ARM
CLIMATE RESEARCH FACILITY

Surface Temperature Humidity Reference System
USER MANUAL

February 2011

U.S. DEPARTMENT OF ENERGY | Office of Science

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Surface Temperature Humidity Reference System (SURTHREF)

User Manual

February 2011

Contents

1.0   Surface Temperature Humidity Reference System

1.1   Purpose

The Surface Temperature and Relative Humidity Reference Station (SURTHREF) is intended to provide accurate reference values of ambient temperature and relative humidity for comparison with radiosonde pre-launch values.

1.2   References

- ECR-00319 (Modify BBSS surface reference system at SGP)
- ECO-00319 (Modify the Chilled Mirror/BBSS surface reference system at SGP)

1.3   Components

- **Meteorological Instrument Shelter**. The shelter is a standard NWS "Stevenson screen" modified to allow for operator access on two sides. The shelter dimensions are 20" x30" x34".

- **Instrument Shelter stand**.

- **Aspirated Chamber**. The chamber is fabricated from white polypropylene plastics. Its dimensions are 11"x13"x18" (volume = 1.49 ft^3). One end is open and covered with a removable plate containing a 7" x7.5" access port. Two muffin fans, each rated at 115 cfm, are mounted at the far end. The fans produce an estimated face flow of 10.49 fps or 3.2 m/s. The chamber has six sensor ports on its top surface to accommodate standard temperature and relative humidity probes.

- **Sonde positioning platform**. A polypropylene platform is mounted approximately 1" above the bottom of the aspirated chamber. The platform is equipped with moveable guides for positioning radiosondes. A user-controlled switch is mounted on the side of the Aspirated Chamber to indicate when a radiosonde is placed in or removed from the chamber.

- **Temperature and relative humidity probes**.

  – Vaisala HMP45D probes: four each, one spare.

  – Rotronics MP100H probes: four each, one spare.

  – See Appendix G for serial numbers.

- **Data logger**. The system uses a Campbell Scientific Instruments CR23X data logger.

- **Campbell Scientific NL-100 Ethernet Device**.

- **Allied Telesyn AT-MC13 Media Converter**.

- **Dell Computer**. The computer is configured to conform to ARM Core-PC standards.

1.4   Power Requirements

- Muffin fans use 110V AC.

- Data logger uses 12V DC through an AC/DC converter plugged into the GFCI.

- Probes use 12V DC supplied by the data logger. The Vaisala probes require < 4 mA; the Rotronics probes < 10 mA.

- Enclosure heater uses 110V AC

- Enclosure cooling fan uses 110V AC

- Micro-switch uses 5V DC supplied by the data logger.

- NL-100 is powered by 12V from the data logger.

- The AT-MC13 Media converters use 12V DC through an AC/DC converter plugged into the GFCI.

1.5   Safety Considerations

Electrical safety is the largest concern when it comes to the SURTHREF system. Power for the system is supplied by 110VAC that enters the enclosure and is run through a switch that controls power to all devices (See Appendix G for power AC wiring diagrams).

Work on any component that is powered by 110VAC **MUST** be done while de-energized. The muffin fans that are used to aspirate the T/RH probes in the polypropylene enclosure also use 110VAC; any work on these fans **MUST** also be done while de-energized.

Other safety considerations are insects, rodents, and pinching of appendages in the Stevenson Screen openings and data logger enclosure.

1.6   Corrective Maintenance

SURTHREF is designed to require a minimum amount of routine maintenance. If the system does not operate properly or conform to the routine checks, the following action steps should be taken.

1.   On-site check. See the "Troubleshooting Techniques" section in this manual.

2.   Inform the instrument mentor if the troubleshooting techniques in this manual or from experience are unable to locate/fix the problem.

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1.7 Depot Maintenance

Some components that have been replaced due to malfunction or being out of tolerance will be returned to the vendor and/or manufacturer for service and/or repair. Normally this will be done after consultation with the instrument mentor. Many items can and will be repaired in the Repair Lab at the Central Facility (CF). All sensors will be returned to the SGP CF and given to George Sawyer. He will either have them repaired under warranty, repaired in-house in the Repair Lab, or send them to the appropriate vendor. If a unit or system has to be shipped to the SGP, ship to the address listed below. An ARM SGP shipment notification form **must** be filled out and sent to SGP before the shipment arrives. A link to that form is attached below.

George Sawyer
ARM SGP CART Site
309600 EW 28
Billings, OK 74630
Phone: (580) 388-4053
Fax: (580) 388-4052
E-mail: george@ops.sgp.arm.gov
http://sdsops.arm.gov/shipping/shipnote.html (password-protected site)

The phone numbers below are the contact numbers to obtain RMA numbers required for return of the sensors. Serial numbers and the reason for return are required.

Vaisala: 1-888-824-7252 (follow prompts)
Rotronic: 1-800-628-7101 ext. 20

1.8 Shipment Notification

All returns will be evaluated in the lab and/or repaired. If the unit cannot be repaired in the lab it will be sent to the manufacturer or appropriate vendor. An RMA number must be obtained from the vendor. A SGP problem report (PR) must be filled out with all of the appropriate information including the obtained RMA number. The PR will list the quoted repair cost and/or a not-to-exceed cost. The PR must be signed by all of the appropriate managers and then faxed to Laurel Chapman at Argonne National Laboratory. When notified by Argonne that a PO is in place, pack the unit appropriately and ship it to its repair destination.

Laurel Chapman
DIS Division, Building 900 Room B03B
Argonne National Laboratory
9700 S. Cass Ave
Argonne IL 60439
Phone: (630) 252-2887
Fax: (630) 252-9792
E-mail: lachapman@anl.gov

1.9 Logistics

The following expendables are used with the SURTHREF systems:

1. The Vaisala HMI31/HMP35 Temperature and Relative Humidity Meter using 9V batteries.

2. A desiccant pack, CSI type DSC20/4, is used in the enclosure.

3. T/RH probe filters.

The desiccant packs will require replacement approximately every six months. The site operators should maintain an adequate inventory of this item. Contact Laurel Chapman to obtain replacement packs when the supply level falls.

1.10 Routine Maintenance

1.10.1 Every Two Weeks

The following are required to perform the checks and preventative maintenance (See Appendix A):

1. A single technician.

If equipment of sensor replacement is required, the following additional items may be needed:

1. Replacement parts or sensors

2. The User Manual

3. HMI31/HMP35 Temperature and Relative Humidity probe.

1.10.2 Every Two Months

The following are required to perform the cleaning and replacement of sensor caps (See Appendix B).

1. A single technician

2. Replacement caps for the Vaisala HMP-45D T/RH probes.

1.10.3   Every Six Months

The following are required to perform the six-month checks, maintenance and sensor verification (See Appendix C):

1. A desiccant pack.

2. A second person and radios.

3. HMI31/HMP35 Temperature and Relative Humidity probe

4. Assorted tools (wrenches, screwdrivers).

If equipment or sensor replacement is required, the following additional items may be needed: (see Appendix D)

1. Replacement parts or sensors

2. The User Manual.

1.11 Troubleshooting Techniques

1. Communication Outages:
   The PC communicates with the data logger through various peripheral devices (See Appendix H: Wiring Diagrams). Any one of these devices or the cables connecting them can fail. If a communication outage occurs, check these devices for power and proper functioning: NL-100, AT-MC13 Fiber Drivers.

2. Failed T/RH sensors:
   There are six sensors in the aspirated chamber. A malfunctioning sensor should be fairly obvious, as the data from it will be significantly different than the other sensors. Check for tight connections from the sensor wires to the data logger input channels. If connections are tight a replacement sensor should be installed (see Appendix D: Sensor Replacement Procedures).

3. Aspirator Fan/Heater Failure:
   There are two muffin fans at the rear of the aspirated chamber. There is one located in the data logger enclosure along with a heater and two thermostats. If any of the muffin fans fail, check for obstructions and/or that 110V power is available. If the muffin fan in the data logger enclosure fails also check the thermostat for a proper setting. Turning the thermostat up or down will allow power to the fan. The same procedure can be used for the heater. See Appendix H: Wiring Diagrams for the AC power wiring diagram.

4. "Sonde In" Switch Failure:
   The "Sonde In" switch is a user-operated switch. The switch is a normally open switch. When the switch is closed, 5V supplied by the data logger is present on the line. The program looks for any voltage on this line above 0V. There is also a 100k ohm resistor. If the switch does not work: check the connections, check for 5V on the line, and check for breaks in the cable. If all of the above check out, then the switch either has gone bad or there are dirty contacts preventing proper operation of the switch. Either way the switch will have to be replaced. See Appendix H: Wiring Diagrams.

5. Computer Problems:
   The computer conforms to the ARM Core PC Standards. Problems with the PC should be directed to Ron Reed or Tim Martin (630-252-8708). If neither can be reached, contact the Mentor(s).

Appendix A

Bi-Weekly Procedures

SURTHREF

Preventative Maintenance Procedures

Frequency: Bi-Weekly
Mentor: Michael Ritsche, Barry Lesht

The following procedures are for performing the scheduled bi-weekly maintenance. All results should be recorded on the PM checklist.

Inspection of Site Grounds near the Instrument

Visually inspect the site grounds around the instrument shelter for hazards such as rodent burrows, buried conduit trench settling, and insect nests.

    Checklist Response: No problems noted.
                            Problem: See CM Report
                            Problem: See Comments

Visual Inspection of Instrument Components

Stevenson Screen

Check that the Stevenson Screen is in good working order. Ensure that the paint is in good shape and that all hardware (hinges, latches, etc.) is in good shape. Check for excessive rust on moving metallic parts, cracked components, and/or slats of the Stevenson Screen. Periodic painting of the Stevenson Screen may be required.

    Checklist Response: No problems noted.
                            Problem: See CM Report
                            Problem: See Comments

Conduit, Cables and Connectors

Check that all conduits and cables on the bottom of the control box are secure. Check all cables and conduits for damage. Check all sensor and electrical wires inside the control box for damage. Check the tightness of all sensor connection at the data logger. Check for water intrusion and that the fan or heater is working.

    Checklist Response: No problems noted.
                            Problem: See CM Report
                            Problem: See Comments

Appendix B

Bi-Monthly Procedures

SURTHREF

Bi-Monthly Procedures

Frequency: Bi-Weekly
Mentor: Michael Ritsche, Barry Lesht

The following procedures are for performing the scheduled bi-weekly maintenance. All results should be recorded on the PM checklist.

Remove the humidity cap from each of the sensors and clean or replace.. The Rotronic humidity cap is made of wire mesh. This cap should be gently cleaned using a mild detergent and soft bristled brush. It will need to be dried thoroughly before re-installation. If major damage has occurred the humidity cap should be replaced. The Vaisala humidity caps should be replaced with a new cap.

# Appendix C

Six-Month Procedures

SURTHREF

Six-Month Calibration Check Procedures

Frequency: Twice a year
Mentor: Michael Ritsche, Barry Lesht

To verify the accuracy and installation of the six temperature and relative humidity probes the following will need to be accomplished:

Verification of the sensors is performed with the Vaisala HMI31/HMP35 T/RH meter. Set or hold the measuring portion of the meter inside the polypropylene aspirated chamber. Ensure that the meter is centered and at similar height to the measuring portion of the six probes. Turn on the meter and allow it to stabilize so that the meter readings are changing by less than 0.2 °C and 1% RH. When the meter has stabilized, wait an additional five minutes before taking readings.   The readings from the sensors are available inside the sonde trailer and are located on the PC in the program called BBSSRef.RTMC.
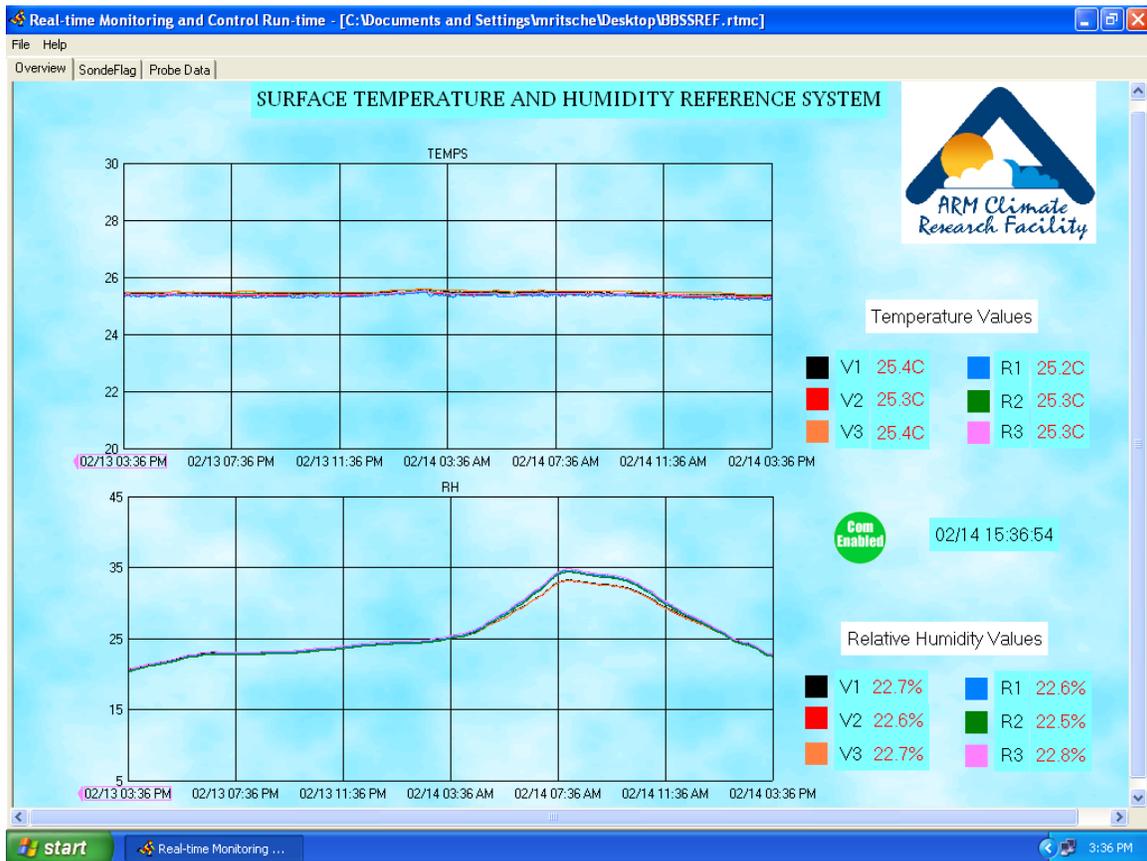
SURFACE TEMPERATURE AND HUMIDITY REFERENCE SYSTEM

SENSOR VERIFICATION

Tested by:_____ Date: _____/_____/_____

Started: _____GMT Ended:_____GMT

1. Vaisala HMP-45D Temperature and Relative Humidity
   (The temperature readings, once stabilized, should match within +/- 0.5 $^{\circ}$C)
   (The RH readings, once stabilized, should match within +/- 3% RH for 0–90%
   RH and +/- 4% for 90 – 100% RH)

   V1 HMP-45D Serial Number:_____

   Temperature:
   HMI31 Reading:_____V1 HMP-45D Reading:_____ P/F

   RH%:
   HMI31 Reading:_____V1 HMP-45D Reading:_____ P/F

   V2 HMP-45D Serial Number_____

   Temperature:
   HMI31 Reading:_____V2 HMP-45D Reading:_____ P/F

   RH%:
   HMI31 Reading:_____V2 HMP-45D Reading:_____ P/F

   V3 HMP-45D Serial Number_____

   Temperature:
   HMI31 Reading:_____V3 HMP-45D Reading:_____ P/F

   RH%:
   HMI31 Reading:_____V3 HMP-45D Reading:_____ P/F

2. ROTRONIC MPH100H Temperature and Relative Humidity
   (The temperature readings, once stabilized, should match within +/- 0.5 °C)
   (The RH readings, once stabilized, should match within +/- 3% RH for 0–90%
   RH and +/- 4% for 90–100% RH)

   R1 MPH100H Serial Number_____

   Temperature:
   HMI31 Reading:_____R1 HMP-45D Reading:_____ P/F

   RH%:
   HMI31 Reading:_____R1 HMP-45D Reading:_____ P/F

   R2 MPH100H Serial Number_____

   Temperature:
   HMI31 Reading:_____R2 HMP-45D Reading:_____ P/F

   RH%:
   HMI31 Reading:_____R2 HMP-45D Reading:_____ P/F

   R3 MPH100H Serial Number_____

   Temperature:
   HMI31 Reading:_____R3 HMP-45D Reading:_____ P/F

   RH%:
   HMI31 Reading:_____R3 HMP-45D Reading:_____ P/F

Appendix D

Sensor Replacement Procedures

Sensor Replacement Procedures

Both the Rotronic and Vaisala probes have removable sensing units. To access the sensing unit, it is necessary to remove the probe from the aspirated chamber.

1. Turn the copper retaining screw counterclockwise to loosen and remove the sensor from the chamber.

2. Grasp the sensor body firmly and remove the sensing unit. If the whole unit needs to be replaced, see Appendix G: Wiring Diagrams.

3. Replace the sensing unit with a recently calibrated unit.

4. Return the sensor to the aspirated chamber and tighten the copper retaining screw by turning it clockwise.

5. Check the BBSSRef.rtmc Overview screen to ensure the new unit is working properly and compare the new sensors readings to the readings of the other sensors in the aspirated chamber.

The CR23X program will need to be updated with the new sensor's serial number.

1. To change the program you will need to log onto the collector PC as administrator.

2. Once logged on as administrator, double-click on the shortcut "Shortcut to Administrative Tools" located on the desktop.

3. Next, double-click on "Services".

4. Find LoggerNet in the list of services and highlight by left-clicking on it.

5. On the left-hand side two menu choices will show up in blue text.

6. Choose "Stop" to stop the service.
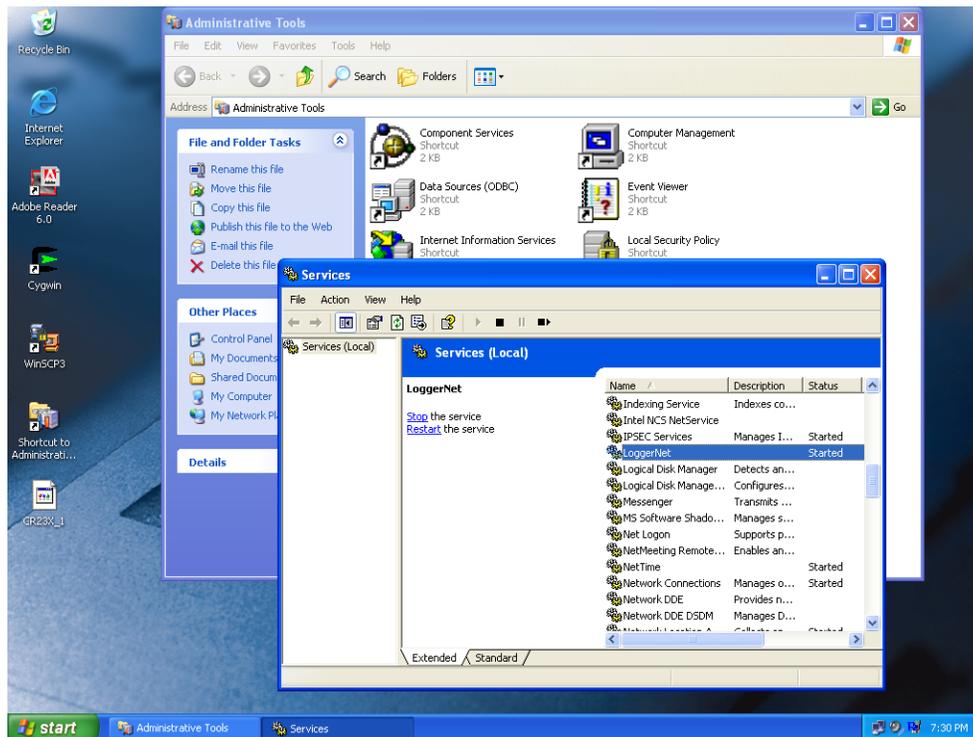
7. Once the service has been stopped, go to "Start" and choose "LoggerNet" to start the program. When the LoggerNet menu bar is active click on "EdLog".
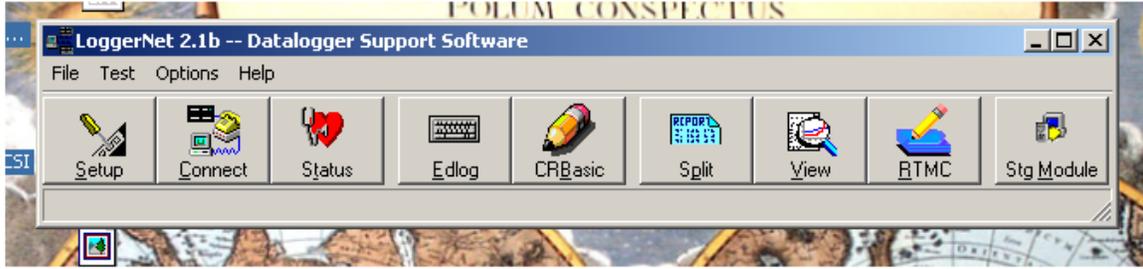
8. When Edlog starts, go to "File→Open", navigate to the C:\SurTHRefPgm folder, choose the .csi program (.csi should be default), and open it.

9. Navigate to the lower section of the program where the DAILY OUTPUT and LOGISTICS section is located.

```
****************DAILY OUTPUT and LOGISTICS**************************
;
;This output, once per day, captures the serial number
;of the 6 probes; three Vaisala HMP-45D's and three Rotronic MP100H.
;The Rotronic probe serial numbers are: 92781,
;92782, 92783.  The Vaisala probe serial numbers are: Y3110012,
;Y3110013, Y3110014.  Campbell doesn't allow for text values
;to be entered so we capture the Vaisala probes SN's as 0012, 0013, 0014.
;The locations of the probes in the box are also captured in variables called
;XXlocate, where XX corresponds to V1, V2, V3 for the Vaisala probes and R1, R2, R3
;for the Rotronic probes.  The location of a particular probe and the serial number
;should match.  For example, if Vaisala probe 0012 is V1 and it is in
;location 1 then the value of V1probeSN should be 0012 and the value of V1locate
;should be 1.  The ranges of values for locations are 1 - 12.  The number
;of the location is as follows, if looking down on top of the
;box with the open end at the bottom.
;
;
;          fan        fan
;
;
;           3    6
;
;
;           2    5
;
;
;           1    4
;
;
;         OPEN END
```

```
;
;
;***************************************************************
;

22:  If time is (P92)
 1: 0       Minutes (Seconds --) into a
 2: 1440    Interval (same units as above)
 3: 10      Set Output Flag High (Flag 0)


23:  Set Active Storage Area (P80)^17083
 1: 1       Final Storage Area 1
 2: 2       Array ID


24:  Real Time (P77)^22655
 1: 1220    Year,Day,Hour/Minute (midnight = 2400)

;V1 probe serial number

25:  Z=F x 10^n (P30)
 1: 0012    F
 2: 0       n, Exponent of 10
 3: 31      Z Loc [ V1probeSN ]

;V1 probe location

26:  Z=F x 10^n (P30)
 1: 1       F
 2: 0       n, Exponent of 10
 3: 32      Z Loc [ V1locate  ]

;V2 probe serial number

27:  Z=F x 10^n (P30)
 1: 0013    F
 2: 0       n, Exponent of 10
 3: 33      Z Loc [ V2probeSN ]

;V2 probe location

28:  Z=F x 10^n (P30)
 1: 5       F
 2: 0       n, Exponent of 10
 3: 34      Z Loc [ V2locate  ]

;V3 probe serial number

29:  Z=F x 10^n (P30)
 1: 0014    F
 2: 0       n, Exponent of 10
 3: 35      Z Loc [ V3probeSN ]

;V3 probe location
```

17

30: Z=F x 10^n (P30)
 1: 3   F
 2: 0   n, Exponent of 10
 3: 36   Z Loc [V3locate]

;R1 probe serial number

31: Z=F x 10^n (P30)
 1: 92781   F
 2: 0   n, Exponent of 10
 3: 37   Z Loc [R1probeSN]

;R1 probe location

32: Z=F x 10^n (P30)
 1: 4   F
 2: 0   n, Exponent of 10
 3: 38   Z Loc [R1locate]

;R2 probe serial number

33: Z=F x 10^n (P30)
 1: 92782   F
 2: 0   n, Exponent of 10
 3: 39   Z Loc [R2probeSN]

;R2 probe location

34: Z=F x 10^n (P30)
 1: 2   F
 2: 0   n, Exponent of 10
 3: 40   Z Loc [R2locate]

;R3 probe serial number

35: Z=F x 10^n (P30)
 1: 92783   F
 2: 0   n, Exponent of 10
 3: 41   Z Loc [R3probeSN]

;R3 probe location

36: Z=F x 10^n (P30)
 1: 6   F
 2: 0   n, Exponent of 10
 3: 42   Z Loc [R3locate]

Change the serial number in location 1 (see bold values above) of the appropriate instruction number for a particular probe or location. For example, if the probe located in V2 was changed go to Instruction 27 and change the serial number in location 1 of Instruction 27 (0013 above). The same holds true for moving sensors or changing the location. If the probes in located in V2 and V3 are swapped, the serial numbers also have to be swapped in the program.

Once the program has been changed, click on "save" and when the warning banner comes up asking you to compile click, on "yes". If there are errors or warnings stop and contact the mentor(s). If there are no warnings proceed with loading the program to the data logger. EdLog can be closed at this time.

Go back to the main LoggerNet menu bar and click on "Connect". When the "Connect" screen is active choose "BBSSRef" from the left hand menu location under **Stations**. Once the BBSSRef logger is highlighted, click on the "connect" button under **Control**. When communication with the logger has been established (wires connect) click on "Send" under **Program**. Choose the program that was just updated above (C:\SurTHRefPgm) and send it to the logger. Click on "Ok" when the warning banner appears. Click on "Disconnect" under **Control** to stop communication with the data logger and close the "Connect" screen.

After the program has been sent, view the Overview screen of the BBSSRef.rtmc program to ensure the data appear reasonable and that everything appears to be working properly. Notify the mentor(s) of the probe and program change so that they can verify that the changes appear during the next daily output.

Once the changes have been made and the new program sent, LoggerNet needs to be set as a Service again.

Close the LoggerNet menu bar and double-click on "Shortcut to Administrative Services" and double click on "Services" again. Navigate to LoggerNet and choose "start" from the two choices listed in the left hand window. Once LoggerNet has started as a service, close all screens and log off as administrator.

Appendix E

LoggerNet Set-Up

LoggerNet Setup

1. Set up and start PC. Ensure the PC is connected to the network and the loggers and NL-100s are connected and running.

2. Create the following directories on the PC:

    −   C:\ARM\bin

    −   C:\SendDir\SurTHRef

    −   C:\SurTHRefData

    −   C:\SurTHRefPgm

3. Start LoggerNet if it not already running (task bar will be on desk top if it is).

4. Click on the *Setup* icon.
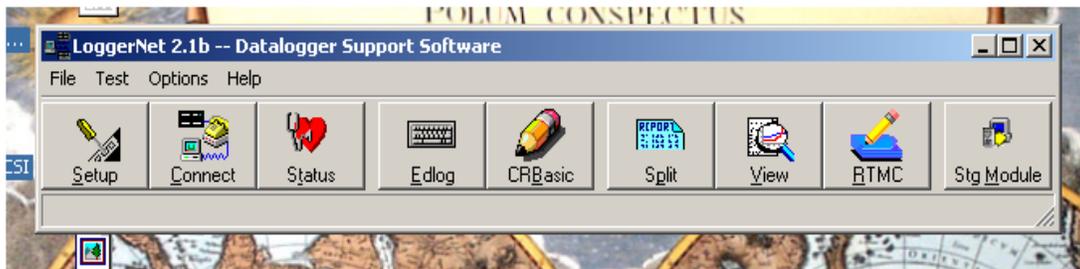
5. Once the *Setup* interface starts click on the *Add Root* button and choose *IPPort*.
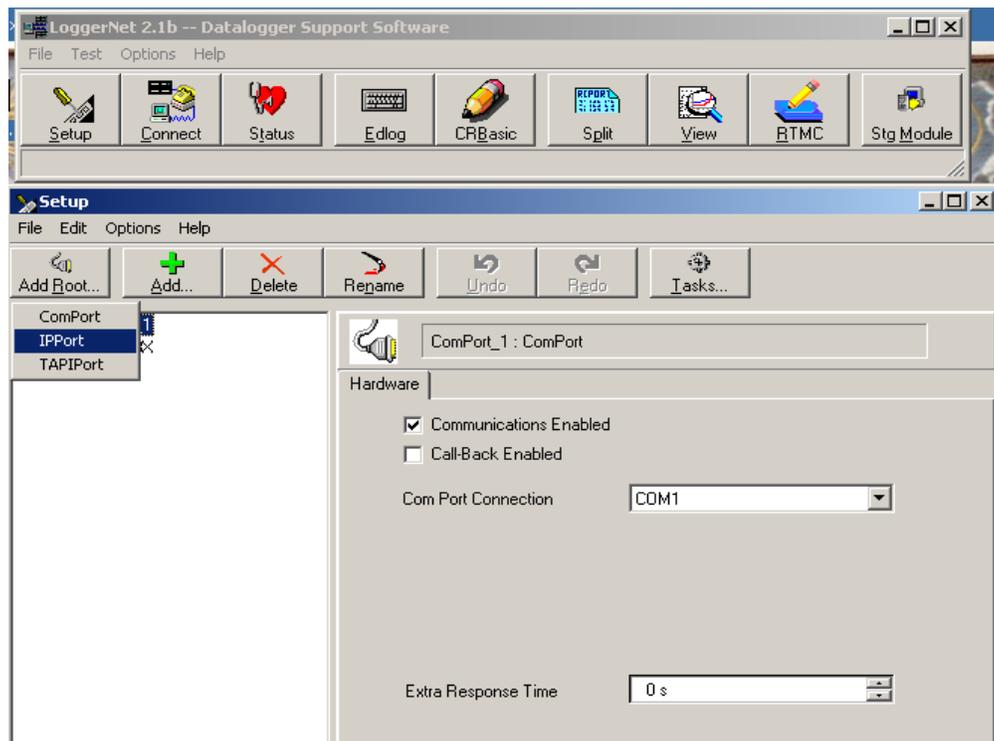
6. Once the *IPPort* has been added, enter the IP address 198.124.98.19. Ensure the Communications Enabled box is checked. Set Extra Response time to 0 s if not already done. Call-back Enabled should not be checked.
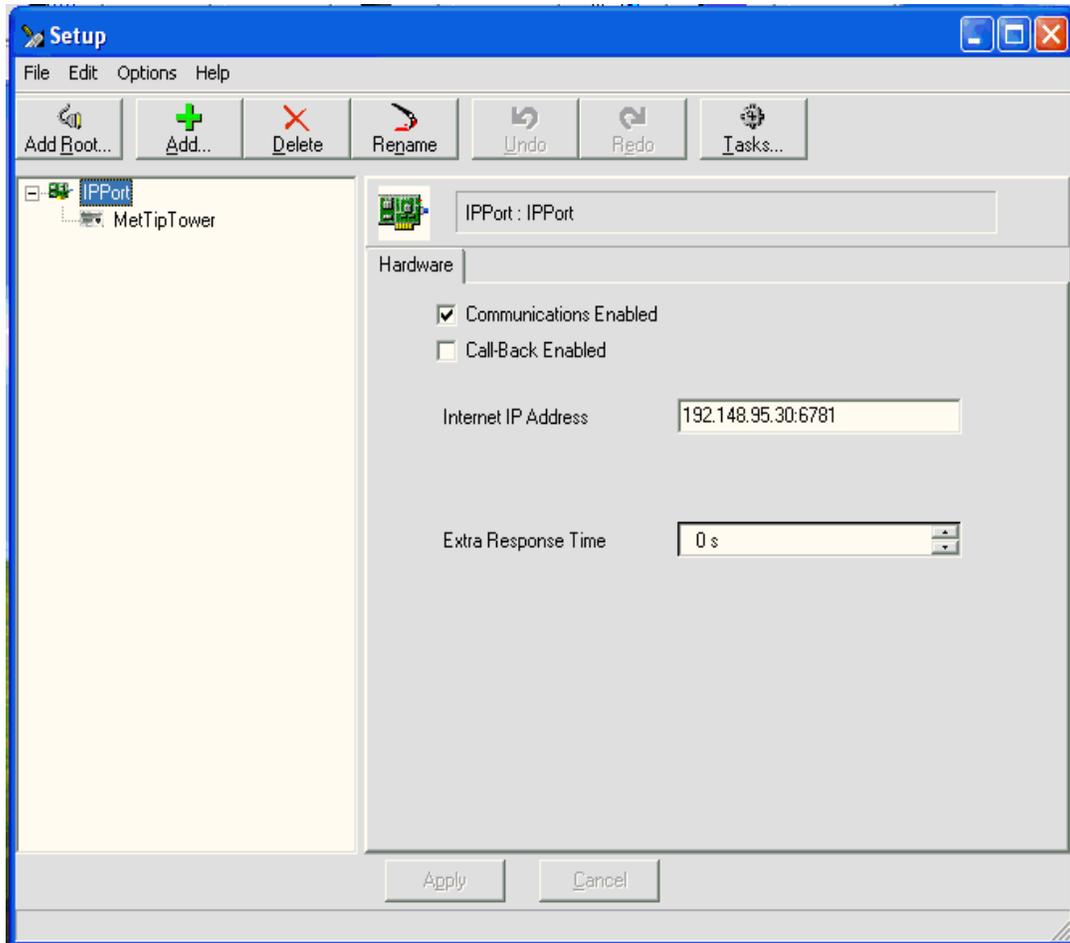
7. Once the *IPPort* has been added, you can change the name. A suggestion would be to change the name to IPPort.Sur.19. This is not necessary but may help in identification.

8. Click on the *Add* button to add a data logger under the *IPPort*. Choose CR_23X. Once you highlight the logger type, click on the *Add Now* button. You must click on close afterwards to shut down the Add Device window. Clicking the *Add Now* button will add multiple loggers if done more than once. If this occurs, highlight the unwanted loggers by clicking on them and clicking on the *delete* button.
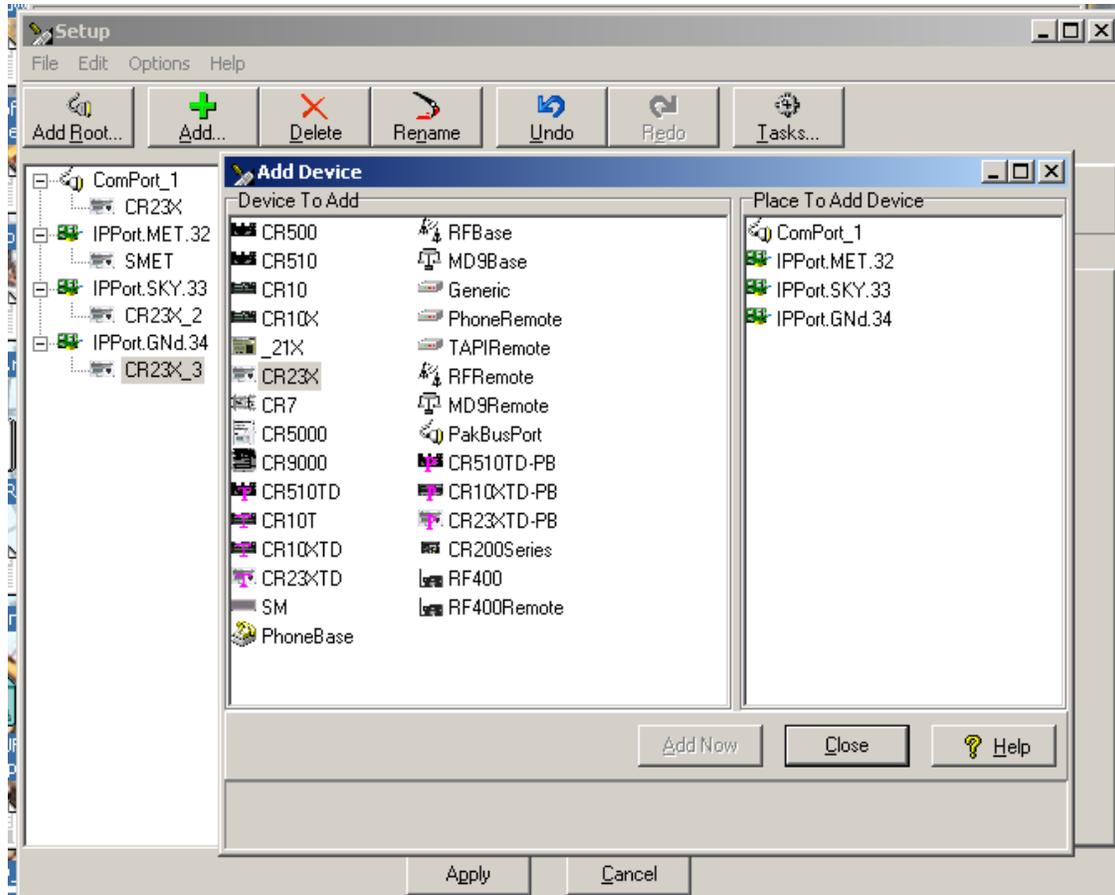
9. Once the logger has been added, you should rename it to SurTHRef either using the *Rename* button or highlighting and using the right mouse button.

10. Left-click on a logger to access the remaining connection information so that it can be reconfigured.
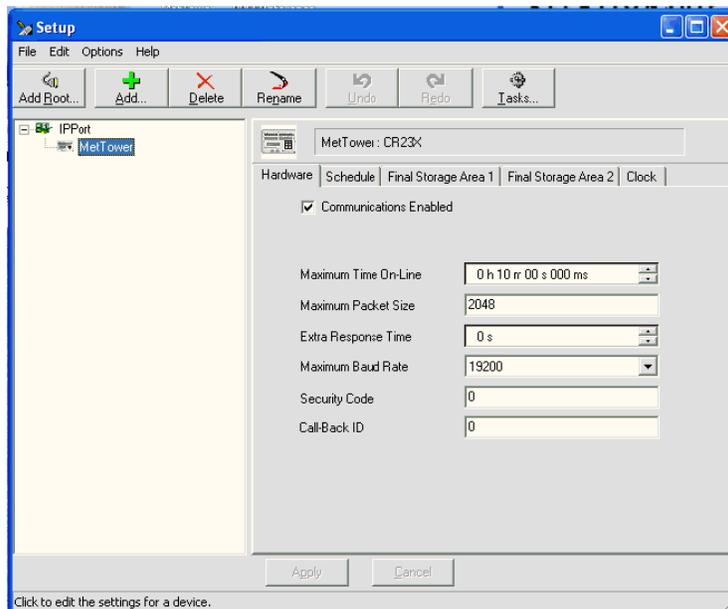
11. Ensure the <u>Communications Enabled</u> box is checked and leave all settings under hardware tab as default.

12. Click on the <u>schedule</u> tab and change the following settings:

    – Ensure Scheduled Collection Enabled box is checked.

    – Change *Collection Interval* to 01m, with the rest zeros.

    – Change *Primary Retry Interval* to all 01m and *Number of Primary Retries* to 1.

    – Uncheck *Secondary Retry Interval* and *Collect Ports and Flags*.

    – Leave everything else as defaults.
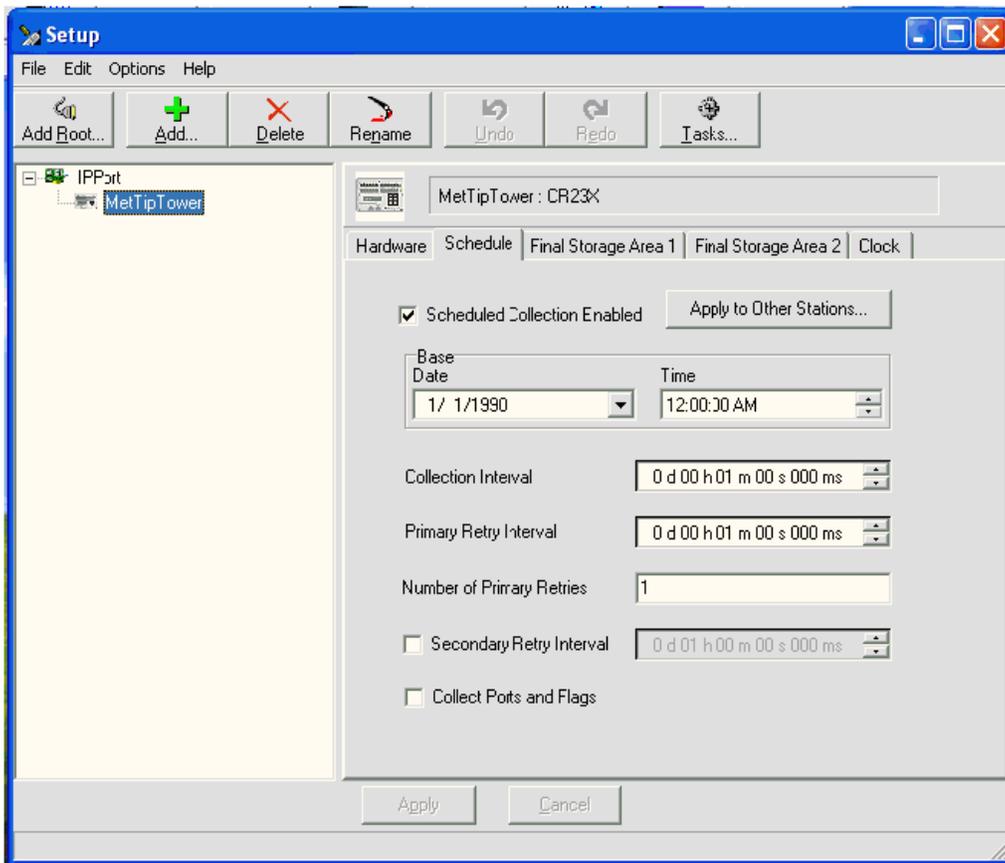
13. Click on <u>Final Storage Area 1</u> tab and make the following changes to the settings:

    – Check the *Enable for Collections* box and change the destination of the data file to the directory created in step 2 (SurTHRefData) and change the name of the data file to SurTHRef.dat.

    – Uncheck the *Use Default Name* box.

    – Under <u>File Output Option</u> click the *Append to End of File* radio button.

    – Under <u>Output Format</u> click the *ASCII, Comma Separated* radio button.

    – Under <u>Collect Mode</u>, click on *Data Logged Since Last Call* radio button and check the *Collect All on First Call* box.
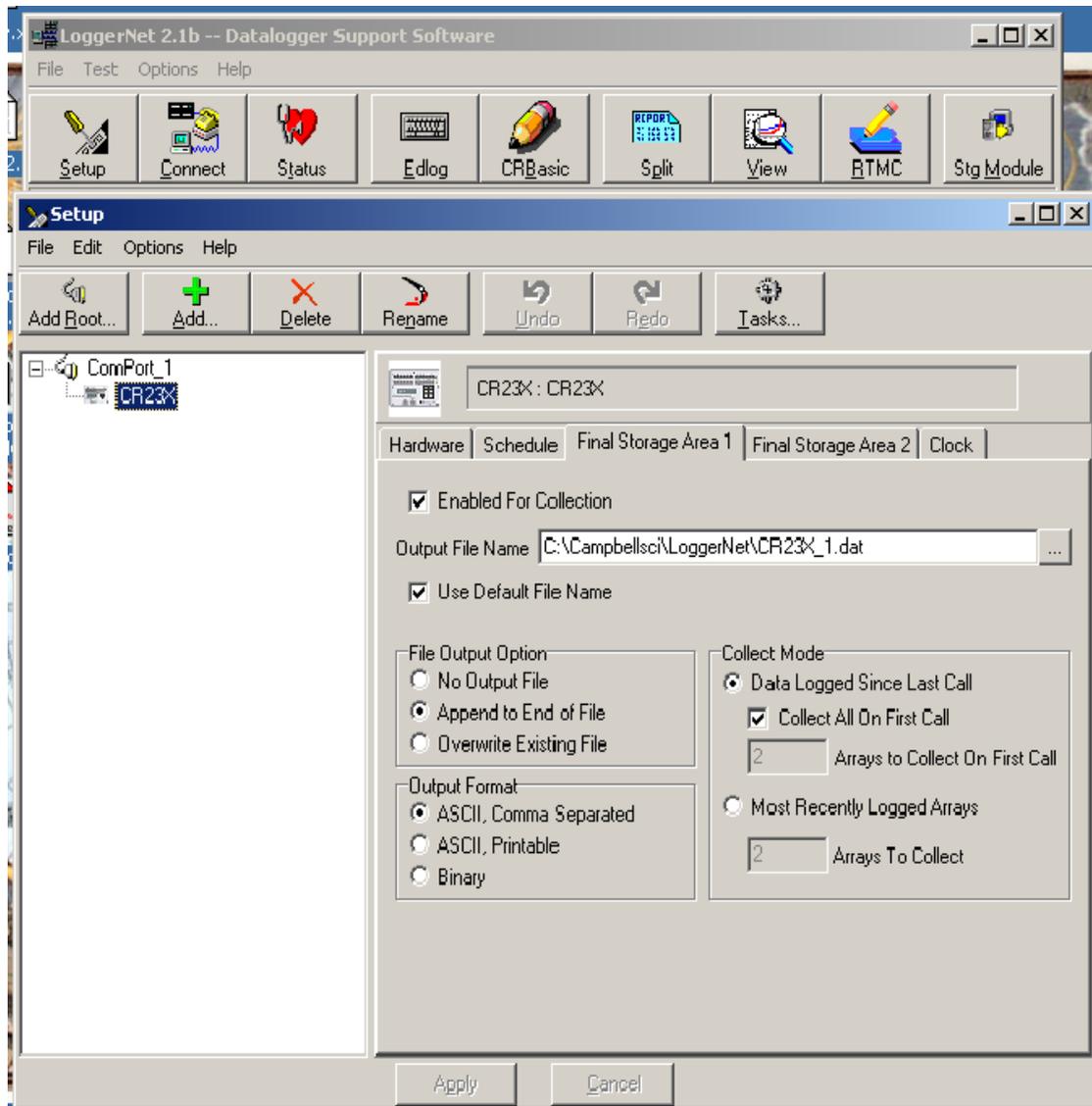
14. Click on the <u>Clock</u> tab to make changes to the following settings:

    − Leave Time Zone Offset as 0h 00m.

    − Under <u>Automated Clock Check</u> click the box Enabled.

    − You can leave Initial Date as default but make sure Initial Time is XX:XX:30 so that any clock check occurs at 30 sec past a minute.

    − Set Interval to 01 d, for once per day.

    − Set the Allowed Clock Deviation to 1 sec.
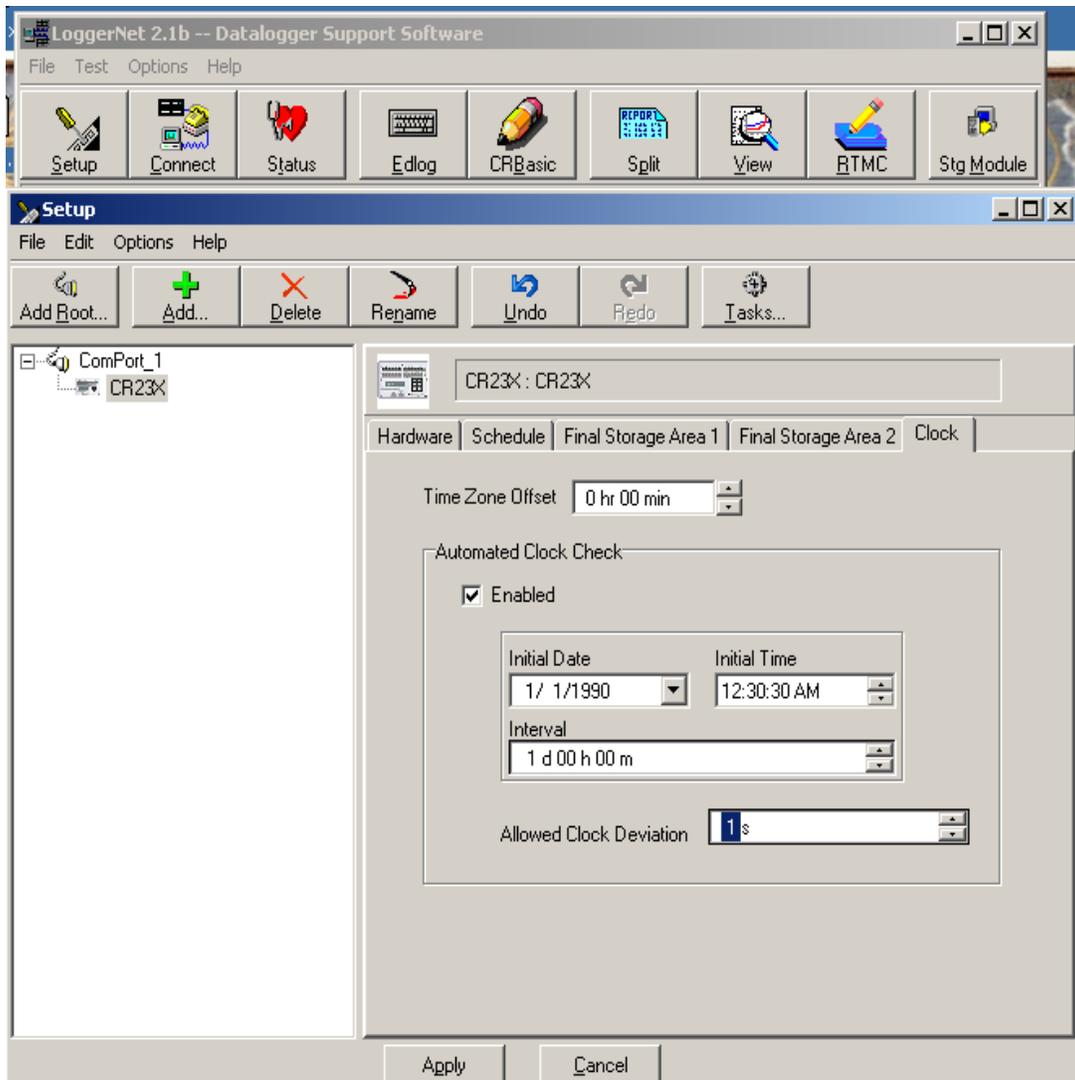
15. You will not need to make any changes to the settings in the <u>Final Storage Area 2</u> tab. Just ensure that the *Enabled for Collections* box is not checked.

16. Once the above steps are complete you should be able to connect to the logger using the *Connect* button of the main menu.
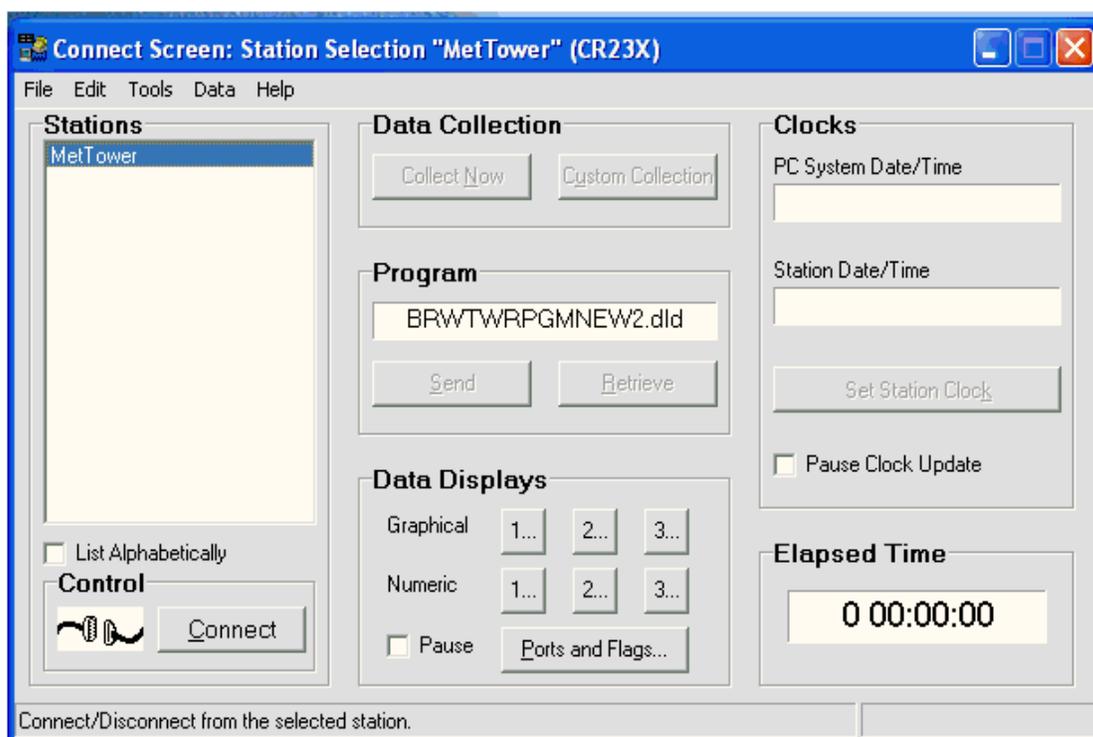
17. The logger you added in the above steps will be located in the Stations menu.

   – Highlight the logger you wish to connect to and click on the *connect* button on the bottom. If everything is connected and correct the wires of the Control display will connect.

   – To send a program to the logger click on the *Send* button under the Program portion of the Connect screen.

   – Navigate to the directory where the program is stored (should be C:\SurTHRefPgm) and select the appropriate program.

   – Once the program has been selected, click on the *Send* button. A warning banner will be displayed stating that continuing will cause all data to be lost.

   – Continue to send the program by clicking on the Ok button. Once the send is complete and the logger has compiled the program, another message banner will be displayed, click on Ok to finalize the transmission.

   – Once connected and a program is running (assuming sensors connected), you can view the raw data and final stored data by clicking on the numbers in the Data Displays section of the Connect screen.

NOTE: Connecting to a logger using the connect screen will disable communications to other loggers on LoggerNet. No data will be collected while you are connected this way. Regular communications will be restored when the connection is severed.

Appendix F

Perl Script Set-Up

PERL SCRIPT SET-UP

${DataDir} = The name of the output directory used by LoggerNet
${DataFile} = The name of the output file used by LoggerNet

${DataDir} = SurTHRefData
${DataFile} = SurTHRef.dat

1. Create directories:

    –   C:\ARM\bin

    –   C:\SendDir\SurTHRefData

2. Copy split_working_cdl.pl script to C:\ARM\bin

3. Install ActivePerl-5.8.0.806-MSWin32-x86.msi

    –   Choose default options

4. Schedule split_working_cdl.pl script in LoggerNet Tasks.

5. Click on *Setup* button on main LoggerNet task bar.

6. Click on the *Task* button.
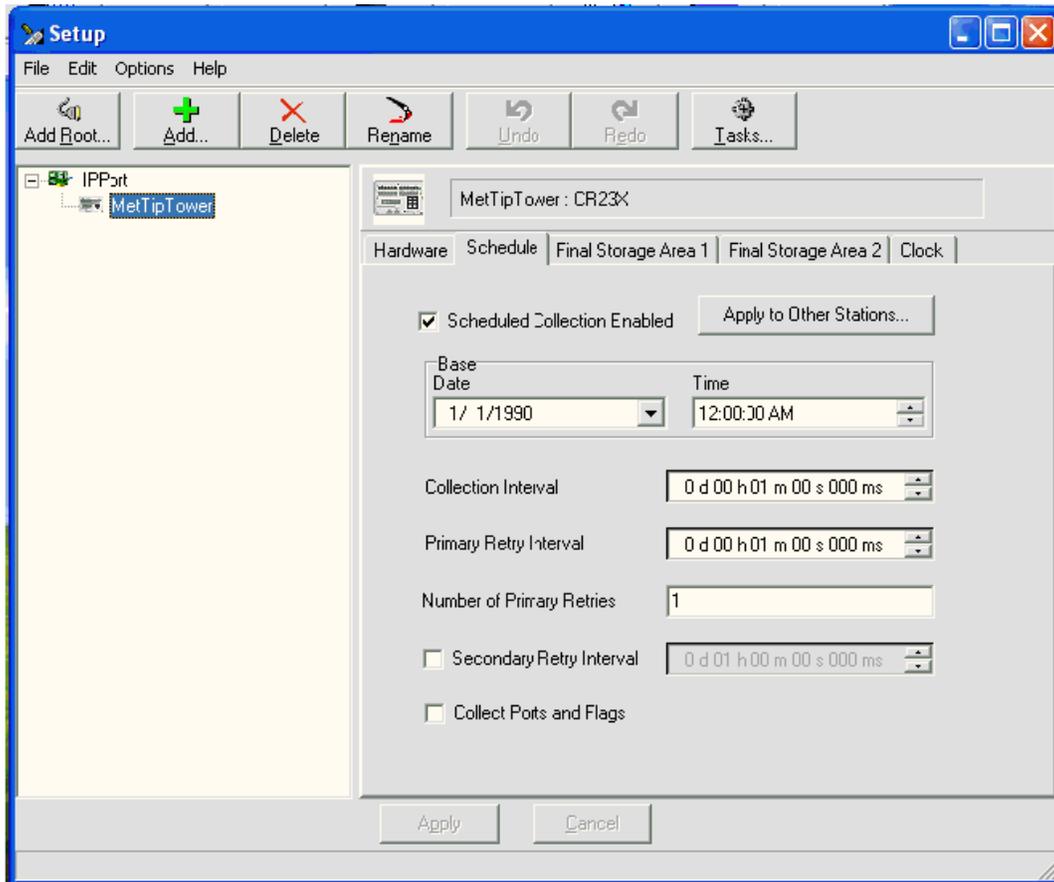
7. Click on *Add Scheduled* button on lower left hand side of window.
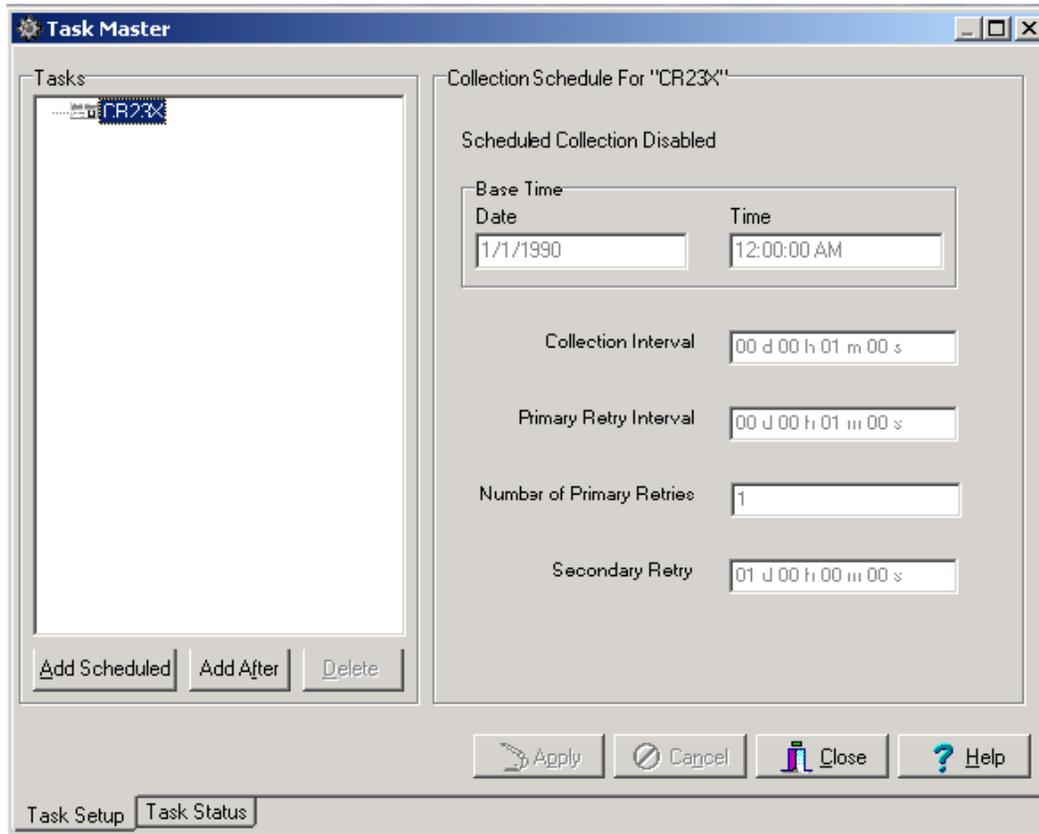
8. Rename the task in the window by right clicking on the highlighted task and rename as SplitSurTHRef.

9. Change the following in the "**Scheduled Event**" section

   − Base Date: any previous date (i.e. 5/7/2004)

   − Base Time: 12:00:50 AM

   − Event Interval: 0 d 01 h 00m 00 s

10. In the "**What Task Does**" section do the following for each task.

   − Check box for *Execute File*:

   − File Name: C:\ARM\bin\split_working_cdl.pl

   − Command Line Options:
   -f SurTHRef.dat –i /SurTHRefData –o /SendDir/SurTHRefData

   The generic format is:
   -f ${DataFile} –i /${DataDir} –o /SendDir/${DataDir}
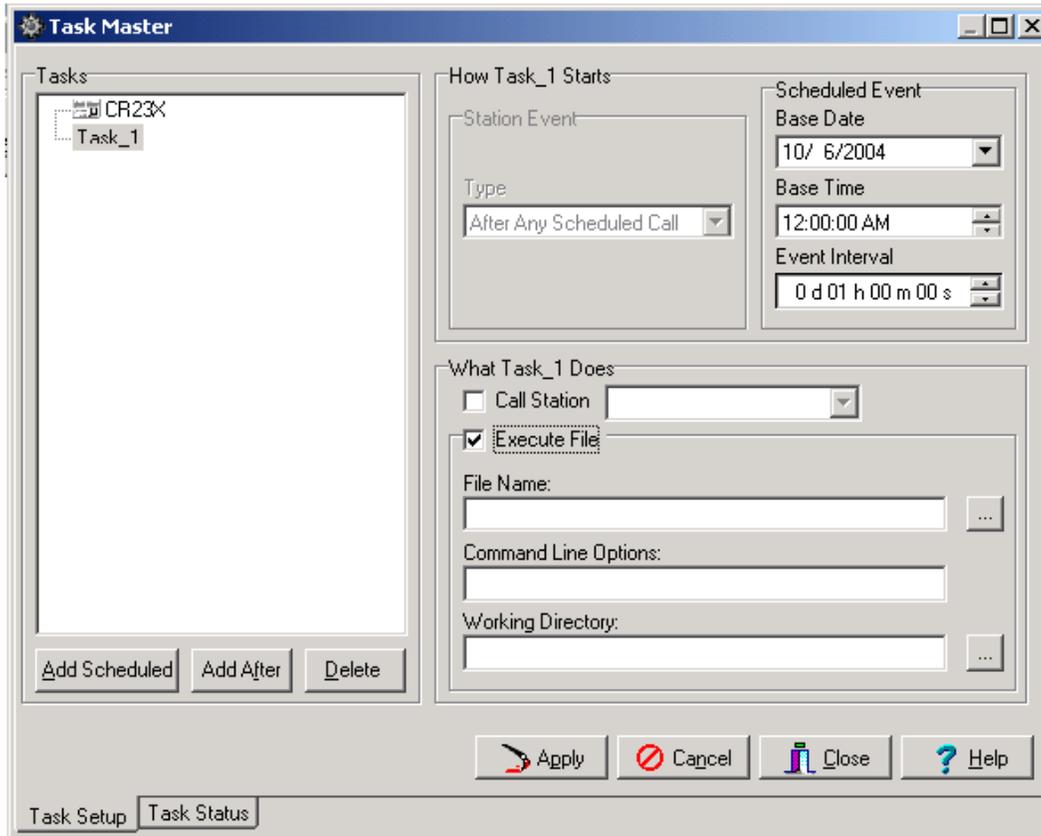
Working Directory:
   C:\SurTHRefData

The generic format is:
   C:\${DataDir}

11. When finished, click on the *Apply* button.

Appendix G

NL-100 Set-Up

NL-100 SET-UP

In order to communicate with the NL-100, you need a Null-modem cable and a PC or Laptop with a terminal communication package. It is assumed for the rest of this document that HyperTerminal is used. You will also need 12VDC to power the NL-100.

Connect the null modem cable to the PC and the NL-100. You will need a cable with female connections at both ends. Use gender adaptors if necessary. If this is the first time communicating with the NL-100 after receipt from factory go to step 1b.

1.   Open NL-100 by removing four screws. Connect boot jumper across both terminals.
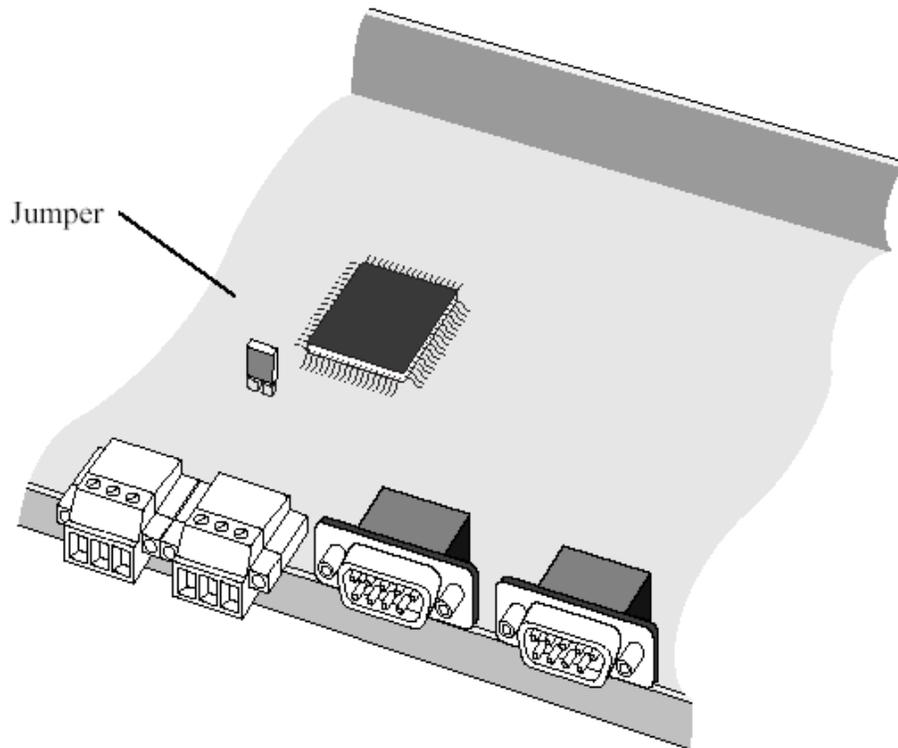
2.   Connect power to NL-100 and connect Null Modem cable.

3.   Open hyperterminal and use following settings:

   –   baud: 115200

   –   databits: 8

   –   parity: none

   –   stop bits: one

   –   flow control: none

4.   Strike the Enter button a few times to get the attention of the NL-100 once the following is returned you may continue:

   –   NL100/105 (ver, show, edit, defaults, reset, help, bye):

5. Type E to Edit and make sure the following is set:

Tlink config [dis]
RS485 [dis]
CS I/O [dis]
RS232 Config [TCPServ]
    RS232 bps [19K]
    RS232 Serial Server Port [6781]

Ethernet 10-baseT [enabled]
10-baseT port IP# [198.124.98.19] (this value is logger IP address[1])
    mask [255.255.255.0]**whatever mask is used
    default gateway [yes]
    default gateway IP [198.124.98.1]

Pakbus node [678]
    Clock neighbor node ID [0]
PakTcp Server config [dis]
PakTcp client config [dis]
Modbus/Tcp gateway config [dis]
Config monitor telnet port [23]
Telnet Session password [nl100]
Serial Server Watchdog [2]

Save

You can progress through the menu by pressing <ENTER>. If you make a mistake after entering a setting, the up arrow can be used to move backwards. If you need help for a particular setting, press the F1 key or the ? key. You can also choose to select <cancel> at the end instead of save if you want to start over.

---

[1] If the jumper was used, it must be disconnected before returning the NL-100 to use. If this is not done, the NL-100 will always be at the boot prompt and will be inaccessible for remote communications.

Appendix H

Wiring Diagrams

Rotronics MP100H-1 wiring table (three sensors)

Campbell CR23X Connection	Wire Color	Function
Power Out – 12V	Green	+12V
SE18, SE20, SE22	White	RH out
SE17, SE19, SE21	Brown	T out
SEGnd, SEGnd, SEGnd	Gray	Ground
N/C	Blue	DIO (not used)
N/C	Yellow	Sig_0 (not used)

Vaisala HMP45D wiring table (three sensors)

Campbell CR23X Connection	Wire Color	Function
EX1, EX2, EX3	Yellow	Pt100
DH2, DH4, DH6	White	Pt100
DL2, DL4, DL6	Green	Pt100
DH1, DH3, DH5	Black	Pt100
Power Out - 12V	Blue	+12V
SE13, SE14, SE15	Brown	RH out
Power Out - Ground	Violet	Ground
Power Out - Ground	Red	Ground
Earth Ground	Grey	Shield

Vaisala HMP45D sensor units

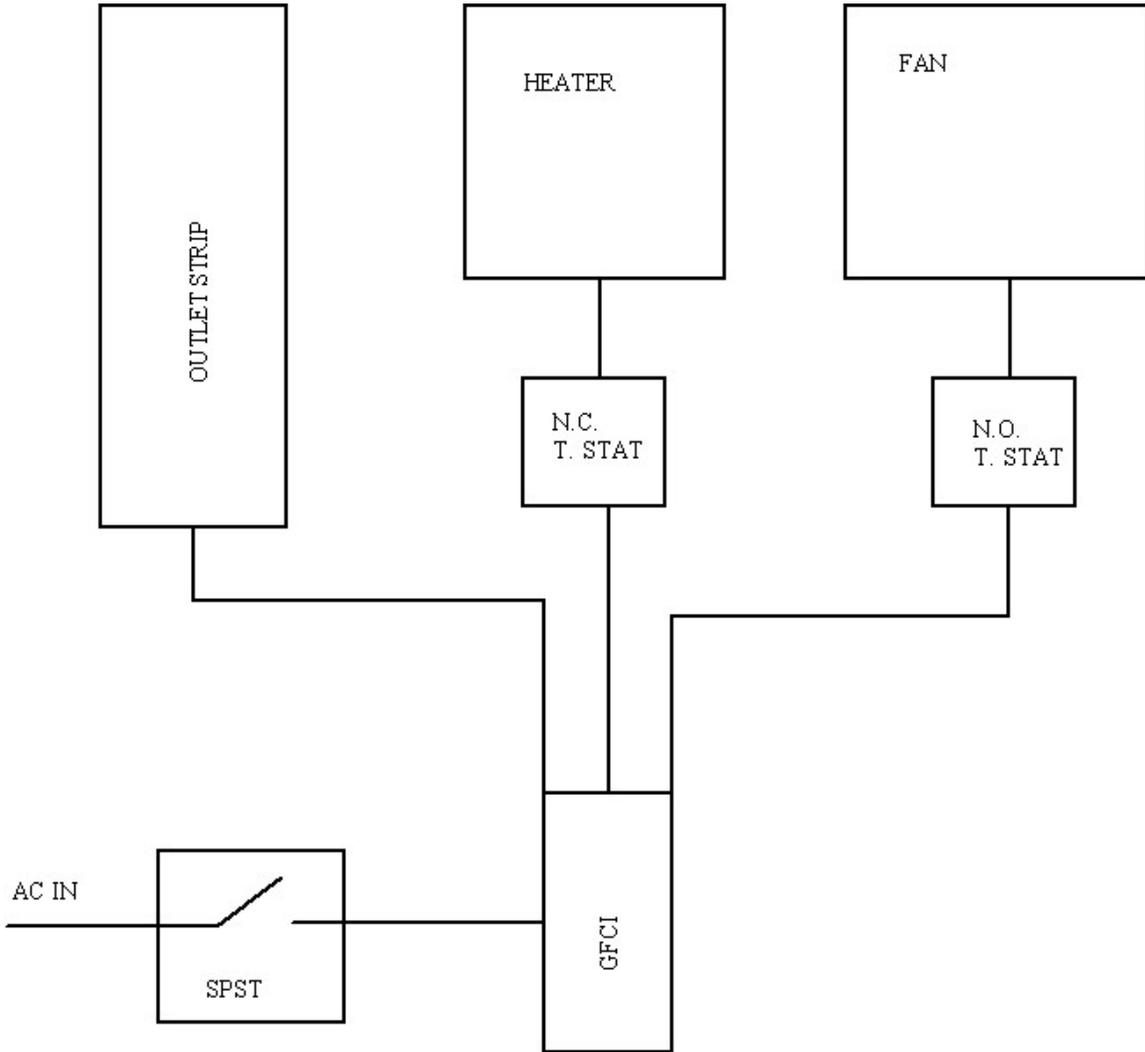| Sensor Identifier	Sensor Serial Number
V1	Y3110012
V2	Y3110013
V3	Y3110014
V4	Y3110015 (spare)

Rotronics MP100H-1 sensor units

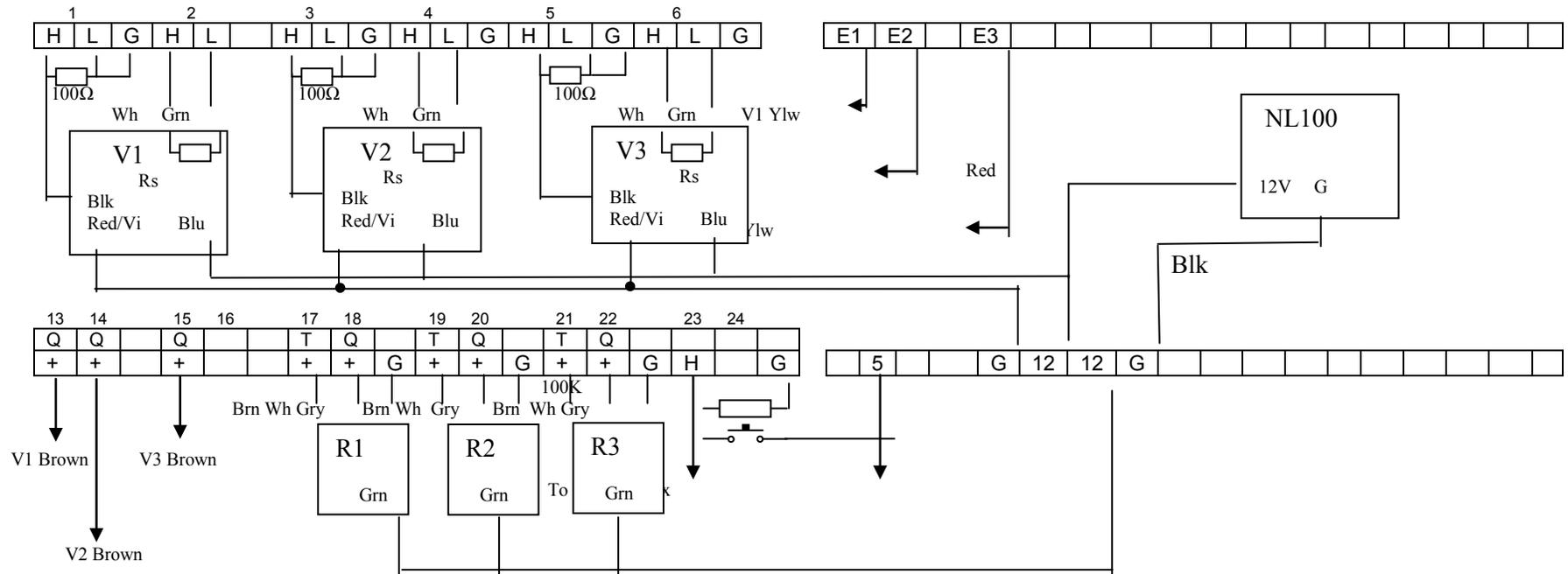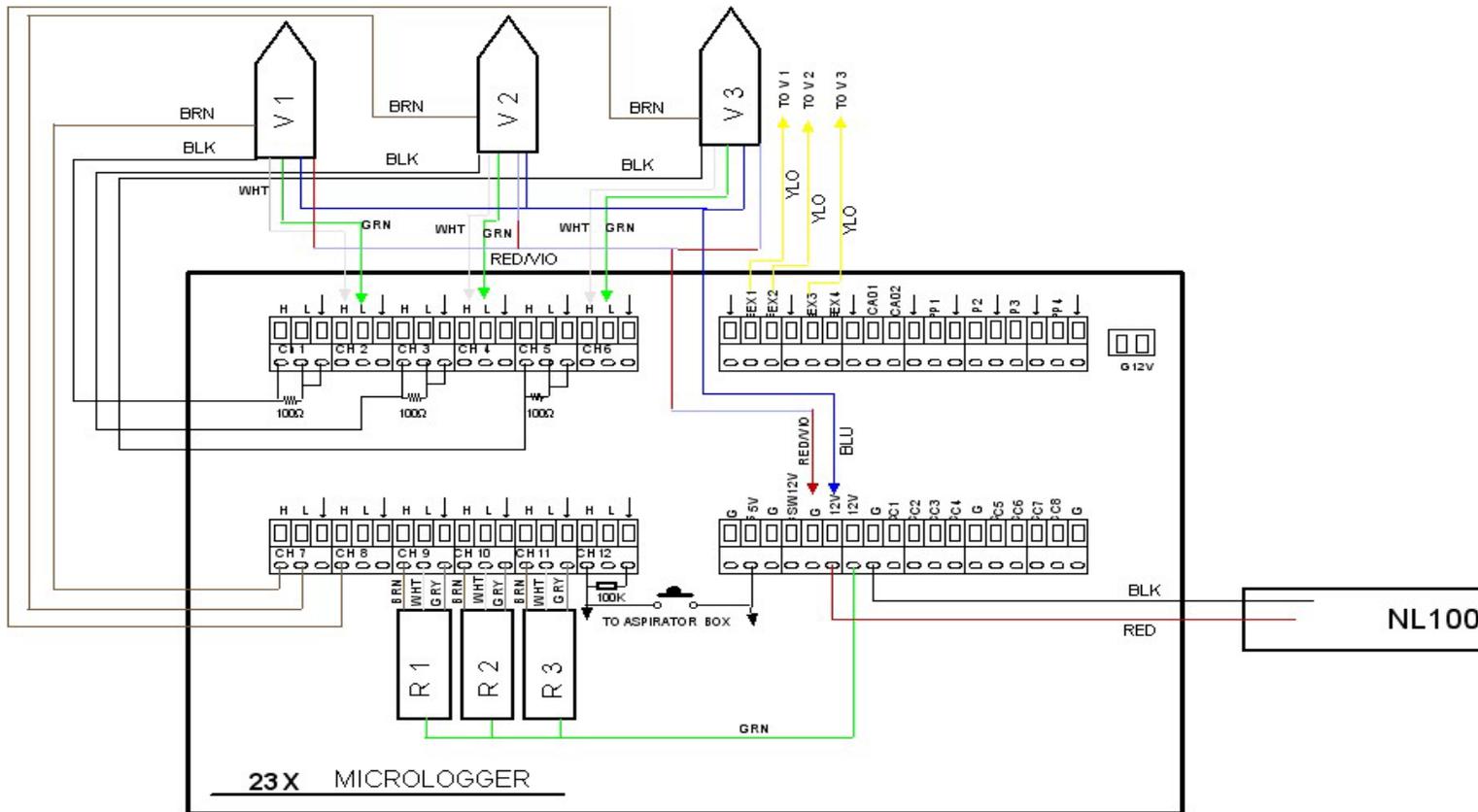| Sensor Identifier	Sensor Serial Number
R1	92781
R2	92782
R3	92783
R4	92784 (spare)

ETHERNET/FIBER/SWITCH COMM LINKS
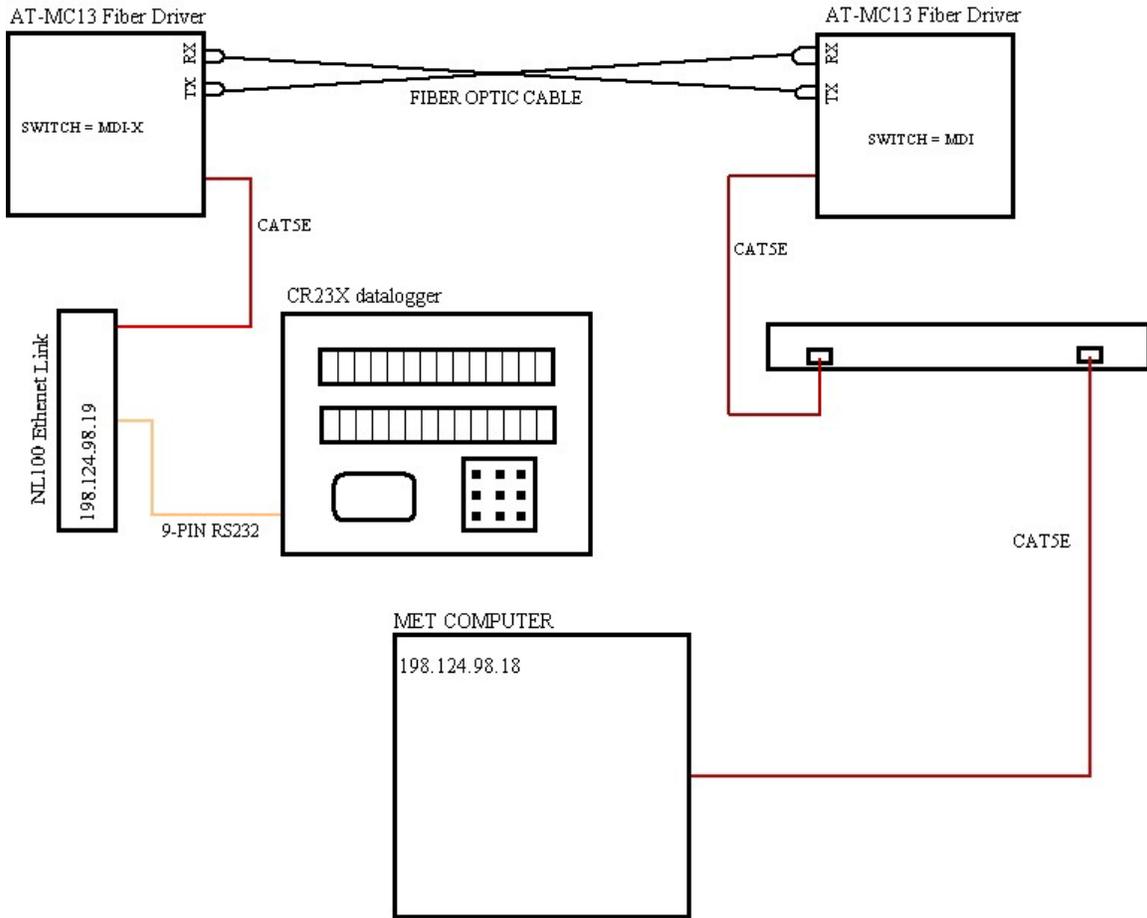
AC Power Wiring Diagram

		Surface Reference System to Data Logger Wiring		
02/10/2005	SIZE NS	FSCM NO	DWG NO	REV 1
Mike Ritsche	SCALE	NS	SHEET	1 OF 1