NBT

Excel Logging Reference Manual

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1   Introduction

These programs require Microsoft Excel.

The historical data processing programs are stand alone programs which use CSV data files that have been retrieved by the Real Time Monitor program (Read historical data function) Time-stamped data which has been recorded previously by the RTU is interpreted and inserted into the correct cells of a data workbook. The data workbook will hold 1 year's data. Installation is initiated by running Setup off of the install disks.

The logging of live real-time data is handled using the ReportMacro workbook and optionally the DailyReport workbook. These are workbooks and can simply be copied into a working subdirectory. Live data is monitored by the ReportMacro via the DDE server, and samples of the data are inserted into a data workbook at selectable intervals. The data workbook will hold 1 year's data.

2   Historical Data

Historical data is time stamped at the RTU for later batch mode retrieval. The Real time monitor can be set up to retrieve the data periodically or it can be retrieved on demand.

2.1   CSV to XL Convert Program

2.1.1   General

This program will convert CSV files of event/historical data into an excel workbook containing sheets Sunday through Saturday and January through December. (template included) Timestamped data will be plugged in the correct cells (daily+monthly) according to the interval specified in the setup boxes.

2.1.2   Setup

For Daily worksheets, the intervals selectable are:

       5 Min
       15 Min
       30 Min
       1 Hr

For Monthly worksheets, the intervals selectable are:

       15 Min
       1 Hr
       12 Hr
       24 Hr

Column Assignments can be preassigned, or they can be automatically added as new "points" are encountered. To limit the data in the worksheets to one (or a few) specific point, disable the "auto add" feature and define only the station/point numbers desired. Column Heading names can be specified along with station/point info.

Note: if multiple samples for a given point occur within one interval period, the last sample value in the interval will be the value in the worksheet cell.

Note: Use the NBT MONITOR program (or DDE Slave Program) to retrieve the historical data into CSV file prior to using these conversion programs.

2.2   CSV to XL Events Program

2.2.1   General

This program will convert CSV files of event/historical data into an excel workbook containing sheets Sunday through Saturday and January through December. Timestamped data will be plugged in the correct cell by checking to see if the timestamp is the "same" as the previous timestamp (same row) or appending it to the next row, with its time stamp.

This program differs from the CSV-to-Excel program in that this program stacks data according to the time sequence of the raw timestamped data not according to a pre-defined time increment. Therefore, if no samples have been recorded for some period of time (i.e., 12 hours), adjacent rows would then show times 12 hours apart. Sample data is separated by column (i.e., point name) and separated by day or month, but entries within those groups are just contiguous rows. This format is useful for error recording applications.

2.2.2   Resolution

For Daily Worksheets:
The "same time" evaluation of the new time stamp with the previous time stamp is based on timestamps within 1 minute of each other. (i.e., multiple samples within 1 minute will be in the same row or, if the in the same column, will overwrite the previous sample.

For Monthly Worksheets:
The "same time" evaluation of the new time stamp with the previous time stamp is based on timestamps within 5 minutes of each other. (i.e., multiple samples within 5 minutes will be in the same row or, if the in the same column, will overwrite the previous sample.

The next row position to store data into is displayed on the program form. (This can manually be modified.)

2.2.3   Setup

Column Assignments can be preassigned, or they can be automatically added as new "points" are encountered. To limit the data in the worksheets to one (or a few) specific point, disable the "auto add" feature and define only the station/point numbers desired.

Note: if multiple samples for a given point occur within one interval period, the last sample value in the interval will be the value in the worksheet cell.

3 Real Time Data

Real-time data is live data, most often gathered in a polling environment via the DDE server program. The data is the current value of the field data.

3.1 Excel Reports Macros   ver 3.0

3.1.1   What are the Reports

The Report macro when active will create or ask for a separate workbook containing worksheets that are named "Sunday" through "Saturday" and "January" through "December". (This workbook is named using the report title (B2) in the macro workbook with the year appended. It is created from the annual.xlt template.) Each worksheet will have a common set of column headers containing the names of report items and the corresponding engineering unit labels.

Summary formulas for Totals, Average, Minimum, and Maximum are included in the header for each column. (the Count of data values for each column is also included for information's sake.)

The Daily sheets will have the data defined in the ReportsMac.xls worksheet inserted at the regular interval specified. Likewise, the monthly sheets will have data inserted at the monthly interval specified.

A single Data workbook can contain an entire years worth of monthly data plus the current week's daily data. The daily reports can be printed weekly or copied to a separate file on a weekly basis for permanent daily records.

The workbook DailyReportGr.XLS can be loaded to automatically transfer daily worksheet data to a separate sheet and print the data at a specified time. It also allows the report data to be selected based on a specified "start time" each day. If a graph is placed on the data worksheet, it can also be printed each day.

3.1.2   Installation

Copy the files into the desired sub-directory. (for Excel, typically My Documents).
If you want to make backup copies of the files (especially after customizing to your system), copy them to another filename. To restore the backups, copy the backup filename to the original name (e.g., ReportMac.xls).

3.1.3   Creating your report file

The first thing to do when opening the ReportMac.xls file is to enter the name of your report (or system) in cell B2.

The program will automatically create or load the correct data file according to the name in B2. (i.e., Watertown1999.xls)

Note: To switch between the workbook windows, select that workbook from the Window Menu.

3.1.4   Initializing your report

The columns of the Definition worksheet correspond to the columns of your report. If you want data in a column to appear in your report, fill in the Name of the data item in Row 6 (Column Title fields). (A column which has a blank Column Title field will leave a blank column in the report)

NOTE: Do <u>NOT</u> delete or insert columns or rows in the ReportMac.Definition worksheet. Just edit the column name fields and associated Tag names etc. (Rows 7 through Row 15) and associated calculation info (rows 16-23). Column widths may also be set which will be copied to the Data workbook when the headers are initialized.

3.1.5   Initializing DDE Data sources

To have a live data item read for a particular column, the application, Topic name, Table # and the Register # have to be specified in rows 8 through 11. The application name for the NBT DDE Server is 'nbtsrvr' or just 'nbt'. The topic name is the Topic name created in the DDE server for the RTU (station) which is the source of the data. The table and register numbers are specified per the source location of the data.

For digital points (ON/OFF), row 12 should be set to the bit number of the source bit. (always 0 for Table 1 digital points) (0-7 for packed bits in Table 2 registers)
For analog points, set the row 12 field to 'blank' for signed register reads (-32768 +32767), or 'U' for unsigned register reads (0-65535).

Row 13 can be set to the following values for processing type:
> blank | Records current value at the time of report update.
> Total | causes the values to be totaled up for display
> | (Gal -> totalized to GPM)
> Net | causes the difference between the current reading and
> | the previous reading to be recorded.
> Average | Averages the reading over the recording interval.
> ETM1 | Single register elapsed time totalizer. (row 23=counter
> | modulus,row 22=totalizer output modulus,row 21= input scaler,
> | row 20=last read value)

Note: Rows 16-23 are used for some of the calculations above. Insert only those values expected by the calculation.

3.1.5.1 SCALING

Raw values are read into row 14. The formula in the same column, row 15 should reflect any scaling or conversion required so that the correct Engineering Units value is displayed in row 15. (i.e., the formula for no conversion in column K (K15) would be:
> =K14

To scale a value by 100 (insert a decimal point before last 2 digits):   =K15/100

NOTE: A calculated value formula can be entered in row 15 that references other column(s). (i.e., to combine two 4 digit registers into a single 8 digit double register reading:
> =(H15*10000)+I15

3.1.5.2 SETTING THE HEADERS AND SUMMARY FORMULAS IN A NEW DATA WORKSHEET

There are two buttons on the Definitions worksheet which will:
> 1) set the column names and engineering units names for a new Data workbook,
> and
> 2) set the summary formulas on each worksheet of the new Data workbook.

The summary formulas are set up in the "Def2" worksheet. The titles (in Column A) will copy to the Data workbook sheets column A. The formulas in column B are programmatically set to reflect the string values shown in column C. Note that editing of formula strings in column C is tricky and must translate into a valid formula.

After the initial setup of a data workbook, you can manually edit formulas (or delete selected ones) to conform to the individual column needs. This workbook can then serve as a template for each new years data workbook.

3.1.6   Running the Report Macros

Reading live data is initiated when the "LINK" button is clicked.

Reading live data is suspended when the "Unlink" button is clicked.

Cell G2 of the Definitions worksheet reflects the current run status.

Note: The Data workbook is saved each time the monthly sheets are updated.

Note: Extended menu and editing activities in Excel can interfere with timely sampling and recording of data because macros do not run while these operator activities are in progress. Normal activities may impact macro execution by a few seconds but extended editing or wizard type activities may cause readings to be missed.

For extended manipulation or charting of report data, it is recommended that a separate instance of Excel be started and a copy of the data workbook opened in a read only mode. In this case, there is no impact on the ReportMac macros.

Communications Status

Row 24 is automatically used to detect communications status'. Each new topic name will have its communication status shown as 1 (good) or 0 failed in the corresponding column of row 24. Cells G3 and A24 provide visual indication of aggregate communications status. (Any communication fail will cause the aggregate communication status to indicate "fail")

Cell H3 will determine if an audible beep occurs once on comm fail or will sound every 30 seconds if there are any communications failures. Enter "repeat" for repeating alarms. Set H3 to blank (not equal repeat) for an audible beep only once when comm status goes from good to fail.

Auto Restart

Currently, a fully automatic restart of the reports is not possible. The "Link" button must be manually activated on system start up. You can place the ReportsMac.xls and data workbook in the xlstart subdirectory to have them load automatically.

3.2   Daily Report and Graph Printing

The DailyRepGr.XLS workbook is setup to retrieve daily data from your data worksheet and to automatically print reports and/or graphs.

It also can arrange data so that data can be displayed on other than a midnight to midnight basis.

Selected columns can be associated with selected worksheet names. This is limited to a range of contiguous data sheet columns.

The data resolution will be the same as the data saved in your data sheet.

The automatic mode will refresh the named sheets at a specified time which is also the start time/end time of the days data. Print time can then be specified to follow the update time. Note: the print time should be at least 6 minutes after the refresh time to insure that the refresh has completed. Also, the print time should be at least 15 minutes after midnight (e.g., not between 00:00:00 and 00:15:00).

If a chart of the data on the sheets is desired, select all of the data and the simply insert a chart into the sheet using the standard Excel operations. Automatic printing of the chart can be specified in the variables sheet by placing an X in the appropriate column(s).

The number of pages to print can be specified for the report printing. (i.e., between 1 and 12 pages)

4 Appendix

4.1 Data Worksheet Setup Tips

If you need to edit the columns, names or summary formulas of your data workbook (manually vs. by using the "Set Headers" button), you can right click on the worksheet tab and select "select all sheets".

At this point, if you enter names or formulas, they will be entered in all selected tabs of your data workbook. (Do this while automatic DDE portions of workbooks are NOT running.)

4.2 Current vs. Old Data

The data workbook(s) in Excel are filled with data for the current day and month. In the event that some part of the system is shutdown for a part of the day, some rows may contain data from the previous week. The week day and monthly worksheets are not automatically cleared of previous data.

For example, if new data is not inserted for the 10:00 AM row, last weeks 10:00 AM data would still be in that row. Summary formulas may give erroneous information if the old value establishes a maximum or minimum, etc. within that column.

To insure accuracy, erase (highlight and delete) old data rows within the worksheet.