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

TABLE OF CONTENTS

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:

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BREWER OZONE SPECTROPHOTOMETER

#0XX

AES SCI-TEC

CANADA

VERSION 39.5 NOV 22, 1982
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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 accidently 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)

fl. 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.

f1. 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 and 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 an 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, than 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 or 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 it's 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 circuity.

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 +/- 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

Section Overview

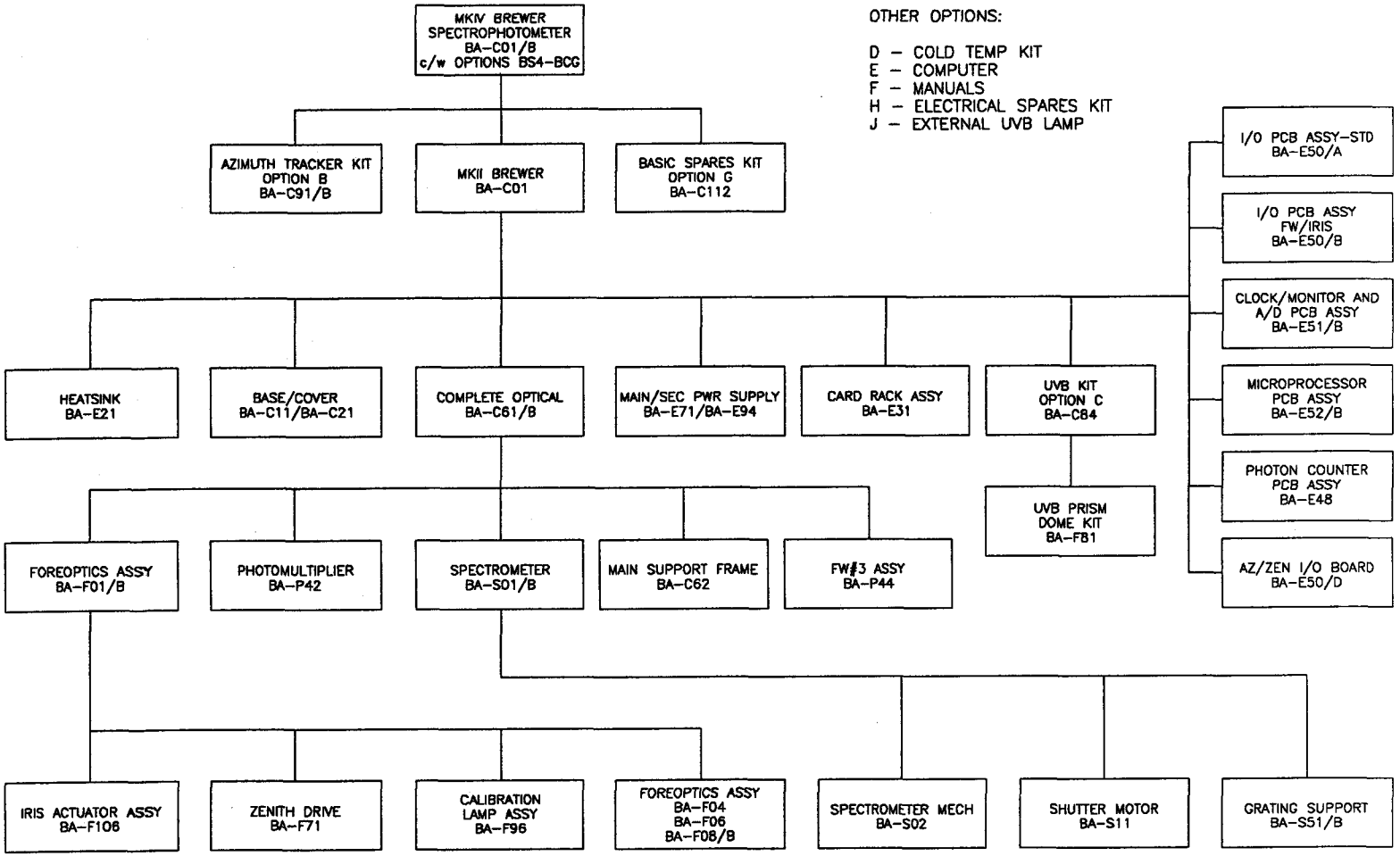
Fig 7.1-1, -2: Configuration Control Diagrams (Family Tree) for complete MKII and MKIV BREWER systems including all possible purchase options

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.



BREWER SERIAL NUMBER _____

CUSTOMER _____

DATE MANUFACTURED _____

DATE DELIVERED _____

SCI-TEC INSTRUMENTS INC., SASKATOON CANADA

CONFIGURATION CONTROL DIAGRAM: BREWER OZONE SPECTROPHOTOMETER MKIV

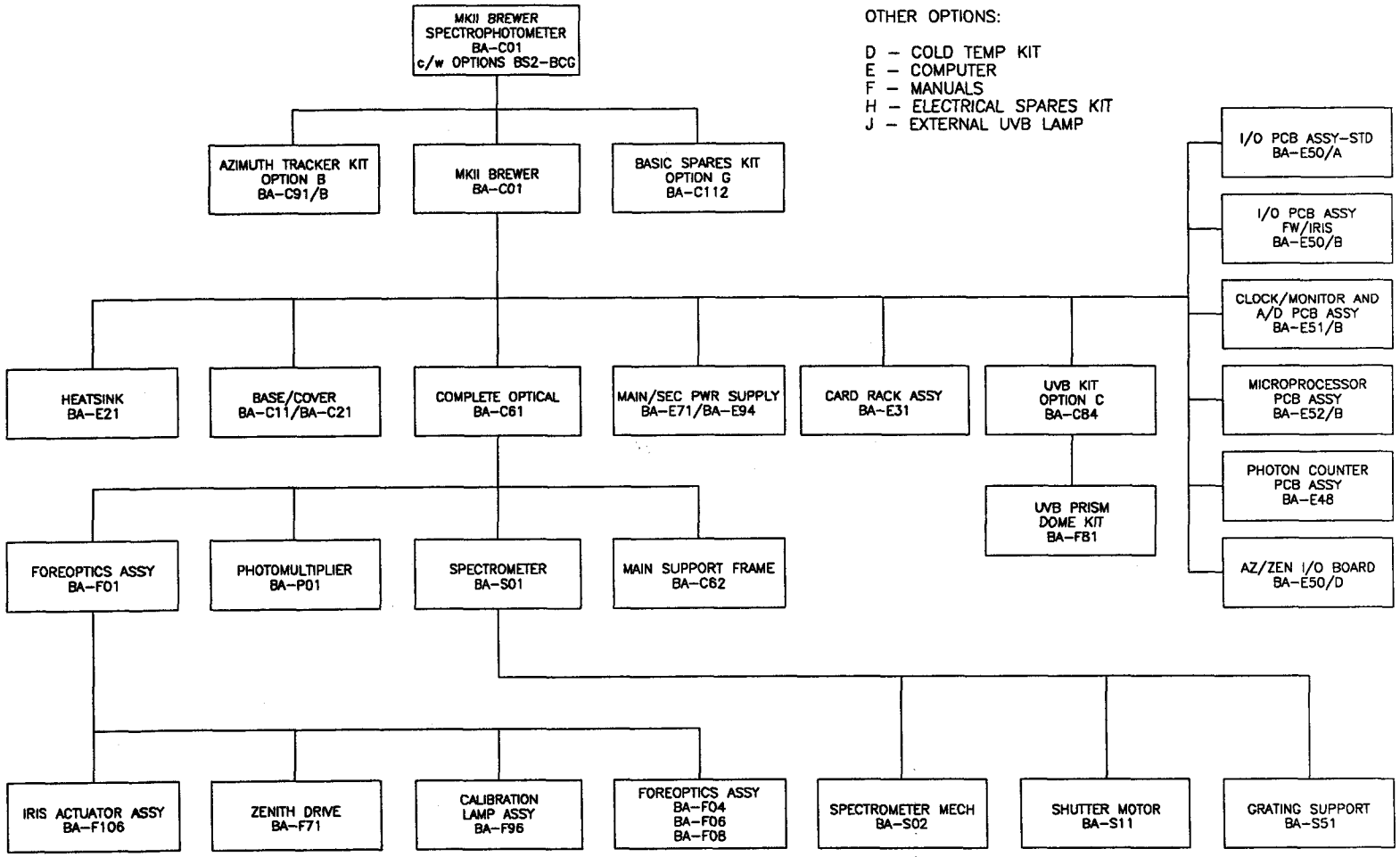
NO. _____

REVISION _____

APPD BY _____

DATE _____

Fig 7.1-1.1



BREWER SERIAL NUMBER _____

CUSTOMER _____

DATE MANUFACTURED _____

DATE DELIVERED _____

SCI-TEC INSTRUMENTS INC., SASKATOON CANADA

CONFIGURATION CONTROL DIAGRAM: BREWER OZONE SPECTROPHOTOMETER MKII

NO. _____

REVISION _____

APPD BY _____

DATE _____

Fig 7.1-1.2

BREWER SYSTEM COMPONENTS

STANDARD AVAILABLE OPTIONS

OPTION A — BREWER SPECTROPHOTOMETER

MODEL MARK II $-O_3-SO_2$ $-110/220VAC$ BA-C01 (OR) MODEL MARK IV $-O_3-SO_2-NO_2$ $-110/220VAC$ BA-C01/B (OR) MODEL MARK III DOUBLE SPECTROMETER BA-C190

BREWER MKIII SHIPPING CRATE BA-C208

BREWER MKII/MKIV SHIPPING CRATE BA-C149

OPTION B — AZIMUTH TRACKER/ MAN ZEN ADJ KIT

AZIMUTH TRACKER 110/220VAC BA-C91/B (OR) MANUAL ZENITH ADJ OPTION KIT BA-C159

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, MKII/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

LDDS (RS422) 110V: BA-C204 220V: BA-C204/B (c/w 15m of cable, see note 5)

ALUM TRANSIT CASE FOR MKII OR MKIV BM-C205

ALUM TRANSIT CASE FOR MKIII BM-C206

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

COMPUTER GENERATED DRAWING
FILENAME: BSC1000A.DWG

DOCUMENT NO. BS-C1000

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 LDDS 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 LDDS (BA-C204/B)	749	95.08.11	FV	DS

NOTES:

1. 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.
2. 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-***.
3. SPECIAL ITEMS TO BE ORDERED SEPARATELY.
4. SEE SHT. 2 FOR GENERAL ARRANGEMENT, DIMENSIONS OF MAIN COMPONENTS.
5. LDDS COMES STANDARD WITH A 15m LONG COMMUNICATIONS CABLE ASSY (BA-W68). ANY 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 (O_3-SO_2)
BS3 = MARK III (DBL SPECTR)
BS4 = MARK IV ($O_3-SO_2-NO_2$)

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 −1 − NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE		NEXT ASSY:	
DATE	88-8-5	DIMENSIONS IN	
DWN	CW	IF DUAL DIMS:	mm (inches)
CHKD		Tolerances (unless otherwise specified)	
APPD	AM	INCHES	MM
FINISH		.xxx ± .005 .xx ± .01 ANGLES ± 1° FRACTIONS ± 1/32	.xx ± 0.15 .x ± 0.25 ANGLES ± 1°

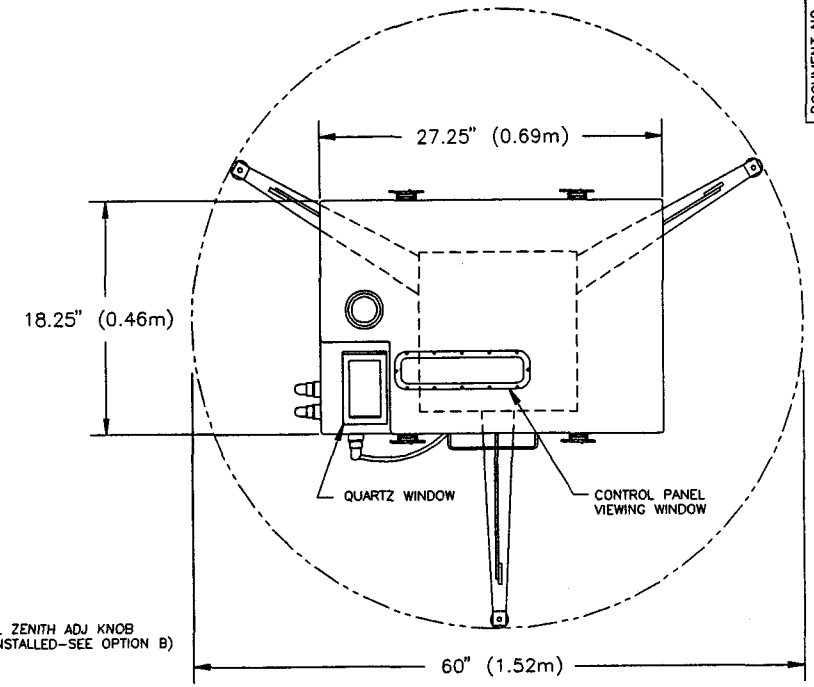
TITLE: BREWER SYSTEMS

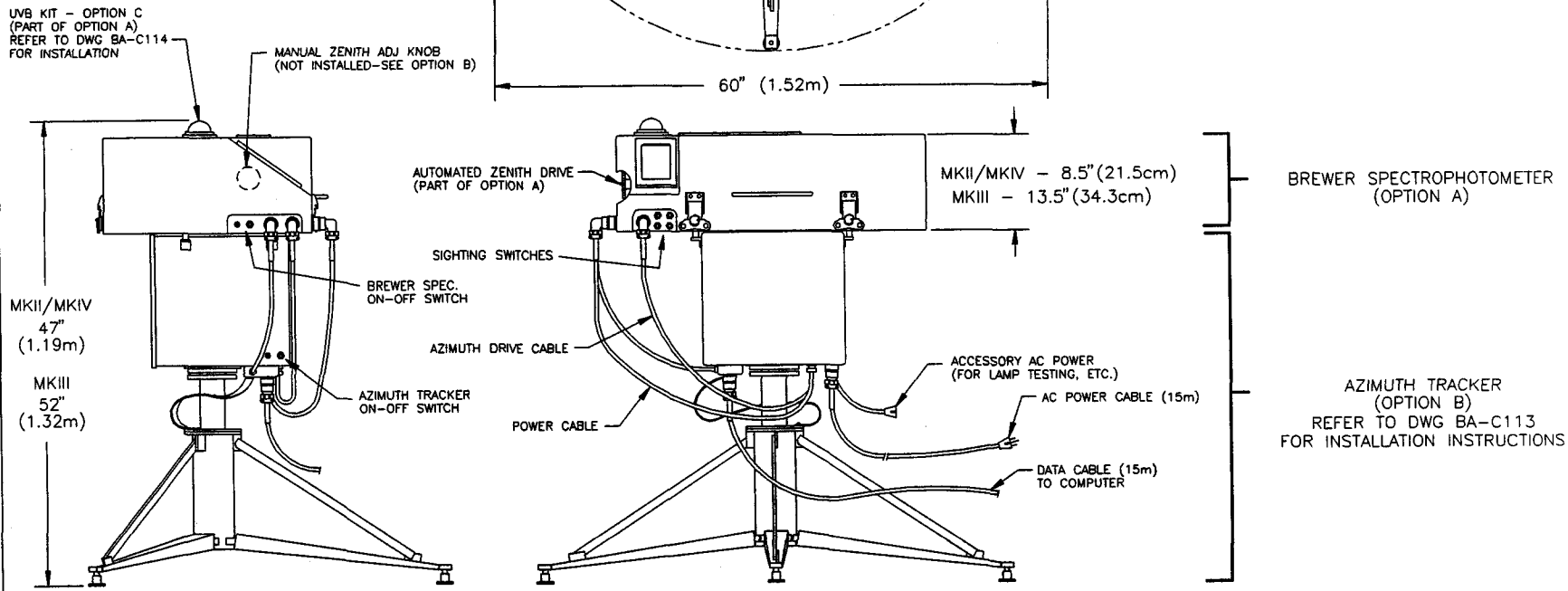
SHEET 1 OF 2 | DOCUMENT NUMBER BS-C1000 | REV. 12

Fig 7.1-2.1

DOCUMENT NO. BS-C1000

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 LODS 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 LODS (BA-C204/B)	749	95.08.11	FV	





NOTES:

1. REFER TO SHT 1 FOR COMPONENT OPTIONS CHART, METHOD OF SYSTEM SPECIFICATION
2. DIMENSIONS SHOWN FOR *REFERENCE PURPOSES ONLY.*
3. OPTIONS D, E, F NOT SHOWN, REFER TO DWG NO'S SHOWN AT EACH OPTION FOR FURTHER INFORMATION.
4. ALL NECESSARY DOCUMENTATION, SOFTWARE AND MANUALS INCLUDED WITH OPTION A (BREWER SPECTROPHOTOMETER).

COMPUTER GENERATED DRAWING
FILENAME: BSC1000B.DWG

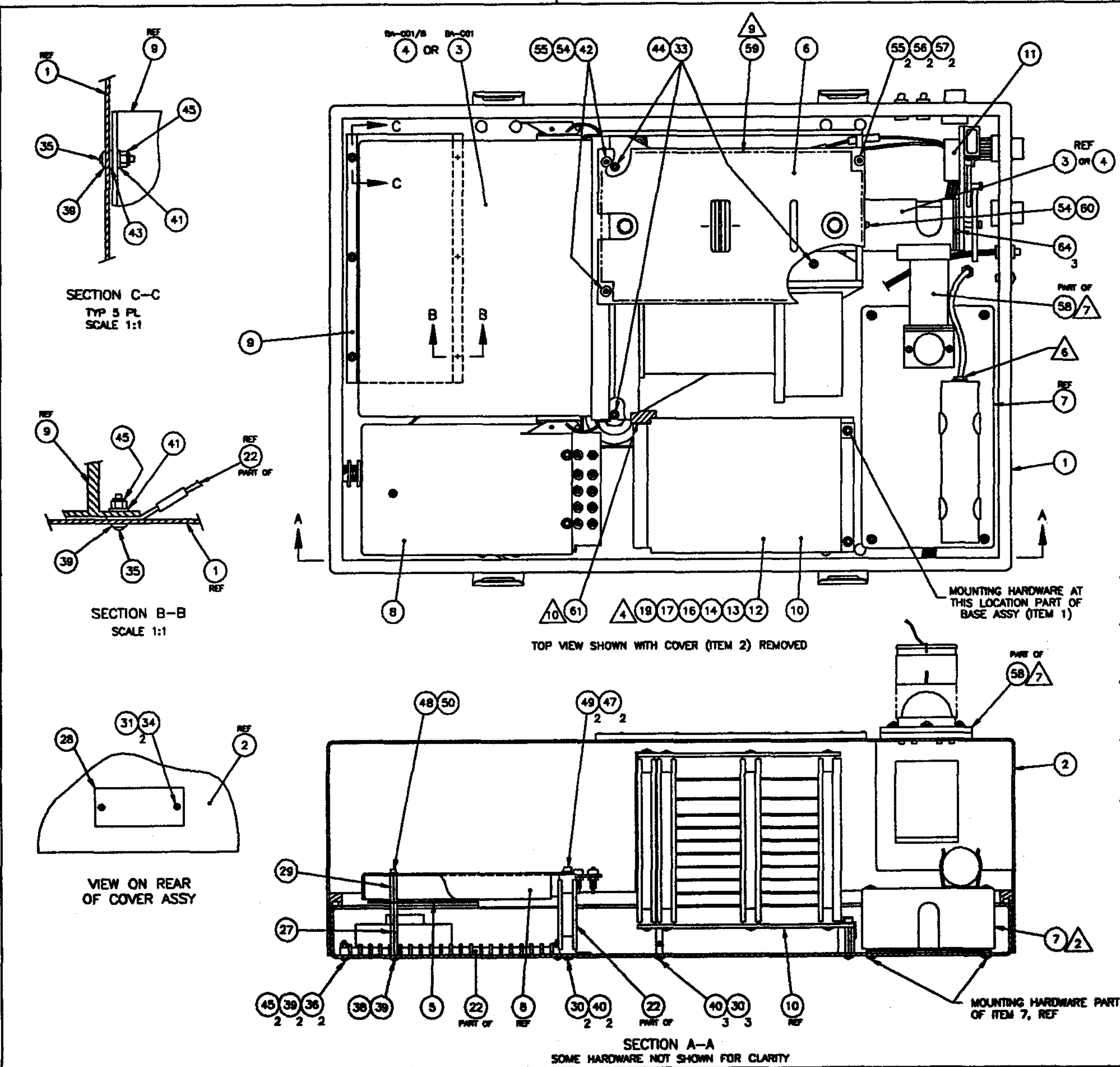
SCALE	—	NEXT ASSY:	—
DATE	88-8-5	DIMENSIONS IN	—
DWN	CW	IF DUAL DIMS:	mm (inches)
CHKD		Tolerances (unless otherwise specified)	
APPD	AM	INCHES	MM
FINISH	—	.xxx ± .005 .xx ± .01 ANGLES ± 1° FRACTIONS ± 1/32	.xx ± 0.15 .x ± 0.25 ANGLES ± 1°

SCI-TEC INSTRUMENTS INC.

TITLE: BREWER SYSTEMS

SHEET 2 OF 2 | DOCUMENT NUMBER BS-C1000 | REV. 12

Fig 7.1-2.2



DOCUMENT NO. BA–C01	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	APPD.
	1	WAS SED 391400–1E–200		82.05.13		
	2	WAS AES D0622.R61		82.11.01		KL
	3	ADD CARD LOC GUIDE	283	86.12.18	DF	KL
	4	GENERAL REVISION	392	87.12.18	CW	RA
	5	REDRAWN – ADD /B VERSION	397, 398	88.08.03	CW	RA
	6	DEL NOTE 1, IT's 47 & 48	440	88.10.28	CW	RA
	7	DEL ITEM 28, ADD ITEM 28	449	88.11.12	CW	RA
	8	UPDATE FOR NEW P/S, ADD ITEM 11	482	90.04.04	FV	RA
	9	CHG ITEM 6 FROM PANEL ASSY TO PANEL	487	90.08.30	FV	RP
	10	ADD ITEMS 5 & 8	522	91.01.22	FV	KL
	11	PICTORIAL CHG ONLY	567	92.01.10	FV	RP
	12	REM ITEMS 15,18 (BA–E50C & BA–E52)	581	92.09.03	FV	KL
	13	ADD S/W & BUMPERS (IT's 15,18,54–57)	612, 614	92.09.30	FV	RP
	14	ADD UVB KIT (ITEM 58)	618	92.12.04	FV	RA
	15	ADD IT's 58–61, NOTES 9,10,11	630	93.01.15	FV	KL
	16	CHG ITEM'S 5,15,17&18; ADD NOTE 12	658, 664	93.08.28	FV	KL
	17	ADD IT'S 62 & 63; CHG NOTES 1 & 3	682, 688	94.01.17	FV	

CARD LOCATION TABLE (BA–C01 & BA–C01/B)			
POSITION	PART NO.	FUNCTION	ITEM
1	BA–E50/A	I/O (MICROMETER–SHUTTER)	13
2	BA–E50/B	I/O (IRIS–F/W #1 & #2)	14
3	BA–E50/D *	I/O (AZ TRKR/ZEN DRIVE)	12
4			
5	BA–E48	PHOTON COUNTER	16
6			
7	BA–E51/B (PART OF)	CLOCK/MONITOR (BA–E95)	17
8	BA–E51/B (PART OF)	A/D (90–98–152)	17
9			
10	BA–E52/B	COSMAC MICROPROC	19

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

NOTES:

1. STD SPARES KIT (ITEM 62) TO BE PACKED WITH BREWER PRIOR TO SHIPPING.
2. REFER TO DWG BA–E71 FOR ASSEMBLY DETAILS OF MAIN POWER SUPPLY (ITEM 7).
3. ADHERE DECAL (ITEM 63) AFTER FINAL TEST AS PER INSTRUCTIONS IN PACKING CHECK LIST.
4. REFER TO CARD LOCATION TABLE FOR SLOT POSITION OF ITEMS 12–14, 16, 17 & 19.
5. WIRING HARNESS AND CABLES (ITEM 22–26) NOT SHOWN FOR CLARITY. FASTEN I/O BOARD CABLES FROM BA–E50/D USING ITEMS 20 & 21.
6. REMOVE BOTH RED PLUGS FROM DESSICANT CONTAINER (PART OF ITEM 7). DRILL 1/4" HOLE THRU ONE PLUG AND RE–INSTALL 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.
7. INSTALL UVB KIT (ITEM 58) AS PER INSTALLATION DWG BA–C114.
8. REFER TO OPTICAL AND ELECTRICAL CALIBRATION AND ACCEPTANCE TEST PROCEDURE AM–BA–C05.
9. PRIOR TO SHIPPING, PLACE FOAM (ITEM 59) ON TOP OF CONTROL PANEL.
10. ADHERE 1" OF NEOPRENE STRIP (ITEM 61) TO F.W. #3 ASSY, FLUSH WITH TOP EDGE.
11. ENSURE CABLING 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 RACK.
12. IF UNIT IS TO HAVE A HEATER KIT (BA–C116) INSTALLED PRIOR TO DELIVERY, ENSURE ALL WIRES IN THE PROXIMITY OF THE HEATERS ARE TYE–WRAPPED SO THEY DO NOT COME IN CONTACT WITH THE HEATERS!

QTY –1 – NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE	1:2	NEXT ASSY: BS–C1000	SCI-TEC INSTRUMENTS INC. ©1994
DATE	88.08.02	DIMENSIONS IN INCHES	TITLE: BREWER SPECTROPHOTOMETER ASSEMBLY
DWN	CW	IF DUAL DIMS: mm (inches)	
CHKD	RA	Tolerances (unless otherwise specified)	
APPD	RA	INCHES / MM	
FINISH			SHEET 1 of 1 — DOCUMENT NUMBER BA–C01 — REV. 17

COMPUTER GENERATED DRAWING
FILENAME: BA–C01.DWG

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/Fltrwhl
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		

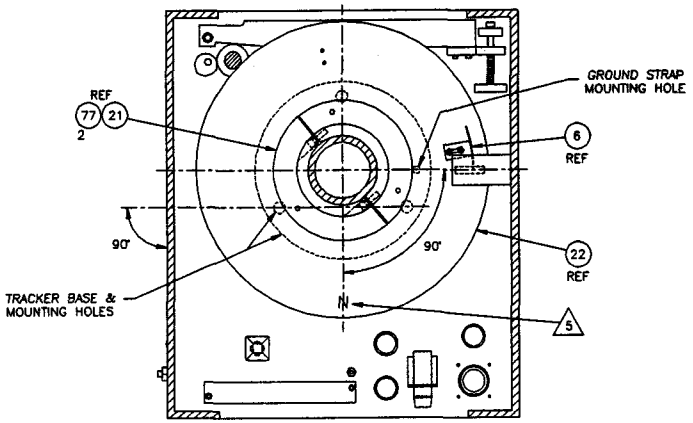
FIG 7.1-3.2

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		

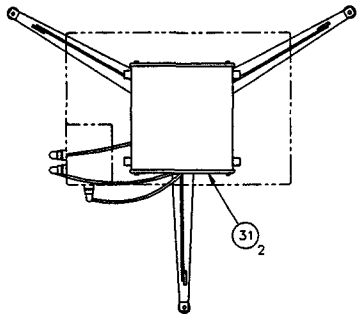
FIG 7.1-3.3

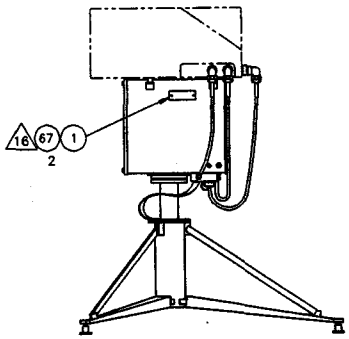
DOCUMENT NO. BA-C91	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	APPD.
	5	REDRAWN/REVISED	8507-DCN-256	85.07.01	DF	RA
	6	DWG CORRECTIONS	8705-DCN-335	87.05.01	DF	RA
	7	P/L UPDATE	DCN373	88.04.08	CW	RA
	8	P/L UPDATE	DCN459	89.07.21	FV	TKL
	9	ADD NEW PCN SUP & MTG H/W	DCN489, 509	90.09.05	FV	RP
	10	ADD SURGE SUPP, TERM BLK & H/W	DCN521	91.02.27	FV	RP
	11	ADD ITEM 39	DCN533	91.03.27	FV	KL
	12	CHG FUSE (IT 40) FR 1A TO 2A	DCN535	91.08.30	FV	KL
	13	ADD GND STRAP/REDRAWN	DCN582	92.03.19	FV	KL
	14	ADD TORQUE SPEC TO NOTE 5	DCN592	92.05.21	FV	RP
	15	ADD ITEMS 51, 70 & 99; NOTE 17	DCN609	92.08.06	FV	RP
	16	ADD IT. 61; CLARIFY GND STRAP MNTG	DCN648	93.05.04	FV	RP
	17	ADD SHIPPING CRATE (ITEM 44)	DCN712	94.09.01	FV	DS
	18	CHG NOTE 1, ADD NOTE 19	DCN738, 739	95.08.01	FV	

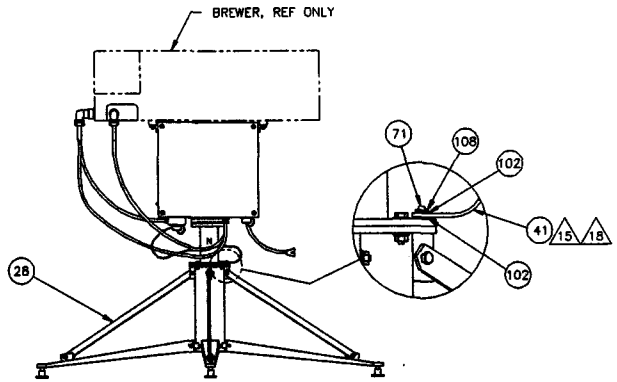


SECTION W–W
SEE SHEET 2

DRIVE PLATE MOUNTING HUB POSITIONING
SEE SECTION V–V ALSO







NOTES:

1. INSERT CONTROL CABLE (ITEM 12) THRU BUSHING & TAPPED HOLE. COAT BUSHING THREADS WITH ITEM 60 AND TIGHTEN.
2. INSERT POWER CABLE (ITEM 17 OR 35) THRU BUSHING (ITEM 55) PRIOR TO CONNECTING TO TERMINAL BLOCK. COAT BUSHING THREADS WITH ITEM 60 AND TIGHTEN IN THREADED HOLE.
3. DO NOT CLAMP SAFETY SWITCH CABLE (PART OF ITEM 13). TO BE DONE AT SYSTEM TEST LEVEL.
4. SECURE ALL UNLOCKED H/W WITH LOCTITE 242 (ITEM 58).
5. WITH MOUNTING HUB (ITEM 21) FIXED TO DRIVE PLATE (ITEM 22), AND LED SENSORS BLOCKED WITH COUNTER BRACKET (ITEM 6), ORIENTATE BOX SO THE SIDES ARE PERPENDICULAR TO THE 2 MOUNTING HOLES ON THE TRACKER BASE AS SHOWN (SEE NOTE 18 ALSO). SECURE MOUNTING HUB (ITEM 21) TO SPINDLE (ITEM 18) BY ADDING ITEM 58 TO SCREWS (ITEM 77) & TIGHTENING TO 80 IN/LB's. ENSURE DRIVE PLATE IS FLUSH AGAINST SPACER (ITEM 23) PRIOR TO TIGHTENING SCREWS. INDICATE 'N' NORTH POSITION ON DRIVE PLATE AS SHOWN, 90° FROM COUNTER BRACKET. MARK A SIMILAR 'N' ON THE SPINDLE & TRACKER BASE AFTER PAINTING.
6. ADHERE 'ON' LABEL UNDER POWER INDICATOR ASSY (ITEM 15).
7. WIRE ASSY AS PER UNIT SCHEMATIC DIAGRAM BS-C91.
8. INSTALL ITEMS 88 & 90 BEFORE INSTALLING SPINDLE (ITEM 18). COAT THREADS AND UNDERSIDE OF NUT WITH ITEM 57 PRIOR TO ASSY. ENSURE SEALANT DOES NOT ADHERE TO OUTSIDE SURFACE OF BOX.
9. PREPARE FINISHED ASSY FOR PAINTING BY USING MASKING TAPE TO COVER CONNECTORS, ETC. COVER OPENINGS WITH SPECIAL MASKING BOARDS.
10. PLACE FUSE (ITEM 40) & #10-32 x 5/8" CAP SCREWS, QTY 4 (ITEM 80) INTO CLEAN PLASTIC BAGS, LABEL WITH PART NO. AND ATTACH TO INSIDE WALL OF BOX WITH TAPE.
11. INSTALL GND TERMINAL FROM BA-W19 (ITEM 12) ONTO BOTTOM BAR (ITEM 28) USING ITEMS 72 & 100.
12. ADHERE 'DC' & 'AC' LABELS AS SHOWN ON TERMINAL BLOCK COVER (ITEM 32).
13. ADJUST LEVELLING SCREWS TO POSITION 4 RUBBER BUMPERS ON BREWER BASE TO CLEAR ANGLE BRACKETS (ITEM 5) BY 1/8" MAX & TIGHTEN JAMB NUTS. IF PROPER TRACKER/BREWER ALIGNMENT IS NOT ACHIEVED, RE-CHECK PRISM ALIGNMENTS IN FOREOPTICS ASSY.
14. INSERT ACCESSORY POWER CABLE (ITEM 34) THRU BUSHING (ITEM 56) PRIOR TO CONNECTING TO TERMINAL BLOCK. COAT BUSHING THREADS WITH ITEM 60 AND TIGHTEN IN TAPPED HOLE.
15. WITH TRACKER IN 'NORTH' POSITION (0 STEPS), ENSURE THE GND STRAP (ITEM 41) PASSES BEHIND SPINDLE PRIOR TO ATTACHING TO TRACKER BASE.
16. ENSURE DOUBLE-SIDED TAPE IS UNDER NAMEPLATE. APPLY RTV (ITEM 56) TO SCREW HEADS.
17. REMOVE AND DISCARD EXISTING SCREW FROM TERMINAL "V2". MOUNT SHIELD (ITEM 43) WITH ITEMS 70 AND 99 IN OPEN TERMINAL.
18. ENSURE THAT THE GROUND STRAP MOUNTING HOLE IN THE BASE IS 1/4 OF A TURN CCW FROM NORTH.
19. SEAL MOUNTING SURFACE OF LED ASSY (ITEM 15) WITH RTV (ITEM 56).

QTY -1 - NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM
SCALE	1:2	NEXT ASSY:	BS-C1000			
DATE	85.07.01	DIMENSIONS IN				
DWN	DF	IF DUAL DIMS:	mm (inches)			
CHKD	RA	Tolerances (unless otherwise specified)				
APPD	TKL	INCHES	MM			
FINISH		.xx ± .005 .xxx ± .001 ANGLES ± 1° FRACTIONS ± 1/32	.xx ± 0.10 .x ± 0.25 ANGLES ± 1°			

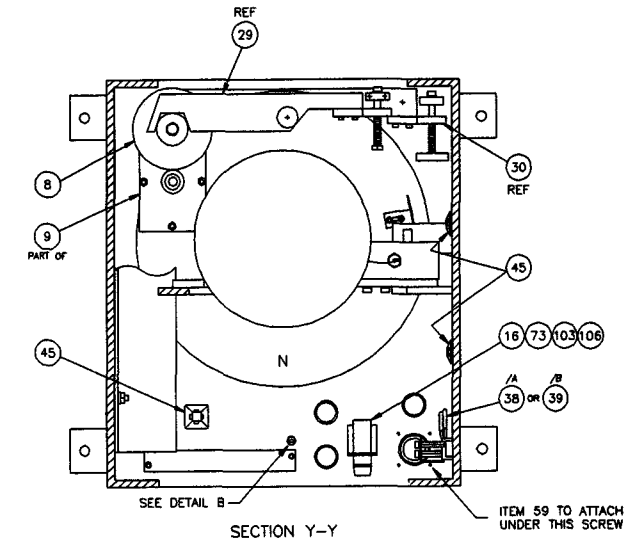
COMPUTER GENERATED DRAWING
FILENAME: BA-C91A.DWG

SCI-TEC INSTRUMENTS INC.

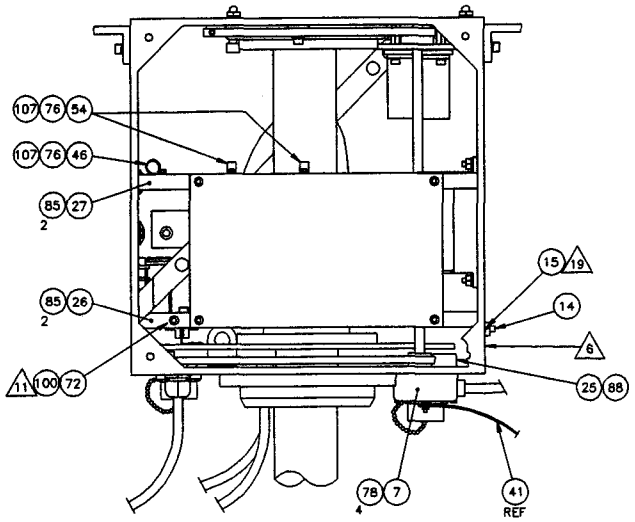
TITLE: AZIMUTH TRACKER ASSY

SHEET 1 of 2 | DOCUMENT NUMBER BA-C91 | REV. 18

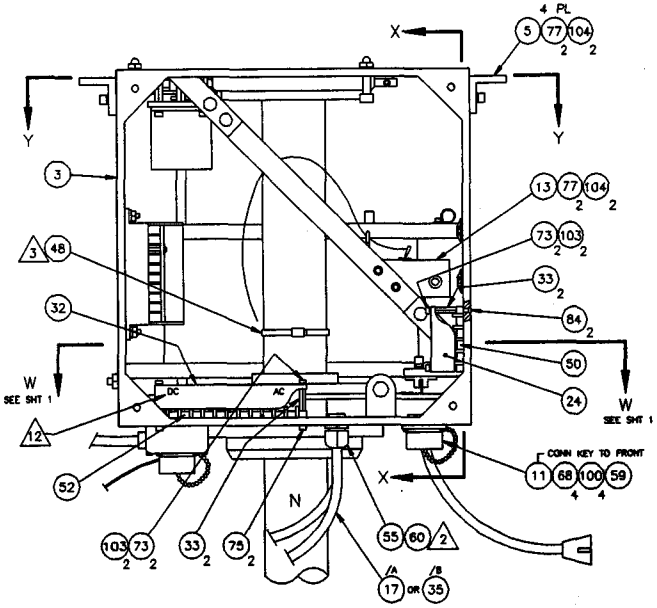
Fig 7.1-4.1



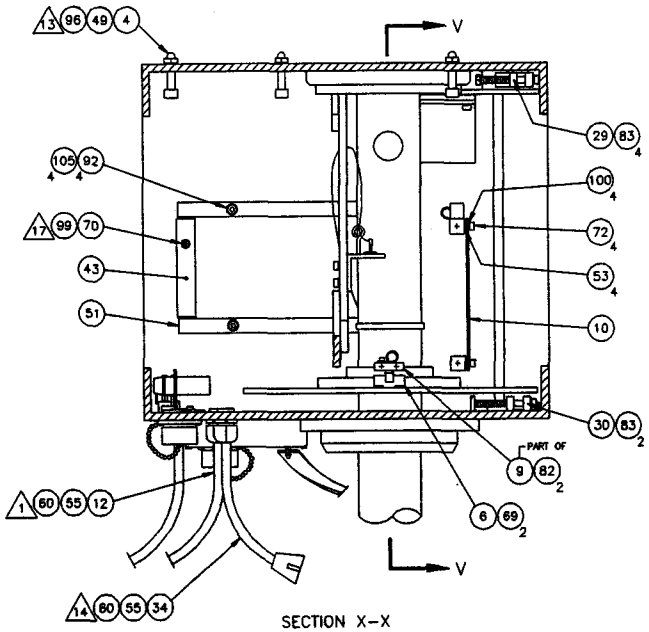
SECTION Y-Y



VIEW A

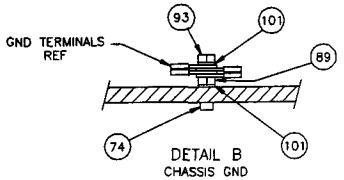


FRONT VIEW
(WITH COVER REMOVED)

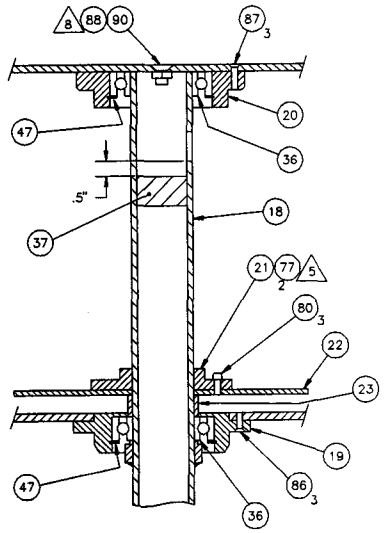


SECTION X-X

VIEW A



DETAIL B
CHASSIS GND
SCALE 1:1



SECTION V-V

SEE SECTION W-W, SHT 1 FOR POSITIONING
OF DRIVE PLATE MOUNTING HUB (ITEM 21)

DOCUMENT NO. BA-C91	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	APPD.
	5	REDRAWN/REVISED	8507-DCN-256	85.07.01	DF	RA
	6	DWG CORRECTIONS	8705-DCN-335	87.05.01	DF	RA
	7	P/L UPDATE	DCN373	88.04.08	CW	RA
	8	P/L UPDATE	DCN459	89.07.21	FV	TKL
	9	ADD NEW POW SUP & MTG H/W	DCN489, 509	90.09.05	FV	RP
	10	ADD SURGE SUPP, TERM BLK & H/W	DCN521	91.02.27	FV	RP
	11	ADD ITEM 39	DCN533	91.03.27	FV	KL
	12	CHG FUSE (IT 40) FR 1A TO 2A	DCN535	91.08.30	FV	KL
	13	ADD GND STRAP/REDRAWN	DCN562	92.03.19	FV	KL
	14	ADD TORQUE SPEC TO NOTE 5	DCN592	92.05.21	FV	RP
	15	ADD ITEMS 51, 70 & 99; NOTE 17	DCN609	92.08.06	FV	RP
	16	ADD IT. 61; CLARIFY GND STRAP MNTG	DCN648	93.05.04	FV	RP
	17	ADD SHIPPING CRATE (ITEM 44)	DCN712	94.09.01	FV	DS
	18	CHG NOTE 1, ADD NOTE 19	DCN738, 739	95.08.01	FV	

QTY -1 - NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM
SCALE	1:2	NEXT ASSY:	BS-C1000			
DATE	95.07.01	DIMENSIONS IN				
DWN	DF	IF DUAL DIMS:	mm (inches)			
CHKD	RA	Tolerances (unless otherwise specified)				
APPD	TKL	INCHES	MM			
FINISH		.xx ± .010 .xxx ± .001 ANGLES ± 1° FRACTIONS ± 1/32	.xx ± 0.10 .x ± 0.25 ANGLES ± 1°			

SCI-TEC INSTRUMENTS INC.

TITLE: AZIMUTH TRACKER ASSY

SHEET 2 of 2 | DOCUMENT NUMBER BA-C91 | REV. 18

COMPUTER GENERATED DRAWING
FILENAME: BA-C91B.DWG

Fig 7.1-4.2

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
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			

FIG 7.1-4.3

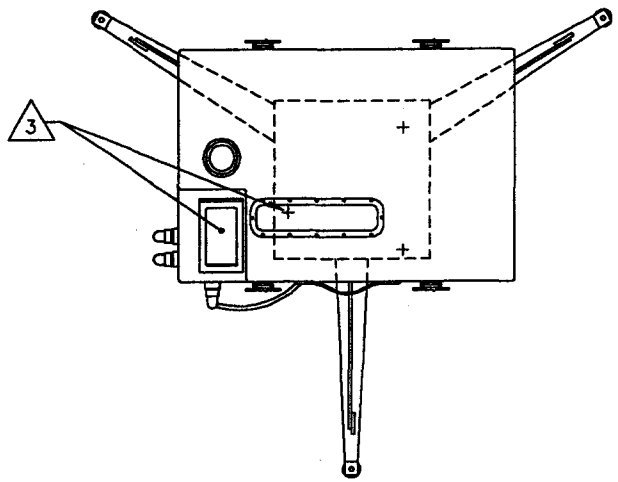
SCI-TEC Instruments Inc.										
Title: AZIMUTH TRACKER ASSY (BA-C91/A: 110V, BA-C91/B: 220V)									Rev Date: 95-08-01 Rev: 18	
DCN: 738, 739	Drawn: DF	Checked:	Approved:	QA App'd:					Dwg No.: BA-C91	
Item No.	Part/Ident No.	Title/Description	Qty /A	Qty /B	Qty /C	Qty /D	UofM		Ref Des	Remarks
39	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			

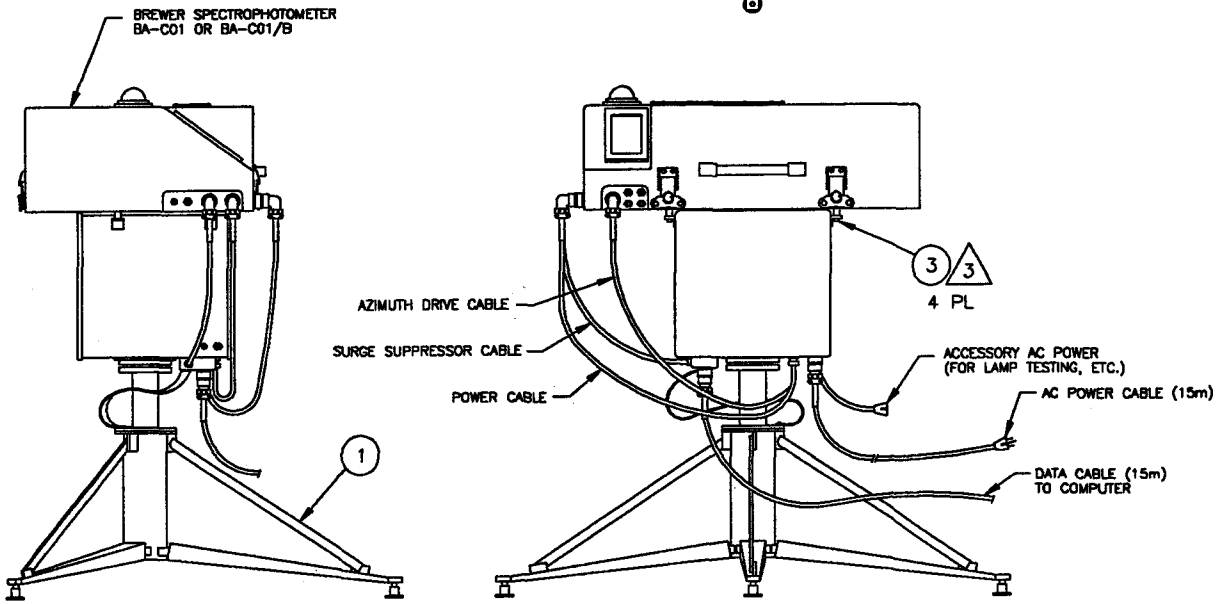
FIG 7.1-4.4

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			

FIG 7.1-4.5

DOCUMENT NO. BA-C113	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	90.09.12	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	





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-C91.
2. REFER TO ACCEPTANCE MANUAL AM-BA-C05 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.

COMPUTER GENERATED DRAWING
FILENAME: BA-C113.DWG

QTY — NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM
— 1						

SCALE		NEXT ASSY:	BA-C91
DATE	88.06.08	DIMENSIONS IN	
DWN	CW	IF DUAL DIMS:	mm (Inches)
CHKD	RA	Tolerances (unless otherwise specified)	
APPD	RA	INCHES	MM
FINISH		.xxx ± .005 .xx ± .01 ANGLES ± 1° FRACTIONS ± 1/32	.xx ± 0.15 .x ± 0.25 ANGLES ± 1°

TITLE:
OPTION B KIT INSTALLATION

SHEET	DOCUMENT NUMBER	REV.
1 of 1	BA-C113	6

FIG 7.1-4.6

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		

FIG 7.1-4.7

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

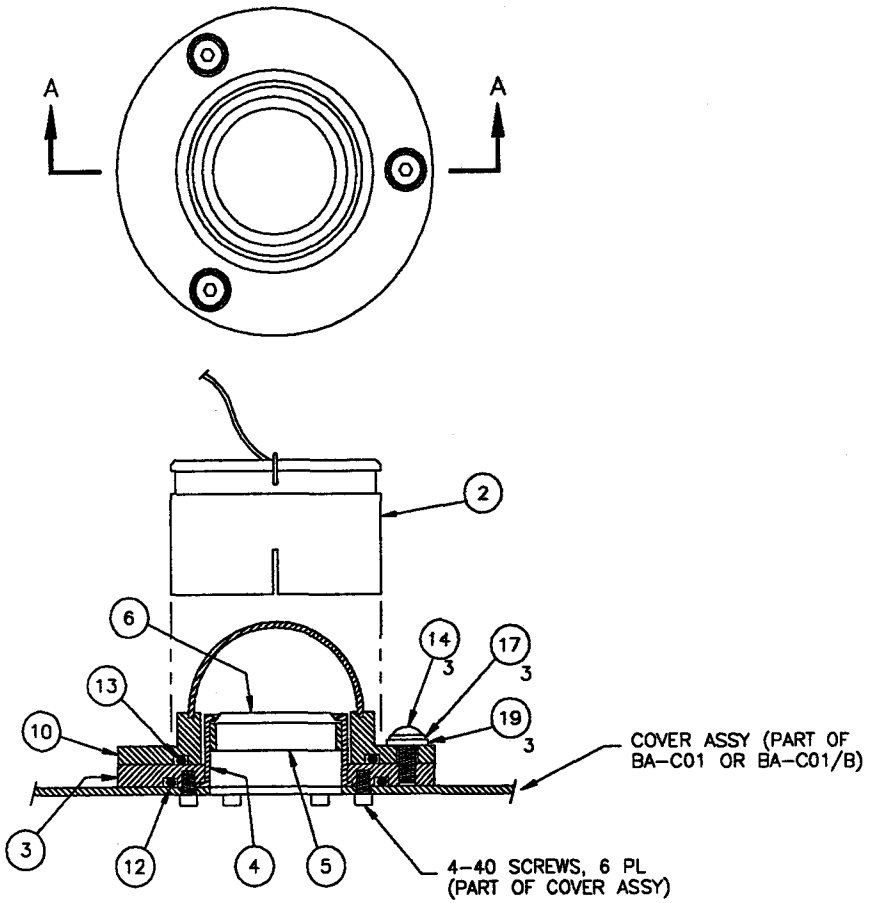
Item No.	Part/Ident No.	Title/Description	Qty	Qty /B	Qty /C	Qty /D	UofM	Ref Des	Remarks
1	BA-F81	UVB Prism Assy	1.00				EA		
2	BM-C175	UVB Dome Cap	1.00				EA		
3	BM-C37	UVB Adaptor	1.00				EA		
4	BM-C38	UVB Dome Light Diffuser Holder	1.00				EA		
5	BM-C39	UVB Retaining Ring	1.00				EA		
6	BM-C40	UVB 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.

FIG 7.1-5.1

DOCUMENT NO. BA-C114	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	APPD.
	1	INITIAL RELEASE			CW	RA
	2	CHG DOME INSTALLATION (FIG 1)	DCN568	92.01.15	FV	



SECTION A-A

FIGURE 1
UVB DOME INSTALLATION
SCALE 1:1

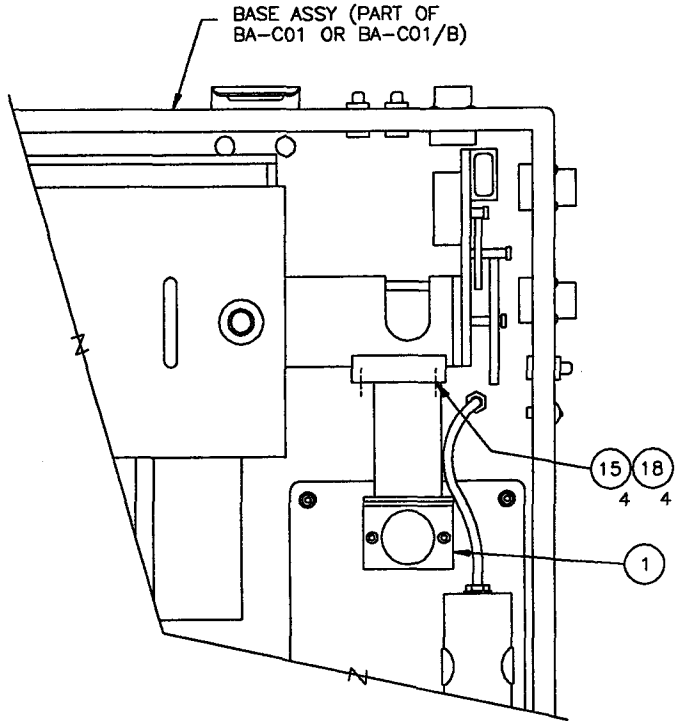


FIGURE 2
UVB PRISM INSTALLATION
SCALE 1:2

NOTES:

1. ITEMS TO BE INSTALLED ARE SHOWN FOR REFERENCE PURPOSES ONLY, AND ARE PART OF OPTION C KIT, DWG NO. BA-C84.

2. UVB DOME INSTALLATION:
   - REFER TO FIGURE 1 (CAUTION! QUARTZ DOME IS FRAGILE)
   - REMOVE SEALING PLATE (P/N BM-C28) AND O-RING (P/N 83-10-739) FROM COVER ASSY, BA-C21 (PART OF BA-C01 OR BA-C01/B). DRILL 3, .20" DIA 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 REFERED 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 & 19.
   - 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:
   - IF REMOVAL OF THE UVB DOME IS NECESSARY, THE SPARE SEALING PLATE AND O-RING MAY BE USED TO RE-SEAL THE 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.

COMPUTER GENERATED DRAWING
FILENAME: BA-C114.DWG

QTY -1 - NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE		NEXT ASSY:	BA-C84
DATE	88.08.08	DIMENSIONS IN	INCHES
DWN	CW	IF DUAL DIMS:	mm (Inches)
CHKD	RA	Tolerances (unless otherwise specified)	
APPD	RA	INCHES	MM
FINISH		.xxx ± .005 .xx ± .01 ANGLES ± 1° FRACTIONS ± 1/32	.xx ± 0.15 .x ± 0.25 ANGLES ± 1°

SCI-TEC INSTRUMENTS INC.

TITLE: OPTION C KIT INSTALLATION (UVB)

SHEET	DOCUMENT NUMBER	REV.
1 OF 1	BA-C114	2

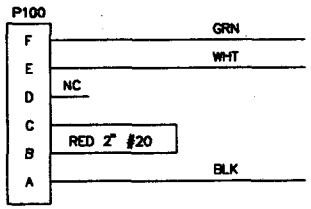
FIG 7.1-5.2

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

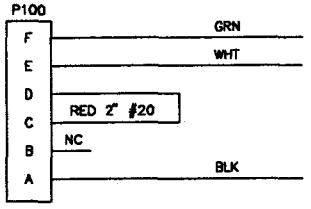
Item No.	Part/Ident No.	Title/Description	Qty	Qty /B	Qty /C	Qty /D	UofM	Ref Des	Remarks
1	BA-F81	UVB Prism Assy	1.00				EA		
2	BM-C175	UVB Dome Cap	1.00				EA		
3	BM-C37	UVB Adaptor	1.00				EA		
4	BM-C38	UVB Dome Light Diffuser Holder	1.00				EA		
5	BM-C39	UVB Retaining Ring	1.00				EA		
6	BM-C40	UVB 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).

FIG 7.1-5.3

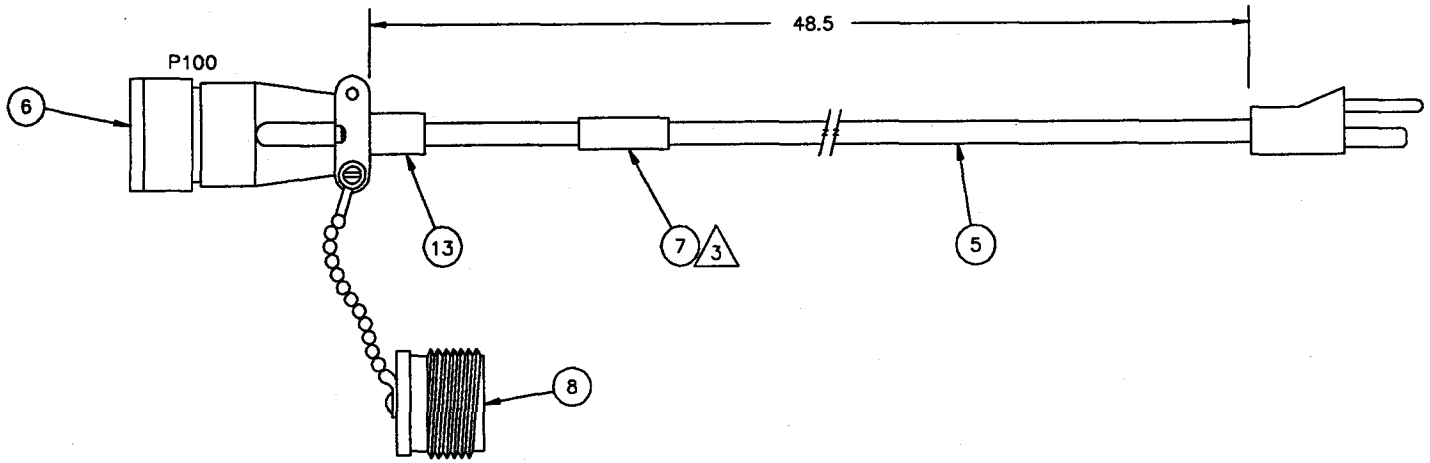


SCHEMATIC DIAGRAM
BA–W12/A (110V)



SCHEMATIC DIAGRAM
BA–W12/B (220V)

DOCUMENT NO. BA–W14	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	RA
	4	REMOVE SMALL BUSHING (ITEM 14)	685	94.05.06	FV	



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.

COMPUTER GENERATED DRAWING
FILENAME: BA–W12.DWC

QTY –1 – NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

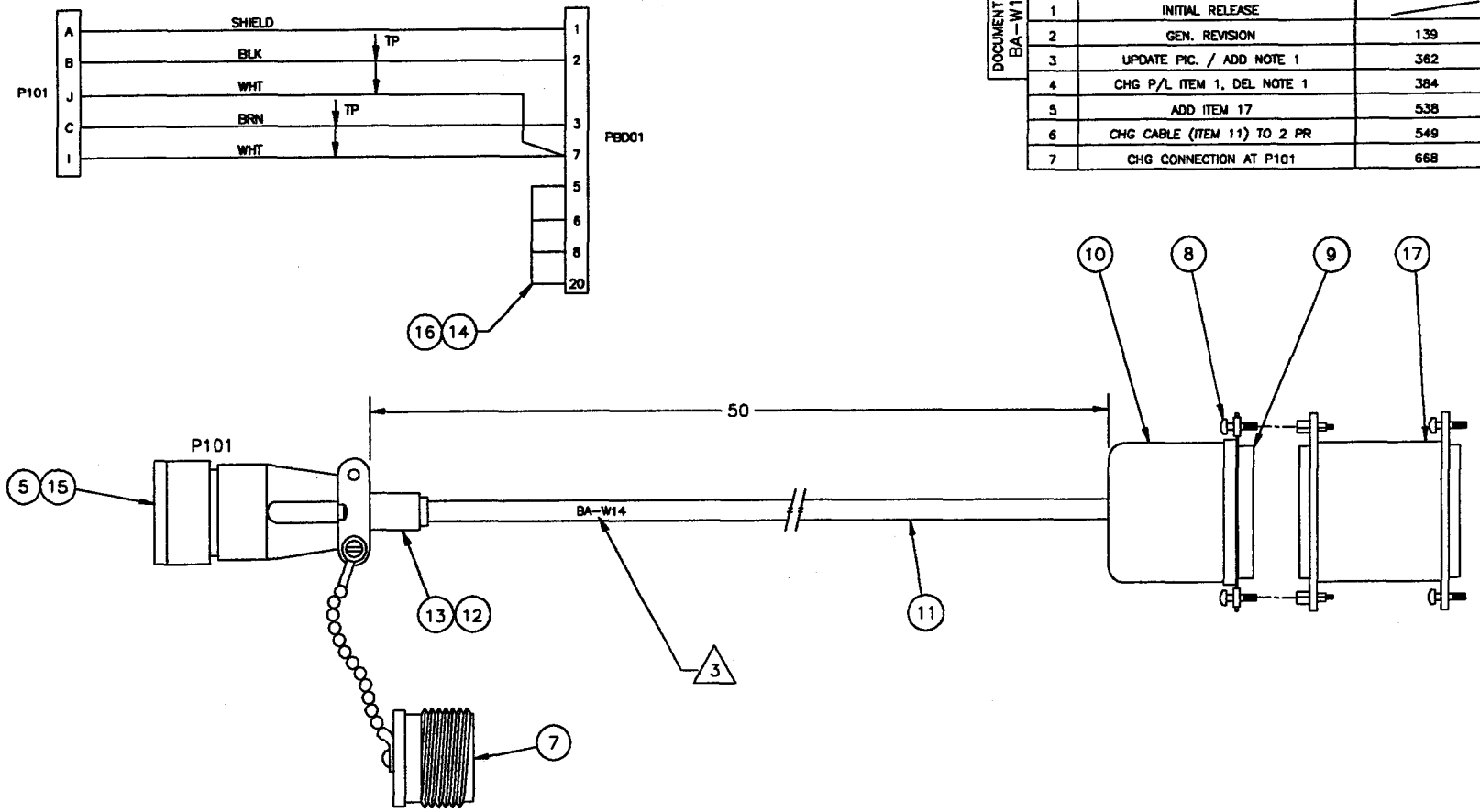
SCALE	1:1	NEXT ASSY:	BA–C01
DATE	83.03.01	DIMENSIONS IN	FEET
DWN	DF	IF DUAL DIMS:	mm (Inches)
CHKD	DW	Tolerances (unless otherwise specified)	
APPD	KL	INCHES	MM
FINISH	/	.xxx ± .005 .xx ± .01 ANGLES ± 1° FRACTIONS ± 1/32	.xx ± 0.13 .x ± 0.25 ANGLES ± 1°

TITLE:
POWER CABLE ASSY, BREWER

SHEET	DOCUMENT NUMBER	REV.
1 OF 1	BA–W12	4

Fig 7.1-6

DOCUMENT NO. BA–W14	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	APPD.
	1	INITIAL RELEASE		83.03.01	DF	
	2	GEN. REVISION	139	84.12.01	DF	
	3	UPDATE PIC. / ADD NOTE 1	362	87.12.11	CW	RA
	4	CHG P/L ITEM 1, DEL NOTE 1	384	88.03.09	CW	RA
	5	ADD ITEM 17	538	91.05.01	FV	GM
	6	CHG CABLE (ITEM 11) TO 2 PR	549	91.09.20	FV	GM
	7	CHG CONNECTION AT P101	668	94.04.11	DM	



NOTES:

1. REMOVE THE RUBBER INSULATOR FROM THE INSIDE OF ITEM 5 & 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 5.

△3 MARK CABLE WITH PART NO. WHERE SHOWN.

4. DISCARD WHITE GROUND CABLE SUPPLIED WITH ITEM 17. ITEM 17 COMES WITH THE MOUNTING HARDWARE REVERSED AS TO WHAT'S SHOWN ON THE DRAWING, SO IT HAS TO BE INTERCHANGED AS PER FOLLOWING:
   - SPLIT SHELL HALVES
   - REMOVE SCREW LOCKS
   - REMOVE STANDOFFS & INSTALL THEM ON THE OTHER CONNECTOR PLACING 2 'CANNON' FLAT WASHERS BETWEEN THE CONNECTOR & THE STANDOFF.
   - REINSTALL THE SCREWLOCKS & SNAP THE SHELL BACK TOGETHER.

COMPUTER GENERATED DRAWING
FILENAME: BA–W14.DWG

QTY –1 – NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE	1:1	NEXT ASSY:	BA–C01
DATE	94.04.11	DIMENSIONS IN	FEET
DWN	DM	IF DUAL DIMS:	mm (inches)
CHKD		Tolerances (unless otherwise specified)	
APPD		INCHES	MM
FINISH		.xxx ± .005 .xx ± .01 ANGLES ± 1° FRACTIONS ± 1/32	.xx ± 0.15 .x ± 0.25 ANGLES ± 1°

SCI-TEC INSTRUMENTS INC.

TITLE: DATA CABLE ASSY, BREWER

SHEET	DOCUMENT NUMBER	REV.
1 OF 1	BA–W14	7

Fig. 7.1-7

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		

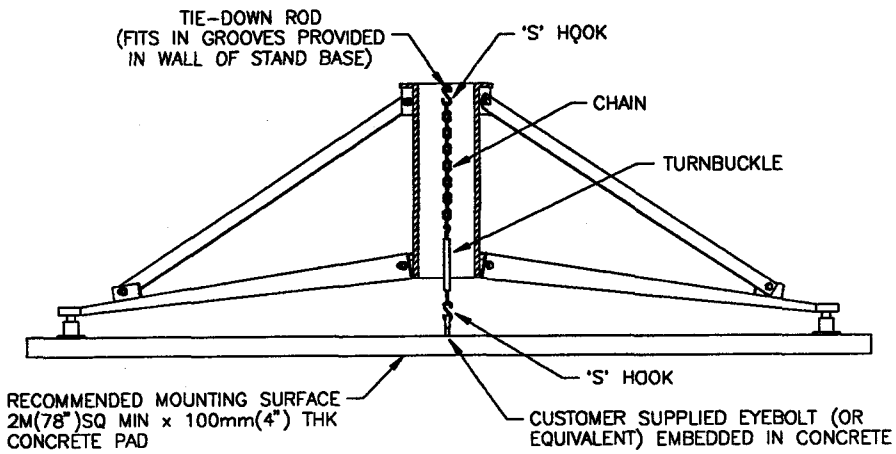
FIG 7.1-8

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

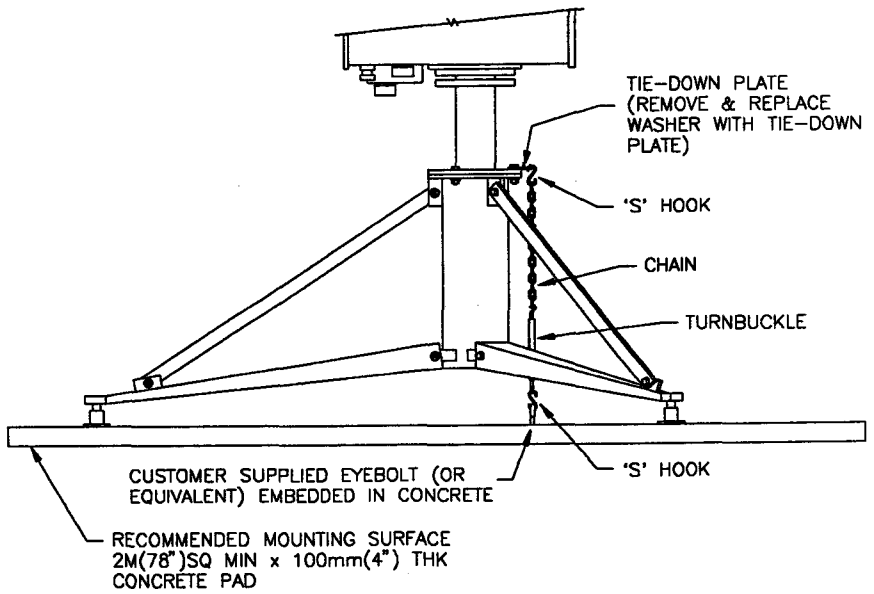
Item No.	Part/Ident No.	Title/Description	Qty /A	Qty /B	Qty /C	Qty /D	UofM	Ref Des	Remarks
1	93-70-401	Lamp, Tungsten, Halogen, 20W, 12V	2.00				EA		
2	93-70-405	Lamp, Mercury, Type B	2.00				EA		
3	91-15-217	Fuse, 5A, 250V, Fast-Blow	2.00				EA		
4	91-15-257	Fuse, 2A, 125V, Slow-Blow	2.00				EA		
5	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		

FIG 7.1-9

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



STANDARD CONFIGURATION



ALTERNATE CONFIGURATION

NOTE:

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

QTY — NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM
-1						

SCALE		NEXT ASSY: A2-1030-135	SCI-TEC INSTRUMENTS INC.
DATE	93.02.22	DIMENSIONS IN	
DWN	FV	IF DUAL DIMS: mm (inches)	
CHKD		Tolerances (unless otherwise specified)	TITLE: INSTALLATION DRAWING, TRACKER TIE-DOWN KIT
APPD		INCHES: .xxx ± .005, .xx ± .01, ANGLES ± 1°, FRACTIONS ± 1/32 — MM: .xx ± 0.15, .x ± 0.25, ANGLES ± 1°	SHEET 1 of 1 — DOCUMENT NUMBER BA-C203 — REV. 1
FINISH			

COMPUTER GENERATED DRAWING
FILENAME: BA-C203.DWG

Fig 7.1-10

BREWER REFERENCE DOCUMENTATION

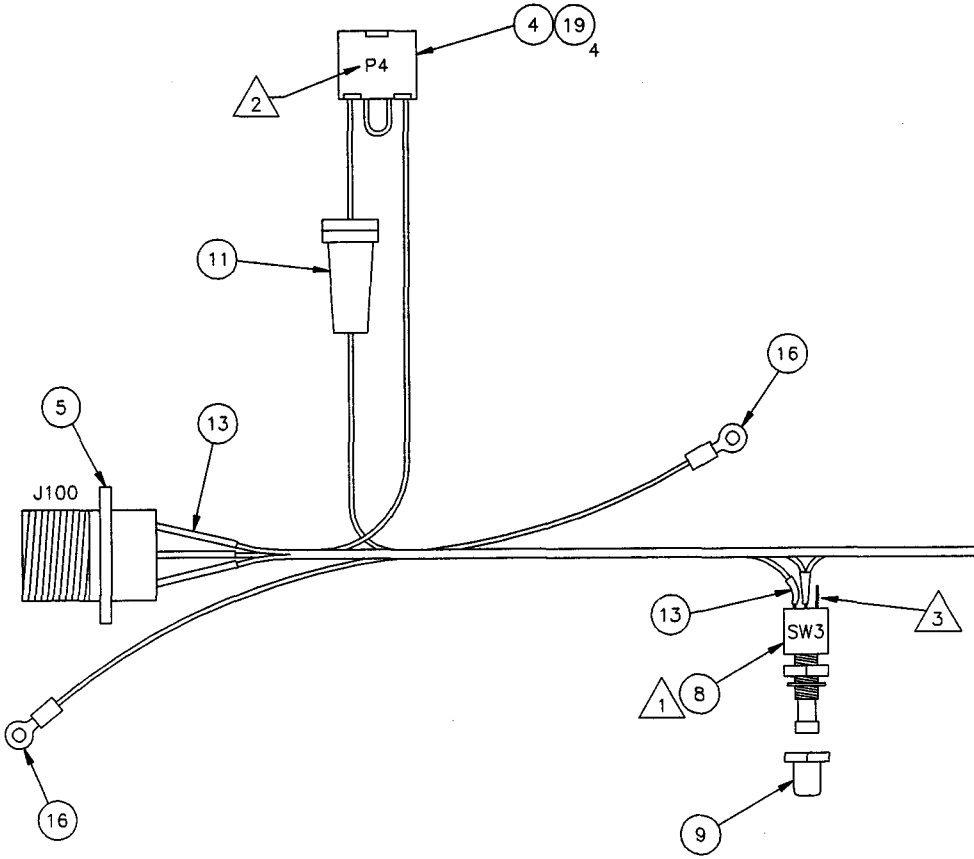
Section 7.2 Power Supply and Harness

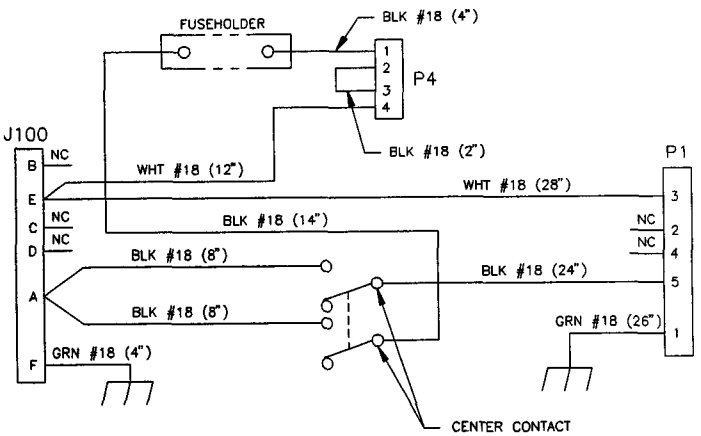
Section Overview

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.

DOCUMENT NO. BA-W32

REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	APPD.
1	FIRST ISSUE		88.08.30	CW	KL
2	SEE DCN	141	84.12.01	DF	KL
3	REDRAWN AND ADD P4	436	88.10.26	CW	RA
4	CHG IT 6 & 7 FOR NEW POW SUPPLY	482	90.04.04	FV	RA
5	CHG IT 8 & 9	487	90.09.14	FV	RA
6	REMOVE P3 (IT 7, 20)	579	92.03.10	FV	RA
7	CHG ITEM 6 & WIRE LGTH FOR NEW P/S	672	93.01.27	FV	RA
8	REVERSE PINS 3 & 5 ON P1	736	95.08.11	FV	





NOTES:

1. DISCARD KEYING WASHER (PART OF ITEM 8) PRIOR TO THREADING BOOT (ITEM 9) ONTO SWITCH.
2. LABEL CONNECTORS (P1 & P4 ONLY) AS SHOWN.
3. COVER BARE TERMINALS WITH RTV (ITEM 32).
4. PLACE FINISHED ASSY IN CLEAN PLASTIC BAG AND LABEL WITH DWG NO. & REV.

QTY -1 – NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE	NONE	NEXT ASSY:	BA-C11
DATE	88.08.30	DIMENSIONS IN	INCHES
DWN	CW	IF DUAL DIMS:	mm (inches)
CHKD	DW	Tolerances (unless otherwise specified)	
APPD	KL	INCHES	MM
FINISH		.xxx ± .005 .xx ± .01 ANGLES ± 1° FRACTIONS ± 1/32	.xx ± 0.15 .x ± 0.25 ANGLES ± 1°

COMPUTER GENERATED DRAWING
FILENMAE: BA-W32.DWG

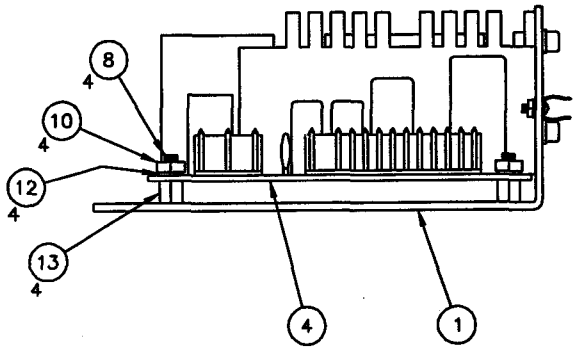
SCI-TEC INSTRUMENTS INC.

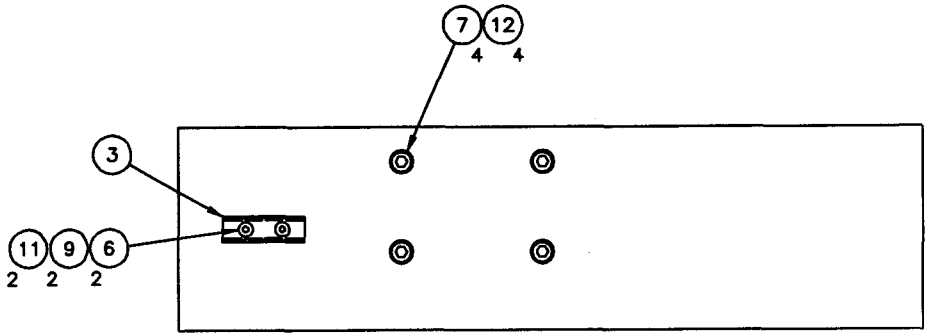
TITLE: MAIN POWER HARNESS ASSY

SHEET	DOCUMENT NUMBER	REV.
1 OF 1	BA-W32	8

Fig 7.2-1

DOCUMENT NO. BA-E103	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	APPD.
	1	INITIAL RELEASE	REF DCN672	94.01.27	FV	





QTY -1 - NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE	1:1	NEXT ASSY:	BA-E71
DATE	94.01.27	DIMENSIONS IN	INCHES
DWN	FV	IF DUAL DIMS:	mm (Inches)
CHKD		Tolerances (unless otherwise specified)	
APPD		INCHES	MM
FINISH		.xxx ± .005 .xx ± .01 ANGLES ± 1° FRACTIONS ± 1/32	.xx ± 0.10 .x ± 0.25 ANGLES ± 1°

TITLE: POWER SUPPLY ASSEMBLY

SHEET	DOCUMENT NUMBER	REV.
1 OF 1	BA-E103	1

COMPUTER GENERATED DRAWING
FILENAME: BA-E103.DWG

Fig 7-21

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		

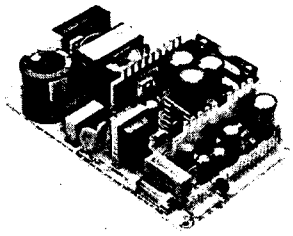
FIG 7.2-2.2

NFS80 SERIES
80 Watt Universal Input Switching Power Supplies

NEW!

- 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



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.

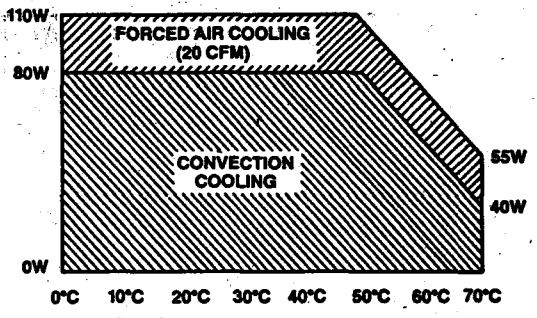
Universal input allows the supply to operate from any line voltage throughout the world without a switch or jumper setting. The NFS80 series is approved by UL, CSA and VDE, and its built-in line filter reduces conducted noise below FCC and VDE limit B.

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.



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

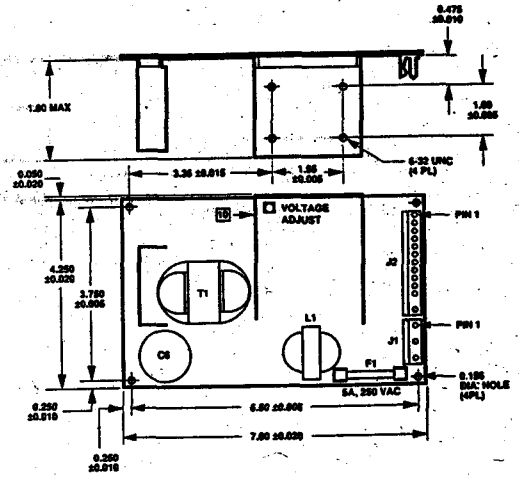
SPECIFICATIONS

SCI-TEC #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, setting 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	

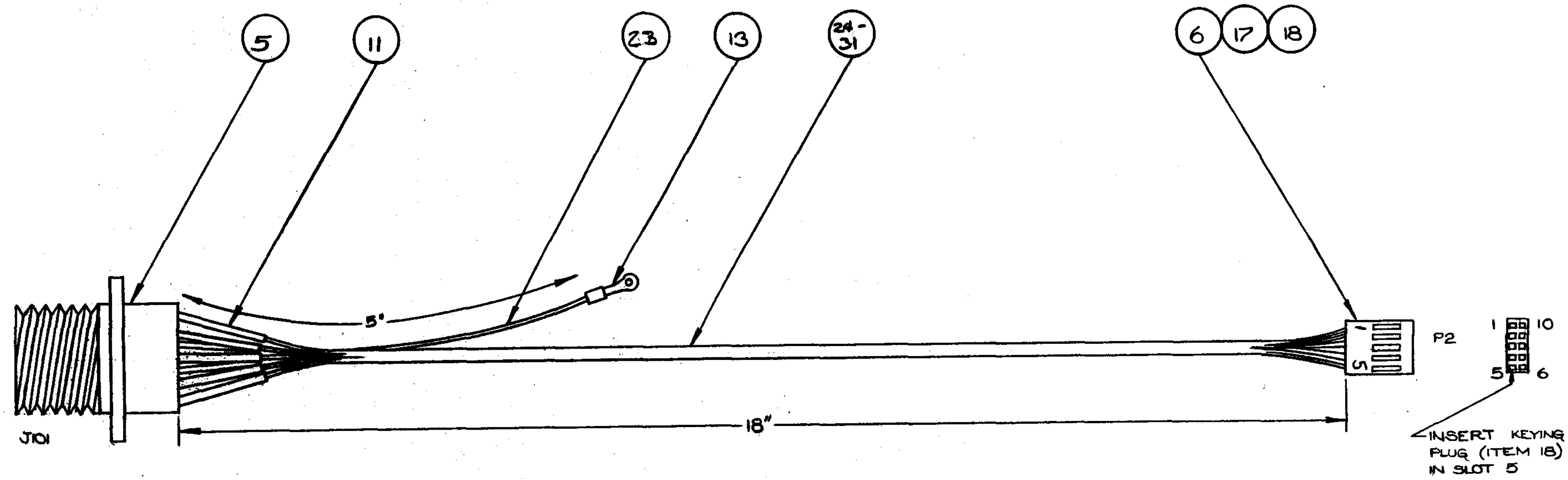


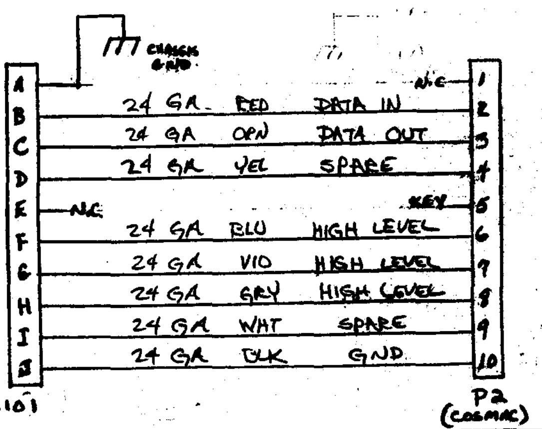
(7) Pins 10 and 11 are a floating output, which can be referenced as either positive or negative. Pin 10 is positive with respect to pin 11. Either pin 10 or 11 must be connected to Return (pins 4-7) for proper operation.
(8) All dimensions are in inches and (mm).
(9) Either metallic or non-metallic standoffs can be used in all four mounting holes without affecting VDE safety approval. The diameter of metal standoffs, if used, must not exceed 0.212".
(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.

FIG 7.7-2.4

BREWER REFERENCE DOCUMENTATION

Section 7.3 Internal Cabling





SCI-TEC INSTRUMENTS INC.

NEXT ASSEMBLY BA-C11

DATA CABLE
COSMAC TO CHASSIS

SCALE	DIMS.	TOLS.
—	—	—

MATERIAL —

FINISH —

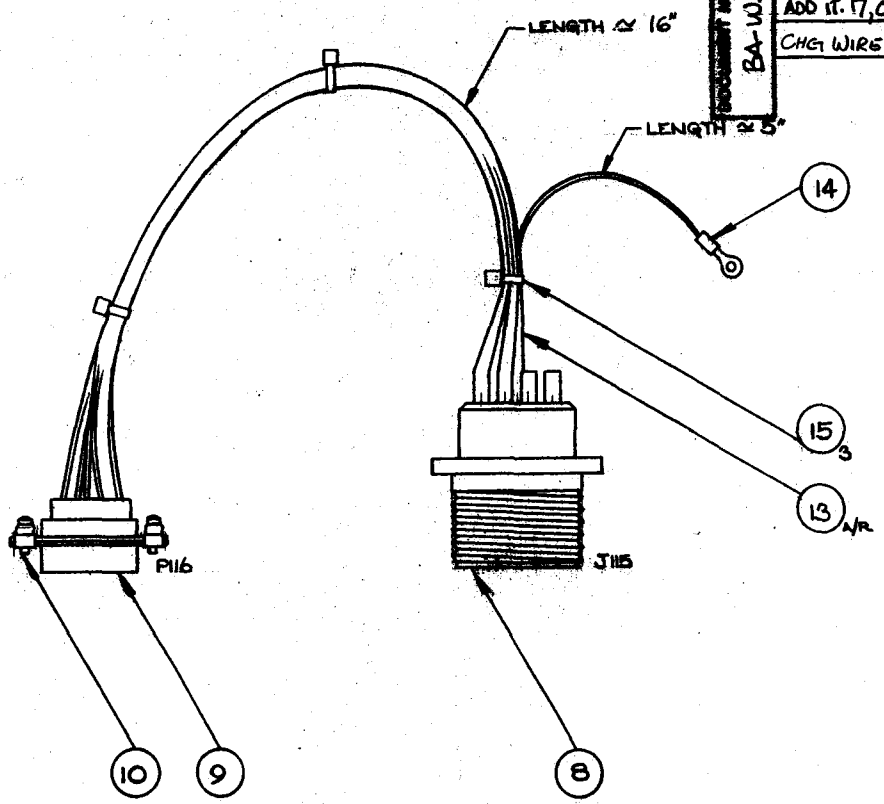
DATE	DWN	CHKD.	APPD.
MAR 83	[illegible]	[illegible]	[illegible]

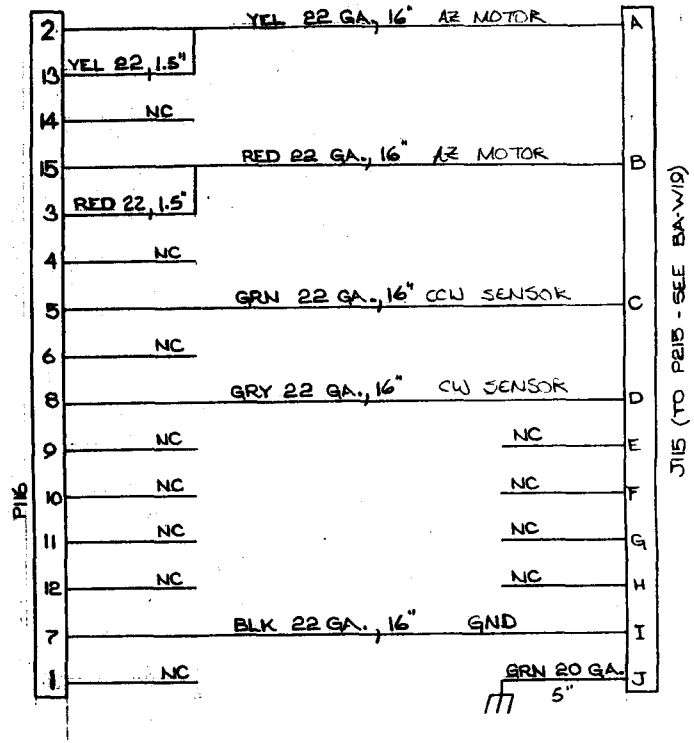
SHT.	SIZE	NUMBER	ISS.
1of1	B	BA-W37	1

FIG 7.2-1

DESCRIPTION	REV.	DCN NUMBER	DATE	DWN.	APPD.
ADD IT. 17, CHG QTY IT'S 19, 21.	2	DCN-373	88-2-18	C.W.	RA
CHG WIRE LENGTHS & P116 PINOUT	3	DCN-622	93-01-20	FV	RA

DOCUMENT NO. BA-W31





SCHEMATIC

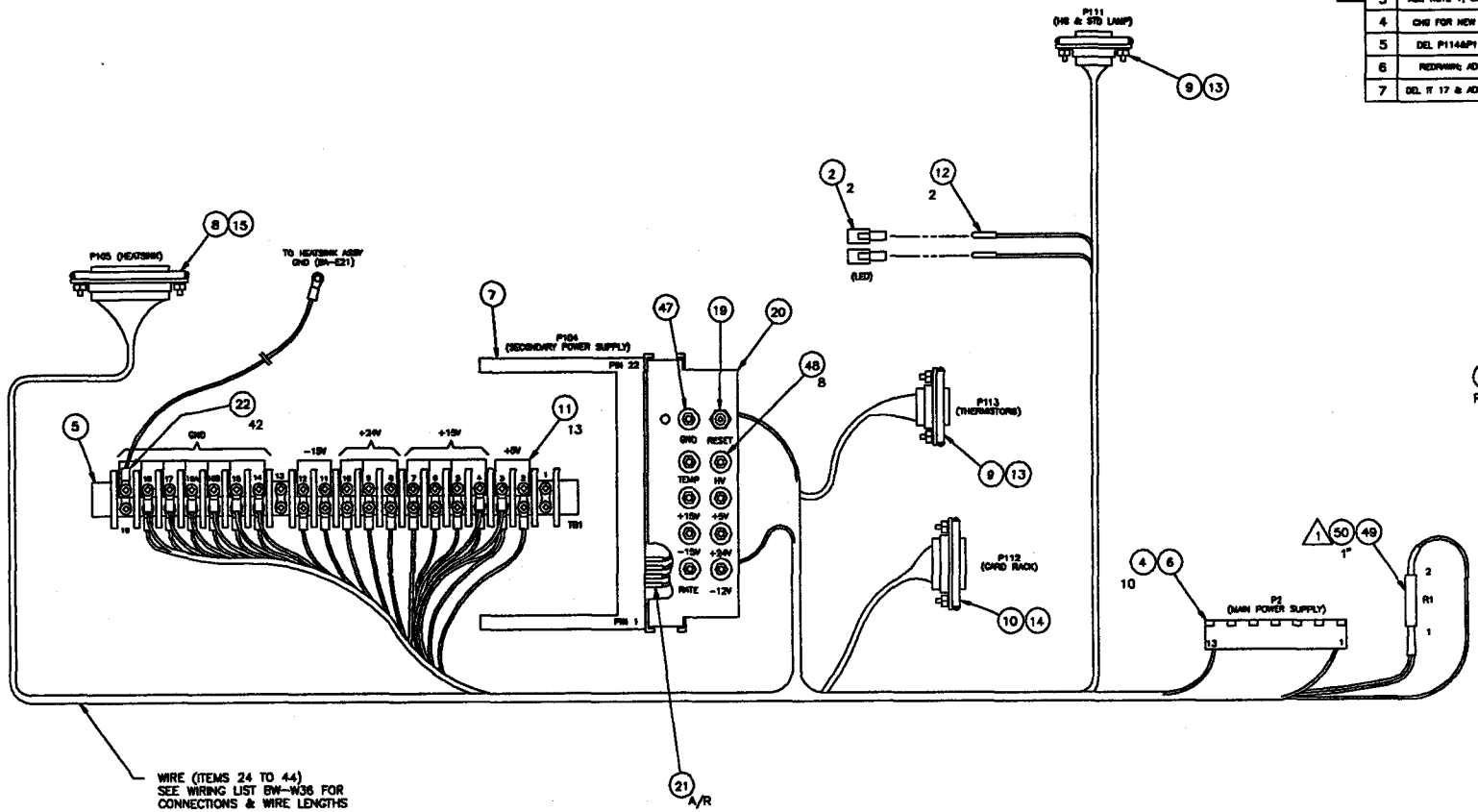
SCI-TEC INSTRUMENTS INC.		
SCALE 1:1	FINISH	TOLS.
MATERIAL		
FINISH		

NEXT ASSEMBLY BA-C01

INTERNAL AZIMUTH DRIVE DATA CABLE
BREWER SPECTROPHOTOMETER MK II

DATE	DWN.	CHKD.	APPD.
MAR 84			KL

SHT.	SIZE	NUMBER	ISS.
1 of 1	B	BA-W31	3



DOCUMENT NO. BA-W36	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	APPD.
	1	GEN REVISION	DCN 136	84.12.01	DF	KL
	2	DWG CLARIFICATION – ADD REF INFO	DCN 362	87.12.14	CW	RA
	3	ADD NOTE 1; CHG H/S GND TO 180A	DCN 447	88.10.28	CW	RA
	4	CHG FOR NEW POW SUP; ADD IT 17&3	DCN 482	90.04.04	FV	RA
	5	DEL P114&P110; ADD IT 2&12	DCN 487	90.09.04	FV	RA
	6	REDRAWN; ADD IT 20, 45–46	DCN 522	91.01.25	FV	RA
	7	DEL IT 17 & ADD IT 48 (FOR NEW P/S)	DCN 672	94.01.27	FV	

NOTES:

1. AFTER SOLDERING WIRES TO RESISTOR LEADS, COVER EACH LEAD WITH .5" OF HEAT SHRINK. ENSURE HEAT SHRINK IS TIGHT AGAINST RESISTOR CASE SO NO PORTION OF THE LEADS ARE EXPOSED.

QTY	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM
-1						
-NO.						

SCALE	NONE	NEXT ASSY	BA-C01
DATE	83.03.22	DIMENSIONS IN	INCHES
DWN	DF	IF DUAL DIMS:	mm (Inches)
CHKD	DW	Tolerances (unless otherwise specified)	
APPD	KL	INCHES	MM
FINISH			

COMPUTER GENERATED DRAWING
FILENAME: BA-W36.DWG

SCI-TEC INSTRUMENTS INC. ©1994

TITLE: MAIN INTERCONNECT HARNESS ASSY

SHEET 1 OF 1 | DOCUMENT NUMBER BA-W36 | REV. 7

FIG 7.3-3

SCI-TEC
INSTRUMENTS INC.

CABLE ASSEMBLY PART NUMBER: BA-W36

UNIT: TERMINAL BLOCK

CONNECTOR NUMBER: TB1

CONNECTOR TYPE: CINCH 20-141

CONN. #	CONN. TYPE
P2	MOLEX 09-50-3131
P105	CANNON DBMA-25S
LED	MOLEX 03-06-2011
P112	CANNON DBMA-15S
P104	EDAC 322-044-500-258

INFORMATION
USED FOR PRODUCTION

INTERNAL DESTINATION		ORIGINATION					EXT. DESTINATION	
POSITION	FUNCTION	PIN	WIRE TYPE	GAUGE	COLOR	LENGTH	PIN	CONNECTOR
		1		NO CONNECTION				
		1		NO CONNECTION				
	+5V	2		22	YEL	23½"	2	P2
		2		22	YEL	12"		TP5 +5V
		3		22	YEL	24"	3	P2
		3		22	YEL	13½"	9	P112
		3		22	YEL	28"	2	LED
	+15V	4		20	RED	23"	1	P2
		4		22	RED	15½"	12	P104
		4		22	RED	20"	5	P105
		5		22	RED	19"	4	P105
		5		22	RED	11"		TP4 +15V
		6		22	RED	13"	11	P112
		7		22	RED	16½"	X	P104

DATE: JUNE '83	ISSUE NO.	1	2	3	4	5	6	7			
	DATE		87-12-14	88-10-28	90-2-20	90-9-4	91-1-25	94-2-7			
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. 1		DRAWING NUMBER BW-W36			
SHEET 1 OF 13											

FIG 7.2-4.1

SCI-TEC
INSTRUMENTS INC.

CABLE ASSEMBLY PART NUMBER	CONN. #	CONN. TYPE
BA-W36	P2	SEE SHT 1
	P105	↓
UNIT: TERMINAL BLOCK	P104	
	P112	↓
CONNECTOR NUMBER: TB1 (CONT)		
CONNECTOR TYPE: CINCH 20-141		

INFORMATION
USED FOR PRODUCTION

INTERNAL DESTINATION		ORIGINATION					EXT. DESTINATION	
POSITION	FUNCTION	PIN	WIRE TYPE	GAUGE	COLOR	LENGTH	PIN	CONNECTOR
	+24V	8		22	ORG	23½"	10	P2
		8		22	ORG	19½"	1	P105
		9		22	ORG	16"	2	P104
		9		22	ORG	19½"	22	P105
		10		22	ORG	13½"	15	P112
		10		22	ORG	10"		TP7 +24V
	-15V	11		22	BLU	34¾"	1	R1
		11		22	BLU	14"	8	P112
		12		22	BLU	17"	9	P104
		12		22	BLU	11"		TP6 -15V
		13		NO CONNECTION				
	GND	14		20	BLK	24¾"	4	P2
		14		22	BLK	19"	5	P104
		14		22	BLK	22"	13	P105
		15		22	BLK	18"	16	P104
		15		22	BLK	18½"	21	P104
	(SEE NEXT PAGE)	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. KL	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.

CABLE ASSEMBLY PART NUMBER	CONN. #	CONN. TYPE
BA-W36	P104	AS SHT 1
	P112	"
UNIT	P111	CANNON DEMA-9S
TERMINAL BLOCK	P2	AS SHT 1
CONNECTOR NUMBER	LED	"
TB1 (CONT)		
CONNECTOR TYPE		
CINCH 20-141		

INFORMATION
USED FOR PRODUCTION

INTERNAL DESTINATION	
POSITION	FUNCTION
	GND (CONT)

ORIGINATION					EXT. DESTINATION	
PIN	WIRE TYPE	GAUGE	COLOR	LENGTH	PIN	CONNECTOR
16A		22	BLK	19"	T	P104
16A		22	BLK	19½"	Z	P104
16A		22	BLK	17"	2	P112
19		18	BLK	8½"	GND	H/S ASSY BA-E21
17		22	BLK	16½"	C	SW2
17		22	BLK	21"	J	P104
17		20	BLK	42"	1	P111
18		20	BLK	27"	5	P2
18		22	BLK	43"	1	LED
18		22	BLK	19"	B	P104
16B		20	BLK	26¼"	11	24 VOLT RTN
16B		22	BLK	15"		TP1 GND

DATE	ISSUE NO.	1	2	3	4	5	6	7			
JUNE '83	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. 3		DRAWING NUMBER BW-W36			
SHEET 3 OF 13											

FIG 7.3-4.3

SCI-TEC
INSTRUMENTS INC.

CABLE ASSEMBLY PART NUMBER	CONN. #	CONN. TYPE
BA-W36	TB1	CINCH 20-141
	R1	OHMITE 95J10R
UNIT HAMMOND POWER SUPPLY		
CONNECTOR NUMBER P2		
CONNECTOR TYPE MOLEX 09-50-3131		

INFORMATION
USED FOR PRODUCTION

INTERNAL DESTINATION		
POSITION	FUNCTION	
1	+5V	NC
2	+5V	
3	+5V	
4	GND	
5	GND	
6	GND	NC
7	GND	NC
8	+15V	
9	+15V	
10	GND (-15V RTN)	
11	-15V	
12	KEY	NC
13	+24V	

ORIGINATION					EXT. DESTINATION	
PIN	WIRE TYPE	GAUGE	COLOR	LENGTH	PIN	CONNECTOR
1		NO CONNECTION				
2		22	YEL	25"	2	TB1
3		22	YEL	24½"	3	TB1
4		20	BLK	26¼"	14	TB1
5		20	BLK	28½"	18	TB1
6		NO CONNECTION				
7		NO CONNECTION				
8		20	RED	23½"	4	TB1
9		NO CONNECTION				
10		20	BLK	27¾"	16	TB1
11		22	BW	9"	1	R1
12		NO CONNECTION				
13		22	ORG	24½"	8	TB1

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. 4		DRAWING NUMBER BW-W36			
SHEET 4 OF 13											

FIG 7.3-4.4

SCI-TEC
INSTRUMENTS INC.

CABLE ASSEMBLY PART NUMBER	CONN. #	CONN. TYPE
BA-W36	TB1	CINCH 20-141
	P105	CANNON DBMA-25S
UNIT: SECONDARY POWER SUP.	P113	CANNON DEMA-9S
CONNECTOR NUMBER: P104		
CONNECTOR TYPE: EDAC 322-044-500-258		

INFORMATION
USED FOR PRODUCTION

INTERNAL DESTINATION		ORIGINATION					EXT. DESTINATION	
POSITION	FUNCTION	PIN	WIRE TYPE	GAUGE	COLOR	LENGTH	PIN	CONNECTOR
	SHUTTER MOTOR, +24V/R301	A		22	BLU	30"	2	P105
	" GND	B		22	BLK	23"	18	TB1
	" R301/Q303B	C		22	GRN	30½	3	P105
	" Q303B	D		22	GRN	30"	14	P105
		E	No Connection					
	SHUTTER MOTOR Q303C	F		22	GRN	31"	15	P105
	STD LAMP +15V	H		22	RED	30½	6	P105
	" GND	J		22	BLK	21	17	TB1
	" Q103E/R101	K		22	VIO	31	7	P105
	" Q103B	L		22	VIO	31	18	P105
	" Q103C	M		22	VIO	31	19	P105
	THERMISTOR 2	N		24	RED	14	4	P113
	" 2	P		24	GRN	14	5	P113
	" 2	R		24	BRN	14	6	P113
	" 3	S		24	RED	14	7	P113
	" 3	T		24	GRN	14	8	P113
	" 3	U		24	BRN	14	9	P113
	" 1	V		24	RED	14	1	P113
	" 1	W		24	GRN	14	2	P113
		X		22	RED	16½	7	TB1
	HT SUPPLY D/A	Y	No Connection					
	HT SUPPLY GND	Z		22	BLK	20½	16	TB1
		T		22	BLK	21	16	TB1

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.

CABLE ASSEMBLY PART NUMBER	CONN. #	CONN. TYPE
BA-W36	TB1	CINCH 20-141
	P105	CANNON DBMA-25S
UNIT	P111	CANNON DEMA-9S
SECONDARY POWER SUPPLY	P113	CANNON DBMA-9S
CONNECTOR NUMBER		
P104		
CONNECTOR TYPE EDAC		
322-044-500-258		

INFORMATION
USED FOR PRODUCTION

INTERNAL DESTINATION		ORIGINATION					EXT. DESTINATION	
POSITION	FUNCTION	PIN	WIRE TYPE	GAUGE	COLOR	LENGTH	PIN	CONNECTOR
1	HG LAMP Q704B	1		22	GRY	30"	9	P105
2	" Q704C/24V	2		22	ORG	16	9	TB1
3	" Q704E	3		22	GRY	30	10	P105
4	LAMP RTN	4		20	GRN	41½	6	P111
5	GND	5		22	BLK	18	14	TB1
		6	NO CONNECTION					
7	HT SUPPLY - VE IN	7		22	WHT	30	12	P105
8	HT SUPPLY FEEDBACK	8		22	WHT	6		TP3 HV
		8		22	WHT	30	25	P105
9	+5,-8V REG +10V	9		22	BLU	17	12	TB1
10	RATEMETER O/P	10		22	BLU	5		TP8 RATE
11	+5,-8V REG +10V	11		22	WHT	30	17	P105
12	TEMP & RATE +15V	12		22	RED	15"	4	TB1
		13	NO CONNECTION					
		14	NO CONNECTION					
		15	NO CONNECTION					
16	TEMP MON GND	16		22	BLK	19	15	TB1
		17	NO CONNECTION					
		18	NO CONNECTION					
19	TEMP1 O/P	19		22	RED	6		TP2 TEMP
20	THERMISTOR 1	20		24	BRN	14	3	P113
21	GND	21		22	BLK	19½	15	TB1
22	HT SUPPLY -12V	22		22	VIO	36¼"	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.

CABLE ASSEMBLY PART NUMBER: BA-W36

UNIT: HEATSINK

CONNECTOR NUMBER: P105

CONNECTOR TYPE: CANNON DBMA-25S

CONN. #	CONN. TYPE
TB1	CINCH 20-141
P104	EDAC 322-044-501-258
P111	CANNON DEMA-9S

INFORMATION
USED FOR PRODUCTION

INTERNAL DESTINATION		ORIGINATION					EXT. DESTINATION	
POSITION	FUNCTION	PIN	WIRE TYPE	GAUGE	COLOR	LENGTH	PIN	CONNECTOR
	SHUTTER MOTOR +24V	1		22	ORG	19½	8	TB1
	" " FEEDBACK	2		22	BLU	31	A	P104
	" " Q303E	3		22	GRN	31½	C	P104
	+15V - 5V REG	4		22	RED	19	5	TB1
	STD LAMP +15V	5		22	RED	19½	4	TB1
	" +15V	6		22	RED	30½	H	P104
	" Q103E/R101	7		22	VIO	31	K	P104
		8	NO CONNECTION					
	HG LAMP Q704B	9		22	GRY	31	1	P104
	" Q704E	10		22	GRY	31	3	P104
	" LAMP	11		20	WHT	53½	9	P111
	HT SUPPLY VE I/P	12		22	WHT	31	7	P104
	" GND	13		22	BLK	22	14	TB1
	SHUTTER MOTOR Q303B	14		22	GRN	31	D	P104
	" Q303C	15		22	GRN	31	F	P104
		16	NO CONNECTION					
	+15V TO R8	17		22	WHT	31	11	P104
	STD LAMP Q103B	18		22	VIO	31	L	P104
	" Q103C	19		22	VIO	31	M	P104
	" SOURCE	20		20	RED	53½	5	P111
		21	NO CONNECTION					
	+24V	22		22	ORG	19½	8	TB1
	HG LAMP Q704C	23	NO CONNECTION					
		24	NO CONNECTION					
	HT SUPPLY FEEDBACK	25		22	WHT	31	8	P104

DATE: JUNE 83	ISSUE NO.	1	2	3	4	5	6	7			
	DATE										
DWN. DW	CN/RN		362	447	482	487	522	672			
CHKD. KL	CERT.		RA	RA	RA	RA	RA	DJ			
APPD.	TITLE: MAIN POWER HARNESS ASSY					SHEET NO. 7		DRAWING NUMBER BW-W36			
SHEET 7 OF 13											

FIG 7.3-4.7

SCI-TEC
INSTRUMENTS INC.

INFORMATION
USED FOR PRODUCTION

CABLE ASSEMBLY PART NUMBER: BA-W36

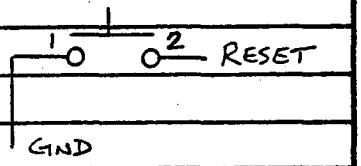
CONN. #	CONN. TYPE
P112	CANNON DAMA-15S
TB1	CINCH 20-141

UNIT: SWITCH PANEL

CONNECTOR NUMBER: SW1 - SW2

CONNECTOR TYPE: SOLDER DIRECT

INTERNAL DESTINATION		ORIGINATION				EXT. DESTINATION	
POSITION	FUNCTION	PIN	WIRE TYPE	GAUGE	COLOR	LENGTH	PIN	CONNECTOR
SW1	RESET	1		22	GRY	13	7	P112
SW1	COMMON	2		22	BLK	18	17	TB1
TP1	GND			22	BLK	15"	16B	TB1
2	TEMP			22	RED	6"	19	P104
3	HV			22	WHT	6"	8	P104
4	+15V			22	RED	11"	5	TB1
5	+5V			22	YEL	12"	2	TB1
6	-15V			22	BLU	11"	12	TB1
7	+24V			22	ORG	10"	10	TB1
8	RATE			22	BLU	5"	10	P104
9	-12V			22	VIO	8"	22	P104



DATE	ISSUE NO.	1	2	3	4	5	6	7			
JUNE '83	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. 8		DRAWING NUMBER BW-W36			
SHEET 8 OF 13											

FIG 7.3-4.8

SCI-TEC
INSTRUMENTS INC.

CABLE ASSEMBLY PART NUMBER	CONN. #	CONN. TYPE
BA-W36	TB1	CINCH 20-141
UNIT: LED		
CONNECTOR NUMBER: LED		
CONNECTOR TYPE: MOLEX 03-06-2011		

INFORMATION
USED FOR PRODUCTION

INTERNAL DESTINATION		ORIGINATION					EXT. DESTINATION	
POSITION	FUNCTION	PIN	WIRE TYPE	GAUGE	COLOR	LENGTH	PIN	CONNECTOR
LED	GND	1		22	BLK	43"	18	TB1
LED	+5V POWER	2		22	YEL	28"	3	TB1

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											

Fig 7.2-4.9

SCI-TEC
INSTRUMENTS INC.

CABLE ASSEMBLY PART NUMBER: BA-W36

UNIT: HG & STD LAMP

CONNECTOR NUMBER: P111

CONNECTOR TYPE: CANNON DEMA-9S

CONN. #	CONN. TYPE
P111	CANNON DEMA-9S
P105	CANNON DEMA-25S
P104	EDAC 322-044-500-258

INFORMATION
USED FOR PRODUCTION

INTERNAL DESTINATION		ORIGINATION					EXT. DESTINATION	
POSITION	FUNCTION	PIN	WIRE TYPE	GAUGE	COLOR	LENGTH	PIN	CONNECTOR
	STD LAMP GND	1		20	BLK	42	17	TB1
		2			N/C			
		3			N/C			
		4			N/C			
	STD LAMP +VE	5		20	RED	54½	20	P105
	HG LAMP RTN	6		20	GRN	40½	4	P104
		7			N/C			
		8			N/C			
	HG LAMP +VE	9		20	WHT	54½	11	P105

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.: 10			DRAWING NUMBER: BW-W36		
SHEET 10 OF 13											

FIG 7.3-4.10

SCI-TEC
INSTRUMENTS INC.

CABLE ASSEMBLY PART NUMBER	CONN. #	CONN. TYPE
BA-W36	TB1	UNCH 20-141
	SW1	PUSHBUTTON
UNIT: CARD RACK		
CONNECTOR NUMBER: P112		
CONNECTOR TYPE: CANNON DAMA-15S		

INFORMATION
USED FOR PRODUCTION

INTERNAL DESTINATION		ORIGINATION					EXT. DESTINATION	
POSITION	FUNCTION	PIN	WIRE TYPE	GAUGE	COLOR	LENGTH	PIN	CONNECTOR
	GND	1		22	BLK	16½	15	TB1
	GND	2		22	BLK	17	16	TB1
		3			N/C			
		4			N/C			
		5			N/C			
		6			N/C			
	RESET $\overline{CLR}$	7		22	GRY	13	N.O.	SW1
	-15V	8		22	BLU	14	11	TB1
	+5V	9		22	YEL	13½	3	TB1
		10			N/C			
	+15V	11		22	RED	13	6	TB1
		12			N/C			
		13			N/C			
		14			N/C			
	+24V	15		22	ORG	13½	10	TB1

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. 11			DRAWING NUMBER: BW-W36		
SHEET 11 OF 13											

Fig 7.3-4.11

SCI-TEC
INSTRUMENTS INC.

CABLE ASSEMBLY PART NUMBER	CONN. #	CONN. TYPE
BA-W36	P104	EDAC 322-044-500-258
UNIT: THERMISTORS		
CONNECTOR NUMBER: P113		
CONNECTOR TYPE: CANNON DEMA-9S		

INFORMATION
USED FOR PRODUCTION

INTERNAL DESTINATION		ORIGINATION					EXT. DESTINATION	
POSITION	FUNCTION	PIN	WIRE TYPE	GAUGE	COLOR	LENGTH	PIN	CONNECTOR
	THERMISTOR #1	1		24	RED	14	V	P104
	" #1	2		24	GRN	14	W	
	" #1	3		24	BRN	14	20	
*	" #2	4		24	RED	14	N	
*	" #2	5		24	GRN	14	P	
*	" #2	6		24	BRN	14	R	
*	" #3	7		24	RED	14	S	
*	" #3	8		24	GRN	14	T	
*	" #3	9		24	BRN	14	U	P104
*	OPTIONAL							

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. 12			DRAWING NUMBER BW-W36		
SHEET 12 OF 13											

FIG 7.3-4.12

SCI-TEC
INSTRUMENTS INC.

CABLE ASSEMBLY PART NUMBER: BA-W36

UNIT: POWER RESISTOR

CONNECTOR NUMBER: R1

CONNECTOR TYPE: OHMITE 95J1ØR

CONN. #	CONN. TYPE
P2	MOLEX 09-50-3131
TB1	CINCH 20-141
P104	EDAC 322-044-500-258

INFORMATION
USED FOR PRODUCTION

INTERNAL DESTINATION

POSITION	FUNCTION

ORIGINATION					EXT. DESTINATION	
PIN	WIRE TYPE	GAUGE	COLOR	LENGTH	PIN	CONNECTOR
1		22	BLU	9"	11	P2
1		22	BLU	34 1/4"	11	TB1
2		22	J10	36 1/4"	22	P104

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.: 13		DRAWING NUMBER: BW-W36			
SHEET 13 OF 13											

FIG 7.3-4.13

BREWER REFERENCE DOCUMENTATION

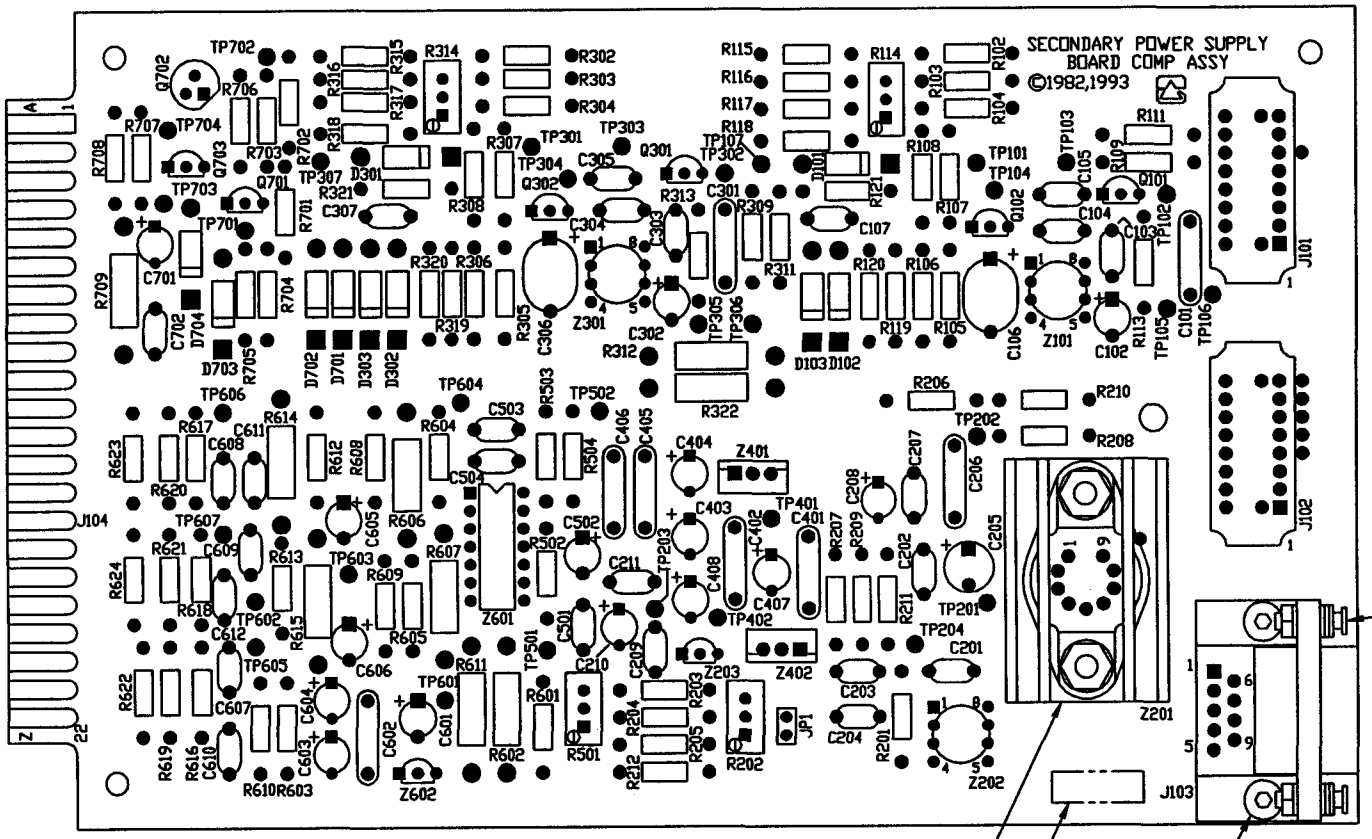
Section 7.4 Secondary Power and Panel

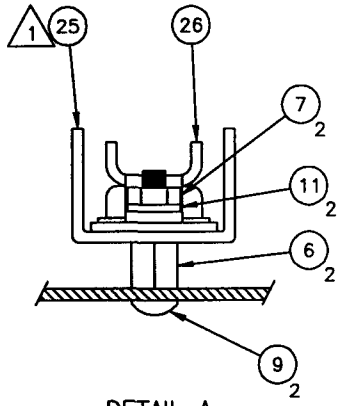
Section Overview

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.

DOCUMENT NO. BA-E94	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	APPD.
	1	INITIAL RELEASE	DCN658/659	93.11.30	FV	





DETAIL A
Z201

5 2

7 10 8
2 2 2

3

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.

COMPUTER GENERATED DRAWING
FILENAME: BA-E94.DWG

QTY -1 = NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE	2:1	NEXT ASSY:	BA-CD1
DATE	93.11.30	DIMENSIONS IN	INCHES
DWN	FV	IF DUAL DIMS:	mm (inches)
CHKD		Tolerances (unless otherwise specified)	
APPD		INCHES	MM
FINISH		.xxx ± .005 .xx ± .01 ANGLES ± 1° FRACTIONS ± 1/32	.xx ± 0.15 .x ± 0.25 ANGLES ± 1°

SCI-TEC INSTRUMENTS INC.

TITLE:
SECONDARY POWER SUPPLY BOARD ASSY

SHEET	DOCUMENT NUMBER	REV.
1 OF 1	BA-E94	1

Fig 7.4.1-1

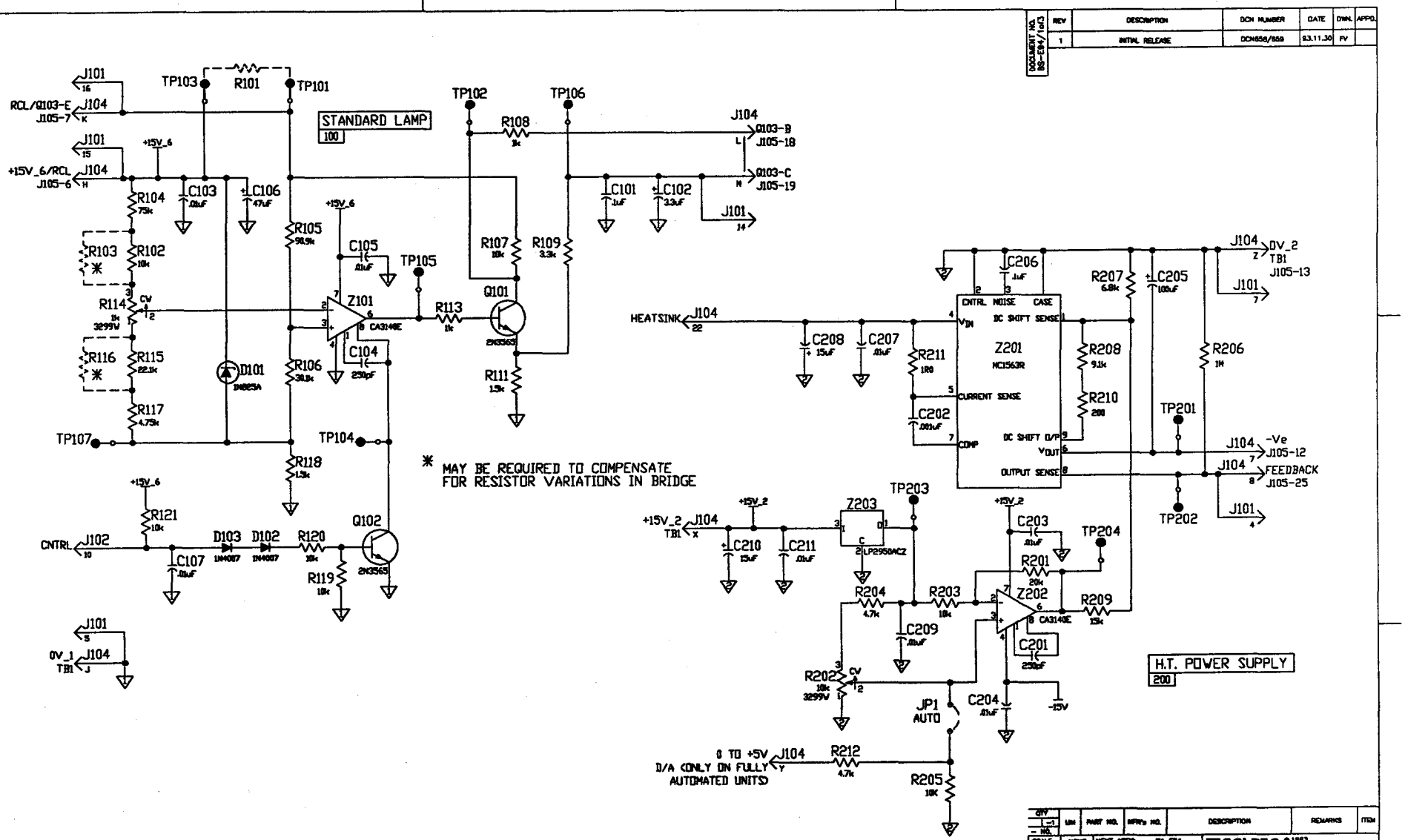

STANDARD LAMP
100
H.T. POWER SUPPLY
200
* MAY BE REQUIRED TO COMPENSATE FOR RESISTOR VARIATIONS IN BRIDGE
0 TO +5V D/A ONLY ON FULLY AUTOMATED UNITS
SECONDARY POWER SUPPLY BRD SCHEMATIC
SCI-TEC INSTRUMENTS INC.
BS-E94

Fig 7.4.1-2

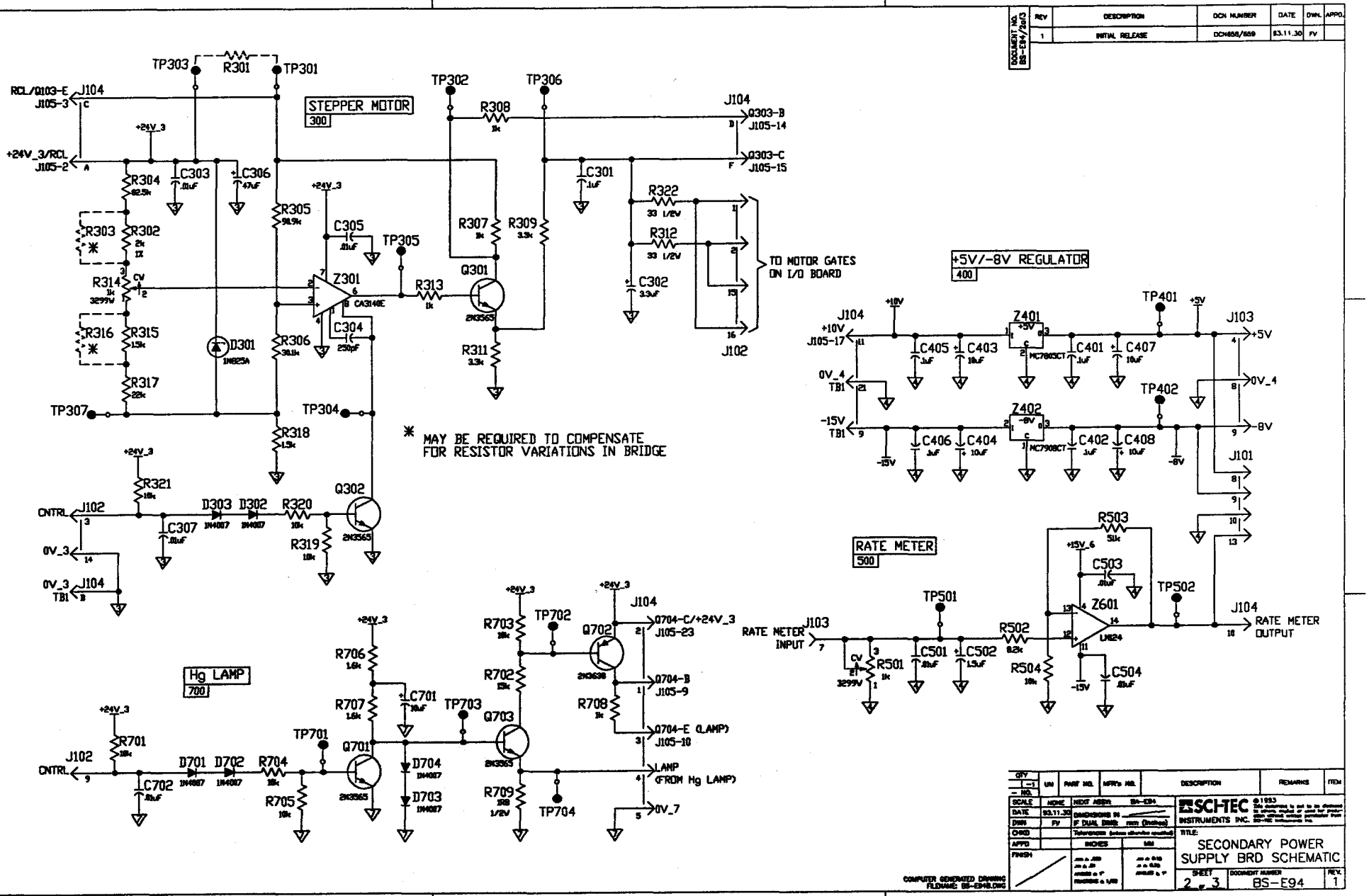

STEPPER MOTOR
300
+5V/-8V REGULATOR
400
RATE METER
500
Hg LAMP
700
TO MOTOR GATES ON I/O BOARD
* MAY BE REQUIRED TO COMPENSATE FOR RESISTOR VARIATIONS IN BRIDGE
RATE METER INPUT
RATE METER OUTPUT
LAMP (FROM Hg LAMP)
SECONDARY POWER SUPPLY BRD SCHEMATIC
BS-E94
SCHTEC INSTRUMENTS INC.

Fig 7.4.1-2

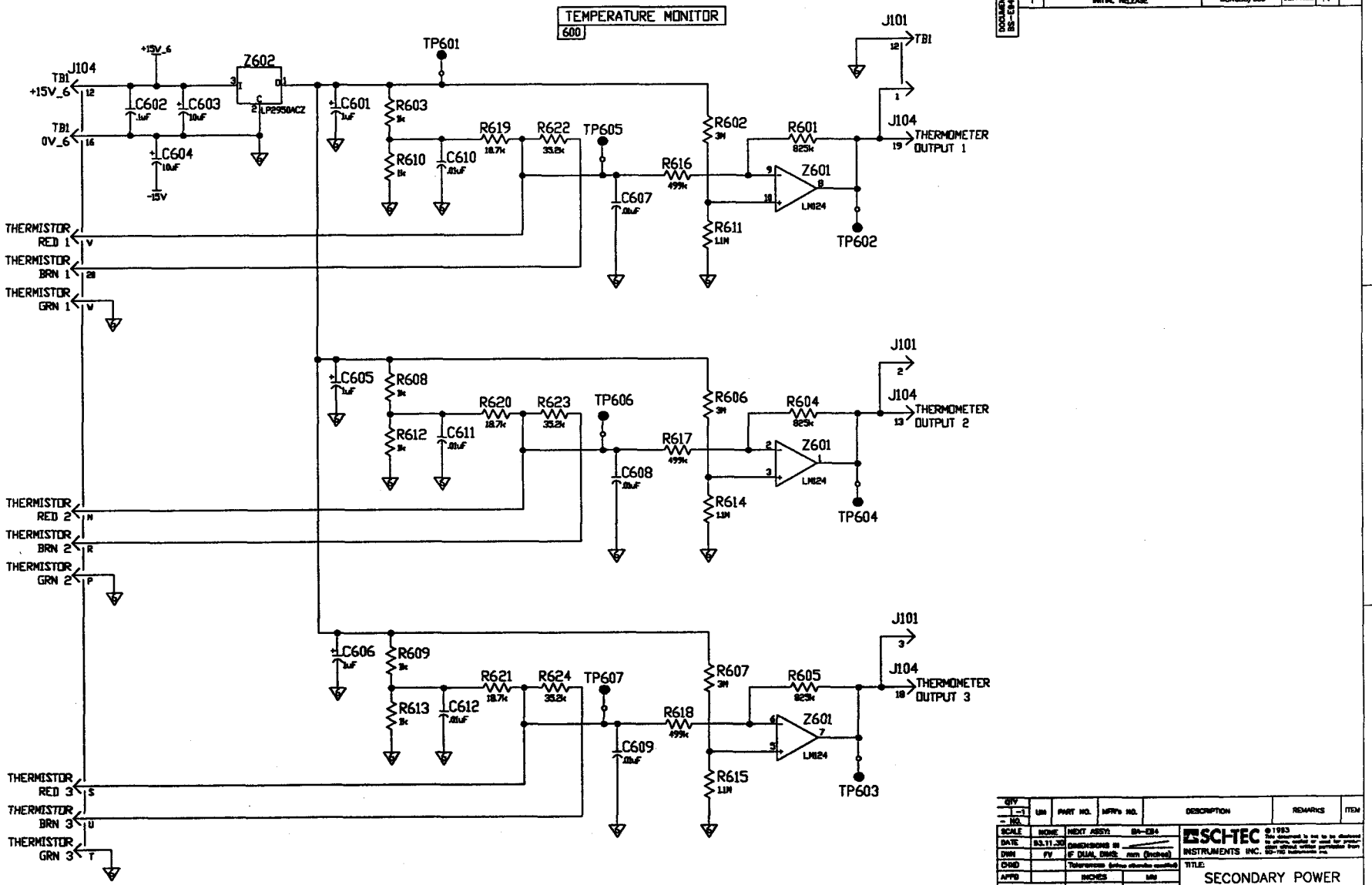
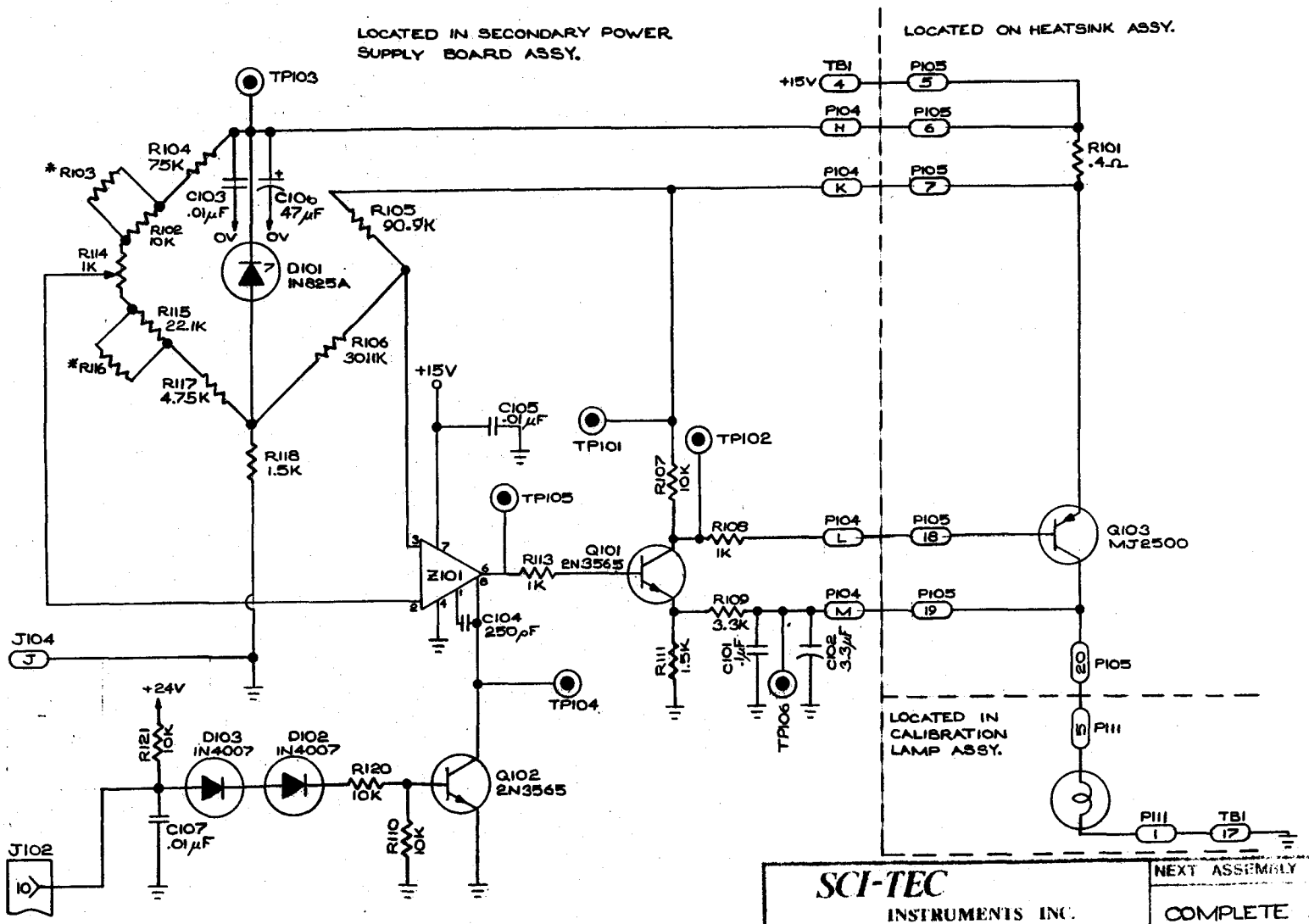

TEMPERATURE MONITOR
600
J104
TB1
+15V_6
TB1
0V_6
+15V_6
C602
C603
C604
-15V
Z602
LP2950ACZ
C601
TP601
R603
R610
C610
R619
R622
TP605
C607
R616
R602
R611
R601
Z601
LM124
J101
TB1
J104
THERMOMETER
OUTPUT 1
TP602
THERMISTOR
RED 1
THERMISTOR
BRN 1
THERMISTOR
GRN 1
C605
R608
R612
C611
R620
R623
TP606
C608
R617
R606
R614
R604
Z601
LM124
J101
J104
THERMOMETER
OUTPUT 2
TP604
THERMISTOR
RED 2
THERMISTOR
BRN 2
THERMISTOR
GRN 2
C606
R609
R613
C612
R621
R624
TP607
C609
R618
R607
R615
R605
Z601
LM124
J101
J104
THERMOMETER
OUTPUT 3
TP603
THERMISTOR
RED 3
THERMISTOR
BRN 3
THERMISTOR
GRN 3
DOCUMENT NO. BS-E94/3of3
REV
DESCRIPTION
DCN NUMBER
DATE
DWN.
APPD.
1
INITIAL RELEASE
DCN858/859
93.11.30
FV
SCALE
NONE
DATE
93.11.30
DWN
FV
CHKD
APPD
FINISH
NEXT ASSY:
BS-E94
INCHES
MM
SCI-TEC INSTRUMENTS INC.
©1993
TITLE:
SECONDARY POWER SUPPLY BRD SCHEMATIC
SHEET
3 of 3
DOCUMENT NUMBER
BS-E94
REV.
1
COMPUTER GENERATED DRAWING
FILENAME: BS-E94C.DWG

FIG 7.4.1-2



*SELECTED TO GIVE LAMP OUTPUT POWER OF 16W @ R114 MIDRANGE

SCI-TEC INSTRUMENTS INC.		
SCALE	DIMS.	TOLS
MATERIAL		
FINISH		

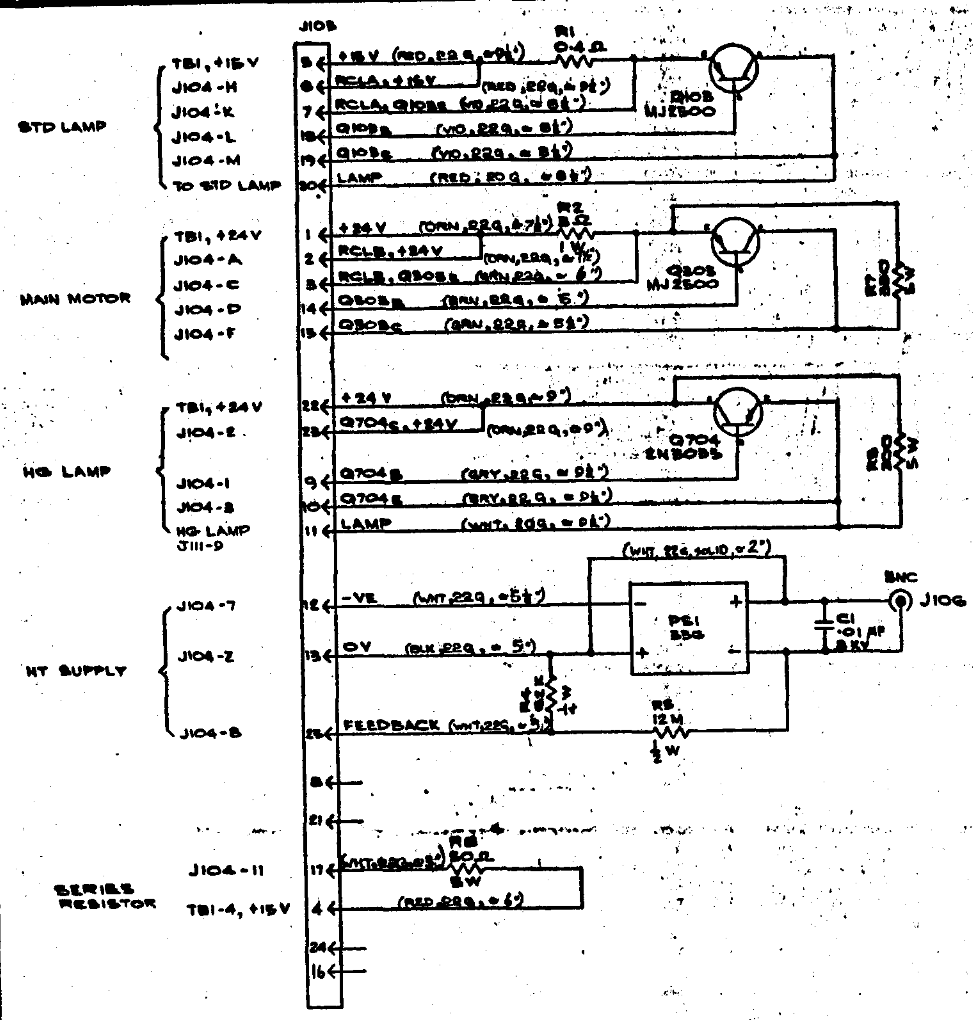
NEXT ASSEMBLY BS-E63 (REF.) N/A.

COMPLETE STANDARD LAMP CIRCUIT - S.P.S SCHEMATIC

DATE FEB 83 DRN KL

SIZE B BS-E64 REV 1

FIG. 7.4.1-3



Issue No.	Revision and Description	App'd	Date	Work No.
—	[illegible] - WAS [illegible] DWG [illegible]	—	—	[illegible]
1	△ R2 WAS 2W (B-3) △ GENL NOTES ADDED	[illegible]	11 DEC 1981	5705
3	△ R8 (B-3) ADDED. △ PIN REF (F-2) ADDED.	[illegible]	FEB 10 1982	3755
4	△ '+15V' WAS '+12V' (A-2,3) △ PIN DESTINATIONS ON 105 ADDED (A TO F-2)	[illegible]	JULY 21 1982	5747
5	WAS AES [illegible]	KL	JAN 85	
6		KL	AUG 84	[illegible]
7	REMOVE NOTE 1, ADD ID TO TERM. TERMINALS	RA	[illegible]	[illegible]
8	CLARIFY OUTPUT CONNECTIONS	TKL	89-6-9	DCN 462
9	REMOVE R6, R9	RA	90-4-4	482-6

FORM C

GENERAL NOTES:

1- REMOVED
2- ASSEMBLY BA-E21

Date	Drawn By	
AUG 18 1981	[illegible]	All dimensions are in inches unless otherwise indicated
Design / App'd	Checked	Tolerances, unless otherwise stated: Fractional dimensions ± 1/32; Dimensions to 1 decimal ± .02; Dimensions to 2 decimals ± .01; Dimensions to 3 decimals ± .005; Angles ± 1 degree
Approved		

SCI-TEC INSTRUMENTS INC.

Title: BREWER SPECTROPHOTOMETER HEATSINK ASSEMBLY

Associated Specification: —

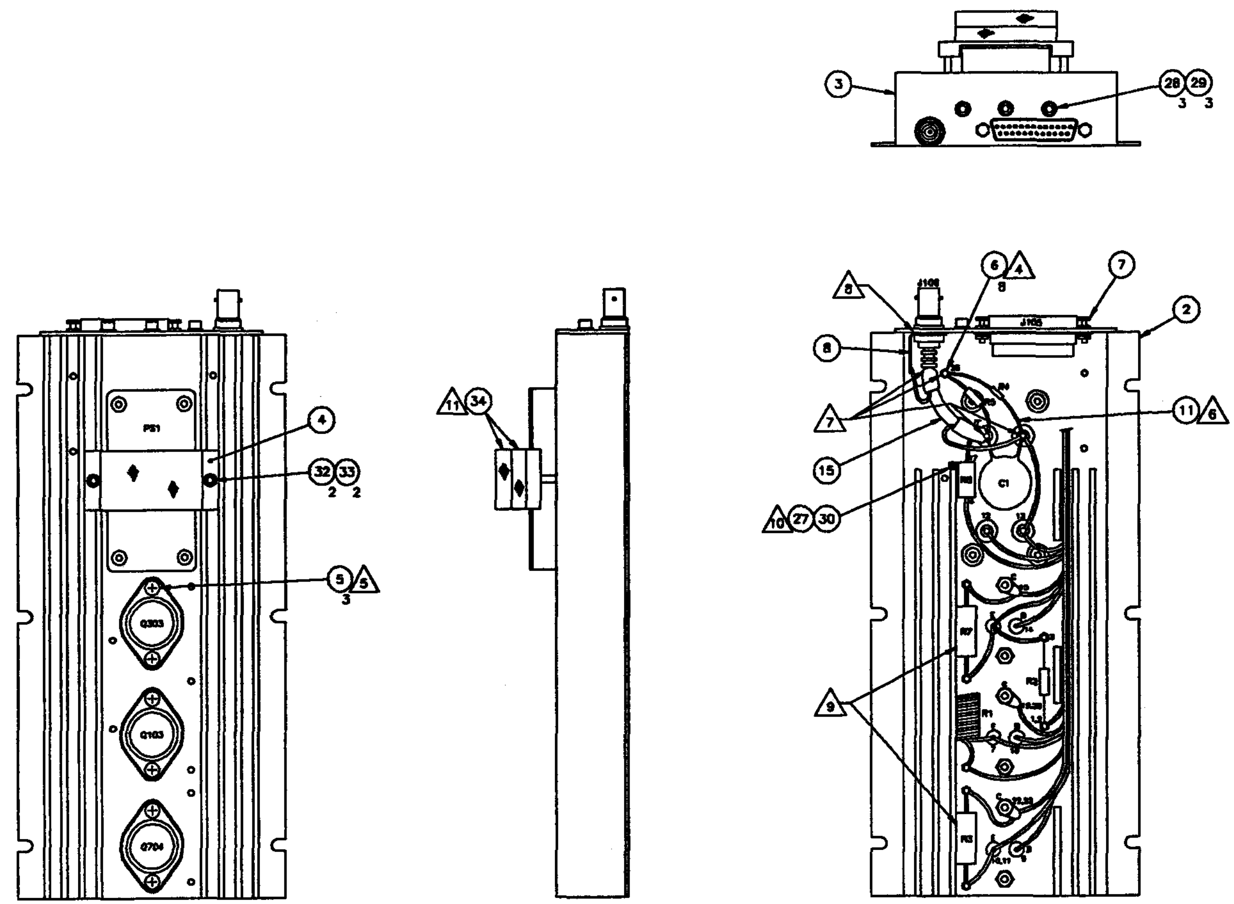
Drawing No. BS-E21

Issue No. 9

FIG. 7.4.2-1

REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	APPD.
11	REDRAWN WITH CHG – ITEM 34	620	93.01.15	FV	

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 (Q103,Q303,Q704) AND MOUNTING KIT (ITEM 5).
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 R8 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.

COMPUTER GENERATED DRAWING
FILENAME: BA-E21.DWG

QTY	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE	1:1	NEXT ASSY: BA-C01	SCI-TEC INSTRUMENTS INC. ©1993
DATE	91.08.18	DIMENSIONS IN INCHES	
DWN	HGV	F DUAL DIMS: mm (inches)	
CHKD	QR	Tolerances (unless otherwise specified)	TITLE: BREWER HEATSINK ASSY
APPD	HL	INCHES / MM	
FINISH			SHEET 1 of 1 — DOCUMENT NUMBER BA-E21 — REV. 11

CRESTRONICS INC. 221-200

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

3.3 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

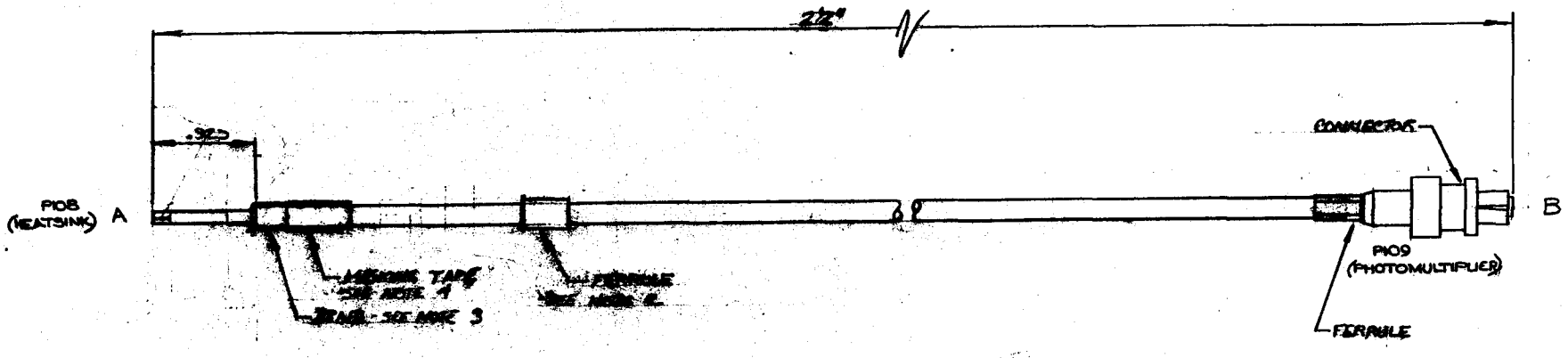
7.0 FILTERING

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 NORMALY PUT INTO THE POSITIVE LEAD.
7.3 ON THIS UNIT THE FILTER IS IN THE NEGATIVE FOR A POSITIVE OUTPUT GROUND.

REF DWG BA-E21

FIG 7.4.2-3

DOCUMENT NO. 34-W38	DESCRIPTION	REV.	RN/DCN NUMBER	DATE	DWN	APPD
	ORIGINAL ISSUE	1	—	MAR 83	CH	
	ADD NOTES AND SHEET 2	2	—	MAR 83	KL	
	NEXT ASSY WAS BA-W21	3	DCN- 373	88-2-2	C.W.	RA



1. Use a 2½" length of cable (item 5).
2. Slide crimp ferrules over cable as illustrated.
3. Trim outer conductor .925", comb out braid and fold back evenly over cable.
4. Temporarily cover braid with masking tape to prevent damaging it during assembly.

SCI-TEC INSTRUMENTS INC.

FRACT. FULL	DECIMAL INCHES	TOLS. XXX ±.005 XX ±.01
MATERIAL		
FINISH		

NEXT ASSEMBLY BA-C01

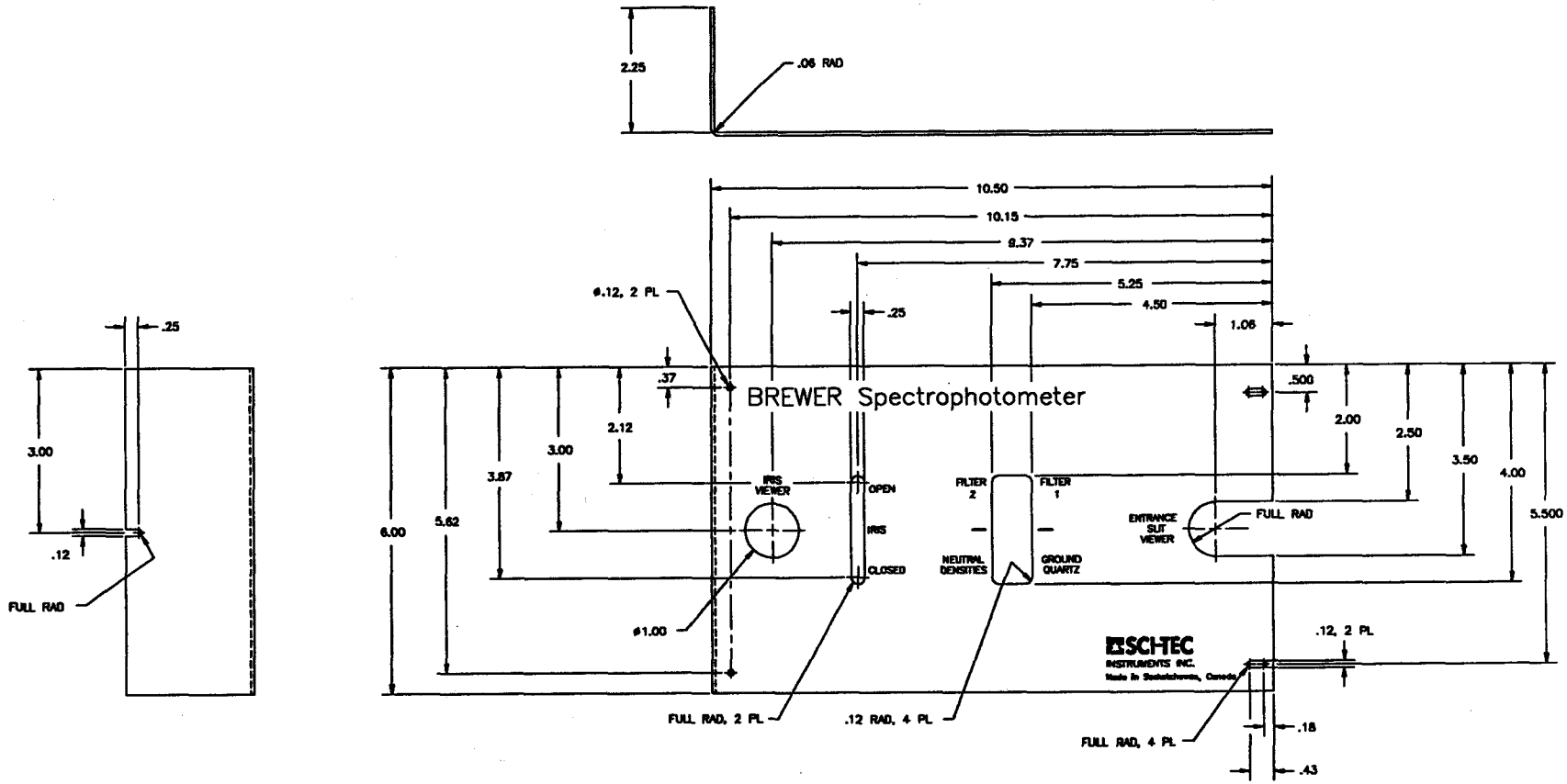
HIGH VOLTAGE CABLE ASSY.

DATE	DWN.	CHKD	APPD.
MAR 83			KL

SHT.	SIZE	NUMBER	ISS.
1 of	B	BA-W38	3

FIG. 7.4.2-4.

DOCUMENT NO. BM-C82	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	APPD.
	10	REDRAWN WITH CHG (SEE DCN)	487	90.09.15	FV	RP
	11	CHG VERT BEND FR 2.37 TO 2.25	525	91.02.27	FV	RP
	12	ADD ø.12 HOLES	614	92.08.30	FV	



NOTES:

1. REMOVE ALL BURRS AND SHARP EDGES.
2. FINISH: - PAINT ALL OVER WITH 1 COAT VINYL WASH AND 2 COATS DUPONT IMRON WHITE #1300
   - SILK SCREEN IN BLACK USING A/W, BM-C82 SHT 2 of 2.

QTY	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM
-1		99-20-013		ALUM ALLOY SHEET, .064 THK, 5052-H32		
- 355						

SCALE	1=1
DATE	88.02.10
DWN	BSV
CHKD	WC
APPD	ML
FINISH	SEE NOTE 2

NEXT ASSEM BM-001
DIMENSIONS IN INCHES
IF DUAL DIMS mm (Inches)
Tolerances (unless otherwise specified)
INCHES MM
.xx ± .020 .xx ± 0.50
.xxx ± .010 .xxx ± 0.25
ANGS ± 1° ANGS ± 1°
FINISH ± 1/64

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TITLE: CONTROL PANEL

SHEET 1 OF 1 | DOCUMENT NUMBER BM-C82 | REV. 12

COMPUTER GENERATED DRAWING
FILENAME: BM-C82.DWG

Fig 7.4.2-1

BREWER REFERENCE DOCUMENTATION

Section 7.5 Card Rack Boards

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.

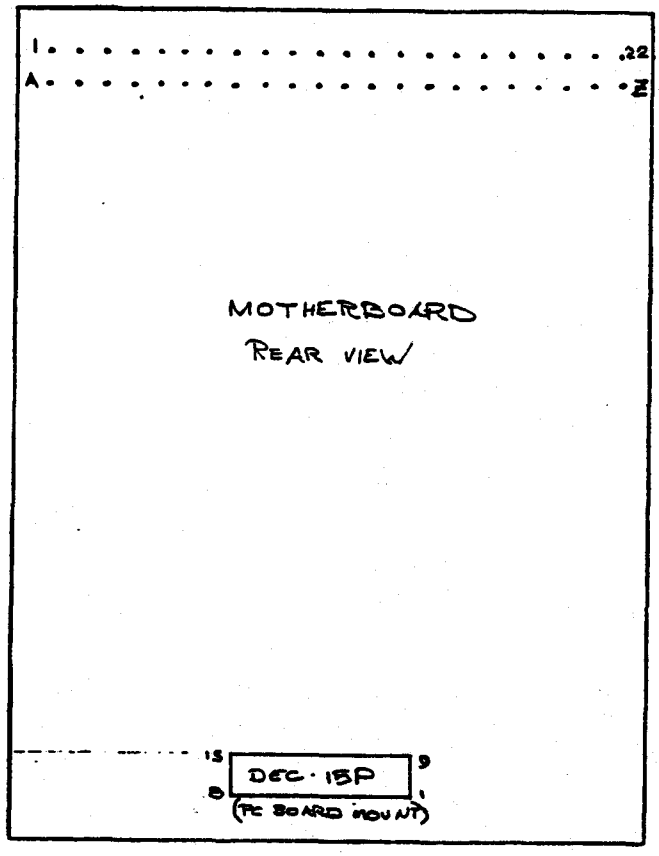
Fig 7.5.2-1: BA-E50/A and BA-E50/B boards for Shutter/Micrometer, Filterwheels #1, #2 and Iris are the same for both MKII and MKIV. For Azimuth/Zenith and Sighting Switches, BA-E50/D is used. This board also includes motor control for Filterwheel #3 in front of PMT, on MKIV only. The Photon Counter board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

SCI-TEC
INSTRUMENTS INC.

INFORMATION ONLY
NOT USED FOR PRODUCTION

CABLE ASSEMBLY PART NUMBER	CONN. #	CONN. TYPE
UNIT CARD RACK MOTHERBOARD		
CONNECTOR NUMBER J112		
CONNECTOR TYPE DEC-25P		



(DEC-15P) PIN #	
1	22
2	Z
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									
	DATE										
DWN. DW	CN/RN										
CHKD.	CERT.										
APPD. KL	TITLE BREWER					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

CABLE ASSEMBLY PART NUMBER

UNIT MOTHER BOARD SIGNALS

CONNECTOR NUMBER

CONNECTOR TYPE

CONN. #	CONN.

INTERNAL DESTINATION — POSITION | FUNCTION

ORIGINATION — PIN | WIRE TYPE | GAUGE | COLOR | LENGTH; EXT. DESTINATION — 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

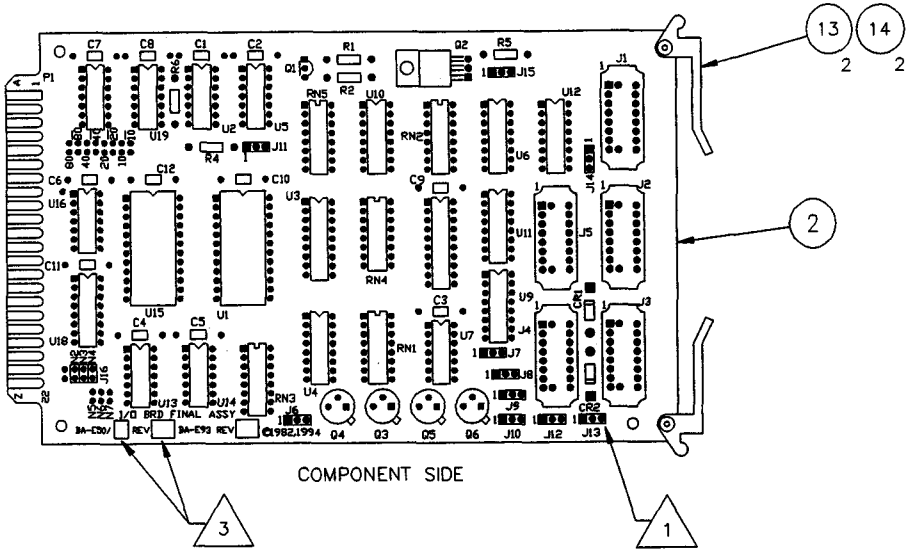
DATE 1 Jun 83
DWN. DW
CHKD.
APPD. KV
SHEET 2 OF 2

ISSUE NO
DATE
CN/RN
CERT.
TITLE BREWER
SHEET NO.
DRAWING NUMBER BW-E46

FIG 7.5.1-2

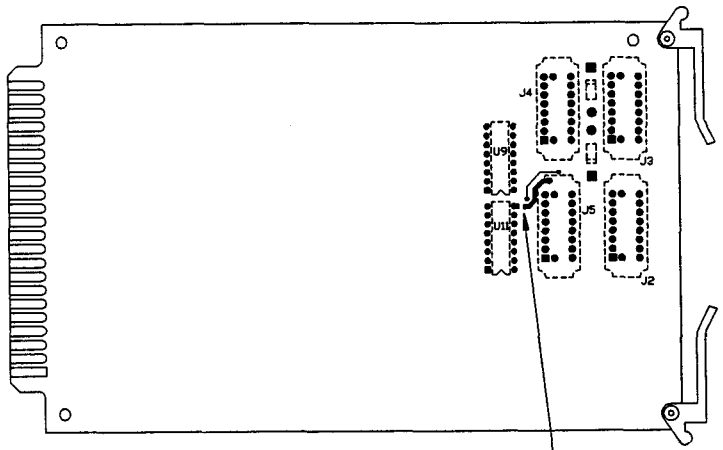
DOCUMENT NO. BA-E50

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 'V'	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	



COMPONENT SIDE

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	2–3	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



SOLDER SIDE (PARTIAL VIEW)

CUT TRACK @ U11–PIN 9,
/D & /E ASSY'S ONLY!

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 (IRIS)	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/".

COMPUTER GENERATED DRAWING
FILENAME: BA-E93.DWG

QTY -1 - NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE	1:1	NEXT ASSY: BA-C01/BA-C190	
DATE	94.05.25	DIMENSIONS IN	
DWN	FV	IF DUAL DIMS: mm (inches)	
CHKD		Tolerances (unless otherwise specified)	
APPD		INCHES: .xxx ± .005, .xx ± .01, ANGLES ± 1°, FRACTIONS ± 1/32	MM: .xx ± 0.15, .x ± 0.25, ANGLES ± 1°
FINISH			

SCI-TEC INSTRUMENTS INC.

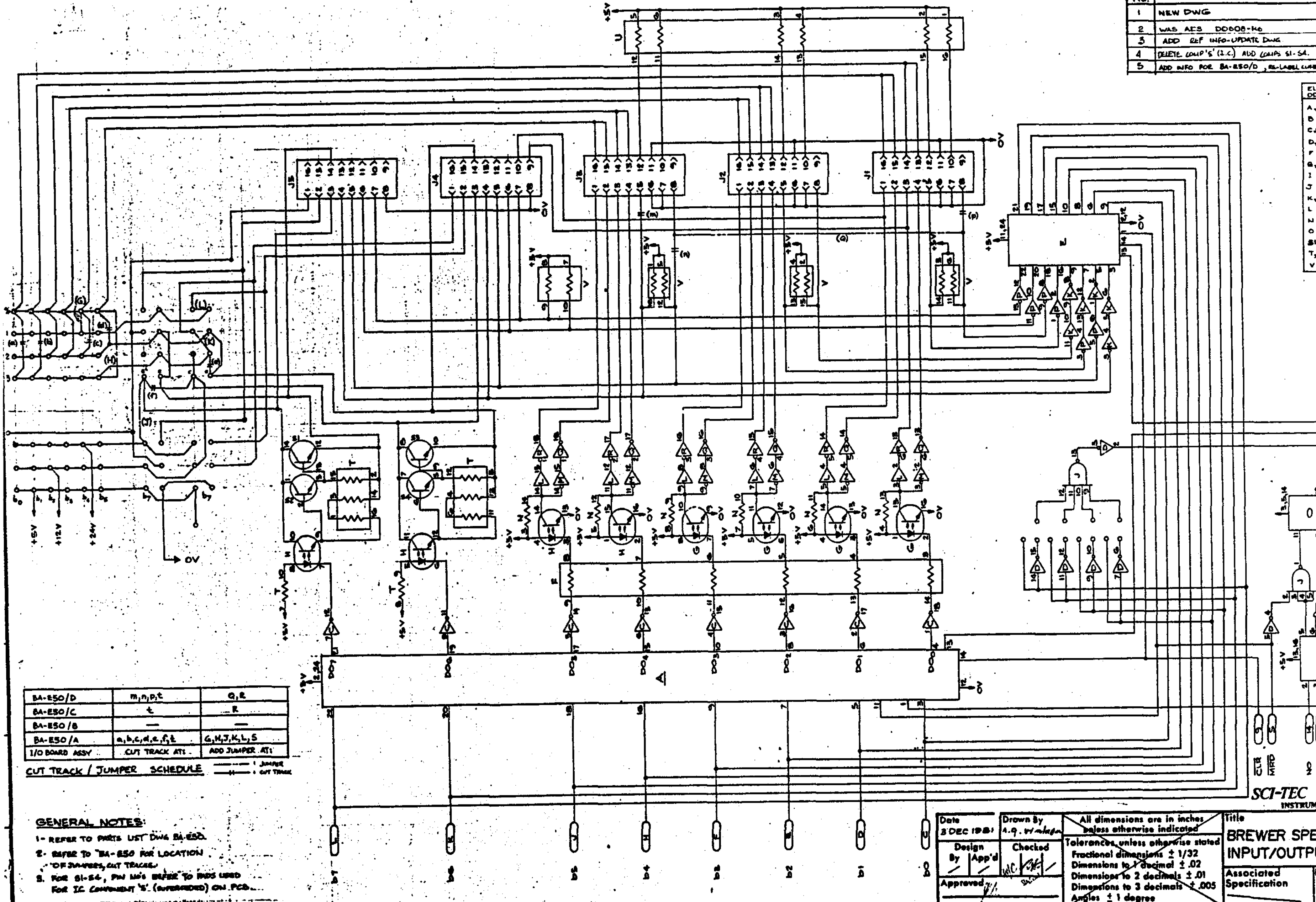
TITLE: I/O BOARD FINAL ASSY

SHEET	DOCUMENT NUMBER	REV.
1 OF 1	BA-E50	10

Fig 7.5.2-1

Issue No.	Revision and Description	App'd	Date	Work No.
1	NEW DWG	—	—	3620
2	WAS AES DD008-K6		JAN 82	KL
3	ADD REF INFO-UPDATE DWG	R/A	87-12-15	DJ-3-7
4	DELETE COMP'S (I.C.) ADD COMPS S1-S4.		86-6-6	409-1
5	ADD INFO FOR BA-E50/D, RE-LABEL CUSTOMER & JMPS		88-8-11	433-2

ELECT. DESC.	
A,E	CDP1852D
B	CDP1853D
C,Q,R	ULN2803
D,M	CD4040BE
F	416R-001-221
G,H	ICL-74
I	CD4081BE
J	CD4012BE
K,P	MC14584
L	CD4050BE
N	416R-001-682
O	CD4013BE
S1-S4	2N5725 (SEE NOTE 3)
T,U	416R-001-471
V	416R-001-153



BA-E50/D	m,n,p,t	Q,R
BA-E50/C	t	R
BA-E50/B	—	—
BA-E50/A	a,b,c,d,e,f,t	G,H,J,K,L,S
I/O BOARD ASSY	CUT TRACK AT:	ADD JUMPER AT:

CUT TRACK / JUMPER SCHEDULE

GENERAL NOTES:

1- REFER TO PARTS LIST DWG BA-E50.
2- REFER TO "BA-E50 FOR LOCATION OF JUMPERS, CUT TRACKS.
3. FOR S1-S4, PIN NO'S REFER TO PADS USED FOR IC COMPONENT 'S'. (SUPERSEDED) ON PCB.

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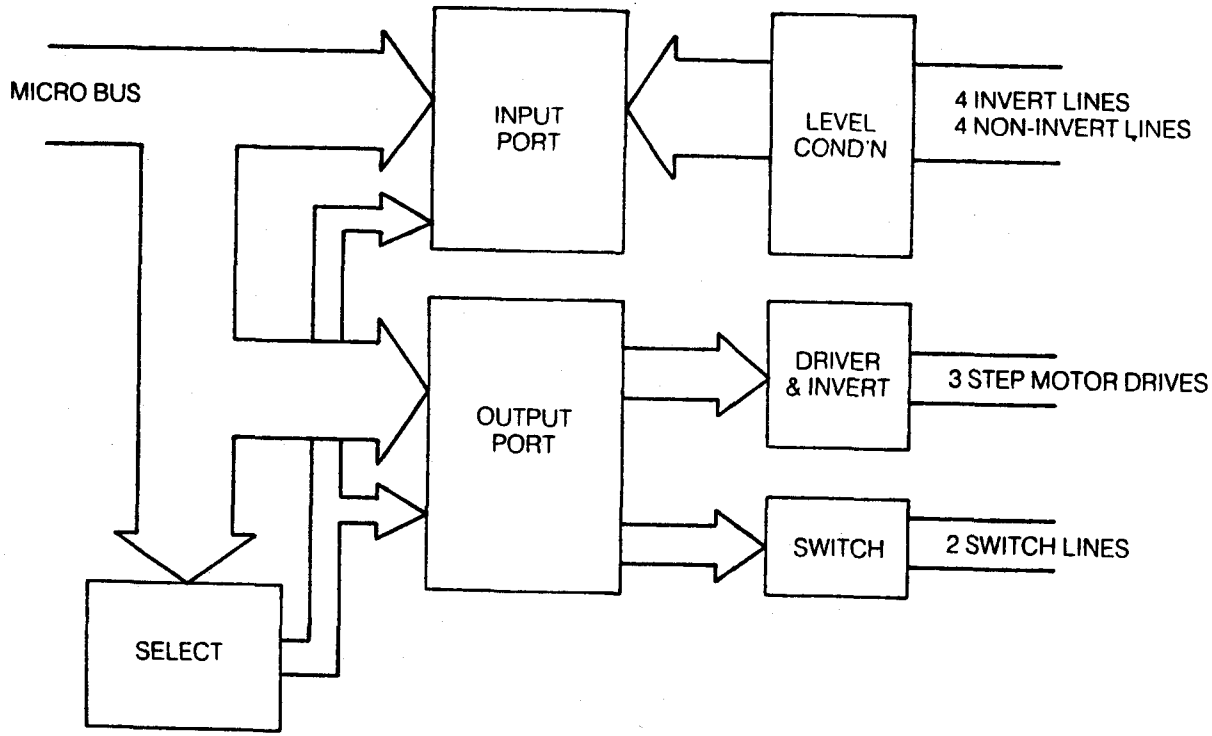
Date	Drawn By	All dimensions are in inches unless otherwise indicated	Title
3 DEC 1981	A.G. [illegible]	Tolerances unless otherwise stated: Fractional dimensions ± 1/32; Dimensions to 1 decimal ± .02; Dimensions to 2 decimals ± .01; Dimensions to 3 decimals ± .005; Angles ± 1 degree	BREWER SPECTROPHOTOMETER INPUT/OUTPUT BOARD
Design By / App'd	Checked		Associated Specification
Approved			Drawing No. BS-E50 Issue No. 5

FIG 7.5.2-2

INPUT/OUTPUT Board



Block diagram of I/O Board BA-E50

Fig. 7.5.2-3

E50 ORIGIN	/A P2	/D P3	OPT/STD MICROMETER	STD P22
	1	F3	MOTOR COIL 3	1
	2		MOTOR COIL 4	2
	3		MOTOR COIL 1	3
	4		MOTOR COIL 2	4
	5		COLLECTOR 1	5
	6		EMITTER 1	6
	7		EMITTER 2	7
	8		COLLECTOR 2	8
	16		MOTOR COIL 3	9
	15		MOTOR COIL 4	10
	14		MOTOR COIL 1	11
	13		MOTOR COIL 2	12
	12		ANODE 1	13
	11		COM CATH	14
	10		ANODE 2	15
	9		NC	

BA-W43/C 'X' = 24"

E50 ORIGIN	/A P3	/B P2	/B P3	/B P1	/C P1	/D P3	OPT/STD DESTINATION	STD P23	A	A	A	B
	SH	F1	F2	IRS	ZE	F3	FUNCTION	SH	F1	F2	IRS	ZE
	1						MOTOR COIL 1	1	1	1	1	1
	2						MOTOR COIL 2	2	2	2	2	2
	3						MOTOR COIL 3	3	3	3	3	3
	4						MOTOR COIL 4	4	4	4	4	4
	5						COLLECTOR 1	5	NC	NC	5	5
	6						EMITTER 1	6	NC	NC	6	6
	7						EMITTER 2	7	NC	NC	7	NC
	8						COLLECTOR 2	8	NC	NC	8	NC
	16						MOTOR COIL 1	9	9	9	9	9
	15						MOTOR COIL 2	10	10	10	10	10
	14						MOTOR COIL 3	11	11	11	11	11
	13						MOTOR COIL 4	12	12	12	12	12
	12						ANODE 1	13	NC	NC	13	13
	11						COM CATH	14	NC	NC	14	14
	10						ANODE 2	15	NC	NC	15	NC
	9						NC					

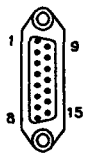
BA-W43/A 'X' = 20"

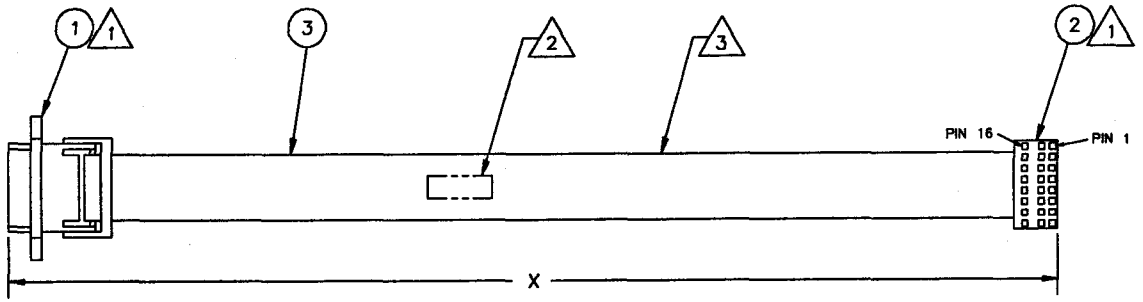
E50 ORIGIN	/C P2	/D P3	OPT/STD DESTINATION	B
	AZ	F3	FUNCTION	AZ
	1		AZ MOTOR	1
	2			NC
	3		AZ MOTOR	3
	4			NC
	5		CCW SENSOR	5
	6			NC
	7		GND	7
	8		CW SENSOR	8
	16			NC
	15			NC
	14			NC
	13			NC
	12		AZ MOTOR	13
	11			NC
	10		AZ MOTOR	15
	9		NC	

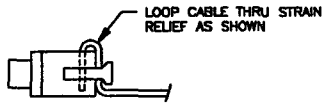
BA-W43/B 'X' = 16"

DOCUMENT NO. BA-W43

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 E50/D	DCN540	91.6.4	FV	RA







E50 ORIGIN	/C P4	/D P3	OPT/STD DESTINATION	B P114
	SW	F3	FUNCTION	SW
	1			NC
	2			NC
	3			NC
	4		CW	4
	5		CCW	5
	6		UP	6
	7		DOWN	7
	8			NC
	16			NC
	15			NC
	14			NC
	13			NC
	12			NC
	11			NC
	10			NC
	9		NC	

BA-W43/B 'X' = 16"

E50 ORIGIN	/D P3	OPT/STD DESTINATION	F3
	1	MOTOR COIL 3	1
	2	MOTOR COIL 4	2
	3	MOTOR COIL 1	3
	4	MOTOR COIL 2	4
	5	NC	5
	6	NC	6
	7	EMITTER	7
	8	COLLECTOR	8
	16	MOTOR COIL 3	9
	15	MOTOR COIL 4	10
	14	MOTOR COIL 1	11
	13	MOTOR COIL 2	12
	12	NC	13
	11	CATHODE	14
	10	ANODE	15
	9	NC	

BA-W43/A 'X' = 20"

NOTES:

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

QTY -1 / - NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE	1:1	NEXT ASSY: BA-E50	
DATE	MAR 83	DIMENSIONS IN INCHES	
DWN	DF	IF DUAL DIMS: mm (inches)	
CHKD	DW	Tolerances (unless otherwise specified)	
APPD	KL	INCHES	MM
FINISH		.xxx ± .005 .xx ± .01 ANGLES ± 1° FRACTIONS ± 1/32	.xx ± 0.13 .x ± 0.25 ANGLES ± 1°

SCI-TEC INSTRUMENTS INC.

TITLE: CONTROL CABLE

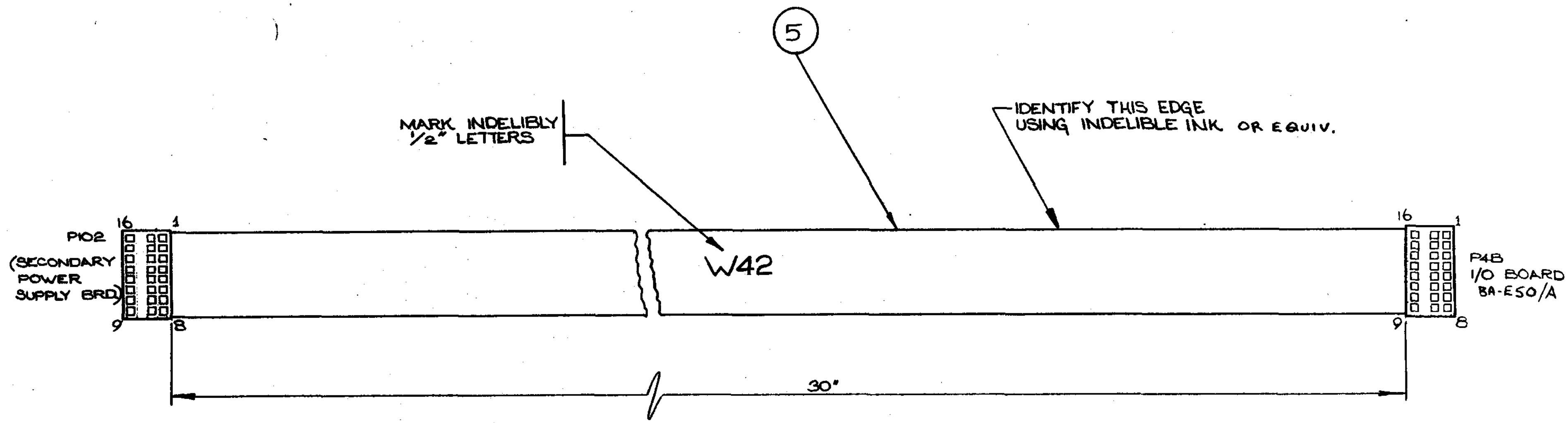
SHEET 1 OF 1 | DOCUMENT NUMBER BA-W43 | REV. 5

COMPUTER GENERATED DRAWING
FILENAME: BA-W43.DWG

Fig 7.5.2-4

DOCUMENT NO. BA-W42	DESCRIPTION	REV				
	SEE DCN	1	DCN-157	85-2-1	D#	KL.
	CHG. NEXT ASSY DWG #	2	DCN-362	87-12-16	C.W.	RA

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



P4 (ORIGIN)	FUNCTION	P102 (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	HG 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

SCI-TEC INSTRUMENTS INC.

NEXT ASSEM: BA-E50/A

IO POWER CONTROL CABLE

SCALE: FULL | DIMS: INCHES | TOLS: ______

MATERIAL: SEE P/L

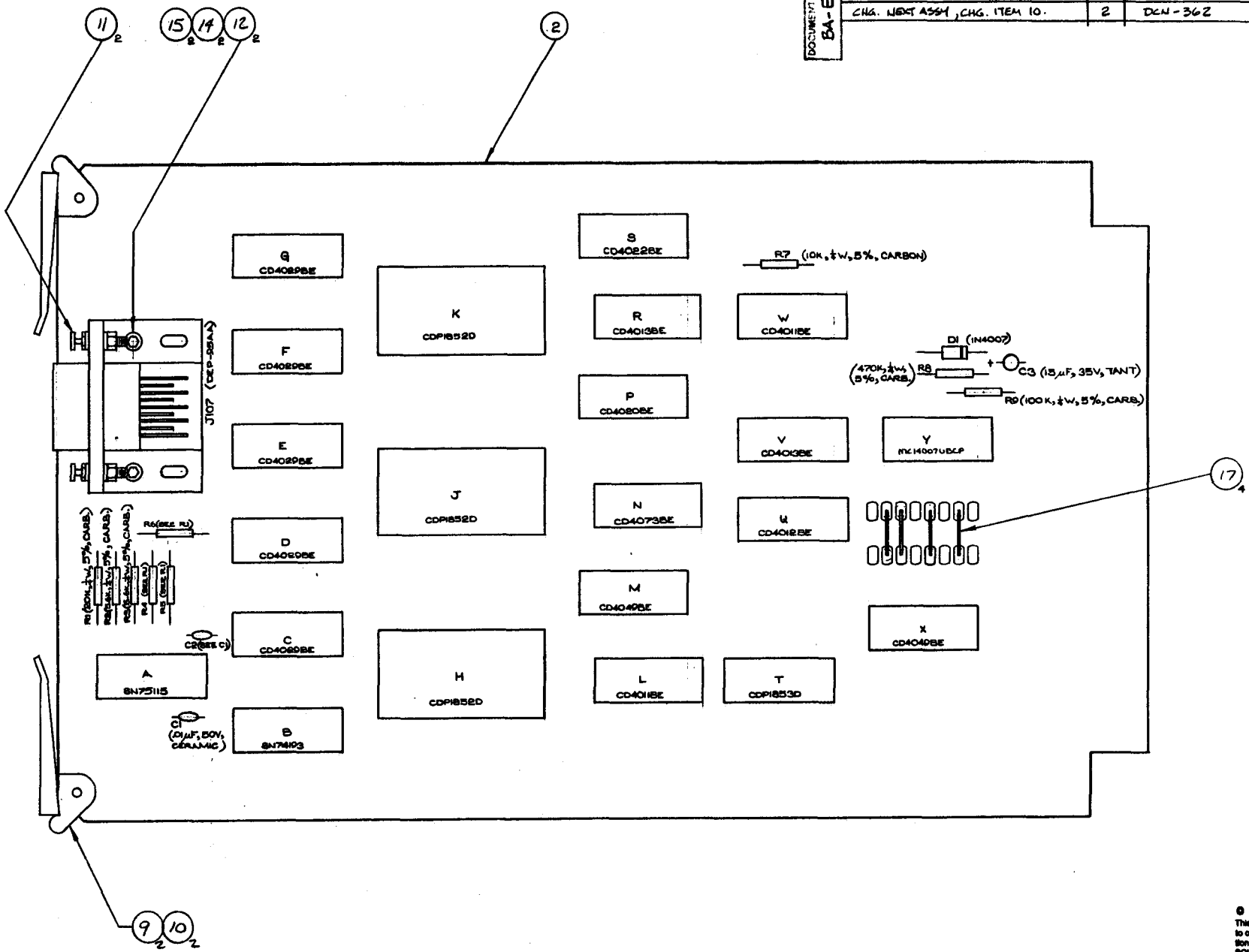
FINISH: ______

MAR 83 | KL

SIZE: B | NUMBER: BA-W42 | 2

FIG 7.5.2-5

DOCUMENT NO. BA-E48						
SEE DCN.	1	DCN-223	85-05-1	DF	KL
CHG. NEXT ASSY, CHG. ITEM 10.	2	DCN-362	87-12-16	C.W.	RA

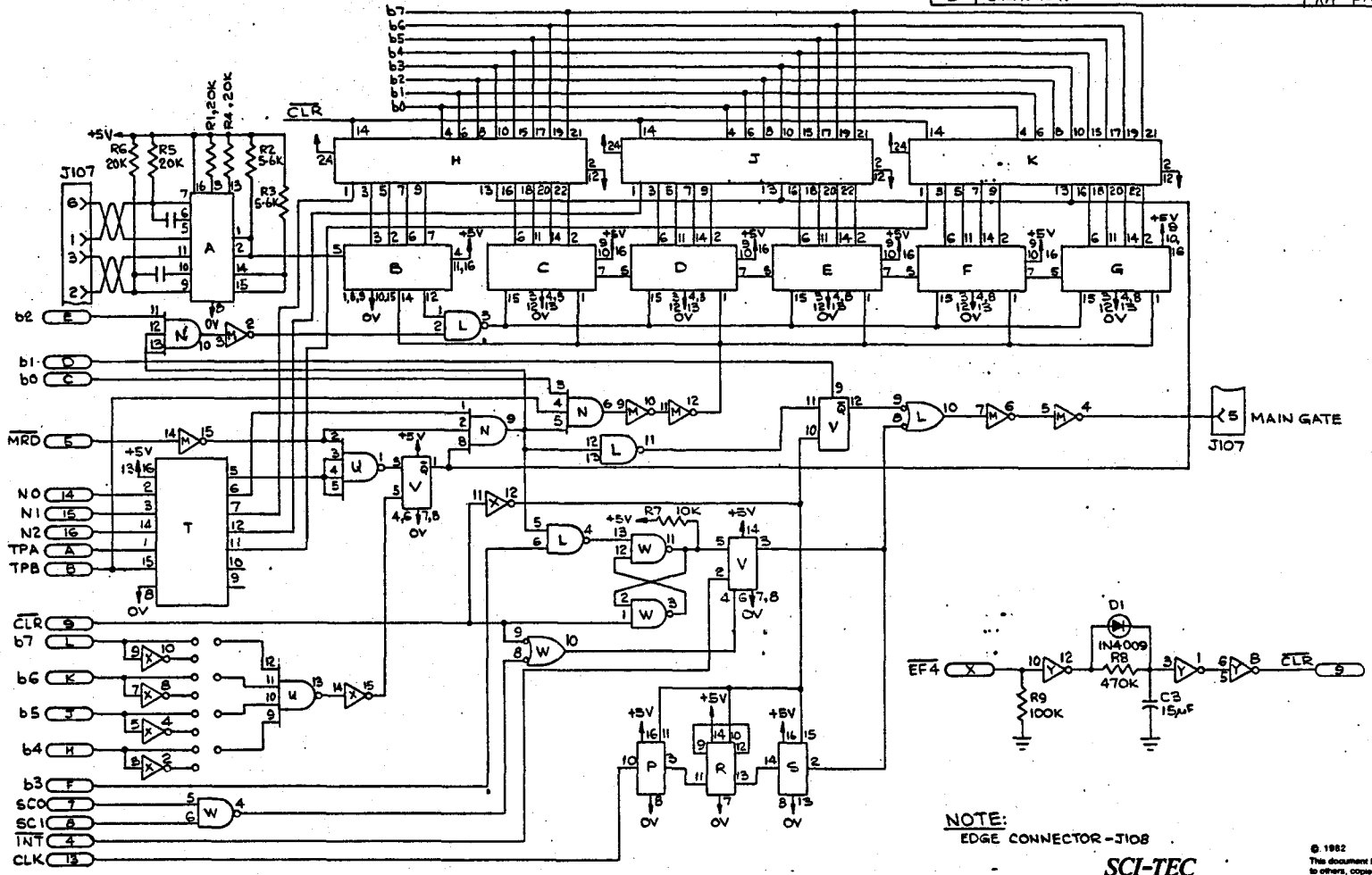


SCI-TEC INSTRUMENTS INC.			NEXT ASSEMBLY BA-C01			
			PHOTON COUNTER CONTROL BOARD ASSY.			
SCALE 2"=1"	DIMS.	TOLS.	DATE MAR 83	DWN.	CHKD.	APPD.
MATERIAL SEE P/L			SHT. 1 of 1	SIZE C	NUMBER BA-E48	ISS. 2
FINISH						

Fig 7.5.3-1

DESCRIPTION	REV.	DCN NUMBER	DATE	DWN.	APPD.
AT U3,K Pin 15,17,19,21 and U17,19,21,23; N was GND	4	423-1	88-8-19	GW.	RA

Issue No.	Revision and Description	App'd	Date	Work No.
1	NEW DWG	——	——	3620
2	WAS AES C0608-R2	KL	Nov/82	
3	CHG. NOTE 1.	RA	87-12-16	DCN-362



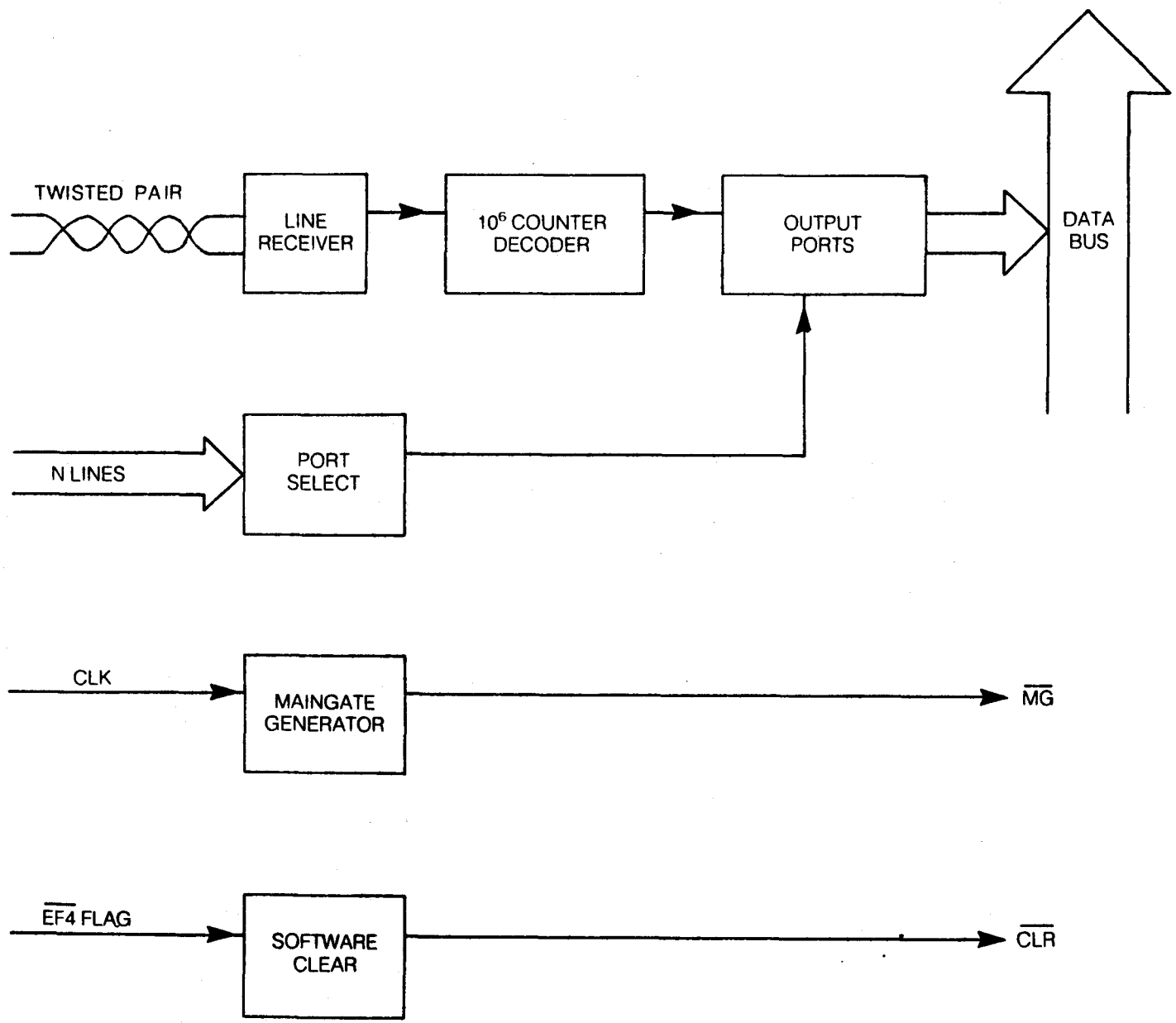
GENERAL NOTES:

1 - PARTS LIST - BA-E48 (REF)

SCI-TEC INSTRUMENTS INC.

Date	Drawn By	All dimensions are in inches unless otherwise indicated	Title
3 DEC 1981	H. BLACK	Tolerances, unless otherwise stated: Fractional dimensions ± 1/32; Dimensions to 1 decimal ± .02; Dimensions to 2 decimals ± .01; Dimensions to 3 decimals ± .005; Angles ± 1 degree	BREWER SPECTROPHOTOMETER PHOTON COUNTER BOARD
Design By / App'd	Checked		
Approved		Associated Specification	Drawing No. BS-E48 Issue No. 4

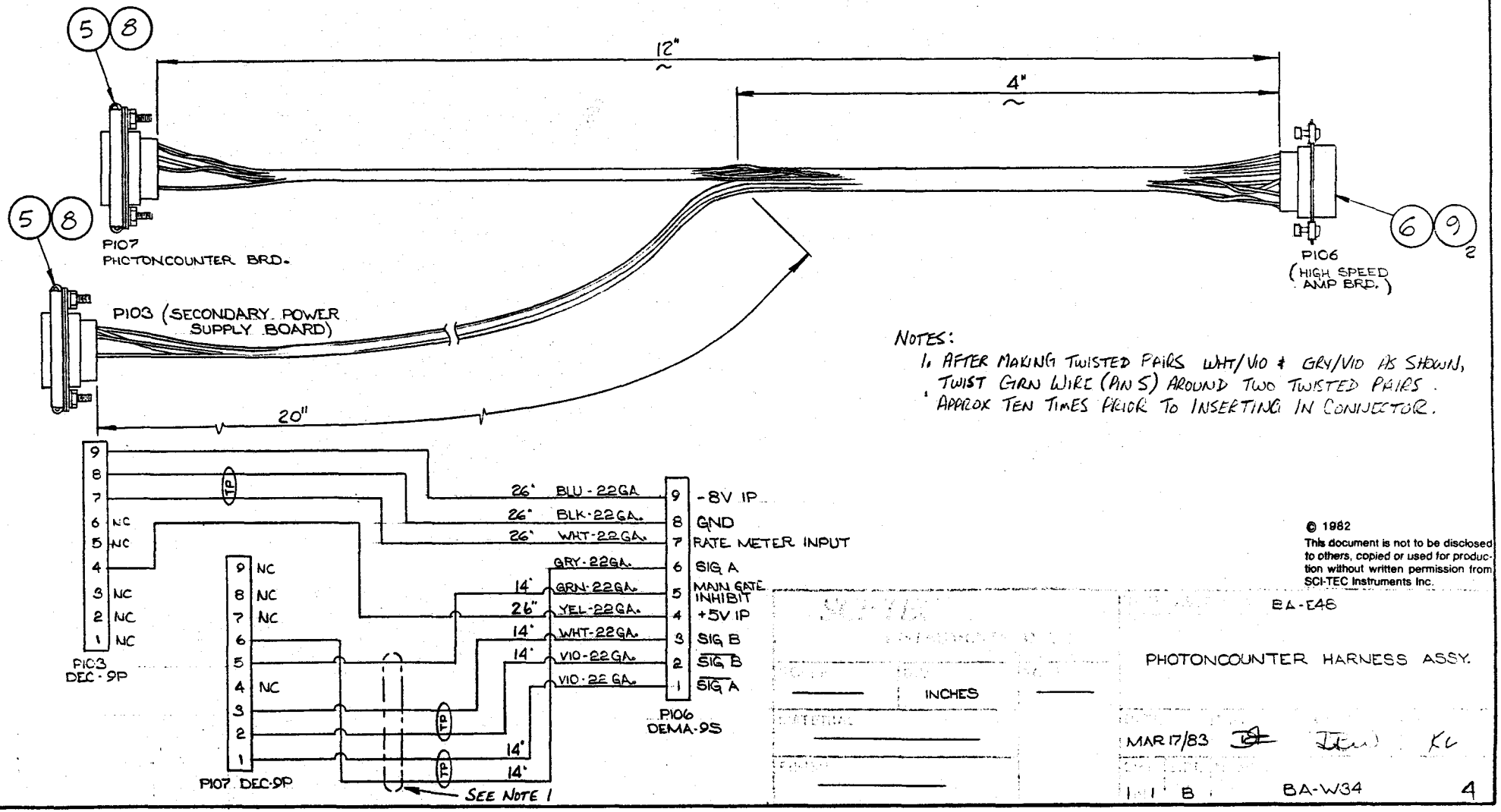
FIG 7.5.3-2



Block diagram of photon counter board, BA/E48.

FIG 7.5.3-3

DOC. NO./PART NO. BA-W34	DESCRIPTION	ISS. REV.	RN/CN NUMBER ECN NUMBER	DATE	DWN.	APPD.
	FIRST ISSUE	1		MAR.83	DF	KL
	SEE DCN	2	BA12-DCN-140	Dec 84	LT	
	CHG. LENGTH OF CABLE, ADD TWIST. PR.	3	DCN-362	87-12-14	C.W.	RA
	ADD NOTES	4	DCN-532	91.3.18	JV	RA



NOTES:

1. AFTER MAKING TWISTED PAIRS WHT/VIO & GRY/VIO AS SHOWN, TWIST GRN WIRE (PIN 5) AROUND TWO TWISTED PAIRS. APPROX TEN TIMES PRIOR TO INSERTING IN CONJECTOR.

INCHES

BA-E46

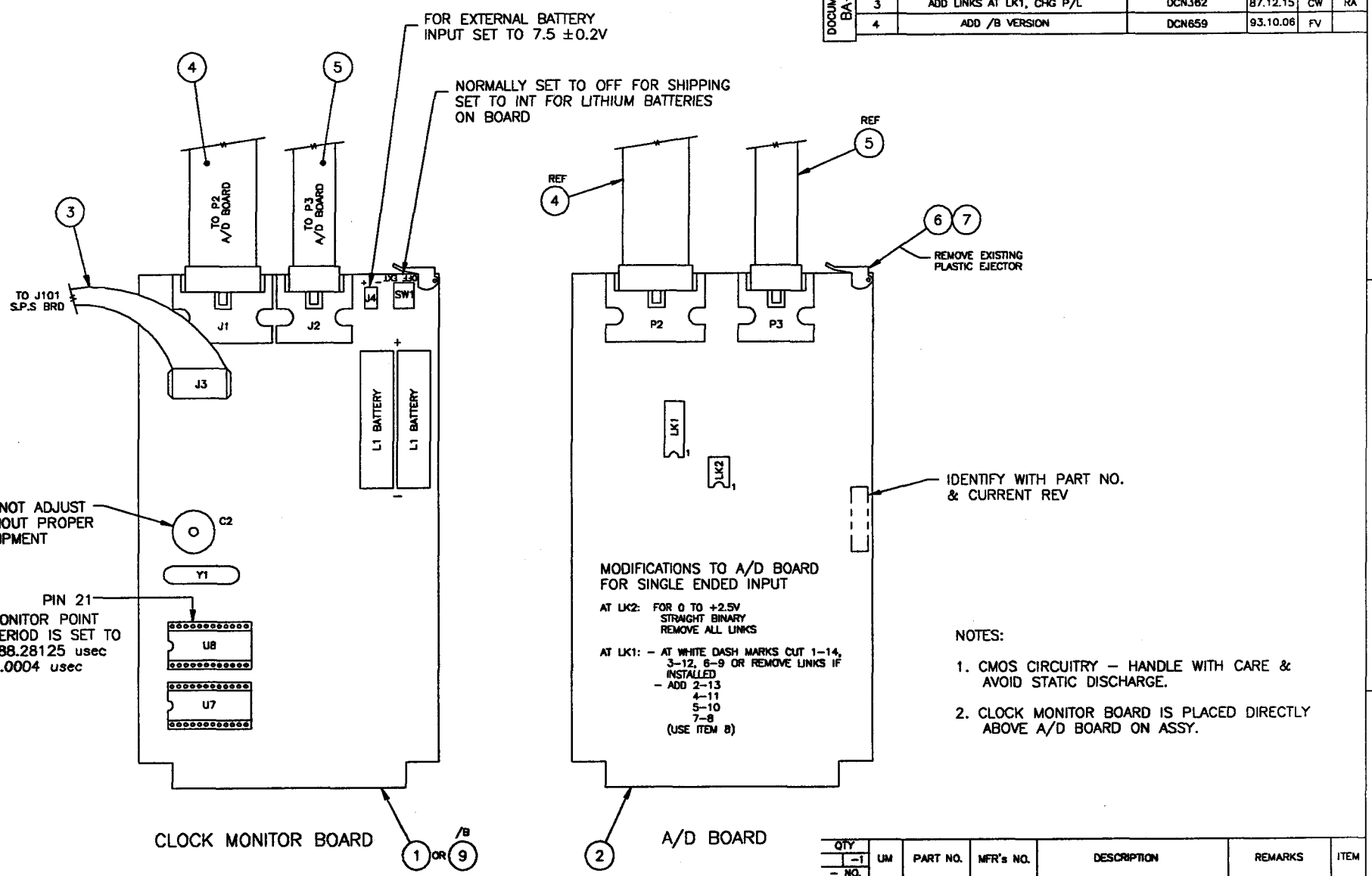
PHOTONCOUNTER HARNESS ASSY.

MAR 17/83 KL

1 1 B BA-W34 4

FIG 7.5.3-4

DOCUMENT NO. BA-E51	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	APPD.
	2	SEE DCN	8701-DCN-303	87.01.07	DF	KL
	3	ADD LINKS AT LK1, CHG P/L	DCN362	87.12.15	CW	RA
	4	ADD /B VERSION	DCN659	93.10.06	FV	



NOTES:

1. CMOS CIRCUITRY – HANDLE WITH CARE & AVOID STATIC DISCHARGE.
2. CLOCK MONITOR BOARD IS PLACED DIRECTLY ABOVE A/D BOARD ON ASSY.

QTY -1 – NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE	NTS	NEXT ASSY: BA-C01/BA-C122	
DATE	84.01.06	DIMENSIONS IN ———	
DWN	DF	IF DUAL DIMS: mm (Inches)	
CHKD	RA	Tolerances (unless otherwise specified)	
APPD	KL	INCHES / MM	
FINISH		.xxx ± .005 .xx ± .01 ANGLES ± 1° FRACTIONS ± 1/32 / .xx ± 0.15 .x ± 0.25 ANGLES ± 1°	

TITLE: CLOCK MONITOR BRD & A/D BRD ASSY

SHEET	DOCUMENT NUMBER	REV.
1 OF 1	BA-E51	4

COMPUTER GENERATED DRAWING
FILENAME: BA-E51.DWG

Fig 7.5.4-1

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:

SW1	Time
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

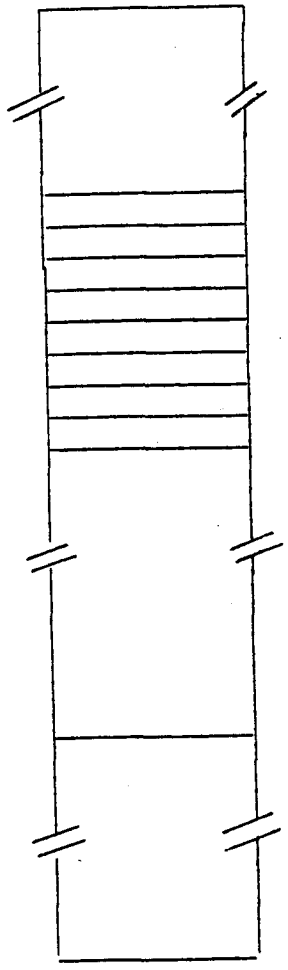
June 1, 1984

CIC 7.5 4-7

A/D Channel	Monitor Name	Typical Resolution	Nominal Reading
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 7.5.4-3

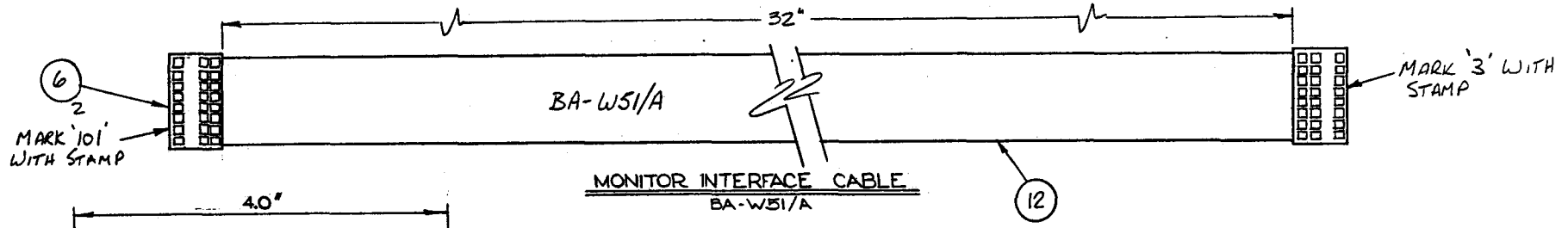


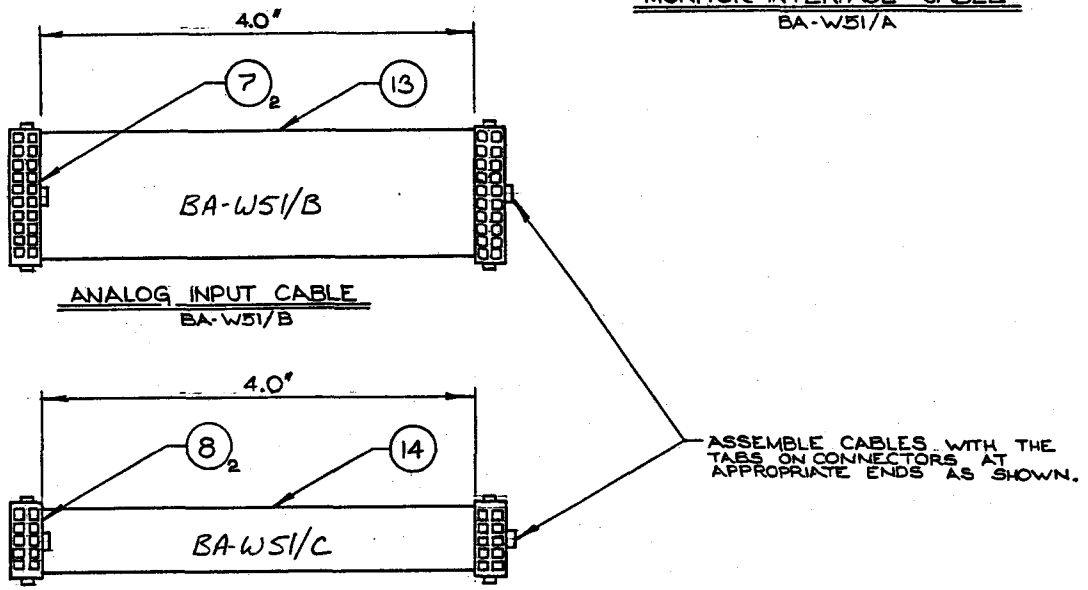
Memory Map	Hex	Decimal	Description	
	FFFF	65535	Top of Memory	Not Used (E800-FFFF)
	E800	59392		
	E7FF	59391	Control/Status	Real Time Clock (E7F8-E7FF)
	E7FE	59390	Month	
	E7FD	59389	Day	
	E7FC	59388	Hours	
	E7FB	59387	Minutes	
	E7FA	59386	Seconds	
	E7F9	59385	Freeze Circuit	
	E7F8	59384	-	
	E7F7	59383		Battery Backed-Up RAM (E000-E7F7)
	E000	57344		
	DFFF	57343		Not Used (0000-DFFF)
	0000	0	Bottom of Memory	

- MEMORY MAP FOR CLOCK/MONITOR BOARD

FIG 7.5.4-4

DESCRIPTION	REV.	DCN NUMBER	DATE	DWN.	APPD.
P/L REVISION	2	DCN-362	87-12-16	C.W.	RA





NOTES

1. MONITOR INTERFACE CABLE MUST BE ASSEMBLED AS SHOWN (PIN 1 DOES NOT CONNECT WITH PIN 1). DESIGNED THIS WAY TO AVOID MIXUP WITH I/O CABLES; REF. DWG # BA-W42.
2. LABEL EACH CABLE WITH THEIR PART NUMBER (ie: W51/A-1), ALSO LABEL THE ENDS OF CABLES AS SHOWN.
3. INSTALL ALL CONNECTORS USING ANSLEY HAND TOOL CAT. #779-2100 WITH DIP SOCKET CONN. ATTACHMENT CAT. # 779-2162

SCI-TEC INSTRUMENTS INC.

SCALE	DIMS.	TOLS.
1:1	INCHES	± .1"

MATERIAL: SEE P/L

FINISH:

NEXT ASSEMBLY: BA-E51

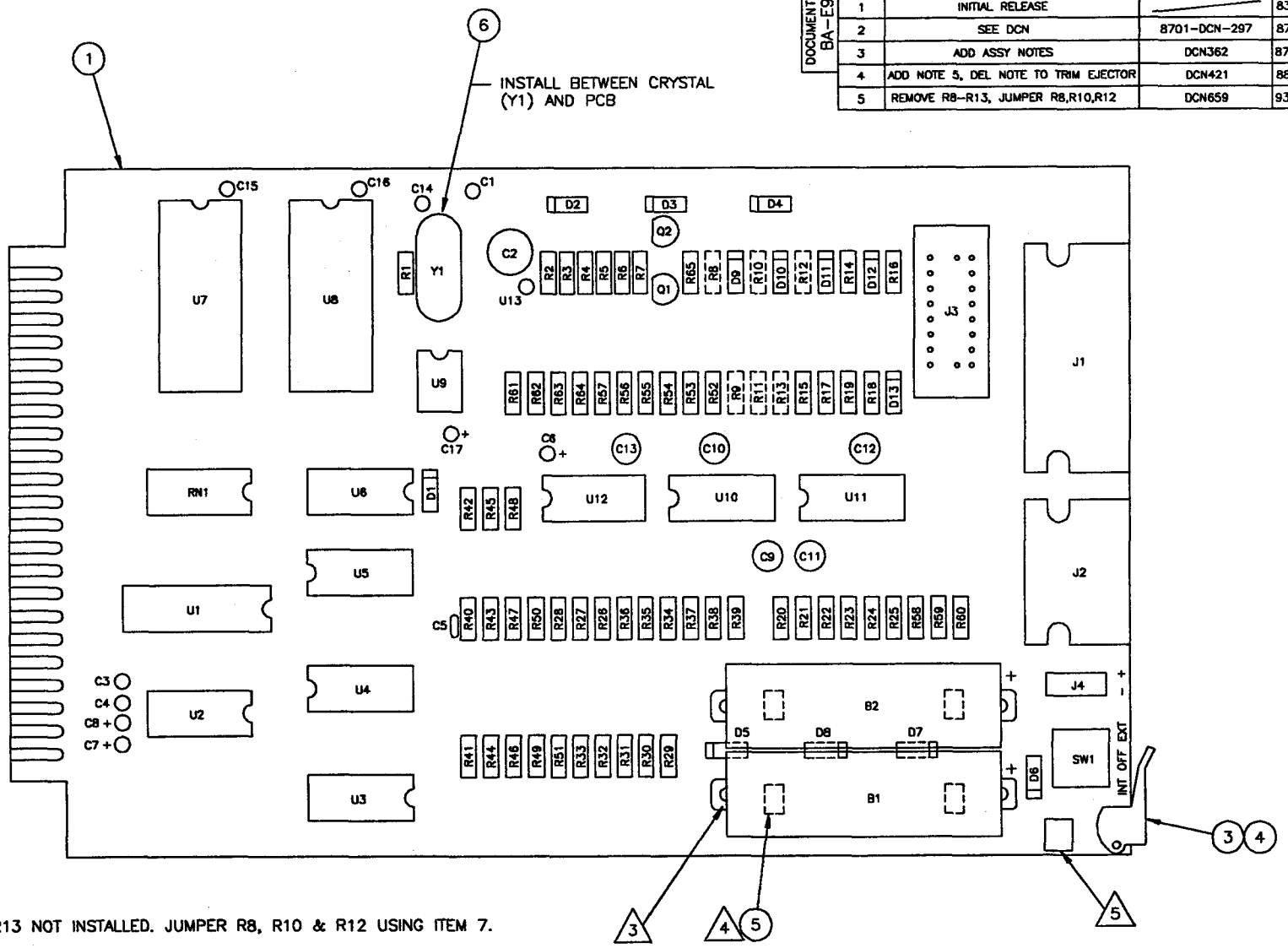
CLOCK/MONITOR BOARD & A/D BOARD CABLES

DATE	DWN.	CHKD.	APPD.
JUN 4 84	[illegible]		KL

SHT.	SIZE	NUMBER	ISS.
1 of 1	B	BA-W51/A/B/C	2

FIG 7.5.4-5

DOCUMENT NO. BA-E95	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 EJECTOR	DCN421	88.06.21	CW	RA
	5	REMOVE R8-R13, JUMPER R8,R10,R12	DCN659	93.10.06	FV	



NOTES:

1. R8 – R13 NOT INSTALLED. JUMPER R8, R10 & R12 USING ITEM 7.
2. INSTALL BATTERY LAST (BEFORE TESTING), THEN PLACE IN ANTI-STATIC BAG AND SEAL.

3. ENSURE SOLDER FILL ON PADS FOR BATTERIES (B1 & B2) DOES NOT TOUCH BATTERY CASE.

4. DEPOSIT 1/16" THK LAYER OF ADHESIVE ON PCB TO ISOLATE BATTERY LEADS AND PROVIDE STRESS RELIEF, 4 PL AS SHOWN.

5. COVER EXISTING ASSY NO. "BA-E49" AND IDENTIFY WITH DWG. NO. "BA-E95" AND CURRENT REV.

COMPUTER GENERATED DRAWING
FILENAME: BA-E95.DWG

QTY -1 - NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE	2:1	NEXT ASSY:	BA-E51/B
DATE	83.12.01	DIMENSIONS IN	
DWN	DF	IF DUAL DIMS:	mm (inches)
CHKD	RA	Tolerances (unless otherwise specified)	
APPD	KL	INCHES	MM
FINISH		.xxx ± .005 .xx ± .01 ANGLES ± 1° FRACTIONS ± 1/32	.xx ± 0.15 .x ± 0.25 ANGLES ± 1°

TITLE: CLOCK MONITOR BOARD ASSY

SHEET	DOCUMENT NUMBER	REV.
1 OF 1	BA-E95	1

Fig 7.5.4-6

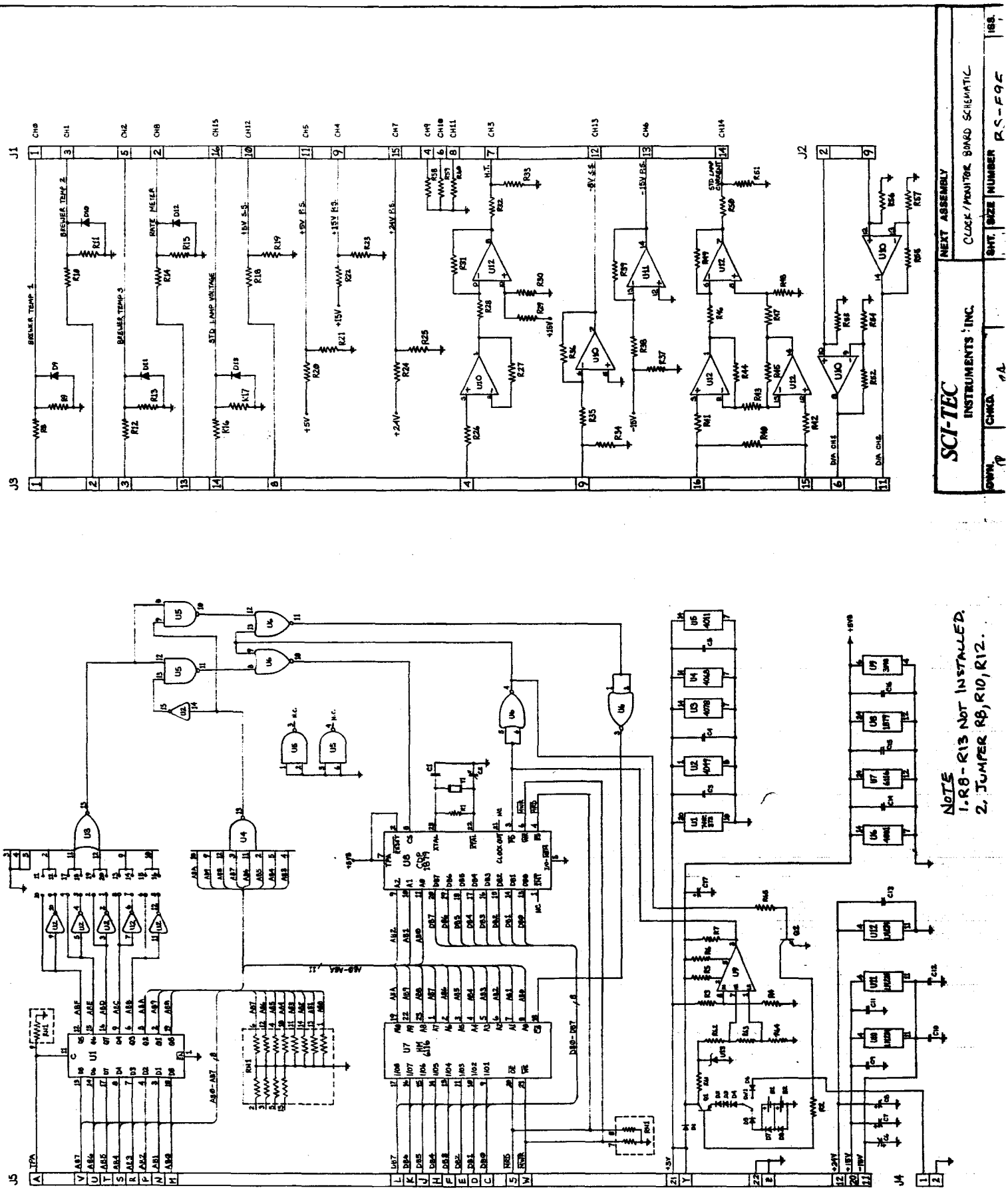

SCI-TEC
INSTRUMENTS, INC.
NEXT ASSEMBLY
CLOCK/MONITOR BOARD SCHEMATIC
SHT.
SIZE
NUMBER
RS-F95
DWN.
CHKD.
NOTES
1. R8-R13 NOT INSTALLED.
2. JUMPER R8, R10, R12.

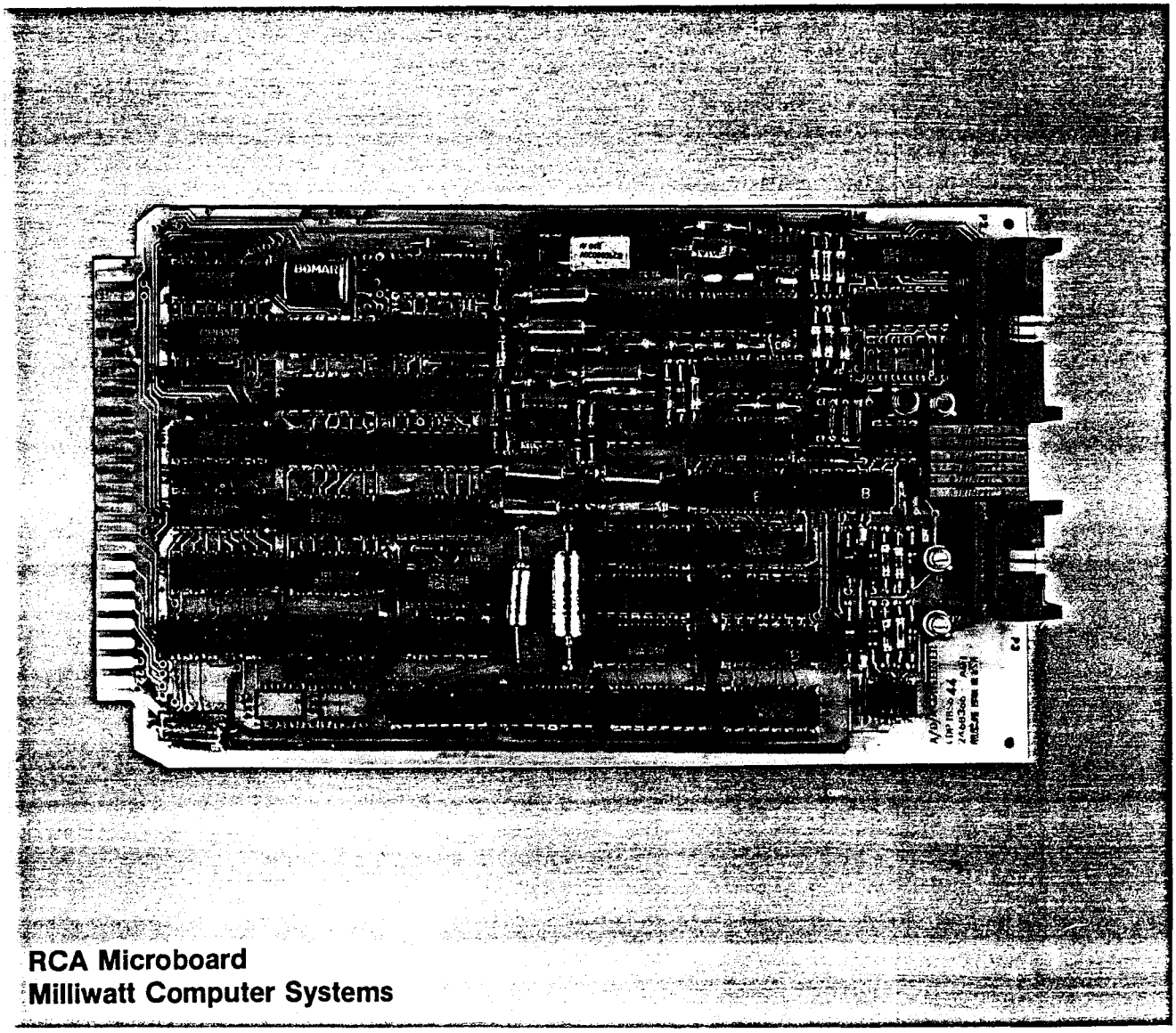
FIG. 7.5.4-7

RCA Solid State

RCA CMOS Microboard A/D and D/A Converters

CDP18S644A, CDP18S654A

Sci-Tec # 90-98-152



RCA Microboard
Milliwatt Computer Systems

FIL 75 1-8

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°C**

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 (CDP18S-644A)**
- **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**

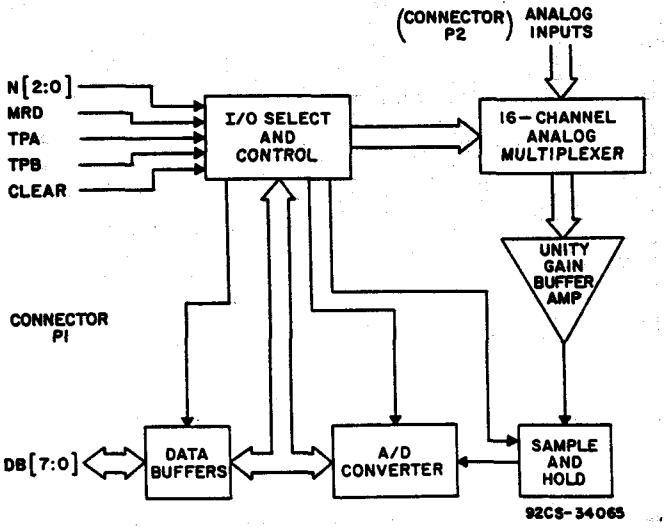


Fig. 1 — Block Diagram of A/D Section of RCA CMOS Microboard A/D and D/A Converters CDP18S644A and CDP18S654A

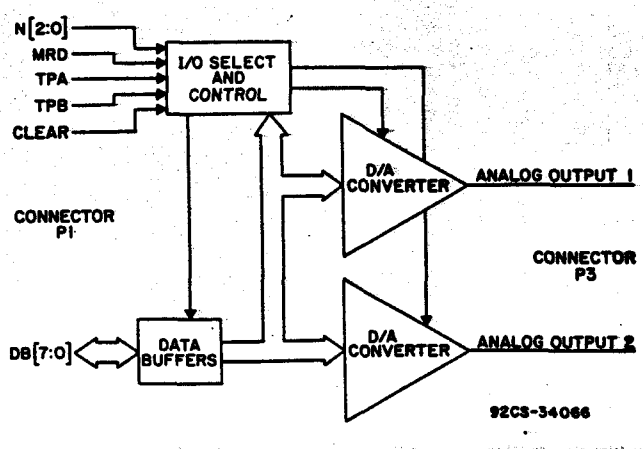


Fig. 2 — Block Diagram of D/A Section of RCA Microboard A/D and D/A Converters CDP18S644A and CDP18S654A.

RCA CMOS MICROSYSTEMS

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 μs max
Total Common-Mode Error Over A/D Input Range (Differential Input): <1/4 LSB

A/D Accuracy
Differential Linearity: ±3/4 LSB
Power Supply Sensitivity: ±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-kΩ pull-down resistor to V neg.
(V neg. = 0 V on CDP18S654A, V neg. ≈ -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 μs

D/A Accuracy
Differential Linearity: ±1/2 LSB
Power Supply Sensitivity: ±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 CDP-18S654A. 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.

$\overline{\text{MRD}}$ — 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.

EIC 7.5.4-10

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

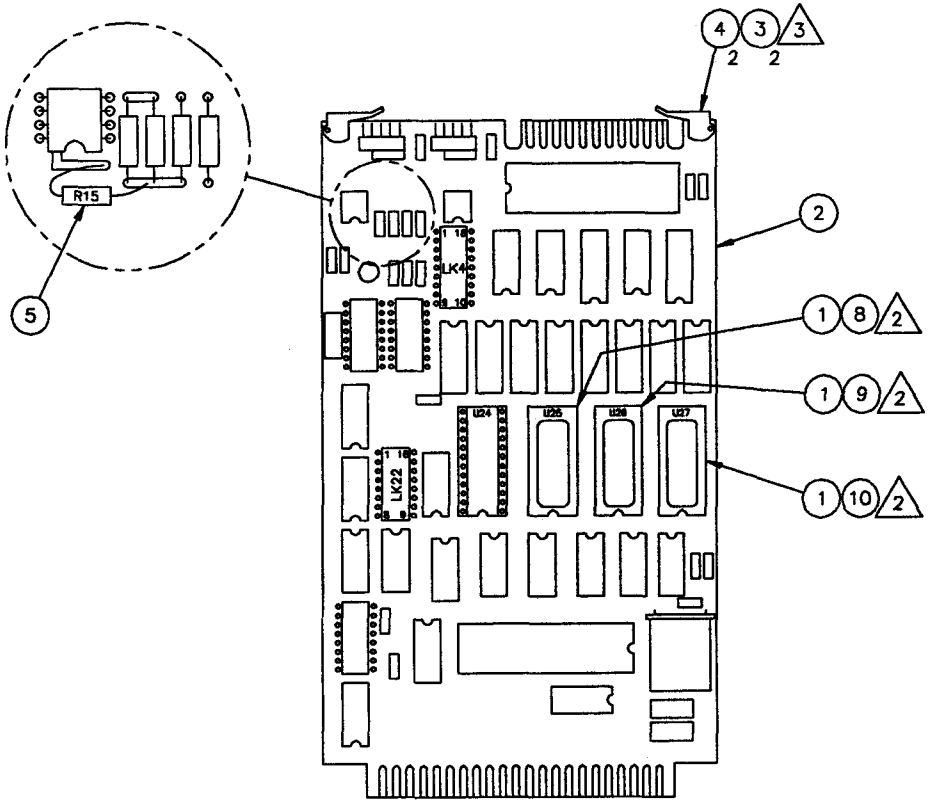
Potentiometers are provided on the CDP18S644A and the CDP18S654A Microboards for both gain and offset A/D adjustments. Adjusting the offset potentiometer, R1, moves the transfer function either up or down. Adjusting the gain potentiometer R2, varies the slope of the transfer function (see Fig. 4). The 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

FIG 7.5.4-11

DOCUMENT NO. BA-E52	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	APPD.
	2	CHG MODS TO 601A	DCN362	87.12.16	CW	RA
	3	ADD VERSION BA-E52/B	DCN448	88.10.24	CW	RA
	4	ADD EPROM LABELS & SOURCE	DCN673	94.02.15	FV	



LINK ADDITION/REMOVAL INSTRUCTIONS

1. MODEL 601
   - LK4
     - CUT 3–16 TRACK
     - REMOVE 4–15 LINK
     - CUT 7–12 TRACK
     - REMOVE 8–11 LINK
     - ADD 2–17 LINK
     - ADD 5–14 LINK
     - ADD 6–13 LINK
     - ADD 9–10 LINK
   - LK22
     - ADD 6–11 LINK

2. MODEL 601A
   - LK4
     - ADD 1–18 LINK
     - ADD 4–15 LINK
     - ADD 5–14 LINK
     - ADD 8–11 LINK
   - LK22
     - REMOVE 1–16 LINK
     - REMOVE 6–11 LINK
     - ADD 3–14 LINK
     - ADD 5–12 LINK

NOTES:

1. CDP18S601 AND CDP18S601A ARE INTERCHANGEABLE.

2. COPY CURRENT VERSION OF FIRMWARE SOURCE FROM MASTER EPROMS TO EPROMS U25, U26, U27 (ITEM 1), ADD APPROPRIATE LABEL AND INSTALL IN BOARD. ADD LABEL (ITEM 7) TO U24 (ITEM 1) AND STORE FOR PROGRAMMING AT SYSTEM TEST LEVEL.

3. REMOVE EXISTING PLASTIC EJECTORS AND ADD INSTALL ITEM 4 USING ITEM 3.

4. INSTALL R15 (ITEM 5) AS SHOWN IN DETAIL.

5. INSTALL/REMOVE LINKS (ITEM 6) AS PER INSTRUCTIONS (NOTE: SOME ALTERATIONS MAY CURRENTLY EXIST ON BOARD PRIOR TO ASSEMBLY).

6. BAG CONNECTOR, CONTACTS & KEYING PLUG SUPPLIED WITH BOARD (ITEM 2) AND SIGN BACK INTO STOCK AS PER FOLLOWING:
   - 10 CKT HEADER: 81-52-500 (AMP 1-86148-2)
   - CONNECTOR CONTACTS: 81-52-501 (AMP 86016-1)
   - KEYING PLUG: 81-52-502 (AMP 87077-1)

PART NO.	NEXT ASSY	APPL
BA-E52	N/A	OBSOLETE
BA-E52/B	BA-C01, BA-C01/B & BA-C190	BREWER MKII MKIII & MKIV

QTY -1 - NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE	1:2	NEXT ASSY:	SEE TABLE
DATE	85.02.01	DIMENSIONS IN	
DWN	DF	IF DUAL DIMS:	mm (inches)
CHKD		Tolerances (unless otherwise specified)	
APPD	KL	INCHES	MM
FINISH		.xxx ± .005 .xx ± .01 ANGLES ± 1° FRACTIONS ± 1/32	.xx ± 0.15 .x ± 0.25 ANGLES ± 1°

SCI-TEC INSTRUMENTS INC.

TITLE: MICROPROC (COSMAC) BOARD ASSY

SHEET	DOCUMENT NUMBER	REV.
1 OF 1	BA-E52	4

COMPUTER GENERATED DRAWING
FILENAME: BA-E52.DWG

FIG 7.5.5-1

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		

Fig 7.5.5-2

RCA Solid State

RCA COSMAC Microboard Computer

CDP18S601 SCI-TEC # 90-98-150

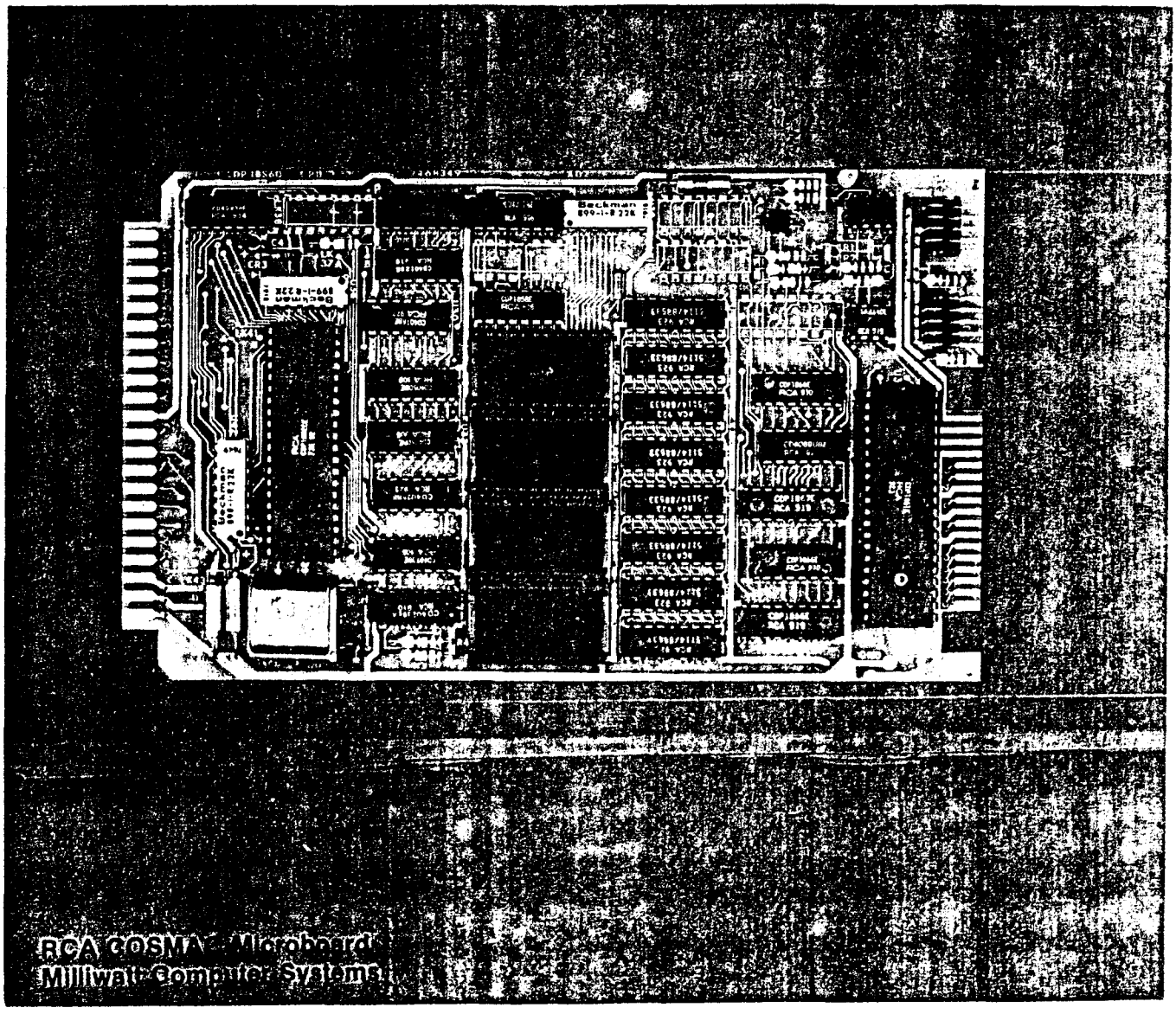


FIG 7.5.5-3

MB-601

RCA COSMAC Microboard Computer

CDP18S601

The RCA COSMAC Microboard Computer CDP18S601 is a versatile computer system on a single 4.5 × 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.

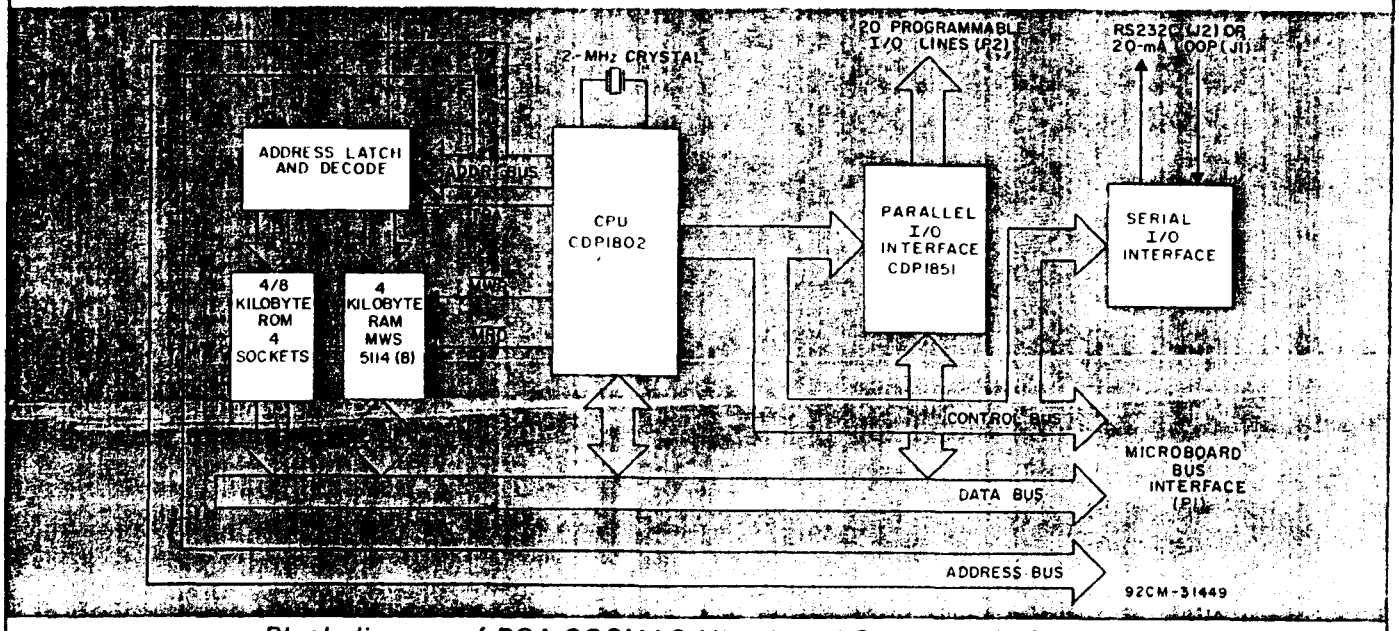
Features

- 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 × 7.5 inches

†With CMOS ROM and RS232C serial interface.

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 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.

Printed in USA 11-80
Supersedes issue dated 6-79

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

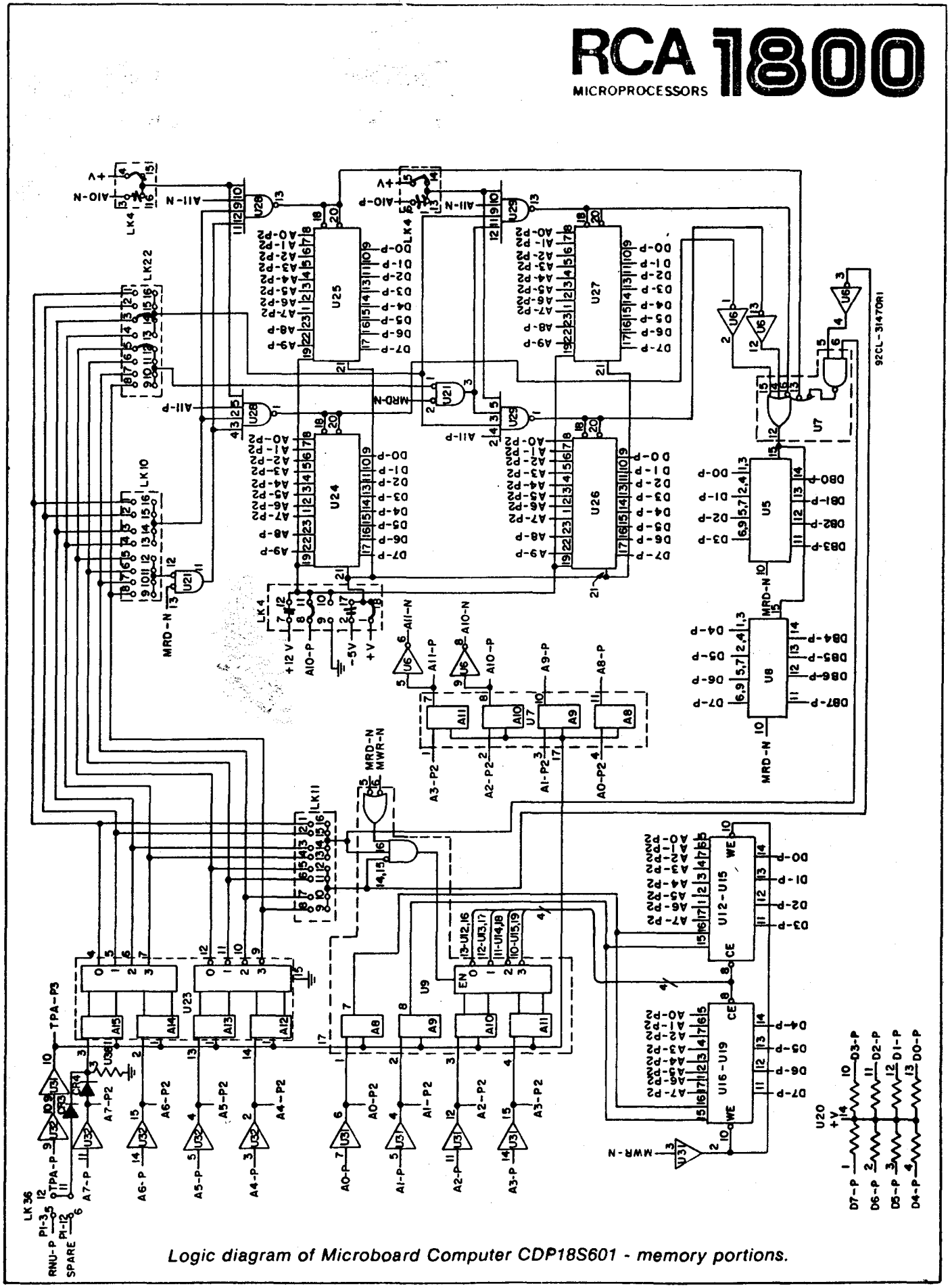
With CMOS ROM's and 20-mA loop: +5 V at 30 mA, typical operating

Optional voltages used only for RS232C interface:

+12 to +15 V at 8 mA, typical

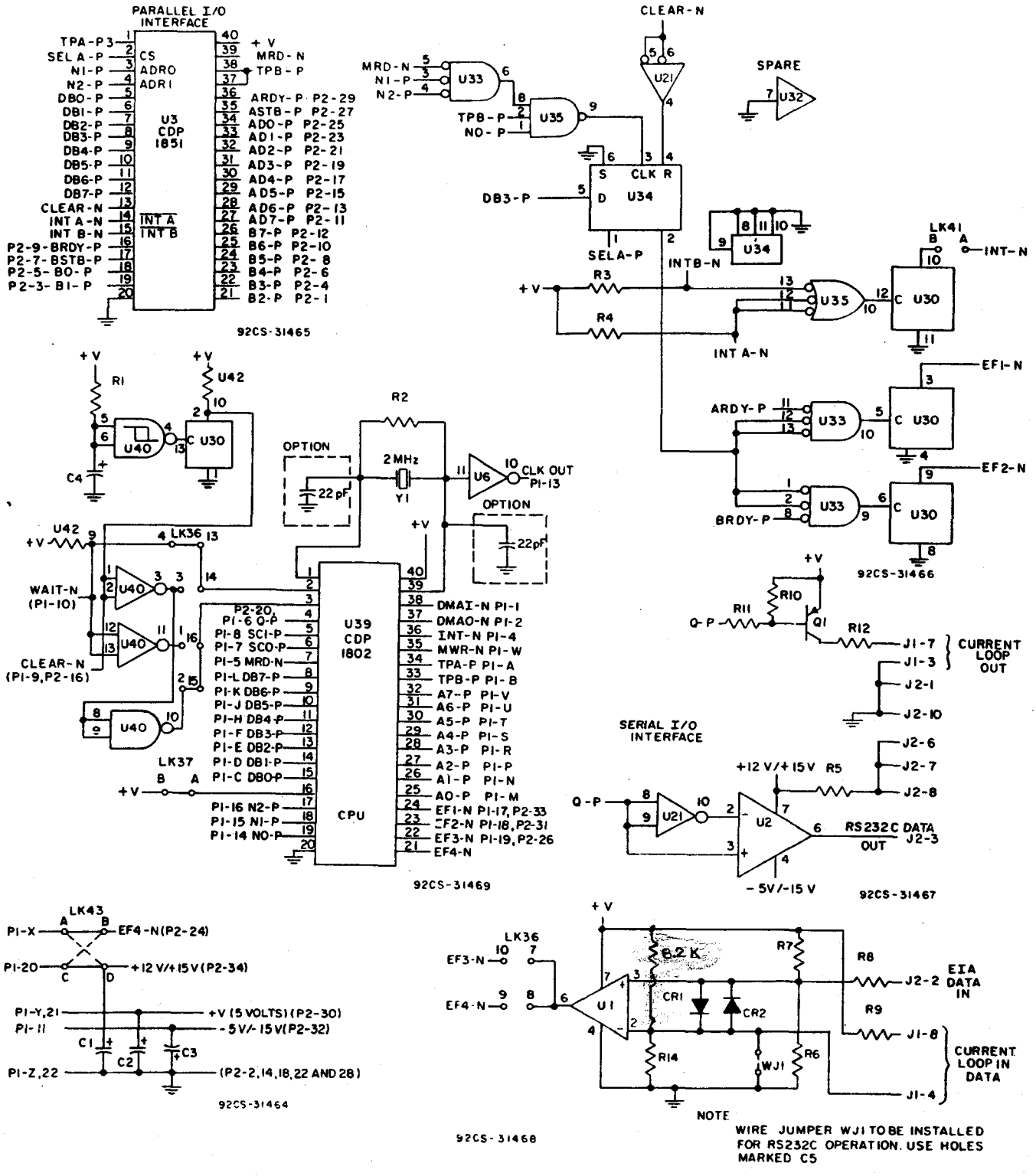
−5 to −15 V at 8 mA, typical

Fig. 7.5.5-5



Logic diagram of Microboard Computer CDP18S601 - memory portions.

FIG 7.5.5-6

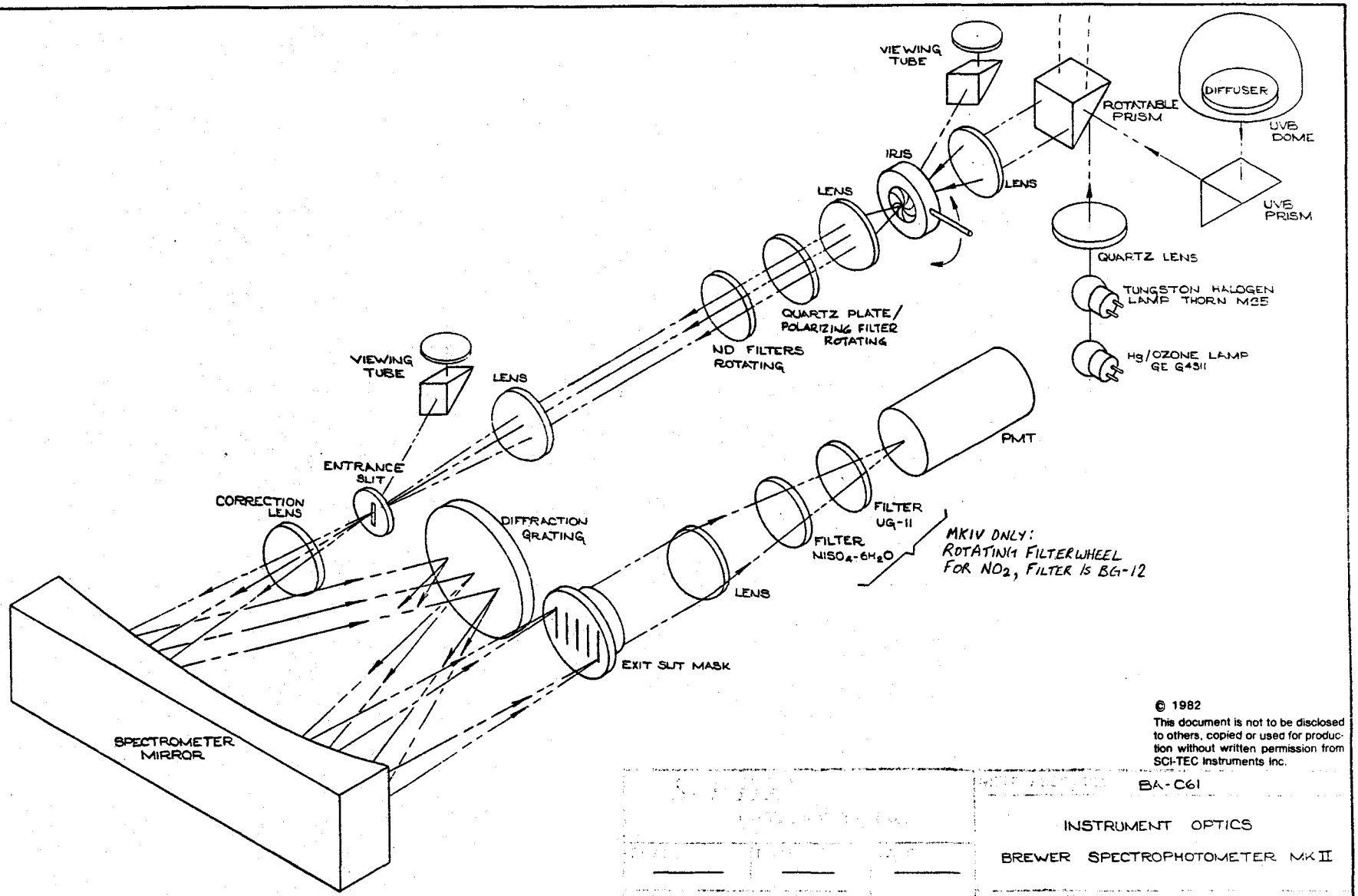


Logic diagram of Microboard Computer CDP18S601 - CPU and interface portions.

FIG. 7.5.5-7

BREWER REFERENCE DOCUMENTATION

Section 7.6 Optics



BA-C61

INSTRUMENT OPTICS

BREWER SPECTROPHOTOMETER MK II

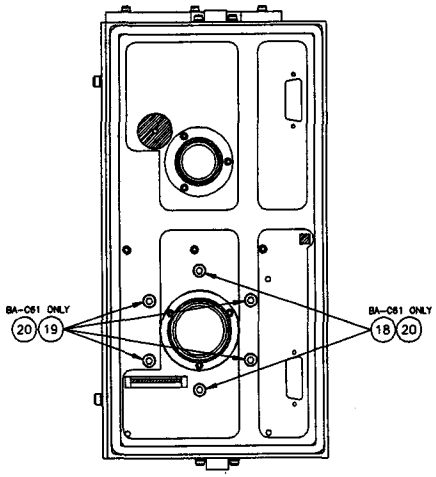
APR 83 WB KL

DCN 538

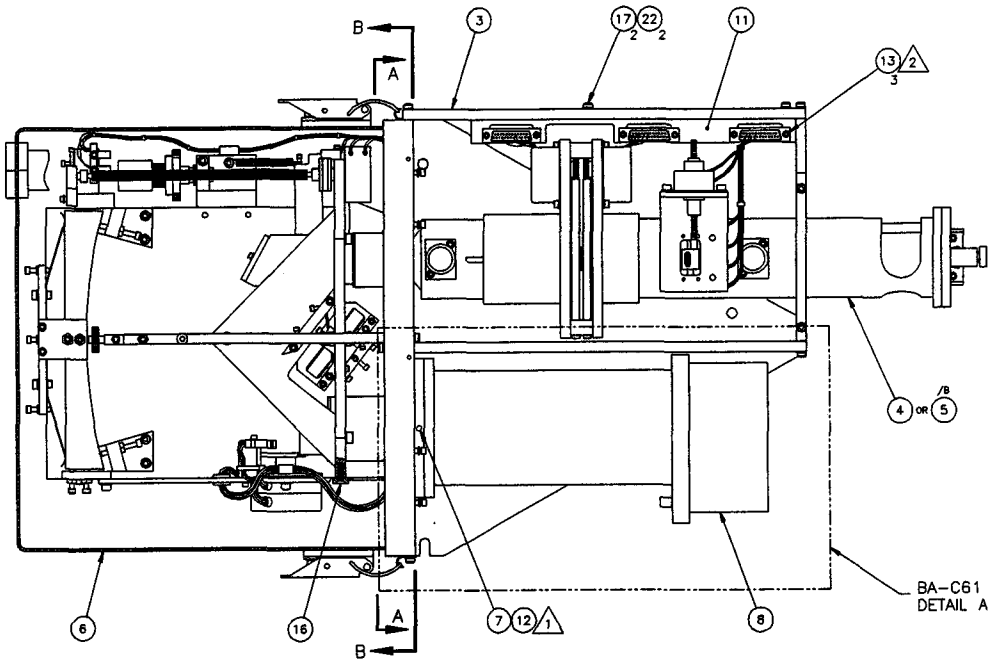
B BS-C61 2

FIG 7.6.1-1

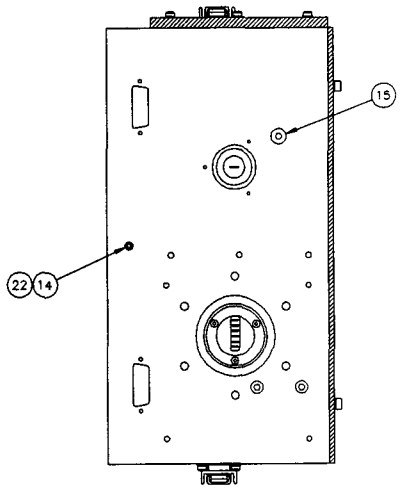
DOCUMENT NO. BA-C191	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	APPD.
	1	INITIAL RELEASE - WAS AES D0622-R41		82.10.01	AGV	JW
	2	ADD ITEM 21, REM NOTE 1, ADD NOTE 3	345	87.10.28	DF	KL
	3	P/L REV	346	87.10.29	MS	RA
	4	ADD ITEMS 2-4,11,13	359	87.12.08	MS	RA
	5	CHG ITEM 2, DEL ITEMS 17,21	408	88.06.07	CW	RP
	6	DEL BA-W43/W, ADD BA-C61/B	419	88.08.02	CW	RA
	7	ADD ITEMS 4, 5	457	90.03.29	FV	RA
	8	PICTORIAL CHG, STD LAMP	538	91.04.22	FV	FV
	9	CHG ITEM 25 TO 1/2" FROM 7/16"	546	91.08.20	FV	KL
	10	CHG ITEM 10 FROM INT TOOTH TO SPLIT	563	92.01.06	FV	RP
	11	CHG ITEM 17, DEL ITEM 21	745	95.08.17	FV	



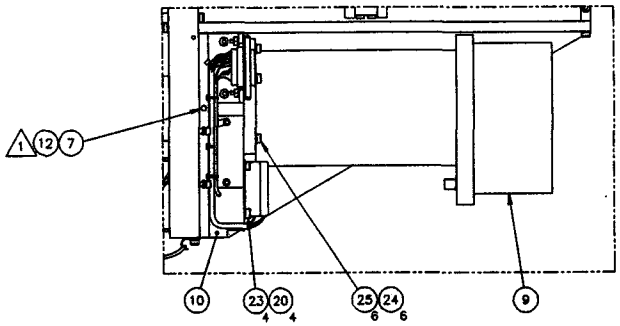
SECTION A-A



BA-C61 SHOWN, SEE DETAIL A FOR BA-C61/B



SECTION B-B



DETAIL A (BA-C61/B ONLY)

NOTES:

1. INSTALL THERMISTOR ASSY (ITEM 8) INTO HOLE AND SECURE IN PLACE USING RTV (ITEM 26). NOTE: THE POSITION OF THE HOLE MAY VARY BY ±30° ON BA-C61.
2. USE 1 FLAT WASHER ONLY WHEN MOUNTING CABLE CONNECTORS TO MOUNTING BRACKET.

QTY	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM
- NO.						
SCALE	2:3	NEXT ASSY:	BA-C01	SCI-TEC INSTRUMENTS INC.	©1995 This document is not to be disclosed to others, copied or used for production without written permission from SCI-TEC Instruments Inc.	
DATE	82.05.13	DIMENSIONS IN	INCHES			
DWN	AGV	IF DUAL DIMS:	mm (inches)			
CHKD	CW	Tolerances (unless otherwise specified)		TITLE: COMPLETE OPTICAL ASSY, BREWER MKII/IV		
APPD	CW	INCHES	MM			
FINISH		.xxx ± .005 .xx ± .01 ANGLES ± 1°	.xx ± 0.13 .x ± 0.25 ANGLES ± 1°			
		FRACTIONS ± 1/32		SHEET 1 OF 1	DOCUMENT NUMBER BA-C61	REV. 11

COMPUTER GENERATED DRAWING FILENAME: BA-C61.DWG

Fig 7.6.1-2

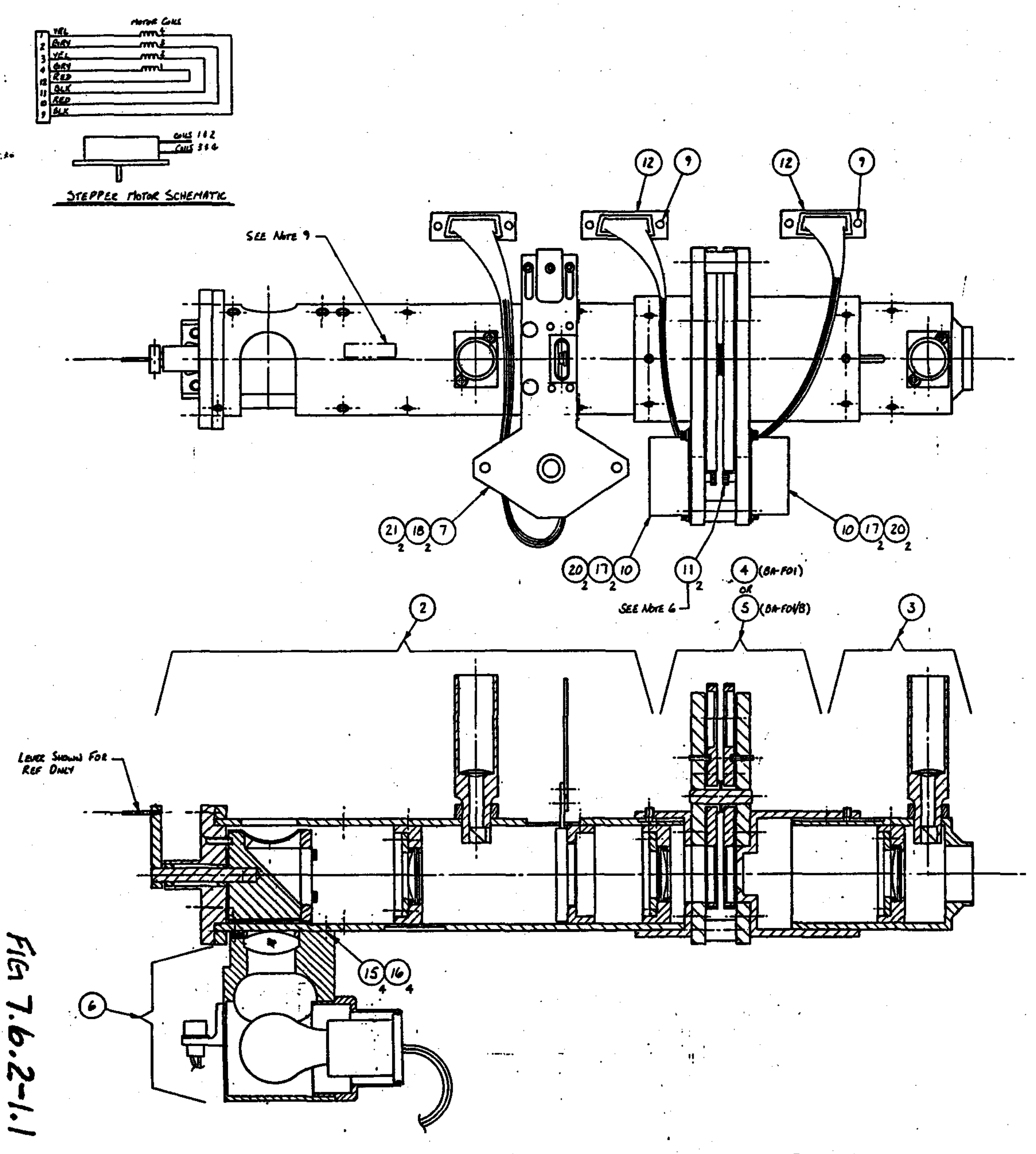
SCI-TEC Instruments Inc.

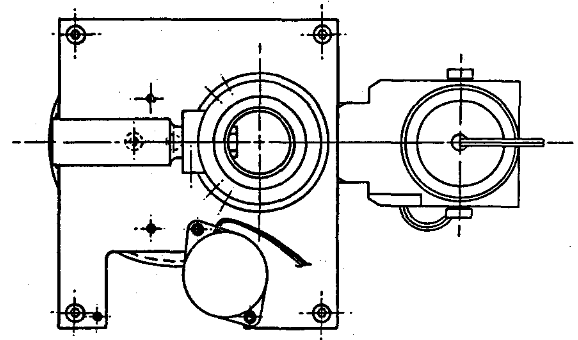
Title:	BREWER COMPLETE OPTICAL ASSY BREWER MKII/MKIV					Rev Date:	95-08-15
						Rev:	11
DCN: 745	Drawn: FV	Checked:	Approved:	QA App'd:		Dwg No.:	BA-C61

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		Dow Corning 3145
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		

FIG 7.6.1-3

DOC. NO./PART NO.	DESCRIPTION	ISS. REV.	DWCH NUMBER DCN NUMBER	DATE	
BA-F01	FIRST ISSUE	1	39400-2N-??		
	WAS SED 39400-D-240	2		NOV/82	
	ADD NOTES 1&2, RENAME 'BA-F01'	3	DCN-352	NOV. 8/83	
	POSSIBLE CHG. ITEM 4, PL. OR IT.15.	4	DCN-370	88-1-19	C.W.
	ADD/UPDATE BA-F01; CREATE /B ASSY	5	DCN-457-3	90-03-27	TV
	UPDATE IT. 6 TO SHOW NEW DESIGN	6	DCN-506	90-10-24	TV
	UPDATE NOTES	7	DCN 564	92-06-21	TV





NOTES:

1. Install the Rear Optics Tube Assy (Item 3) and the Filter Wheel Housing Assy (Item 4 or 5). Using the ground quartz position on the filter wheel and viewing a distant object, obtain a clear image looking through the filter wheel and out the rear optics tube. Reposition the optics tube 3.0mm (.12") away from the Filter Wheel Assy (to correct for UV focus). Tighten the set screws on the filter wheel rear tube.
2. Install the Front Optics Tube Assy (Item 2) and adjust so there is approx 7mm (0.27") between the centers of the viewing tubes. Tighten the set screws on the filter wheel front tube.
3. Install The Calibration Lamp Assy (Item 6) on the side opposite that of the viewing tubes and with the leads directed toward the filter wheels. Secure the 4-40 screws (Item 15) and lock washers (Item 16).
4. Removed.
5. Install Stepper Motors (Item 10) using screws and washers (Item 17, 20). Wire connectors (Item 12) as per schematic.
6. Prior to mounting gear (Item 11) to motor, ensure that set screw can be turned freely into bore.
7. Install Iris Actuator Assy (Item 7) using screws and washers (Items 18,21).
8. Check alignment of standard lamp and zenith.
9. Label assy with Serial Number where shown.
10. Place finished assy in plastic bag and mark with dwg no. and current rev.

PART No.	USED ON	NEXT ASSY.
BA-F01/B	BREWER MK III	BA-C61/B
BA-F01	BREWER MK II	BA-C61/A

MATERIAL	DATE	80-12-16	SCI-TEC INSTRUMENTS INC.	© 1992 This document is not to be disclosed to others, copied or used for production without written permission from SCI-TEC Instruments Inc.
—	DRAWN	RKF		
	CHKD.	KA		
	APPD.			
FINISH	TOLERANCES		TITLE FORE OPTICS ASS'Y	DOCUMENT NO./PART NO. BA-F01
—	—		DIMS. IN — SCALE 1:1 DO NOT SCALE SUPERSEDE —	SHEET 1 OF 1 ISS. REV. 7

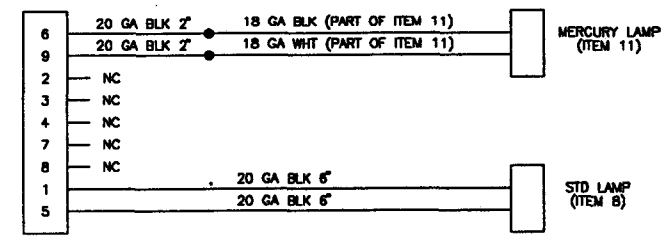
FIG 7.6.2-1.1

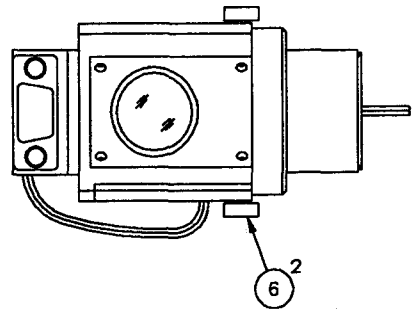
SCI-TEC Instruments Inc.										
Title: FORE OPTICS ASSY									Rev Date:	94-02-18
									Rev:	8
DCN: 674	Drawn: RKF	Checked:	Approved:	QA App'd:					Dwg No.:	BA-F01

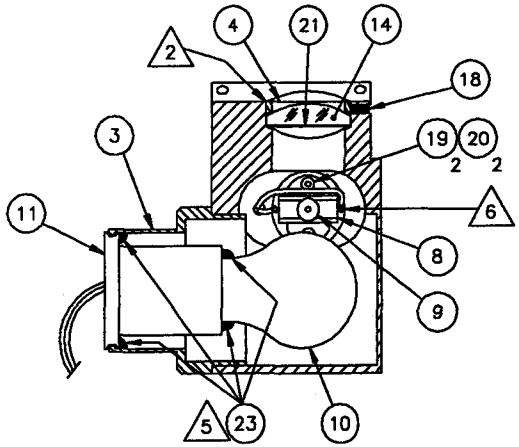
Item No.	Part/Ident No.	Title/Description	Qty	Qty /B	Qty /C	Qty /D	UofM	Ref Des	Remarks
1									
2	BA-F04	Front Optics Tube Assy	1.00	1.00			EA		
3	BA-F06	Rear Optics Tube Assy	1.00	1.00			EA		
4	BA-F08	Filter Wheel Housing Assy	1.00	--			EA		
5	BA-F08/B	Filter Wheel Housing Assy	--	1.00			EA		
6	BA-F96	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		

FIG 7.6.2-1.2

DOCUMENT NO. BA–F96	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	APPD.
	1	INITIAL RELEASE		90.11.06	FV	KL
	2	CHG NOTE 2	597	92.06.09	FV	

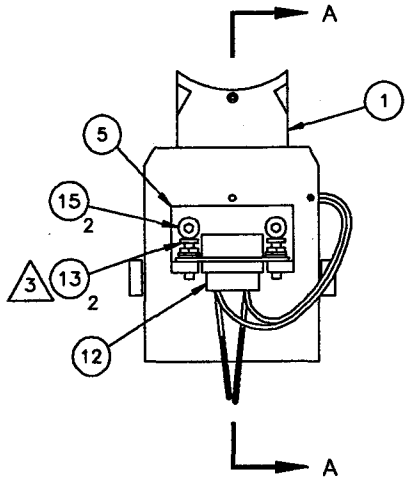


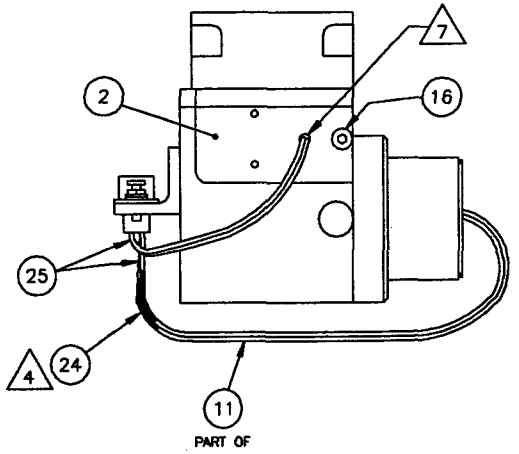




PARTIAL SECTION A–A

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 SHOWN. 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 RTV (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 8), COVER LEADS WITH RTV (ITEM 23).
7. AFTER ASSY, SECURE WIRES IN HOLE USING RTV (ITEM 23).
8. ENSURE LENS AND LAMPS (ITEMS 9,10 & 21) ARE FREE OF FINGERPRINTS AFTER ASSY. (CLEAN WITH ALCOHOL AND Q–TIP)

COMPUTER GENERATED DRAWING
FILENAME: BA–F96.DWG

QTY –1 – NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE	1:1	NEXT ASSY:	BA–F01
DATE	90.10.11	DIMENSIONS IN	
DWN	FV	IF DUAL DIMS:	mm (inches)
CHKD	RA	Tolerances (unless otherwise specified)	
APPD	KL	INCHES	MM
FINISH		.xxx ± .005 .xx ± .01 ANGLES ± 1° FRACTIONS ± 1/32	.xx ± 0.15 .x ± 0.35 ANGLES ± 1°

SCI-TEC INSTRUMENTS INC.

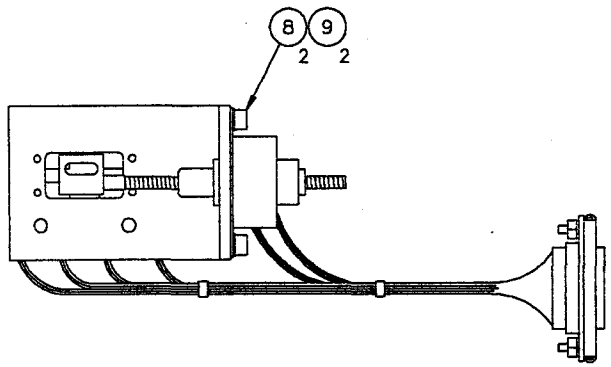
TITLE:

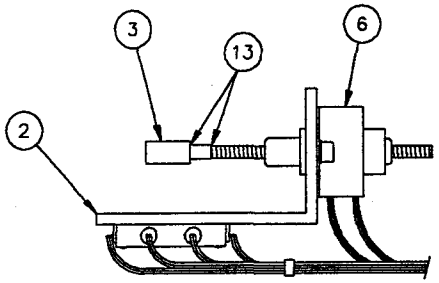
CALIBRATION LAMP ASSY

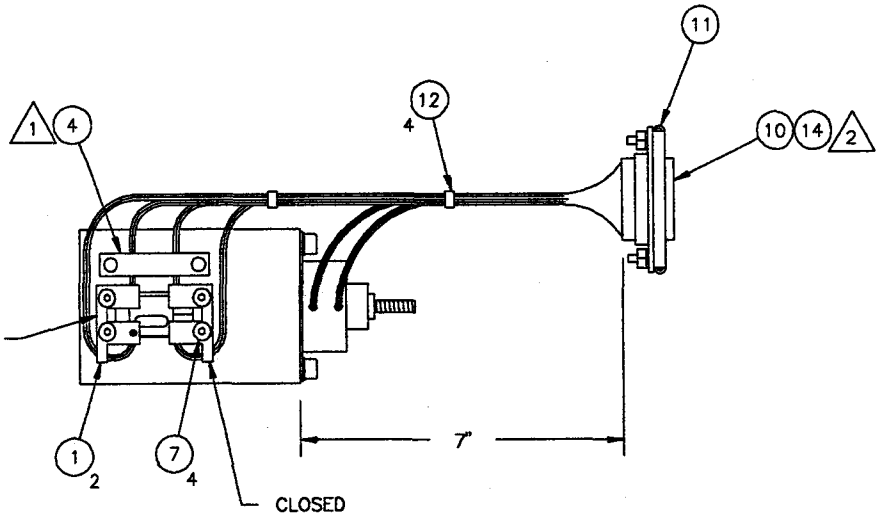
SHEET	DOCUMENT NUMBER	REV.
1 OF 1	BA–F96	2

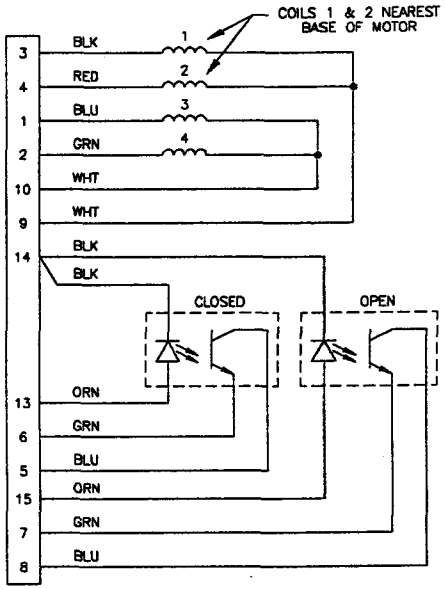
FIG 7.6.2-2

DOCUMENT NO. BA-F106	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	APPD.
	1	FIRST ISSUE	REF DCN674	94.02.14	DF	DJS









SCHEMATIC

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

QTY — NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM
-1						

SCALE	1:1	NEXT ASSY:	BA-F01
DATE	94.02.14	DIMENSIONS IN	INCHES
DWN	FV	IF DUAL DIMS:	mm (Inches)
CHKD		Tolerances (unless otherwise specified)	
APPD	TKL	INCHES	MM
FINISH		.xxx ± .005 .xx ± .01 ANGLES ± 1° FRACTIONS ± 1/32	.xx ± 0.15 .x ± 0.25 ANGLES ± 1°

SCI-TEC INSTRUMENTS INC.

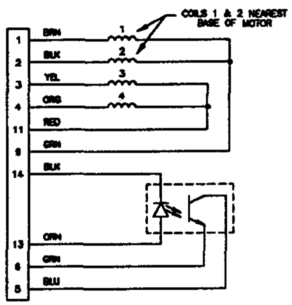
TITLE:

IRIS ACTUATOR ASSEMBLY

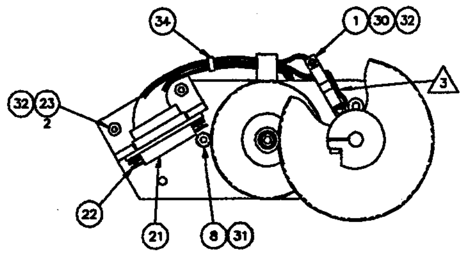
SHEET	DOCUMENT NUMBER	REV.
1 OF 1	BA-F106	1

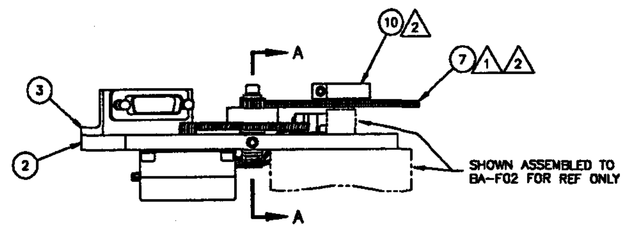
FIG 7.6.2-3

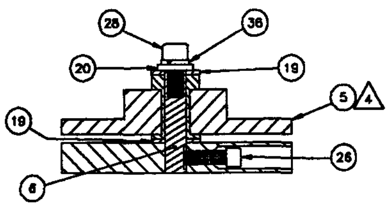
DOCUMENT NO. BA-F71	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	APPD.
	1	SEE DCN	DCN119	84.08.01	DF	KL
	2	SEE DCN	DCN125	84.11.01	DF	KL
	3	SEE DCN	DCN364	87.12.22	CW	RP
	4	DEL IT. 20, QTY 1; ADD IT. 18	DCN446	88.10.21	CW	RA
	5	DEL IT's 39,40,41,42; CHG NOTE 3	DCN460	88.11.28	CW	RA
	6	ADD IT. 10, REM IT. 9	DCN467	90.08.29	FV	RA
	7	REDRAWN WITH CHG, SEE DCN	DCN560	92.03.31	FV	RA
	8	CHG ITEM 20 TO SST	DCN663	93.12.17	FV	KL
	9	CHG MOTOR (ITEM 11)	DCN670	94.02.10	FV	DJS
	10	CHG GEAR (ITEM 8)	DCN678	94.04.11	DM	



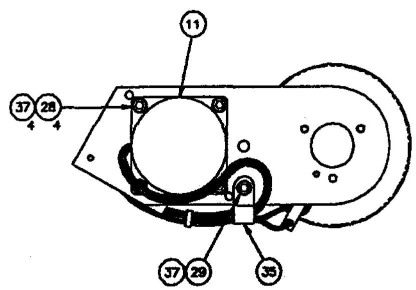
SCHEMATIC







SECTION A–A
SCALE 2:1



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).

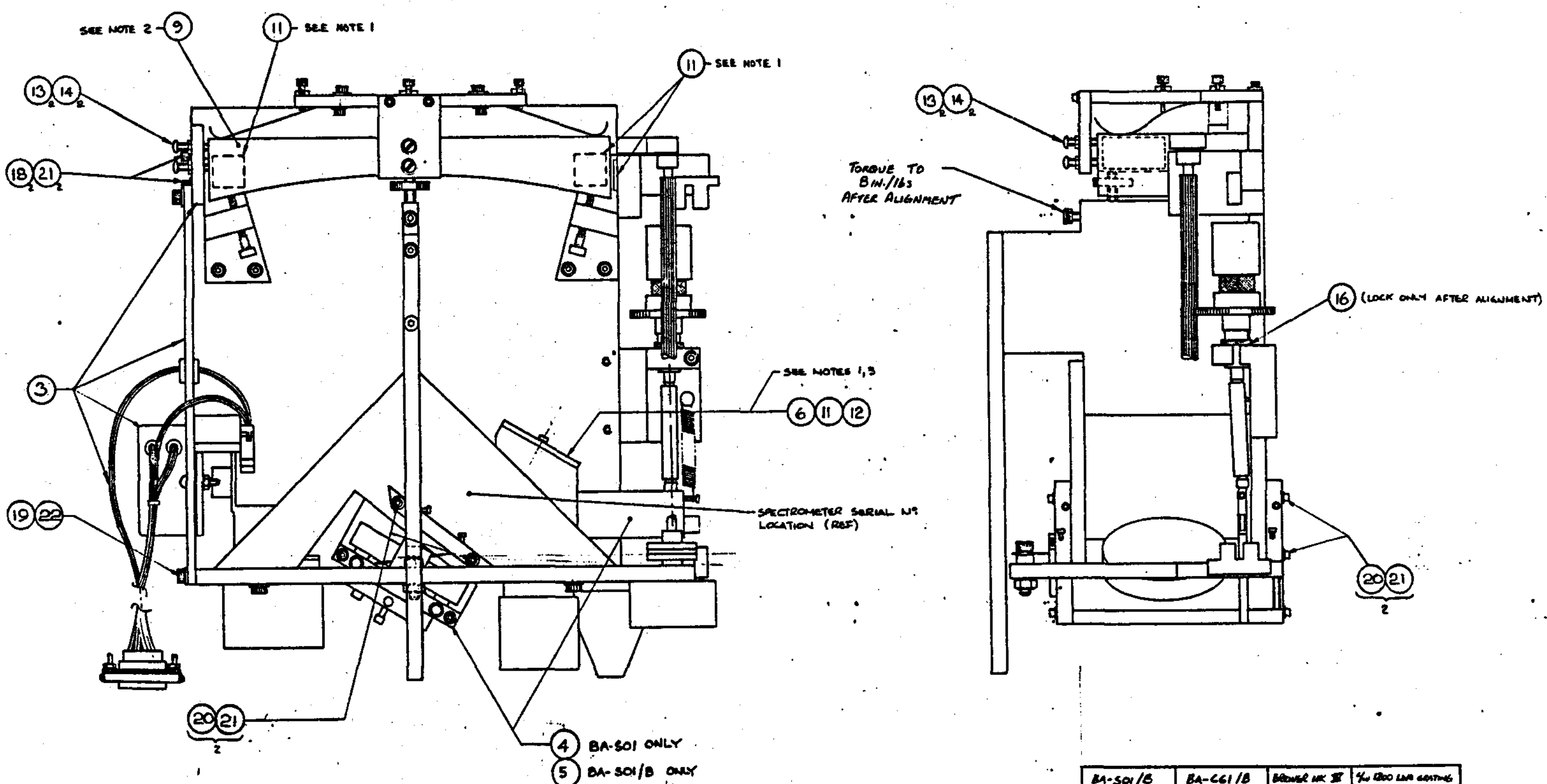
COMPUTER GENERATED DRAWING
FILENAME: BA-F71.DWG

QTY -1 / - NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM
SCALE 1:1	NEXT ASSY: BA-C01			SCI-TEC INSTRUMENTS INC. ©1984		
DATE 83.07.01	DIMENSIONS IN			TITLE:		
DWN DF	IF DUAL DIMS mm (Inches)			ZENITH DRIVE ASSY/KIT, BREWER		
CHKD	Tolerances (unless otherwise specified)					
APPD KL	INCHES / MM					
FINISH				SHEET 1 of 1	DOCUMENT NUMBER BA-F71	REV. 10

Fig 7.6 2-4

FORM D

Issue No.	Revision and Description	App'd	Date	Work No.
1	NEW DWG	—	—	3716
2	[illegible] ALL DOCS [illegible] BA-501 DRAWN	KL	OCT/82	
3	SEE ECN	JH	Jan 87	[illegible] 297
4	REDRAW MICROMETER ASSY, ADD NOTE 4 & 5	RA	[illegible]	ECN-347
5	BA-501 BECOMES BA-501/A; ADD BA-501/B & REF INFO	RA	88-7-13	419-2
6	ADD TORQUE NOTE FOR OPTICAL ALIGN SCREW	R.P.	91-2-21	524



BA-501, BA-501/B SHOWN

BA-501/B	BA-C61/B	BREWER MK III	1/4 1200 LINE GRATING
BA-501	BA-C61/A	BREWER MK II	1/4 1800 LINE GRATING
PART Nº	NEXT ASSY	USED ON	REMARKS

TABULATION TABLE

NOTES:

1. FROM ITEM 11, CUT 4 PIECES AS FOLLOWS: 1 PC. (WASHER SHAPE) 1" O.D. = 3/4" I.D.; 1 PIECE 1" = 1/2"; 2 PCS. (SQUARE) 1/2" = 1/2".
2. INSTALL MIRROR AS SHOWN (WITH WIDE SIDE TOWARDS TOP OF FRAME) USING CUT PIECES FROM ITEM 11 LOCATED AS SHOWN.
3. TO INSTALL CORRECTION LENS, FIRST INSTALL WASHER CUT FROM ITEM 11, THEN LENS (ITEM 6), THEN NYLON WASHER (ITEM 12). SCRIBE MARK ON LENS SHOULD INITIALLY BE ALIGNED WITH THE SCRIBE MARK ON THE LENS MOUNT. INSTALL LENS WITH CONCAVE SURFACE FACING ENTRANCE SLIT.
4. ADJUST AND ALIGN OPTICS AND FRAME AS DESCRIBED IN AP-BA-501 (OPTICAL FRAME ALIGNMENT PROC.)
5. PERFORM ACCEPTANCE TEST PROCEDURE PER TP-BA-501. (SPECTROMETER ACCEPTANCE TEST RECORD.)

SCALE: FULL SIZE

Date MAY 13, 1982	Drawn By [illegible]	All dimensions are in inches unless otherwise indicated
Design By / App'd	Checked	Tolerances, unless otherwise stated: Fractional dimensions ± 1/32; Dimensions to 1 decimal ± .02; Dimensions to 2 decimals ± .01; Dimensions to 3 decimals ± .005; Angles ± 1 degree
Approved		

SCI-TEC INSTRUMENTS INC.

SPECTROMETER ASSY

SHEET 1 of 1 — DOCUMENT NUMBER BA-501 — 6

FIG. 7.6.3-1

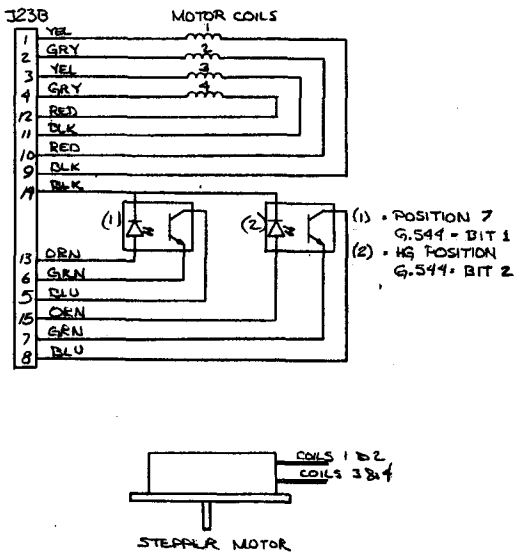
SCI-TEC Instruments Inc.										
Title:	SPECTROMETER ASSEMBLY								Rev Date:	93-05-21
									Rev:	7
DCN: 652	Drawn: GN	Checked: LV	Approved:	QA App'd:					Dwg No.:	BA-S01

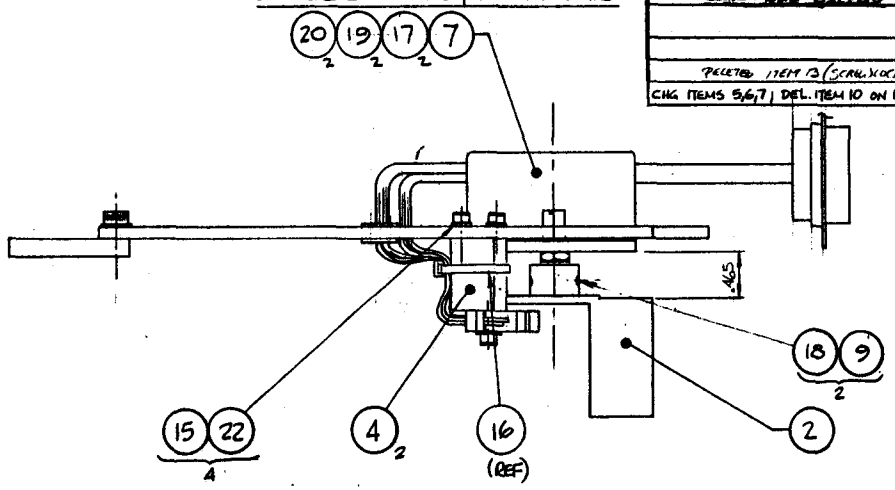
Item No.	Part/Ident No.	Title/Description	Qty	Qty /B	Qty /C	Qty /D	UofM	Ref Des	Remarks
1	BA-S02	Spectrometer Mechanical Assy	1.00	1.00			EA		
2									
3	BA-S11	Shutter Motor Assy	1.00	1.00			EA		
4	BA-S51	Grating Support Assy, 1800 Line	1.00	--			EA		
5	BA-S51/B	Grating Support Assy, 1200 Line	--	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		

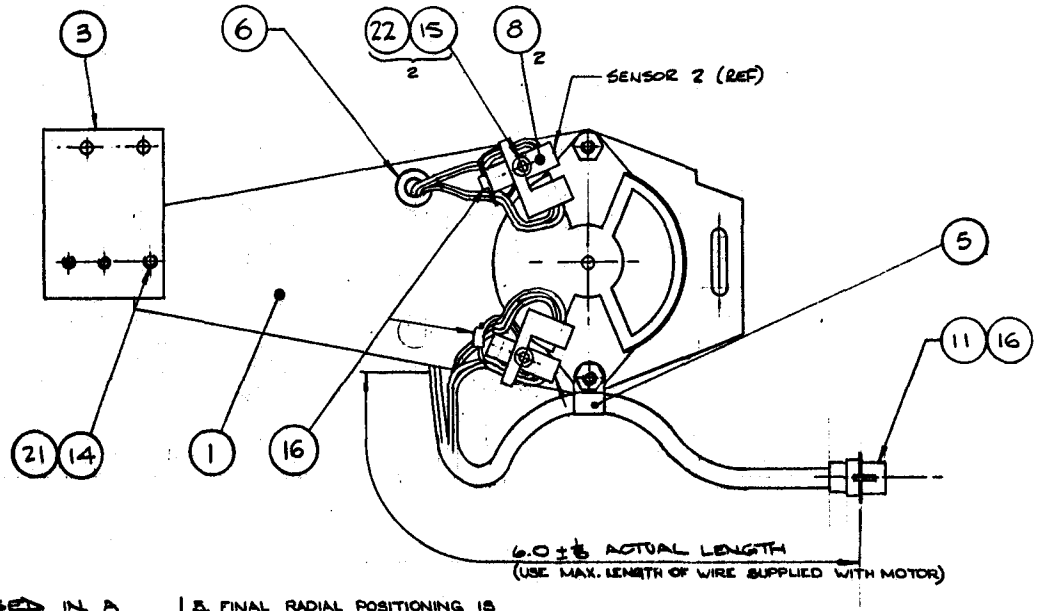
FIG 7.6.3-1.1

NON		E		DW	
FIRST ISSUE.	1	351400-RN-289			
WAS SED 351400-IC-118	2	8308-DCN-078	AUG/83	DF	KL
	—	8502-DCN-194	FEB 85	DF	KL
	—	8509-DCN-261	AUG 85	DF	KL
DELETED ITEM 13 (SCREW LOCKS)	3	8612-DCN-285	DEC/86	DF	KL
CHG ITEMS 5,6,7 DEL. ITEM 10 ON P/L, UPDATE DWG.	5	DCN-348	87-11-10	C.W.	RA

ITEM 20, WASHER, TO BE LOCATED BETWEEN MOTOR & MOTOR PLATE







DOC. NO./PART NO.
BA-S11

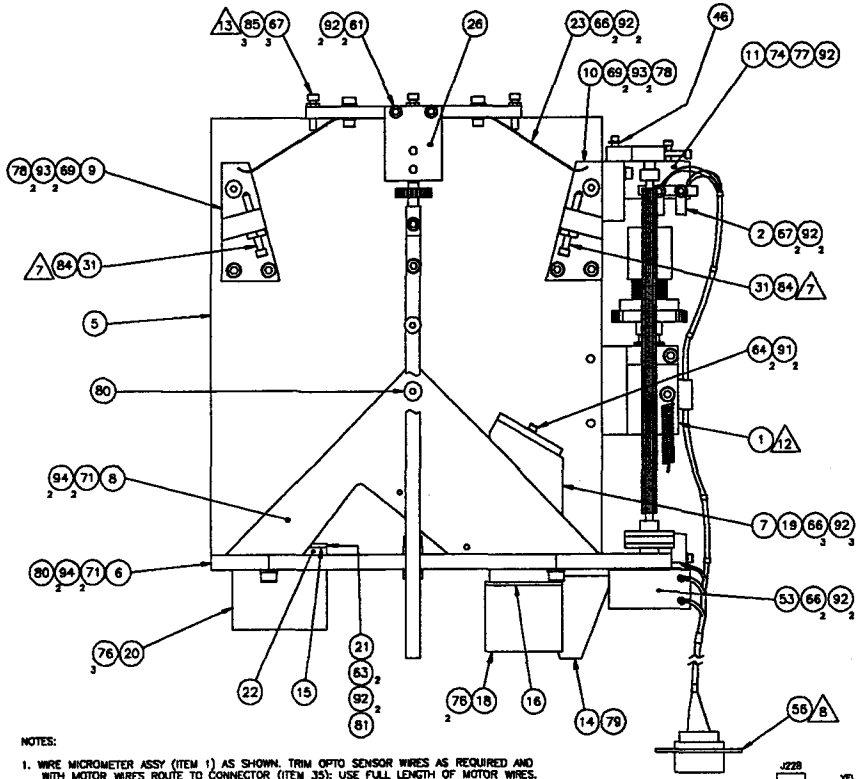
NOTES:

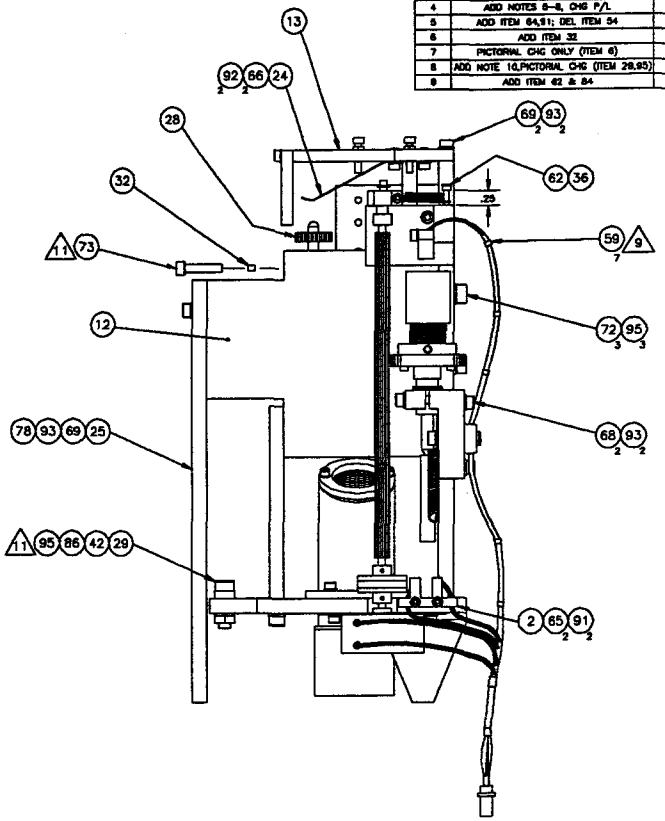
1. FINISHED ASSEMBLY TO BE ENCLOSED IN A CLEAN PLASTIC BAG, PACKED IN A CARDBOARD BOX & LABELLED WITH DRG. Nº & ISSUE. PACKING TO ENSURE NO POSSIBILITY OF DAMAGE TO EXIT SLIT CHOPPER, ITEM 2.
2. ENSURE ALL SCREWS LOCKED WITH INTERNAL TOOTH LOCK WASHER AND/OR LOCTITE 242.
3. WIRE SHUTTER MOTOR ASSY. AS SHOWN AND REF SCHEMATIC ABOVE.
4. INITIAL RADIAL POSITIONING OF SHUTTER (ITEM 2) TO BE SET SO AS BOTH SET SCREWS AVOID THE MOTOR SHAFT FLAT, AND LATERAL SETTING ON SHAFT IS .465 ±.005 INCHES AS SHOWN USING BA-S11 PA01.
5. FINAL RADIAL POSITIONING IS DONE WITH POWER APPLIED AND USING 'RUN' COMMAND FROM BREWER COSMAC.

MATERIAL: —	DATE: NOV 80	SCI-TEC INSTRUMENTS INC.	© 1982 This document is not to be disclosed to others, copied or used for production without written permission from SCI-TEC Instruments Inc.	
	DRAWN:			
	CHKD.: RA			
	APPD.: KL			
FINISH: —	TOLERANCES (UNLESS OTHERWISE STATED): —	TITLE: SHUTTER MOTOR ASSY.	DOCUMENT NO./PART NO.: BA-S11	
NEXT ASSY.: BA-801		DIMS. IN: INS.	SCALE: 1/1	DO NOT SCALE
		SUPERSEDS	SHEET: 1 OF 1	ISS. REV.: 5

FIG. 7.9.3-2

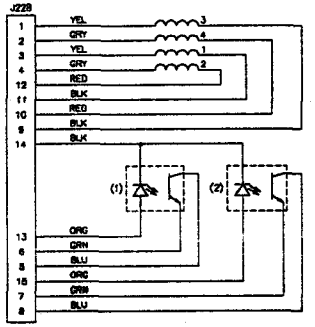
DOCUMENT NO. BA-S02	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	APPD.
	1	INITIAL RELEASE	391400-RN-288			
	2	WAS S.E.O. 391400-10-120		82.10.01	DF	KL
			8502-DCN-193	85.02.01	DF	KL
			8507-DCN-250	85.07.01	DF	KL
	3	SEE DCN'S	346, 347	87.11.09	CW	RP
	4	ADD NOTES 8-8, CHG P/L	357	88.01.05	CW	RP
	5	ADD ITEM 64,91; DEL ITEM 54	419	88.10.24	CW	RA
	6	ADD ITEM 32	524	91.02.21	FV	RP
	7	PICTORIAL CHG ONLY (ITEM 6)	545	91.08.20	FV	FV
	8	ADD NOTE 10,PICTORIAL CHG (ITEM 29,95)	652	93.05.21	FV	RA
	9	ADD ITEM 62 & 84	703	94.07.28	FV	

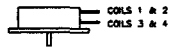




NOTES:

1. WIRE MICROMETER ASSY (ITEM 1) AS SHOWN. TRIM OPTO SENSOR WIRES AS REQUIRED AND WITH MOTOR WIRES ROUTE TO CONNECTOR (ITEM 35); USE FULL LENGTH OF MOTOR WIRES.
2. ENSURE THAT ITEM 12 IS SQUARE TO ITEM 6.
3. ENSURE THAT ITEMS 9 & 10 ARE MOUNTED SQUARE TO EDGE OF ITEM 5.
4. ENSURE THAT MICROMETER SUPPORT BRACKET BM-S20 (PART OF ITEM 1) IS SQUARE TO ITEM 5.
5. ENSURE THAT ITEM 11 IS PARALLEL TO BOTTOM OF ITEM 5.
6. ENSURE THAT MICROMETER SHAFT (PART OF ITEM 1) IS THRU REAR BEARING.
7. ITEM 31 IN BOTH POSITIONS SHOULD BE APPROX. 7 TURNS THRU ITEMS 9 & 10. INSTALL ONE FIRST, MEASURE IT WITH A VERNIER CALIPER & INSTALL THE SECOND THE SAME DISTANCE THRU.
8. WIRE CONNECTOR AS PER MOTOR WIRING DIAGRAM.
9. START TIEING CABLE AT THIS END, WORK TOWARDS CONNECTOR, DRESS CABLE AND TRIM FOR LENGTH.
10. ENSURE ITEMS 12 & 25 ARE MOUNTED SQUARE TO ITEM 6.
11. FINGER TIGHT ONLY.
12. ATTACH PUSH ROD PIVOT (PART OF ITEM 1) TO ASSY FOR INSTALL AT THE NEXT LEVEL.
13. WHEN INSTALLING ITEMS 67 & 85, TIGHTEN ALL THE WAY DOWN, BACK OFF TWO TURNS AND LOCK INTO PLACE.





STEPPER MOTOR

COMPUTER GENERATED DRAWING
FILENAME: BA-S02.DWG

QTY	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM
— NO.						

SCALE	1:1	NEXT ASSY:	BA-S01
DATE	80.11.01	DIMENSIONS IN	
DWN	RR	IF DUAL DIMS.	mm (inches)
CHKD	RP	Tolerances (unless otherwise specified)	
APPD	KL	INCHES	MM
FINISH			

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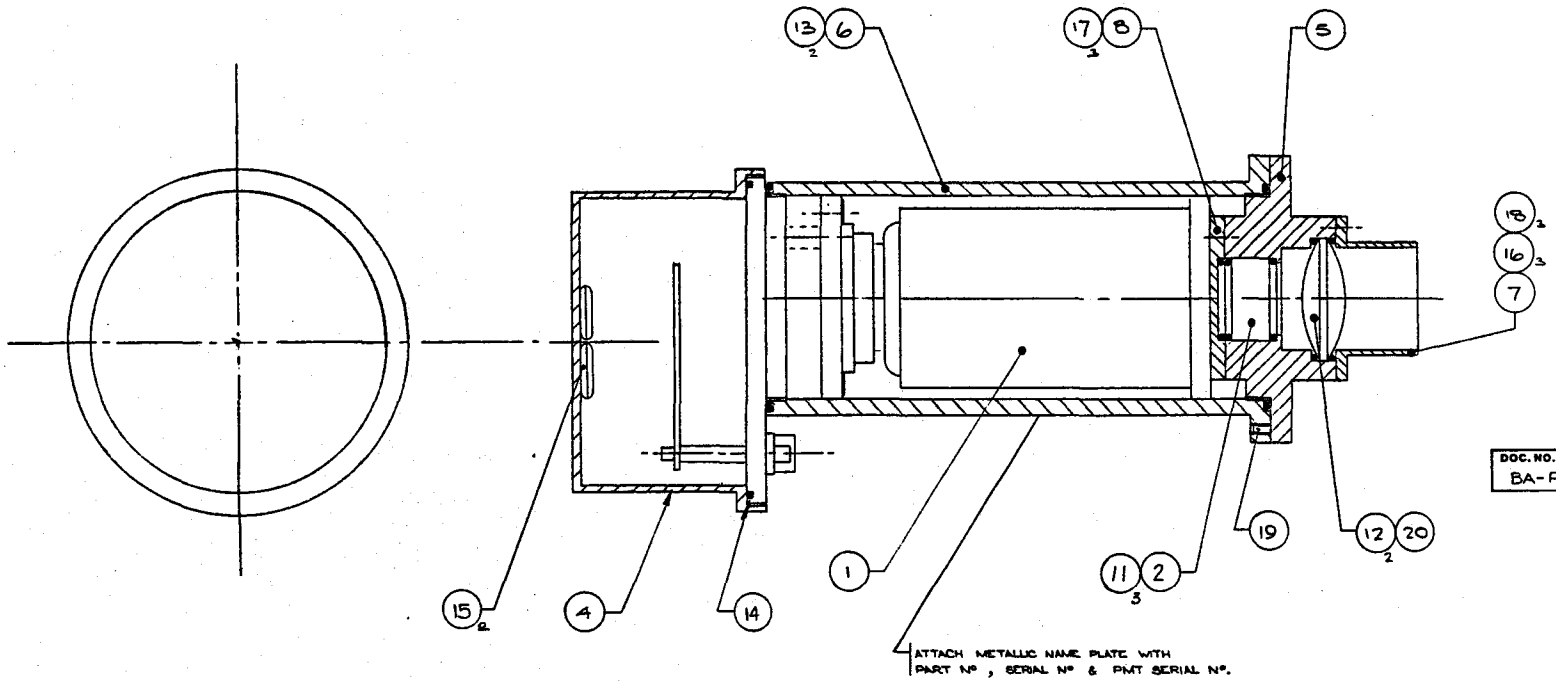
TITLE: SPECTROMETER MECHANICAL ASSY

SHEET 1 OF 1 | DOCUMENT NUMBER BA-S02 | REV. 9

FIG 7.6.3-3

DESCRIPTION	ISS. REV.	RCN/CN NO. ECN NUMBER	DATE	DWN.	APP.
FIRST ISSUE.	1	391400-EN-282			
WAS SED 391400-1C-180	2	8211-DCN-008	NOV/82	JF	KL
ADD P/N'S ON P/L. REMOVE NOTE 1	4	DCN 351	87-11-17	C.W.	RA
ADD IT 2 1 REMOVE IT 21 & 22	5	DCN 503	90-9-27	JV	KL



DOC. NO./PART NO.
BA-P01

NOTES

1. REMOVED
2. ON COMPLETION OF ASSY STORE IN A CLEAN PLASTIC BAG, SEAL & LABEL WITH DRG Nº & ISSUE.
3. LOCTITE ALL SCREWS ON FINAL ASSY USING ITEM 9.
4. FOR ASSY. PROCEDURES SEE APOI-BA-POI
5. COAT THREADS OF PMT COVER (ITEM 4) WITH TEFLON SPRAY (TYGADURE TFE SPRAY).

MATERIAL: —	DATE: DEC 85	SCI-TEC INSTRUMENTS INC.	© 1982 This document is not to be disclosed to others, copied or used for production without written permission from SCI-TEC Instruments Inc.		
	DRAWN:				
	CHKD.: RA				
	APPD.: KL				
FINISH: —	TOLERANCES (UNLESS OTHERWISE STATED): —	TITLE: PHOTOMULTIPLIER HOUSING ASSY.		DOCUMENT NO./PART NO.: BA-P01	
		DIMS. IN: —	SCALE: 1/1	DO NOT SCALE	SUPERSEDE
				SHEET 1 OF 1	ISS. REV. 5

BA-C61
NEXT ASSY.

FIG 7.6.4-1

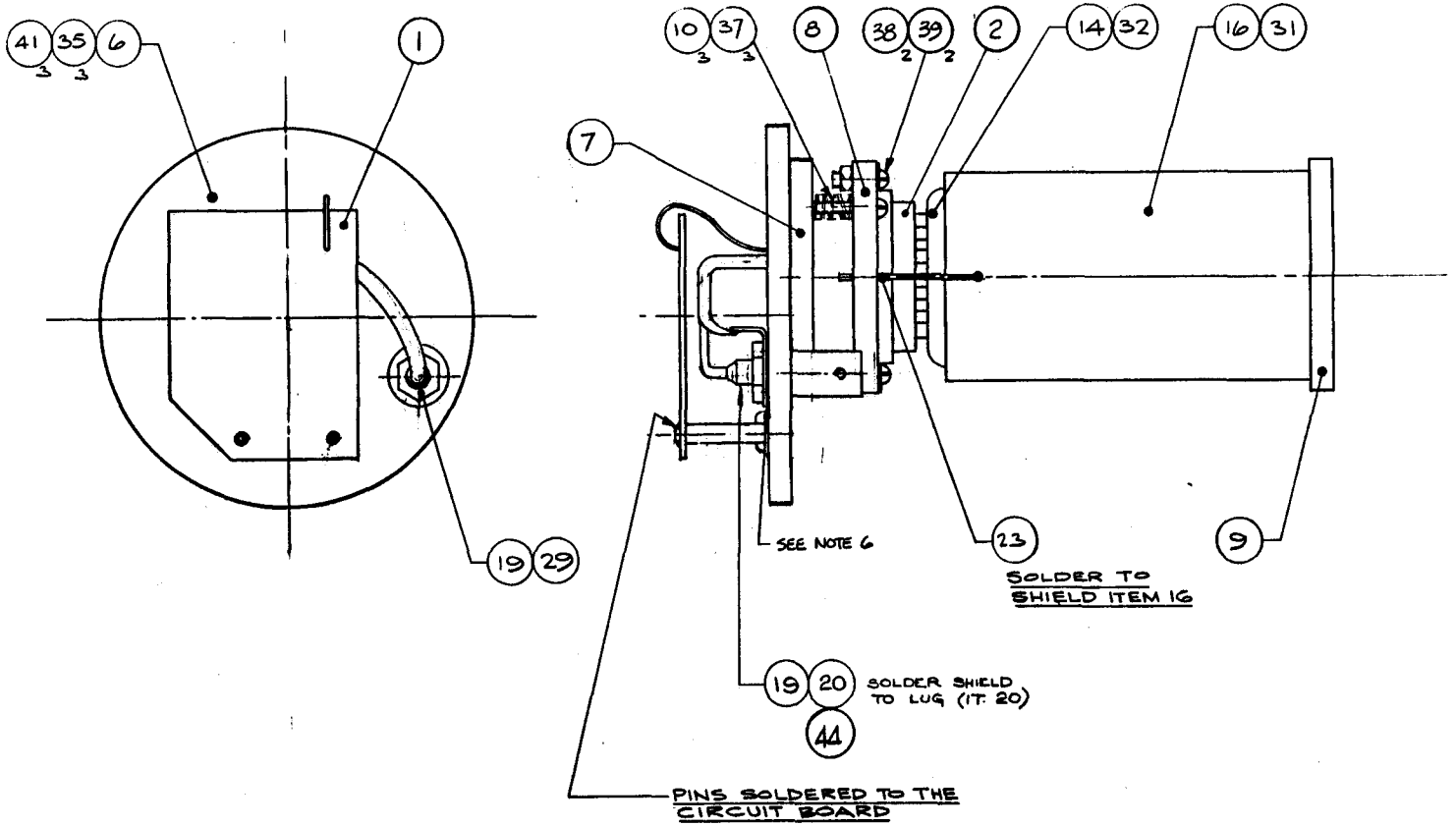
ITEM	DOC. NO./PART NO.	SIZE	DESCRIPTION	NO. OFF	REMARKS
1	BA-P02	C	PHOTOMULTIPLIER TUBE ASSY	1	
2	BA-P46	B	ULTRAVIOLET FILTER		MFR BY INRAD
3					
4	BM-P11	C	COVER, PMT	1	
5	BM-P15	C	LENS & FILTER MOUNT	1	
6	BM-P14	C	HOUSING, PHOTOMULTIPLIER	1	
7	BM-P16	B	LENS RETAINER & LIGHT TRAP	1	
8	BM-P17	B	FILTER RETAINER	1	
9	85-10-145		ADHESIVE SEALANT LOCTITE 242 MEDIUM	A/R	242-31 LOCTITE
10					
11	83-10-620		'O' RING #020 - 7/8 × 1 × 1/16 NBR	3	ARP568A-020 NATIONAL
12	83-10-628		'O' RING #028 - 1 3/8 × 1 1/2 × 1/16 NBR	2	ARP568A-028 NATIONAL
13	83-10-638		'O' RING #038 - 2 5/8 × 2 3/4 × 1/16 NBR	2	ARP568A-038 NATIONAL
14	83-10-644		'O' RING #044 - 3 3/4 × 3 7/8 × 1/16 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., 4-40 × 1/4 FH. HX. SC. 82D SS	3	
18	83-51-762		SCREW, 4-40 × 5/16 BUTTON HD. HX SOC. CAP SS	3	
19	83-56-143		SCREW, SET, 6-32 × 1/4 CUP PT. SS HX SOC.	1	
20	10-10-020		LENS B1/C × G1 FSD QTZ 38.1 mm D, 38.1 mm 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. TR	RN/CN NUMBER	39400-RN-289	REV. BY A.E.C.	8211-DCN-009	DCN-351	DCN-503			
	APPD.		AHO	KL	RA	KL			

CHKD.	SCI-TEC INSTRUMENTS INC.	TITLE: PHOTOMULTIPLIER HOUSING ASSY.		
APPD. KL		SUPERSEDE	SHEET 1 OF 1	ITEMS LIST FOR BA-P01

FIG 7.6.4-1.1

ITEM		REVISION		DWN	
FIRST ISSUE	1	391400-RN-2			
DWG REVISED BY A.E.S.	2		AUG 6, 1982	BSV	140
WAS SED 391400-IC-186	3	8211-DCN-006	NOV/82	JB	KL
DELETE IT. 15 P.M.T. SKT. & ASSOC. PARTS TO SUB-ASSY IT. 2, ADD P/N's TO P/L.	4	DCN-351	87-11-18	CW	RA



DOC. NO./PART NO.
BA-P02

NOTES:

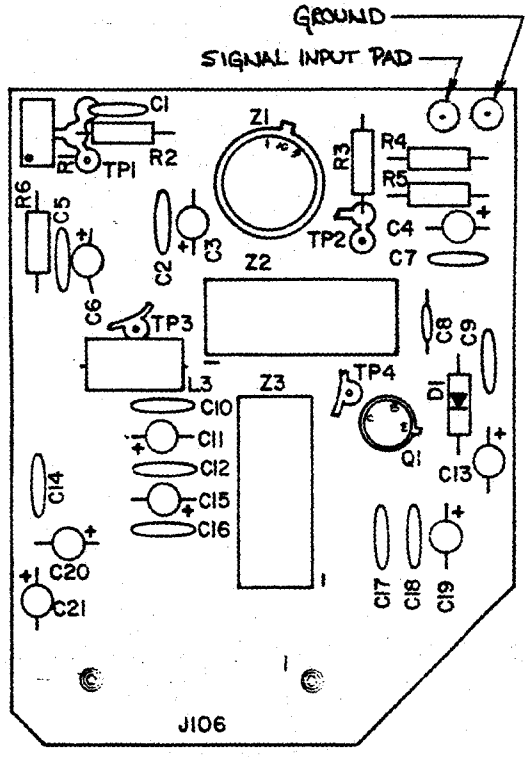
1. FOR DYNODE CHAIN SCHEMATIC SEE BS-P25.
2. (REMOVED)
3. ON COMPLETION OF ASSY. WRAP WITH BUBBLE PACK & PLACE IN A CLEAN PLASTIC BAG LABELLED WITH DRG Nº & ISSUE.
4. WRAP TUBE, ITEM 14 WITH FELT TAPE, ITEM 32, 3 STRIPS LENGTHWISE & 2 STRIPS AROUND O/DIA. & 3 PADS ON END OF TUBE.
5. REMOVED
6. PLACE STAR LOCKWASHER SUPPLIED WITH ITEM 19 BETWEEN LUG ITEM 20 AND BASEPLATE ITEM 6. TIGHTEN NUT USING 9/16" BOX END WRENCH WHILE HOLDING CONNECTOR CAREFULLY WITH PLIERS.

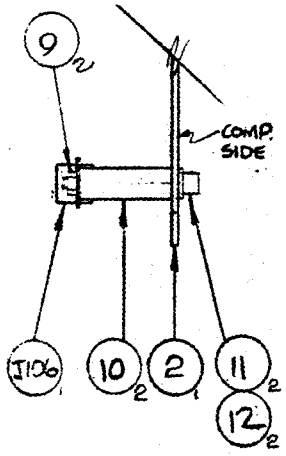
SEE ASSY PROCEDURE AP01-BA-P02

FIG. 7.6.4-2

MATERIAL: —	DATE: DEC 80	SCI-TEC INSTRUMENTS INC.		
	DRAWN:			
	CHKD.: RA			
	APPD.: KL			
FINISH: —	TOLERANCES (UNLESS OTHERWISE STATED): —	TITLE: PHOTOMULTIPLIER TUBE ASSY	DOCUMENT NO./PART NO.: BA-P02	
C BA-P01 NEXT ASSY.		DIMS. IN: — SCALE: N.T.S. DO NOT SCALE	SUPERSEDE	SHEET 1 OF 1 ISS. REV. 4

DOC. NO./PART NO. BA-P23	DESCRIPTION	ISS. REV.	RN/CN NUMBER ECN NUMBER	DATE	DWN.	APPD.
		3		FEB 83	JE	KC
		4	8505-DCN-239	MAY 83	JE	KC
	P/L REVISION	5	DCN-331	88-1-6	C.W.	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 - MAIN GATE INHIBIT INPUT, 16 M sec WIDE REPEATS EVERY 130 M sec.
5. TP4 - 500 KHz SQUARE WAVE
6. CURRENT DRAIN +5 ≈ 120 MA ± 20; -8 ≈ 10 MA ± 3 PIN 4 IS +5V; PIN 9 IS -8V; PIN 8 IS GND.
7. BAG WHEN TESTED AND INDICATE ON BAG TESTED TO BA-P23 PROCEDURE.

SCI-TEC INSTRUMENTS INC.

NEXT ASSEMBLY: BA-P02

HIGH SPEED AMP BOARD ASSY.

SCALE	DIMS.	TOLS.	DATE	DWN.	CHKD.	APPD.
2" = 1"			FEB 83		JE	KC
MATERIAL			SHT.	SIZE	NUMBER	ISS.
FINISH			1 of 1	B	BA-P23	5

	sion	Des			
1	NEW DWG		—	—	3620
—	WAS AES C0608-R4			NOV/85	
			KL	MAY/85	

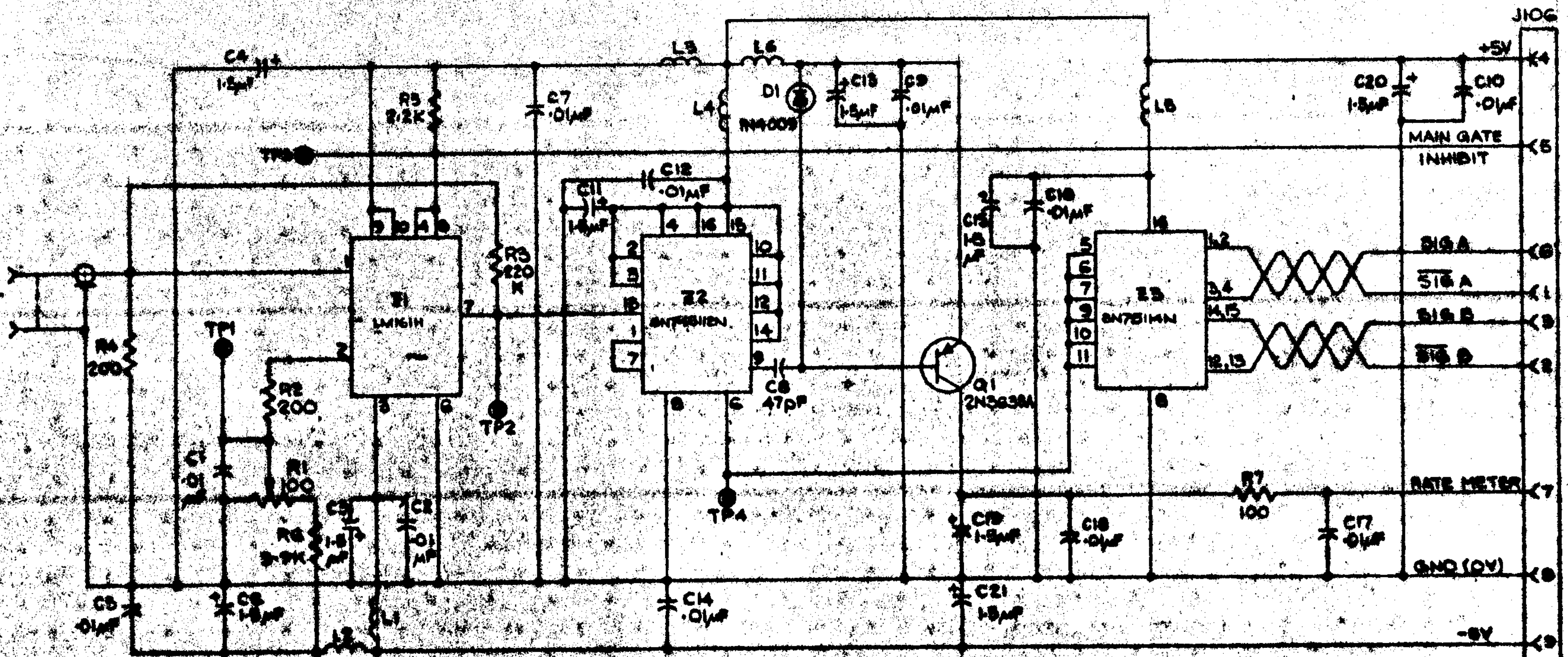


FIG 7.6.4-4

NOTES
1. CHOKES "L1, L2, L4, L5, L6" NOT NORMALLY USED.
2. RESISTOR, 'R7' NOT NORMALLY USED.
3. L1, L2, L4, L5, L6 HAVE BEEN REMOVED AND REPLACED BY CONNECTING TRACE.

SCI-TEC INSTRUMENTS INC.

GENERAL NOTES:
1-PARTS LIST = BP-P23

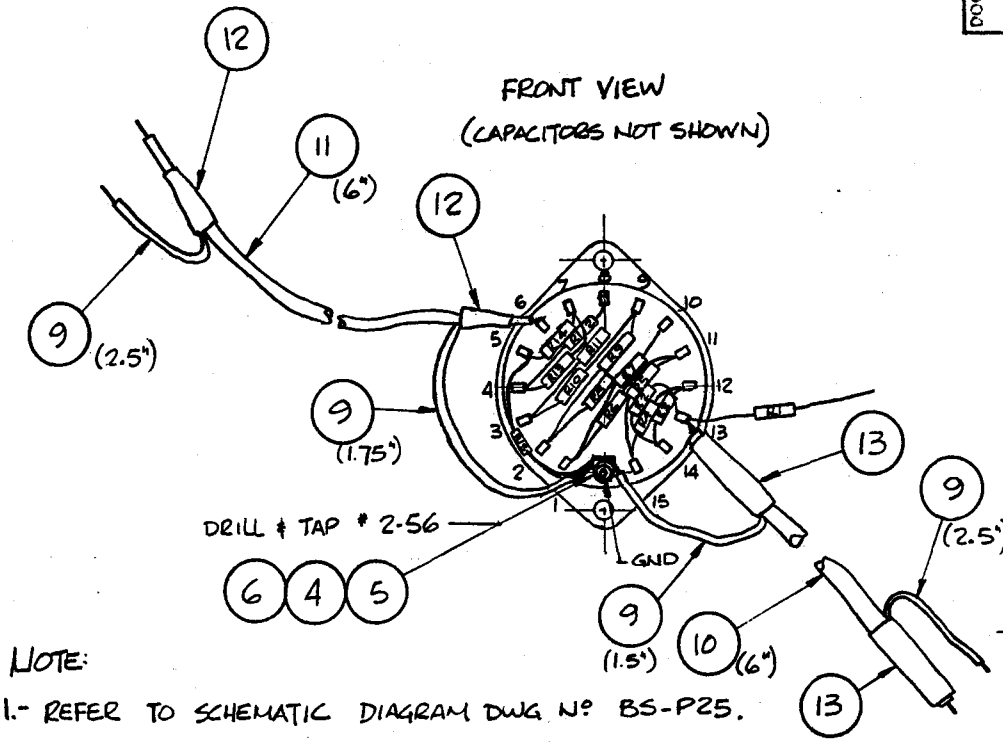
Date 5 DEC 1981	Drawn By H. BLACK	All dimensions are in inches unless otherwise indicated
Design By / App'd	Checked	Tolerances, unless otherwise stated: Fractional dimensions ± 1/32; Dimensions to 1 decimal ± .02; Dimensions to 2 decimals ± .01; Dimensions to 3 decimals ± .005; Angles ± 1 Degree
Approved		

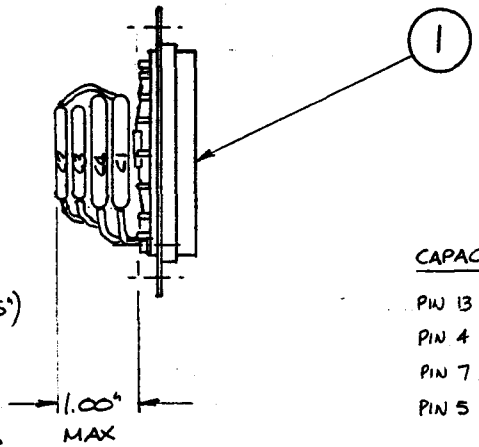
Title
BREWER SPECTROPHOTOMETER
HIGH SPEED AMPLIFIER BOARD

Associated Specification

Drawing No. BS-P23

DOCUMENT NO. BA-P25	DESCRIPTION	REV.	DCN NUMBER	DATE	DWN	APP
	FIRST ISSUE	1	DCN-351	87-11-17	C.W.	RA
	REVISE NOTE, ADD TEST. PROC, RELOCATE R15	2	442	88-10-21	C.W.	RA





CAPACITOR WIRING (REF)

PIN 13 ← C1 → GND LUG
PIN 4 ← C2 → GND LUG
PIN 7 ← C3 → GND LUG
PIN 5 ← C4 → GND LUG

NOTE:

1.- REFER TO SCHEMATIC DIAGRAM DWG Nº BS-P25.

2.- ASSEMBLE AND TEST PER AP-BA-P25.

3.- STORE FINISHED ASSY IN A CLEAN PLASTIC BAG, SEAL, AND LABEL WITH DWG. Nº & ISSUE NO.

FIG. 7.6.4-5

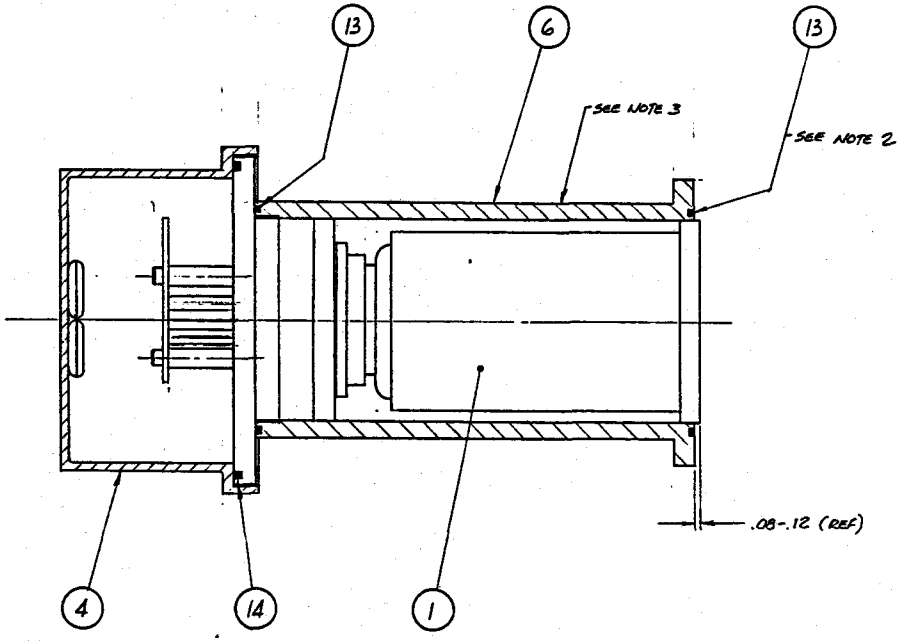
SCALE	N.T.S.	NEXT ASSY. BA-P02	
DATE	87-11-17	DIMENSIONS IN INCHES IF DUAL DIMS mm (inches)	
DWN	C.W.		
CHKD	RA	TOLERANCES (unless otherwise specified)	
APPD		INCHES: .xxx ± .005, .xx ± .01, ANGLES ± 1°, FRACTIONS ± 1/32 — MM: .xx ± .16, .x ± .25, ANGLES ± 1°	
FINISH	—		

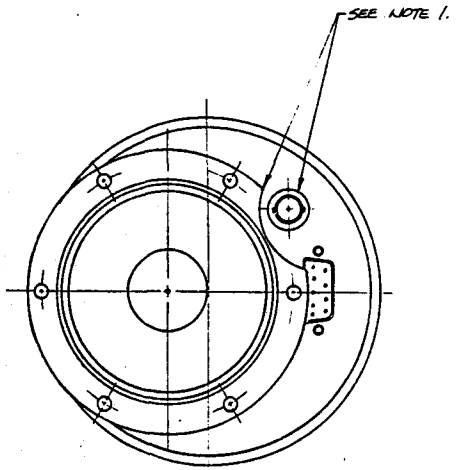
SCI-TEC INSTRUMENTS INC.

DYNODE CHAIN ASSY

SHEET 1 OF 1 | DOCUMENT NUMBER BA-P25 | REV 2

DOCUMENT NO. BA-P42	DESCRIPTION	REV.	DCN NUMBER	DATE	DWN.	APPD.
	FIRST ISSUE	1	——	88-9-27	CW	





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	1:1	NEXT ASSY. BA-C61/B	SCI-TEC INSTRUMENTS INC.	
DATE	88-7-8	DIMENSIONS IN INCHES IF DUAL DIMS. mm (inches)		
DWN	C.W.	TOLERANCES (unless otherwise specified)		
CHKD	R.P.	INCHES: .xxx ± .005, .xx ± .01, ANGLES ± 1°, FRACTIONS ± 1/32 — MM: .xx ± .13, .x ± .25, ANGLES ± 1°	PHOTOMULTIPLIER HOUSING ASSY	
APPD			SHEET 1 OF 1 — DOCUMENT NUMBER BA-P42 — REV 1	
FINISH	——			

FIG 7.6.4-6

BREWER REFERENCE DOCUMENTATION

Section 7.7 Brewer Options

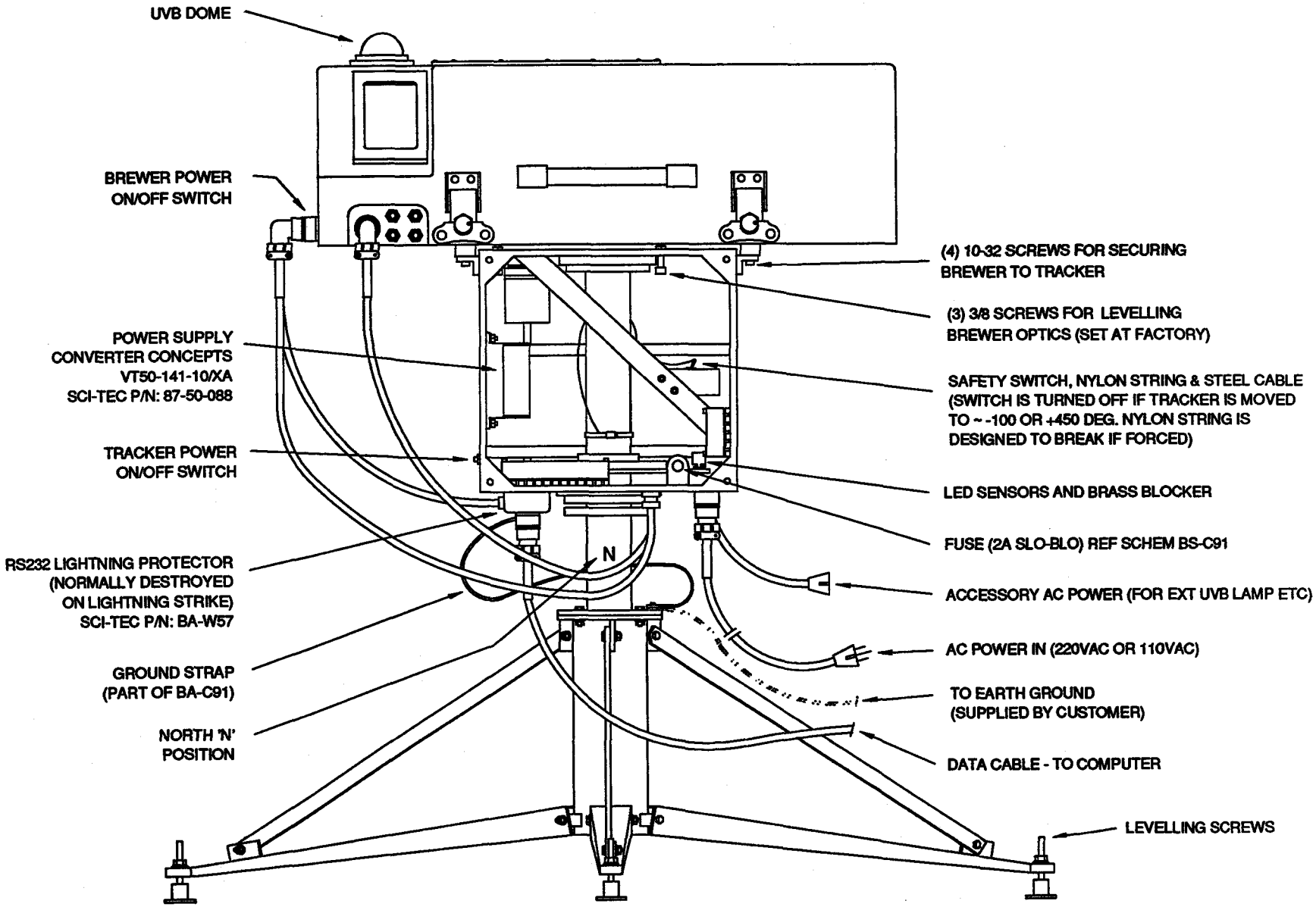
7.7.1 Option B - Azimuth Pointing System

- 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 Manuall Sec 2.1 thru 2.5 for setup and maintenance information.

7.7.2 Option C - UVB F81 7.7.2-1

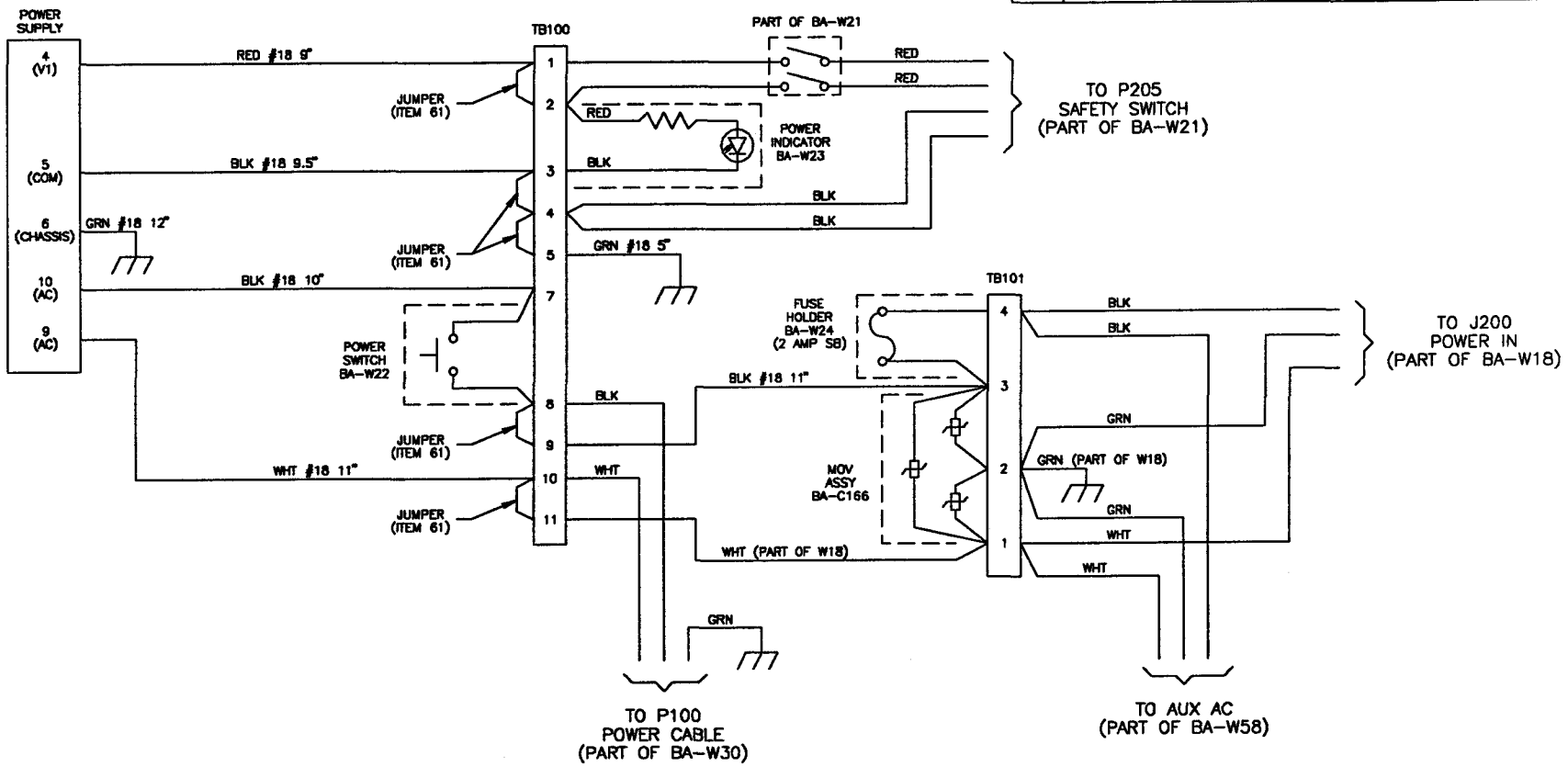
Reference Fig 7.1-5 of this manual for further information on Option C.
CAUTION: Quartz Hemisphere (UVB Dome) is fragile. Ensure UVB Dome is removed and packed separately when the Brewer is transported.

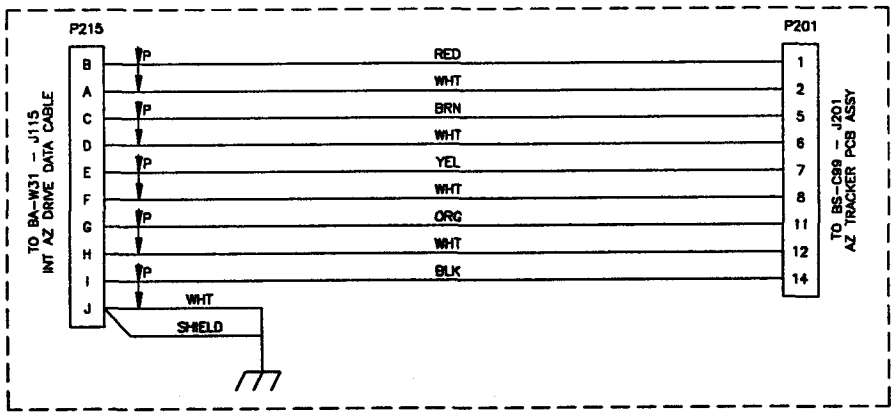


AZIMUTH TRACKER AND TRIPOD STAND
FRONT VIEW WITH COVER REMOVED
(REFERENCE SECTION 2.1 & 2.2 OF ACCEPTANCE MANUAL FOR SETUP INSTRUCTIONS)

Fig 7.7.1-1

DOCUMENT NO. BS-C91	REV	DESCRIPTION	DCN NUMBER	DATE	DWN.	APPD.
	4	REDRAWN WITH CHANGE - SEE DCN	521,533	91.04.29	FV	KL
	5	CORRECT WIRE LENGTHS	DCN562	92.03.10	FV	KL
	6	CHG CONTROL CABLE WIRING	DCN623	93.01.20	FV	KL
	7	ADD JUMPERS (ITEM 61)	DCN648	93.05.03	FV	





AZIMUTH TRACKER CONTROL CABLE INSTALLATION (REF ONLY)

COMPUTER GENERATED DRAWING
FILENAME: BS-C91.DWG

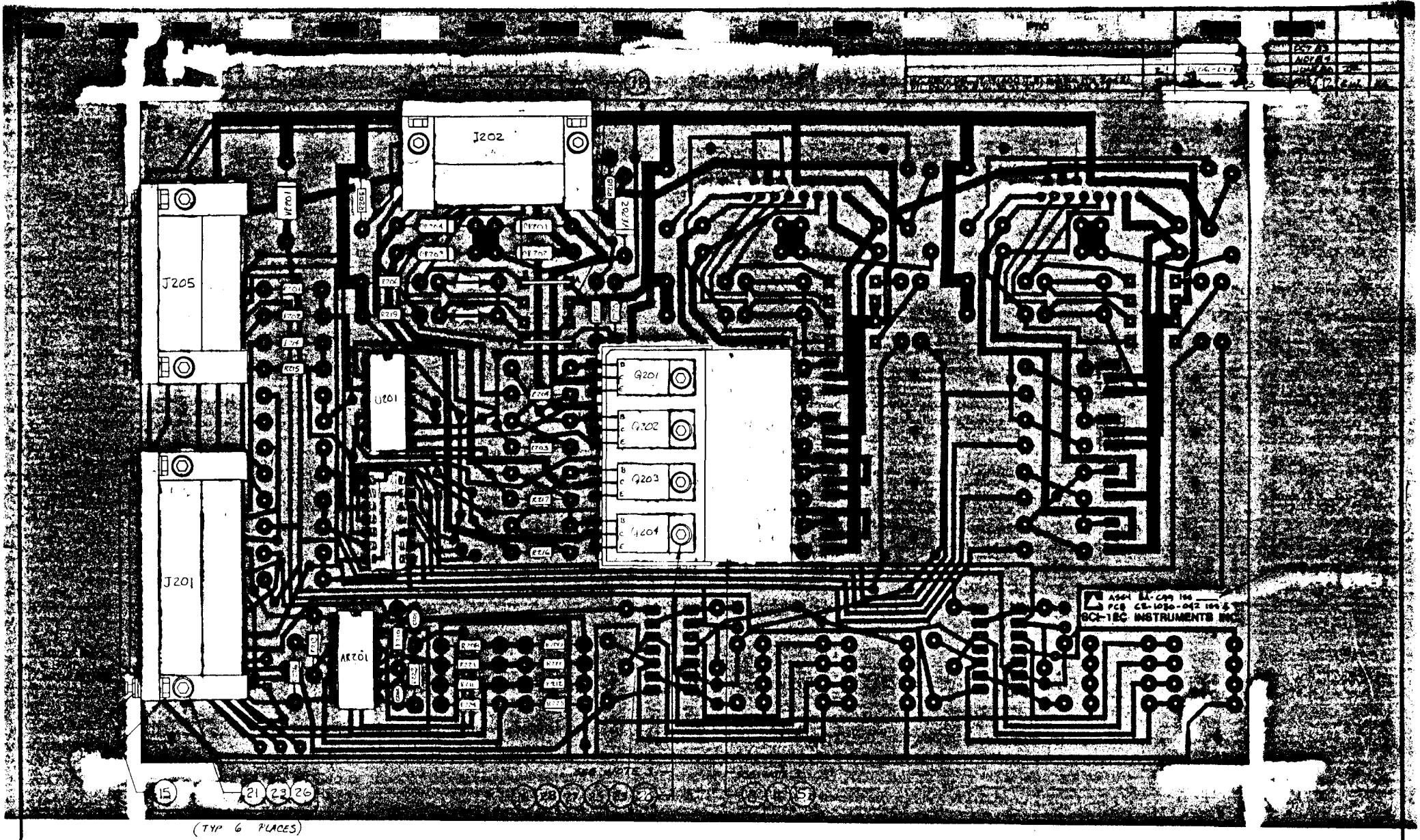
QTY -1 - NO.	UM	PART NO.	MFR's NO.	DESCRIPTION	REMARKS	ITEM

SCALE		NEXT ASSY: BA-C91	
DATE	JUN 83	DIMENSIONS IN INCHES	
DWN	DF	IF DUAL DIMS: mm (inches)	
CHKD		Tolerances (unless otherwise specified)	
APPD		INCHES: .xxx ± .005, .xx ± .01, ANGLES ± 1°, FRACTIONS ± 1/32	MM: .xx ± 0.15, .x ± 0.25, ANGLES ± 1°
FINISH			

TITLE: UNIT SCHEMATIC, AZIMUTH TRACKER

SHEET 1 of 1 | DOCUMENT NUMBER BS-C91 | REV. 7

Fig 7.7.1-2



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 WHERE SHOWN.

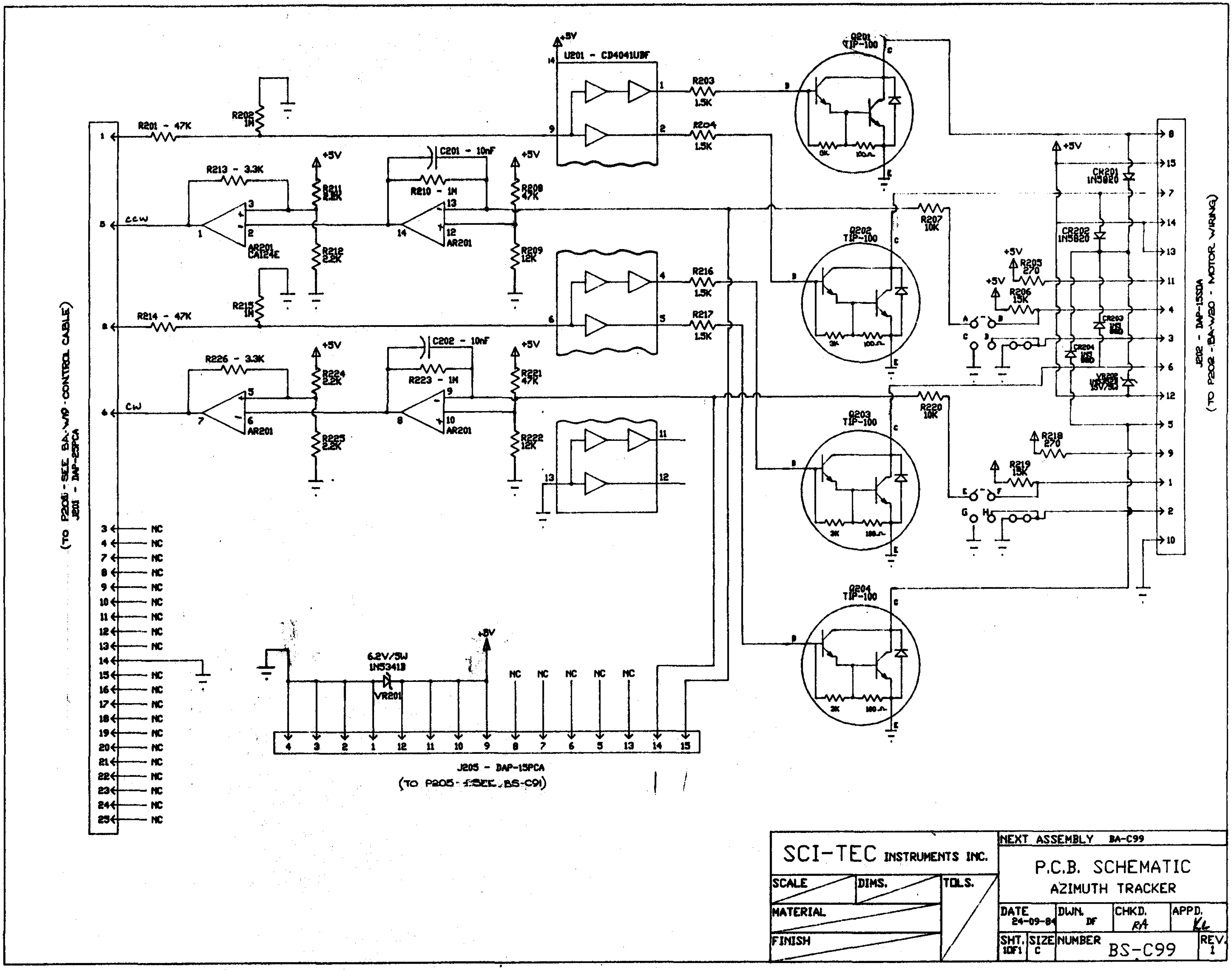
QTY	PART NO	MFR'S NO	DESCRIPTION	REMARKS	ITEM
SCALE	2:1	NEXT ASSY	ZA-099		
DATE	JUNE 84	DIMS IN	INCHES		
DWN	JD	TOLERANCES (UNLESS OTHERWISE SPEC'D)			
CHKD	RA				
APPD		Inches: XXX ± .005, XX ± .01, ANGLES ± 1°, FRACTIONS ± 1/32	mm: XX ± .15, X ± .25, ANGLES ± 1°		
FINISH					

SCI-TEC INSTRUMENTS INC.

PCB ASSEMBLY
AZIMUTH TRACKER

SHEET	NUMBER	ISS
1 OF 1	ZA-099	3

Fig. 7.7.1-3



SCI-TEC INSTRUMENTS INC.
NEXT ASSEMBLY BA-C99
P.C.B. SCHEMATIC
AZIMUTH TRACKER
SCALE
DIMS.
TOLS.
MATERIAL
FINISH
DATE 24-09-84
DWN. DF
CHKD. RA
APPD. KL
SHT. 1OF1
SIZE C
NUMBER BS-C99
REV. 1
U201 - CD4041UBF
J201 - DAP-25PCA
(TO P206 - SEE BA-W19 - CONTROL CABLE)
J202 - DAP-15SDA
(TO P202 - BA-W20 - MOTOR WIRING)
J205 - DAP-15PCA
(TO P205 - SEE BS-C91)
CCW
CW

FIG. 7.7.1-4

FIRST ISSUE	1				
	—	BA0E-1... 117			KL
SEE DCN	2	B012-DCN-288			KL
ADD P/N IT.10, CHG P/N IT.15, DEL. IT.8, CHG QTY IT'S 26-34	3	DCN-373	85-4-7	C.W.	RA
ADD NOTES 2,3, ITEM 16.	4	443-1	85-10-27	C.W.	RA
CLARIFY BOTTOM VIEW OF BLOCK & SENSOR	5	DCN 531	91-03-15	TV	RA

BA-W20

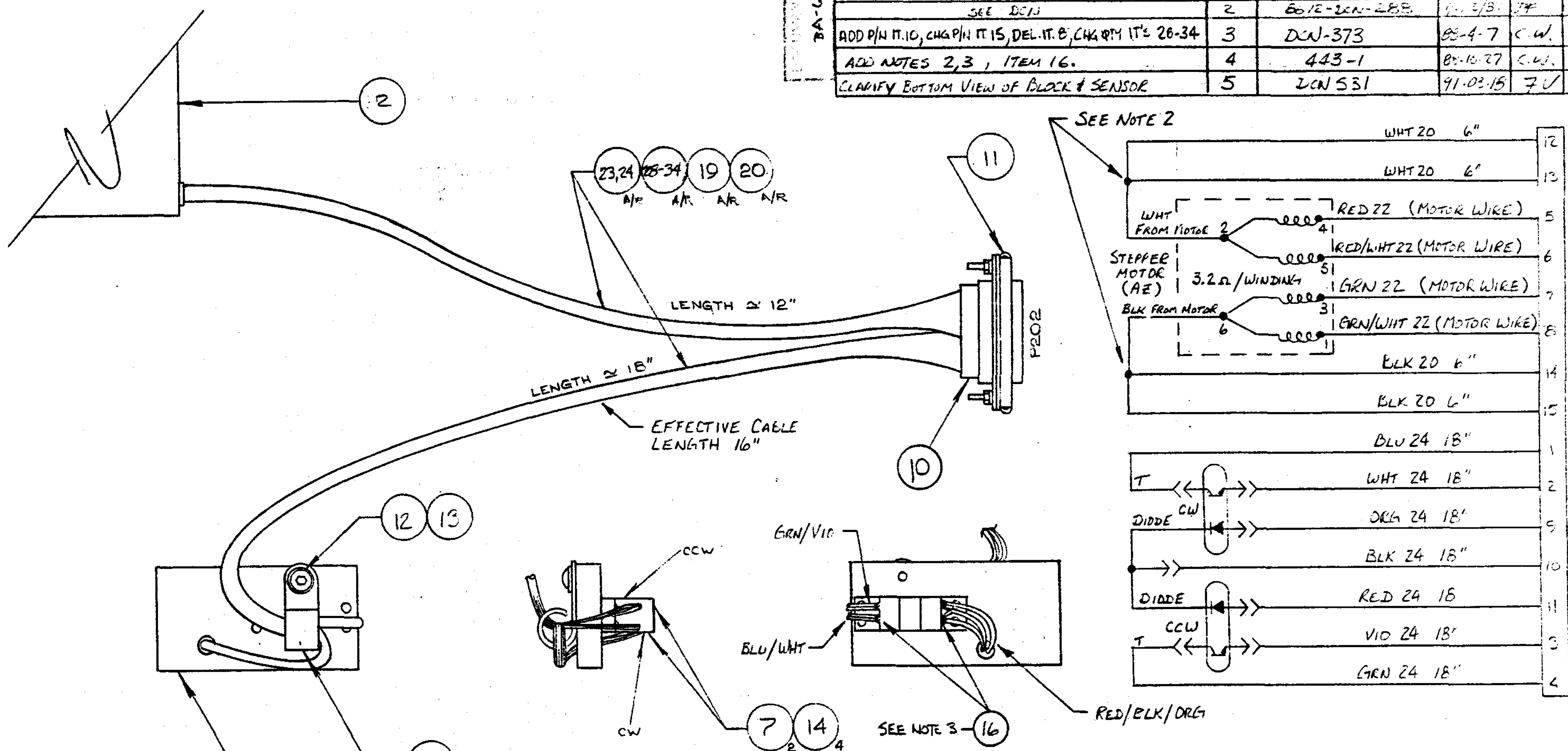


FIG 7.7.1-5

NOTES:

1. LOCK ALL UNLOCKED SCREWS WITH ITEM 15.
2. CUT WHT & BLK WIRES TO 6". SOLDER ADDITIONAL WIRES AS SHOWN. COVER SOLDER JOINT WITH HEAT SHRINK ITEM 20.
3. APPLY RTV IT. 16 TO BARE LEADS.

SCI-TEC INSTRUMENTS INC.

NEXT ASSEMBLY: BA-058 / 72-1030-082

MOTOR WIRING
AZIMUTH TRACKER

SCALE 1:1	DIMS	TOLS	DATE DEC 30/83	DWN
MATERIAL			SHT 1 of 1	SIZE B
FINISH			NUMBER BA-W20	5

I D E A S T H A T P O W E R T E C H N O L O G Y

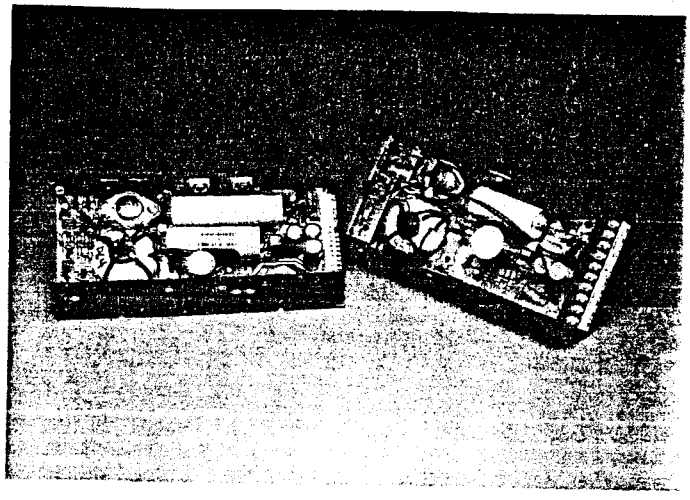
VT 50/VX 50
TECHNICAL DATA

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

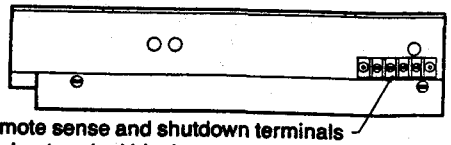
Shock & Vibration: Designed to withstand normal commercial shock and vibration conditions.
Short Circuit Protection: Current limited for overload and short circuit protection.
Multiple Output Regulation Specifications:
Regulation: Line, All Outputs: .3%
Regulation: Load, Output No. 1: 20% Load—Full Load 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

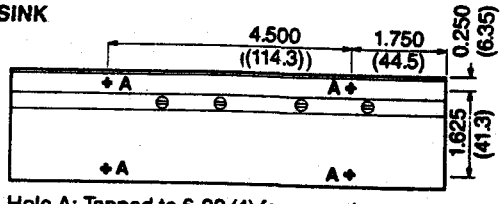
Size: VT 50 2.063" x 4.187" x 8.063" (52.4 x 106.4 x 204.8 mm)
Size: VX 50 2.125" x 3.581" x 8.000" (54.0 x 91.0 x 203.2 mm)
Weight: 2.0 lbs. (0.91 kg)

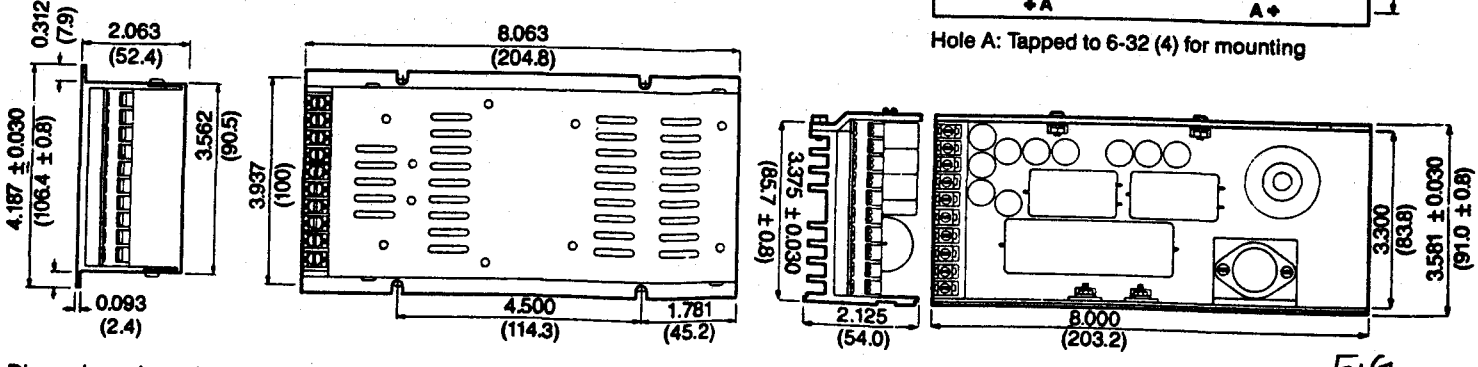
MECHANICAL DIMENSIONS

VT 50 OPEN FRAME & ENCLOSED MODULES
Four No. 8 mounting screws recommended



VX 50 HEATSINK MODULES





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

FIG 7.7.1-6

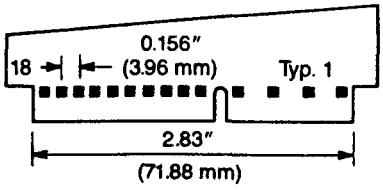
VT 50/VX 50

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

TERMINATION OPTIONS

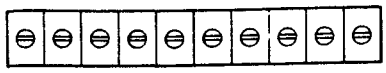
Sci-Tec #87-50-088 (VT50-141-10/XA)

SQUARE PINS (OPTIONAL)



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

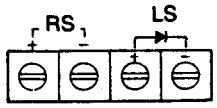
4-40 TERMINAL BLOCK (STANDARD)



TYPICAL

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

REMOTE SENSE AND LOGIC SHUTDOWN



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	1.0A Slow Blow Fuse
2		10-40		10.0A Slow Blow Fuse
3		20-60		5.0A Slow Blow Fuse

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 V3	+5 −5	1.8-9 .05-1	±10% ±5% Fixed

Model No.	Output	Volts	Amps	Adjustment
24	V1 V2	+5 +12	1.6-8 .05-1	±10% ±5% Fixed
26	V1 V3	+12 −12	.6-3 .05-1	±10% ±5% Fixed
27	V1 V3	+15 −15	.4-2 .05-1	±10% ±5% Fixed
32	V1 V2 V3	+5 +12 −5	1.2-6 .05-1 .05-1	±10% ±5% Fixed ±5% Fixed
34	V1 V2 V3	+5 +12 −12	1-5 .05-1 .05-1	±10% ±5% Fixed ±5% Fixed
37	V1 V2 V3	+5 +15 −15	1-5 .05-.8 .05-.8	±10% ±5% Fixed ±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 VX Heat Sink (open frame only)	50		1 2 3	2 4 6 7 8 See series specific output range	1 2 3 See series specific input range		0 Open Frame 1 Enclosed 2 P.C. Board	0 Terminal Block 1 Square Pin 2 Wire Holes Only		A B C D E F G H I J K See group 1 chart	A B C D E F G See group 2 chart

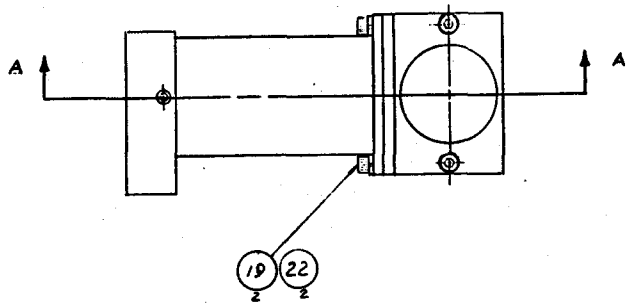
GROUP 1 OPTIONS	Remote Sense	Logic Shutdown	Overvoltage Shutdown Protection	Power Fail Detect
A	•			
B		•		
C			•	
D				•
E	•	•		
F	•		•	
G	•			•
H		•	•	
I		•		•
J	•	•	•	
K	•	•		•
X	No Options			

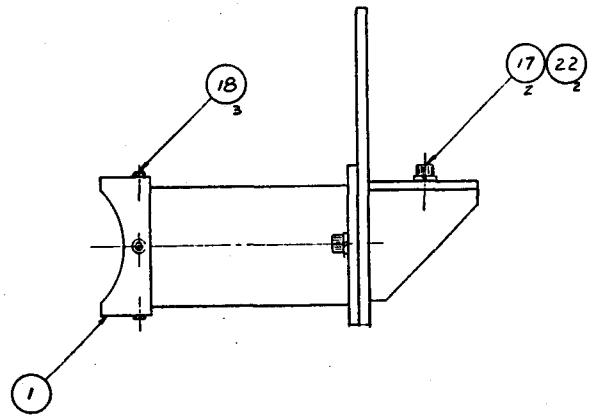
GROUP 2 OPTIONS	Regulated	Reverse Polarity Protection	Thermal Shutdown
A	•		
B		•	
C			•
D	•	•	
E	•		•
F		•	•
G	•	•	•
X	No Options		

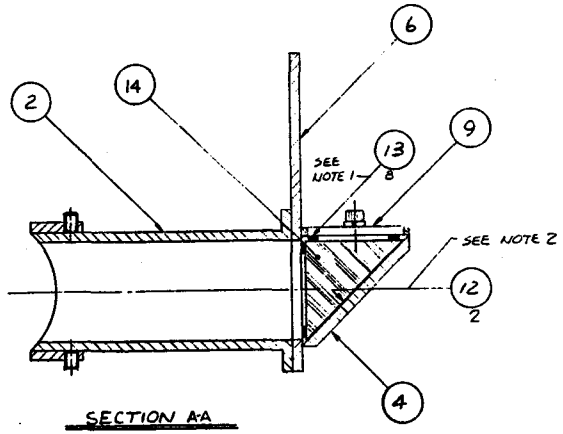
For all U.L. recognized products, the application criteria is available at customer request. This material will give additional guidelines for installation and operation as per Underwriters Laboratory.

FIG 7.7.1-7

BA-FB1	DESCRIPTION	REV	DCN#	DATE	DWN	APPD
	FIRST ISSUE	1	—	85-1-1	DF	RA
	P/L REVISION	2	365	87-12-24	CW	RA
	ADD IT. 13, DWG CLARIFIED	3	401-1	88-5-25	CW	RA
	REDESIGNED & REDRAWN	4	439-1	89-2-9	RP	CW







SECTION A-A

NOTES:

1. CUT O-RING, ITEM 13 INTO 5/32" LONG PIECES (8) & INSERT INTO (4) .136 DIA. HOLES IN ITEM 6, UVB LIGHT SHIELD & INTO (4) .136 DIA. HOLES IN ITEM 9, UVB PRISM RETAINER PRIOR TO ASSEMBLY
2. PLACE (2) 1 15/16" STRIPS OF TAPE, ITEM 12 ALONG CORNERS OF INNER SLANTED SURFACE
3. PLACE FINISHED ASSY. IN CLEAN PLASTIC BAG & LABEL WITH PART No. & ISSUE No.

FIG. 7.7.2-1

SCALE	1:1	NEXT ASSY.	BA-CB4
DATE	89-02-10	DIMENSIONS IN IF DUAL DIMS.	——— mm (inches)
DWN	RP	TOLERANCES (unless otherwise specified)	
CHKD	CW	INCHES	MM
APPD	CW 2/1	.xxx ± .005 .xx ± .01 ANGLES ± 1° FRACTIONS ± 1/32	.xx ± .15 .x ± .25 ANGLES ± 1°
FINISH	———		

SCI-TEC INSTRUMENTS INC.

UVB PRISM ASSY

SHEET	DOCUMENT NUMBER	REV
1 OF 1	BA-FB1	4