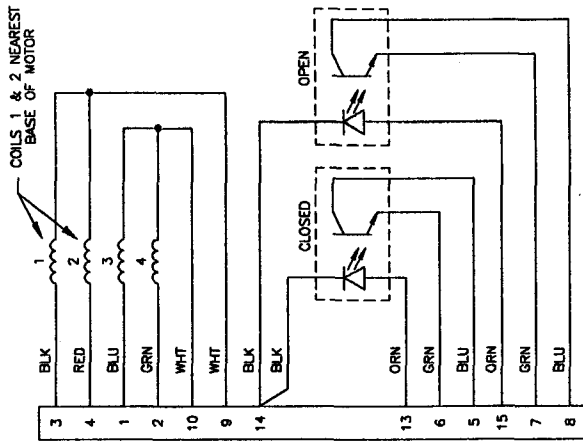
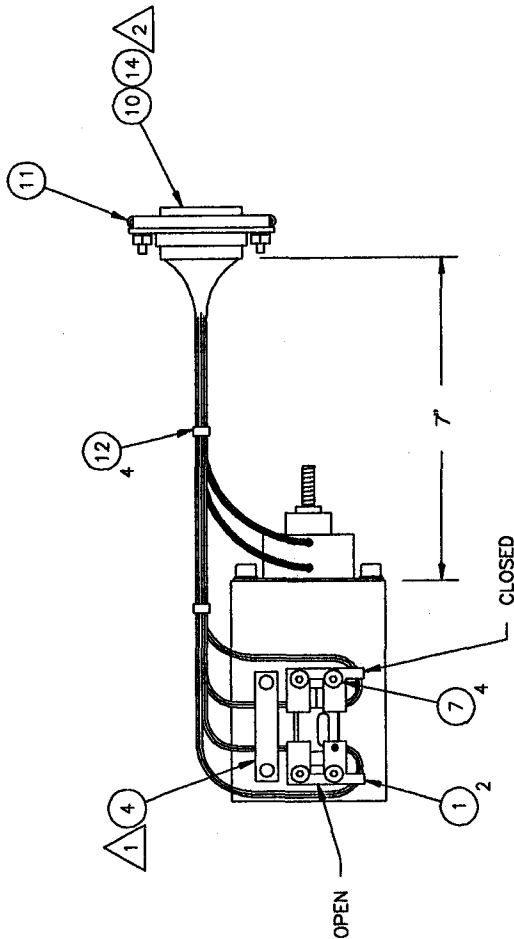
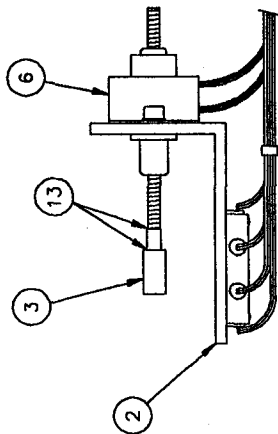
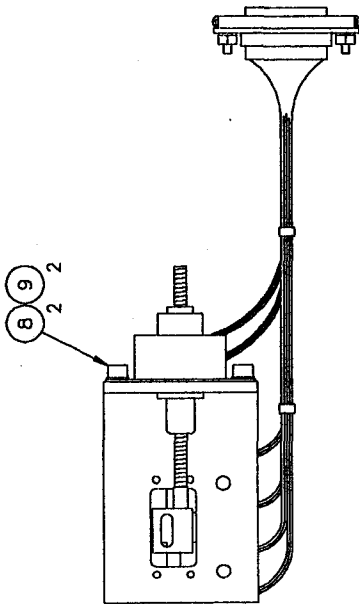
- NOTES:
1. USE THREADLOCK (ITEM 22) ON ALL HARDWARE WITHOUT LOCKING DEVICES.
 2. ENSURE LENS RETAINER (ITEM 4) IS INSTALLED WITH CHAMFERED EDGE TOWARDS LENS AND TOP SIDE FLUSH WITH BOTTOM OF CURVED SURFACE OF ITEM 1.
 3. INSTALL POSTS (ITEM 13) WITH ONE FLATWASHER AND ONE LOCKWASHER AS SPACERS. DISCARD OTHER HARDWARE.
 4. SPlice 2-2" PIECES OF WIRE (ITEM 25) TO ENDS OF WIRES OF LAMP HOLDER (ITEM 11) AND COVER WITH HEATSHRINK (ITEM 24) PRIOR TO INSTALLING IN CONN.
 5. USE RIV (ITEM 23) TO SECURE LAMP AND HOLDER IN PLACE AS SHOWN.
 6. AFTER PASSING WIRES THRU HOLE IN ITEM 2 AND SOLDERING TO LEADS ON LAMP SOCKET (ITEM 6), COVER LEADS WITH RIV (ITEM 23).
 7. AFTER ASSY, SECURE WIRES IN HOLE USING RIV (ITEM 23).
 8. ENSURE LENS AND LAMPS (ITEMS 9,10 & 21) ARE FREE OF FINGERPRINTS AFTER ASSY. (CLEAN WITH ALCOHOL AND Q-TIP)

QTY		UM	PART NO.	MFR'S NO.	DESCRIPTION	REMARKS	ITEM
-	NO.						
SCALE	1:1	NEXT ASSY:	BA-F01				
DATE	90.10.11	DIMENSIONS IN					
DWN	FV	BY DUAL DIMS	mm (inches)				
CMD	RA	Tolerances (unless otherwise specified)					
APPD	KL	INCHES	MM				
FINISH							

COMPUTER GENERATED DRAWING
FILENAME: BA-FR6.DWG

REV	DESCRIPTION	DCN NUMBER	DATE	DWN	APPO.
1	FIRST ISSUE	REF DCN674	94.02.14	DF	DJS

DOCUMENT NO.
BA-F106



SCHEMATIC

QTY	UM	PART NO.	MFR'S NO.	DESCRIPTION	REMARKS	ITEM
1	1	BA-FD1		IRIS ACTUATOR ASSEMBLY		1
1	1	BA-F106		IRIS ACTUATOR ASSEMBLY		1

SCALE	1:1	NEXT ASSY:	BA-FD1
DATE	94.02.14	DIMENSIONS IN	INCHES
DWN	FV	F DUAL DIMS:	mm (inches)
CHKD		Tolerances (unless otherwise specified)	
APPD	TKL	INCHES	MM
FINISH		mm ± 0.15	inches ± 0.005
		mm ± 0.25	inches ± 0.01
		mm ± 0.5	inches ± 0.02
		mm ± 1.0	inches ± 0.04
		mm ± 1.5	inches ± 0.06
		mm ± 2.0	inches ± 0.08
		mm ± 2.5	inches ± 0.10
		mm ± 3.0	inches ± 0.12
		mm ± 3.5	inches ± 0.14
		mm ± 4.0	inches ± 0.16
		mm ± 4.5	inches ± 0.18
		mm ± 5.0	inches ± 0.20
		mm ± 5.5	inches ± 0.22
		mm ± 6.0	inches ± 0.24
		mm ± 6.5	inches ± 0.26
		mm ± 7.0	inches ± 0.28
		mm ± 7.5	inches ± 0.30
		mm ± 8.0	inches ± 0.32
		mm ± 8.5	inches ± 0.34
		mm ± 9.0	inches ± 0.36
		mm ± 9.5	inches ± 0.38
		mm ± 10.0	inches ± 0.40
		mm ± 10.5	inches ± 0.42
		mm ± 11.0	inches ± 0.44
		mm ± 11.5	inches ± 0.46
		mm ± 12.0	inches ± 0.48
		mm ± 12.5	inches ± 0.50
		mm ± 13.0	inches ± 0.52
		mm ± 13.5	inches ± 0.54
		mm ± 14.0	inches ± 0.56
		mm ± 14.5	inches ± 0.58
		mm ± 15.0	inches ± 0.60
		mm ± 15.5	inches ± 0.62
		mm ± 16.0	inches ± 0.64
		mm ± 16.5	inches ± 0.66
		mm ± 17.0	inches ± 0.68
		mm ± 17.5	inches ± 0.70
		mm ± 18.0	inches ± 0.72
		mm ± 18.5	inches ± 0.74
		mm ± 19.0	inches ± 0.76
		mm ± 19.5	inches ± 0.78
		mm ± 20.0	inches ± 0.80
		mm ± 20.5	inches ± 0.82
		mm ± 21.0	inches ± 0.84
		mm ± 21.5	inches ± 0.86
		mm ± 22.0	inches ± 0.88
		mm ± 22.5	inches ± 0.90
		mm ± 23.0	inches ± 0.92
		mm ± 23.5	inches ± 0.94
		mm ± 24.0	inches ± 0.96
		mm ± 24.5	inches ± 0.98
		mm ± 25.0	inches ± 1.00

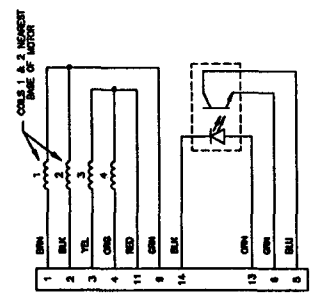
NOTES:

- 1 PASS SENSOR WIRES THRU HOLES IN SPACER BAR AS SHOWN PRIOR TO ASSEMBLING TO CONNECTOR AND TIE-WRAPPING WIRES.
- 2 AFTER ASSEMBLY SEAL CONNECTOR LEADS USING ITEM 14.

COMPUTER GENERATED DRAWING
FILENAME: BA-F106.DWG

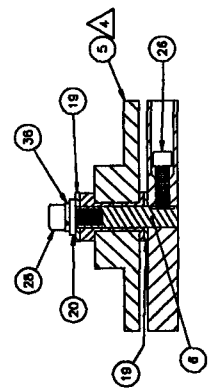
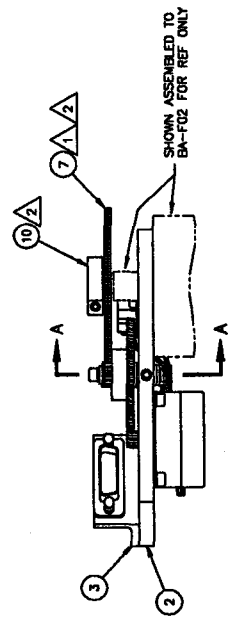
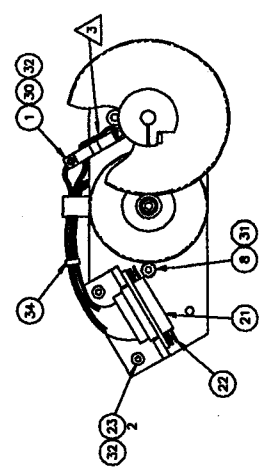
REV	DESCRIPTION	DOH NUMBER	DATE	DWN. APPRO.
1	SEE DOH	DOH119	84.08.01	DF
2	SEE DOH	DOH125	84.11.01	DF
3	SEE DOH	DOH364	87.12.22	CF
4	SEE IT, 20, 27, 1; ADD IT, 18	DOH448	88.10.21	CF
5	DOH IT, 20, 27, 1; ADD IT, 18	DOH448	88.10.21	CF
6	DOH IT, 20, 27, 1; ADD IT, 18	DOH448	88.10.21	CF
7	REWORK WITH DOH, SEE DOH	DOH467	88.08.26	CF
8	DOH IT, 20, 27, 1; ADD IT, 18	DOH467	88.08.26	CF
9	DOH IT, 20, 27, 1; ADD IT, 18	DOH467	88.08.26	CF
10	DOH IT, 20, 27, 1; ADD IT, 18	DOH467	88.08.26	CF

DOCUMENT NO. BA-F71

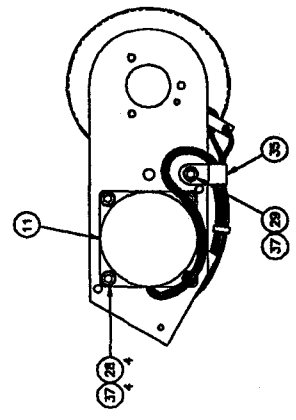


SCHEMATIC

- NOTES:
1. PRE-TENSION SPRINGS ON ANTI-BACKLASH GEAR (ITEM 7) ON ASSY, TO MESH WITH ITEM 5.
 2. BAG ITEMS 7, 10, & 24 AND ATTACH TO ASSEMBLY.
 3. GLUE DOWN ORANGE & BLACK WIRES FROM SENSOR USING ITEM 33. ENSURE THEY DO NOT COVER C/SK MOUNTING HOLE.
 4. AFTER ASSEMBLY, PLACE A DROP OF NYE SYNTHETIC OIL IN HOLE OF OF GEAR ASSEMBLY (ITEM 5).



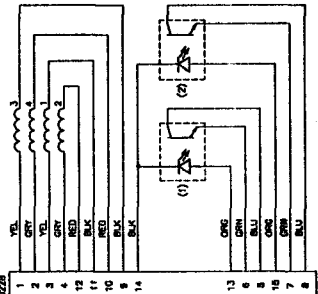
SECTION A-A
SCALE 2:1



REV	DATE	DESCRIPTION	REMARKS	ITEM
1	84.08.01	DOH119	DOH119	1
2	84.11.01	DOH125	DOH125	2
3	87.12.22	DOH364	DOH364	3
4	88.10.21	DOH448	DOH448	4
5	88.10.21	DOH448	DOH448	5
6	88.08.26	DOH467	DOH467	6
7	88.08.26	DOH467	DOH467	7
8	88.08.26	DOH467	DOH467	8
9	88.08.26	DOH467	DOH467	9
10	88.08.26	DOH467	DOH467	10

SCI-TEC Instruments Inc.												
Title: SPECTROMETER ASSEMBLY									Rev Date:	93-05-21		
									Rev:	7		
DCN: 652		Drawn: GN		Checked: LV		Approved:		QA App'd:		Dwg No.: BA-S01		
Item No.	Part/Ident No.	Title/Description				Qty	Qty /B	Qty /C	Qty /D	UofM	Ref Des	Remarks

1	BA-S02	Spectrometer Mechanical Assy			1.00	1.00			EA		
2											
3	BA-S11	Shutter Motor Assy			1.00	1.00			EA		
4	BA-S51	Grating Support Assy, 1800 Line			1.00	--			EA		
5	BA-S51/B	Grating Support Assy, 1200 Line			--	1.00			EA		
6	BM-S42	Correction Lens			1.00	1.00			EA		
7	TP-BA-S01	Acceptance Test Record, Spect Assy			--	--			REF		
8	LP-BA-S01	Optical Frame Alignment Proc, Spect Assy			--	--			REF		
9	BM-S47	Spherical Mirror			1.00	1.00			EA		
10											
11	98-10-010	Sheet, Closed Cell Neoprene, 1/16", Adh Back			2.00	2.00			SI		
12	83-95-830	Washer, Flat, 1"OD x 3/16"ID x .015"Thk, Nylo			1.00	1.00			EA		
13	83-78-022	Screw, #4-40 x 1/2"Lg, Skt Hd Cap, Nylon			4.00	4.00			EA		
14	83-40-237	Nut, #4-40, Hex, Nylon			4.00	4.00			EA		
15											
16	85-10-145	Adhesive Sealant (Loctite 242)			0.10	0.10			ML		
17											
18	83-79-049	Screw, #4-40 x 3/8"Lg, Skt Hd Cap, SS			2.00	2.00			EA		
19	83-79-068	Screw, #6-32 x 3/8"Lg, Skt Hd Cap, SS			1.00	1.00			EA		
20	83-79-051	Screw, #4-40 x 1/2"Lg, Skt Hd Cap, SS			4.00	4.00			EA		
21	83-95-748	Washer, #4, Split-Lock, SS			6.00	6.00			EA		
22	83-95-605	Washer, #6, Internal Tooth, SS			1.00	1.00			EA		

[illegible]

COLS 1 & 2
COLS 3 & 4

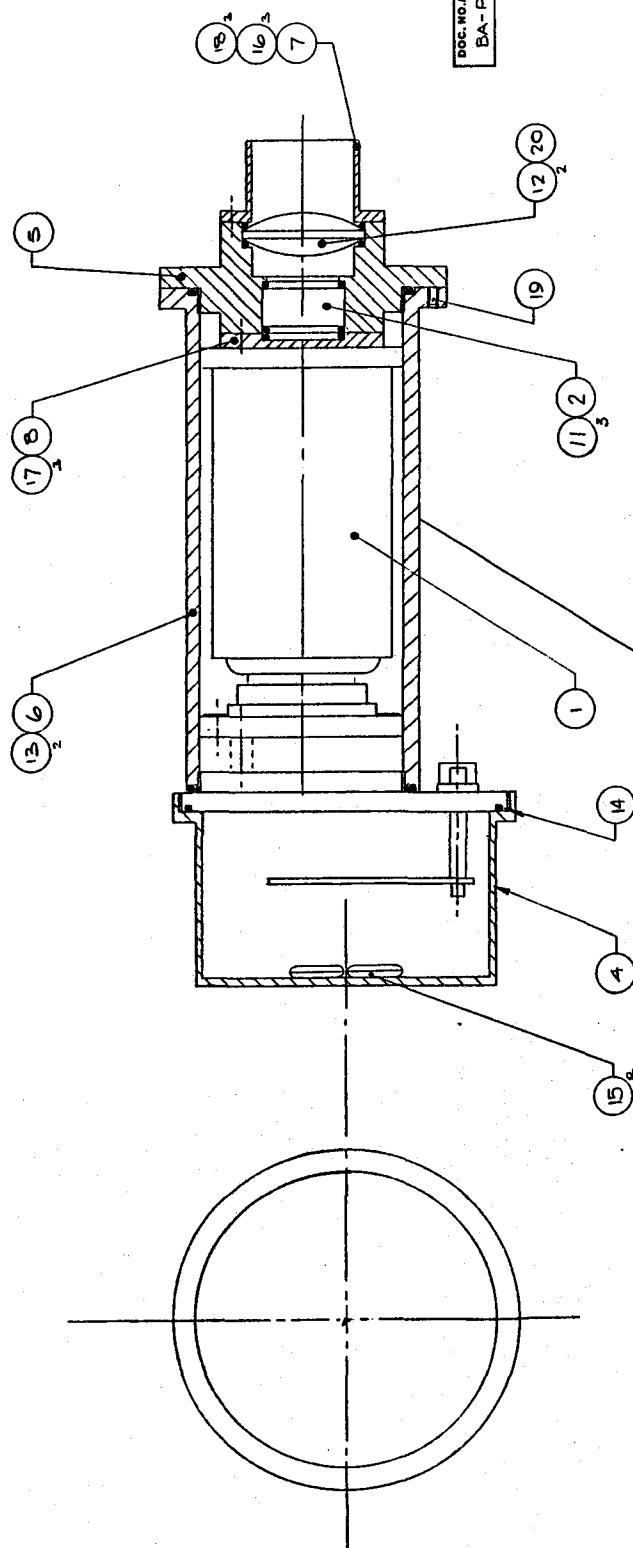
STEPPER MOTOR

[illegible]

COMPUTER GENERATED DRAWING
FILENAME: BA-S02.DWG

FIG 7.6.3-3

REV.	DESCRIPTION	REV. NO.	DATE	DWN.	APP.
1	FIRST ISSUE	1	30 MAR 60		
2	WAS SED 391400-1C-180	2	22 MAR 60		
3	ADD P/Ns ON P/L. REVISE NOTE 1	3	27 APR 60		
4	ADD P/Ns ON P/L. REVISE NOTE 1	4	27 APR 60		
5	ADD P/Ns ON P/L. REVISE NOTE 1	5	27 APR 60		



DOC. NO./PART NO.
BA-POI

NOTES

1. REMOVED
2. ON COMPLETION OF NESS STAGE IN A CURRENT PLASTIC ENG. SEAL & LABEL WITH DES NO. & ISSUE.
3. LOCITE ALL SCREWS ON FINAL ASSY USING ITEM 9.
4. FOR ASSY. PROCEDURES SEE: APOI-BA-POI
5. COAT THREADS OF P/N CODE (ITEM 4) WITH TEFLON SPRAY (TYGARDURE TFE SPRAY).

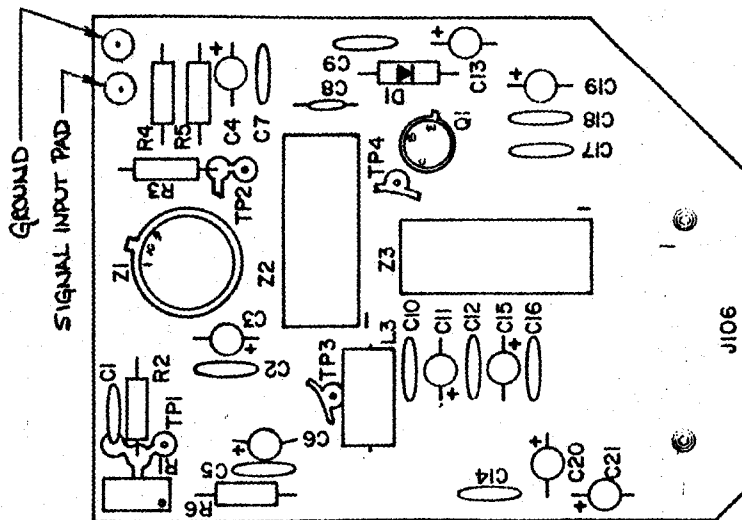
DATE		DRAWN		CHECKED		APPROVED	
30 MAR 60		BA		KL		KL	
FINISH		TOLERANCES		DIM. IN		SCALE	
—		—		1/1		1/1	
MATERIAL				SCI-TEC INSTRUMENTS INC.			
TITLE				PHOTOMULTIPLIER HOUSING			
DOCUMENT NO./PART NO.				BA-POI			
SHEET				REV. 5			
1 OF 1				1 OF 1			

BA-CCI
NEXT ASSY.

ITEM	DOC. NO./PART NO.	SIZE	DESCRIPTION	NO. OFF	REMARKS
1	BA-P02	C	PHOTOMULTIPLIER TUBE ASSY	1	
2	BA-P46	B	ULTRAVIOLET FILTER		MFR BY INRAD
3					
4	BM-P11	C	COVER, PMT	1	
5	BM-P15	C	LENS & FILTER MOUNT	1	
6	BM-P14	C	HOUSING, PHOTOMULTIPLIER	1	
7	BM-P16	B	LENS RETAINER & LIGHT TRAP	1	
8	BM-P17	B	FILTER RETAINER	1	
9	85-10-145		ADHESIVE SEALANT LOCTITE 242 MEDIUM	A/R	242-31 LOCTITE
10					
11	83-10-620		O' RING #020-7/8x1x1/16 NBR	3	ARP568A-020 NATIONAL
12	83-10-628		O' RING #028-1 3/8x1 1/2x1/16 NBR	2	ARP568A-028 NATIONAL
13	83-10-638		O' RING #038-2 5/8x2 3/4x1/16 NBR	2	ARP568A-038 NATIONAL
14	83-10-644		O' RING #044-3 3/4x3 7/8x1/16 NBR.	1	ARP568A-044 NATIONAL
15	70-10-012		DESSICANT 2164 MINIPAX T 1.56GM-900/GAL	2	02-00041AG09 MULTIFORM DESS.
16	83-95-748		WASHER #4 SPLIT LOCK SS MED PAT 316	3	
17	83-87-161		SCREW, MACH., 4-40x1/4 FH. HX. SC. 82D SS	3	
18	83-51-762		SCREW, 4-40x5/16 BUTTON HD. HX SOC. CAP SS	3	
19	83-56-143		SCREW, SET, 6-32x1/4 CUP PT. SS. HX SOC.	1	
20	10-10-020		LENS BI/CX GI FSD QTZ 38.1mm D, 38.1mm FL	1	ESCO
21					
22					

DATE DEC 80	ISSUE/REV.NO.	1	2	3	4	5			
	DATE	JAN 81	AUG 6, 1982	OCT/82	87-11-17	90-9-29			
DWN. RR	RN/CN NUMBER	39400-2N-289	REV. BY A.E.E.	8211-DCN-009	DCN-351	DCN-503			
	APPD.		AWO	KL	RA	KL			
CHKD.	SCI-TEC INSTRUMENTS INC.			TITLE PHOTOMULTIPLIER HOUSING ASSY.					
APPD. KL				SUPERSEDE		SHEET 1 OF 1		ITEMS LIST FOR BA-POI	

DOC. NO./PART NO.	DESCRIPTION	ISS. REV.	RN/CN NUMBER ECN NUMBER	DATE	DWN. APPD.
BA-P23		3		FEB 83	KL
		4	8505-DAN-239	MAY 83	KL
	P/L REVISION	5	DAN-231	88-1-6	CW, PA



COMPONENT LAYOUT
FOR HIGH SPEED AMPLIFIER
NEG # 391400-3C-103
SCALE: 2" = 1"
ISSUE 3

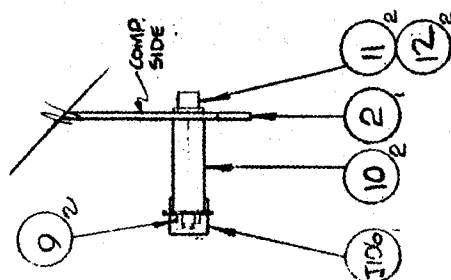


FIG 7.6.4-3

NOTES: 1. ENSURE THE TURNS OF L3 DO NOT TOUCH EACH OTHER,
OR THE PCB.

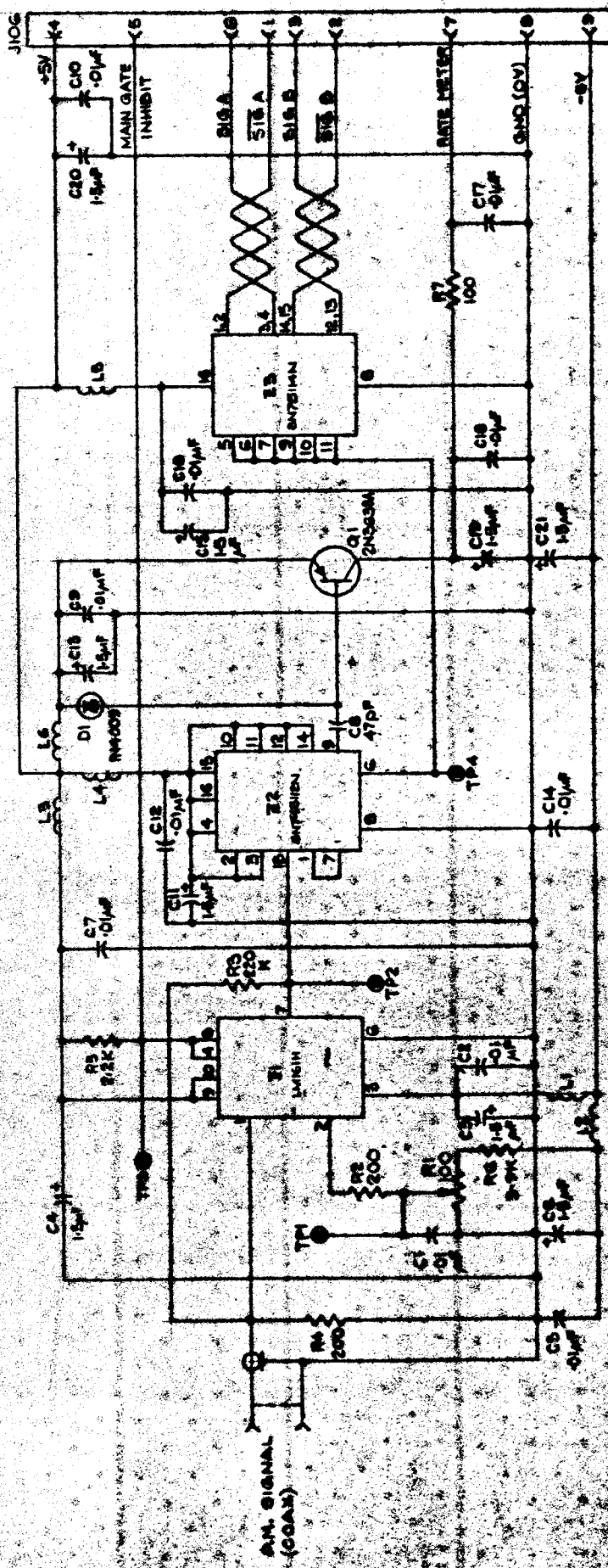
2. PUT ITEM 9, TEMPORARY HOLD DOWN NUTS IN PLACE AND TRIM
CONNECTOR PINS TO .090" BEFORE SOLDERING THE PINS. THE
NUTS WILL BE REMOVED WHEN MOUNTED TO NEXT ASSY. UP.

TEST PROC.: 1. APPLY +1 → -4V 2 MHz PULSE
2. TP1 → 30 mV ADJUST POT R1
3. AT TP1, TP4 SEE 2 MHz "CLEAN SIGNAL"
4. TP3-MIN GATE INHIBIT INPUT, 16 Msec WIDE
REPEATS EVERY 130 Msec.
5. TP4 - 500 KHz SQUARE WAVE
6. CURRENT DRAIN +5 ± 120 mA ± 20; -8 ± 10 mA ± 3
PIN 4 IS +5V; PIN 9 IS -5V; PIN 8 IS GND.
7. BAG WHEN TESTED AND INDICATE ON BAG TESTED
TO BA-P23 PROCEDURE.

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SCI-TEC Instruments Inc.

SCI-TEC INSTRUMENTS INC.		NEXT ASSEMBLY: BA-P23	
SCALE 2" = 1"	DIMS.	HIGH SPEED AMP BOARD ASSY.	
MATERIAL	TOLS.	DATE FEB 83	CHKD. DAN
FINISH		DWN. DAN	APPD. KL
SHT. 1 of 1	SIZE B	NUMBER BA-P23	ISS. 5

Rev	W	Y	plan	Doc
1	NEW DWG			3620
2	WAS AES	COGOS-R4		NOV/82
3				KL MAY/85



- NOTES
1. CHANGES 1, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100 HAVE BEEN EXAMINED AND FOUND TO BE CORRECT.
 2. RESISTOR TO NOT NORMALLY USED.
 3. 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100 ARE PLACED BY CONSULTING TEAM.

GENERAL NOTES: 1-PARTS LIST # BP-P23		DATE 5 DEC 1981		DRAWN BY W. BLACH		ALL dimensions are in inches unless otherwise indicated		THIS DOCUMENT IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM.	
DESIGN BY: [Signature]		CHECKED BY: [Signature]		DATE 5 DEC 1981		REVISIONS 1. 5 DEC 1981		REVISIONS 1. 5 DEC 1981	
APPROVED BY: [Signature]		DATE 5 DEC 1981		REVISIONS 1. 5 DEC 1981		REVISIONS 1. 5 DEC 1981		REVISIONS 1. 5 DEC 1981	
Associated Specification 95-P23		Drawing No. 95-P23		Associated Specification 95-P23		Associated Specification 95-P23		Associated Specification 95-P23	

SCALE	DATE	DATE	DATE	DATE
1:1	88-7-8	88-7-17	88-7-17	88-7-17
DATE	DATE	DATE	DATE	DATE
88-7-8	88-7-17	88-7-17	88-7-17	88-7-17
88-7-8	88-7-17	88-7-17	88-7-17	88-7-17
88-7-8	88-7-17	88-7-17	88-7-17	88-7-17

DOCUMENT NO. BA-P42

DESCRIPTION

REV.

DCH NUMBER

DATE

DWN. APD.

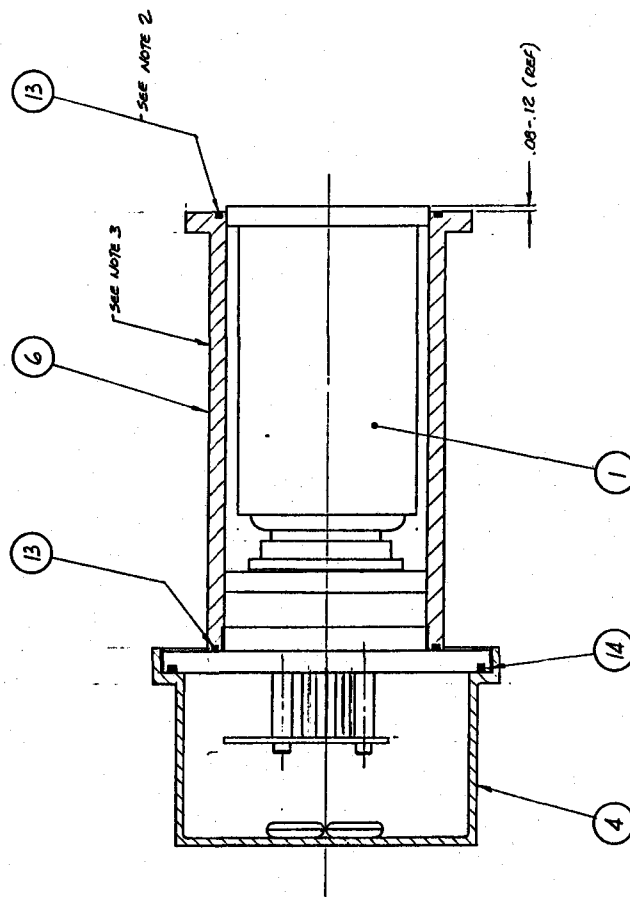
FIRST ISSUE

REV.

DCH NUMBER

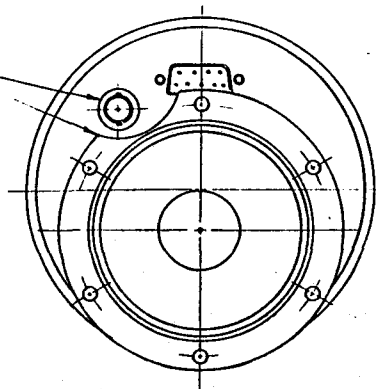
DATE

DWN. APD.



NOTES:

- 1.- ASSEMBLE PER AP-BA-P42
- 2.- PERFORM ACCEPTANCE TEST PROCEDURE PER TP-BA-P42
- 3.- ATTACH AN ADHESIVE LABEL INDICATING ASSY PART NO. & ISSUE, ASSY SERIAL NO., AND P.M.T. SERIAL NO. WHERE SHOWN.
- 4.- SUITABLY COVER OPEN END OF ASSY TO PROTECT P.M.T. AND SECURE O-RING.
- 5.- PLACE FINISHED ASSEMBLY IN A CLEAN PLASTIC BAG, AND LABEL WITH PART NO. & ISSUE.



SCALE	DATE	DATE	DATE	DATE
1:1	88-7-8	88-7-17	88-7-17	88-7-17
DATE	DATE	DATE	DATE	DATE
88-7-8	88-7-17	88-7-17	88-7-17	88-7-17
88-7-8	88-7-17	88-7-17	88-7-17	88-7-17
88-7-8	88-7-17	88-7-17	88-7-17	88-7-17

SCALE	DATE	DATE	DATE	DATE
1:1	88-7-8	88-7-17	88-7-17	88-7-17
DATE	DATE	DATE	DATE	DATE
88-7-8	88-7-17	88-7-17	88-7-17	88-7-17
88-7-8	88-7-17	88-7-17	88-7-17	88-7-17
88-7-8	88-7-17	88-7-17	88-7-17	88-7-17

SCALE	DATE	DATE	DATE	DATE
1:1	88-7-8	88-7-17	88-7-17	88-7-17
DATE	DATE	DATE	DATE	DATE
88-7-8	88-7-17	88-7-17	88-7-17	88-7-17
88-7-8	88-7-17	88-7-17	88-7-17	88-7-17
88-7-8	88-7-17	88-7-17	88-7-17	88-7-17

BREWER REFERENCE DOCUMENTATION

Section 7.7 Brewer Options

7.7.1 Option B - Azimuth Pointing System

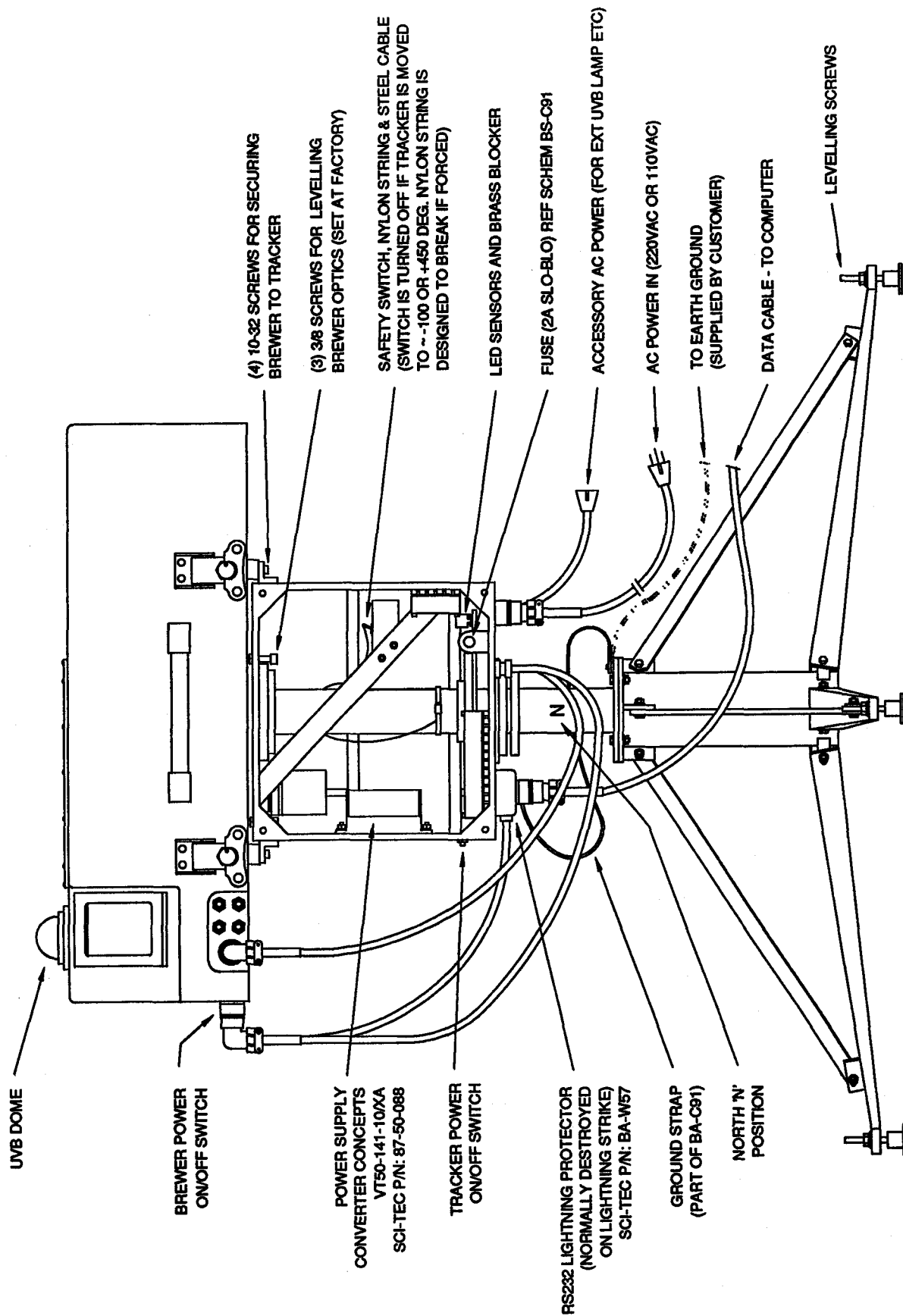
- Azimuth Tracker and Stand	7.7.1-1
- Azimuth Tracker Unit Schematic C91	7.7.1-2
- Azimuth Tracker Board Assy C99	7.7.1-3
- Azimuth Tracker Board Schematic	7.7.1-4
- Azimuth Motor Wiring W20	7.7.1-5
- Azimuth Power Supply Specifications	7.7.1-6

Reference Acceptance Manual Sec 2.1 thru 2.5 for setup and maintenance information.

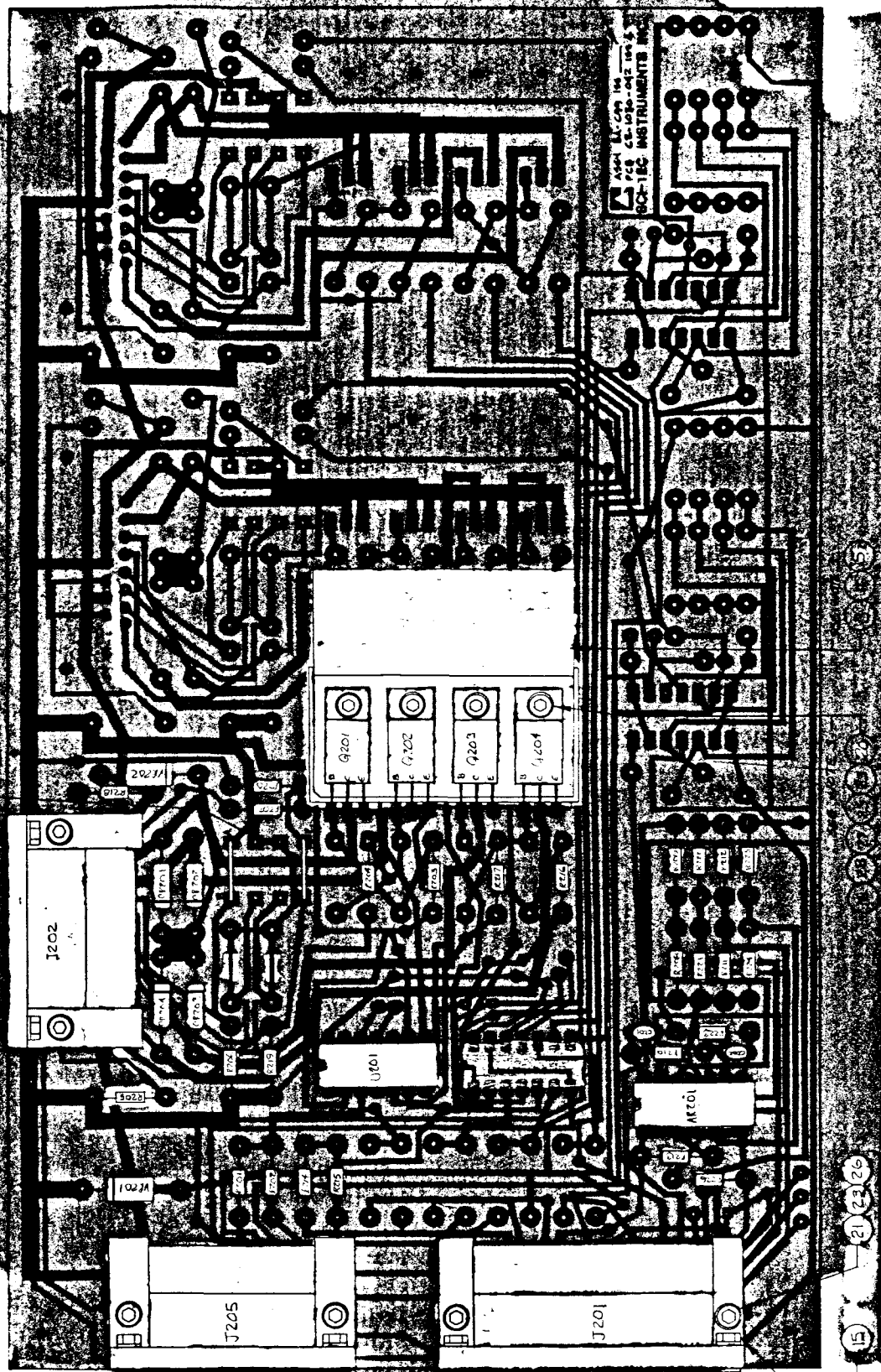
7.7.2 Option C - UVB F81 7.7.2-1

Reference Fig 7.1-5 of this manual for further information on Option C.

CAUTION: Quartz Hemisphere (UVB Dome) is fragile. Ensure UVB Dome is removed and packed separately when the Brewer is transported.



AZIMUTH TRACKER AND TRIPOD STAND
 FRONT VIEW WITH COVER REMOVED
 (REFERENCE SECTION 2.1 & 2.2 OF ACCEPTANCE MANUAL FOR SETUP INSTRUCTIONS)



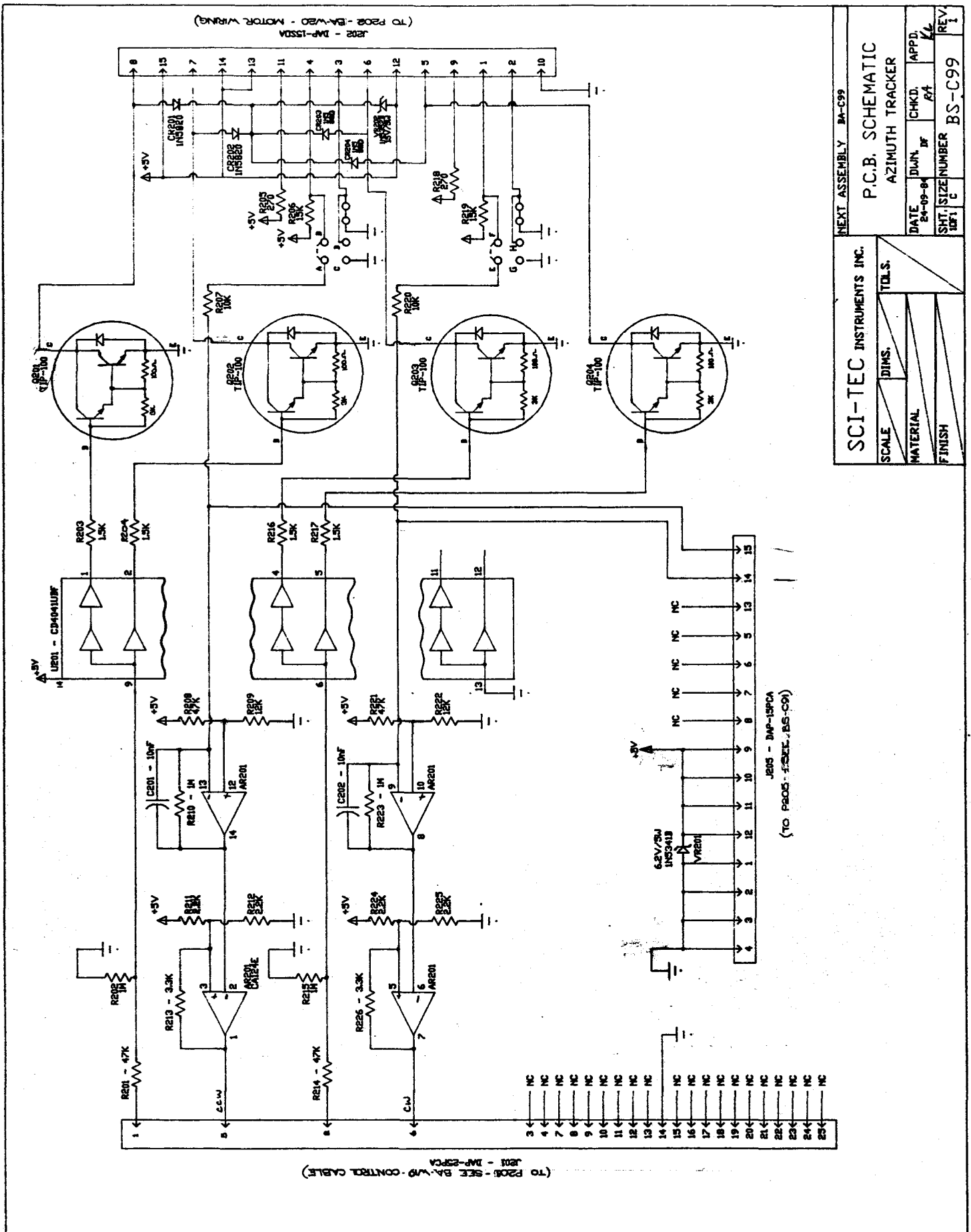
NOTES

1. MOUNT DIODES WITH PART NO UP.
2. APPLY HEATSINK COMPOUND (ITEM 16) ON TOP OF HEATSINK (ITEM 3), AND ON THE BOTTOM OF TRANSISTORS Q201 - Q204.
3. MARK APPROPRIATE REVISION LEVEL OF Assy WHENEVER SHOWN.

FIG. 7.7.1-3

Q19	PART NO	MIR'S NO	TEST REPORT	REMARKS	1749
ZONE	2:1	NET ASSY	ZA-021	© 1984 SCI-TEC INSTRUMENTS INC. POB ASSEMBLY AZIMUTH TRACKER THIS DOCUMENT IS TO BE DISCLOSED TO OTHERS, COPIED OR USED FOR PRODUCTION WITHOUT WRITTEN PERMISSION FROM SCI-TEC INSTRUMENTS INC.	
DATE	10/18/84	ITEMS IN	11/10/84		
QUANTITY	100	PERMITS	100		
Q20	RA	ROBUSTES (UNLESS OTHERWISE SPEC.)	100		
Q21	RA	ROBUSTES	100		
Q22	RA	RA	100		
Q23	RA	RA	100		
Q24	RA	RA	100		
Q25	RA	RA	100		
Q26	RA	RA	100		
Q27	RA	RA	100		
Q28	RA	RA	100		
Q29	RA	RA	100		
Q30	RA	RA	100		
Q31	RA	RA	100		
Q32	RA	RA	100		
Q33	RA	RA	100		
Q34	RA	RA	100		
Q35	RA	RA	100		
Q36	RA	RA	100		
Q37	RA	RA	100		
Q38	RA	RA	100		
Q39	RA	RA	100		
Q40	RA	RA	100		
Q41	RA	RA	100		
Q42	RA	RA	100		
Q43	RA	RA	100		
Q44	RA	RA	100		
Q45	RA	RA	100		
Q46	RA	RA	100		
Q47	RA	RA	100		
Q48	RA	RA	100		
Q49	RA	RA	100		
Q50	RA	RA	100		
Q51	RA	RA	100		
Q52	RA	RA	100		
Q53	RA	RA	100		
Q54	RA	RA	100		
Q55	RA	RA	100		
Q56	RA	RA	100		
Q57	RA	RA	100		
Q58	RA	RA	100		
Q59	RA	RA	100		
Q60	RA	RA	100		
Q61	RA	RA	100		
Q62	RA	RA	100		
Q63	RA	RA	100		
Q64	RA	RA	100		
Q65	RA	RA	100		
Q66	RA	RA	100		
Q67	RA	RA	100		
Q68	RA	RA	100		
Q69	RA	RA	100		
Q70	RA	RA	100		
Q71	RA	RA	100		
Q72	RA	RA	100		
Q73	RA	RA	100		
Q74	RA	RA	100		
Q75	RA	RA	100		
Q76	RA	RA	100		
Q77	RA	RA	100		
Q78	RA	RA	100		
Q79	RA	RA	100		
Q80	RA	RA	100		
Q81	RA	RA	100		
Q82	RA	RA	100		
Q83	RA	RA	100		
Q84	RA	RA	100		
Q85	RA	RA	100		
Q86	RA	RA	100		
Q87	RA	RA	100		
Q88	RA	RA	100		
Q89	RA	RA	100		
Q90	RA	RA	100		
Q91	RA	RA	100		
Q92	RA	RA	100		
Q93	RA	RA	100		
Q94	RA	RA	100		

FIG. 7.7.1-4





VT 50/VX 50 TECHNICAL DATA

CONVERTER
CONCEPTS INC

SCI-TEC # 87-50-088
(VT50-141-10/XA)

FEATURES

- 50 Watt Switching Power Supply
- Single, Dual and Triple Output
- AC/DC or DC/DC Models Available
- Best Low DC Input-High Power Output Ratio
- Overvoltage Limit Protection
- UL Recognized

SPECIFICATIONS

Efficiency AC Input:

Single Output: 75% Typical 70% Min.

Multiple Output: 70% Typical 65% Min.

Efficiency DC Input:

Single Output: 75% Typical 55% Min.

Multiple Output: 70% Typical 50% Min.

Turn-On Overshoot: None

Turn-On Surge Current: Limited by active soft-start to 5A 1st cycle

Turn-On Time: 100 msec.

Hold-Up Time: 90 VAC Input (low line) 12 msec.

115 VAC Input (nominal line) 20 msec.

250 VAC Input 180 msec.

Ripple: 20 mV pk-pk Max.

Switching Noise: 2 MHz @ 20 kHz Rep. Rate; 100 mV pk-pk or 1%

Transient Response: 0.5V excursion for 50% to 100% or 100% to 50% load change with return to regulation in 2 msec. Load change 1 A/ μ sec.

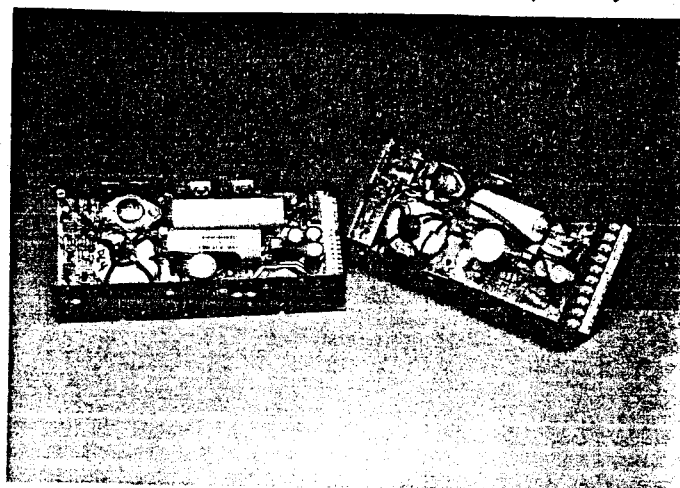
Operating Temp: -20°C to +80°C Base Plate Full Load. -20°C to +55°C Free Air Full Load. Derate linearly to 50% output at 80°C

Temperature Coefficient: 0.02%/°C

Storage Temp: -55°C to +85°C

Isolation:

Input		
Hipot	AC	DC
Input to Output	1.5kVAC	250 VDC
Input to Case	1.5kVAC	250 VDC
Output to Case	250 VDC	250 VDC



Shock & Vibration: Designed to withstand normal commercial shock and vibration conditions.

Short Circuit Protection: Current limited for overload and short circuit protection.

Multiple Output Regulation Specifications:

Regulation: Line, All Outputs: 3%

Regulation: Load, Output No. 1: 20% Load—Full Load 1%

Regulation: Load, All Other Outputs: 50 ma—Full Load 1.5%

% of Full Load Current					
Output #1 load current	20	35	50	75	100
Each Auxiliary load current	50	75	100	100	100

Size: VT 50 2.063" x 4.187" x 8.063" (52.4 x 106.4 x 204.8 mm)

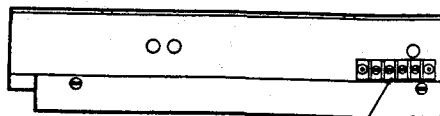
Size: VX 50 2.125" x 3.581" x 8.000" (54.0 x 91.0 x 203.2 mm)

Weight: 2.0 lbs. (0.91 kg)

MECHANICAL DIMENSIONS

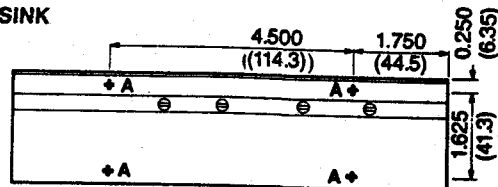
VT 50 OPEN FRAME & ENCLOSED MODULES

Four No. 8 mounting
screws recommended

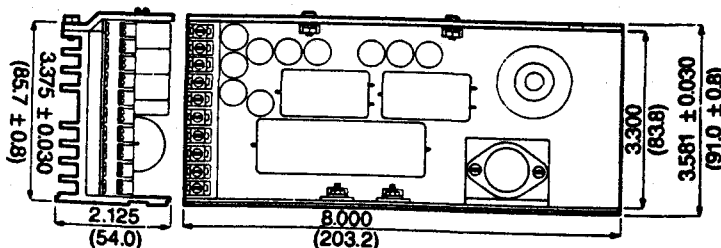
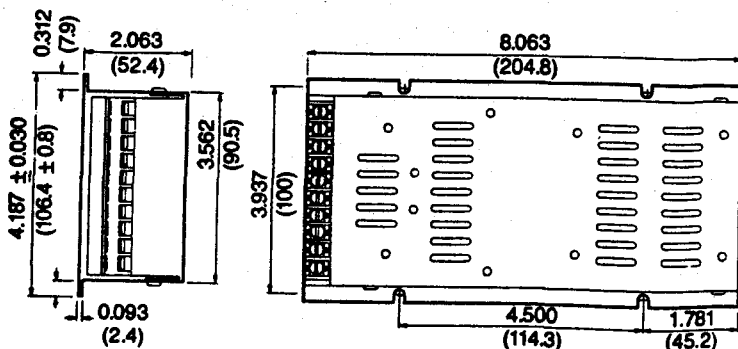


Optional remote sense and shutdown terminals
2-56 spade lug terminal block

VX 50 HEATSINK MODULES



Hole A: Tapped to 6-32 (4) for mounting



Dimensions shown in inches. Dimensions in parentheses () indicate millimeters. Tolerance ± 0.010 (0.3 mm) unless otherwise noted.

FIG
7.7.1-6

VT 50/VX 50

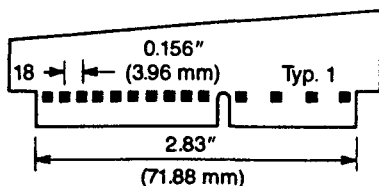


**CONVERTER
CONCEPTS**

Industrial Parkway • Pardeeville, WI 53954
(608) 429-2144 • TWX: 910-280-2630
Toll-Free 800/253-5227

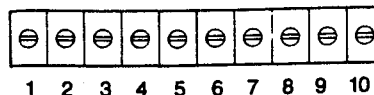
TERMINATION OPTIONS

SQUARE PINS (OPTIONAL)

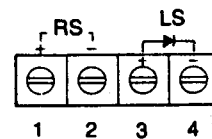


- | | |
|---------------|-------------|
| 18. V3 Output | 9. Chassis |
| 17. V4 Output | 8. Keyslot |
| 16. V4 Output | 7. -V Input |
| 15. V2 Output | 6. NC |
| 14. V2 Output | 5. +V Input |
| 13. V1 Output | 4. NC |
| 12. V1 Output | 3. AC Input |
| 11. Ground | 2. NC |
| 10. Ground | 1. AC Input |

4-40 TERMINAL BLOCK (STANDARD)



REMOTE SENSE AND LOGIC SHUTDOWN



TYPICAL

- | | |
|--------------|--------------|
| 1. V3 Output | 6. Chassis |
| 2. V4 Output | 7. -DC Input |
| 3. V2 Output | 8. +DC Input |
| 4. V1 Output | 9. AC Input |
| 5. Return | 10. AC Input |

- | |
|---------|
| 1. RS + |
| 2. RS - |
| 3. LS + |
| 4. LS - |

Caution:
Shutdown Current 20mA max.

INPUT AND OUTPUT RANGES

INPUT VOLTAGE RANGE (SERIES SPECIFIC)

Input Option	Input Voltage Range AC DC	Frequency In Hz	Input Fuse (User Provided)
1	90-250	100-350	44-440
2		10-40	
3		20-60	

OUTPUT RANGE (SERIES SPECIFIC)

Model No.	Output	Volts	Amps	Adjustment
14	V1	+5	0-10	± 10%
16	V1	+12	0-5	± 10%
17	V1	+15	0-4	± 10%
18	V1	+28	0-2	± 10%
22	V1	+5	1.8-9	± 10%
	V3	-5	.05-1	± 5% Fixed

Model No.	Output	Volts	Amps	Adjustment
24	V1	+5	1.6-8	± 10%
	V2	+12	.05-1	± 5% Fixed
26	V1	+12	.6-3	± 10%
	V3	-12	.05-1	± 5% Fixed
27	V1	+15	.4-2	± 10%
	V3	-15	.05-1	± 5% Fixed
32	V1	+5	1.2-6	± 10%
	V2	+12	.05-1	± 5% Fixed
	V3	-5	.05-1	± 5% Fixed
34	V1	+5	1-5	± 10%
	V2	+12	.05-1	± 5% Fixed
	V3	-12	.05-1	± 5% Fixed
37	V1	+5	1-5	± 10%
	V2	+15	.05-.8	± 5% Fixed
	V3	-15	.05-.8	± 5% Fixed

SELECTING A UNIT: VT 50/VX 50

Series	Total Power	No. of Outputs	Output Range	Input	Package	Termination	Group 1 Options	Group 2 Options
X	X	X	X	X	X	X	X	X
VT Standard	50	1 2 3	2 4 6 7 8	1 2 3	0 Open Frame	0 Terminal Block	A B C D E F G	A B C D E F G
VX Heat Sink (open frame only)			See series specific output range	See series specific input range	1 Enclosed	1 Square Pin	H I J K	H I J K
					2 P.C. Board	2 Wire Holes Only		

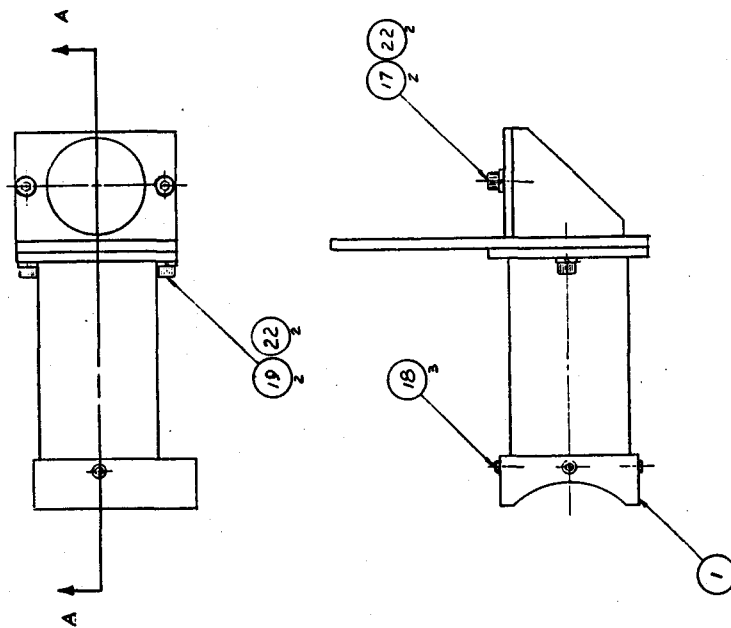
GROUP 1 OPTIONS	Remote Sense	Logic Shutdown	Overvoltage Shutdown Protection	Power Fail Detect
A	•			
B		•		
C			•	
D				•
E	•	•		
F	•		•	
G	•			•
H		•	•	
I		•		•
J	•	•	•	
K	•	•		•
X	No Options			

GROUP 2 OPTIONS	Reg- ulated	Reverse Polarity Protection	Thermal Shutdown
A	•		
B		•	
C			•
D	•	•	
E	•		•
F		•	•
G	•	•	•
X	No Options		

For all U.L. recognized products, the application criteria is available at customer request. This material will give additional guidelines for installation and operation as per Underwriters Laboratory.

DESCRIPTION	REV	DCN#	DATE	UNW/APP
FIRST ISSUE	1		05-1-1	DA
ADD IT. 13, DIM. CIRCULAR	2	345	01-12-24	DA
DESIGNED & REDRAWN	3	401-1	08-5-25	DA
	4	489-1	09-2-9	RP
				DA

DA-F-81



NOTES:

1. CUT O-RING, ITEM 13 INTO $\frac{9}{16}$ " LONG PIECES (18) & INSERT INTO (14)
2. .036 DIA. HOLES IN ITEM 6, UVB LIGHT SHIELD (1 INTO (14). .036 DIA. HOLES IN ITEM 9, UVB PRISM RETAINER PRIOR TO ASSEMBLY
3. PLACE (2) $1\frac{1}{16}$ " STRIPS OF TAPE, ITEM 12 ALONG CORNERS OF INNER SLANTED SURFACE

FIG. 7.7.2-1

SCALE 1:1		NEXT ASSY. BA-CB4		 SCHTEC INSTRUMENTS INC.		19-37 This drawing is not to be produced in other, copied or used for product without written permission from SCHTEC Instruments, Inc.	
DATE 05-25-12	BY RP	CHNG 02	APPRO 02	INCHES	MM	INCHES	MM
DIMENSIONS IN		TOLERANCES UNLESS OTHERWISE SPECIFIED		FRACTIONS $\frac{1}{16}$ "		DECIMALS $\pm .005$	
IF DUAL DIMS.		TOLERANCES UNLESS OTHERWISE SPECIFIED		FRACTIONS $\frac{1}{16}$ "		DECIMALS $\pm .005$	
PARTS				DOCUMENT NUMBER			
1 OF 1				BA-FB1			
SHEET				REV			
1 OF 1				4			
UVB PRISM ASSY							